

REVIEW OF THE SOUTH AFRICAN SAND AND AGGREGATE INDUSTRY, 2012

DIRECTORATE: MINERAL ECONOMICS



mineral resources

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ABSTRACT

The widespread use of aggregate and sand result not only from their general availability but also from economic considerations. Demand for aggregate and sand in South Africa is driven by the construction industry, which is comprised of residential building, non residential building and civil construction. The report looks at the abundance in terms of occurrence of sand and aggregate and how best these can be exploited towards valuable contribution to the economy. A market analysis is also covered indicating the recent trends together with the supply and demand dynamics. The report concludes with an outlook with particular focus on the demand drivers of the industry.

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1. INTRODUCTION

Aggregate refers to the different sizes of stone that are used in the building, construction and road-making industries while sand is the collective name given to finer grain size components. Ninety percent of sand will pass through a square sieve with an aperture size of 4.75 mm, whilst at least ninety percent of the coarse stone will be retained by such a sieve.

The widespread use of aggregate results not only from its general availability but also from economic considerations. Aggregate of good quality is commonly available near the site of use at relatively low cost. Because the profitable exploitation of aggregate is very sensitive to transport costs, quarries were traditionally located on the outskirts of cities and towns. In numerous instances, these deposits have been depleted and new sources further away had to be found, often resulting in greater transportation costs. Urban development itself has, in recent times, been responsible for the rapid depletion of readily available deposits.

Hard rock aggregate quarries are often located on the slopes of hills and mountains, usually resulting in the defacing of areas of natural scenic beauty. Growing environmental awareness increasingly influences the exploitation of such resources in localities of this nature.

2. OCCURRENCE OF SAND AND AGGREGATE IN SOUTH AFRICA

In South Africa, various rock types are available for aggregates and concrete aggregate is usually found in abundance around most of the major centres of development. The three main groups of coarse aggregate are:

- Igneous rocks – Andesite, basalt, dolerite, felsite, gabbro, granite, granodiorite, norite, rhyolite and syenite.
- Metamorphic rocks – Granite-gneiss, granulite, hornfels, quartzite and slate.
- Sedimentary rocks – Quartzite, sandstone, greywacke, shale and tillite.

Unlike in many countries, naturally occurring gravel suitable for use as aggregate is very rare in South Africa. Natural sand consists of loose grains which result from the chemical weathering and/or physical breakdown of rocks. The range of particle sizes is dependent on the original texture of the source rock and the state and degree of weathering and breakdown. Sand accumulates in rivers, on beaches, in dunes and in valleys between

mountains. Natural sands include alluvial/eluvial sands, aeolian/windblown sands and marine/beach sands. Each of these sands has its own characteristic properties which are determined by factors such as origin and mode of transport.

Manufactured sand is produced by the mechanical crushing or milling of rock and gravel. Mine-dump sand can also be classified as manufactured sand, being a waste product in the mining industry.

3. PRODUCTION PROCESS

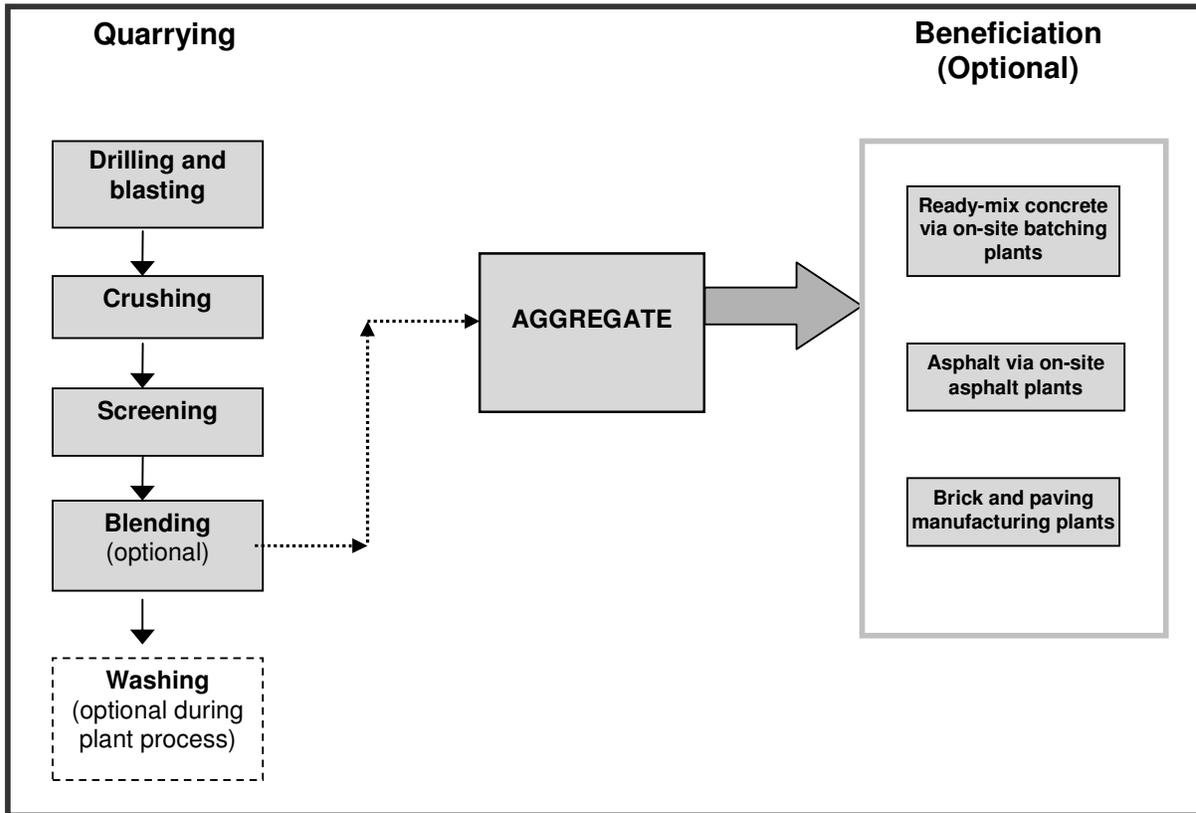
Most hard rock material used to produce coarse aggregate is sourced from open pit quarries and waste dumps. Quarrying usually requires drilling and blasting, after which the rock is extracted by means of bulldozers and draglines. The broken rock is transported to a processing facility and the material goes through several stages of crushing and sizing (Fig.1). In some instances, blending is necessary to produce a specific customer specification. A good concrete aggregate must be clean, chemically inert, durable, hard, homogenous, and roughly cubic in shape after crushing and of a size grade suitable to make concrete of the desired physical qualities.

Natural sand is usually mined with conventional earth-moving equipment. The quality and final use of the sand usually determine the amount of processing necessary. Washing and screening are used in some instances to produce better quality sand.

It is now a common practice to further beneficiate the aggregate into:

- Ready-mix concrete,
- Asphalt,
- Bricks and paving material.

FIGURE 1: BASIC FLOW DIAGRAM OF THE SAND AND AGGREGATE INDUSTRY



Source DMR, Directorate Mineral Economics

4. OWNERSHIP AND SMALL SCALE MINING

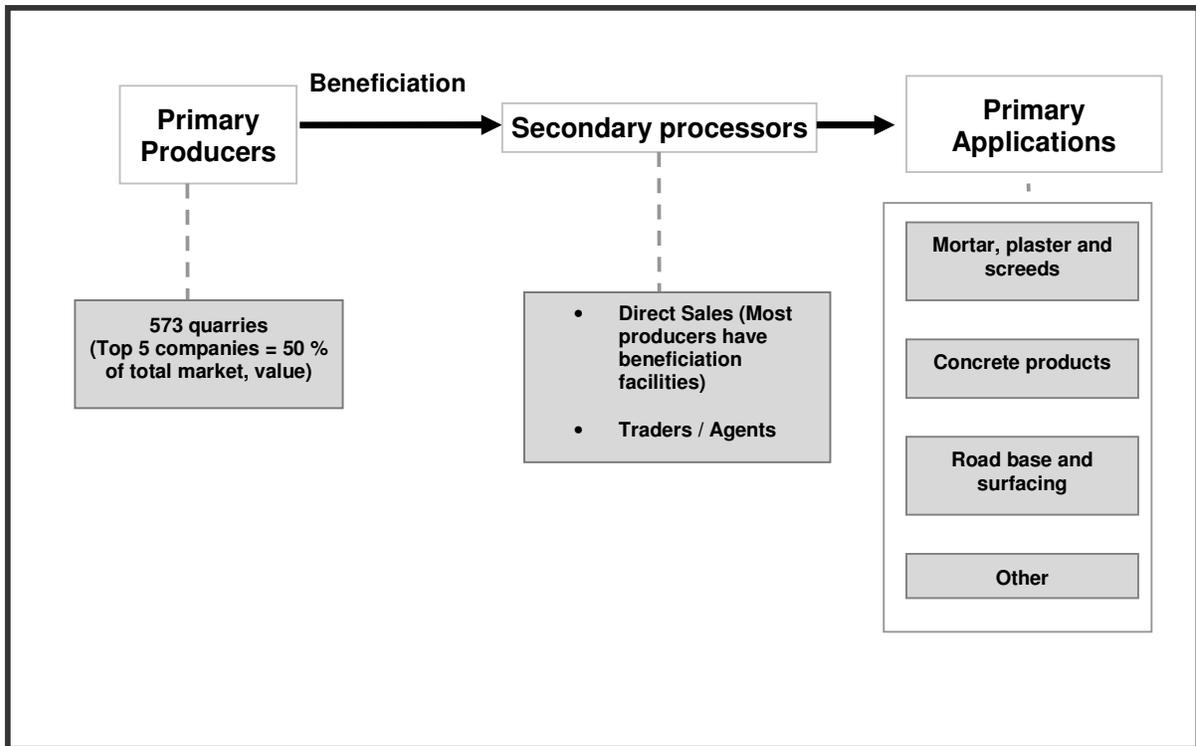
The sand and aggregate industry comprises of some 573 registered operating quarries in South Africa.

The leading sand and aggregate operators are:

- **Lafarge** (subsidiary of Lafarge International,) empowerment partner Sinako Consortium (26% of Lafarge mining Pty. Ltd) and 10% for the employees.)
- **Afrisam** (Afrisam is 100% owned by the Afrisam Consortium, an entity made up of: Bunker Hills, a Black Economic Empowerment (BEE) investment company, Motheo Wa Basadi Trust , Holcim Ltd, an international company based in Switzerland, the Public Investment Corporation (PIC), and all management and employees of the southern African operations of Afrisam.)
- **Afrimat** (empowerment partner Joe Kato Investment (Pty) Limited, Mega Oils and staff trust),

- **Wearne** (empowerment partners Enerst Moloï of Moseme Road Construction, B Mkhonto of Imisebe Trading and staff),
- **NPC** (Natal Portland Cement) Aggregate (subsidiary of CIMPOR - Cimentos de Portugal and empowerment partner National African Women’s Alliance (NAWA)

FIGURE 2: INDUSTRY AND COMPANY STRUCTURE



4.1. OPPORTUNITIES FOR SMALL SCALE MINERS

Sand and Aggregate mining opens up more opportunities to small scale miners since it requires less capital for operation. There is not much capital that goes into buying expensive underground machinery. Potential opportunities for small scale miners exist in the following areas:

- **Waste from underground mining operations** e.g. gold and platinum mines are suitable for beneficiation into good quality aggregate and sand for concrete and roads.
- **Slag and ash** formed as by-products from power generation, the iron and steel and petroleum industries have potential for the provision of aggregate.
- **“Used” concrete and asphalt** can be recycled for use as aggregate in road building.

5. MARKET ANALYSIS AND DEVELOPMENTS

Demand for aggregate and sand in South Africa is driven by the construction industry, which is comprised of residential building, non residential building and civil construction. According to Industry Insight, the residential market activity remains subdued due to consumer high level of indebtedness. Civil construction and non-residential building activity continue to be muted as the number of new projects are lacking. The entry of new companies in the market in recent years has resulted in over-capacity in the current environment of reduced demand for construction services.

South Africa's construction sector experienced a decade of considerable growth between 2002 and 2011, driven by the buoyant property market and the government's infrastructure spending. Sales volumes of sand and aggregate increased annually by 6 percent from 2002 to 2011, while sales value increased by 15 percent in the same period (Fig. 3 and 4). The rise in sales resulted from the strong growth in the construction sector experienced between 2004 and 2007.

Growth in the construction sector subsided in 2008, following the effects of the global economic financial crisis, which saw investment in construction moderate to 8.5 percent in the fourth quarter of 2008, recording single digit real annual growth since the fourth quarter of 2004. However, the full extent of the recession was offset by momentum of long term contracted projects, resulting in sales of sand and aggregates stabilising between the period 2009 and 2011 in spite of the global economic uncertainties. The country embarked on a lot of capital intensive projects, such as building and renovation of stadia, airport and transportation infrastructure, leading to the 2010 FIFA soccer world cup. During this period the residential market was at its peak as well, on the back of government's roll out of social housing programme.

The civil construction industry recovered somewhat in the fourth quarter of 2011, according to FNB/BER civil construction confidence index, as provincial and local governments continued to spend on road and water projects. In the mining industry the private sector continued to spend on construction works to sustain mining capacity. The Building Research Strategy Consulting Unit of business consultancy (BMI) estimated that investment in construction and

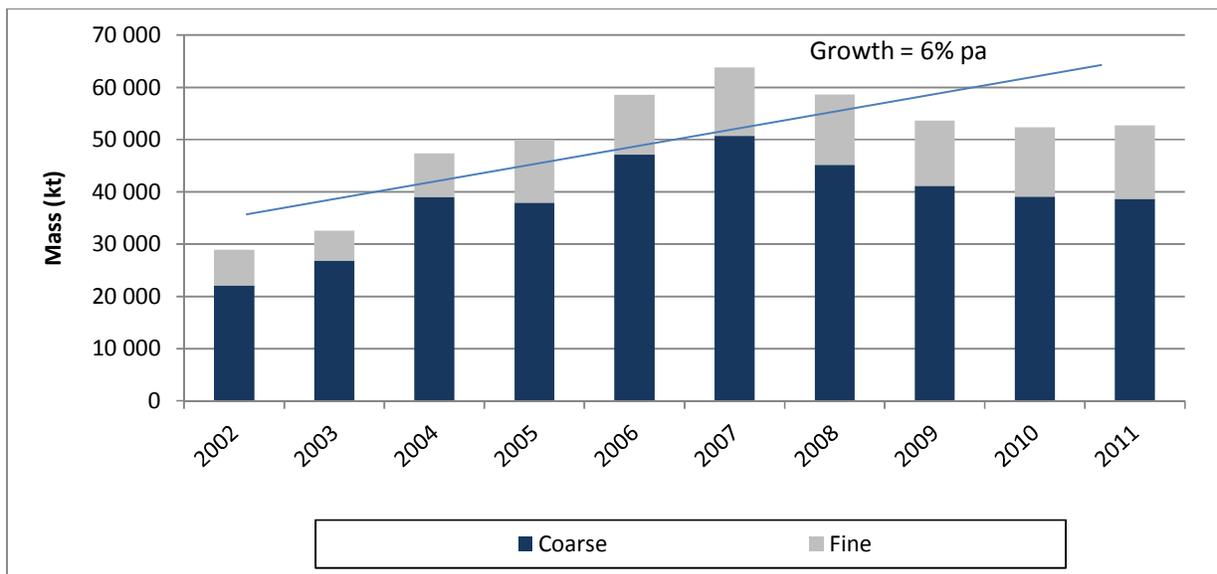
building in South Africa in 2011 was R320-billion. The shortage of bitumen halted a number of projects that would have resulted in increased expenditure on road projects.

Ongoing major projects currently driving demand for aggregates and sand:

- South African National Roads Agency Limited (SANRAL) - continuing upgrades of the road network, including the resealing and repaving of existing roads.
- Passenger Rail Agency of South Africa (PRASA) - continuing improvements on rail and electrical systems,
- Airports Company of South Africa (ACSA) - continuing improvements of facilities, including the runways and taxiways at the East London Airport.

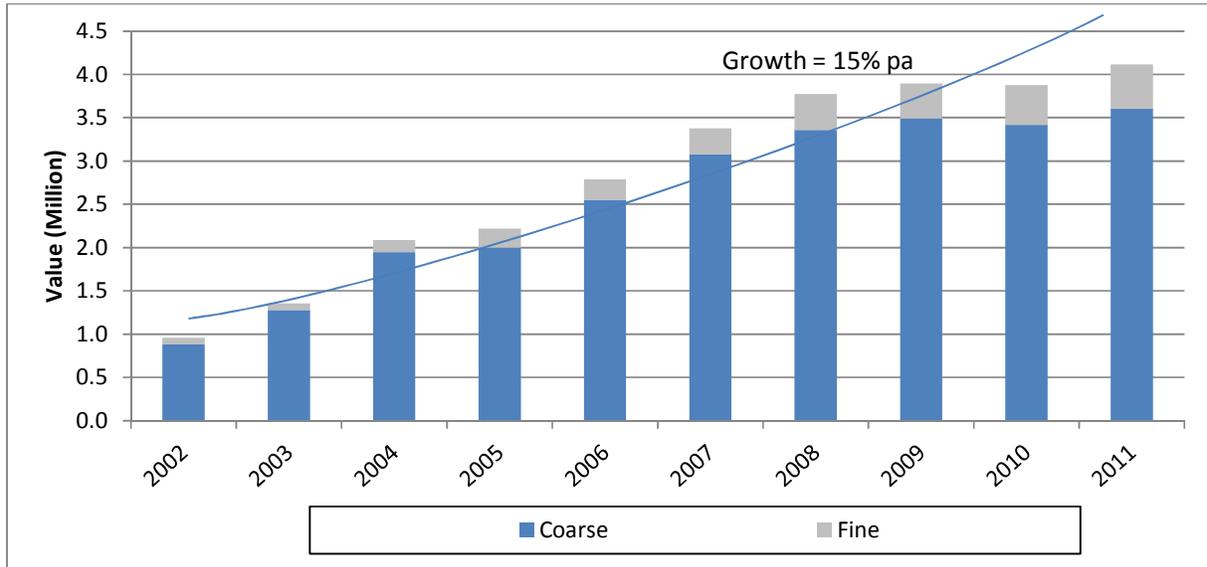
An agreement between the Public Investment Corporation (PIC) and Swiss group Holcim over a restructuring plan for AfriSam to prevent the company from defaulting on R12-billion of debt repayments was reached in January 2012. AfriSam's debt will be reduced to R6.5-billion and would ensure job security for over 1 800 employees. After the restructuring, PIC will hold 57 percent of AfriSam, Pembani Group 38 percent, Holcim 2 percent, Bunker Hills 1.5 percent and AfriSam staff and management 1.5 percent. Holcim and Bunker Hills also have an option to acquire an extra 14% in AfriSam for R940-million, which they could exercise in the next six to 18 months.

FIGURE 3: SOUTH AFRICAN SALES OF SAND AND AGGREGATE BY VOLUME, 2002 - 2011



Source: Directorate Mineral Economics

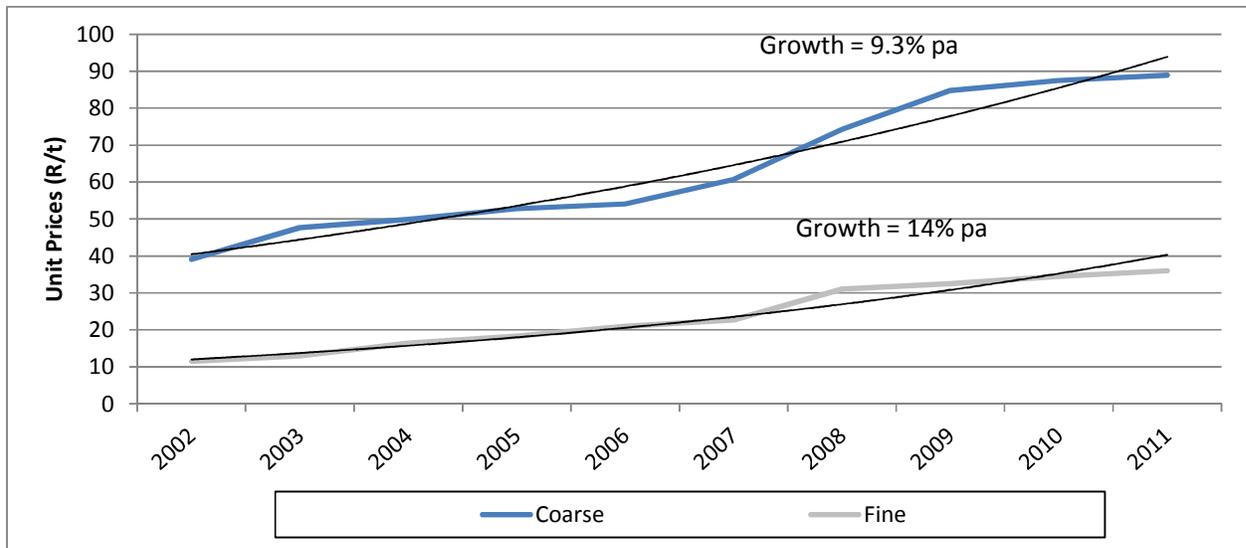
FIGURE 4: SOUTH AFRICAN SALES OF SAND AND AGGREGATE, BY VALUE, 2002 – 2011



Source: Directorate Mineral Economics

Prices of both coarse and fine aggregate displayed annual growth averages of 9.3 percent and 14 percent respectively (Fig. 5). Most companies adopted a more aggressive pricing strategy in a bid to recover their operational costs post 2010 as demand continued to be weak.

FIGURE 5: AVERAGE UNIT PRICES OF SAND AND AGGREGATE, 2002 – 2011

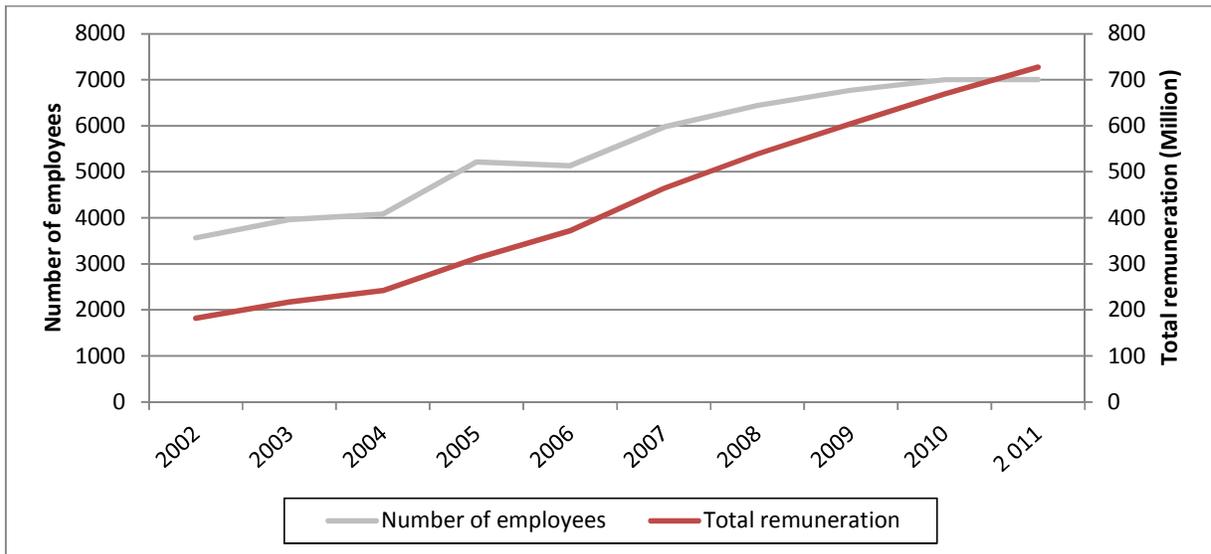


Source: Directorate Mineral Economics

6. EMPLOYMENT

Employment in the sand and aggregate industry increased by 8.1 percent and remuneration by 16 percent over the past ten years, as a result of increased activity in the construction sector (Fig. 6). Labour productivity decreased by 2.1 percent while average earnings increased by 7.3 percent in the same period.

FIGURE 6: SOUTH AFRICA'S AGGREGATE AND SAND EMPLOYMENT AND REMUNERATION, 2002 – 2011



Source: Directorate Mineral Economics

7. ENVIRONMENTAL IMPACT

Some of the environmental disturbances created by quarrying is caused directly by engineering activities during aggregate extraction and processing. The most obvious impact of quarrying is a change in geomorphology and conversion of land use, with associated change in visual scene. The major impacts on the environment may include increased dust, noise, and vibrations, increased truck traffic near aggregates operations, visually and physically disturbed landscapes and habitats and affected surface or groundwater.

The geologic, hydrologic, vegetative, climatic, and man-made characteristics of an area largely determine the potential environmental impacts of aggregates production. Effects such as dust, noise, and vibrations are typical of nearly any construction project. These impacts commonly can be controlled, mitigated, or kept at tolerable levels and restricted to immediate

vicinity of an aggregate operation by using available technology. In South Africa, each project that will result in a negative impact on the environment needs to have allocated funds for rehabilitation before an operation can commence. Unfortunately, not all quarries are registered and illegal operations continue to pose a threat to the environment. However, the DMR has embarked on a project to encourage illegal operators to register, as some of these are small scale miners without much information about mining requirements and processes.

8. LICENSING PROCESS

All mineral and mining operations in South Africa are regulated in terms of the Mineral and Petroleum Resources (MPRDA), Act 28 of 2002, with health and safety aspects being regulated by the Mine Health and Safety Act (MHSA), Act 29 of 1996. These Acts are administered by the Regional Managers and Principal Inspector of Mines in the respective Regional Office.

Before a quarry can be established, all the regulatory procedures as laid out in the aforementioned Acts must be followed. These include securing the rights to the minerals (rock source), completing an Environmental Impact Assessment (EIA) and Environmental Management Programme (EMP) to mitigate or minimise the resultant environmental impacts. The EMP will include a rehabilitation plan for the mine on closure and detail as to how this will be funded. All the necessary EIA and EMP documentation is submitted to the authorities in support of the application for the mining license. If a license is granted the recovery of the mineral/rock through mining can begin.

All applications for prospecting/mining rights/permits must be addressed to the Regional Manager in the Province where the prospecting/mining operation is located. The regional office then sends a recommendation to the Head office where a decision to grant or refuse the applicant the right to mine is made. In a case where the applicant is refused a mining right a refusal letter is sent to the applicant. The granting letter is sent back to the regional office, who then issues the letter to the applicant; this can be done from the head office or the regional offices depending on how quickly the client can be reached. The mining right must be registered with the Mining titles and the applicant is then permitted to start mining after 180 days from the day the mining right is approved. The mining permit is valid for 2 years and can be renewed for 3 more years while a mining right is valid for 30 years and can be renewed for the number of years needed for operation on a particular site. For a mining

permit to be issued the mining area in question must not exceed 1.5 hectares. Prospecting rights are valid for 5 years and can also be renewed for 3 more years.

9. OUTLOOK

South Africa's construction industry is experiencing a period of stagnant growth, owing to overcapacity in the current environment of reduced demand for construction services. However, the subdued conditions are expected to improve in future, reinforced by government's continued commitment to infrastructure development as well as the expected recovery in residential building activity in due course. The construction sector, particularly contractors, account for about 4 percent of the gross domestic product of the country.

The 2012 Budget Review projected that the economy would add about 850 000 new jobs over the next three years. Most of these jobs would be concentrated in the construction sector due to steady growth in domestic demand and infrastructure expenditure. The government is planning to embark on a huge campaign of building infrastructure nationwide in 2012, which will boost the levels of job creation and the economy. The infrastructure plan will be driven and overseen by the Presidential Infrastructure Coordinating Commission, (PICC), which will coordinate projects from all government entities with emphasis on efficient and prompt execution of capital projects. These projects, which will drive demand for construction materials including aggregate and sand, have been clustered, sequenced and prioritised into a pipeline of strategic integrated projects. The initiative will involve among other projects, a plan to develop and integrate rail, road and water infrastructure together with the development and expansion of ports. The projects will be centered around all nine provinces of the country.

According to the South African reserve bank, growth in real domestic product is expected to increase by 2.7 percent in 2012 driven by a myriad of economic factors including public sector infrastructure spending. Spending on economic infrastructure was estimated to increase by an annual average of 6.4 percent from R83.6 billion in fiscal 2012/13 to R98.3 billion in fiscal 2014/15. The infrastructure programmes of Eskom and Transnet were expected to expand significantly over the next decade, supported by higher cash flows from operations, with the shortfalls financed by a combination of equity and debt.

The long term prospect for the local construction industry is positive, underpinned by investment in construction of key infrastructure projects such as electricity, water and roads, which will continue playing a critical role in driving economic growth. On the upside are opportunities presented by Public Private Partnerships (PPPs) in the development of high value projects, which will ultimately result in increase in demand for aggregate and sand.

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