

E190 FAN



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London City Steep Approach Procedures Summary

Introduction

Following the temporary re-categorisation of LCY as a CAT B aerodrome, this FAN outlines the procedures to be used by BAV CityFlyer E190 crews when conducting steep approaches at London City (LCY/EGLC).

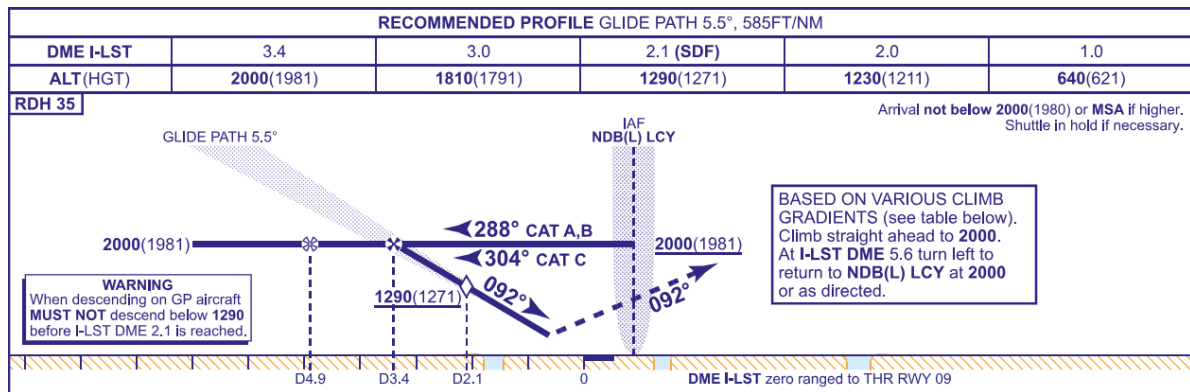
This FAN focuses on the steep approach procedures for the E190 fleet. Operations at LCY are complex and the [LCY RIM](#), which provides a detailed summary of potential threats to the operation, **must** be read in conjunction with this FAN. Resources for other fleets are included at the end.

Overview of LCY Steep Approaches

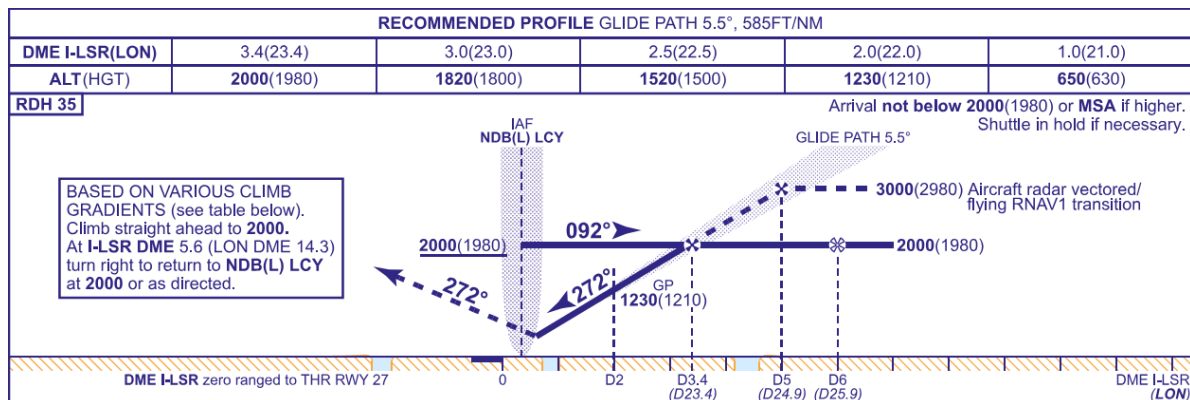
LCY is unique in the BAV operation as the only aerodrome on the network with steep approach procedures. Implemented initially as a noise abatement measure, the development of the London skyline at Canary Wharf now also contributes to the requirement.

The instrument approach to both RWY 09 and 27 consists of an ILS step approach with a 5.5° glidepath:

RWY 09 ILS Profile: – **Note the mandatory 1290 ft step-down-fix at 2.1 DME**



RWY 27 ILS Profile:



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During normal operations, positioning for both approaches is by either RNAV-1 transition or radar vectors from Thames Director. For RWY 09 the platform altitude is 2000 ft with glideslope intercept at 3.4 DME; for RWY 27 the platform altitude is 3000 ft with glideslope intercept at 5 DME.

Thames Director routinely applies speed control of 210 knots during the initial approach, reducing to 180 knots on base leg for RWY 09/at approximately 12 DME for RWY 27, before slowing to 160 knots on final approach. The 160-knot speed restriction is applied until 5 DME for RWY 09 and until 6 DME for RWY 27 – exceptionally, crews may begin to reduce speed 1 NM before earlier without reference to ATC, for example if there is a tailwind aloft.

As a steep approach, the rate of descent will be greater than normal approaches. At typical E190 final approach speeds the rate of descent is approximately 1100-1300 feet per minute:

Rate of Descent	G/S KT	160	140	120	100	80
	FT/MIN	1560	1365	1170	975	780

For steep approaches the rate of descent limitation for stable approach criteria is increased to 1500 feet per minute. All other criteria remain the same.

Both approaches are certified as CAT I only – for planning considerations during periods of adverse weather see the section below on planning considerations. BAV CityFlyer has dispensation to apply the following DA for the E190 fleet **only**:

- RWY 09 – 310 ft
- RWY 27 – 400 ft

The approach lighting to both RWYs is non-standard with an abbreviated approach light system consisting of high intensity extended centre-line lighting with two crossbars for RWY 09 and a single crossbar for RWY 27. PAPIs to both RWYs are set at 5.5° to correspond to the ILS GP and are sited to the left of the RWY 09 TDZ and the right of the RWY 27 TDZ.

The TDZ end for both RWYs is marked by two pairs of high-intensity white lights. A go-around is **mandatory** if touchdown is anticipated to be beyond these lights.

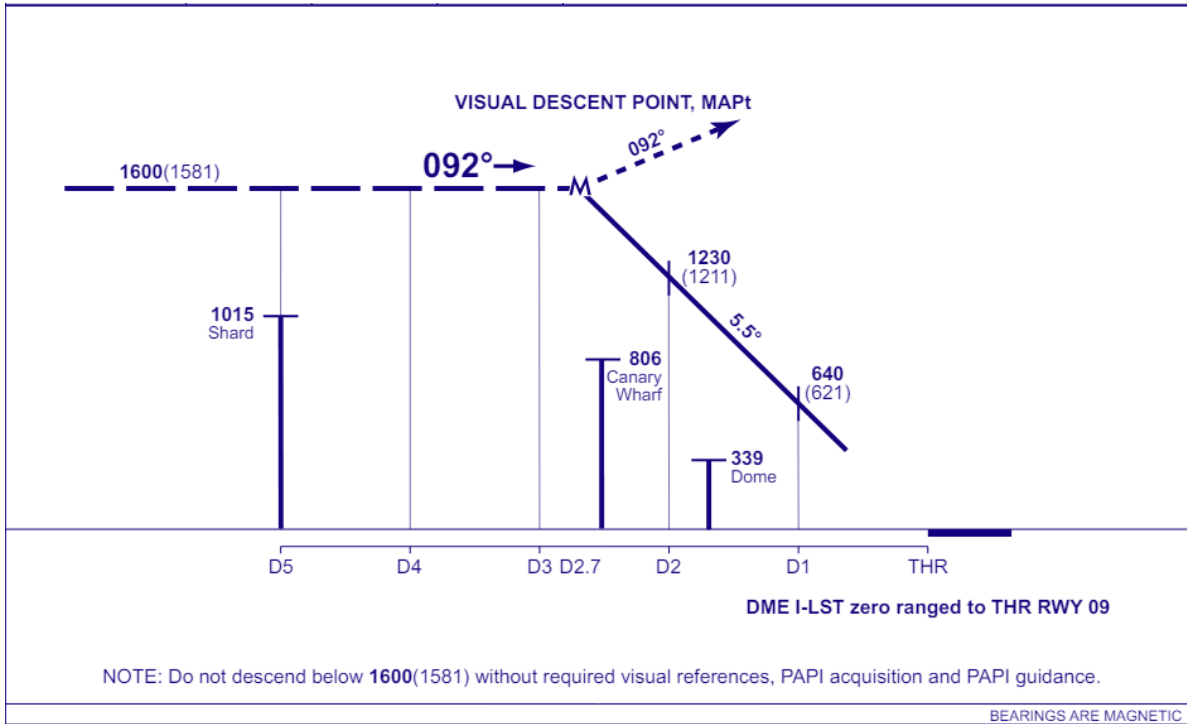
Touchdown lights:



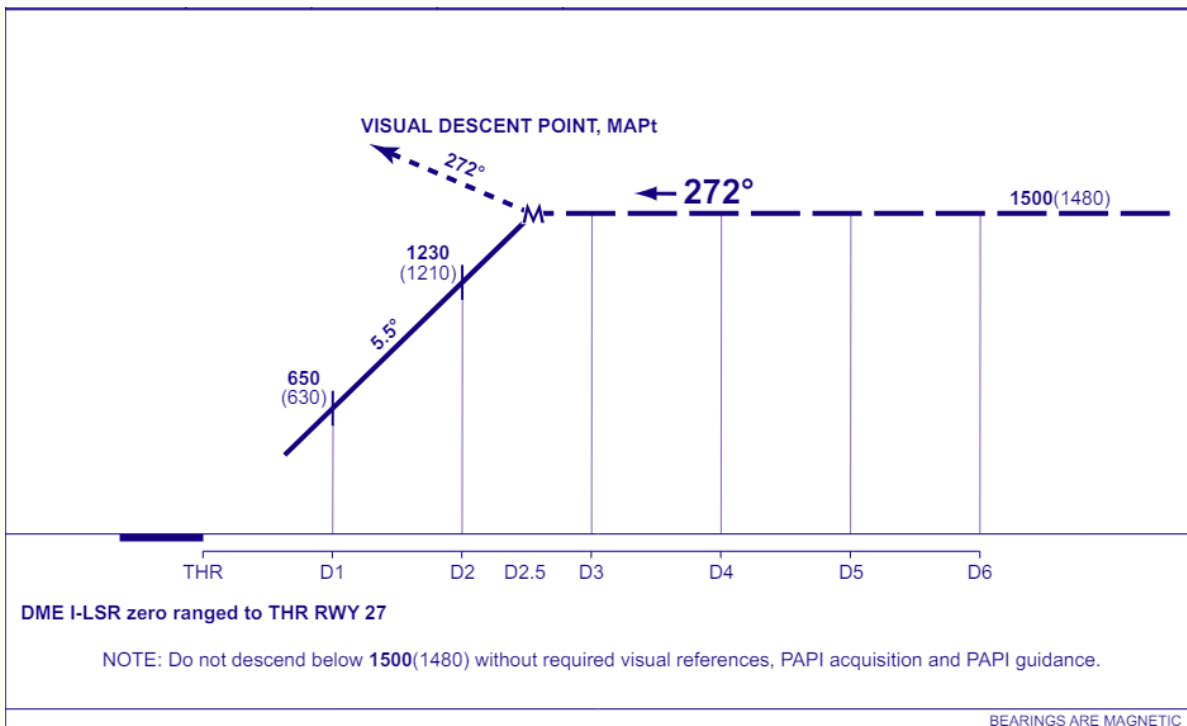
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In the event that the ILS is unavailable, for example during periods of failure or maintenance, Thames Director will radar vector aircraft for a visual approach. ATC will position aircraft onto the extended centreline at either 1600 ft for RWY 09 or 1500 ft for RWY 27. Aircraft will **not** be permitted to self-position and final descent **must** only be initiated with PAPI guidance.

RWY 09 Visual Approach Profile:



RWY 27 Visual Approach Profile:



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Planning Considerations

Due to LCY being CAT I only:

- If the weather at LCY is forecast below CAT I an additional alternate must be planned.
- LGW and STN (both CAT II/III) are the preferred alternates however, during CAT II/III conditions, consideration should be given to carrying additional fuel on-top of divert fuel to account for congestion in the LTMA and any delay in diverting.
- If SEN is planned as a fuel alternate be aware it is CAT I only also and if the weather at SEN is forecast to be below non-precision minima it cannot be nominated as an alternate and a different airfield should be selected.

E190 Operational Limitations

The following limitations apply to steep approach operations on the E190:

- Steep approach to landing may be performed with an approach flight path angle up to 5.5°
- Steep approach cannot be initiated with one engine inoperative
- Steep approach is not permitted if the steep approach mode is not armed
- Only CAT I approaches are permitted with the steep approach mode engaged
- Steep approach to landing must be done at the VREF applicable to steep approach
- Autopilot minimum use height is 167 ft above ground level.
- Steep approach to landing must be performed with slats/flaps FULL.
- A 5 kts tailwind and 25 kts crosswind limitation apply to steep approaches.

E190 Operational Procedures

Descent and Approach Preparation

Preparation for conducting a steep approach begins prior to descent. The P1 shall identify and discuss the threats associated with the steep approach during the briefing. The following steps shall be completed during the descent preparation and prior to completing the descent checklist:

- MCDU set-up:
 - Select LDG FLAP – FULL on the LANDING INIT page
 - Insert Steep Approach VREF and VAC (overleaf) on the LANDING page
- Select the STEEP APPROACH button ON and confirm the steep approach mode is armed with STEEP is displayed in white in the FMA
- Select autobrake MEDIUM

Steep Approach Status Indication – Armed:



E190 Steep Approach Operation Approach and Landing Speeds:

Weight (kg)	VREF – Flaps FULL VAC – Flaps 4 (KIAS)	VREF – Flaps FULL VAC – Flaps 4 (KIAS)	VFS (KIAS)
	No ICE	ICE	
28000	104	106	156
29000	104	108	159
30000	106	110	161
31000	108	112	164
32000	109	113	167
33000	111	115	169
34000	113	117	172
35000	114	118	174
36000	116	120	177
37000	117	121	179
38000	119	123	182
39000	120	124	184
40000	122	126	187
41000	123	127	189
42000	125	129	191
43000	126	130	194
44000	128	132	196
45000	129	133	198
46000	131	135	200
47000	132	136	202
48000	133	137	205
49000	135	139	207
50000	136	140	209
51000	137	142	211
52000	139	143	213

Approach

During steep approaches, the deceleration rate on final approach is significantly limited. As such, careful planning is required to ensure that the aircraft is in the landing configuration at or shortly after intercepting the glideslope intercept point.

The following process should be followed:

- Aim to achieve 160 knots with gear down and flap 3 by 2 NM before the final approach fix
- As the glideslope becomes alive, select flap 5 and begin to slow to VAP, as the speed begins to reduce select flap FULL (flap FULL limiting speed in 165 knots).

Avoid an early selection of flap FULL as this will result in a prolonged period of level flight with spoilers deployed. It is permissible to select flap 5 and 140 knots as an intermediate step before selecting flap FULL and VAP. At the very least, the aircraft should reach the descent point with gear down, flap 5 and speed reducing to VAP with flap FULL selected and travelling.

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Steep approach mode engages when:

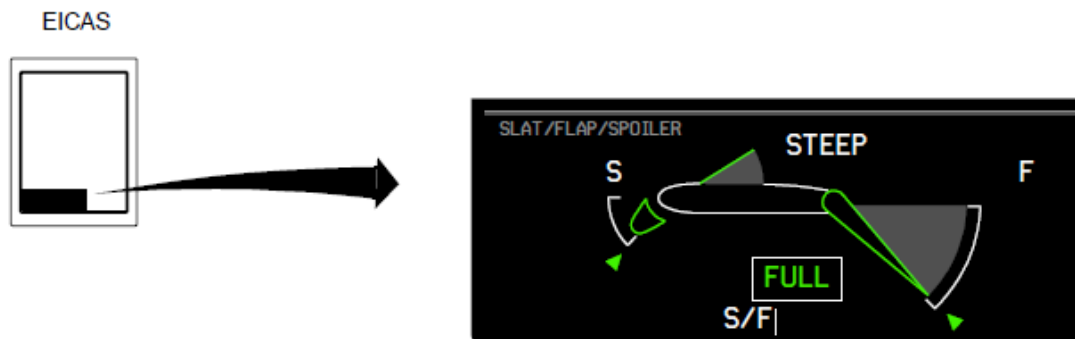
- Steep approach mode was armed, AND
- Slat/Flap set to FULL.

Engagement of steep approach mode is indicated by STEEP green in the FMA and spoiler extension with STEEP displayed in white on the EICAS SLAT/FLAP/SPOILER window.

Steep Approach Status Indication – Engaged:



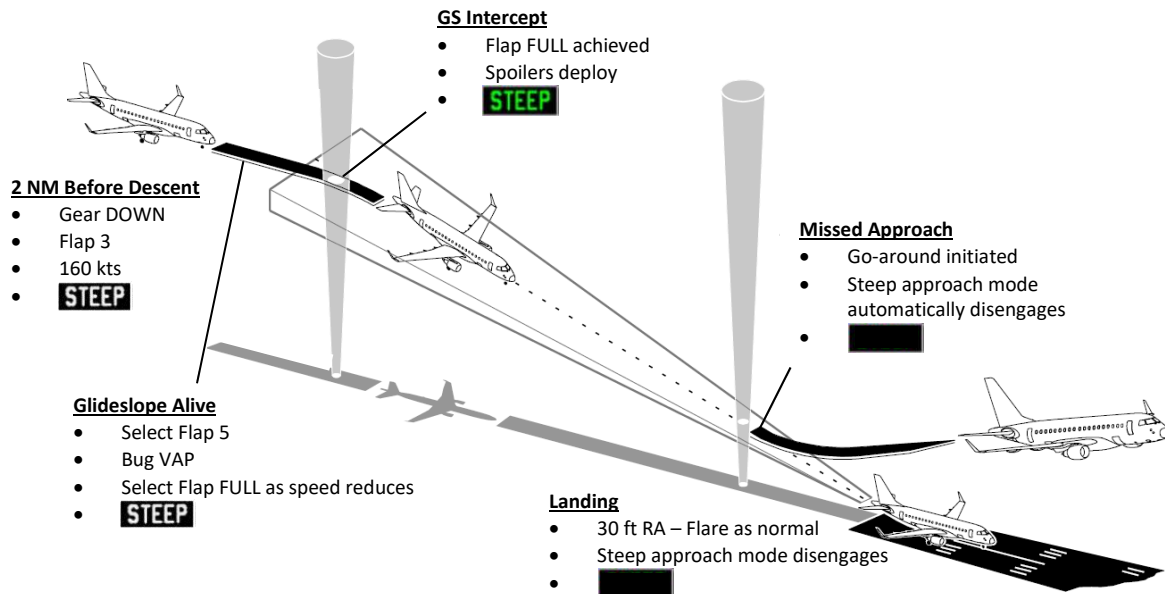
Steep Approach Engaged EICAS Indications:



When steep approach mode engages spoilers 4 and 5 deploy to 21° extension to provide additional drag, this allows for an increased sink rate with no change to airspeed and whilst not requiring idle throttle (which would impact engine spool up). The spoiler panel deployment angle is modulated by control column pitch inputs (nose up pitch commands reduce the spoiler deployment angle, and nose down pitch commands increase the spoiler deployment angle) to allow an increase or reduction in rate of descent without significant pitch changes. The horizontal stabilizer automatically compensates the airplane pitch during steep approach mode engagement/disengagement. Flying characteristics remain conventional and the stall speed, stall characteristics, the maximum lateral control and the manoeuvring capabilities for flap FULL are unaffected by the steep approach mode.

Accurate speed control is essential as, even with gear down, flap FULL and steep approach mode engaged, the rate of deceleration is minimal without retarding the thrust levers to an unacceptably low level.

Steep Approach Profile:



There are no restrictions on automation use during the approach other than the autopilot minimum use height of 167 feet agl – the autopilot should be disengaged before 200 ft RA to comply with this restriction. Autothrottle should be used throughout but the PF must be prepared to override if the autothrottle retards the thrust levers to an unacceptably low level.

Landing

The steep approach specific before landing checklist shall be completed.

During steep approach operations, the approach configuration provides a slight nose-up pitch attitude with a flare manoeuvre that is almost identical to a standard approach. Despite this, the visual aspect on short final is unusual and there can be a tendency to flare early and float. Similarly, the flare can be over-exaggerated risking a tail strike. Crews should follow the general guidance:

- At 30 ft RA initiate the flare as normal aiming for a 3° pitch change.
- The autothrottle should enter RETARD mode at 30 ft RA, should this fail, the PF should smoothly reduce thrust to idle during the flare.
- The PM should monitor the pitch attitude, calling “ATTITUDE” if the pitch during flare becomes 10° or greater – if corrective action by the PF is insufficient then the PM must call for a go-around.
- If the aircraft has not touched down before the TDZ end lights then a go-around is mandatory.

Aircraft landing performance with autobrake leads to a restricted MLW, which is not the case for manual braking. In order to achieve the higher MLW associated with manual braking whilst retaining the safety benefits of autobrake, crews shall:

- Select autobrake MEDIUM
- Make an early transition to manual braking when compared to operating on longer RWYs.

Go-Around

The go-around procedure is standard and the steep approach mode will automatically disengage.

Crews should note the following points in the briefing:

- Go-around Flap 4 for a Flap FULL landing.
- There is potential for building-induced windshear when landing on either RWY in strong winds.
- The missed approach stop altitude is 2000 ft and crews must be alert to the risk of level bust or rapid acceleration beyond flap limit speeds. If a go-around is initiated due to windshear crews should report this to ATC to alert them to the possibility of an unavoidable level bust.

System Failures

Any failure of the steep approach mode on final should lead to a go-around and diversion. In the event of an engine failure:

- A failure above DA should lead to a go-around
- Below DA the approach may be continued – note that the demonstrated height loss during a go-around after engine failure is 120 ft with or without autopilot.

Other Fleets

The following types within the BAV schedule are also authorised to conduct steep approaches:

- Airbus A318 (when authorised for events)
- Avro RJ / BAe 146 series (historic schedule)
- Dornier 328JET (SUN-AIR franchise)

Airbus A318

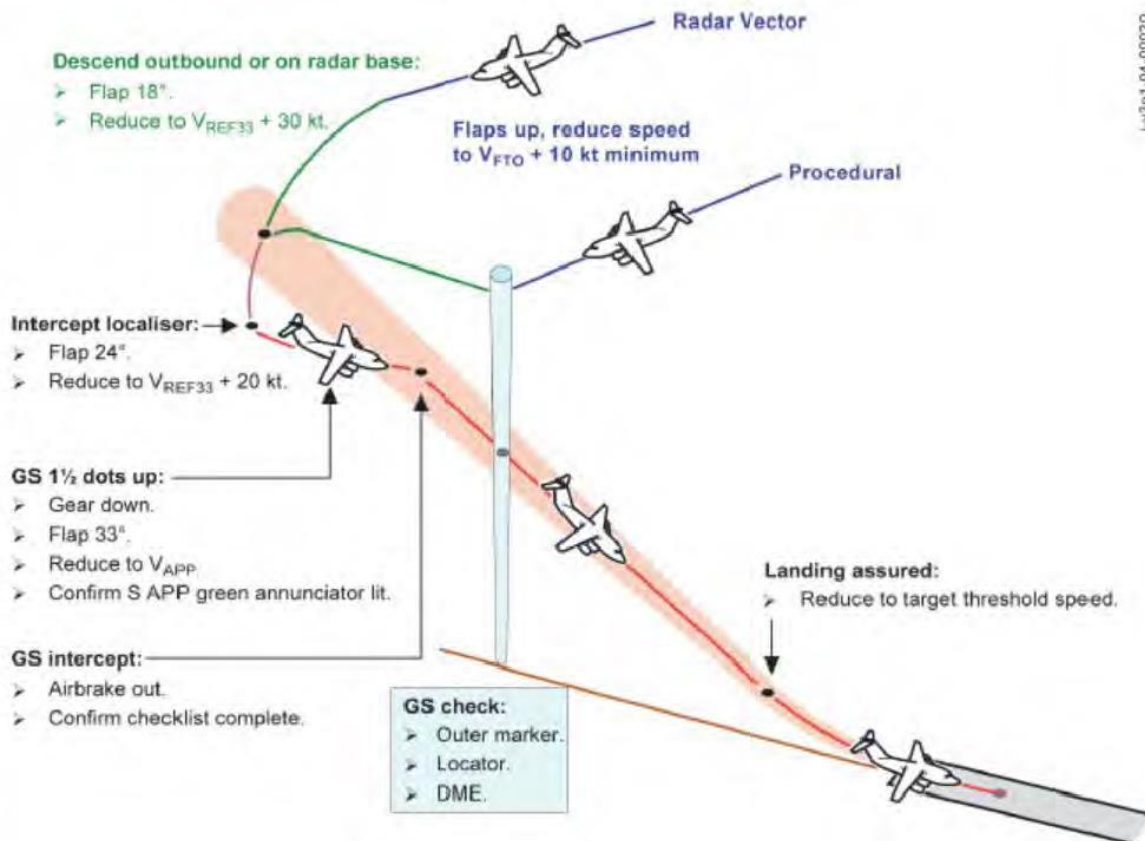
Refer to [A32N Flight Crew Operating Manual](#) section PRO-SPO-80 – Steep Approach and Landing.

Avro RJ / BAe 146 series

Follow the following procedure:

Avro RJ / BAe 146 series Steep Approach Procedure	
Inbound to final approach	Flaps 18° Speed 160 kt or minimum manoeuvring if higher Press the Steep Approach Switch Confirm S.APP white annunciator is lit
Localiser capture	Select Flaps 24° Reduce speed to VREF33 + 20 kt Nuisance gear not locked down warnings may be cancelled
Approaching the glideslope (1½ dots below)	Select gear down Select Flaps 33° Reduce to VAPP Confirm S.APP green annunciator is lit
Glideslope intercept	Select airbrakes OUT Maintain VAPP
After landing	De-select Steep Approach Switch Confirm both S.APP annunciators are extinguished

Avro RJ / BAe 146 series Steep Approach Profile:



Notes:

- Landing with a tailwind component is not permitted in the RJ100/146-300, it is allowed in the RJ70/146-100 and RJ85/146-200; the maximum tailwind component is 5 kts.
- The autopilot may remain engaged down to 160 ft above RWY threshold provided it is coupled to an ILS glideslope and localiser.
- When stabilised on a steep approach, the aircraft nose down attitude approximates to the approach path.
- The lower pitch attitude on a steep approach necessitates a slightly larger change in attitude to achieve the landing or to initiate a missed approach. An early flare can result in an unnecessary increase in landing distance due to float. A very late flare can result in a heavy landing. Do not extend the flare to achieve a smooth touchdown.

Dornier 328JET

No type specific guidance is currently available at BAV.