



# Have We Reached Peak Archaeologists? (in the United Kingdom)

A Landward Research White Paper on  
Commercial Archaeology Job Demand

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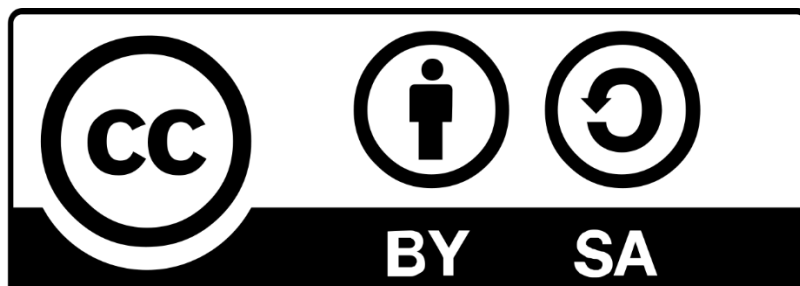
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## Introduction: Commercial Archaeology is in Trouble?

**Lack of Archaeologists 'will Bring UK to a Halt'** (Milmo 2016)

**British archaeology is in a fight for survival** (Shepperson 2017)

These are some of the more dramatic headlines on recent news articles discussing the state of commercial archaeology in the UK. Though, they are more succinct than the Daily Mail's article title,

**'HS2 and Homebuilding Schemes 'at Risk of Delay' Because Britain Is Running out of Archaeologists to Examine Relics Dug up during Construction'** (Mailonline 2016)

Following the news, one would believe that commercial archaeology in the UK is in a crisis due to a lack of archaeologists, but is it?

All the articles base this belief, of a lack of archaeologists to handle projects, on the results from the 2016 report, *National Infrastructure Development and Capacity 2015-33: An Assessment* (NIDC). The NIDC report examined future infrastructure needs and estimated that there will be a '...shortage of between 25 and 64% in the available workforce needed to service the archaeological needs ...' (p.3).

There is a problem with the data that the NIDC used, which means there will **not** be such a significant increase in demand for archaeologists because of large infrastructure projects. This white paper explores that problem and examines if it is possible to predict future job demand in commercial archaeology.

## Why is there no infrastructure boom coming?

The NIDC report presented two similar models for estimating the number of full time equivalent years<sup>1</sup> of archaeological work created by £1 billion of new construction. One estimate was 41 FTE for every billion pounds spent on new construction and other was for between 19-25 FTE<sup>2</sup>, again for every billion spent. The report applied those potential ratios to the estimated £464.9bn in future infrastructure spending anticipated from 2014-15 to 2020-21 to estimate job demand.

The £464.9bn of future work estimate came from the National Infrastructure Plan December 2014<sup>3</sup> (HM Treasury 2014) (NIP) which in turn obtained those numbers from another source, the 'infrastructure pipeline'. The 'pipeline' is described in the NIP as 'a forward-looking, bottom-up assessment of planned public and private infrastructure investment in the UK' (HM Treasury 2014 p. 11). The 'infrastructure pipeline' is essentially a list, updated yearly, of large infrastructure projects<sup>4</sup>, both privately and publicly funded.

The problem with using the 'infrastructure pipeline' as a basis for estimating future infrastructure spending is that it includes projects and programmes that were already started but not yet finished. The 2014 National Infrastructure Plan stated, 'Over 60% of the projects and programmes in the pipeline (excluding oil and gas) are now in construction or part of an active programme (compared with 45% in 2013)' (p. 13). Most of that 'future' £460+ billion, that the NIDC report used in its calculations, had already been spent or was in the process of being spent. Considering commercial archaeology, specifically survey and excavation, usually occurs at the beginning of projects it is likely that most of the 'future' (in 2014) field archaeology work had already started or even finished, by the time the NIDC report was published.

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<sup>1</sup> That is one person working for one year full-time as an archaeologist. Which could be two people working 50% part-time for a year, or three people, working .333 for a year, etc.

<sup>2</sup> 41 FTE per £1 billion spend assumes that £1.0bn construction spending translates to £2.3m in archaeology spend that in turn equals 41 person years based on the assumption that each job is the result of £56,237 spending. That number is derived from the Landward Research Ltd labour market reports from 2013 on turnover per employee. The NIDC never explains how it gets the 19-25 FTE numbers other than to suggest it results from dividing the number of jobs by new construction spending at particular points between August 2007 and December 2012. What those points are is never mentioned and as such this remains a black box method in which there is no way to evaluate how those numbers are derived.

<sup>3</sup> The NIDC does not cite a source for the £464.9 billion figure. However, in the 'Links and Further Reading' section of the report there are references to the 'National Infrastructure Plan December 2014'. The numbers mentioned in the National Infrastructure Plan 2014 (NIP) match the numbers presented in *Table 1: Planned infrastructure projects 2015–33* (p. 5) of the NIDC report and is likely the source.

<sup>4</sup> Large projects are defined as those over £50 million or programmes of smaller projects that when added together are over £50m.

The following table provides a breakdown of the predicted capital cost in *Table 1* of the NIDC report and how much of that was already in construction:

Area	Predicted	Already in Construction	Actual Future Work
Roads	15.9	2.5	13.4
Rail	86.9	34.8	52.1
Local Transport	32.3	19.8	12.5
Aviation	6.1	5.7	0.4
Ports	1.2	1	0.2
Energy	274.9	194.7	80.2
Floods & Coastal Erosion	3.7	1.9	1.8
Communications	11	11	0
Water	30.9	4.1	26.8
Waste	2	1	1
<b>Total</b>	<b>464.9</b>	<b>276.5</b>	<b>188.4</b>

**Table 1: By infrastructure category the predicted future spending in the NIDC, the amount listed in the NIP as already in construction, and the actual future work. All numbers are £billions.**

Only an estimated £188.4bn in new infrastructure work was anticipated after 2014, not £460+ billion. There will be not be a 25-64% increase in commercial archaeology jobs, as estimated, at least not from large infrastructure projects.

### What Does the 'Pipeline' Show?

The 'pipeline' is designed to be updated yearly and future spending is added as new projects are created. So that £188.4bn of future work will have more projects added to it and increase in size. However, an examination of 'pipeline' trends and more recent data does not indicate that there will be a significant increase in large infrastructure projects.

Untangling the 'pipeline' data is not straightforward, as the different years of pipelines are not comparable. In 2014, Oil and Gas projects, worth £53bn, were added to the pipeline, increase the total amount significantly (HM Treasury 2014). But this is not new construction, it just means that Oil and Gas projects were now being counted in the pipeline when they hadn't been before – but they always existed. Similarly, in the 2016 National Infrastructure Plan £58bn was added to the pipeline, this time for social infrastructure<sup>5</sup>. The 2016 plan estimated that, 'The average annual investment excluding social infrastructure is around £48 billion.' (p. 24). If we strip out both the Social Infrastructure and Oil & Gas projects, the total value of the pipeline is essentially flat<sup>6</sup> since 2013, with some year to year fluctuations.

<sup>5</sup> All of the National Infrastructure Plans (in 2016 called the National Infrastructure Delivery Plan) can be found here- <https://www.gov.uk/government/collections/national-infrastructure-plan>

<sup>6</sup> The numbers used for this were the raw data of the 'pipeline' provided as an Excel sheet download from the gov.uk website here: <https://www.gov.uk/government/publications/national-infrastructure-pipeline->

Growth has only come from adding new categories, not from increased spending in existing categories:

Year	2012	2013	2014	2015	2016
Communications	16.4	14.4	11	7	15.4
Energy	176.5	218.9	274.9	244.9	206.3
Flood	5	4	3.7	3.5	4.1
Intellectual capital/ Science and Research	0.2	0.9	1.4	1.4	6.2
Transport	92.3	121.5	142.3	127.4	138.3
Waste	3.1	2.3	2	1.1	0.5
Water	16.5	15.2	30.9	25.7	74.8
<b>Total</b>	<b>309.9</b>	<b>377.1</b>	<b>466</b>	<b>411</b>	<b>502.3</b>
Oil & Gas			53	34.3	34
Social and other					56.6
<b>Total without Oil &amp; Gas and Social</b>	<b>309.9</b>	<b>377.1</b>	<b>413</b>	<b>376.6</b>	<b>411.7</b>
Five Year average	61.9	75.4	82.6	75.3	82.3

**Table 2: Pipeline estimations of total value of projects in pipeline by sub-categories from 2012-2016, in £billions (rounded to nearest .1). This does not take into account inflation.**

This is good for archaeology, as the archaeological jobs currently supported by large infrastructure projects are unlikely to disappear for the foreseeable future. The flipside is that there are no new jobs coming from these sorts of projects as spending is relatively stable. Future funding would need to be higher than current levels to result in a larger workforce, otherwise it would just fund current positions or their equivalents<sup>7</sup>.

Whenever a Minister delivers a statement about spending on x or y projects most of the money is coming from funds freed up from older projects ending. While it does represent new spending, it does not usually represent significant increased spending and such

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december-2014 here: <https://www.gov.uk/government/publications/national-infrastructure-and-construction-pipeline-2016> and here: <https://www.gov.uk/government/publications/national-infrastructure-pipeline-2013>

<sup>7</sup> A hypothetical example of this problem would be if there were £50 billion in large infrastructure work in 2017 and every £1bn of such work would support the jobs of 50 archaeologists. That would mean that the jobs of 2,500 archaeologists would be supported by that £50bn in 2017. Each year going forward the government and private sources would have to commit £50bn to infrastructure to maintain those levels otherwise those archaeological jobs would disappear. If the pipeline showed that there was £200bn in future work over the following four years until 2021, that would mean an average of £50bn per year. Those jobs would be maintained but there would be no more money to increase the workforce. Moreover, if inflation was at 2% in 2017 the level of expenditure would need to be £51 billion in the following year just to keep those all those archaeologists employed without reducing their real pay.

announcements should be taken with a heavy dose of scepticism that it will make a difference to the economy, other than to maintain current levels of infrastructure spending.

### **The Pipeline is Unreliable**

Even these results need to be taken with a healthy dose of scepticism as the pipeline data is not a reliable resource to estimate future construction needs. The pipeline data are not fully inclusive of all large infrastructure projects<sup>8</sup>. Moreover, the Excel spreadsheets containing the data for the pipeline comes with this warning-

‘The pipeline is based on unaudited administrative data and should not be considered as national statistics or as official statistics.’

### **Archaeology and Infrastructure**

In summary, the data used to estimate future archaeology job demands does not in fact show significant growth in large infrastructure project spending. It shows relatively stable spending, but even then that data is suspect and of unknown quality. This does not mean there will not be an increase in archaeology job demand. We may very well see increases of 20-60% in jobs, in fact since 2014 we have. What this does mean is that attempts to model such increases are not correct and that the increases are a coincidence, not the result of accurate modelling.

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<sup>8</sup> The Infrastructure reports warns that the ‘pipeline’ is not comprehensive but it is working towards that by adding Oil and Gas, Social Infrastructure, *etc.* but that then raises the issue of compatibility.

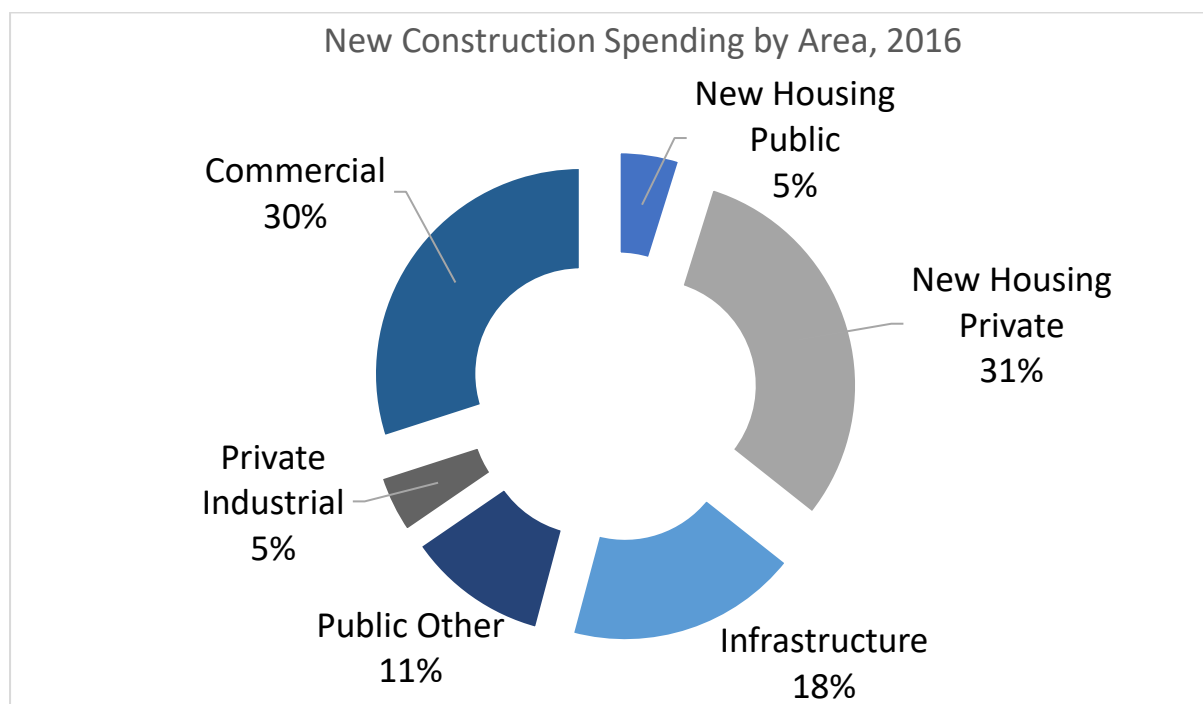


## Can We Estimate Future Commercial Archaeology Job Demand?

The NIDC report presented a methodology to estimate future job needs:

1. Calculate the number of jobs in archaeology created by money spent on construction.
2. Estimating future construction spending to get future demand for archaeological jobs.

While there are problems with estimations of future infrastructure demand this methodology has potential. Infrastructure made up less than a fifth of new construction spending in 2016 (Figure 1) so even if the numbers had been accurate we would still need to look at the other 80% of construction to accurately predicted future job needs. Might it still be possible to achieve the NIDC authors' goals of modelling future job demand? The remainder of this white paper explores efforts to investigate such a possibility.



**Figure 1: Percentage, by top level category, of total New Construction spending in 2016.**  
Source (ONS 2017b) data.

### Relationship Between Construction and Archaeology Jobs

First, we need to establish how many archaeology jobs are created by construction work. No one has established a correlation, statistically, between money spent on construction and commercial archaeology jobs. Common sense tells us there is a correlation but an examination of the numbers, surprisingly, shows that at first glance this correlation is weak

and it is not as simple as comparing spending on construction to the number of jobs in commercial archaeology.

## Data Sources

We have a time-series dataset of jobs in commercial archaeology from mid-2007 until the end of the 2016-17 financial year. This comes from several report series – *Profiling the Profession* (Aitchison & Edwards 2008, Aitchison & Rocks-Macqueen 2013), *Job Losses in Archaeology* (Aitchison 2010, 2011a, 2011b), *State of the Archaeological Market* (Aitchison 2011c, 2012a, 2012b), *Heritage Market Survey* (Aitchison 2014) and the *Archaeological Market Surveys* (Aitchison 2015, 2016, 2017). From the Office for National Statistics (ONS), we have data on ‘New Work’ undertaken in construction (ONS 2017b), the type of work that is most likely to lead to archaeological investigations<sup>9</sup>.

Comparing the results of the numbers of commercial archaeology jobs from those surveys with their corresponding quarterly results for New Work, using linear regression<sup>10</sup>, found a coefficient of determination ( $R^2$ ) of 0.35.

$R^2$  is a measurement of how the change in one variable affects the change in another. This is on a 0 to +/-1 scale; 0 means there is absolutely no correlation between the changes in two variables and +/-1 means there is perfect correlation. A low number like 0.35 is not a bad thing. In certain fields, just being able to show that some of the results are influenced by a variable is valued. However, for attempting to predict future demand for jobs in archaeology this is disappointing as it indicates that two-thirds of the change in the numbers of commercial archaeology jobs is not related to construction spending and we don’t know what those other influencers are.

The New Work figures cover the total spend throughout projects. If a project lasts 10 years then, for 10 years, the money spent counts as New Work money for each year. Commercial archaeological work typically takes place before construction or early in the process. Another metric provided by ONS is ‘New Orders’ (ONS 2017a). These are ‘contracts for new construction work awarded to main contractors by clients in both the public and private sectors’<sup>11</sup>. This captures the work as it starts, when archaeological work is most likely to occur. I thought this would better capture when archaeological activity occurs and thus

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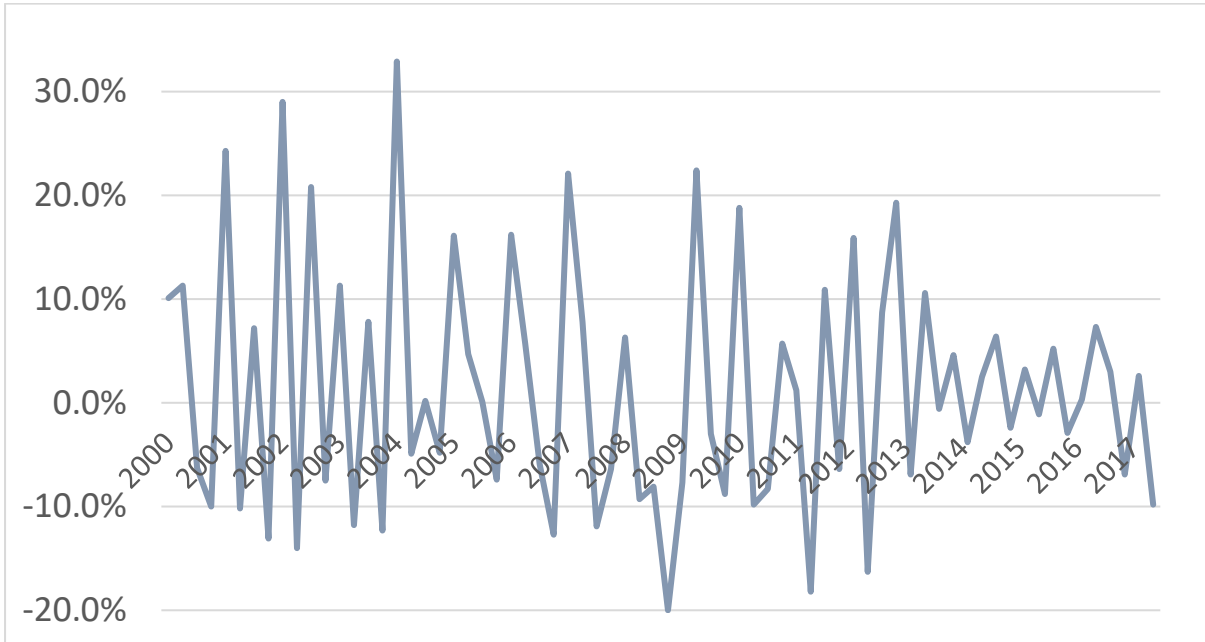
<sup>9</sup> ‘Includes extensions, major alterations (improvements), site preparation and demolition, except for housing where work done on improvements, extensions and alterations and house/flat conversions is included under repair and maintenance. New construction work includes houses converted to other uses.’ See ONS 2017c for full details on definitions and methodology of how these data were collected.

<sup>10</sup> Linear regression is a linear approach to statistically modelling the relationship between two variables (modified version of Wikipedia definition).

<sup>11</sup> ‘...including extensions to existing contracts and construction work in “package deals”. Also included is speculative work, undertaken on the initiative of the firm, where no contract or order is awarded; the value of this work is recorded in the period when foundation works are started, such as on houses or offices for eventual sale or lease.’ See ONS 2014 for full details on definitions and methodology of how these data were collected.

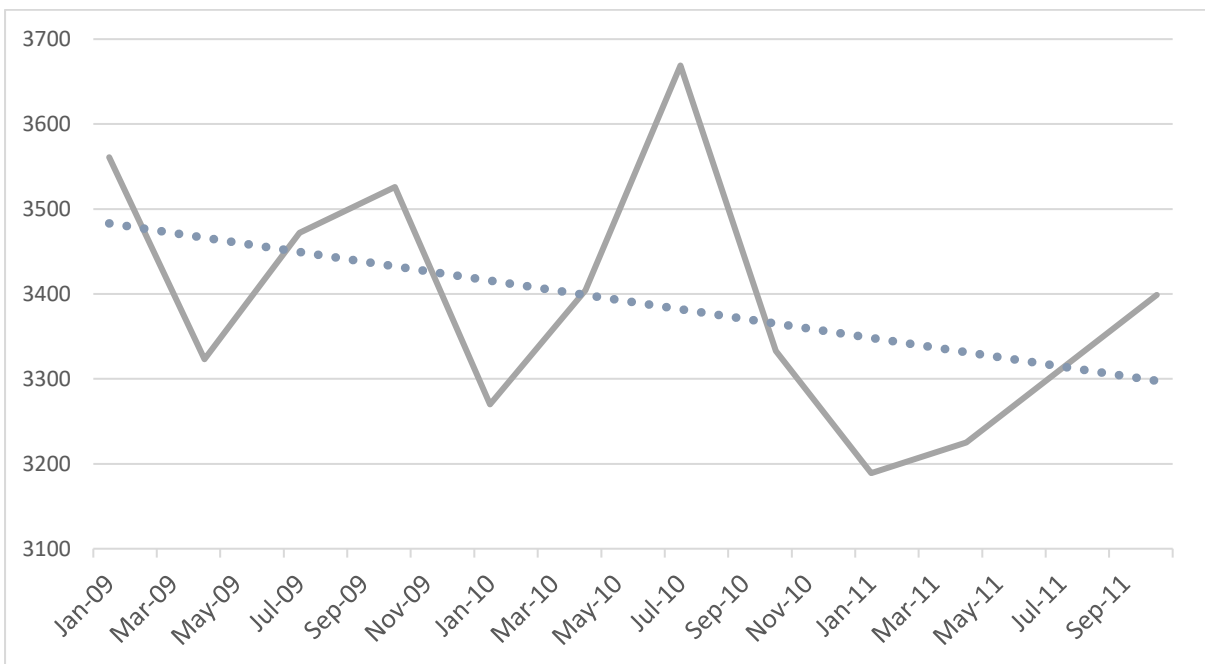
might correlate better, but I was wrong. It was worse. The  $R^2$  for New Orders and jobs in commercial archaeology was 0.17.

These calculations were based on quarterly estimates of jobs and construction spending. These data are very noisy. The graph below shows the percentage of change, quarter-to-quarter, for New Orders.



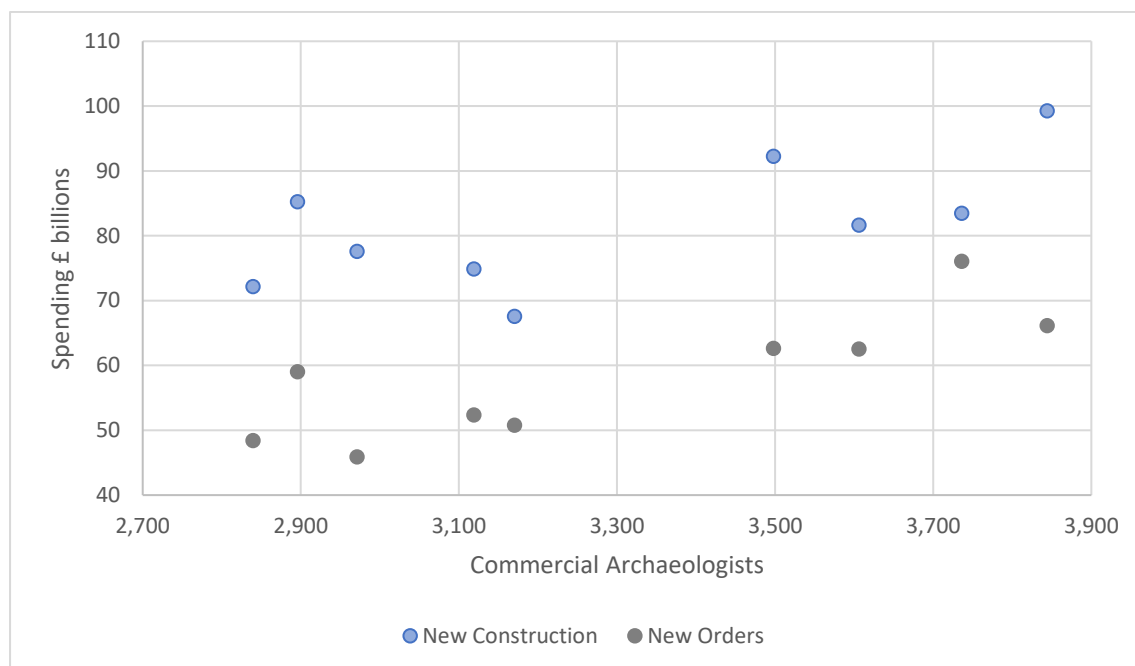
**Figure 2: Percentage of change in 'New Orders' from quarter-to-quarter, from 2000 to the second quarter of 2017. Data source ONS.**

Similarly, the data for commercial archaeology jobs, quarter-to-quarter, are noisy as well. While the trend was downwards from 2009 to 2011 the number of jobs fluctuated:



**Figure 3: Number of commercial archaeology jobs (not adjusted) for each quarter between June 2009 and September 2011. Source: Landward Research Ltd Labour Market Reports.**

I thought that flattening out the fluctuations by averaging out the results from quarters to years might reduce this variation and increase correlations. The number of jobs for archaeologists was averaged for each calendar year and the total spending on construction per calendar year was used for New Work and New Orders (Table 4).



**Figure 4: Calendar year average for commercial archaeology jobs (not adjusted, source Landward Research Ltd reports) compared to New Work and New Orders in same year (Source ONS, in £billions). Construction figures have been adjusted to 2017 equivalent.**

While the trends appear to correlate somewhat (Figure 4), this did not result in significant improvements of  $R^2$  for New Work (0.116), although New Orders improved to 0.498. However, switching to financial years, adjusting both archaeology jobs and the construction numbers, improves  $R^2$  for New Builds to 0.565 and for New Orders to 0.537 (Table 5).

The low  $R^2$  was the result of the data being noisy. Averaging out the results over longer periods and switching to fiscal years resulted in an improvement in modelling.

### Archaeology Numbers Adjustments

A final adjustment to the data was made to the archaeology jobs data, and that improved the results.

The methodology used for the various surveys of the numbers of people in work in commercial archaeology, excluding the *Profiling the Profession* reports, was to survey a sample of commercial archaeology employers. The change in their employment figures, positive or negative, was then applied to the results of the previous survey to get updated

numbers of commercial archaeology jobs *e.g.* if the sample showed a 5% increase than a 5% increase was applied to the previous total estimated number of commercial archaeology jobs. This is a rapid and effective method to produce a time-series of job changes but it does mean that changes in numbers can cascade. If one of the years had unusually high numbers, say 500 more than expected, then all following years would also be higher than might have been expected by 500.

There was a significant drop between April 2012 (State of the Archaeological Market April 2012) and December 2012 (Profiling the Profession 2012-13). This could be due to seasonality or another variation in the data. However, the authors of *Profiling the Profession 2012-13*, myself and Kenneth Aitchison, discussed (during the running of the *Profiling the Profession* survey<sup>12</sup>) the possibility that the 2007 numbers may have been too high. This was based on the idea that only two previous *Profiling the Profession* surveys had been completed before 2007 so there were only two data points to set trend lines. Those data points indicated that the total numbers of all archaeological jobs were increasing. But now know that was not the case. In 2006 the number of archaeologists employed by local planning authorities in heritage manager roles began to drop, two years before the recession (Historic England, the Association of Local Government Archaeological Officers and the Institute of Historic Building Conservation 2017). It was discussed informally between the authors that maybe numbers in some other areas were also declining, such as jobs in museum archaeology. Based on the change in numbers between the different *Profiling the Profession* reports (2002-03, 2007-08 & 2012-13) and anecdotal evidence<sup>13</sup> I thought that the number of commercial archaeologists recorded as being employed by local planning authorities in 2007-08 was too high. At the time, I estimated this to be about 300.

If the number of commercial archaeologists is shifted down by 300 from 2007 to 2012, then the R<sup>2</sup> for New Work jumps up to 0.813 and to 0.613 for New Orders. That means changes in spending on new construction work accounts for 81% of the changes seen in commercial archaeological employment, almost explaining it all.

It also gives us a simple formula to predicted future job demands:

predicted number of jobs = (x multiplied by 42.268) – 60.523

x = New Build spend in £billions

### Fitting to the Trendline?

Making those changes to the archaeology jobs numbers is not without its issues. Am I adjusting the data to fit a narrative?

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<sup>12</sup> Early in 2013

<sup>13</sup> I was aware of commercial units that had been part of local planning authorities or universities being outsourced or moving into the private sector during the 2002-2007 period.

A reduction of 300 was used because that was the number discussed informally between myself and Kenneth Aitchison in 2013 during the *Profiling the Profession 2012-13* project even though it was a rough estimate. This was used because it was made before I attempted to run this analysis so it was unbiased by subconscious needs to fit the data to produce the anticipated result. Indeed, making a larger reduction, like 350 or 400, would have caused the  $R^2$  to be higher and thus fit the regression trendline model even better.

Moreover, it is not uncommon for official statistics to be revised later. The construction statistics used here may be revised to up to a year later as new information is collected. The most recent labour market survey has adjusted the non-commercial archaeology jobs with information provided after the surveys to create a new graph of the rises and falls in all archaeology jobs. Rejecting data that will improve the modelling because it is new is not the best way to model. There is still the risk that I am trying to fit the data but including these changes follows best practice.

### **Are the Models Good Enough?**

This data adjustment makes the regression analysis a better fit (higher  $R^2$  numbers) but that is not in itself helpful for our end goal, predicting future labour market needs. When we examine the Standard Error of the Regression (S), we find it to be +/- 223 for New Work and +/- 320 for New Orders. That means the prediction is not precise and gives a range of outcomes. In the case of using New Work data to predict current commercial job levels the estimations could be within a range of ~450 jobs. Is that precise enough for future planning?

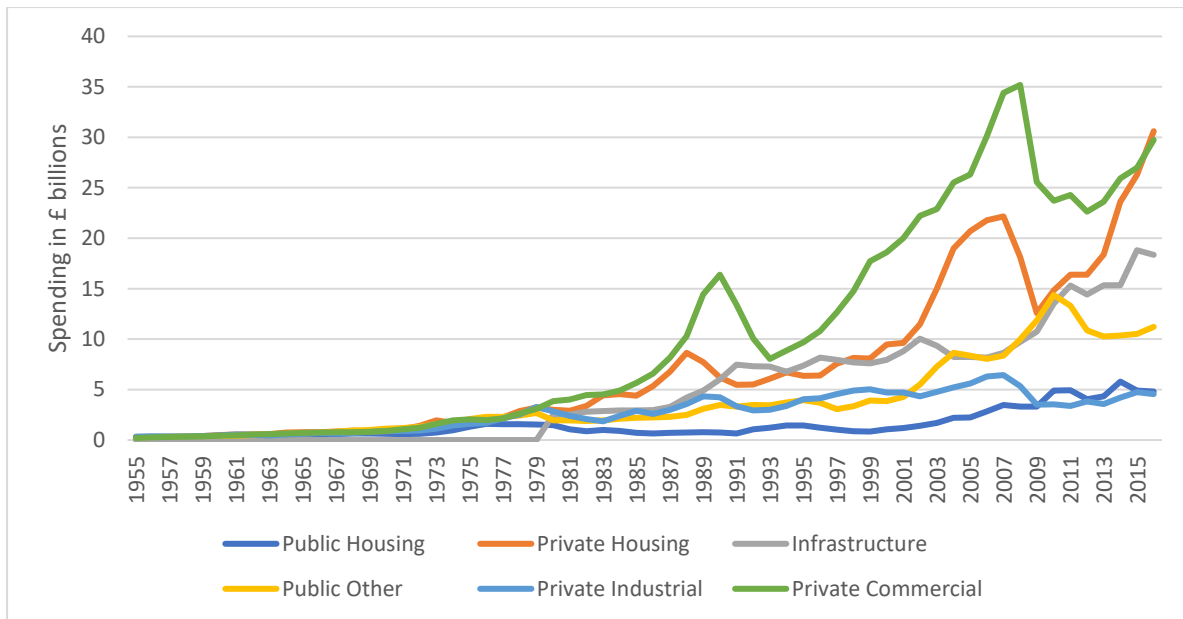
The answer would depend on the users' needs. Knowing that we will need 4000-4500 commercial archaeologists next year may be suitable for the different interested parties attempting to predict training demand, future labour needs, etc. But if a user needs to know numbers within a dozen or so, this will not be helpful<sup>14</sup>.

### **Estimating future construction spending: public sector and infrastructure**

With a workable model to correlate construction spending with archaeology jobs the next step was to predict future construction spending trends. An examination of the spending on 'New Construction' by ONS categories shows that some areas are relatively stable (Figure 5). The categories with the greatest amount of change have been in the private sector housing and commercial.

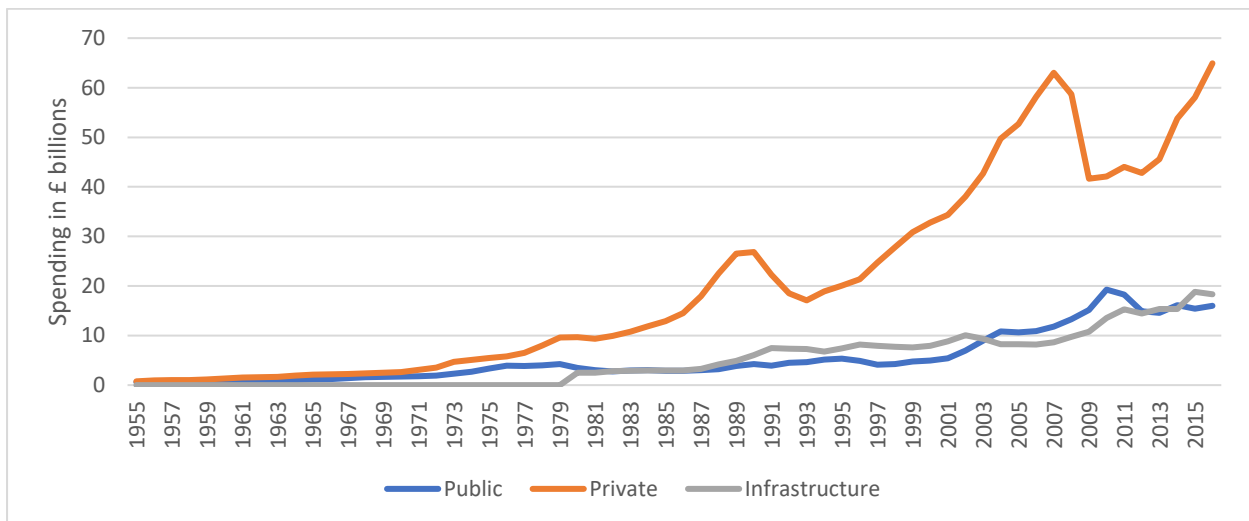
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<sup>14</sup> Methods for improving the precision of this model were investigated but as will be demonstrated in the next section they are not needed, currently. I hope to explore these issues in a future publication but in this publication they would just be an unwanted distraction.



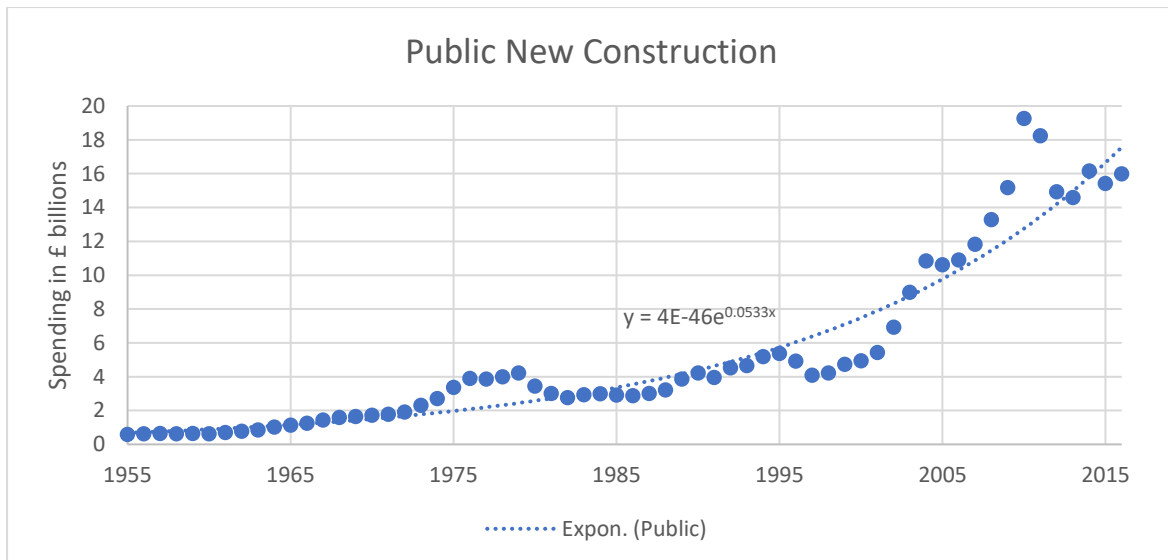
**Figure 6: Total spending (£billions) on New Construction by ONS category per year from 1955 to 2016. Non-seasonally adjusted, current prices. Source (ONS 2017b) data.**

In general, since the 1970s it has been the private sector that has driven the most growth in New Construction in the UK (Figure 7). There have been fluctuations in both public and infrastructure<sup>15</sup> spending, especially at the beginning of the Great Recession to offset the private sector collapse, but they tend to regress to a general trend of (barely) exponential growth (Figure 8 & Figure 9).

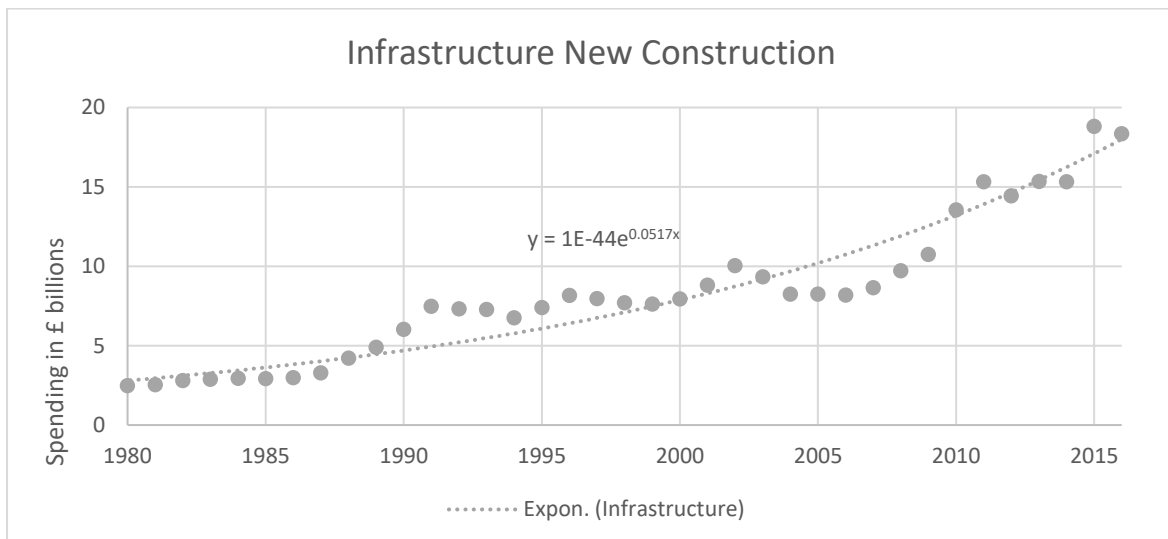


**Figure 7: Total spending (£billions) on New Construction by Public, Private and infrastructure per year from 1955 to 2016 Non-seasonally adjusted, current prices. Source (ONS 2017b) data.**

<sup>15</sup> According to the ‘pipeline’, 50% of funding for large infrastructure projects comes from the private sector thus it can be categorised as purely private or public spending. The ONS data does not distinguish who the funders are.



**Figure 8: Total spending (£billions) on New Construction in the Public Sector from 1955 to 2016 Non-seasonally adjusted, current prices. Source (ONS 2017b) data.**



**Figure 9: Total spending (£billions) on New Construction on Infrastructure from 1980 (first year data recorded) to 2016 Non-seasonally adjusted, current prices. Source (ONS 2017b) data.**

For modelling purposes, it would be possible to assume a constant growth because:

1. Fluctuations are minimal.
2. They only constitute a third of New Construction spending and thus fluctuations will have a low impact on overall spending.

The 'construction pipeline', while not comparable to the ONS data, and with the issues already discussed, indicates that future infrastructure work will be relatively stable. Based on the current infrastructure and public spending on new construction (£34.35 billion in 2016), which is relatively stable, we can estimate that there are roughly 1,170-1,615 (accounting for an error range of +/- 223) FTE jobs supported in commercial archaeology by



this spending. If past trends are indicative of future spending then that spending is likely to stay stable for the next few years with a slight increase but given the error range of the model, not one that could make a difference.

### **Estimating future construction spending: private sector housing**

With a third of construction spending accounted for efforts were made towards predicting private sector growth.

For private sector housing, I examined the current methodology used by government and experts to estimate future housing demand (Wilson, Barton & Smith 2017; DCLG 2017a; Authority of the House of Lords 2016; Holmans 2014; Jefferys, Lloyd et al 2014; Holmans 2013) – predicted growth in households. ‘Households’ is a term defined by the Office of National Statistics as,

‘... one person living alone, or a group of people (not necessarily related) living at the same address who share cooking facilities and share a living room, sitting room or dining area. A household can consist of a single family, more than one family, or no families in the case of a group of unrelated people.’ – Office for National Statistics 2017d

Basically, households are a proxy for the number residential units in use in the country. It is not perfect as a household could have more than one dwelling<sup>16</sup>, but it is still a good estimation. Between 1950 and 2000<sup>17</sup> households have increased at a predictable rate based on demographic changes. This has led the Government to use them as indications of housing ‘demand’ (Wilson, Barton & Smith 2017; Authority of the House of Lords 2016; DCLG 2017a). The Department for Communities and Local Government (DCLG) has even recently put out a consultation on using predicted household growth, with variation based on local housing prices, as the official estimation for local housing needs (DCLG 2017b).

DCLG recently predicted household growth in England from between 2014 and 2039. It predicted a slowdown in growth with annual average household growth between 2014 and 2019 of 236,000 but falling to 183,000 per year between 2034 and 2039 (DCLG 2016a). This would give a good trend line to estimate housing construction need and thus archaeology job needs. However, further investigation into these predictions has cast serious doubt on their usefulness for forward planning.

Estimated ‘need’ for the 2000s was over 200,000 homes per year in England alone but over the last ten years new home numbers have rarely reached that:

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<sup>16</sup> People with second homes / holiday homes.

<sup>17</sup> The 2011 census did not follow this trend but given it was at the height of the Great Recession it is unknown if this was an aberration or a new trend.

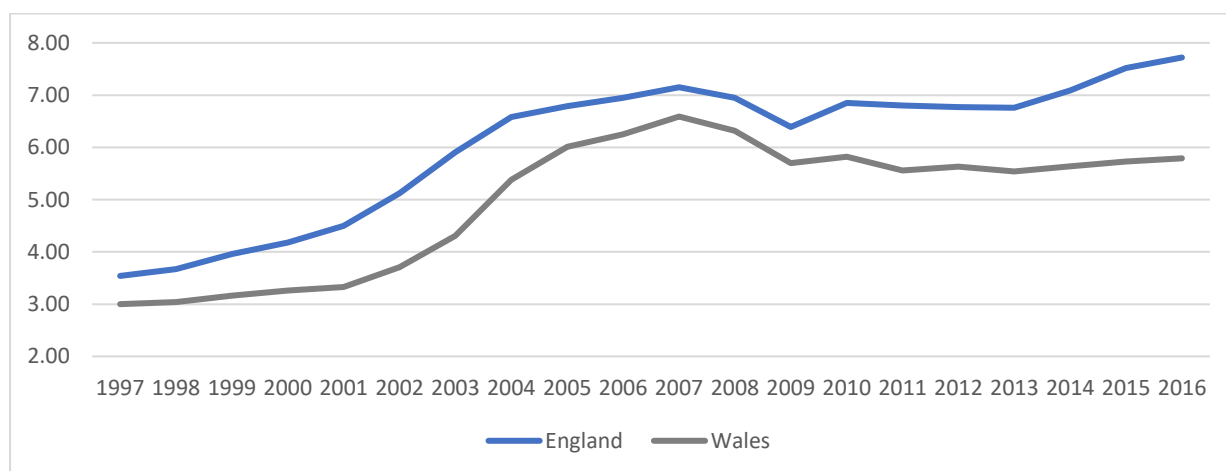
Components of net housing supply	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
New build completions	193,080	200,300	157,630	124,200	117,700	128,160	118,540	130,340	155,080	163,940	183,570
Net conversions	7,600	9,020	8,640	6,230	5,050	5,240	4,100	4,470	4,950	4,760	5,680
Net change of use	20,150	17,640	16,640	13,600	11,540	12,590	12,780	12,520	20,650	30,600	37,190
Of which under permitted development right - Agricultural to residential										226	330
Of which under permitted development right - Office to residential										12,824	17,751
Of which under permitted development right - Storage to residential										55	106
Of which under permitted development right - Any other										645	613
Of which under permitted development right - Unspecified										129	87
Of which under permitted development right - Total										13,879	18,887
Net other gains	460	1,020	270	970	1,809	1,100	1,370	1,330	630	780	720
Demolitions	22,290	20,500	16,590	16,330	14,890	12,200	12,060	12,060	10,610	10,420	9,820
Adjustment to Census 2011	16,190	16,190	16,190	16,190	16,190	-	-	-	-	-	-
<b>Net additional dwellings</b>	<b>214,940</b>	<b>223,530</b>	<b>182,770</b>	<b>144,870</b>	<b>137,390</b>	<b>134,900</b>	<b>124,720</b>	<b>136,610</b>	<b>170,690</b>	<b>189,650</b>	<b>217,350</b>

**Table 3: Components of housing supply in England. A modified version of Table 120 Components of net housing supply, England 2006-07 to 2016-17. Available at <https://www.gov.uk/government/statistical-data-sets/live-tables-on-net-supply-of-housing>.**

Some people have interpreted this as undersupply of housing and that there needs to be an even greater number of new houses built in the future to make up for this under formation of households (Wilson, Barton & Smith 2017; DCLG 2017a; Authority of the House of Lords 2016; Holmans 2014; Jefferys, Lloyd et al 2014; Holmans 2013). However, much of the literature, and news announcements, conflate ‘need’ with ‘demand’. As described in the House of Commons Briefing paper, *Tackling the under-supply of housing in England*, they are different:

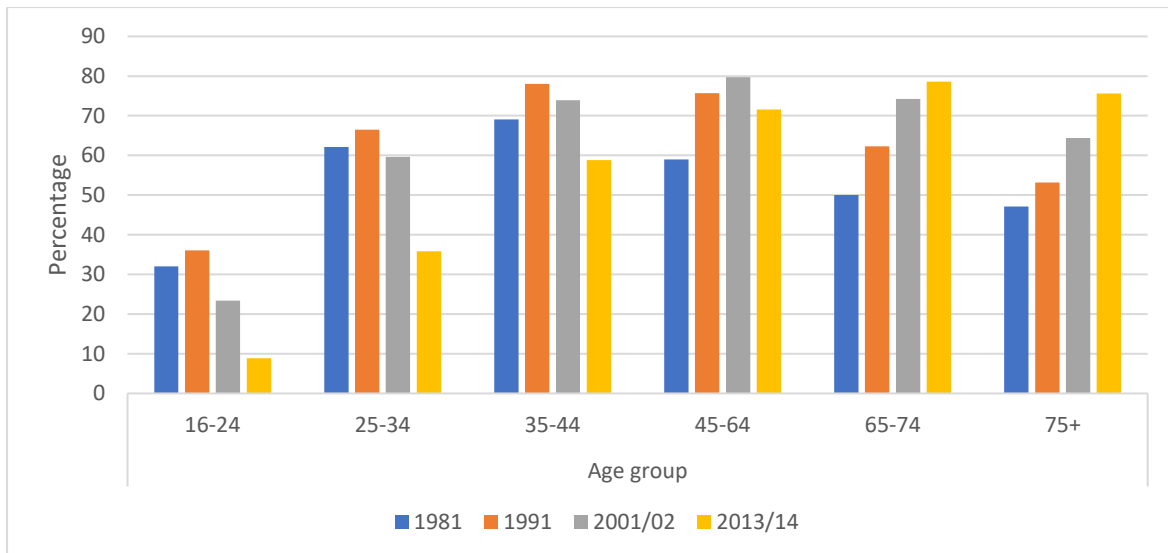
“There is no strict definition of housing need, but it can be understood as the amount of housing required for all households to live in accommodation that meets a certain normative standard. By contrast, housing demand usually refers to the amount of housing that households will choose to buy, given their preferences **and ability to pay.**” – Wilson, Barton & Smith 2017

Housing demand, under the current system and conditions, is unlikely to ever be enough to see the building of 250,000-350,000 homes by the private sector in the UK, precisely because of people’s ability to pay. The cost to buy a home has increased dramatically, while wages have not (Figure 10). This has resulted in first time house buyers being increasingly affluent and young people not leaving home to start their own households (Figure 11). While, private sector spending on new housing is correlated with housing prices ( $R^2$  0.703049967)<sup>18</sup>. The higher the prices the more housing is built but that in turn reduces the number of people who can afford to buy new housing.



**Figure 10: Ratio of median house price to median annual earnings, England and Wales, 1997 to 2016. Source (ONS 2017e) data.**

<sup>18</sup> Based on yearly (calendar) New Construction data from 2005 and average home prices- source (ONS 2017g) data

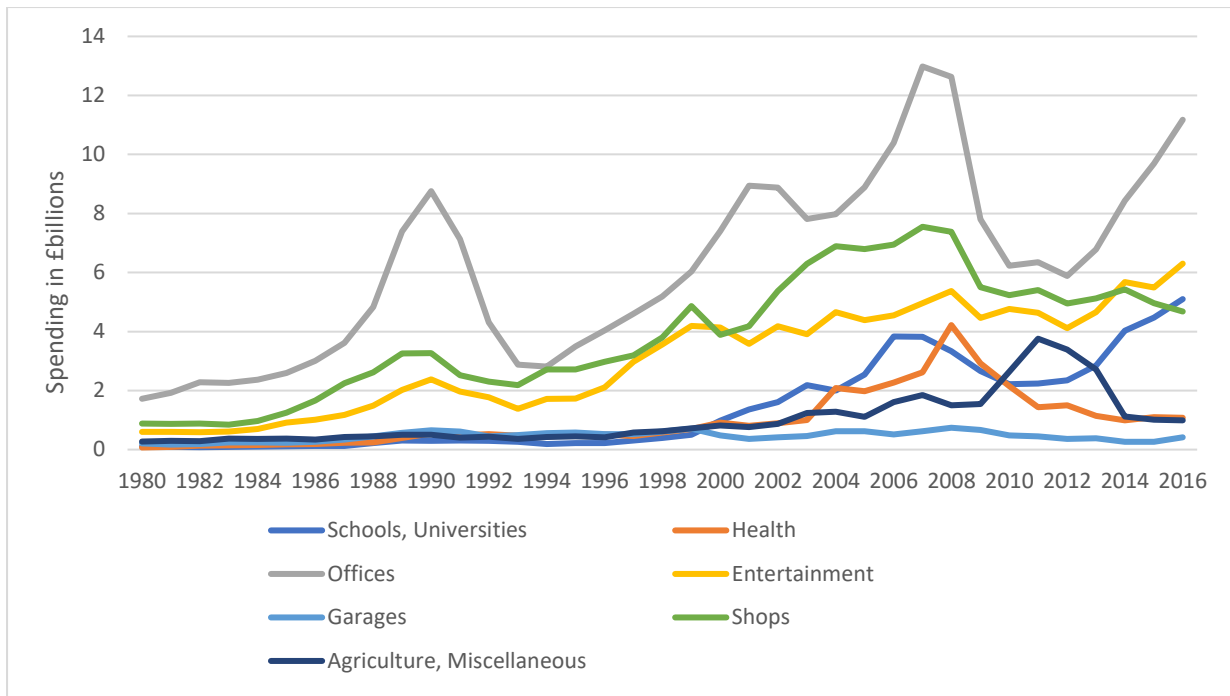


**Figure 11: Percentage of each age group that are home owners, England, 1981 to 2014. Source (ONS 2017f) data.**

There would need to be significant changes in the current system to see 250,000-350,000 homes built a year. There are many different proposals to do this from a Land Bank to increased Local Authority building. Regardless, of the methods proposed they will almost all involve the intervention of the Government, be it through policies, funding or both. When these interventions will be, and what they be, are unknown and perhaps in most cases unknowable. Which makes any future estimations of demand essentially guess work.

### Boom and Bust Cycles

Even without the risk of Government intervention predicting future private sector trends are going to be extremely difficult as housing and office construction, a sub-category of commercial construction, have been running through cycles of asset bubbles, where prices strongly exceed the asset's intrinsic value (Figure 12). In fact, almost all the sub-categories of Private Commercial New Construction exhibit characteristics of asset bubbles, not as frequently as Offices but they still have periods of booms and busts.



**Figure 12: Total spending (£billions) on New Construction Commercial sub-categories per year from 1980 to 2016 Non-seasonally adjusted, current prices. Source (ONS 2017b) data.**

Since the early 1980s private sector housing and commercial building has made up between roughly 50-70% of all New Construction spending. Even if we assume, hypothetically, that only office and housing are the only areas of construction that susceptible to boom and bust cycles, these areas represented 30-45% of New Construction. That is too high a proportion of construction susceptible to asset bubbles to allow for accurate predictions of future demand. Especially, give their wild swings in short periods of time. For example, between 2007 and 2009 spending on housing by the private sector fell by 43% but between 2013 and 2016 it rose 40%. That 2013-16 rise alone accounted for a 51% of the change of in New Construction spending. In the last three years Private sector housing would have accounted for a 15% increase in the workforce. Including Office construction, it would be around 20%. With such wild swings in demand it is not surprising that in the last decade we have seen the commercial archaeology sector lose than gain roughly a third of jobs. There will be a stable work, that will grow, but the booms and busts will make any prediction likely wrong.

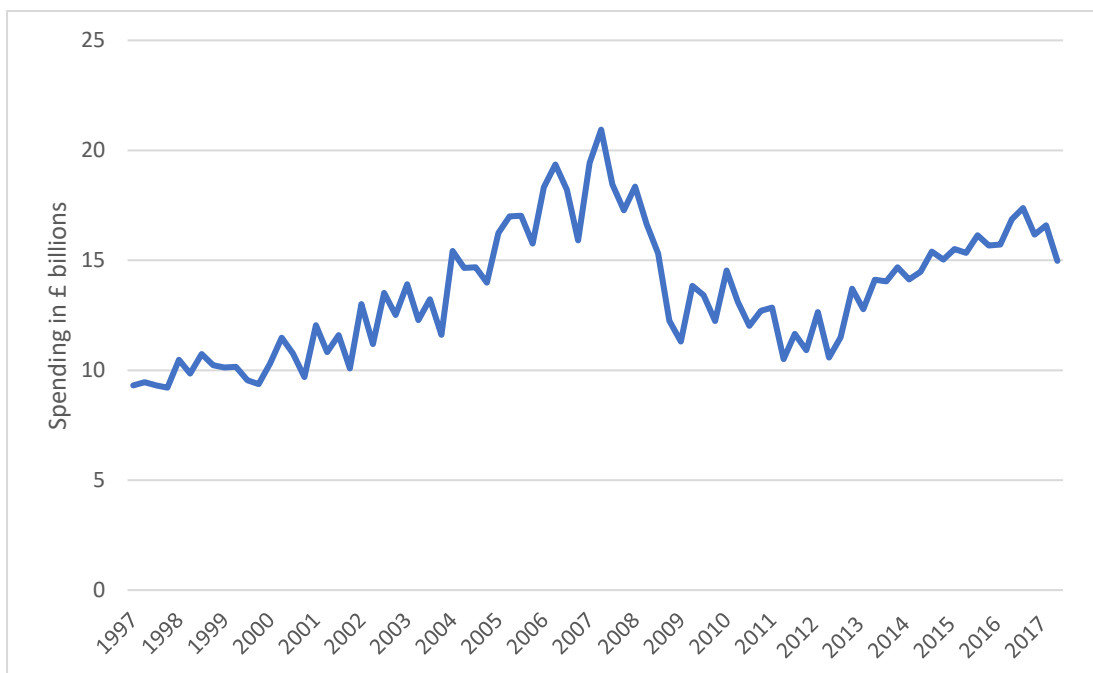
### Have we reached peak archaeologists?

In hindsight, it is possible to see the causes and formations of these bubbles. For example, the Lawson Boom of the late 1980s, named after Margaret Thatcher's Chancellor of the Exchequer – Nigel Lawson, was the result of government policies to lower taxes, cut interest rates (at that time controlled by the Chancellor, not the Bank of England) and depreciation of sterling (Cobham 1997, Oliver & Pemberton 2004). This led to a boom and subsequent recession across the whole UK.

It is even possible to see a bubble building during the process. We can see that in the late 1980s new housing and office construction increased significantly faster than historic trends (Figure 6 & Figure 12). The same occurs in the 2000s and even recently, construction increases at a much faster rate than historic trends. Currently, in England the ratio of yearly median income to median home price is higher than before the Great Recession (Figure 10). It appears that we are currently experiencing a bubble.

The most recent uptick in housing can be partially attributed the Government's 'Help to Buy' scheme that launched in 2013. With the Help to Buy equity loan scheme, people in England buying a new-build property can take out a loan from the government worth 20% (40% in London) of the property's value at, with the first 5 years being interest free. The Government's analysis shows that in the first few years it accounted for 14% of the total new build output or 43% of the growth in new home building (DCLG 2016b). More importantly recent analysis claim that this scheme has led to a 15% increase in new home prices that are driving the price increases seen since 2013 (Collison 2017)<sup>19</sup>.

We do not know when this boost/bubble will end. 'Help to Buy' is scheduled to end in a few years' time (2021). But, already there is there is reduction in New Orders (Figure 13) which usually indicates the potential onset of a construction recession<sup>20</sup>.



**Figure 13: New Orders from quarter to quarter from 1997 to the 2nd quarter of 2017.**  
Source (ONS 2017a) data.

<sup>19</sup> Caution should be taken with these numbers as the report the news article is based on is not accessible and so the data and results cannot be confirmed.

<sup>20</sup> The third quarter numbers of 2017 are not included as that was the signing of the HS2 contracts which greatly inflated the numbers and distorted the graph.

Confidence in the construction sector has fallen greatly (Green 2017). The economic estimates for the country are for a recession or weak growth, depending upon if the Government makes poor economic decisions (Office for Budget Responsibility 2017). Prices have stopped rising for housing in some areas such as London (Office for National Statistics 2017g). However, lower prices may not mean a reduction in building. 'Help to Buy' may have pushed new build prices high enough that they have almost surpassed the benefits of the 20% government loan. It could be that the levelling out of house prices is the result of the market adjusting to subsidies, having reached the limit. It could be that house building will now plateau but will not collapse.

The data indicate that there is not going to be significant growth in the numbers of archaeological jobs, especially not from infrastructure projects, possibly there may even be losses. We may have reached peak archaeologists, at least for the next few years.

## Discussion

There will not be a significant increase in commercial archaeology jobs because of large infrastructure projects. Moreover, it is likely that we are in the middle of another construction bubble that may pop soon or we might even be in the process of it popping now. This will likely result in the loss of jobs, not the significant increase that many are expecting over the next few years.

While it is not practical to have long term planning in terms of demand we now have a workable statistical model to evaluate changes to the construction sector. If a policy is suggested in the future that greatly increase new construction spending then we will be able to ascertain its potential impact on the sector. While out of the scope of this white paper there are several avenues to explore to improve the precision of this model that could be investigated in the future.

Forward planning is the right method that the stakeholders in UK archaeology should be undertaking be it national bodies like Historic England, professional bodies like the Chartered Institute for Archaeologist, individual companies and even individuals. Unfortunately, until a significant portion of construction is not affected by asset bubbles we will not be able to anticipate with much accuracy commercial archaeology job demands. This does not mean the sector cannot prepare. Though, instead of anticipating continuous growth we need to plan for uneven growth and contractions – a very different sort of capacity building. As a sector, we need to think about how we can handle the wild swings in commercial archaeology demand, possibly as high as 20% increase in the workforce in as little as two years, or conversely the loss of 20% of the workforce in two years, if historical trends are anything to go by.

## Appendix I

Year	Commercial Archaeologists	New Work	New Orders
2007	4,036	83.457	76.078
2008	3,906	81.669	62.550
2009	3,470.5	67.587	50.780
2010	3,419	74.905	52.349
2011	3,271	77.590	45.911
2012	3,139.5	72.172	48.423
2013			
2014	2,896	85.240	59.019
2015	3,498	92.257	62.650
2016	3,844	99.266	66.126
2017	4,351	unknown	unknown

**Table 4: Calendar year average for FTE commercial archaeology jobs (not adjusted, source Landward Research Ltd reports), New Work and New Orders (Source ONS) in £billion. Construction figures have been corrected for inflation to 2017 rates.**

Year	Commercial Archaeologists	New Work	New Orders
2007-08	4,036	84.562	75.009
2008-09	3,733.5	77.343	55.502
2009-10	3,397.75	67.440	54.006
2010-11	3,398.75	75.909	50.667
2011-12	3,312	77.190	45.707
2012-13	3,139.5	71.418	48.549
2013-14	2,896	77.965	56.965
2014-15	3,498	87.256	60.405
2015-16	3,844	93.570	62.860
2016-17	4,351	101.471	67.002

**Table 5: Fiscal year average for commercial archaeology jobs (not adjusted, source Landward Research Ltd reports) compared to New Work and New Orders in same year (Source ONS, in £bn). Construction figures have been corrected for inflation to 2017 rates.**



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