From:	Brown, Emma
To:	Hornsea Project Three
Subject:	Hornsea Project Three - Deadline 9 Response from Natural England
Date:	26 March 2019 19:14:13
Attachments:	SouthernNorthSeaDRAFTConservationObjectivesAndAdviceOnActivities.pdf EN010080 Hornsea Project Three Deadline 9 Natural England Comments on ExA Q F3.1.pdf EN010080 Hornsea Project Three Deadline 9 Natural England Correction to REP7-078.pdf EN010080 Hornsea Project Three Deadline 9 Natural England Response to ExA Q F4.1, F4.2 and F4.3.pdf EN010080 Hornsea Project Three Deadline 9 Natural England's Response to ExAQ F6.1.pdf EN010080 Hornsea Project Three Deadline 9 Natural England"s comments on the Applicant"s D7 Submissions.pdf OffshoreRegisterEntry_SouthernNorthSea (Citation).pdf

Good Evening,

Please find attached Natural England's Deadline 9 Response.

This includes:

- Natural England's Comments on the Applicants D7 submissions
- Natural England's Comments on ExA Q F3.1
- Natural England's Response to ExA Qs F4.1, F4.2 and F4.3
- Natural England's Response to ExA Q F6.1
- Offshore Register Entry for the SNS SAC (Citation)
- SNS SAC Draft Conservation Objectives and Advice on Activities

Kind regards,

Emma

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Please note I currently work Monday - Thursday

http://www.gov.uk/naturalengland

We are here to secure a healthy natural environment for people to enjoy, where wildlife is protected and England's traditional landscapes are safeguarded for future generations.

THE PLANNING ACT 2008

THE INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES 2010

HORNSEA PROJECT THREE OFFSHORE WIND FARM

Planning Inspectorate Reference: EN010080

NATURAL ENGLAND

Written Submission for Deadline 9

Natural England's Response to Rule 17 Letter dated 19 March 2019

[ExA Qs F4.1, F4.2, F4.3]

26 March 2019

ExAQ F4.1 (a): ***Please explain what conclusions you draw from the results of the collision risk model analysis submitted by the Applicant at Deadline 6 [REP6-043] in relation to the predicted impacts on the gannet population at Flamborough and Filey Coast SPA. Please elaborate on whether the outputs suggest an Adverse Effect on Site Integrity as you have done for kittiwake in [REP7-064].***

As highlighted in REP7-064 Natural England consider that the baseline information provided by the applicant is insufficient to adequately characterise the Hornsea Three Array area and consequently we do not consider it possible to rule out Adverse Effect on integrity for Multiple features at multiple sites (including gannet at Flamborough and Filey Coast SPA) and significant impacts on species at an EIA level. This position has not changed, and will not change unless further data can be provided.

As well as these fundamental concerns regarding the baseline information, Natural England have highlighted (throughout the Evidence Plan Process and the Examination) several areas of concern with the applicant's approach to the analysis of their data.

At the Examiner's request, the applicant has provided collision and displacement figures that are more in line with Natural England's Advice (notably [REP6-043] and [REP4-092]), though there are outstanding issues.

Within our REP7-046 response, we sought to provide advice to the ExA in two respects. Firstly, to signpost to the outputs within REP6-043 and REP4-092 that related to the assessment parameters that most closely align with Natural England's advice, and secondly to provide a worked example to demonstrate the potential 'difference' that following our advice could make to the conclusion of an assessment.

It has not been and is not Natural England's intention to provide an alternative set of analyses, but simply to highlight and evidence the level of uncertainty surrounding the Applicant's conclusions.

ExAQ F4.1 (b) ***Do you have any observations regarding how the analysis was parameterised, as set out in Appendix A of [REP7-032]?***

Appendix A of [REP7-032] provides copies of a selection of Band Model spreadsheets populated with the project, turbine and bird parameters and some of the data used for CRM for each species (gannet, kittiwake, lesser black-backed gull, great black-backed gull and Herring gull). The Applicant has not provided the actual spreadsheets, or all of the relevant copies of Band Model worksheets, citing as a reason: "*Due to the large number of collision risk models required to model the various parameter iterations throughout the examination process it is not possible to provide all collision risk models. The models used to calculate Natural England's position (as interpreted by the Applicant) and the Applicant's position are presented in Appendix B. These models present collision risk estimates calculated using the mean estimate for all parameters*."

Natural England cannot find an Appendix B, and therefore has assumed that the Applicant is referring to the Band Model information presented in Appendix A of [REP7-032].

Given the large volume of additional analyses and data that the Applicant has submitted to the Examination process since submission of their Application, Natural England does not consider that the Applicant's reasoning for not providing all the collision risk modelling data is valid.

Natural England requested this information at Deadline 1 [REP1-211] in order to provide transparency and a clear audit trail for the assessments as well as providing data in an accessible format for Natural England and the competent authority. Natural England reiterated this request in our Deadline 4 submission [REP4-130]. Natural England note that the Applicant has waited until Deadline 7 to submit a partial set of the information that Natural England had requested.

At Deadline 4 [REP4-049] and then at Deadline 6 [REP6-043] the Applicant submitted tables of collision risk figures that Natural England assumed had been extracted from Band Model spreadsheets, but where not all input parameters used in the CRM were made available by the Applicant.

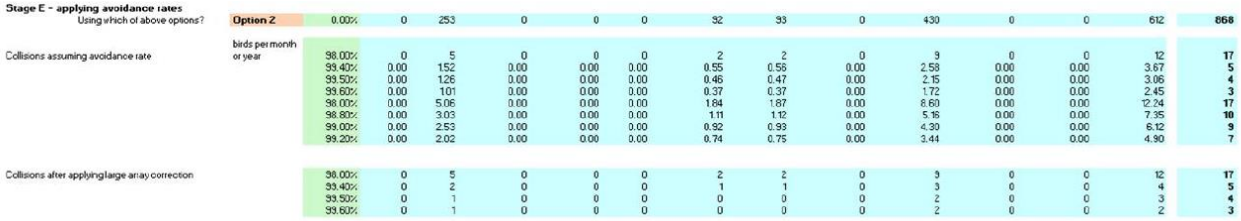
The tables presented in these documents (e.g. Table 3.1 and 3.2 for gannet in [REP7-043] also did not present the annual total collisions. The annual number of predicted collisions are a key element of the information used to assess impact and Natural England had to spend time manually adding the monthly collision values presented by the Applicant to derive annual values as a result of the Applicant not presenting this information. Natural England had to undertake this work in order to provide the information presented in our Deadline 7 response [REP7-078] and to answer the ExA question F2.26. The Band Model spreadsheets calculate and present the summed annual collision totals and so had the Applicant presented these as requested at the start of the Examination, Natural England would not have had to spend a considerable amount of time calculating the figures manually.

Further, in Natural England's Deadline 7 response [REP7-078] we noted that there were errors present in the information that the Applicant has provided in the tables in [REP6-043] (e.g. in Table 3.15) but without the full set of Band Model spreadsheets, it is not possible to see the correct values.

With regards the Band Model information that the Applicant has now provided in REP7-032 Natural England do not believe that the copies of the worksheets that the Applicant has presented in Appendix A represent the actual spreadsheet outputs from the Band Model. Natural England believes that the Applicant has pasted together different elements of spreadsheets.

For example, for Herring gull the following data are presented by the Applicant in Appendix A (Figure 1.13):

Figure 1. Applicant's HG figures for Option 2 as presented in Figure 1.13 of [REP7-032]

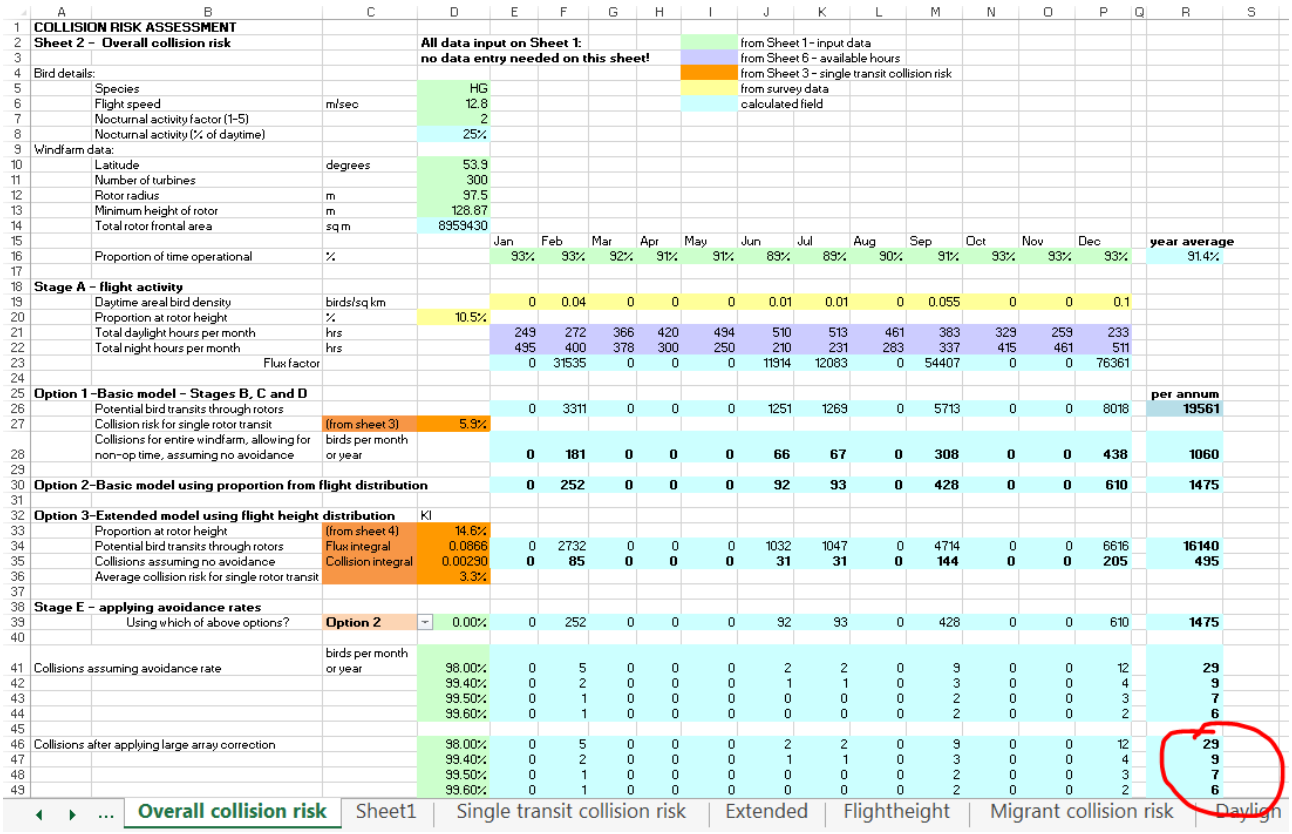


Stage E – applying avoidance rates														
Using which of above options?	Option 2	0.00%	0	253	0	0	0	92	93	0	430	0	0	612	868
	birds per month														
Collisions assuming avoidance rate	or year														
		98.00%	0	5	0	0	0	2	2	0	9	0	0	12	17
		99.40%	0.00	152	0.00	0.00	0.00	0.55	0.56	0.00	2.58	0.00	0.00	3.67	5
		99.50%	0.00	126	0.00	0.00	0.00	0.46	0.47	0.00	2.15	0.00	0.00	3.06	4
		99.60%	0.00	101	0.00	0.00	0.00	0.37	0.37	0.00	1.72	0.00	0.00	2.45	3
		98.00%	0.00	5.06	0.00	0.00	0.00	1.84	1.87	0.00	8.60	0.00	0.00	12.24	17
		98.80%	0.00	3.03	0.00	0.00	0.00	1.11	1.12	0.00	5.16	0.00	0.00	7.35	10
		99.00%	0.00	2.53	0.00	0.00	0.00	0.92	0.93	0.00	4.30	0.00	0.00	6.12	9
		99.20%	0.00	2.02	0.00	0.00	0.00	0.74	0.75	0.00	3.44	0.00	0.00	4.90	7
Collisions after applying large array correction															
		98.00%	0	5	0	0	0	2	2	0	9	0	0	12	17
		99.40%	0	2	0	0	0	1	1	0	3	0	0	4	5
		99.50%	0	1	0	0	0	0	0	0	2	0	0	3	4
		99.60%	0	1	0	0	0	0	0	0	2	0	0	2	3

For example, taking the values for an avoidance rate of 99.4 and summing the 12 monthly collision estimates (0, 1.52, 0, 0, 0, 0.55, 0.56, 0, 2.58, 0, 0 and 3.67) gives a total of 8.88 (9 collisions) and not 5 as indicated in the final total column. The totals are similarly incorrect for the other avoidance rates.

Natural England considers that the Applicant is presenting misleading information by implying that they have presented spreadsheet outputs from the Band Model when in fact they haven't. Natural England has run the Band Model using the figures provided by the Applicant and the per annum collisions are correct in the Band Spreadsheet (see Figure 2 below). Therefore the Applicant must have cut and pasted the per annum total column into the [REP7-043] from another source

Figure 2. CRM run for Herring gull using parameters provided by Applicant. The per annum collisions for AR 99.4, 99.5 and 99.6 should be 9, 7 and 6 respectively and not 5, 4 and 3 collisions as in the Applicant's version (see Figure 1 above).



COLLISION RISK ASSESSMENT																			
Sheet 2 – Overall collision risk			**All data input on Sheet 1:**						from Sheet 1 – input data										
			no data entry needed on this sheet!						from Sheet 6 – available hours										
Bird details:									from Sheet 3 – single transit collision risk										
	Species		HG						from survey data										
	Flight speed	m/sec	12.8						calculated field										
	Nocturnal activity factor (1-5)		2																
	Nocturnal activity (% of daytime)		25%																
Windfarm data:																			
	Latitude	degrees	53.9																
	Number of turbines		300																
	Rotor radius	m	97.5																
	Minimum height of rotor	m	128.87																
	Total rotor frontal area	sq m	8959430																
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				**year average**
	Proportion of time operational	%		93%	93%	92%	91%	91%	89%	89%	90%	91%	93%	93%	93%				91.4%
Stage A – flight activity																			
	Daytime areal bird density	birds/sq km		0	0.04	0	0	0	0.01	0.01	0	0.055	0	0	0.1				
	Proportion at rotor height	%	10.5%																
	Total daylight hours per month	hrs		249	272	366	420	494	510	513	461	383	329	259	233				
	Total night hours per month	hrs		495	400	378	300	250	210	231	283	337	415	461	511				
	Flux factor			0	31535	0	0	0	11914	12083	0	54407	0	0	76361				
Option 1 –Basic model – Stages B, C and D																			**per annum**
	Potential bird transits through rotors			0	3311	0	0	0	1251	1269	0	5713	0	0	8018				**19561**
	Collision risk for single rotor transit	(from sheet 3)	5.3%																
	Collisions for entire windfarm, allowing for non-op time, assuming no avoidance	birds per month or year		**0**	**181**	**0**	**0**	**0**	**66**	**67**	**0**	**308**	**0**	**0**	**438**				**1060**
Option 2–Basic model using proportion from flight distribution				**0**	**252**	**0**	**0**	**0**	**92**	**93**	**0**	**428**	**0**	**0**	**610**				**1475**
Option 3–Extended model using flight height distribution			KI																
	Proportion at rotor height	(from sheet 4)	14.6%																
	Potential bird transits through rotors	Flux integral	0.0866	0	2732	0	0	0	1032	1047	0	4714	0	0	6616				**16140**
	Collisions assuming no avoidance	Collision integral	0.00290	**0**	**85**	**0**	**0**	**0**	**31**	**31**	**0**	**144**	**0**	**0**	**205**				**495**
	Average collision risk for single rotor transit		3.3%																
Stage E – applying avoidance rates																			
	Using which of above options?	**Option 2**	0.00%	0	252	0	0	0	92	93	0	428	0	0	610				**1475**
	Collisions assuming avoidance rate	birds per month or year	98.00%	0	5	0	0	0	2	2	0	9	0	0	12				**29**
			99.40%	0	2	0	0	0	1	1	0	3	0	0	4				**9**
			99.50%	0	1	0	0	0	0	0	0	2	0	0	3				**7**
			99.60%	0	1	0	0	0	0	0	0	2	0	0	2				**6**
Collisions after applying large array correction			98.00%	0	5	0	0	0	2	2	0	9	0	0	12				**29**
			99.40%	0	2	0	0	0	1	1	0	3	0	0	4				**9**
			99.50%	0	1	0	0	0	0	0	0	2	0	0	3				**7**
			99.60%	0	1	0	0	0	0	0	0	2	0	0	2				**6**

Overall collision risk | Sheet1 | Single transit collision risk | Extended | Flightheight | Migrant collision risk | Daylight

Additionally the Band Model spreadsheet data presented as the “Applicant’s position” in REP7-032 are even more confusing. The gannet and kittiwake examples have no value in the “Input Data” sheet for nocturnal activity factor (Figures 1.16 and 1.18). This “Input Data” sheet of the Band Model workbook is where the user should add all the user defined input parameters that the model uses to calculate predicted collisions. The “Overall Collision Risk” worksheet which the Applicant also presents in REP7-032 (e.g. Figures 1.17 for gannet and 1.19 for kittiwake) is where the collision risk outputs that the model has generated are output. The user should not add any data to this sheet. In the Applicant’s example for gannet (Figure 1.17) there is a value in the Nocturnal activity factor cell of 3%. This would have required a NAF of 1.12 to have been added to the “Input Data” sheet (Figure 1.16). The Applicant has added some text to indicate that a NAF of 1.12 was used for the non-breeding season and a NAF of 1.32 for the breeding season (without providing any further information about which months are defined for each season). But the collision risk figures for each month and the per annum totals in Figure 1.17 are based on running the model with a NAF factor of 1.12 equating to 3% daytime activity in all months, not two different NAFs that are applicable to different months. The same applies to the kittiwake information supplied by the Applicant. Further, in the kittiwake data, the input data spreadsheet in Figure 1.18 does not match the output data spreadsheet in Figure 1.19 as the avoidance rates reported in the “Overall Collision Risk” page are not the same as the avoidance rates specified in the “Input Data” page. Therefore the outputs spreadsheet in Figure 1.19 does not represent the results of running the CRM using the input values in Figure 1.18 as implied by the Applicant.

In conclusion, Natural England considers that the information provided by the Applicant in Appendix A of REP7-032 is incomplete, inaccurate and misleading. There remains a lack of transparency or a clear audit trail regarding the Applicant’s assessment of collision risk and this is the reason that Natural England requested that the Applicant publish the Band Model spreadsheets that relate to all the collision risk modelling outputs that they have presented in their assessments [REP1-211 and REP4-130].

ExA Q F.2 : ***What are your views on the mitigation measures that have been set out by the Applicant at Deadline 7 [REP7-030 and REP7-031]?***

Natural England can confirm that raising the minimum blade height is a recognised mitigation technique to reduce collision risk. Whilst we acknowledge that the scenarios referred to within this document do not represent any kind of commitment from the Applicant, we would welcome any changes that would reduce the impacts of this project.

However, given our stated concerns in relation to baseline data, we do not feel it is possible to calculate collision risk with sufficient scientific certainty, and therefore we cannot comment as to the adequacy of the options presented in the context of Adverse Effect on Site Integrity.

We note that the applicant has not presented any mitigation options for displacement impacts.

In relation to REP7-031, we would like to highlight that we find the presentation of the tables are misleading, with particular reference to the 'Natural England' column.

Whilst there are references to the fact that these figures are based on the Applicant's interpretation of Natural England's advice in some places within the accompanying text, this is not clear from the tables themselves. Reference to REP6-043 within the "Natural England" could also make it appear (to those less familiar with the submissions associated with this case) that these figures are taken from an Natural England submission, when in fact this is a submission made by the applicant.

For clarity, Natural England do not support the figures presented in the "Natural England" column due to our concerns regarding the sufficiency of the Applicant's baseline data. However, we can confirm that the figures presented in these columns align to the parameters outlined in our advice.

Overall, Natural England considers that [REP7-031] *Appendix 13 to Deadline 7 submission - Collision Risk Estimates for Mitigation Scenarios* is confusing and difficult to follow as it contains consideration of a raft of different parameter assumptions that are not linked to the two mitigation options that the Applicant presents (raising the lower rotor tip height from 33.17m to 37.5m relative to mean sea level and raising the lower rotor tip height from 33.17m to 40m relative to mean sea level). However, comparison of the figures in the tables presented in Sections 5 (base case), 6 (37.5m mitigation) and 7 (40m mitigation) does indicate the relative effects that raising the lower turbine height would have on predicted collision impacts.

ExA Q F4.3: ***In your Deadline 7 response [REP7-078] you have applied apportioning rates from the digital aerial survey data. Please elaborate on why you consider the age class data from the digital aerial survey to be more suitable for apportioning than the boat-based survey data for each species*****.**

In our Deadline 7 response we selected apportioning rates derived from the digital age class data for two species – Kittiwake and Gannet.

In our written rep (REP1-211) we requested the applicant supply the digital aerial age class data:

7.16. Hornsea Three have presented an apportioning approach for gannet, kittiwake and puffin based on at-sea age class data. As previously requested (EWG meeting, 23.11.17) a detailed breakdown of age class data from boat and digital aerial data sets should be provided in order for Natural England to assess suitability of the two data sets and help to establish suitable apportioning figures.

We further state the following in our written rep:

7.18. Hornsea Three present age class data derived from both boat based survey data and digital aerial survey data. As a general comment on the suitability of the two data sets it is of note that the boat based data is now several years old (2010-2013), and the transects covering the Hornsea Three project site were spaced at 6km and resulted in a maximum coverage of 5%. This compares to the digital aerial data that were from surveys designed specifically for the Hornsea Three project site, cover the 2016 and 2017 breeding seasons, and results in a consistent coverage of 10% of the project site. Furthermore, Natural England note that the digital aerial data collected to inform the Hornsea Three application was collected using four cameras, yet only two cameras have been analysed, and presented within the application, resulting in half the data collected not being presented within the application. Natural England would recommend that that these survey data are analysed and presented, this would increase the sample size (and hence decrease uncertainty) for age class data derived from these surveys, and result in 20% coverage of the project site.

The applicant supplied a breakdown of the boat based age class data at Deadline 1, REP1-169 and the digital aerial age class data at Deadline 3, REP3-026 (results from 2 not 4 cameras). A summary of this data (as calculated by NE) is presented in Table 1 below.

For both species, the total sample size is greater in the boat based data set, however as the applicant notes, the main limitation to ageing birds from the digital data set is the inability to age birds on the water. This means that while the boat based data set is representative of age class ratios for ALL birds (albeit historical data from 2010-2012) the digital aerial data is representative of birds in flight

The key impact for both kittiwakes and gannets is collision risk, and hence birds in flight are the sub-sample of interest – indeed it is the same digital aerial data set (birds in flight only) that is used to calculate the density parameter in the collision risk modelling.

Taking this into consideration, along with the reasons stated above (coverage, date range) Natural England therefore consider that the digital aerial data set is more appropriate to inform apportioning rates.

We also bring to the Examiners attention that in Annex 2 of our Deadline 4 submission (REP4-130) (and repeated this at the ISH5), we highlighted some apparent discrepancies in the digital age class data submitted by the applicant (at Deadline 3) and an earlier report submitted as part of the EWG process (see below).

Furthermore we note that age class data from the same digital aerial surveys (but limited to the time period April 2016- February 2017) is presented in a report prepared and submitted to NE as part of the EWG process (Hi Def 23 May 2017, HC00002-002), On preliminary inspection the data presented in REP3-026 appears to differ substantially from the data presented in the Hi Def report, in particular the proportion of birds aged is considerably higher in the Hi Def report for both gannets and kittiwake. We query why these discrepancies exist and request the applicant submits the Hi Def report (23 May 2017) as part of the examination process.

Table 1: Summary age class data for boat based and digital aerial survey data set – derived from data supplied by the applicant REP1-169 and REP3-026.

Species	Data set	Date range	Sample size	% aged	% adults
Gannet	Boat based – 6km transect spacing across Hornsea 3 project site	March – Sept[1], 2010-2012	1477	42.7	46.8[2]
Gannet	Digital aerial surveys, 2km transect spacing across Hornsea project site plus 4km buffer	March – Sept[3], 2016-2017	793	27.9	62.4[4]
Kittiwake	Boat based – 6km transect spacing across Hornsea 3 project site	March – Sept[5], 2010-2012	5272	30.7%	75.8
Kittiwake	Digital aerial surveys, 2km transect spacing across Hornsea project site	March – Sept[6], 2016-2017	3696	30%	93.1%

[1] No data for Sept 2011 & 2012
[2] Presented as 46.5% by the applicant in REP4-049
[3] No data for March 2016
[4] Presented as 63.3% by the applicant in REP4-049
[5] No data for Sept 2011 & 2012
[6] No data for March 2016