Long-term Aggregates Supply: Part 1

Myths, perceptions, hazards, risks and solutions

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There can be no doubt that we are living in a fast-changing world experiencing fast-moving circumstances. Things are shifting. Economic power appears to be moving east and south, political power is in flux and evolving, and every now and then biological and/or man-made threats intrude and wake us all up to the fragility of our interconnected and interdependent world.

There is nothing like a crisis to focus the mind. The impacts of local and global food and water shortages, and oscillating oil, gas and metal prices sharpen thinking about our often profligate use of natural resources.

While we are now in a period of reduced demand, it was, momentarily, reassuring to see how the construction industry shuddered when cement supplies in the UK stuttered in 2007 when demand was high. It was possible to hear the occasional penny drop.

As prices rise and fall for some of the fundamentals in our lives, people are beginning to ‘make the link’ between demand and supply, although this awareness has not yet extended to non-energy resources let alone aggregates, which remain among the cheapest of all naturally derived commodities.

In an era of ‘one-planet living’ where the sustainability agenda is growing and influencing the way industries do business, all companies are having to work harder to earn their licence to operate and make use of our natural resources.

There are signs that environmentalism is maturing and dialogue may slowly be replacing confrontation as the search is on for ‘sustainable solutions’ which may yield benefits for both economies and the environment.

There is still a tendency, however, for emotional propaganda to attract more column inches than science, but as the ‘evidence-based’ culture takes firmer root hopefully soundness and reason will prosper going forward.

With over 75% of all major legislation now originating from the EU, its stance on natural resources is important. The endless stream of directives on virtually all aspects of environment protection, eg water, waste, mine waste, air quality, emissions etc, only serve to increase the permitting challenges in the UK, although the EU appears to have developed a higher degree of strategic awareness of the vital role that non-energy minerals play in the health of...
the European Community than our
government has for the UK.

Within the UK the impact of
globalization continues to manifest itself
with the vast majority of the non-energy
minerals industry now controlled by
overseas companies, effectively
exporting strategic control to South
Africa, Mexico, France, Germany,
Switzerland and Belgium.

As our devolved political model
develops, the degree of difficulty of
managing four different approaches to
licence-to-operate issues becomes more
complex with Regional Spatial Strategies
in England now introducing new tensions
as parochialism tends to erode the
pursuit of national aims.

Skills shortages are growing in both
the public and corporate sectors, and an
increasingly complex permitting regime
is becoming more difficult for all players
to navigate, with the possible exception
of the public who are smarter and
better connected and able to use
professionals who know how to play the
‘anti-development game’.

In summary, from a mineral and
aggregate industry point of view, it is
getting harder, slower, more costly and
more uncertain just to standstill, let
alone grow and develop, other than by
merger or acquisition.

**National priorities**

Minerals, particularly non-energy
minerals and specifically aggregates, are
far more significant to our way of life
and economic well being than probably
99.9% of the general public and most of
our elected representatives can possibly
understand.

With the public gaze all too often
distracted by the cult of celebrity, and
the political agenda dominated by so
many sociological issues, it is easy to feel
frustrated that some of the ‘harder’
issues, such as the management of
natural resources, are simply taken for
granted.

Although there are some signs in the
energy sector that political awareness is
increasing as to the need to ‘keep the
lights on’ and avoid dependence on
others for supply, it is late in the day and
for every voice of reality there seems to
be an alternative voice of constraint.

**Advocacy for
minerals**

So what are the chances of having a
proper conversation with government
about non-energy minerals? Who in
government owns the issue? Who is
thinking about domestic ‘Geo’ or
geopolitical issues across the mineral
spectrum?

CLG (Department of Communities
and Local Government) is committed to
purely managing the planning system;
DEFRA (Department of the
Environment, Food and Rural Affairs) and
the EA (Environment Agency) act as a
constraining force focused solely on
environmental protection; and BERR
(Business, Enterprise and Regulatory
Reform), which has the sponsorship
role, is unable or unwilling to resource
proper support of the minerals industry
in anything other than a minimalist
fashion.

Out of approximately 525,000 civil
servants only around seven appear to be
allocated to non-energy minerals
throughout the whole of government. So
who does champion the minerals
industry? In reality, only the industry
itself.

It has the duty to make the case for
the largest material flows in the
economy and to keep the profile of
minerals, particularly aggregates, as high
as possible to hopefully influence public
policy in order to ensure that the nation
avoids supply shortages over the next 25
years.

The next generation we will require
around 9 billion tonnes of non-energy
minerals to keep their ‘non-energy lights’
on, of which around 70% will be
aggregates.

**Aggregates**

Globally, it is estimated that we
currently consume about 26 billion
tonnes of aggregates per annum, of
which 3 billion tonnes is in the EU and
about 300 million tonnes in the UK, ie
the UK represents around 10% and 1%
of EU and global consumption
respectively.

Looking at the UK’s total annual
material requirement of 2.1 billion
tonnes, energy and non-energy minerals
represent the largest flow at 562 million
tonnes, with aggregates alone
representing the single biggest flow at
14%.

On an island that is fortunate to be
blessed with a variety of key aggregate resources in both quantity and quality, we should be grateful. Aggregates are a crucial part of the ‘oxygen’ of our economy and our way of life, and yet they remain highly contested. Their release is dependent upon an increasingly complex planning and permitting regime.

For the aggregates industry, no planning means no business. For construction, less aggregates means less construction. For society, less construction means a lower quality of life. For any government this is a failure to develop the built environment and deliver its broader agenda.

We cannot sensibly live without aggregates; they are essential and, although demand will ebb and flow, we consume and will probably continue to consume something in the order of 6 billion tonnes over the next 25 years. That is a lot of stock.

This takes no account of some projections that suggest that population levels in England may rise from around 50 million to over 60 million by 2031, with a consequent increase in demand for all natural resources.

Verney Report
Three years ago I gave a paper to the QPA/RTPI conference entitled ‘Sir Ralph, you are never going to believe this but…’. One of my conclusions was that, while Verney had the right ideas about the key issues of long-term aggregate supply, he was possibly a generation premature in terms of his analysis of when potential major supply imbalances would occur, particularly in the South East, although his work probably helped prevent what he was predicting from materializing.

The critical achievement of Verney, however, was the creation of the Managed Aggregate Supply System (MASS), without which the nation would have been unlikely to have received a steady and adequate supply of aggregates for the last 33 years.

Finding around 6 billion tonnes of anything to feed the economy for 25 years does not just happen, it needs managing and it is hard to imagine how this could realistically be achieved any other way. However, although the MASS broadly continues to deliver, it is under stress and will need to be improved if we are to avoid potential future supply problems.

Resources
There has never been a definitive and systematic assessment of the unconstrained resources of aggregates available in the UK or England, although Verney undertook a very broad-brush estimate which suggested sufficient resources were available to last 30,000 years.

In 1988 the then SERPLAN (South East Regional Planning Assembly) estimated that approximately 2.5 billion tonnes of relatively unconstrained workable reserves of sand and gravel were available in the South East, although a similar exercise undertaken by SEERA (South East England Regional Assembly), albeit with different regional boundaries, suggested that as much as 9.5 billion tonnes of unconstrained workable resources remained some 20 years later.

While we may lack good, hard, consistent data, it is fair to conclude that, even within arguably the most stressed region, availability at the resource level is not the issue. And even taking account of the fact that nearly 40% of our land area is constrained by just national designations, availability is currently not a fundamental problem.

As most mineral operators know only too well, the big issue is access.

Planning system
The constant issue for the industry over the last 30 years has been the operation and effectiveness of the planning system, although in terms of operation, in recent years it has been anything but. Since the presumption in favour of development was replaced in the mid-1990s by a presumption in favour of the development plan, we have really gone backwards.

Each well-intentioned government review of the planning system promises a simpler, quicker and more certain approach but then seems to convolute itself by new processes, more iterations and new tick-box techniques, such as Sustainability Appraisal and Strategic Environmental Assessment, which bring very little to the party other than delay and inertia.

While it is a worthy aim to seek greater involvement of local communities in the plan-making process, it is unlikely to speed things up or sweeten the outcomes; the proof being that of the theoretical 79 Local Development Frameworks we are supposed to have had in place by 2004, we still only have around seven and these only relate to core strategies with the more contentious site-allocation plans still work in progress.

It could be the case that after every 10-year period we can look back and say that at the time we thought things were bad only to realize that, in fact, they were the good old days!

A conundrum certainly exists for the minerals industry. How to square our continuous criticism of the system in spite of planning success rates greater than 75%, a success rate, we are advised, the housing industry can only dream of.

But success rate alone is not the real issue, nor even the typical 2–4 years required to get a permission. It is the cost, the uncertainty, the vexatious nature of so many planning decisions and the very low replenishment rates that arise as a consequence.

A 100% planning success rate would mean nothing if we only replenished 10% of what we need. The reality is that we have been failing to replenish our reserves at far less than 100% for many years.

There is evidence that part of the problem of inadequate replenishment is the lower level at which planning applications are being submitted by the industry. This may well be true, but ➤
Demand forecasting
The forecasting of demand has been a problem over the last 30 years or so; sometimes too high, sometimes too low, but always an issue. Some say it drives a predict-and-provide approach, as if this is a bad thing; others that it merely allows plan allocations to be made from which landbank policies will control the release of reserves if required.

Whatever the merits of the many varying points of view, one thing is undeniable, over the last 25 years in England we have consumed between 5.5 and 6 billion tonnes of aggregates through economic highs and lows and considerable societal change. Even if no further forecasts were to be undertaken, it is likely that reserves of a similar order are likely to be required over the next 25 years if we are to continue to maintain, develop and improve basic infrastructure, which is so crucial to the economy.

It does not seem unreasonable to seek to convert future public and private sector aspiration and likely construction demand into some form of estimate of need that allows a plan-led system to identify areas of land for extraction, subject to the test of need and environmental impact.

If population levels in England are destined to grow by 10 million by 2031, we are likely to require an additional 50 million tonnes per annum of aggregate, roughly equivalent to current demand in Wales and Scotland, a strategic issue that could not be ignored whether we have forecasts or not.

On balance, surely this is a resource-management challenge we would be better being aware of and informed about, rather than playing things by ear?

Outlook for demand
In terms of demand, the picture painted by the current draft CLG forecasts is clear in that there is generally steadily rising demand from 2005 until 2016, so provision at anything less than we have experienced in recent years is not an option. The current economic downturn will influence the profile of demand and supply but over such a long period of time it does not necessarily alter the overall picture or reduce the need to allocate potential future sites.

The shift to more sustainable and modern methods of construction may impact upon estimates of demand, although no-one has evaluated whether this would actually increase or decrease the demand for aggregates.

Once the whole-life benefits of concrete are fully realized, particularly in relation to the thermal mass properties, it is likely that this will act as a driver of increased demand.

Permitted reserves
England
Using the AM 2005 national collation and looking back to 1973, a significant downward trend in the level of permitted reserves of both sand and gravel and crushed rock can be seen in figure 1. While there are some definitional issues which affect the figures in more recent years, the important features are the trend and the significant reduction in reserves of sand and gravel from over 11 billion tonnes in 1973 to 0.6 billion tonnes in 2005 – a decline of 45%.

Looking at the BGS data in figure 2, since 1990 the significant downward trend for sand and gravel is again noticeable from around 0.9 billion tonnes in 1993 to around 0.6 billion tonnes in 2005 – a reduction of 33%.

There are those who argue that although the trends on reserves are down, this is from an artificially high starting point – one of initial reserve overprovision – so the trend is not meaningful, and that with 4.2 billion tonnes of reserves being consumed at around 160 million tonnes per annum, we have sufficient reserves for around 25 years, and in some regions nearly double this.

Other interpretations go so far as to conclude that we have nearly 40 years supply of crushed rock and around 10 years for sand and gravel, so the issue is not one of security of supply but of oversupply.

Although this may be one way of looking at the figures it is not the only one nor is it accurate. First, it assumes there was initial overprovision; secondly, it assumes that reserves are evenly distributed; and thirdly, it assumes that shortfalls in one region can be offset by surpluses elsewhere.
If all our permitted reserves happened to be on one site producing one tonne per annum we would have sufficient reserves for 4 billion years, but we would then have a massive ‘real’ supply issue.

Simple notional estimates of supply life at the national level are meaningless and arguably dangerous as they mask a more complex picture at the regional and below.

Key to the truth is recognition that our reserves are unevenly distributed, have varying qualities and accessibility, and each constituent of reserves has its own limitations and life expectancy.

**Landbanks**

What is the picture with regard to landbanks, the more conventional way of assessing potential for the supply of land won aggregates?

Looking at sand and gravel landbanks based on RAVP data for 2001 and 2005 (see fig. 3), 41% or 15 counties have landbanks at or below the minimum of seven years. While the average level of landbanks may be stated as being greater than at least seven years, a high landbank in Manchester is of no use to London unless the reserves are economically connected.

The picture for crushed rock (see fig. 4) is of less concern, although the picture is by no means uniform across the country and this is but one indicator of supply potential in an area. Reasonable landbanks should not be assumed to indicate that supply constraints cannot emerge.

Landbanks are not supposed to be unduly arithmetical, although all too often a decimal-point approach is adopted by many mineral planning authorities (MPAs), which distorts the proper implementation of policy. They are a means to assess the need to release reserves both locally and as part of a contribution to a bigger national picture.

Landbanks have been, are and will continue to be a controversial issue but there are some simple measures that could be introduced to increase the accountability of MPAs in discharging their responsibilities to provide a steady and adequate supply of aggregates in their counties.

First and foremost there needs to be firmer and more consistent adherence to the words ‘at least’ when landbank calculations are made. Far too often the landbank requirements, as set out in MPS1, are regarded as caps and not minima.

Far greater attention to the concept of ‘real need’ and ‘real supply’ is also required.

Annual league tables of landbanks and replenishment rates prepared by CLG or the National Coordinating Group (NCG) might also serve to create clarity and collective responsibility among MPAs so that we can see which ones are failing to comply with national guidance.

Such information may also help local communities in extraction areas realize that they are not alone, which may help mitigate the familiar cries of ‘Why us?’, ‘Why here?’ and ‘Why now?’.

Irrespective of this particular technical policy issue, landbanks alone can only tell a partial story about supply potential in an area.

**‘Capacity to supply’**

An additional, more practical approach to the issue of predicting life expectancy and identifying future levels of reserve provision could be to look at ‘capacity to supply’.

As figure 5 indicates, this approach is not just about production capacity but logistical constraints and possibly even sustainability issues, such as carbon, and proximity, where operators elect to restrict supply to local markets.

Large levels of permitted reserves (a quantum) do not necessarily convert into high levels of actual supply capacity (a rate) on the ground. In general terms, there is a tendency to over-focus on the reserve ‘tank’ and not on road, rail, sea, canal and river ‘pipelines’ which govern the capacity to supply or feed real markets (see fig. 6).

Clearly, this is a very site-specific approach and the current system does not legislate for such information to be provided in detail as part of crucial debates on need, although MPS1 does indicate that these issues should be taken into account.

We can, however, get a more...
reasonable picture of reserve life expectancy if we look at regional AM data over time, on the assumption that sales levels do largely reflect practical supply capacity. If we calculate the notional life expectancy by region (ie permitted reserves by annual sales) for each EPR and plot these over time for all regions in England, as shown in figure 7, a distinctly different national picture emerges than the conventional one which suggests that ‘we have 25 years of supply’.

The graph for total reserves (fig.7) indicates significant losses in supply capacity from 2012, 2016 and 2027, ie four, eight and 19 years hence, a long way short of 2033 as implied by the ‘national notional’ approach.

Applying the same approach to sand and gravel, as shown in figure 8, reveals an even more dramatic deterioration in supply capacity with a steady worsening from 2010 onwards – again a far cry from 2018 as implied by the national approach.

Even allowing for existing market deterioration and the ‘robustness’ of the last knockings that most quarries display, this regional approach paints a significantly starker picture than the ‘complacent’ picture created by applying a similar approach at the national level.

**Replenishment rates**

So, what are the chances that we will permit sufficient reserves and, more significantly, what is our ‘capacity to supply’ going forward. How are we doing on replenishment rates?

This is probably the least talked about and least measured aspect of the current system when it really should be one of the key performance indicators of the Managed Aggregate Supply System.

My analysis of replenishment rates using AM 2005 and AM 2001 data (as shown in fig. 9) indicates that, on average, replenishment rates have dropped from around 66% in AM 2001 to 59% in AM 2005, with rates over the last eight years averaging 58% and 64% for sand and gravel and crushed rock respectively.

These remarkable facts get no attention currently, nor do the potential consequences. For how long can we afford to ‘under-replenish’ our reserves and, more importantly, our supply capacity? The longer we fail to replenish the greater the need to ‘over-replenish’ at a later date with all the collateral controversy this may provoke.

Current policy seeks to provide a steady and adequate supply, which is a beautifully crafted aim and one that is far more than just a quantum issue – it is also about the rate of supply. It follows that we also need a steady and adequate rate of planning applications and approvals if the aim is to be achieved in future. Currently, there is a risk that future supply will become unsteady and inadequate unless replenishment rates increase significantly and soon.

If we assume no change in the efficiency and capacity of the planning system to deliver permissions and assume a 60% replenishment rate going forward, the shortfall in reserves required and the consequence upon capacity to supply will be significant.

**Having identified the potential scale of the task that lies ahead, next month Nigel Jackson examines the various options available to ensure that supply continues to meet demand and considers how the management of future aggregates supply may need to evolve and improve in order to ensure a steady and adequate supply for the long term.**

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**Notes:**

- Fig. 6.
- Fig. 7.
- Fig. 8.
- Fig. 9.