

RNP Instrument Approach Procedures at Sherburn-in- Elmet aerodrome

*Description of Airspace Change Proposal
For ACP-2015-04*

September 2021 version



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1 September 2021 Update

Sherburn Aero Club (SAC) are submitting an updated proposal to the CAA for the introduction of RNP instrument approach procedures to runways 28 and 10. There are no major changes to the proposal from previous versions submitted in 2019, however some minor changes have been made to the layout of the procedures.

These changes have been driven by technical design feedback from the CAA, feedback from local stakeholders and some refinement of how aircraft can most effectively navigate the local airspace environment.

1.1 Runway 28 procedure

The southern initial approach fix 'IAWP2' has now been moved to a location south of the aerodrome and west of the Doncaster CTA. This was felt to be a more optimal location for aircraft to join and reduce the likelihood of a vertical infringement of the Doncaster CTA above the southern joining route. The original northern initial approach fix has been removed due to the proximity of Brighton. There is now an initial fix on the extended centreline (IAWP1), which is intended to be used by aircraft arriving from the north or east. See p8-11 for more details.

1.2 Runway 10 procedure

The main refinement is the missed approach path, it is now fully charted back to the 'EMBIT' initial approach fix, this is to ensure aircraft are delivered to sector safe location on termination of the missed approach. See p12-15 for more details.

1.3 Further Engagement

Between 25th August and 16th September 2021 SAC engaged with local airspace stakeholders on the most recent changes (see section 7 for more detail) to ensure impacts were understood. Having concluded this engagement SAC are now confident that the proposals presented are final and represent the most optimal arrangements for implementing the IAP.

1.4 Note on the loss of EGNOS

When the project commenced in 2015, it was intended to make use of the European Geostationary Navigation Overlay Service (EGNOS) to improve accuracy of the approach procedure and provision of vertical guidance for arriving aircraft. Following the UK's departure from the EU, we understand that EGNOS is no longer available in the UK and therefore references to the system and systems it supports (such as Localiser Performance with Vertical guidance) within this proposal should be disregarded. While it is disappointing that the IAP will not benefit from the vertical approach guidance that EGNOS facilitated, this loss does not alter SAC's IAP implementation plans.

2 Proposal Summary

Sherburn Aero Club (SAC) first assessed the viability of introducing Instrument Approach Procedures (IAPs) at Sherburn aerodrome in the summer of 2014. Since 2016 SAC have been progressing an application with the CAA for the introduction of RNP (Required Navigation Performance) IAPs to Runways 28 and 10.

IAPs provide a planned sequence of waypoints and a descent profile to a runway, such that a safe landing can be made in reduced visibility. Historically Sherburn has lacked any form of IAP, meaning aircraft are reliant on visual references only for landing. However, improvements in technology and regulatory provision meant that by 2016 it was viable for SAC to consider applying to the UK CAA for approval of an IAP to the aerodrome.

The IAPs are intended to provide increased safety and operational resilience during periods of poor weather and are consistent with wider Government policy to support the introduction of more RNP IAPs at GA aerodromes and support the ongoing viability of GA aerodromes.

The application to the CAA is made in accordance with the CAP 725 Airspace Change Process. Focused consultation with local stakeholders was conducted in 2017 and 2018 and discussion around operational implementation has continued since then.

The purpose of introducing the IAPs is not to significantly increase movements at Sherburn, but to provide a more reliable means of arriving at the aerodrome during reduced visibility. The procedure would only be used when weather conditions at Sherburn are poor and when there is no visual flying in the aerodrome traffic pattern, although aircraft based at Sherburn may occasionally fly the approach trajectory under visual conditions for practice purposes.

The procedures would align aircraft for approximately eight nautical miles (NM) with either runway 10 or runway 28 (the runway that aligns roughly East-West) for landing. Aircraft would follow a progressive descent profile of around 350 feet per nautical mile.

The utilisation rate is thought likely to be two or three per day when weather conditions are poor, therefore averaging around one per day overall. SAC estimate the environmental impact of the procedures to be very low. The plans are consistent with SAC's overall aim of minimising any negative impact operations may have on the local community.

3 Background

SAC is a private members club. It operates Sherburn-in-Elmet, a general aviation (GA) aerodrome situated in North Yorkshire. The field is 16 NM southeast of Leeds Bradford Airport, and 20 NM northwest of Doncaster Sheffield Airport. It is situated in Class G airspace. The aerodrome has an air/ground communications service (AGCS) which passes information to aircraft operating at Sherburn and in the immediate vicinity.

The ATZ associated with Leeds East Airport (LEA) is immediately to the north of Sherburn. The proximity of the two aerodromes required a letter of agreement (LoA) to agree procedures for deconfliction of visual traffic operating at either location. This was produced in 2016 and has proved effective.



Sherburn has three runway orientations. The most used runway is the hard surface runway that is aligned 28/10 (roughly east/west). It is to both ends of this runway that the IAPs are to be established.



Sherburn aerodrome summer 2016

There are approximately 35,000 movements annually and around 85 aircraft based at the aerodrome. The aircraft and operations are characterised by the following:

- Light two or four seat models of around one and a half tonnes maximum take-off weight (MTOW). The largest based aircraft is four tonnes;
- Visual flight rules (VFR) flights. Although some occasional IFR traffic arrives from either the airways or from outside of controlled airspace, before obtaining visual references for landing; and
- Recreational and flight training, with occasional business use.

SAC itself operates a fleet of ten aircraft light aircraft consisting of six Piper PA28s, one Robin 2160 and three Aero AT-3s. These are used for private hire by members and training towards the private pilot licence (PPL) and associated qualifications. There is also a separate flying school based at Sherburn, Advanced Flight Training, which specialises in more advanced flying courses.

The level of flying activity at the aerodrome has been relatively consistent and has recovered considerably since the lifting of Covid-19 related restrictions. SAC's membership and financial position is stable.



SAC Piper PA28s

4 Justification and objectives

SAC's motivation for introducing the procedures include:

- In the absence of a published IAP, IFR operations into Sherburn have always been vulnerable to disruption by weather conditions (sometimes difficult to predict);
- Changes in technology have now made published IAPs a possibility for aerodromes like Sherburn, since the costs have been brought down to more manageable levels;
- There was European funding available for aerodromes wishing to publish IAPs to LPV minima (which make use of the European EGNOS service¹) from the European GNSS Agency (GSA). This money was targeted at environments where conventional approach technology (ILS, VOR, NDB) was not viable; and
- Regulatory provision from the UK CAA in the form of CAP 1122 meant that an alternative (and more cost effective) means of regulatory approval was possible.

¹ EGNOS is the European Geostationary Navigation Overlay Service, it essentially augments the accuracy of a standard GPS signal, allowing it be used for more applications that require high degrees of positional accuracy in three dimensions.

It was agreed within SAC that there would be operational advantages to having an RNP approach and introducing them (compared to 'doing nothing') was essentially a matter of reducing the cost to a level that SAC could afford. A small grant in 2015 from the GSA facilitated this.

Runway 10/28 (tarmac) was chosen since it is the longest runway at Sherburn and gives the maximum operational benefit of the procedure. It was briefly considered whether an IAP to runways 06/24 might have some advantages, such as being parallel to the approach track for the nearby Leeds East airport, however it was discounted since this runway is shorter, grass surfaced, has no lighting and is less frequently used. An IAP to 24/08 that terminated in a 'circle to land' procedure to 28/10 was not considered desirable and would likely have high weather minima and therefore lower operational utility.

It is not the intention of SAC to change the core (VFR) flying activities currently taking place. The IAP would be there to provide operational resilience and safety to the limited recreational and business users of the aerodrome who sometimes operate under IFR in and out of the aerodrome, often to destinations outside the UK.

There will be limited opportunities for Sherburn based aircraft to fly the trajectory of the procedure in VMC conditions, however this will be strictly under VFR and controlled internally at SAC.

5 Description of Airspace Change

The IAPs to runways 10 and 28 will be standard RNP procedures with 2D (LNAV) minima.

The IAPs will have obstacle clearance heights (OCH) of around 500 ft AGL (above ground level) and be limited to category A & B approach speeds. This means a maximum runway threshold speed of 120 kts. The approach path angle will be 3.5° for both runways, giving a descent profile of around 360 ft per mile.

There is no controlled airspace or change of airspace classification associated with this proposal. The IAPs will be established in class G airspace and follow the normal conventions for the design and publication of RNP procedures. There are no plans to introduce holding procedures; mainly due to the low intensity utilisation of the procedure making it very unlikely (and unintended) that aircraft would need to hold for either arrival sequencing or weather conditions. In the event of weather conditions preventing (even with the IAP) a successful landing, it is intended that aircraft divert to another aerodrome with more extensive facilities rather than attempt multiple approaches into Sherburn.

Prior to publication the IAPs will be approved by the Civil Aviation Authority in accordance with:

- CAA CAP 725 – *Guidance on the Application of the Airspace Change Process*
- ICAO PANS-OPS (volume II) – *Construction of Visual and Instrument Flight Procedures*; and
- CAA CAP 785 – *Approval Requirements for Instrument Flight Procedures for Use in UK Airspace*.

Runways 10 and 28 do not meet the instrument runway obstacle clearance standards and there will not be an approach control service provided for aircraft flying the IAPs. Sherburn therefore applied to the CAA in 2016 to be approved in accordance with CAP 1122 – *Application for instrument approach procedures to aerodromes without an instrument runway and/or approach control*. CAP 1122 has since been withdrawn for new applicants, however Sherburn continues to use the framework set out in CAP 1122, since it provides guidance on safety procedures and mitigations required to ensure the IAPs can be operated to an acceptable level of safety.

The operational concept is that the procedure is only for use when required due to the weather. When conditions permit, aircraft shall join under normal visual joining procedures prior to entering the ATZ. It is envisaged the use of the procedure will average two to three per day when weather conditions require, with most approaches being made to runway 28.

As part of the safety management procedures the utilisation rate of the IAP will be kept no more than one approach per hour. Given Sherburn's normal hours of operation and the shared slots times with Leeds East, this will likely limit movements on the IAP to not more ten per day – shared between both aerodromes. It is unlikely that number will transpire in practice – the estimated demand for using the procedure is lower.

5.1 Runway 28 procedure rationale

The IAP incorporates a 9.5 NM final approach track from the Intermediate Fix to the runway. Originally there was an initial approach leg from the north, but this was removed due to the proximity of Brighton aerodrome. The missed approach path turns to the south, optimised for clearance of obstacles, local villages, and congested areas. Use of the missed approach path is envisaged to be very limited.

For aircraft arriving from the south, it was important to provide an initial approach fix that was accessible while remaining clear of controlled airspace. Originally there was an IAF at point now designated 'CJE01', but it was felt this presented an infringement risk since aircraft may not descend in time to remain below the Doncaster CTA5. Instead, an IAF has now been established at IAWP2, which will start aircraft on the procedure with the following waypoint (CSJ01) indicating to cross at 1900 ft, which is below the CTA.

The possibility of the joining altitude being within the CTA (for example at 2500 ft) was considered, but after discussion with Doncaster ATC it was felt too complex to integrate this arrangement into Doncaster's airspace.

The location of glider site at Burn, close to the final approach fix, was considered a potential hazard. It was not possible due to PANS-OPS constraints to move the final approach track any further away (for example to the north) from Burn. The risks associated with the proximity to Burn will be addressed as part of the operational procedures for the IAP.

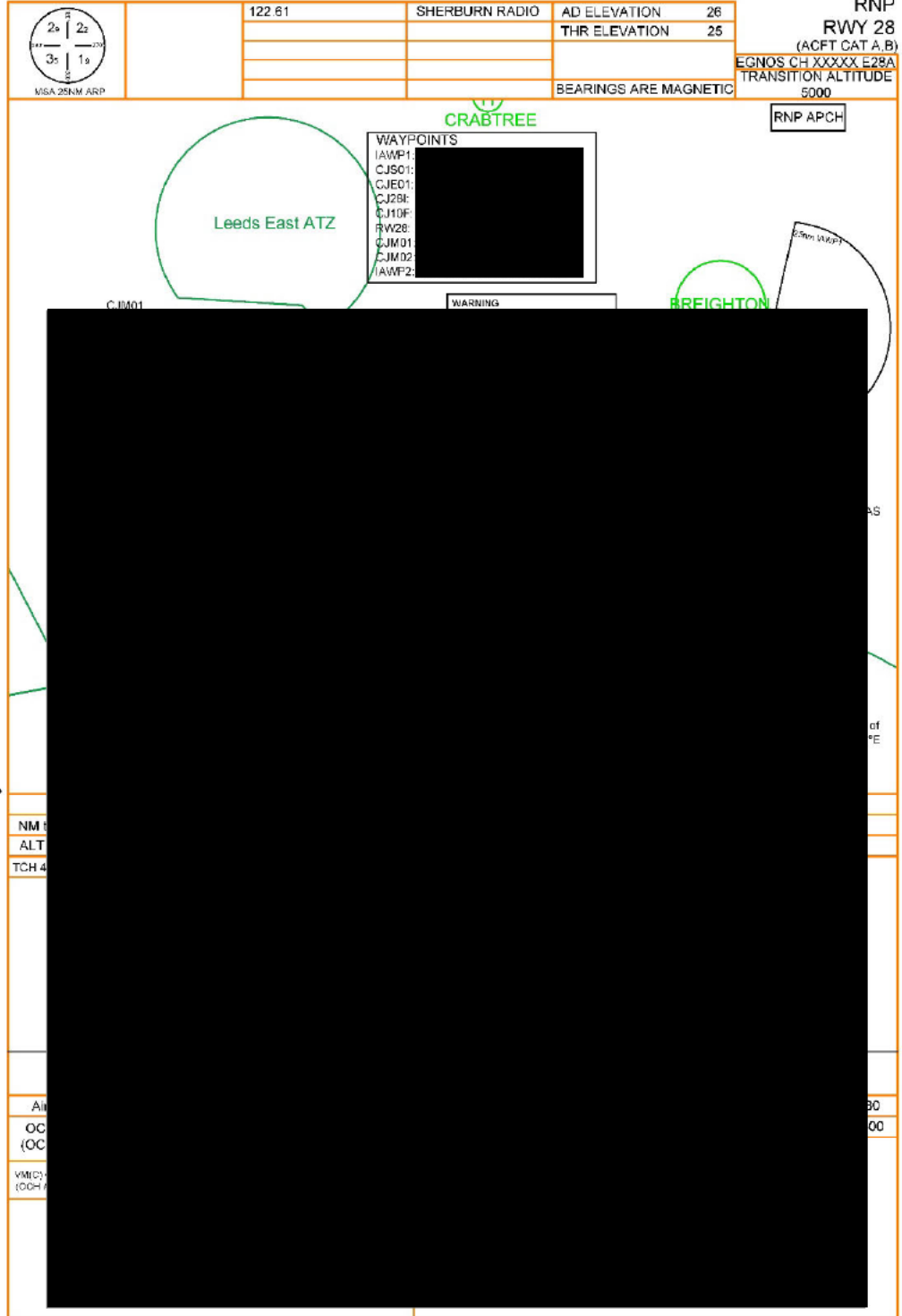
The missed approach procedure returns aircraft to 1900 ft at IAWP2, from which point they can either execute another approach or exit the procedure at the southeast sector MSA of 1900 ft. Due to the proximity of IAWP2 to the higher MSA within the southwest sector (3500 ft), a note is included on the chart to emphasise that pilots must adhere to the applicable MSA if planning to divert away from Sherburn on completion of the missed approach.

5.2 Runway 28 – draft instrument approach chart

DRAFT - NOT FOR OPERATIONAL USE

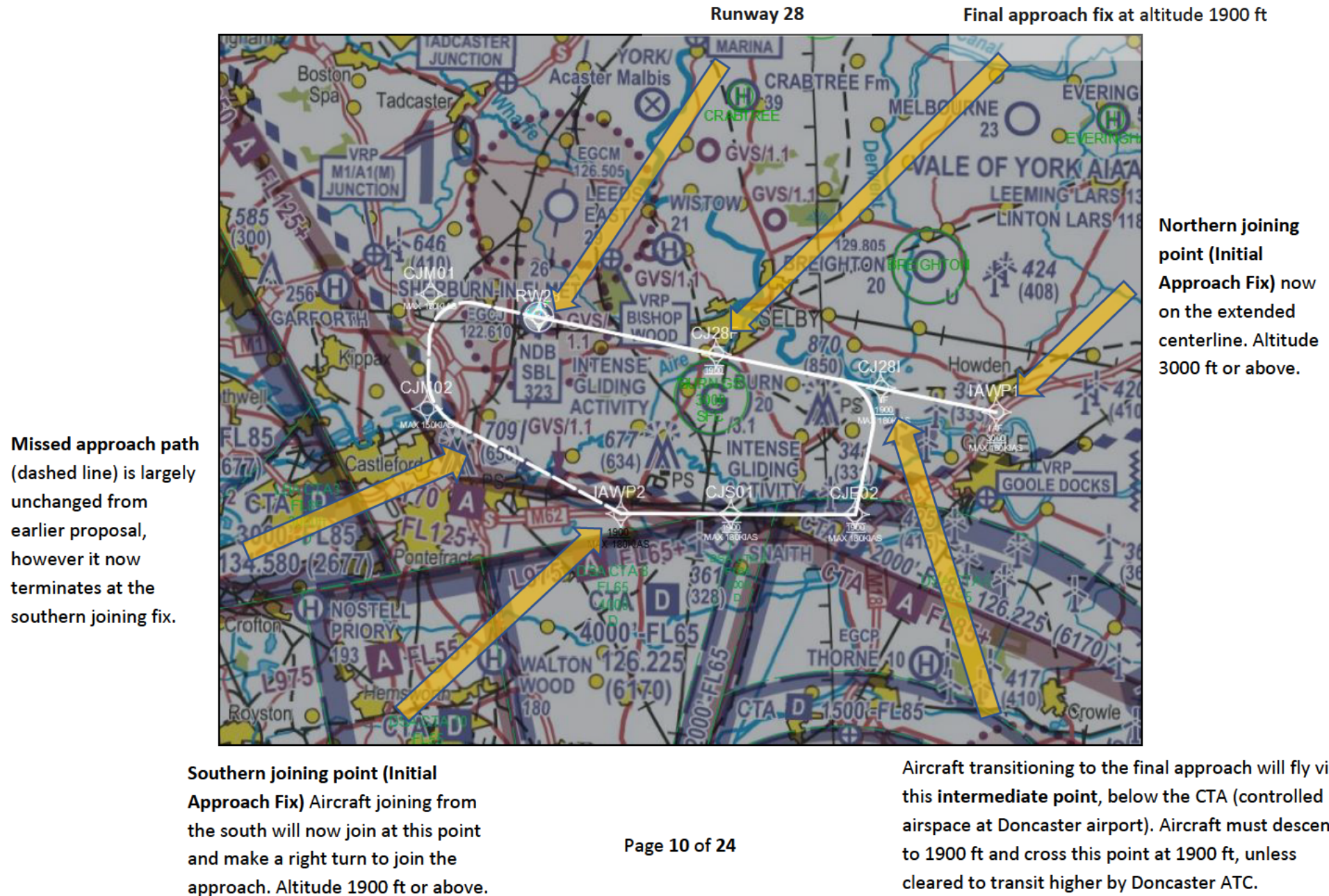
INSTRUMENT APPROACH CHART - ICAO

SHERBURN-IN-ELMET

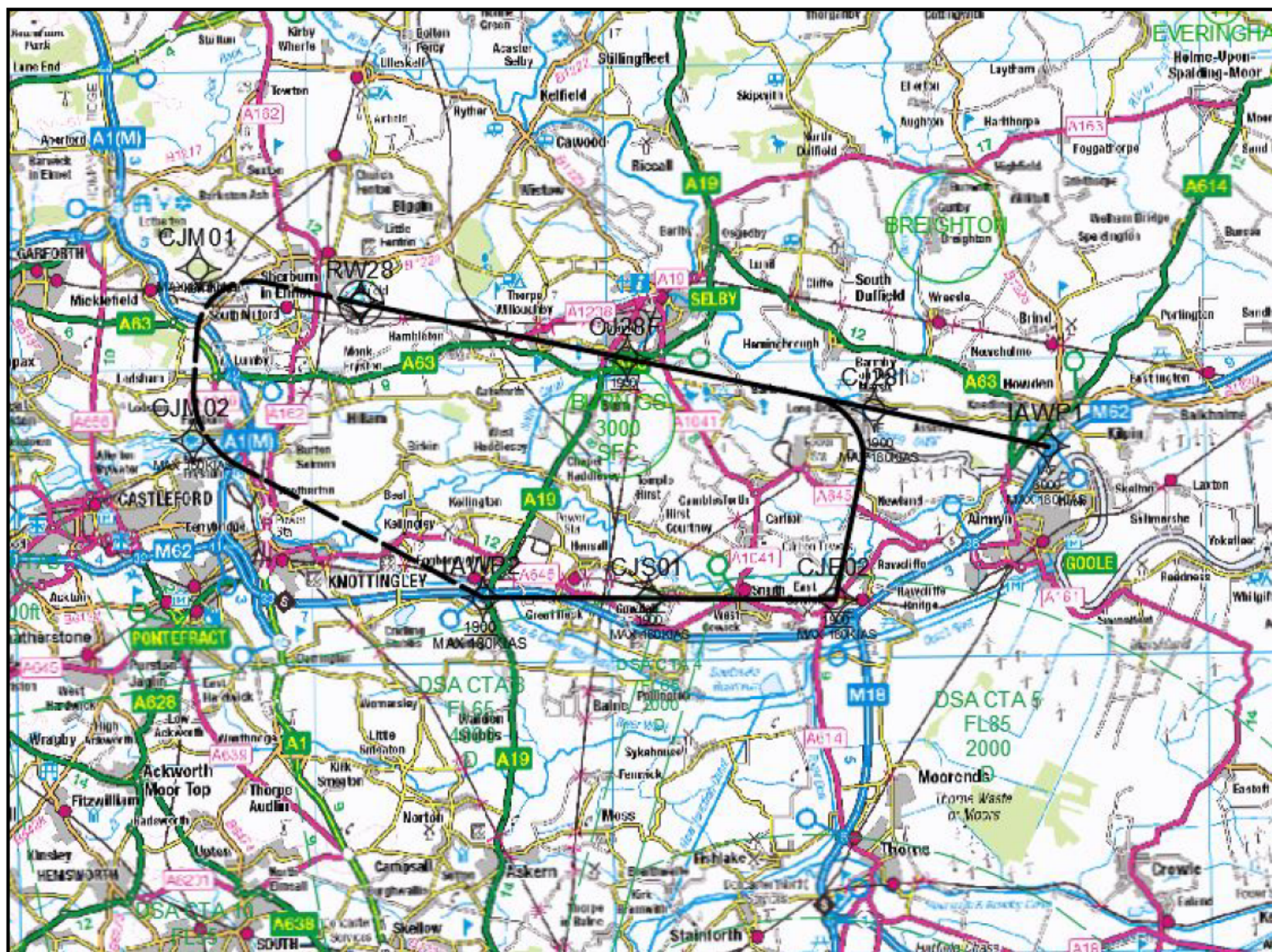


DRAFT - NOT FOR OPERATIONAL USE

5.3 VFR chart 1:500,000 scale view Runway 28 approach



5.4 Ordinance Survey view Runway 28 approach



5.5 Runway 10 procedure Rationale

The IAP incorporates a 7 NM final approach track from Intermediate Fix to the runway. Joining is via either the northern (EMBIT) or southern (ULPUG) IAFs.

The tracks minimise environmental impact on the local communities. Leeds Bradford's controlled airspace to the west of the aerodrome is a restricting factor. Initially a calculated TAA of 3000 ft meant aircraft routing from the south and southwest towards the southern IAF would need to transit controlled airspace. A revised TAA to allow a join below controlled airspace was subsequently calculated. The northern IAF is clear of airspace and minimises environmental impact on local villages.

Environmental issues and TAA limitations prevent joins at the 'centre fix', so this will be noted on the chart as being prohibited. A central IAF prior to the IF would have been over the congested area of Leeds and well inside Leeds CTR, so this was discounted. All aircraft therefore must start the procedure at either the northern or southern IAF. The inbound legs from the IAFs are set at 3.5 NM, considered acceptable for the types of aircraft intended to use the procedure.

To avoid Leeds East, the missed approach path turns to the south initially before returning to the northern IAF via EMBIT. The rationale for terminating the missed approach at EMBIT is that it delivers the aircraft back to the northwest sector MSA of 2900 ft, should an aircraft wish to resume enroute flight after executing a missed approach. Use of the missed approach path is envisaged to be very limited.

5.6 Runway 10 – draft Instrument approach chart

DRAFT - NOT FOR OPERATIONAL USE

INSTRUMENT APPROACH CHART - ICAO		SHERBURN-IN-ELMET	
 MSA 25NM ARP	122.61	SHERBURN RADIO	AD ELEVATION 26
			THR ELEVATION 26
			RNP RWY 10 (ACFT CAT A,B) EGNOS CH XXXXX E10A TRANSITION ALTITUDE 5000
			BEARINGS ARE MAGNETIC

WARNING
IAP is non-standard

RNP APCH

Changes : New Chart.

NM to
ALT ()
TCH 40

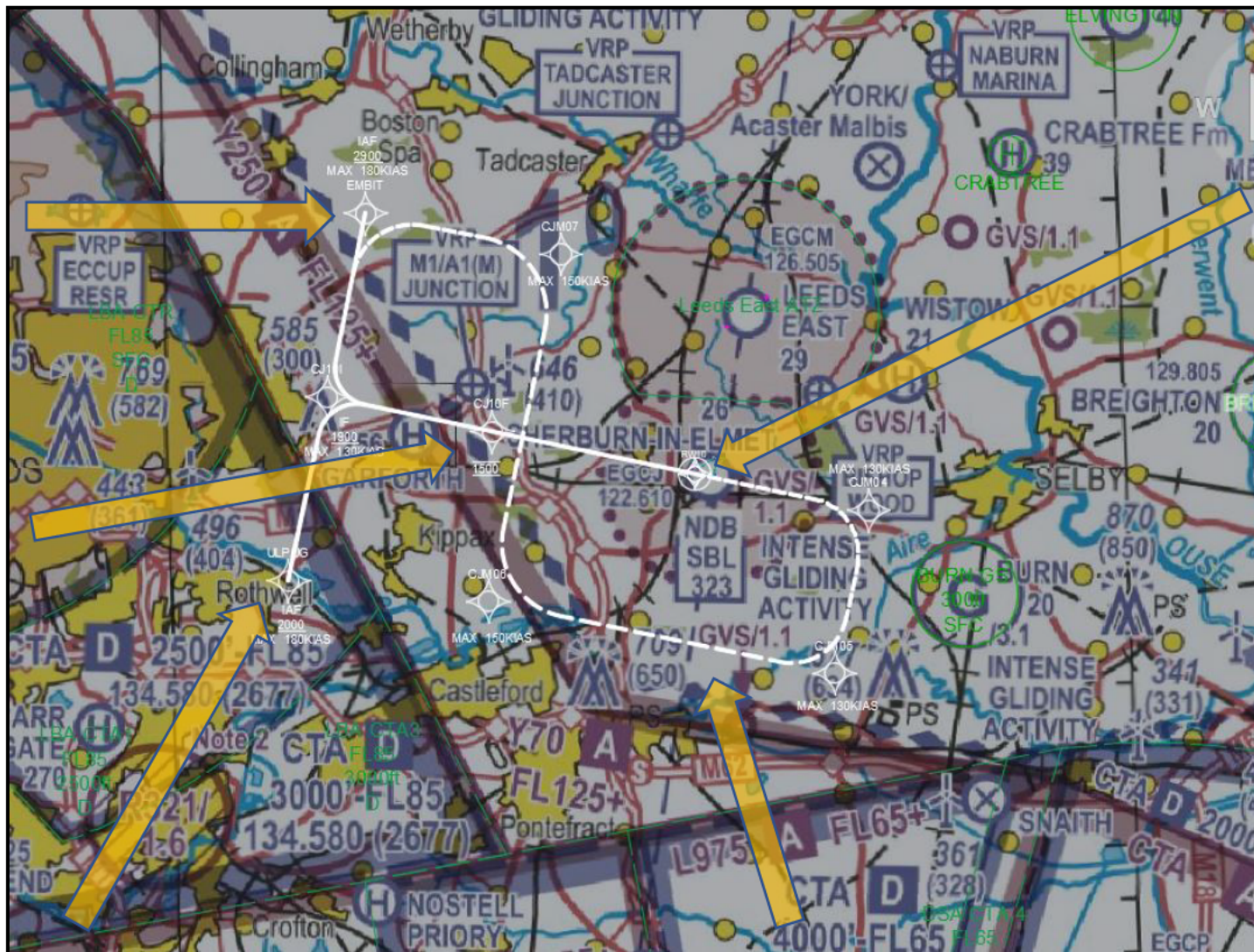
Altitude
OCA
(OCH)
VM(C) D
(OCH AP)

DRAFT - NOT FOR OPERATIONAL USE

5.7 VFR chart 1:500,000 scale view Runway 10 approach

Northern joining point (Initial Approach Fix) approach fix. Altitude 2900 ft or above.

Final approach fix at altitude 1500 ft



Runway 10

Southern joining point (Initial Approach Fix) Aircraft joining from the south will remain below Leeds Bradford CTA

Missed approach path (dashed line) turns to the south to avoid Leeds East and then routes to the northern IAF, such that aircraft return to an MSA compliant exit from the procedure should they wish to divert elsewhere.

5.8 Ordnance Survey view Runway 10 approach



6 Safety management

The safety management of the IAPs uses the framework provided by CAP 1122, as was current in 2016. The detail of this is subject to a separate and detailed safety case that will also be reviewed by the CAA as part of the CAP 725 ACP approval process.

6.1 Lack of instrument runway

ICAO sets down international standards for the areas around runways which must be free from obstacles or objects that might pose a hazard to aircraft. For runways to which an IAP is established these are more stringent and are known as the 'instrument runway' standards. Runways without an IAP are normally designed to lesser 'non-instrument' (formerly 'visual') standards.

The ICAO definition of a 'non-instrument runway' also includes runways to which an *'instrument approach procedure to a point beyond which the approach may continue in visual meteorological conditions'* is established. The IAPs intended for Sherburn will be published under this definition. CAP 1122 sets out the framework and conditions for approval under these circumstances in the UK.

6.2 Air traffic management

Introduction of the IAP requires an overall assessment of the impact on the surrounding airspace and how aircraft flying the procedure would integrate with it. The following is a summary based on the safety case.

The primary challenge was operating without approach control, which Sherburn advocated could be achieved with an acceptable level of safety with PPR (prior permission required) and arrival slot allocation. Safety was further reinforced by negotiating Letters of Agreement (LoA) with local ATC units for the provision of air traffic services outside of controlled airspace. These Letters of Agreement will provide that:

- Depending on the arrival directions/runways in use, aircraft will contact either Leeds Bradford or Doncaster Sheffield ATC and request an air traffic service outside of controlled airspace. The provision of this service will be subject to ATC capacity;
- When ATC workload permits, provision of a traffic or deconfliction service will provide mitigation against conflict with non-participating traffic that may be passing in the vicinity of the IAP; and
- If arriving aircraft wish to transit controlled airspace prior to joining the approach at Sherburn, Leeds or Doncaster ATC will facilitate this if operationally possible.

Conflict between visual circuit traffic at Sherburn and that approaching on the IAP was also considered as an issue since only an A/GCS is provided within the ATZ. This will primarily be managed by:

- Ensuring that if traffic on the IAP is in VMC prior to entering the ATZ they follow normal visual joining procedures and integrate with any visual traffic; and
- When the cloud base is 1200 ft AGL or lower, local procedures do not allow VFR traffic in the aerodrome circuit.

6.3 Ongoing review

The utilisation rate will be monitored. Safety issues identified will be assessed as soon as possible by SAC, in accordance with the SAC SMS. The operational experience of the IAP will be formally reviewed after one month, three months, six months of implementation and annually thereafter. The Chairman of SAC will be responsible for ensuring this takes place and presenting the findings to the Board of Directors and the Head of Training. The Board will sanction any changes in response to any safety or environmental issues identified.

The review will include:

- 1) Review the log of RNP approach movements (the issue of PPR numbers);
- 2) Study any pilot reports;
- 3) Study any incident reports;
- 4) Study the number, type, and location of noise complaints;
- 5) Evaluate any desirable changes in the approach and missed approach paths;
- 6) Review the overall environmental impact; and
- 7) Produce a review document for consideration.

Any noise or impacts that do transpire can be discussed with local communities via the existing channels and any relevant changes to procedures considered.

7 Local Airspace Engagement

The design of the IAPs is entirely within class G airspace. However, there were several local airspace stakeholders who would potentially be impacted by the introduction of the IAPs. These stakeholders were identified and engaged with from 2016 onwards.

Due to the small scale of the envisaged operations, it was agreed with the CAA in November 2016 that full public consultation on the proposals would not be proportionate. SAC nonetheless engaged with all relevant local stakeholders to discuss the plans. In some cases (such as Doncaster and Leeds Bradford airports) this involved multiple meetings to discuss local airspace arrangements. All arrangements will be subject to appropriate Letters of Agreement.

The following is a summary of the airspace stakeholders identified by Sherburn, what engagement took place and what changes or arrangements have been agreed as a result. This includes recent engagement in September 2021.

Most engagement took place via email, with teleconferences, online meetings and face to face meetings being held as required with different stakeholders. Records of engagement have been kept should the CAA wish to inspect them.

Where Letters of Agreement (LoA) have been established with stakeholders, these will also be submitted to the CAA with the ACP application for the IAP.

7.1 Leeds Bradford Airport (LBA).

Leeds Bradford Airport is to the west of Sherburn and aircraft approaching from the west will transit close to LBA airspace. Discussions involved layout of the procedures and the likely trajectory of arriving aircraft that may wish to receive an air traffic service. During the

development of the IAP safety case it was agreed that a letter of agreement (LoA) would be established between Sherburn and LBA to provide mitigation against the risk of mid-air collision (MAC) when approaching to fly the IAP. In September 2021 LBA were advised of the updated procedure layout. An LoA with LBA has now been finalised.

7.2 Doncaster Sheffield Airport (DSA)

Doncaster Sheffield Airport is to the southeast of Sherburn and aircraft arriving from the south will transit close to DSA airport. The discussions with DSA were similar to those with LBA. The circumstances (for example depending on direction of arrival and runway in use) in which an aircraft should contact DSA (rather than LBA) will be set out by LoA. In 2016 DSA raised some concerns about the proximity of the southern joining procedure to RW28 and the northwest area of the DSA CTA. These concerns have been mitigated by a minor redesign of the southern join and guidance in the pilot briefing for the IAP. An LoA with DSA has now been finalised.

7.3 Leeds East Airport (LEA)

Leeds East (formerly Church Fenton) lies to the north of Sherburn by several miles. The ATZs of the two aerodromes abut. The interaction of IAPs at LEA with those planned at Sherburn was a major consideration. The planned IAPs at LEA overlap with those at Sherburn. The management at SAC and LEA worked closely over several years to resolve the issue of coordination. Procedures and an LoA to avoid concurrent use of the IAPs have been established for when IAPs are operational at both Sherburn and LEA.

7.4 Brighton aerodrome

Brighton aerodrome lies to the northeast of Sherburn. Originally there was to be a joining point for RW28 to the northeast of Sherburn, catering for aircraft coming from that direction. This was approximately 2 NM southeast of Brighton. SAC approached Brighton management in 2018 to discuss this. In 2019 SAC understood to have agreed in principle an LoA with Brighton covering any coordination requirements.

In January 2020 Brighton further communicated to SAC that they no longer supported the IAP and the arrangements agreed with SAC. Brighton requested several amendments to the procedures. Not all these suggestions were possible (mainly due to design limitations) but in response SAC removed the northeast joining point and instead added a join on the extended centreline for RW28. Sherburn also conducted a risk assessment on conflict with Brighton and added it to the local airspace hazards to be avoided, which are identified in the pilot briefing. SAC did attempt further dialogue with Brighton but this was not pursued. The latest version of the procedures have been communicated to Brighton and SAC is satisfied that the final procedure designs adequately take account of activities at Brighton.

7.5 Burn Gliding Club

The Burn glider site lies just to the south of the final approach track for runway 28, about 5 NM from the RW28 threshold. Aircraft approaching RW28 will therefore pass in proximity to Burn. Burn Gliding Club was first approached in 2016 for comment and discussion around a coordination agreement with SAC. Burn did raise concerns about the proximity of the final

approach to RW28, but it was not possible to materially change the approach track due to design limitations and the CAP 1122 brief that the procedures be as simple as possible.

After multiple versions of a LoA SAC believed that an agreement with Burn could be reached, but at this time it has not been possible to finalise this. Burn did raise concerns about the use of the IAP trajectory in VMC conditions by aircraft based at SAC – SAC would be prepared to ensure this did not take place on days that Burn is active, but this agreement has not been taken up by Burn.

After conducting a risk assessment, SAC is confident the IAP can proceed without a formal agreement with Burn – mainly on the basis that when the weather conditions are such that the IAP will be used, gliding activities are likely to be limited. It will be emphasised in the pilot brief that Burn is a potential hazard and that pilots are responsible for see and avoid when in VMC. It is also noted that under the Rules of the Air, powered aircraft must give way to gliders, regardless of flight rules.

7.6 Garforth

Garforth is a small landing site about 5 NM west of Sherburn, marked on the VFR chart as a helicopter site. Garforth is underneath the approach path for RW10. Activity at Garforth is quite limited, but SAC have established a coordination LoA, should the need arise.

7.7 Emergency Service Helicopters

Some NPAS and Air Ambulance activity takes place in the Leeds / Sherburn area, so the local NPAS unit were notified of the planned IAP and an LoA signed to ensure the operating pilots were aware of the IAP layout. The local Air Ambulance operator has also been notified of the procedure.

7.8 Other aviation stakeholders

Other stakeholders further afield were contacted for comment, including Full Sutton airfield, the landing site at Walton Wood and the glider clubs at York, Pocklington and Sutton Bank. The glider sites were more the focus of the consultation on IAPs at Leeds East airport, but the presence of the Sherburn IAPs was also noted in this context. No direct impacts were identified, or action required by SAC.

8 Non-aviation engagement

Local councillors and community representatives have historically met with Sherburn's community liaison representative on a biannual basis to discuss any issues regarding relations between SAC and the local community. During Covid, this has been more on a reactive basis – with meetings organised to discuss specific issues if required.

For the purposes of engagement with non-aviation stakeholders, it was considered sufficient to keep engagement limited to the liaison group. A specific meeting was held on 17th January 2017 in which SAC made a short presentation to representatives of local authorities included in the normal liaison group. All members of the group who were not present were sent the presentation. The 2021 changes are not considered to materially affect non-aviation stakeholders.

9 Environmental impacts

9.1 Noise

Like most aerodromes of any significant activity, Sherburn does attract noise complaints. These are mainly generated by traffic repeatedly flying around the aerodrome traffic circuit for training purposes. This is a long-standing issue that SAC manages as far as possible and is not considered relevant to the proposed IAPs. Occasionally aircraft conducting aerobatics in the surrounding areas (which may not originate from Sherburn) attract complaints, but other than that it is very rare for aircraft outside the ATZ to attract any noise complaints.

Of the 35,000 annual movements at Sherburn, the vast majority is VFR traffic. It is estimated that the environmental impact of the IAPs will be very low, and not significantly increase the overall number of aircraft operating into Sherburn. It may on occasion allow arrivals that would otherwise use/divert to other aerodromes, although this is not envisaged to be significant. It is impossible to estimate the exact demand for use of the IAP, largely because IAPs to aerodromes like Sherburn are uncommon in the UK, so there is little practical experience of how much they will be used. SAC estimates likely demand to be no more than two or three per day when weather conditions require use of the IAP.

There is not likely to be any significant change in the types of aircraft operating at Sherburn as a result of in the IAPs. The relatively short length of runway 10/28 (around 830 m) limits the types that can safely use Sherburn to typical light aircraft models.

For reference, noise values for the approach phase (taken from the FAA Advisory Circular April 2002 AC No 36-3H) of typical aircraft that use Sherburn are listed below. They are approximate and derived from when the aircraft is around 1 NM from landing (therefore at around 350 ft). At this distance/height, there would be no difference in noise levels from the IAP compared to a visual approach. When flying the track of the IAP, aircraft would be much higher than this – above 1500 ft AGL until approximately 4 NM prior to the runway and therefore a lot quieter from the ground.

Aircraft		Noise
Piper PA28		61 dB
Cessna 425		75 dB

Currently aircraft approach from all directions with a concentration over the ATZ and around 1 mile around the ATZ. The main difference between IAPs and visual approaches into Sherburn is that aircraft will be established on the final approach track further away from the runway, rather than flying directly to the immediate vicinity of the aerodrome before descending more rapidly for landing.

While this could expose new communities to noise, the low utilisation rate and the general lack of residential areas beneath the approach tracks will limit this. Those currently most affected by Sherburn's flying will not experience any increase in impact since within 2 NM or so of the runway (when aircraft are at 1000 ft AGL or less) the tracks followed by existing visual arrivals and that on the IAP will be similar.

9.1.1 Runway 28

Due to the prevailing wind, most approaches flown will be to runway 28.

Efforts were made to ensure the IAP tracks to 28 did not unnecessarily overfly residential areas. The potential impacts below 1500 ft AGL were considered most significant, although much below 1000 ft AGL the difference between the tracks adopted by existing visual and instrument traffic is not significant.

The overflight of Brayton (just to the south of Selby) and Thorpe Willoughby on the final approach track was considered undesirable during the design phase, however avoiding them would have led to a 4° offset to the south, thereby raising a conflict with the glider site at Burn. PANS-OPS also advises against runway alignment offsets purely for noise abatement reasons.

It was identified that the initial missed approach leg will pass over the southern tip of the village beyond runway 28, although missed approaches in conditions in which visual avoidance would not be possible are likely to be very rare indeed.

9.1.2 Runway 10

Efforts were made to ensure the IAP tracks to runway 10 did not unnecessarily overfly residential areas. The potential impacts below 1500 ft AGL were considered most significant, although much below 1000 ft AGL the difference between the tracks adopted by existing visual and instrument traffic is not significant. As it happens the final approach track tends not to overfly any significant areas, the only exception to this being the southern tip of the village just prior to the runway. This was unavoidable so close to the runway. Even if noise abatement could have been used as a reason to offset to the south, this would have placed the track over other areas further out from the runway.

Despite the likelihood of very low utilisation, the missed approach tracks were adjusted for the best possible compromise between airspace, obstacle constraints and minimising over flight of residential areas.

9.2 Other environmental impacts

CAA guidance also requires any impacts on National Parks, Areas of Outstanding National Beauty (AONB), fuel burn/CO₂, local air quality, tranquillity or visual intrusion are considered.

Sherburn does not reside in an AoONB or National Park. Impacts on local air quality or CO₂ emissions are likely to be negligible due to the low utilisation rate and that for the most part aircraft will be encouraged to operate using the normal visual joining procedures when conditions allow. There are no Air Quality Management areas overflown by the IAP.

On the basis that the IAP may allow some aircraft to land that otherwise would not and that the overall distance flown by an aircraft on an IAP tends to be slightly greater compared to a visual approach a modest increase in CO₂ emissions and fuel burn could be anticipated, although this should be considered against the fact that many of these flights would otherwise have landed elsewhere (potentially further away from origin) rather than not take place at all.

It is difficult to predict the exact impact, but the taking the estimated additional distance that an aircraft might fly on an IAP compared to a visual approach as around 7 NM (based on the increased distance the aircraft will be aligned on the final approach and having to fly the T-bar shape from the initial approach fix) and using typical speed and fuel burn figures, some approximate comparisons have been generated below.

The CO₂ burn figures are based on 2.7 kgs per litre of fuel consumed.

Aircraft	Fuel burn (VFR)	Fuel burn (IAP)	CO ₂ (visual)	CO ₂ (IAP)
Piper PA28	2.5 ltrs	3.2 ltrs	6.8 kgs	8.6 kgs
Cessna 425	25 ltrs	36 ltrs	9.3 kgs	13.3 kgs

It is emphasised that these figures are for comparison purposes – it is not the intention that aircraft currently flying shorter visual approaches will instead use the IAP with the associated potential for greater fuel burn.

SAC does not believe there to be any tranquillity or visual intrusion impact associated with introducing the IAP.

Annex 1 – List of engagement stakeholders

Aviation
Leeds Bradford Airport
Doncaster Sheffield Airport
Burn Gliding Club
Garforth
Brighton Airfield
Leeds East Airport
Local NPAS and Air Ambulance helicopter operators

Local community (via local liaison group)
Sherburn Parish Council (attended 2017 presentation)
South Milford Parish Council (attended 2017 presentation)
Monk Frystone Parish Council
Selby District Council
Biggin Parish Council
East Yorkshire County Council
North Yorkshire County Council

Annex 2 – Abbreviations and Acronyms

1. A/GCS – Air Ground Communication Service (often seen at A/G)
2. ACP – Airspace Change Proposal
3. AGL – Above Ground Level
4. AIP –Aeronautical Information Publication
5. AoONB – Area of Outstanding Natural Beauty
6. ATC – Air traffic control
7. ATS – Air Traffic Service
8. ATZ –Air Traffic Zone
9. CAA – Civil Aviation Authority
10. CAP1122 – CAA Publication 1122
11. CFI – Chief Flying Instructor
12. CFIT – Controlled Flight Into Terrain
13. CO2 – Carbon Dioxide
14. dB – decibels (level of sound measurement)
15. DSA – Doncaster Sheffield Airport
16. EGNOS – European Geostationary Navigation Overlay Service
17. FAF – Final Approach Fix
18. GA -- General Aviation
19. GNSS –Global Navigation Satellite System
20. IAF – Initial Approach Fix
21. IAP – Instrument Approach Procedure
22. ICAO – International Civil Aviation Organisation
23. IF – Intermediate Fix
24. IFR – Instrument Flight Rules
25. IMC – Instrument Meteorological Conditions
26. LBA – Leeds Bradford Airport
27. LNAV – Localiser performance without vertical guidance
28. LOC loss of control
29. LPV – Localiser Performance with Vertical Guidance
30. MAC Mid-Air collision
31. MAP – Missed Approach Proceedure
32. MTOW – Maximum Take Off Weight
33. NATMAC - National Air Traffic Advisory Committee
34. NM – nautical mile
35. PANS-OPS – Procedures for Air Navigation Services - Operations
36. PPR – Prior Permission Required
37. RNAV – aRea NAVigation
38. SAC – Sherburn Aero Club
39. TAA – terminal arrival altitude
40. VFR – Visual Flight Rules