BRITISH AGGREGATES ASSOCIATION

REVIEW OF THE AGGREGATES TAX

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EXECUTIVE SUMMARY

HM Government is considering a tax on primary aggregate production, to be levied at the point of sale. The Quarry Products Association (QPA) has yet to submit a voluntary package of measures that the industry would undertake, to mitigate the cost of the environmental damage and to avoid the need for the tax.

After Customs & Excise's consultations with industry, the Treasury is likely to decide the level of the aggregates tax for the 2000/01budget, based on the results of two research projects, undertaken by London Economics on behalf of the Department of the Environment, Transport and the Regions (DETR). These attempt to assess the cost of the environmental damage caused by the aggregates industry, on a per tonne basis, making use of the contingency valuation method.

The basis of the tax is suspect. Its impact on the smaller aggregate producers will be disproportionate. The actual net transfers to the Government, arising from the tax, could be disappointingly modest.

Firstly, the aggregates tax's guise, as an environmental tax is dubious, although convenient for the Government with its New Deal policies. Strangely, exports of aggregates are exempt of the tax which is contrary to the concept that the "polluter pays". This suggests that the tax is little more than a thinly disguised land-use tax that is to be levied on an industry that has little sympathy amongst voters.

Secondly, the research done for the DETR concentrated almost exclusively on the environmental costs, largely ignoring any benefits and failing to explore the economic implications of the tax on the industry.

Thirdly, the cost per tonne estimates of the environmental damage, purported to be caused by the aggregates industry are widely different in the two pieces of research – by an order of magnitude in some instances. This indicates the lack of robustness in the statistical methodology (contingency valuation) that was used. It casts doubt on the method's ability to properly estimate the costs of environmental damage.

Fourthly, the estimated environmental costs appear to measure little more than the NIMBY (not in my back yard) syndrome, demonstrating that the population in the affluent Home counties of England are willing to pay more not to have a quarry nearby, than those living in the Highlands of Scotland.

Lastly, the control and regulation of the environmental impacts of the aggregates industry are adequately covered in the Environment Act, 1995. It provides for the planning permissions for minerals extraction, including aggregates, to be reviewed and updated on a regular basis by the mineral planning authorities. The minerals planning guidance notes are also being currently updated to ensure that all mineral operators provide local benefits that clearly outweigh the likely impacts of mineral extraction. The imposition of the aggregates tax, as well, appears to be redundant

The Government has not taken the opportunity to commission an economic cost/benefit analysis of the impact of the aggregates tax. This has been left to the industry. The imposition of the tax is likely to have a disproportionate impact on the smaller quarry operators who have less flexibility than the major companies to absorb the increasing costs of environmental mitigation measures.

Furthermore, the likely contraction of the industry, through loss of smaller companies, would lead to increased environmental damage associated with lorry movements, as the average distance between fewer, larger quarries to consumers increased.

Provisional calculations suggest that the imposition of an aggregates tax of £1/tonne would reduce demand by some 17 million tonnes per year and could lead to the closure of some 200 small quarries and the loss of some 1,400 quarry workers. The Government's additional gross tax take from the industry, although increased by the imposition of the aggregates tax, would have to absorb the reductions in company tax and national insurance that have been caused by the reduction in demand. Moreover, the Government, itself, purchases some 40% of the aggregate production for its own construction needs, thus further reducing the additional net transfers to the Government – estimated to be little more than £72 million per year, when the aggregates tax is set at £1/tonne.

Reductions in the UK's productive capacity and the negative impacts on the Government's policies on promoting growth of the SME's, employment opportunities and rural economies, seem to outweigh the potential benefits which might accrue from the limited additional net transfers to the Government that come from the imposition of an aggregates tax.

WA: SRR, 04-Feb-00

1. INTRODUCTION

HM Government is considering a tax on the sale of newly extracted (primary) aggregates, justified on the basis of the estimated cost of damage to the environment that is caused by quarrying hard rock and excavating sand and gravel. The tax has been under consideration since the Chancellor, in his July 1997 budget proposals, included the extraction of primary aggregates as an activity that is potentially harmful to the environment and as such should be discouraged through the tax system. Since its conception, some three years ago, a number of government departments have investigated the tax – one of three environmental taxes under consideration by the Government (the aggregates tax, a landfill tax and a carbon tax – a tax on industry's energy consumption).

Currently, the level of the aggregates tax is being considered by HM Treasury, for introduction in the April 2000 budget unless the industry can propose to the Department of Environment, Transport and Regions (DETR), a voluntary and satisfactory package of environmental measures. Such voluntary measures would have to mitigate the purported environmental damage caused by the industry, to a level that would make the aggregates tax redundant. To date, the DETR have not found proposals submitted by the Quarry Products Association (QPA) on behalf of its members, to have achieved this aim which was quite forcefully put to the industry, in March 1999, by Mr Richard Caborn, the then minister of state at DETR. Members of the newly formed trade association, **British Aggregates Association**, have become increasingly concerned over the economic impact of the proposed tax. The association has taken a number of measures including the

commissioning of Wardell Armstrong to review the basis of the tax, to make the government aware of the likely implications of its proposed action.

2. THE TAX

HM Treasury has indicated in March 1999 that the aggregates tax would have "a phased implementation over three years and could begin in January 2000, with an independent annual review and final assessment no later than the end of 2002". Unlike the landfill tax, there are indications that it will not be a tax deductible expense when calculating company tax. As yet, no mention has been made as to its hypothecation (i.e. allocation of the tax to specific uses). This also contrasts with the landfill tax. A landfill operator can claim a tax credit worth up to 90% of any contribution made to an enrolled environmental body for spending on an approved project, subject to a maximum credit of 20% of the landfill tax liability in any one tax year.

It is more than likely that HM Treasury would like to justify the level of the tax based on the two research projects which have been undertaken by London Economics on behalf of the DETR. Each of these research projects attempted to estimate the cost of the environmental damage which is caused by the aggregates industry, based on surveys of people who might be affected by quarrying. There are wide variations in the estimates of the costs that are given in the two studies. The variation is, in part, caused by the imperfections inherent in the methodology (contingent valuation) used in the surveys and, in part, in the inability of the

methodology to exclude completely the environmental impact of other industrial and commercial activities affecting the survey's respondents.

The following tabulates the best estimates of the environmental costs derived by London Economics in its two research studies.

Table 1: Results of London Economics Research on Environmental Costs of Aggregates

	Phase I Study April 1998	Phase II Study 26 August 1999	Variation (Times)
	£/tonne		
Hard rock quarries	2.62	0.34	**X7**.7
Sand & gravel pits	9.00	1.96	**X4**.6
Coastal super quarry	0.18	-	-
Marine aggregates	4.67	8.19	**X1**.8
Quarries in National Park - non residents	-	10.52	-
- residents	-	0.07	-
Average – primary aggregates	**£4.77**	**not recorded**	**-**
Recycling	1.06	9.47	**X**8.2
Average, all aggregates	**£4.63**	**not recorded**	**-**

In all probability the Treasury will be confused with the wide variation in the results of the two surveys (an order of magnitude or so, in some cases!). At best, the variations in the two estimates indicate the inexactness and subjectiveness of the contingent valuation methodology which has been used to measure the cost of

the environmental damage caused by the aggregates industry: at worst, they do little more than quantify the NIMBY (not in my back yard) syndrome, reflecting the wealth and priorities of people living in different parts of the country.

It is doubtful if, either the substantiation of the tax, or its cost to the industry, can be determined by treating it as just an environmental tax: the economic impact of the tax needs to be known and this has not been addressed in either of the two research studies.

3. TAX JUSTIFICATION

Mining, including quarrying hard rock and extracting sand and gravel for aggregates, is unique in industrial processes, in that it is:

- based on a finite resource of aggregate material which depletes as extraction proceeds
- existing extraction/mining operation cannot be moved at will, as aggregates can only be worked where they occur.

Unlike other industries that generally have the option to move if external costs (ie taxes) become onerous, mining cannot. Governments, throughout the world, have taken a variety of stances towards mining and quarrying, depending on their attitude as to whether the industry is seen as a generator of wealth or as a ‘static target’, which can be taxed with impunity. Governments with a beneficial attitude to the mining industry realise that, together with agriculture, mining is one of the two primary industries, which support all other industrial activities.

Tax deductible depletion allowances, as seen in the USA, are a measure of an enlighted government approach to the mining industry. The UK Government's aggregate tax is indicative of a tax punitive approach.

It has been both expedient and convenient for the Government to label the aggregates tax as an environmental tax. It has been conveniently fitted into the Government's policy of "fairness to present and future generations" – with the landfill tax and the carbon tax completing the triumvirate of environmental taxes. But is it being labelled as an environmental tax, which seeks to make pay those who cause the environmental impact ("pollutor-pays"), or is it a misplaced use of the public's heightened interest in matters environmental, for the Exchequer to merely raise more money for general purposes? It is extraordinary, if it is indeed an 'environmental tax', that aggregates destined to be exported are exempt of the tax. Under the precepts of environmental taxation, 'those causing the environmental damage' must pay, regardless of the end use of the aggregates. Therefore, it is not really an environmental tax, but a **land use tax**, selectively and cynically imposed on the aggregates industry, because it is an 'easy taxation target'. It is likely that the people who participated in London Economics' surveys would also offer to pay amounts similar to that which they have offered, to prevent quarrying, for preventing any form of industrial activity near their homes; for example, a warehouse or distribution centre with frequent lorry movements. Perhaps they should be asked and the results compared with those from the quarry survey.

The aggregates tax may be politically expedient for the Government, but is it fair to the UK's population as a whole? Is it compatible with the government's policies to encourage economic growth in the regions? Perhaps not. Rather, it panders to those with a strong propensity to exhibit NIMBY attitudes. The Government sponsored research, done by London Economics, shows that the willingness to pay to avoid primary aggregate production in the density populated and affluent southeastern parts of England is some ten times more than that measured in the remote Highlands of Scotland.

The Government has sought to enforce the concept of the 'polluter-pays' ('those causing the environmental impact should pay') in other ways. For example, the framework already exists to correct any adverse environmental impacts of primary aggregate production, in the Environment Act, 1995, which prescribes the mineral planning authorities' duties to manage planning permissions for the industry. As the environmental impacts of the extraction of aggregates are predominately local, then the use of the planning laws - a local government instrument - is surely more applicable than a blanket tax at national level. Indeed, mitigation of environmental impacts of aggregates extraction, at the local level, has already happened. Increasingly, planning authorities negotiate mitigation measures (planning gains) with developers who are seeking to extract aggregates, as in the case of planning permissions for any other potentially polluting industrial activity. The concept of planning gain is now, for all intents and purposes, formalised in the process of granting planning permissions, to such an

extent that in Scotland, for example, opencast coal developers pay a levy of £0.25/tonne of production to the local authorities.

The Environment Act and others were formulated to keep the environmental impacts of mineral extraction, constantly under review. Old permissions, given before1982, have been, or are in the process of being, updated: post 1982 and new permissions for extraction have to be reviewed every 15 years and then at the industry's cost. Furthermore, as of early 1999, the DETR (followed shortly by The Scottish Office and the National Assembly of Wales) reopened the debate on the minerals planning guidance notes for local authorities, very much emphasising the need for developers to submit schemes which are environmentally acceptable or have local benefits. Key issues being emphasised in the considerably tougher, future, planning regime are:

- Mining proposals must be environmentally acceptable and do no lasting damage.
- Where there is environmental damage, proposals must include the **provision of local or community benefits that clearly outweigh the likely impacts.**
- Proposals must **meet additional tests in national parks**, areas of outstanding beauty and other site of importance such as those of special scientific interest.
- Land must be **restored to the highest standard** and to a beneficial and suitable after-use.

The mechanism, therefore, already exists to mitigate the environmental impact of the aggregates industry at the local level. Indeed, the minerals extraction industry which includes aggregates, is the only industry for which planning permissions are constantly under review and which local authorities can require further environmental mitigation works from the operators. As a consequence, any environmental tax levied at the national level would be seen, at best, as a double

taxation, or at worst, as a thinly disguised land use tax which has been imposed indiscriminately on the aggregates industry.

The need for the industry to propose a set of voluntary environmental mitigation measures to take the place of the proposed aggregates tax, is also redundant for the same reasons as above. Indeed the Government's acceptance of the voluntary measures that have been proposed by the QPA (and rejected by the Government) would be detrimental to the industry and discriminate against the smaller quarry operators. Informal estimates from industry sources indicate that QPA's voluntary measures could add some £0.50/tonne to the cost of aggregates. Much of this expense would go towards the cost of implementing and running the ISO 14001 environmental management systems in the quarries – the cornerstone of QPA's voluntary measures. These measures, if ever accepted as working norms for the industry, would have two negative impacts. Firstly, the increase in price would reduce the demand for aggregates and cause closures of some of the smaller quarries. Secondly, there would be serious implications for the smaller operators if the Government were to adopt also the QPA's recommendation for the Government to follow a 'green-buying' policy: a policy which would exclude all aggregate suppliers from Government contracts unless they were signed up to the QPA's voluntary measures. The smaller quarry producers would certainly find the burden of implementing ISO 14001 more onerous than the majors because of their smaller production base, across which to spread the additional costs.

4. THE RESEARCH REPORTS

The DETR has spent some £600,000 on two research studies, done by London Economics, to estimate the public's perception of the cost of the environmental damage which is caused by the aggregates industry. Because so much money has been spent, it does not mean that the research has produced the correct result, Indeed, there has been much concern not only on the precepts of the research, but also on the efficacy and validity of the contingent valuation methodology which was used to estimate the industry's environmental costs.

The aim of the first research report was:

> *"To identify, evaluate and, wherever possible, value the environmental costs* ***and benefits*** *associated with the main source of supply of aggregates for the UK construction industry".*

Despite a steering committee with representatives from industry, the first research report concentrated largely on the design, implementation and results of a contingent valuation survey carried out to determine the industry's environmental costs. A general review was made of the industry, but little or no reference was made as to the industry's environmental benefits, nor to the environmental mitigation measures commonly negotiated with mineral planning authorities to obtain planning permissions for mineral extraction. Absolutely no information was provided on the effects of the tax on the economics of the industry itself nor its impact on its customer - the construction industry. As a result, the Government obtained a biased, one-sided perspective of the environmental costs

of the industry, with none of its benefits, on which to justify and quantify an 'environmental tax'.

There was sufficient concern over the methodology and results of the first survey for the DETR to commission a second, larger study. This time the DETR abandoned the steering committee with its industrial representatives and failed to take this opportunity to re-address some of the imbalances in the aims and objectives of the research. London Economics was again commissioned to define and expand its contingent liability survey, largely to answer the critics of the statistical methodology used in the first report.

It was perhaps unfortunate for the Government and proponents of its environmental taxation policy that the second research report came up with widely different estimates of the environmental costs for the aggregates industry. The two surveys may have been undertaken to the highest standards, making use of the best available statistical expertise, but the wide variation (an order of magnitude or so, in some cases) demonstrates the lack of statistical robustness in the contingency valuation method, that was used in the surveys. There is no doubt, that the contingent valuation methodology was, in this instance, the best available method to determine the environmental costs. However, the different sizes and diversity of the quarries and the limited sample size of the people surveyed who are directly and indirectly affected by quarry operations, means that the returns of the surveys and their statistical analysis can be easily distorted. The researchers have been unable to put any meaningful measure of precision as to the accuracy of their estimates of the environmental costs: this also is an indication of

the complexities and inexactness of the contingent valuation method. The imperfections and lack of accuracy of the contingent valuation methodology, together with the lack of any economic cost/benefit analysis of the tax, suggests that the Government, at best, has an incomplete picture with which to evaluate the net costs of the environmental damage caused by the industry. It has, too, little idea as to the economic effects on the industry of imposing this tax.

5. ECONOMIC FACTORS

Introduction

Despite commissioning the two research studies, the Government has left the industry to count the cost of the aggregates tax. No economic cost/benefit studies have been done by the Government on the impact of the aggregate tax on the aggregates industry, nor on the construction industry. Only discussions by the industry and interested parties concerning the application of the tax have been the subject of consultations with HM Customs & Excise. Economic arguments on the principals of the tax have been well ventilated in a number of papers in the technical press, and in research commissioned by the Quarry Products Association on behalf of its members.

Industry Losses

One of the key issues is the impact that the aggregates tax would have on aggregates demand (see Annex 2). Research by ECOTEC Research and Consulting Ltd for the QPA has shown that, both in the short and long term, aggregate demand is only moderately affected by price rises, such as that which

would be caused by the imposition of the aggregates tax. Although the impact of price rises might be modest, its effect is likely to be felt disproportionately by the smaller companies (ie those with output in the range of 0 to 140,000 tonnes/year). Small companies, generally with only one quarry, have less flexibility, often work on small profit margins and are less able to spread increasing environmental costs over a larger production base, when compared to large, multi-quarry companies. For example, preliminary estimates (see Annex 2) suggest that an aggregates tax of £1/tonne, equivalent to a 20% increase in the current average, ex-quarry price of £5/tonne, would reduce the annual aggregate demand by some 17 million tonnes (about 8% of the 1996 production of 215 million tonnes). This could lead to the closure of some 200 small quarries with a loss of some 1,400 direct quarry jobs and an industry loss of £13 million in net profits after taxes. The loss of wages, estimated to be some £29 million per year, for a £1/tonne aggregates tax, would likely have a disproportionate effect on lower income earners in poorer rural parts of the country, where small quarries commonly serve local communities.

Contraction of the Industry

Already the industry is restructuring under commercial pressures. Small and medium sized companies are finding it increasingly difficult to compete with the majors of the industry, as they tie up land for future quarrying, discourage small operators setting up downstream competing ready-mix and asphalt coating plants and use predatory pricing to capture market share. Currently, there are plans for further consolidation in the industry as Tilcon (owned by the Anglo American Corporation) has made an agreed cash bid for Tarmac, whilst Hanson is

considering the purchase of Pioneer. The two new companies will dominate the industry and will control in excess of 50% of the market.

The aggregates tax will further exacerbate the demise of the small and medium sized quarry companies by increasing the pressures on their profit margins. The profit margins of smaller quarries are already under pressure from having to absorb indirect environmental costs increasingly imposed by planning authorities and unlike the majors can not spread these costs across a number of quarries. Experience of the landfill tax, indicates that aggregate purchasers are likely to demand that the quarries absorb some of the aggregates tax, especially if it is not identified as a discrete item on invoices.

Increased Transport Costs

It is generally accepted that the delivery of aggregates by lorry to construction sites, from hard rock quarries and sand and gravel pits, is a significant component of the aggregate industry's the environmental impact. Consolidation of the industry is likely to lead to increased lorry movements as smaller quarries in more remote locations are closed down by the majors. Thus, the imposition of the aggregates tax which would reduce demand and result also in the closure of smaller quarries, would have two significant effects. Firstly, the transport costs of delivered aggregate would increase, as it would have to be moved greater distances. Secondly, the environmental costs associated with lorry movements would also increase. Thus, the aggregates tax if implemented, would itself contribute to further environmental damage.

Reduction in Construction

Any modest increase in the cost of aggregates is likely to have a minimal effect on construction activity in the private sector. However, it is estimated by the QPA that some 40% of aggregates are purchased by the Government – half by central governmental agencies and half by local authorities. The Government would need to be aware that it would be paying some £75 million per year in aggregates tax, if it were introduced at £1/tonne. Although this money eventually returns to the Government through the Treasury, it would need to revise upwards its various construction budgets to account for the tax. It is likely, however, in these cost cutting days, that upward budget revisions to accommodate the cost of the aggregates would not happen, especially in the case of local authorities many of which are capped by central government. The aggregates tax would therefore result in less expenditure on public sector construction works.

Impact on Recycling

Because the cost of aggregates is little more than 2% to 3% of construction costs in the economy, any immediate increase is unlikely to spur the trend to recycle demolition materials as secondary aggregates. The dramatic increase in the use of secondary aggregates has largely come about by the implementation of the landfill tax and the business opportunities now available to landfill operators to generate extra income from sorting and recycling inert waste from demolition sites. Also, the construction industry has revised its specifications on low quality aggregates to allow the use of secondary aggregates. The aggregates tax is, therefore, not considered to be important in encouraging further recycling of demolition materials. Indeed, the sources of secondary aggregates, under the

present landfill tax regime, may well be reaching their limits of available supply. Perhaps, the only way to encourage further recycling of even poorer quality construction waste material would be to substantially increase the landfill tax, rather than to believe that an aggregates tax would have a similar impact.

Benefits

Apart from the industry's contribution to the UK's productive capacity, the Government has not been made suitably aware of two key benefits of aggregate extraction:

- The negative impacts of transporting aggregate over long distances, as seen in many other countries, are kept to a minimum in the UK. Great Britain has sufficiently diverse geology so as to allow the regional development of small quarries throughout the country to serve local markets.
- Land improvements are commonly made during the reclamation of exhausted quarries. Many sand and gravel pits are flooded and used for recreation. Many former quarries and pits are now sites of special scientific interest (SSSIs) and are important habitats for birds and other wildlife.

6. CONCLUSIONS

The case for the aggregates tax, based on the estimates of the cost of environmental damage that is caused by the extraction and delivery of primary aggregates, is, by no means, proven.

Estimates of the costs of environmental damage are uncertain and, if proven, could well be mitigated by using existing planning legislation. The Government has not, as yet, commissioned any research on the economic impact of the tax, nor the quantification of the industry's benefits, for example those arising from the reclamation of exhausted quarries.

The likely reduction in the number of small quarrying companies, reduced employment in rural areas, inflationary pressures on the construction industry, and increased environmental damage in transporting aggregates longer distances, seems to outweigh HM Treasury's modest fiscal gains, especially as 40% of the tax would be paid for by the Government itself.

ANNEX 1

Milestones

Milestones

____September 1995	"Minerals planning guidance notes", Environmental Act, 1995, Review of mineral planning permissions, issued by the Department of the Environment & Welsh Office.
____July 1997	The government released a statement of intent on environmental taxation stating its central economic objective as "promoting high and environmentally sustainable levels of growth and employment". Research is to be commissioned to value the environmental costs ('externalities') attached to quarrying aggregates.
25th November 1997	The DETR commissions London Economics to provide information on the environmental costs and benefits associated with the extraction, processing and transport of aggregates.
30th April 1998	The executive summary of the London Economic's report is made available, free of charge, followed shortly by the publication of its report entitled "The environmental costs and benefits of the supply of aggregates". It attempts to identify the environmental costs of aggregates on a per tonne basis.
12th May 1998	Richard Caborn, the planning minister at the DETR, announced to a joint Quarry Products Association (QPA)/Royal Town Planning Institute seminar, that a tax was being considered to deal with the remaining external impacts of aggregates not as yet addressed by planning controls. The tax would go ahead unless the industry could come up with creditable alternatives, including voluntary self-restraint over further proposals to extract aggregates in National Parks.
____ May 1998	"Towards an environmental tax on aggregates", END Report 280, pg. 17/19, A review of the government's activities in justifying an aggregates tax.
12th June 1998	"Setting a tax level in tablets of stone", Planning, pg. 9, Richard Bate questions the efficacy of the government's intention to impose an aggregates tax on producers, based on externalities.
15th June 1998	H M Customs and Excise requests comment on the aggregates tax from interested parties by 31 August 1998.
27th August 1998	Wardell Armstrong submits its comments from interested parties on the aggregates tax to HM Customs and Excise.
____ November 1998	HM's Pre-budget report, "Steering a stable course for lasting prosperity", 5-60 to 5-63. The government announces that its research has demonstrated that there are significant environmental costs associated with aggregate quarrying which are not already covered by regulations. Customs and Excise have been consulted on how the aggregates tax might work. The aggregates industry has been asked to propose alternatives to the tax.

5th November 1998	The Quarry Products Association (QPA) submits a package of voluntary measures, on behalf of its members, to Richard Caborn, minister of state, at the DETR.
9th March 1999	The deputy prime minister informs the QPA that its voluntary measures fall short of what the government considers necessary to justify the environmental costs of aggregate quarrying.
9th March 1999	HM Treasury press release "Reducing the environmental impact of quarrying", HMT8. The government believes that there are significant environmental costs associated with quarrying, based on the DETR sponsored research. Before introducing a tax, the government calls for the industry to submit an enhanced package of voluntary measures which would alleviate the need for the tax.
30th March 1999	Draft clauses for a potential aggregates tax are issued.
____April 1999	Reeves & Neylan of Perth, Scotland prepare a three page summary for the Scottish branch of the QPA, entitled "The case for no aggregates in Scotland".
30th April 1999	HM Customs and Excise issues the draft legislation and a summary of consultation on the aggregate tax. It states that if the industry is not able to submit an improved package of voluntary measures, then the tax could begin in January 2000.
26th August 1999	"The environmental costs and benefits of the supply of aggregates – phase 2", prepared for the DETR by London Economics. Following criticism of the methodology used in the phase I report, London Economics attempts a further estimate of the environmental costs of quarrying aggregates, on a per tonne basis.
____ September 1999	"Rocky Logic: the role of aggregates in the UK economy", prepared for the Council for the Protection of Rural England by MacKay Consultants. The report is in favour of government initiatives to reduce primary aggregate production and thereby reduce the amount of land used for quarrying.
_____1999	"Aggregates taxation as an environmental instrument", QPA. The paper sets out to demonstrate that aggregates extraction is not harmful and that an aggregates tax would not satisfy the test of good taxation.
22nd January 2000	The newly formed British Aggregates Association commissions Wardell Armstrong to undertake a review of the aggregates tax based on the two DETR research projects.

ANNEX 2

Economic impact of the aggregates tax

Economic Impact of the Aggregates Tax

Methodology

Sufficient data exists in various trade directories and in reports commissioned by the Quarry Producers Association (QPA), to estimate the following impacts of a range of levels for the aggregates tax:

1. Loss of demand
2. Loss of employment
3. Closure of quarries and pits
4. Loss of net profit
5. The opportunity cost of job losses
6. Extra tax gained by the Government
7. Net additional transfers to Government

Although lists of hard rock quarries and sand and gravel pits exist for ten regions in Great Britain, no individual production data are available to the public, for reasons of commercial confidentiality. However, an approximation of the number of quarries in three class sizes (small, medium, large) can be estimated indirectly from available published information.

The average size of a crushed stone quarry and a sand and gravel pit (collectively called 'quarries') can be obtained from dividing the reported aggregated annual tonnages of output by the numbers of quarries in each of the ten regions. This gives 20 average quarry sizes which reflect the distribution of individual quarry sizes for the 1,509 reported quarries in the regions (see table A2.1).

The quarries can then be divided into three size classes – small, medium and large – based on the work done by Reeves & Neylan, which prepared "The case for no aggregates in Scotland" (see table A2.2). Multiplying the estimated number of quarries in each size class by the 'average' quarry output gives an estimate of 237 million tonnes of production. This is 10% in excess of QPA's figure of 215 million tonnes of aggregate production in 1996 and is a reasonable check on the estimation method to determine a distribution of the sizes of quarries throughout the ten regions. The numbers of quarries, estimated above in each of the three class sizes, is therefore used in the subsequent analysis.

The average ex-quarry selling price throughout Great Britain has been assumed to be £5/tonne, although it is known to vary from £3/tonne in parts of Scotland to as high as £6/tonne in more densely populated parts of SE England. Five aggregate tax levels have been

investigated, ranging from 5% of the original ex-quarry price (ie £5.25/tonne) to 100% of the original ex-quarry price (ie £10.00/tonne). It is estimated that one, directly employed person in the quarries accounts annually for 11,600 tonnes of production (Statistical Year Book, 1997, QPA, pg2). The industry's average profit margin, ie the gross profit before tax divided by (the sales price – excluding aggregates tax), is assumed to be 20%. The company tax rate is assumed to be 20%.

Results

Tables A2.3 and A2.5 show the impact of different levels of the aggregates tax on the loss of demand, likely number of quarry closures, loss of employment, loss of net profit to the industry and the loss of wages. These can be contrasted with the Government's net additional tax gain by imposing the aggregates tax, suitably adjusted for the industry's reduced output and profit, and taking note that some 40% of the tax is to be paid for by the Government in their own purchases of aggregate.

ECOTEC Research and Consultancy (1998?) have shown that the demand for aggregates in the short term is little affected by price. However, should the aggregates tax be fixed at £1/tonne (at 20% of the original price), the annual demand could be reduced by some 17 million tonnes. It is likely that it would be the smaller quarries which would close, as they often have smaller profit margins, will be generally unable to support the burgeoning costs of environmental works imposed by planning authorities and would have to absorb part of the new aggregate tax likely demanded by consumers. It is estimated that some 211 small size quarries could close – representing about a quarter of those currently in production. About 1,400 direct quarry jobs (about 8% of the industry's total labour force) would be lost, not to mention the people employed in downstream asphalt coating and ready-mix plant, who also rely on aggregate demand. The industry would lose about £85 million in revenue, and some £13 million in net profits, which, for all intents and purposes, would be a transfer to the public sector in the form of part of the aggregates tax.

With aggregates tax at £1/tonne, the Government's net tax gain (aggregates tax less the loss in company tax and national insurance on reduced aggregates demand) would be some £190 million; this for the loss of some 1,400 jobs in the industry. The actual additional net transfer to the Government would be considerably less as some 40% of the aggregates tax would be

paid for by the Government, out its own construction budgets. The opportunity costs, therefore, of the loss of an individual quarry job would be some £50,000 per year, which is close to the estimated cost of creating a productive job in the industrial sector.

The £72 million net additional transfer to the Government, assuming an aggregates tax of £1/tonne, needs to be set against the £29 million in lost wages of the 1,400 people displaced from the industry. Thus, for the sake of this small net economic gain, the Government would further stress the already belaboured construction industry, marginally reduce the UK's overall productive capacity and impact negatively on small and medium sized enterprises in many of the UK's low income, rural areas.

Tables

TABLE A2.1: Aggregates by Region – Quarries and Output, 1996

Region	Crushed Rock			Sand and Gravel			Totals	
	No Quarries	Output 10^6t/yr	Unit output t/yr/mine	No Quarries	Ouput 10^6t/yr	Unit Output t/yr/mine	No Quarries	Output 10^6t/yr
North	72	10.4	144,400	34	2.9	185,300	106	13.3
Yorkshire & Humberside	47	12.4	263,800	94	3.9	41,500	141	16.3
East Midlands	75	29.0	386,700	155	10.8	196,400	230	39.8
East Anglia	6	0.6	100,000	82	5.6	68,300	88	6.2
South East	17	1.2	70,600	240	26.5	110,400	257	27.7
South West	95	22.9	241,100	51	5.8	113,700	146	28.7
West Midlands	34	6.5	191,200	77	9.6	124,700	111	16.1
North West	39	6.4	164,100	32	3.8	118,800	71	10.2
Wales	77	21.3	276,600	19	3.1	163,200	96	24.4
Scotland	136	22.2	163,200	127	9.9	78,000	263	32.1
Totals	**598**	**132.9**	**222,200**	**911**	**81.9**	**89,900**	**1,509**	**214.8**

Sources: Statistical Year Book, 1997, Quarry Products Association, Section 10, Regional Summaries

Directory of Quarries, Pits and Quarry Equipment, 25th Edition, Quarry Management, pgs 94 to 109.

TABLE A2.2: Distribution of Quarries by Size

Quarry Size	Annual Output – tonnes/year		Number of Quarries				Estimated Aggregates Annual Production 10^6t/year			
	Range	Average (nominal)	Crushed Stone	Sand & Gravel	Total	%	Crushed Stone	Sand & Gravel	Total	%
Small	0 to 140,000	80,000	23	703	726	48	1.8	56.2	58	25
Medium	140,001 to 275,000	200,000	423	208	631	42	84.6	41.6	126	53
Large	+275,001	350,000	152	-	152	10	53.2	-	53	22
Total	**-**	**-**	**598**	**911**	**1,509**	**100**	**139**	**98**	**237**	**100**

NB: Rounding out errors may occur in last significant figure.

The estimated aggregated annual tonnages are obtained by multiplying the number of quarries by the nominal average quarry output, for each of the three classes of quarry size.

The 1996 production estimates by QPA are 133 million tonnes of crushed stone, 82 million tonnes of sand and gravel giving a total of 215 million tonnes of aggregates, ie there is a 10% error in the above table caused by a mis-estimation of the average size of the quarries.

Sources: Directory of Quarries, Pits and Quarry Equipment, 25th Edition, Quarry Management (for numbers of quarries).

Statistical Year Book, 1997, QPA (for 1996 production estimates to check with above).

"The case for no aggregates tax in Scotland, April 1999" Reeves & Neylan (for average size of three classes of quarries).

TABLE A2.3: Aggregate Tax -v- Reduction in Demand, Loss of Employment & Loss of Net Profits

Tax as a percentage of the original price %	Aggregate Tax £/t	Revised Price with Tax £/t	Short Term Reduction in Demand						
			%	Demand Loss 10^6/yr	Revised Output 10^6/yr	Quarries Closed (Nominal)	Loss of Employment	Industry Revenue Net of Aggregate Tax £10^6	Loss of Net Profit after Taxes £10^6
0 (Base Case)	**0.00**	**5.00**	**0**	**0.00**	**215.0**	**-**	**-**	**1,075**	**-**
5	0.25	5.25	2.1	4.51	210.5	56	389	1,053	3.5
10	0.50	5.50	4.2	9.03	206.0	113	778	1,030	7.2
20	1.00	6.00	7.7	16.56	198.4	207	1,428	992	13.3
50	2.50	7.50	16.4	35.26	179.7	440	3,040	899	28.2
100	5.00	10.00	26.3	56.55	158.5	707	4,875	793	45.1

Percentage reduction in demand is a weighted composite for crushed rock and sand and gravel, given in "Environmental effectiveness of a tax on the supply of aggregates", QPA and ECOTEC, 1998(?).

Aggregate supply is assumed to be 215 million t/yr (1996), QPA

The average size of a small quarry is assumed to be 80,000 t/yr and employs 1 person per 11,600 t/yr of output.

Loss of net profit after taxes assumes a 20% profit margin to obtain gross profit and a 20% company tax on gross profit,
(ie total revenue without aggregate tax) x 0.2 (profit margin) x 0.8 (percentage gross profit after company tax)

TABLE A2.4: Aggregate Tax -v- Reduction in Profit and Increased Tax Burden

Tax as a percentage of the original price %	Aggregate Tax £/t	Ex-quarry Price £/t	Revised Output 10^6t	Quarry Employment N^o Jobs	Ex-Quarry Revenue less Aggregates Tax £10^6	Gross Profit before Company Tax £10^6	Company Tax £10^6	Aggregates Tax £10^6	National Insurance £10^6	Total Estimated Tax Take £10^6	Extra Tax Burden £10^6
0 (Base Case)	**0.00**	**5.00**	**215.0**	**18,534**	**1,075**	**215**	**43.0**	**-**	**66.7**	**110**	**-**
5	0.25	5.25	210.5	18,145	1,053	211	44.2	52.6	65.3	162	52
10	0.50	5.50	206.0	17,756	1,030	206	41.2	103	63.9	208	98
20	1.00	6.00	198.4	17,106	992	198	39.7	198	61.6	300	190
50	2.50	7.50	179.7	15,494	899	180	35.9	449	55.8	541	431
100	5.00	10.00	158.5	13,659	793	159	31.7	793	49.2	874	764

Assumes an average profit margin of 20% of net sales price (gross sales price less aggregate tax) and a 20% company tax rate.

Assumes an average wages cost of £20,000/yr and a National Insurance payment of 19% of wages.

Total Estimated Tax Take = Company tax + aggregates tax + national insurance contribution.

Extra Tax Burden = (Aggregates tax + company tax + national insurance) – Total tax take without the aggregates tax (£110 million).

TABLE A2.5 Aggregate Tax -v- Industry Losses -v- Government Gains

Tax as a percentage of the original price %	Aggregate Tax £/t	Loss of Revenue £10^6	Loss of Net Profit After Tax £10^6	Loss of Jobs	Loss of Wages £10^6	Aggregate Tax paid by Government £10^6	Extra Tax Gain by Government £10^6	Net Transfers to Government £10^6	Opportunity Cost of Job Losses £/lost job/year
0 (Base Case)	**0.00**	-	-	-	-		-	-	-
5	0.25	22	4	389	8	21	52	19	49,000
10	0.50	45	7	778	16	39	98	36	46,000
20	1.00	83	13	1,428	29	76	190	72	50,000
50	2.50	176	28	3,030	61	172	431	170	56,000
100	5.00	282	45	4,875	98	306	764	315	65,000

Source: From Tables A2.1 to A2.4

See Table A2.3 for Loss of Net Profit after Tax.

Extra Tax Gain by the Government = Extra tax burden (see Table A2.4)

Net Transfer to Government = Extra tax gain by Government – (loss of net profit after taxes + loss of wages) - aggregate tax paid by Government.