1. Executive Summary

This section provides a summary of the environmental assessment process for the proposed extraction of friable sandstone at Newnes Junction. The conclusions made following the study are also summarised below.

1.1 Project Overview

Newnes Kaolin Pty Limited (NKPL) proposes to develop an open pit operation to extract and primary crush friable sandstone at Newnes Junction, on the Newnes Plateau some 10 km east of Lithgow, between the existing Clarence Colliery and Rocla Quarry (see **Plate 1** and **Figure 2.1**). The primary crushed sandstone is to be transported off-site for subsequent extraction and processing of the constituent minerals - kaolin and silica sand. Off-site processing and beneficiation will yield a range of industrial minerals and construction materials.

This Environmental Impact Statement (EIS) covers the extraction and primary crushing of the friable sandstone resource on site and the delivery of the material to the Clarence Rail Loop for transport to Sydney for further processing. This downstream processing will be the subject of a separate EIS and is only addressed conceptually in this document. A number of sites within the Greater Sydney Area have been identified and are the subject of ongoing commercial negotiations.

NKPL holds Exploration Licence 4192 (EL4192) that covers a deposit of high quality friable sandstone with a kaolin matrix. The Newnes Junction area has not been previously worked for industrial minerals (kaolin and industrial grade silica sand), although adjacent areas are currently being extensively quarried for construction sands. The proposed development is located adjacent to three existing extractive industries, these being the Rocla sand quarry immediately south, the Clarence Colliery immediately north, and Pioneer's sand quarry to the north west. These existing quarrying and mining operations comprise a concentration of extractive industries on the eastern margin of the Newnes Plateau.

Exploration work conducted to date has indicated that the kaolin and silica sand are of high quality and of considerable commercial value. NKPL has applied for a Mining Lease over a portion of EL4192 for kaolin, as well as an extractive industries licence to cover extraction of industrial and construction grade, silica sands to allow commercial development of this multi-commodity resource.

The proposal consists of developing an open pit extractive operation on the ridgeline between the Rocla quarry to the south and Clarence Colliery pit top to the northwest. The village of Newnes Junction is located to the southwest and currently contains six dwellings with several undeveloped blocks and road and rail infrastructure. To the east, the site is bordered by the Blue Mountains National Park, which is part of the Blue Mountains World Heritage Area.

The resource and its location are unique in terms of geology and proximity to rail transport. The resource is a friable sandstone, traditionally quarried and processed as a source of construction sand. However, unlike other friable sandstone deposits located in relative proximity to Sydney Metropolitan market areas, the matrix clay content is dominantly pure kaolin. The clay matrixes of alternative friable sandstone deposits (at Maroota, Somersby, Penrose-Wingello and elsewhere) comprise a mixture of clay minerals that need to be separated and disposed of as waste during sand processing. The Newnes sandstone is unique in that all constituent minerals have commercial value. Unlike any other friable sandstone operation in the Sydney Basin area there will be no on-site washing operations nor settlement ponds and associated waste management issues.

Although the bulk of product sales will be to construction and industrial sand market sectors, the bulk of revenue will be derived from refined kaolin products from approximately year 5 onwards. This situation will result from increased kaolin yields and beneficiation as sand volumes increase. The project will be effectively sand and kaolin sales driven, with sales projections and detailed financial modelling based on extensive market research by highly experienced industry consultants.

The extractive industry proposed for the subject site is comparatively limited in extent, with secondary, tertiary and quaternary processing all to be undertaken off-site. Site operations will essentially comprise an open cut pit development, a small primary crushing operation, conveyors, stockpiles, and a train loading facility. Mobile plant will usually comprise one or more bulldozers, dump trucks, a front end loader and a water cart. Associated infrastructure will essentially comprise a site office and amenities and a water treatment plant. The location is ideal in that it is adjacent to an existing rail loop that facilitates the transport of the raw material to Sydney for processing.

While year one kaolin sales are projected at less than 30,000 tonnes, it is estimated that average sales will be around 96,300 tpa over the 21 year period of the initial mining lease and the maximum annual tonnage will be in the order of 119,000 t. Kaolin product will be supplied to the building materials industry, the ceramic and refractories industries, as well as being sold as a cement pozzolan and as a mineral filler.

Silica sand sales (including gravel and silt fractions) are projected to increase from less than 300,000 tonnes in year one to an average of nearly 1.034 Mtpa over the 21 year period, peaking at 1.28 Mtpa. Sales of premium quality, fully graded sand to the construction industry will account for an average 90% of total sand sales, with the bulk of these going to the ready mixed concrete and concrete product sectors. High quality industrial sands will be principally sold for glass manufacture and as filter medium.

With the gravel and silt components included, maximum production is anticipated to be 1.4 Mtpa.

1.2 Objectives of the Proposed Development

The objectives of the proposed extractive operation are to:

- develop the commercially viable resource of silica sand and kaolin at Newnes Junction to supply existing and projected shortages in the Sydney Metropolitan area;
- optimise the resource by off-site processing and beneficiating all of the constituent minerals into saleable products;
- establish a long term source of white firing industrial grade kaolin in relative proximity to Sydney markets currently supplied from remote NSW localities, interstate and/or, from overseas;
- develop and manage the proposed operation in a manner that minimises associated environmental and social impacts;
- undertake extraction in a way that will result in a well drained, stable landform able to be successfully and progressively rehabilitated;
- provide direct long-term employment for 6 to 10 people at Newnes Junction and 12 to 15 people in Sydney; and
- provide indirect employment to a substantial number of drivers, tradesman, suppliers, consultants and other associated persons, both in Sydney and in the local region.

1.3 Description of the Proposed Extractive Operation

The project represents a significant advancement in resource utilisation and value adding which has not been previously available in the Lithgow region. Plans presented in this EIS cater for the extraction of an estimated 23.7 Mt of reserves over the next 21 years. It is estimated that there will be sufficient reserves remaining at the site after 21 years to support a subsequent application for a further six to twelve year operation. The proposed open cut operation covers an area of 25 ha, adjacent to three existing quarry / mine operations.

Key activities at the site will involve:

- removing and stockpiling of topsoil using bulldozers;
- extracting friable sandstone in a series of shallow benches by ripping and/or excavating with bulldozers;
- loading ripped sandstone to haul trucks for transport to the crushing station;
- primary crushing ripped sandstone at the crusher station;
- dust suppression using water carts;

- conveying material to covered stockpiles before removal off site via train to the processing site; and
- progressive rehabilitation of the small benches with native species.

Friable sandstone will be won by selectively ripping a series of shallow benches using a bulldozer. Ripped material will be stockpiled using front-end loaders to be subsequently trucked to the primary crusher and conveyed to covered stockpiles. From here the crushed sandstone will be conveyed to a surge bin adjacent to the Clarence railway loop and loaded onto trains for transportation to the processing site in Sydney.

Sandstone extraction is scheduled to be conducted in a number of stages, progressing in a north to south direction. Rehabilitation of the pit walls will be carried out progressively with the completion of each bench of mining.

Since secondary, tertiary and quaternary processing of crushed sandstone will be conducted off site, large stockpiles of material will not be required on site. However, there will be temporary stockpiling of material in-pit before rail transportation to the Sydney processing site.

Proposed hours of operation will be 10 hours per day, 5.5 days per week and 50 weeks per year.

1.4 Pit Production and Sales

The Company is planning a staged entry into the market, with progressive increases in production up to 1.4 Mtpa.

Capital investment in processing and product beneficiation plant in the Sydney area will be linked to market demand for the individual sand and kaolin products to be produced. Initial investment will be for plant capable of processing crushed sandstone to produce:

- building material and ceramic clays (white firing clays), and metakaolin (cement pozzalan);
- construction sand (quartz sand);
- pea gravels (landscaping);
- filter sand (quartz sand);
- silica flour; and
- glass sand (flint grade).

Plant design will be modular in order to allow additional processing and beneficiation plant to be installed as higher value product quality is proven and markets penetrated /

captured.

1.5 Project Justification

A large part of the justification for developing the Newnes Junction resource relates to its unique geological characteristics and location relative to established extractive industries, transport links and markets. These factors in turn relate to the:

- size and extractability of the friable sandstone resource;
- relative lack of iron concentrations and induration compared to alternative resource areas on the Newnes Plateau (Pecover 1986);
- quality and 'fully graded' characteristics of resultant sand products;
- high quality of diagenetic kaolin present in the sandstone as matrix;
- location adjacent to established sand quarries and the Clarence Coal Colliery;
- ability of the proponent to develop, operate and rehabilitate the site in an environmentally sustainable manner;
- possibility of developing a joint rehabilitation and end use strategy in conjunction with adjacent mining and quarrying operators;
- proximity to an existing rail siding providing a direct rail link to off-site processing locations and Sydney Metropolitan area markets;
- quality and range of industrial minerals and premium quality construction sands able to be produced;
- current and growing regional demand for products to be made available after processing;
- finite and diminishing availability and supply of premium quality, industrial and construction sands (particularly fully graded construction sands within the greater Sydney Metropolitan area; and
- non-availability of any substantial quantities of equivalent quality kaolin within the Sydney Metropolitan area;

The project represents a significant advancement in resource utilisation, product beneficiation and value adding when compared to conventional friable sandstone quarries supplying product into Sydney markets. The project is considered further justified by:

- resource optimisation (with little or no waste product); and
- impact minimisation (with off-site processing and limited, if any, requirement for settling ponds).

Thus, key planning decisions made by the proponent in formulating this application include provision for:

- transport of all raw material to a processing site in the Greater Sydney Region;
- location of the operation adjacent to a rail loop with easy loading facilities;
- a substantial land buffer between the operation and the adjoining Blue Mountains National Park;
- full containment of the 1in50 year storm event;
- development of a unique terraced landform allowing early and progressive rehabilitation; and
- commencement of extraction at the furthest point away from residences in Newnes Junction.

1.6 Planning Issues

The project is subject to both State and Commonwealth environmental legislation.

The provisions of the *Environmental Planning and Assessment Act 1979* determine the EIS process for this proposal. The proposed extractive industry is a designated development under Schedule 3 of the Environmental Planning and Assessment Regulation 1994. The development therefore requires planning consent and, being designated development, an EIS must be prepared to accompany the Development Application.

The proposal is also of State Significance and has been called in by the Minister for approval under Section 76A(7) of the Environmental Planning and Assessment Act. Consequently, the State's determining authority will be the Minister for Infrastructure and Planning.

Since the proposed open pit development is located near the Greater Blue Mountains World Heritage Area, the *Environment Protection and Biodiversity Conservation Act 1999* may apply and therefore the project has been referred to Environment Australia for its consideration and has been determined to be a "Controlled Activity".

1.7 Key Environmental Issues

This EIS for the proposed development represents a culmination of a wide variety of environmental investigations addressing the key environmental issues associated with the mining activities. NKPL have adopted a proactive approach to environmental management from the outset of the project by undertaking both engineering and environmental studies concurrently. This enabled decisions identified during the environmental assessment studies to be incorporated into the design of the open pit.

Consequently, effective mitigation measures have been incorporated into the project from the outset, limiting the environmental impacts associated with the development.

The key environmental issues for the Newnes Kaolin Project include hydrology and water quality, noise, dust, flora, fauna, archaeology, and traffic and transportation. Specialist consultants were engaged to undertake the necessary environmental studies in these areas. The results are summarised in the following sections.

1.7.1 Hydrology and Water Quality

A surface and ground water study has been prepared (see Section 6 of the EIS) and to manage water on site, clean and dirty water flows will be separated. The surface water management system has been designed to minimise clean water inflow by constructing diversion channels as necessary. The dirty water system has been designed to fully contain and treat all the 50 year ARI, 72 hour storm event.

Given that the ore will be transported offsite for processing, there will be little requirement to store or manage process water on site. Water contained in the pollution control structures will be used for dust suppression. Water treatment systems will be employed prior to any controlled discharge to enhance settlement of the very fine clay particles (which is high quality product) and enable the water quality to meet discharge requirements.

Groundwater inflows have been modelled and incorporated into the design of the pollution control system. Depth to the potentiometric surface over the site area could be expected to be at a depth from ground surface in the range of less than 2 m to 25 m. These depths, however, are consistent with the emergence of seepages in the lower lying sections of the drainage gullies that cross the western boundary of the site. Final pit inflow is expected to average around 0.2 ML/day, but the major proportion of this is expected to be lost via evaporation from the high walls of the pit and storages within the floor of the pit. No groundwater would exit the pit during active mining operations since the watertable gradient will be directed toward the pit.

As groundwater flows into the pit, the watertable will be lowered progressively around its periphery. The drawdown will migrate outwards from the pit until it reaches equilibrium. Outside this zone of influence the groundwater flow directions will remain unaffected and unchanged from pre-mining flow directions. It is anticipated that the proposed pit will not have any hydraulic effect on the groundwater system within the Clarence Village.

Any significant drawdown influence will be restricted to within about 500 m or so from the pit under maximum development. Ultimate steady state conditions will be reached within a year or so once the 21-year pit floor depth has been achieved. Note however, that these are predicted maximum levels, which will develop slowly over time as the mining progresses.

Drawdown around the periphery of the pit will not affect vegetation since these species rely largely on soil moisture. This is verified by the sound condition of tree species evident in the areas surrounding the adjacent Rocla quarry pit where drawdown conditions also occur.

The drawdown influence on the tributary streamflow will also be small. Some baseflow and surface water seepage will be lost to the easterly drainage gullies, but the volume would not be measurable in the lower reaches of the main draining tributaries. Any change would be well within that created naturally by climatic variations. No groundwater would exit from the pit during active sandstone extraction operations since the watertable gradient will be directed toward the pit.

Once extraction ceases the resultant voids will fill with groundwater, rainfall and rainfall runoff. Filling of the pit will occur until a new equilibrium is established between the ponded water depth, evaporation and natural groundwater seepage. It is currently proposed that a new lake system will be finally established as regrowth occurs and natural seepage of good quality water re-enters the catchment area. The rehabilitation plan is flexible and will enable alternative final landforms to be developed if appropriate. These alternatives include a free draining model. The final alternative will be developed with the Department of Mineral Resources in consultation with other government agencies.

Effects on groundwater will be monitored by the construction of three bores fitted with piezometers for sub surface monitoring, located progressively to the west. Water level measurements initially be conducted on a monthly basis in each hole over time to establish seasonal trends and then at 3 monthly intervals to verify the impacts predicted.

1.7.2 Noise

A noise impact assessment, carried out by Atkins Acoustics, is contained in full in Appendix G and summarised in Section 6. The study showed that the extractive operation will meet acceptable noise impact assessment criteria for the first four stages, however noise exceedences will occur on a section of the Newnes Junction community in later years of operation.

Prior to operations commencing, an Environmental Management Plan (EMP) for the Mine will be prepared. This will include a "Noise Management Plan" (NMP) that will involve noise monitoring during initial stages of pit development to confirm noise levels and, where required, assess the practicability of additional noise controls. Subsequent annual noise audits would be undertaken if considered necessary to ensure that all noise control measures are installed and maintained, and that the environmental noise levels (criteria) are satisfied. The program shall incorporate a complaint management protocol that facilitates investigation and addressing of noise related complaints.

The noise assessment undertaken as part of this EIS has shown that Stages 1 to 4, that is the first nine years of an estimated twenty-one year lifespan of the mine generally comply with the recommended noise goals, with possible technical exceedances of 1-2dB(A), considered marginal. Noise predictions during the final extraction for all stages, has shown that the recommended goals are satisfied at 5 Sandham Road (R1). However, during Stage 5 noise exceedances of 3-5dB(A) (calm) and 1-3dB(A) (west wind) are predicted at Sandham Road (R2).

The proponent (Newnes Kaolin Pty Ltd) has consulted with the local community comprising six residential premises on Sandham Road, and discussed potential mitigation strategies including purchase.

1.7.3 Dust and Air Quality

Air quality in the proposed pit area is considered good. The current air quality in this area would be influenced mainly by local industries and residential development in the area.

An air quality study was undertaken by Holmes Air Sciences assessing the air quality impacts due to the proposed extractive operation. Results from dispersion modelling indicate that off-site dust impacts would be minimal and that the proposed operations would contribute very little to existing dust levels in the area. These estimates assume some control of dust emissions is achievable through the use of watering carts on all unsealed haul roads and by enclosing some of the processing areas.

Compliance with air quality goals would be expected during all stages of the proposed extractive operations.

1.7.4 Traffic and Transportation

It is proposed to transport the material off-site through the rail transport system, which is considered to be the most environmentally responsible option. There is an existing rail loop associated with Clarence Colliery, which is used currently to transport coal to Port Kembla. A purpose designed train loader will be constructed adjacent to the existing coal loader.

A reclaim system and conveyor will be designed with a new train loader located adjacent to the existing Clarence Colliery coal loader. It is intended to use similar rail wagons to those commonly used for coal. The loading system is anticipated to be a continuous, automatic, flood loading system. The Newnes Junction Rail Loop is a Class "A" system and a unit train holds 3,000 t. It is anticipated that 9 unit trains will be required per week.

The operation of the reclaim system, the train loading conveyor and the train loader will all be interlocked, automatic and controlled from the train loader control cabin by the operator.

1.7.5 Flora and Fauna

A flora and fauna survey was conducted over the proposed development site and identified one vegetation community within the study area, the Silvertop Ash – Sydney Peppermint Forest. During the initial surveys the vegetation showed signs of severe devastation due to the 1997 wildfire that swept across the Newnes Plateau. Further surveys were conducted in 2003 to update the surveys and conduct further targeted searches for rare or threatened species that may have colonised the area since the initial surveys. No rare or threatened species were identified on site, and it is considered that if present in the surrounding area, the resulting impact would be negligible.

The potential fauna habitat type that has been identified in the area of the proposed development is open forest. Few fauna species were detected during the survey and no rare or threatened species were found. No areas of critical habitat are present.

The proposed development is therefore considered unlikely to have a significant impact on the flora and fauna of the region, and no rare or threatened species will be impacted on.

1.7.6 Aboriginal and European Cultural Heritage

An archaeological survey was conducted in the area, in consultation with the Bathurst Local Aboriginal Land Council. No sites or areas of potential archaeological deposit were identified in the survey. The absence of sites may be the result of physical characteristics of the area.

Since no sites or areas of potential archaeological sensitivity were identified in the survey, it is concluded that there is no archaeological impediment to the project proceeding as planned.

1.7.7 Visual Issues

The main visual impacts associated with the project will occur from elevated remote vantage points surrounding the open pit development. This is the case for all industrial activities in the area, which can be invariably seen from the higher vantage points in the district. In this case, views of the site can, with some difficulty, be seen from elevated points within the adjacent Blue Mountains National Park / World Heritage Area. These locations are not easily accessible and when located, provide a view of the adjacent industrial sites also. This is also the case along other sections of the park boundary that abut residential areas, agricultural land, industrial sites and major public infrastructure.

Views of the pit area from residential receptors in Newnes Junction will be mitigated by intervening vegetation that will be maintained throughout the life of the operation, and augmented as necessary. A buffer zone between the proposed development area and the Blue Mountains National Park has been incorporated into the design of the proposed extractive operation. Although the project will result in some visual impacts, the net effects are considered acceptable.

1.7.8 Soils

The soils within EL4192 are sandy, shallow and well drained. The sub-strata across the site is predominantly weathered, medium grained, cream to white sandstone. A characteristic of this sandstone is that it forms a thin hardened surface crust, rarely exceeding a few millimetres, which mantles a friable, crumbly sandstone with a clay matrix of kaolin. There are no outcrops of sandstone visible in the proposed development area. Soils derived from the friable sandstone are low fertility sandy soils with a moderate to extreme erosion hazard.

1.7.9 Socio-economic Impacts

The proposed development will employ a number of workers during both the construction and operational phases. The construction workforce will be a skilled team employed to carry out specialised work. It is anticipated that the workforce employed during construction will include local contractors.

The proposed operation will result in direct long term employment opportunities for approximately 6 to 10 people, some of whom may be drawn from the local Newnes Junction village providing the relevant skills are available. Off-site processing and administration will provide direct employment for a further 12 to 15 people in Sydney as well as indirect employment to truck drivers, tradesmen (electricians, mechanics, fitters, plumbers etc), suppliers (fuel, consumables, spare parts, stationery etc), consultants and so on. Tradesmen, suppliers and consultants will also be required at Newnes Junction.

It is anticipated that the workforce at Newnes Junction will be locally available, as evidenced by the high proportion of unemployed people in the region, many of whom will have mining and/or quarrying experience. Consequently, with the exception of some management staff, it is expected that project employment can be mainly satisfied from the surrounding region with little or no in-migration.

1.7.10 Land Ownership and Use

The majority of land designated for the proposed development is located on Crown land, vegetated with eucalyptus woodland and used primarily by the local residents to access the adjacent Blue Mountains National Park. The proposed conveyor route from the mine to the existing Clarence rail loop, and the rail loading facilities would be located on land leased by Centennial Coal Company. The land was formally owned by the Commonwealth (Department of Defence) and title has been recently transferred to Lithgow City Council. Transfer of the land to Centennial Coal Company is now underway.

The site has little agricultural potential. Neighbouring land is used for coal mining, sand quarrying, recreation, environmental protection, residential dwellings, transport routes and forestry activities.

The proposed development would be confined to an area within EL 4192, located almost entirely on vacant Crown land. It will have minimal impact on surrounding land uses during the first three stages of extraction providing the mitigation measures outlined in this EIS are implemented. With the development of Stage 4, additional noise assessment will be required, based on measured data, to determine whether or not extractive operations can meet pre-determined noise criteria.

Noise modelling indicates that some of the residences may experience noise in excess of the stringent 35 dBA criteria. If required by either the planning consent or the affected residences, NKPL would propose to undertake additional noise mitigation works at the effected residential locations and/or agree to purchase the properties and/or negotiate alternative arrangements with landholders.

Following extraction of the friable sandstone resource and rehabilitation of the landscape, the future land capability of the site would be similar to that of the current site, although the topography would be different. The land could be used for recreational purposes or left as vegetated land as is currently the case.

1.8 Conclusion

This EIS has identified and assessed the key environmental issues relating to the proposed silica sand and kaolin extraction operation. As with all development projects, the proposed development will cause some environmental impacts. The purpose of this EIS is to identify and quantify these impacts, to assess their significance and to propose ameliorative measures to be undertaken to minimise and/or eliminate impacts.

The results of the various environmental investigations have demonstrated that most of the resultant impacts are within acceptable criteria, and the impact on the environment will be limited to within acceptable parameters as set down by the various statutory authorities. The main environmental cost of the development proceeding will be the impacts on some residents at Newnes Junction, particularly in the later stages of extraction when noise assessment criteria are expected to be exceeded.

Although the anticipated level of environmental impact has been determined as acceptable in the initial stages of development, it is important with any project of this type to monitor ongoing environmental performance. The ongoing environmental monitoring program will allow early identification and rectification of potential problems.

It is considered that the balance between environmental impacts and benefits resulting from the proposed development, strongly favour the development proceeding.

Plate 1
Newnes Kaolin Project
Aerial View