Order Form / Work Package Order

Aerial Survey of The Greater Wash Special Protection Area for Various Bird Species for the mNCEA Project

FROM

Authority	Natural England
Address	Foss House, Kings Pool, 1-2 Peasholme Green, York, YO1 7PX
Contact Ref:	[redacted] Phone: 0208 [redacted] Mobile: 07770 [redacted] Email: [redacted]@naturalengland.org.uk
Order Number	TBC
Order Date	22 September 2022

TO

Contractor	APEM Limited
For attention of:	Name: [redacted] Phone: [redacted] 8938 Email: tenders1@apemltd.co,uk
Address	Riverview A17 Embankment Business Park Heaton Mersey Stockport SK4 3GN

1. SERVICES REQUIREMENTS

(1.1) Services [and deliverables] required:

The service required is provision of all aspects of digital aerial survey (including suitably qualified surveyors, appropriate digital camera equipment, and survey aircraft designed for offshore work over long durations), digital data processing, Quality Assurance and reporting to meet the requirements and objectives of the survey work, as detailed in this specification.

There are four **core objectives** for this contract. These are to:

a) conduct **four** high precision digital aerial surveys of the Greater Wash SPA with two surveys in autumn (September/October 2022) and two in late winter (January/February 2023) with each pair of surveys approximately a month apart. Survey data are to be collected using digital video or still imagery at a suitable resolution (typically at least 2 cm Ground Surface Distance (GSD)) to confidently capture and identify to the lowest taxonomic level possible all birds (in flight and on

the water) and marine mammals **within** the boundaries of the SPA (note: imagery should also be collected within the "hole" in the Greater Wash SPA in which Lincs and Lynn and Inner Dowsing windfarms are located (see Figure 1));

b) process imagery to identify **all** birds, marine mammals, and other objects of interest captured to the lowest taxonomic level possible;

c) Quality Assure results so that pre-agreed data standards are met (e.g. to meet MEDIN standards or equivalent for archival in marine data repositories such as the Marine Data Exchange);

d) produce ArcGIS layers, associated metadata, accompanying .csv files etc. and two brief reports (one covering the autumn surveys and one the winter surveys) detailing survey effort and observations for each individual survey within pre-agreed timeframes, likely to be within 6 – 8 weeks of data collection.

There is no requirement to analyse data to produce e.g. abundance estimates or density maps – the contract is solely for data collection, image analyses and provision of data, imagery and associated files to required standards.

There were two **optional objectives** detailed under Request for Quotation ITT_10530.

Both of those options are included within this mini-contract.

They are:

e) extend the transects used to survey the Greater Wash SPA under core objective a) to cover sea areas out to 10km beyond the seaward limits to the Greater Wash SPA (area = 3,066 km^2) and to report on and provide the resultant additional imagery and information to Natural England. (note: **there will be no requirement to conduct image processing to identify objects within the areas covered under this optional objective** – the requirement will be to simply to gather the imagery, archive it for future processing and make available to Natural England when required.

f) extend the transects used to survey the Greater Wash SPA under core objective a) to cover The Wash SPA (area = 620 km^2) and to report on and provide the resultant additional imagery and information to Natural England. (note: **there will be no requirement to conduct image processing to identify objects within the areas covered under this optional objective** – the requirement will be to simply to gather the imagery, archive it for future processing and make available to Natural England when required.

Methods

The successful Contractor will need to develop an appropriate survey design to meet the project aims and objectives outlined above.

Requirements

To enable successful delivery, the successful Contractor is expected to:

- Conduct appropriate preliminary analyses to demonstrate that the survey design/coverage will allow robust population and distribution estimates to be derived from the survey data (after this project). Those analyses are to be submitted at tendering stage. For example, existing empirical survey data of each of the three principal species of interest (from the visual aerial surveys between 2002 and 2008) or, failing that, simulated hypothetical distributions of the designated populations of each of the principal species of interest, could be used to explore the suitability of alternative survey designs/coverage etc. in terms of the resulting population abundance estimates, confidence intervals and costs.

- Plan the survey design and submit these plans at tendering stage.

- Conduct the survey(s), including organisation and positioning of aircraft, crew and equipment and ensuring that all health and safety requirements, including Covid-19 requirements, are met.

- Process the acquired imagery (for areas surveyed in line with core objective a only).

- Quality Assure results so that pre-agreed data standards are met (e.g. to meet MEDIN standards or equivalent for archival in marine data repositories such as the Marine Data Exchange). (Note, that by the time this project is completed it is likely that Marine Scotland's *Digital Aerial Survey Data Standard Guidance Document,* which is currently in preparation, will have been finalised and published. This guidance will set out details of the data and metadata requirements needed for MEDIN compliance when reporting on digital aerial surveys and will provide templates for the provision of all necessary information in a standard format. It is likely that the successful framework contractor will be required to provide data and metadata relating to the surveys conducted under this project in accordance with this guidance, once finalised.)

- Submit ESRI ArcGIS 10.2 compatible shapefiles (clean of any topology errors) and .csv files showing survey effort (e.g. aircraft tracks and altitude) and observations of birds, marine mammals and other objects of interest (one per survey), including data fields and metadata to pre-agreed standard (see above). These to be submitted to pre-agreed public repository with accompanying metadata, within pre-agreed period following each survey. Point and polygon data should be supplied.

- Submit two brief technical reports in Microsoft Word format following the autumn and winter survey periods (i.e. 2 reports covering the 4 surveys), detailing pertinent survey information including: detailed description of, and rationale for, survey methods and design, maps of survey routes and coverage; details of surveys as actually flown (dates, time, weather conditions, crew, camera set up, etc.); details of data extraction and processing and associated challenges or limitations (e.g. around species identification). The final report structure and content will be agreed with the nominated officer.

- Submit copies of all survey imagery and above files to Natural England.

(1.2) Commencement Date: 9 Sept 2022

(1.3) Completion Date: 31 March 2023

There is the option to extend for up to a further six weeks, subject to availability of funds. To be confirmed by issue of a Contract Change Note (CCN). Any work undertaken after 31 03 2023 will be at Supplier's risk until a CCN is offered and accepted.

2. PERFORMANCE OF THE SERVICES [AND DELIVERABLES]

(2.1) Key Personnel of the Contractor to be involved in the Supply of the Services

[redacted] – Project Manager
[redacted] – Project Director
[redacted] – Project Support
[redacted] – Quality Assurance Manager and Ornithologist
[redacted] – Head of Data Operations Manager
[redacted] – Field Health and Safety Manager
[redacted] – Lead Image Analyst

(2.2) Performance Standards
Project deliverables

APEM, E01, Methodology

Understanding of Requirements
Department for Environment and Rural Affairs (DEFRA) are seeking to collect data using digital aerial survey methods to assess the distribution and abundance of marine wildlife within the Greater Wash Special Protection Area (SPA). Following on from previous surveys undertaken in January / February 2022, these this study will contribute to investigations into abundance and distribution changes of key species within the SPA. Additionally, data on important surrounding areas may also be collected.

Study Area
Greater Wash SPA – APEM present a survey design that would collect data across the area indicated in the RFQ. This would include collecting data over windfarms within the SPA.
Greater Wash 10 km Buffer – APEM have designed a survey plan where the flight lines from the Greater Wash survey could be extended if required to cover a 10 km buffer.
The Wash SPA - APEM have included flight lines which would extend into the wash SPA if required.

APEM are experienced in conducting digital aerial surveys of the East Coast of England, therefore are familiar with the local airfields, weather, and flight restrictions. This would be most valuable when conducting surveys of The Wash SPA due to the strict flight resections, having undertaken surveys for Natural England of these areas in the past we are confident that even with these restrictions we would be able to deliver [1-2].

1 APEM. (2022). in prep. Greater Wash Special Protection Area (SPA) Winter 2021 / 2022 Surveys and Analysis.
2 APEM. (2018). Digital Aerial Imagery Proof of Concept Surveys – The Wash SPA. APEM Scientific Report P00002312. Natural England, May 2018, v4.0.

Aims
APEM would deliver two high-resolution still digital aerial survey to capture data on little gull, red-throated divers and common scoters and other marine ornithology and megafauna across the survey area. The data would be processed and analysed by APEM's marine experts and delivered to DEFRA in line with the delivery schedule and quality requested in the RFQ.

Objectives
- Four 1.5 cm ground sampling distance (GSD) digital aerial surveys (September/October 2022 and January/February 2023), targeting peak abundance of key species (little gull, red-throated diver, common scoter).
- APEM would aim to collect 20% of the sea surface, and 10% coverage would be analysed.
- Deliver observation data that is analysed to enumerate species captured to the lowest taxonomic level.
- Deliver observation data that is quality assured and standardised as per MEDIN requirements.
- Deliver two survey summary reports (one covering the autumn surveys, and one for the winter surveys) outlining the survey methodology, as well as achieved survey effort, survey effort map, survey timings, weather, H&S report, raw observations, and anecdotal observation.
- Deliver ArcGIS layers with associated metadata and accompanying .csv files for both observation and survey effort files.
- Deliver raw geofenced images in the form of TIFF files.

Optional Objectives
- Fly extended flight lines to cover 10 km buffer seaward from the Greater Wash SPA. Archive files for a minimum of five years.
- Fly extended flight lines to cover The Wash SPA. Archive files for a minimum of five years.

Survey Methodology
APEM recommends a grid-based survey design with 20% capture and 10% analysed with a 3.5 km spacing. Flight lines will be surveyed spaced approximately 3.5 km apart, to provide 10% analysed coverage. APEM's survey method collects multiple images along the flight line corridors planned for each survey, providing an accurate footprint that allows very accurate abundance and density estimates to be modelled.

The power analysis method involved using the population estimates from previous surveys[3] for the two key species: red-throated diver and common scoter. The red-throated diver population estimate was 1,787 (mean peak population estimate from three winter seasons). The common scoter population estimate was 3,517 (mean of season-specific estimates). The power analysis method involved using the population estimates from previous surveys for the lowest density species, the little gull (Hydrocoloeus minutus) which had a estimated population size of 2,153 (as in Lawson et al 2016). The initial power analysis used the KDE distribution data from the SeaMAST website and two survey design scenarios (varying coverage and transects or grid designs) were used to "survey" the area, observing a sample of the individuals.

3 Lawson, J., Kober, K., Win, I., Allcock, Z., Black, J. Reid, J.B., Way, L. & O'Brien, S.H. 2016. An assessment of the numbers and distribution of wintering red-throated diver, little gull and common scoter in the Greater Wash. *JNCC Report No 574*. JNCC, Peterborough.

The sample was used to calculate design-based abundance estimates and the corresponding precision value (coefficient of variation, CV). This was repeated 100 times. APEM aimed for CV values less than 0.16 as this would allow the detection of a population change of a factor as small as 2. R code for this analysis is available on request.

The population estimate was randomly distributed across the SPA area and two survey design scenarios (varying coverage and transects or grid designs) were used to "survey" the area, observing a sample of the individuals. The sample was used to calculate design-based abundance estimates and the corresponding precision value (coefficient of variation, *CV*). This was repeated 100 times. APEM aimed for *CV* values less than 0.16 as this would allow the detection of a population change of a factor as small as 2. R code for this analysis is available on request.

The survey designs that APEM are offering:

1. 10% of the site analysed from 20% coverage of the Great Wash in a grid-based pattern, the survey would take less than 12 hours with 47 transect lines.
2. 10% of the site analysed from 20% coverage of the Great Wash and Wash in a grid-based pattern, the survey would take less than 13 hours with 51 transect lines.
3. 10% of the site analysed from 20% coverage of the Great Wash and 10 km Buffer in a grid-based pattern, the survey would take less than 17 hours with 53 transect lines.

All survey designs offer great opportunities of attaining robust design-based population estimates with 100% of iterations of the power analysis achieving suitable *CV* values for red-throated divers, little gulls, and common scoter.

Survey Design

The surveys to target peak abundance of little gulls will be undertaken in September and October 2022 with a month in-between. The surveys to target peak abundance of red-throated divers and common scoters will be undertaken in January and February 2023 with a month in-between. Image acquisition would be with a bespoke camera and sensor system, the Shearwater IV, set up to acquire and save a series of digital still images based on the latest technology introduced in 2020. This state-of-the-art system was created by APEM to deliver world-leading, ultra-high resolution digital still imagery for easier analysis compared to other systems. At the same time, it also saves on costs by having an extremely large image footprint at all resolutions.

The images would be captured at a resolution of 1.5 cm ground surface distance (GSD). Due to the level of detail captured in images of this resolution it is possible to identify the large majority of seabirds and marine megafauna to species level. APEM recommends that survey flights take place at a height of at least *c*.1,300 ft, which will avoid disturbance to birds and marine megafauna and optimises ground resolution and footprint. At this resolution, the footprint of the Shearwater IV camera system consists of an image node 144 m in length and 656 m in width, which is a footprint of 94,464 m sq. APEM's method collects multiple images of this sized footprint along the lines planned for each survey.

Data Collection

Our state-of-the-art digital camera systems are integrated with custom flight planning software that allows each survey flight path to be accurately mapped out before the aircraft leaves the ground. Each image capture node is precisely defined, allowing the system to fire

the camera exposures at exactly the right location. This ensures that each survey is flown with the same survey flight path orientation and the camera is triggered at the same position along each line within set tolerances. APEM's planning systems enable tolerances on flight path along survey lines to be set automatically aborting survey lines that drift away from the aircraft's planned flight line.

In accordance with the Scope of Work, APEM collects and records additional data relating to each survey flight as standard, which is collated and provided as follows:

- Time – time of image capture, start / end time of whole survey and individual survey lines;
- Location of image – latitude / longitude or easting / northing in respect to UTM zone;
- Environmental conditions – including visibility, cloud cover, sun angle, wind speed, wind direction, air temperature, air pressure, precipitation, sea state and turbidity; and
- Anecdotal observations – for example, shipping observations made by the camera technician that may not be captured in the imagery.

All images collected would be securely saved and backed-up on mirrored disks during flight and then multiple servers at APEM to ensure data security. These data are then stored for five years as standard.

Data will be collated and provided in the form of ArcGIS Shapefiles and corresponding Microsoft Excel spreadsheets, where applicable. Raw imagery will be in the form of Tiff files and will be transferred to Natural England via an external drive that would be billed at additional cost or can be transferred via a link.

Glare, Weather Risk, and Challenges

To provide Natural England with certainty on costs, various risks that may constrain the ability to complete the survey and data extraction within the required timescales, considering factors such as weather, airspace restrictions and COVID-19. APEM cover all risks (provided that the decision about when a survey goes ahead or not is also held by APEM). We are highly experienced in optimising surveys to make use of small weather windows and we fully expect to mitigate against weather risks. Should a survey attempt fail, we will try again at the next available opportunity at no cost to the client.

Weather windows are reviewed daily, and we have sufficient capacity of both aircraft and crew to be on task when the conditions are favourable. We have continual access to aircraft to be able to mobilise even at short notice. APEM has previously owned and operated three aircraft, meaning we are able to troubleshoot possible challenges with our aviation provider knowledgably. The surveys would be undertaken in weather conditions that have been acceptable to the UK statutory nature conservation advisers, namely: visibility greater than 5 km, wind speed of less than 30 knots, sea state of four or less (Beaufort 5 or 6), and no icing conditions. While it is possible to survey in less favourable conditions, our aim is to balance the number of possible survey windows, the safety of our aircrew and the quality of the data collected. On bright days, there is a risk of glare in the images that can make finding and identifying birds and marine megafauna more difficult. We mitigate for this by avoiding surveying for some two hours around midday and tasking our on-board technician with continuously monitoring the image quality and, if necessary, ceasing acquisition until suitable conditions return.

APEM has a forward planning process to ensure staff and resource availability for the duration of the project. Prior to each survey a ground check is undertaken of the camera

systems as well as the aircraft to ensure they are in working order. We own multiple camera systems to enable us to survey if there are competing weather windows with other contracts we currently have. We have an arrangement with our aviation provider to have a number of aircraft available for use at our discretion.

APEM has a highly experienced Flight Operations team who coordinate APEM's operational logistics to ensure crew and systems are mobilised in multiple aircraft to survey seven days a week as suitable weather and sea conditions allow. As part of its operations, APEM have a global Duty Operations roster; a fleet of survey sensors mounted in manned survey aircraft; multiple aviation providers providing a large pool of aircraft; survey pilots; and aviation engineering support. The systems are operated and maintained by APEM's own pool of Aerial Survey Task Specialists. With this configuration, APEM currently maintains five crews ready and available for Marine Wildlife Offshore surveys every day of the year except for Christmas Day and Boxing Day.

Image Analysis Methodology

The digital still imagery acquired by the aerial surveys will be analysed by APEM staff using bespoke image analysis software to determine species identification, raw counts, estimates of flight heights, flight direction, and other information relevant to seabirds and marine megafauna present within the Survey Area, including static fishing equipment (such as lobster pots) and fishing vessels. All possible information from the imagery is 'extracted' (including anthropogenic artefacts) and typically georeferenced to the WGS84 UTM projection unless otherwise requested.

Data collected and recorded as standard are as follows:

- Species-level identification of each animal observation, or, where not possible, the lowest taxon;
- Age, sex, length and wingspan of each animal observation where possible/applicable;
- Behaviour of each animal observation, e.g. sitting/flying/perching/diving for birds or submerged/surfacing for mammals;
- Flight height of flying birds where appropriate (Size-Based Flight Height Provision for more detail);
- Flight direction of flying birds;
- Date and time of each observation (e.g. animal/vessel/structure) recorded in the survey;
- Corresponding coordinates for each observation (with an accuracy of ±3 to 5 m); and
- Unique identifying numbers for each observation with reference to the corresponding image.

Image Analysis Quality Assurance

APEM's team of 50 image analysts are hand-picked for their existing skills and experience and then receive further ongoing training internally from our experienced Team Leads and QA Team providing excellent quality making our data the best in the business. Our analysts receive on-going training in identification from APEM's QA Manager [redacted], who is almost certainly the world's most experienced analyst of digital aerial images of seabirds. Our analysts also have access to the in-house Image Archive Library, which is regularly updated. This comprehensive guide is compiled from previously identified individuals in aerial images. Analysts also measure the body length and wingspan (for birds) as input parameters for species identification. On-going advances in digital imagery have removed many of the uncertainties in species identification that have existed in the past (e.g., failure to differentiate species of auk) through poor resolution and image smear. After the images have been analysed, 10% of the birds and marine megafauna recorded by each survey can

be subject to external QA upon request by the client at an additional cost (not included in the costs provided in this tender). This is carried out by our QA partners, the British Trust for Ornithology (BTO) and the Sea Mammal Research Unit Marine (SMRU Marine). APEM have recently included its Senior Marine Mammal and ornithology Consultants in the Quality Assurance process of all marine mammal images.

Where identification to species is not possible individuals will be assigned to taxonomic groups such as ‘black-backed gull sp.’ (lesser black-backed or great black-backed gull) or ‘gull sp.'

It is APEM’s experience that for equal resolution, still images give a superior quality image for bird and marine megafauna identification than to those acquired using video (See example of images in Figure 1). Due to the limitations associated with High Definition (HD), vertical digital stills cameras are adept at detecting marine species submerged in the surface of the water column that may not be seen by oblique video cameras, and multiple frames from video surveys does not improve identification of marine mammals. APEM’s bespoke camera systems also have a short focal length and are less zoomed at any given resolution in comparison to video cameras, providing better image quality and less motion blur for a better chance of species identification. Furthermore, the benefit of vertically mounted cameras is that they have an improved viewing angle over oblique video systems. This is because poorer sea states would have a negative impact on the detectability for objects of interest which may be obscured by waves and breaking surf. In addition, APEM can estimate its coverage captured more accurately whereas with angled video systems this is not the case. Using the methods described here, APEM can achieve identification accuracy of greater than 90% for a vast majority of avian species and 90% for harbour porpoise, common dolphins and bottlenose dolphins and over 85% accuracy for white-beaked dolphins.

There are key distinguishing features of size and colour patterns in winter plumage that image analysts will use to differentiate between the species in aerial imagery. Crucially red-throated diver is the largest of the key species that are being identified (53-69cm in length) but are the smaller of the diver species. Red-throated diver are more elliptical in body form, have a dark head and neck and white flashes on either side of the hind flank panels. Common scoter is 44-54cm in length and are distinguishable through their dark plumage, and bright bills on the males. The common scoter is distinguishable from velvet scoter (*Melanitta fusca*) by the lack of white wing bars. Many measures are used to ID little gulls them from other gulls (mainly kittiwake, Mediterranean, and black-headed Gulls). The overall size of little gulls is appreciably smaller than the other gulls we encounter, averaging from 25-30cm body length, which is roughly 5-10cm smaller than black-headed gull. In contrast to black-headed gulls, little gulls do not have the large white wedge on the leading edge of black-headed gull (a feature of BHG that is very apparent in our imagery). Some other features we look for are the small white 'hand' (many Gulls like kittiwakes have black wingtips). Little gulls having white wingtips shows as a small white dot on the wingtip that contrasts strongly with grey mantle. With the use of some aspects of structure like their very small head compared to other gulls and their wings are quite slender looking giving them a long-winged look. In the first winter little gulls can be more challenging due to very similar patterning to first winter kittiwakes but they are approximately 15cm smaller so there is very rarely any confusion.

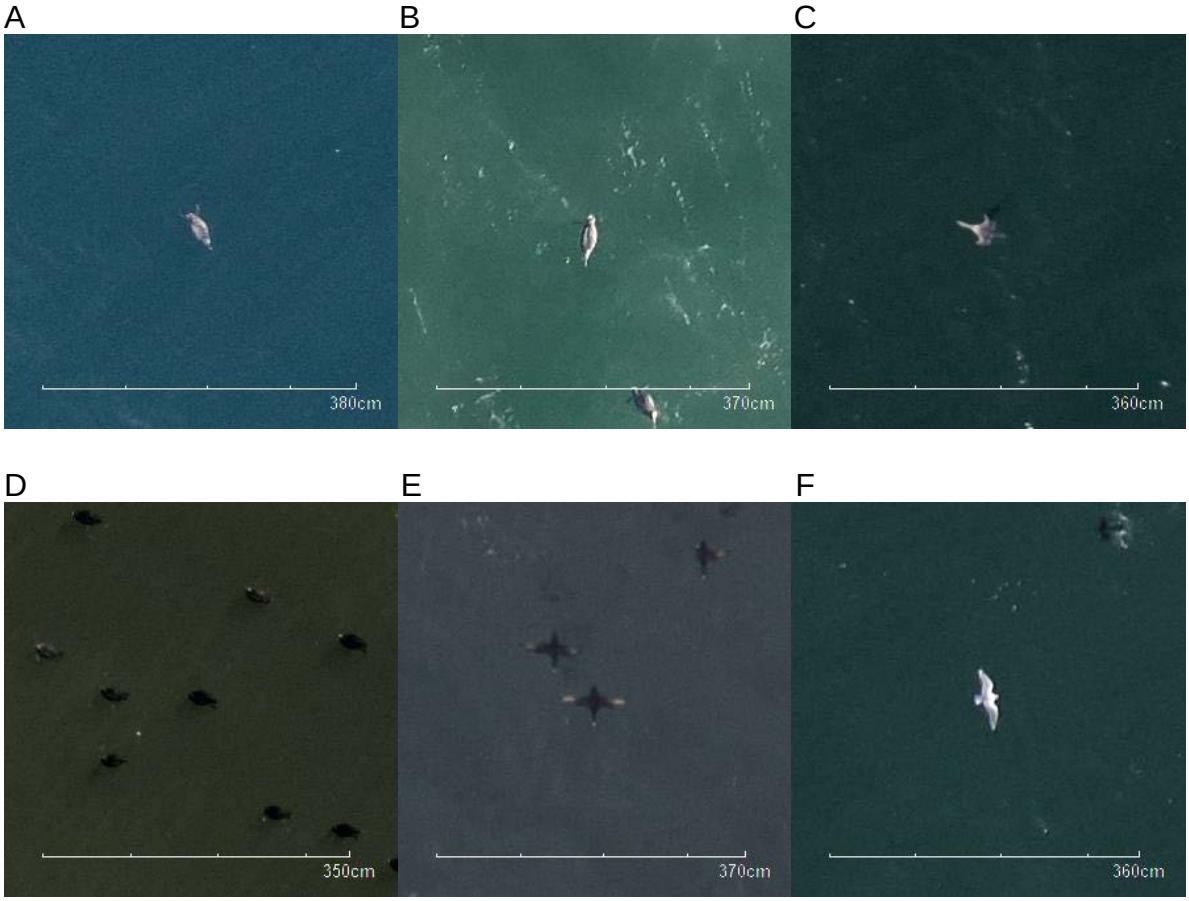


Figure 1: Example snags for identified red-throated diver, common scoter and little gull from surveys in European and America waters. A, B and C: show red-throated divers at 1.5cm GSD. D and E: show common scoter at 1.5cm GSD any F shows little common gull at 1.5 GSD.

Size-Based Flight Height Provision

In addition, using a set of rules developed in-house, based upon trigonometry and more complex mathematics, we can estimate the flight height of birds with a range of error and confidence intervals, dependent upon image quality, size of the bird species and the size of the bird relative to the image. Size-based flight heights can be provided as an additional part of the data. It must be noted that we are unable to accurately estimate flight heights for birds that are diving or turning sharply, as these individuals are not fully stretched out and therefore their measured lengths are not comparable to the reference length of the relevant species. Typically, the proportion of flying birds that APEM provide flight height estimates for is between 15% and 25% of the total in each survey.

Flight Heights and Flight Direction

From: [redacted]
Sent: 22 September 2022 13:43
To: [redacted]
Cc: [redacted]
Subject: 22/09/2022 meeting updates (P10257 Greater Wash)

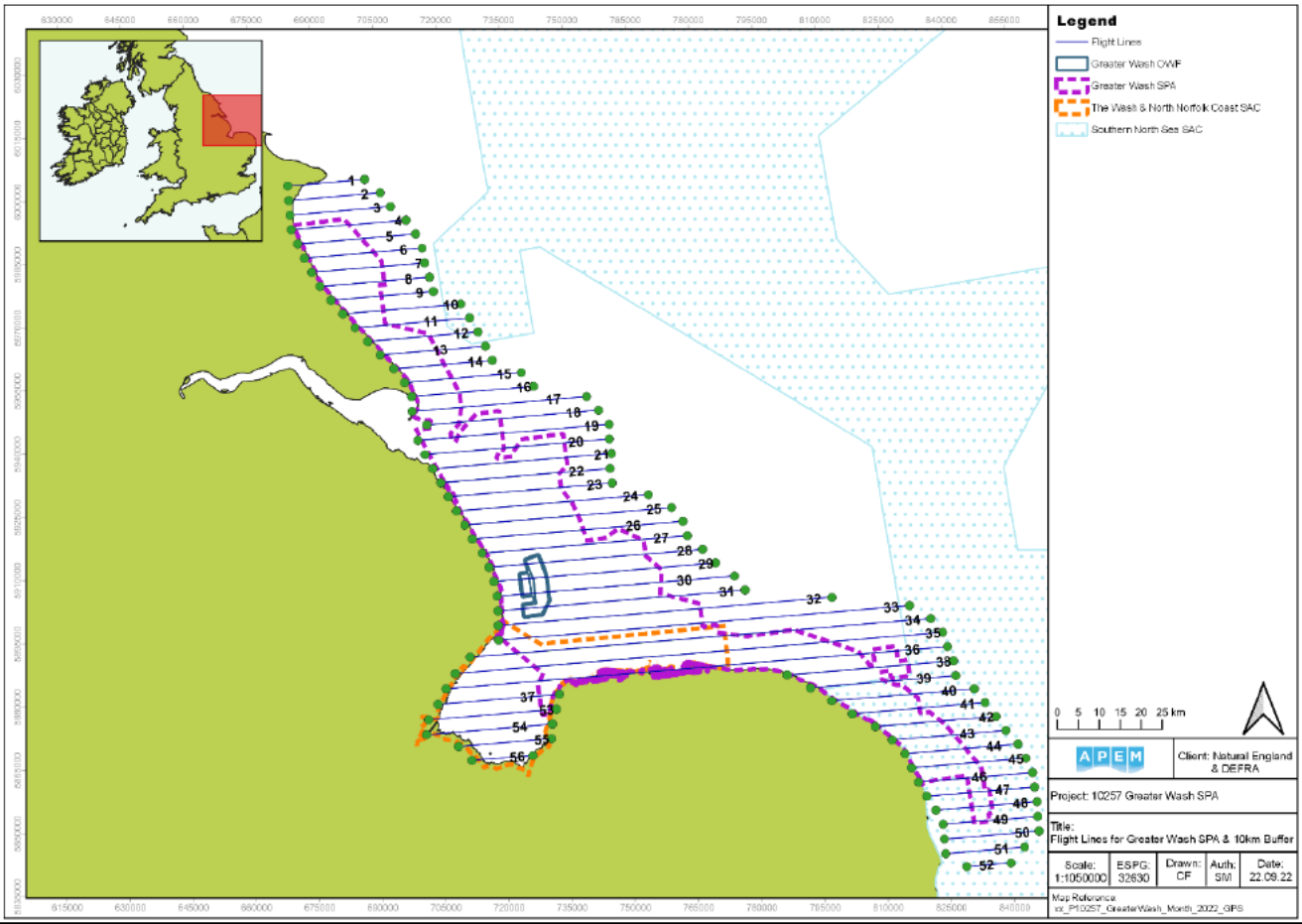
Hi all,

Just to follow up from my actions for the meeting:

- please see the attached flight plan
- flight heights and flight directions are included in the quotation
- survey plan will be delivered early next week latest (needs reviewing)
- CF to go away and get indicative costs for image analysis
- contract will come through today - I have someone on Bravo on standby to push it through
- Weather: there is a small window (unlikely) that we may be able to fly this weekend if we get everything sorted beforehand (contract etc.). Monday- Wednesday the weather is not looking good but from Thursday onwards we may have another opportunity. Keep in mind weather is changeable and we might suddenly be able to fly Monday.
- Danger area: so this is not set or scheduled. We have to literally ask for permission the day of and if nothing is active in the area then we can fly. Sometimes they give advance warned but it's usually the day of. In practice this would mean we just fly the rest of the survey and come back the next day (this is my understanding)

Hope this all helps and if there's anything I've missed please give me a shout.
Best wishes,
[redacted]

Flight plan



(2.3) Location(s) at which Services are to be provided: The Greater Wash SPA

(2.4) Standards: Reporting to pre-agreed standards, see below Annex 2

(2.5) Contract Monitoring Arrangements

Catch up call approximately every 8 weeks between NE Project Officer [redacted] and Successful Contractor's Project Manager. Some of these are additional too the meeting dates set out under project milestones. Namely:

15th September 2022 – Project Initiation Meeting

w/k beginning 31st October 2022

Mid-Nov 2022 Teleconference to discuss conduct of two autumn surveys

w/k beginning 19th December 2022

w/k beginning 27th February 2023

Mid-March 2023 Teleconference to discuss conduct of two winter surveys

3. PRICE AND PAYMENTS

(3.1) Contract Price payable by the Authority excluding VAT, payment profile and method of payment (e.g. BACS))

£231,085, as per below correspondence and commercial submission:

Date: 20/09/2022 13:30
Sent by: APEM Ltd
Sent from User: [redacted]
Subject: Re: Re: Re: Commercial Clarification - Aerial Survey of The Greater Wash SPA
Message
[redacted]

Please see survey breakdown below -

Item Description Price (£) Excl. VAT
Survey 1 [Greater Wash plus 10km and The Wash] and Project Set-Up £ 43,751.81
Survey 2 [Greater Wash plus 10km and The Wash] £ 41,075.00
Survey 3 [Greater Wash plus 10km and The Wash] £ 41,075.00
Survey 4 [Greater Wash plus 10km and The Wash] £ 41,075.00
Image Analysis [Greater Wash Only], Report 1, and Data Provision £ 32,054.09
Image Analysis [Greater Wash Only], Report 2, and Data Provision £ 32,054.10
Grand Total £ 231,085.00

Many Thanks

Apem Ltd
Broadcast Message: No

Date: 15/09/2022 16:53
Sent by: APEM Ltd
Sent from User: [redacted]
Subject: Re: Commercial Clarification - Aerial Survey of The Greater Wash SPA
Message

Dear [redacted]
Our cost revision is slightly different at £231,085.00. This is because the area to survey as a combined site is larger and we are unlikely to complete it in one day with two aircraft during the winter months. The Wash has certain aviation constraints (the Danger Area) meaning we need to call ahead to request access to this when it is not in use, as well as in addition to the tidal requirements. Given the consideration of surveying all three areas, undertaking The Wash in combination with the Greater Wash SPA plus 10 km buffer would mean possibly risking a successful survey in one day even with two aircraft. As such, it would be our advice to plan to survey The Wash as a separate 'block', to provide the best chance for the SPA and buffer to be completed. Hence the reason for the slight additional expense which is due to factoring additional aircraft and crew mobilisation. We would also like to confirm that these costs are based on our aviation subcontractor Bioflight.
Kind regards
Laura
APEM
Broadcast Message: No

Date: 08/09/2022 14:24
Sent from User: [redacted]
Subject: Commercial Clarification - Aerial Survey of The Greater Wash SPA
Message
Dear [redacted]

With regard to your commercial bid for Aerial Survey of The Great Wash Special Protection Area for Various Bird Species for the mNCEA Project can you please confirm costs for surveying all three aspects of the requirement?

I arrive at a figure of £226,418.91 (exc VAT) for surveying The Greater Wash SPA, 10Km Buffer and The Wash SPA. Can you please confirm?

I derived my figures from the quotations for:
The Greater Wash SPA – Core - £183,542.34
The Greater Wash and Wash SPA - £191.470.92
The Greater Wash SPA plus 10 km Buffer - £218,490.33

Regards

[redacted] Commercial.

Broadcast Message: No

2.1.2 – Commercial Response - Core

Core

Aerial Survey of The Greater Wash Special Protection Area for Various Bird Species for the mNCEA Project.

The Greater Wash SPA - Core	
Provide total cost (exc VAT) with the following breakdown [Surveys Only]	**£ 123,366.54**
Survey Planning	£ [redacted]
Fuel Cost **[Included in Survey cost]**	£ [redacted]
Flying Hours Required	[redacted]
Litres of Fuel Per Flying Hour	[redacted]
Fuel Cost per Litre, On Date Tender Submitted	£ [redacted]
Image Analysis **[For Great Wash area only]**	£ [redacted]
Reporting (including provision of all associated deliverables)	£ [redacted]
Grand total ex VAT	**£ 183,542.34**

2.1.2 – Commercial Response – Optional Objectives

Optional Objectives

Optional Objective - The Greater Wash and Wash SPA	
Provide total cost (exc VAT) with the following breakdown [Surveys Only]	**£ 131,295.12**
Survey Planning	£ [redacted]
Fuel Cost **[Included in Survey cost]**	£ [redacted]
Flying Hours Required	[redacted]
Litres of Fuel Per Flying Hour	[redacted]
Fuel Cost per Litre, On Date Tender Submitted	£ [redacted]
Image Analysis **[For Great Wash area only]**	£ [redacted]
Reporting (including provision of all associated deliverables)	£ [redacted]
Grand total ex VAT	**£ 191,470.92**

Optional Objective - The Greater Wash SPA plus 10 km Buffer		
Provide total cost (exc VAT) with the following breakdown [Surveys Only]	**£**	**158,314.53**
Survey Planning	£	[redacted]
Fuel Cost **[Included in Survey cost]**	£	
Flying Hours Required		
Litres of Fuel Per Flying Hour		
Fuel Cost per Litre, On Date Tender Submitted	£	
Image Analysis **[For Great Wash area only]**	£	
Reporting (including provision of all associated deliverables)	£	
Grand total ex VAT	**£**	**218,490,33**

(3.2) invoicing and Payment
50% of contract value will be made on receipt of detailed invoice following completion of Autumn survey (to the satisfaction of the Natural England Nominated Officer).
50% of contract value will be made on receipt of detailed invoice following completion (to the satisfaction of the Natural England Nominated Officer) of all the milestones detailed above, and formal acceptance of the specified outputs.

4. Invoicing Requirements

APEM Limited to quote Natural England purchase order number (TBC) and Bravo reference number ECM 65645 in their invoice.

Invoice should be emailed to Accounts-Payable.neg@sscl.gse.gov.uk or posted to:
Shared Services Connected Limited
Natural England
PO Box 793
Newport
NP10 8FZ

BY APPROVING THIS ORDER FORM, THE CONTRACTOR AGREES to enter a legally binding contract with the Authority to provide to the Authority the Services specified in this Order Form, incorporating the rights and obligations in the Call-Off Contract that are set out in the Framework Agreement entered into by the Contractor and the Authority on 25th July 2022.

Electronic Signature
Acceptance of the award of this Contract will be made by electronic signature carried out in accordance with the 1999 EU Directive 99/93 (Community framework for electronic signatures) and the uk Electronic Communications Act 2000. Acceptance of the offer comprised in this Contract must be made within 7 days and the Agreement is formed on the date on which the Contractor communicates acceptance on the Authority's electronic contract management system ("Bravo"). No other form of acknowledgement will be accepted.

ANNEX 2

Natural England data requirements

This Annex provides high level guidance for contractors regarding Metadata and Geographic Information System deliverables. Final details of requirements for this project, with reference to section 5 of the Specification, will be agreed with the Nominated Officer.

Natural England reserve the right to check the quality of all digital data and reserve the right to return any data that does not meet these compliance requirements. If any part of this guidance is unclear, please make early contact with the Natural England Nominated Officer who will be able to provide clarification in consultation with data management colleagues.

Metadata

A generic MEDIN compliant discovery metadata record should be completed for the project outputs as a whole and for each GIS layer generated. By generating MEDIN compliant metadata, Natural England gain required compliance with both INSPIRE Directive and UK GEMINI 2.1 metadata requirements, while using term list vocabularies fit for marine purposes. There are a variety of mechanisms for generating MEDIN compliant metadata available at the following link along with a full description of the MEDIN standard, XML encoding, and guidance documentation: https://www.medin.org.uk/medin-discovery-metadata-standard. Metadata derived as part of this project must be submitted to Natural England in an XML file which Natural England will archive through Data Archive Centres (DACs). Guidance 'MEDIN Guidance for Contractors' can be provided to the winning contractor.

Beyond the discovery metadata requirement, it is essential that the final GI datasets are accompanied by a detailed 'readme.doc' describing the file structure within submitted outputs, and clearly outlining file associations (e.g. layer files for colours/ fill patterns).

Geographic Information data - format for deliverables

GIS products should be compatible with ArcGIS Desktop 10.2. Data will be supplied as a series of Feature classes in a File geodatabase (.gdb) to an attribute structure to be agreed between the contractor and Natural England on commencement of the contract. One or more ArcMap Document files (.mxd) must be provided to pull out data into distinct layers based on its attribution and these will apply appropriate layer styling.

Data in the Feature classes of File geodatabases will be supplied using the following coordinate system parameters:

Attribute	**Value**
Geographic Coordinate System	GCS_WGS_1984
Datum	D_WGS_1984
Prime Meridian	Greenwich
Angular Unit	Degree

For the purposes of this project ArcMap document files (.mxd) are to display WGS84 data projected from requested feature classes in Lambert Azimuthal Equal Area projection based on ETRS 1989, using an appropriate (eg Petroleum EPSG) transformation between WGS 1984 and ETRS 1989.