

**Technical Report and Noise Model Operational  
Data Documentation (100%)  
for MacDill AFB, FL**

**in Support of the Environmental Impact Statement for  
KC-46A Main Operating Base (MOB) 6 Beddown**

HMMH Report No. 312900

July 2022

Prepared for:

**HDR**

**Environmental, Operations and Construction, Inc.**

3025 Chemical Road, Suite 110

Plymouth Meeting, PA 19462



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## Executive Summary

This Noise Model Operational Data Documentation (NMODD) is in support of an Environmental Impact Statement (EIS), pursuant to the National Environmental Policy Act (NEPA), for the proposed beddown by the US Air Force (DAF) of 24 Primary Authorized Aircraft (PAA) of KC-46A Pegasus aircraft, replacing 24 PAA of KC-135 Stratotanker aircraft. This beddown will occur either at MacDill Air Force Base (AFB), FL, or at Fairchild AFB, WA. By the end of Calendar Year (CY) 2030 (CY30), all proposed KC-46A aircraft would be fully operational at the selected base.

The aircraft noise modeling for this EIS was launched from a previous modeling effort for MacDill AFB in 2016 by the Air Force Civil Engineering Center (AFCEC). Updating of the noise modeling files was limited to based KC-135R, proposed based KC-46A, and transient aircraft. Modeling for other based aircraft was not updated, except for numbers of flight operations. Only minor modifications were made to the flight profiles of the other based aircraft to facilitate the running of the noise model.

### Operational Scenarios Modeled

This EIS considers three scenarios: Baseline, Proposed Action, and Alternative 1.

1. Baseline/No Action Alternative (referred to as simply “Baseline” for brevity) reflects CY21 activity.
2. The Proposed Action considers the full replacement of based KC-135R aircraft with the KC-46A at MacDill AFB.
3. Alternative 1 would replace 24 of 48 based KC-135R aircraft at Fairchild AFB with 24 KC-46A aircraft. Twenty-four based KC-135R aircraft would remain in operation.

This NMODD considers the Baseline/No Action Alternative and the Proposed Action for MacDill AFB only.

Modeling was accomplished with the legacy core program of the NOISEMAP suite (NMAP) for airfield noise exposure. Noise exposure was computed in terms of Day-Night Average Sound Level (DNL) for annual average daily operations. DNL contours of 65 through 85 decibels (dB) are shown. Noise exposure for aircraft operations in Special Use Airspace (SUA) was not considered.

### Interviews Conducted

Telephone interviews with subject matter experts (SMEs) were conducted in March 2022 for pilots and maintenance personnel for the KC-135 and KC-46A. Additional phone interviews were conducted with each base operations division to gather a comprehensive dataset. After the interviews, analysts processed and verified the data with its respective SMEs. Once approved, analysts then inserted the data into the model. See Section 1.3 for further detail.

### Results Summary

The results of the analysis predict that noise levels of 65 DNL would remain like the Baseline and the Proposed Action. The Proposed Action would increase the 65 DNL extent by approximately 900 feet to

the southwest of the runway and decrease the 65 DNL contour extent to the northeast side of the runway by approximately 630 feet. The extent of the noise areas by the runup pads and perpendicular to the runways (northwest and southeast of the base) would remain generally unchanged.

Additional noise metrics were calculated at specific locations to analyze the noise on nearby activities. There is no potential for hearing loss around the base. One school has an eight-hour (school-day) equivalent sound level ( $L_{eq(8hr)}$ ) above 60 dB; for that school, the number of events (NA) and time above (TA) metrics would decrease for the Proposed Action. Two residential points of interest (POI) would potentially experience an annual increase of up to 24 potentially sleep-disturbing events. The Proposed Action would potentially reduce the number of speech-interfering events for all residential POI and the on-base hospital. Noise effects on wildlife POI would be dominated by transient fighter aircraft activity and would not change from the Baseline scenario.

## Contents

Executive Summary.....	vii
Contents.....	ix
Figures.....	ix
Tables.....	x
1 Modeling Overview.....	1
2 Airfield Flight Operations.....	7
3 Runway Use.....	15
4 Airfield Flight Tracks and their Utilization.....	17
5 Airfield Flight Profiles and their Utilization.....	65
6 Maintenance and Preflight Runups.....	74
7 Noise Exposure Calculations/Results.....	82
8 References.....	92
9 Acronyms and Abbreviations.....	94

## Figures

Figure 1-1. A-weighted Day-Night Average Sound Level.....	1
Figure 1-2. Average Daily Temperature and Relative Humidity for Each Month.....	4
Figure 4-1. Modeled KC-135 Aircraft Runway 05 Arrival Flight Tracks.....	19
Figure 4-2. Modeled KC-135 Aircraft Runway 23 Arrival Flight Tracks.....	20
Figure 4-3. Modeled KC-135 Aircraft Runway 05 Departure Flight Tracks.....	21
Figure 4-4. Modeled KC-135 Aircraft Runway 23 Departure Flight Tracks.....	22
Figure 4-5. Modeled KC-135 Aircraft Runway 05 Closed Pattern Flight Tracks.....	23
Figure 4-6. Modeled KC-135 Aircraft Runway 23 Closed Pattern Flight Tracks.....	24
Figure 4-7. Modeled Temporary Duty Aircraft Runway 05 Arrival Flight Tracks.....	25
Figure 4-8. Modeled Temporary Duty Aircraft Runway 23 Arrival Flight Tracks.....	26
Figure 4-9. Modeled Temporary Duty Aircraft Departure Flight Tracks.....	27
Figure 4-10. Modeled Temporary Duty Aircraft Runway 05 Closed Pattern Flight Tracks.....	28
Figure 4-11. Modeled Temporary Duty Aircraft Runway 23 Closed Pattern Flight Tracks.....	29
Figure 4-12. Modeled Army Reserve Aircraft Runway 05 Arrival Flight Tracks.....	33
Figure 4-13. Modeled Army Reserve Aircraft Runway 23 Arrival Flight Tracks.....	34
Figure 4-14. Modeled Army Reserve Aircraft Runway 05 Departure Flight Tracks.....	35
Figure 4-15. Modeled Army Reserve Aircraft Runway 23 Departure Flight Tracks.....	36
Figure 4-16. Modeled Army Reserve Aircraft Runway 05 Closed Pattern Flight Tracks.....	37
Figure 4-17. Modeled Army Reserve Aircraft Runway 23 Closed Pattern Flight Tracks.....	38

Figure 4-18. Modeled Transient Fighter Aircraft Runway 05 Arrival Flight Tracks ..... 39

Figure 4-19. Modeled Transient Fighter Aircraft Runway 23 Arrival Flight Tracks ..... 40

Figure 4-20. Modeled Transient Fighter Aircraft Runway 05 Departure Flight Tracks ..... 41

Figure 4-21. Modeled Transient Fighter Aircraft Runway 23 Departure Flight Tracks ..... 42

Figure 4-22. Modeled Transient 4ETP Aircraft Runway 05 Arrival Flight Tracks ..... 43

Figure 4-23. Modeled Transient 4ETP Aircraft Runway 23 Arrival Flight Tracks ..... 44

Figure 4-24. Modeled Transient 4ETP Aircraft Runway 05 Departure Flight Tracks ..... 45

Figure 4-25. Modeled Transient 4ETP Aircraft Runway 23 Departure Flight Tracks ..... 46

Figure 4-26. Modeled Transient 4ETP Aircraft Runway 05 Closed Pattern Flight Tracks ..... 47

Figure 4-27. Modeled Transient 4ETP Aircraft Runway 23 Closed Pattern Flight Tracks ..... 48

Figure 4-28. Modeled Transient Aircraft Runway 05 Arrival Flight Tracks ..... 49

Figure 4-29. Modeled Transient Aircraft Runway 23 Arrival Flight Tracks ..... 50

Figure 4-30. Modeled Transient Aircraft Runway 05 Departure Flight Tracks ..... 51

Figure 4-31. Modeled Transient Aircraft Runway 23 Departure Flight Tracks ..... 52

Figure 4-32. Modeled Transient Helicopter Aircraft Runway 05 Closed Pattern Flight Tracks ..... 53

Figure 4-33. Modeled Transient Helicopter Aircraft Runway 23 Closed Pattern Flight Track ..... 54

Figure 4-34. Modeled Based KC-46 Aircraft Runway 05 Arrival Flight Tracks ..... 57

Figure 4-35. Modeled Based KC-46 Aircraft Runway 23 Arrival Flight Tracks ..... 58

Figure 4-36. Modeled Based KC-46 Aircraft Runway 05/23 Spiral Arrival Flight Tracks ..... 59

Figure 4-37. Modeled Based KC-46 Aircraft Runway 05/23 Beam Arrival Flight Tracks ..... 60

Figure 4-38. Modeled Based KC-46 Aircraft Runway 05 Departure Flight Tracks ..... 61

Figure 4-39. Modeled Based KC-46 Aircraft Runway 23 Departure Flight Tracks ..... 62

Figure 4-40. Modeled Based KC-46 Aircraft Runway 05 Closed Pattern Flight Tracks ..... 63

Figure 4-41. Modeled Based KC-46 Aircraft Runway 23 Closed Pattern Flight Tracks ..... 64

Figure 6-1. Location of Modeled Runup Pads for KC-135R and KC-46A Maintenance ..... 79

Figure 7-1. DNL Shading for Baseline Scenario ..... 82

Figure 7-2. DNL Shading for Proposed Action Scenario ..... 83

Figure 7-3. Comparison of DNL Contours for Baseline and Proposed Action ..... 83

Figure 7-4. Modeled POI Locations ..... 85

## Tables

Table 1-1. Aircraft Noise Models Used ..... 3

Table 1-2. Modeling Parameters ..... 3

Table 1-3. Topography Parameters ..... 3

Table 1-4. Weather Data, MacDill AFB 2021 ..... 3

Table 1-5. SME Contact List ..... 5

Table 2-1. Based Annual Airfield Flight Operations for Baseline ..... 9

Table 2-2. Transient Annual Airfield Flight Operations for Baseline and Proposed Action ..... 9

Table 2-3. Summary of Annual Airfield Flight Operations for Baseline ..... 9

Table 2-4. Aircraft Types Representing Each Transient Aircraft Group/Category ..... 11

Table 2-5. Annual Airfield Flight Operations for Based Aircraft for Proposed Action ..... 13

Table 2-6. Summary of Annual Airfield Flight Operations for Proposed Action ..... 13

Table 2-7. KC-46A Arrival Type Usage Distribution ..... 13

Table 3-1. Runway Utilization Percentages ..... 15

Table 5-1. Modeled Average Daily Departure Flight Events for Based KC-135 ..... 65

Table 5-2. Modeled Average Daily Arrival Flight Events for Based KC-135 ..... 66

Table 5-3. Modeled Average Daily Closed Pattern Flight Events for Based KC-135 ..... 66

Table 5-4. Modeled Average Daily Departure Events for Temporary Duty and Based Army Reserve Aircraft ..... 67



Table 5-5. Modeled Average Daily Arrival Events for Temporary Duty and Based Army Reserve Aircraft .....	68
Table 5-6. Modeled Average Daily Closed Pattern Events for Temporary Duty and Army Reserve Aircraft.....	68
Table 5-7. Modeled Average Daily Departure Events for Transient Aircraft .....	69
Table 5-8. Modeled Average Daily Arrival Events for Transient Aircraft .....	70
Table 5-9. Modeled Average Daily Closed Pattern Events for Transient Aircraft.....	71
Table 5-10. Modeled Average Daily Departure Flight Events for Based KC-46 .....	72
Table 5-11. Modeled Average Daily Arrival Flight Events for Based KC-46 .....	72
Table 5-12. Modeled Average Daily Closed Pattern Flight Events for Based KC-46 .....	72
Table 6-1. Annual Maintenance Runup Operations for Based KC-135R.....	76
Table 6-2. Pressurization Check Runup Profile for KC-135 .....	78
Table 6-3. Accel/Decel/Component Charge-2 engine Runup Profile for KC-135.....	78
Table 7-1. Guideline Values (Outdoor Values).....	84
Table 7-2. Annual Number of Nighttime Events (at or) Above 90 dB SEL .....	86
Table 7-3. School-Day $L_{eq(8h)}$ .....	88
Table 7-4. Annual Number of School-Day Events (at or) Above 75 dB $L_{max}$ for the Academy of Active Education (S07)	88
Table 7-5. Annual Time (at or) Above 75 dB (minutes) during the School Day for the Academy of Active Education (S07)	88
Table 7-6. Annual Number of Daytime Events (at or) Above Outdoor 75 dB $L_{max}$ .....	89
Table 7-7. Estimated Maximum Sound Levels at Wildlife POI for Baseline and Proposed Action .....	90



# 1 Modeling Overview

The International Civil Aviation Organization’s (ICAO) abbreviation for MacDill AFB is KMCF, shortened to just “MCF” for brevity for the purposes of this Noise Model Operational Data Documentation (NMODD).

## 1.1 Noise Metric and Levels of Significance

The noise contour methodology used herein is the Day-Night Average Sound Level (DNL) metric of describing the noise environment. Efforts to provide a national uniform standard for noise assessment have resulted in the U.S. Environmental Protection Agency adopting DNL as the standard noise descriptor for use in land use planning.

The DNL metric can be used to describe different types of sounds. Because human hearing picks up noise energy in certain frequency ranges better than others, sound energy in certain frequency bands is emphasized when measuring noise to best predict effects. For aircraft noise and most other types of sound, the frequencies most easily audible to humans are emphasized using a function known as A-weighting. Because A-weighting is prevalent, sounds can be assumed to be A-weighted unless otherwise specified.

The DAF uses the DNL descriptor in assessing the amount of aircraft noise exposure and as a metric for community response to the various levels of exposure. The DNL values most commonly plotted for planning purposes are 65, 70, 75, 80, and 85 decibels (dB). Land use guidelines are based on the compatibility of various land uses with these noise exposure levels. It is generally recognized that a noise environment descriptor should consider, in addition to the annoyance of a single event, the effect of repetition of such events and the time of day in which these events occur. DNL begins with a single-event descriptor and adds corrections for the number of events and the time of day. Since the primary development concern is residential, nighttime events are considered more annoying than daytime events. Thus, nighttime events are weighted by a factor of 10. DNL values are computed from the single-event noise descriptor, plus corrections for number of flights and time of day (see Figure 1-1).

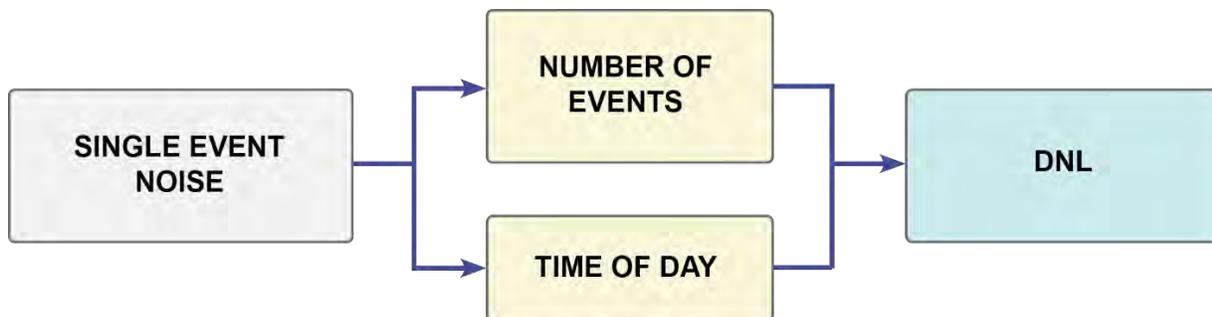


Figure 1-1. A-weighted Day-Night Average Sound Level

As part of the extensive data collection process, detailed information is gathered on the type of aircraft, time of day, and the number of flying operations for each flight track during a typical day. This information is used in conjunction with the single-event noise descriptor to produce DNL values. These values are combined on an energy summation basis to provide single DNL values for the mix of aircraft

operations at the base. Points of equal DNL value on a rectangular grid are connected to form the contour lines.

## 1.2 Computer Noise Model

Data describing flight track distances and turns, altitudes, airspeeds, power settings, flight track operational utilization, maintenance locations, ground runup engine power settings, and number and duration of runs by type of aircraft/engine are assembled. Trained personnel process the data for input into the NOISEMAP computer program. Aircraft operations parameters are reviewed for accuracy by operational unit points of contact prior to running the noise model.

Tables 1-1 through 1-4 list the computerized noise models used for this NMODD and pertinent modeling parameters discussed herein. The models used are described briefly below.

NOISEMAP is a suite of computer programs and components developed by the US Department of Defense (DoD) to predict noise exposure near an airfield due to aircraft flight, maintenance, and ground runup operations. The relevant components of NOISEMAP are as follows:

- BASEOPS is the input module for NOISEMAP and is used to enter detailed aircraft flight track and profile and ground maintenance operational data.
- NOISEFILE is a comprehensive database of measured military and civil aircraft noise data. Aircraft operational information is matched with the noise measurements in NOISEFILE after the detailed aircraft flight and ground maintenance operational data have been entered into BASEOPS.
- NMAP and the Advanced Acoustics Model (AAM) are the core computational modules in NOISEMAP. NMAP and AAM take BASEOPS input and uses the NOISEFILE database to calculate the noise levels caused by aircraft events at specified grid points in the airbase vicinity. The output of NMAP is a series of georeferenced data points, specific grid point locations, and corresponding noise levels.
- NMPLOT is the program for viewing and editing the sets of georeferenced data points. NMPLOT plots the NMAP output from the noise contour grid and can export the noise contours as files used in mapping programs for analyzing the noise impacts.

Noise exposure was computed in terms of DNL for annual average daily operations. DNL contours of 65 dB through 85 dB, in 5-dB increments, are shown.

The airfield modeling uses a local coordinate system with the origin at the MCF Airfield Reference Point (ARP), which has geographical coordinates of 27.849344° North / 82.521219° West and an elevation of 14 feet above Mean Sea Level (MSL). The current magnetic declination is 5.8° West. All maps in this report depict a north arrow pointing to true north.

**Table 1-1. Aircraft Noise Models Used**

Software	Analysis	Version
NMAP	Airfield flight and runup noise	7.3

**Table 1-2. Modeling Parameters**

Parameter	Description
Receiver Grid Spacing	100 feet in x and y
Modeled flying days	365
Magnetic Declination	5.8 deg West
Reference Point Elevation	14 feet MSL

**Table 1-3. Topography Parameters**

Parameter	Description
Elevation and Impedance Grid Spacing	50 feet in x and y
Flow Resistivity of Land Areas (soft)	200 kPa-s/m <sup>2</sup>
Flow Resistivity of Water Areas (hard)	1,000,000 kPa-s/m <sup>2</sup>

**Table 1-4. Weather Data, MacDill AFB 2021**

Month	Temperature (°F)	Relative Humidity (%)	Pressure (inHg)
January	60.3	75.9	30.1
February	66.7	78.5	30.0
March	68.3	79.4	30.1
April	71.7	73.8	30.0
May	78.1	64.8	30.0
June	80.8	76.0	30.0
July	81.9	67.8	30.0
August	82.2	68.6	30.0
September	79.9	59.7	29.9
October	77.2	66.1	29.9
November	65.3	51.0	30.0
December	68.4	87.4	30.1

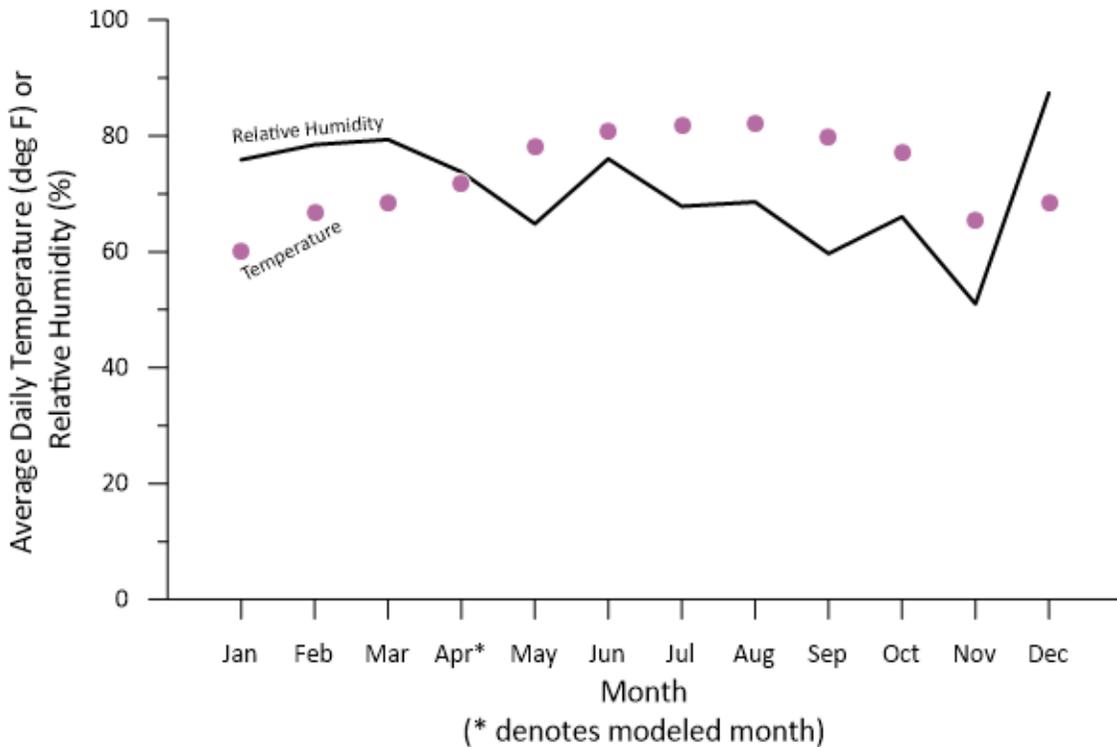
Notes:

- 1) Relative humidity computed by averaging the monthly minimum and maximum; daily average provided by MCF.
- 2) Modeled condition chosen by BaseOps is highlighted (April).

The modeling used the topography data files from AFCEC. HMMH specified areas of land as acoustically “soft” surfaces, with a flow resistivity of 200 kiloPascal-seconds per square meter (kPa-s/m<sup>2</sup>), and bodies of water as “hard” surface, with a flow resistivity of 1,000,000 kPa-s/m<sup>2</sup>. MCF is located on a peninsula surrounded by Tampa Bay, Hillsborough Bay, and Old Tampa Bay.

Local weather conditions (e.g., temperature, relative humidity, and air pressure) influence how quickly sound is absorbed by the atmosphere as it travels outward from its source. This report utilized detailed daily average weather conditions for each month from MCF for 2021. Average daily temperature and

relative humidity values are plotted in Figure 1-2. The average temperatures for summer months (May to September) and winter months (October to April) are 80.6°F and 68.3°F, respectively, and the average temperature overall is 73.4°F. Relative humidity for the same periods over the course of an entire day are 67.4 percent for the summer months and 73.1 percent for winter months. The NOISEMAP suite’s BaseOps program computes absorption coefficients for each month and selects the median coefficient to use in the noise exposure modeling (Lee and Mohlman 1990). The modeled conditions selected by the BaseOps program correspond to the month of April with a temperature of 71.7°F and a relative humidity of approximately 74 percent.



**Figure 1-2. Average Daily Temperature and Relative Humidity for Each Month**

### 1.3 Data Collection and Validation

For the data collection process, we developed packages for each Subject Matter Expert (SME) containing information from an existing Air Force BaseOps file (Peer 2022a). For pilots, these packages consisted of annual operations, runway usage, flight tracks, flight profiles, and utilization percentages. For other SMEs, the data collection packages contained previously modeled information relevant to each group (e.g., we sent the KC-135R mechanics a list of all previously modeled KC-135R maintenance runups at MCF). Table 1-5 lists each of the interviewed SMEs and their contact information.

During interviews conducted during the week of March 7, 2022, the contents of each package were discussed with its respective SME to correct any errors and fill most data gaps. Afterwards, analysts synthesized the data and produced data validation packages for each pilot/maintainer SME. These packages contained final questions and subject-specific data for SME approval.

**Table 1-5. SME Contact List**

<b>Role</b>	<b>Interviewee</b>	<b>E-mail</b>	<b>Phone Number</b>
Airfield Management	Mr. Link Collier	<a href="mailto:link.collier.1@us.af.mil">link.collier.1@us.af.mil</a>	813-828-2030
Base Ops/Transient Alert	Mr. Link Collier	<a href="mailto:link.collier.1@us.af.mil">link.collier.1@us.af.mil</a>	813-828-2030
Weather	MSgt Anthony Marks	<a href="mailto:anthony.marks.3@us.af.mil">anthony.marks.3@us.af.mil</a>	813-828-2374
Weather	TSgt Adam Baker	<a href="mailto:adam.baker.15@us.af.mil">adam.baker.15@us.af.mil</a>	813-828-2374
ATC Tower	SMSgt Charles Holbert	<a href="mailto:charles.holbert@us.af.mil">charles.holbert@us.af.mil</a>	813-828-2122
ATC Tower	Mr. Juan Torres-Arroyo	<a href="mailto:juan.torres_arroyo@us.af.mil">juan.torres_arroyo@us.af.mil</a>	813-828-2120
KC-135 Pilot	Maj David "TankerDave" Sproul	<a href="mailto:david.sproul.1@us.af.mil">david.sproul.1@us.af.mil</a>	813-828-3903
KC-135 Pilot (OGV)	Lt Col John D. Schwartz	<a href="mailto:john.schwartz@us.af.mil">john.schwartz@us.af.mil</a>	813-828-9618
KC-135 Maintenance (6 <sup>th</sup> )	Maj Aaron Darty	<a href="mailto:aaron.darty@us.af.mil">aaron.darty@us.af.mil</a>	813-828-4269
KC-135 Maintenance (6 <sup>th</sup> )	CMSgt Garrett Forehand	<a href="mailto:garrett.forehand@us.af.mil">garrett.forehand@us.af.mil</a>	813-828-5151
KC-135 Maintenance (6 <sup>th</sup> )	TSgt Justin Sparks	<a href="mailto:Justin.sparks@us.af.mil">Justin.sparks@us.af.mil</a>	
KC-135 Maintenance (927 <sup>th</sup> )	CMSgt Erin Willis	<a href="mailto:erin.willis.2@us.af.mil">erin.willis.2@us.af.mil</a>	813-828-1544
KC-135 Maintenance (OSS/XP)	Mr. Alvin M. Kuper	<a href="mailto:alvin.kuper.2@us.af.mil">alvin.kuper.2@us.af.mil</a>	813-828-1646
KC-46 Pilot	Mr. Derek Strunk	<a href="mailto:derek.strunk.1@us.af.mil">derek.strunk.1@us.af.mil</a>	618-229-2251
KC-46 Maintenance	Mr. Derek Strunk	<a href="mailto:derek.strunk.1@us.af.mil">derek.strunk.1@us.af.mil</a>	618-229-2251

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## 2 Airfield Flight Operations

There are 24 Primary Authorized Aircraft (PAA) for the KC-135R for Baseline at MCF. All based KC-135R at MCF would be replaced by 24 PAA of the KC-46A aircraft for the Proposed Action. Other based aircraft include the H-60 used by the Army Reserve and various fighter/attack jets at MCF for Temporary Duty Travel (TDY).

Tables 2-1 through 2-3 summarize the annual airfield flight operations for the Baseline scenario. The 23,592 total annual flight operations for Baseline are based on the 23,592 flight operations logged by Air Traffic Control (ATC) for CY21. The based KC-135R aircraft generate approximately 11,522 annual flight operations, with 939 during the DNL nighttime period (2200-0700 hours). The remaining based aircraft generate over 4,000 annual flight operations at the airfield, with 131 during the DNL nighttime period. These operation counts were derived from scaling the previously modeled aircraft operation counts to the current ATC tower counts. Only the based KC-135R and Army Reserve operations were scaled with TDY aircraft operations remaining consistent with the previous modeling effort.

The transient aircraft in Table 2-2 comprise of 6,740 annual flight operations. These operations were derived from data provided by the Transient Alert community at MCF. The categories of transient aircraft listed in Table 2-2 are shown and defined in Table 2-4. The Transient Alert community tracks many different types of aircraft. For modeling purposes, aircraft were grouped into categories and modeled with a representative aircraft type; this representative type usually represents the most frequently occurring aircraft type in each group that is also supported by the noise model. These transient aircraft counts were not scaled to the ATC tower count.

The No Action scenario would be identical to the Baseline scenario.

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**Table 2-1. Based Annual Airfield Flight Operations for Baseline**

Based Group	Modeled Aircraft Type	Departure Day	Departure Night	Departure Total	Arrival Day	Arrival Night	Arrival Total	Closed Pattern Day	Closed Pattern Night	Closed Pattern Total	Total Day	Total Night	Total
-	KC-135R	628	3	631	628	3	631	9,327	933	10,260	10,583	939	11,522
Army Reserve	UH60A	422	47	469	422	47	469	337	37	374	1,181	131	1,312
TDY	F-18A/C	85	-	85	85	-	85	855	-	855	1,025	-	1,025
TDY	A-10A	85	-	85	85	-	85	598	-	598	768	-	768
TDY	F-15A	43	-	43	43	-	43	1,197	-	1,197	1,283	-	1,283
TDY	F-16A	172	-	172	172	-	172	598	-	598	942	-	942

**Table 2-2. Transient Annual Airfield Flight Operations for Baseline and Proposed Action**

Transient Category	Modeled/Representative Aircraft Type	Departure Day	Departure Night	Departure Total	Arrival Day	Arrival Night	Arrival Total	Closed Pattern Day	Closed Pattern Night	Closed Pattern Total	Total Day	Total Night	Total
Fighter/Jet trainer	F-35A	53	-	53	53	-	53	-	-	-	106	-	106
Attack	A-10A	50	-	50	50	-	50	-	-	-	100	-	100
4ELJ/Bomber	C-17	70	-	70	70	-	70	-	-	-	140	-	140
4EWB/NB	KC-135R	143	-	143	143	-	143	-	-	-	286	-	286
3EWB	KC-10A	6	-	6	6	-	6	-	-	-	12	-	12
2EWB/NB	KC-46X	83	-	83	83	-	83	-	-	-	166	-	166
Bizjet	C-21	140	-	140	140	-	140	-	-	-	280	-	280
4ETP	C-130H&N&P	296	-	296	296	-	296	2,887	-	2,887	3,479	-	3,479
2ETP/1ETP/1EPP	C-12	84	-	84	84	-	84	-	-	-	168	-	168
Helo	UH60	160	-	160	160	-	160	1,683	-	1,683	2,003	-	2,003

**Table 2-3. Summary of Annual Airfield Flight Operations for Baseline**

Group	Departure Day	Departure Night	Departure Total	Arrival Day	Arrival Night	Arrival Total	Closed Pattern Day	Closed Pattern Night	Closed Pattern Total	Total Day	Total Night	Total
Based	1,435	50	1,485	1,435	50	1,485	12,912	970	13,882	15,782	1,070	16,852
Transient	1,085	-	1,085	1,085	-	1,085	4,570	-	4,570	6,740	-	6,740
<b>Total</b>	<b>2,520</b>	<b>50</b>	<b>2,570</b>	<b>2,520</b>	<b>50</b>	<b>2,570</b>	<b>17,482</b>	<b>970</b>	<b>18,452</b>	<b>22,522</b>	<b>1,070</b>	<b>23,592</b>

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**Table 2-4. Aircraft Types Representing Each Transient Aircraft Group/Category**

<b>Grouping/Abbreviation</b>	<b>Meaning of Abbreviation</b>	<b>Represented Aircraft Types</b>
Fighter/Jet trainer	-	T-38, F-35, F-16, F-15
Attack	-	A-10
4ELJ/Bomber	4-engine large jet or bomber	C-17, C-5, B-1
4EWB/NB	4-engine narrow body jet	K/R/TC-135, E-6, E-4, etc.
3EWB	3-engine narrow body jet	KC-10
2EWB/NB	2-engine wide body or narrow body jet	C-40, C-32, KC-46, etc.
Bizjet	business jet or similar	C-37, C-21, LJ-35, etc.
4ETP	4-engine turboprop	C-130, C-27
2ETP/1ETP/1EPP	2-engine turboprop/ single engine turboprop or piston prop	C-12, T-6, CV-22, etc.
Helo	Helicopter	H-60, CH-47, H-53, etc.

The Proposed Action Alternative involves the replacement of the 24 based KC-135R aircraft with 24 KC-46A aircraft at MCF. Tables 2-2, 2-5, and 2-6 summarize the annual airfield flight operations for the Proposed Action. The based KC-46A aircraft would generate 13,222 annual flight operations. The remaining based, transient, and TDY aircraft operations would be identical to the Baseline/No Action Alternative.

The KC-46A aircraft use Beam and Spiral arrival tracks at MCF. The distribution of KC-46A arrival operations is shown in Table 2-7.

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**Table 2-5. Annual Airfield Flight Operations for Based Aircraft for Proposed Action**

Based Group	Modeled Aircraft Type	Departure Day	Departure Night	Departure Total	Arrival Day	Arrival Night	Arrival Total	Closed Pattern Day	Closed Pattern Night	Closed Pattern Total	Total Day	Total Night	Total
-	KC-46A	1,272	35	1,307	1,081	226	1,307	9,547	1,061	10,608	11,900	1,322	13,222
Army Reserve	UH60A	422	47	469	422	47	469	337	37	374	1,181	131	1,312
TDY	F-18A/C	85	-	85	85	-	85	855	-	855	1,025	-	1,025
TDY	A-10A	85	-	85	85	-	85	598	-	598	768	-	768
TDY	F-15A	43	-	43	43	-	43	1,197	-	1,197	1,283	-	1,283
TDY	F-16A	172	-	172	172	-	172	598	-	598	942	-	942

Notes:

1) Army Reserve and TDY operations would be identical to Baseline

**Table 2-6. Summary of Annual Airfield Flight Operations for Proposed Action**

Group	Departure Day	Departure Night	Departure Total	Arrival Day	Arrival Night	Arrival Total	Closed Pattern Day	Closed Pattern Night	Closed Pattern Total	Total Day	Total Night	Total
Based	2,079	82	2,161	1,888	273	2,161	13,132	1,098	14,230	17,099	1,453	18,552
Transient	1,085	-	1,085	1,085	-	1,085	4,570	-	4,570	6,740	-	6,740
<b>Total</b>	<b>3,164</b>	<b>82</b>	<b>3,246</b>	<b>2,973</b>	<b>273</b>	<b>3,246</b>	<b>17,702</b>	<b>1,098</b>	<b>18,800</b>	<b>23,839</b>	<b>1,453</b>	<b>25,292</b>

**Table 2-7. KC-46A Arrival Type Usage Distribution**

Arrival Operation	Op type %	Arrival Day	Arrival Night	Arrival Total
Standard	84%	909	190	1,099
Beam (no spiral)	8%	86	18	104
Beam into Spiral	8%	86	18	104
<b>Total Arrivals</b>	<b>-</b>	<b>1,081</b>	<b>226</b>	<b>1,307</b>

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### 3 Runway Use

All based and transient aircraft utilize Runways 05 and 23 equally, for all types of flight operations, as shown in Table 3-1. This runway use split is taken from the previous modeling effort performed by AFCEC and adjusted based on feedback from the subject matter expert interviews (Holbert 2022).<sup>1</sup>

**Table 3-1. Runway Utilization Percentages**

<b>Aircraft Type</b>	<b>Operation Type</b>	<b>Runway 05</b>	<b>Runway 23</b>
Based KC-135R	Departure	50%	50%
Based KC-135R	Arrival	50%	50%
Based KC-135R	Closed Pattern	50%	50%
Based KC-46A	Departure	50%	50%
Based KC-46A	Arrival	50%	50%
Based KC-46A	Closed Pattern	50%	50%
Other Based Aircraft	Departure	50%	50%
Other based Aircraft	Arrival	50%	50%
Other based Aircraft	Closed Pattern	50%	50%
Transient	Departure	50%	50%

Proposed KC-46A aircraft would utilize the runways identically to the based KC-135 community.

<sup>1</sup> 312920//MacDill fighter/4ETP runway splits, virtual meeting. 06/28/2022

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## 4 Airfield Flight Tracks and their Utilization

The flight tracks shown in this section represent actual ground paths followed by aircraft flying to and from MCF runways. It is fully recognized that flying operations, particularly when conducted under Visual Flight Rules (VFR), vary from one operation to the next even when conducting the same procedure. Variations may be a result of winds, other air traffic, pilot preference, or a multitude of other factors. Instrument Landing System (ILS) and Instrument Flight Rule (IFR) operations have less variability.

The background maps for the flight track maps are the aeronautical sectional chart and/or an aerial photograph. Both types of background maps are geo-referenced. All tracks are labeled with the modeled identification number consisting of the runway, a character for the type of operation, and a consecutive number.

Closed pattern tracks for the based KC-135R and transient C-130J were modified based on feedback from the data collection and validation process. All other tracks remain unchanged from the previous modeling.

Section 4.1 contains the flight tracks and utilization percentages for based aircraft for the Baseline scenario. Section 4.2 is for the transient aircraft. Section 4.3 is for the proposed based KC-46A aircraft.

### 4.1 Based Aircraft

Sections 4.1.1 and 4.1.2 show the modeled flight tracks and their utilization percentages for the based aircraft, respectively.

#### 4.1.1 KC-135R

Figures 4-1 through 4-6 show the modeled arrival, departure, and closed pattern flight tracks and their utilization, respectively, for the based KC-135R aircraft. Please note that “circle to Runway 23” tracks are counted as part of the 50 percent runway utilization on Runway 05.

#### 4.1.2 Other Based Aircraft

##### 4.1.2.1 Temporary Duty Aircraft

Figures 4-7 through 4-11 show the modeled arrival, departure, and closed pattern flight tracks and their utilization, respectively, for the TDY aircraft.

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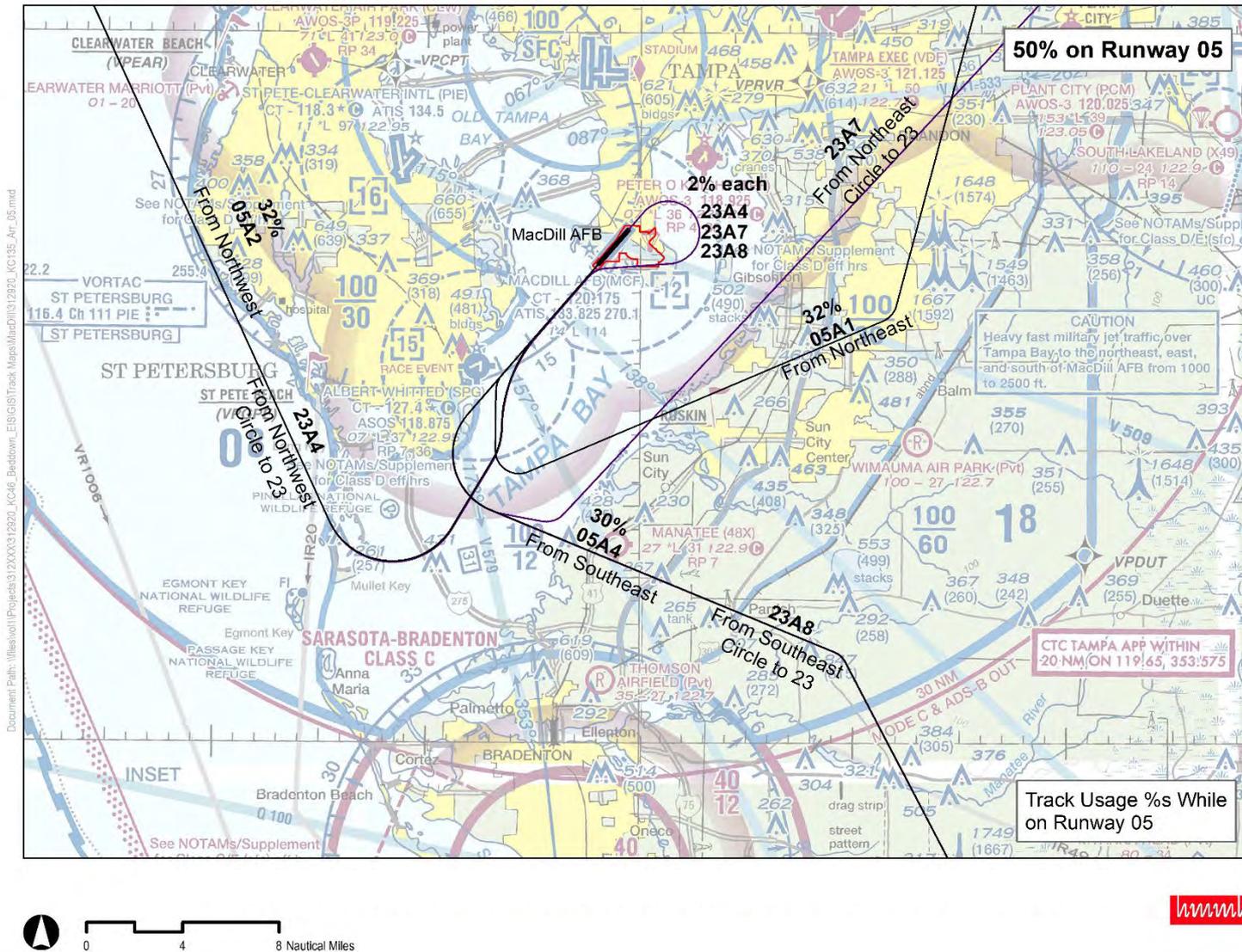


Figure 4-1. Modeled KC-135 Aircraft Runway 05 Arrival Flight Tracks



Figure 4-2. Modeled KC-135 Aircraft Runway 23 Arrival Flight Tracks

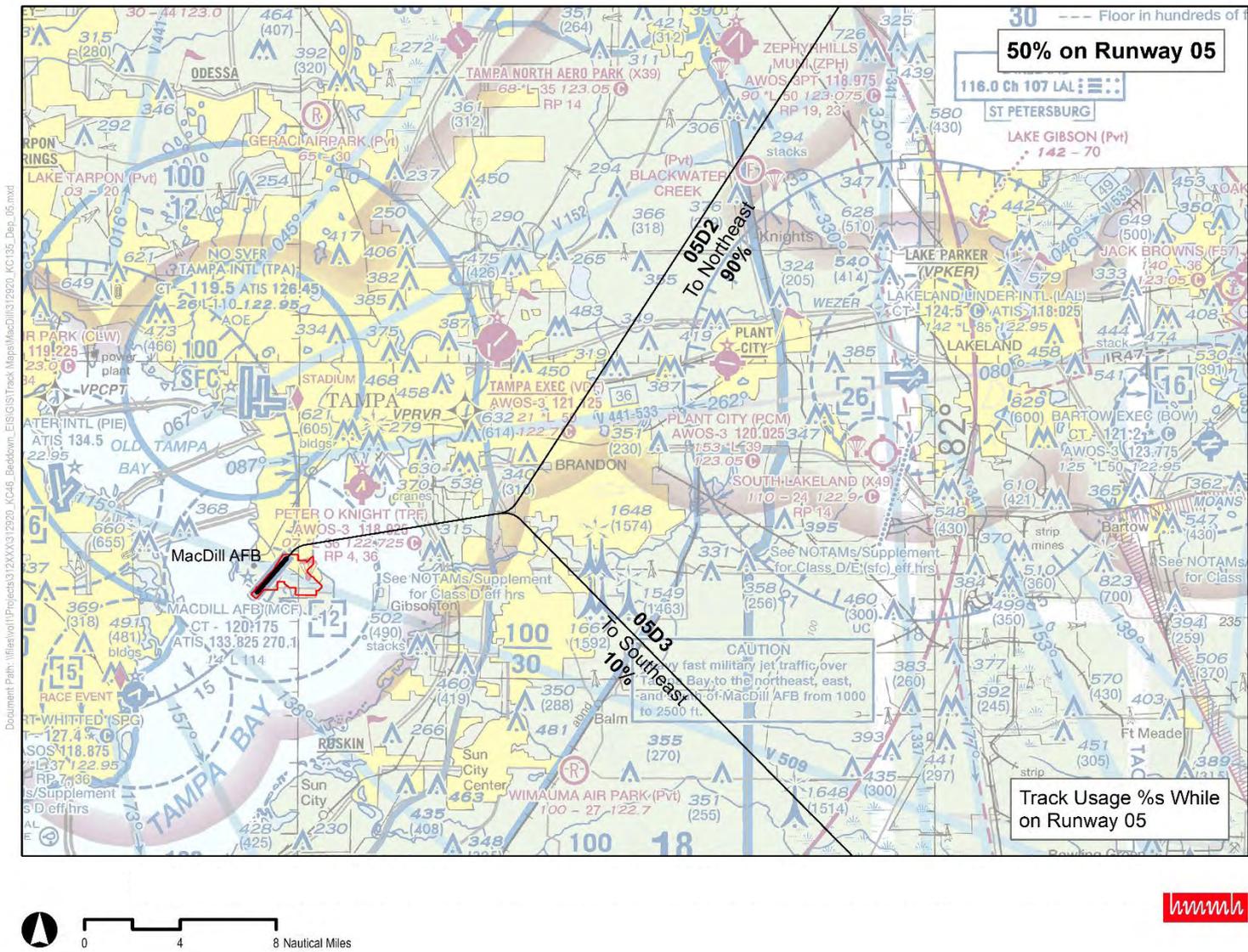


Figure 4-3. Modeled KC-135 Aircraft Runway 05 Departure Flight Tracks

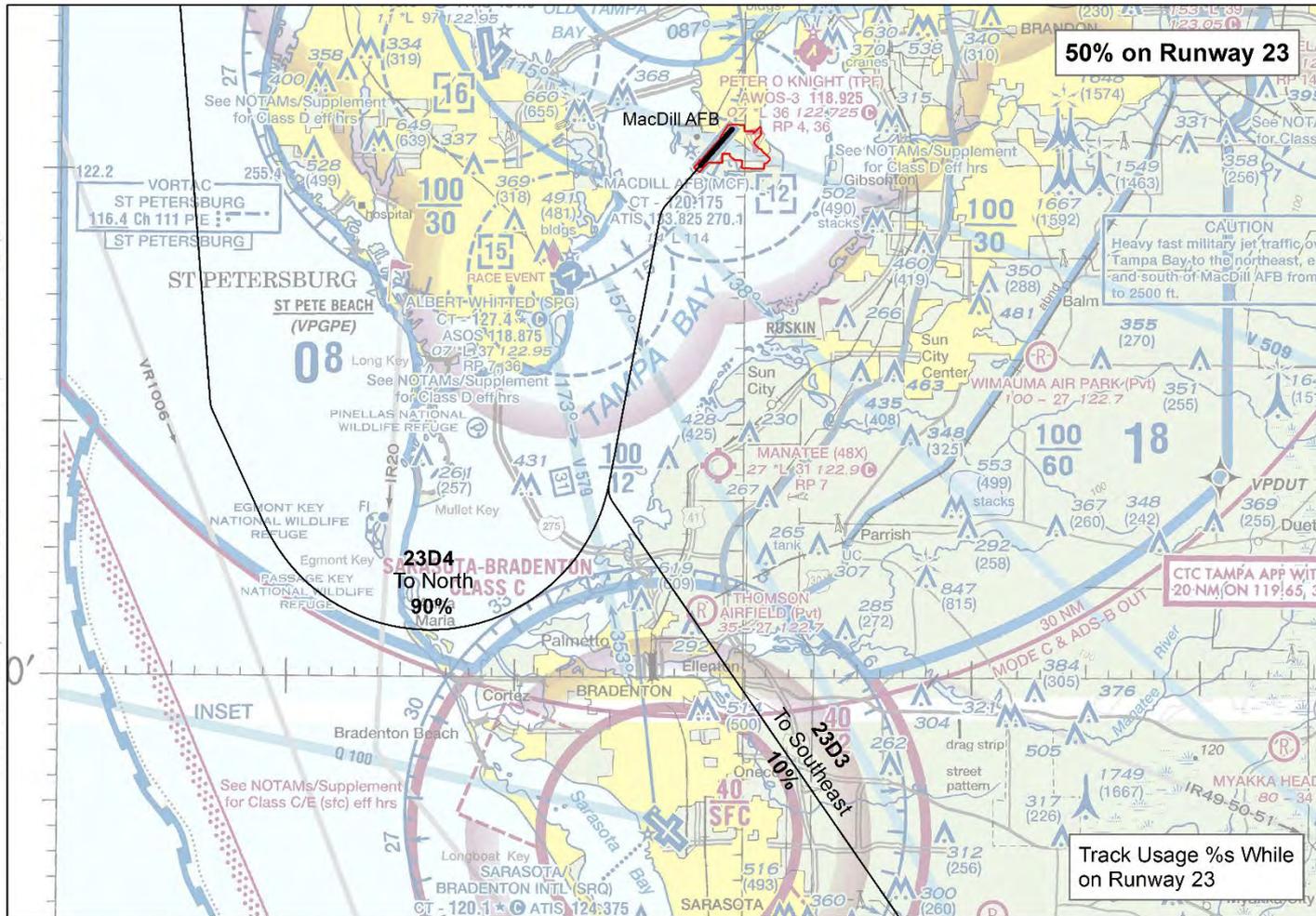
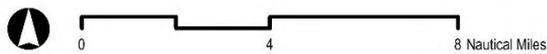
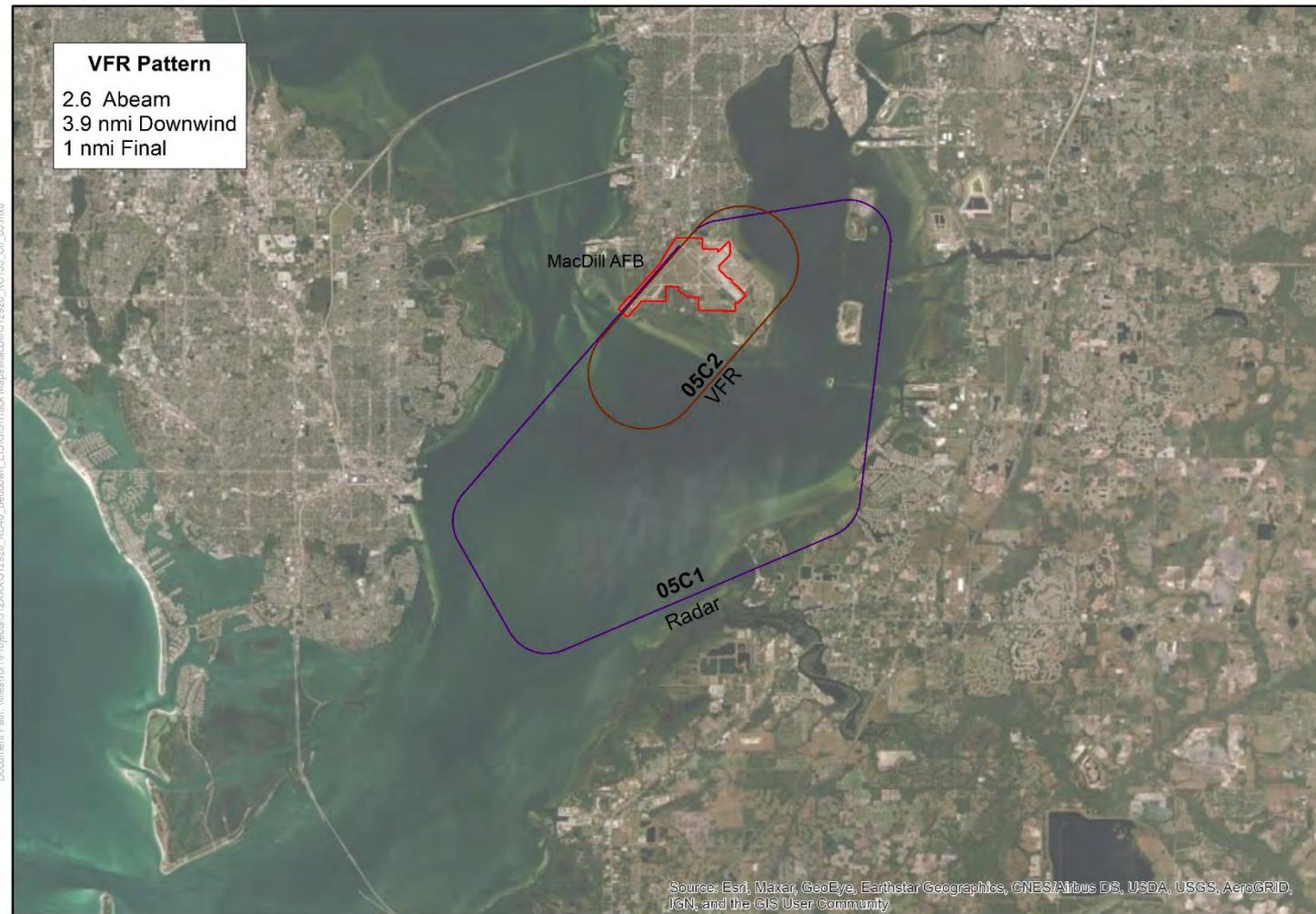
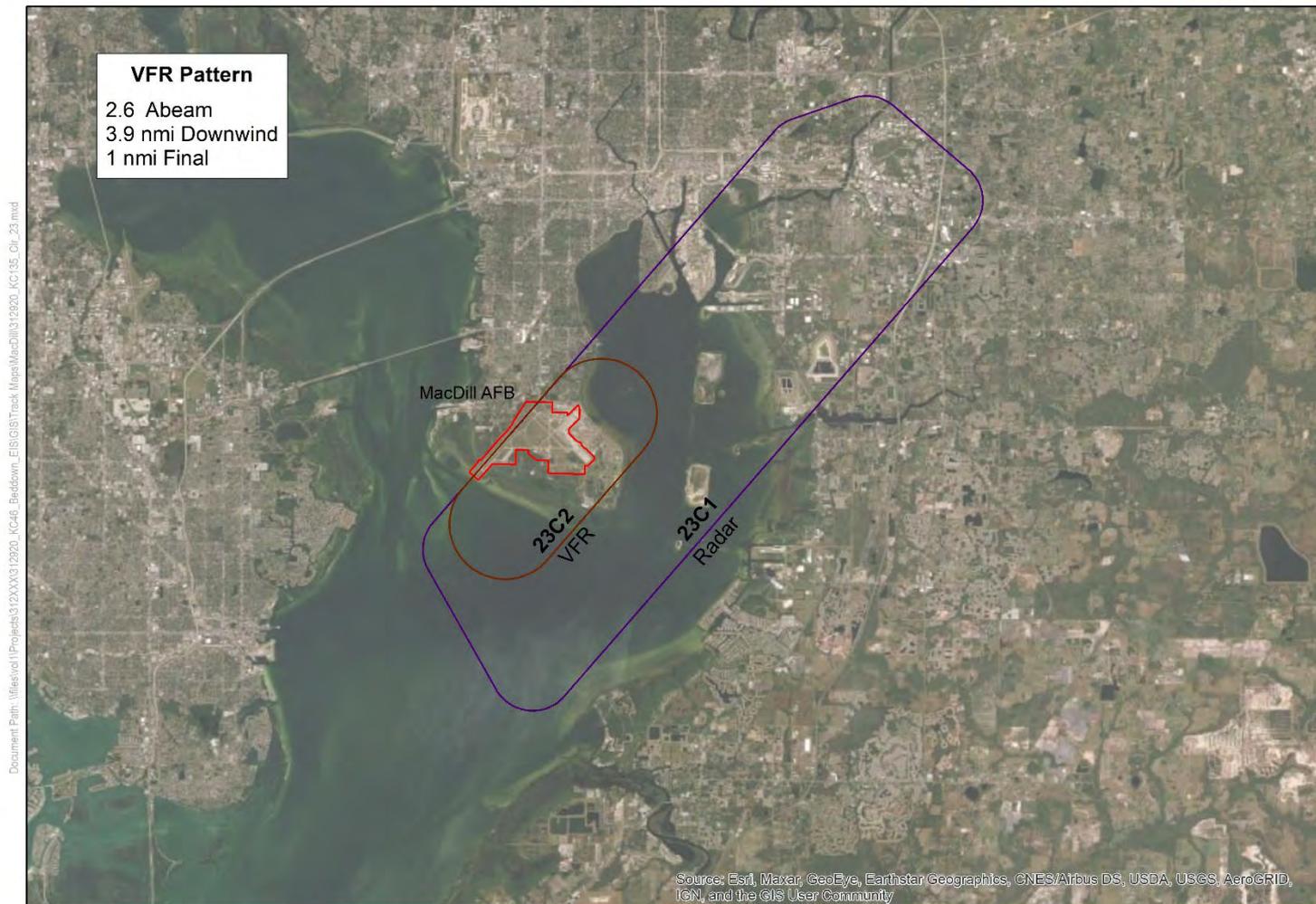


Figure 4-4. Modeled KC-135 Aircraft Runway 23 Departure Flight Tracks

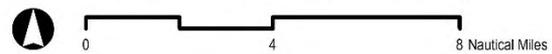


**Figure 4-5. Modeled KC-135 Aircraft Runway 05 Closed Pattern Flight Tracks**





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**Figure 4-6. Modeled KC-135 Aircraft Runway 23 Closed Pattern Flight Tracks**



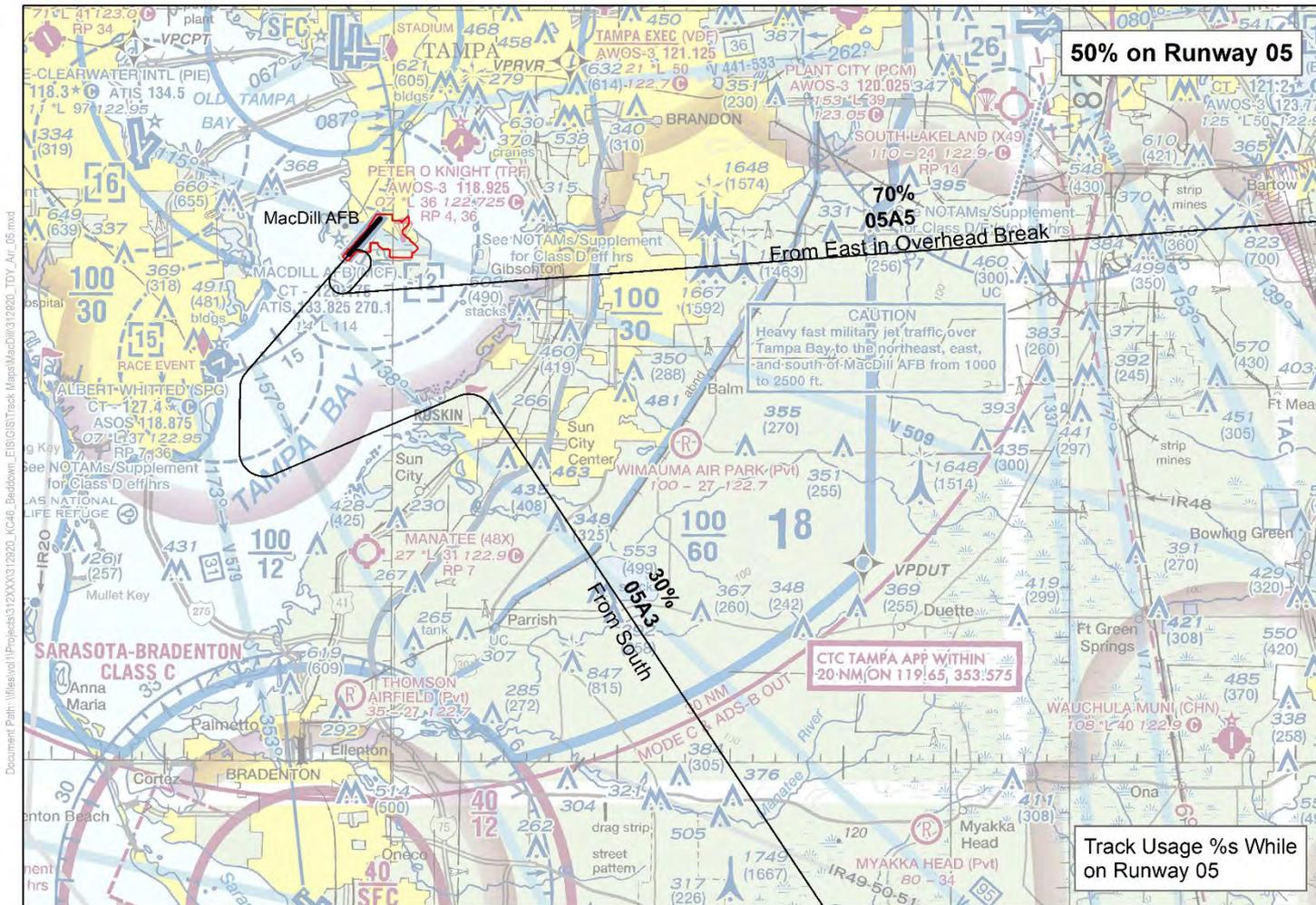


Figure 4-7. Modeled Temporary Duty Aircraft Runway 05 Arrival Flight Tracks

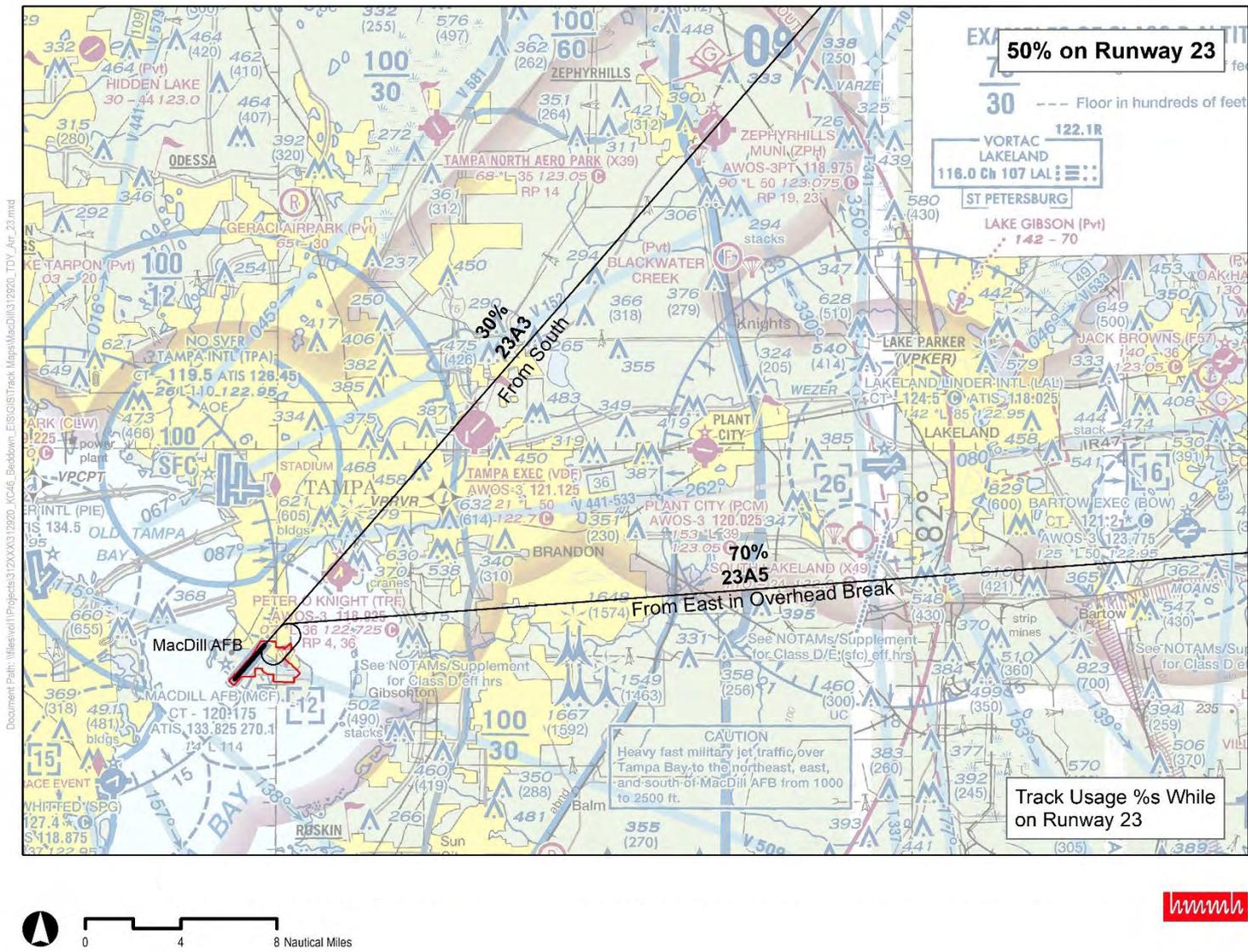


Figure 4-8. Modeled Temporary Duty Aircraft Runway 23 Arrival Flight Tracks

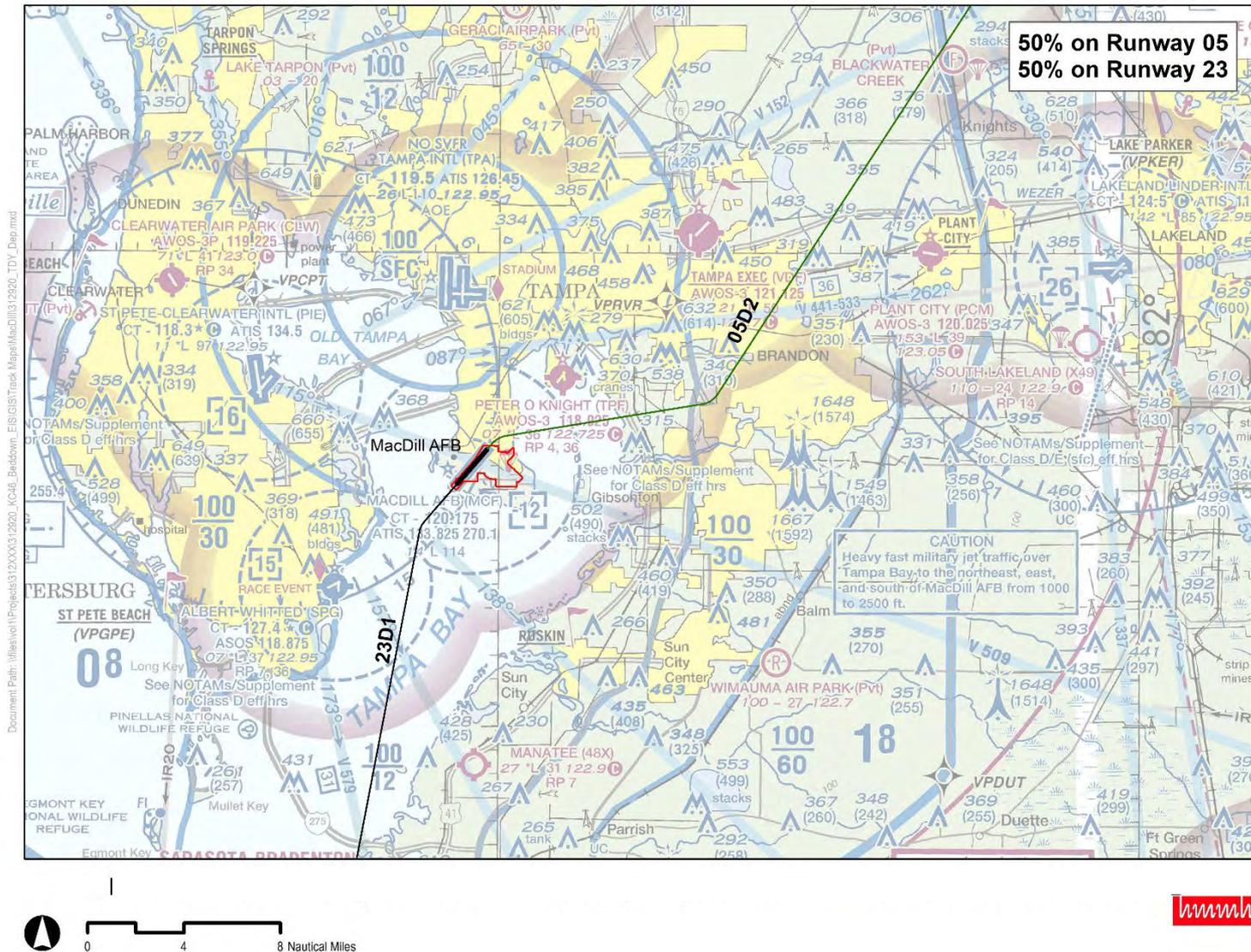
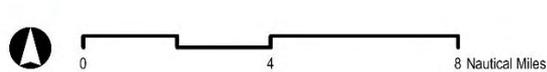
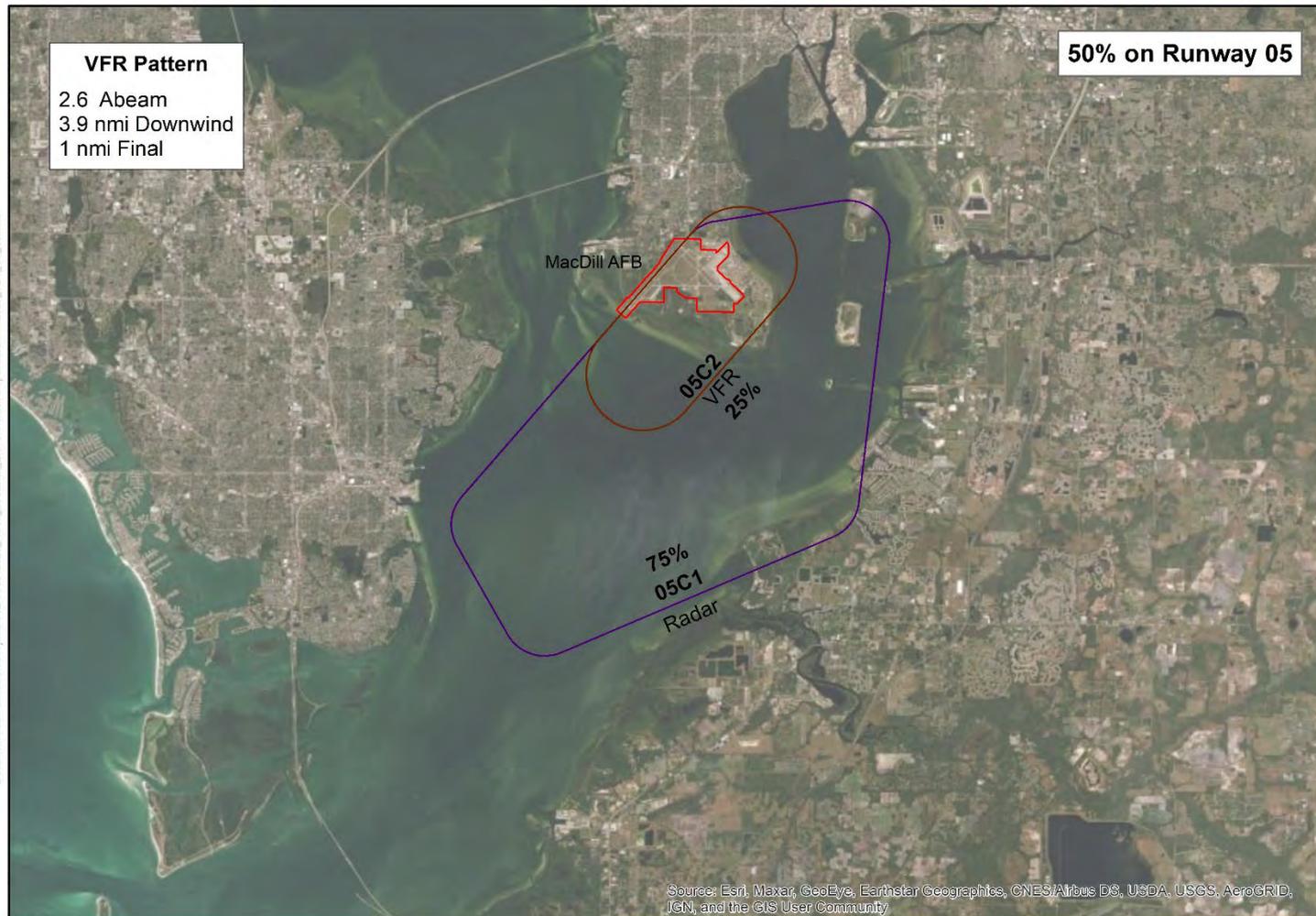
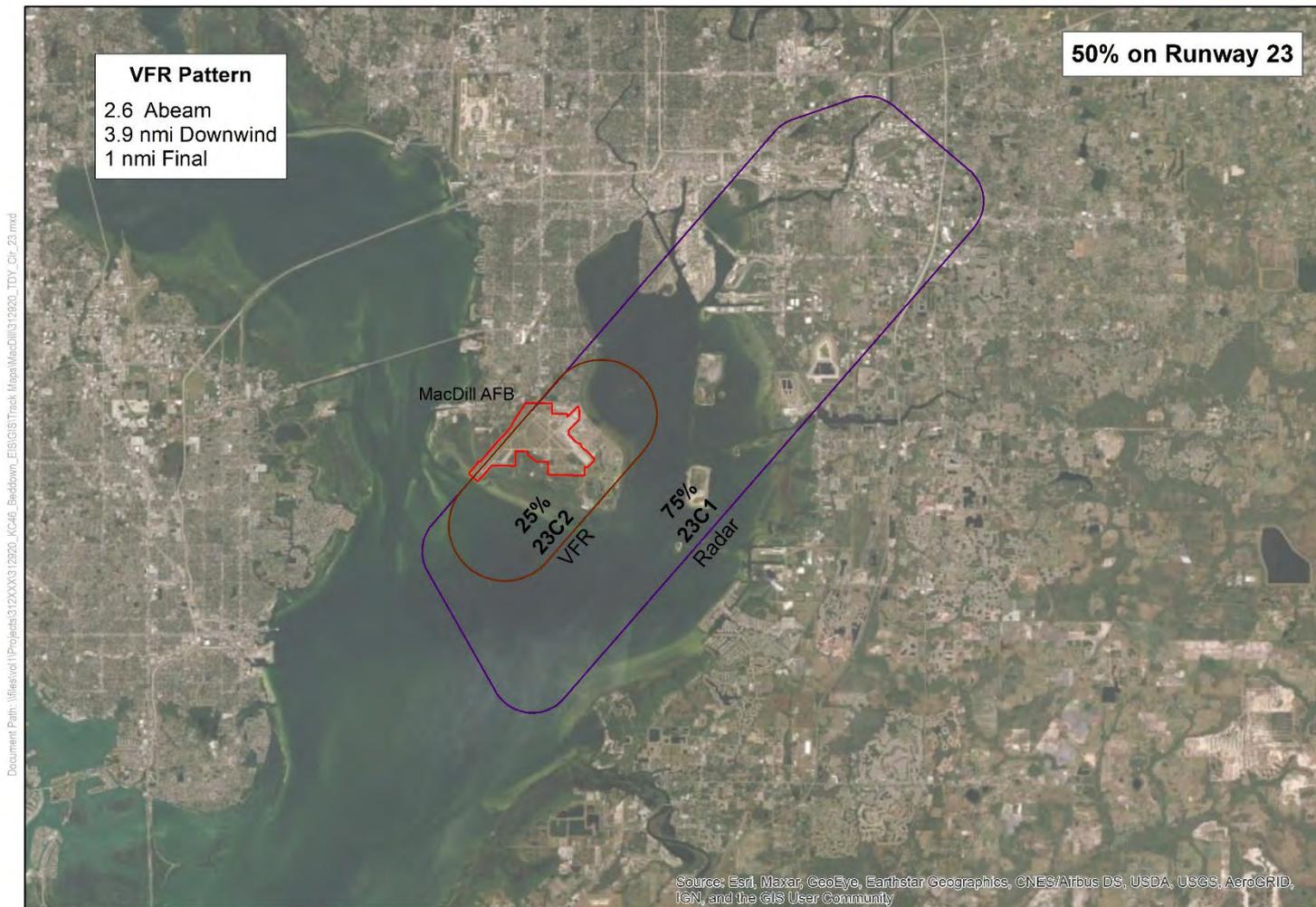


Figure 4-9. Modeled Temporary Duty Aircraft Departure Flight Tracks

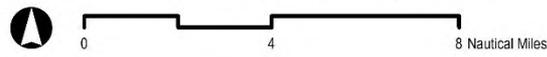


**Figure 4-10. Modeled Temporary Duty Aircraft Runway 05 Closed Pattern Flight Tracks**





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**Figure 4-11. Modeled Temporary Duty Aircraft Runway 23 Closed Pattern Flight Tracks**



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#### **4.1.2.2 Army Reserve**

Figures 4-12 through 4-17 show the modeled arrival, departure, and closed pattern flight tracks and their utilization, respectively, for the based Army Reserve aircraft.

### **4.2 Transient Aircraft**

Sections 4.2.1 through 4.2.3 show the modeled flight tracks and their utilization percentages for the transient aircraft at MacDill AFB.

#### **4.2.1 Transient Fighters**

Figures 4-18 through 4-21 show the modeled arrival, departure, and closed pattern flight tracks and their utilization, respectively, for Transient Fighter aircraft.

#### **4.2.2 Transient Four-Engine Turboprop**

Figures 4-22 through 4-27 show the modeled arrival, departure, and closed pattern flight tracks and their utilization, respectively, for transient 4ETP aircraft.

#### **4.2.3 Other Transient Aircraft**

Figures 4-28 through 4-33 show the modeled arrival, departure, and closed pattern flight tracks and their utilization, respectively, for all other transient aircraft.

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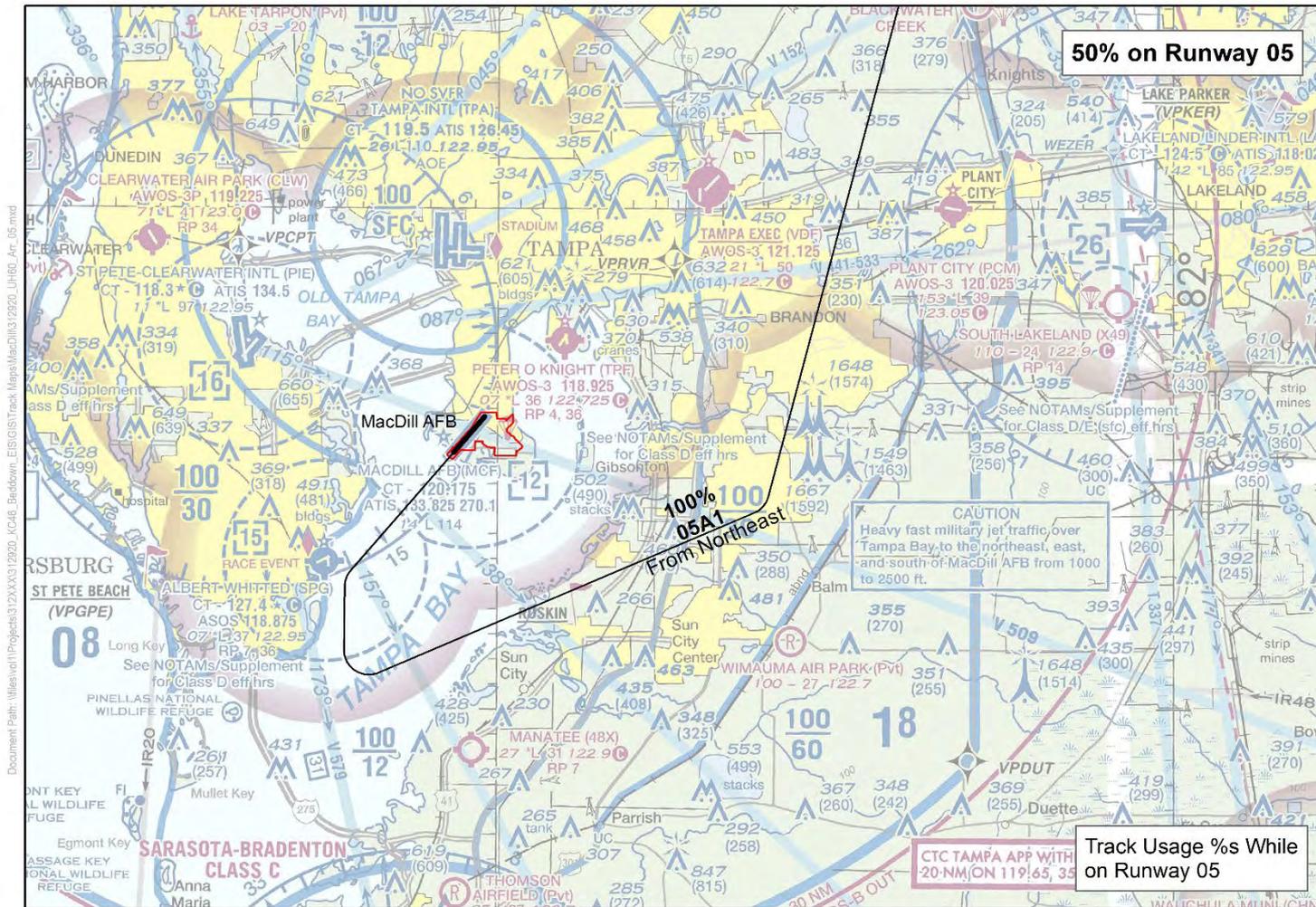


Figure 4-12. Modeled Army Reserve Aircraft Runway 05 Arrival Flight Tracks

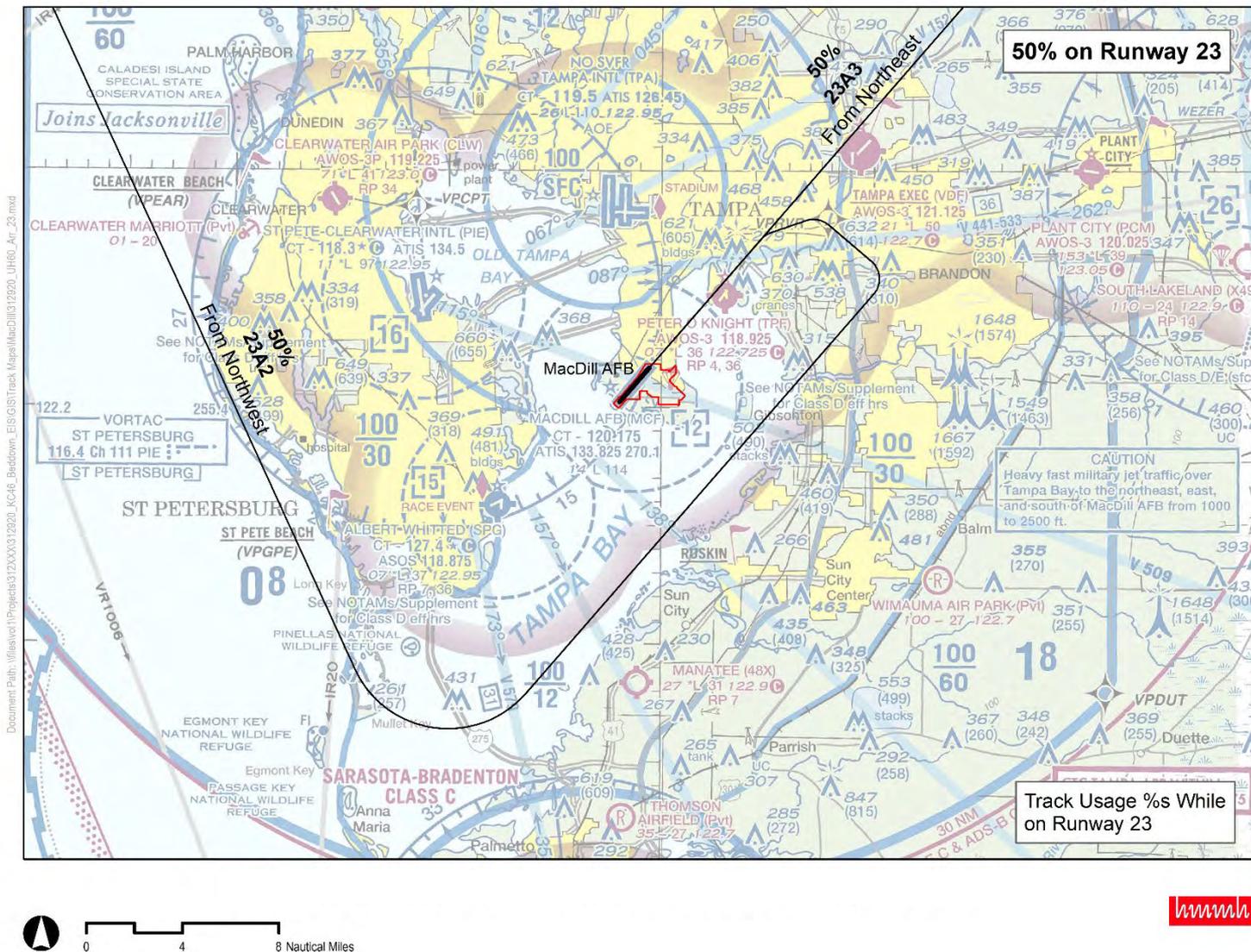


Figure 4-13. Modeled Army Reserve Aircraft Runway 23 Arrival Flight Tracks

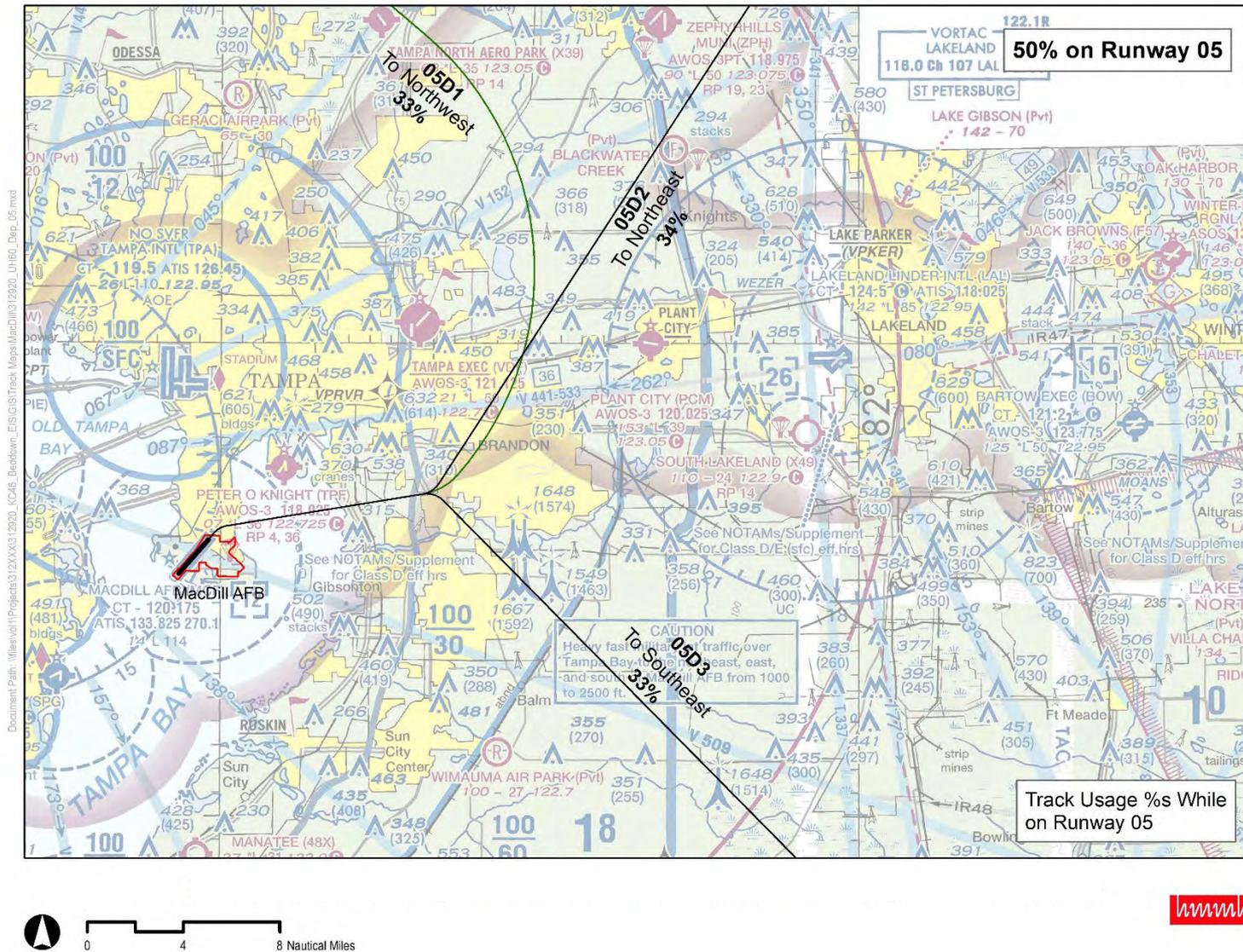


Figure 4-14. Modeled Army Reserve Aircraft Runway 05 Departure Flight Tracks

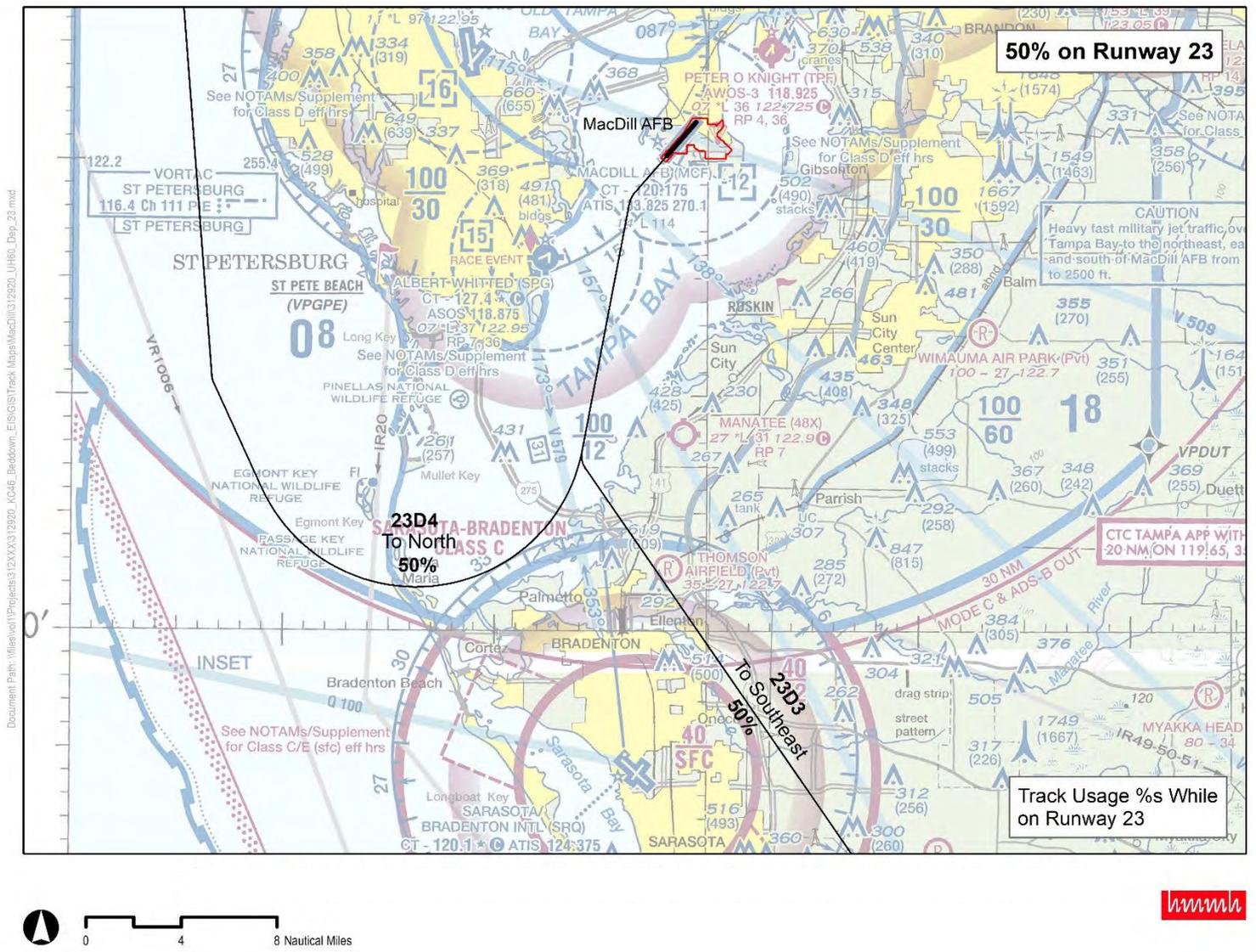


Figure 4-15. Modeled Army Reserve Aircraft Runway 23 Departure Flight Tracks



Figure 4-16. Modeled Army Reserve Aircraft Runway 05 Closed Pattern Flight Tracks



Figure 4-17. Modeled Army Reserve Aircraft Runway 23 Closed Pattern Flight Tracks

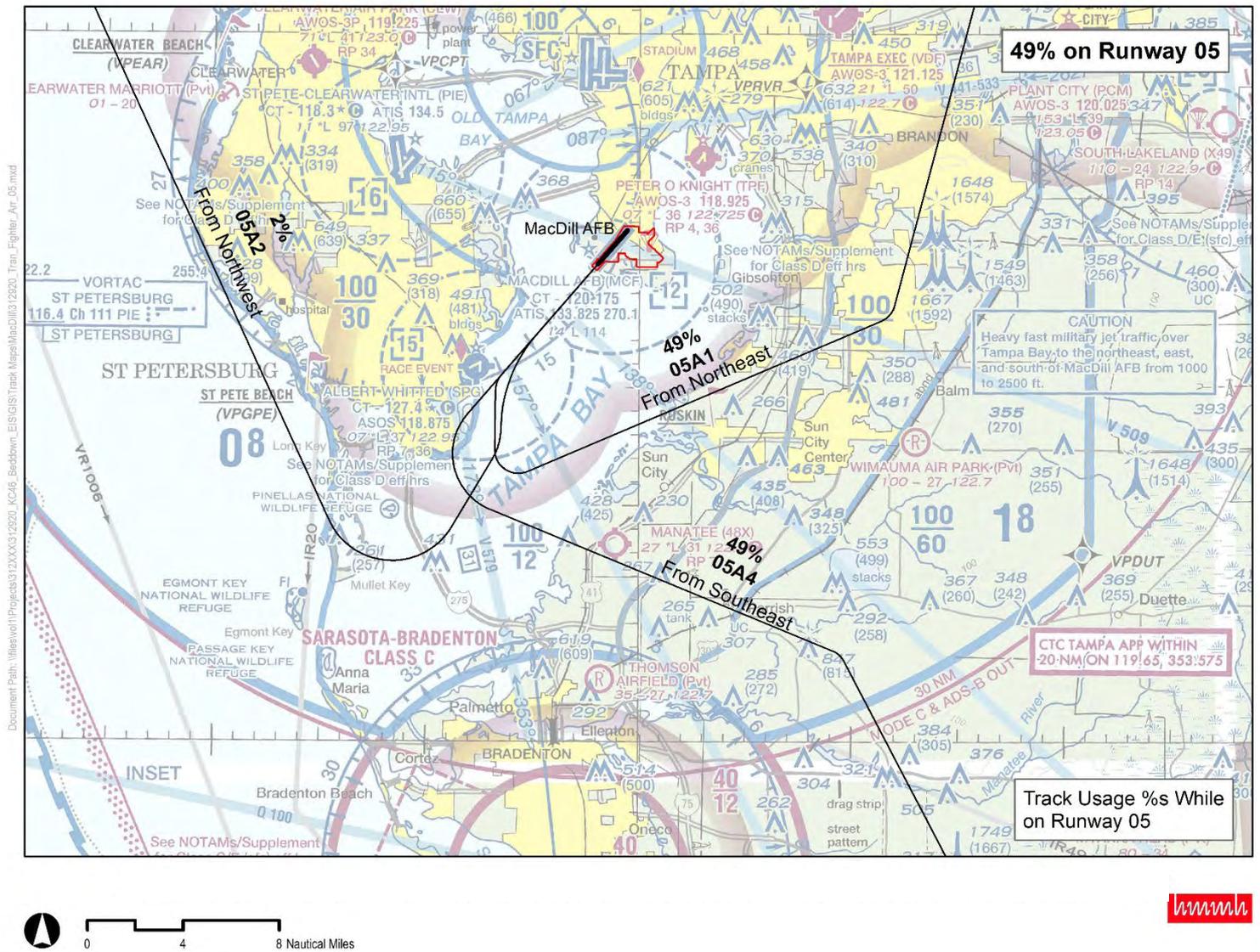


Figure 4-18. Modeled Transient Fighter Aircraft Runway 05 Arrival Flight Tracks

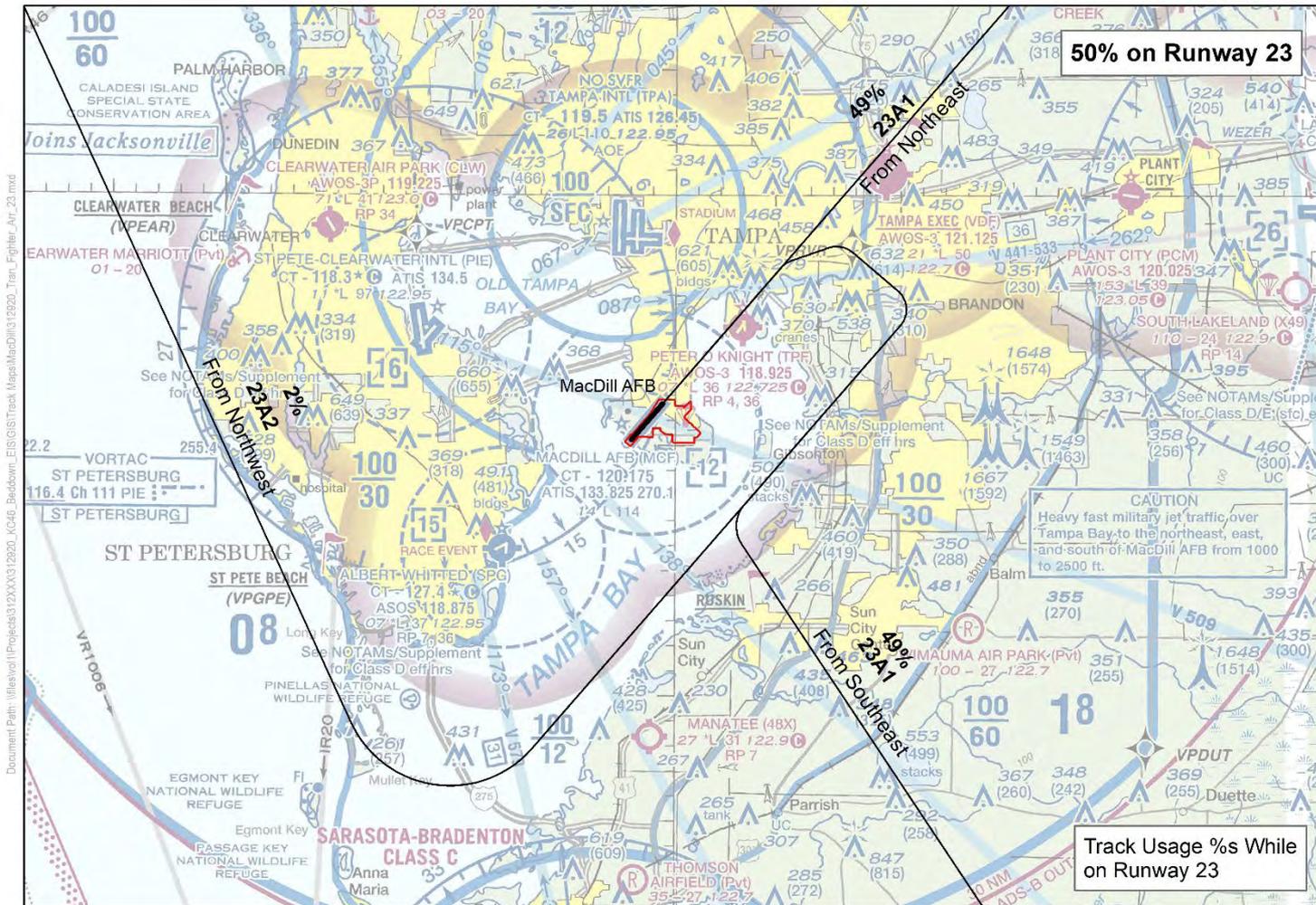


Figure 4-19. Modeled Transient Fighter Aircraft Runway 23 Arrival Flight Tracks

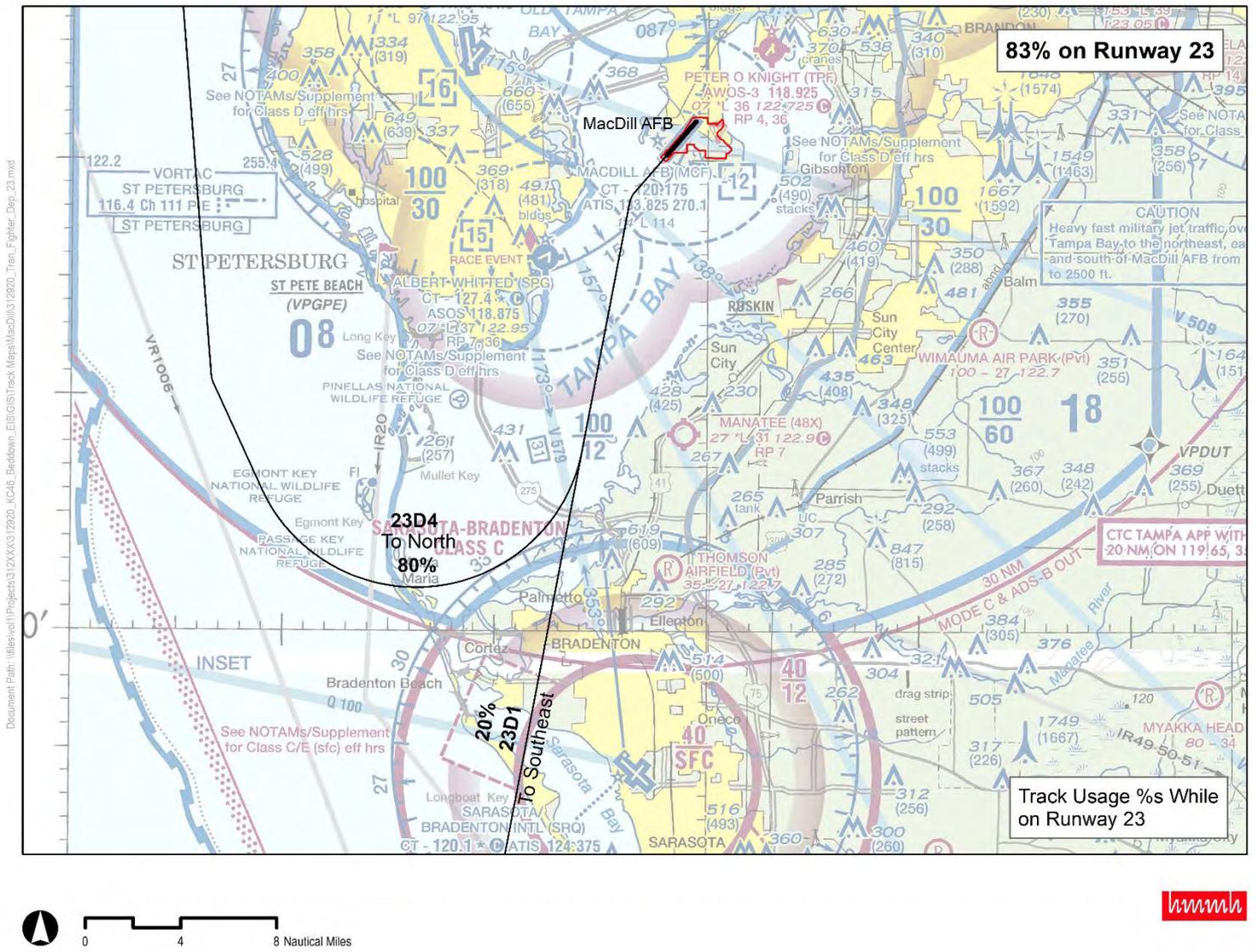


Figure 4-20. Modeled Transient Fighter Aircraft Runway 05 Departure Flight Tracks



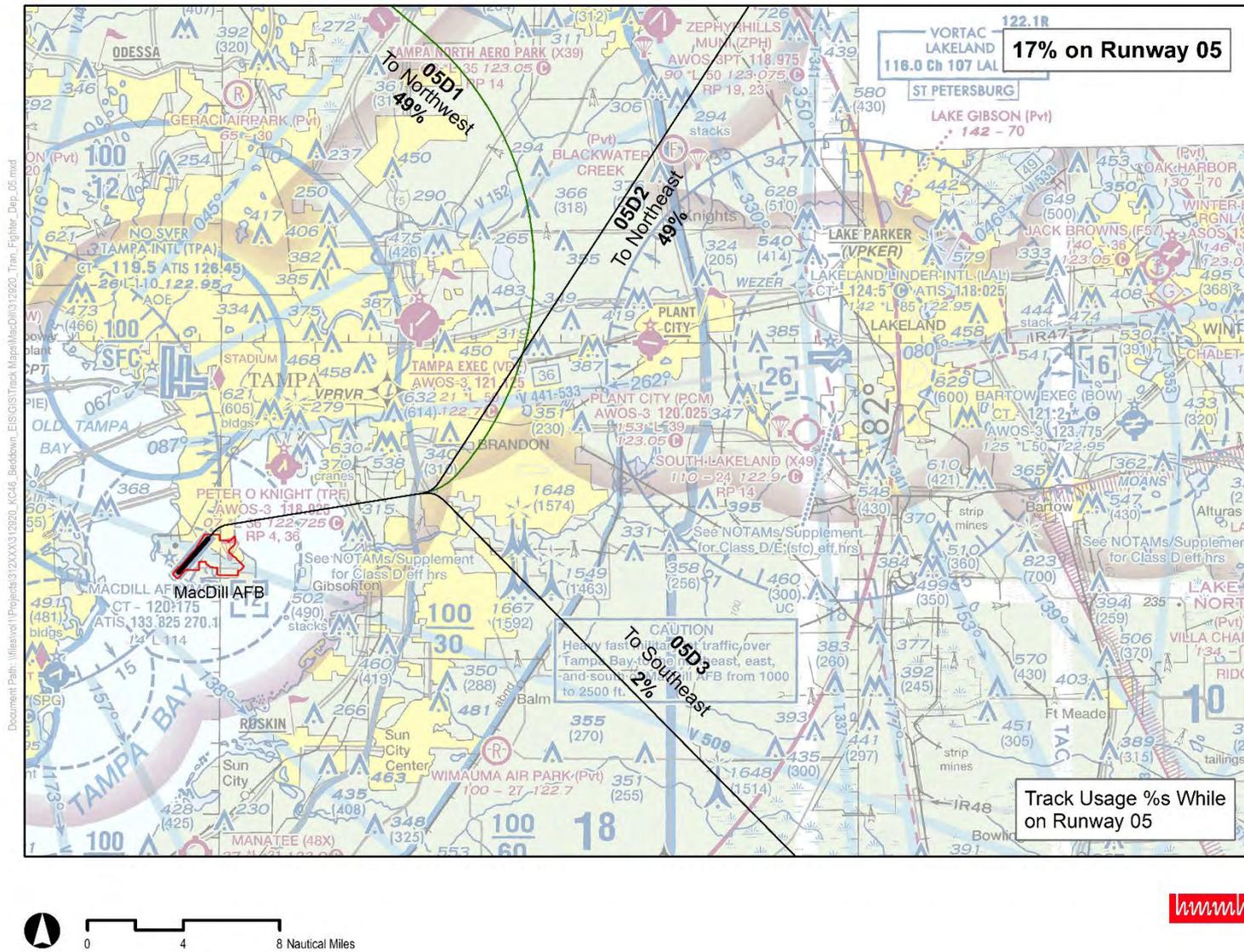


Figure 4-21. Modeled Transient Fighter Aircraft Runway 23 Departure Flight Tracks

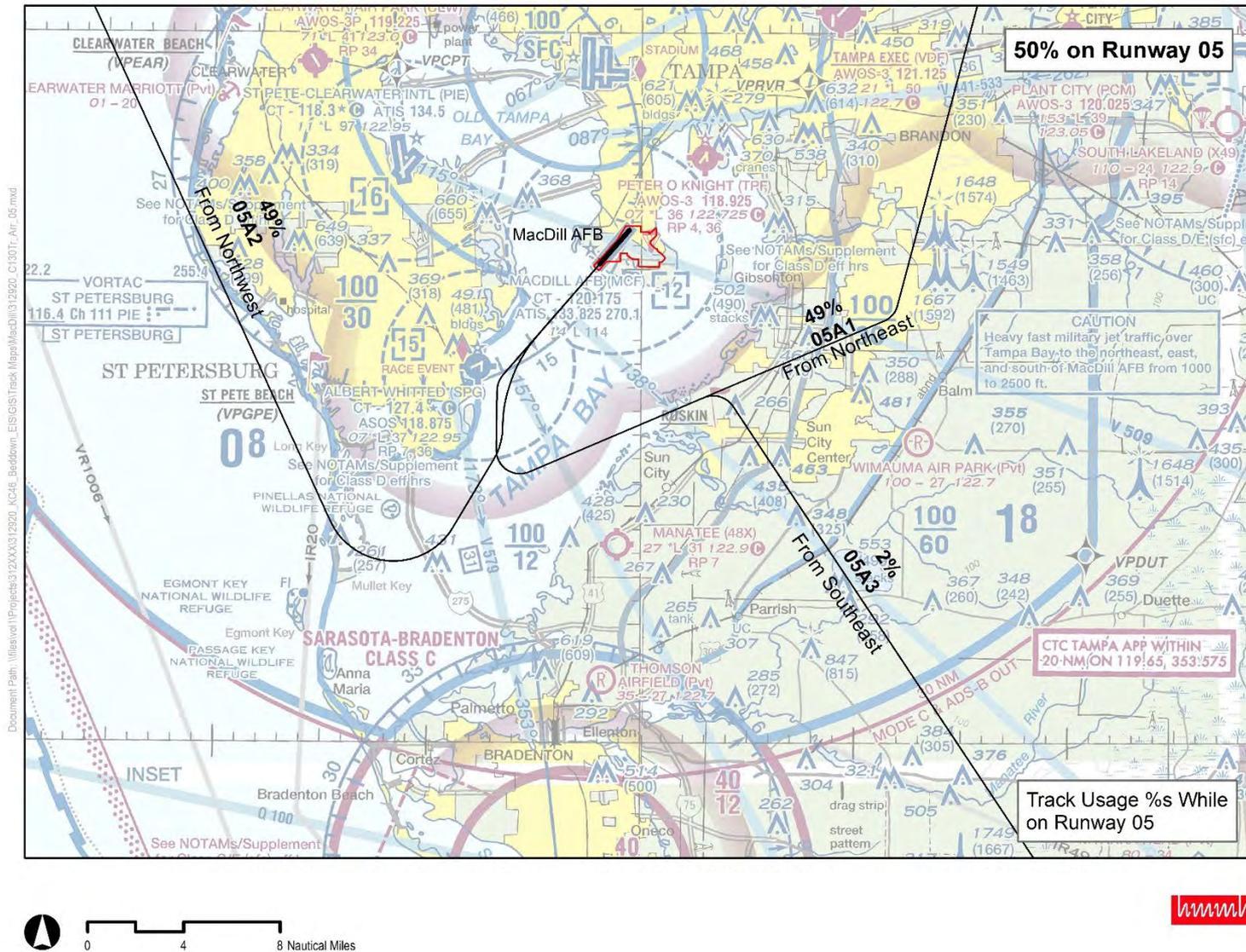


Figure 4-22. Modeled Transient 4ETP Aircraft Runway 05 Arrival Flight Tracks

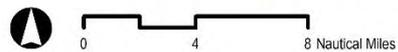
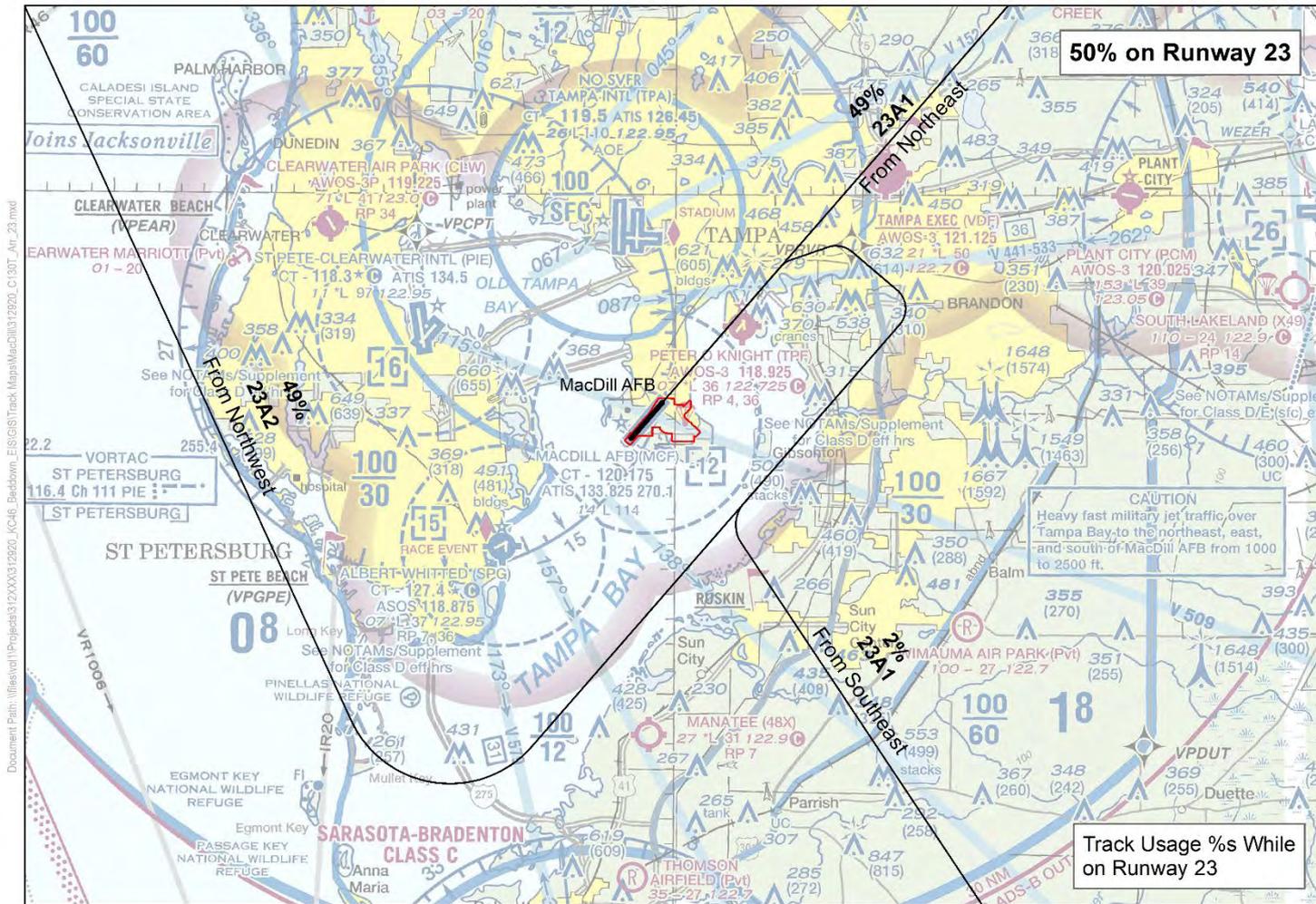


Figure 4-23. Modeled Transient 4ETP Aircraft Runway 23 Arrival Flight Tracks



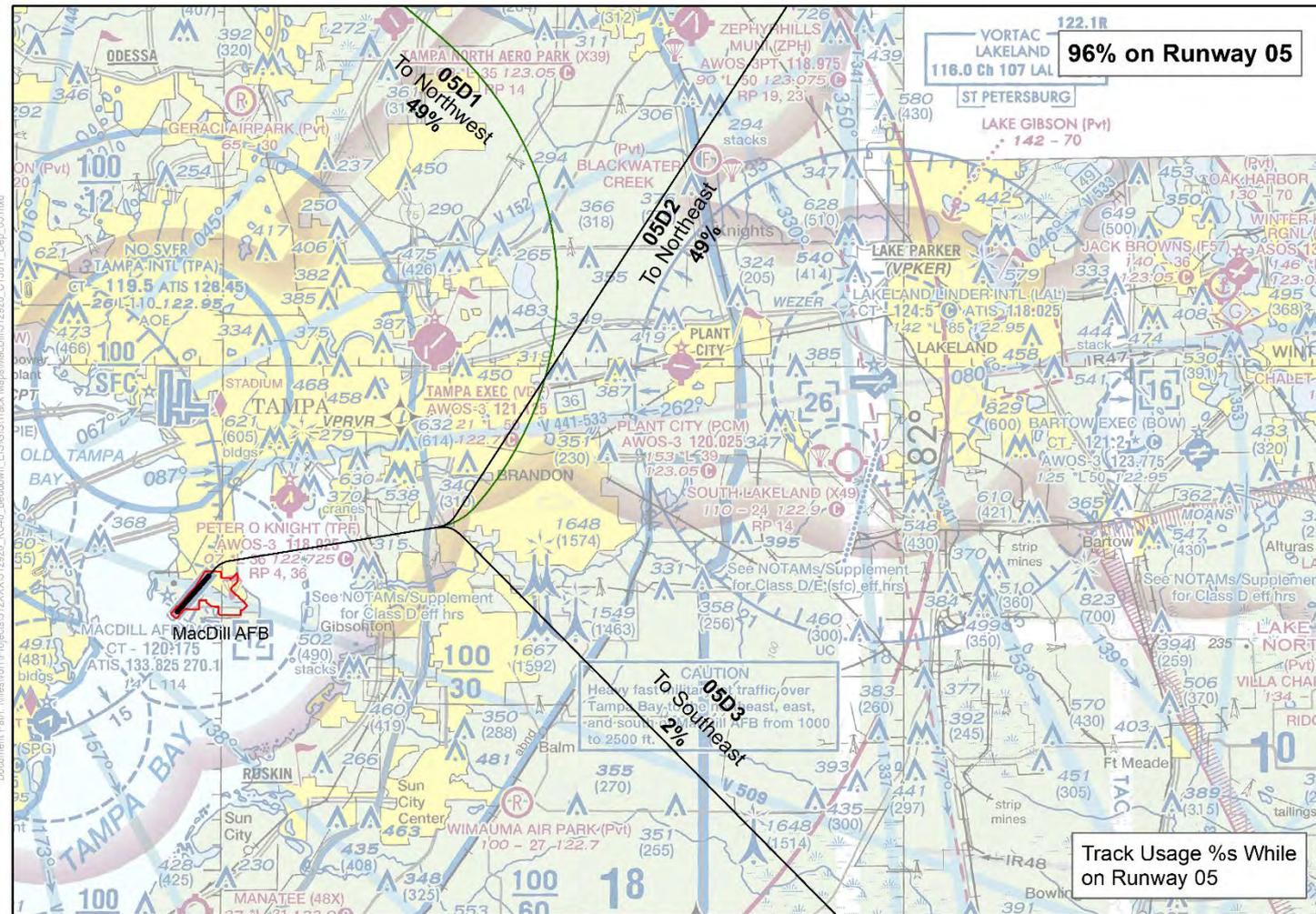
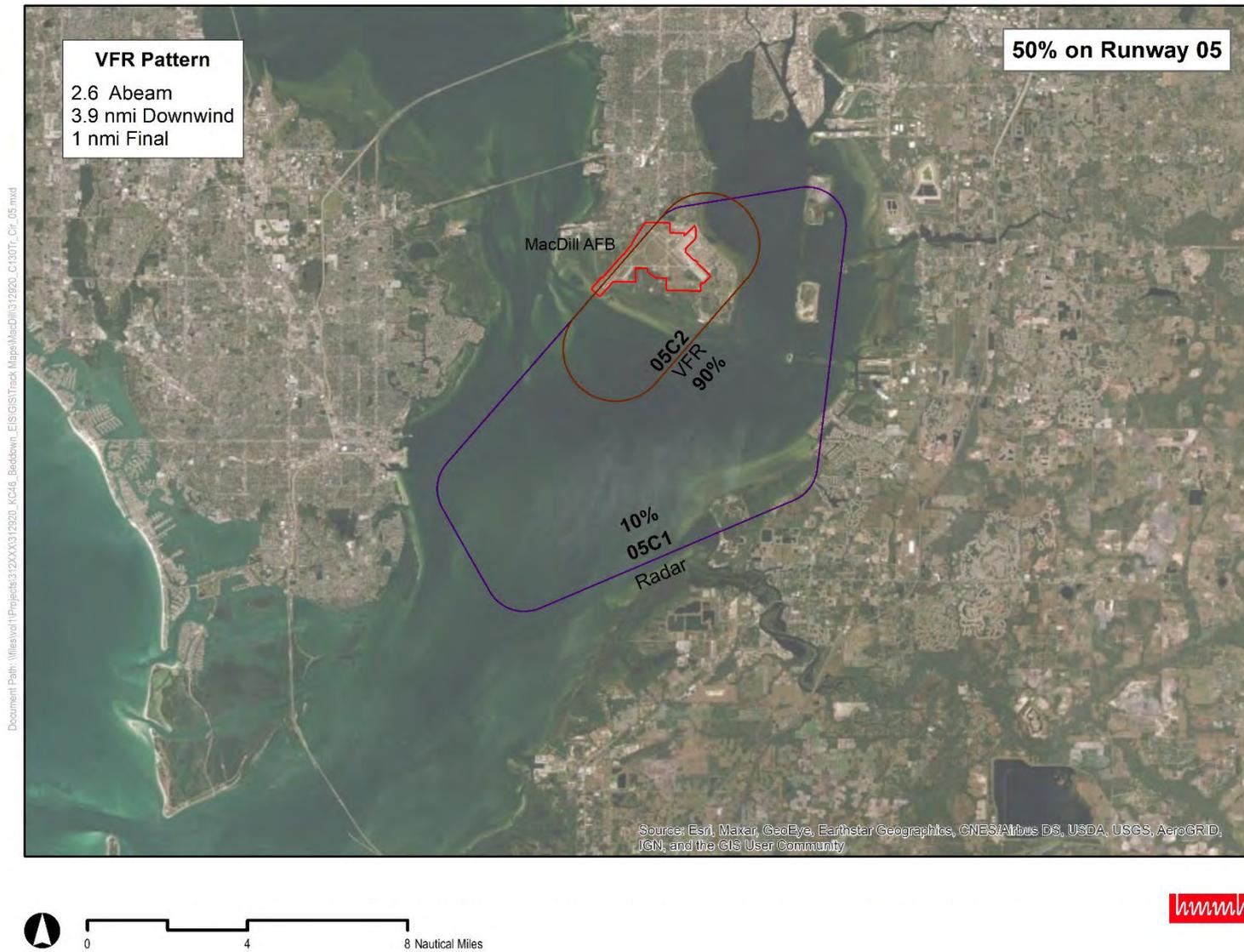


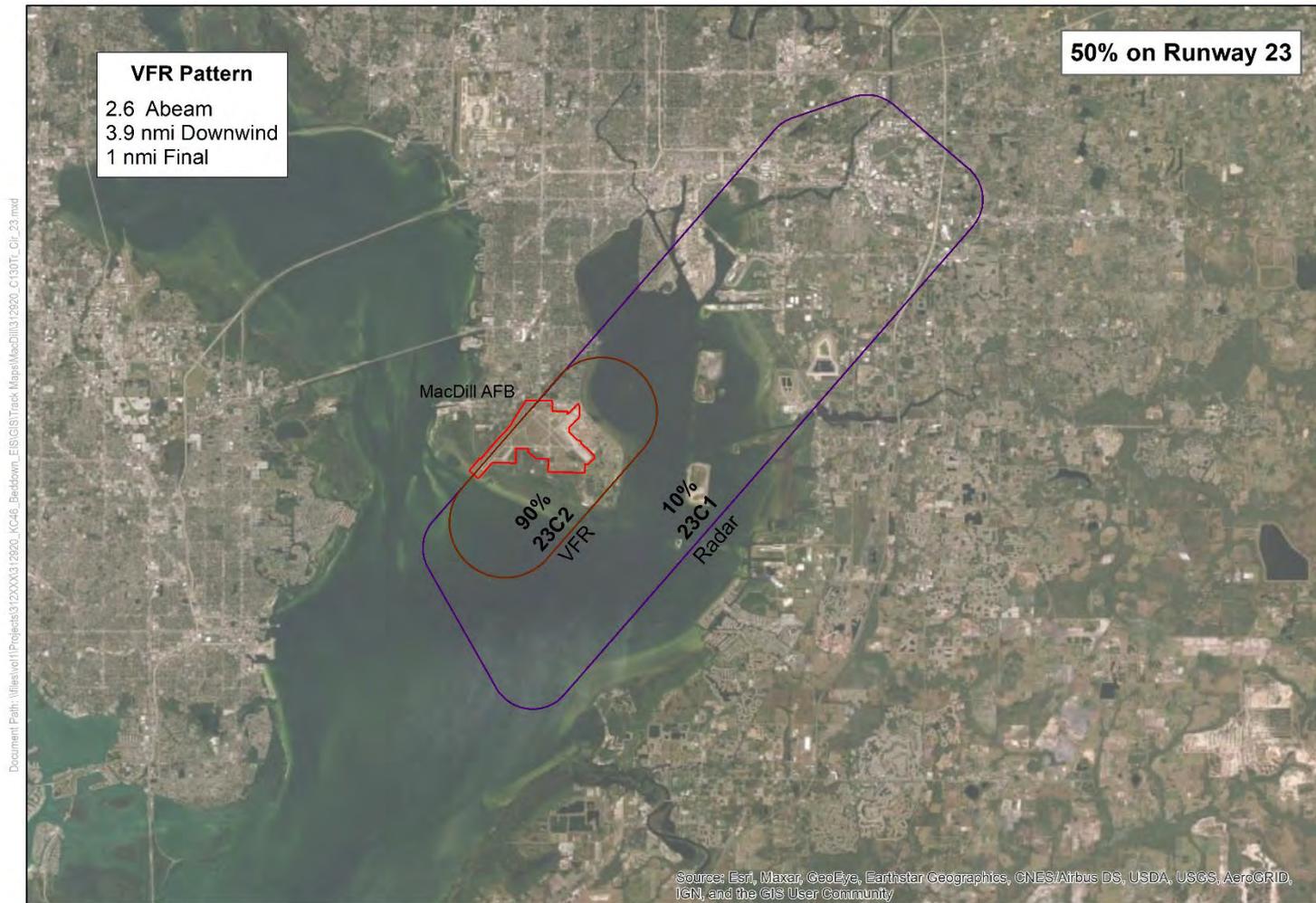
Figure 4-24. Modeled Transient 4ETP Aircraft Runway 05 Departure Flight Tracks



Figure 4-25. Modeled Transient 4ETP Aircraft Runway 23 Departure Flight Tracks



**Figure 4-26. Modeled Transient 4ETP Aircraft Runway 05 Closed Pattern Flight Tracks**



**Figure 4-27. Modeled Transient 4ETP Aircraft Runway 23 Closed Pattern Flight Tracks**

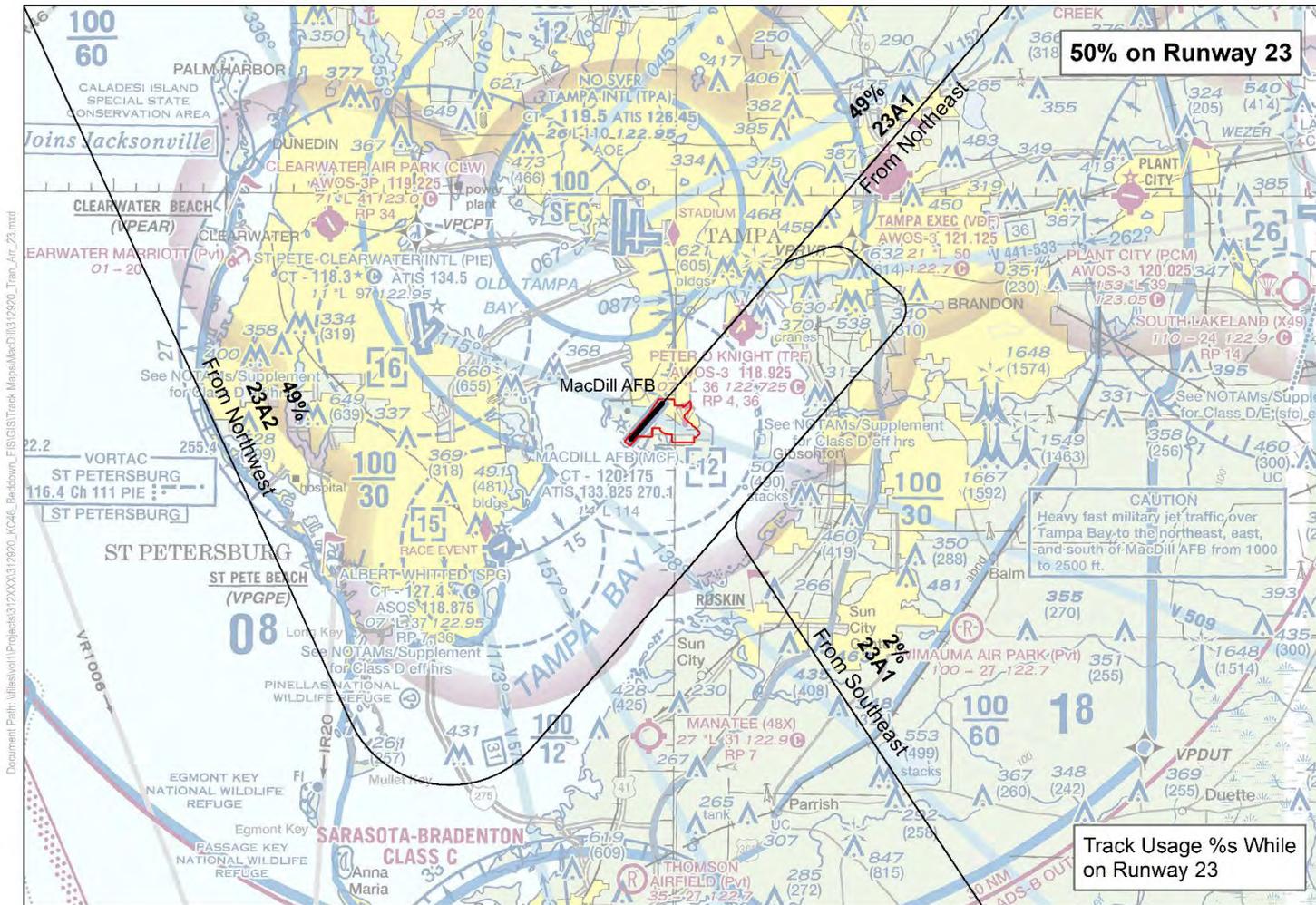


Figure 4-28. Modeled Transient Aircraft Runway 05 Arrival Flight Tracks

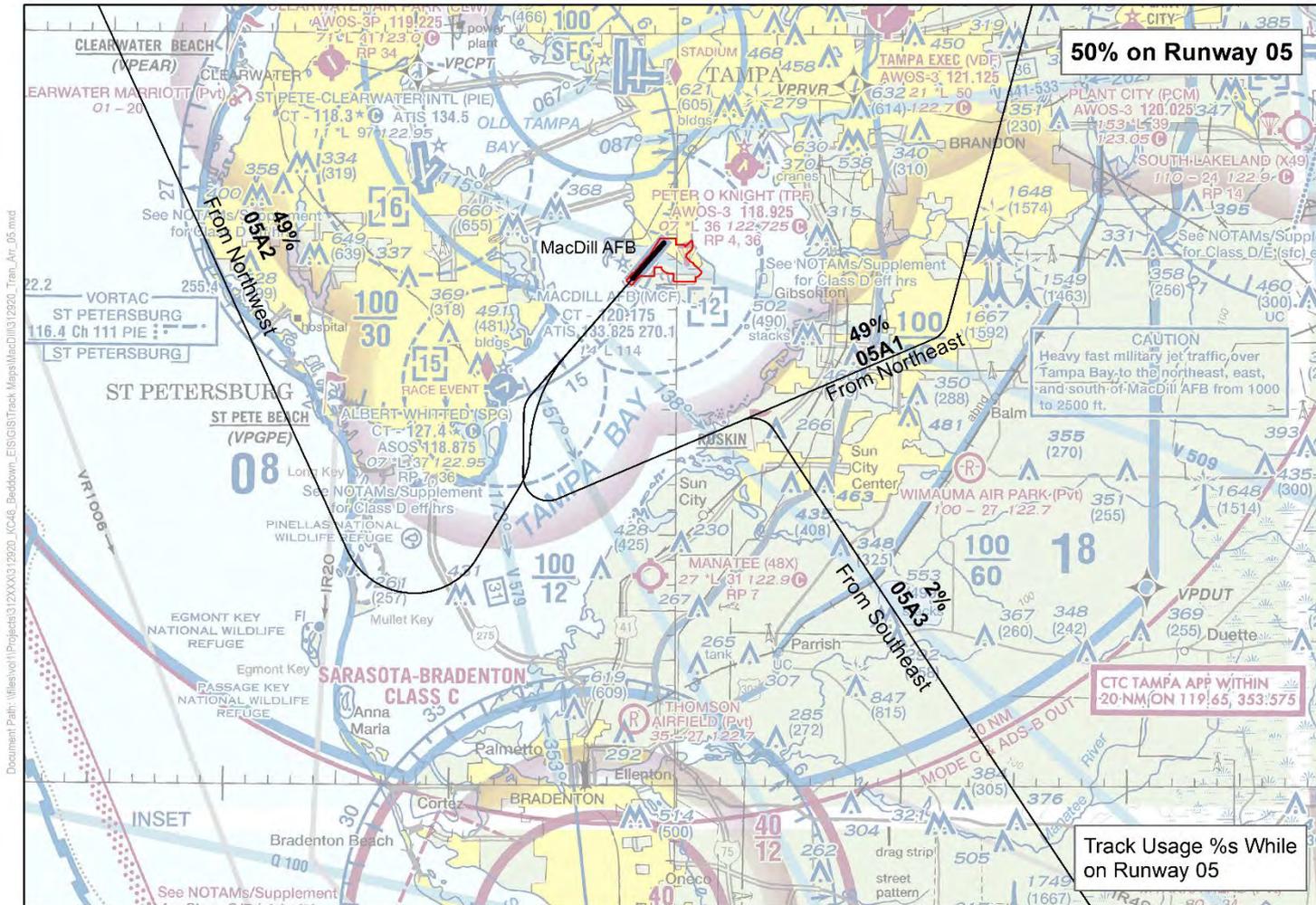


Figure 4-29. Modeled Transient Aircraft Runway 23 Arrival Flight Tracks

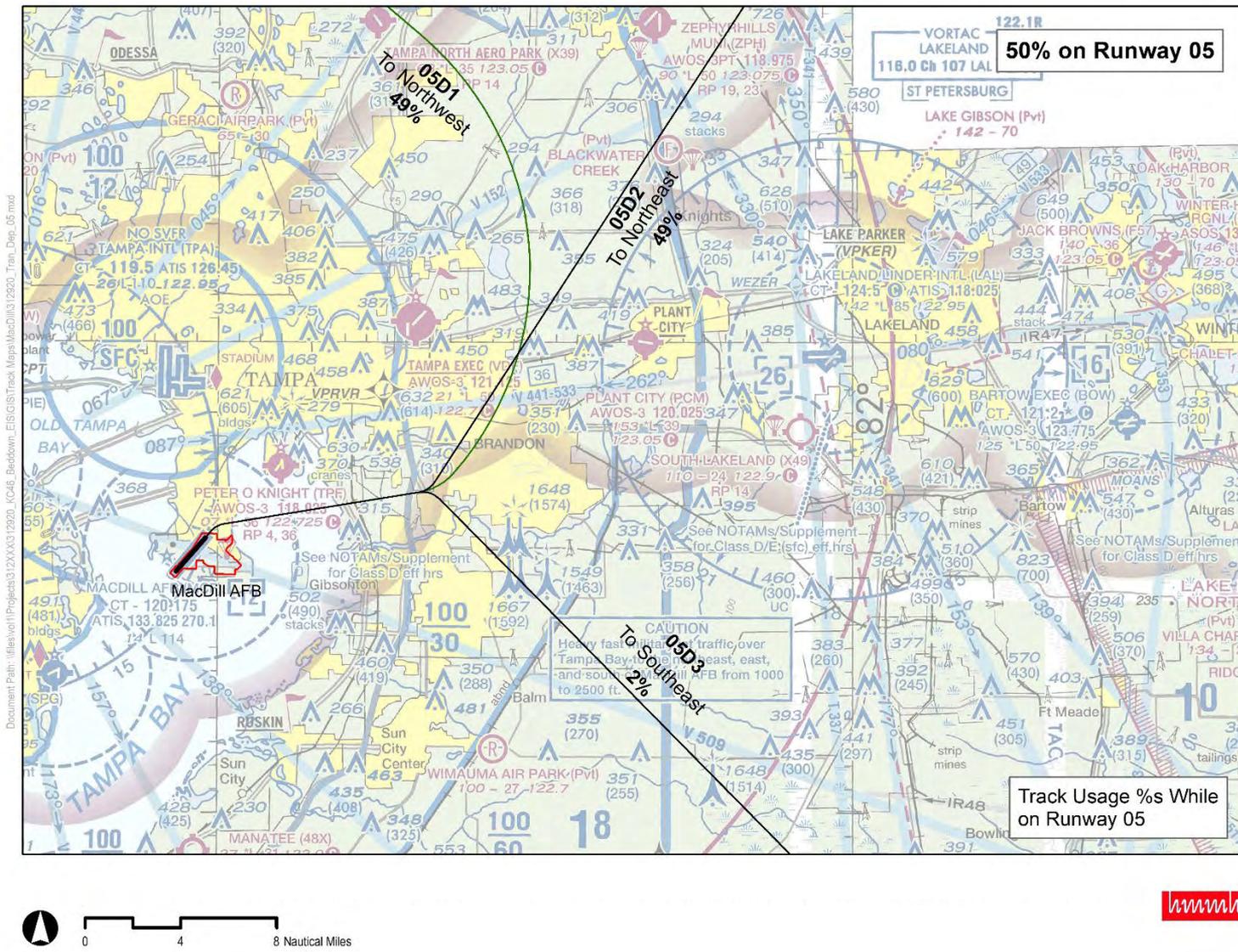


Figure 4-30. Modeled Transient Aircraft Runway 05 Departure Flight Tracks

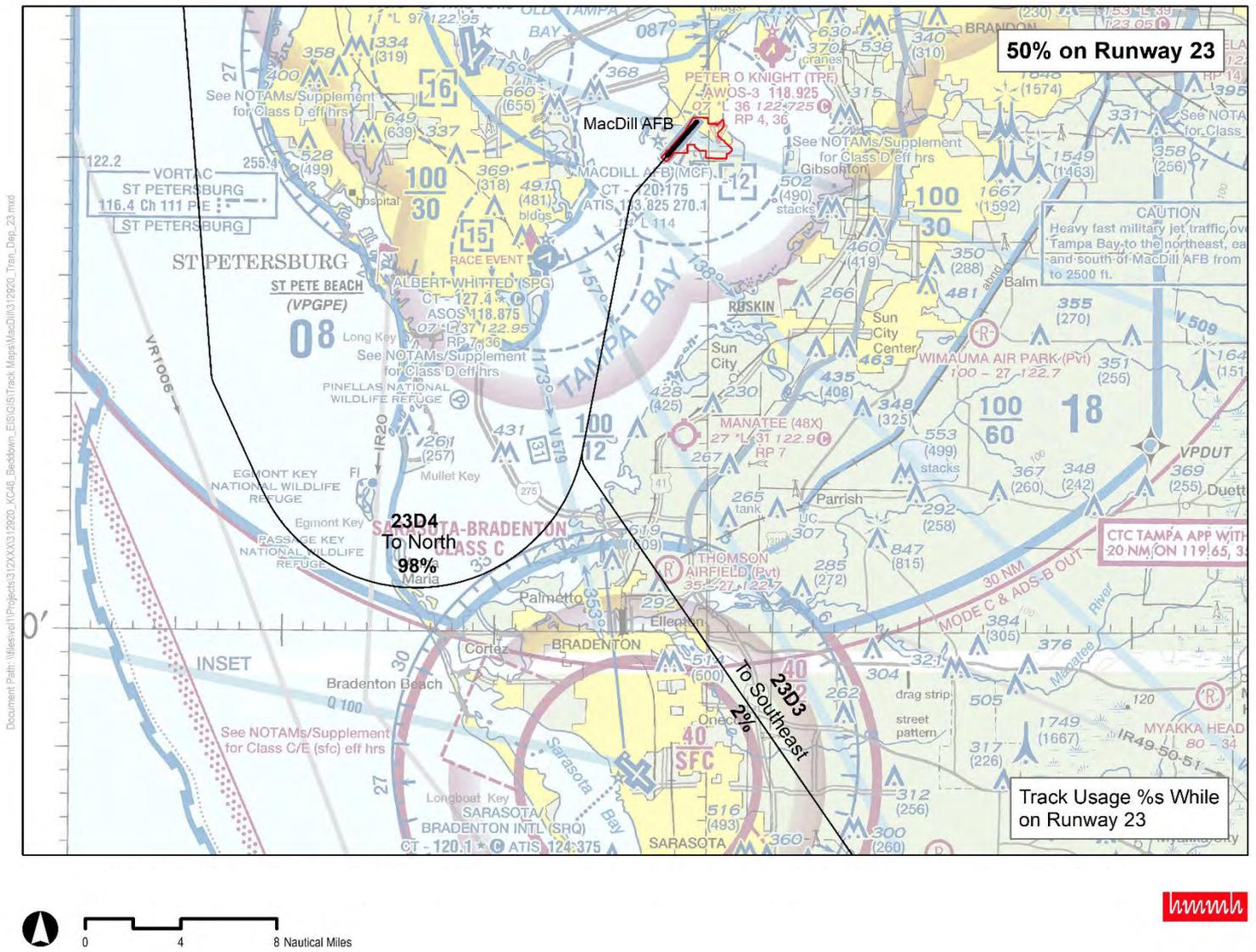


Figure 4-31. Modeled Transient Aircraft Runway 23 Departure Flight Tracks



Figure 4-32. Modeled Transient Helicopter Aircraft Runway 05 Closed Pattern Flight Tracks



**Figure 4-33. Modeled Transient Helicopter Aircraft Runway 23 Closed Pattern Flight Track**

### 4.3 Proposed Based KC-46A Aircraft

Figures 4-34 through 4-41 show the modeled arrival, departure, and closed pattern flight tracks and their utilization, respectively, for the proposed based KC-46A aircraft. Please note that “circle to 23” tracks are counted as part of the 50 percent runway utilization on Runway 05. The KC-46A would use identical flight tracks as the based KC-135R but the KC-46’s utilization would be different to account for the addition of the beam and spiral arrival tracks. The KC-46A utilization of departure and closed pattern tracks would be identical to the based KC-135R track usage.

At Fairchild AFB, there are additional KC-46A tracks that would not be proposed for MCF. These tracks include the arrival overhead break and tactical tracks, departure spiral tracks, and closed pattern beam, spiral, and overhead break tracks.

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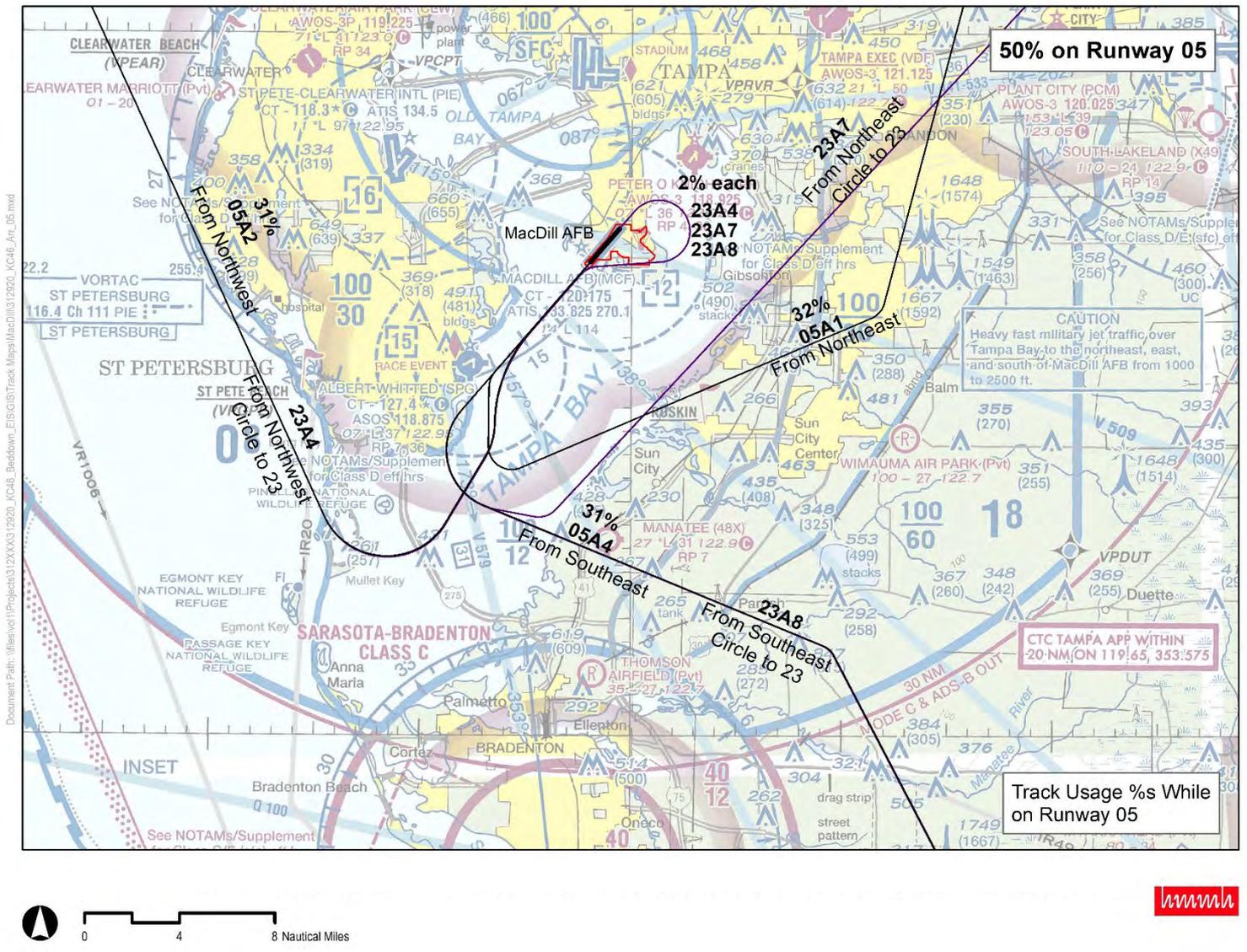


Figure 4-34. Modeled Based KC-46 Aircraft Runway 05 Arrival Flight Tracks

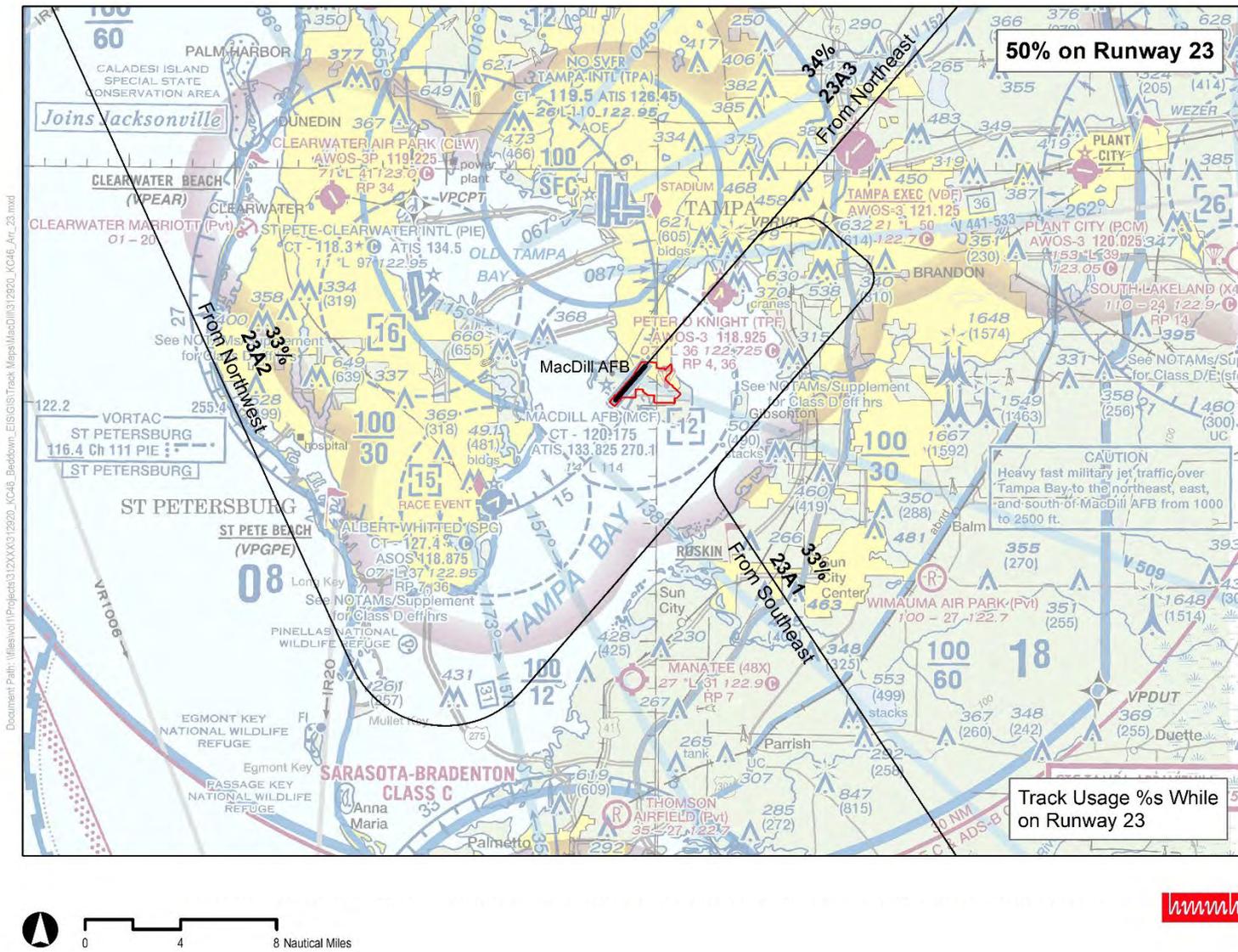
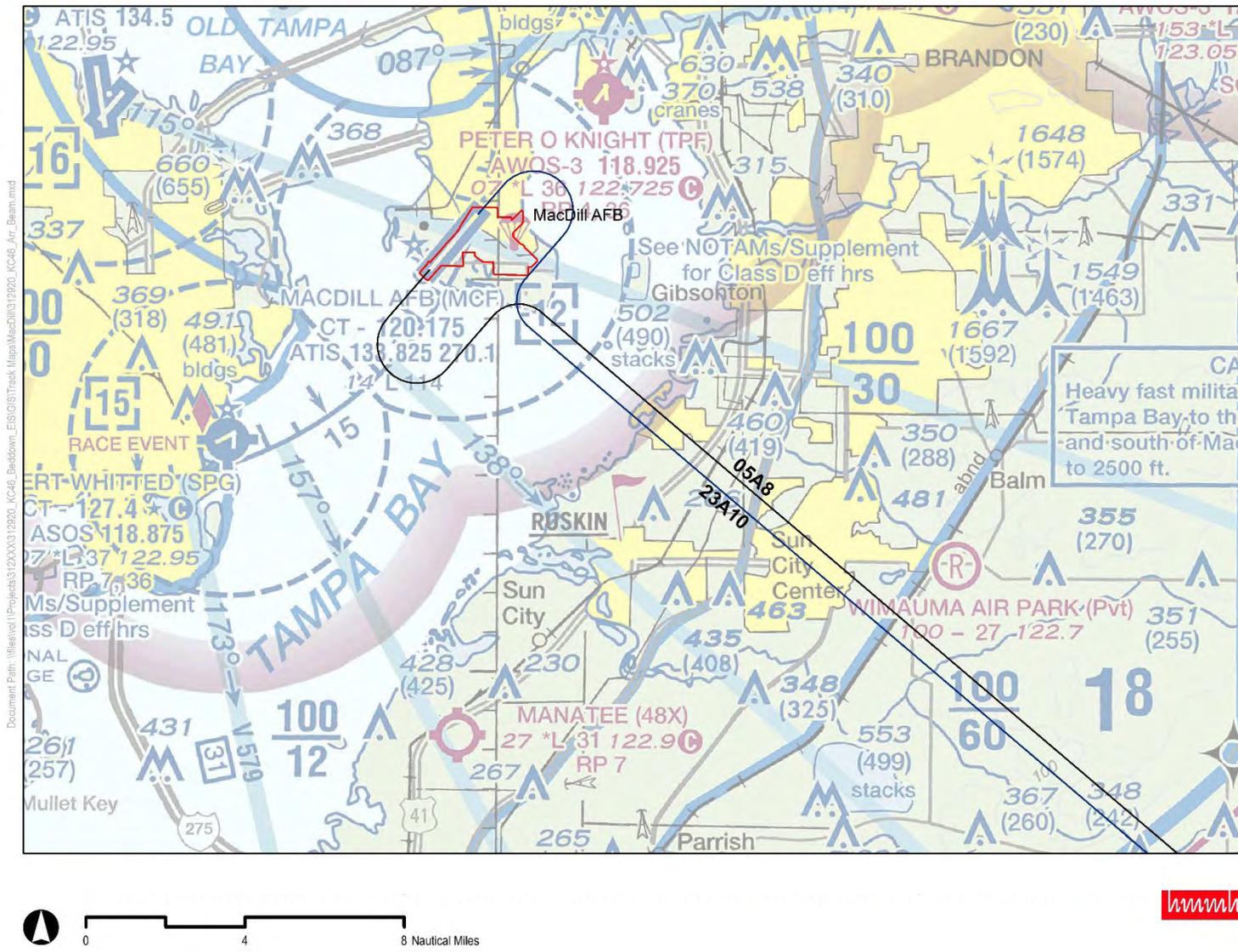


Figure 4-35. Modeled Based KC-46 Aircraft Runway 23 Arrival Flight Tracks





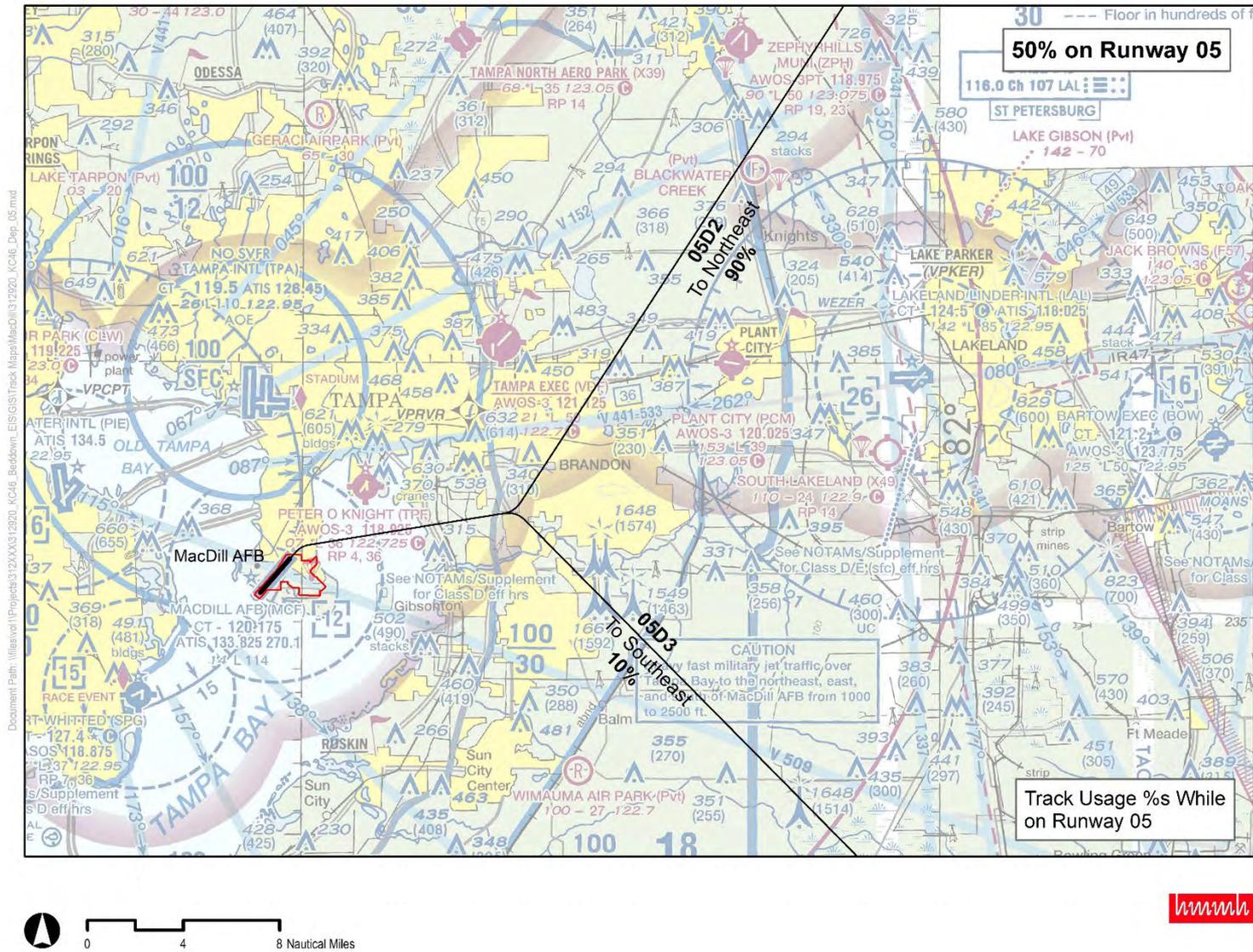
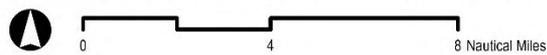
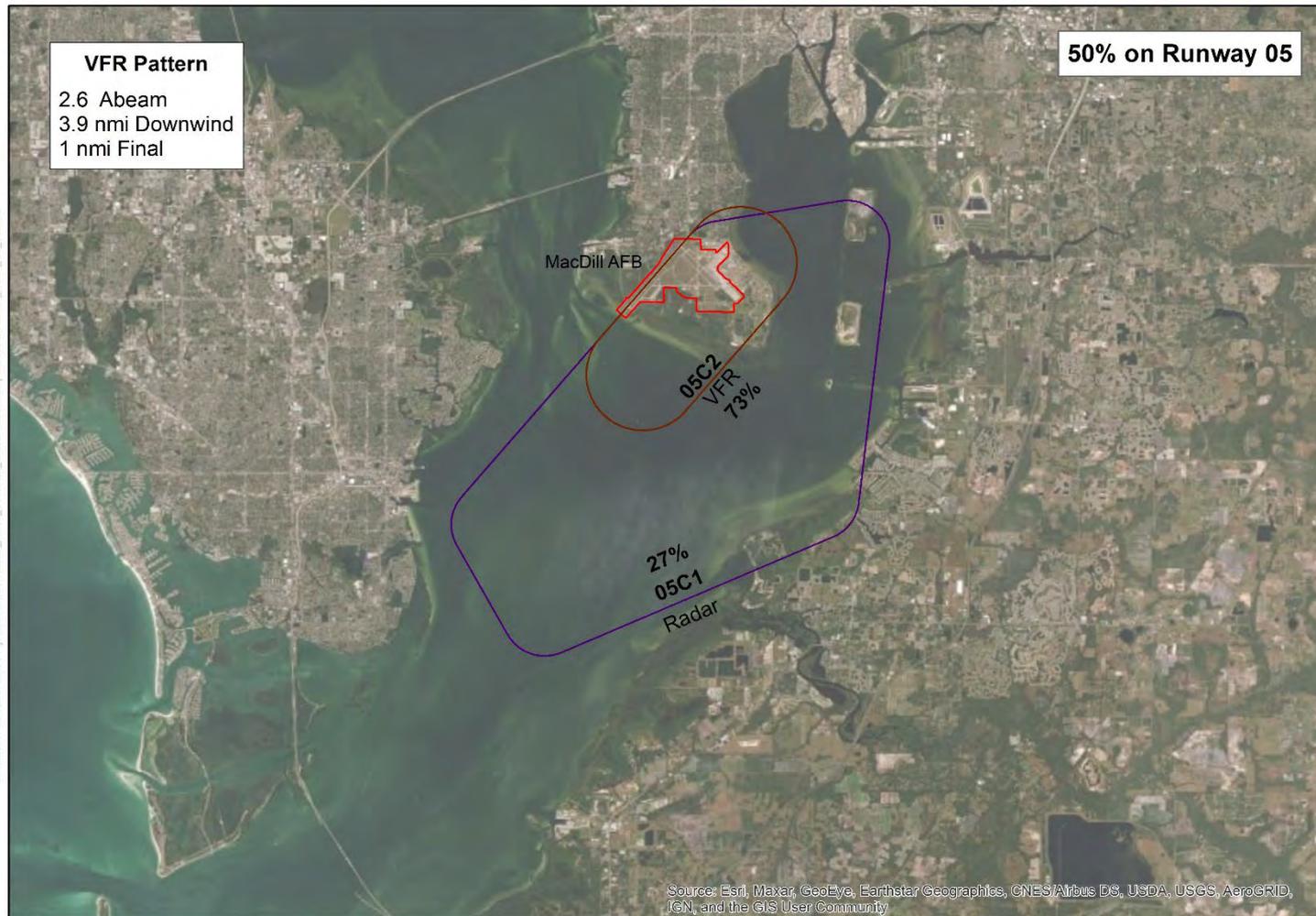


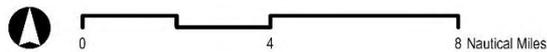
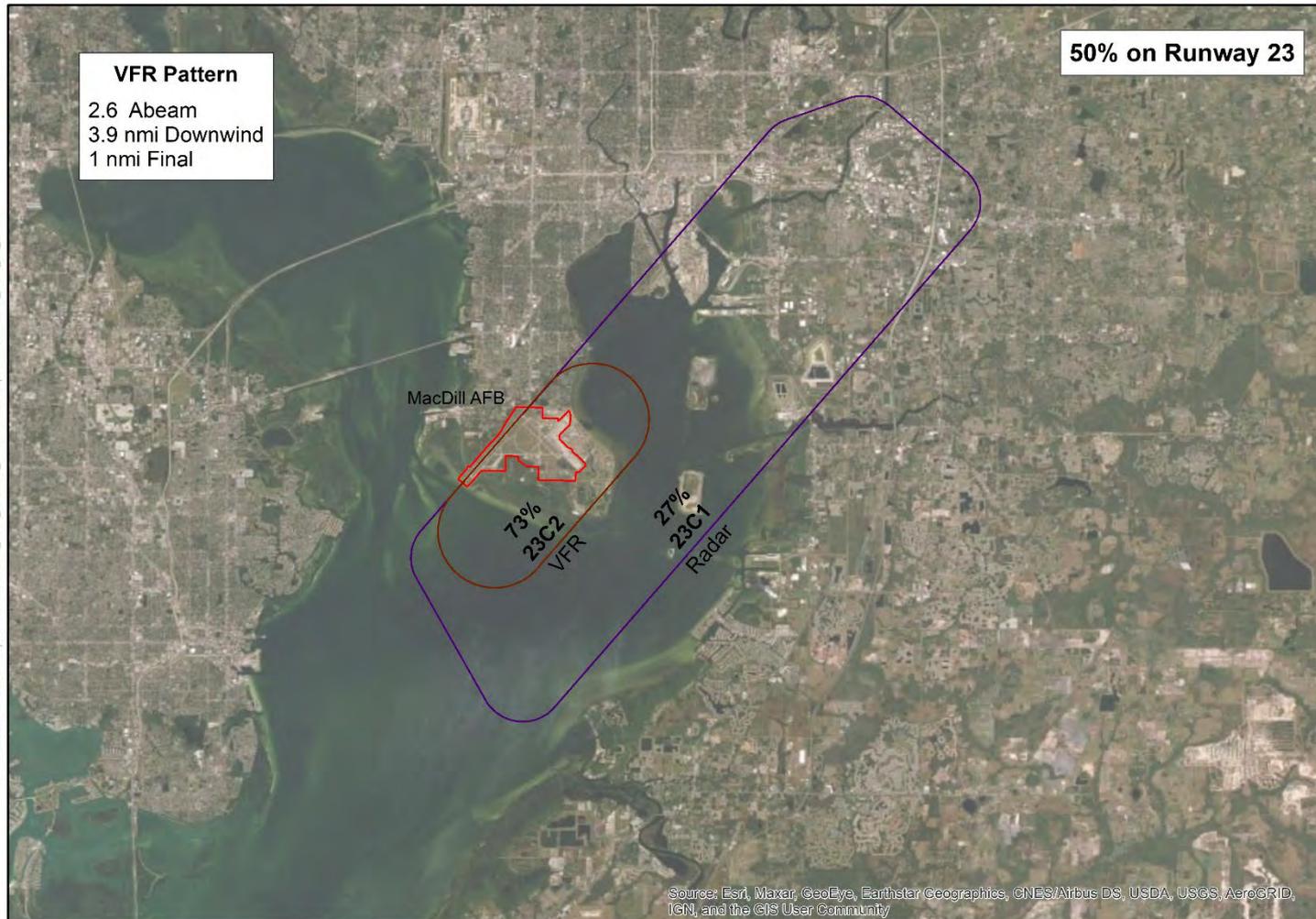


Figure 4-39. Modeled Based KC-46 Aircraft Runway 23 Departure Flight Tracks



**Figure 4-40. Modeled Based KC-46 Aircraft Runway 05 Closed Pattern Flight Tracks**





**Figure 4-41. Modeled Based KC-46 Aircraft Runway 23 Closed Pattern Flight Tracks**



## 5 Airfield Flight Profiles and their Utilization

Profiles data (i.e., altitude, speed, and engine power) were provided by MCF personnel for the based KC-135R and proposed KC-46A aircraft via the data collection process (interviews and follow-up data validation). Flight profiles for the transient aircraft were based on the profiles of similar based aircraft or the previously modeled profiles. In terms of profile utilization, all the profiles were only used on one track for each aircraft at MacDill AFB.

All arrival operations and closed pattern operations have only one profile per track.

Table 5-1 through Table 5-12 show the modeled average DNL daytime and nighttime daily events modeled for each flight profile, rounded up to the nearest fourth decimal place. The events shown in these tables were computed by the following steps:

- a) Dividing the operations shown in Table 2-1, 2-2 or 2-5 by 365 (per Table 1-2),
- b) Further dividing the closed pattern operations by 2,
- c) Multiplying the results from (a) and (b) by the percentages shown in Table 3-1 and by the percentages shown in the maps of Section 4 for corresponding missions.
- d) For KC-46 Arrivals only, further multiplying the results from the previous steps by the arrival type distribution in Table 2-7.

### 5.1 Based Aircraft

#### 5.1.1 KC-135R

Tables 5-1 through 5-3 show the modeled average daily departure arrival and closed pattern events respectively, for the KC-135R.

**Table 5-1. Modeled Average Daily Departure Flight Events for Based KC-135**

Track ID	Track usage	Profile ID	Daytime	Nighttime
05D2	90%	35RDA	0.7742	0.0037
05D3	10%	35RDC	0.0860	0.0004
23D3	10%	35RDG	0.0860	0.0004
23D4	90%	35RDH	0.7742	0.0037
Total			1.7204	0.0082

**Table 5-2. Modeled Average Daily Arrival Flight Events for Based KC-135**

Track ID	Track usage	Profile ID	Daytime	Nighttime
05A1	32%	35RAB	0.2753	0.0013
05A2	32%	35RAC	0.2753	0.0013
05A4	30%	35RAD	0.2581	0.0012
23A4	2%*	35RAO	0.0172	0.0001
23A7	2%*	35RAP	0.0172	0.0001
23A8	2%*	35RAQ	0.0172	0.0001
23A1	20%	35RAH	0.1721	0.0008
23A2	40%	35RAI	0.3441	0.0016
23A3	40%	35RAJ	0.3441	0.0016
Total			1.7206	0.0081

Note: Tracks 23A4, 23A7 and 23A8 are counted in the Runway 05 distribution. The tracks fly along an approach to Runway 05 before circling to land on the opposite runway end (Figure 4-1).

**Table 5-3. Modeled Average Daily Closed Pattern Flight Events for Based KC-135**

Track ID	Track usage	Profile ID	Daytime	Nighttime
05C1	27%	35RE	1.7249	0.1725
05C2	73%	35RF	4.6635	0.4665
23C1	27%	35RM	1.7249	0.1725
23C2	73%	35RN	4.6635	0.4665
Total			12.7768	1.2780

### 5.1.2 Temporary Duty and Based Army Reserve

Tables 5-4 through 5-6 show the modeled average daily departure, arrival, and closed pattern events for TDY aircraft and the Army Reserve helicopters in the Baseline and Proposed Action scenarios.

**Table 5-4. Modeled Average Daily Departure Events for Temporary Duty and Based Army Reserve Aircraft**

Group	Modeled Aircraft Type	Track ID	Track usage	Profile ID	Daytime	Nighttime
TDY	F-18A/C	05D2	2%	F18B	0.0023	0
TDY	F-18A/C	05D2	98%	F18A	0.1141	0
TDY	F-18A/C	23D1	2%	F18D	0.0023	0
TDY	F-18A/C	23D1	98%	F18C	0.1141	0
TDY	A-10A	05D2	100%	A10A	0.1164	0
TDY	A-10A	23D1	100%	A10C	0.1164	0
TDY	F-15A	05D2	100%	F15 05D1	0.0589	0
TDY	F-15A	23D1	100%	F15 23D1	0.0589	0
TDY	F-16A	05D2	100%	F16 05D2	0.2356	0
TDY	F-16A	23D1	100%	F16 23D1	0.2356	0
Army Reserve	UH60	05D1	34%*	AR05D1	0.1925	0.0214
Army Reserve	UH60	05D2	33%	AR05D2	0.1925	0.0214
Army Reserve	UH60	05D3	33%	AR05D3	0.1925	0.0214
Army Reserve	UH60	23D3	50%	AR23D3	0.2890	0.0322
Army Reserve	UH60	23D4	50%	AR23D4	0.2890	0.0322
Total					2.2101	0.1286

Note: \* Modeling reflects one-third on each track; percentage shown rounded for summation purposes

**Table 5-5. Modeled Average Daily Arrival Events for Temporary Duty and Based Army Reserve Aircraft**

Group	Modeled Aircraft Type	Track ID	Track usage	Profile ID	Daytime	Nighttime
TDY	F-18A/C	05A3	30%	F18E	0.0349	0
TDY	F-18A/C	05A5	70%	F18F	0.0815	0
TDY	F-18A/C	23A3	30%	F18G	0.0349	0
TDY	F-18A/C	23A5	70%	F18H	0.0815	0
TDY	A-10A	05A3	30%	A10E	0.0349	0
TDY	A-10A	05A5	70%	A10F	0.0815	0
TDY	A-10A	23A3	30%	A10G	0.0349	0
TDY	A-10A	23A5	70%	A10H	0.0815	0
TDY	F-15A	05A3	30%	F15 05A3	0.0177	0
TDY	F-15A	05A5	70%	F15 05A5	0.0412	0
TDY	F-15A	23A3	30%	F15 23A3	0.0177	0
TDY	F-15A	23A5	70%	F15 23A5	0.0412	0
TDY	F-16A	05A3	30%	F16 05A3	0.0707	0
TDY	F-16A	05A5	70%	F16 05A5	0.1649	0
TDY	F-16A	23A3	30%	F16 23A3	0.0707	0
TDY	F-16A	23A5	70%	F16 23A5	0.1649	0
Army Reserve	UH60	05A1	100%	AR05A1	0.5781	0.0644
Army Reserve	UH60	23A2	50%	AR23A2	0.2890	0.0322
Army Reserve	UH60	23A3	50%	AR23A3	0.2890	0.0322
Total					2.2107	0.1288

**Table 5-6 Modeled Average Daily Closed Pattern Events for Temporary Duty and Army Reserve Aircraft**

Group	Modeled Aircraft Type	Track ID	Track usage	Profile ID	Daytime	Nighttime
TDY	F-18A/C	05C1	75%	F18-05C1	0.4392	0
TDY	F-18A/C	05C2	25%	F18-05C2	0.1464	0
TDY	F-18A/C	23C1	75%	F18-23C1	0.4392	0
TDY	F-18A/C	23C2	25%	F18-23C2	0.1464	0
TDY	A-10A	05C1	75%	A10-05C1	0.3072	0
TDY	A-10A	05C2	25%	A10-05C2	0.1024	0
TDY	A-10A	23C1	75%	A10-23C1	0.3072	0
TDY	A-10A	23C2	25%	A10-23C2	0.1024	0
TDY	F-15A	05C1	75%	F15 05C1	0.6149	0
TDY	F-15A	05C2	25%	F15 05C2	0.2050	0
TDY	F-15A	23C1	75%	F15 23C1	0.6149	0
TDY	F-15A	23C2	25%	F15 23C2	0.2050	0
TDY	F-16A	05C1	75%	F16 05C1	0.3072	0
TDY	F-16A	05C2	25%	F16 05C2	0.1024	0
TDY	F-16A	23C1	75%	F16 23C1	0.3072	0
TDY	F-16A	23C2	25%	F16 23C2	0.1024	0
Army Reserve	UH60	05CHE	6%	AR05CHE2	0.0138	0.0015
Army Reserve	UH60	05CHE	19%	AR05CHE1	0.0439	0.0048
Army Reserve	UH60	05CHW	19%	AR05CHW2	0.0439	0.0048
Army Reserve	UH60	05CHW	56%	AR05CHW1	0.1293	0.0142
Army Reserve	UH60	23CHW	6%	AR23CHE2	0.0138	0.0015
Army Reserve	UH60	23CHE	19%	AR23CHE1	0.0439	0.0048

Group	Modeled Aircraft Type	Track ID	Track usage	Profile ID	Daytime	Nighttime
Army Reserve	UH60	23CHW	19%	AR23CHW2	0.0439	0.0048
Army Reserve	UH60	23CHW	56%	AR23CHW1	0.1293	0.0142
Total					4.9112	0.0506

## 5.2 Transient Aircraft

Tables 5-7 through 5-9 show the modeled average daily departure and arrival events, respectively, for the transient aircraft under the Baseline and Proposed Action scenarios.

**Table 5-7. Modeled Average Daily Departure Events for Transient Aircraft**

Modeled Aircraft Type	Track ID	Track usage	Profile ID	Daytime	Nighttime
F-35A	05D1	49%	F35G	0.0356	0
F-35A	05D2	49%	F35H	0.0356	0
F-35A	05D3	2%	F35I	0.0015	0
F-35A	23D1	20%	F35J	0.0145	0
F-35A	23D4	80%	F35K	0.0581	0
A-10A	05D1	49%	T10G	0.0336	0
A-10A	05D2	49%	T10H	0.0336	0
A-10A	05D3	2%	T10I	0.0014	0
A-10A	23D3	2%	T10J	0.0014	0
A-10A	23D4	98%	T10K	0.0671	0
C-17	05D1	49%	C17G	0.0470	0
C-17	05D2	49%	C17H	0.0470	0
C-17	05D3	2%	C17I	0.0019	0
C-17	23D3	2%	C17J	0.0019	0
C-17	23D4	98%	C17K	0.0940	0
KC-135R	05D1	49%	T135RH	0.0960	0
KC-135R	05D2	49%	T135RG	0.0960	0
KC-135R	05D3	2%	T135RI	0.0039	0
KC-135R	23D3	2%	T135RJ	0.0039	0
KC-135R	23D4	98%	T135RK	0.1920	0
KC-10A	05D1	49%	KC10J	0.0040	0
KC-10A	05D2	49%	KC10A	0.0040	0
KC-10A	05D3	2%	KC10I	0.0002	0
KC-10A	23D3	2%	KC10K	0.0002	0
KC-10A	23D4	98%	KC10C	0.0081	0
KC-46X	05D2	98%	T46DA	0.1114	0
KC-46X	05D3	2%	T46DB	0.0023	0
KC-46X	23D3	2%	T46DC	0.0023	0
KC-46X	23D4	98%	T46DE	0.1114	0
C-21	05D1	49%	C21G	0.0940	0
C-21	05D2	49%	C21H	0.0940	0
C-21	05D3	2%	C21I	0.0038	0
C-21	23D3	2%	C21J	0.0038	0
C-21	23D4	98%	C21K	0.1879	0
C-130H&N&P	05D1	49%	TC130G	0.1987	0

Modeled Aircraft Type	Track ID	Track usage	Profile ID	Daytime	Nighttime
C-130H&N&P	05D2	49%	TC130H	0.1987	0
C-130H&N&P	05D3	2%	TC130I	0.0081	0
C-130H&N&P	23D3	50%	TC130J	0.2027	0
C-130H&N&P	23D4	50%	TC130K	0.2027	0
C-12	05D1	49%	C12G	0.0564	0
C-12	05D2	49%	C12H	0.0564	0
C-12	05D3	2%	C12I	0.0023	0
C-12	23D3	2%	C12J	0.0023	0
C-12	23D4	98%	C12K	0.1128	0
UH60	05D1	49%	TH60G	0.1074	0
UH60	05D2	49%	TH60H	0.1074	0
UH60	05D3	2%	TH60I	0.0044	0
UH60	23D3	2%	TH60K	0.0044	0
UH60	23D4	98%	TH60J	0.2148	0
Total				2.9729	0

**Table 5-8. Modeled Average Daily Arrival Events for Transient Aircraft**

Modeled Aircraft Type	Track ID	Track usage	Profile ID	Daytime	Nighttime
F-35A	05A1	49%	F35A	0.0356	0
F-35A	05A2	2%	F35B	0.0015	0
F-35A	05A4	49%	F35C	0.0356	0
F-35A	23A1	49%	F35D	0.0356	0
F-35A	23A2	2%	F35E	0.0015	0
F-35A	23A3	49%	F35F	0.0356	0
A-10A	05A1	49%	T10A	0.0336	0
A-10A	05A2	49%	T10B	0.0336	0
A-10A	05A3	2%	T10C	0.0014	0
A-10A	23A1	2%	T10D	0.0014	0
A-10A	23A2	49%	T10E	0.0336	0
A-10A	23A3	49%	T10F	0.0336	0
C-17	05A1	49%	C17A	0.0470	0
C-17	05A2	49%	C17B	0.0470	0
C-17	05A3	2%	C17C	0.0019	0
C-17	23A1	2%	C17D	0.0019	0
C-17	23A2	49%	C17E	0.0470	0
C-17	23A3	49%	C17F	0.0470	0
KC-135R	05A1	49%	T135RA	0.0960	0
KC-135R	05A2	49%	T135RB	0.0960	0
KC-135R	05A3	2%	T135RC	0.0039	0
KC-135R	23A1	2%	T135D	0.0039	0
KC-135R	23A2	49%	T135E	0.0960	0
KC-135R	23A3	49%	T135F	0.0960	0
KC-10A	05A1	49%	KC10B	0.0040	0
KC-10A	05A2	49%	KC10F	0.0040	0
KC-10A	05A3	2%	KC10E	0.0002	0
KC-10A	23A1	2%	KC10G	0.0002	0

Modeled Aircraft Type	Track ID	Track usage	Profile ID	Daytime	Nighttime
KC-10A	23A2	49%	KC10H	0.0040	0
KC-10A	23A3	49%	KC10D	0.0040	0
KC-46X	05A1	49%	T46AB	0.0557	0
KC-46X	05A2	49%	T46AC	0.0557	0
KC-46X	05A4	2%	T46AD	0.0023	0
KC-46X	23A1	2%	T46AG	0.0023	0
KC-46X	23A2	49%	T46AH	0.0557	0
KC-46X	23A3	49%	T46AI	0.0557	0
C-21	05A1	49%	C21A	0.0940	0
C-21	05A2	49%	C21B	0.0940	0
C-21	05A3	2%	C21C	0.0038	0
C-21	23A1	2%	C21D	0.0038	0
C-21	23A2	49%	C21E	0.0940	0
C-21	23A3	49%	C21F	0.0940	0
C-130H&N&P	05A1	49%	TC130A	0.1987	0
C-130H&N&P	05A2	49%	TC130B	0.1987	0
C-130H&N&P	05A3	2%	TC130C	0.0081	0
C-130H&N&P	23A1	2%	TC130D	0.0081	0
C-130H&N&P	23A2	49%	TC130E	0.1987	0
C-130H&N&P	23A3	49%	TC130F	0.1987	0
C-12	05A1	49%	C12A	0.0564	0
C-12	05A2	49%	C12B	0.0564	0
C-12	05A3	2%	C12C	0.0023	0
C-12	23A1	2%	C12D	0.0023	0
C-12	23A2	49%	C12E	0.0564	0
C-12	23A3	49%	C12F	0.0564	0
UH60	05A1	49%	TH60A	0.1074	0
UH60	05A2	49%	TH60B	0.1074	0
UH60	05A3	2%	TH60C	0.0044	0
UH60	23A1	2%	TH60E	0.0044	0
UH60	23A2	49%	TH60F	0.1074	0
UH60	23A3	49%	TH60F2	0.1074	0
Total				2.9732	0

**Table 5-9. Modeled Average Daily Closed Pattern Events for Transient Aircraft**

Aircraft	Track	Track usage	Profile	Daily-Daytime	Daily-Nighttime
C-130H&N&P	05C1	10%	CGC1A	0.1977	0
C-130H&N&P	05C2	90%	CGC2A	1.7797	0
C-130H&N&P	23C1	10%	CGC1B	0.1977	0
C-130H&N&P	23C2	90%	CGC2B	1.7797	0
UH60	05CHE	6%	CGHC1E2	0.0692	0
UH60	05CHE	19%	CGHC1E1	0.2190	0
UH60	05CHW	19%	CGHC1W2	0.2190	0
UH60	05CHW	56%	CGHC1W1	0.6455	0
UH60	23CHW	6%	CGHC2E2	0.0692	0
UH60	23CHE	19%	CGHC2E1	0.2190	0

Aircraft	Track	Track usage	Profile	Daily-Daytime	Daily-Nighttime
UH60	23CHW	19%	CGHC2W2	0.2190	0
UH60	23CHW	56%	CGHC2W1	0.6455	0
Total				6.2602	0

### 5.3 Proposed Based KC-46A Aircraft

Tables 5-10 through 5-12 show the modeled average daily departure, arrival, and closed pattern events, respectively, for the KC-46A under the Proposed Action.

**Table 5-10. Modeled Average Daily Departure Flight Events for Based KC-46**

Track ID	Track usage	Profile ID	Daytime	Nighttime
05D2	90%	K46DA	1.5682	0.0432
05D3	10%	K46DB	0.1742	0.0048
23D3	10%	K46DC	0.1742	0.0048
23D4	90%	K46DE	1.5682	0.0432
Total			3.4848	0.0960

**Table 5-11. Modeled Average Daily Arrival Flight Events for Based KC-46**

Track ID	Track usage	Profile ID	Daytime	Nighttime
05A1	26%	K46AB	0.3850	0.0805
05A2	26%	K46AC	0.3850	0.0805
05A4	26%	K46AD	0.3850	0.0805
05A7	8%	K46AE	0.1185	0.0248
05A8	8%	K46AF	0.1185	0.0248
23A4	2%*	K46AO	0.0296	0.0062
23A7	2%*	K46AP	0.0296	0.0062
23A8	2%*	K46AQ	0.0296	0.0062
23A1	28%	K46AG	0.4146	0.0867
23A2	28%	K46AH	0.4146	0.0867
23A3	28%	K46AI	0.4146	0.0867
23A9	8%	K46AK	0.1185	0.0248
23A10	8%	K46AJ	0.1185	0.0248
Total			2.9616	0.6194

Note: Tracks 23A4, 23A7 and 23A8 are counted in the Runway 05 distribution. The tracks fly along an approach to Runway 05 before circling to land on the opposite runway end (Figure 4-34).

**Table 5-12. Modeled Average Daily Closed Pattern Flight Events for Based KC-46**

Track ID	Track usage	Profile ID	Daytime	Nighttime
05C1	27%	K46CA	1.7655	0.1962
05C2	73%	K46CB	4.7735	0.5305
23C1	27%	K46CD	1.7655	0.1962
23C2	73%	K46CE	4.7735	0.5305
Total			13.0780	1.4534

Maps of all modeled flight profiles are contained in Appendix A.

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## 6 Maintenance and Preflight Runups

Sections 6.1 and 6.2 address runups for the Baseline and Proposed Action, respectively.

### 6.1 Baseline

Sections 6.1.1 and 6.1.2 address preflight runups and maintenance runups for the Baseline scenario, respectively.

#### 6.1.1 Preflight Runups

NMAP flight profiles include a preflight runup to model the beginning of takeoff roll and runups the pilot does prior to brake release. However, preflight runups can occur other places or have power cycles not compliant with the flight profile's preflight modeling. The latter style of preflight runups is modeled as maintenance-style runups. However, none of the based or transient aircraft conduct preflight runups at MacDill, thus none were modeled.

#### 6.1.2 Maintenance Runups

Table 6-1 lists the maintenance runups for the KC-135R. The pads listed are shown in Figure 6-1. Pads POW and RP2 have runup operations using multiple headings as shown in Table 6-1, while Pads RP1A and RP1B are only used at heading 220.

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**Table 6-1. Annual Maintenance Runup Operations for Based KC-135R**

Runup Type	Power Setting	# Engines Running	Duration of total Runup Profile (Minutes)	Day (0700-2200) Operations	Night (2200-0700) Operations	Total Annual Operations	Pad	Heading (true) and Distribution
Pressurization Check	see note 1	2	40	9	3	12	POW	40, 130, 220,310 (Even Usage)
Engine Compressor Wash	25% NF	4	25	72	24	96	POW	40, 130, 220,310 (Even Usage)
Accel/Decel/Component Charge-2 engine	see note 2	2	32	18.75	6.25	25	POW	40, 130, 220,310 (Even Usage)
4 Engine Troubleshooting	20% NF	4	15	37.5	12.5	50	RP2	40, 130, 220,310 (Even Usage)
Other Troubleshooting	20% NF	1	20	37.5	12.5	50	POW, RP1A, RP1B, RP2	220 see note 3

Notes:

- 1) See Runup profile in Table 6-2
- 2) See Runup profile in Table 6-3
- 3) Usage split amongst pads: POW 57.1%, RP1A 14.3%, RP1B 14.3%, RP2 14.3%

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### 6.1.2.1 Pressurization Check

Pressurization check runups occur at the POW pad, 12 times per year, 75 percent during DNL daytime, with two engines running. Events are split equally among four (true) headings: 40, 130, 220 and 310 degrees. Table 6-2 describes the power profile.

**Table 6-2. Pressurization Check Runup Profile for KC-135**

Segment	Power (%NF)	Duration (minutes)
1	50	10
2	90	10
3	20	20

### 6.1.2.2 Engine Compressor Wash

Engine compressor wash runups occur at the POW pad, 96 times per year, 75 percent during DNL daytime, with four engines running. Events are split equally among four (true) headings: 40, 130, 220 and 310 degrees.

### 6.1.2.3 Accel/Decel/Component Charge—Two Engine

Accel/decel/component charge for two-engine runups occur at the POW pad, 25 times per year, 75 percent during DNL daytime, with two engines running. Events are split equally among four (true) headings: 40, 130, 220 and 310 degrees. Table 6-3 describes the power profile.

**Table 6-3. Accel/Decel/Component Charge-2 engine Runup Profile for KC-135**

Segment	Power (%NF)	Duration (minutes)
1	20	13
2	65	6
3	70	3
4	80	10.2 seconds
5	87	4
6	90	5



**Figure 6-1. Location of Modeled Runup Pads for KC-135R and KC-46A Maintenance**

#### 6.1.2.4 Four-Engine Troubleshooting

Four-engine troubleshooting runups occur at the RP2 pad, 50 times per year, 75 percent during DNL daytime, with four engines running. Events are split equally among four (true) headings: 40, 130, 220 and 310 degrees.

#### 6.1.2.5 Other Troubleshooting

Other troubleshooting runups occur at all pads, 50 times per year, 75 percent during DNL daytime, with one engine running. Events run at (true) heading of 220. About 57 percent of the runups are on pad POW, while the remaining are split evenly amongst the rest of the pads (RP1A, RP1B, RP2).

### 6.2 Proposed Action

Runup activity for the KC-46A is currently unknown. NMAP does not contain reference acoustic data for KC-46A static/runup operations; therefore, per AFCEC direction and to ensure consistency with previous MOB analyses, KC-135R reference acoustic data was used as a surrogate for KC-46A data. Also, per AFCEC direction, the KC-46A maintenance runup profiles were assumed to be identical to the based KC-135R runup profiles (AFCEC 2022).

The KC-46A can develop more thrust than the KC-135R, even though the KC-135R has twice as many engines. AFCEC notes the KC-46A can develop 50 percent more thrust from its two engines than the KC-135R can produce from its four engines. Thus, the KC-46A numbers of runups were multiplied by 1.5 in an initial attempt to account for the difference in noise output caused by the difference in thrust output (AFCEC 2022). The net result is the Proposed Action uses the same runup profiles as Baseline, but with 1.5 times the annual events (for both day and nighttime activities).

#### 6.2.1 Preflight Runups

As noted in Section 6.1.1, none of the based or transient aircraft conduct preflight runups at MacDill, thus none were modeled. The KC-46A would not perform any preflight runups.

#### 6.2.2 Maintenance Runups

The KC-46A maintenance runups would use the existing KC-135R maintenance runups events scaled up by 150 percent (i.e., a factor of 1.5) to account for the increase in noise that would accompany the total thrust difference between the KC-46A compared to the KC-135R. Thus, all the runup profiles described in Section 6.2.1 apply for the KC-46A maintenance runups, with numbers of events multiplied by 1.5.

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## 7 Noise Exposure Calculations/Results

Section 7.1 contains the DNL results while Section 7.2 addresses the supplemental noise analyses.

### 7.1 Primary Noise Analysis

Figure 7-1 shows shaded DNL bands/contours for the Baseline scenario. The shaded regions represent ranges of DNL<sup>2</sup>: 65-70 (blue), 70-75 (green), 75-80 (yellow), 80-85 (orange), and 85+ (red). The 65 DNL contour extends beyond the base boundary to the northeast by approximately 3,680 feet and to the west by approximately 1,650 feet. Off-base residences and schools are exposed to DNL greater than or equal to 65 dB.



**Figure 7-1. DNL Shading for Baseline Scenario**

Figure 7-2 shows shaded DNL bands/contours for the Proposed Action, in a manner similar to Figure 7-1. The 65 DNL contour would extend beyond the base boundary to the northeast by approximately 3,050 feet and to the west by approximately 1,650 feet. Off-base residences and schools would be exposed to DNL greater than or equal to 65 dB.

<sup>2</sup> Exclusive of upper bounds



**Figure 7-2. DNL Shading for Proposed Action Scenario**

Figure 7-3 shows a comparison of the 65 DNL contours for both scenarios. The 65 DNL for the Baseline is shown as a solid blue line and the Proposed Action is shown with a black dashed line. The Proposed Action would cause the 65 DNL contour to extend slightly to the southeast along the runway axis by approximately 900 feet and to slightly contract to the northwest along the runway axis by approximately 750 feet.



**Figure 7-3. Comparison of DNL Contours for Baseline and Proposed Action**

## 7.2 Supplemental Noise Analysis

The scope of work required analyses of noise exposure in addition to the DNL contours shown in Section 7.1. The extra analyses relate to the potential effect of the noise (i.e., sleep disturbance, hearing loss, classroom learning interference, and speech interference in Sections 7.2.1 through 7.2.4, respectively). Section 7.2.5 addresses a supplemental analysis for wildlife locations.

The DoD’s guidelines for the use of supplemental metrics were used to identify metrics and their thresholds (DoD Noise Working Group 2009). Table 7-1 shows the relevant metrics and thresholds for this EIS, based on DoD guidelines. The two primary metrics for supplemental analyses are the Number of Events (at or) Above a Specified Threshold (NA) and Time (at or) Above a Maximum Sound Level (TA). NA utilizes Maximum Sound Level ( $L_{max}$ ) and Sound Exposure Level (SEL). As its name implies, TA is solely based on  $L_{max}$ . Eight-hour (school-day) Equivalent Sound Level ( $L_{eq(8h)}$ ) is also utilized. Schools with  $L_{eq(8h)}$  less than 60 dB are screened out and are not likely to be affected. NA and TA metrics are computed for schools having  $L_{eq(8h)}$  greater than or equal to 60 dB in any scenario.

For wildlife impact analysis,  $L_{max}$  was calculated at each wildlife monitoring site. As the NOISEMAP suite cannot automatically compute the overall  $L_{max}$  for all flight/static profiles at once, the flight profile contributing the greatest SEL at each site was chosen to approximate the flight/static profile with highest overall  $L_{max}$  at that site.

**Table 7-1. Guideline Values (Outdoor Values)**

Application	Metric	Unit	Time Period	Recommended Outdoor Thresholds for Reporting Purposes
Speech Interference	NA	Number of Events	15-hr day (DNL daytime)	75 dB $L_{max}$
Sleep Disturbance	NA	Number of Events	9-hr night (DNL nighttime)	90 dB SEL
Classroom Speech Interference	$L_{eq}$	Decibel	School hours (8-hr)	60 dB (for scoping)
Classroom Speech Interference	NA	Number of Events	School hours (8-hr)	75 dB $L_{max}$
Classroom Speech Interference	TA	Time (minutes)	School hours (8-hr)	75 dB $L_{max}$
Potential for Hearing Loss	PHL	Decibel	Annual Average Day	80 dB
Wildlife Effects/impacts	$L_{max}$	Decibel	Overall	(species specific)

The NOISEMAP suite was used to compute the identified supplemental metrics.

The supplemental analyses address specific Points of Interest (POI) in the vicinity of MCF. The POI provided by DAF are shown in Figure 7-4. The POI consist of multiple residential-type receptors (R01 through R11) and multiple off-base schools (S01 through S10). The on-base hospital (H01) was included in the speech interference and sleep disturbance analyses. The wildlife POI consist of two bald eagle nests (A01 and A02) and multiple gopher, tortoise, burrowing owl, and shorebird monitoring locations.

All POI were modeled at five feet above ground level (AGL), except for the bald eagle nest and shorebird locations, which were modeled at 50 feet AGL.

Figure 7-4 shows all POIs near MCF at an overview scale. Wildlife locations A29 and A30 are not shown on the map because they are both located a significant distance away from MCF on the opposite side of Tampa Bay.



Figure 7-4. Modeled POI Locations

### 7.2.1 Potential For Sleep Disturbance

The residential and hospital POI are applicable for this analysis. Table 7-2 shows the results. The (outdoor) NA 90 SEL would not change relative to the Baseline/No Action scenarios at all the residential POI except R08 (Milgwen) and R10 (Interbay). The NA 90 SEL would also not change relative to the Baseline/No Action scenarios for the hospital (H01). Under the Proposed Action, R08 would experience an increase of 24 potentially sleep disturbing events per year and R10 would experience an increase of five potentially sleep disturbing events per year. These increases would be due to the increase in KC-46 nighttime closed pattern operations compared to the Baseline KC-135 nighttime closed pattern operations.

**Table 7-2. Annual Number of Nighttime Events (at or) Above 90 dB SEL**

Point of Interest	ID	Baseline Annual Events	Proposed Action Annual Events	Increase re Baseline
Family Housing	R01	0	0	0
Family Housing	R02	0	0	0
Family Housing	R03	0	0	0
Family Housing	R04	0	0	0
Family Housing	R05	0	0	0
Family Housing	R06	0	0	0
Family Housing	R07	0	0	0
The Estates at Bayshore Point	R08	65	89	24
Port Tampa Communities	R09	0	0	0
Interbay	R10	493	498	5
Milgwen	R11	0	0	0
MacDill Regional USAF Hospital	H01	0	0	0

### 7.2.2 Potential For Hearing Loss

Residential receptors would have the potential for hearing loss (PHL) if their DNL would be 80 dB or greater. For either scenario, the 80 dB DNL contour is/would be contained to the base boundary and exclude on-base residential POI; therefore, no PHL is anticipated.

### 7.2.3 Classroom Learning Interference

The school-day hours were assumed to be 8 AM to 4 PM, wholly within the DNL daytime period. With the hourly distribution of the numbers of operations unknown, DNL daytime operations were assumed to be evenly distributed throughout its 15-hour daytime period. DNL daytime operations were scaled by a factor of 0.53 ( $=8 \div 15$ ) to convert them to school-day operations.

Table 7-3 shows the  $L_{eq(8h)}$  for the school POI. Only one school (S07; Academy of Active Education) would have  $L_{eq(8h)}$  greater than or equal to 60 dB under any scenario (Baseline or Proposed Action), so the NA and TA metrics are calculated for S07 and shown in Tables 7-4 and 7-5. These results show a reduction in the NA and TA for the Proposed Action scenario, corresponding with the reduction in the 65 DNL contour area northeast of the base, which shifts it approximately 200 feet farther from the school. The

NA would decrease by over 1,000 annual events (approximately 32 percent) while the TA would decrease by 73 minutes per year (approximately 15 percent).

**Table 7-3. School-Day  $L_{eq(8h)}$**

<b>School</b>	<b>ID</b>	<b>Baseline</b>	<b>Proposed Action</b>
Westshore Elementary School	S01	57	57
Robinson High School	S02	53	53
Monroe Middle School	S03	48	48
Lanier Elementary School	S04	49	49
Tinker Elementary School	S05	46	46
Chiaromonte Elementary School	S06	51	51
Academy of Active Education	S07	61	61
MacDill School Age Program	S08	49	49
Top Kids Bilingual Preschool	S09	55	55
Sunshine Learning Center	S10	51	51

**Table 7-4. Annual Number of School-Day Events (at or) Above 75 dB  $L_{max}$  for the Academy of Active Education (S07)**

<b>Baseline</b>	<b>Proposed Action</b>	<b>Change</b>
3,353	2,279	-1,074

**Table 7-5. Annual Time (at or) Above 75 dB (minutes) during the School Day for the Academy of Active Education (S07)**

<b>Baseline</b>	<b>Proposed Action</b>	<b>Change</b>
475	402	-73

## 7.2.4 Speech Interference

Table 7-6 reports the annual NA 75 dB  $L_{max}$  for the speech interference analysis, which used only the DNL daytime operations at the residential locations and hospital. The Proposed Action would potentially decrease the number of outdoor speech interfering events three of the residential POI (i.e., R01, R08 and R10) and the on-base hospital (H01). These four POI would experience a decrease between 19 and 1,365 events per year due to the replacement of all the KC-135 closed patterns with quieter (on a daily average) KC-46 closed pattern operations. The decrease in events at R01 can also be attributed to the replacement of KC-135 by the KC-46 since R01 is located directly under the shared “circle to 23” flight tracks. All other POI in the table would not experience a change in NA 75 dB  $L_{max}$  because TDY F-18 and A-10 operations, the dominant contributors to the metric, would remain unchanged for the Proposed Action.

**Table 7-6. Annual Number of Daytime Events (at or) Above Outdoor 75 dB L<sub>max</sub>**

<b>Point of Interest</b>	<b>ID</b>	<b>Baseline Events</b>	<b>Proposed Action Events</b>	<b>Increase re Baseline</b>
Family Housing	R01	388	369	-19
Family Housing	R02	396	396	0
Family Housing	R03	1,159	1,159	0
Family Housing	R04	904	904	0
Family Housing	R05	931	931	0
Family Housing	R06	931	931	0
Family Housing	R07	815	815	0
The Estates at Bayshore Point	R08	5,339	3,974	-1,365
Port Tampa Communities	R09	2,590	2,590	0
Interbay	R10	7,421	6,300	-1,121
Milgwen	R11	1,716	1,716	0
MacDill Regional USAF Hospital	H01	2,505	2,191	-314

### 7.2.5 Noise Analysis Relating to Effects and Impacts on Wildlife

The TDY F-18 departure operations from Runways 05 and 23 would have the highest SEL at almost all the wildlife POI for both scenarios (Baseline and Proposed Action). For POI A07, A08, A09, and A11, the TDY A-10 closed pattern operations from Runways 05 and 23 would have the highest SEL. The maximum of the two flight profiles are listed in Table 7-7. As the TDY operations do not change under the Proposed Action relative to the Baseline, no change in wildlife effects is anticipated.

**Table 7-7. Estimated Maximum Sound Levels at Wildlife POI for Baseline and Proposed Action**

<b>Wildlife Site</b>	<b>ID</b>	<b>L<sub>max</sub> (dB)</b>
Bald Eagle Nest	A01	85
Bald Eagle Nest	A02	88
Gopher Tortoise	A03	96
Burrowing Owl	A04	96
Gopher Tortoise	A05	92
Multiple shorebird species	A06	115
Multiple shorebird species	A07	86
Multiple shorebird species	A08	89
Multiple shorebird species	A09	88
Multiple shorebird species	A10	111
Gopher Tortoise	A11	87
Gopher Tortoise	A12	87
Burrowing Owl	A13	112
Gopher Tortoise	A14	97
Gopher Tortoise	A15	102
Burrowing Owl	A16	109
Burrowing Owl	A17	103
Gopher Tortoise	A18	89
Gopher Tortoise	A19	88
Gopher Tortoise	A20	92
Gopher Tortoise	A21	90
Gopher Tortoise	A22	95
Gopher Tortoise	A23	104
Gopher Tortoise	A24	101
Gopher Tortoise	A25	105
Gopher Tortoise	A26	91
Burrowing Owl	A27	95
Multiple shorebird species	A28	98
West Indian Manatee Critical Habitat	A29	72
Piping Plover Critical Habitat	A30	46

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## 9 Acronyms and Abbreviations

AAM	Advanced Acoustics Model
AFB	Air Force Base
AFCEC	Air Force Civil Engineering Center
AGL	Above Ground Level
ARP	Airport Reference Point
ATC	Air Traffic Control
CY	Calendar Year
DAF	United States Air Force
dB	Decibel
DNL	Day-Night Average Sound Level
DoD	Department of Defense
EIS	Environmental Impact Statement
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
ILS	Instrument Landing System
kPa-s/m <sup>2</sup>	kilopascal-seconds per square meter
L <sub>eq(8h)</sub>	Eight-hour (school-day) Equivalent Sound Level
L <sub>max</sub>	Maximum Sound Level
MOB	Main Operating Base
MCF	MacDill Air Force Base
MSL	Mean Sea Level
NA	Number of Events (at or) Above a Specified Threshold
NEPA	National Environmental Protection Agency
NLR	Noise Level Reduction
NMAP	NOISEMAP
NMODD	Noise Model Operational Data Documentation
PA	Probability of Awakening
PAA	Primary Authorized Aircraft
PHL	Potential for Hearing Loss
POI	Point of Interest
SEL	Sound Exposure Level
SME	Subject Matter Expert
SUA	Special Use Airspace
TA	Time (at or) Above a Maximum Sound Level
TDY	Temporary Duty Travel
VFR	Visual Flight Rules

## Appendix A Airfield Flight Profile Maps

Sections A.1 through A.5 contain the flight profile maps for the KC-135, Temporary Duty aircraft, based helicopters, transient aircraft, and the KC-46, respectively.

### A.1 Airfield Flight Profile Maps for Based KC-135 Aircraft

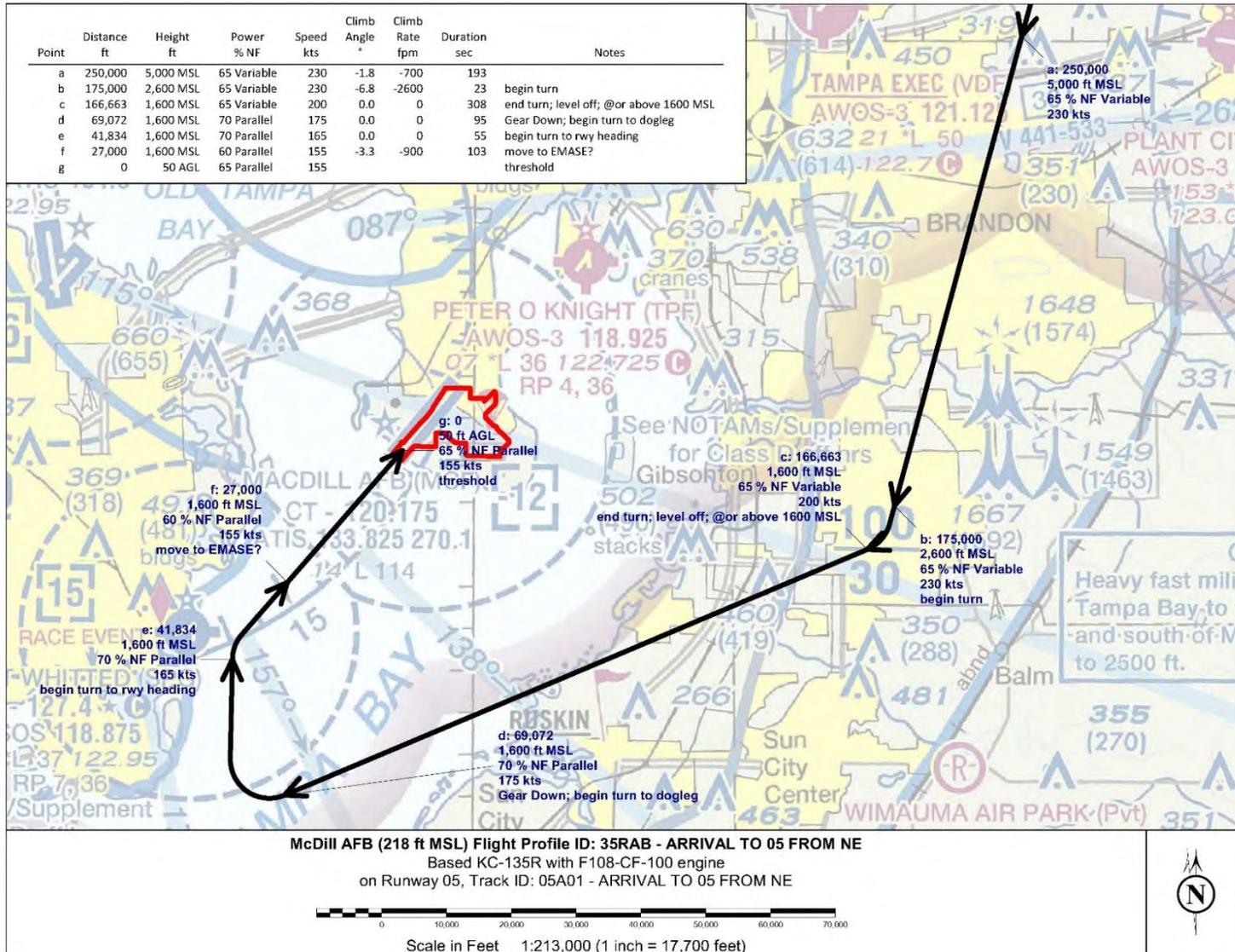


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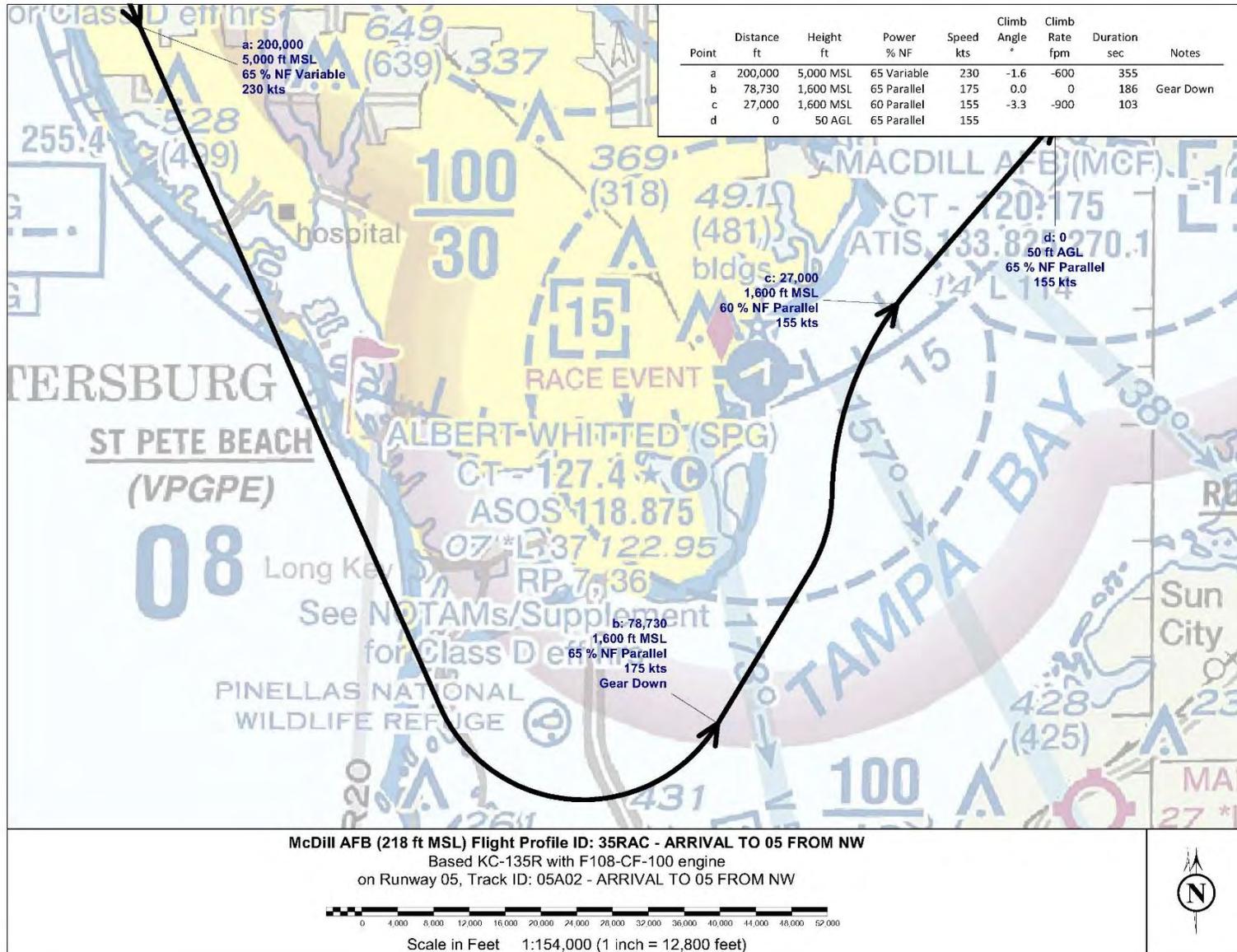


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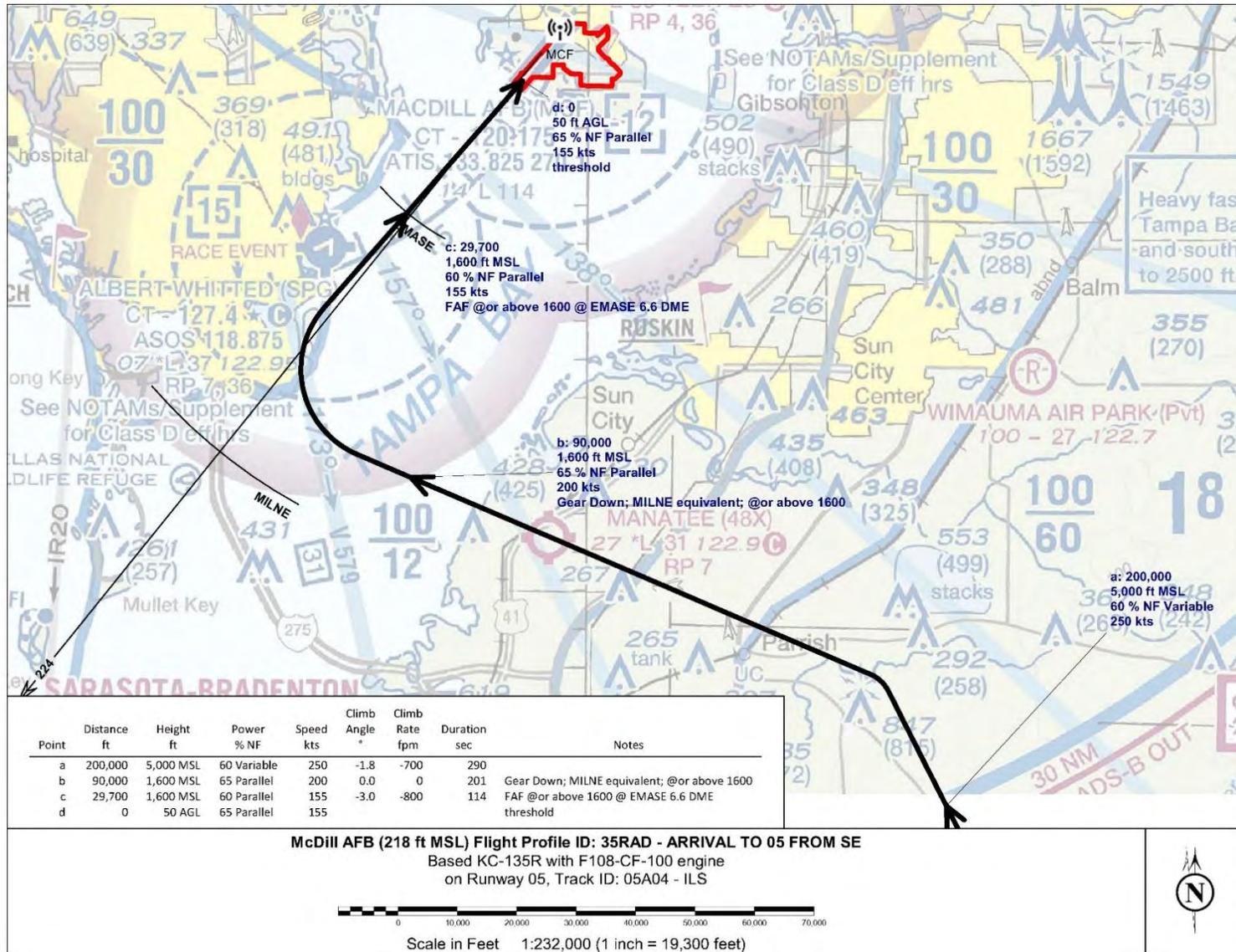


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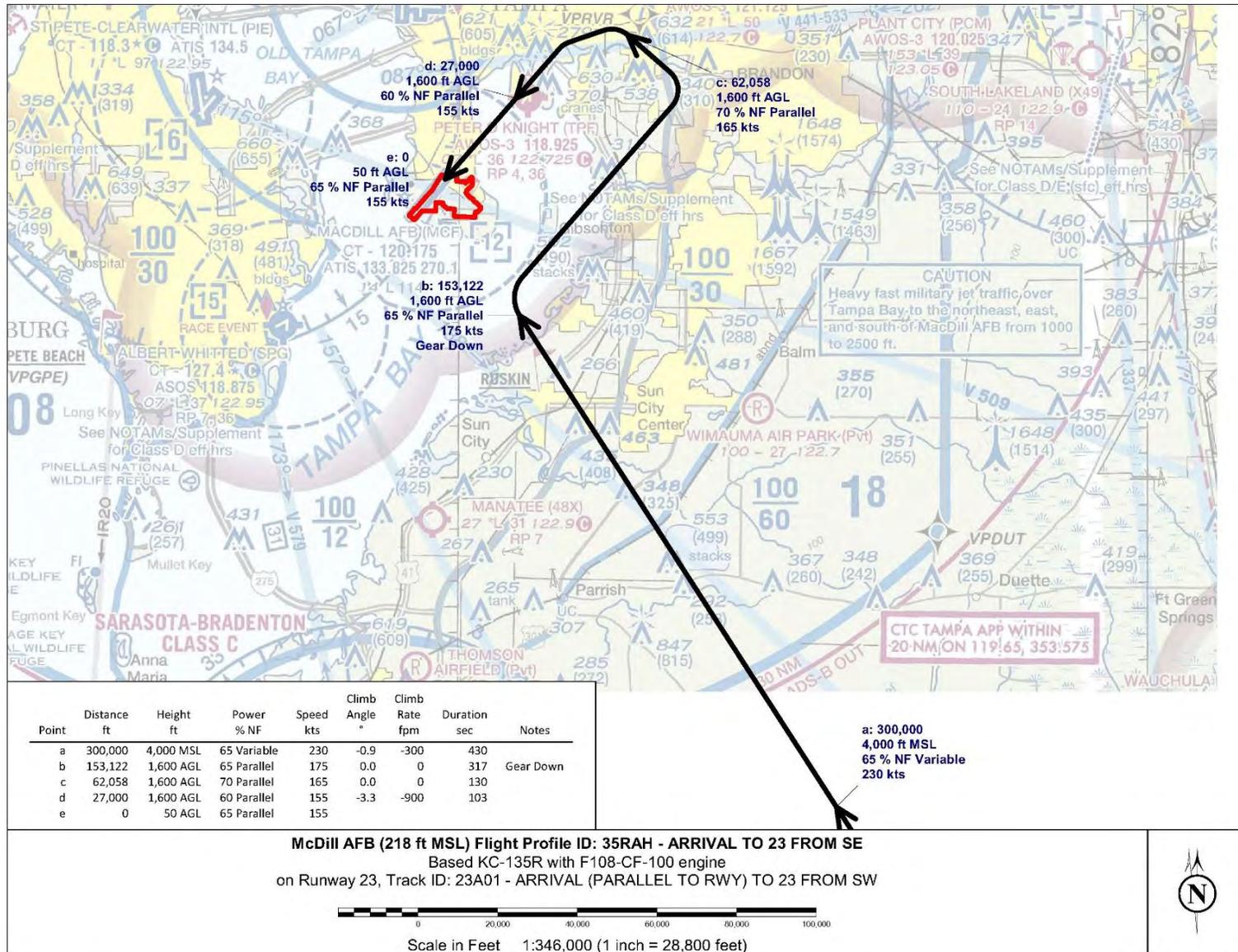


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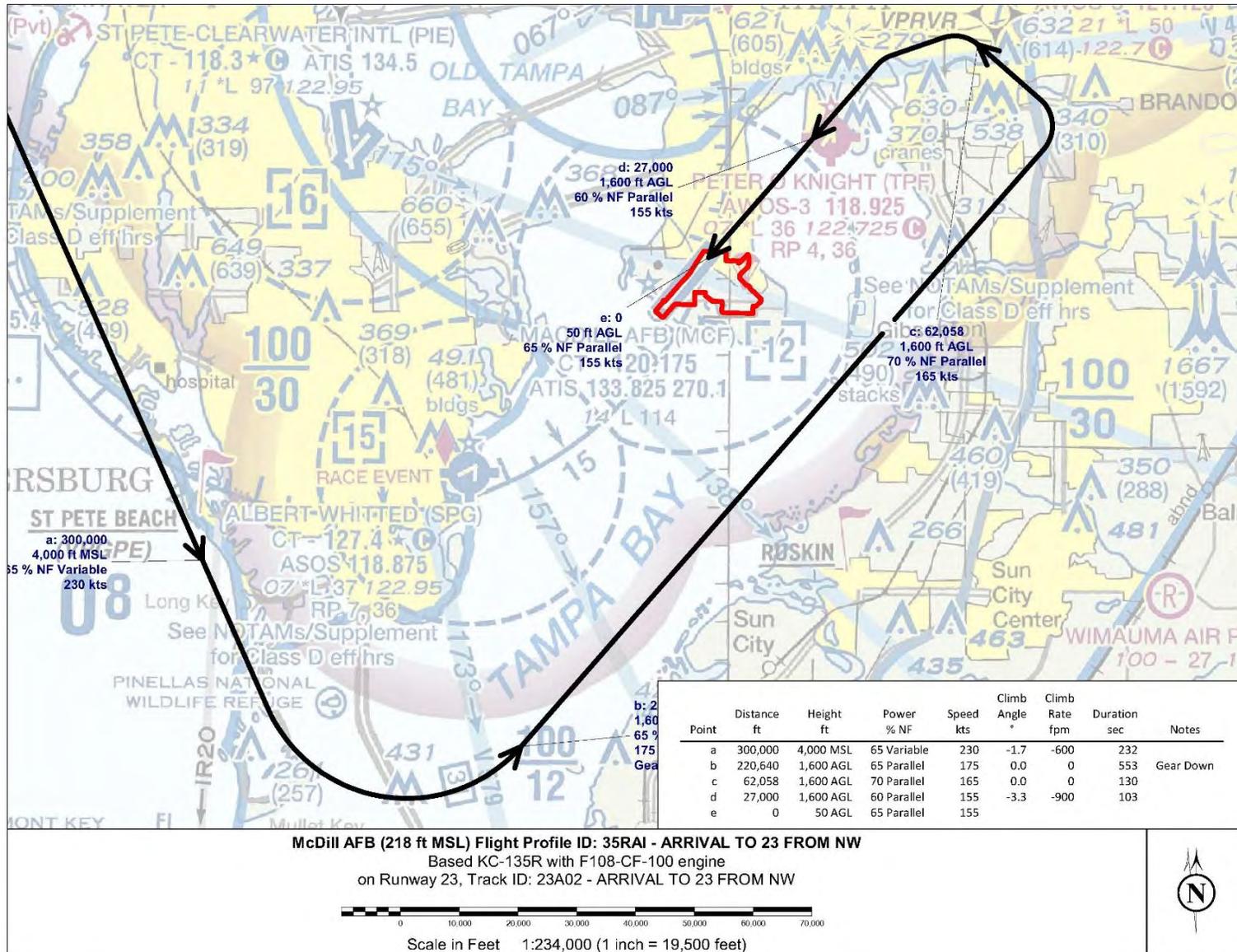


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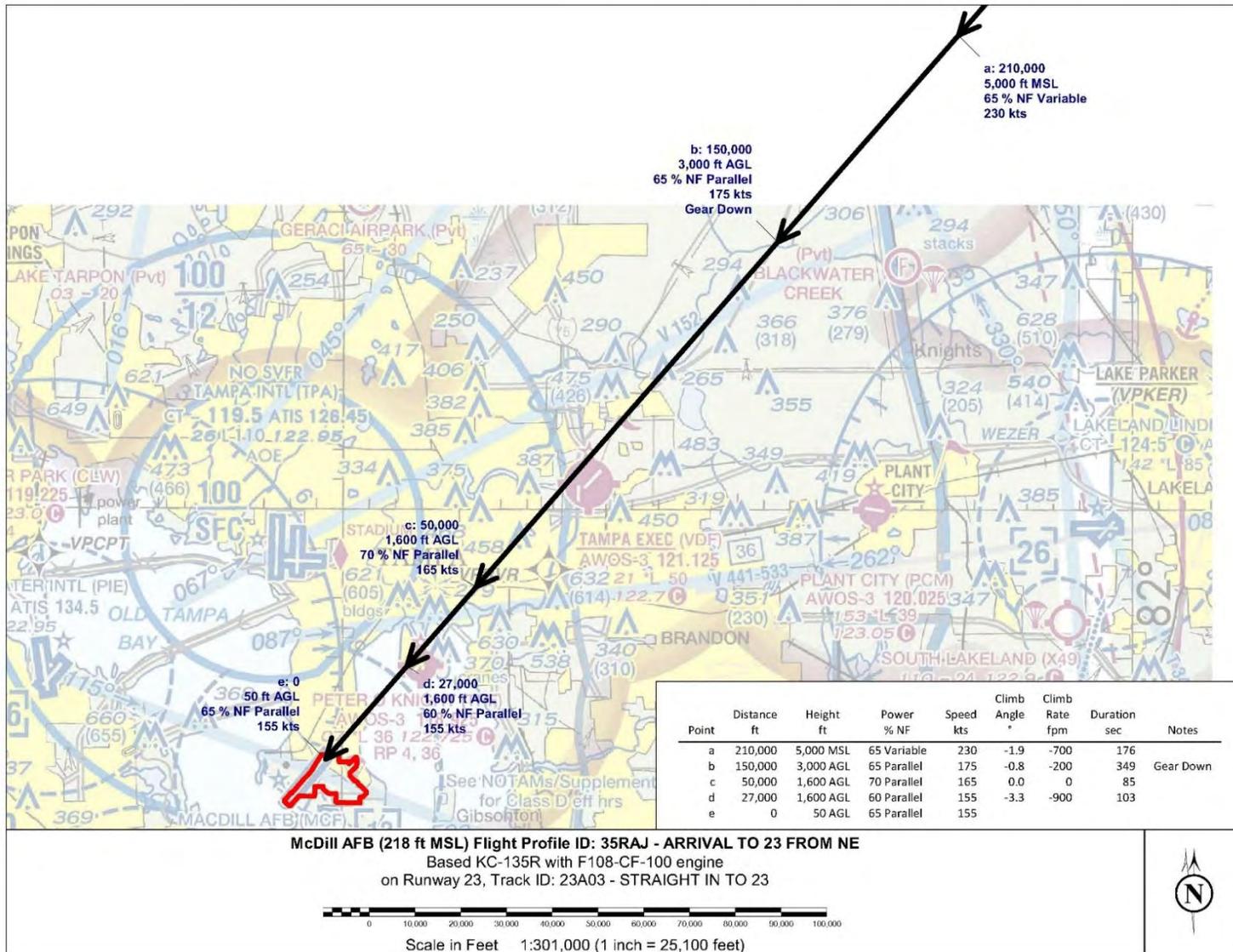


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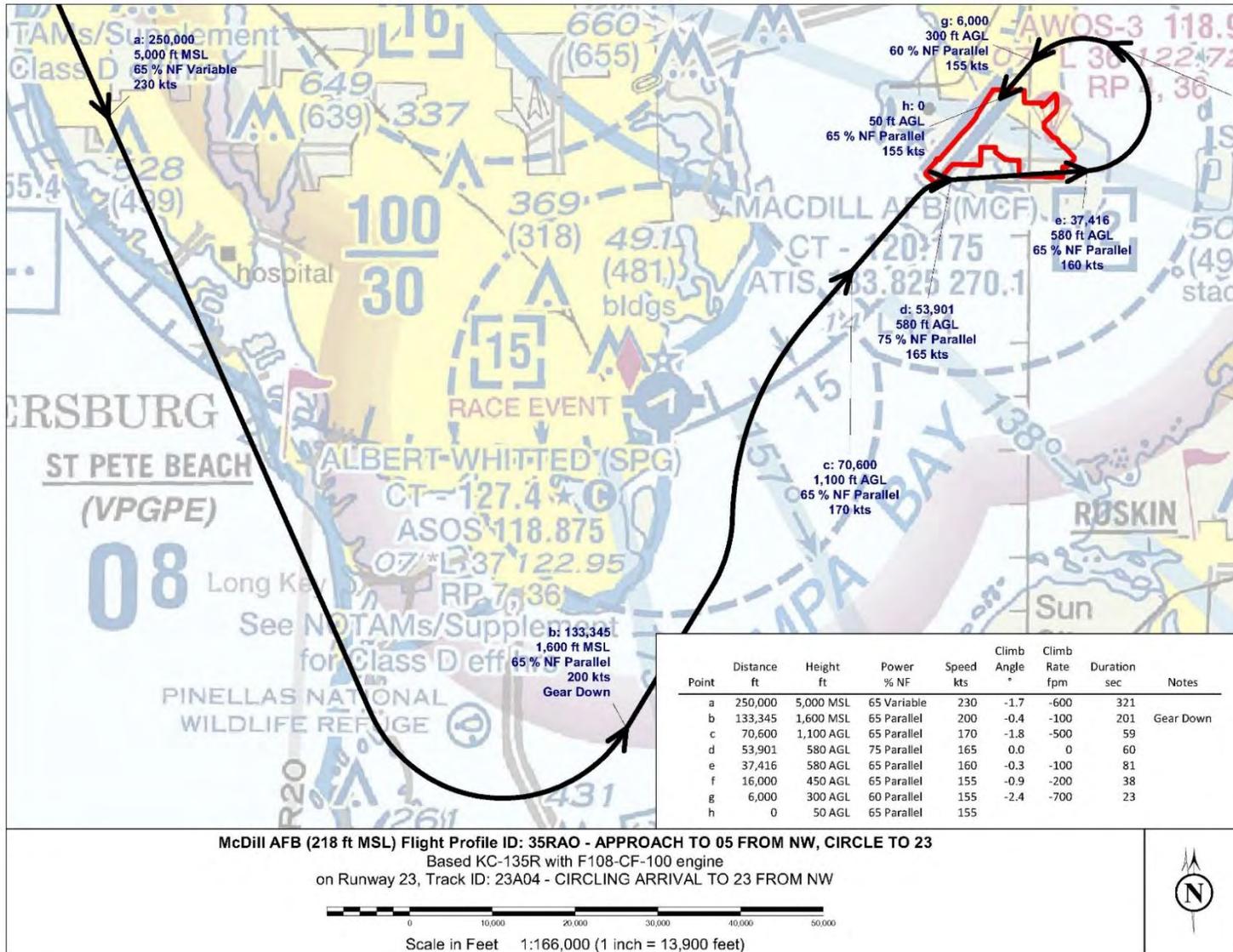


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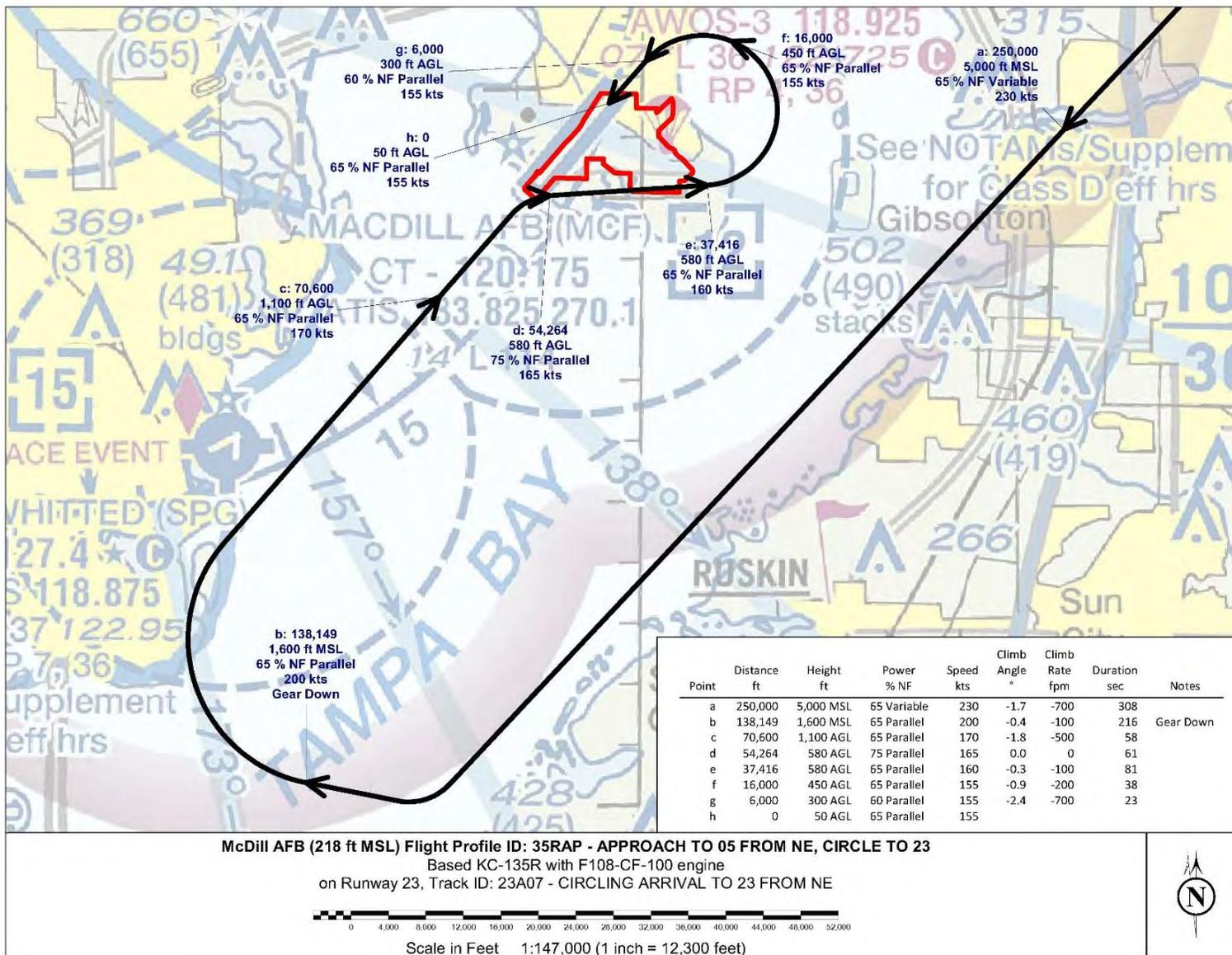


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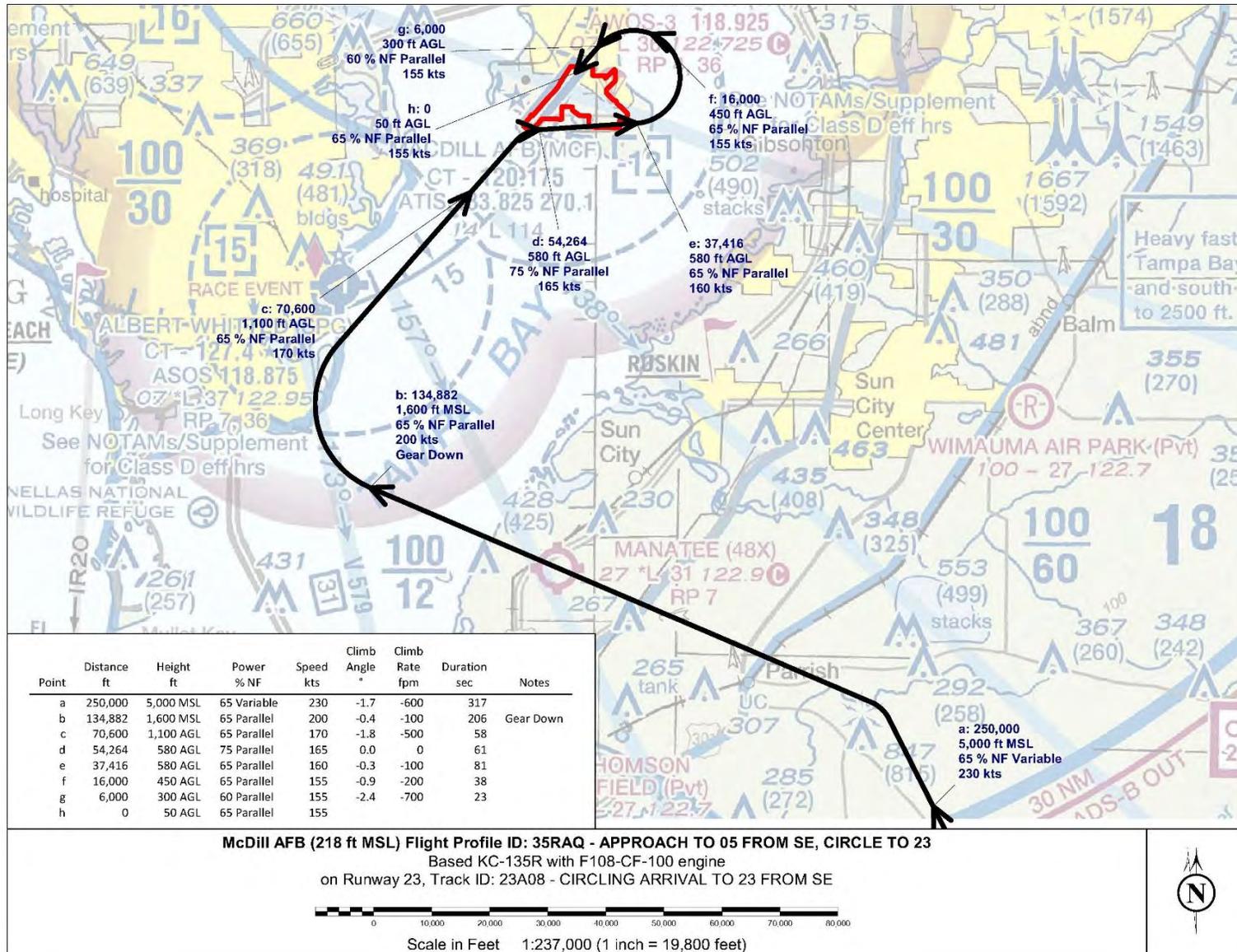


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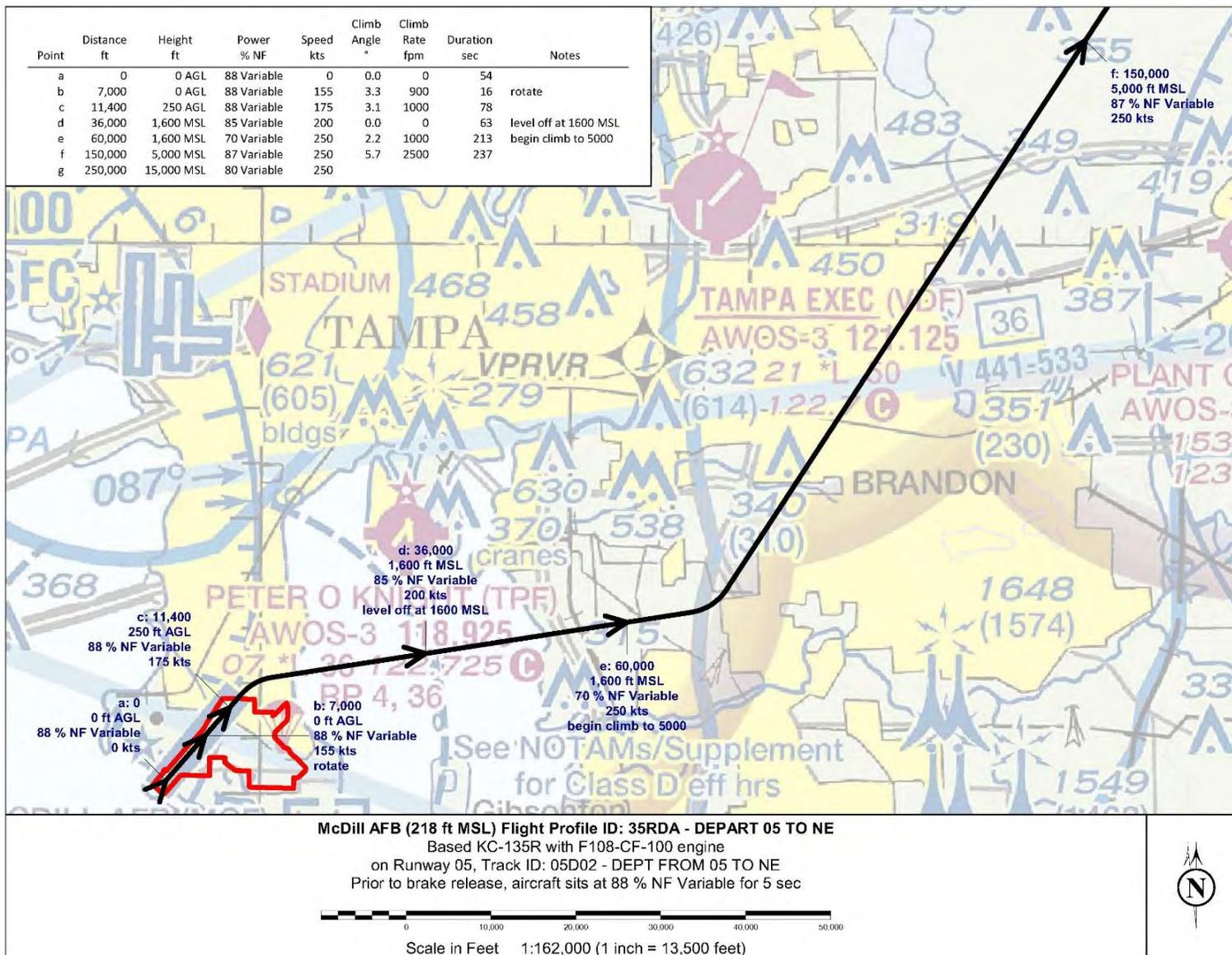


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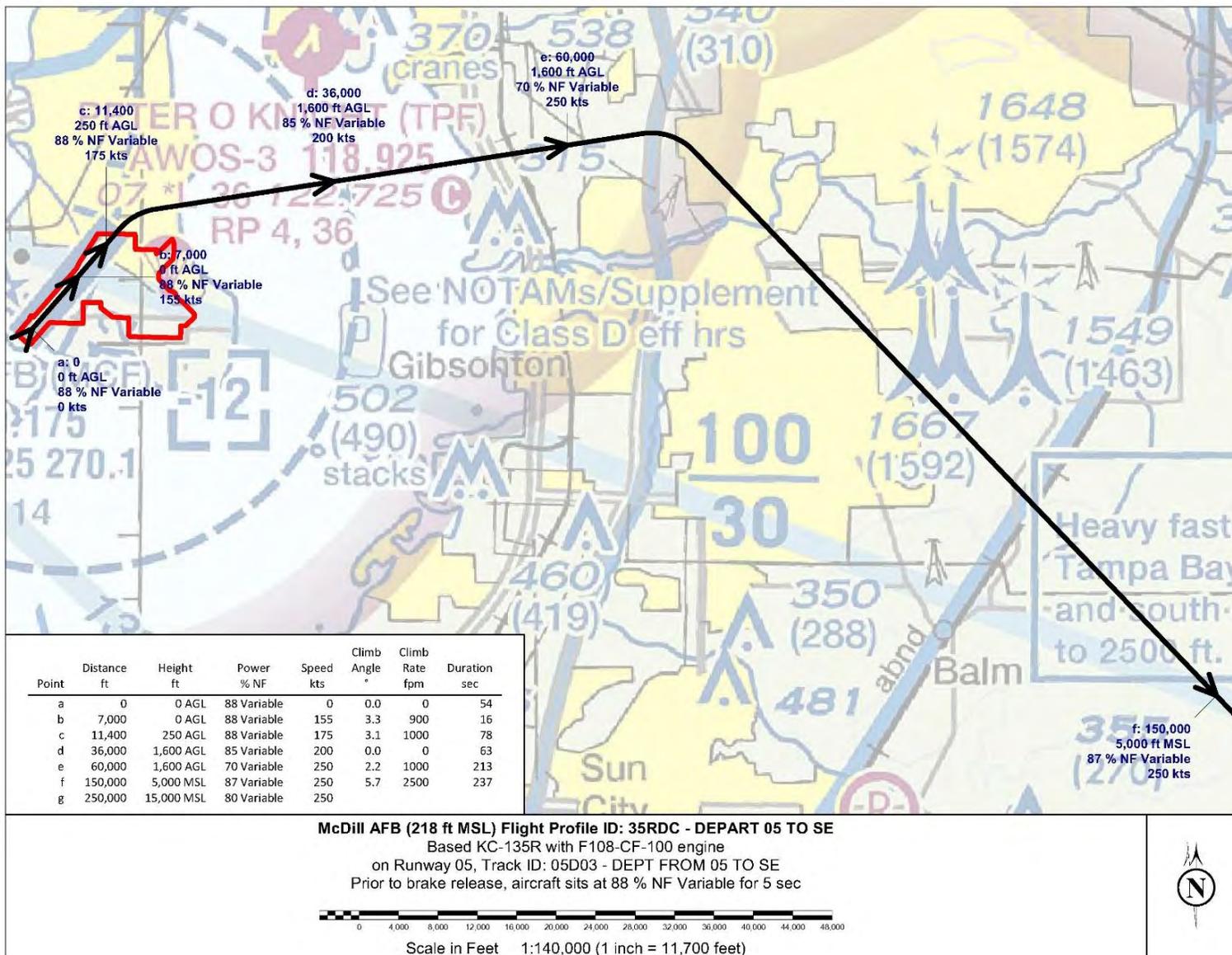


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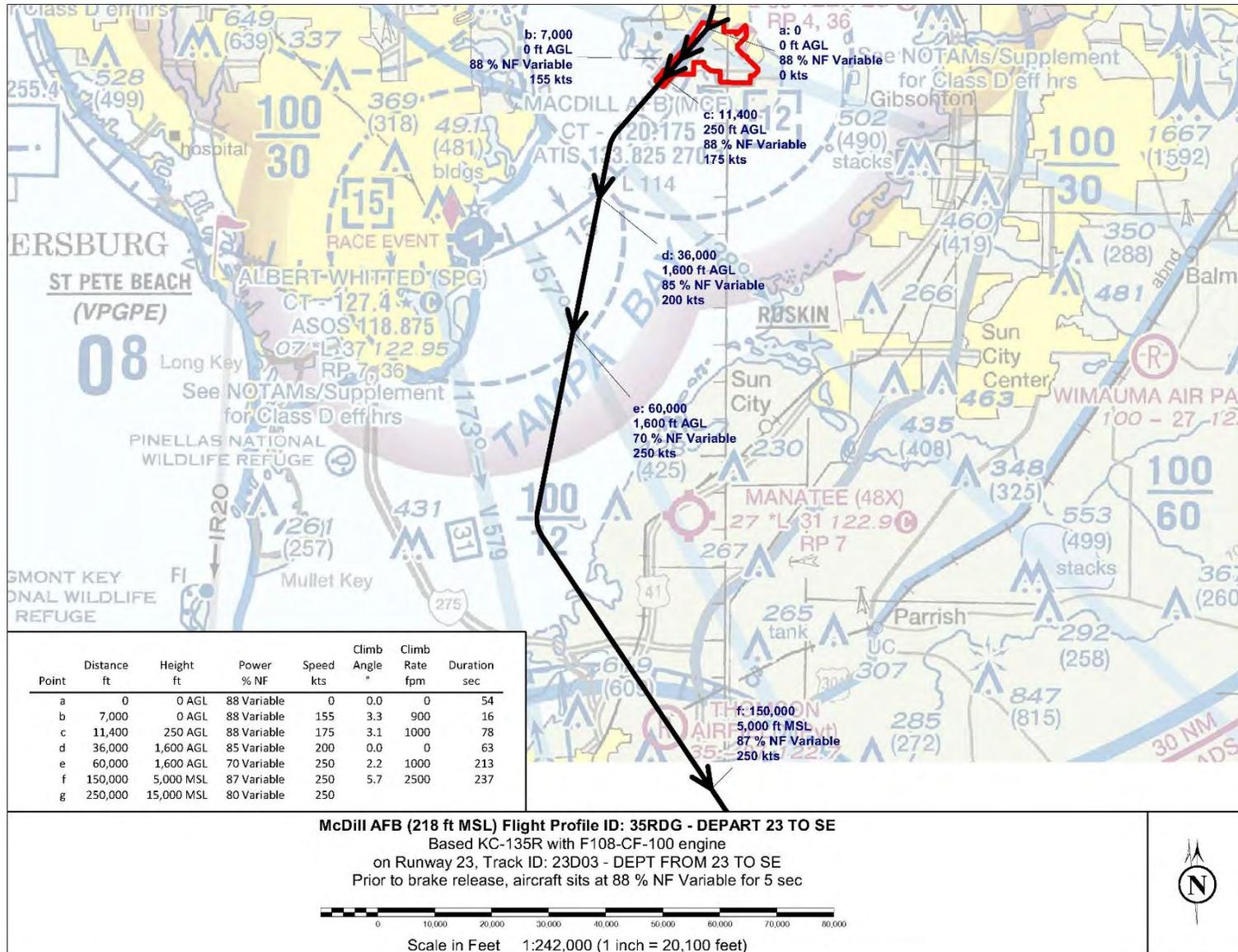


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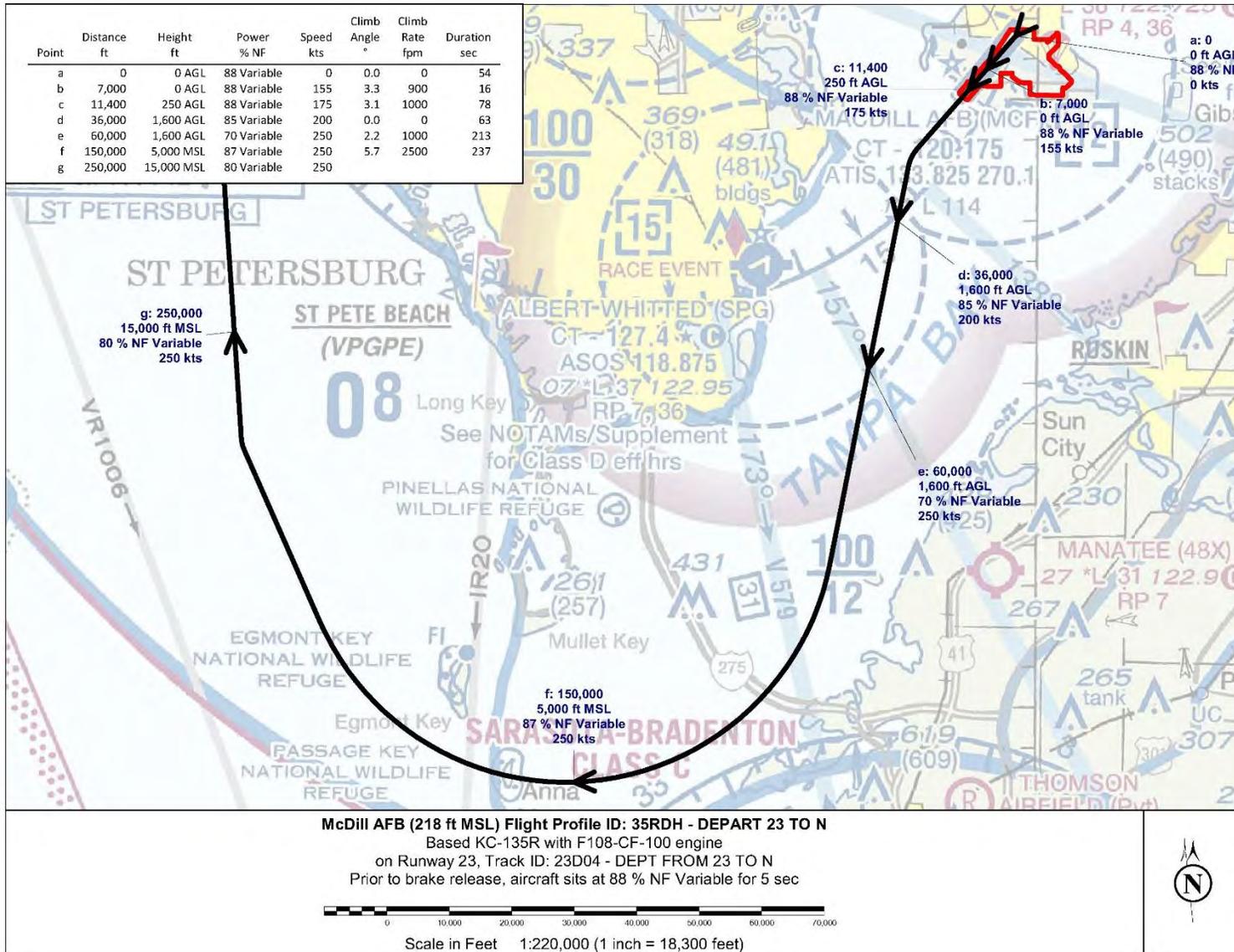


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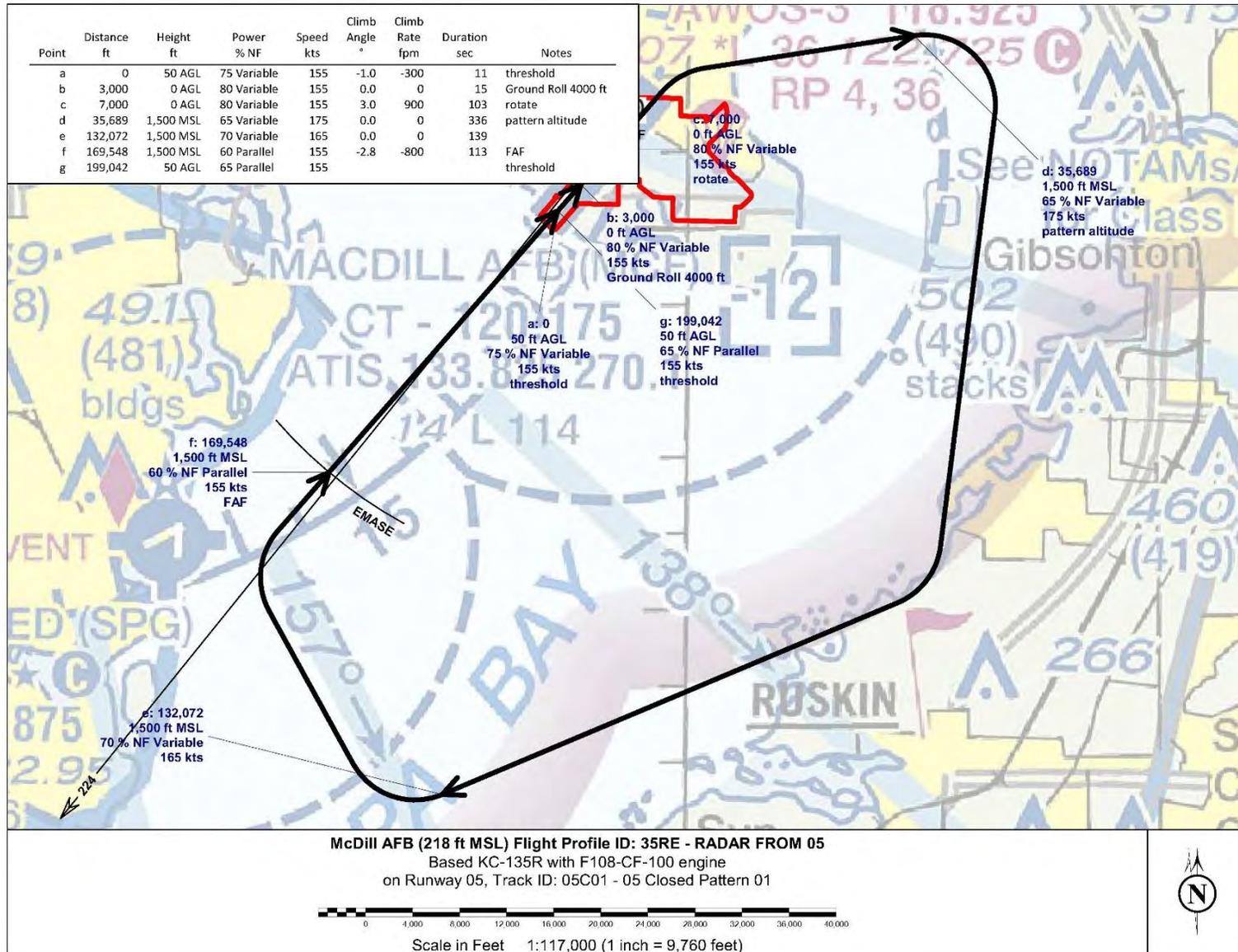


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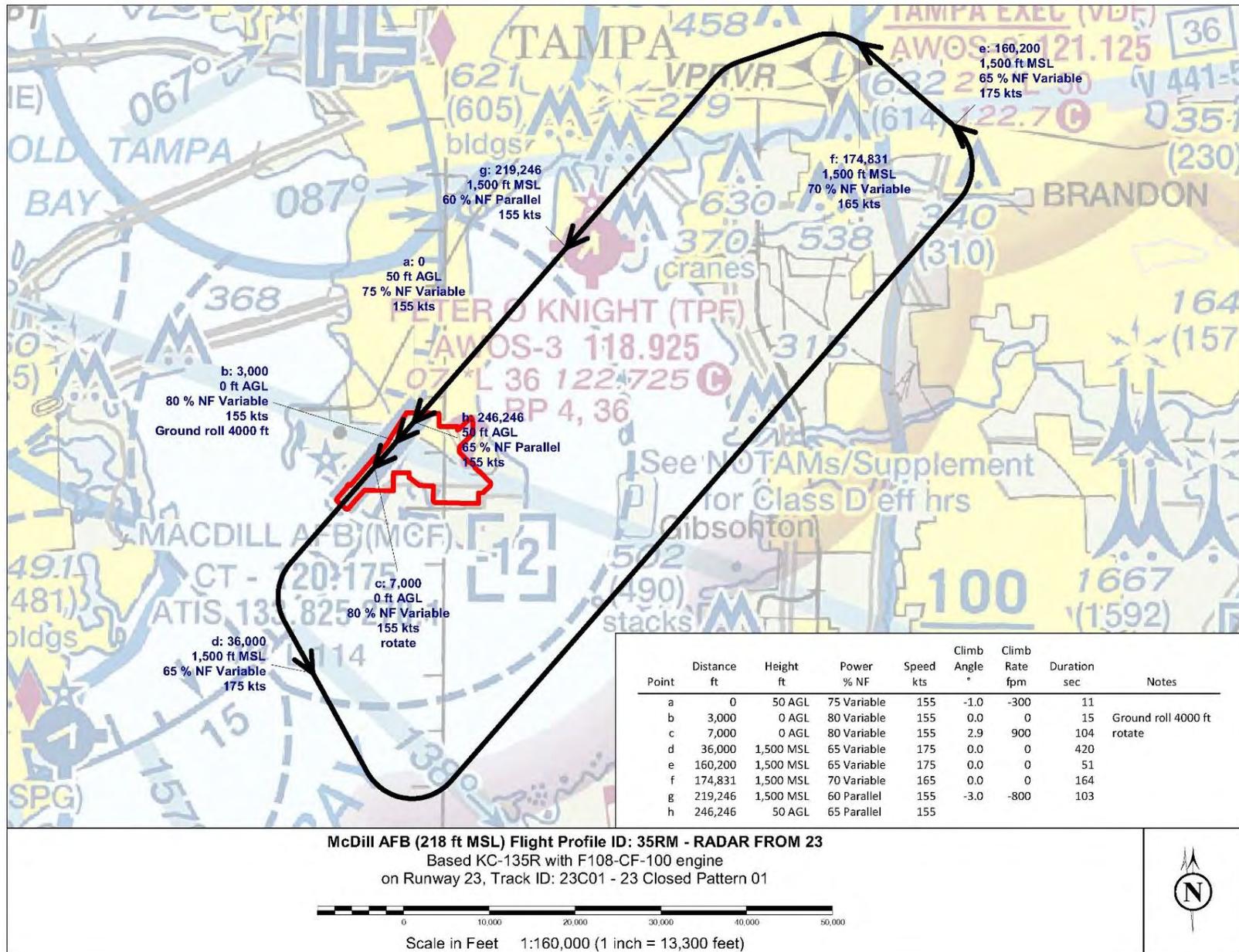


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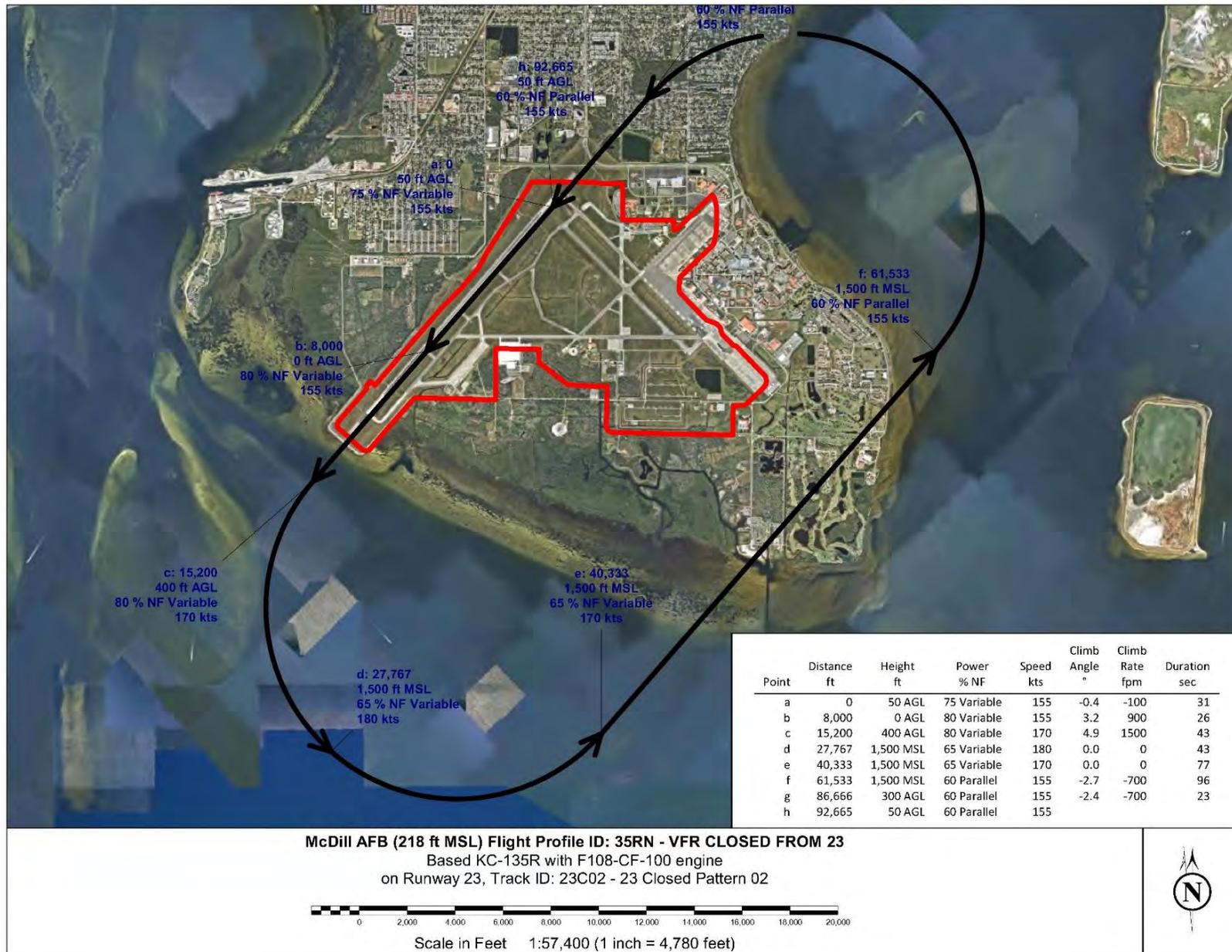


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## A.2 Airfield Flight Profile Maps for Temporary Duty Aircraft

All Temporary Duty flight profiles are labeled as “based” to avoid potential confusion with the transient aircraft.

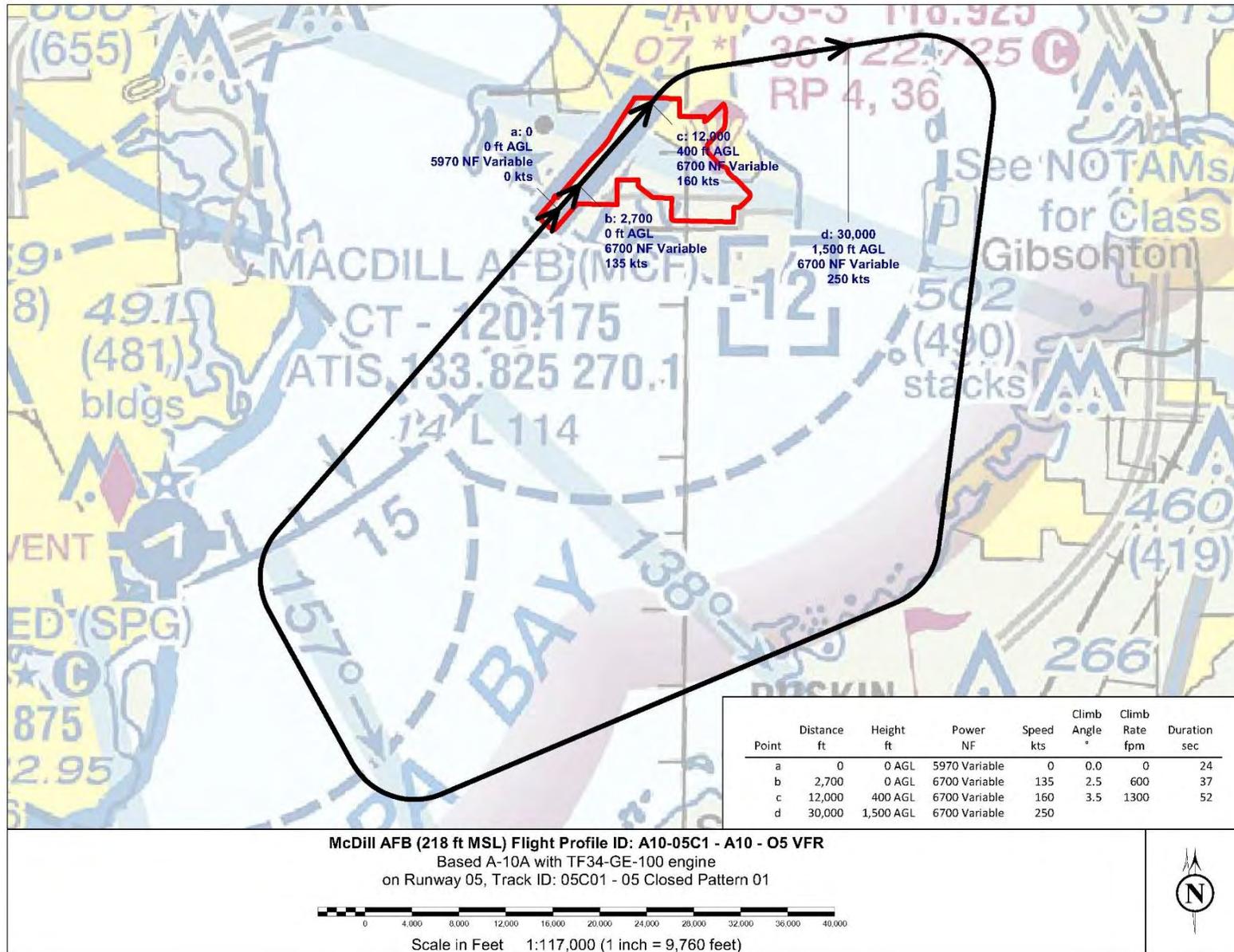


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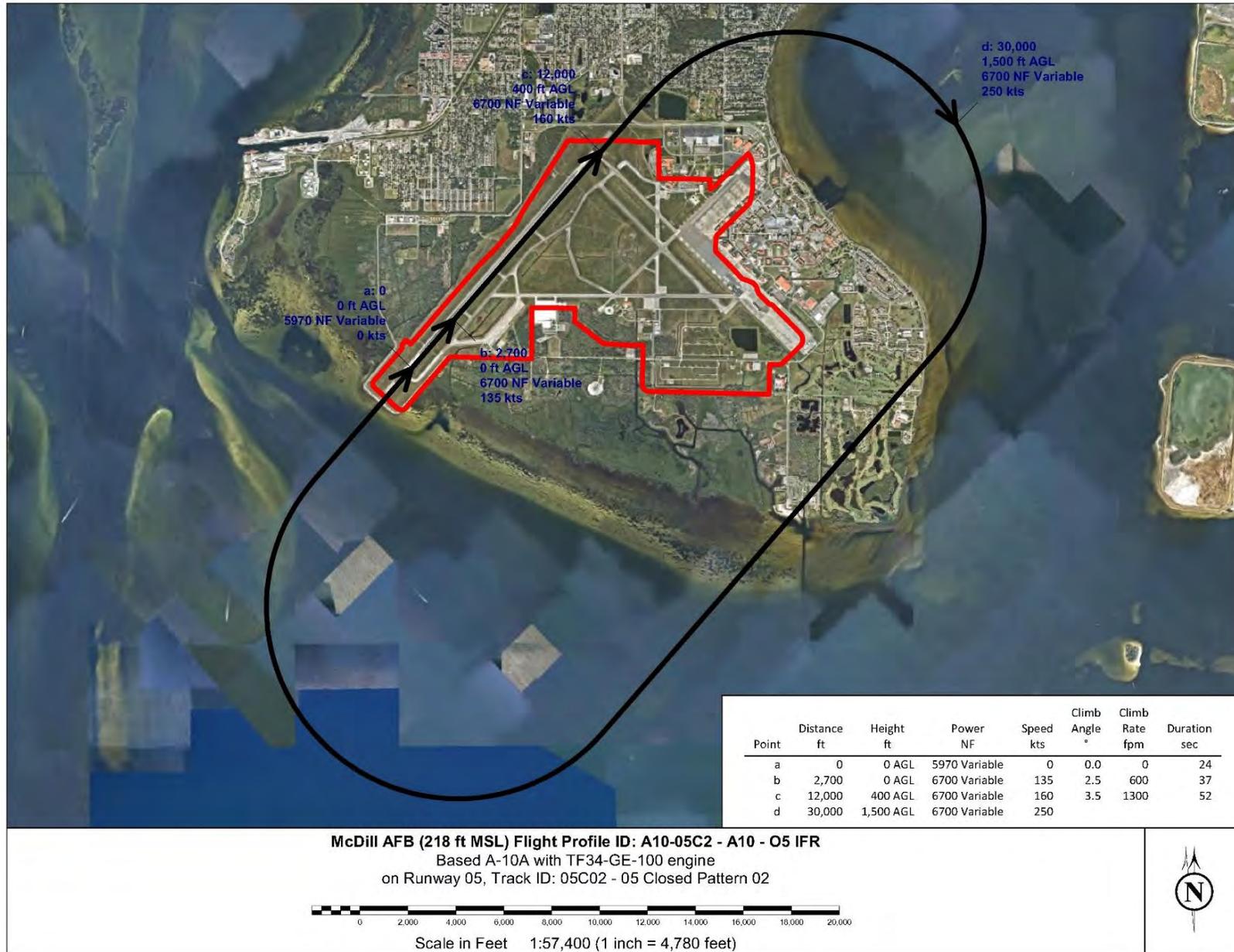


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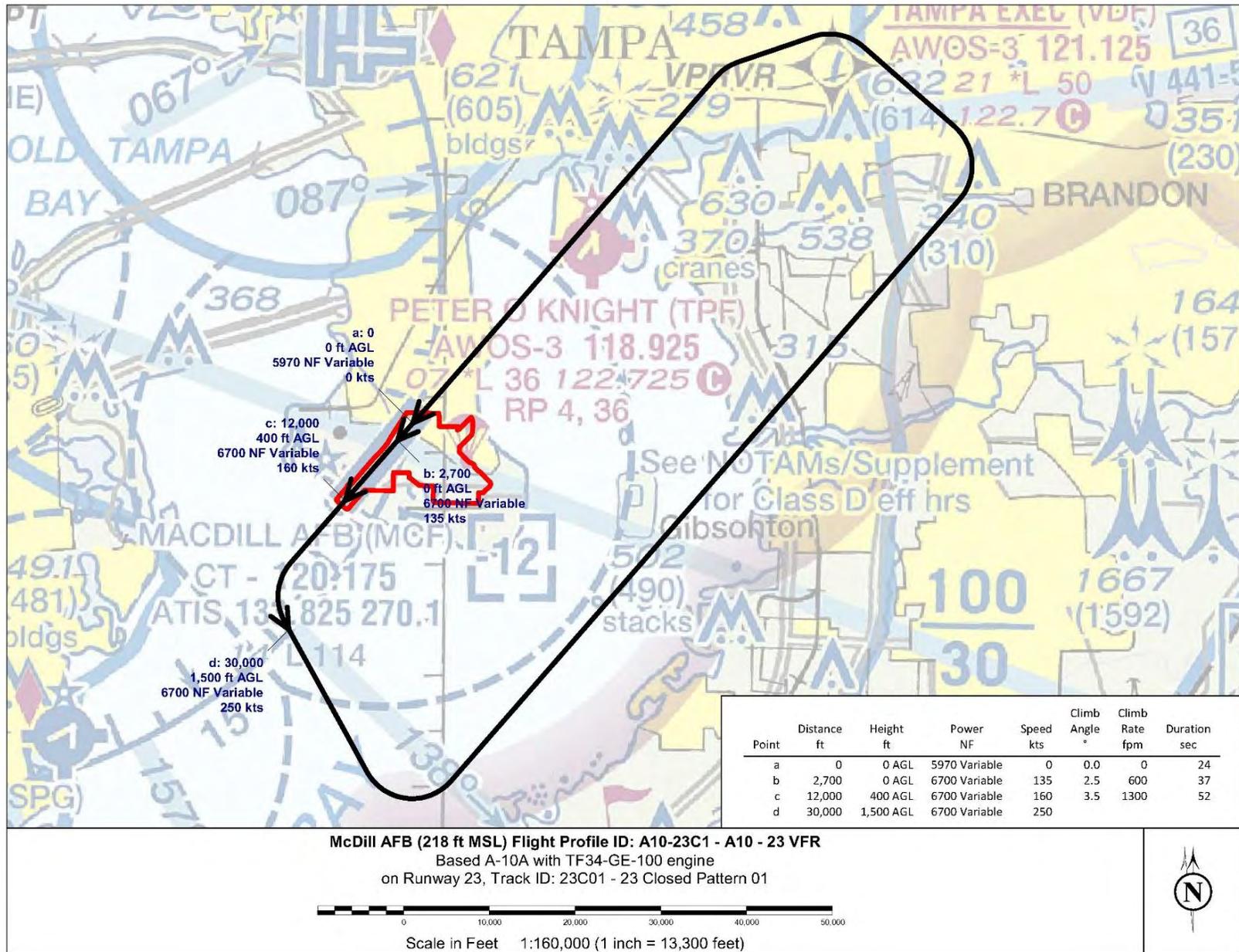


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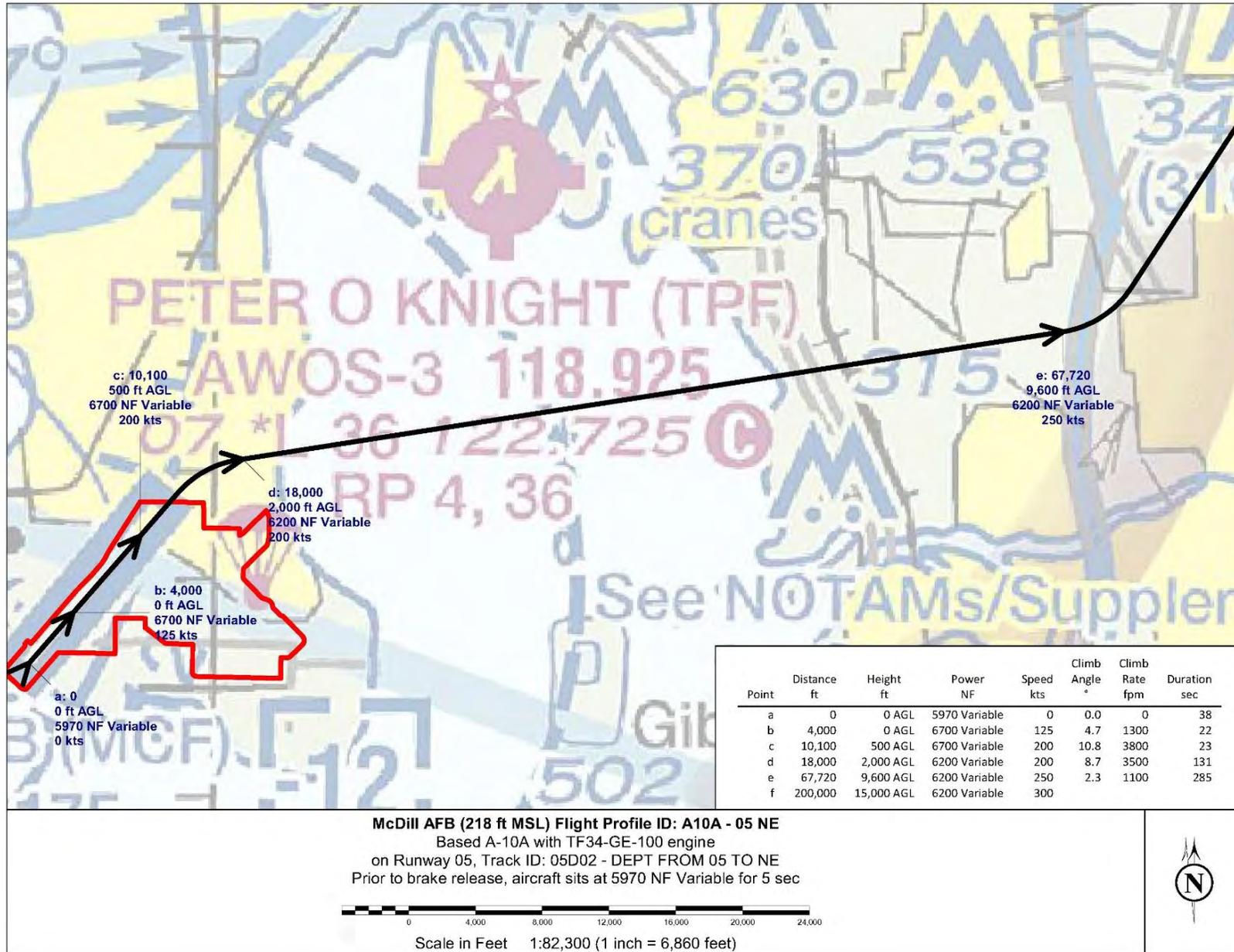


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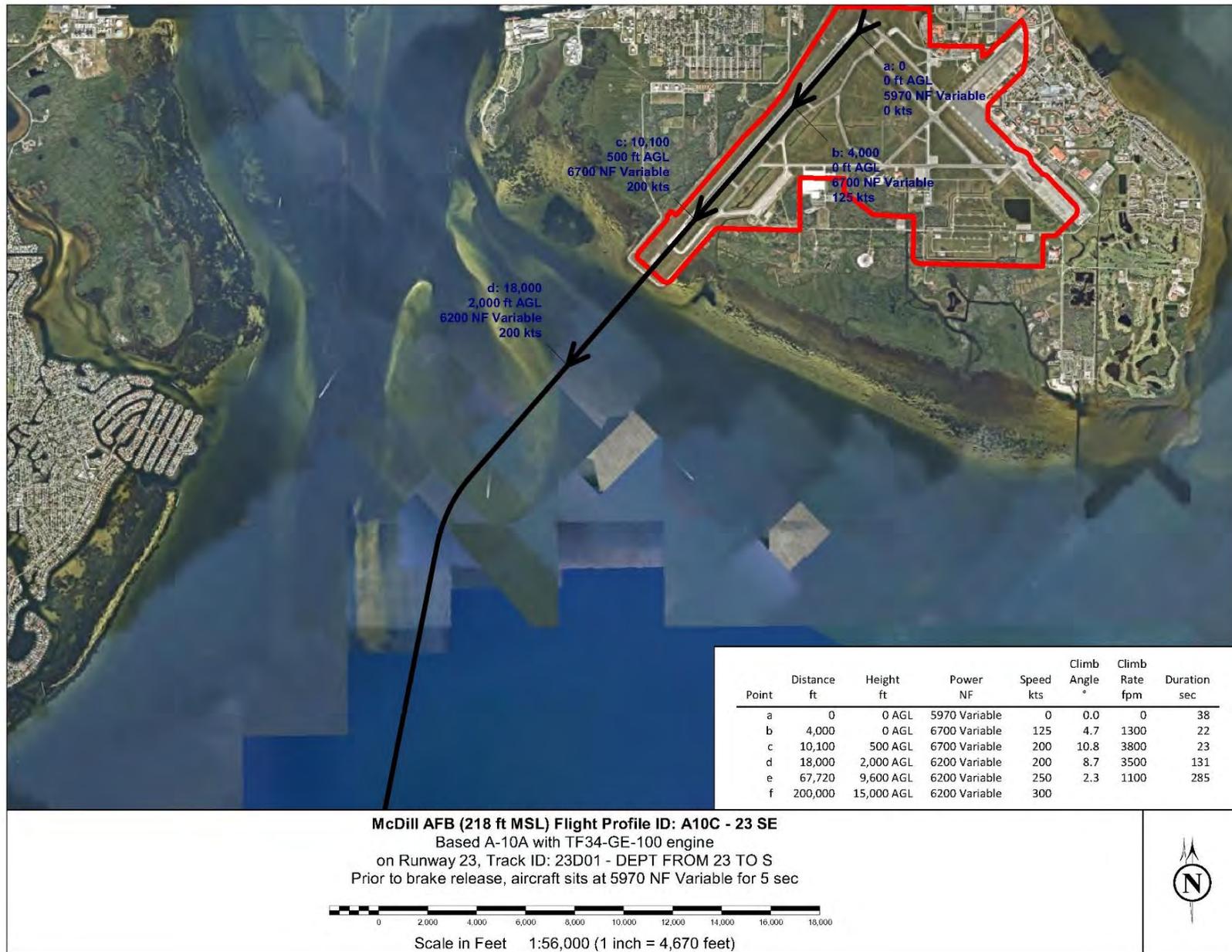


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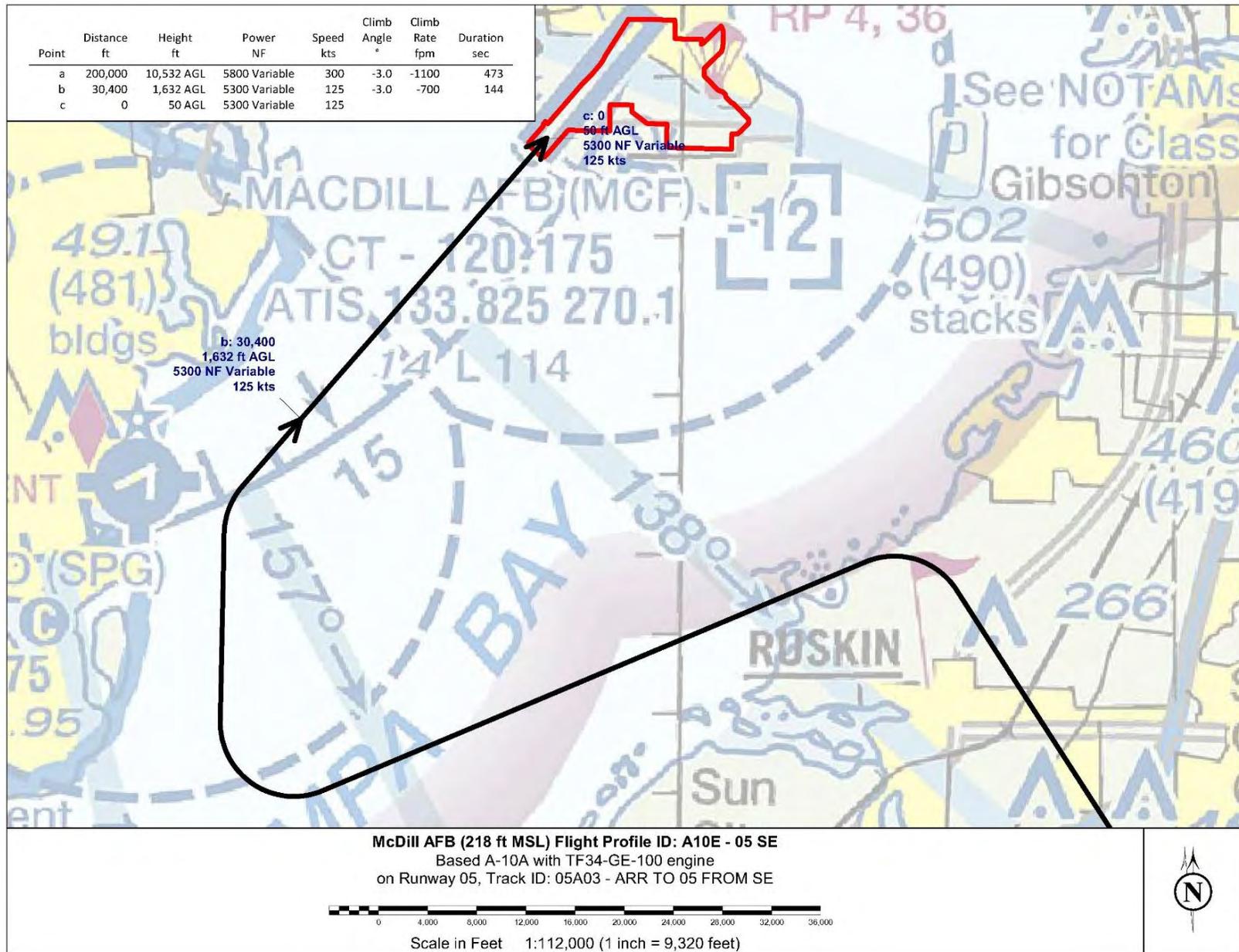


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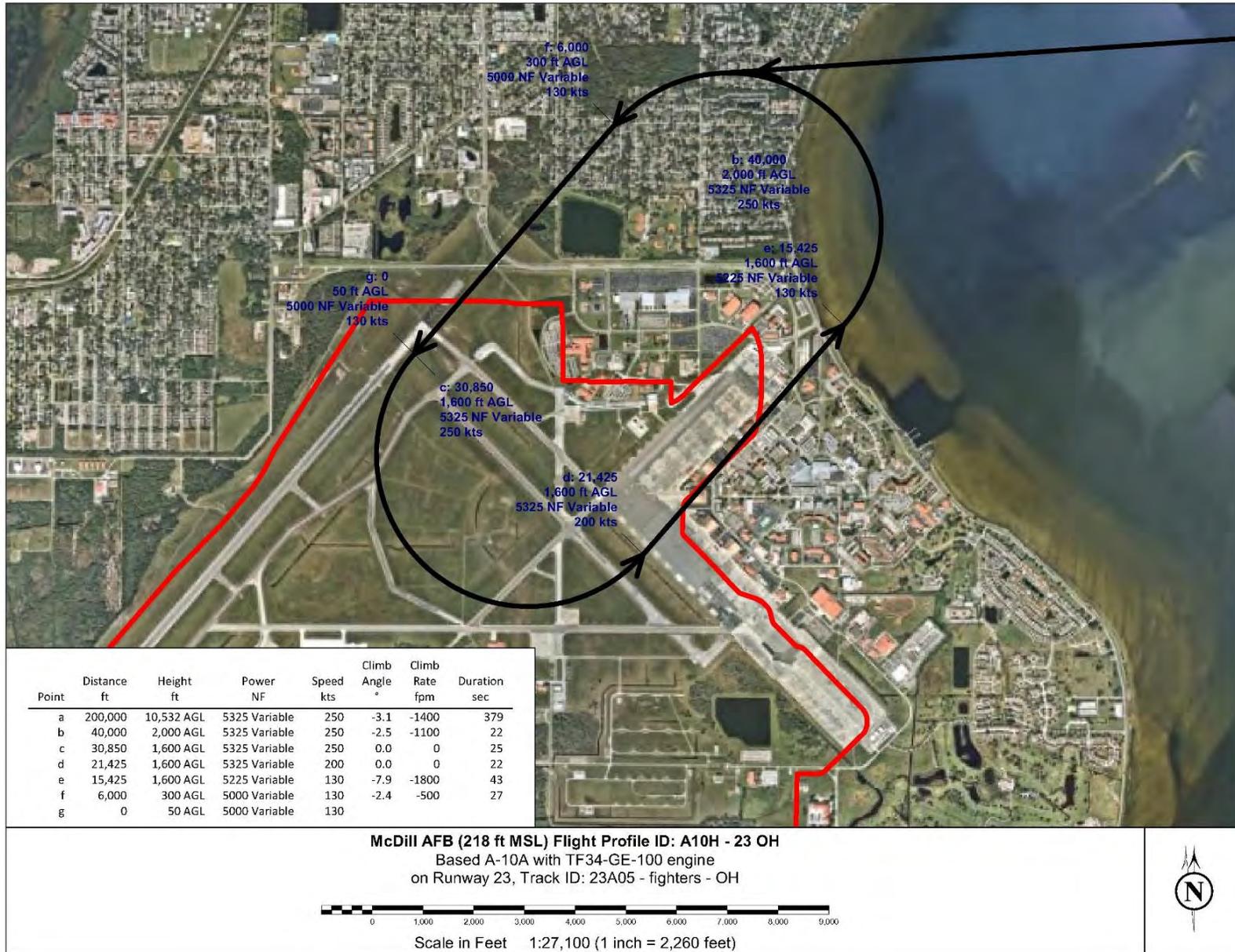


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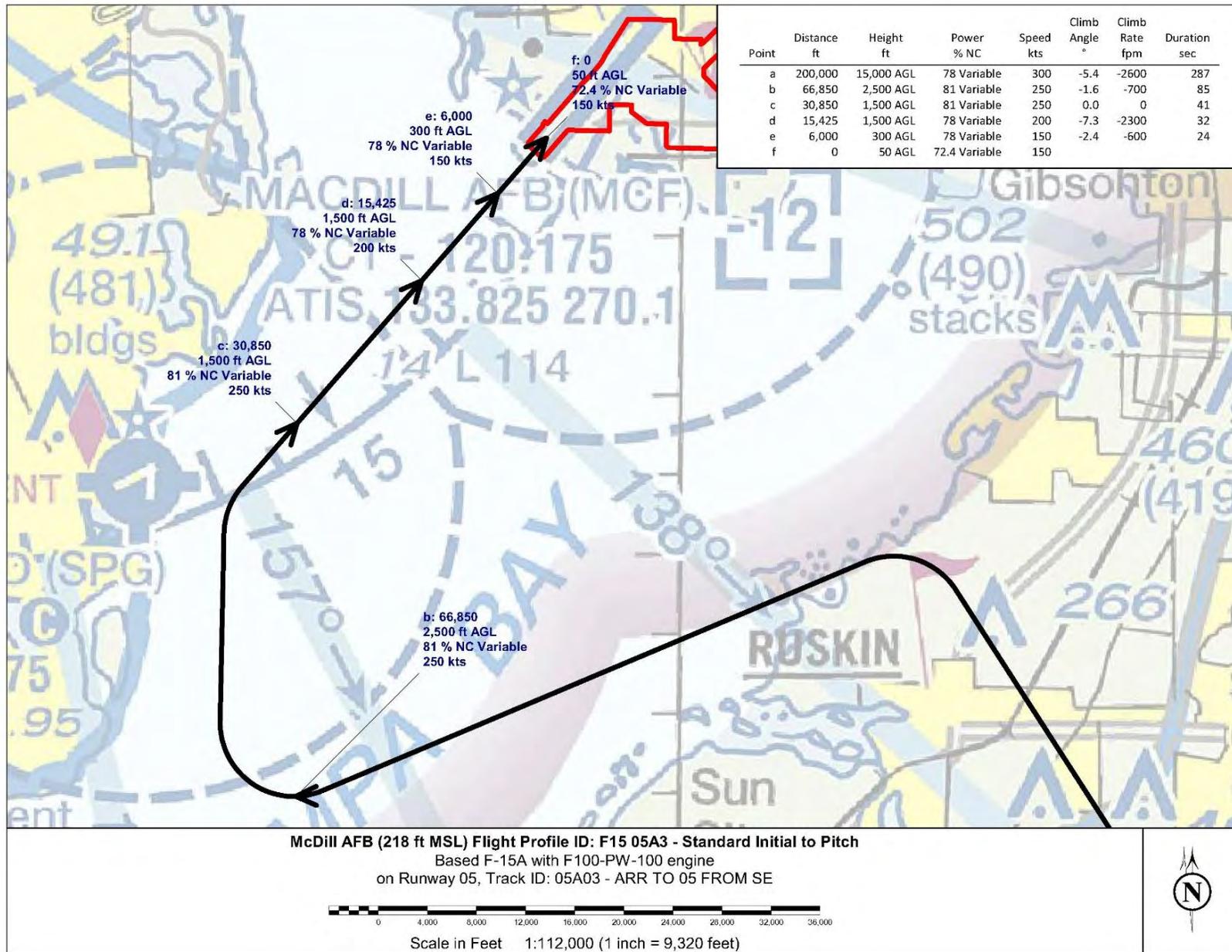


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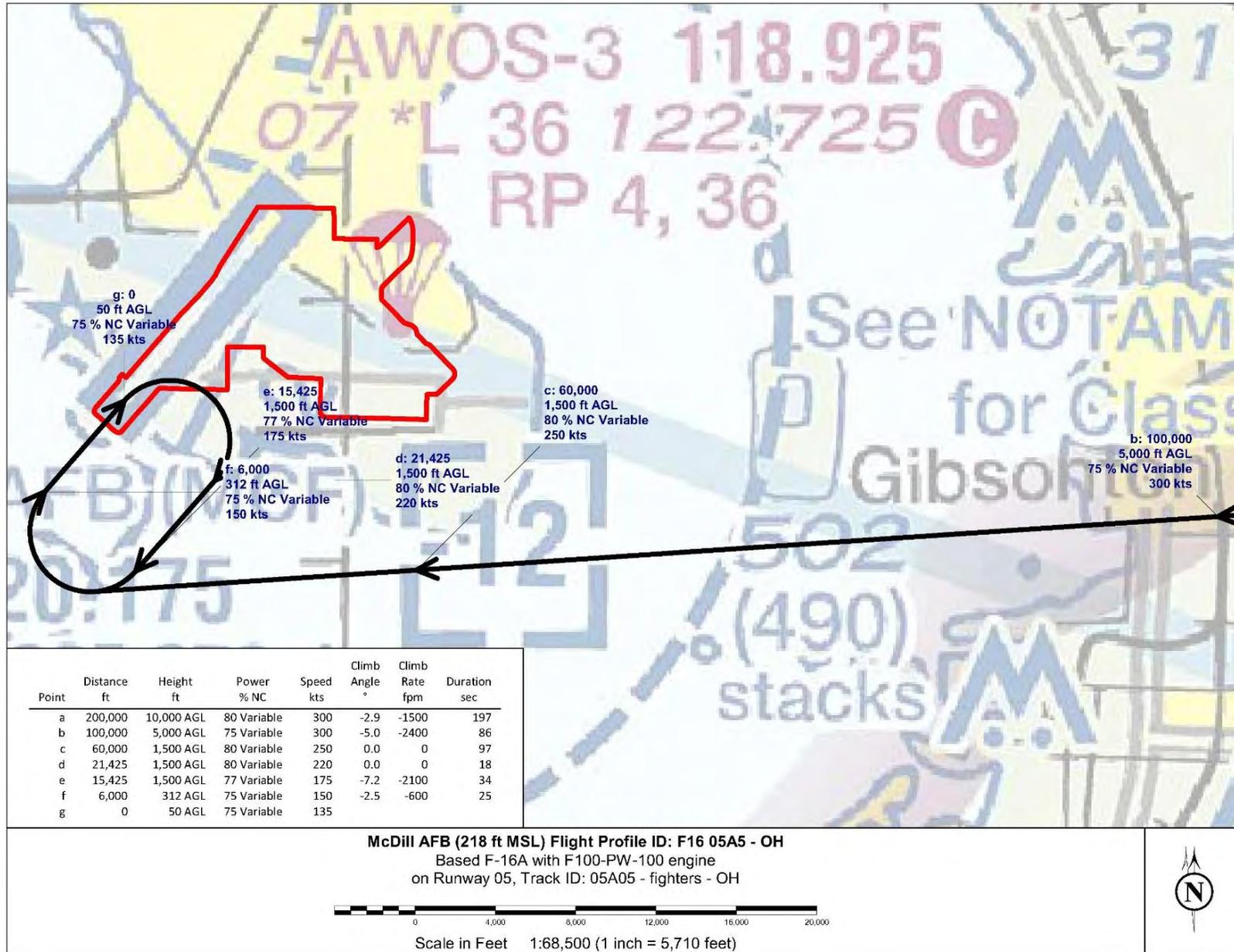


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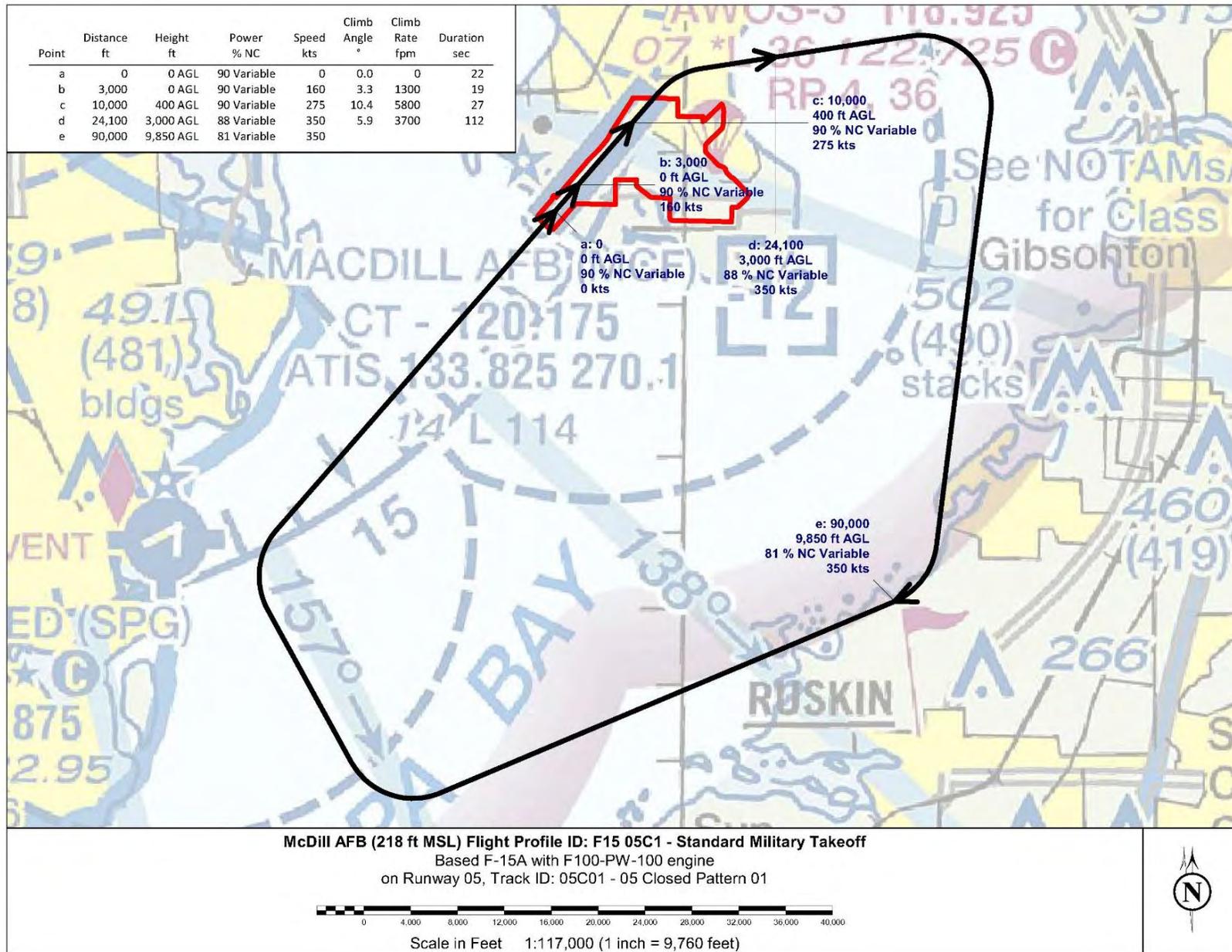


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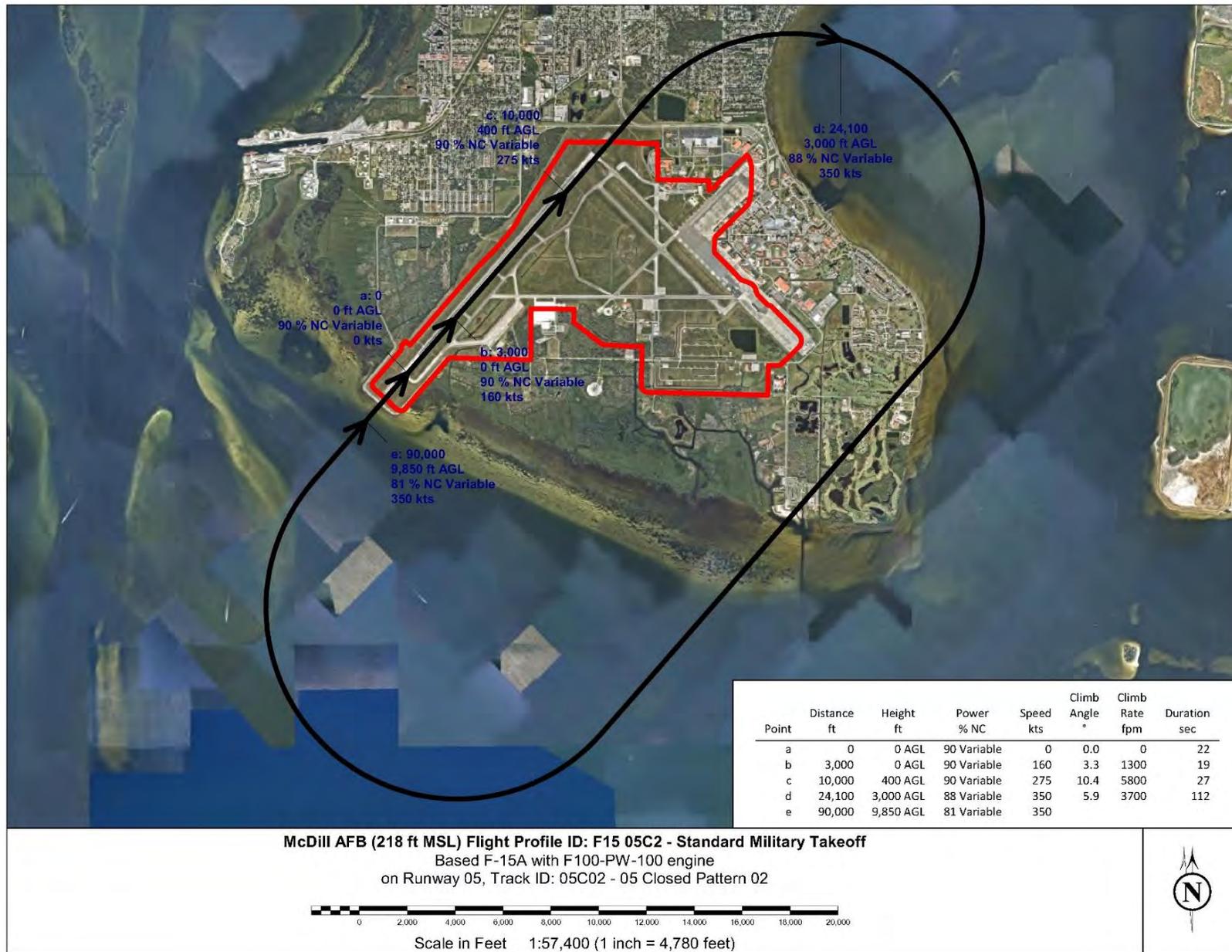


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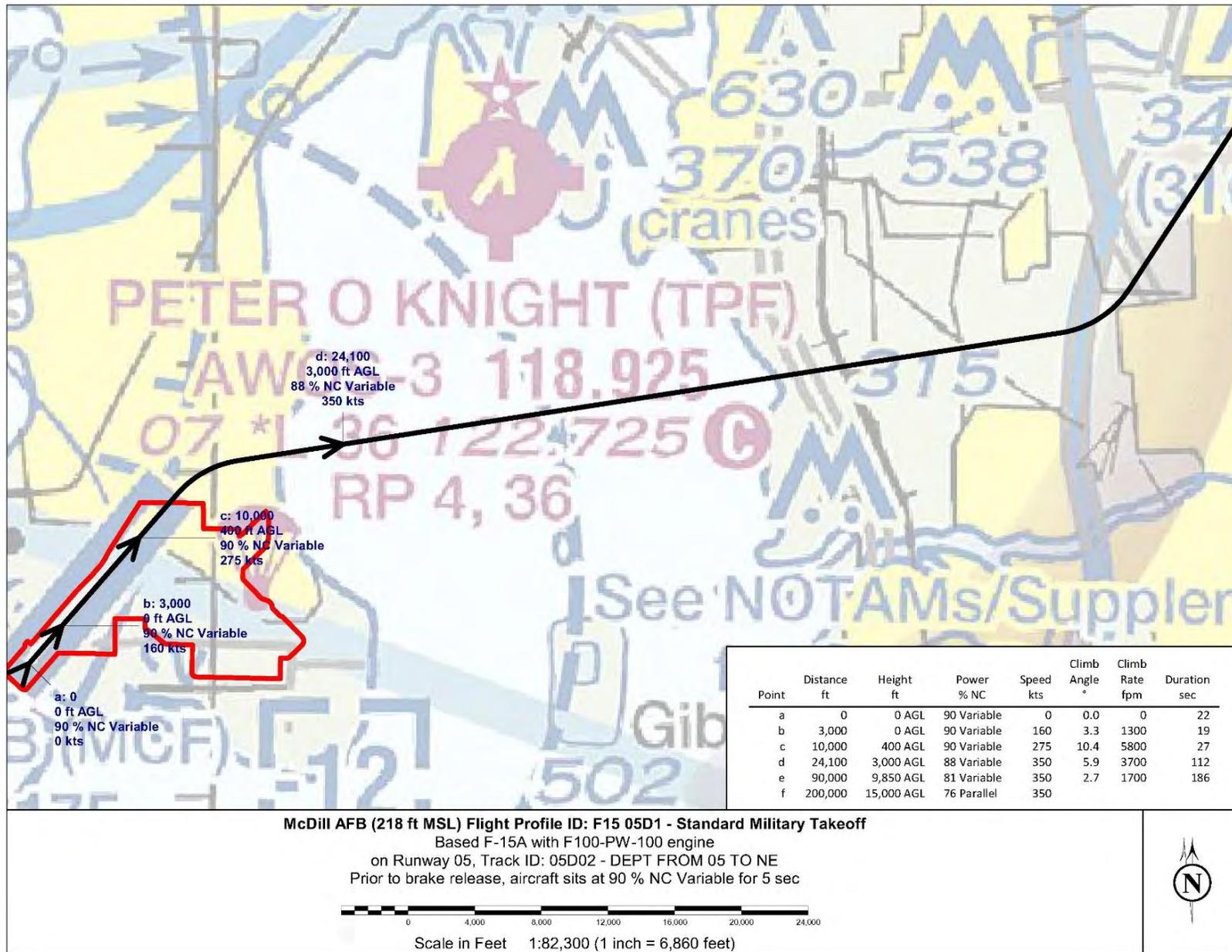


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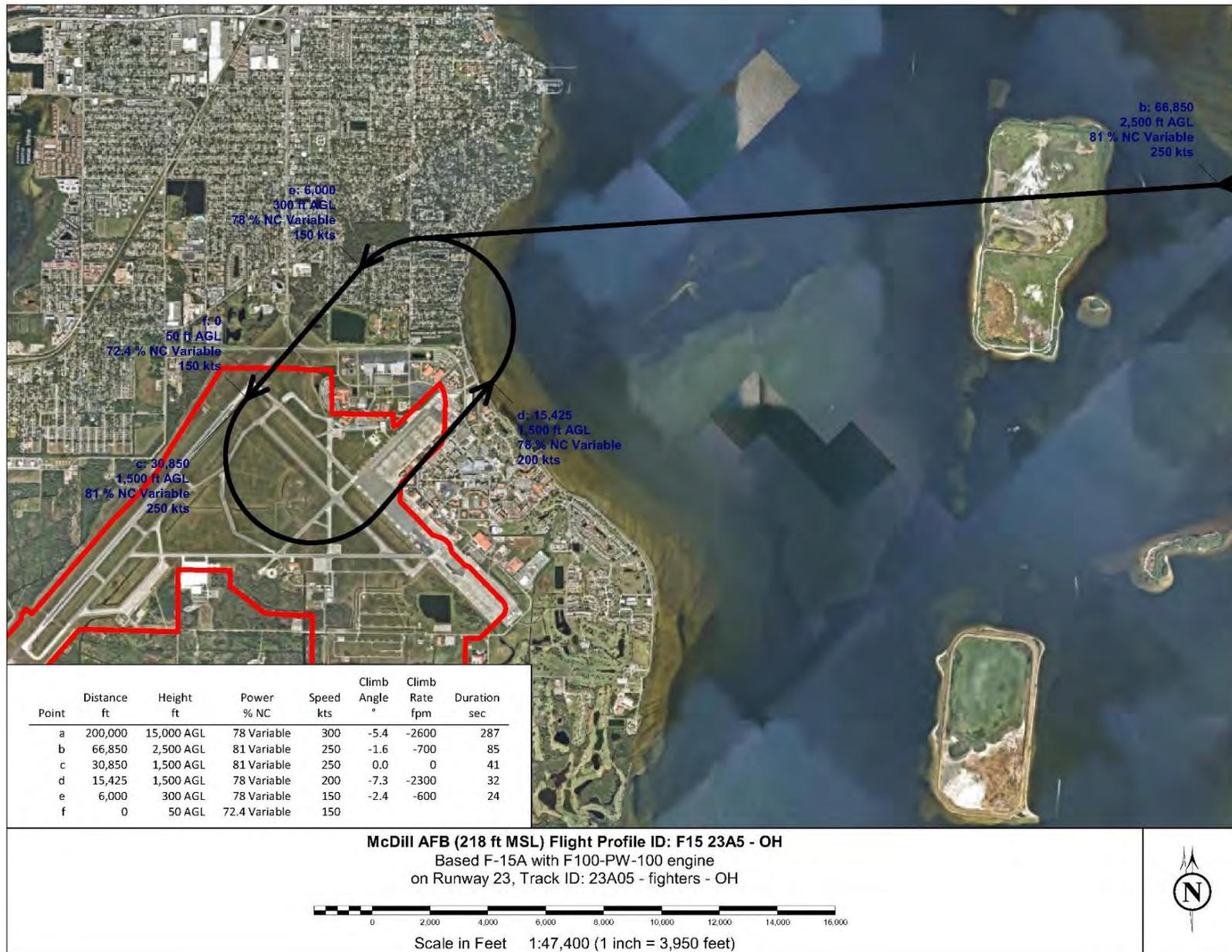


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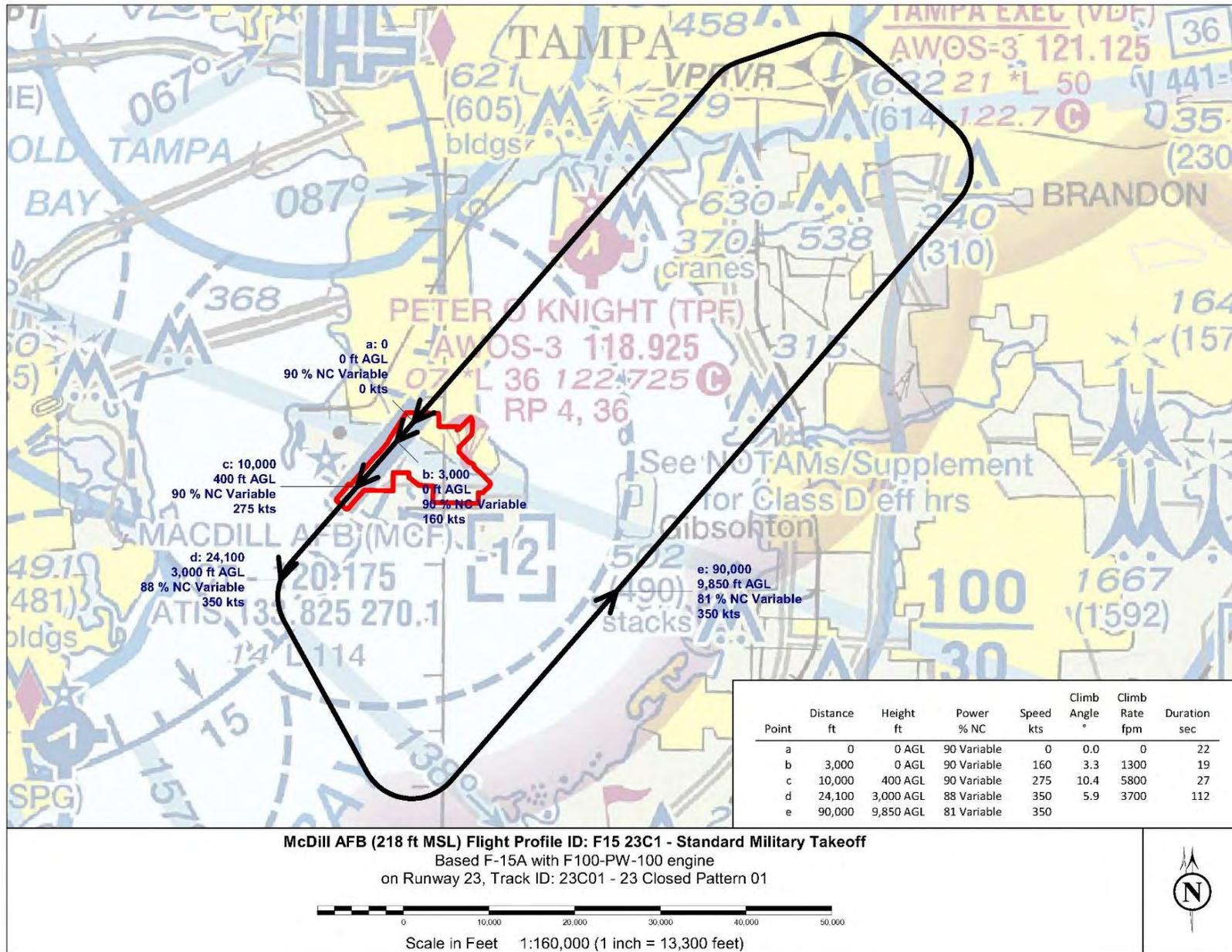


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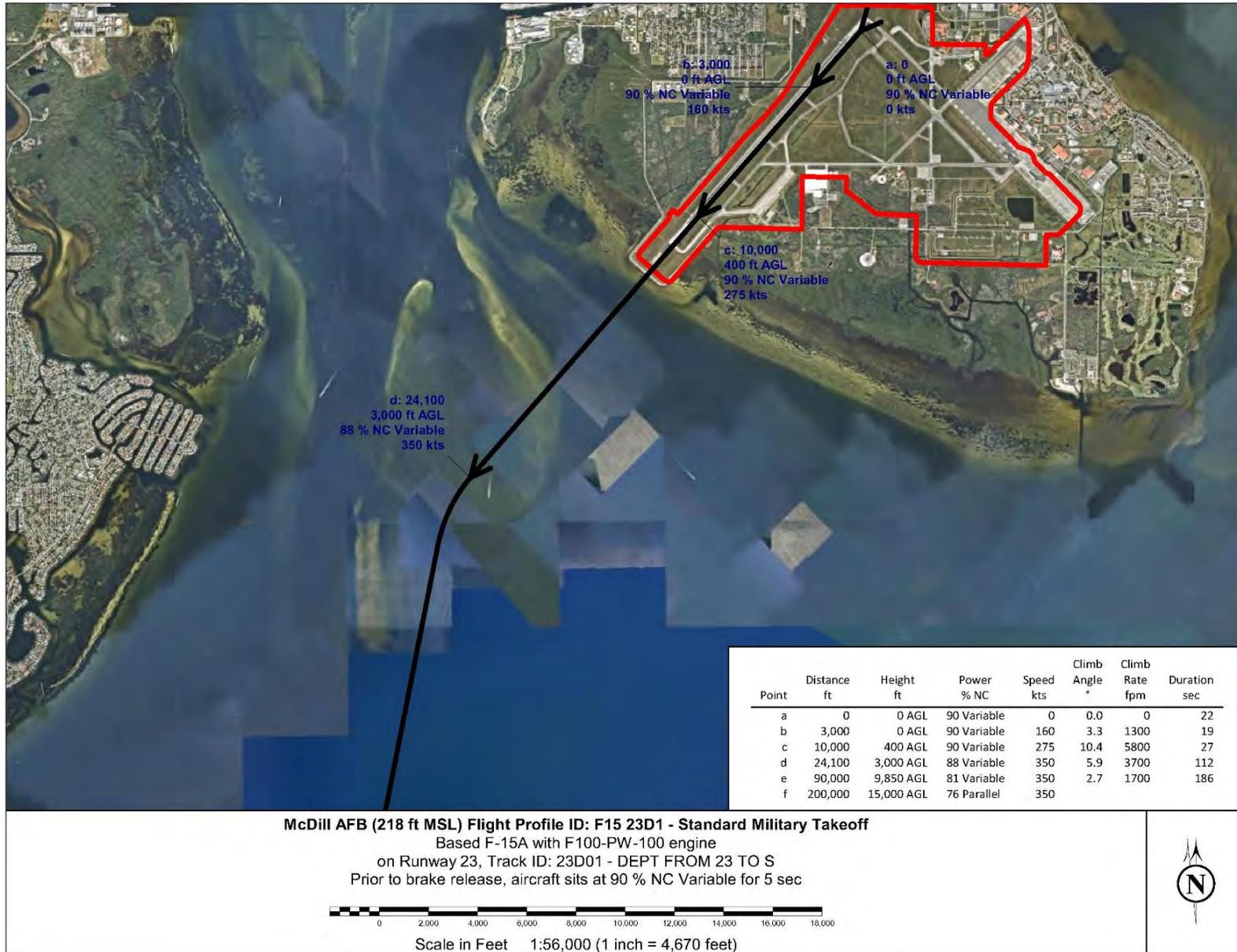


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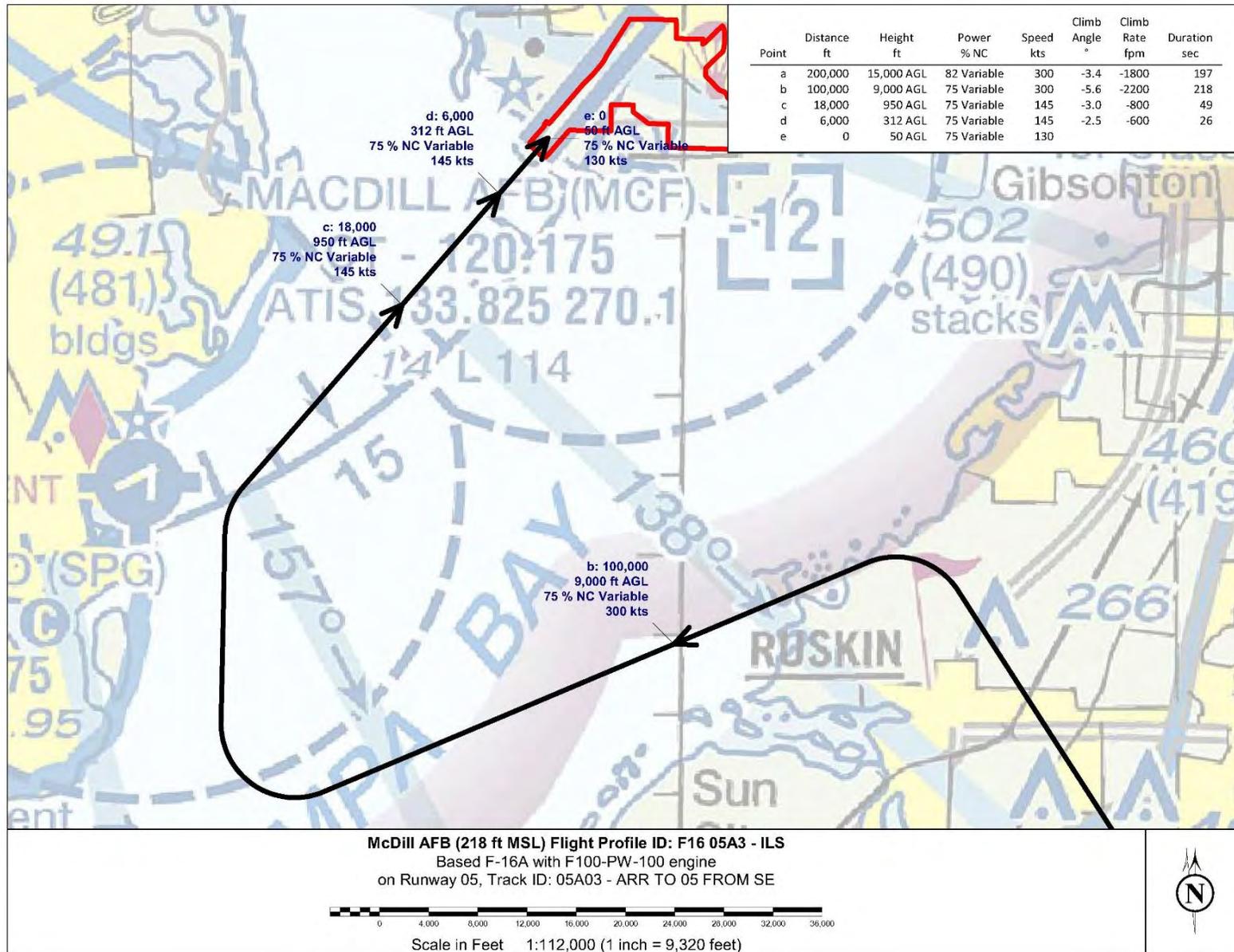


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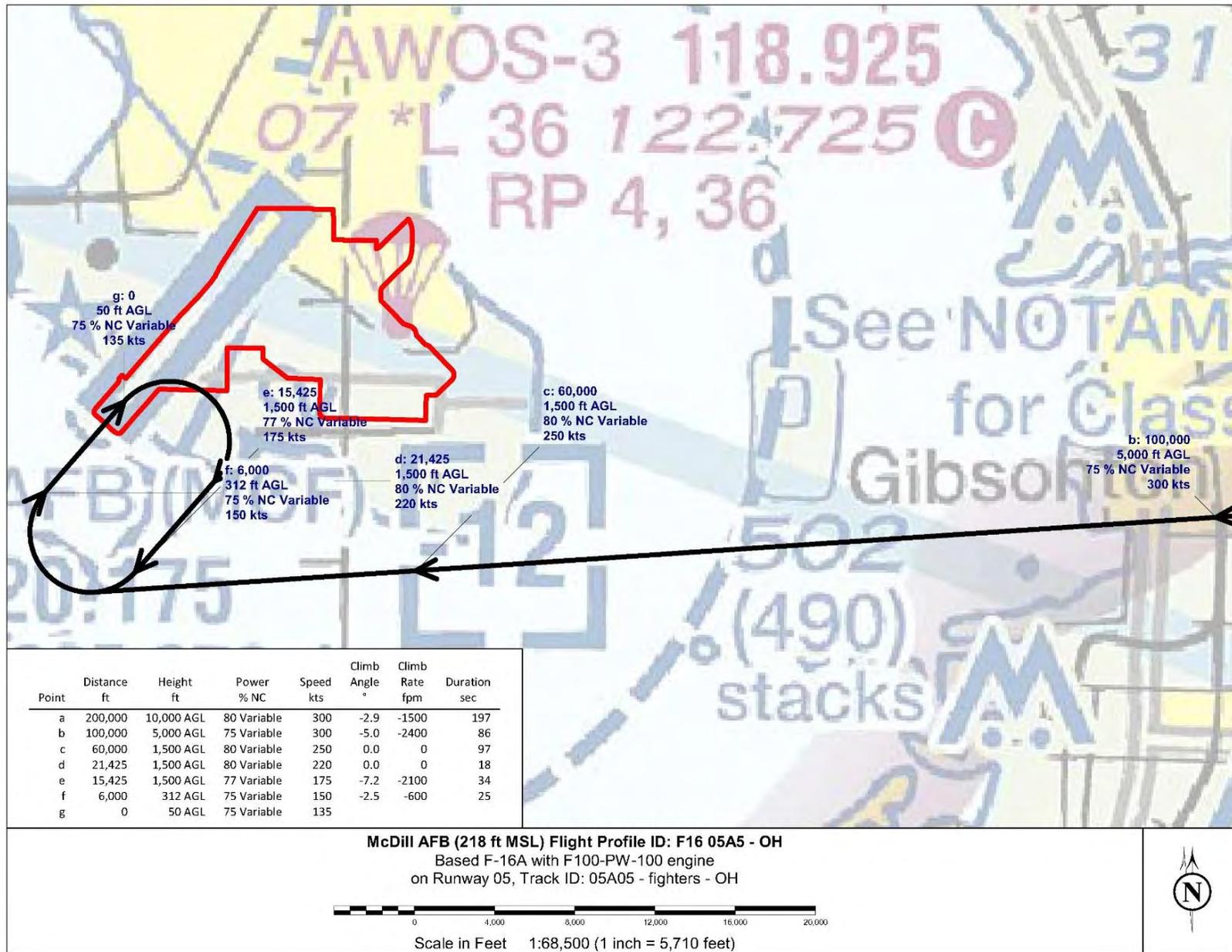


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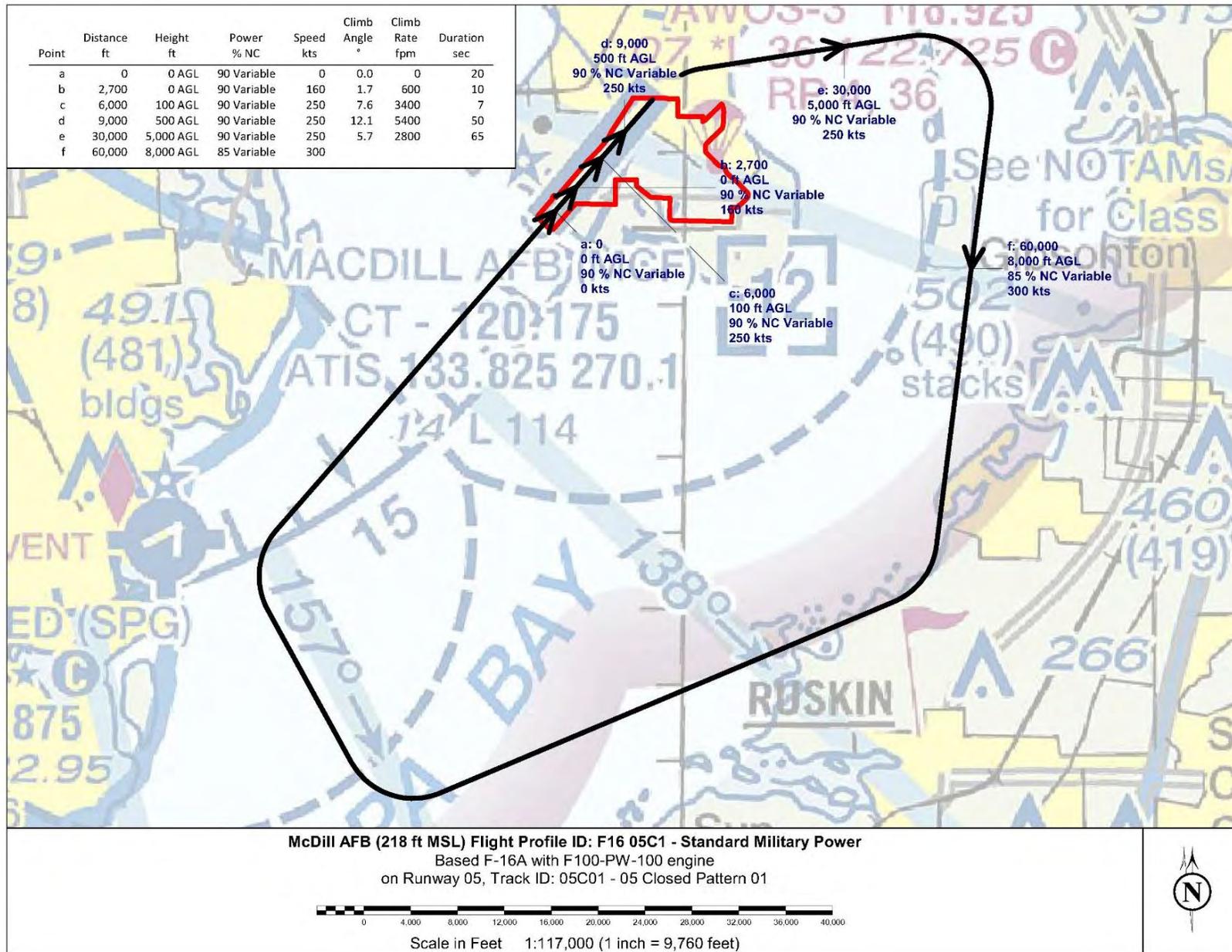


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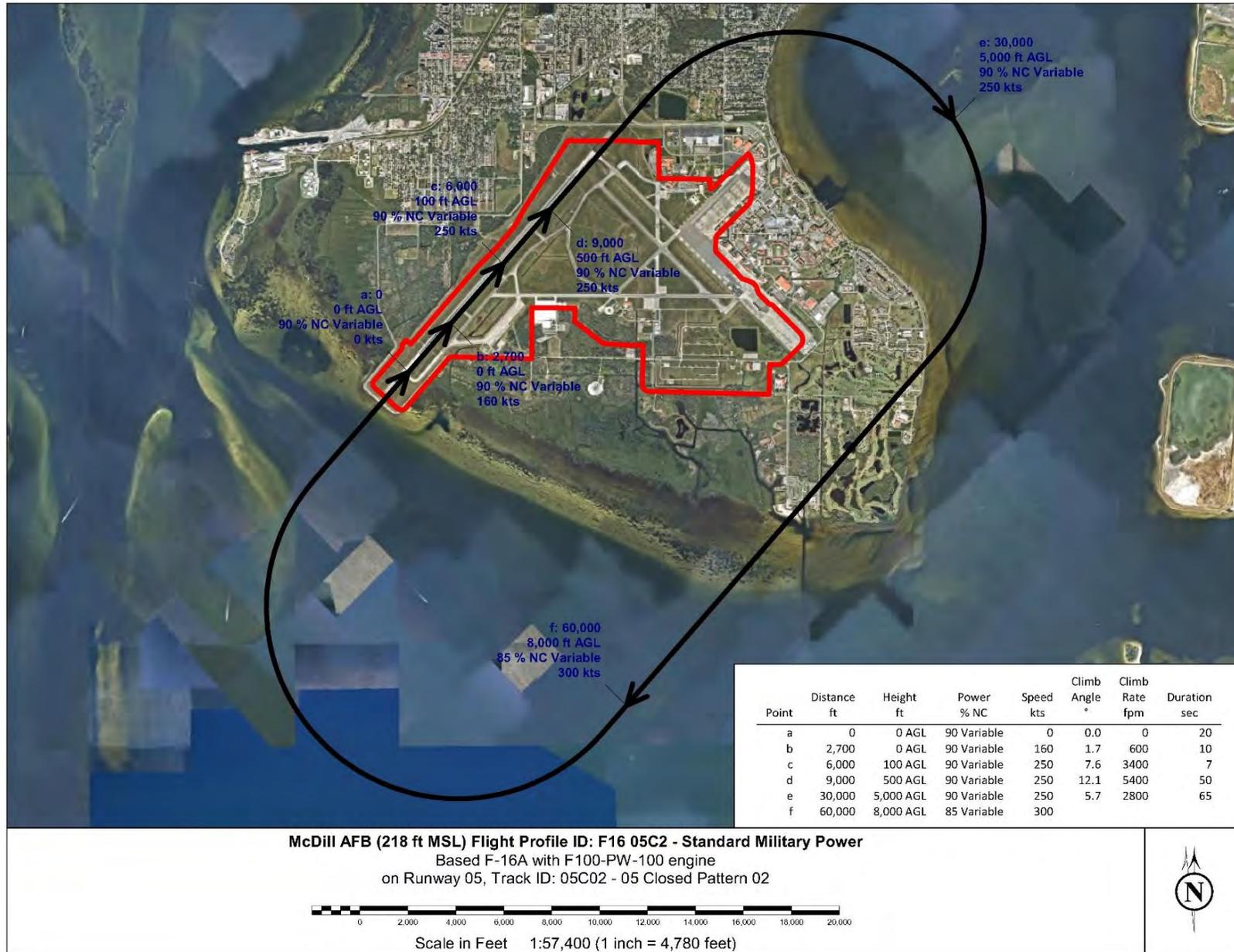


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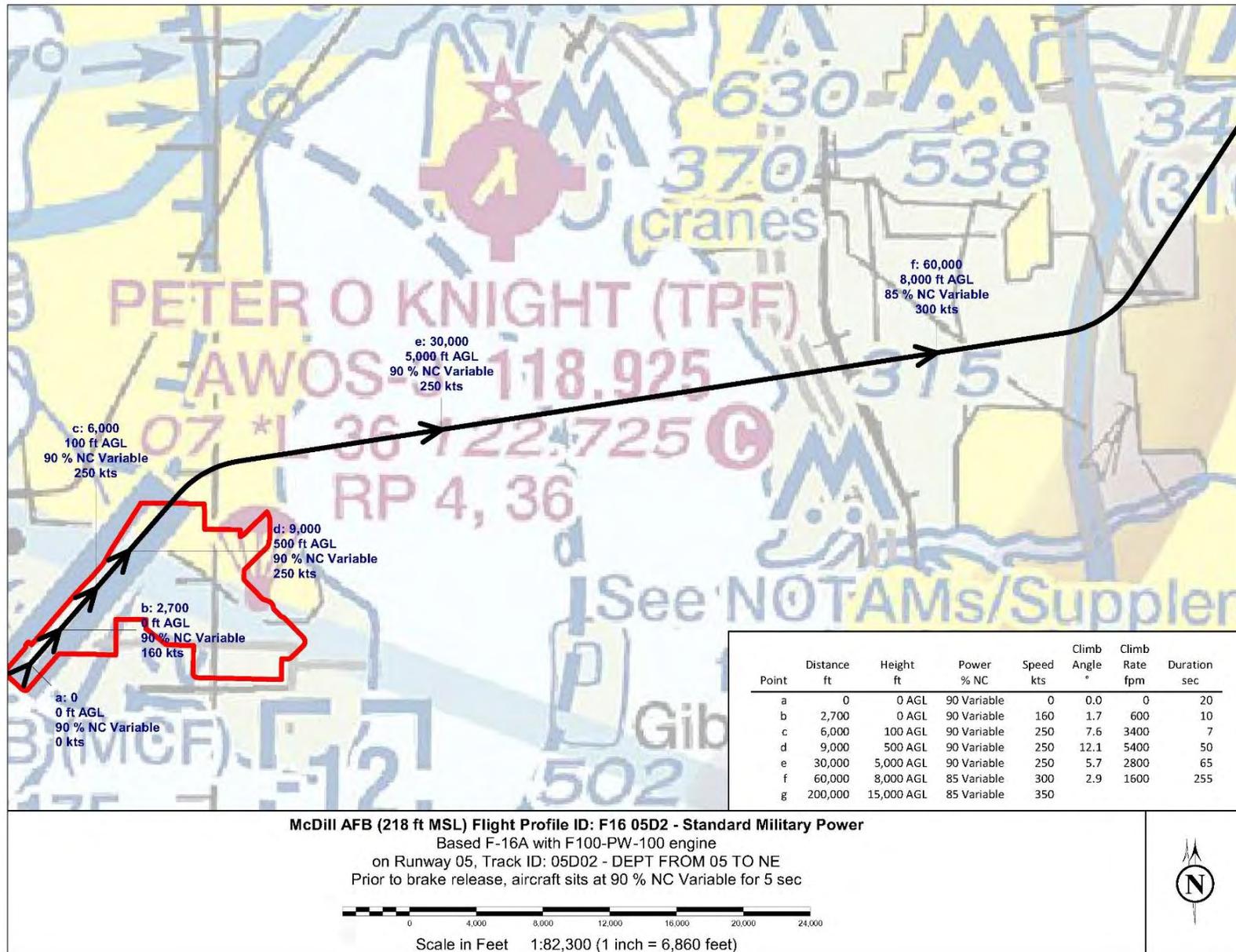


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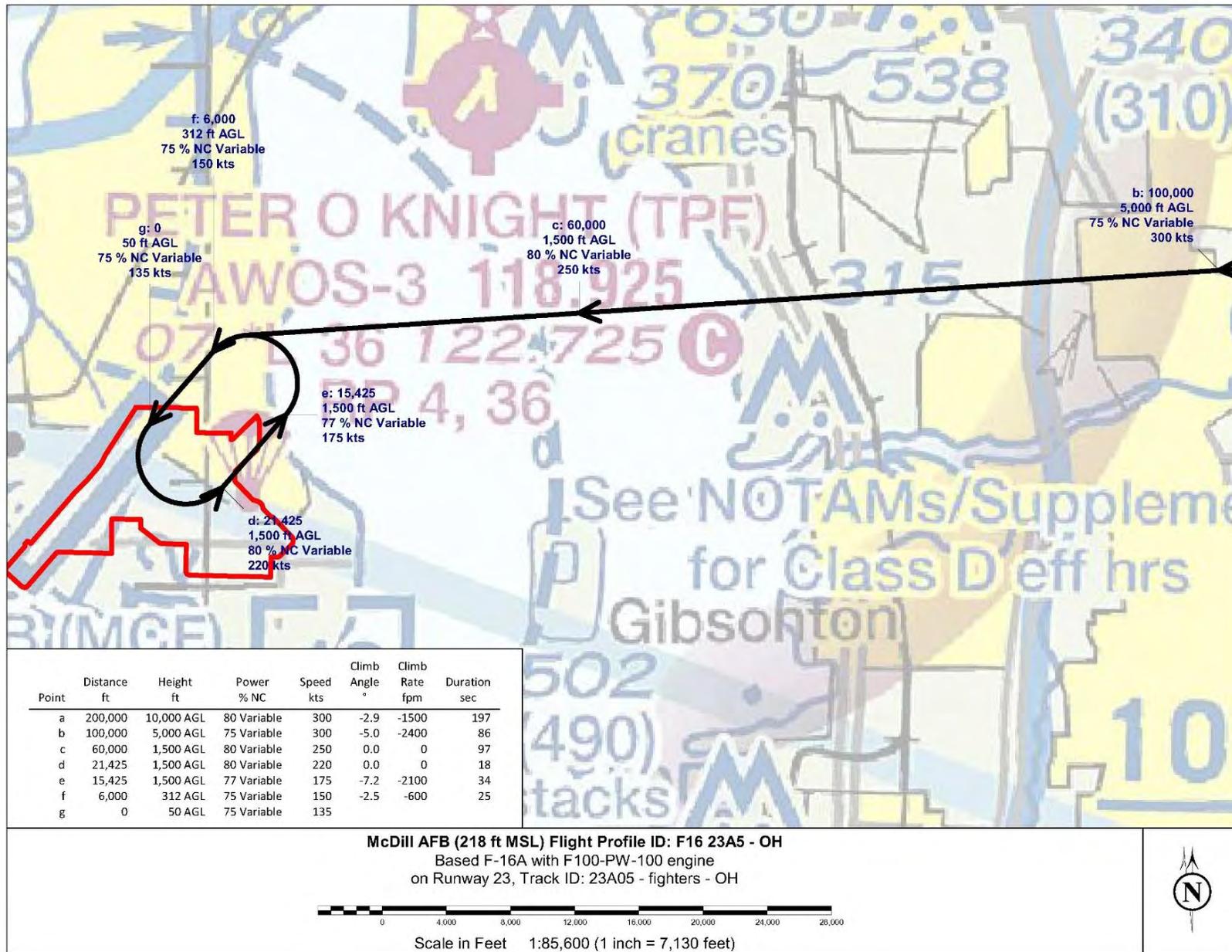


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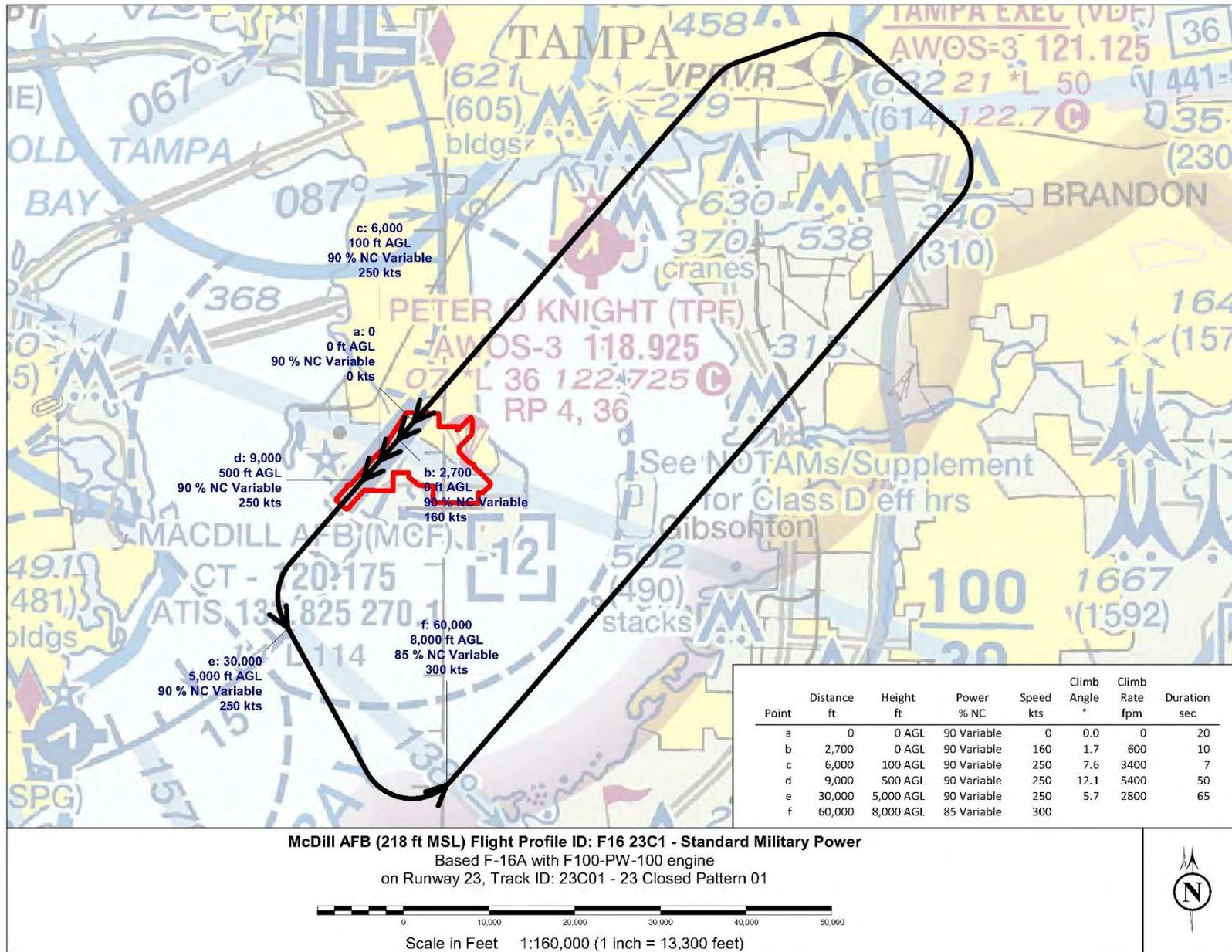


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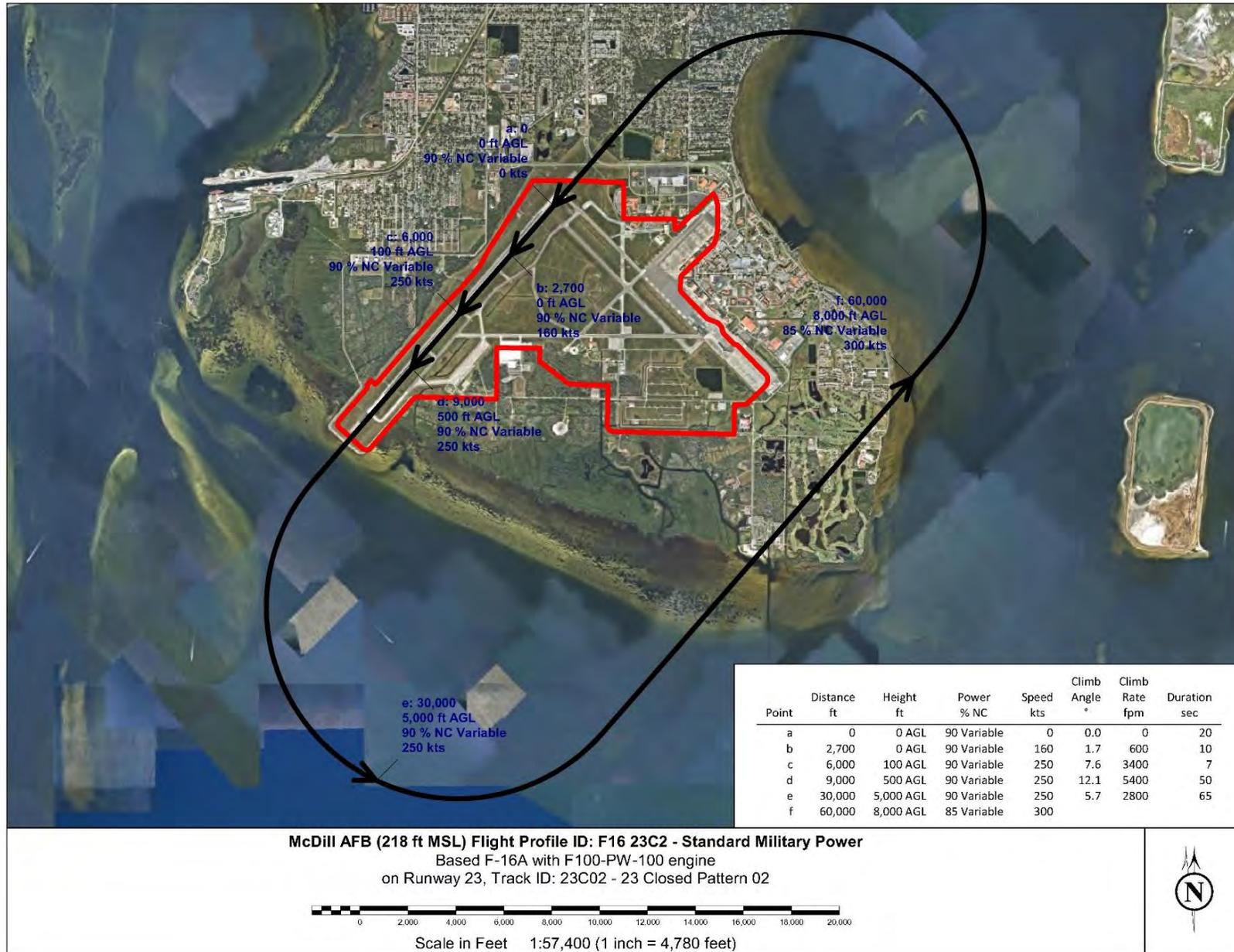


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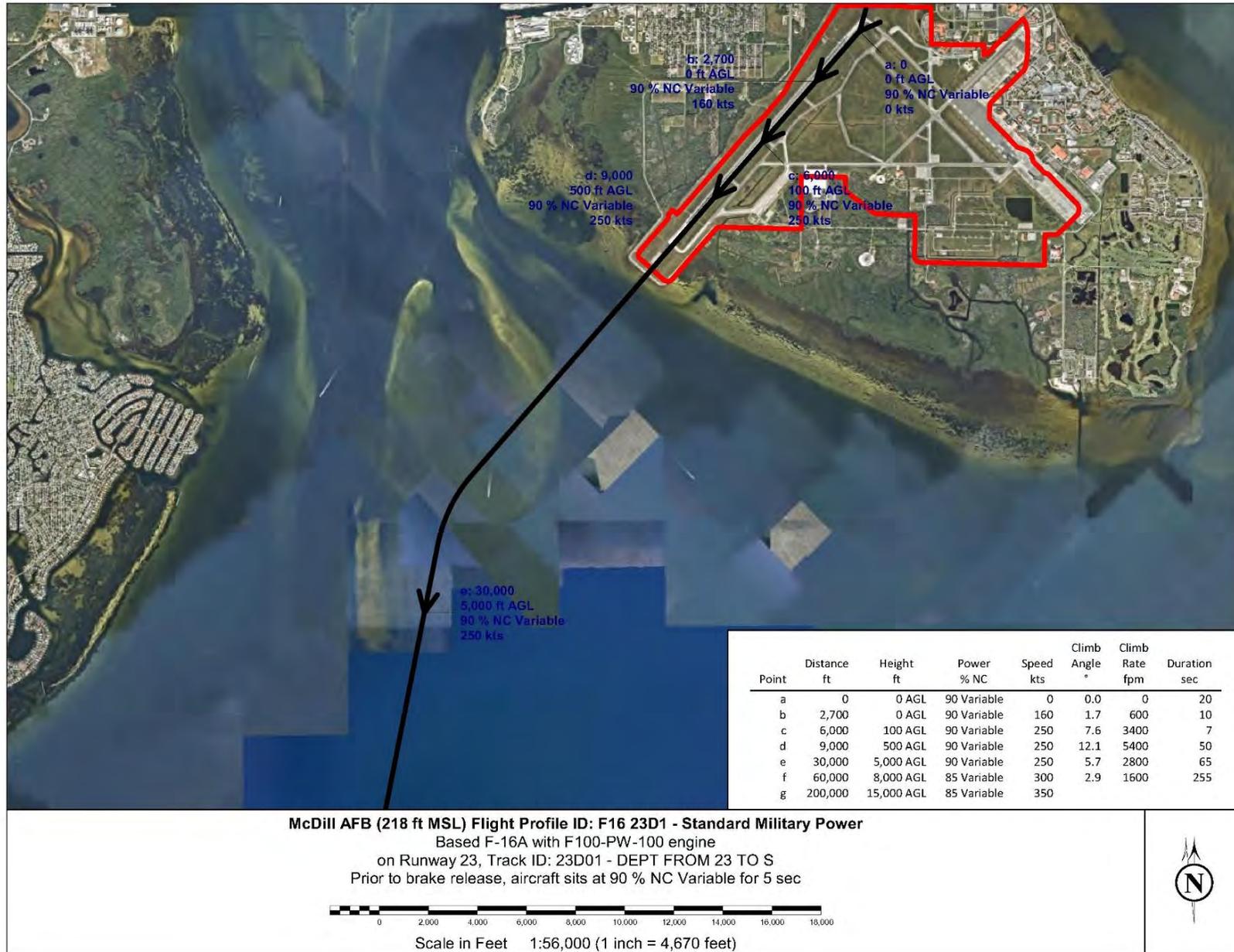


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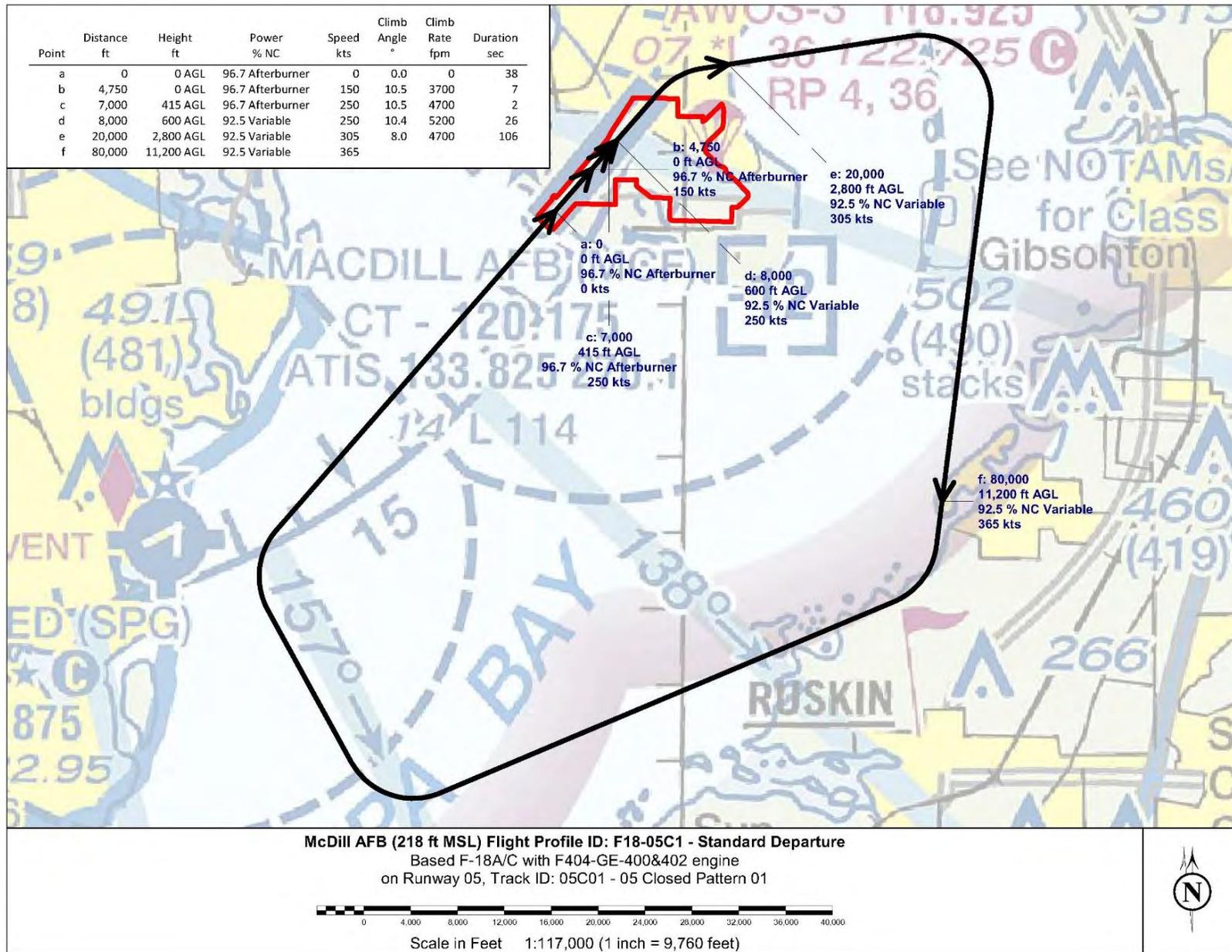


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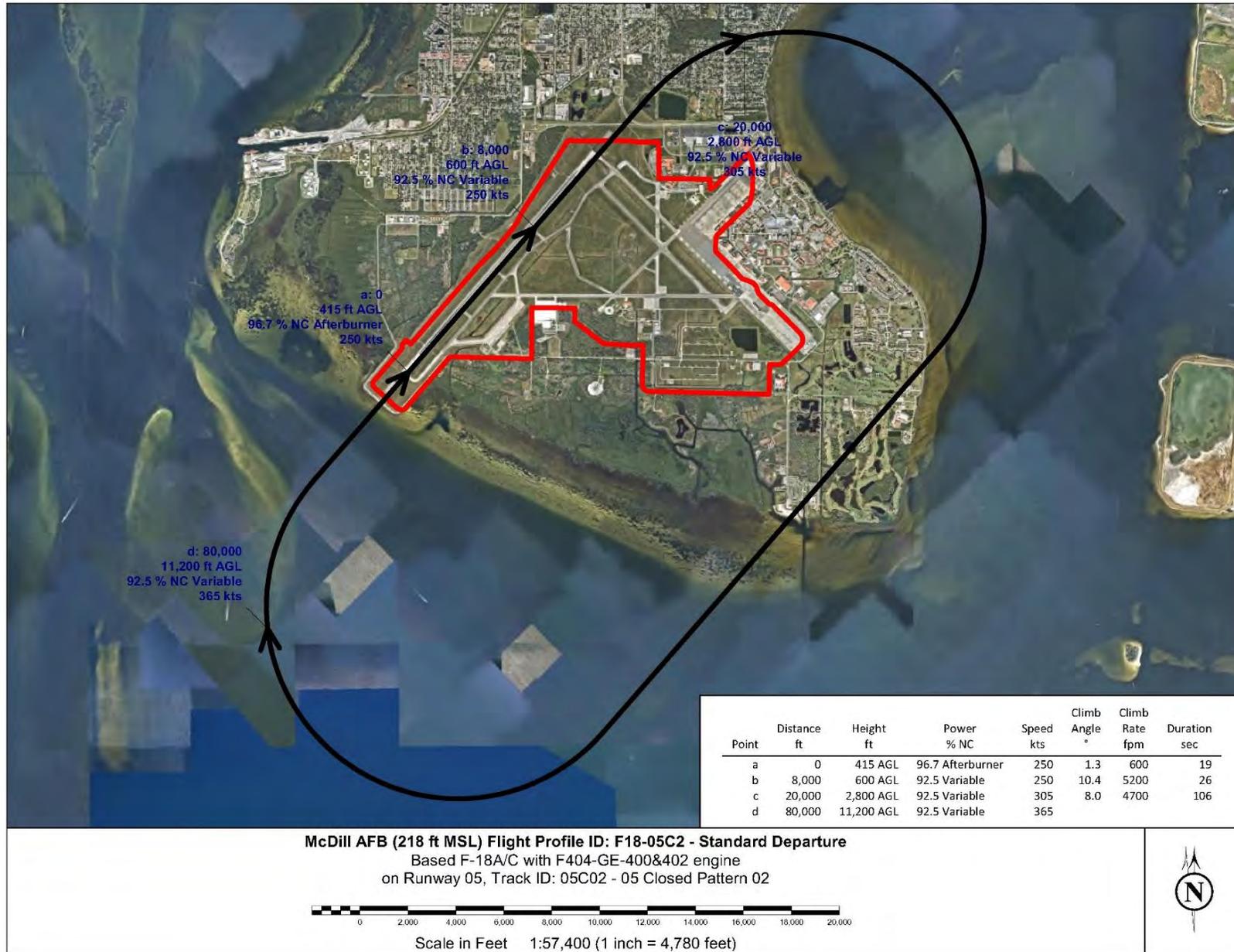


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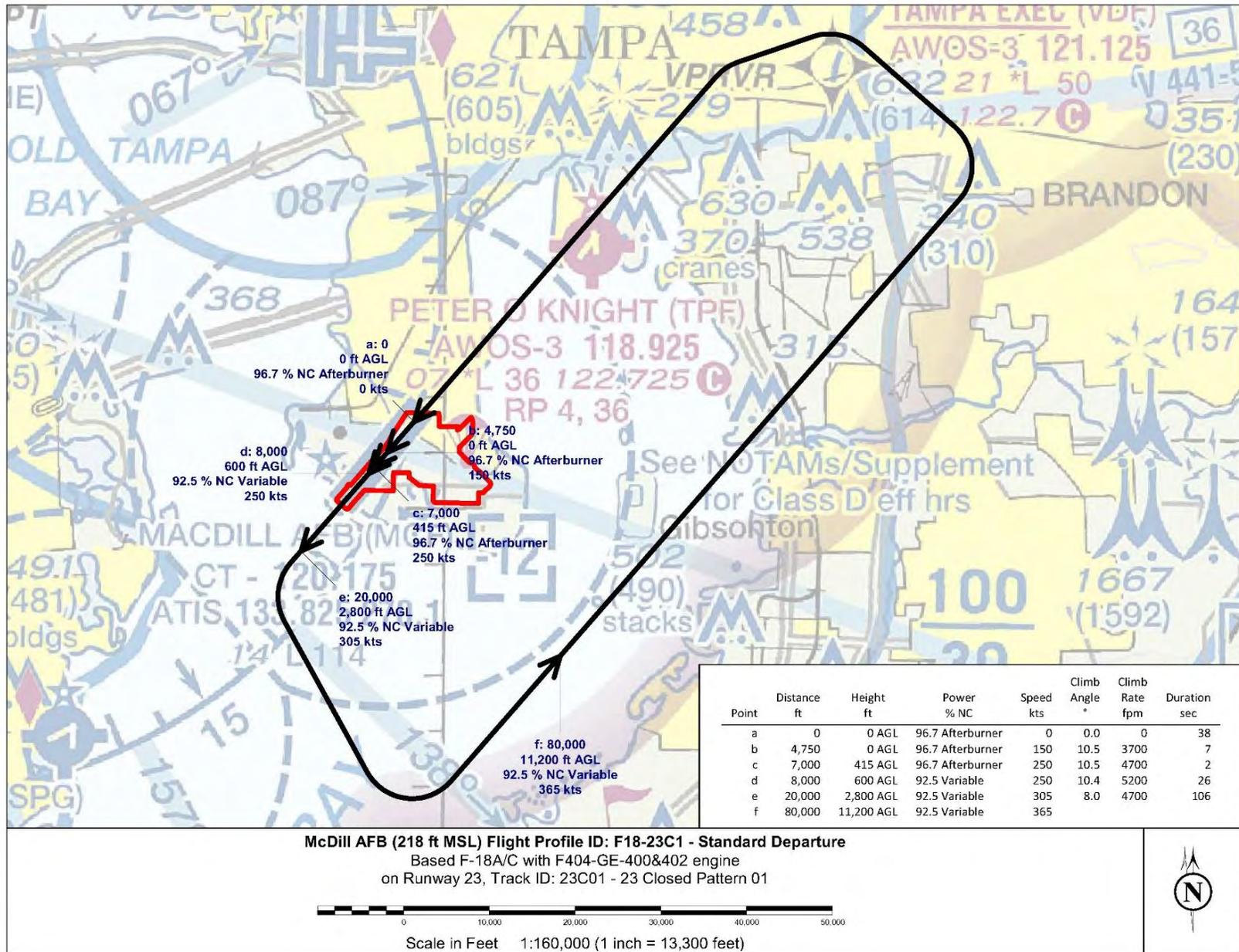


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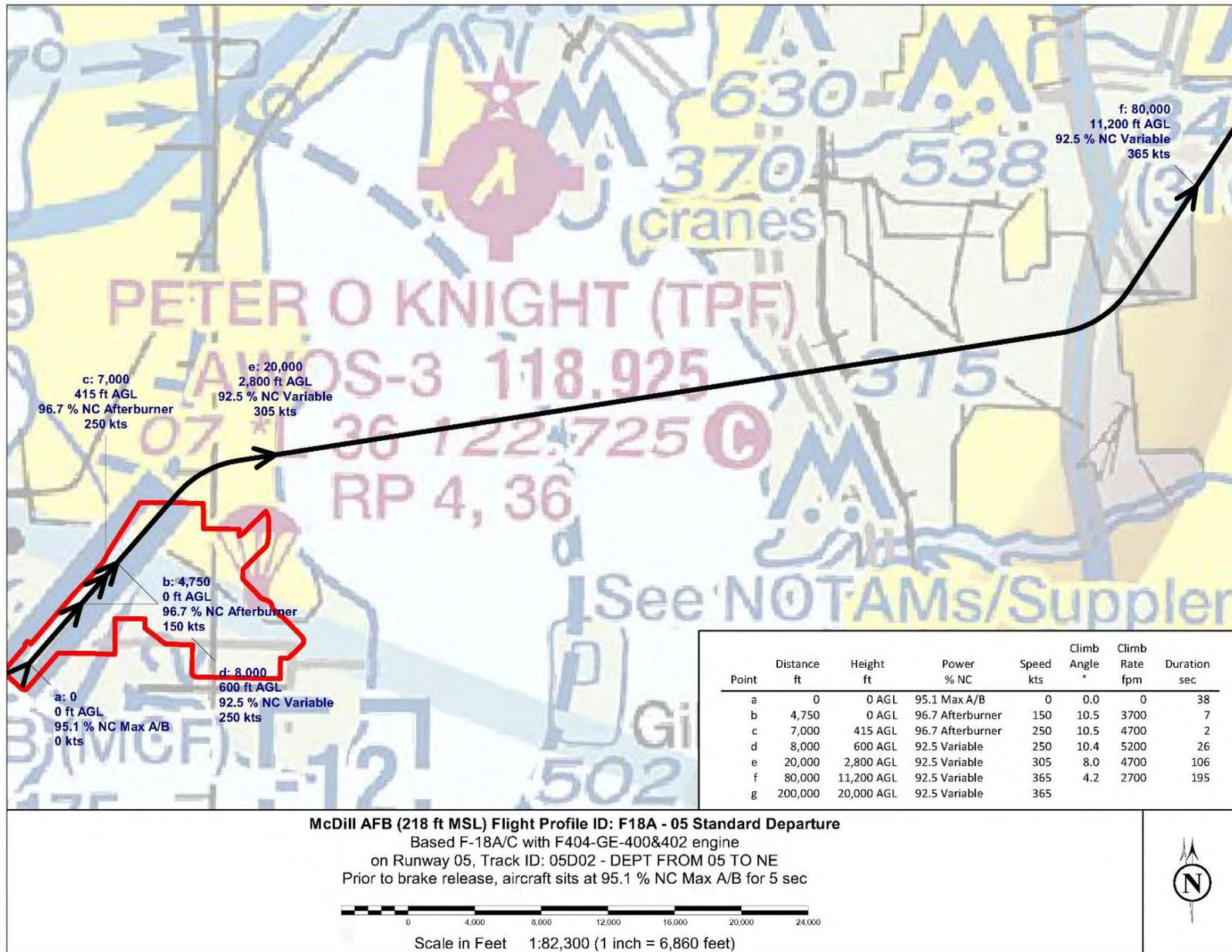


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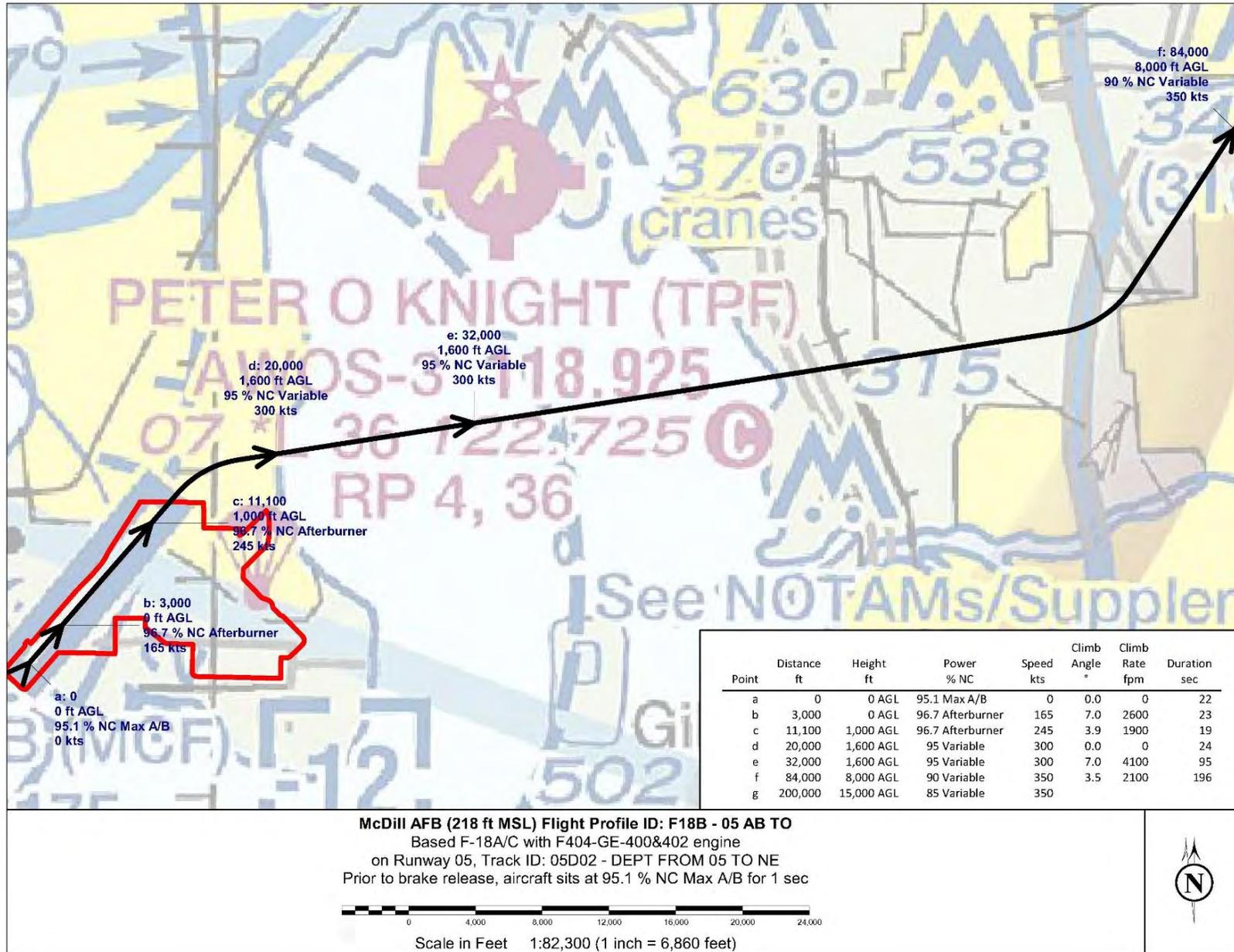


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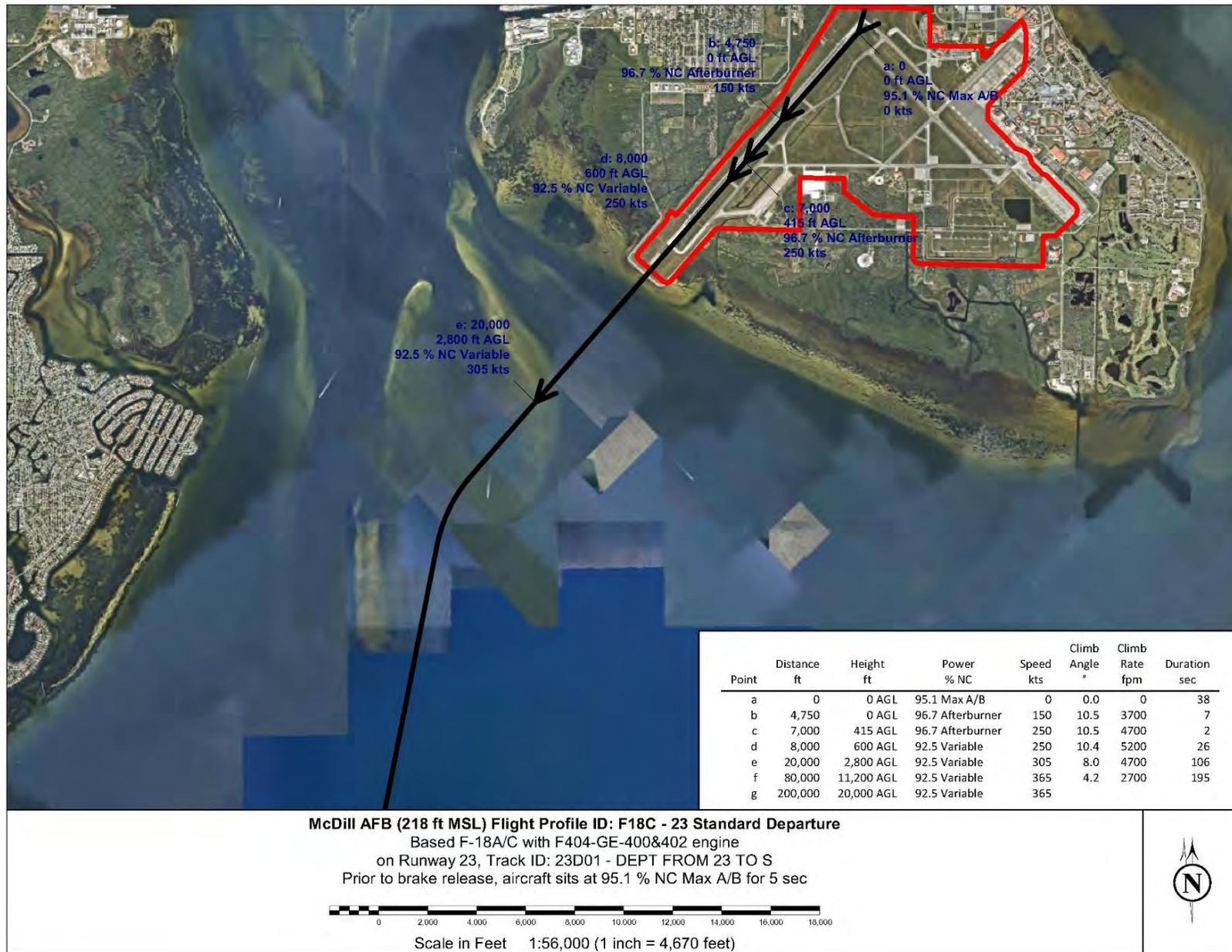


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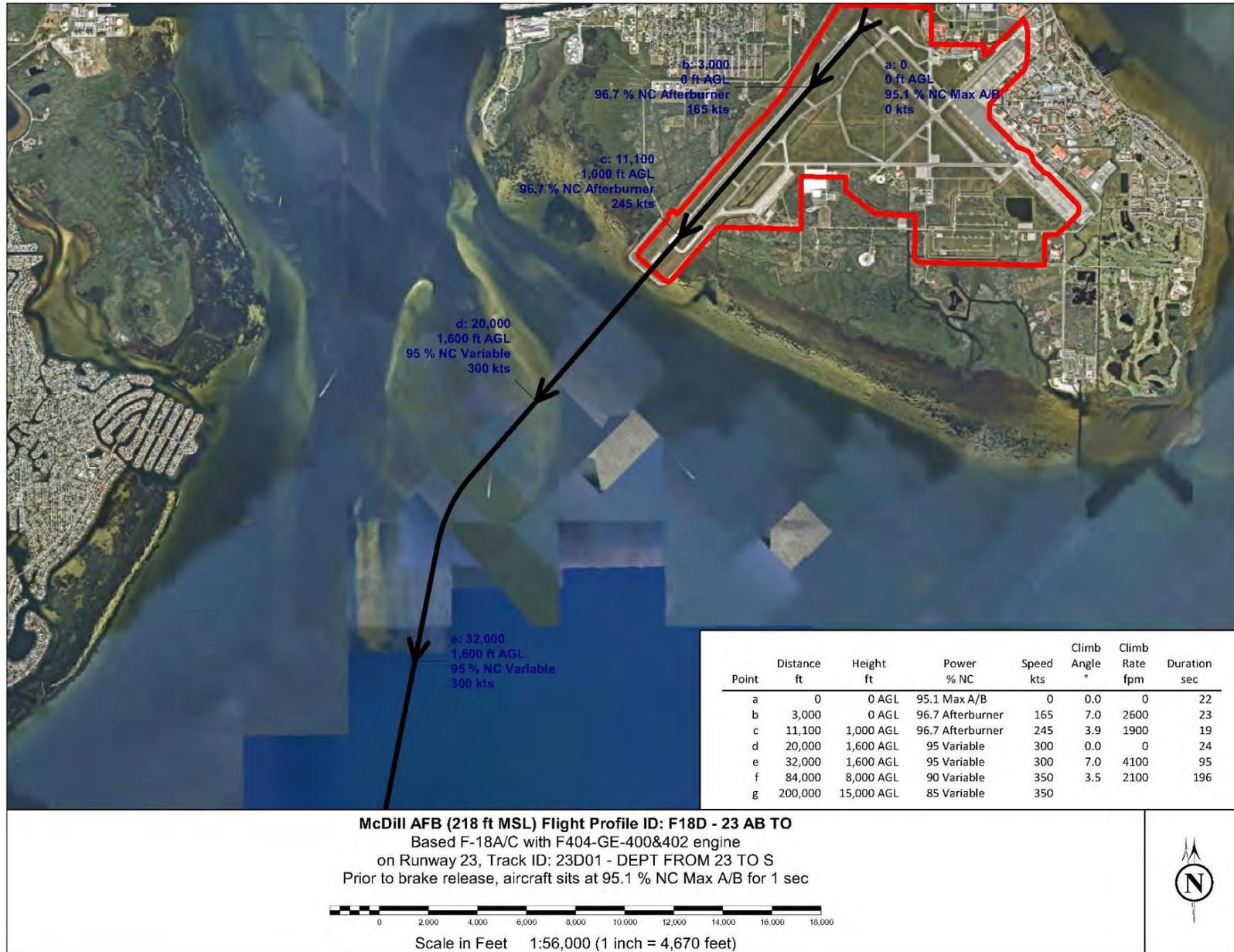


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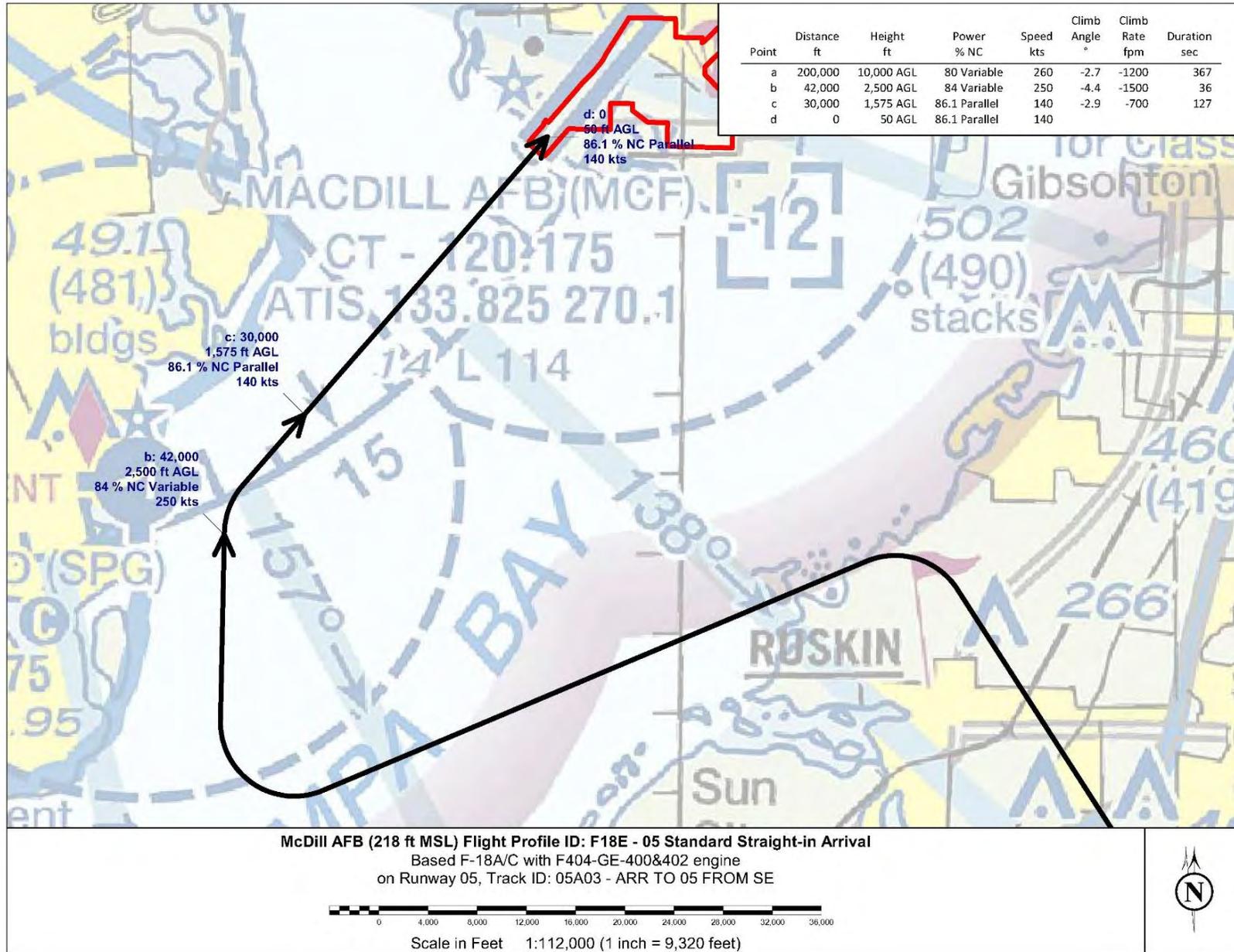


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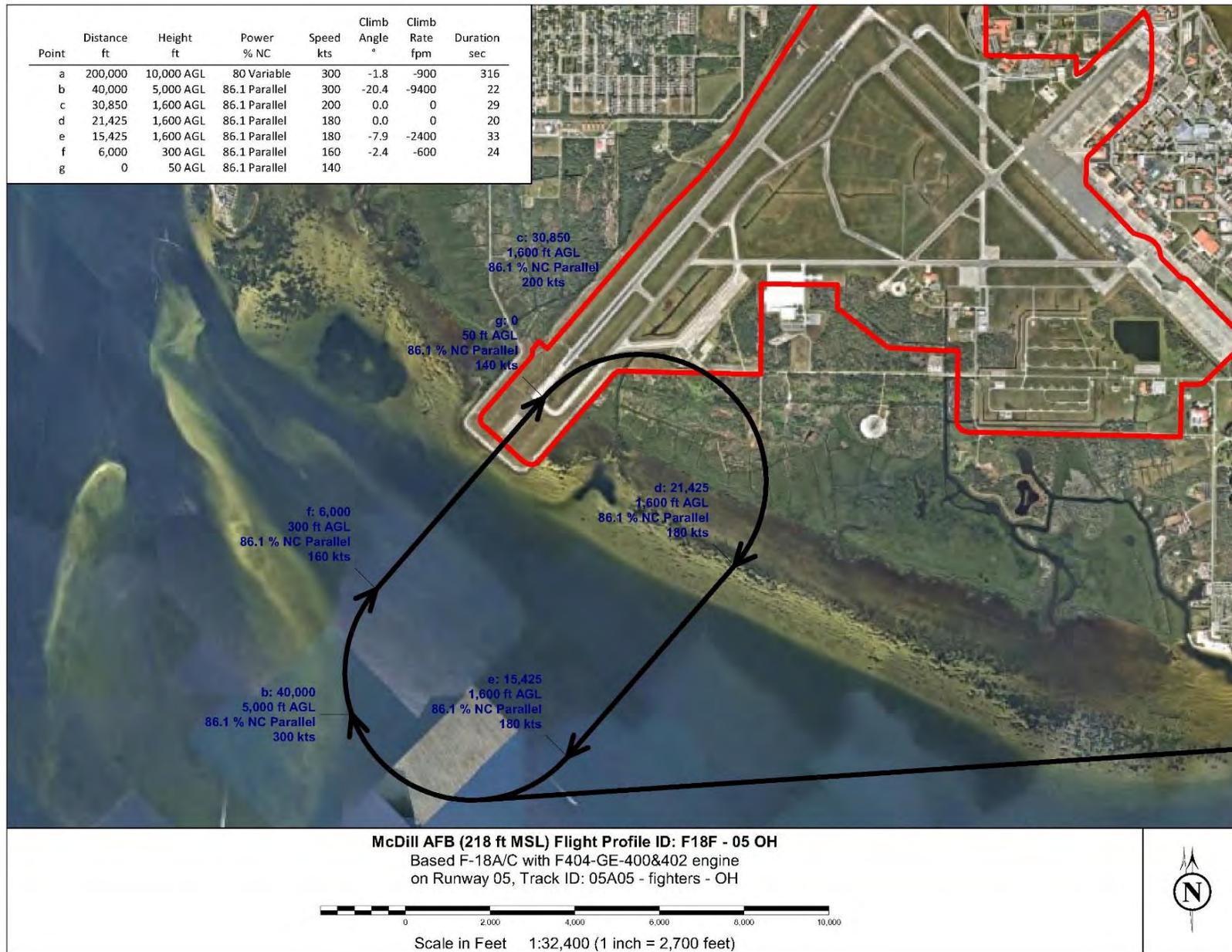


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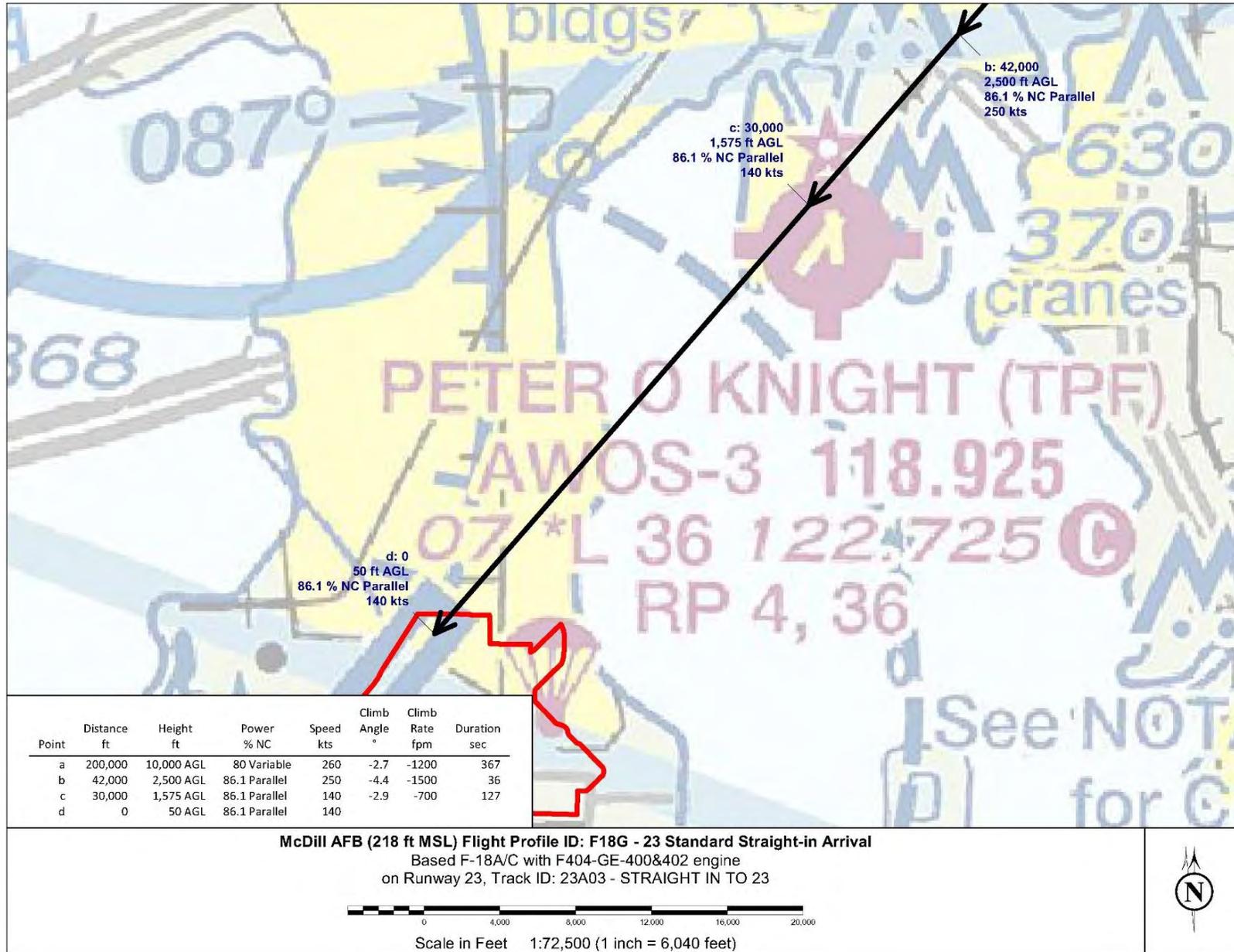


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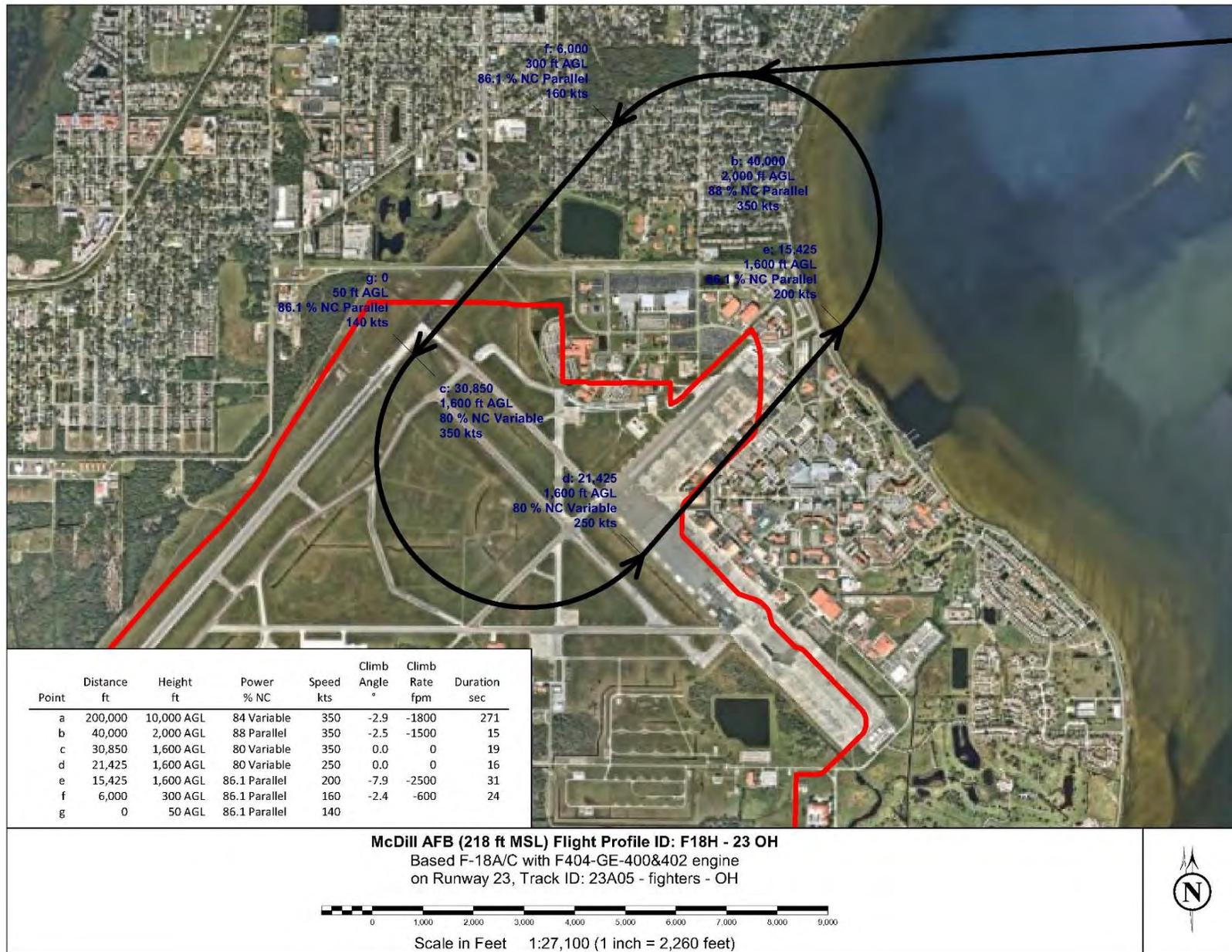


Figure A.2.42

### A.3 Airfield Flight Profile Maps for Army Reserve Aircraft

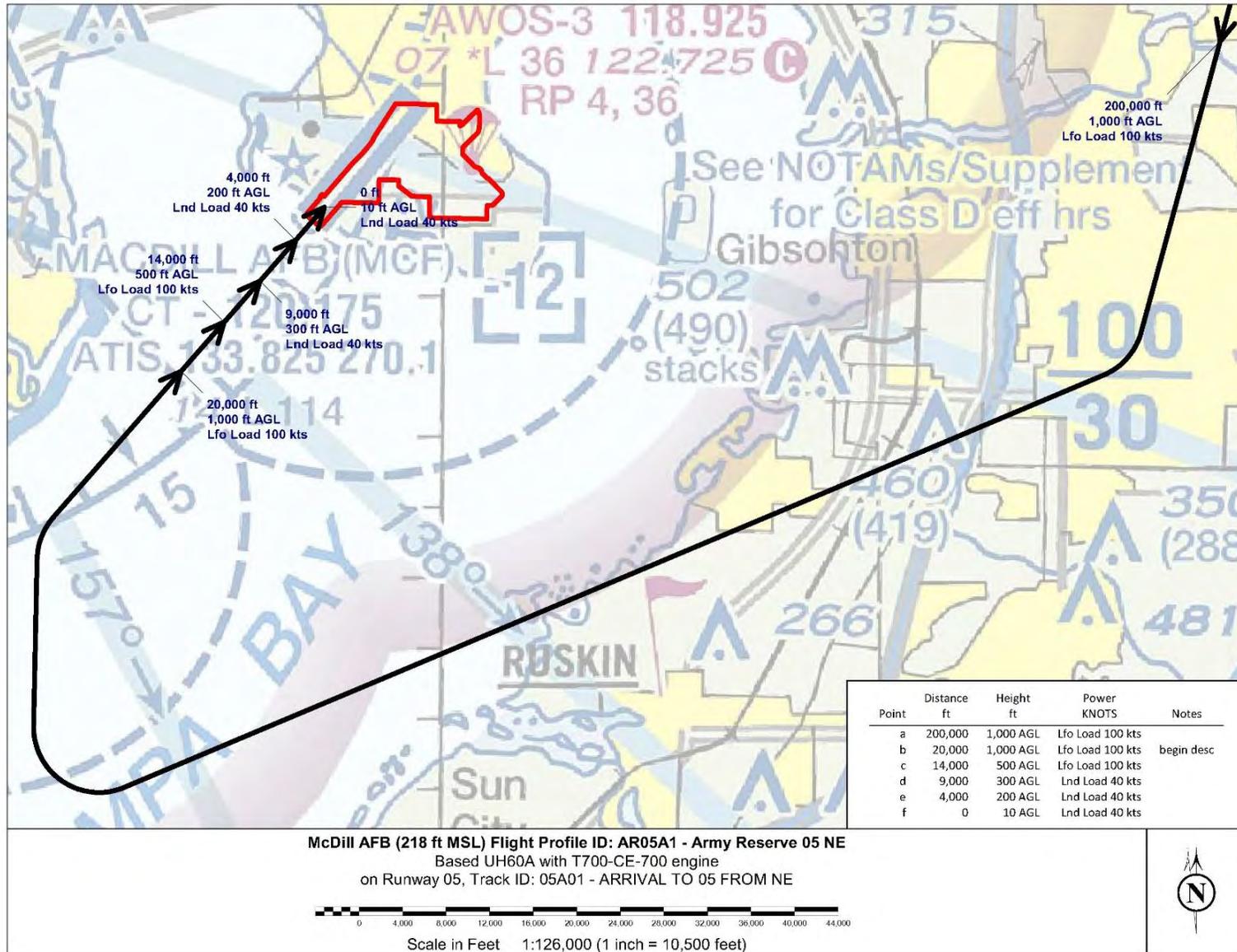


Figure A.3.1



Figure A.3.2



Figure A.3.3

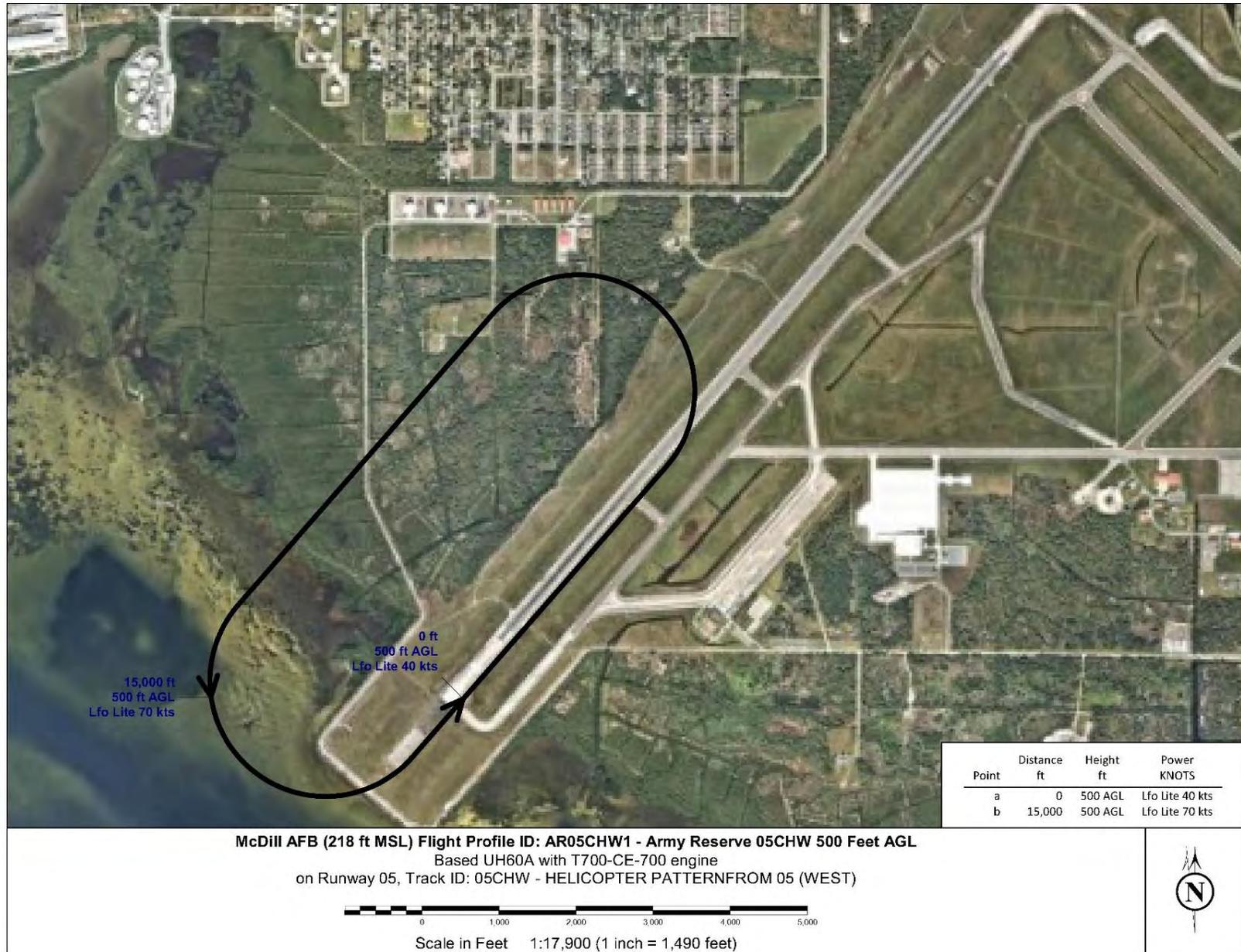


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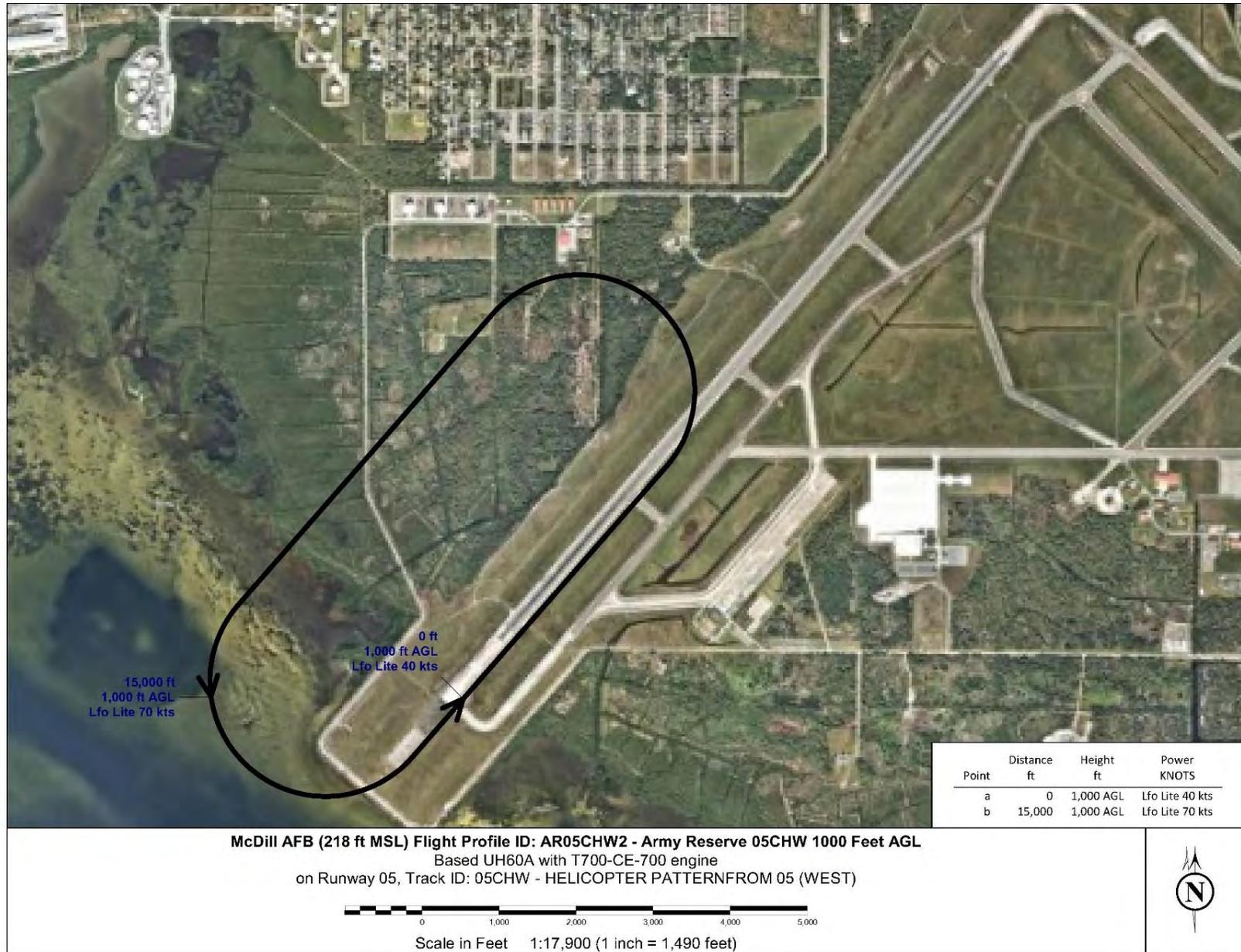


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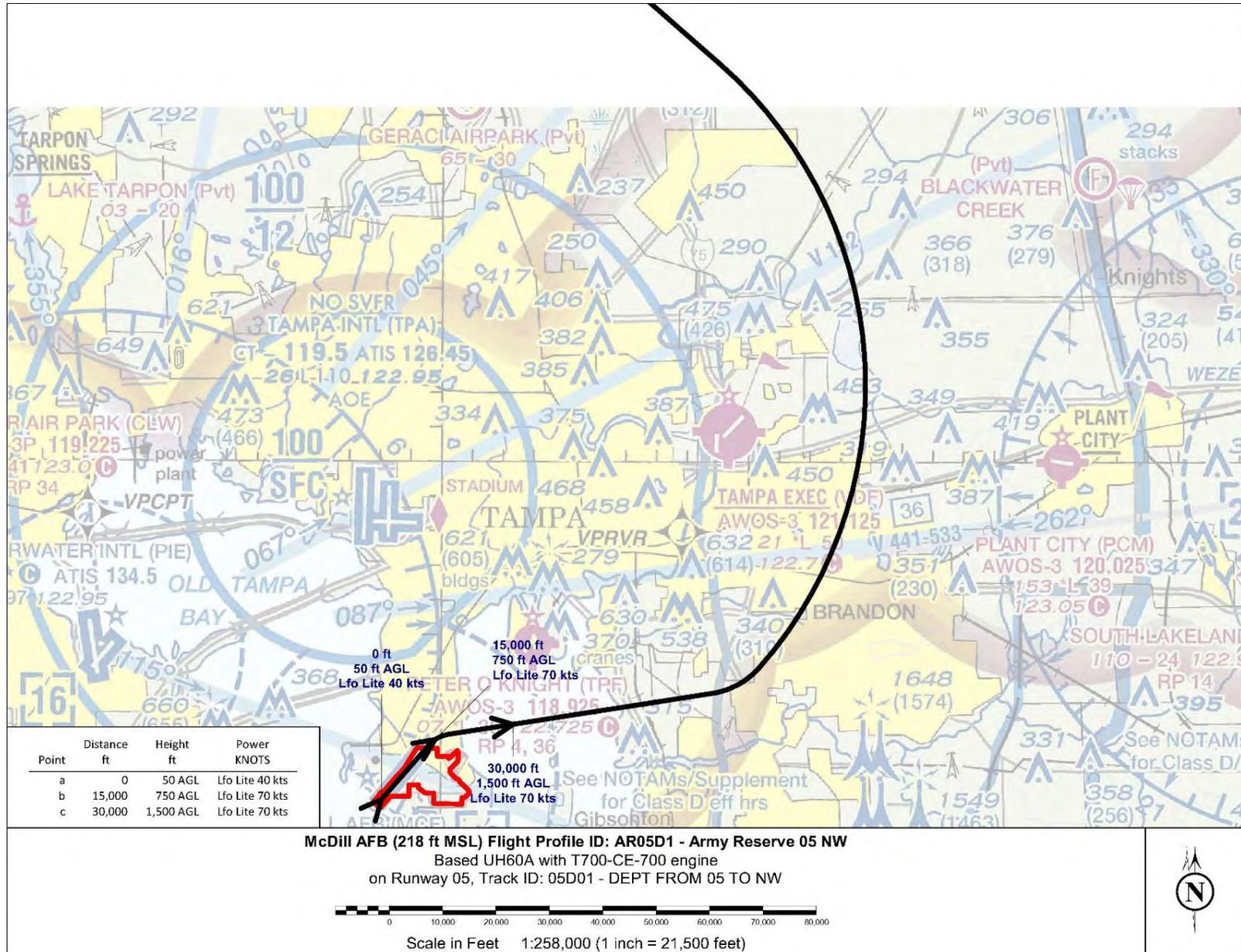


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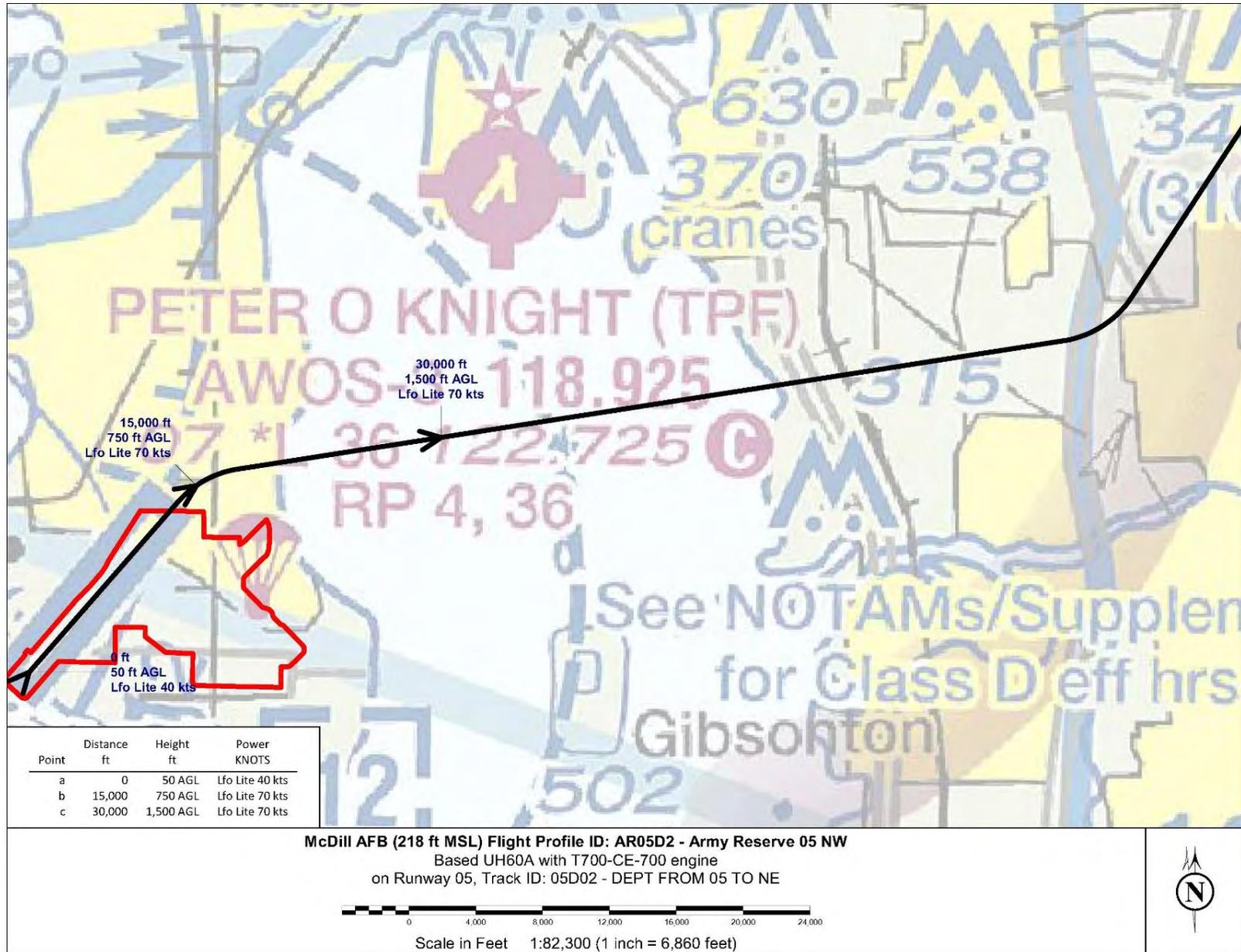


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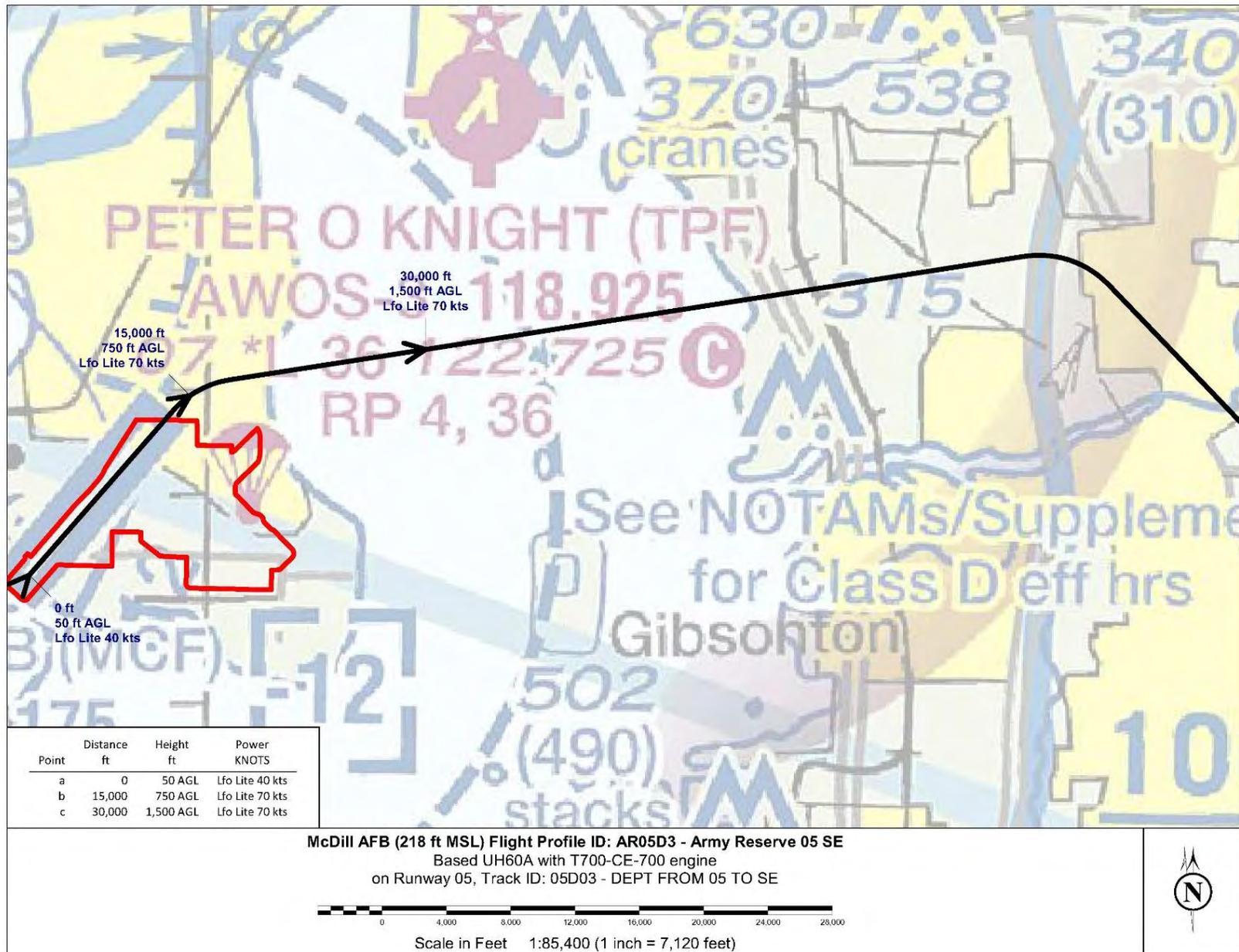


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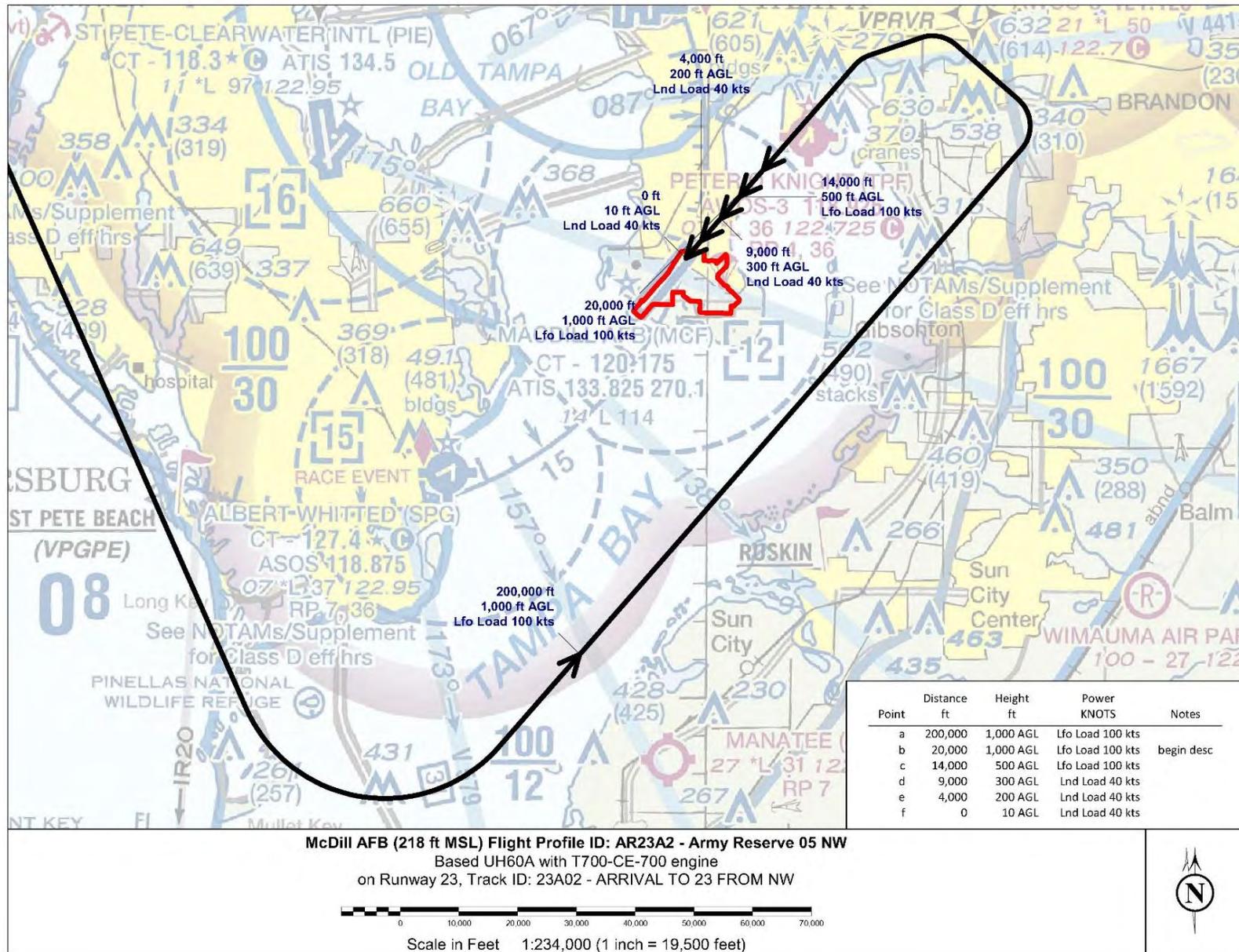


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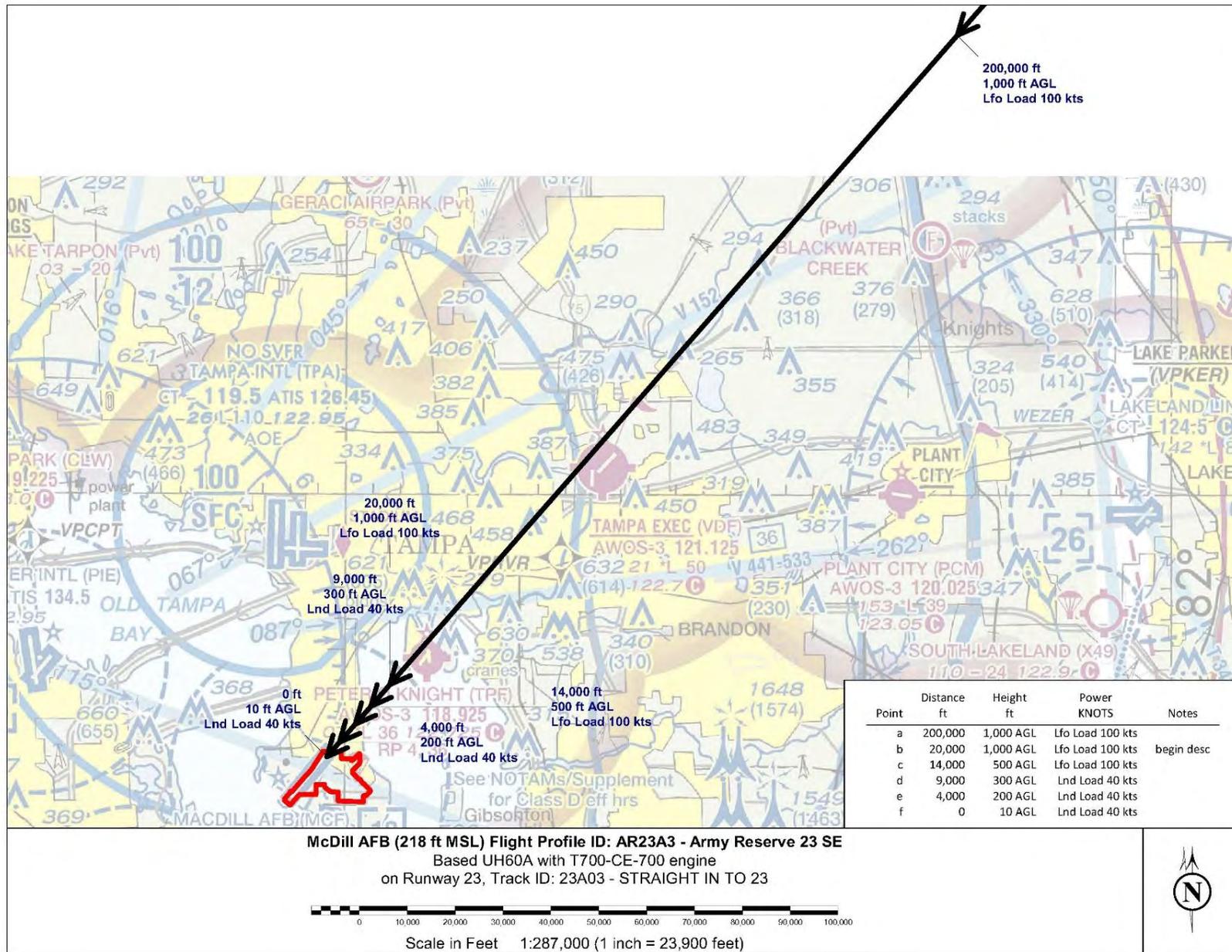


Figure A.3.10



Figure A.3.11



Figure A.3.12



Figure A.3.13



Figure A.3.14

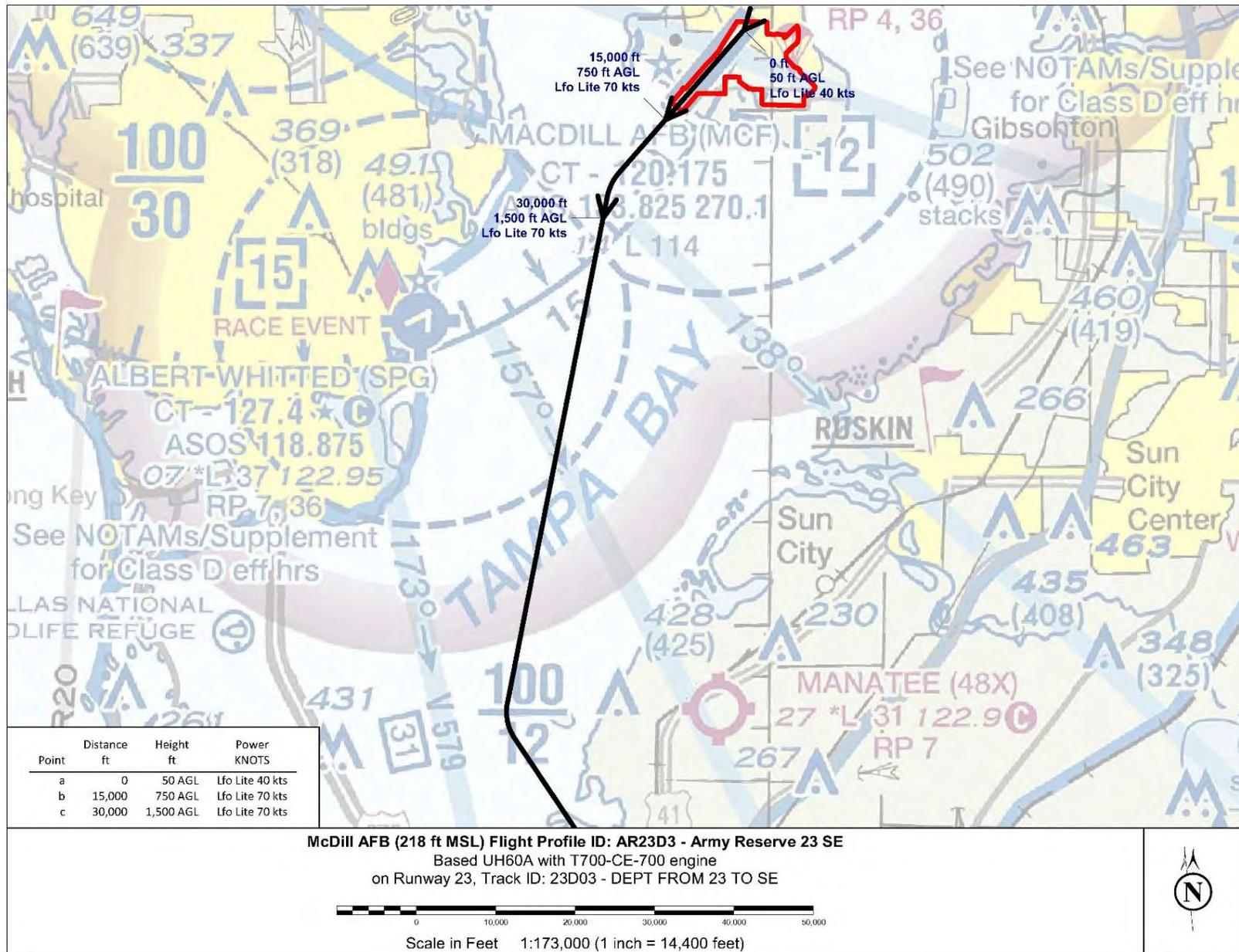


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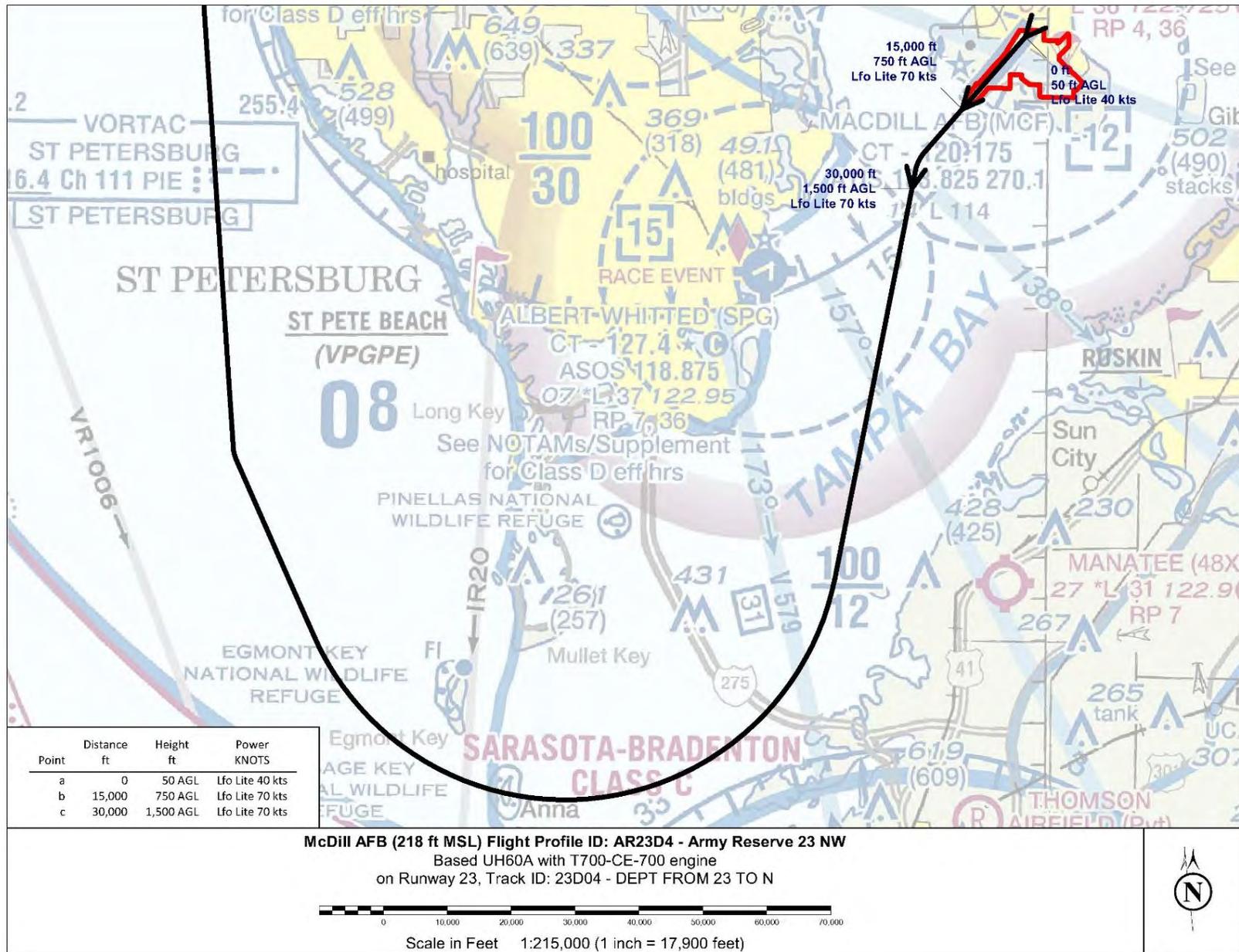


Figure A.3.16

### A.4 Airfield Flight Profile Maps for Transient Aircraft

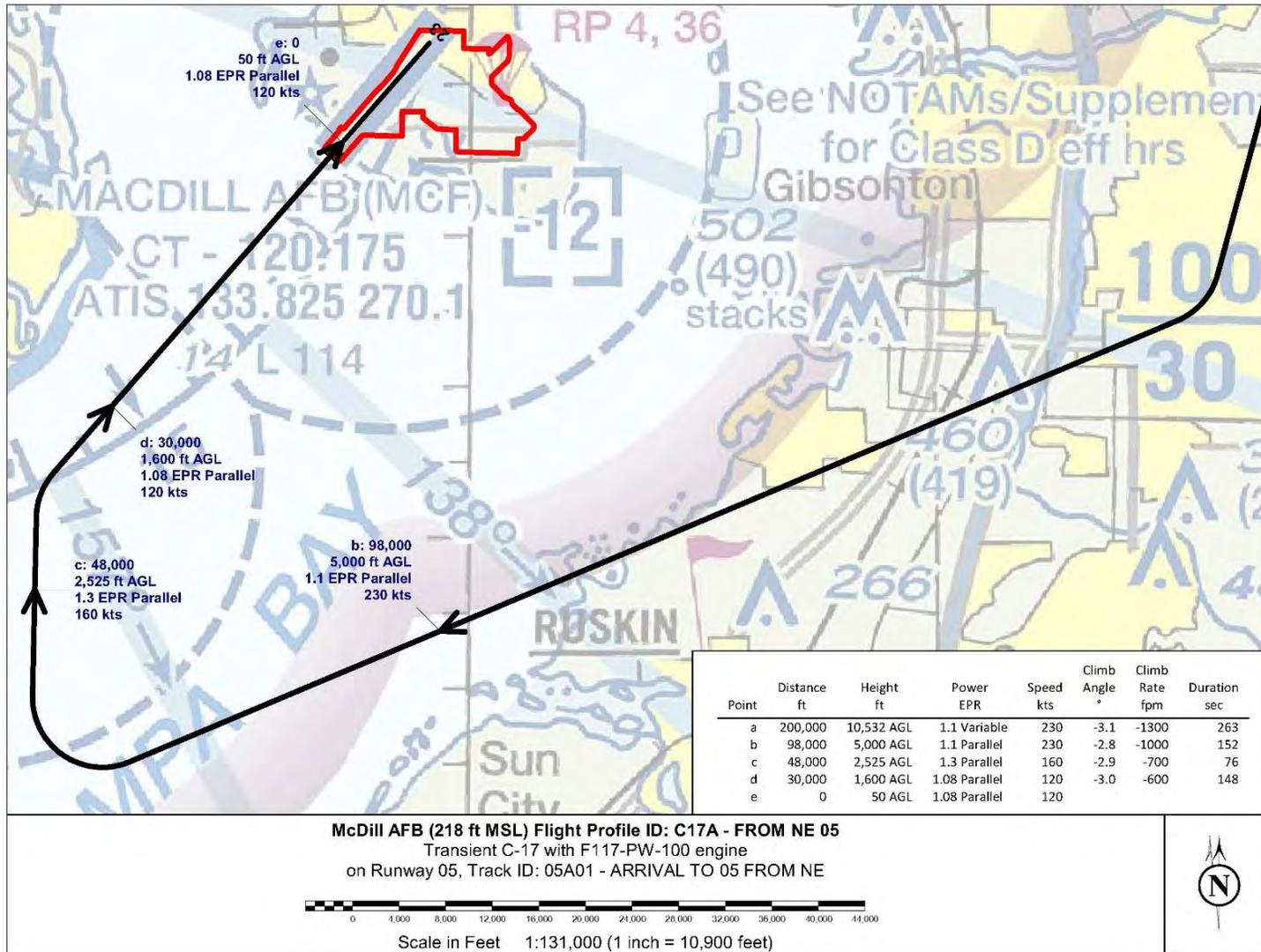


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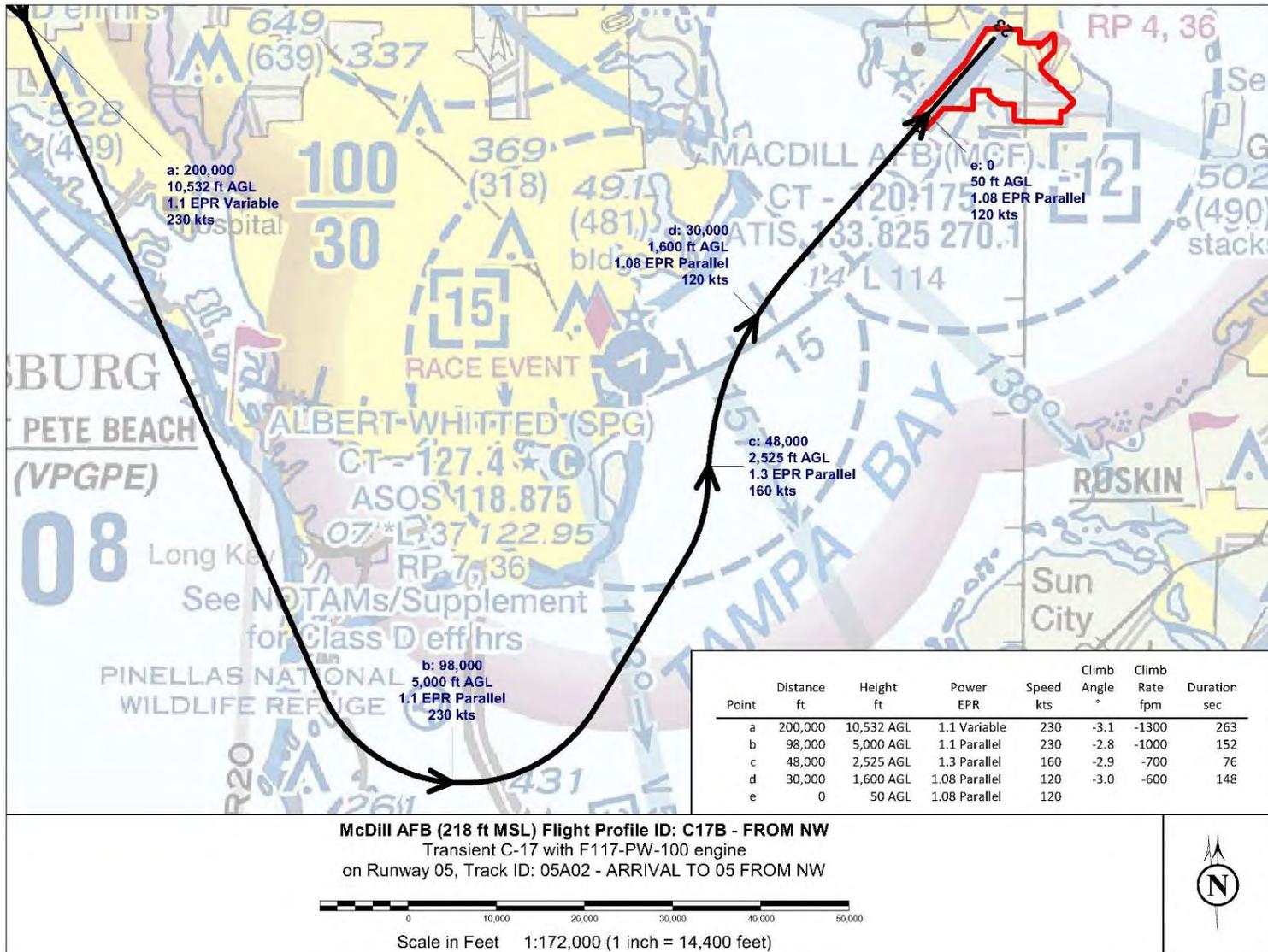


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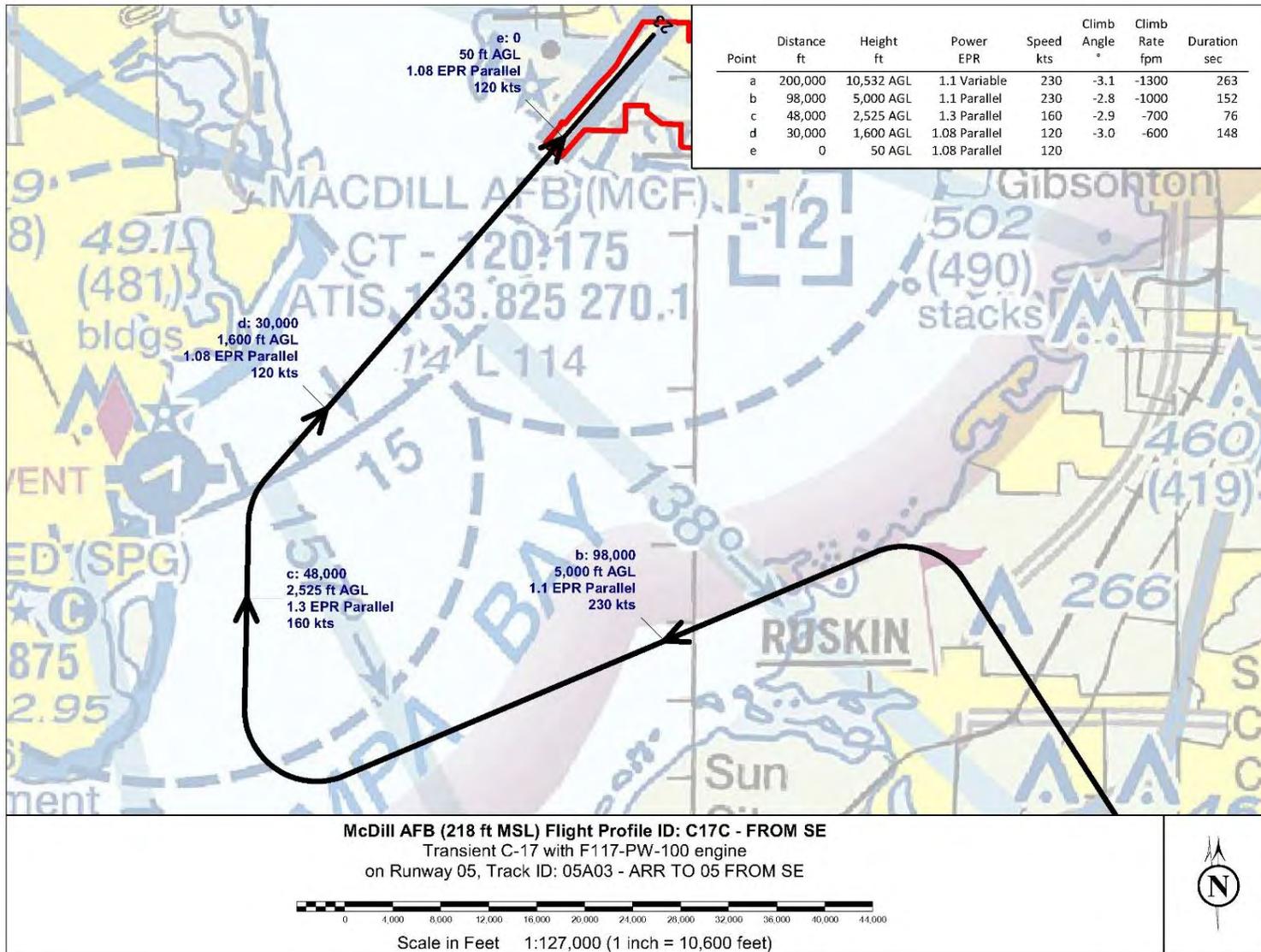


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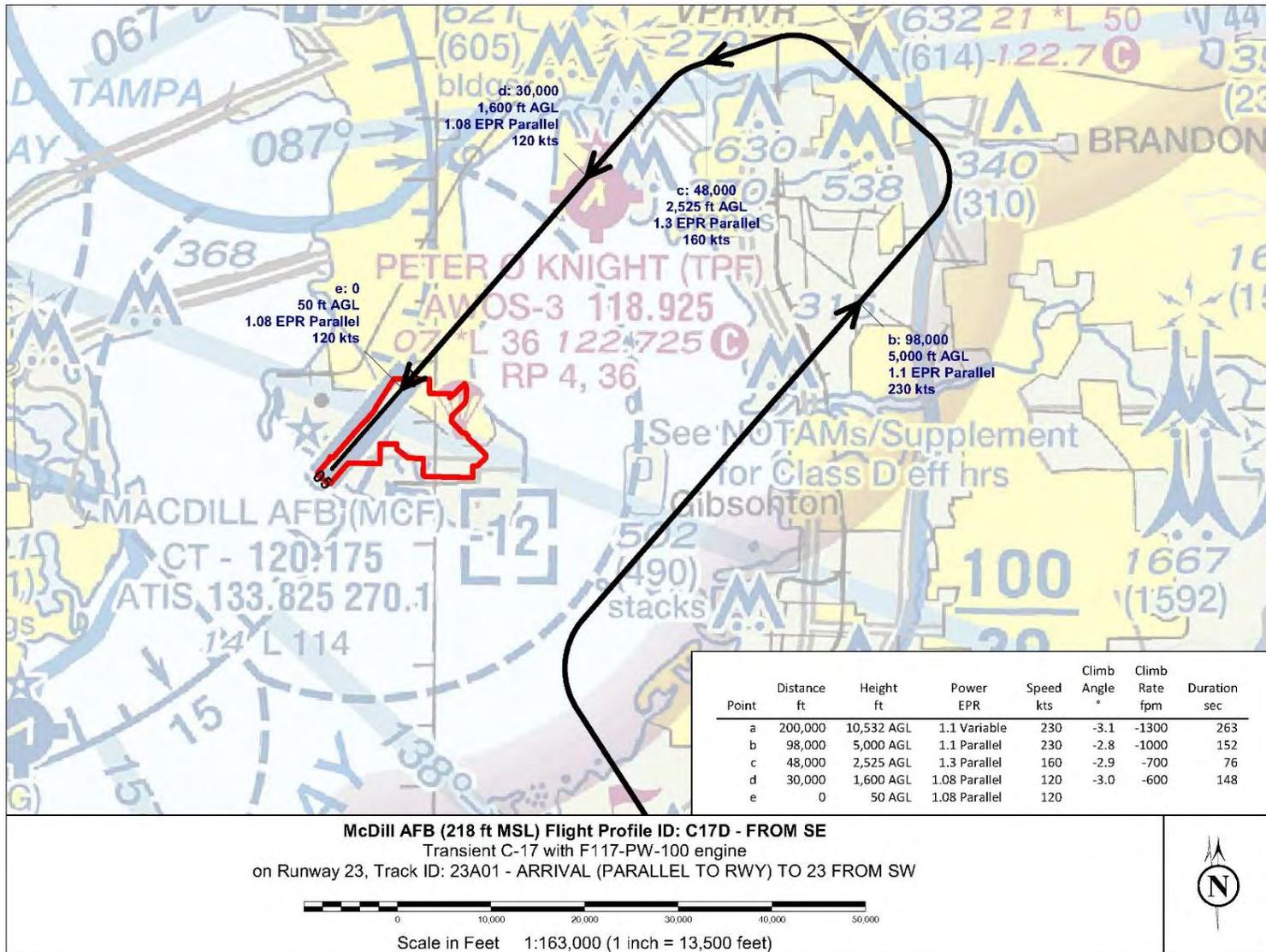


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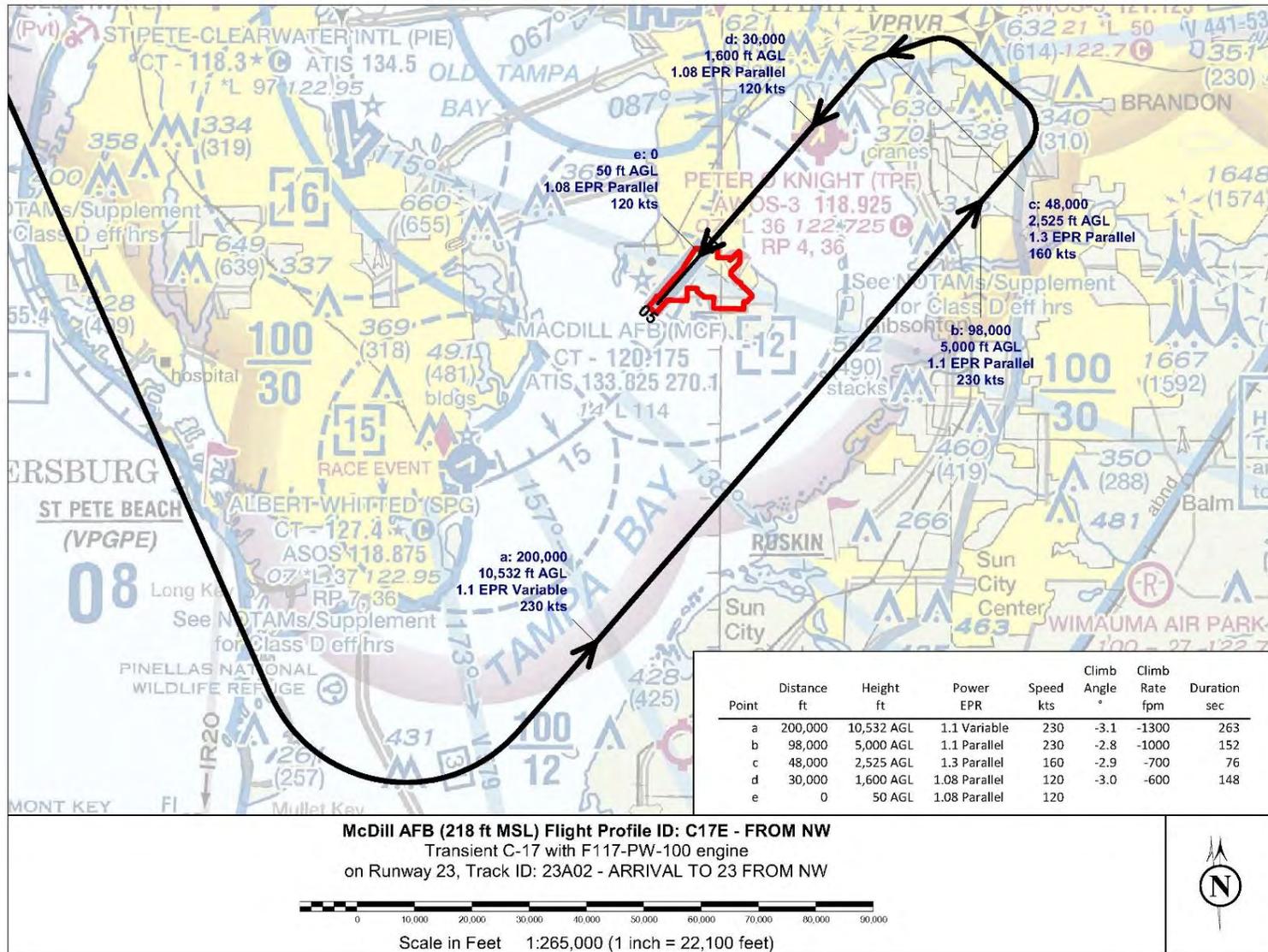


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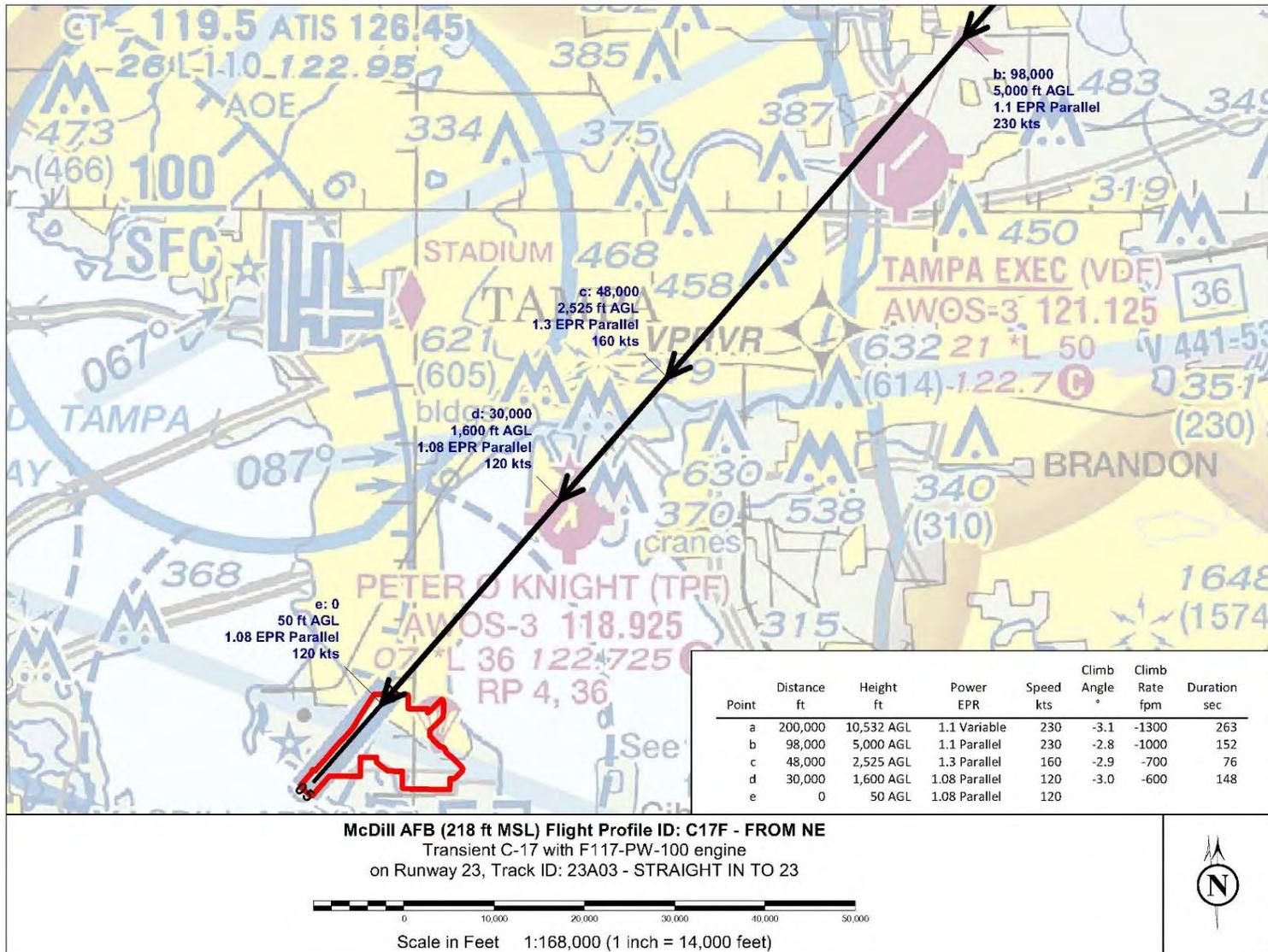


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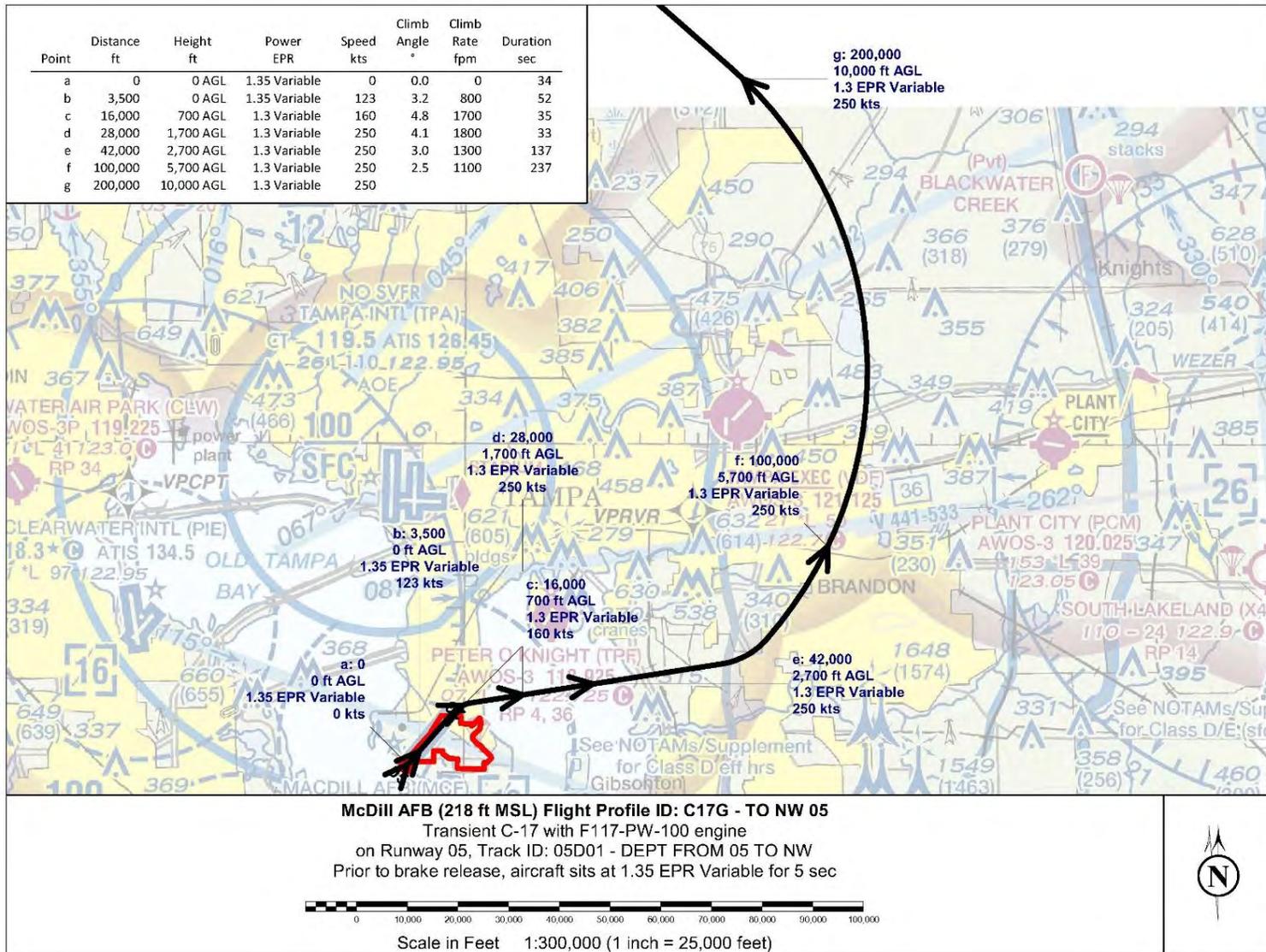


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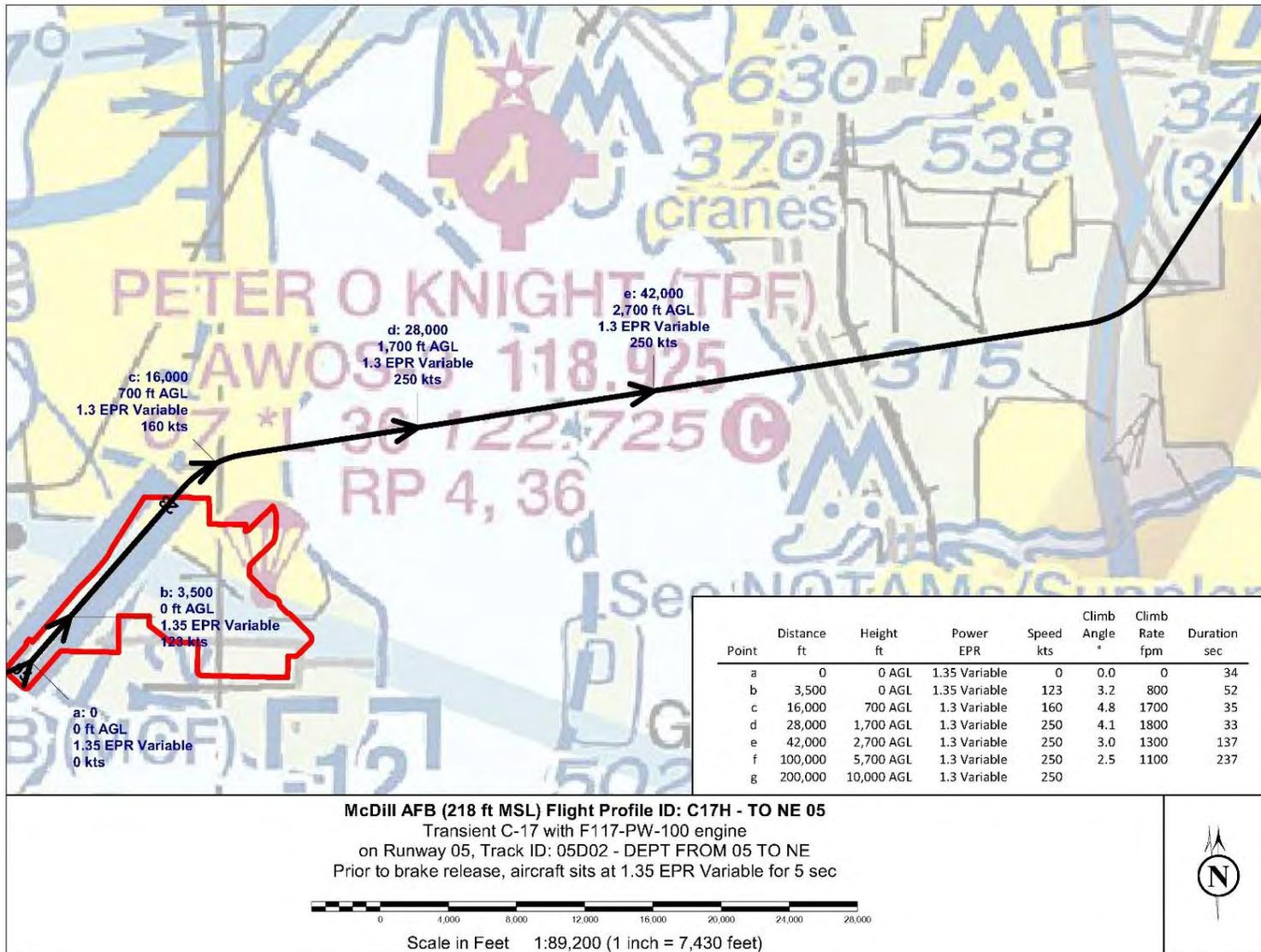


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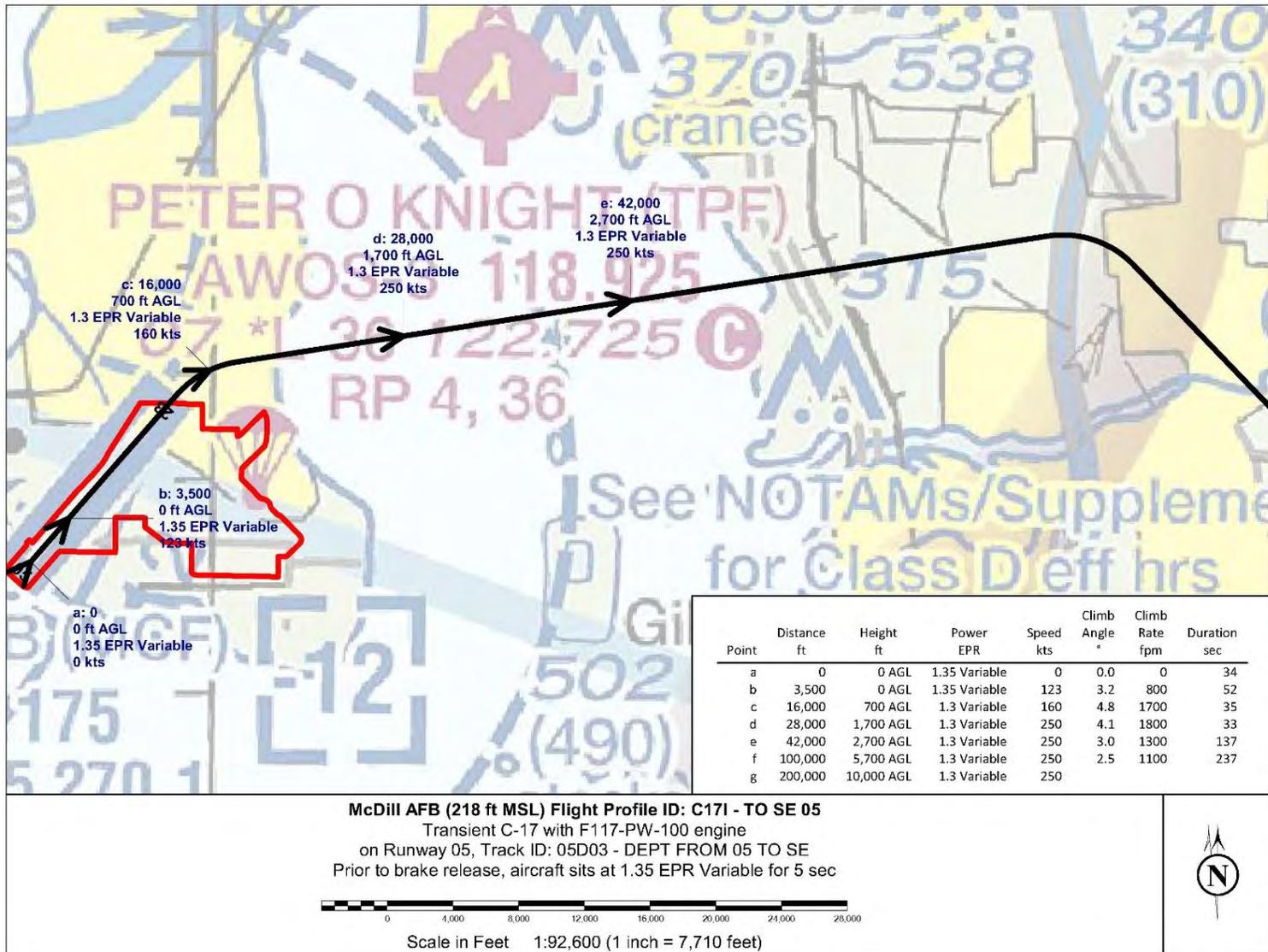


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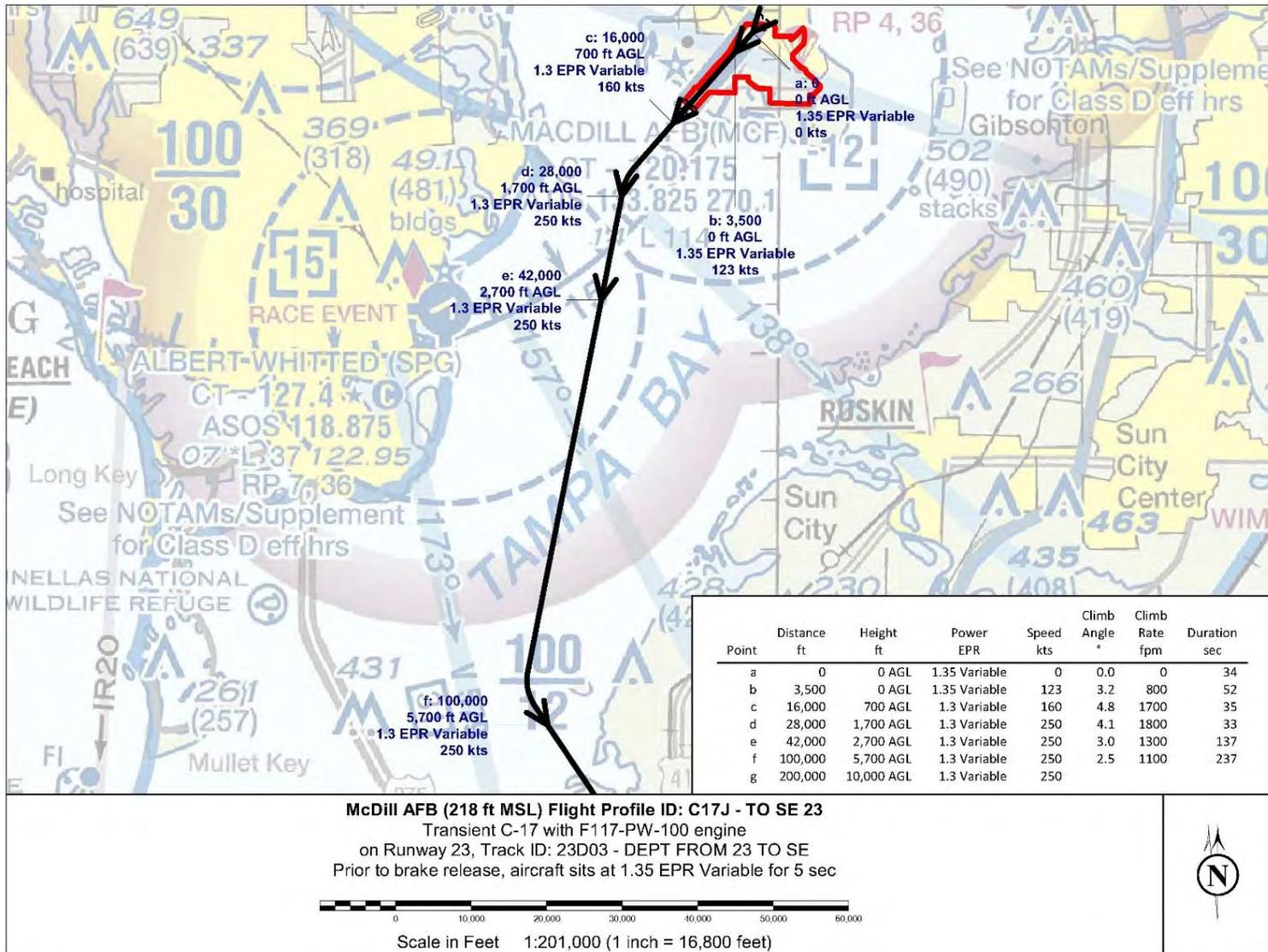


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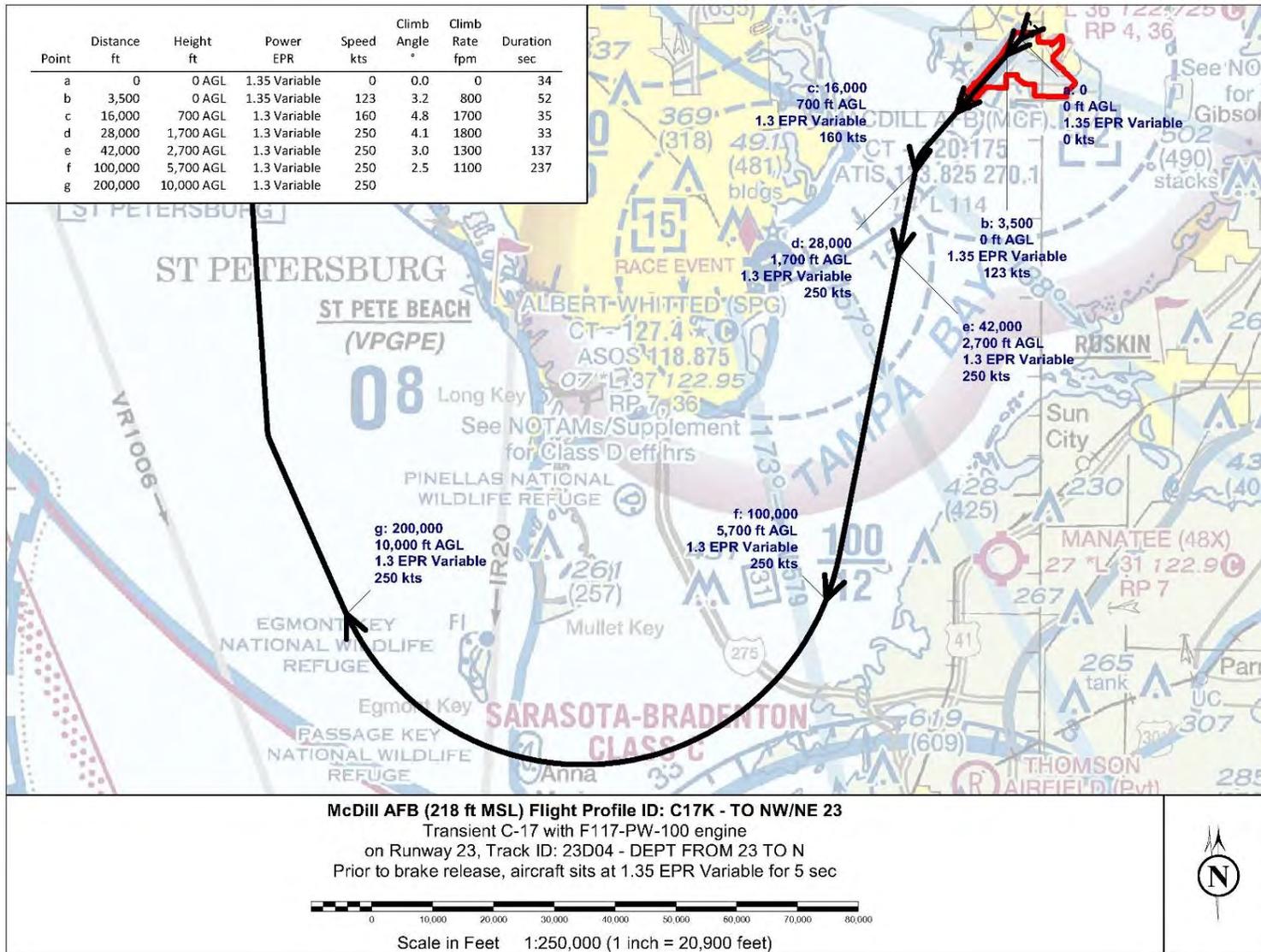


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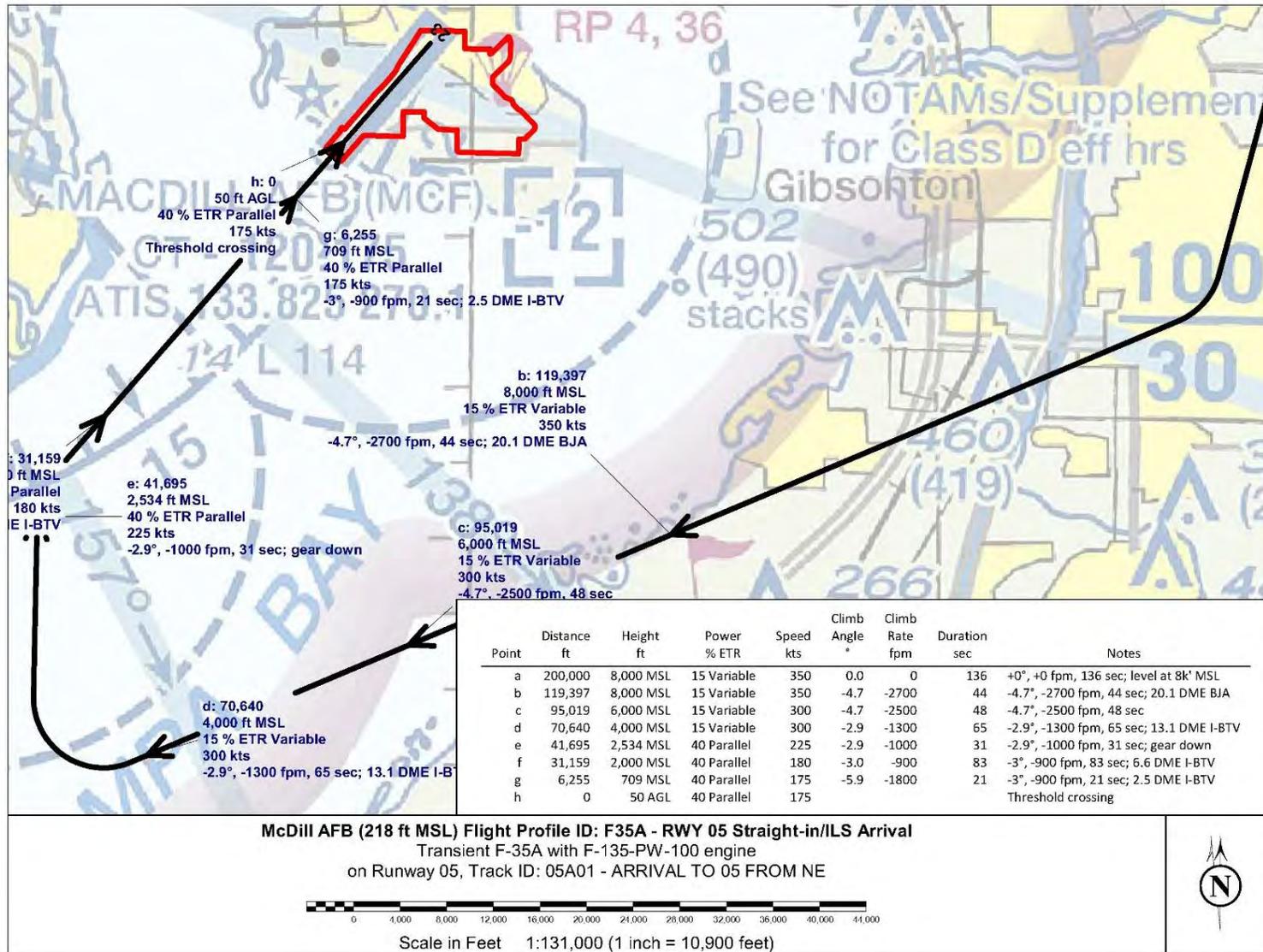


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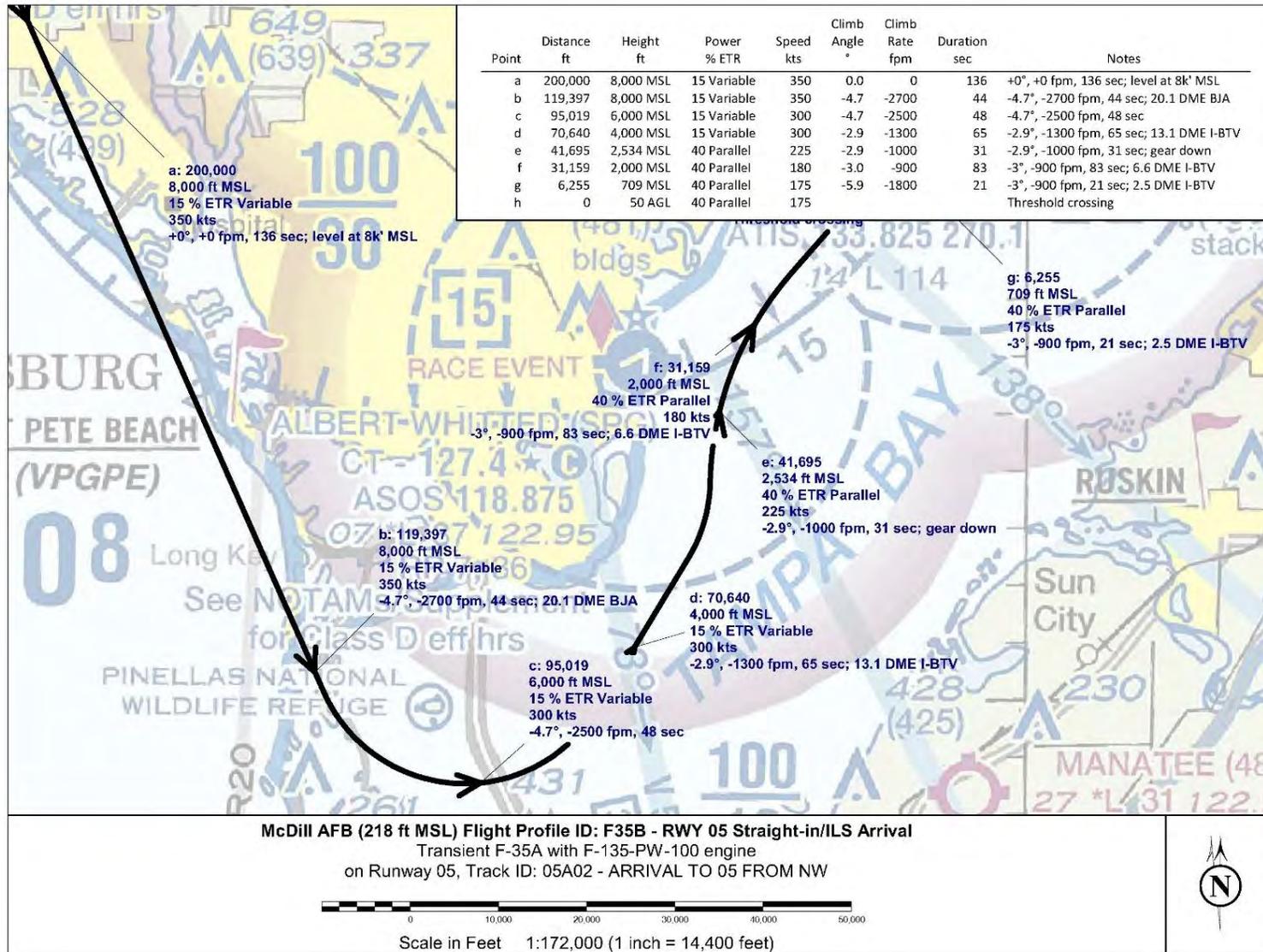


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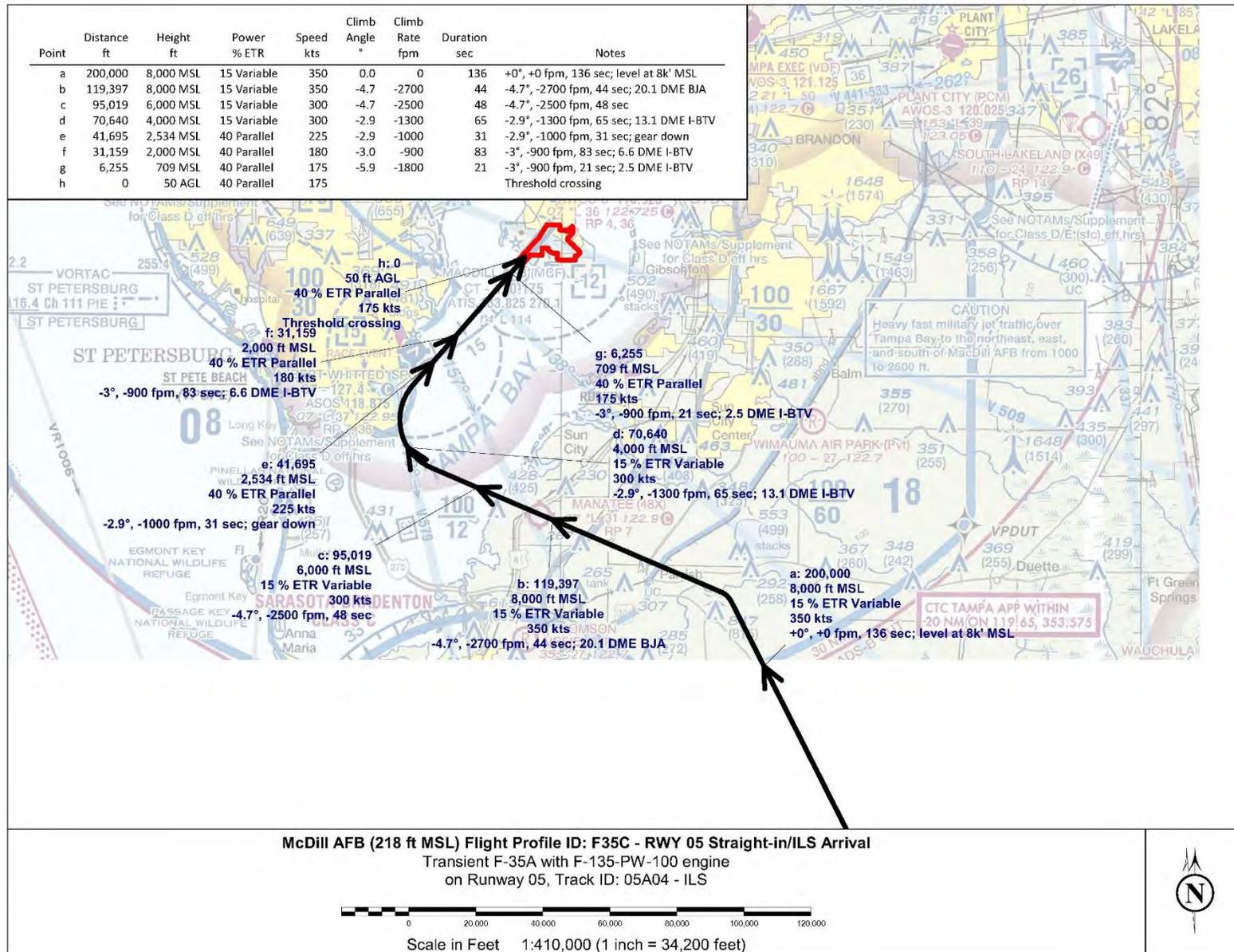


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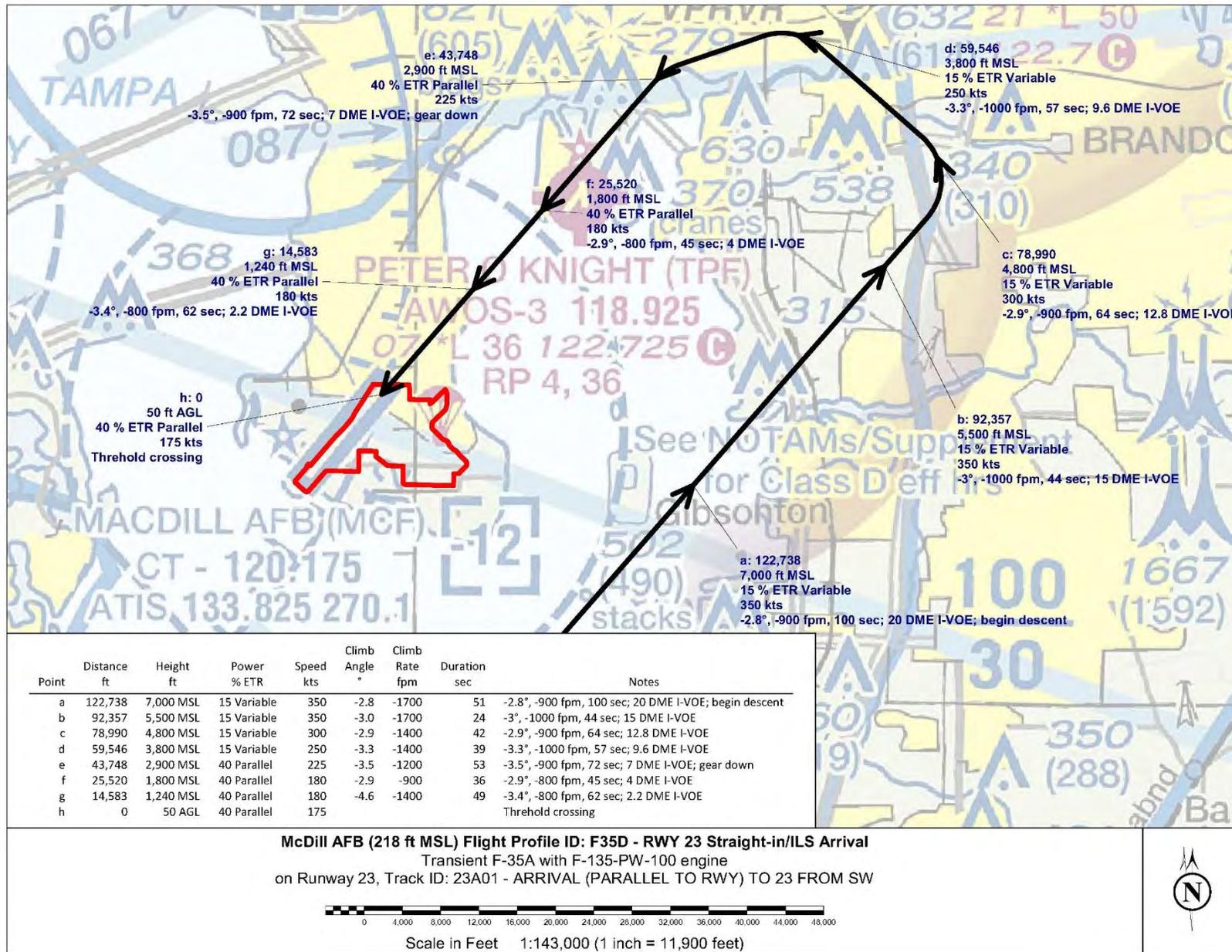


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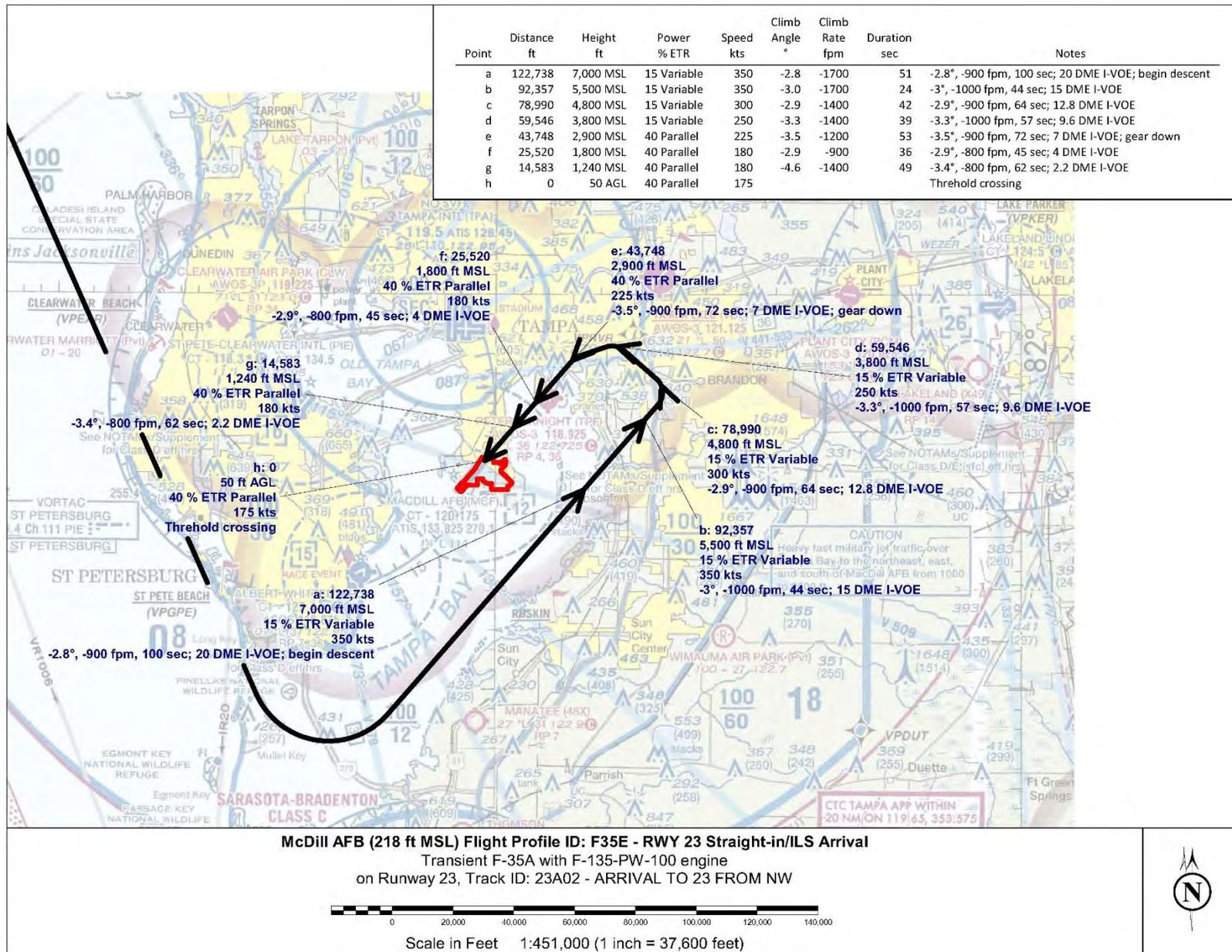


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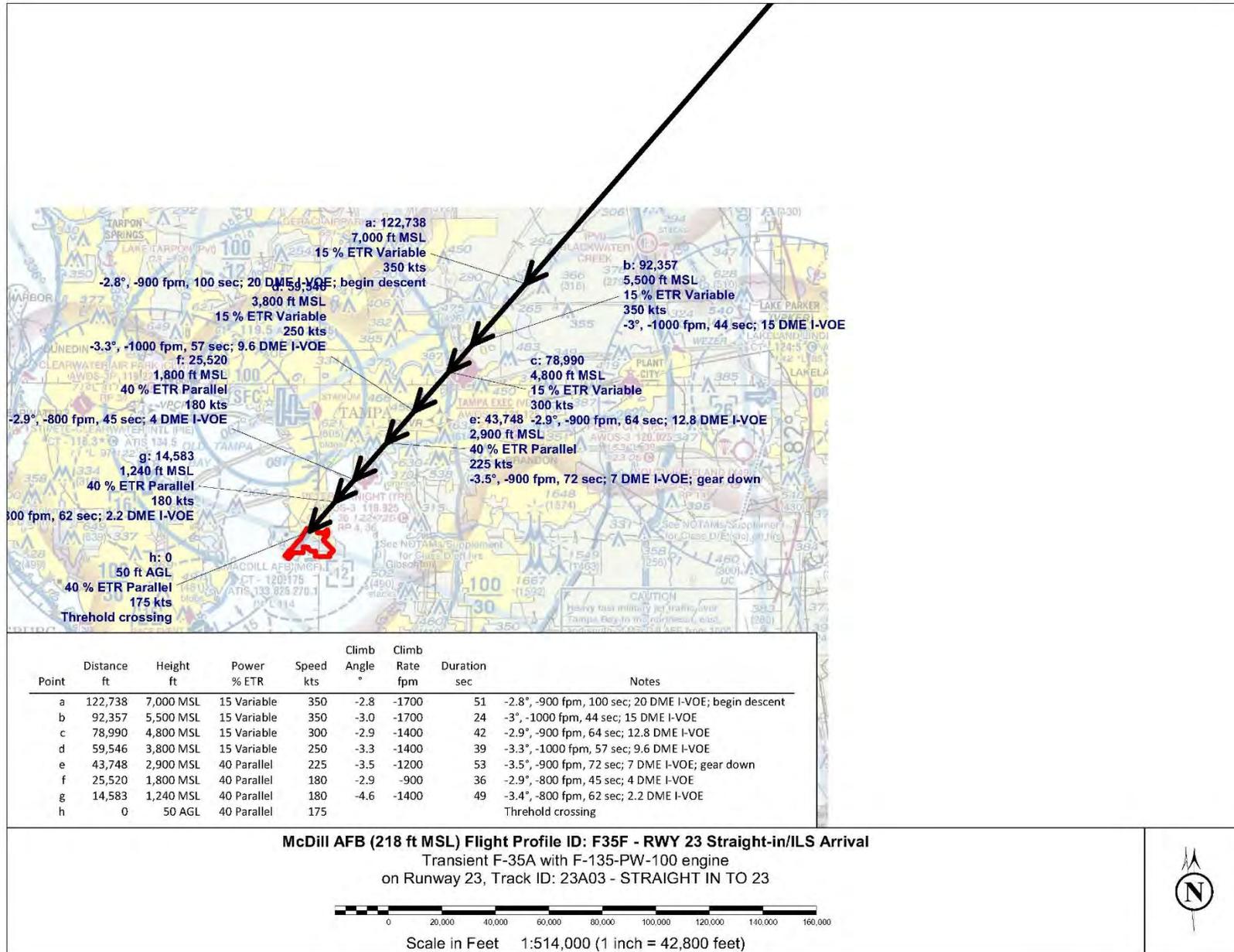


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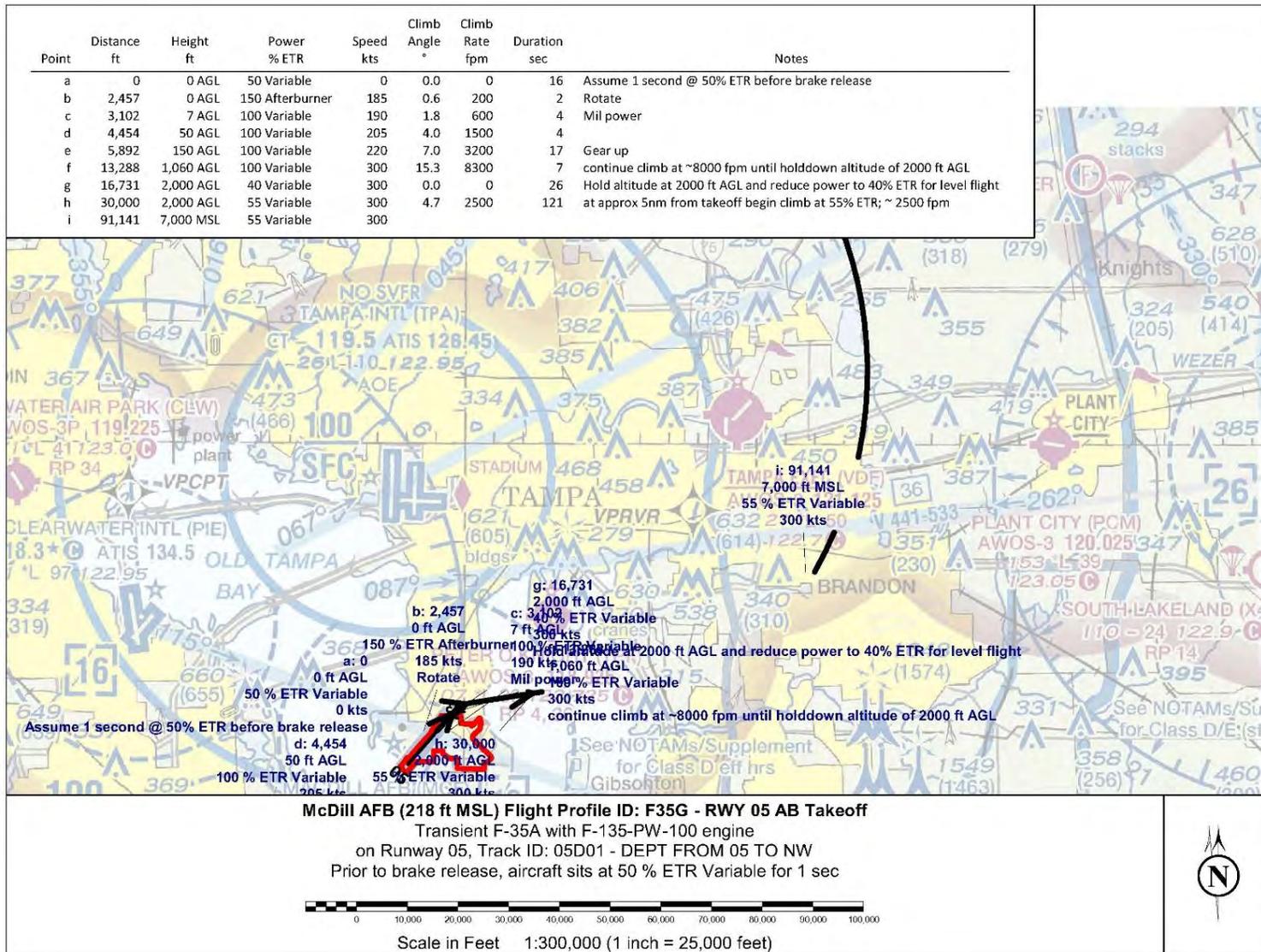


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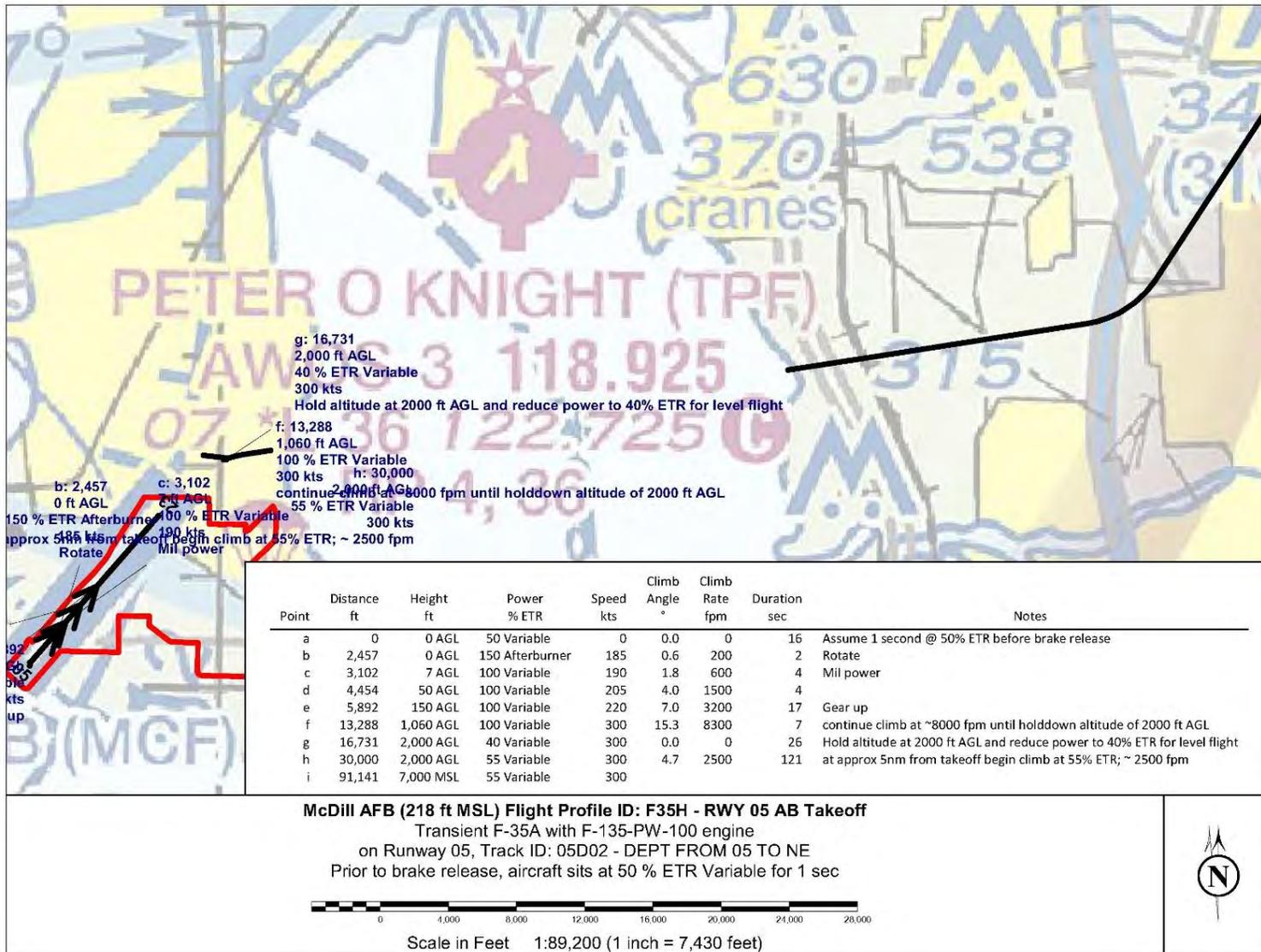


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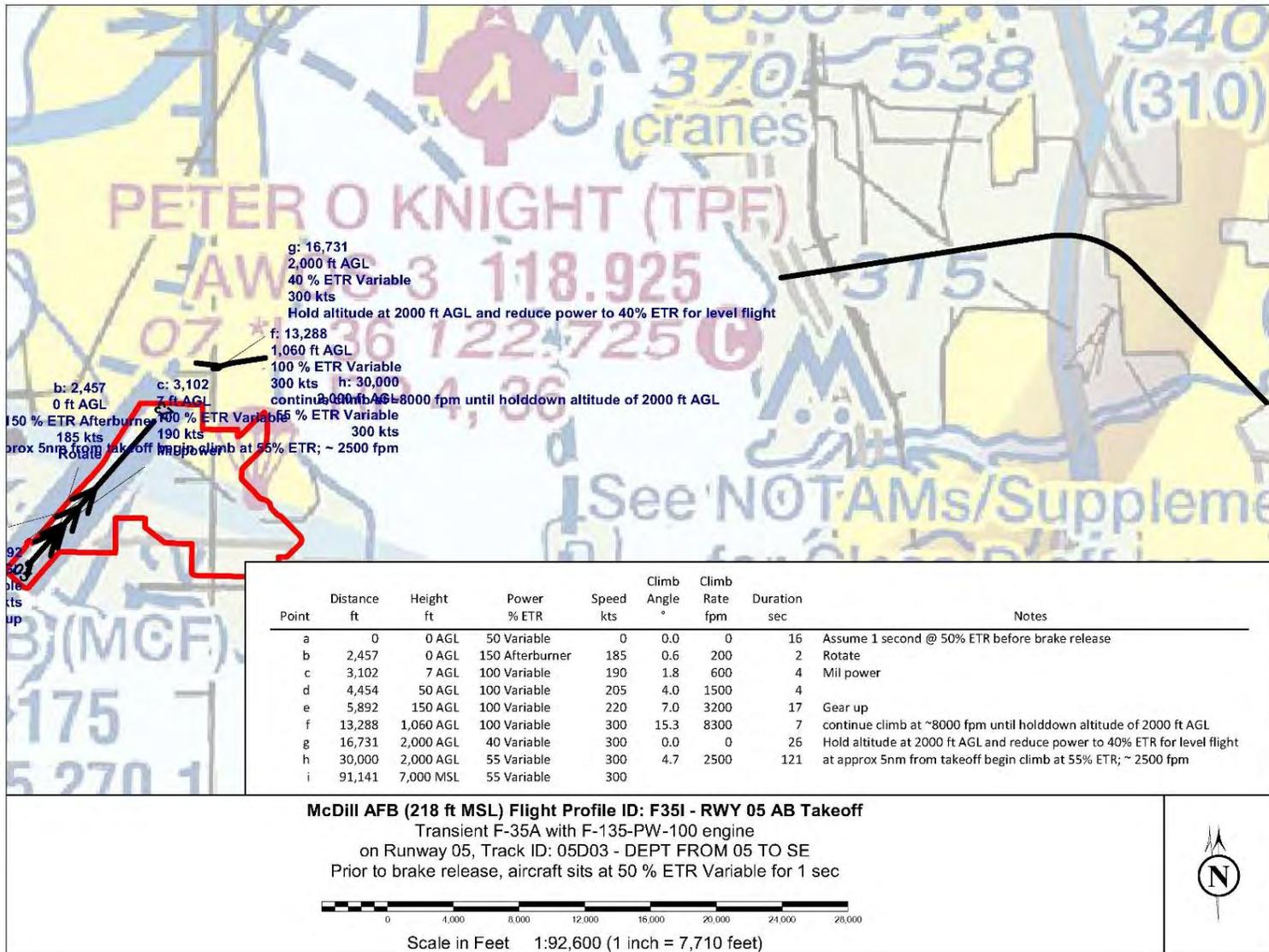


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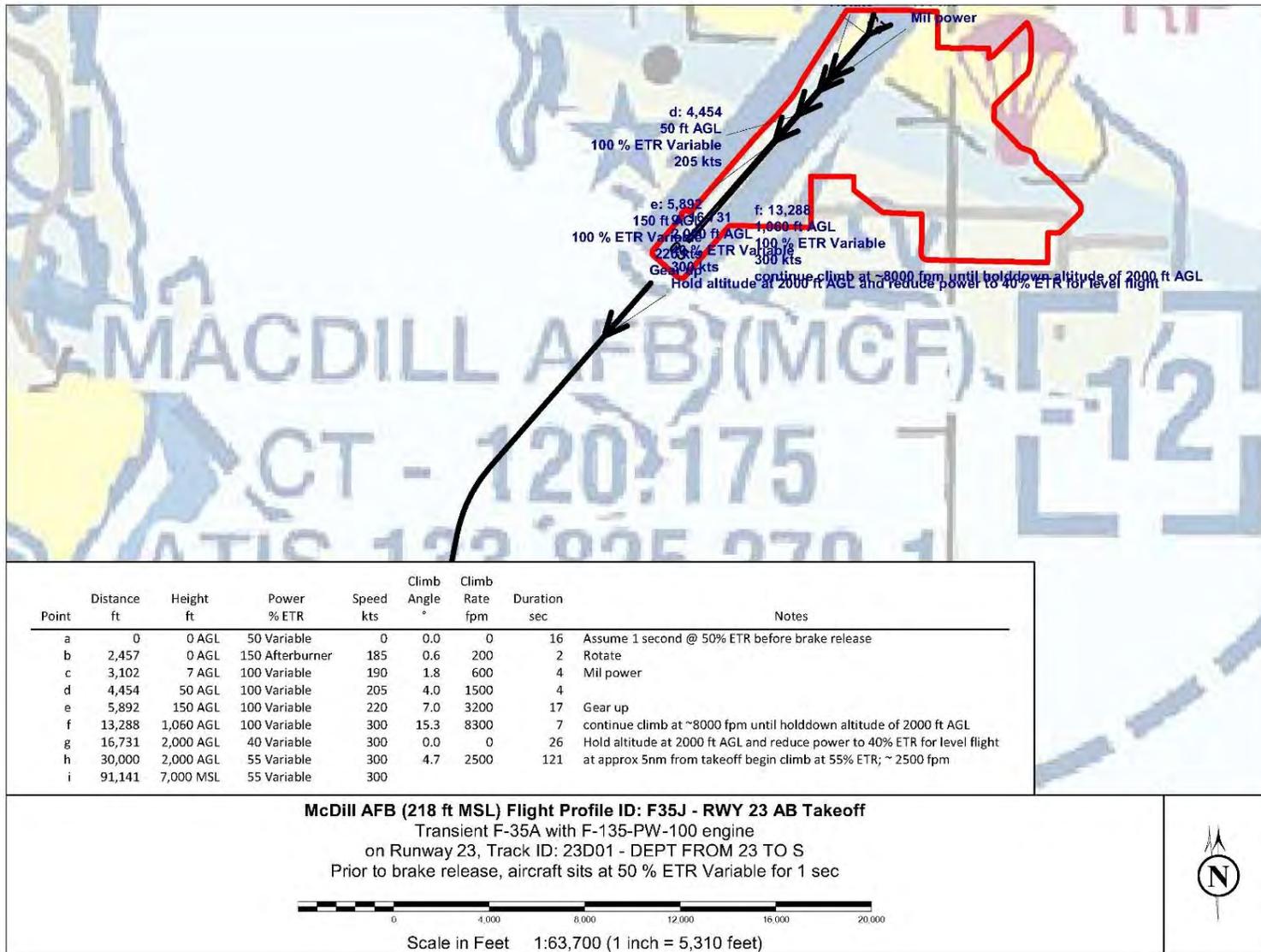


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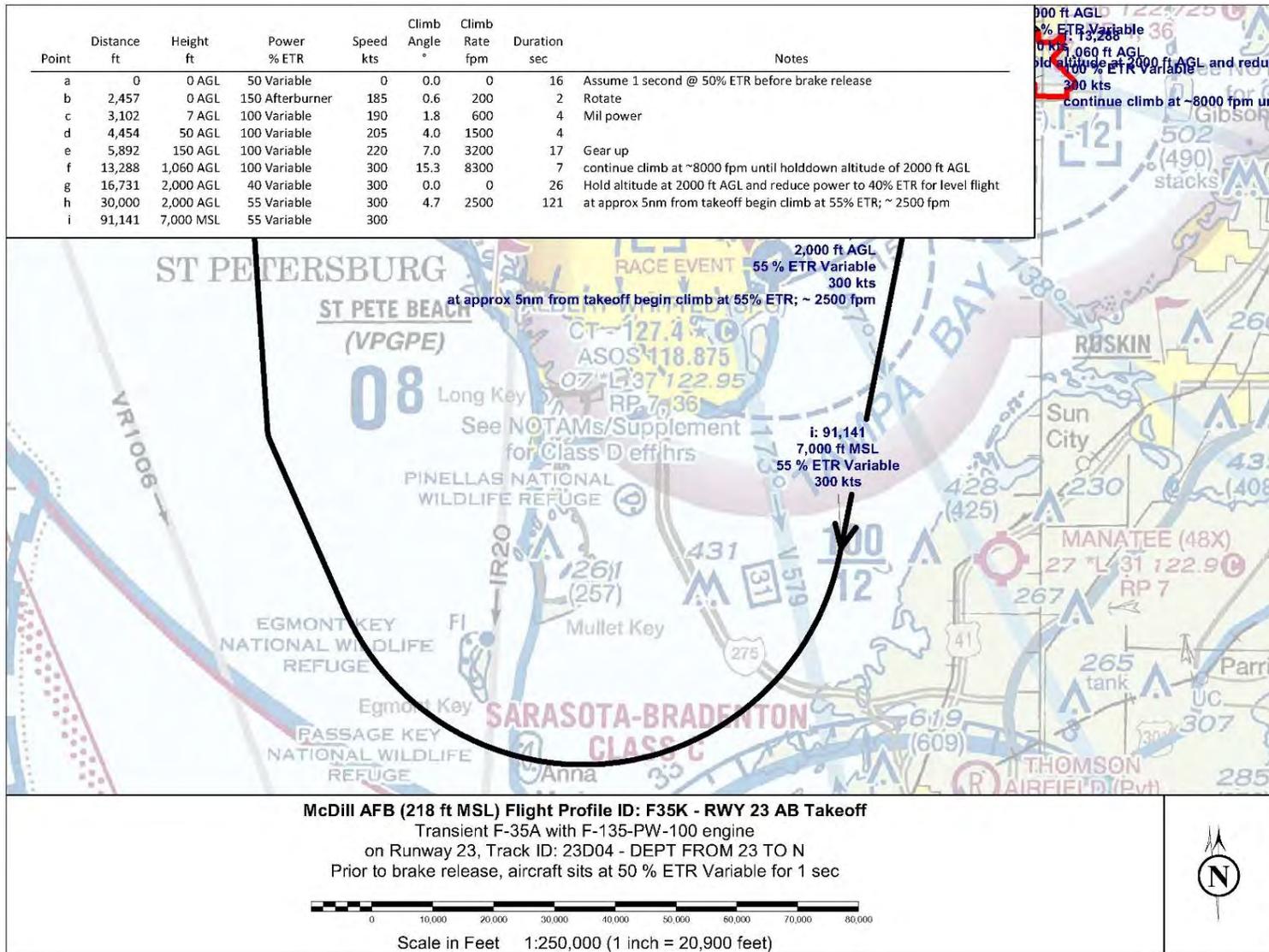


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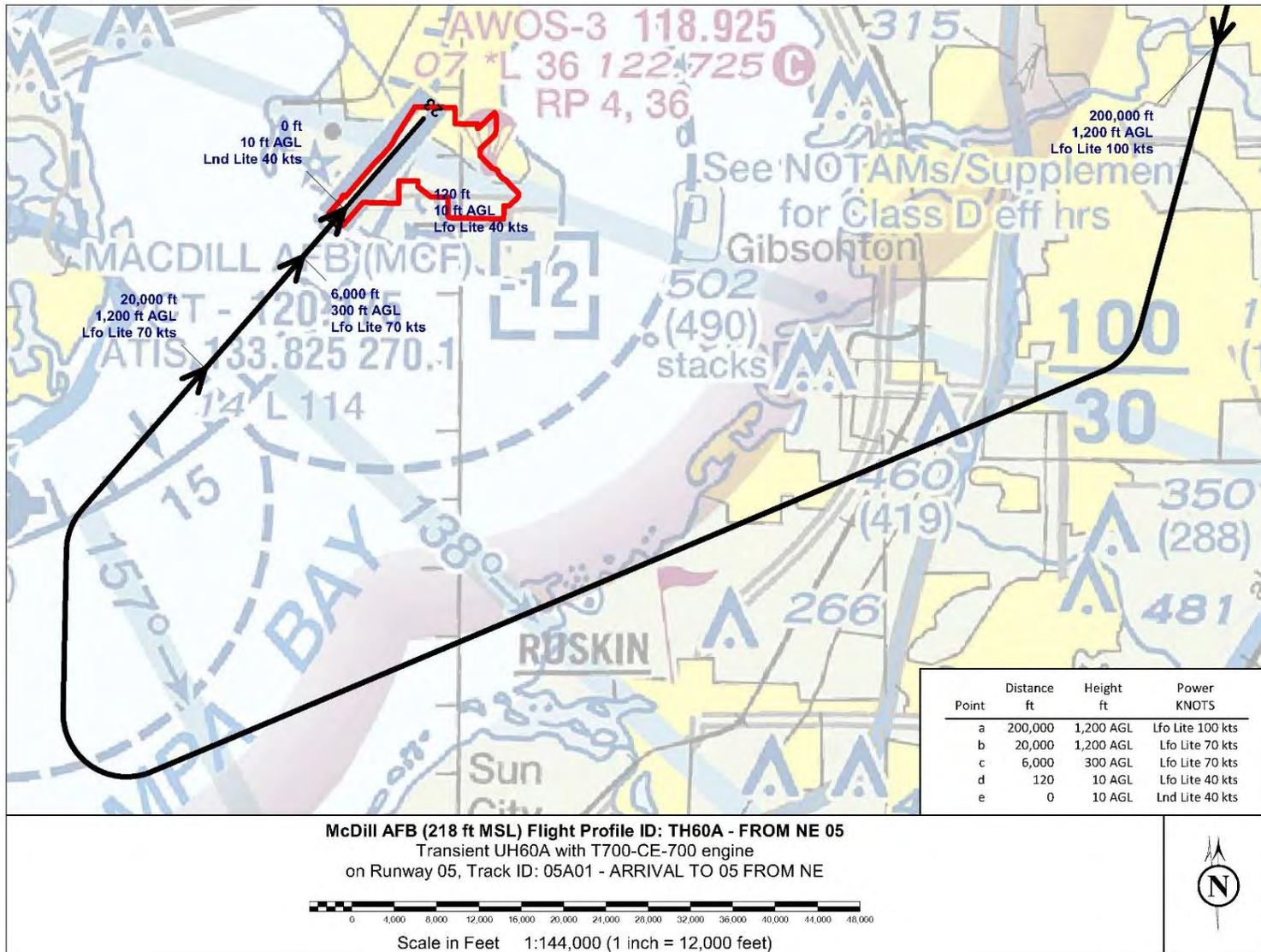


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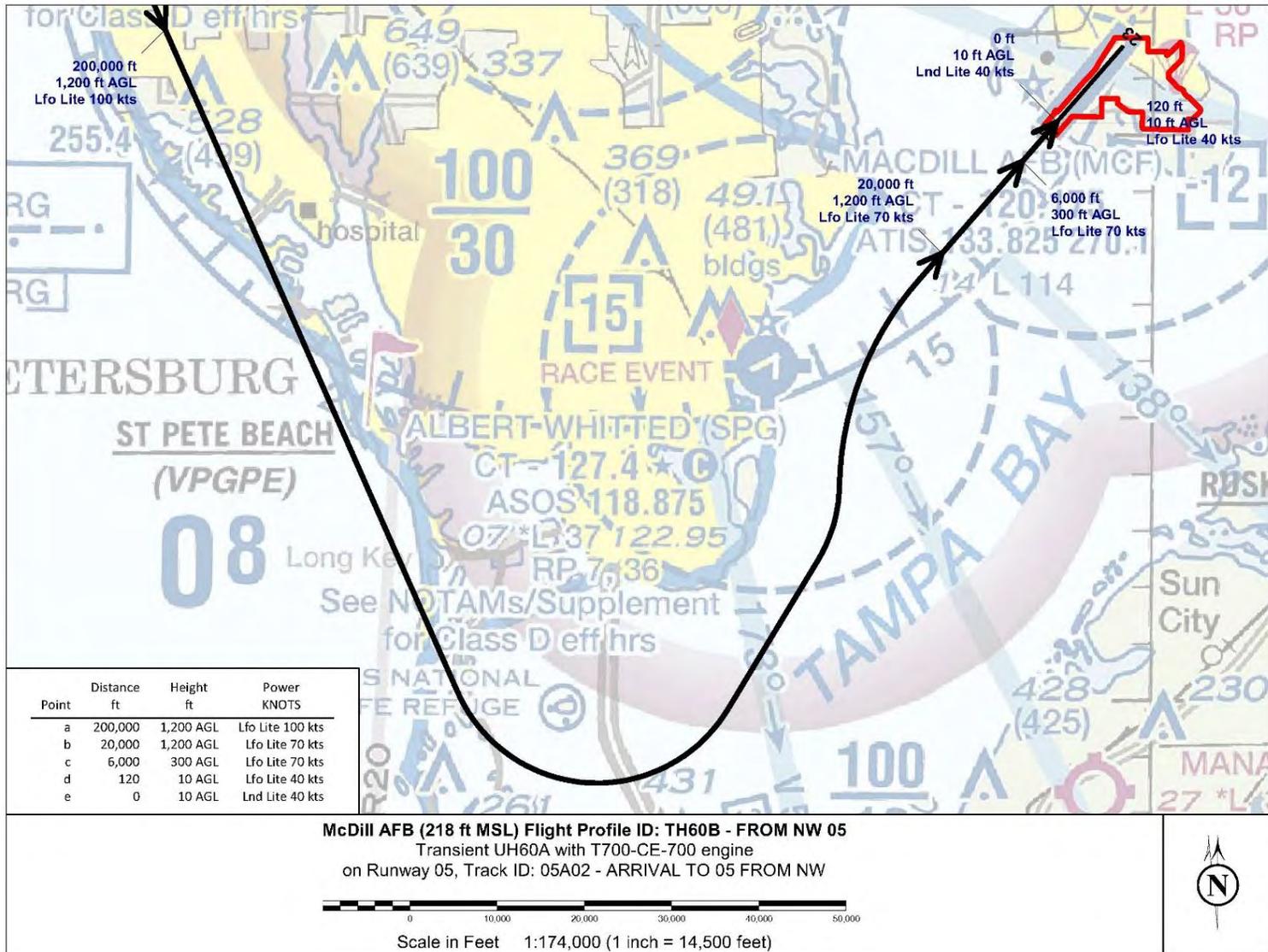


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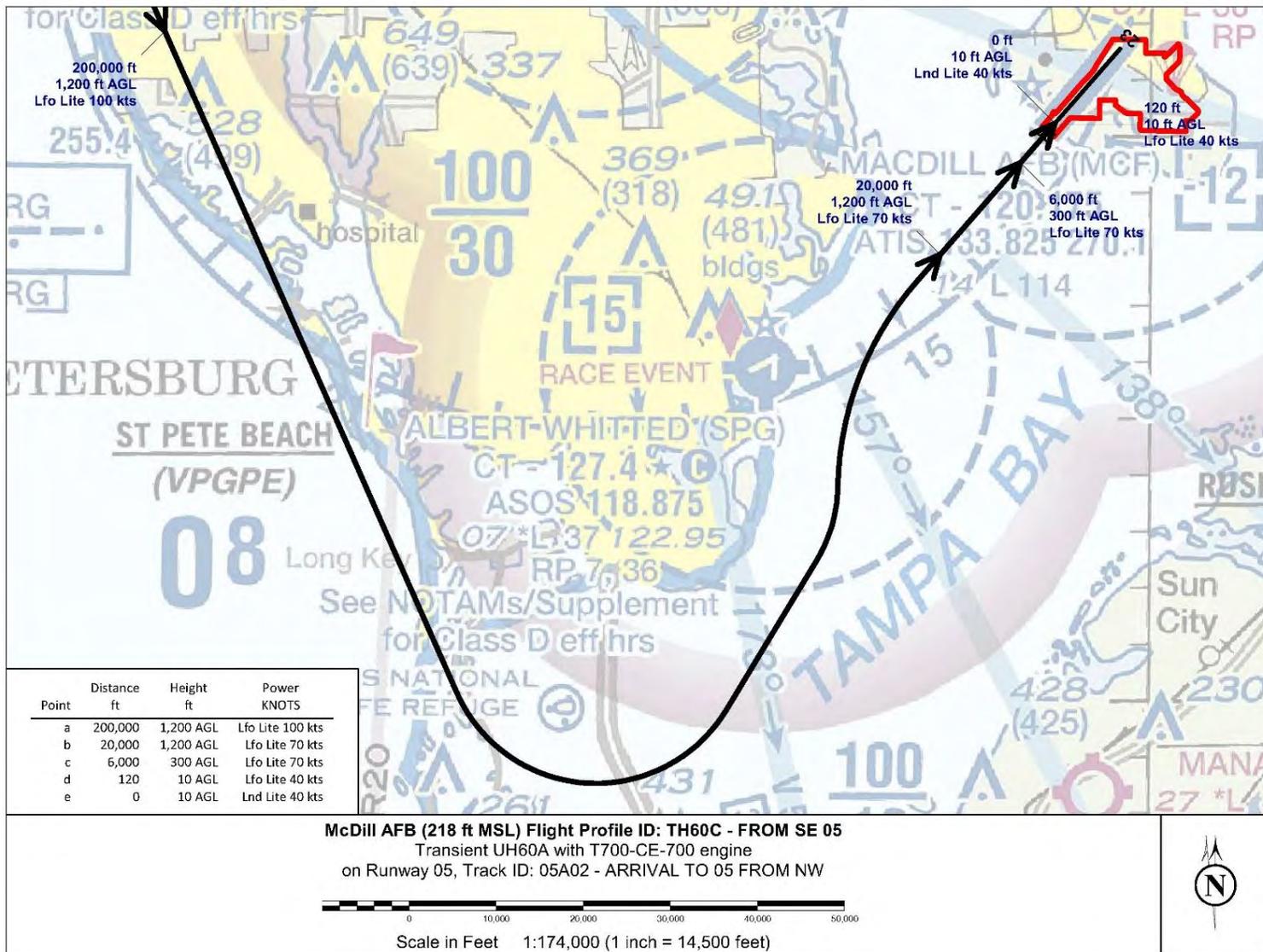


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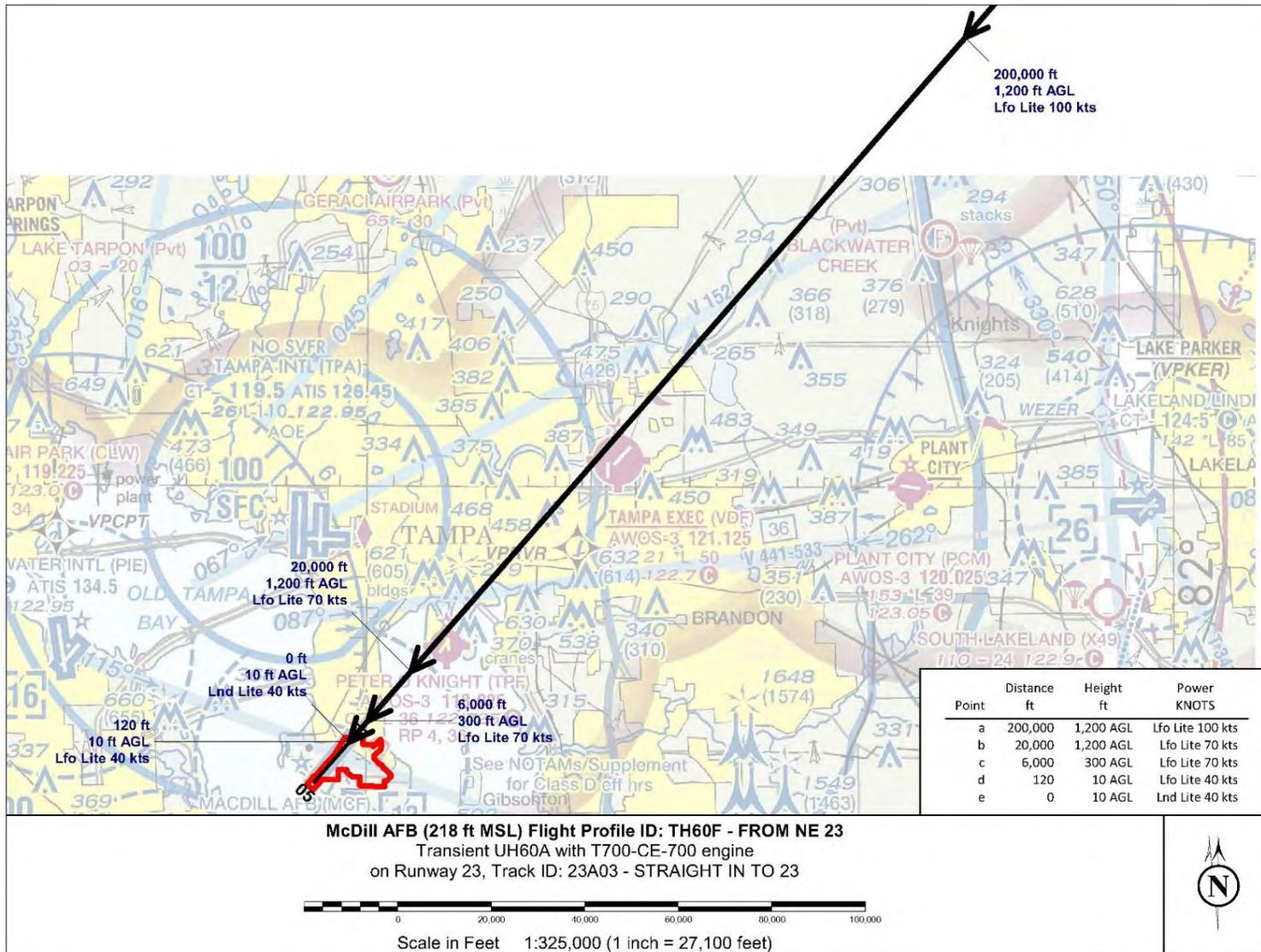


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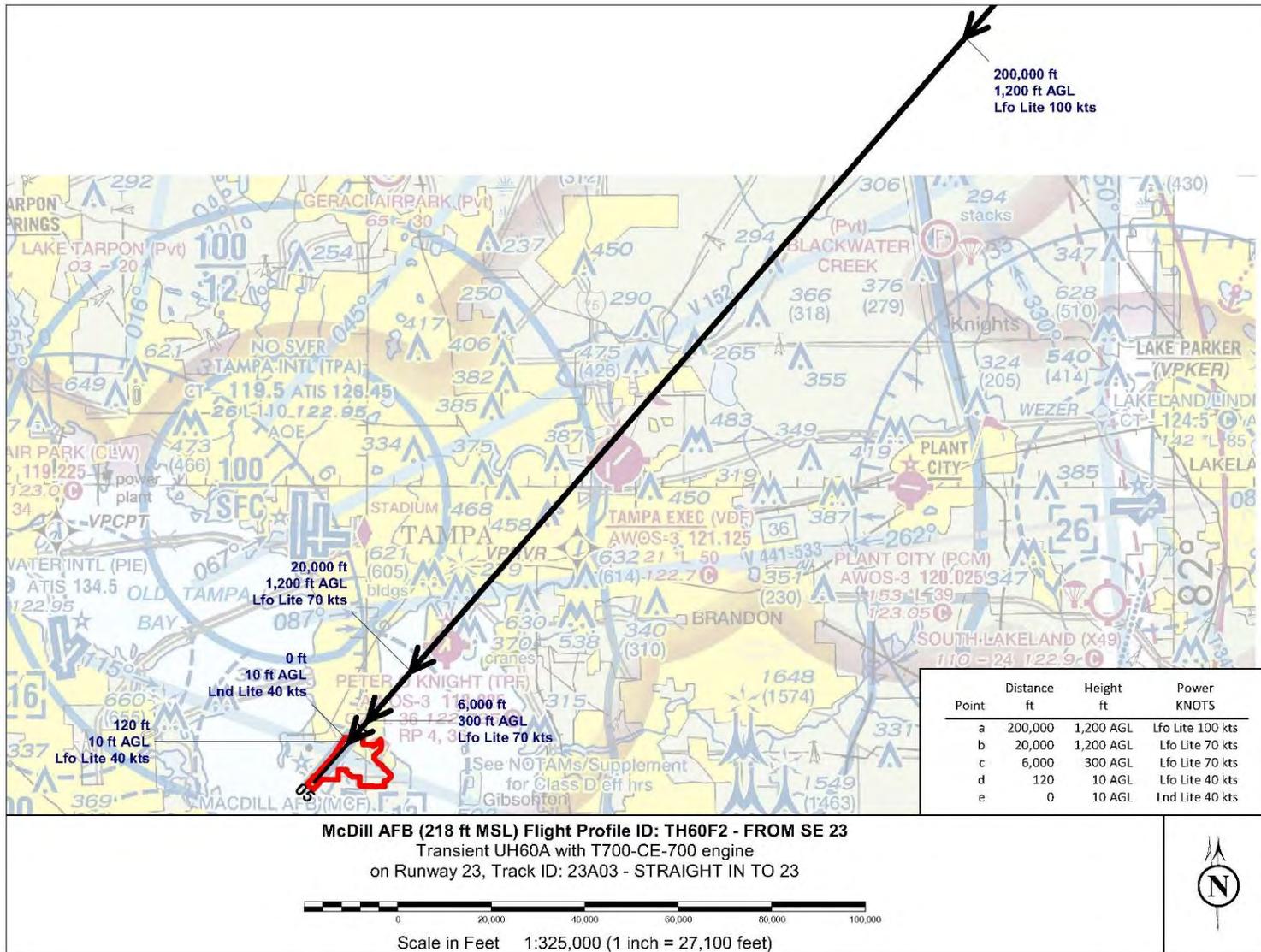


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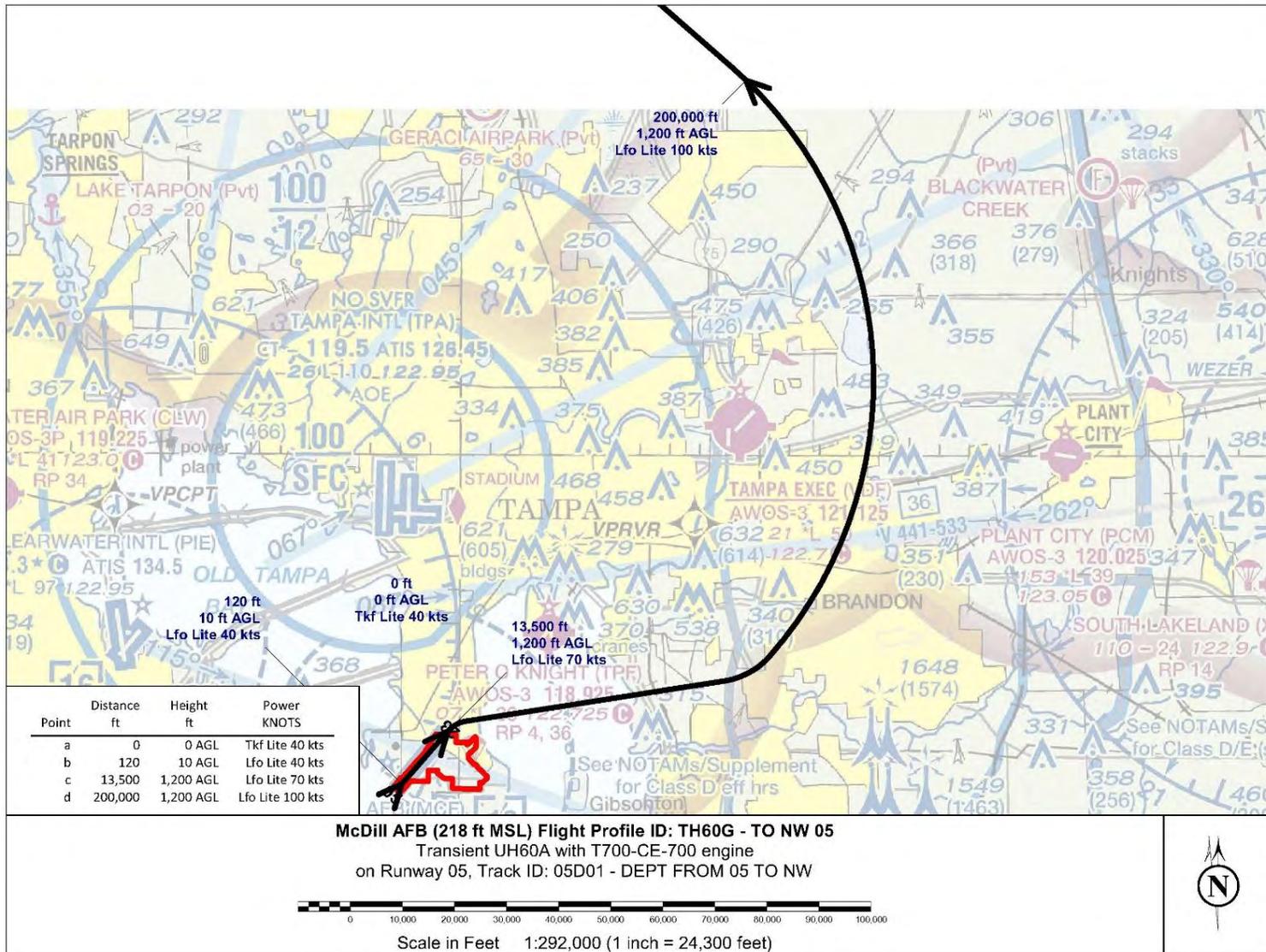


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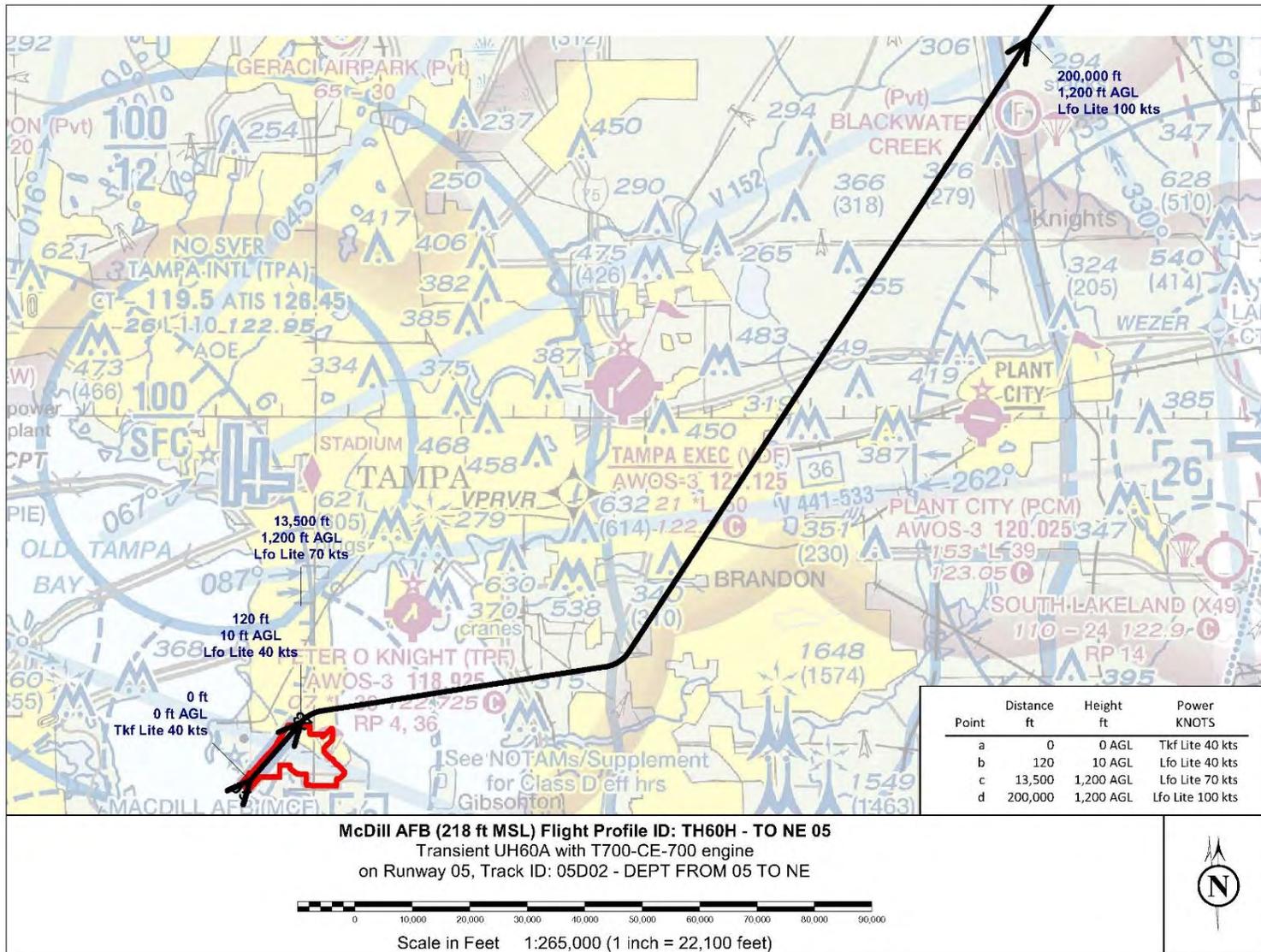


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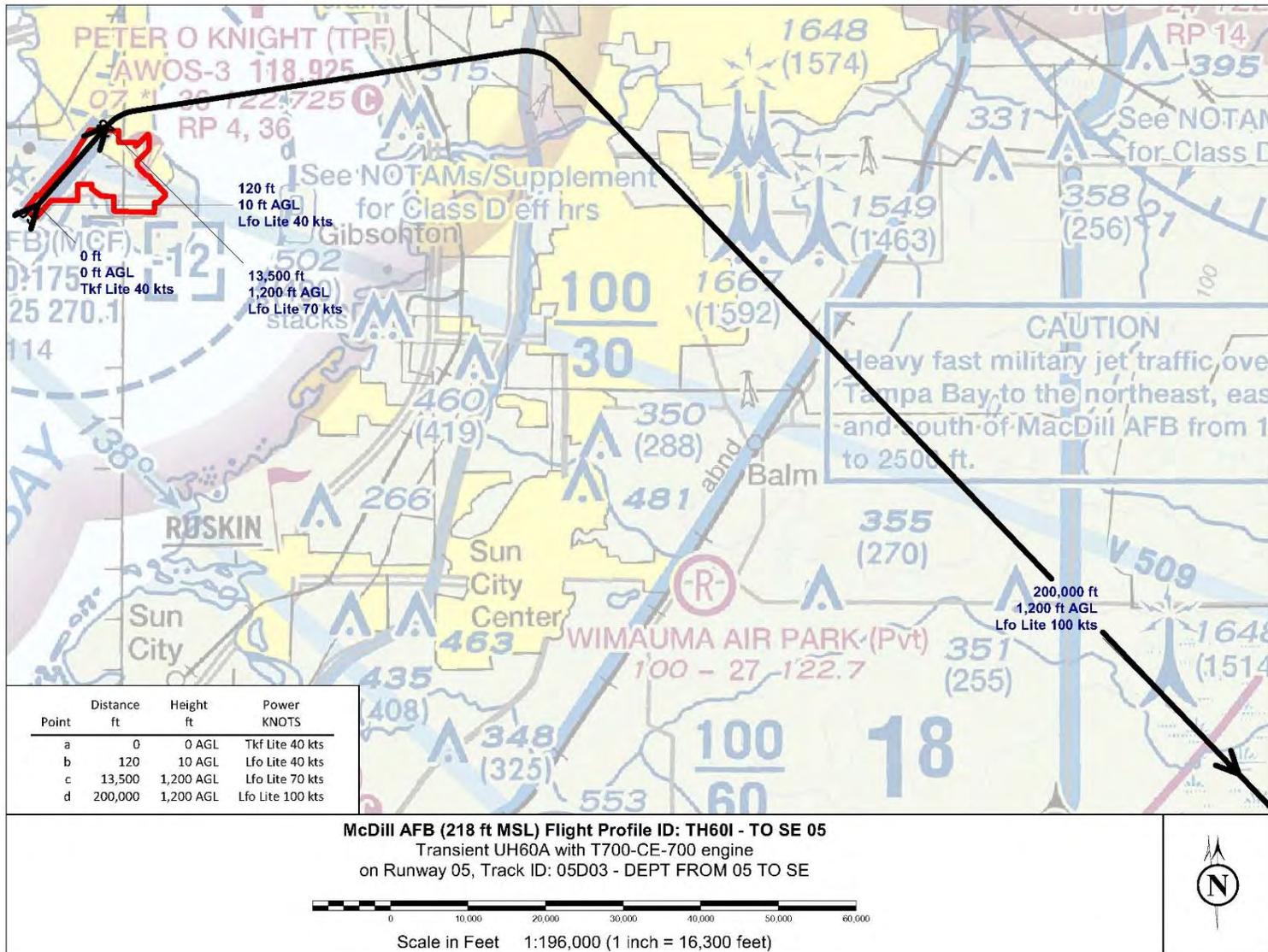


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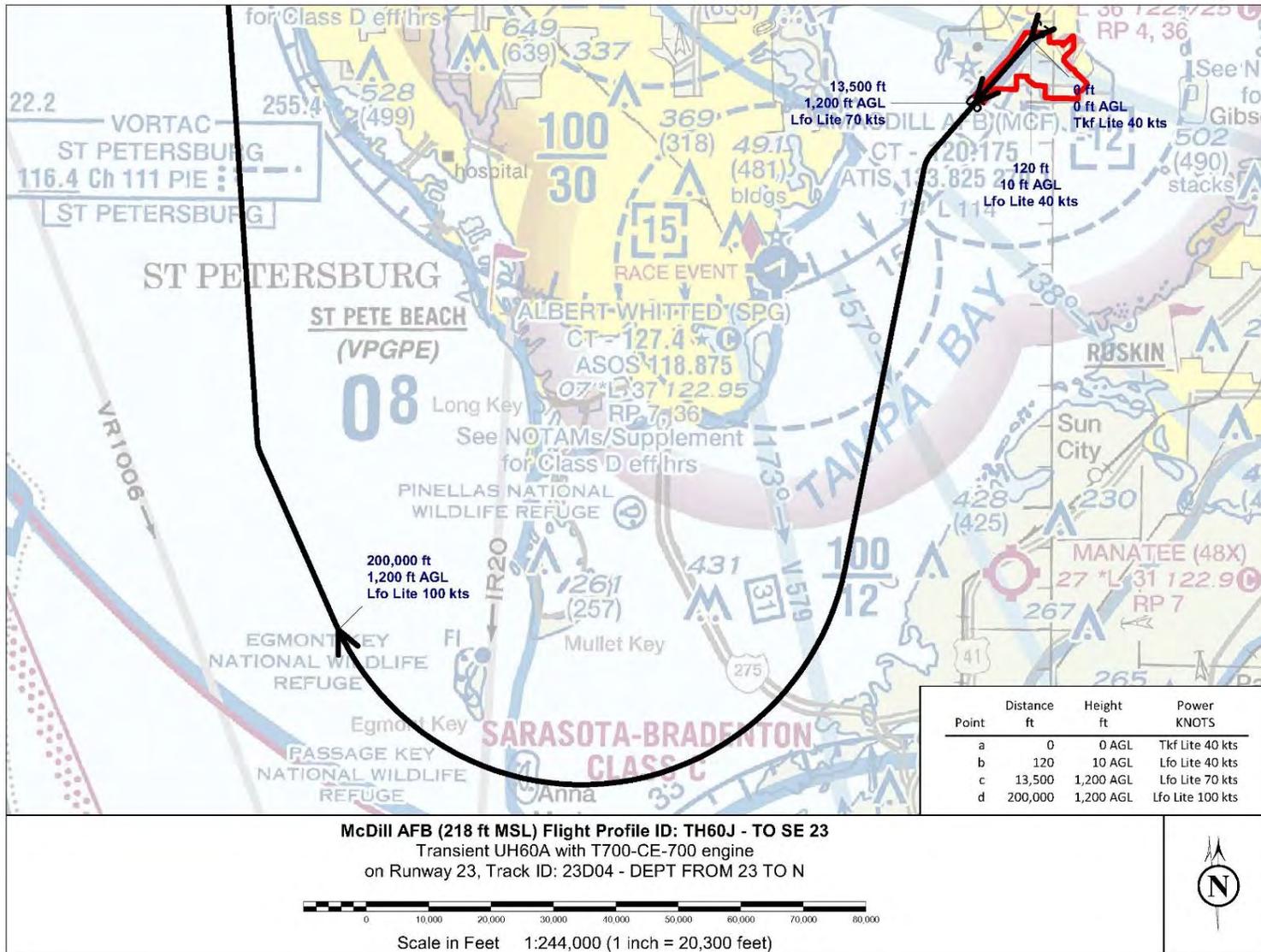


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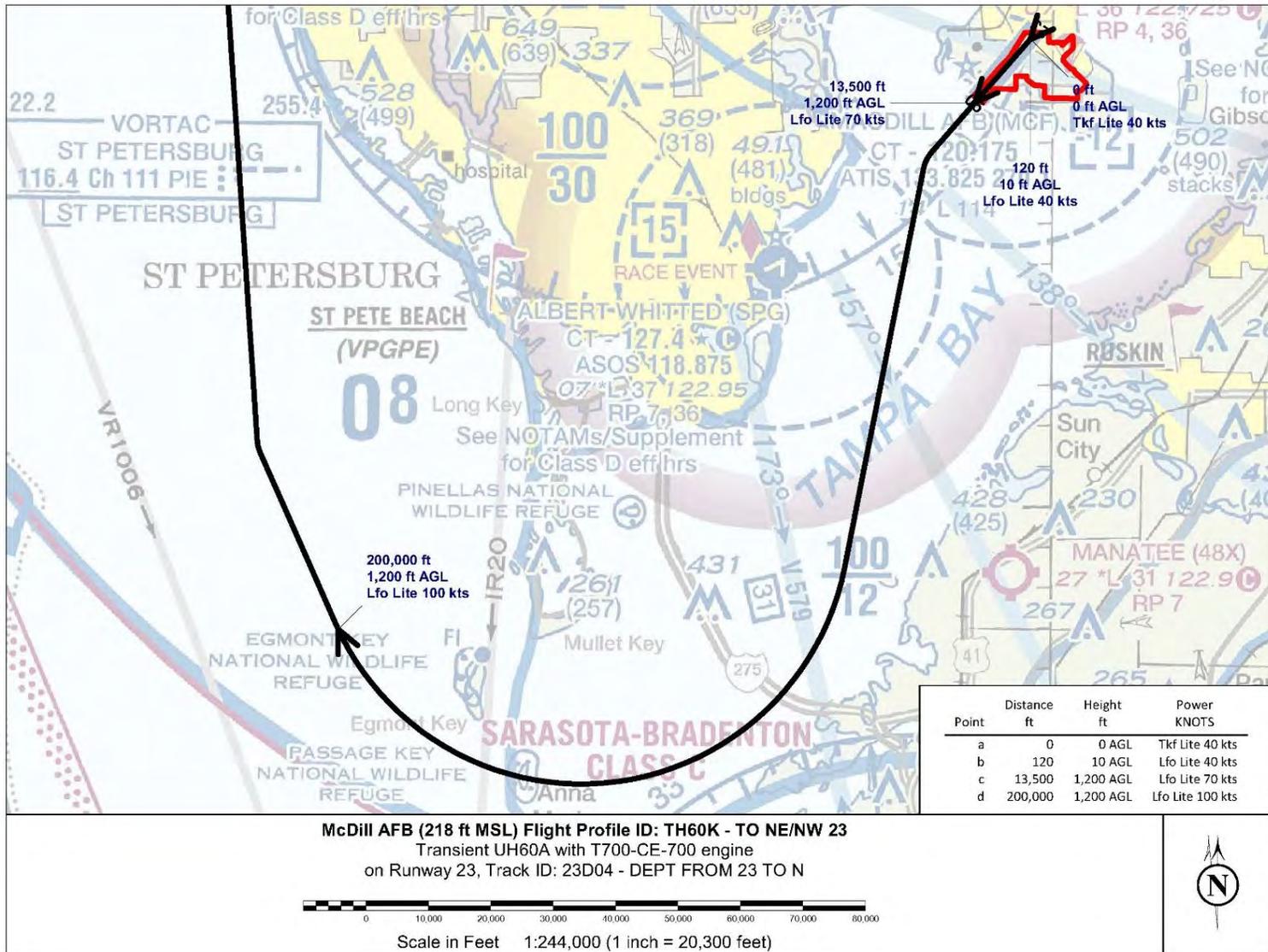


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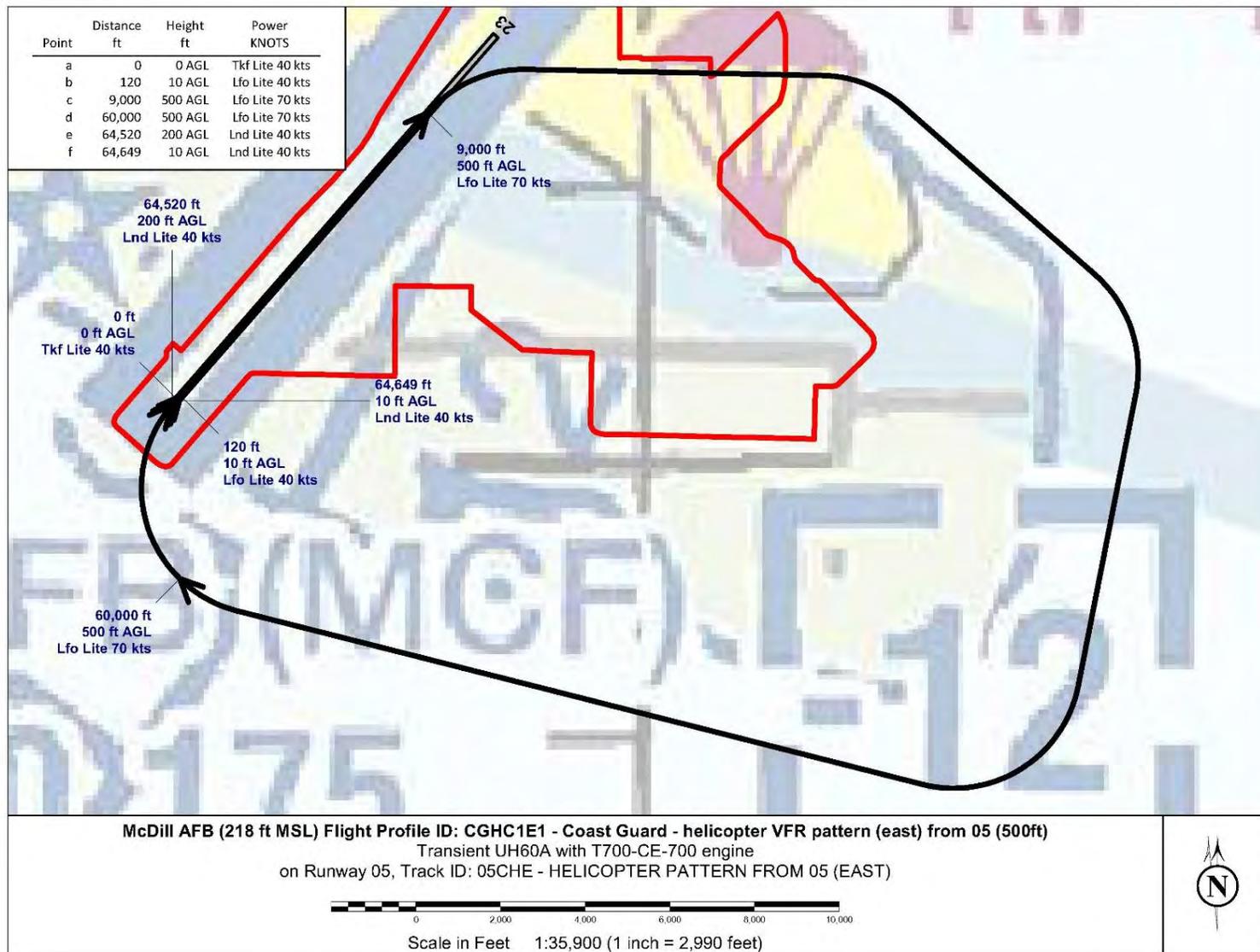


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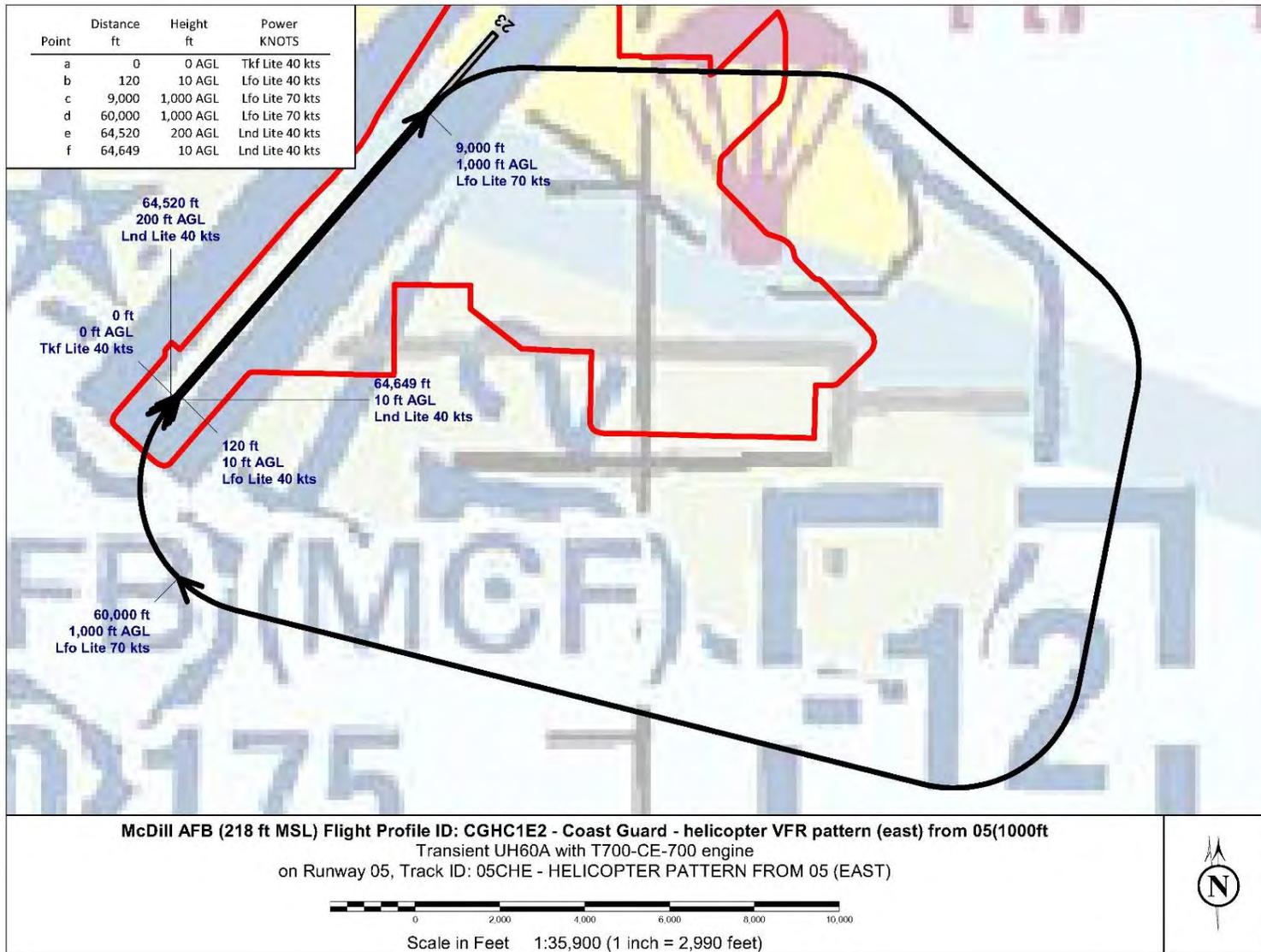


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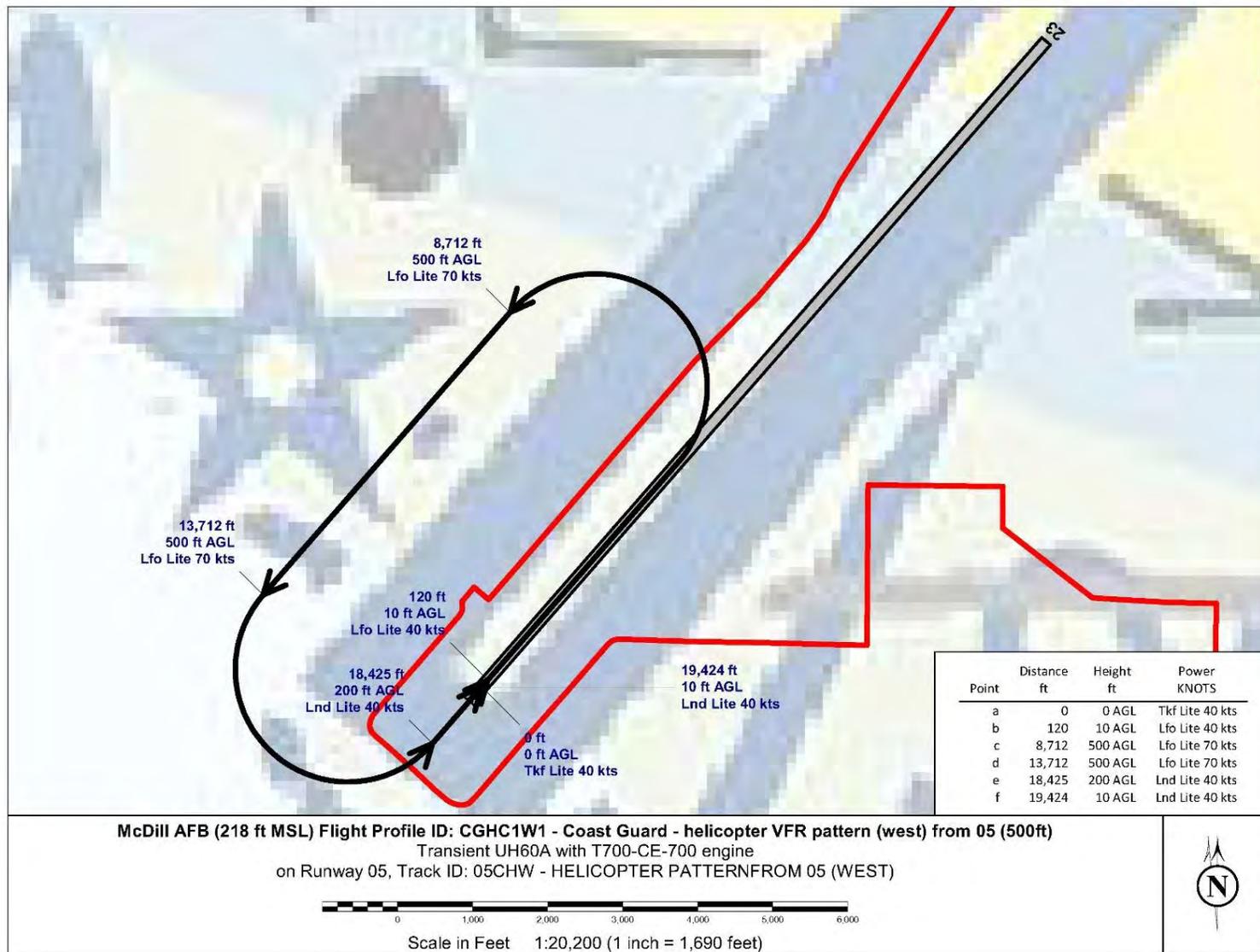


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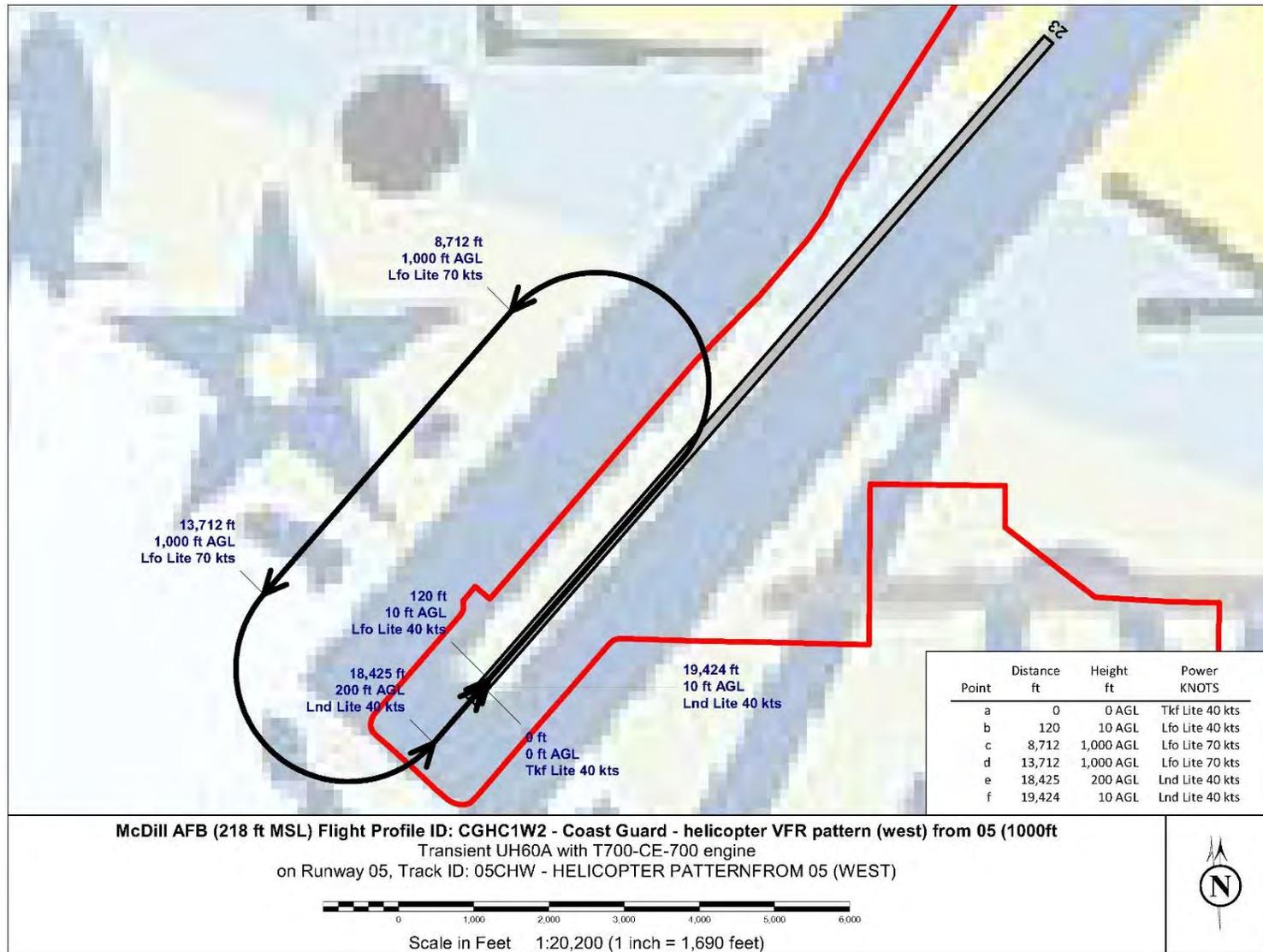


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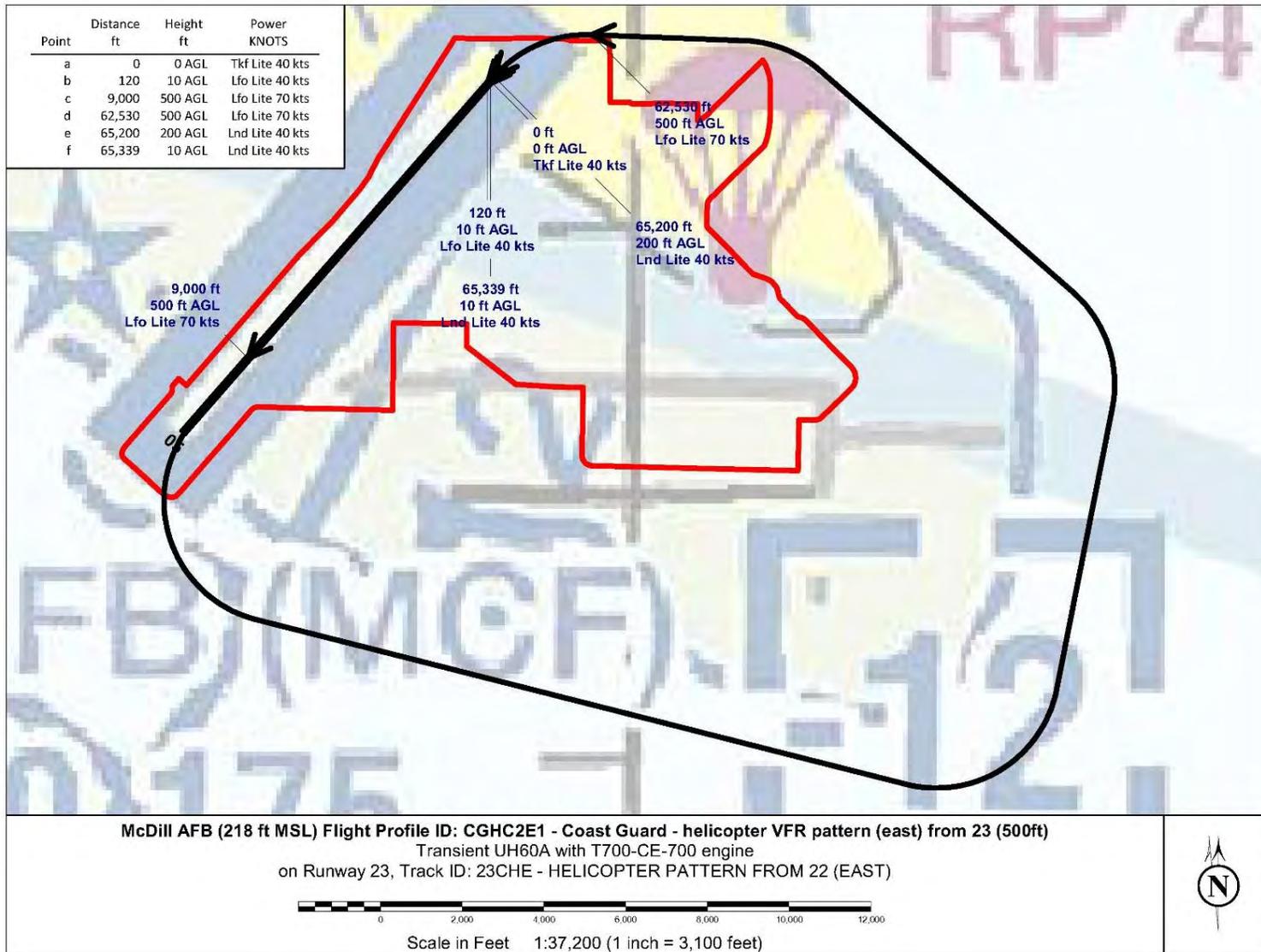


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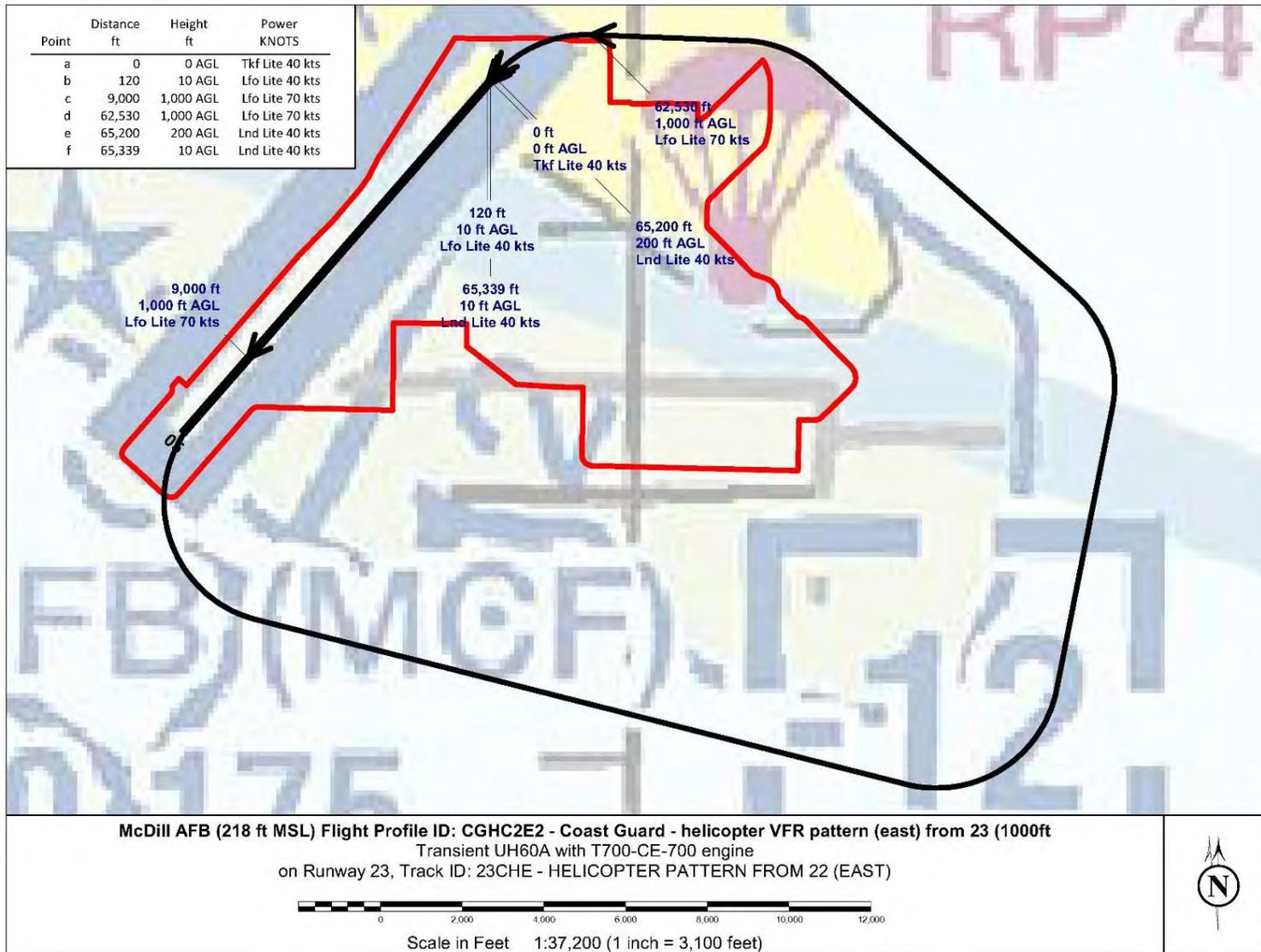


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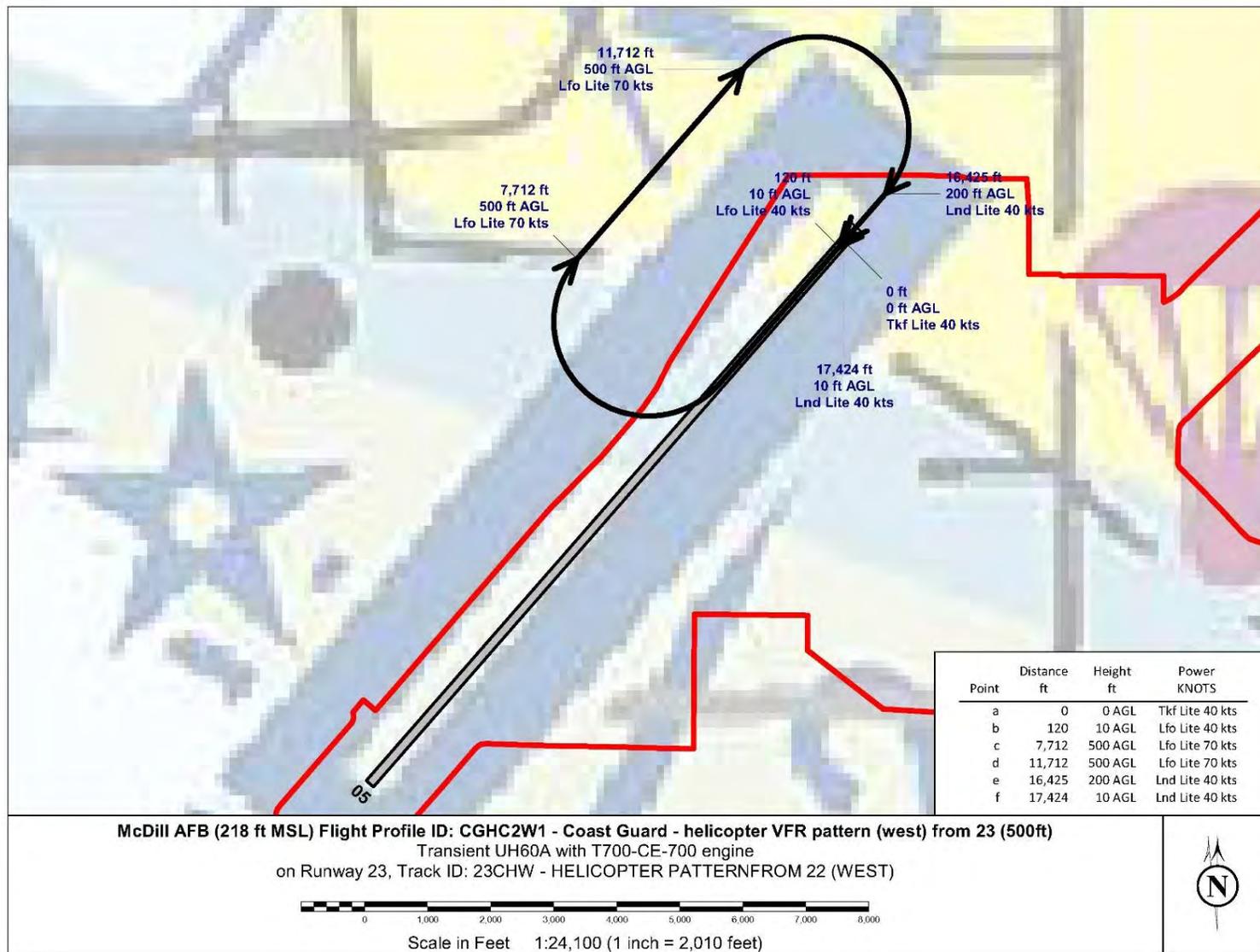


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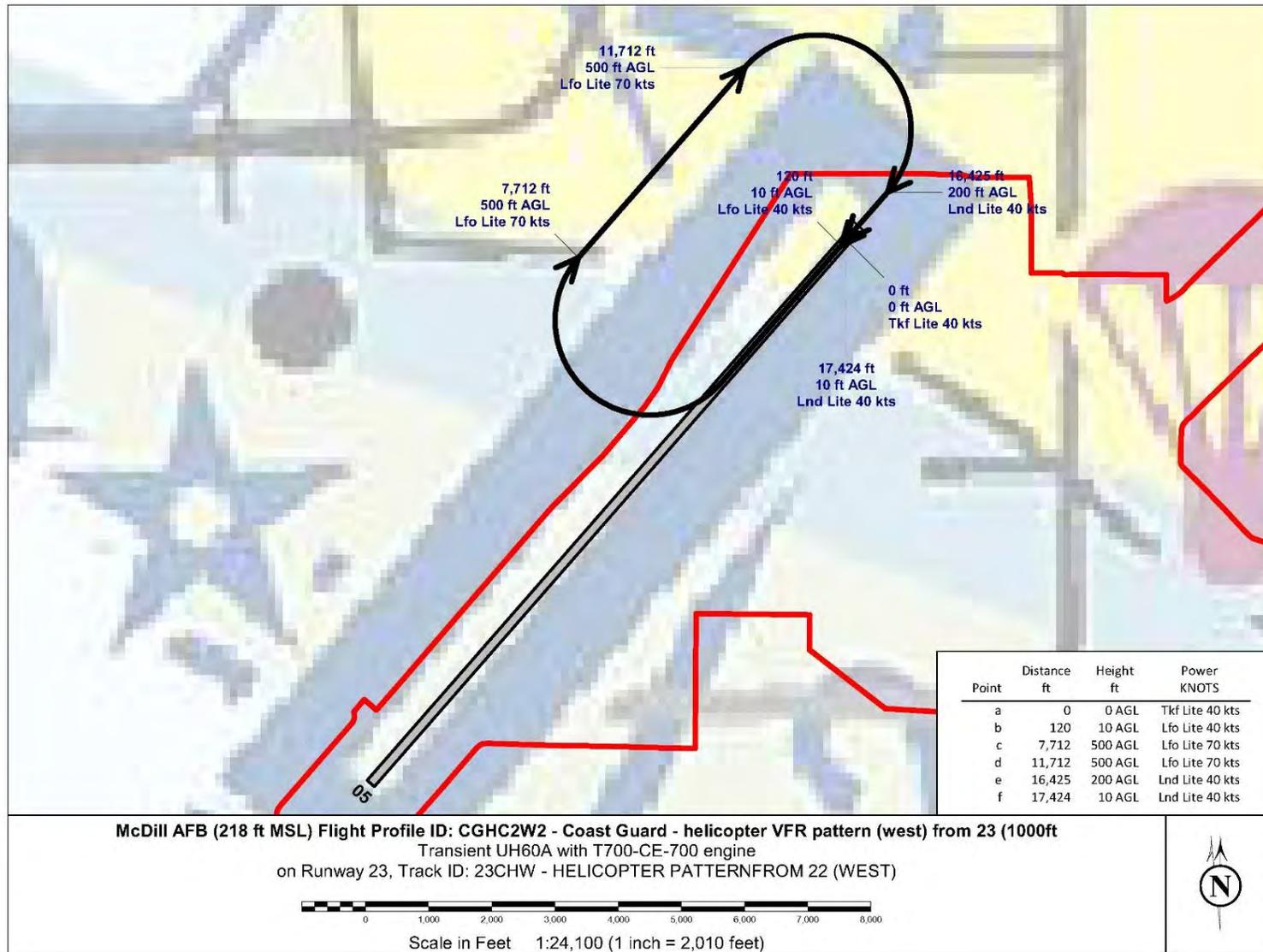


Figure A.4.40

A.5 Airfield Flight Profile Maps for Based KC-46 Aircraft

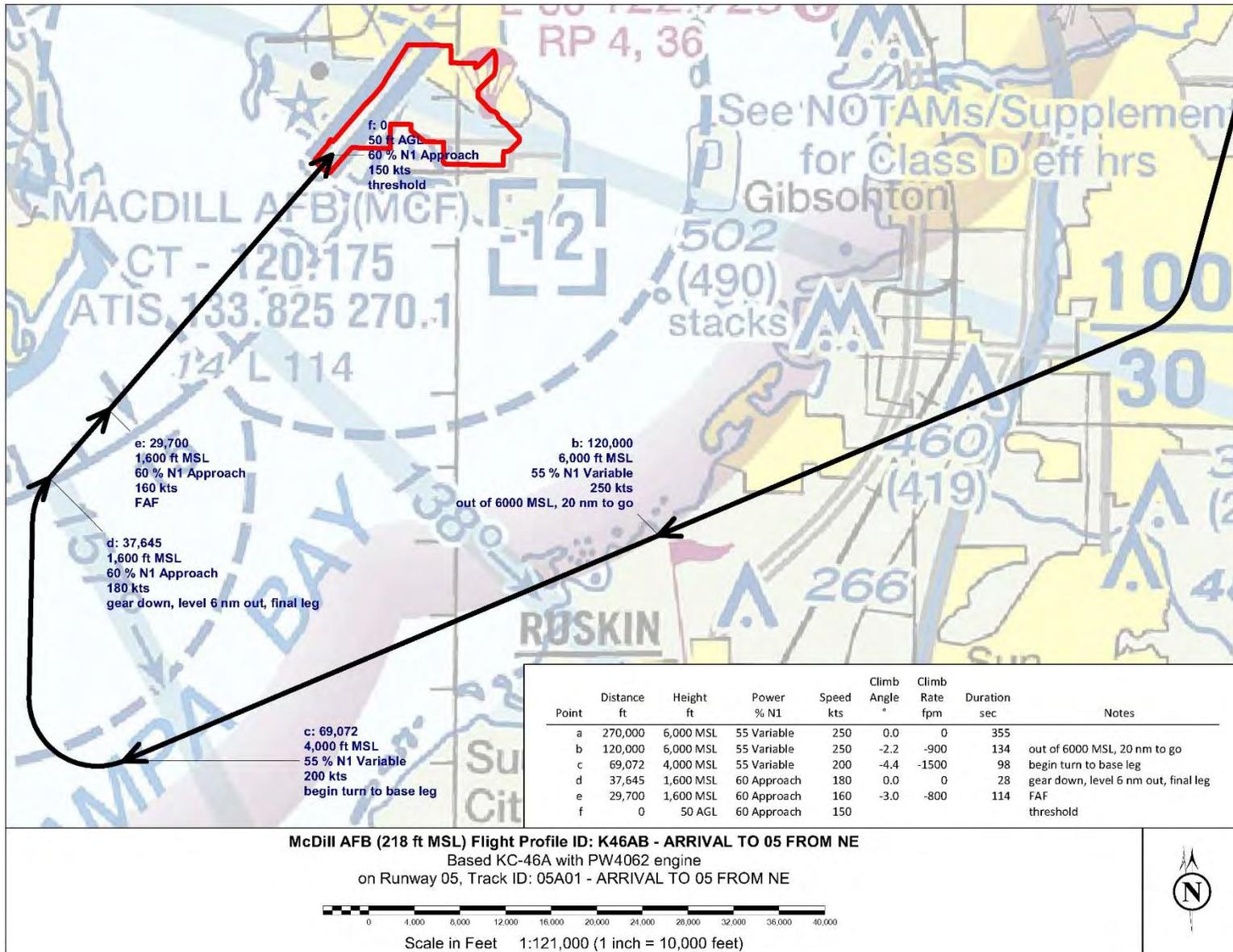


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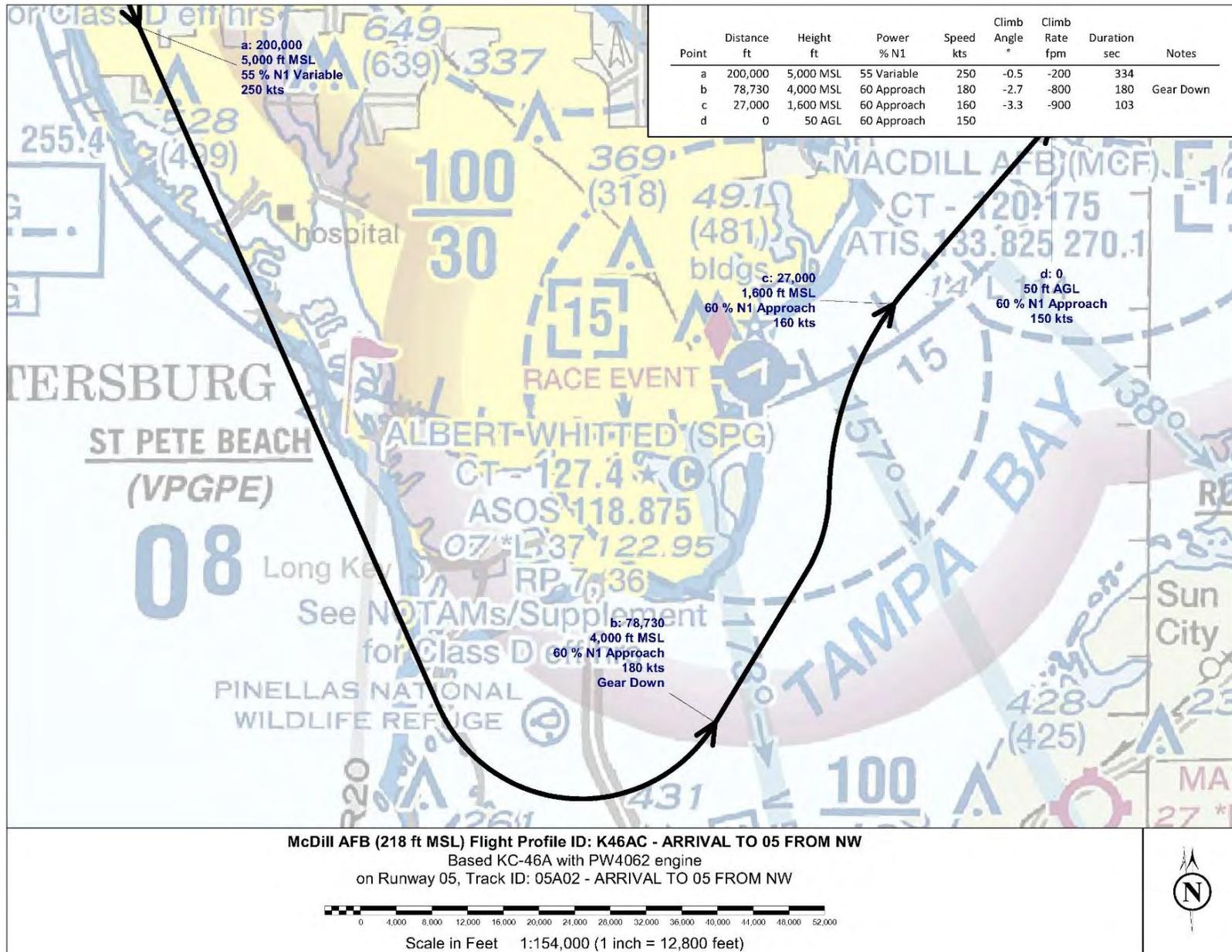


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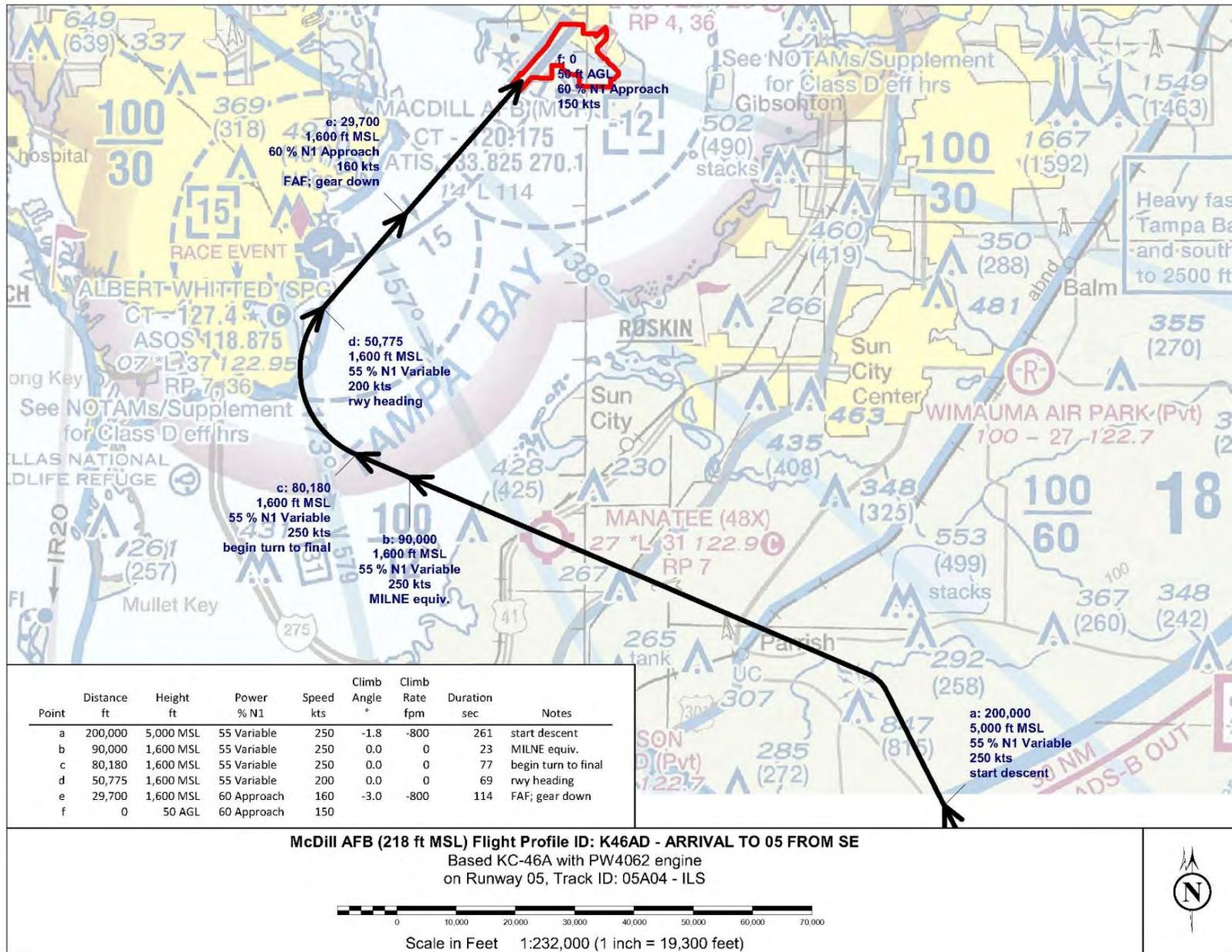


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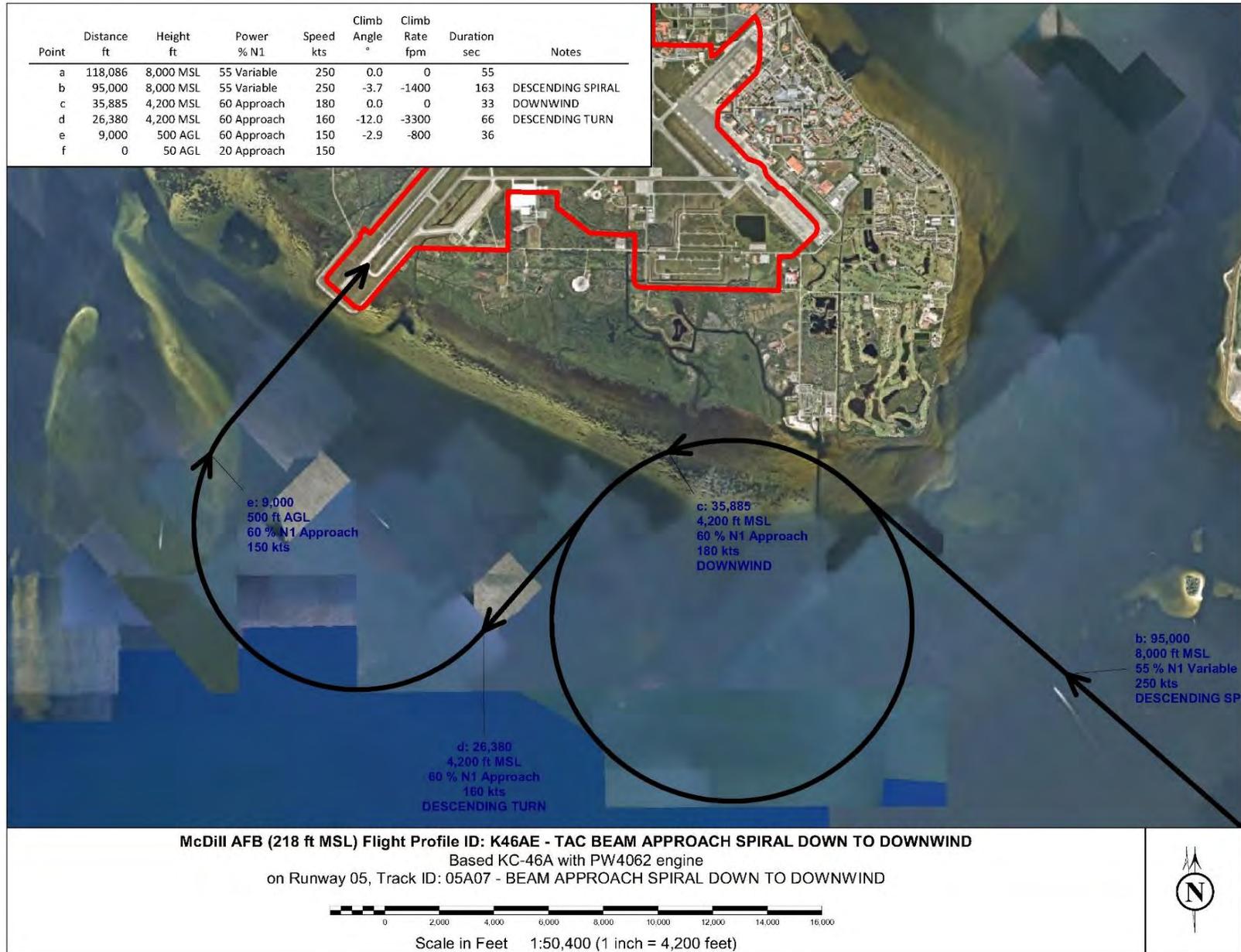


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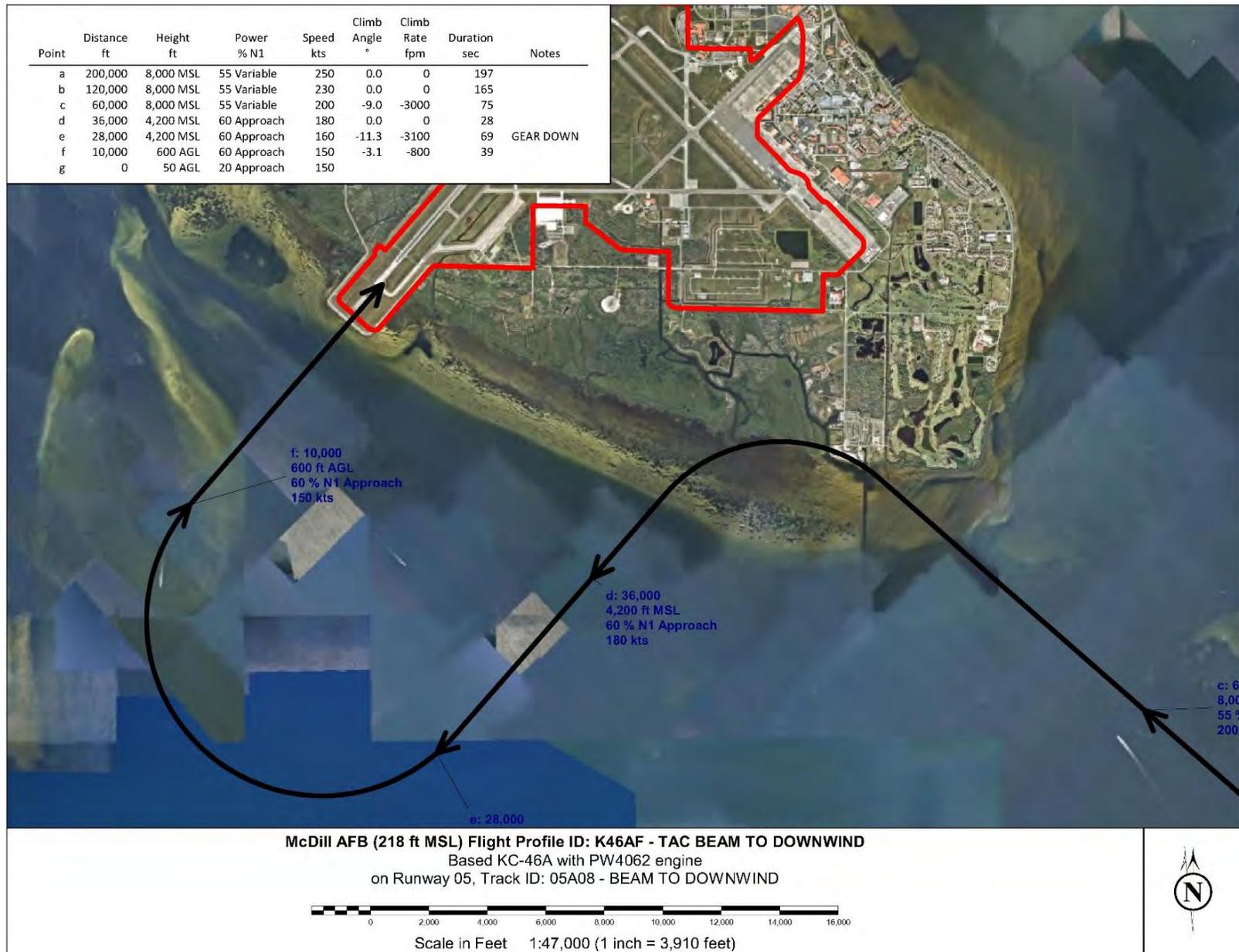


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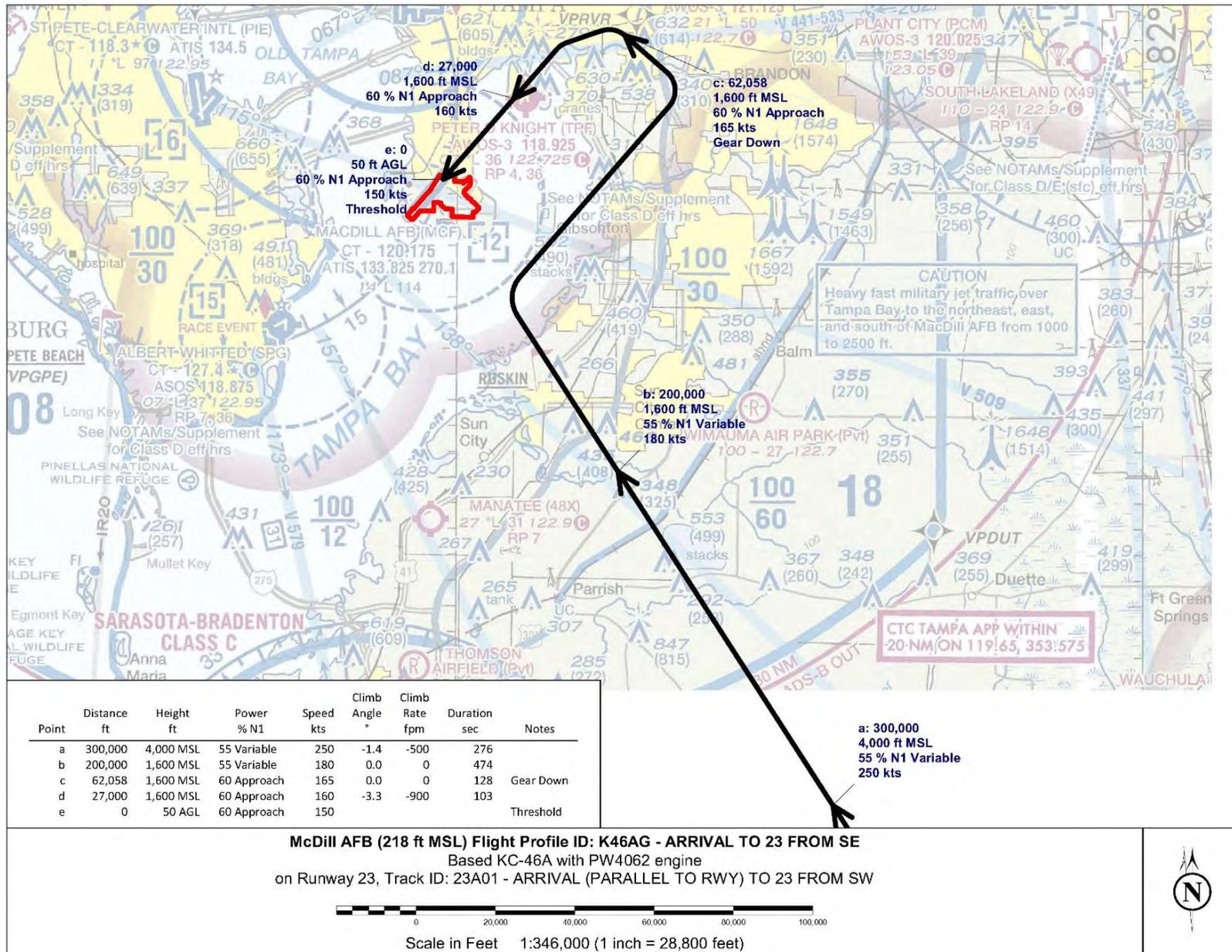


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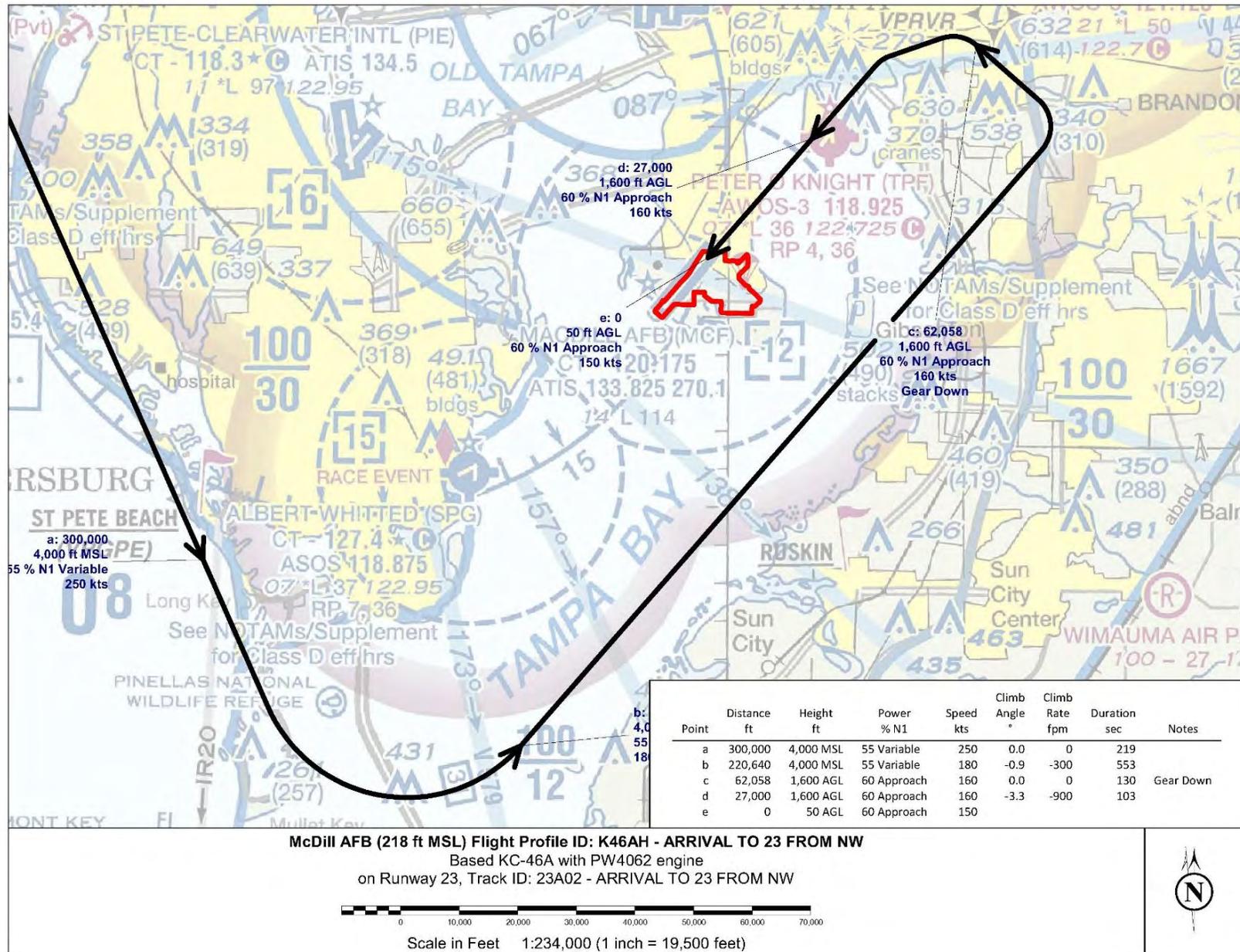


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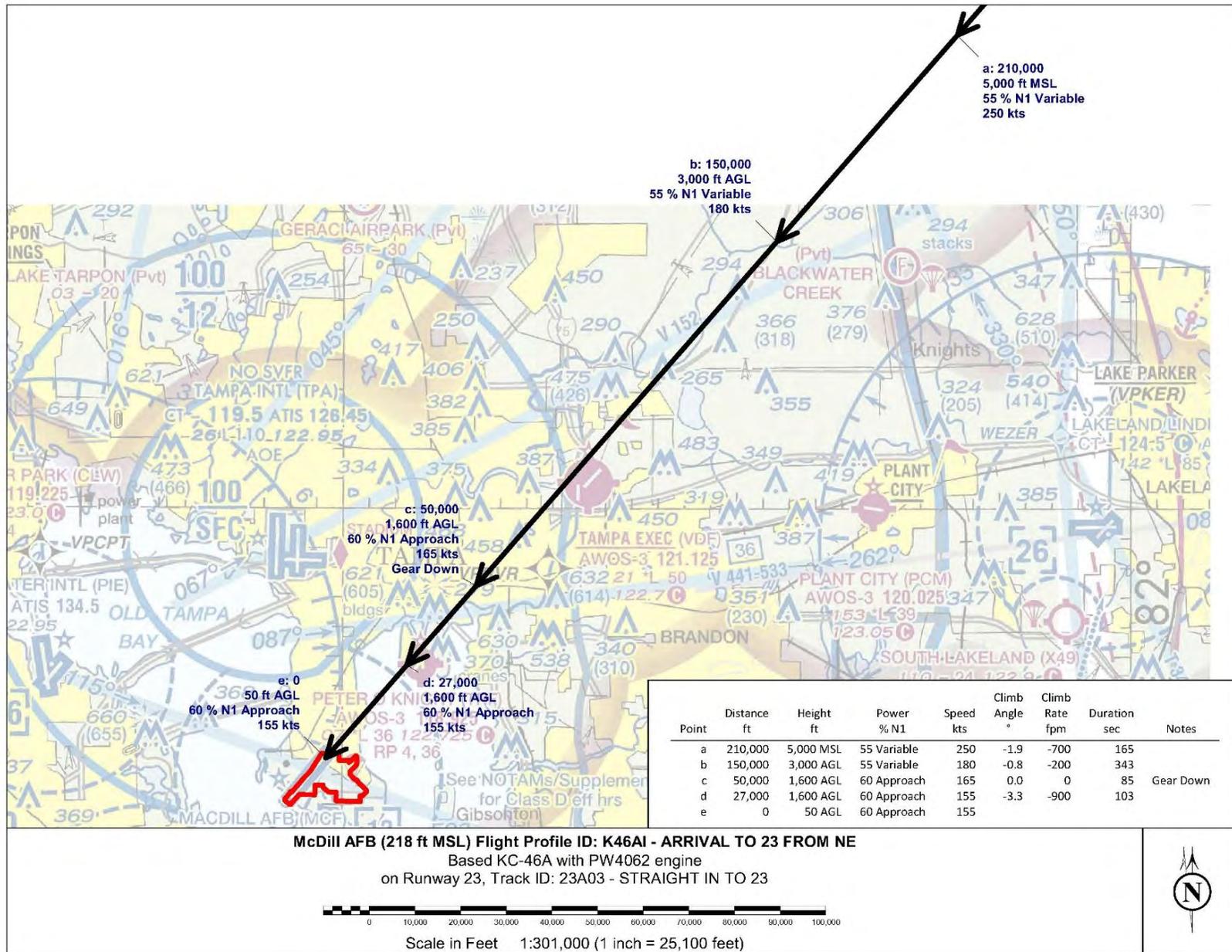


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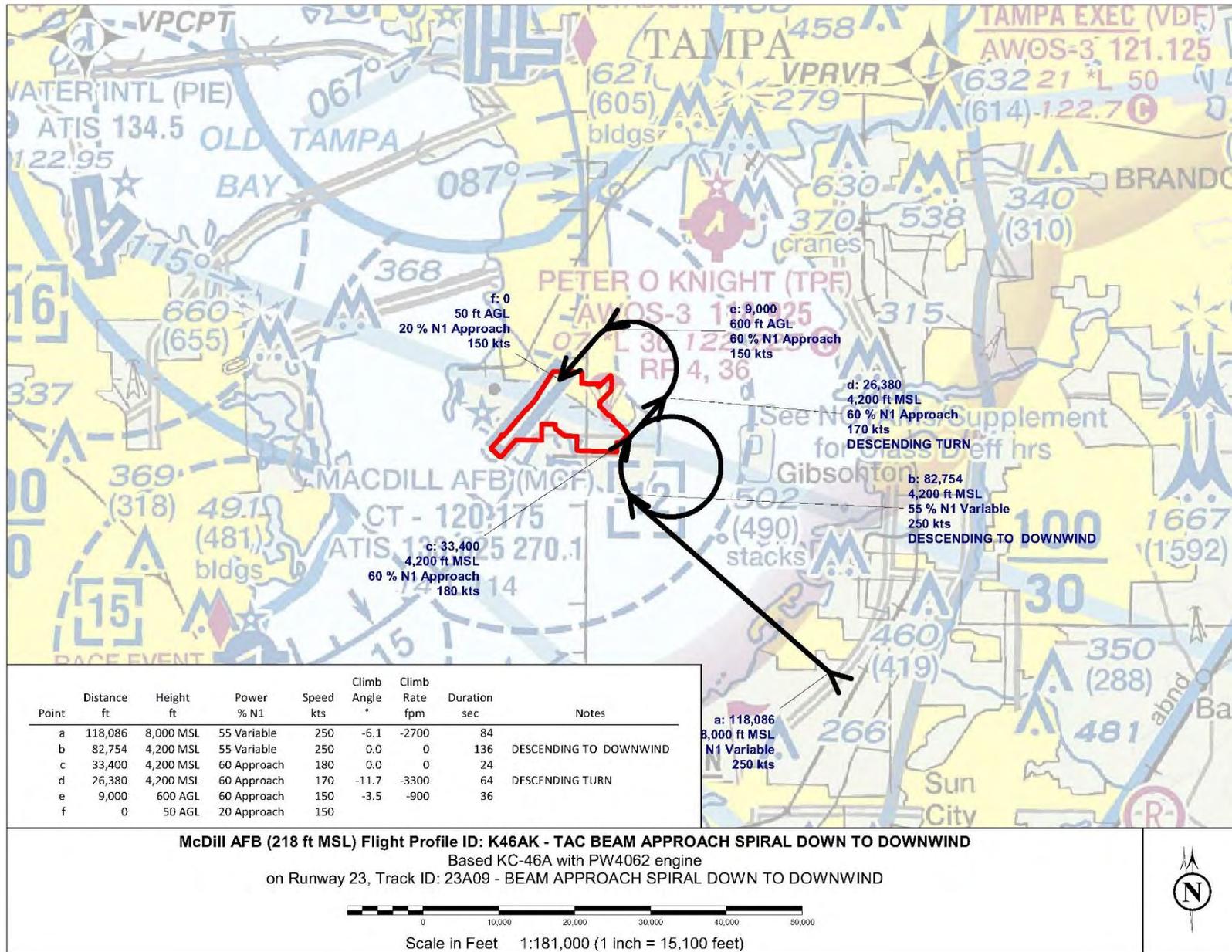


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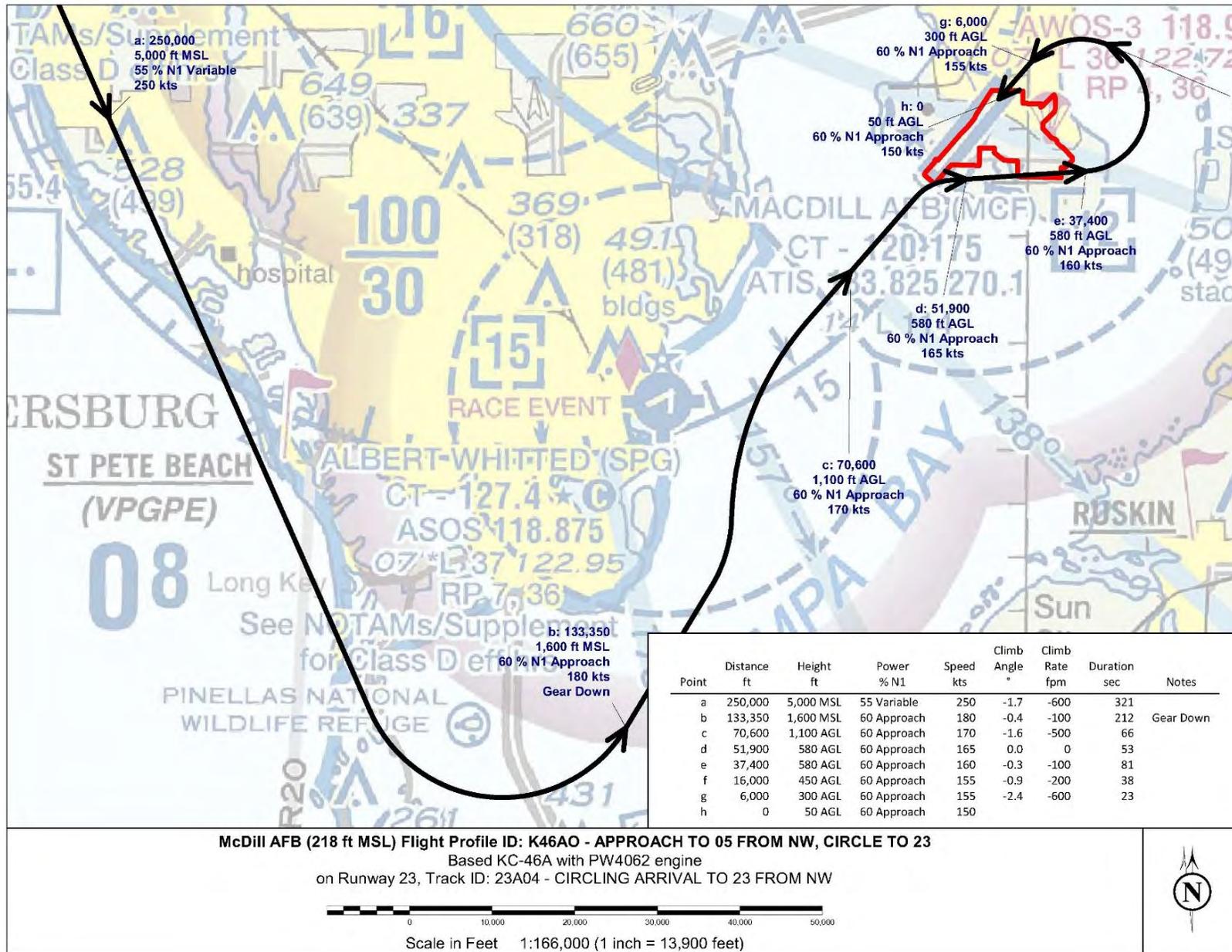


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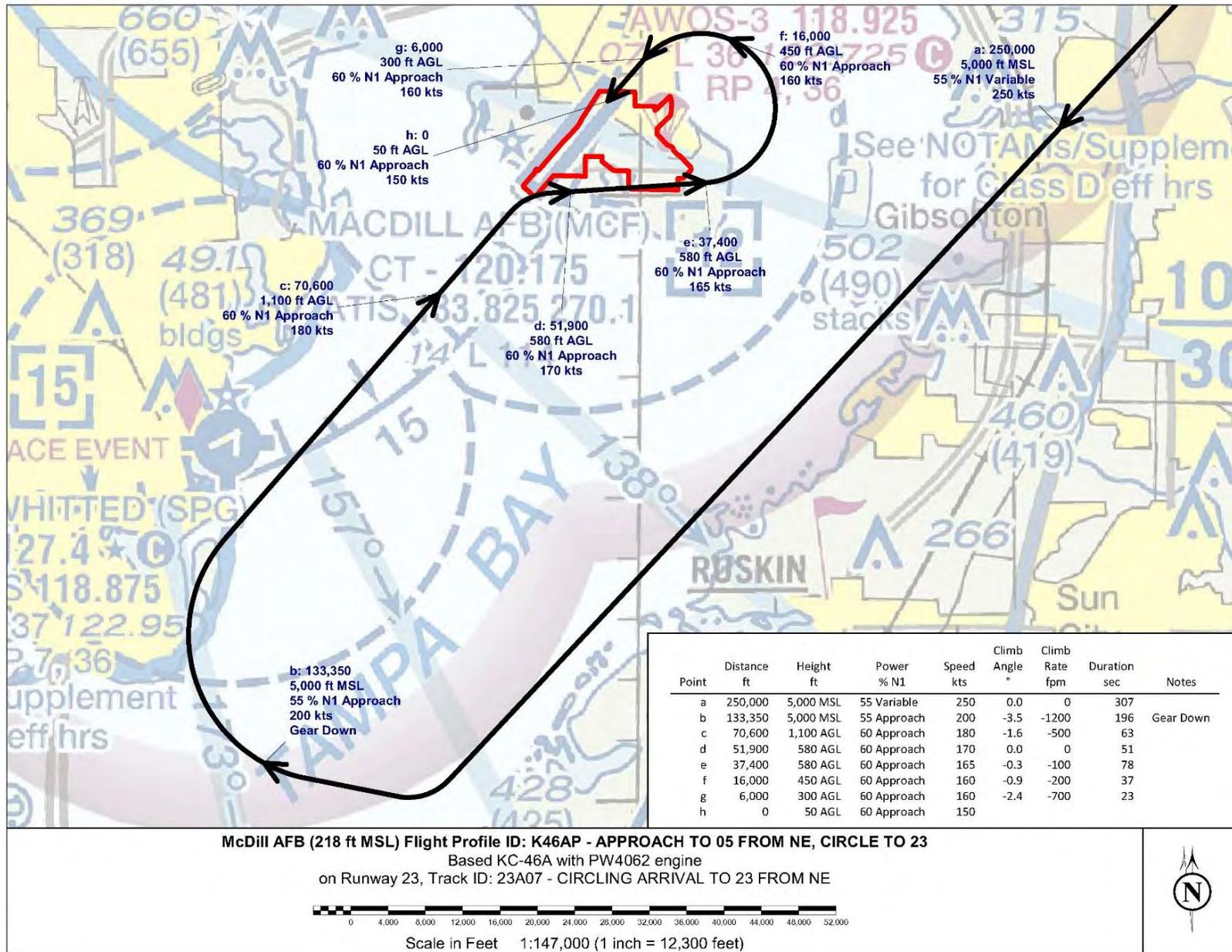


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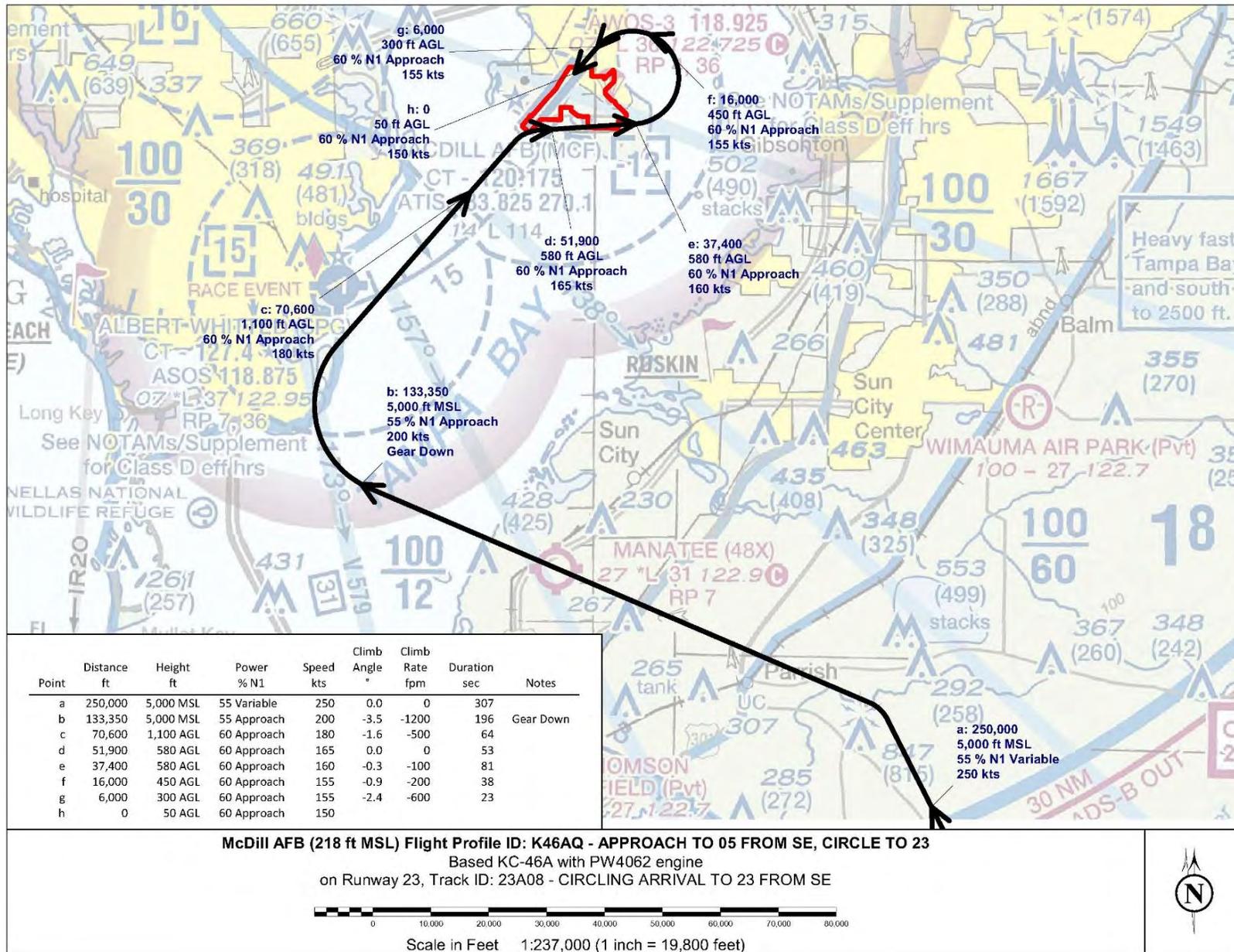


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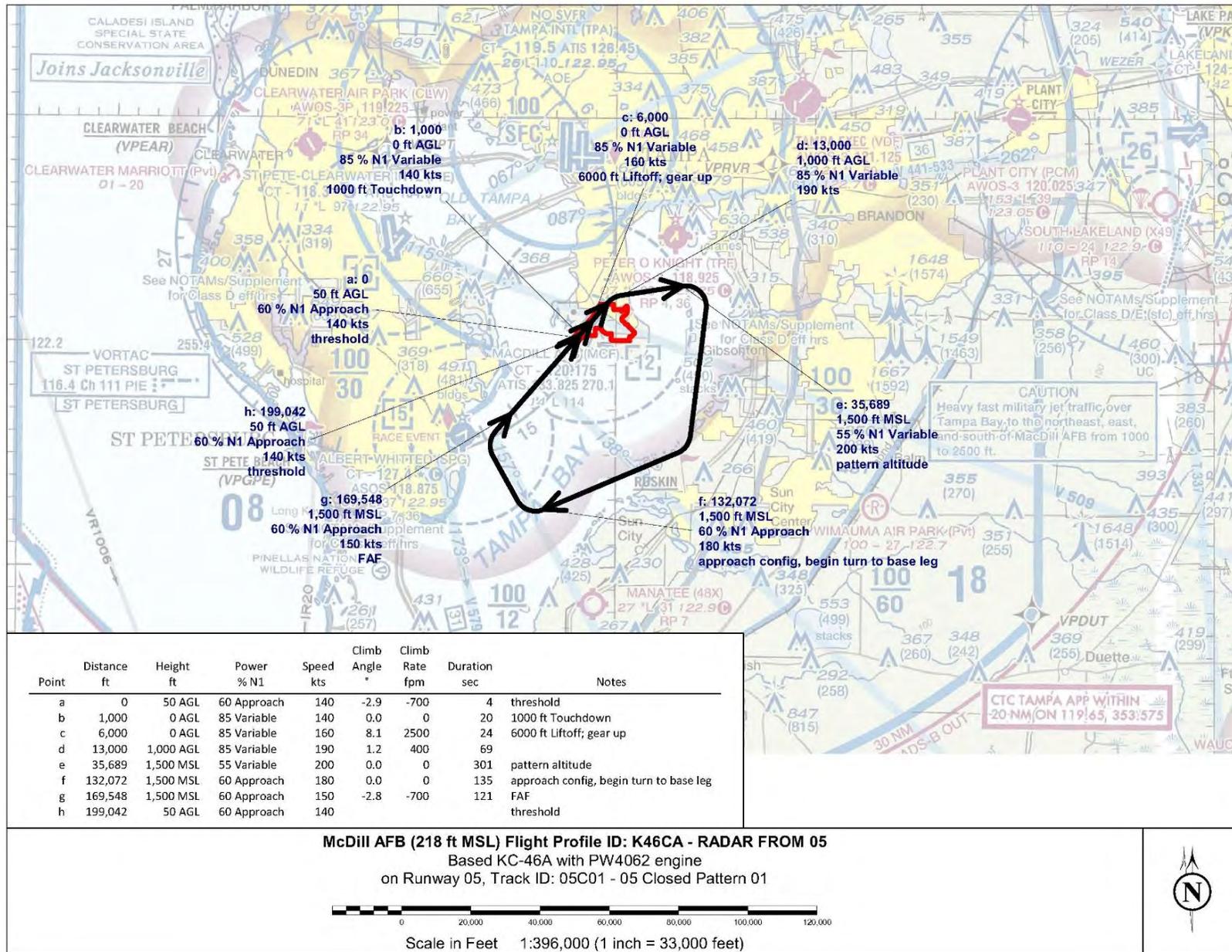


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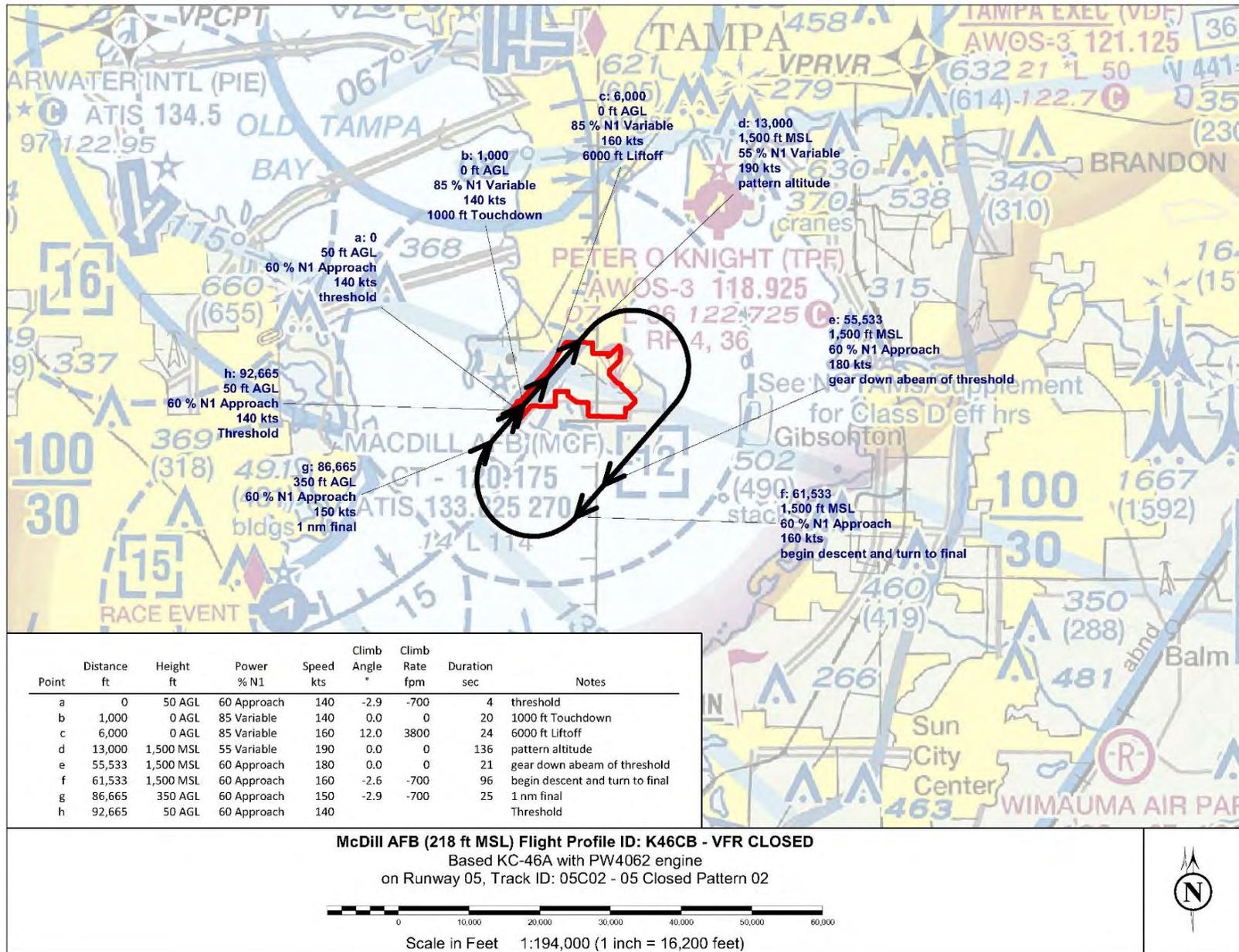


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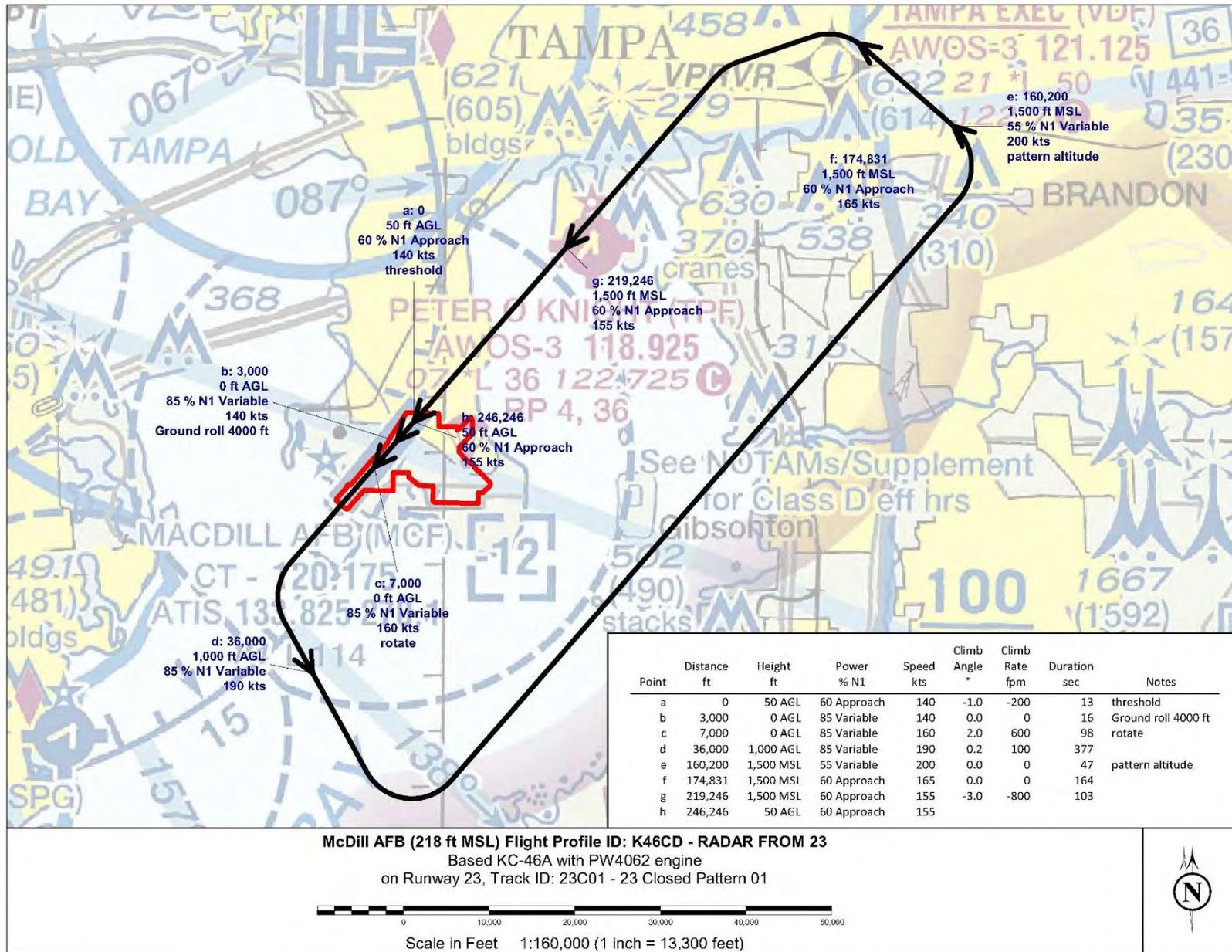


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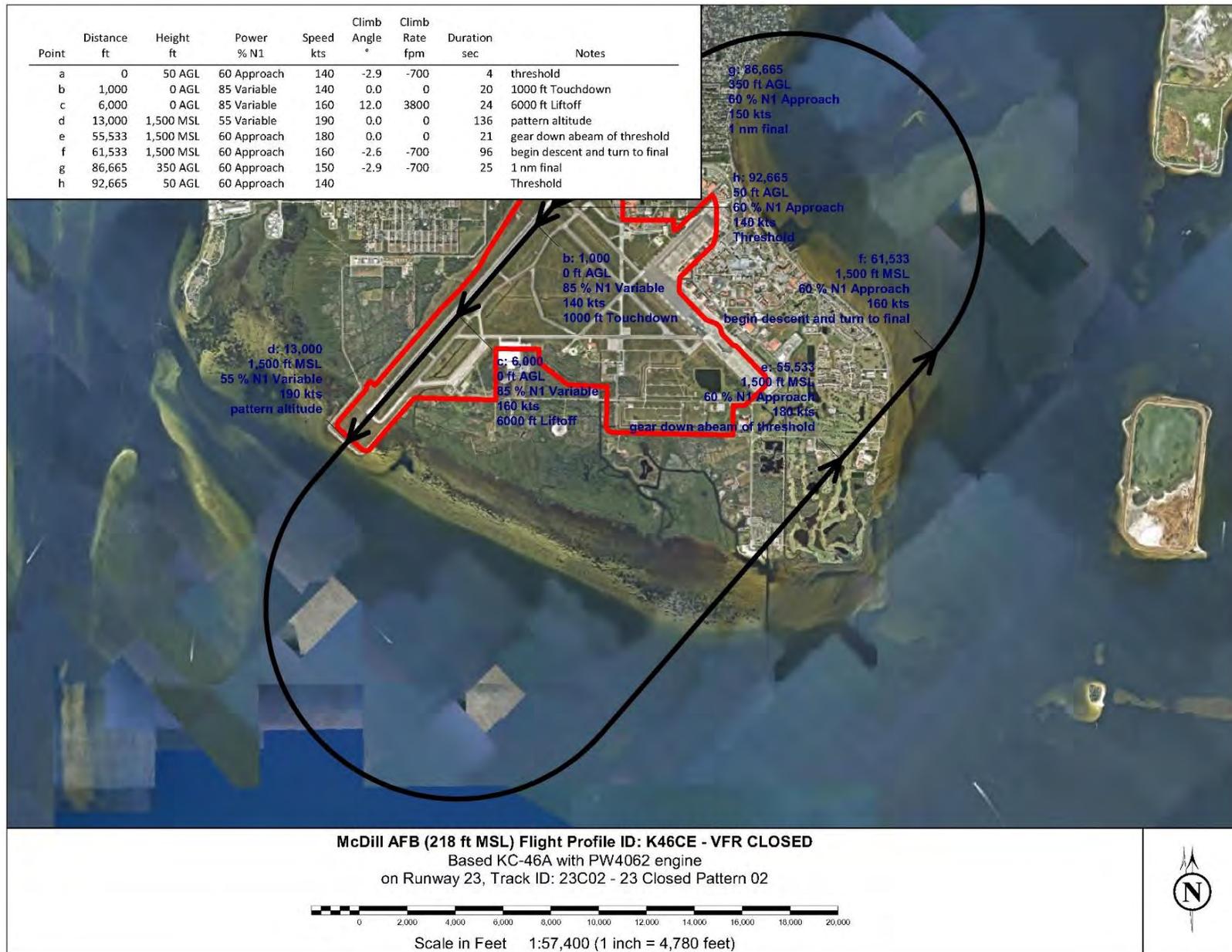


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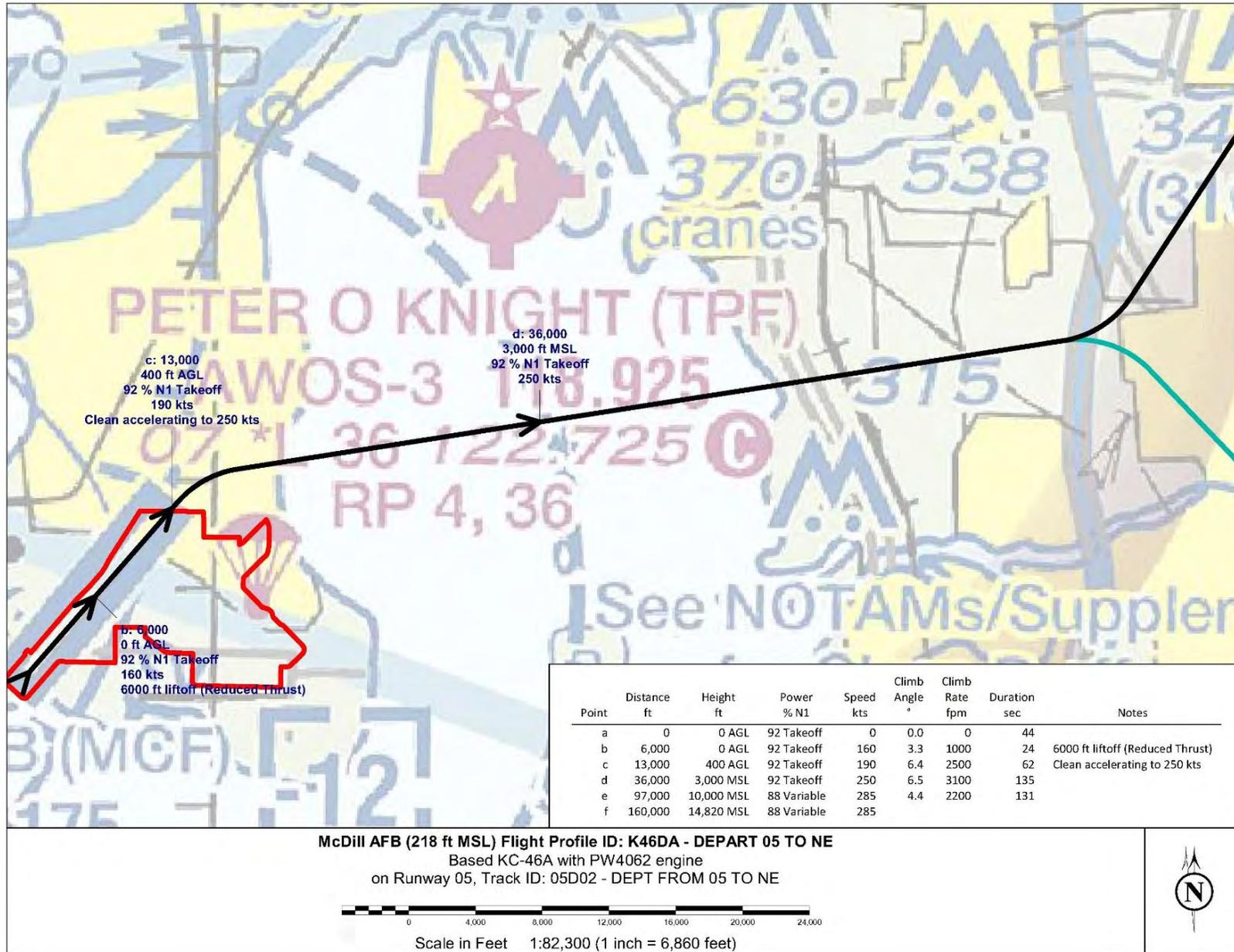


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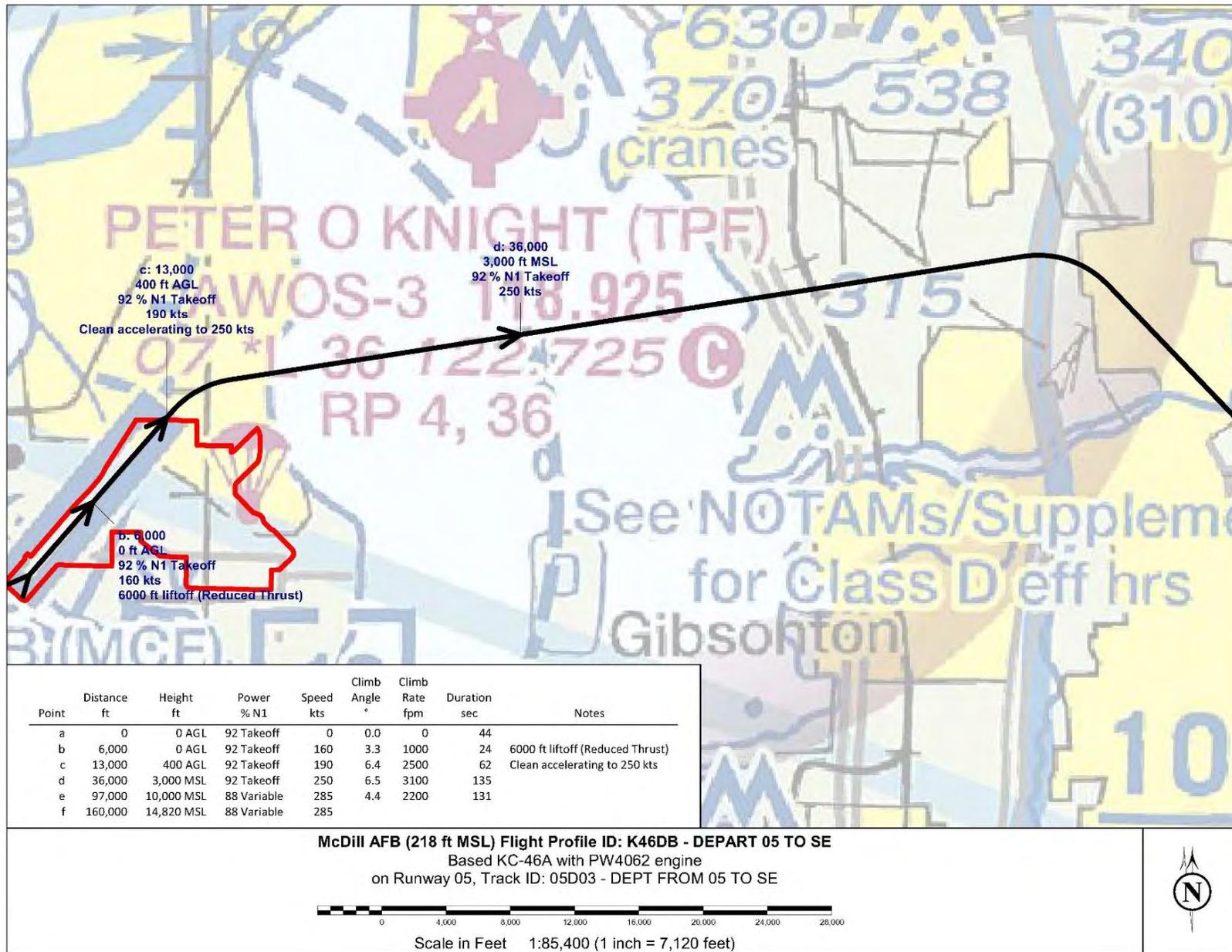


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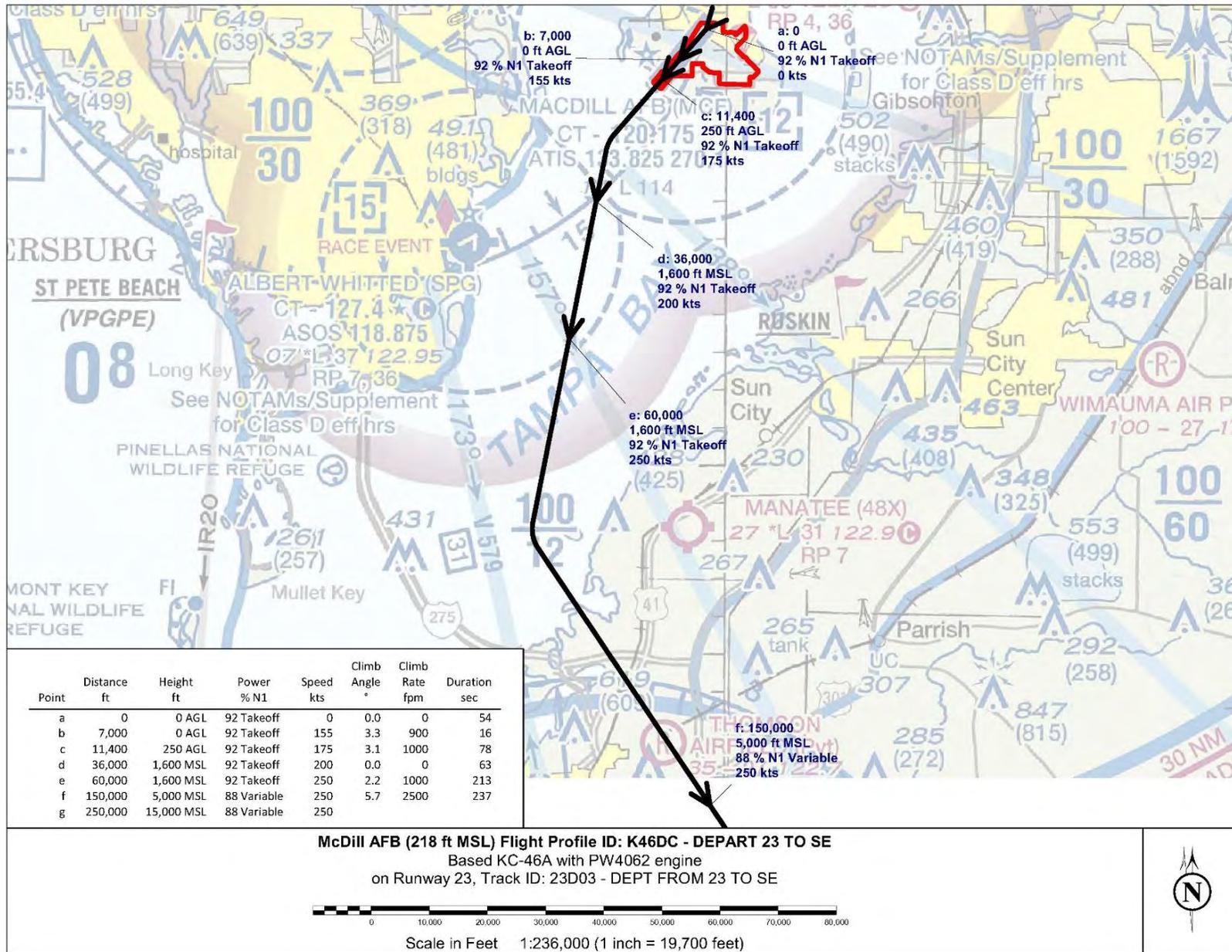


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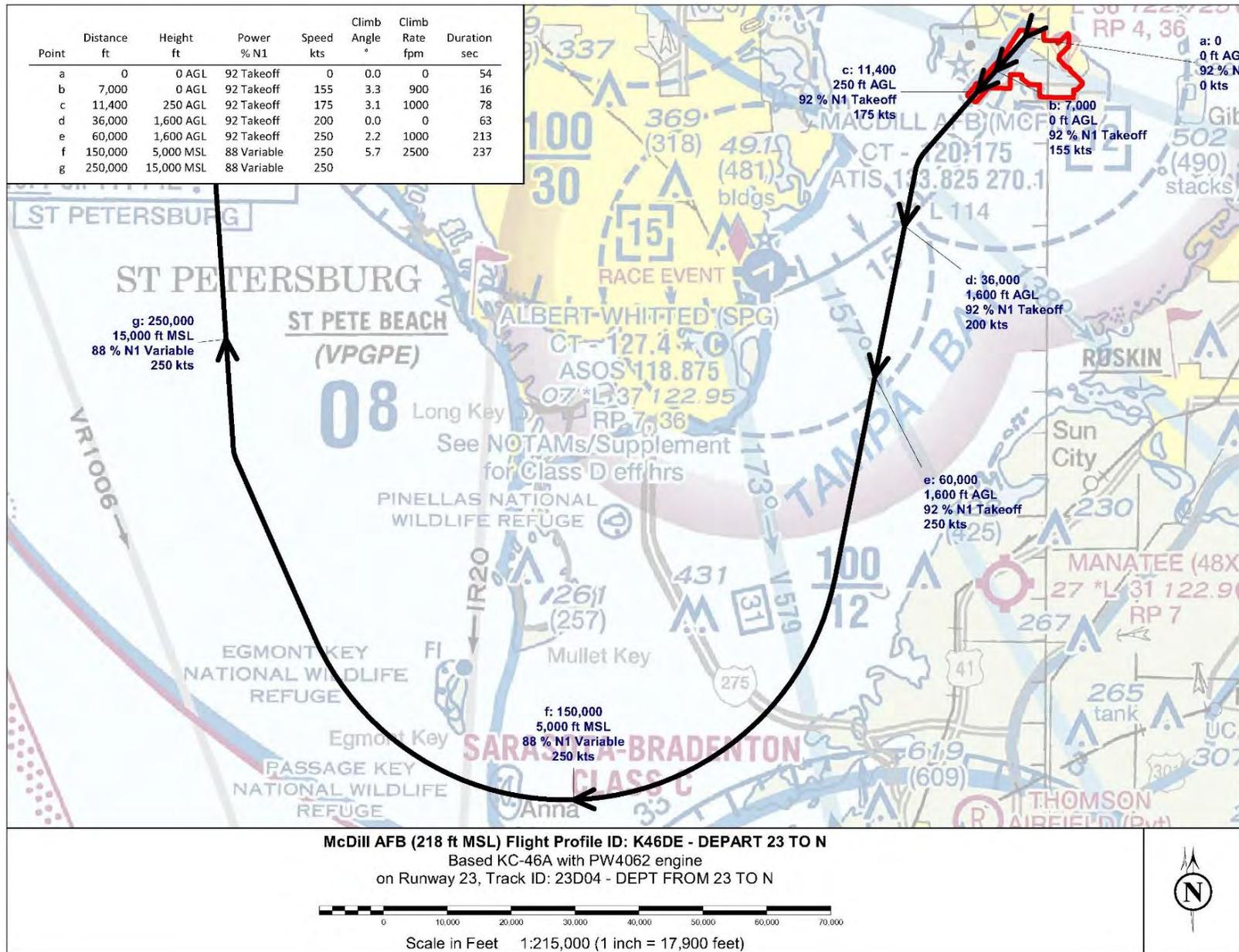


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