



## **City AM: Women's Super League (WSL) Team of the Year 2020**

Matthew Belford<sup>1</sup>, Jack Morris<sup>2</sup>, James Powell<sup>3</sup>

Strictly Private and Confidential

21 December 2020

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<sup>1</sup>Matthew Belford, Director, Carteret Group, London. T: +44 20 3876 2414. E: mbelford@carteret.group

<sup>2</sup>Jack Morris, Corporate Analyst, Carteret Group, London. T: +44 20 3876 2414. E: jmorris@carteret.group

<sup>3</sup>James Powell, Chief Executive Officer, Carteret Group, London. T: +44 20 3876 2414. E: jpowell@carteret.group

## 1. How were these players selected?

The players chosen for the Carteret Analytics WSL Team of the Year 2020 have been selected based on their *Carteret Rating*. The *Carteret Rating* is a highly accurate and objective proprietary algorithm, developed to determine how good a player is, by assessing their overall contribution to their team winning football matches. The data from every WSL match played in 2020 has been analysed to select the WSL Team of the Year 2020.

The *Glossary* located at the end of this report will provide more information about the *key terms* and *metrics* used in this research paper.

## 2. The WSL Team of the Year 2020 is...

Exhibit 1: Formation chart for the WSL Team of the Year 2020

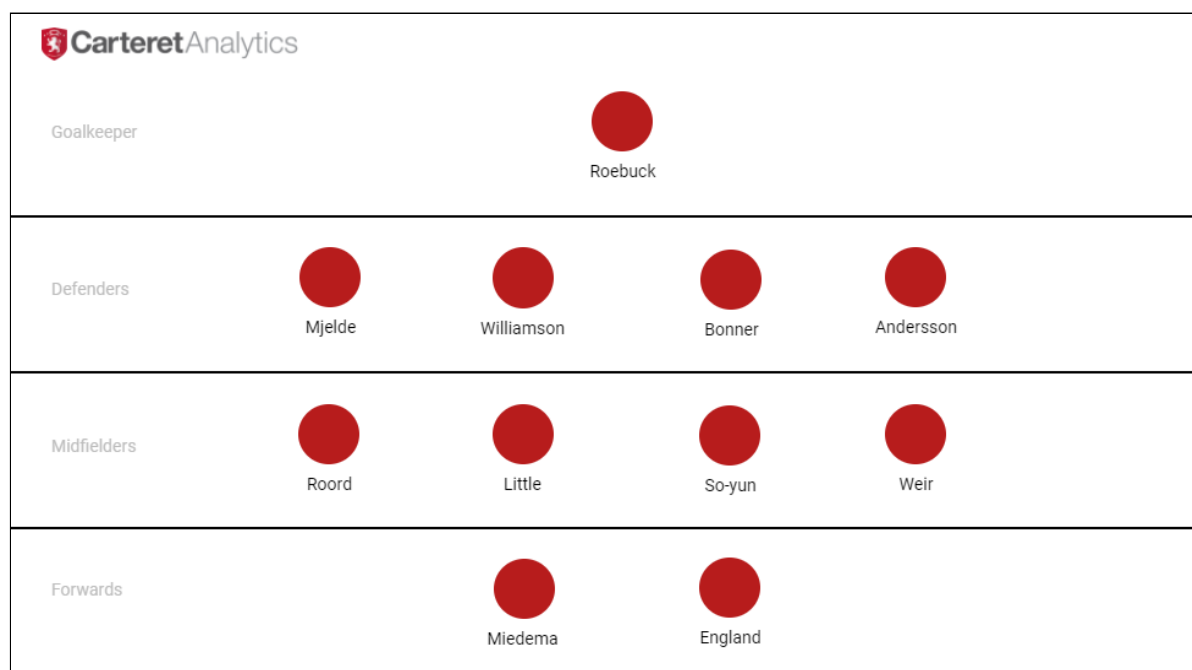


Exhibit 2: Table outlining the best WSL players of 2020, based on their objective performance levels

CarteretAnalytics		WSL' - Team of the Year 2020		
Player	Principal Position	Team	Carteret Rating	CRCI
Vivianne Miedema	Centre Forward	Arsenal	<b>389.3</b>	0.18
Bethany England	Centre Forward	Chelsea	<b>299.3</b>	0.26
Kim Little	Midfielder	Arsenal	<b>281.5</b>	0.30
Caroline Weir	Midfielder	Manchester City	<b>269.6</b>	0.24
Ji So-yun	Midfielder	Chelsea	<b>262.7</b>	0.23
Jill Roord	Midfielder	Arsenal	<b>253.0</b>	0.37
Maren Mjelde	Right-back	Chelsea	<b>221.1</b>	0.18
Leah Williamson	Centre back	Arsenal	<b>219.9</b>	0.17
Ellie Roebuck	Goalkeeper	Manchester City	<b>218.8</b>	0.15
Jonna Andersson	Left-back	Chelsea	<b>214.0</b>	0.19
Gemma Bonner	Centre back	Manchester City	<b>213.0</b>	0.20

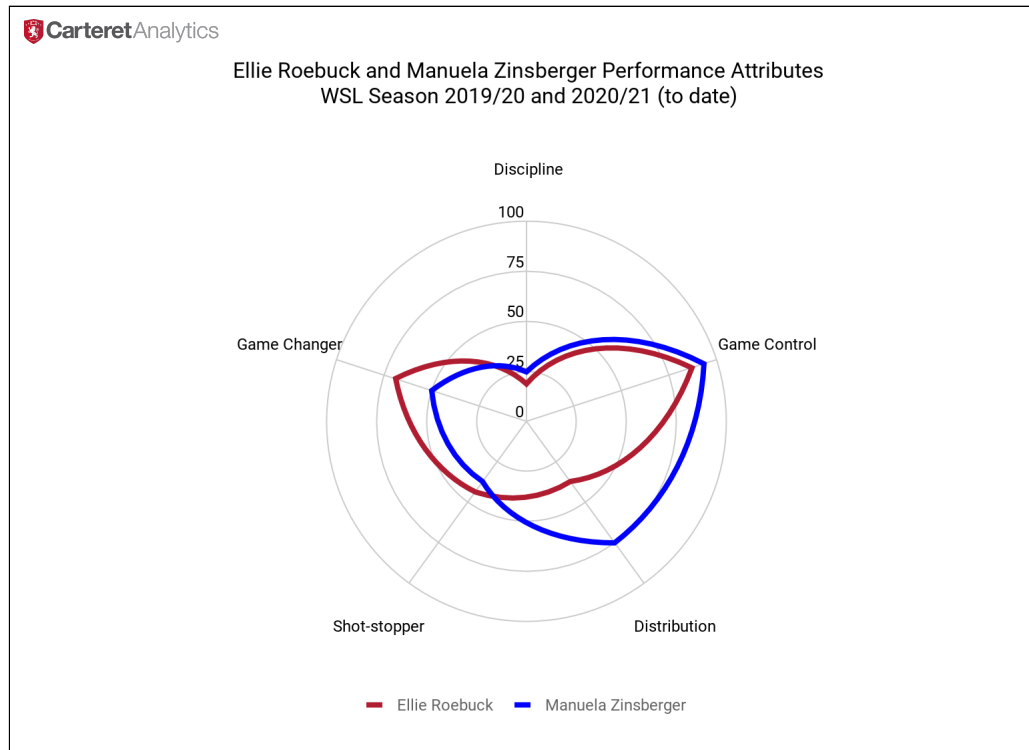
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## 2.1 Goalkeeper

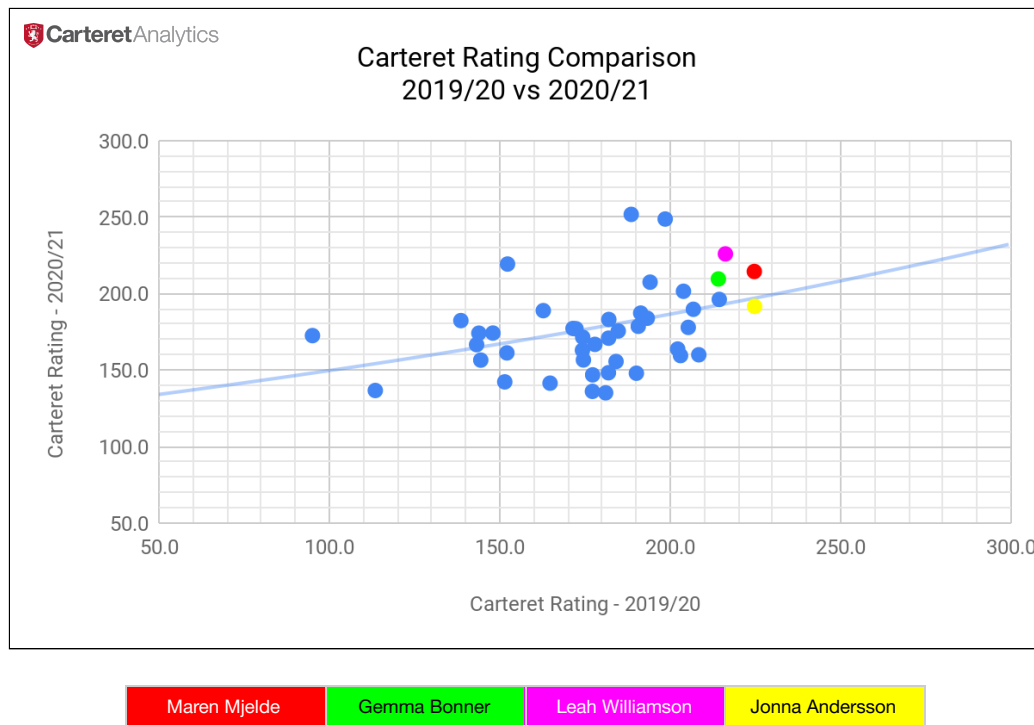
The quantitative data analysis shows that objectively Manchester City's **Ellie Roebuck (Carteret Rating 218.8)** was the best performing goalkeeper in 2020. The radar chart in Exhibit 3 (below) compares **Roebuck** to Arsenal's **Manuela Zinsberger (Carteret Rating 215.4)**, who was objectively the second-best goalkeeper in the WSL. The data suggests that it is **Roebuck's Distribution and Game Control** matchplay attributes that set her apart from her closest rival.

Exhibit 3: A Radar Chart to show Ellie Roebuck's Performance Attributes in the 2019/20 and 2020/21 season (to date).



## 2.2 Defenders

Exhibit 4 (below) showcases a scatter graph with each defender in the Women's Super League plotted. We can see that based on the results, all of our selected defenders are on a positive trajectory bar one. **Jonna Andersson (Carteret Rating 214.0)** is still objectively one of the best defenders in the league however, (by her own standards) she is struggling to find the same level of form that she previously displayed in the 19/20 season. Arsenal centre back **Leah Williamson (Carteret Rating 219.9)** is showing the greatest level of improvement within our selection, up 5% on her performances from the 19/20 season. Despite this, the data suggests that overall, **Maren Mjelde (Carteret Rating 221.1)** is still the strongest defender in the league. **Gemma Bonner (Carteret Rating 213.0)** is displaying the highest level of consistency amongst the defenders with a delta of just 2% when compared to last season's *Carteret Rating*.

Exhibit 4: Scatter graph plotting the *Carteret Rating* for all WSL defenders during seasons 2019/20 and 2020/21 (CRCI <=1.00)

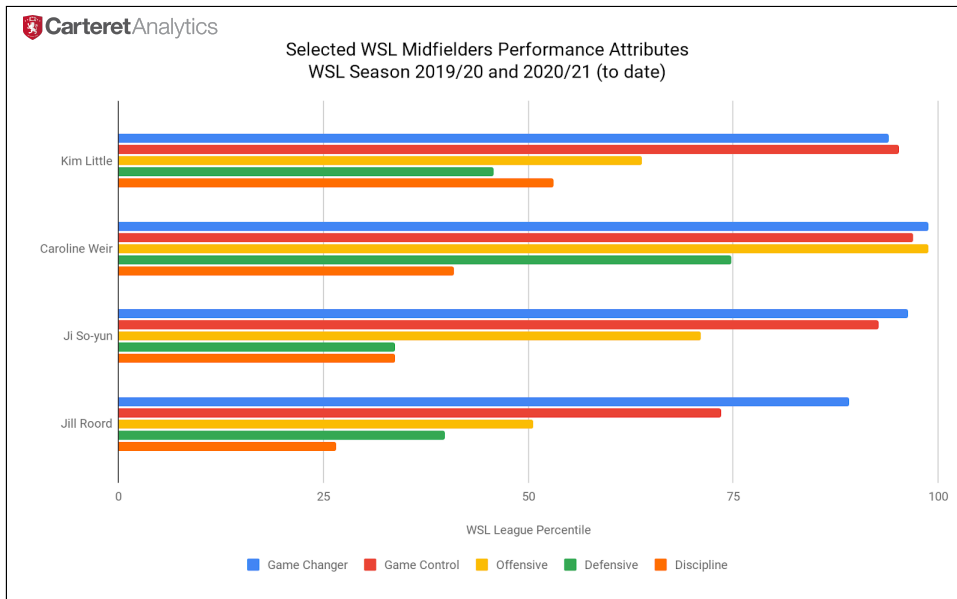
## 2.3 Midfielders

The data analysis indicates that the best performing WSL midfielders in 2020 were Arsenal's **Kim Little (Carteret Rating 281.5)** and **Jill Roord (Carteret Rating 253.0)**, Manchester City's **Caroline Weir (Carteret Rating 269.6)** and Chelsea's **Ji So-yun (Carteret Rating 262.7)**. The horizontal bar chart in Exhibit 5 (below) shows that of the four selected players, **Caroline Weir** demonstrates the strongest matchplay attributes in all but one of the five categories. Interestingly, **Weir** does not have the highest *Carteret Rating* of the four players, she is objectively the second-best midfielder in the WSL according to the *Carteret Rating*, behind the highly experienced **Kim Little**. The data suggests that if **Weir** can improve her *Discipline* attribute, it may be possible to achieve the status of the best midfielder in the league. At the age of 25, **Weir** is yet to reach her peak, the data analysis shows that WSL players reach their optimal performance levels between the ages of 27 to 29. All four of the selected midfielders are in the top 25th percentile of the *Game Changer* attribute when compared to all other WSL midfielders, suggesting that they all have the ability to transform a match.

Exhibit 5: Horizontal bar chart illustrating each player's objective performances, by category of Attribute, vs WSL League Percentiles

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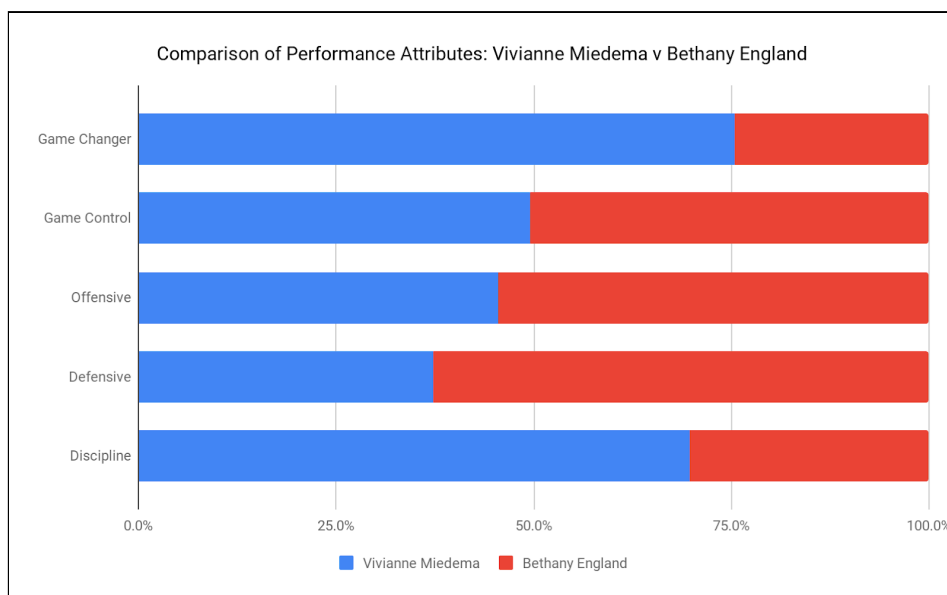
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## 2.4 Centre Forwards

Recent media articles have suggested that **Vivianne Miedema** is one of if not the best centre forward in the world. This is supported by the data analysis which shows that **Miedema** has the highest *Carteret Rating* (**389.3**) of any WSL player in 2020. The stacked bar chart in Exhibit 6 (below) shows a direct comparison of the matchplay attributes of **Miedema** and objectively the second-best centre forward in the league, Chelsea’s **Bethany England** (*Carteret Rating* **299.3**). **Miedema** dominates **England** when comparing their *Game Changer* attribute but does not offer her team as much in terms of their comparative *Defensive* attributes. **Miedema** has demonstrated a *Carteret Rating* over **370.0** in each of the previous 3 seasons and continues to perform at this exceptionally high level in the current 2020/21 season.

Exhibit 6: Horizontal stacked bar chart illustrating **Miedema’s Attribute** percentiles vs **England’s**



## 2.5 Where is Lucy Bronze?

**Lucy Bronze** recently completed her transfer to Manchester City in September 2020 and therefore, cannot be included within the Team of the Year 2020 due to an insufficient amount of game time within the division. It is important to note however, that **Bronze** currently holds a *Carteret Rating* of **251.9**. This means that she would have been selected as part of the Team Of The Year if her performances had been sustained over a greater number of games within the WSL.

## 3. Glossary

### Carteret Rating

This is a proprietary and objective method of determining how good a football player really is (and aims to accurately predict future performance in various scenarios set by the football club). It is based on a series of leading-edge algorithms that have been developed by Carteret Analytics. These algorithms have evolved from the quantitative analysis utilised in investment banking by its sister company, Carteret Capital, for, inter alia, asset and equities trading strategies, pricing and hedging of derivatives, portfolio optimisation and risk management. The algorithmic methodology assesses each player by identifying every match in which he/she has been involved (for which we have data) and then identifying and isolating the Key Match Events (“KMEs”) in each and every one of those matches. Then, for each and every KME, in each and every single match, we analyse that player’s contribution to each of those KMEs. This is a substantial piece of analysis, and one which produces a unique *Carteret Rating* for the player.

It is a dynamic rating, and it changes with each additional match played. Its ‘beauty’ is in its pure objectivity - ignoring characteristics such as age and nationality, and avoiding the ‘noise’ of subjective considerations that are frequently taken into account (often wrongly) in trying to determine the ability, attributes, characteristics and the ‘fit’ of a player into the club style or systems. It is an exceptionally accurate rating, with an *r-squared value* between 0.88-0.90 for Premier League players - demonstrating that it is very precise at predicting how good a player will be in the future. The dynamic nature of the Carteret Rating also enables Carteret Analytics to accurately predict the impact of the player in different clubs and different leagues.

### Carteret Rating Confidence Index (“CRCI”)

We are in the business of predictions, and, more specifically, accurately predicting the future performance levels of players, managers and teams - in a variety of league, style, player combination and formation scenarios. We have built a series of algorithms that are able to utilise a huge amount of raw data to produce highly accurate predictions - which we constantly measure after every match to ensure the predictive levels (*r-squared value*) remains high. The line of predictive extrapolation in any data analysis will always be dependent on the quality and quantity of raw data. We are usually very confident with the quality of raw data that we are able to utilise, but sometimes the quantity of the raw data is lower for one player for a particular period than another player. We need to recognise that difference in quantity, and the CRCI is our mechanism for doing so. A CRCI of 1.00 or lower suggests an extremely high level of confidence that the quantity and quality of the raw data is of a sufficiently high level to produce a strong extrapolated line of prediction.

### Attribute

The purpose of this Report is to provide an objective analysis of a player’s performance levels and ability, and to predict what these might be in the future at his current or an alternative football club. The *Carteret Rating* provides a highly accurate and objective rating of the player, and which provides a means for an

objective measure against every other player - it is a holistic measure of overall performance and avoids all the noise created by subjective or other poor data analysis.

Nevertheless, we are able to break down a player's performance into a number of Attributes - Game Changer, Game Control, Offensive, Defensive and Discipline. This provides greater clarity on the player's strengths and weaknesses, and enables us to provide insights into **how** the player actually contributes to increasing the probability of his team winning matches. Where the Carteret Rating provides the overall (objective) measure of the player's performances, the Attributes allow us to peel back the layers of those performances - to identify strengths and weaknesses, but also to help us understand how he might fit into preferred styles and formations. These Attributes have been quantitatively constructed based on rigorous data testing, to provide an accurate representation of how a number of KMEs can be combined to build a picture of how a player can best contribute in a match to increase the probability of the team winning.

The **Game Changer** Attribute measures a player's creation of, or contribution to, specific KMEs that were demonstrated to move the in-match position to a better score position (weighted against the extant opposition score position), or to retain a score position in circumstances where there was a material probability that the score position could have moved against the player's team.

The **Game Control** Attribute measures a player's ability to maintain a positive score position, and avoid a reduced or negative score position, through a variety of in-match scenarios such as proactive ball control and movement, maintenance of possession, and transitioning between offensive, defensive and 'special teams' types of play (moving the ball and gameplay away from dangerous scenarios in a positive score position, late in the match). It is a good measure of tactical leadership on the pitch, and it is an extremely beneficial Attribute for teams that value a possession based style of play as well as those teams that need to contain the game for periods of time.

The **Offensive** Attribute measures a player's ability to create and contribute to 'positive' KMEs that actually provided an incremental step to offensively maintain an in-match score position or to positively transform an in-match score position. This will involve forward play, as well as play in a offensively forward zone. Likewise, the **Defensive** Attribute measures a player's ability to create and contribute to 'protecting and continuing' KMEs, i.e. to avoiding a reduced and/or negative in-match score position. All players will have both an Offensive and Defensive Attribute, whatever their position, and these Attributes (as with all Attributes) are generally measured against a League Percentile of other players in the same position (in a particular league). High levels for **both** the Offensive and Defensive Attributes often indicate a player's [strong] ability to transition quickly and effectively between attack and defence (and vice-versa).

The **Discipline** Attribute is a useful measure of a player's ability to avoid losing control of various aspects of a match **and** to avoid reducing the options of the team to maximise the probability of winning future matches because he has been suspended through poor Discipline. Poor in-match Discipline often leads to loss of possession, and frequently leads to negative KMEs. It is usually measured on charts *in the positive* - i.e. on radar charts or bar charts set against the League Percentiles for the Attribute, a player whose Discipline is in the bottom 25th League Percentile has a poor Discipline Attribute.

## Characteristics

These are individual elements of a player's gameplay, and each forms what we refer to as the player's 'Atomic Structure'. A player's relative success in each individual Characteristic teaches us very little about their ability to contribute to their team increasing the probability of winning football matches. We currently have 33 Characteristics that we combine in a series of algorithms with a player's Attributes, and measure against the creation/contribution to KMEs, in every single minute or every single match in which the

player has participated (for which we have data). Then the relative success of each part of the 'Atomic Structure' is plotted across 42 measures to build a picture of the player and their performances. These

can then be used to recreate the 'Atomic Structure' of other players (e.g. finding a quasi Virgil van Dijk at half the cost), or recreating parts of a successful team in the aggregate (again, ideally, at a much lower cost).

## League Percentiles

The mechanism to measure and rate a player against their peers (usually in the same position) in a particular league. References are often made to the lower 25th League Percentile (which indicates a poor performance measure), 50th League Percentile (which is the average measure), and in the 75th League Percentile (which indicates high performance - in the top 25% of players in that League).

## Key Match Events (“KMEs”)

Key Match Events (“KMEs”) are events that we have identified (through constant quantitative testing) as having the greatest influence on the outcome of a football match. Our current quantitative modelling includes 42 KMEs, and in very general terms these are events that, to varying degrees, lead to a goal being scored; could lead to a goal being scored; lead to a goal being conceded; or could lead to a goal being conceded. The *Carteret Rating* - which is obviously the proprietary objective measure that permeates everything that we do - measures a player's creation and contribution to each and every KME, in each and every match for which we have data on that player. This is a huge piece of data analysis, and is the reason why the *Carteret Rating* is so accurate and predictive.

## 4. Contact Details

Carteret Analytics is part of the Carteret Group of companies, based in the City of London, New York and Geneva. It provides leading-edge quantitative analysis and commercial analytics to clients worldwide, with particular expertise in the sports sector. In football our work includes player rating and valuation, head coach assessment, team performance analysis, and applying proprietary analytics to transform commercial revenues.

### Further information and contact details

If you have any questions, or would like to enquire about further services provided by the Carteret Group, then please feel free to contact one of the team members listed below.

#### **Matthew Belford**

Director - Carteret Group

E: [mbelford@carteret.group](mailto:mbelford@carteret.group)

T: +44 20 3876 2414

#### **James Powell**

CEO - Carteret Group

E: [jpowell@carteret.group](mailto:jpowell@carteret.group)

T: +44 20 3876 2414

#### **Jack Morris**

Corporate Analyst - Carteret Group

E: [jmorris@carteret.group](mailto:jmorris@carteret.group)

T: +44 20 3876 2414