

STAKEHOLDER CONSULTATION DOCUMENT

PROPOSAL TO ESTABLISH A TEMPORARY TRANSPONDER MANDATORY ZONE OVER THE CLYDE WIND FARM

NATS



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1. EXECUTIVE SUMMARY

In July 2008, the Scottish Ministers gave consent for the development of the Clyde Wind Farm. This consent paved the way for the development of one of Europe's largest wind farms. The wind farm will consist of 152, 2.3 MW turbines, and is located between Abington and Moffat, straddling both sides of the M74 in the south of Scotland.

The Clyde Wind Farm had both primary and secondary radar planning conditions 6.60 and 6.61 respectively applied, this is due to an aviation objection raised by NATS En Route Safeguarding as the Clyde Wind Farm would be seen by the Lowther Hill primary radar service and would appear as clutter on air traffic controller's displays at NATS's Prestwick Centre ATC operational unit .

The secondary radar condition 6.61 has been discharged and the primary mitigation scheme 6.60 still needs to be discharged.

Planning condition 6.60 prevents SSER erecting blades on the Clyde Wind Farm turbines until the condition is discharged by the Scottish Minister. Condition 6.60 also puts an obligation on both NATS and SSER to work together to produce a primary radar mitigation scheme to discharge the condition and allow both parties to co exist long term.

The original permanent primary radar mitigation scheme was to use an upgraded primary radar located at Glasgow Airport as an infill to replace the airspace picture as Lowther Hill primary service would be blanked over the Clyde Wind Farm to negate the wind farm clutter. The coverage from Glasgow Airport PSR was validated using propagation models by both SSER and NATS to assess the base of coverage as being suitable. Unfortunately the base of coverage has proved to be unsuccessful in practice across the whole of the Clyde Wind Farm. This means the current radar coverage over the Clyde Wind Farm is unable to distinguish the difference between aircraft or turbine blades, a critical safety issue, which requires to be resolved before the blades of the turbines can be erected.

Although Glasgow PSR BOC does not cover the whole of the wind farm it will provide coverage for 17 turbines located in the north of the site due for construction end 2011.

Temporary and permanent courses of action are being developed in tandem to resolve the primary radar issue. The temporary measure is to investigate the imposition of a Transponder Mandatory Zone (TMZ) over the Clyde Wind Farm for 18 months for the 135 turbines in the south. This means aircraft which enter or fly within the defined area are required to have and operate a working altitude reporting transponder, while the new permanent primary radar which provides coverage over the wind farm is built, commissioned and integrated and therefore replace the proposed TMZ and no longer require aircraft to operate on working altitude transponders.

Plans for the permanent primary surveillance radar solution are well advanced with several sites identified and in development with planning issue being addressed. SSER are in the final sensitive and confidential stages of placing an order with a sole supplier for the new primary radar system. The radar supplier will be required to complete the roll-out and delivery of the radar solution before the end of the proposed temporary TMZ period. This is anticipate to be 18 months from when the CAA make a formal decision on the TMZ or earlier if operational hand-over of the new radar into Prestwick Centre is successfully achieved.

It is proposed by SSER that an airspace change application is undertaken to facilitate the permanent mitigation solution and allow the Clyde Wind Farm development to progress. NATS have agreed to sponsor this proposal under contract.

Undertaking this contract does not prevent SSER having to consult NATS as a NATMAC representative and an identified stakeholder, nor does it preclude or prevent NATS having the rights to act and respond to the consultation

The consultation will begin on 25 September 2010 and finish on the 18th December 2010.

The airspace change process requires a consultation process to be undertaken with the relevant stakeholders. This document outlines the consultation approach and provides all consultation information required for stakeholders to make an informed decision.

2. WHAT IS THE CONSULTATION ABOUT AND HOW DOES THE CONSULTATION PROCESS WORK

What is this consultation about?

This consultation is about establishing a temporary Transponder Mandatory Zone (TMZ) of airspace for 18 months over the Clyde Wind Farm.

Where a TMZ is proposed a consultation is required to be undertaken with stakeholders and any interested parties likely to be affected by the change.

The temporary TMZ proposed over the Clyde Wind Farm would require airspace users to carry and operate a working altitude reporting transponder in the airspace between 3,500 feet above mean sea level (AMSL) and 5,500 feet AMSL above the wind farm.

Within controlled airspace there will be no changes to the procedures or to the general distribution of air traffic in the vicinity of NATS En route Ltd (NERL) or to the categorisation of the airspace. Please see the map and visual of the temporary TMZ over the Clyde Wind Farm in Appendix 1.

Introducing the proposed TMZ imposes an operating change on some of the potential users of the airspace which are not fitted with a working altitude reporting transponder. In order to accommodate the needs of these airspace users, a corridor underneath the TMZ will permit these aircraft to transit the region below 3500ft AMSL. In accordance with CAA policy conditional access can be granted by non-transponder equipped aircraft with prior ATC approval (see section 3).

This consultation will allow SSER and NATS to obtain feedback, views and opinions about the impact of the proposed temporary airspace change.

We encourage you all to participate so that the full spectrum of stakeholder views and opinions can be gathered with respect to the proposal of a temporary TMZ. Feedback could influence the size shape or dimensions of the proposed temporary TMZ.

Why is this consultation required?

The Civil Aviation Authority (CAA) has a regulatory requirement to consult when changes to the use of airspace are proposed such as TMZ's.

The consultation procedure required to be followed is outlined in Civil Aviation Publications (CAP) 724 and 725. This consultation follows the procedures outlined in these documents.

Who are the stakeholders in the consultation?

Four key consultation stakeholder groups have been identified covering those with an interest in the specialist nature of the proposal, but also including wider public representatives, this list is not exhaustive or limited to but is thought to be the most appropriate to prevent over consulting:

- (i) The Ministry of Defence
- (ii) Members of the National Air Traffic Management Advisory Committee (NATMAC)
- (iii) Other potential users of the airspace over the Clyde Wind Farm Area
- (iv) Emergency services e.g. Air Ambulance

NATS and SSER will jointly liaise with stakeholders as required.

The application for the imposition of a temporary Primary Radar Mitigation Zone over the Clyde Wind Farm will have the most impact on individuals who use airspace below 5,500 feet AMSL and whose aircraft are not fitted with a transponder i.e. hang gliders, private light aircraft, therefore the proposed temporary TMZ will be of most interest to groups (ii) and (iii) above.

Before embarking on the main body of the Consultation work, SSER has held discussions with key aviation stakeholders to gain a better understanding of the views of these stakeholders. We have also endeavoured to identify all relevant stakeholder groups to be included in consultation.

A full list of identified consultees was developed in conjunction with industry bodies and can be found in Appendix 2, feedback is requested from all, this list is not exhaustive and not limited to and anyone is welcome to provide feedback if they so wish.

How will the consultation work?

The CAA has determined that consultations be conducted in line with the principles set out in the Cabinet Office Code of Practice on Consultation.

NATS has been requested to act on SSER's behalf to assist in the development of this proposal and the consultation process. NATS has conducted many airspace changes and has assisted in the construction of previous TMZ and can draw on an extensive portfolio of managing Airspace Change Proposals in the UK and conducting consultation to meet the CAA requirements.

How long will the Consultation Period Last?

The consultation will begin on 25 September 2010 and close on the 18th December 2010 and will last for a full period of 12 weeks

It would be appreciated if consultees could provide comments as early in the process as possible. This will allow the sponsor to answer any additional questions, provide further information or engage in dialogue as appropriate in good time.

Who do I contact if I have a query or wish to respond to the consultation?

The main point of contact is **Ruth Semple, Community Liaison Officer at SSER**, her contact details are provided below.

The primary audiences for this consultation are airspace users who will understand the aeronautical terminology and information contained within this consultation. However, we recognise that there will be some consultees who are not familiar with the aviation industry and the technical terms. These are explained in as simple a form as possible throughout the document and contained in the Glossary in Appendix 3.

If you require further clarification of the technical terms or other aspects of the consultation please contact **clydetmz@sserenewables.com** placing '**Technical Query**' in the subject line. Please make mention of organisation or group you may be representing and include your contact details as we may need to contact you to ensure we address your query as fully as possible.

All communication received in relation to this consultation are required to be kept for auditing purposes and will be forwarded to CAA as part of the formal process. To facilitate this SSE Renewables (SSER) will act as the focal point for all queries. Email is the preferred method of communication for this consultation, but all channels outlined below may be used. **Please submit replies with your comments for or against the proposed temporary TMZ** stating any reasons or justifications for your position.

E-mail: **clydetmz@sserenewables.com**

Address: Freepost – RSKK-BGEC-XYLB
Ruth Semple, Community Liaison Officer
Clyde TMZ Response
SSE Renewables
16 Robertson Street
Glasgow
G2 8DU

Website: www.sse-clyde.com

If you wish to submit a formal response to the consultation please use the contact information above marking clearly on your correspondence '**Response**' i.e. placing it in the subject line of the e-mail or letter reference and the name of any organisation or group you may be representing. Please include your contact details in case we need to contact you on any aspects of your response as appropriate.

The consultees list in appendix 2 is thought to be the most appropriate list but anyone can comment and feedback is requested from all.

If I have no comment to make on the proposal do I need to do anything?

If you have no comment to make on the proposal, either as an individual or as a representative of an organisation **we would still like to know**. Please send your email with '**No Comment**' in the email subject line or letter reference, again stating your name and/or organisation you represent.

What happens to the responses to the Consultation?

Responses to the Consultation are used to prepare a formal submission to the CAA Directorate of Airspace Policy (DAP) regarding change required to be made to the airspace.

Responses to the consultation will be analysed to identify the key concerns of respondents and how these may be addressed. Where concerns can be addressed by making changes to the overall proposal, whilst still protecting the integrity of the proposed TMZ solution, these will be made and incorporated into the formal submission to the CAA Directorate of Airspace Policy (DAP); any significant changes to the proposal may extend or restart the consultation process.

When does the CAA DAP decide on the outcome of the Consultation?

The CAA will make a decision as soon as possible following the conclusion of the consultation period, but no longer than a maximum of 16 weeks plus 1 week administrative check.

If the TMZ is proposed the target date for implementation of the TMZ would be anticipated as May 2011 but if the CAA make a decision earlier than that date an earlier TMZ deployment date will be sought.

Can I have copy of the Consultation Results?

A summary report including feedback of this Consultation will be added to the website. This is likely to be published shortly after the consultation closes. Hard copies can be sent if requested, to the address above.

What is the consultation not about?

The scope of this consultation is gathering the views of stakeholders and any interested parties regarding the implementation of a TMZ over the Clyde Wind Farm.

This consultation is not about: wind farms in general; the Clyde Wind Farm Development which was granted consent in July 2008; any other or future development of SSER or NATS; any aspect of Government Airports Policy; or the establishment of controlled airspace. Please note that TMZs do not change the status of the airspace from uncontrolled airspace to controlled airspace.

Any comments in responses not directly related to the Clyde TMZ will be discounted from the analysis.

Who monitors the consultation and where can I go if I have concerns regarding how the Consultation is being carried out?

The CAA DAP will oversee the implementation of this consultation that is being carried out by NATS to ensure adheres to the process laid down in CAP 725 document mentioned earlier. If you have any complaints about NATS's adherence to the consultation process these should be referred to:

Head of Business Management Directorate of Airspace Policy

CAA House

45 -49 Kingsway

London

WC2B 6TE

E-mail: businessmanagement@dap.caa.co.uk

Please note that this address is for concerns and complaints regarding non-adherence to the defined consultation process. The DAP will not engage with consultees on details of this consultation. Response to the nature of this specific consultation should be addressed to SSER. The DAP will receive details of your response as part of the formal submission for the proposed implementation of an Airspace Change proposal, which a TMZ over the Clyde Wind Farm falls into (see 'Confidentially' below).

Will my Query/Response be treated as Confidential?

The CAA requires all consultation material, which includes copies of responses from all key stakeholders, to be included in any formal submission.

However, aside from providing details to the CAA, NATS and SSER undertake that we will not disclose personal details or content of responses and submissions to any third parties without prior permission.

3. CONSULTATION DETAILS

Why does NATS need the TMZ

The Clyde Wind Farm development will have 152 turbines in it's initial phase. It is under construction and the operational turbines will cause clutter on the radar screens at NATS' Prestwick Centre. It is agreed in the wind farm and aviation industries that areas of significant clutter need to be mitigated. The airspace over Clyde is a mix of various classes of airspace and can be intensely busy. There is a full range of ATC service deployed in this area from an ATC Basic Service to Radar Control. In this context the clutter expected to be generated by the Clyde Wind Farm is significant. The developer and NERL have sought to find acceptable mitigation to allow the full development of this phase of Clyde Wind Farm.

NATS Lowther primary radar service is the only radar which detects the Clyde turbines. The mitigation which best satisfies the ATC requirement for Prestwick Centre is to blank an area of Lowther primary radar. It is a requirement of the Scottish TMA that primary radar is provided. NATS operations in this area are also licensed by the CAA to provide radar services and non radar to aircraft operating outside controlled airspace. It is therefore necessary to infill the blanked Lowther radar area with another primary radar. The requirement on this infill radar is to provide similar coverage to Lowther but not see low enough to detect the Clyde turbines. Investigation is ongoing to provide that level of radar cover. Until that infill radar coverage is available the request is for a Mandatory Transponder Zone to assure the safety of the various ATC operations.

The topography of the area surrounding Clyde Wind Farm has a significant line feature running through the development. This is the river valley which contains the M74 motorway. Light and military aircraft routinely follow this line feature.

NERL and the wind farm developer have consulted widely and taken advice from the CAA Department of Airspace Policy. The base of controlled airspace is 5,500ft AMSL above Clyde. Above 6,000ft AMSL the TMA airspace rules require carriage and use of working altitude reporting transponders. Below 5,500ft AMSL the airspace is Class G where there is no mandatory aircraft equipage. By blanking and removing the available primary radar data from

the Lowther radar, there would be a significantly reduced chance of detecting primary-only radar targets from aircraft flying in the area. That would mean a significantly reduced chance of detecting aircraft conflicts.

Taking advice and initial consultation feedback, NERL and the wind farm developer propose a TMZ from 3,500ft to 5,500ft above the Clyde Wind Farm. The base level and the prominent river valley means that most aircraft which wish to transit the area, and are not equipped with a working altitude reporting transponder, may do so safely while following the favoured line feature. The dimensions requested have taken into account the ability of aircraft to fly beneath the TMZ, through the TMZ with a working altitude reporting transponder or fly over the TMZ inside controlled airspace. It is considered that there will be no adverse impact on any aircraft operations in this area.

Lowther Hill primary radar service will see the Clyde Wind Farm, therefore as condition 6.60 sets out that SSER and NATS would work together, the failure of the original mitigation means an alternative mitigation has to be developed, as discussed earlier the permanent solution will be a new green-field primary radar.

The permanent solution will not be ready for 18 months and in the mean time a temporary mitigation has to be put in place.

After careful hazard analysis by NATS operational unit at Prestwick a TMZ was seen as being the only viable option to preserve and protect safety.

This section outlines the full details of the consultation for the proposed Temporary Transponder Mandatory Zone (TMZ). Outlining the effect on wind turbines on Air Traffic Control radars, the options that have been considered to mitigate these effects, and why we are proposing the implementation of a TMZ.

Effect of wind turbines on Air Traffic Control (ATC) radars and radar displays for Air Traffic Controllers

The motion of rotating wind turbines leads ATC radars to detect them. Because the radar frequently observes a different part of the rotating blades each time it surveys the area it detects movement. That movement is similar to the pattern observed when an aircraft is moving across the ground so the radar displays a target to Air Traffic Controllers on their radar screens. A large number of turbines in an area cause a large number of apparently moving radar returns to be displayed on ATC radars. The effect of these returns is to clutter a particular area on an Air Traffic Controller's radar screen.

The actual position of real aircraft is displayed by a symbol which moves across the Controller's screen accurately indicating where the aircraft is at any time. Information such as identity and height is transmitted by the aircraft working altitude reporting transponder. That information is displayed and a label attached to the aircraft position symbol on the Air Traffic Controller's radar display.

When real aircraft are being observed by ATC radars and transiting these areas of clutter there are three main effects to ATC.

- (i) The position symbol is obscured in the clutter and the controller cannot accurately observe the actual position of aircraft under their control.
- (ii) The information displayed in the label attached to the position symbol may be obscured or misread by ATC.
- (iii) Aircraft which have penetrated the airspace without authorisation, and are therefore not known to ATC, may not be observed clearly in this area of clutter.

These form the key considerations in seeking solutions to best manage aircraft safety radar control in and around wind farm developments.

An overview of civil aircraft Operations over Clyde Wind Farm

The airspace above the wind farm is very busy in Air Traffic Control terms. It is controlled in the main by Scottish Control at Prestwick Centre (PC). However, individual aircraft may be handed over to Glasgow International Airport, Glasgow Prestwick Airport or Edinburgh Airport approach radar services.

At the Prestwick Centre the airspace is divided into sectors of different sizes and shapes which reflects the density and main flow of air traffic through the airspace.

There are two sectors over the Clyde Wind Farm where radar control is mandatory. The Class C airspace of the Dean Cross upper air sector and the Talla lower airspace sector which is a mix of Class A, C, D and E airspace. Over the wind farm, the Class G airspace below controlled airspace has Air Traffic Services Outside Controlled Airspace (ATSOCAS) providing radar and non-radar Flight Information Service from Prestwick Centre.

Dean Cross sector is relatively small in ATC terms because it is busy and contains highly complex traffic flows. The Dean Cross sector handles most of the higher level traffic overflying Scotland to and from the North Atlantic. This sector can be extremely busy both during the day and in the early hours of the morning.

The Talla sector handles almost all of the air traffic into the three main Central Scottish Airports. (Glasgow International, Glasgow Prestwick and Edinburgh Airports) In addition there are a number of flights which overfly the area en route to Aberdeen and Inverness airports.

The area is surveyed by several radars. Prestwick Control now uses Multi-Radar Tracking (MRT) system and for the purposes of this paper it is planned that Lowther is blanked over this development and, within MRT, in-filled with Glasgow Primary Surveillance Radar (PSR).

To indicate the potential number of aircraft affected, in Table 1 below are the number of flights handled by the Dean Cross sector from Jun 2009 to Jun 2010.

Month	Dean Cross Combined	Talla Combined
Jun 2009	14,392	11,952
Jul 2009	16,283	12,261
Aug 2009	15,603	11,547
Sep 2009	14,432	11,554
Oct 2009	13,904	11,488
Nov 2009	12,225	9,485
Dec 2009	11,118	8,522
Jan 2010	11,150	8,328
Feb 2010	10,921	8,502
Mar 2010	11,940	9,676
Apr 2010	9,849	8,155
May 2010	12,837	10,534
Jun 2010	14,227	11,669

Table 1: Number of flights handled by the Dean Cross Sector June 2009 – June 2010

Due to the upgraded Primary Radar at Glasgow Airport not providing enough low level coverage over Clyde a temporary and permanent course of action are being developed in tandem. The permanent measure of finding a Greenfield in-fill radar solution location and delivery for a new primary radar which provides coverage for the wind farm is well advanced. The options explored regarding the temporary measure are outlined over the page.

Why is a Condition Needed?

On 21st July 2008, Airtricity Developments (UK) Limited (“**Airtricity**”) (now called SSE Renewables Developments (UK) Ltd) obtained consent under Section 36 of the Electricity Act 1998 (“**S36 Consent**”) to construct the Clyde Wind Farm in South Lanarkshire (the “**Wind Farm**”) subject to discharging certain conditions including condition 6.60 which relates specifically to the impact of the development of the Wind Farm upon NATS (En Route) PLC’s (“**NERL**”) Lowther Hill primary surveillance radar (“**PSR**”) (“**Condition 6.60**”).

What does Condition 6.60 state?

Condition 6.60 Primary Radar

No development shall commence unless and until Scottish Ministers have approved in writing a Primary Radar Mitigation Scheme proposed by the Company and agreed by the Operator. No turbine blades shall be fitted to any turbines unless and until all measures required to implement the approved Primary Radar Mitigation Scheme have been carried out and approved by Scottish Ministers in consultation with the Operator, and the Company shall thereafter comply with all ongoing obligations contained within the approved Primary Radar Mitigation Scheme.

For the purposes of the above conditions “Primary Radar Mitigation Scheme” means a scheme for the action to be taken to mitigate the impact of the Development upon the Lowther Hill primary radar installation and the operations of the Operator by ensuring that by appropriate measures, including provision of an approved extra radar feed, any adverse impact of the Development on the Operator's operations is avoided.

Reason: To mitigate the impacts of the development on the Lowther Hill radar station

Who imposed the Condition?

Scottish Ministers from the Scottish Government.

Design Options

The four options below were considered as possible design options.

Option 1: Do Nothing

CAP 724 and 725 requires that in all proposals requiring a change to airspace, that the effect of ‘doing nothing’ must be considered.

If no action was taken to adapt the airspace arrangements it would not be possible to provide safe and effective airspace management over the Clyde Wind Farm arrays.

The conditions 6.60 and 6.61 attached to the approval given for the development of Clyde arrays took account that something other than ‘Do Nothing’ would be required before the development could proceed.

6.61 has been discharged, 6.60 primary surveillance objection still has to be discharged.

Therefore to preserve NATS’ radar coverage over Clyde and as is required by the planning requirements, ‘Do Nothing’ is not an option.

Option 2: Establish a ‘Known Traffic Environment’ Controlled Airspace

The establishment of a ‘Known Traffic Environment’ by means of a controlled airspace over the Clyde Wind Farm footprint would ensure that all traffic in proximity to the wind farm would be known to ATC and subject to ATC Clearance.

Controlled Airspace would not address the areas of radar clutter generated by the turbines arrays or the labels, as described above, and therefore aircraft could not be tracked effectively.

Early feedback from GA community indicated that this option would be too restrictive.

Therefore this option was rejected.

Option 3: Introducing a Temporary a Transponder Mandatory Zone (TMZ) over the Clyde Wind Farm for 18 months

It is technically possible to blank out the PSR returns in the area where wind turbines cause extensive clutter. However if an area is blanked out then there is no height limit to that blanked area. All targets in that area will be blanked including the very aircraft that the ATC radar is sited to detect.

If the size of the area is significant then the blanked area must be filled with another surveillance source for ATC operations to continue. NATS has a requirement to provide primary radar cover in Terminal Maneuvering Area (TMA) operations. There is a significant amount of flying beneath the controlled airspace of the TMA over Clyde Wind Farm. The area over the Clyde Wind Farm is large, and as described above, very busy and blanking the radar over that development would be operationally unacceptable without providing a substitute radar source.

What are the parameters of Transponder Mandatory Zone (TMZ) over Clyde?

The extent (lateral and vertical) of the proposed Clyde temporary TMZ are shown in Appendix 1.

The need is for aircraft intending to enter this airspace to carry and operate a serviceable Mode A/C or Mode S transponder. This would enable ATC to see all traffic operating over Clyde and to avoid the traffic if considered necessary.

The proposed vertical extent of the TMZ would be between 3,500ftAMSL and 5,500ftAMSL .

The TMZ base of coverage only goes down to 3,500ft AMSL to allow VFR traffic to transit along the M74. This is a popular VFR route beneath the proposed TMZ zone (hence aircraft not equipped with working altitude reporting transponder will still be permitted to transit this area below 3,500ft AMSL.

This proposal is for a TMZ for the area identified in Appendix 1 for an 18 month duration with a latest end date of May 2012. The TMZ end date could potentially be earlier if the CAA reach a formal decision earlier or operational handover of the Clyde Greenfield radar is earlier than end of the TMZ date.

In accordance with CAA policy, conditional access to a TMZ can be granted with prior approval from ATC. Aircraft must be equipped with appropriate 2-way radio, and must contact the Scottish Flight Information Service (FIS) at least 10 minutes prior to the planned time of entry into the TMZ. The FIS will coordinate with the Galloway & Talla sector and make best endeavours to give authorisation for transit of the TMZ by the non-transponding aircraft. Aircraft which have neither radio or a working transponder will be required to fly clear of the TMZ.

What airspace users will be impacted?

The traffic figures above represent Commercial Air Traffic which already operates with working altitude reporting transponders as a mandatory requirement.

The main users of the airspace are described in Section 2 above. In addition to this there is military flying¹ which takes place deliberately underneath the controlled airspace vertical boundaries. To the east of the Talla and Dean Cross sectors is the electronic warfare range at Spadeadam. The area of the proposed temporary TMZ is used by military traffic entering or exiting the Spadeadam danger area.

¹ All military aircraft are equipped with Altitude reporting transponders.

A temporary TMZ over the Clyde Wind Farm will have the most impact on individuals who use airspace below 5,500 ft AMSL and whose aircraft is not fitted with a working altitude reporting transponder. These users would either need to use a working altitude reporting transponder within the zone (to ensure that they could be picked up on the radar) or navigate around or below the TMZ.

Military and commercial aircraft are not expected to be impacted by this proposed change as they are equipped with, and routinely use altitude reporting transponders.

Option 4 Raising the base of controlled airspace

The base of controlled airspace across the extent of the area in question uniform at 5,500ft AMSL. In accordance with airspace design best practice this makes it easy for airspace users to be able to comply with the boundaries of controlled airspace.

Raising the base of controlled airspace above the Clyde Wind Farm was considered as an option. However this would complicate the airspace design and would hence increase the risk of unintentional infringement of controlled airspace. The traffic flows within the existing controlled airspace are in the initial descent approach phase into Glasgow and Edinburgh airports. Raising the base of controlled airspace could impair Air Traffic Controllers' ability to give continuous decent approach clearances. Instead step descent profiles would have to be used. This would increase the controllers' workload, and would be environmentally detrimental as this increases CO₂ emissions

Conclusion

Options 1, 2 and 4 have been considered in the mitigation solution design and these options were not considered satisfactory and hence have been ruled out.

Option 3 is deemed to be the only feasible option from those listed above. The temporary establishment of a TMZ will provide the most effective mitigation measure. This will safeguard the safety of Airspace users by NATS ATC while the permanent solution is progressed. Hence this is the only option being consulted on.

NATS supports this proposal and will proceed through the CAA Airspace Change Process of consultation through to the submission for the formal Airspace Change proposal to the CAA. The details of the TMZ proposed are outlined below.

TMZ Duration and Frequency

SSER requests the TMZ is time bounded for an 18-month duration as agreed with NATS and underwritten by an ATC hazard analysis. SSER will ensure that its Greenfield radar provider is incentivised and contractually bound to deliver the radar to SRG approval and integrated into NATS' infrastructure within this time.

If SSER fails to achieve this within the agreed 18 months, NATS will seek an enforcement order to stop the turbines turning and remove the blanking, both would be on a cost recovery basis. This approach firmly places the responsibility on SSER to deliver to the agreed timescale or take the financial penalty of turning off 90% of the Clyde Wind Farm.

The expectation is that the TMZ is bound to 18 months.

Dimensions of the proposed Clyde TMZ

This area is represented in an Appendix 1. These dimensions represent the minimum practicable to meet the safety and operational requirements with an additional buffer to provide a comfortable margin for non-transponding aircraft moving into the area.

Table 2 below outlines the co-ordinates which delineate the blanked area encompassing the consented turbines.

E	N		Deg	Min	Sec	DD
293500.5	629517.9	N	55	32	51.76731	55.54771
		W	3	41	17.50613	-3.6882
305039.2	629517.9	N	55	33	0.344817	55.5501
		W	3	30	19.30741	-3.50536
305039.2	605645.8	N	55	20	8.311438	55.33564
		W	3	29	49.9931	-3.49722
293500.5	605645.8	N	55	19	59.80198	55.33328
		W	3	40	44.63533	-3.67907

Table 2: Co-ordinates which delineate the proposed Clyde TMZ

The vertical extent of the TMZ is requested to be from 3,500ft AMSL to 5,500ft AMSL. It is understood that as the Clyde Wind Farm lies underneath the Scottish TMA, above this level there is already an extant requirement for the carriage and operation of a working altitude reporting transponder.

Procedure for initiating TMZ

CAA will advise NATS when the TMZ is agreed and in place so NATS can be satisfied that all aircraft entering the TMZ are compliant aircraft or they can be granted temporary access to the TMZ as per the procedure outlined above.

4. Environmental Considerations

The proposed Clyde TMZ lies wholly in Class G airspace. This proposal will not result in any changes to current Instrument Flight Procedures or any other flight procedures in the vicinity of Clyde Wind Farm, the intention is to maintain the existing routings and ATM operation in the vicinity of Clyde.

Exhaust emissions and fuel burn

This proposal is not an airspace redesign, but a designation of the airspace as a TMZ with access procedures which does not change the usual trajectories of flights using the airspace. Almost every flight that requires access to the airspace will be able to achieve that in one way or another. Only aircraft with neither working altitude reporting transponder nor radio will be unable to negotiate transit of the TMZ and thus be required to route beneath the airspace. Hence there will be no impact on exhaust emissions and fuel burn.

Noise, Tranquillity, Visual Intrusion, Local Air Quality

This proposal is not an airspace redesign, but a designation of the airspace as a temporary TMZ with access procedures, which does not change the usual trajectories of flights using the airspace. Almost every flight that requires access to the airspace will be able to achieve that in one way or another. Only aircraft with neither working altitude reporting transponder nor radio will be unable to negotiate transit of the temporary TMZ and thus be required to route beneath the airspace.

It is not possible to model or predict the types or numbers of aircraft that will choose or are required to route around the temporary TMZ². Thus analysis of exhaust emissions, fuel burn, noise impact, tranquillity, visual intrusion, and local air quality has not been undertaken.

5 . Political Environment and Economic Benefit

Clyde Wind Farm will produce 350 megawatts of generation capacity by the use of 152 wind turbine generators. This will produce enough energy to power over 200,000 households and will make an important contribution towards the UK Government's aim to provide 34% of the UK electricity demand from renewable sources by 2020. The UK Government has indicated its intention to support a tougher European target during current debate on emissions reduction targets and has passed the UK Climate Act 2008 with a legally binding commitment to reduce UK carbon emissions by 80% by 2050.

An even more ambitious approach is being supported by the Scottish Government which has put in place leading legislation to deliver a 42% reduction in carbon emissions from Scotland by 2020, as well as 80% by 2050. It has set a target of 50% of Scottish electricity demand being met by renewables by 2020.

Scotland's climate legislation passed in 2009 includes a measure to place a duty on all public bodies and agencies to contribute to carbon emission reduction in ALL their decision making processes. The duties in Part 4 of the [Climate Change \(Scotland\) Act](#) require that a public body must, in exercising its functions, act:

- in the way best calculated to contribute to delivery of the Act's emissions reduction targets;
- in the way best calculated to deliver any statutory adaptation programme; and
- in a way that it considers most sustainable.

Although UK-wide agencies operating in Scotland are not currently legally bound by this duty, the Scottish Government encourages such bodies to think broadly about what they can contribute to this crucial area and to Scotland's world-leading targets. In addition to the 'respect' agenda committed to by the UK Prime Minister and the Scotland's First Minister, there is clearly an expectation that clear encouragement for UK-wide agencies operating in Scotland would seek to act and embrace the spirit of the Scottish Climate Change Act and to be as ambitious and wide-looking as possible when thinking about climate change action across their functions, including within decision-making processes. Many authorities and public bodies are already making early progress to show how decisions are being reached given the widely accepted need to accelerate action in all sectors.

The UK Government's Low Carbon Transition Plan has initiated a system of [departmental carbon budgets](#) covering every central government department. These budgets represent a commitment from all parts of Government to taking their carbon impacts seriously, and to managing total emissions from the UK. Between 2008 and 2012 the UK must reduce its emissions by 22%, and between 2013 and 2017 by 28%.

In March 2010 every department published a Carbon Reduction Delivery Plan which sets out how they will meet their departmental carbon budget.

The delivery and deployment of the Clyde Wind Farm is an important investment of over £500m with its associated economic benefits spread across many UK supply chain companies. Any significant delay or threat to the commissioning of the project, could damage confidence across the renewable energy sector and jeopardise the wider economic benefits from the low carbon economy which has been so extensively articulated by the Scottish and UK Governments.

"The implication of the latest trends in emissions and concentrations is that radical reduction is needed..... to

² As was agreed by the CAA at the 15 September 2010 framework briefing.

achieve climate targets." (p.11 - Building a low-carbon economy - the UK's contribution to tackling climate change).

"Climate change resulting from CO₂ and other greenhouse gas emissions poses a huge threat to human welfare. To contain that threat, the world needs to cut emissions by about 50% by 2050, and to start cutting emissions now. A global agreement to take action is vital. But a global agreement will not be possible unless the countries of the rich, developed world provide leadership." (p.1. Executive Summary - Building a low-carbon economy - the UK's contribution to tackling climate change).

6. Summary

Throughout this document NATS has presented the various options available to maintain a safe ATS over the Clyde Wind Farm development.

Upon consideration of the various options it has been determined that establishing a temporary Transponder Mandatory Airspace in the form of proposed temporary TMZ is necessary as one element of three inter-dependent elements: use of the Glasgow PSR for the 17 turbines located in the north of the site; the proposal to establish a TMZ for 18 months for the remaining 135 turbines in the south whilst developing the final permanent solution a green field site to establish a permanent primary radar.

NATS and SSER are consulting widely on this proposal so that the range of views from all airspace users can be ascertained, and the environmental and economic impact of the proposal. Aircraft not equipped with a working altitude reporting transponder can fly around or below the temporary TMZ or have access to the TMZ through the provision of conditional access in accordance with CAA policy using the procedure described in section 3.

NATS and SSER understand that there are no adverse environmental or economic impacts arising from the proposal. Indeed, if the proposal was not to proceed then no significant adverse, environmental and economic impacts would result.

NATS understands that the airspace arrangements outlined in this proposal will eradicate radar screen clutter and facilitate safety in the airspace above the Clyde Wind Farm.

7. What Happens Next?

This consultation document has been circulated to a range of aviation and non-aviation stakeholders which have been identified and agreed with NATS and the CAA. The list of consultees can be found in Appendix 2.

Following the consultation guidelines provided by the CAA, consultees will be provided with a minimum of 12 weeks for consultees to consider and respond to the proposal and, depending on initial feedback, an extension to this period maybe exercised. **The consultation will begin on 25 September 2010 and will close on the 18th December 2010.**

Shortly after the consultation period closes a short report will be made available that will include summary details of the main issues that have been presented by stakeholders during the consultation period. This will be posted on the website (www.sse-clyde.com).

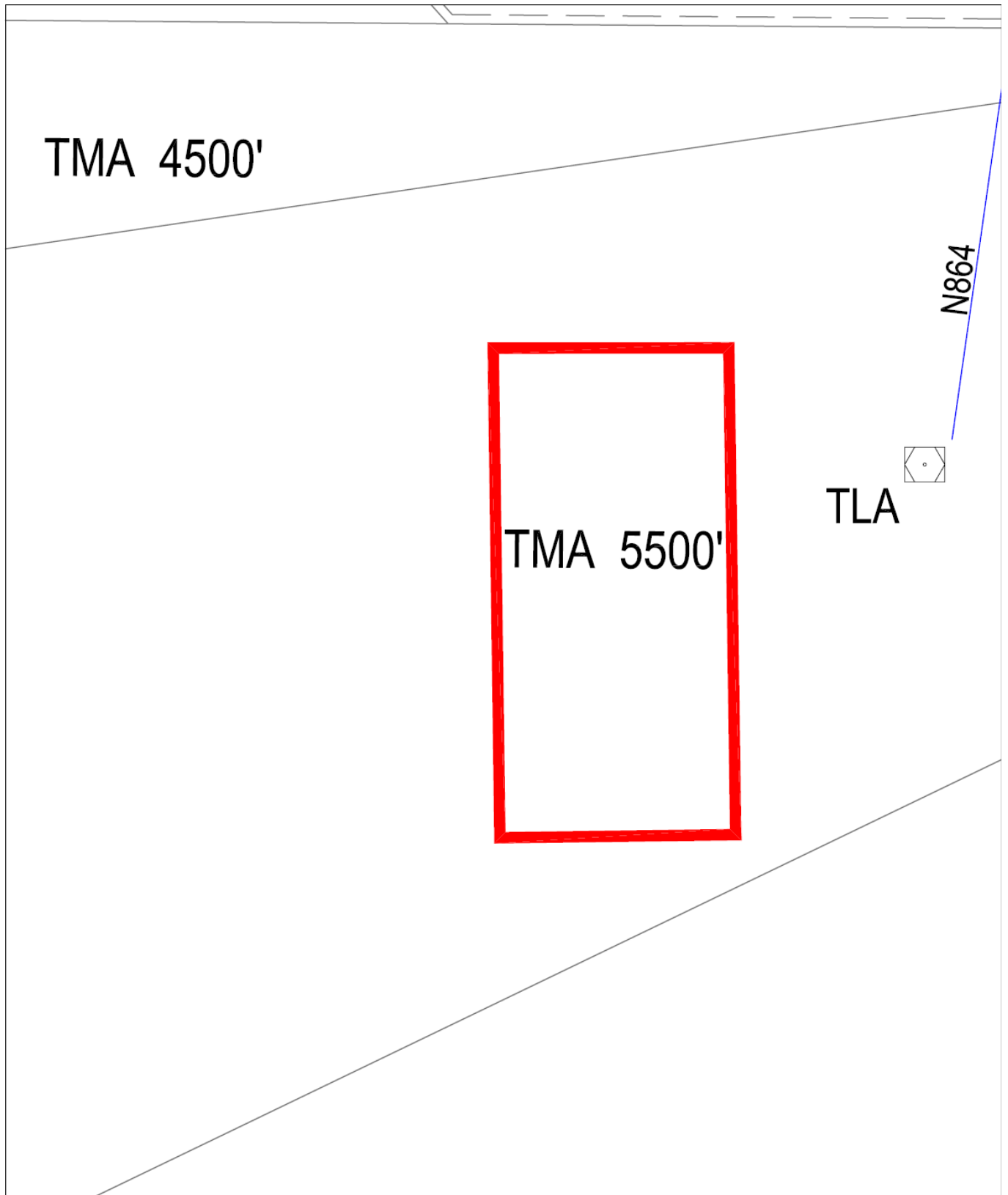
Once the Sponsor Consultation is completed and any issues arising have been dealt with accordingly, NATS will submit a formal proposal to the CAA which shall detail the case for the proposed temporary TMZ. It is a requirement of the consultation process that NATS will provide the CAA with full details of the Consultation (including copies of responses and correspondence) together with all documentation necessary for the promulgation of the proposed TMZs. **It is anticipated that the formal case to the CAA will be presented on or around the 7th January 2010.**

The CAA will then review the proposal which can take up to a maximum of 1 week to review the submitted material is all in place and then take a maximum of 16 weeks and reach a Regulatory Decision. If the case is accepted, then the implementation process could take a further eight weeks.

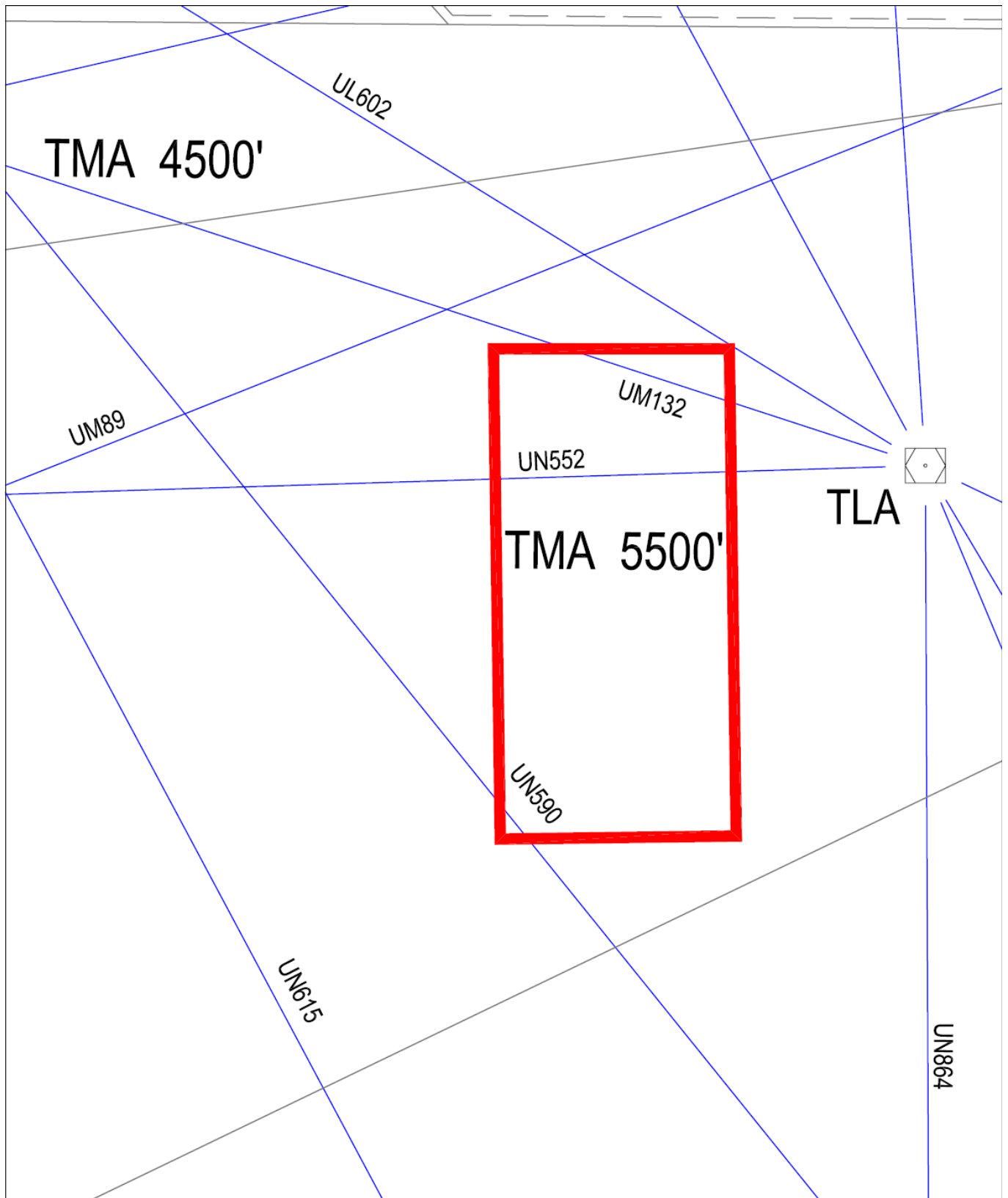
If the outcome to this consultation is to implement a TMZ over the Clyde Wind Farm, it is estimated that this would be effective on 02 Jun 2011. However if CAA make a decision earlier then any AIRAC dates from 13 Jan 2011, 10 Feb 2011, 10 Mar 2011, 07 Apr 2011, 05 May 2011 to 02 Jun 2011 maybe used.

APPENDIX 1: MAP AND VISUAL OF THE PROPOSED TRANSPONDER MANDATORY ZONE OVER THE CLYDE WIND FARM

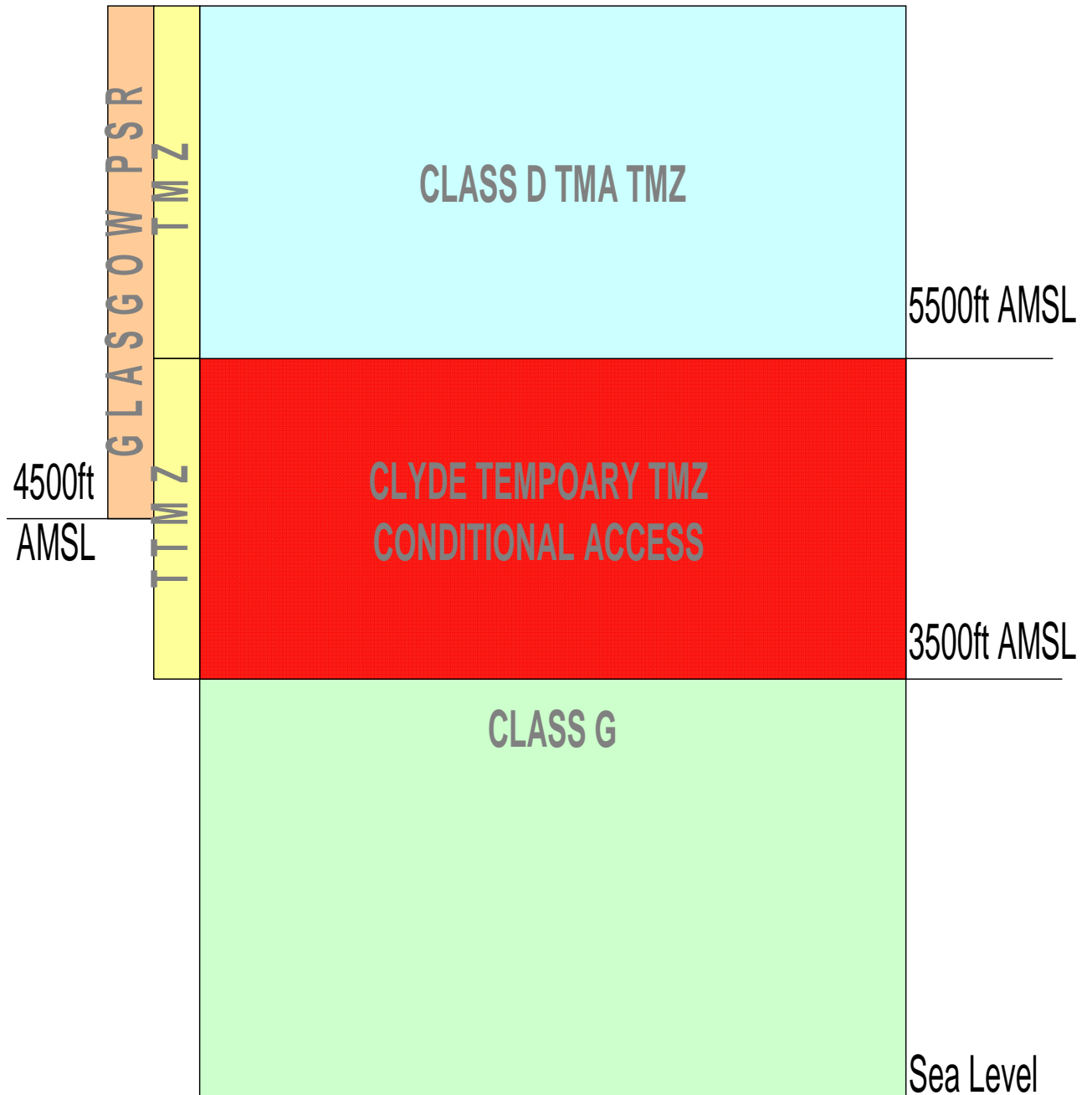
LOWER AIRSPACE



UPPER AIRSPACE



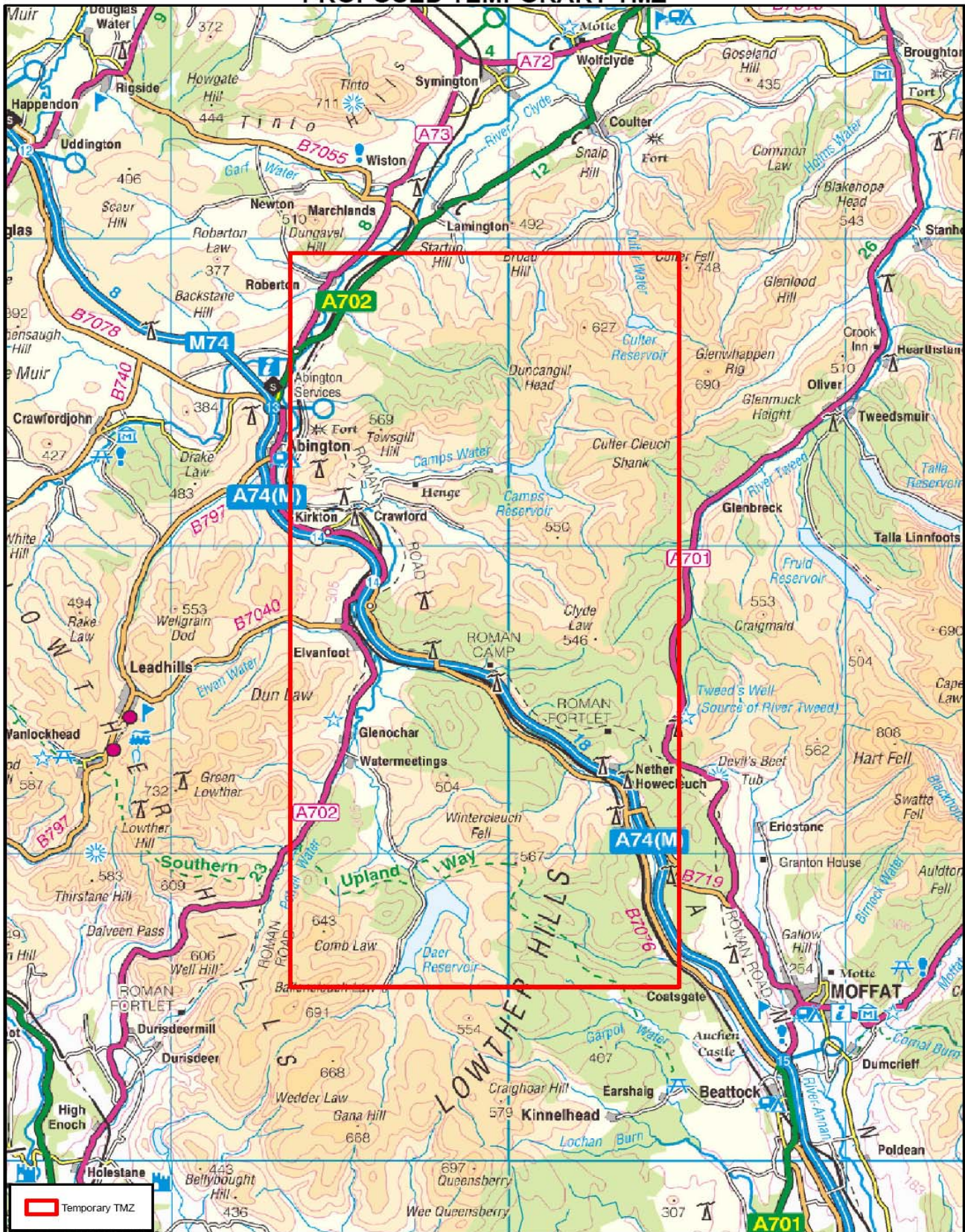
VERTICAL DIMENSION



PROPOSED CLYDE TMZ

TMZ LATERAL EXTENT

PROPOSED TEMPORARY TMZ



Based upon the Ordnance Survey Map with the permission of the controller of Her Majesty's Stationary Office
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APPENDIX 2: CONSULTEE LIST

NATMAC

Organisation	Abb
Civil Aviation Authority SRG	CAA
NATS	NATS
NATS (NSL)	NATS (NSL)
Airport Operators Association	AOA
British Airways	BA
BAA	BAA plc
British Air Transport Association	BATA
British Air Line Pilots Association	BALPA
Aircraft Owners and Pilots Association UK	AOPA
PPL/IR Europe	PPL/IR Europe
The British Hang Gliding and Paragliding Association Ltd	BHPA
The Guild of Air Pilots & Air Navigators	GAPAN
Guild of Air Traffic Control Officers	GATCO
British parachute Association	BPA
Helicopter Club of Great Britain	HCGB
British Helicopter Association	BHA
British Business and General Aviation Association	BBGA
British Balloon & Airship Club	BBAC
Light Aircraft Association	LAA
General Aviation Safety Council	GASCo
British Gliding Association	BGA
British Microlight Aircraft Association	BMAA
Heavy Airlines	
European UAV Systems Centre Ltd	
Light Airlines	
UKAB	UKAB
DAG	
HQ DAAvn	
Aviation Environment Federation	AEF
UK Flight Safety Committee	UKFSC
Ministry of Defence	MOD
MAA	
British Model Flying Association	BMFA
3 AF - UK/A3	
EasyJet	
BAE Systems	

Local Flying Organisations, airports, heliports or aerodromes

The Scottish Flying Club LP
Strathclyde Gliding Club
Microlight Scotland
Scotair

Lanarkshire and Lothian Soaring Club
Leading Edge
Scotia Helicopters Limited
The High School of Hang Gliding
Virgin Balloon Flights
Strathaven Balloon Festival
Glasgow Flying Club
Cloudbusters
Alba Ballooning
East of Scotland Microlights
Edinburgh Flying Club
Wingbeat Paragliding Club
Flight Academy Scotland
Richard Cook Microlight Training Scotland
Cumbernauld Flying School

Licensed Aerodromes

Carlisle
Cumbernauld

Heliports

Addiston (nr Edinburgh)
Leith
City (Glasgow)

Microlight

Strathaven
Auchinleck
Stair

Other unlicensed aerodromes

Kilkerran
Turnberry
Kirkbride
Midlem
Kirknewton

A letter regarding the consultation was set to the following groups for information

Landowners within the Clyde Wind Farm and their Agents

Local MSPS, MPS, MEP'S, Councillors and Local Authority Representatives

Right Hon. Mr David Mundell MP
Russell Brown, MP
Michael Moore, MP
Karen Gillon, MSP
Dr Elaine Murray, MSP
Jeremy Purvis, MSP
Alex Fergusson MSP
Aileen Campbell, Regional MSP
Mr Derek Brownlee, Regional MSP
Mr Jim Hume, Regional MSP
Ms Christine Grahame, Regional MSP

Mr Adam Ingram, Regional MSP
Mr Alasdair Morgan, Regional MSP–
Mr Michael Russell, Regional MSP
David Martin, MEP
Catherine Stihler, MEP
Alyn Smith, MEP
Ian Hudghton, MEP
George Lyon, MEP
Struan Stevenson, MEP
Councillor Beith Forrest
Councillor Bev Gauld
Councillor Hamish Stewart
Councillor Edward McAvoy
Councillor Michael Dickie
Councillor Roger Grant
Councillor Ted Brown
Councillor Gail MacGregor
Councillor Ivor Hyslop
Councillor Willie Archibald
Councillor Catriona Bhatia
Councillor Neil Calvert
Councillor David Parker
Mr Brian Frater

AIRPROX	Aircraft Proximity Report (submitted by pilots and/or controllers where a loss of separation may have occurred).
ATC	Air Traffic Control
ATS	Air traffic control service
Blanking	Term used to identify are in affected PSR were clutter is removed by plot suppression
CAA	Civil Aviation Authority
CAP 725	CAP 725, CAA Guidance On The Application Of The Airspace Change Process, March 2007, CAA Directorate of Airspace Policy http://www.caa.co.uk/docs/33/CAP725.PDF
DAP	Directorate of Airspace Policy (the department of the CAA responsible for airspace matters)
FIR	Flight Information Region
IFR	Instrument flight rules
Infill	PSR radar used to provide cover for the blanked area of the affected PSR
PSR	Primary Surveillance Radar
Squawk	Transponder code
SSR	Secondary Surveillance Radar (radar giving additional information from the aircraft's transponder)
TMA	Terminal manoeuvring area
TMZ	Transponder mandatory zone. A defined area of airspace where aircraft wishing to enter or fly within are required to have and operate a transponder with altitude reporting capability.
Transponder	A device on the aircraft which transmits information (an identifying code, and usually altitude) which is displayed on the Air traffic Controller's radar screen.
VFR	Visual flight rules