Flight Procedures Cover Page	Task Action: FLIGHT CHECK	Task Type: STAR	Estimated Chart Date: 10/02/2025	APWS Task ID: 7078CBBA0EFB45A8B6E54D3D44B4F0AB	APWS Project ID: 88CC04A9274948A898E79C7DABD80CFD
Procedure: BNA PASLY FIVE (RNAV) STAR		Enroute: YES	Specialist: Copeland, Guy		Agreement Number:
Airport ID: KBNA			Airport City: NASHVILLE		State: TN
Facility ID:	Facility Type:	Flight Inspection Remark Type: New FC Slot			

Procedure Comments:
CONTACT ROBERT HAMILTON, AJV-A431 405-954-4608.

LOA: 1. DESCENT GRADIENT
2. DECELERATION

QUALITY 35 CHECKED

QUALITY 41 CHECKED

Data as of: 03/10/2025 13:19:59 CDT

PASLY FOUR ARRIVAL (RNAV)

(PASLY.PASLY4) 05JAN17

NASHVILLE, TENNESSEE
NASHVILLE INTL (BNA)

NASHVILLE EAST APP CON
118.4 360.7
ATIS
135.1

NOTE: Radar required.
NOTE: RNAV 1.
NOTE: DME/DME/IRU or GPS required.
NOTE: Turbojet aircraft only.
NOTE: Expect to receive landing direction (north/south/northwest) and "descend via" clearance from Memphis Center; Nashville approach will issue landing runway.
NOTE: Landing south indicates Rwy 20L/20C/20R.
Landing north indicates Rwy 2L/2C/2R.
Landing northwest indicates Rwy 31.

FORKS
FL230

11000
189°
(30)

GROAT
FL230

11000
243°
(22)

10 NM
063°

11000
(20)

17000
271°
(10)

CHAZE
FL230

LIVINGSTON
LVT

5000
243°
(10)

PASLY
FL200
12000

242°
(4)

CARAP
10000

DAANG

(7)

BODDY
12000
7000
250K

MUUDD
6000 250K

Landing Rwys 20L/20C/20R: After MUUDD, track 270°, expect radar vectors to final approach course.

(9)
4000
247°

270°

NOPOC
5000

CLBTY
6000 250K

5000
242°
(17)

4000
228°
(22)

4000
316°
(4)

JABUN
6000

274°
(6)

(3)

201°
(3)

FIBAX
5000 210K

DRAND
6000 220K

(4)

MUGEE
4000 210K

ZODKA
5000 210K

200°

Landing Rwy 31: After MUGEE, track 200°, expect radar vectors to final approach course.

N

(NARRATIVE ON FOLLOWING PAGE)

NOTE: Chart not to scale.

(PASLY.PASLY4) 17005

PASLY FOUR ARRIVAL (RNAV)

OLD

NASHVILLE, TENNESSEE
NASHVILLE INTL (BNA)

OLD

ARRIVAL ROUTE DESCRIPTION

FORKS TRANSITION (FORKS.PASLY4)
GROAT TRANSITION (GROAT.PASLY4)
LIVINGSTON TRANSITION (LVT.PASLY4)

From over PASLY on track 243° to cross CARAP at/above 10000, then on track 242° to DAANG, then on track 242° to cross BODDY at/above 7000 and at/below 12000 and at 250K, then on assigned runway transition.

LANDING NORTH RWYS 2L/2C/2R: From over BODDY on track 242° to cross CLBTY at/above 6000 and at 250K, then on track 242° to cross JABUN at/above 6000, then on track 201° to cross DRAND at/above 6000 and at 220K, then on track 201° to cross ZODKA at 5000 and at 210K, then on track 201°. Expect radar vectors to final approach course.

LANDING SOUTH RWYS 20L/20C/20R: From over BODDY on track 247° to cross MUUDD at 6000 and at 250K, then on track 270°. Expect radar vectors to final approach course.

LANDING NORTHWEST RWY 31: From over BODDY on track 228° to cross MUGEE at 4000 and at 210K, then on track 200°. Expect radar vectors to final approach course.

LANDING RWY 13: From over BODDY on track 242° to cross CLBTY at/above 6000 and at 250K, then on track 242° to cross JABUN at/above 6000, then on track 274° to cross FIBAX at 5000 and at 210K, then on track 316° to cross NOPOC at 5000, then on track 316°. Expect radar vectors to final approach course.

SE-1, 05 JAN 2017 to 02 FEB 2017

Federal Aviation Administration

Memorandum

Date: January 30, 2025

To: Christopher Hope, Manager, Flight Technologies and Procedures Division
THRU: Romana Wolf, Manager, Flight Procedures and Airspace Group

From: Bev Bordy, Manager, Instrument Flight Procedures Coordination Team, AJV-A43

Prepared by: Erik J John, Sr. ATC Specialist, NAVTAC CTR Support

Subject: Deceleration Approval Request: Nashville International Airport (KBNA)
PASLY (RNAV) STAR

GROAT to PASLY Segment

The requirements stated in Order 8260.3G Paragraph 2-2-10.a. are: **Deceleration.** Sufficient distance and a reduced descent gradient are required prior to any fix with a speed restriction. STARs not meeting the requirements of this paragraph may be authorized with Flight Standards approval (see paragraph 1-4-2).

b. When descent is permitted, the descent gradient leading to the fix with the speed restriction must be reduced. Apply formula 2-2-2 to determine the minimum deceleration distance (DecelD) required before the fix; the greater distance leads to a reduced descent gradient.

(1) In determining the applicable formula gradient value, “G,” use 330 ft/NM (approximately 3.11 degrees) when the ending speed restriction is greater than or equal to 250 KIAS; use 318 ft/NM (approximately 3.0 degrees) when the ending speed restriction is less than 250 KIAS but greater than 220 KIAS; use 250 ft/NM (approximately 2.36 degrees) when the ending speed restriction is 220 KIAS or less.

(2) In determining “K,” use 310 KIAS, or the previous speed restriction if less than 310 KIAS, as the reference speed at or above 10000 feet MSL. For the reference speed below 10000 feet MSL, use 250 KIAS or the previous speed restriction if less. For a block altitude, use the minimum altitude when selecting 310 or 250 to use to determine the “K” value.

Formula 2-2-2. Minimum Deceleration Distance (NM)

$$Decel_D = \frac{Alt_1 - Alt_2}{G} + K$$

Where:
Alt_1 = Minimum altitude at the fix prior to the speed restriction
Alt_2 = Minimum altitude at the fix with the speed restriction
G = Applicable gradient value (330/318/250)
K = 1 NM for every 10 KIAS of deceleration required

> Paragraph 1-4-2. …states in part:
> "**Nonstandard IFP.** …obstacles, navigation information, or traffic congestion may require special consideration where justified by operational requirements. In such cases, nonstandard IFPs that deviate from these criteria may be approved, provided they are documented and an equivalent level of safety exists…"

The GROAT to PASLY segment with constraints at GROAT of AT FL220 and at PASLY of between 15000-FL190/280 KIAS is 21.80 NM in length. Per the 8260.3G requirement from the above formula, the required leg length is 24.21 NM to reduce airspeed from 310K to 280K between FL220 and 15000. The distance required in the formula is based on the aircraft being level at 15000. However, there is no speed requirement at GROAT, only an altitude constraint of AT FL220. Aircraft are permitted to begin speed adjustments along track to prepare for an upcoming constraint. Therefore, aircraft are not required to remain at 310K until GROAT and then begin a reduction, they are able to start that adjustment prior to GROAT if necessary.

Additionally, aircraft on the procedure are not required to be level at 15000 by PASLY. Using the formula above, if the aircraft were to stay at 310K until GROAT and then reduce airspeed to 280K while descending for the PASLY window, with a standard 330FT/NM descent gradient, the aircraft would cross PASLY at approximately 15,796FT and still comply with the constraints at PASLY.

Consideration was given to moving GROAT but after analyzing the requirement and design along with the calculation above, it was deemed not necessary. The location of GROAT is also instrumental in the delivery of aircraft on the procedure from one facility to the next and needs to remain in it's current location. Therefore, ATC requests approval for the design as submitted.

Federal Aviation Administration

Memorandum

Date: January 30, 2025

To: Christopher Hope, Manager, Flight Technologies and Procedures Division
THRU: Romana Wolf, Manager, Flight Procedures and Airspace Group

From: Bev Bordy, Manager, Instrument Flight Procedures Coordination Team, AJV-A43

Prepared by: Erik J John, Sr. ATC Specialist, NAVTAC CTR Support

Subject: Descent Gradient Approval Request: Nashville International Airport (KBNA)
PASLY (RNAV) STAR

CARAP to RDNEK Segment:

Per FAA Order 8260.3, 2-2-8. a.:

2-2-8. Descent Gradient (DG). Calculate DGs between fixes with an altitude restriction by using the guidance in this paragraph and the calculation methods in section 2-9. When deceleration is required, also use paragraphs 2-2-9 and 2-2-10. The DG past the termination fix of the STAR is not calculated as part of the STAR design; the overall airspace design should optimize the location and altitude for the STAR termination fix and that becomes an input to the STAR design.

a. The maximum DG (see figure 2-2-1) is based on altitude, deceleration, and airspeed constraints, as follows:

(1) The maximum permissible DG 10000 feet MSL and above is 330 ft/NM (approximately 3.11 degrees).

(2) The maximum permissible DG below 10000 feet MSL is 318 ft/NM (approximately 3.0 degrees).

(3) When a STAR contains a descent between fixes that passes through 10000 feet MSL, the maximum permissible DG is between 318 ft/NM and 330 ft/NM and is in proportion to the amount of the altitude change that is below/above 10000 feet MSL. Use formula 2-2-1 to determine the maximum DG (*DGmax*) between fixes that contain a descent that passes through 10000 feet MSL.

(6) If more than one of paragraphs 2-2-8.a(1) through 2-2-8.a(5) applies, use the lower of the resulting values for the maximum DG.

b. When a gradient exceeds the maximum DG allowed in paragraph 2-2-8.a, the STAR requires approval (see paragraph 1-4-2).

Formula 2-2-1. Maximum DG Passing Through 10000 Feet MSL (ft/NM)

$$DGmax = \frac{(Alt_1 - 10000) \times 12}{(Alt_1 - Alt_2)} + 318$$

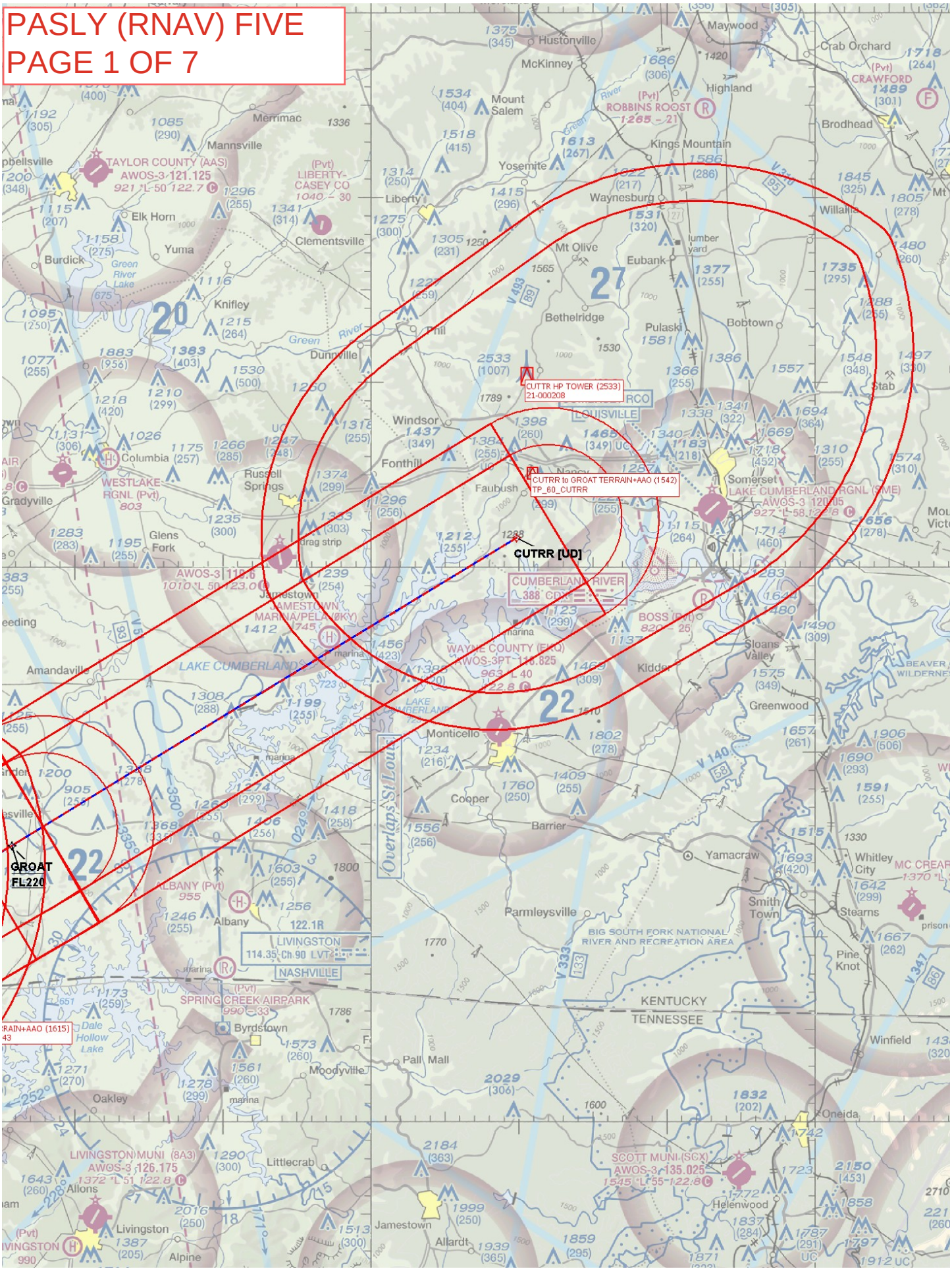
Where:
Alt_1 = Altitude at the fix prior to crossing 10000 feet MSL
Alt_2 = Altitude at the fix after crossing 10000 feet MSL

A computed descent gradient value from CARAP to RDNEK of 326.19 FT/NM was calculated for aircraft descending from 12000 at CARAP to 6000 at RDNEK over 18.38 NM. Using the above formula, criteria states that the computed descent gradient should not exceed 322 FT/NM. In discussion with industry during design meetings, no objections to the altitude constraints were made and the descent gradient is well within limits of aircraft that will use the procedure.

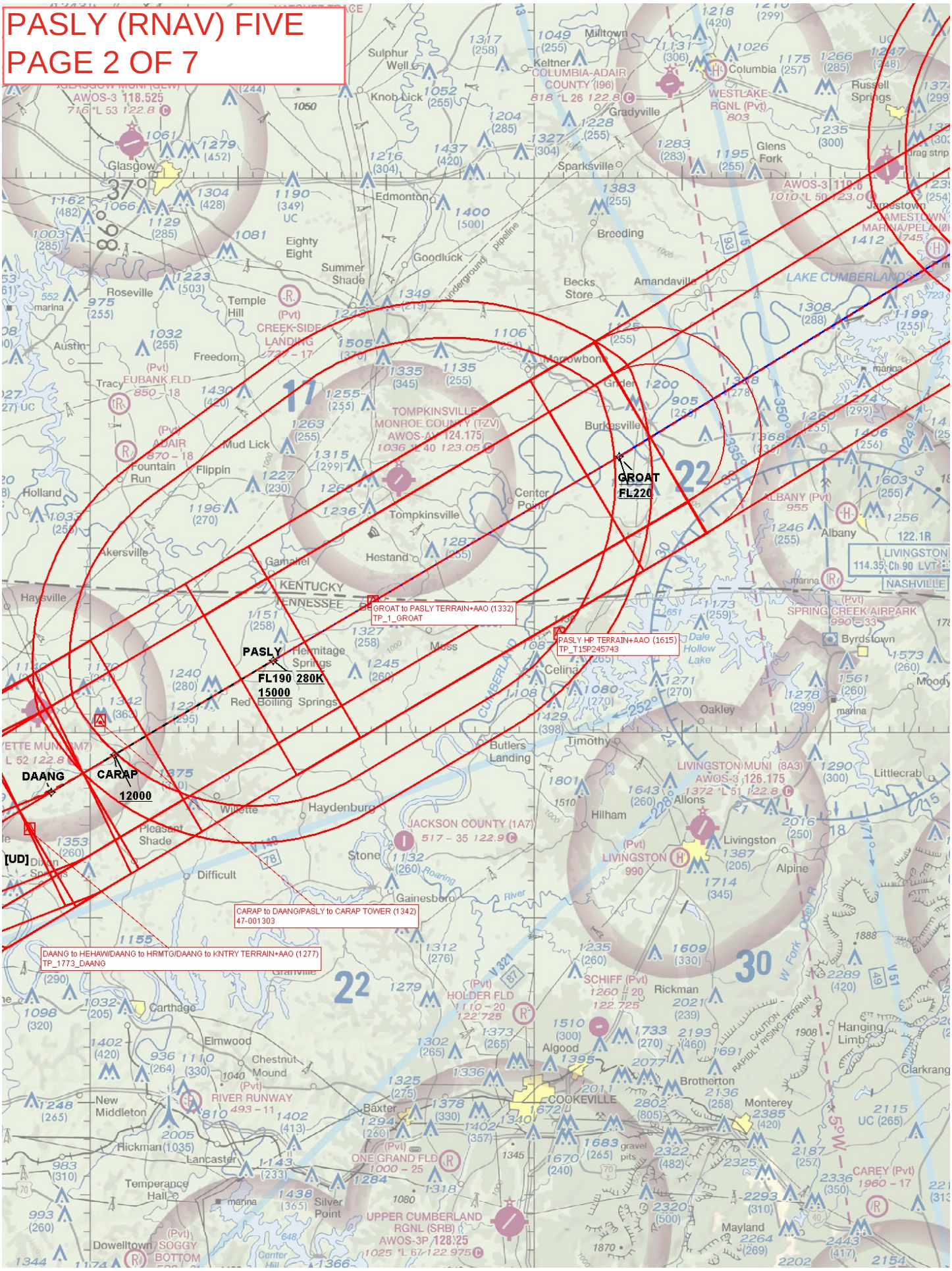
Consideration was given to moving RDNEK but that would have impacted the newly connected RNAV (RNP) approaches that begin at RDNEK. Also, the group discussed a different altitude at RDNEK but that impacted the traffic flow from the opposite direction which needs to be separated by 1000 FT.

Therefore, Nashville ATCT requests approval to chart the procedure as designed with above descent gradient of 326.19 FT/NM.

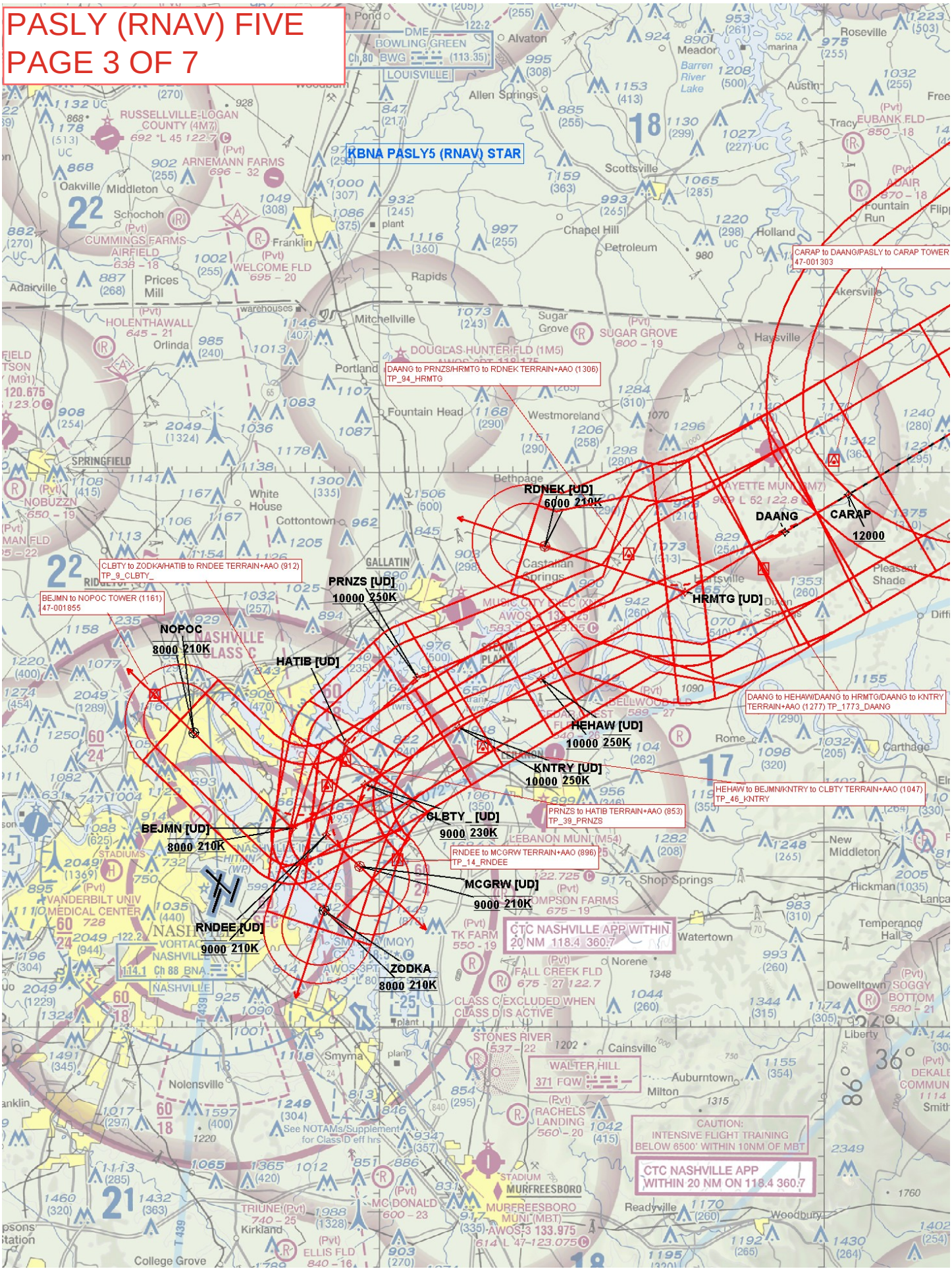
PASLY (RNAV) FIVE
PAGE 1 OF 7

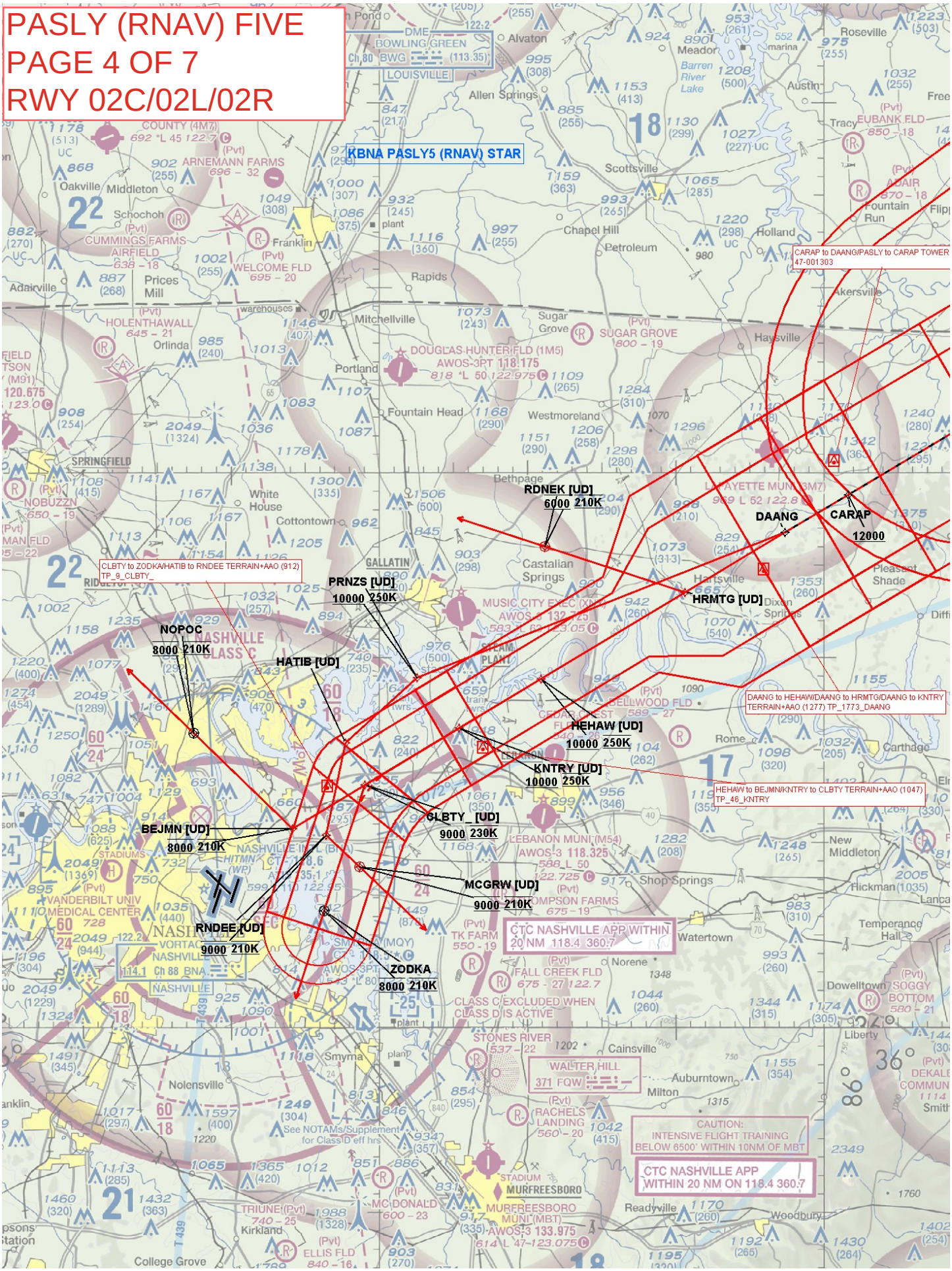


PASLY (RNAV) FIVE
PAGE 2 OF 7



PASLY (RNAV) FIVE
PAGE 3 OF 7




PASLY (RNAV) FIVE
PAGE 4 OF 7
RWY 02C/02L/02R
KBNA PASLY5 (RNAV) STAR
RDNEK [UD]
6000 210K
DAANG
CARAP
12000
CARAP to DAANG/PASLY to CARAP TOWER
47-001303
CLBTY to ZODKA/HATIB to RNDEE TERRAIN+AAO (912)
TP_9_CLBTY_
PRNZS [UD]
10000 250K
HRMTG [UD]
NOPOC
8000 210K
HATIB [UD]
DAANG to HEHAW/DAANG to HRMTG/DAANG to KNTRY
TERRAIN+AAO (1277) TP_1773_DAANG
HEHAW [UD]
10000 250K
KNTRY [UD]
10000 250K
HEHAW to BEJMN/KNTRY to CLBTY TERRAIN+AAO (1047)
TP_46_KNTRY
CLBTY_ [UD]
9000 230K
BEJMN [UD]
8000 210K
MCGRW [UD]
9000 210K
RNDEE [UD]
9000 210K
ZODKA
8000 210K
CTC NASHVILLE APP WITHIN
20 NM 118.4 360.7
CLASS C EXCLUDED WHEN
CLASS D IS ACTIVE
CAUTION:
INTENSIVE FLIGHT TRAINING
BELOW 6500' WITHIN 10NM OF MBT
CTC NASHVILLE APP
WITHIN 20 NM ON 118.4 360.7
See NOTAMs/Supplement
for Class D eff hrs
NASHVILLE
CLASS C
Bowling Green
Louisville
Nashville
Springfield
Portland
Gallatin
Lebanon
Murfreesboro
Smyrna
Franklin
Brentwood
Hendersonville
Goodlettsville
Gallatin
Scottsville
Chapel Hill
Petroleum
Rapids
Mitchellville
Sugar Grove
Fountain Head
Westmoreland
Bethpage
Castalian Springs
Cottontown
White House
Orlinda
Adairville
Oakville
Middleton
Prices Mill
Allen Springs
Alvaton
Meador
Barren River Lake
Roseville
Austin
Tracy
Holland
Akersville
Hartsville
Pleasant Shade
Dixon Springs
Rome
Carthage
Shop Springs
Watertown
Norene
Cainsville
Auburntown
Milton
Readyville
Woodbury
Liberty
Dowelltown
Temperance Hall
New Middleton
Hickman
Lancaster
College Grove
Kirkland
Nolensville
Arrington
Franklin
Brentwood
Hendersonville
Goodlettsville
Gallatin
Scottsville
Chapel Hill
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Cainsville
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Hickman
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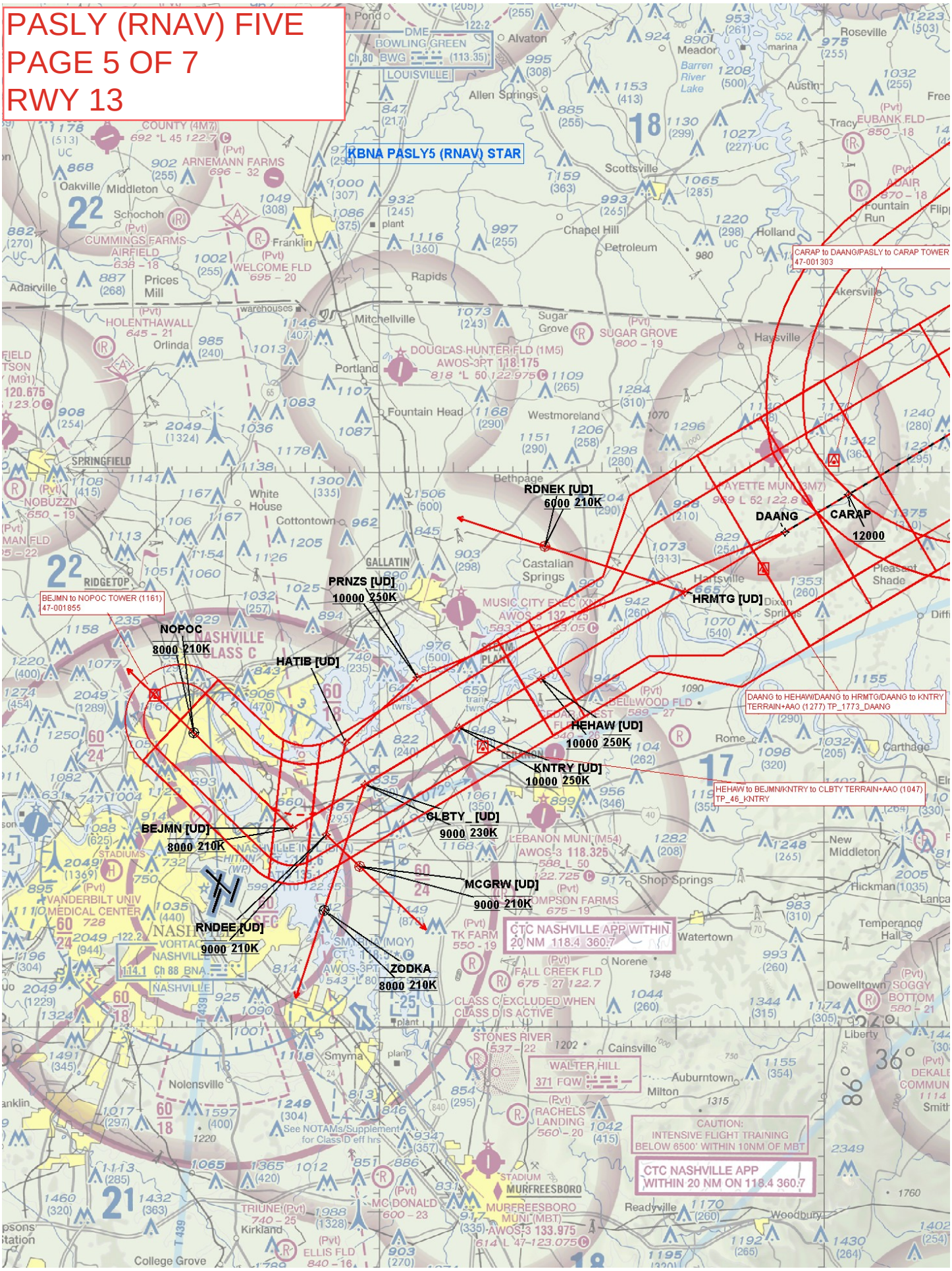
College Grove
Kirkland
Nolensville
Arrington


PASLY (RNAV) FIVE
PAGE 5 OF 7
RWY 13
KBNA PASLY5 (RNAV) STAR
RDNEK [UD]
6000 210K
DAANG
CARAP
12000
CARAP to DAANG/PASLY to CARAP TOWER
47-001303
PRNZS [UD]
10000 250K
HRMTG [UD]
BEJMN to NOPOC TOWER (1161)
47-001855
NOPOC
8000 210K
HATIB [UD]
DAANG to HEHAW/DAANG to HRMTG/DAANG to KNTRY
TERRAIN+AAO (1277) TP_1773_DAANG
HEHAW [UD]
10000 250K
KNTRY [UD]
10000 250K
HEHAW to BEJMN/KNTRY to CLBTY TERRAIN+AAO (1047)
TP_46_KNTRY
CLBTY_ [UD]
9000 230K
BEJMN [UD]
8000 210K
MCGRW [UD]
9000 210K
RNDEE [UD]
9000 210K
ZODKA
8000 210K
CTC NASHVILLE APP WITHIN
20 NM 118.4 360.7
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See NOTAMs/Supplement
for Class D eff hrs
NASHVILLE
CLASS C
BOWLING GREEN
LOUISVILLE
SPRINGFIELD
RIDGETOP
GALLATIN
Castalian
Springs
Hartsville
Pleasant
Shade
Dixon
Springs
Rome
Carthage
Lebanon
New
Middleton
Hickman
Shop Springs
Watertown
Norene
Dowelltown
Liberty
Cainsville
Auburntown
Milton
Nolensville
Smyrna
Kirkland
College Grove
Readyville
Woodbury
Murfreesboro
Portland
Mitchellville
Fountain Head
Westmoreland
Sugar
Grove
Scottsville
Chapel Hill
Petroleum
Holland
Allen Springs
Alvaton
Meador
Austin
Roseville
Tracy
Akersville
Hansville
Bethpage
Cottontown
White
House
Oakville
Middleton
Adairville
Orlinda
Prices
Mill
Franklin
Rapids
Barren
River
Lake
Fountain
Run
Flipp
Free
Temperance
Hall
Lanca
Smith
Milton
Auburntown
Cainsville
Stones River
Walter Hill
Rachels
Landing
Fall Creek
Tk Farm
Vanderbilt Univ
Medical Center
Stadium
Murfreesboro
Mc Donald
Triune
Ellis Fld
Douglas-Hunter Fld
Sugar Grove
Arnemann Farms
Cummings Farms
Airfield
Welcome Fld
Holenthawall
Nobuzzn
Eubank Fld
Adair
Bellwood Fld
Lebanon Muni
Music City Exec
Nashville Intl
Lafayette Muni
Barren River Lake
Louisville
Bowling Green
Nashville
Vortac
Nashville
Smyrna (MQY)
Douglas-Hunter Fld (1M5)
AWOS-3PT 118.175
Lebanon Muni (M54)
AWOS-3 118.325
Murfreesboro Muni (MBT)
AWOS-3 133.975
Nashville Intl (BNA)
ATIS 135.6
Nashville
Ch 88 BNA
114.1
Fall Creek Fld
675 - 27 122.7
Walter Hill
371 FQW
Sugar Grove
800 - 19
Eubank Fld
850 - 18
Adair
870 - 18
Arnemann Farms
696 - 32
Cummings Farms
Airfield
638 - 18
Welcome Fld
695 - 20
Holenthawall
645 - 21
Nobuzzn
650 - 19
Bellwood Fld
589 - 27
Tk Farm
550 - 19
Stones River
537 - 22
Rachels
Landing
560 - 20
Douglas-Hunter Fld (1M5)
AWOS-3PT 118.175
Lebanon Muni (M54)
AWOS-3 118.325
Murfreesboro Muni (MBT)
AWOS-3 133.975
Nashville Intl (BNA)
ATIS 135.6
Nashville
Ch 88 BNA
114.1
Fall Creek Fld
675 - 27 122.7
Walter Hill
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Sugar Grove
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Adair
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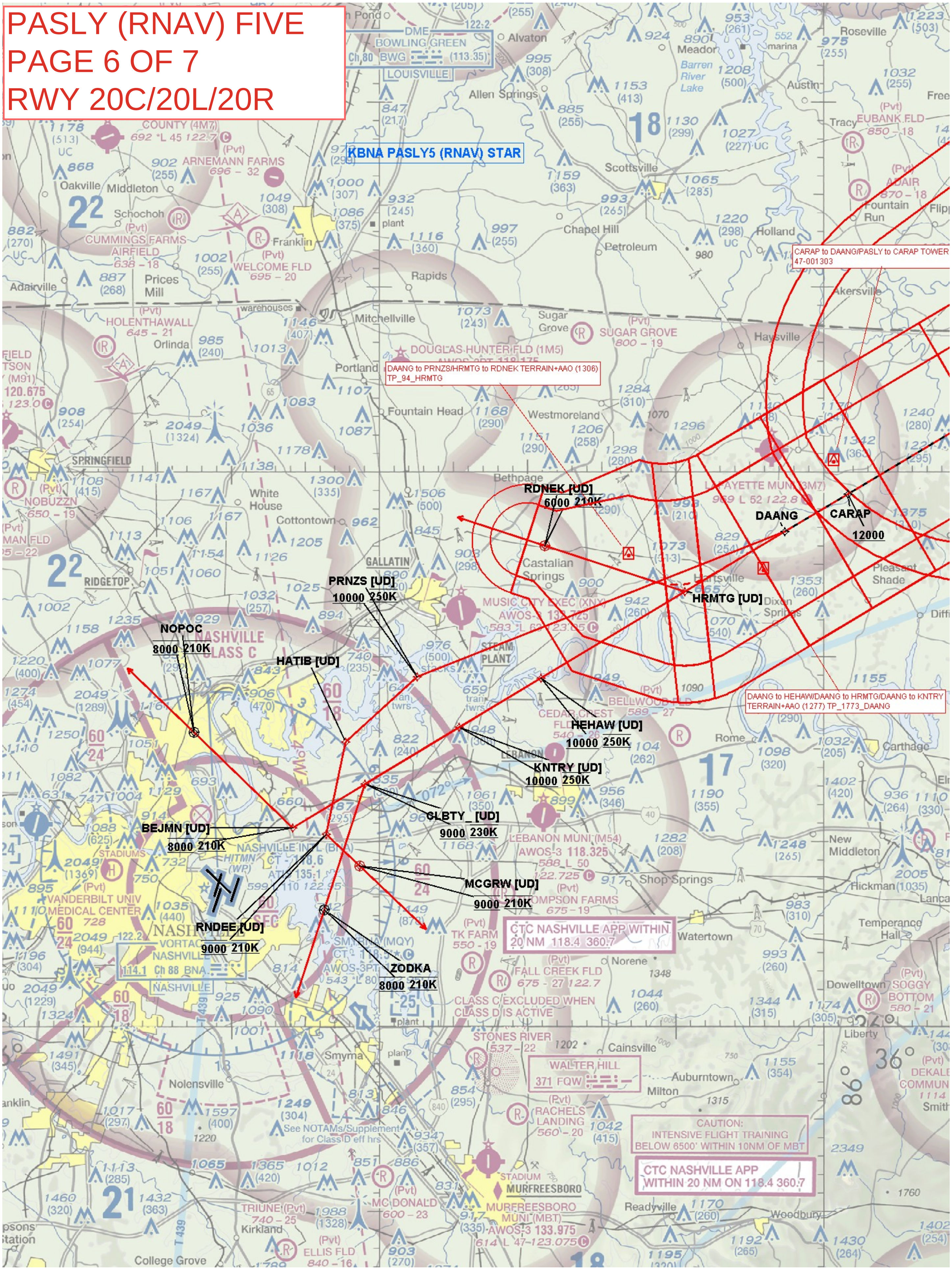
Arnemann Farms
696 - 32
Cummings Farms
Airfield
638 - 18
Welcome Fld
695 - 20
Holenthawall
645 - 21
Nobuzzn
650 - 19
Bellwood Fld
589 - 27
Tk Farm
550 - 19
Stones River
537 - 22
Rachels
Landing
560 - 20

PASLY (RNAV) FIVE
PAGE 6 OF 7
RWY 20C/20L/20R



PASLY (RNAV) FIVE
PAGE 7 OF 7
RWY 31