



EIS 1278 Vol 1

AB020077

Proposed continuation of quarrying, landfilling and site
rehabilitation at Schofields, Blacktown : environmental impact
statement

ENVIRONMENTAL IMPACT STATEMENT

NSW DEPT PRIMARY INDUSTRIES
AB020077

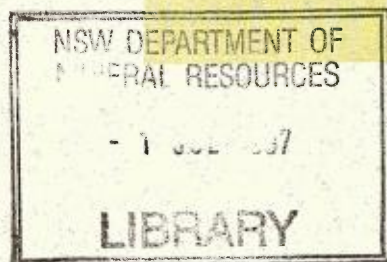


PROPOSED CONTINUATION OF QUARRYING, LANDFILLING AND SITE REMEDIATION

AT THE PGH BRICKWORKS SITE



SCHOFIELDS, BLACKTOWN



VOLUME 1



**PROPOSED CONTINUATION OF
QUARRYING, LANDFILLING
AND SITE REHABILITATION
AT SCHOFIELDS, BLACKTOWN
ENVIRONMENTAL IMPACT STATEMENT**

VOLUME ONE

MAY 1997

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NOTICE TO ALL READERS

This Environmental Impact Statement is prepared and placed on public exhibition for the purpose of allowing all persons who have an interest in the project the opportunity to obtain whatever information they require on the project, its benefits and its effects.

Persons wishing to make comment, criticise, query or support the proposal should write a submission and post it to Blacktown City Council by the date nominated in the advertisement in local papers.

Further information on any aspect of the project can be obtained by contacting CMPS&F Environmental, Environmental Assessment Division, on (02) 9412-9888 or CSR on (02) 9372-5896.

ACKNOWLEDGMENT

This EIS has been prepared with the benefit of an initial draft document
prepared in July 1996 by ERM Mitchell McCotter.

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ABBREVIATIONS

AADT	Average Annual Daily Traffic
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
AS	Australian Standard
ASS	Acid Sulphate Soils
BOD ₅	Biological Oxygen Demand
°C	degrees Celsius
COD	Chemical Oxygen Demand
DA	Development Application
DCP	Development Control Plan
DLEMP	Draft Landfill Environmental Management Plan
DLWC	Department of Land and Water Conservation
DMR	Department of Mineral Resources
DP	Deposited Plan
DUAP	Department of Urban Affairs and Planning
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
K	Hydraulic Permeability
km	kilometres
LALC	Local Aboriginal Land Council
LEMP	Landfill Environmental Management Plan
LEL	Lower Explosive Limit
LEP	Local Environmental Plan
LFG	Landfill Gas
LGA	Local Government Area
m	metres
mm	millimetres
NATA	National Association of Testing Authorities Australia
NPWS	National Parks and Wildlife Service
NSW	New South Wales
PHA	Preliminary Hazard Analysis

REP	Regional Environmental Plan
RES	Regional Environmental Study
RL	Reduced Level
RTA	Roads and Traffic Authority
SEPP	State Environmental Planning Policy
SIS	Species Impact Statement
SREP	Sydney Regional Environmental Plan
TOC	Total Organic Carbon

1. SUMMARY

1.1 BACKGROUND AND OVERVIEW

CSR Limited is an Australian based multinational company with operations in Australia, New Zealand, the United States, Malaysia, China and the United Kingdom. It employs over 20,000 people worldwide. CSR is one of the world's largest building and construction material companies. In addition it has major interests in timber, sugar and aluminium operations.

Monier PGH Holdings Limited (referred to as PGH) is owned by CSR and is an operating unit within the CSR Building Materials Division. PGH currently operates a clay brick and paver manufacturing plant in Townson Road, Schofields, approximately 17 kilometres north-west of Parramatta. The location of the Schofields site is shown on **Figure 1.1**. Raw material is obtained by quarrying clay/shale on site supplemented by material brought to it from other quarries located at Horsley Park, Mulgoa and elsewhere. Extracted material from the Schofields quarry is also transported to other PGH manufacturing plants at Horsley Park and Cecil Park.

PGH has development consent from Blacktown City Council to operate the brickworks and to quarry clay/shale from part of the Schofields property. Production from the Schofields property was first recorded in 1962 when Autobrick Industries Pty Ltd produced 19,320 tons. There has been continuous production from the site since that time. Other consents issued to the company over the last 30 years include a consent to backfill an exhausted excavation in the northern part of the site, north of the overhead power line. This excavation has now been filled with solid waste and the area is undergoing rehabilitation.

The PGH property at Schofields covers an area of approximately 67 hectares which is separated by Meadow Road into north and south portions. All manufacturing and current quarry related development occurs on the northern part, while the southern area has been held in reserve and is relatively undisturbed, apart from a mini-bike track which is used by a local club by arrangement with the company. The combined site is included in Schedule 1 of Sydney Regional Environmental Plan (SREP) No. 9 (2) - *Extractive Industry*, which identifies the property as having a clay/shale resource of regional significance. The site layout is illustrated in **Figure 1.2**.

PGH proposes to progressively extend quarrying operations over most of the site and to sequentially rehabilitate the final quarry voids with solid waste. Initially that portion of the property north of Meadow Road, which has previously been worked, will continue to be quarried and then rehabilitated. During this time overburden will be used to construct new earth mounds and to enlarge and vegetate existing ones around the perimeter of the property. Mounds will also be constructed around that part of the property south of Meadow Road in preparation for later quarrying on that site. It is anticipated that the whole operation will be complete within a period of about 35 years.

The proposal to extend the workings will not greatly change the intensity or method of current operations. Quarrying will continue at a rate of up to 240,000 tonnes per year.

The proposal will not require any significant alteration to existing infrastructure. The main changes include progressive realignment of the internal access road and relocation of the existing stockpile area during the latter stages of development. Controls for surface runoff, noise abatement and dust suppression are currently in place and will be modified when required to match the progression of quarrying and filling operations.

The Company now wishes to obtain development consent to continue extraction and filling operations on the site. This Environmental Impact Statement (EIS) examines the proposal and provides an assessment of its potential impacts. It accompanies a development application lodged with Blacktown City Council seeking approval for:

- progressive clay/shale extraction from most of the PGH property, apart from that part of the site occupied by the brick and paver plant, that part of the site to the east of the gas pipeline, and that part of the site to the north of the overhead electricity line;
- progressive rehabilitation of the resulting voids including filling with solid waste; and
- placing sufficient excavated material around the perimeter of the PGH property for screening and landscaping and to assist in minimising the transmission of noise to adjoining residents.

1.2 THE PROPONENT

Monier PGH Holdings Pty Ltd are the proponent of the proposed development. Monier PGH Holdings Pty Ltd are seeking approval for the continuation of the extraction operation and will contract Enviroguard Pty Ltd to undertake the resultant restoration of the quarry voids via solid waste landfilling.

1.2.1 Monier PGH Holdings Ltd

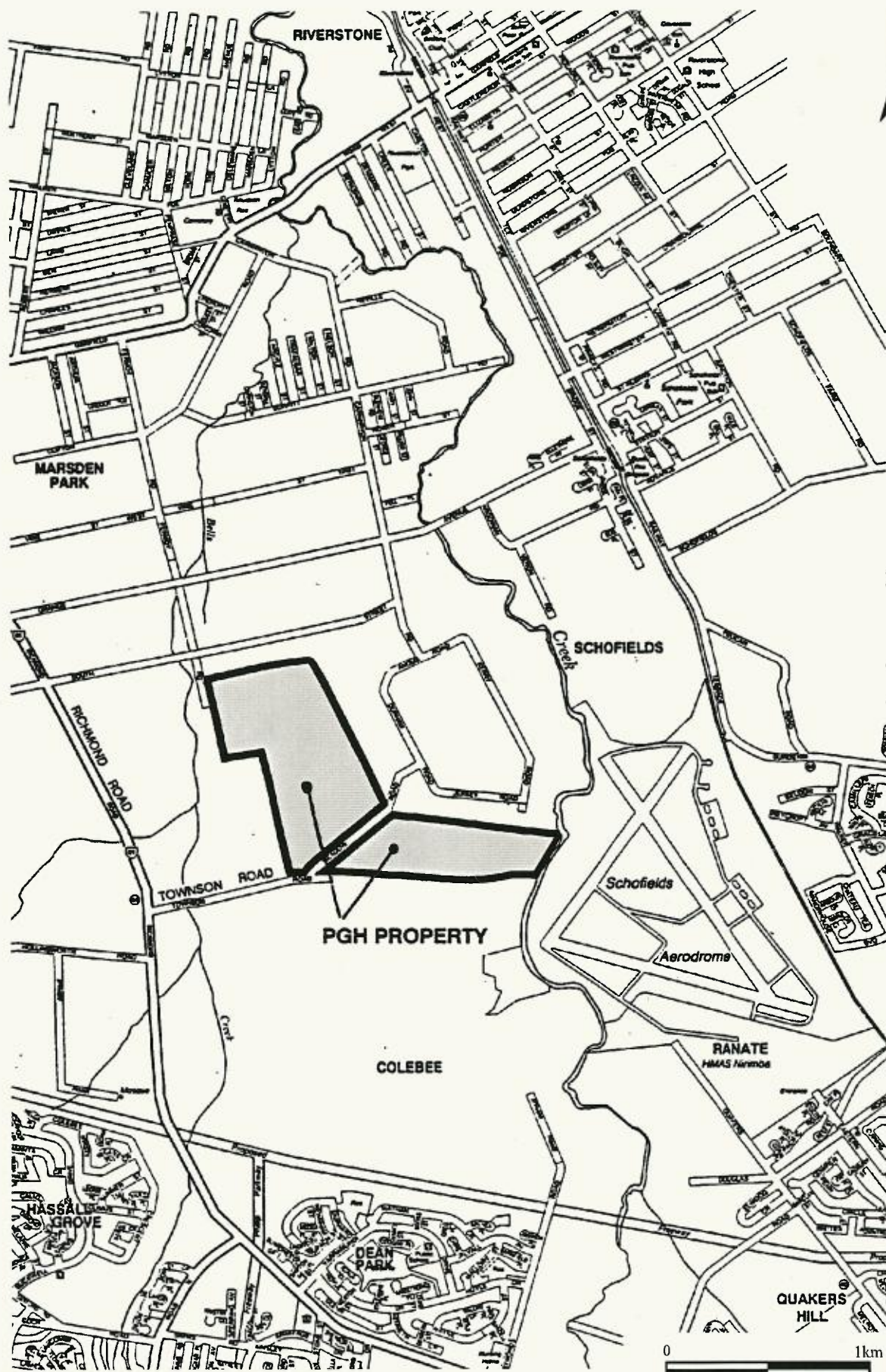
The use of bricks in the construction of buildings became predominant as far back as the first settlement of Sydney. Initially the bricks were imported from England, however, an English bricklayer by the name of James Bloodsworth, convicted of forgery, was chosen to supervise the making and firing of the first bricks with the moulds sent from England. Upon his pardon, 'for exemplary conduct', James Bloodsworth was appointed supervisor of all brickmakers and bricklayers in the settlement.

The brickmaking site was situated between Hay, Pier and Harbour Streets, the current site of the Sydney Entertainment Centre. A new village sprang up around this site and became known as Brickfields, and later as Brickfield Hill. The village remained the centre of the brickmaking industry until 1841.

New technologies in the firing of bricks enabled brickmakers to create a range of different coloured bricks from the same material. Later other materials, shale, iron filings and sawdust, were added to form unusual colours and textures.

SITE LOCATION

ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN



Date : May 1997

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Figure 1.1
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SITE

ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN



KEY

- Site Boundary
- Road

0 800m

Date : May 1997

File Name : F:/DATA/VH/0009/VH000912.cdr

Figure 1.2
CMP S&F

Most of the early production of bricks were sent to Government projects. However, as production increased, surplus bricks were sold by brick manufacturers to the public market.

The origins of PGH began in the early 1900's when a merchant, Maxwell Porter, began importing terracotta roof tiles from Europe, to supply his roof contracting business. When the demand for roof tiles exceeded the supply from Europe, Porter joined with David Galbraith, who owned an art pottery business in Redfern. Together, in 1908, they established a terracotta roofing tile plant at Doonside. Over the next 30 years, the name Porter & Galbraith became a highly respected manufacturer and supplier in the building industry.

In 1948, Porter & Galbraith acquired the management and operation of an unsuccessful government tile and brick plant. The new plant was called PG Clay Products Pty Ltd and was a subsidiary of Porter & Galbraith Limited. The PG Clay plant operated until March 1988, when the land, leased from the State Government, was sold for development.

An amalgamation in 1958 with Hansen Consolidated Industries, saw the formation of a new company, PGH Industries. This merge saw expansion through New South Wales, Queensland and Victoria.

During this period, the company pioneered products such as tunnel kiln manufacture, quarry tiles, big bore vitrified clay pipes and pre-stressed ceramic floor beam manufacture. The floor beams were used extensively in government schools and hospitals during the 60's.

In 1976, PGH Industries Limited was bought by F & T Building Products Pty Ltd, later known as Amcil Industries. The PGH Ceramics Group was bought by ACI in 1981 which enabled increased investments in new plant and equipment and the company grew to the largest manufacturer of clay bricks and pavers in Australia.

Today, PGH Bricks & Pavers is part of the Monier PGH Group which is owned by CSR Limited. The company has interests in all Australian states and New Zealand. The organisation manufactures roof tiles and clay bricks, pipe and paver products. Company assets include 13 brick plants, six other manufacturing plants, 31 display centres and 260 sales outlets. In 1994 PGH employed approximately 2600 people. PGH sells approximately 400 million bricks each year, Australia wide. 85% of these bricks are used in residential construction, with commercial construction accounting for the remainder (15%).

An export division, established by Monier PGH, exports bricks, pavers and vitrified clay pipes to New Zealand, Japan, Hong Kong, Singapore, Malaysia, Philippines and various Pacific Islands.

PGH today provides architects and commercial and home builders and has established Clay Brick and Paver Selection Centres throughout eastern and southern Australia.

Brick and paver manufacturing and quarry operations at the Schofields site currently employ 47 people.

1.2.2 Enviroguard

A joint venture between CSR Limited and Brambles Industries Ltd has resulted in the creation of Enviroguard Pty Ltd which was established in 1993 principally to restore old quarry sites using solid waste as landfill. Enviroguard would be contracted by PGH to operate the proposed Schofields landfill.

Enviroguard currently operates the Erskine Park Landfill within the Penrith local government area. The operation of this landfill provides a good example of the high standard of facility management and procedures that would be replicated at Schofields (a summary of the Erskine Park example is included later as **Section 2.6**).

The Erskine Park quarry located within a total site area of 168 hectares and with a capacity of some 6 million cubic metres opened for public use in August 1994, and is expected to be completed in 10-13 years. It was one of the first solid waste landfills to be operated within a strict management regime agreed with the Environment Protection Authority (EPA) and Penrith City Council. The site accepts non-hazardous solid waste deemed unsuitable for recycling or reprocessing, Category 3 asbestos waste, and low level contaminated soils as licensed by the EPA. A recycling centre is located at the site and green waste is shredded and screened for sale via a company subsidiary, Envirogreen Pty Ltd.

Monitoring is an integral part of the Erskine Park site management programme. Parameters included in the programme are noise, dust generation, water quality, litter, rehabilitation and leachate and gas generation. The results of the monitoring programmes are reported on a regular basis to the EPA and Penrith City Council.

One of the major objectives of the Erskine Park project was to rehabilitate the quarry to a form which is compatible with surrounding employment and residential uses. It was therefore essential that the site operations and the final land use remain acceptable to the community. This has been achieved by a programme of continuing interaction between the community and the proponent. On completion the site will be landscaped to form a public park including bicycle and walking tracks with a profile shaped into a low hill intended to provide focus for the area.

The proposed development at the Schofields site will reflect the procedures and experience gained at the Erskine Park site.

1.3 STATUTORY PROCEDURES

The proposal is designated development within the meaning of Schedule 3 of the *Environmental Planning and Assessment (EP&A) Regulation, 1994*. This EIS is submitted with the development application to Blacktown City Council and addresses the matters specified in Schedule 2 of the Regulation.

The Department of Urban Affairs and Planning (DUAP) has provided the requirements of the Director-General for the preparation of this EIS and these are set out in the Department's letters, included in **Appendix A**.

PGH owns the land which is subject to this proposal. Permission to lodge the development application is not required from any other landowner.

Blacktown City Council will place the EIS on public exhibition and receive submissions from the community prior to determining the application. If the development application is approved by Council further statutory and regulatory approvals will be required as follows:

- Pollution Control Approval from the EPA and issue of a licence under the *Pollution Control Act, 1970* for both the clay extraction and the landfill operations;
- Licence from the EPA to operate a waste disposal depot under the *Waste Minimisation and Management Regulation 1996* which provides for the waste disposal part of the operation to be licensed as a **controlled waste facility**.

1.4 REVIEW OF QUARRYING ACTIVITIES

1.4.1 Clay/Shale Extraction

The quarrying of clay and shale is necessary to provide the raw material for the production of bricks and pavers.

The demand for clay bricks and pavers in New South Wales (NSW) is estimated to average 84 million units per annum and is part of a larger segmented (including concrete pavers) market of some 172 million units per annum. The market is forecast to grow significantly with much of this increased demand focusing on clay pavers.

The largest application for clay products is in the housing market, which is concentrated in the greater Sydney basin, and in various commercial applications.

The major local producers of clay bricks and pavers are PGH, Austral, Boral and Norbrick. A quantity of clay pavers is imported to NSW from Claypave (Queensland), Nubrick (Victoria) and Selkirk (Victoria). PGH is a leading producer of clay products in NSW. The new manufacturing plant at Schofields ensures that the Company maintains this market profile.

PGH currently extracts clay/shale from its Schofields quarry for use in its adjoining brickworks and other Company-owned brickworks in Sydney. The proposed maximum extraction rate of 240,000 tonnes per year is subject to market forces and demand fluctuates in conformity with the building cycle. About 75% of the excavated material can be used for manufacturing clay products. The remainder is used as cover for the waste, sold as fill or used on site for the construction of acoustic mounds. The current rate of extraction will be maintained under the proposed extension to quarrying activities, subject to market forces.

The quarry produces four types of clay/shales which are used for brick and paver manufacturing. The types of clay/shale extracted and their percentage of total product are as follows:

- Pink clay (30%);
- Brown shale (10%);
- Apricot shale (30%); and
- Cream shale (30%).

The site is significant as a source of cream firing shale. Demand is highest for bricks produced from this material which is in short supply.

Up to 120,000 tonnes of clay/shale, predominantly cream and apricot shades, is transported each year from Schofields to other PGH brickworks at Horsley Park and Cecil Park.

The Schofields brickworks receives the majority of its clay/shale, including cream and brown/blue shades, from other sources. Approximately 150,000 tonnes of clay/shale is imported to the site each year for use in the Schofields brickworks. Transporting clay/shale product to and from Schofields is discussed further in **Section 2.3**.

A summary of typical product quantities quarried and exported/imported by the Schofields site is given in **Table 1.1**.

TABLE 1.1 SUMMARY OF SITE MATERIALS

	Material Quarried on Site (tonnes/yr)	Material Exported (tonnes/yr)	Material Imported (tonnes/yr)	Material Consumed (tonnes/yr)
Clay/Shale	Up to 180,000	Up to 120,000	Up to 150,000	Up to 320,000
Overburden ⁽¹⁾	Up to 60,000	-	-	-
Total	240,000	120,000	150,000	320,000

Note 1: Material which is unsuited for product manufacture.

1.4.2 Clay Product Manufacture

Clay/shale based ceramic industries comprise manufacturers who fire clay/shale in kilns to produce ceramic ware including bricks, clay pavers, tiles, earthenware pipes and other products. Bricks are the major structural ceramic product produced with clay/shales in Sydney.

Brick manufacturers use various types of clay/shale for blending with other materials to produce a variety of brick types. Brick colours range from off-white to light apricot/brown to dark brown. The type and colour of bricks produced depends on the mix of blended clay/shale.

PGH operate four manufacturing facilities to serve the Sydney and export markets. The Schofields plant produces pavers, Cecil Park and Horsley Park, bricks and Doonside, clay pipes.

The Schofields quarry can provide some, but not all, of the types of clay/shale required for manufacture of the PGH range of clay products at these sites. Certain types of clay/shales are sourced from other quarries. Importing clay/shale materials is approved under the development consent for Schofields manufacturing plant and will not change as a result of the proposed continuation of quarrying at Schofields.

1.4.3 Existing Suppliers

Clay/shales, particularly light clay/shales, are in short supply within the Sydney metropolitan area and are actively sought by brick manufacturers throughout the region (Cole, 1993).

The Schofields clay/shale quarry lies within land subject to SREP No. 9 (2) - *Extractive Industry*. This SREP has an objective to facilitate development of regionally significant extractive resources in and around the Sydney metropolitan area. The plan identifies 23 possible sources of clay/shale in the Sydney area, of which eight sites are owned and operated by brick manufacturers. PGH manufacturing plants currently source clay/shale material from company owned quarries at Schofields and Horsley Park, and other locations at Mulgoa, Londonderry and Eastern Creek.

The Schofields brick manufacturing plant imports clay/shale materials from two principal sources:

- PGH (Horsley Park) - brown/blue shale; and
- Mulgoa Quarries (Orchard Hills) - cream shale.

A number of possible supplies of clay/shale exist within the Sydney region. However, the viability of these sources is constrained by transportation costs, environmental issues, type and quality of clay/shale and the suitability of material for use in brick and paver manufacture.

1.4.4 Need for Continued Quarrying

The continuation of quarrying at Schofields will limit the quantity of material to be transported to the site to levels outlined in **Table 1.1**. PGH will also be able to exercise greater control of raw material quality.

Confirmed on-site quarrying will allow stockpile sizes to be better managed and ensure that quality is less variable. Given the competitive nature of the market and restricted supply of certain material, new products can be more reliably developed with a controlled supply of raw material.

Continuation of quarrying will assist cost control associated with material purchasing. The location of suppliers is crucial as transport costs are a significant factor. PGH is not required to pay royalties to external suppliers, if this material is mined on site. This enables a competitive cost structure to be maintained.

Under this proposal, continuation of quarry operations would result in the most economical source of raw material for the company.

1.4.5 Importance of the Site

The Schofields clay/shale resource has been identified in SREP No. 9 to be regionally significant. The proposed development would maintain the supply of an identified and regionally important resource for an extensive period of time. The supply shortage of

certain types of clay/shale materials in the Sydney region has been a limiting factor in the production and consumption of manufactured bricks (Cole, 1993).

The proposed extension to quarrying at Schofields would increase the competitive lifespan of both the site itself and the Horsley Park brick manufacturing operations. The commercial viability of the Schofields site is of significant economic importance to the brick manufacturing industry. A commercially viable site will maintain the supply of white and cream brick products to help satisfy continuing demand.

The proposed development will continue a current land use within a site already developed for quarrying with infrastructure established and environmental controls in place. The proposal has importance for the region due to its ability to postpone development of new quarrying operations and contain raw material costs associated with brick manufacturing.

A separate report including details of resource investigations undertaken, extractable reserves and quality of the reserves at the Schofields site is attached as **Appendix B**.

1.5 REVIEW OF WASTE MANAGEMENT PRACTICES

1.5.1 Waste Definition and Characteristics

The EPA has recently published *Environmental Guidelines: Solid Waste Landfills* (EPA, 1996) which reclassify solid waste as either **inert**, **solid** or **hazardous**. Five classes of landfill have been established for the purposes of regulation:

- **Inert Waste Landfill Class 2** - all inert waste except stabilised, fixed, treated or processed waste;
- **Inert Waste Landfill Class 1** - all inert waste;
- **Solid Waste Landfill Class 2** - all solid waste except putrescible material (defined as food or animal matter, unstable or untreated biosolids);
- **Solid Waste Landfill Class 1** - all solid waste; and
- **Hazardous Waste Landfill** - defined hazardous waste.

The EPA guidelines further define the terms **inert waste** and **solid waste** as follows:

- **"Inert waste** is defined as waste which does not undergo environmentally significant physical, chemical or biological transformations and has no potentially hazardous content once landfilled. This waste from building and demolition activities includes bricks, concrete, glass, plastics, metal and timber. It must not be contaminated or mixed with any other material. Inert waste does not include clean excavated natural materials received with no other waste."
- **"Solid waste** means any non-hazardous, solid, degradable wastes. These include putrescible wastes; garden wastes; uncontaminated biosolids; and chemical and related waste (including contaminated waste) sterilised to a standard acceptable to the Department of Health. Solid waste shall contain less than 200 mL/tonne or

200 g/tonne of hazardous wastes. All solid waste shall have an angle of repose of greater than five degrees and have no free liquids."

The proposed landfill operation at Schofields will seek a licence as a Solid Waste Landfill, Class 2. This was previously referred to as non putrescible waste. In this EIS, solid waste is taken to refer to the types of waste permitted to be received at a Solid Waste Landfill, Class 2.

Typical waste to be received at the proposed landfill includes:

- demolition and building wastes such as masonry, glass, timber and metals;
- excavated material;
- inert manufacturing by-products such as fly-ash and clinker;
- inert consumer items such as furniture and other household waste; and
- commercial and industrial waste such as paper, cardboard and packaging from offices.

Waste to be received at the landfill will not include that liable to putrefaction (rapid degradation by micro organisms such as food, offal or dead animals) or chemical, liquid, hazardous or toxic wastes.

1.5.2 Sources of Waste

Figure 1.3 indicates the likely catchment area from which non-putrescible solid waste will be sourced for the proposed landfilling operation. The potential sources of wastes would primarily be the western suburbs of Sydney, including Penrith, Liverpool, Fairfield, Blacktown, Holroyd and other surrounding suburbs. This predicted catchment area is based on knowledge gained from the operation of Enviroguard's Erskine Park Depot, and experience has shown that waste could be sourced from as far out as the northern beaches.

The total quantities of solid waste generated in the likely catchment area would be 2 million tonnes per year - see **Table 1.2**. This estimation of the total waste generated annually in this catchment area was calculated based on 1995 Australian Bureau of Statistics population data and waste generation data available from the NSW EPA.

According to EPA records, each person in Sydney generates approximately 924 kg of solid waste which require disposal (for 1995). This total waste generated consists of 462kg of municipal waste (50%), 327kg of commercial and industrial waste (35%) and 135kg of building and demolition waste (15%).

According to the Waste Service (1993) approximately 20% of the commercial and industrial waste stream is putrescible food type waste, while none of the building and demolition waste is putrescible.

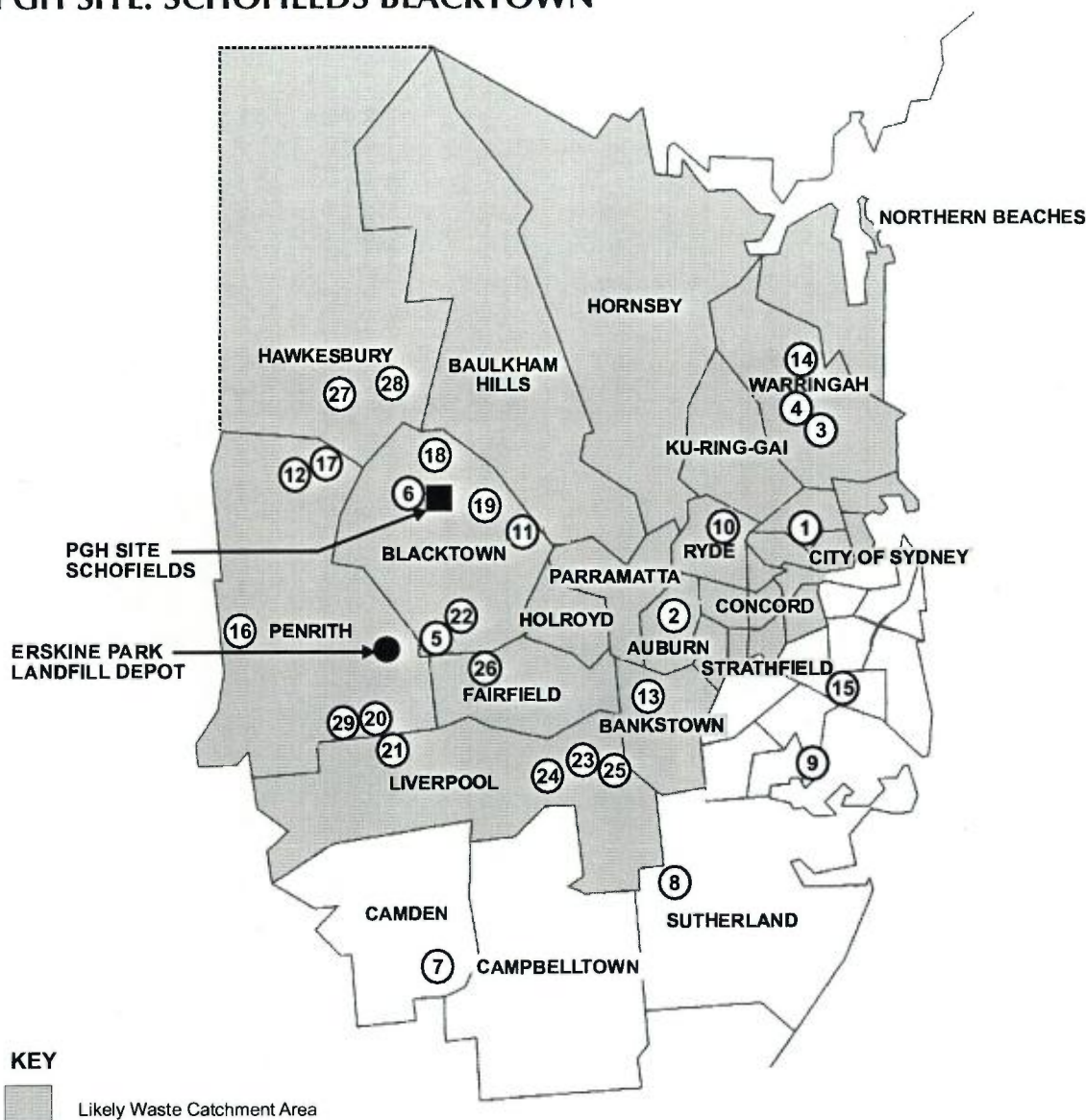
TABLE 1.2 TOTAL SOLID WASTE QUANTITY GENERATED IN LIKELY CATCHMENT AREA (TONNES/YEAR)

Local Government Area	Population ⁽¹⁾	Municipal Waste ⁽²⁾	Commercial & Industrial Waste ⁽³⁾	Building & Demolition Waste ⁽⁴⁾	Total Waste Generation
Penrith	166,850	77,085	54,560	22,525	154,169
Liverpool	113,475	52,425	37,106	15,319	104,851
Fairfield	189,100	87,364	61,836	25,529	174,728
Blacktown	232,000	107,184	75,864	31,320	214,368
Holroyd	83,300	38,485	27,239	11,246	76,969
Parramatta	138,525	63,999	45,298	18,701	127,997
Baulkham Hills	127,175	58,755	41,586	17,169	117,510
Bankstown	164,150	75,837	53,677	22,160	151,675
Auburn	50,625	23,389	16,554	6,834	46,778
Ryde	95,850	44,283	31,343	12,940	88,565
Ku-ring-gai	106,025	48,984	34,670	14,313	97,967
Hornsby	141,375	65,315	46,230	19,086	130,631
Concord	23,875	11,030	7,807	3,223	22,061
Strathfield	26,800	12,382	8,764	3,618	24,763
North Sydney	52,625	24,313	17,208	7,104	48,626
Manly	35,875	16,574	11,731	4,843	33,149
Hunters Hill	12,775	5,902	4,177	1,725	11,804
Ashfield	41,500	19,173	13,571	5,603	38,346
Mosman	26,675	12,324	8,723	3,601	24,648
Warringah	129,525	59,841	42,355	17,486	119,681
Pittwater	51,525	23,805	16,849	6,956	47,609
Lane Cove	30,325	14,010	9,916	4,094	28,020
Willoughby	54,700	25,271	17,887	7,385	50,543
Drummoyne	31,225	14,426	10,211	4,215	28,852
Hawkesbury	56,250	25,988	18,394	7,594	51,975
Total	2,182,125	1,008,142	713,555	294,587	2,016,284

- Notes
1. 1995 ABS Figures
 2. Based on 462 kg/person/year
 3. Based on 327 kg/person/year
 4. Based on 135 kg/person/year

EXISTING SOLID WASTE LANDFILLS

ENVIRONMENTAL IMPACT STATEMENT PGH SITE, SCHOFIELDS BLACKTOWN



WASTE SERVICE REGIONAL WASTE DEPOTS

- ① Artarmon Transfer Station & Recycling Centre
- ② Auburn Transfer Station & Recycling Centre
- ③ Bare Creek Landfill Depot & Recycling Centre
- ④ Belrose Transfer Station & Recycling Centre (Under Construction)
- ⑤ Eastern Creek Landfill Depot & Recycling Centre
- ⑥ Grange Avenue Landfill Depot & Recycling Centre
- ⑦ Jack's Gully Landfill Depot & Recycling Centre
- ⑧ Lucas Heights Landfill Depot & Recycling Centre
- ⑨ Rockdale Transfer Station & Recycling Centre
- ⑩ Ryde Transfer Station & Recycling Centre
- ⑪ Seven Hills Transfer Station & Recycling Centre
- ⑫ Castlereagh Secure Landfill Depot
- ⑬ Chullora, Waste Services To Open August 1997

OTHER WASTE DEPOTS

- ⑭ Kimbriki Road
- ⑮ Sydney Brickpit
- ⑯ Penrith Waste Service, Mulgoa
- ⑰ Camide, Londonderry
- ⑱ Abax, Schofields
- ⑲ Public Works & Services, Blacktown
- ⑳ Kari & Ghossayn, Kemps Creek
- ㉑ Brandown, Cecil Park
- ㉒ Eastern Creek Raceway, Bradshaw
- ㉓ Maron, Chipping Norton
- ㉔ Maron, Moorebank
- ㉕ East Hills, Bankstown Council
- ㉖ Pacific Waste Management, Wetherill Park
- ㉗ Windsor (South), Hawkesbury Council
- ㉘ East Kurajong Hawkesbury Council
- ㉙ Pacific Waste Management, Elizabeth Drive

Date : May 1997

File Name : F:/DATA/VH/0009/VH000922.cdr

Based on the above, the proposed non-putrescible landfill at Schofields has access to a potential solid waste market of approximately 865,000 tonnes per year, comprised of 80% of the 714,000 tonnes per year commercial and industrial waste, 100% of the 295,000 tonnes per year building and demolition waste, and 0% of the municipal waste.

1.5.3 Waste Disposal in Western Sydney

Waste disposal depots in the Sydney catchment accepting solid waste from industry (including the former Schofields landfill), are shown in **Figure 1.3**. The EPA has advised that currently operating depots in Western Sydney are those listed in **Table 1.3**.

**TABLE 1.3 EXISTING SOLID WASTE LANDFILLS AND TRANSFER STATIONS:
WESTERN SYDNEY**

Location	Owner/Operator	Waste Type ⁽¹⁾	Reference (see Figure 1.4)
Landfills		NP	
Londonderry	Camide	NP	16
Mulgoa	Penrith Waste Service	NP	15
Grange Avenue	Waste Services	P	6
Schofields	Abax	NP	17
Blacktown	Public Works and Services	NP	18
Badgerys Creek	Pacific Waste Management	NP	
Kemps Creek	Kari and Ghossayn	NP	19
Cecil park	Brandown	NP	20
Eastern Creek	Waste Services	P	5
East Hills	Bankstown Council	P	21
Chipping Norton	Maron	NP	22
Moorebank	Maron	NP	23
Windsor (South)	Hawkesbury Council	P	26
East Kurajong	Hawkesbury Council	P	27
Eastern Creek Raceway	Bradshaws	NP	24
Transfer Stations			
Wetherill Park	Pacific Waste Management	NP	25
Seven Hills	Waste Services	P	11
Chullora	Waste Services	to open mid 97	27

Note 1: P = Putrescible
NP = Non-putrescible
See **Section 1.5.1** for current definition of waste.

The amount of waste accepted and the expected life of each of the landfills in the catchment area could not be determined during this assessment because of the lack of available data. Such data is commercially sensitive, and not freely available. Therefore it is not possible to establish the current distribution of waste being landfilled in the area, nor the need for additional landfill capacity. The development of the Regional Waste Boards as specified under the *Waste Minimisation and Management Act 1995*, may help establish that information in the future.

However, the *Waste Management Green Paper* (1992) indicated that 'estimates suggest that Sydney's landfill capacity will be close to exhaustion by the end of the decade'. The Waste Recycling & Processing Service of NSW (1993) in their response to the Green Paper claimed that:

"Within an integrated waste management system there is an ongoing need for waste disposal facilities. Assuming that the 50% reduction in the amount of waste requiring disposal by landfill is met, by the year 2000 an estimated 1.9 million tonnes of solid waste will still be presented for disposal in metropolitan Sydney. By that time all existing approved landfill capacity is likely to be filled to capacity."

Since these predictions were put forward in the early 1990's, some new landfills have opened and some of the larger landfills of that time have closed. Erskine Park Landfill is the only sizeable landfill that has opened since the release of the *Waste Management Green Paper* in 1992. Since then, the Camide landfill at Londonderry and Horsely Park, the Abax landfill at the existing site at Schofields have closed (although the Camide landfill is still accepting low-level contaminated wastes by appointment). Waste Service's Grange Ave and Belrose landfills have had their landfilling activities extended, although they are now near to completion.

Thus, despite the lack of specific data, there is still wide spread acknowledgment that there is a need for new landfilling sites in the Sydney region, due to the lack of long term waste disposal capacity.

1.5.4 Expected Waste Quantities for PGH Schofields

The actual quantity of waste that would be received at the proposed Schofields landfill facility would be dependent on many factors including:

- competition from other disposal sites (particularly their pricing policy);
- the opening/closure of other landfill depots in the region;
- restrictions or limitations imposed by or on the landfill operator;
- future waste generation rates (dependent largely on population increases and waste minimisation activities)
- the impact the *Waste Minimisation and Management Act 1995* (and associated guidelines) has on the amount of waste diverted from the waste stream (via recycling or other processes)
- the effect of the Olympics - the rate of construction in the Sydney region is increasing, and this is likely to increase the amount of building and demolition waste produced.

The many factors involved and the uncertainty of the market make the prediction of quantities of waste that could be received at the Schofields Landfill difficult. The potential waste market is in excess of 850,000 tonnes per annum. However, regardless of the available market, to ascertain and assess the impact of the facility as part of this

development approval process, the quantity of waste received at the depot has been estimated in the order of 108,000 tonnes per year (or approximately 360 tonnes per day).

Such a rate for the proposed quarry is considered to be sustainable as the previous landfilling operation at the Schofields site received up to 500 tonnes per day.

1.5.5 Waste Minimisation in Relation to Enviroguard's Operations

Waste minimisation is a priority activity for Enviroguard in its business to provide integrated waste management services to the community. The proposed Schofields Landfill will comprise one component of Enviroguard's waste management operations and it is proposed that the facility will be a dedicated waste disposal site for commercial and industrial customers only. The general public will not be permitted access to the site for safety, health, and security reasons.

Enviroguard's Erskine Park Landfill, which is located nearby, will be the focal point of Enviroguard's waste minimisation activities in the region and recyclable materials will be directed to this facility. Currently the Erskine Park Landfill provides comprehensive recycling facilities encompassing the following:

- a recycling centre which accepts paper and cardboard, various plastics (PVC, PET, HDPE), glass, milk cartons, steel cans, aluminium cans and scrap steel;
- a tyre shredding operation;
- a wood waste shredding operation; and
- garden waste composting operation.

To complement the above activities at the Erskine Park landfill the following measures would be considered for the the proposed Schofields Landfill:

- co-ordination with clients to direct recyclable materials to the Erskine Park Landfill;
- education of users of the facility to utilise the Erskine Park Landfill and other nearby facilities for recyclable materials;
- separation and recycling of steel; and
- separation, stockpiling and transport of tyres, wood waste and garden waste to Erskine Park for processing.

PROPOSAL OUTLINE

ENVIRONMENTAL IMPACT STATEMENT PGH SITE, SCHOFIELDS BLACKTOWN



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Figure 2.1
CMP S&F

The extent of proposed quarrying and earth mound construction is shown in **Figure 2.1**, with the staging of development illustrated in **Figures 2.1a to 2.1e**. The concept landscape plan after site rehabilitation is attached as **Figure 2.1f**.

The amount of material to be quarried and landfilled is detailed in **Table 2.1**. The amount of material to be landfilled within each of the six stages of development is detailed in **Figure 2.3**.

The total space available for landfill over time will be approximately 3.6 million cubic metres. This landfill total consists of the existing quarry void (approximately 0.4 million cubic metres) the void space developed over a 26 year period (approximately 2.7 million cubic metres), and landfilling above current ground level. Some 0.36 million cubic metres of overburden will be included in the landfill, as intermediate and final cover material for the waste. The remaining 3.24 million cubic metres of the void will be filled with solid waste imported to the site. This will include 0.18 million cubic metres of solid waste which is suitable for cover purposes (such as soil fill). This is equivalent to approximately 3.24 million tonnes of compacted waste. It is anticipated that the voids will be landfilled at a rate of approximately 120,000 cubic metres per year. This consists of 108,000 m³ of imported waste (including 6,000 m³ of waste suitable for cover) and 12,000 m³ of cover sourced from the clay/shale overburden per year.

Current quarrying operations will be extended following receipt of development consent. Sufficient area will be available to commence landfilling by about year 3 of the extended operation. Simultaneous quarrying and landfilling will continue for about 21 years when the quarry will be exhausted. Landfill operations will then continue for another 10 years depending on the volume of waste receipted each year. It is intended that on average, landfilling will proceed at a slightly higher volumetric rate than quarrying, although from year to year this will depend on the relationship between brick manufacturing product demand and waste disposal requirements.

Currently quarry operations are undertaken during 'campaigns', for about three months of the year, with the product stockpiled for use in the brick and paver manufacturing plant or exported to the Company's other operations. These arrangements for quarrying will be maintained while proposed landfilling operations will continue throughout the year.

Quarry and landfill operations will be undertaken as two separate operations, each having a designated workforce and infrastructure. Each operation will be undertaken by contract.

It is to be noted that there have been several changes to the originally proposed development during the course of preparation of this EIS and as a result of this assessment process. The main change has been the decision not to include any further land to the north of the overhead power lines as part of this proposal. This change will result in the retention of all existing vegetation in this part of the site especially the ironbark/melaleuca woodland within the north-eastern corner. This vegetation currently provides an effective visual buffer between the site and the rural residential properties to the north, as well as a habitat for native fauna.

2. THE PROPOSAL

2.1 OUTLINE OF THE PROPOSED DEVELOPMENT

The property which is the subject of the development application lies to the north and south of Meadow Road, Schofields and is described as Lot 3 in DP 232474. The property is shown in **Figure 1.2**.

The proposed development includes:

- continuation of existing clay/shale quarrying, to extend beyond the area currently used for quarrying over most of the Company's property north of Meadow Road and south of the overhead electricity power line, and south of Meadow Road to the west of the underground gas pipeline;
- controlled filling of the resulting quarry void with solid waste in conformity with the EPA definition of a Class 2 Solid Waste Landfill;
- revegetating the final land surface for open space/recreational uses in association with adjoining residential and rural residential development;
- controlled placement of sufficient overburden around certain sections of the perimeter of the site to form a landscaped earthen mound as boundary screening and to assist in reducing noise impacts on adjoining residents in advance of extraction and landfill activities; and
- integrating proposed quarry/landfill operations with existing approved operations which include:
 - brick manufacture, stockpiling and delivery from the site;
 - stockpiling clay/shale materials on the site;
 - exporting clay/shale materials from the site;
 - importing clay/shale materials to the site; and
 - completion and maintenance of an existing landfill area in the northern part of the site.

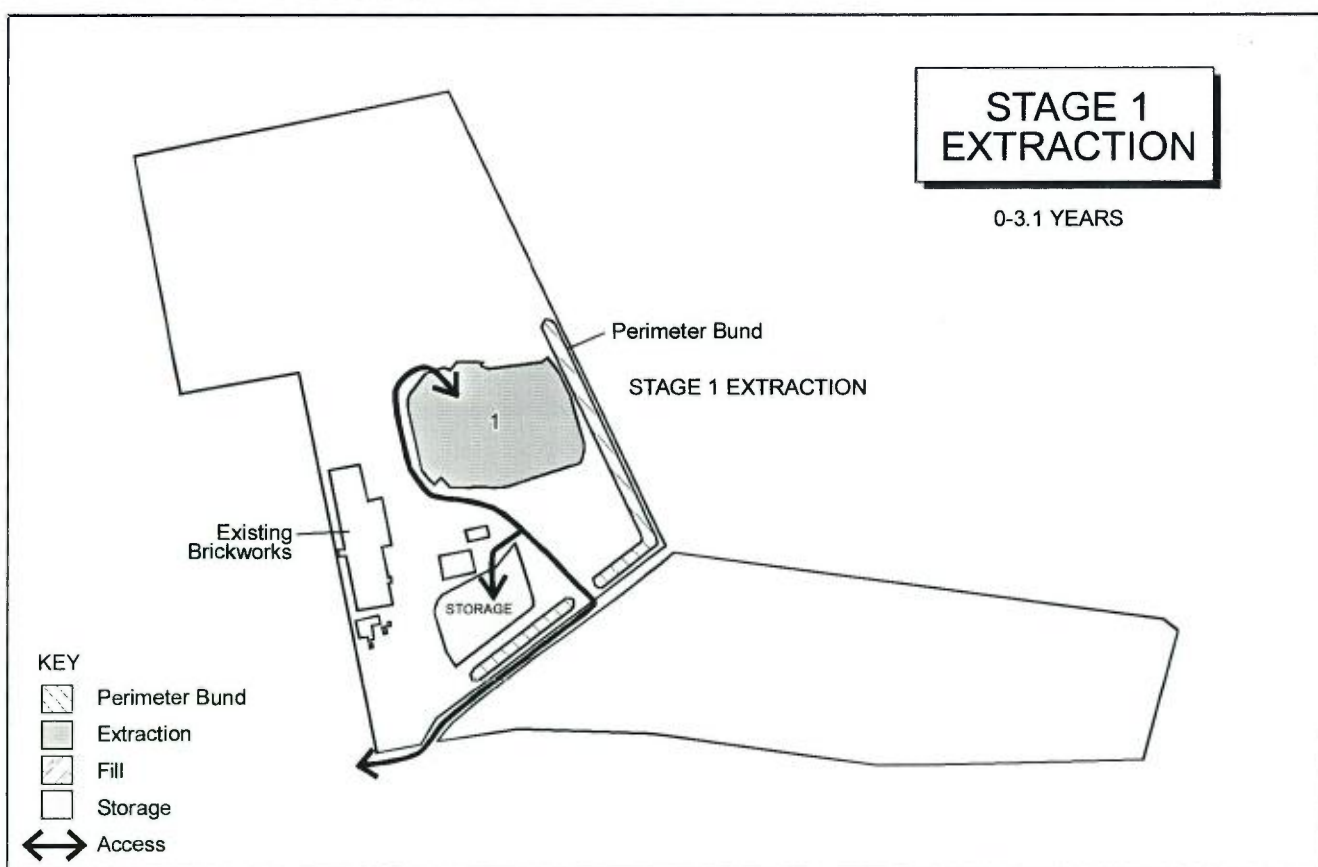
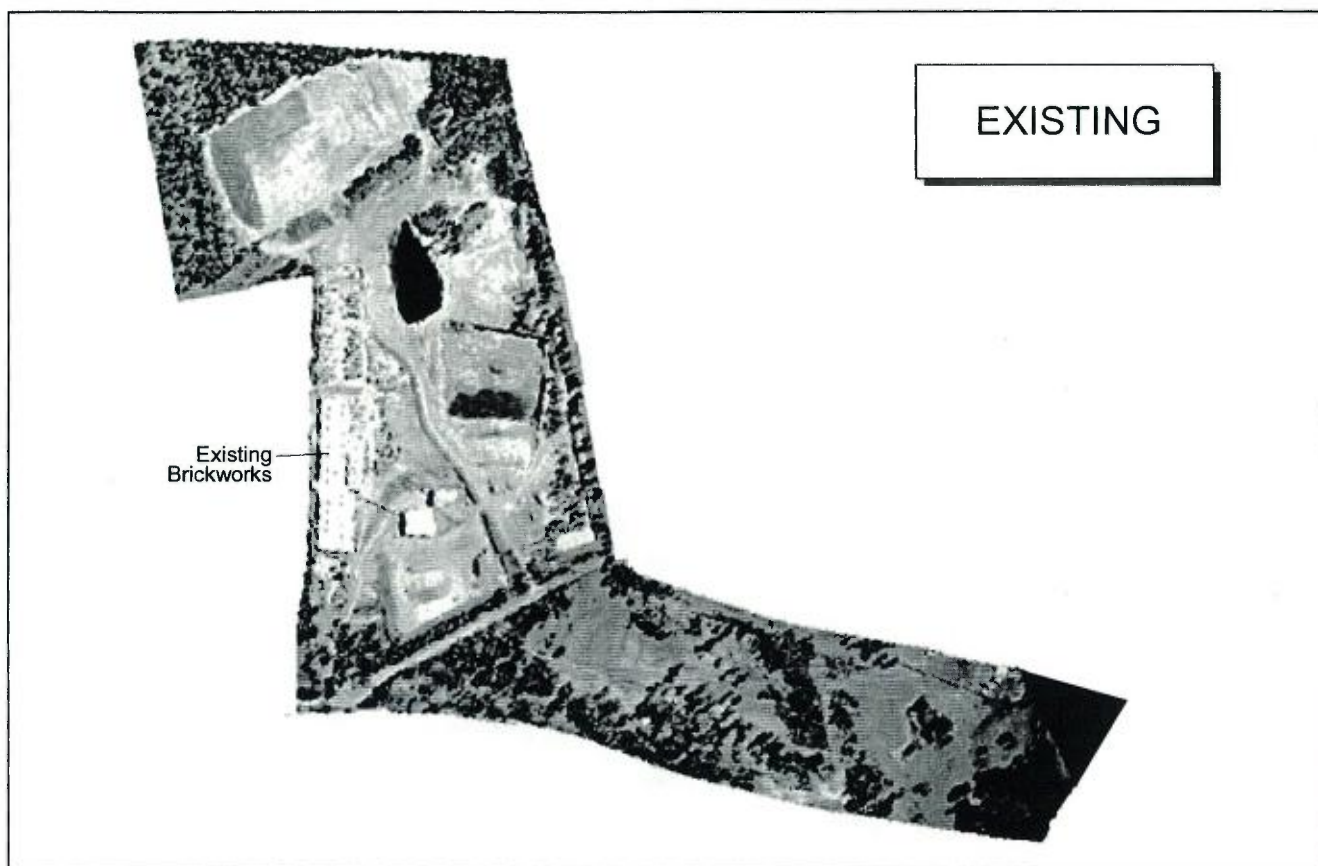
The proposal is to continue excavation at a rate of up to approximately 240,000 tonnes per year. Some 25% of this material is made up of overburden and waste clay/shale not suitable for use in production at the Schofields plant. This will be used in site works, as cover for the waste or removed off-site as fill.

Commencing when sufficient area is available, the void will be progressively filled with solid waste until the final ground profile is achieved which will be capable of effectively shedding rainwater. The final landform will be progressively topsoiled and landscaped.

During the early years of expanded quarrying, overburden will be progressively placed around the boundaries to form a landscaped mound 5-8 metres in height.

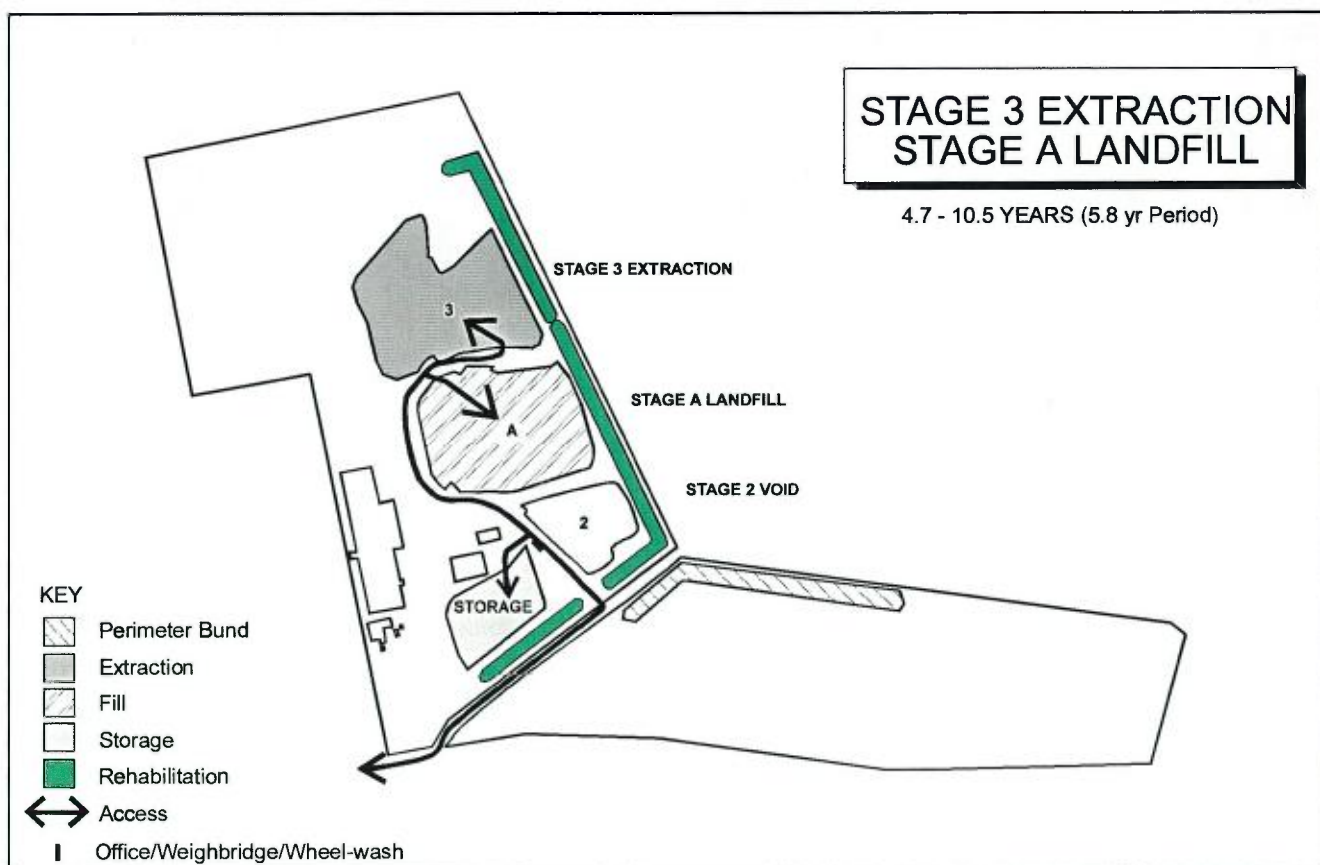
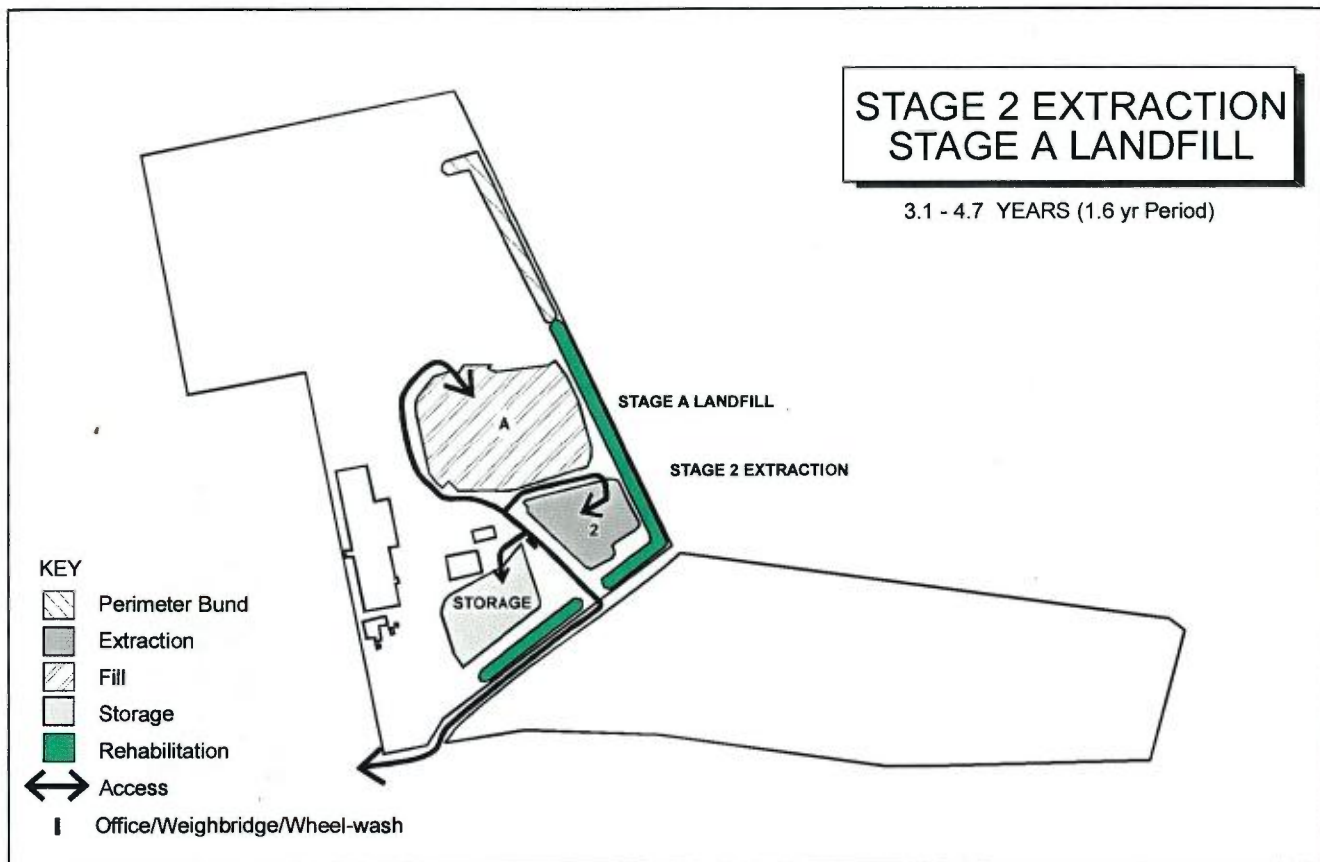
STAGING (Refer also to Fig 2.3)

ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN

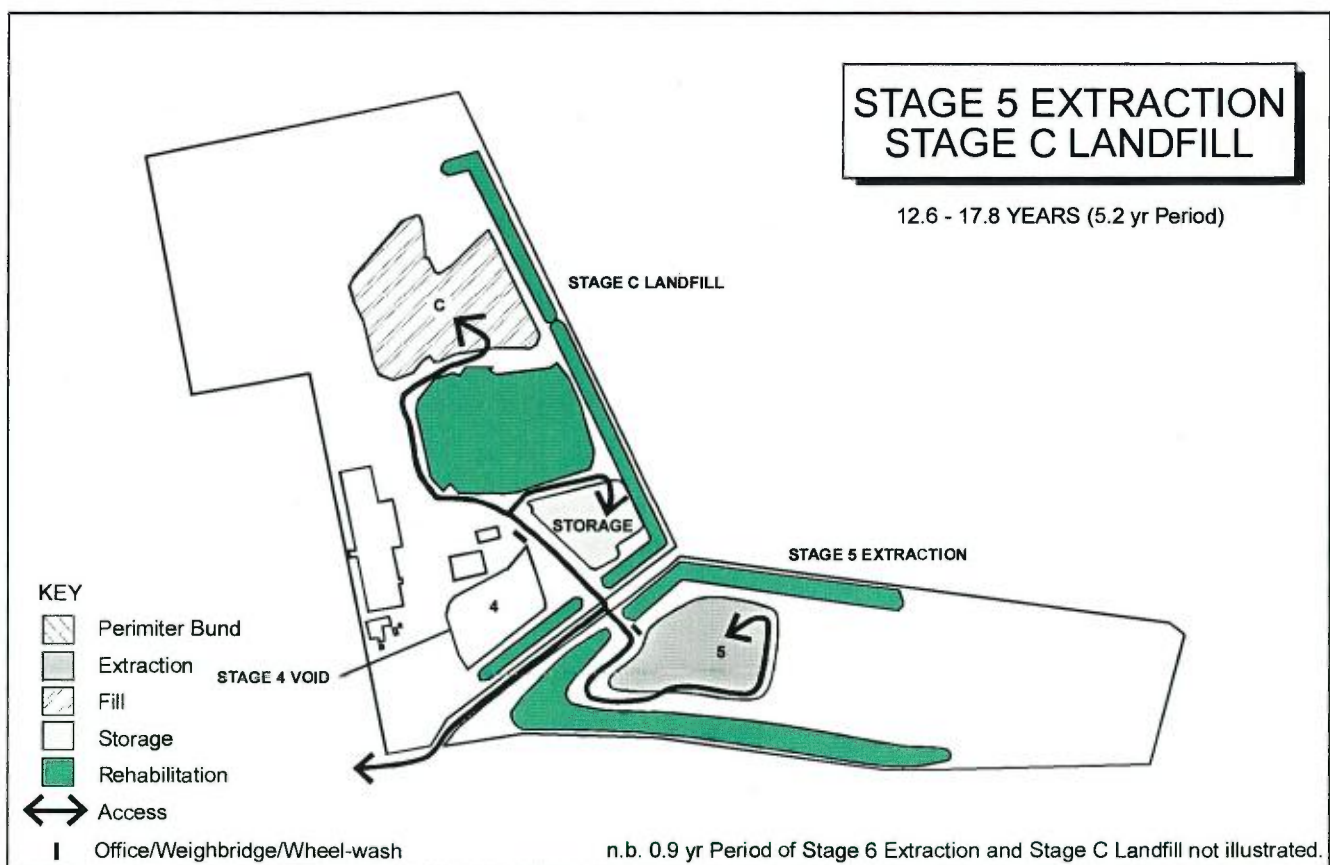


STAGING (Refer also to Fig 2.3)

ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN



ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN



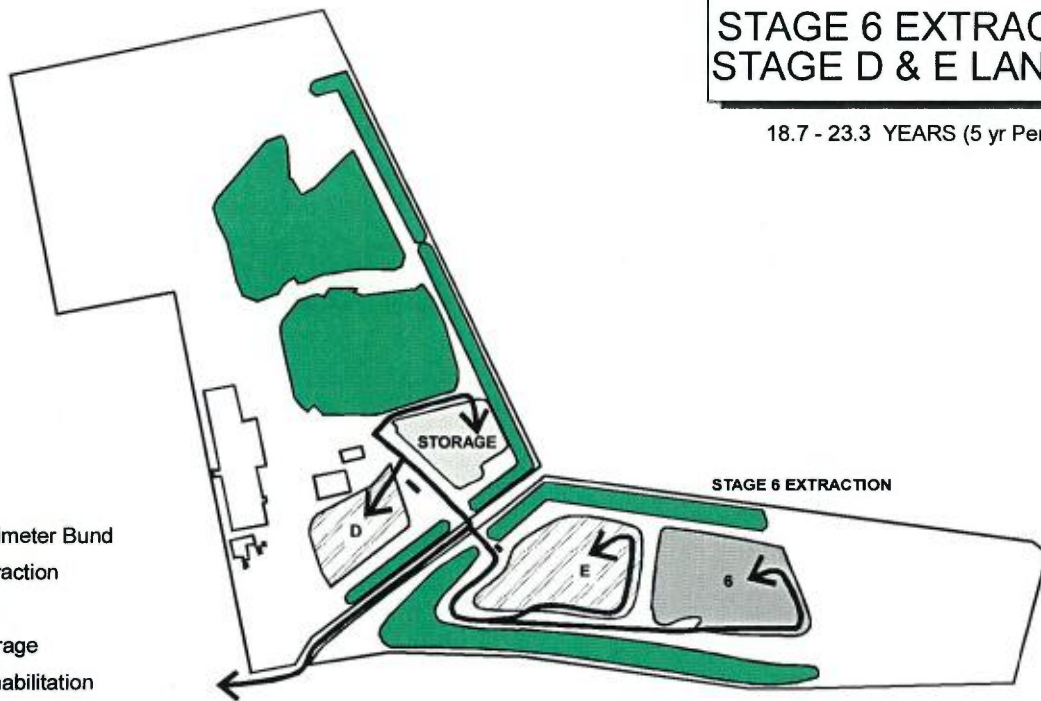
STAGING (Refer also to Fig 2.3)

ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN

STAGE 6 EXTRACTION STAGE D & E LANDFILL

18.7 - 23.3 YEARS (5 yr Period)

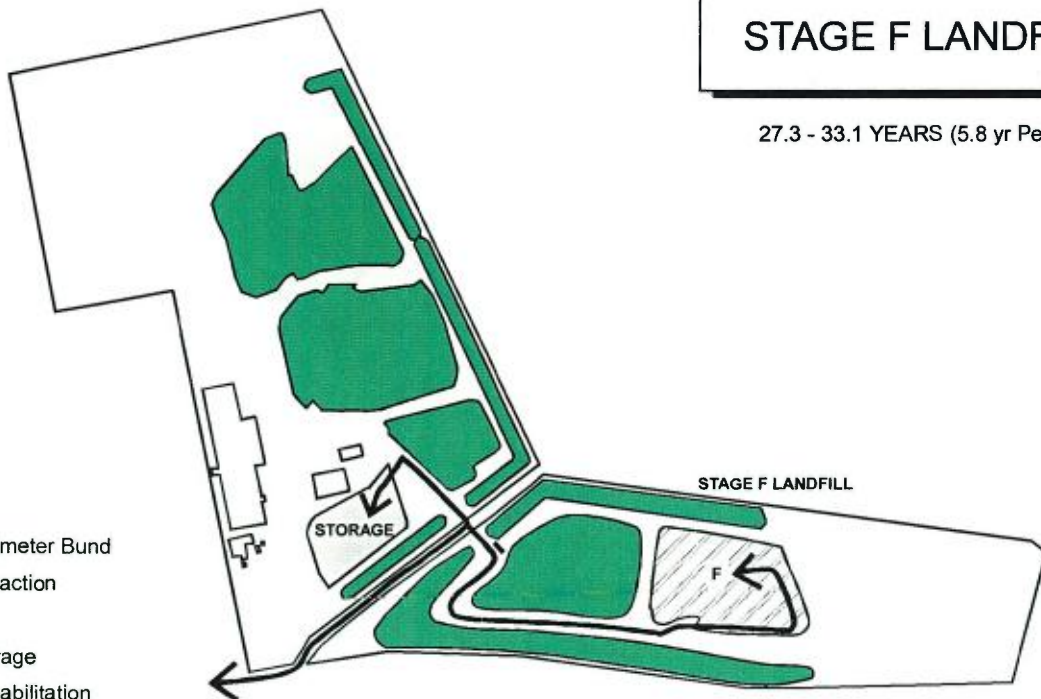
- KEY**
-  Perimeter Bund
 -  Extraction
 -  Fill
 -  Storage
 -  Rehabilitation
 -  Access
 -  Office/Weighbridge/Wheel-wash



STAGE F LANDFILL

27.3 - 33.1 YEARS (5.8 yr Period)

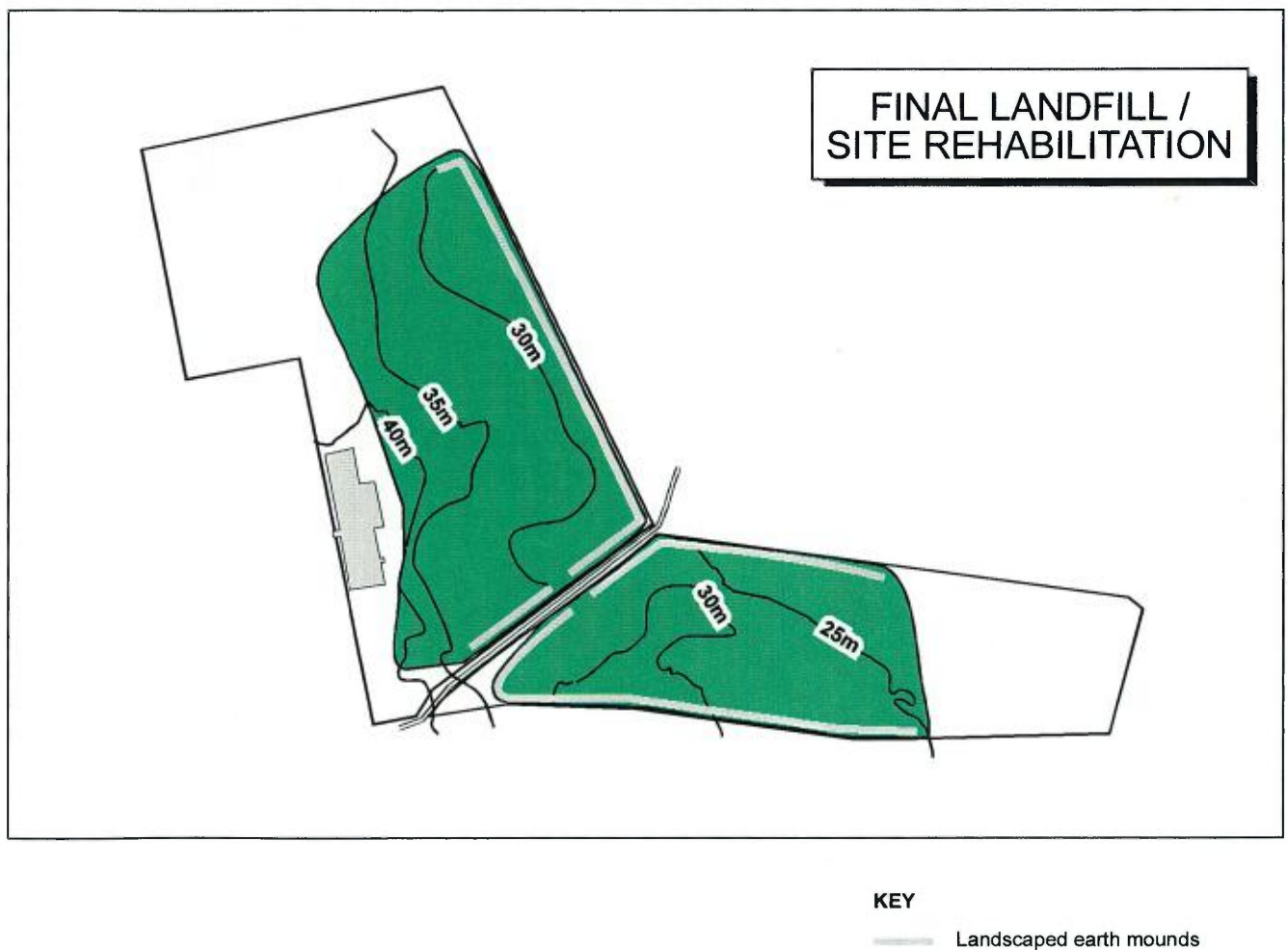
- KEY**
-  Perimeter Bund
 -  Extraction
 -  Fill
 -  Storage
 -  Rehabilitation
 -  Access
 -  Office/Weighbridge/Wheel-wash



Note: 4 yr Period of Stage E Landfilling only, not illustrated

STAGING

ENVIRONMENTAL IMPACT STATEMENT PGH SITE, SCHOFIELDS BLACKTOWN



PROPOSED FUTURE USE

ENVIRONMENTAL IMPACT STATEMENT PGH SITE SCHOFIELDS, BLACKTOWN



LANDSCAPE TREATMENTS

BUSHLAND REGERATION AREAS

STEEP BUND SLOPES

Replanting indigenous trees and shrubs from Grey Box Woodland Community

* approx 80% tree and shrub planting

* approx 20% grassed

GENTLY UNDULATING LANDFORM

Replanting indigenous trees and shrubs from Grey Box Woodland Community

* approx 60% tree and shrub planting

* approx 40% grassed

INDIGENOUS FEATURE TREE PLANTING

Replanting indigenous trees from Grey Box Woodland Community in open grassland.

NATIVE GRASSLAND

* 100% indigenous grasses

PLANT SPECIES

Plant Species for the above vegetation areas selected from the following.

TREES

Eucalyptus moluccana
Eucalyptus teretecornis
Eucalyptus fibrosa
Eucalyptus longifolia
Eucalyptus eugeniodes

Grey Box
Forest Red Gum
Broad-leaved Ironbark
Woollybutt
Thin-leaved Stringybark

SHRUBS

Acacia suaveolens
Acacia parramattensis
Bursaria spinosa
Grevillea juniperina
Melaleuca decora
Melaleuca nodosa

Sweet-scented Wattle
Paramatta Green Wattle
Blackthorn
Pnckly Grevillea
Feather Honeymyrtle
Ball Honeymyrtle

GRASSES

Danthonia species
Themeda australis

Wallaby Grass
Kangaroo Grass

2.2 OBJECTIVES OF THE PROPOSAL

The proposal has been developed to achieve the following objectives:

- ensure an adequate long term supply of clay/shale material to the PGH clay and brick paver manufacturing plant at Schofields;
- provide for one of Sydney's significant extractive resources to continue to be won;
- avoid the need to substantially increase raw material movements into the Schofields site for at least 25 years;
- rehabilitate quarry voids progressively by landfilling with solid waste; and
- construct landscaped earth mounds to screen areas of the site in preparation for future excavation.

2.3 SITE LAYOUT PLANS

2.3.1 General Arrangement

Figure 2.1 shows the overall development sequence for the whole site. Initially, the existing layout of the northern part of the PGH property will not be greatly altered by the proposal. Extraction and landfilling operations will take place to the east of, and be separate from, the access road and operations of the brick plant. The existing internal access road to the extraction area from Meadow Road will be realigned around the western edge of the progressing pit. At the same time, landfill-associated facilities including an office, weighbridge and wheel wash facility will be located near the site entrance in an area which will not be excavated until the final stage of quarrying. As quarrying proceeds initially to the south and then in a northerly direction, an existing surface dam will be relocated closer to the western boundary of the site. In the final stages of quarry development the raw material stockpile area will be temporarily relocated onto a finished section of landfill.

A 50 metre buffer will be maintained between the quarry and the property boundaries. The existing buffer on the eastern side of the present quarry contains a perimeter mound which will be upgraded and extended as part of the proposal.

Operations on the southern part of the PGH property, south of Meadow Road, will initially be confined to a similar perimeter buffer area. Quarrying in this area will commence once the northern property is exhausted. Landfilling will follow as quarrying each cell is completed.

A surface pond will receive rainfall runoff pumped from within the quarry. An existing storage pond will be used for this purpose initially, to be relocated later to make way for quarrying.

Prior to receiving waste, the quarry floor will be prepared by compacting a layer of clay over the existing base and grading it to promote water movement to the leachate collection system. Details of this system are given in **Section 2.4**.

Excavated clay/shale will be stored in the existing stockpiles adjacent to the southern boundary.

2.3.2 Site Infrastructure

Internal Roads and Traffic

Trucks transporting clay/shale will enter from Meadow Road through the western gate and proceed a short distance to the stockpile area in the south-western portion of the site. Departing trucks will leave the same way. Scrapers will transport clay/shale material from the quarry floor to the stockpile area via the internal road.

Trucks delivering waste will enter the site through the eastern gate. They will then proceed via an office and weighbridge, and a ten-metre-wide roadway to the quarry floor and tipping face. Empty trucks will return via a wheel wash to the weighbridge before exiting the site. The office and weighbridge will be located approximately 100 metres from the site entrance to allow ample room for queuing. The access road will be sealed from the site entrance to the wheel wash area.

Simultaneous quarry and landfill operations will commence in about year 3, but will only occur for about three months of the year. Excavation of clay/shale will be undertaken over this period at a rate determined predominantly by market demand. Landfilling with solid waste will continue throughout the year.

Signs, Fencing and Parking

Directional and speed limit signs will be erected at the access from Meadow Road. Signs will provide information on operational hours, types of waste accepted and excluded, tipping charges and other relevant information. Other signs will be erected within the site where required to give direction and facilitate safe movement and tipping. The site is currently fenced and a security gate is located at the site entrance. Up to 10 parking spaces will be provided near the site office. These will be available for employees and visitors associated with landfill operations. Parking is currently provided in relation to existing extraction activities at the site.

Quarry related Infrastructure

Quarrying will be a continuation of current operations and will not require additional infrastructure. The clay/shale stockpile area will be temporarily relocated onto a completed section of landfill during Stage 4 of quarrying.

Landfill related Infrastructure

During landfill operations an office and weighbridge will be located on the internal access road for the purpose of controlling waste vehicles entering the site. Trucks leaving will also be able to pass over the weighbridge where their tare weights will be recorded. These facilities will be located so as to minimise any interference with quarry and tipping trucks accessing the stockpile area.

A demountable, self-contained amenities building will be located near the office. A small workshop will also be located in this area. It will be used for minor maintenance work and storage of equipment parts and hardware items. An above-ground diesel storage tank in a bunded area will be used to fuel plant used in landfill operations.

Services

Landfill facilities including the office, weighbridge, amenities building and workshop will be connected to the existing water and electricity supply. Sewage generated from the staff amenities will be collected in an enclosed tank and regularly emptied by a licensed sullage contractor. Quarry staff will continue to use separate amenities already provided on the site.

Pollution Controls

A truck wheel wash will be provided for landfill trucks leaving the site. It will be located on the access road just north of the weighbridge. Sufficient space will be provided for vehicles to bypass this facility during maintenance. An overhead and side spray facility is currently in use for quarry trucks leaving the site. Landfill controls will include facilities for collecting, treating and disposing of stormwater and leachate. Water carts will regularly spray active work areas to minimise dust generation. The screening mound will be upgraded and extended around the south, east and north perimeters of the site.

Structural and operational pollution controls are further discussed in **Section 2.4**.

2.4 QUARRYING AND LANDFILL OPERATIONS

2.4.1 Introduction

Activities at the site would consist of three major operations:

- Extraction of the clay/shale resource. This will either be stockpiled for use in brickmaking on site or exported to other PGH plants. Overburden and quarry waste produced as a result of the clay/shale extraction would also be stockpiled for later use as cover material. Removal of this material creates a void space available for landfilling and subsequent rehabilitation.
- Filling the airspace created with solid waste imported to the site in combination with overburden and waste from the extraction process which would be returned to the quarry as cover material. On completion of filling the final void, the site would be recontoured to a natural profile and rehabilitated.
- Production of bricks and pavers using the clay/shale extracted from the site and imported from other locations and the storage and subsequent export of the finished product.

The linkages between these activities are shown in **Figure 2.2a**. Activities directly associated with brick and paver manufacture, storage and export are not included in this EIS. An indicative site layout plan illustrating activities during Stage A landfill and Stage 2 extraction is shown in **Figure 2.2b**.

2.4.2 Overall Staging

The overall staging of development at this site will consist of a sequence of clay/shale extraction activities followed by staged landfilling and rehabilitation.

Extraction will produce an additional void of approximately 120,000 m³ each year and approximately 30,000 m³ of the overburden and waste clay/shale will be used as daily cover, for mound construction or be exported from the site for use as fill material. Excavation will create a number of large cells, four on the northern part of the site and two to the south. Clay/shale extraction will be completed in each cell and activity moved to the next area before landfilling commences in the empty cell, allowing a continuous staged operation at the site.

Completion of extraction from the first cell will produce a void space of approximately 800,000m³ by year 3 when landfilling with solid waste will start. Excavation is expected to continue for another 20 years producing a total space for landfilling of about 3,600,000m³ to complete the final landform.

The development programme is designed so that when extraction is completed, only the last landfill cell remains to be filled. If this can be achieved, activities at the site will be complete and the site rehabilitated by year 35, some twelve years after the last clay/shale is extracted.

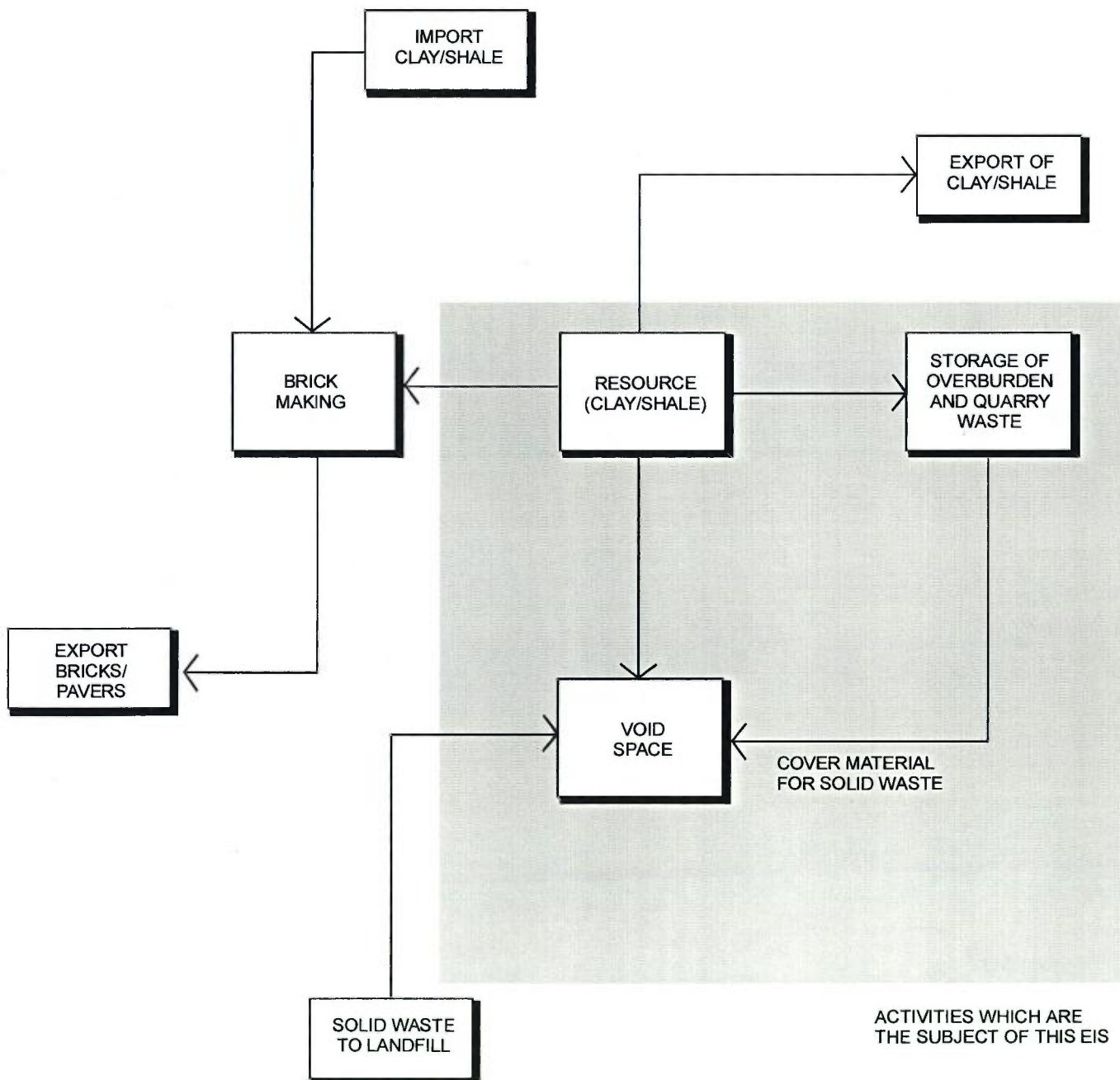
A programme of this kind requires careful control of the rates of extraction and landfilling. However both are subject to market pressures and the clay extraction rate will dictate the volume of void space available for landfilling. The rate at which clay/shale is removed and the void created can be adjusted but it will be difficult to increase the rate of waste receipt if the assumed volumes do not materialise. A conservative estimate has therefore been made of the volume of waste that could be landfilled at the site, based on previous experience.

Overall, the rate of landfilling should be slightly higher than that for clay/shale extraction and allowance has to be made for the volume of waste material from the extraction process which is returned to the landfill.

The proposed programme of extraction and landfilling is shown on **Figure 2.3** and is summarised in **Table 2.1**.

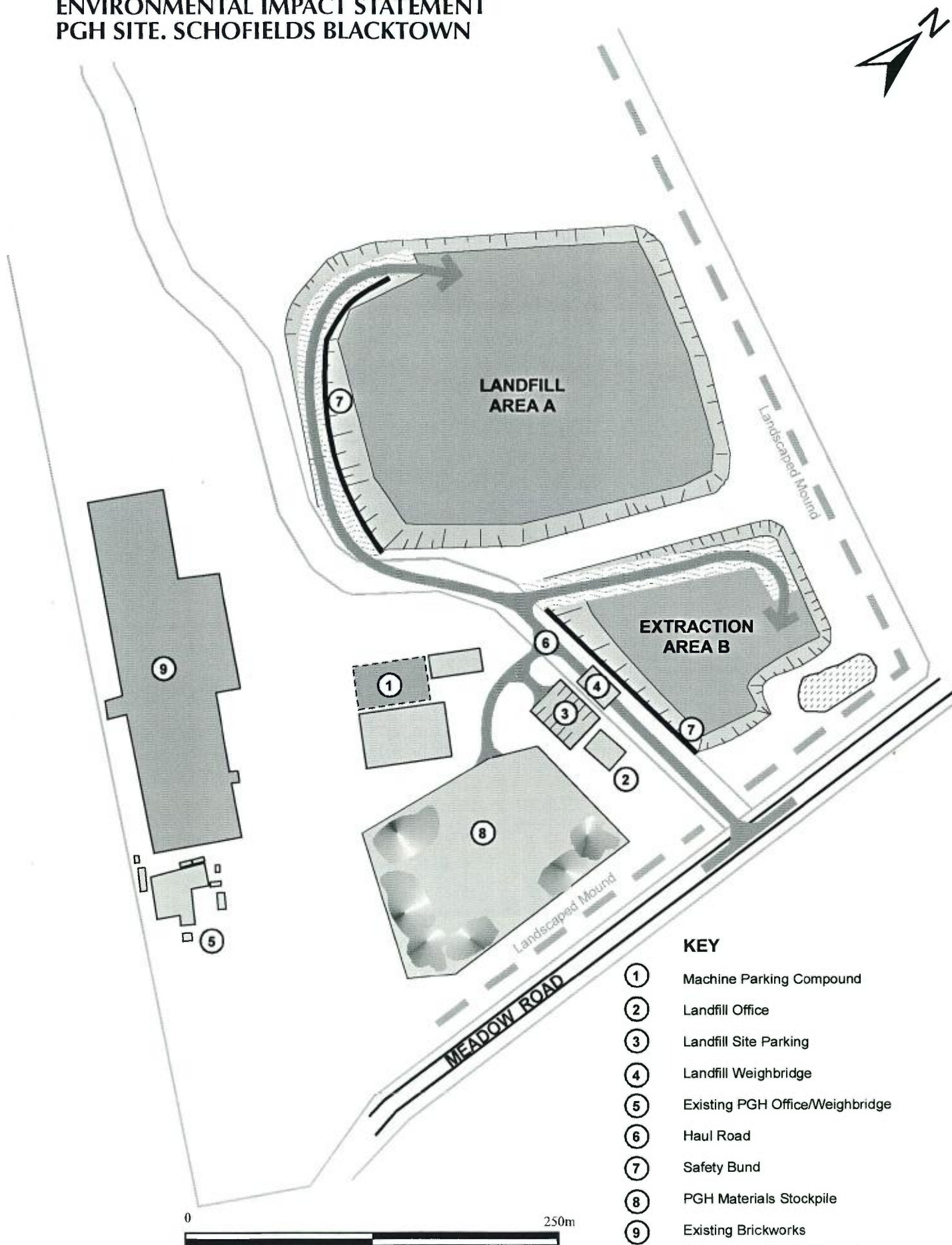
SUMMARY OF SITE ACTIVITIES

ENVIRONMENTAL IMPACT STATEMENT
PGH SITE. SCHOFIELDS BLACKTOWN



INDICATIVE SITE LAYOUT DETAILS (STAGE A LANDFILL STAGE 2 EXTRACTION)

ENVIRONMENTAL IMPACT STATEMENT
PGH SITE. SCHOFIELDS BLACKTOWN



Date : May 1997

File Name : F:\DATA\WH\0009\WH000960.CDR

Figure 2.2b
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EXTRACTION AND LANDFILLING PROGRAMME

ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN

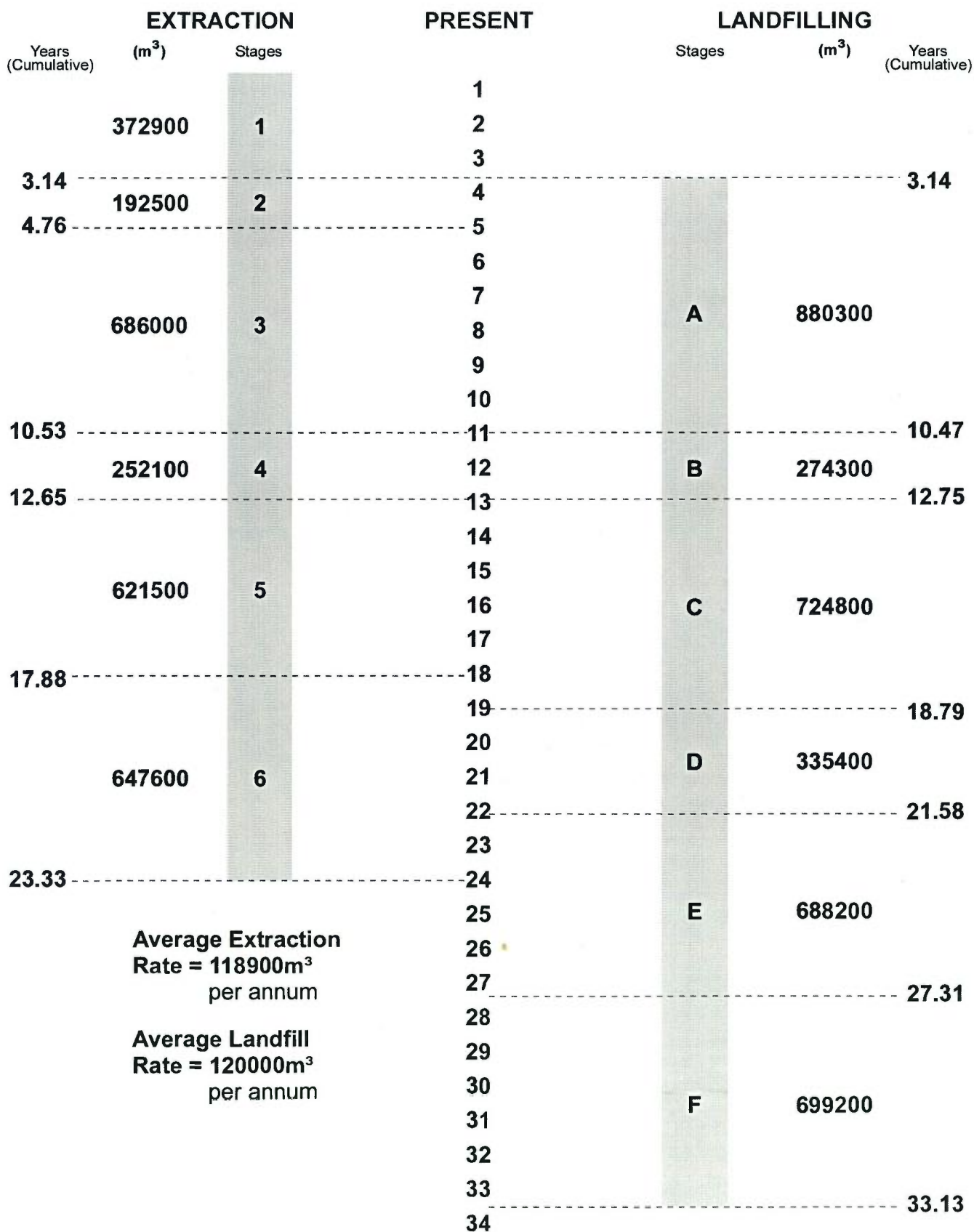


TABLE 2.1 QUARRY AND LANDFILL OPERATIONS SUMMARY

Stage	Product (Clay/Shale) (m ³)	Void Space (m ³)	Elapsed Time (Years)	
			Extraction ⁽¹⁾	Landfilling ⁽²⁾
Present	-	426,700	-	-
1	372,900	453,600	3.14	10.47
2	192,500	274,300	1.62	2.28
3	686,000	724,800	5.77	6.04
4	252,100	335,400	2.12	2.79
5	621,500	688,200	5.23	5.73
6	647,600	699,200	5.45	5.82
Total	2,772,600	3,602,200	23.33	33.13

Notes 1: Extraction would be undertaken at a rate of approximately 120,000m³ per year. Some 75% would be useable clay/shale; the remainder, poor quality clay/shale and overburden. Approximately 325,000m³ of the latter would be used for mound construction during Stages 1 2, 4 and 5.

2: Landfilling would be undertaken at a rate of approximately 120,000m³ per annum, consisting of 108,000m³ of solid waste imported to the site (including 6,000m³ of waste which is suitable as cover) plus 12,000m³ of quarry waste as daily cover and capping. If the volume of unusable material produced is higher, there would be a corresponding reduction in the volume of solid waste accepted for landfilling.

2.4.3 Quarry Operations

Quarry operations will be undertaken on a campaign basis for about three months of the year between the hours of 6.00 am to 6.00 pm, Monday to Friday, and 6.00 am to 4.00 pm on Saturdays. There will be no quarrying on Sundays or public holidays.

Trucks moving clay/shale to and from the site will operate throughout the year between the hours of 7.00 am and 6.00 pm, Monday to Friday.

Four contractor's personnel will normally be required for quarrying operations including one bulldozer driver, and two or three scraper drivers. One of these employees will also be responsible for driving the water truck and site landscaping maintenance.

Rubber tyred scrapers will excavate overburden and the underlying shale. A bulldozer will rip the shale and push the scrapers when required. Blasting will not be required to loosen the material. Equipment will enter and leave the pit from a road which will be progressively developed along the western rim of the quarry. Quarrying will be undertaken on a bench approximately 50 metres wide. The maximum slope of the quarry wall will be about three vertical to one horizontal.

Where required, the earth mound immediately east of the current quarry will be upgraded and extended south and north as the quarry is developed.

Overburden not required for earth mound construction will be used within the landfill as cover and to achieve the final landform profile. This cover material will be stockpiled adjacent to each void. It is not anticipated that there will be any surplus overburden material.

Clay/shale will be transported by scrapers to the stockpile area near the site entrance. Front end loaders will maintain stockpiles, transport material to the clay crushing and milling building and load trucks exporting material from the site.

2.4.4 Landfill Operation and Establishment

The main features of an engineered landfill are shown on **Figure 2.4**.

Hours of Operation

Landfill operations will continue throughout the year between the hours of 6.00 am and 6.00 pm Monday to Friday, and 6.00 am to 4.00 pm on Saturdays. The depot will not operate on Sundays or public holidays. It will cease to receive waste an hour before closing time to allow for compaction and the application of cover material.

Workforce

Four contractor's personnel will be required for landfill operations. The tasks to be undertaken include site manager, weighbridge operator, loader driver and compactor driver. These personnel will also be responsible for driving the water cart, directing incoming vehicles, site landscaping and maintenance. Employees will be multi-skilled, enabling them to fulfil various roles on the site.

Plant and Equipment

Plant and equipment used on the site will be determined by the contractors. It is anticipated those items shown in **Table 2.2**, or their equivalent will be used.

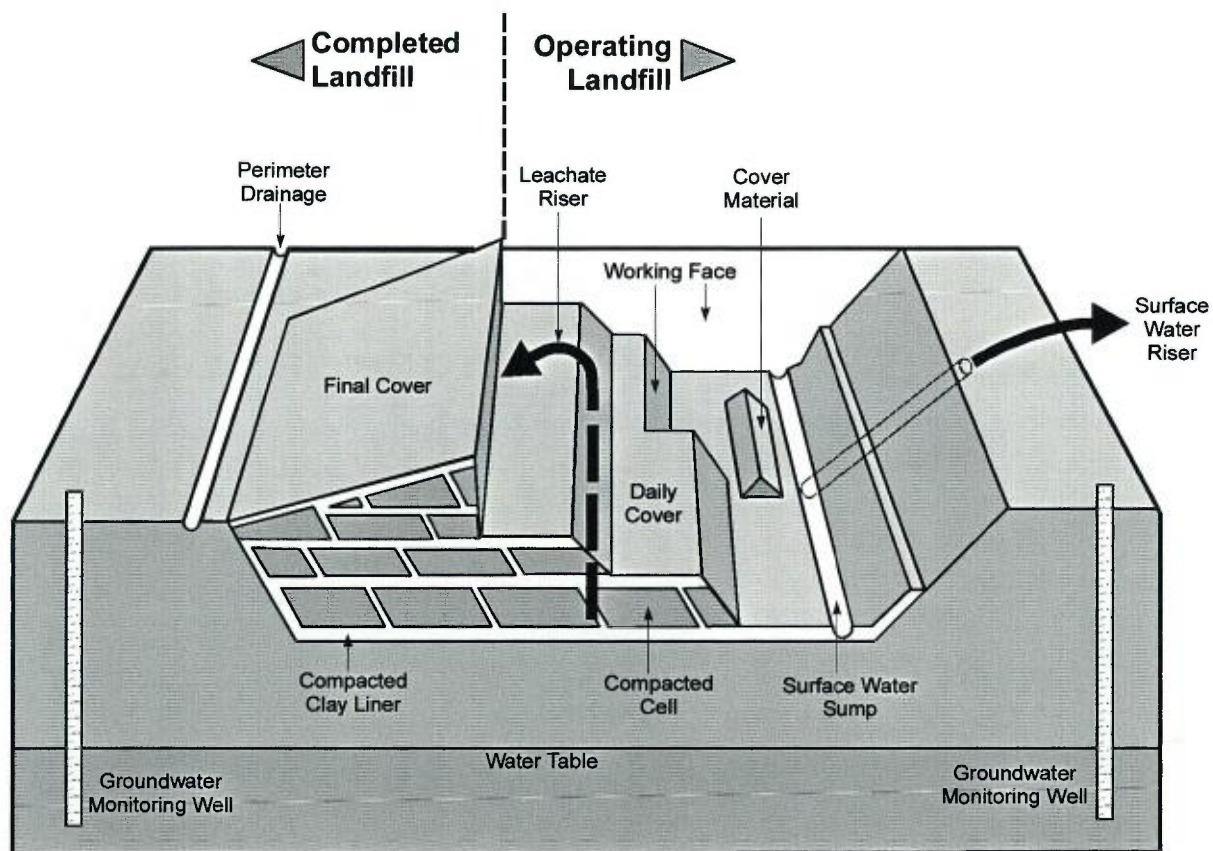
TABLE 2.2 PLANT AND EQUIPMENT

Plant	Number of Items
Quarrying	
Caterpillar D9 bulldozer	1
Caterpillar 631 scrapers	2
12 tonne water truck	1
Landfilling	
Caterpillar 826 Wheeled Loader with steel wheels (compactor)	1
Caterpillar D6 bulldozer or Cat 972 tracked loader	1
truck for moving cover material	1
12 tonne water truck	1

During earth mound construction, two tipping trucks will be used to cart overburden with a bulldozer to form and compact the material.

MAIN FEATURES OF A SOLID WASTE LANDFILL

ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN



Note: This figure is not to scale.
Some features are exaggerated to
ensure clarity.

Mound Construction

Earthen mounds will be constructed around the perimeters of both the northern and southern properties. Around the northern property the mound will be around the eastern and southern boundaries, and around the southern property the mound will extend along the boundary fronting Meadow Road and along the northern and southern boundaries from Meadow Road to the gas pipeline easement. The location of the mounds is shown on **Figure 2.1**. The total length of the mound will be approximately 3,000 metres equally divided between the northern and southern parts of the site. Approximately 60,000 m³ of overburden will be added to the existing northern bund, and some 265,000 m³ will be used to construct the new bunds around the southern property. Details of the mound landscaping are illustrated in **Figure 2.5**.

The mounds will be approximately six to eight metres high, with side slopes, three horizontal to one vertical (18 degrees) giving a total width of approximately 40 metres. Provision will be made for a three metre wide maintenance road along the top of the mound. Topsoil will be spread over the top and sides of the mound and it will be revegetated as described in **Section 2.4**.

Work on the construction of the bunds on the southern property will commence adjacent to the gas pipeline. A bulldozer will be used to clear a 30 metre wide strip in increments of about 100 metres at intervals of three to four days. Cleared vegetation will be spread over completed sections of the mound to aid revegetation. Topsoil will also be transferred to completed sections of the mound.

Material will be dumped and spread in 200 mm layers. Drainage and sediment controls will be used to control erosion from the site as discussed in **Section 2.4.5**.

Landfill Operations

Landfill operations will be carried out in accordance with the conditions of the licence specified by the EPA. Landfilling will progress according to a staged sequence and cease when final contours are reached.

Base Preparation

Prior to receiving waste, a layer of recompacted clay at least 900 mm thick will be placed over the quarry base and graded to sumps. It will then be carried approximately two metres up the walls of the quarry void to provide an effective seal to the base of the landfill.

A clay sample from the site was subjected to permeability testing at a NATA registered laboratory to evaluate its suitability for use as the liner for the landfill cells. The results indicated an average value over three tests of 6.1×10^{-10} metres per second. These are similar to values obtained from material of similar origin at other sites in the area. After reworking and compaction, this material is expected to be suitable for use as a base liner, significantly exceeding the EPA criterion of 1×10^{-9} metres per second.

Waste Receival

The landfill operator will record waste receivals and ensure that only accepted wastes (as described in the licence) are placed into landfill. Careful attention will also be given to placement and covering of waste to use the space efficiently and to minimise potential environmental impacts.

Vehicles transporting waste to the site will proceed to the office/weighbridge where details will be recorded, including vehicle type and registration number together with the nature and volume/weight of the waste. Any vehicles observed to be containing waste of a type which is not accepted at the site will be turned away at the weighbridge.

Vehicles will then follow signs to the quarry floor where the tipping supervisor will direct vehicle movements and waste tipping in the quarry. Once discharged the supervisor will visually inspect the load prior to any compaction and covering of the waste. Any waste considered potentially unacceptable will be isolated for further checking and/or removal from the site.

Waste Placement and Compaction

Each day a working area will be defined and waste placed into cells measuring approximately 40 metres by 20 metres. This will allow sufficient space for incoming waste while limiting the area of landfill exposed to the weather. Waste will be deposited and compacted in 600 mm layers. Layers will continue to be compacted to a height of about 2.8 metres, depending on the rate of incoming waste.

The surface will be covered daily with overburden material to a compacted thickness of approximately 200 mm, forming a total thickness or "lift" of up to three metres. Suitable cover material will be continually placed and compacted so that at the end of each day there is no exposed waste.

Cover material forming the surface of each lift will be graded to facilitate surface water runoff to the low point of the quarry.

The quarry floor will be gradually raised in steps to facilitate drainage and maintain manageable gradients for tipping vehicles. Progressive filling of the site will continue until final contours are reached. A final 900 mm capping layer of compacted low permeability cover material will be placed over the fill prior to landscaping.

Cover (overburden) Material

Overburden from quarrying will be used as a source of cover for waste disposal. This will make up between 10 and 15% of the total landfill volume.

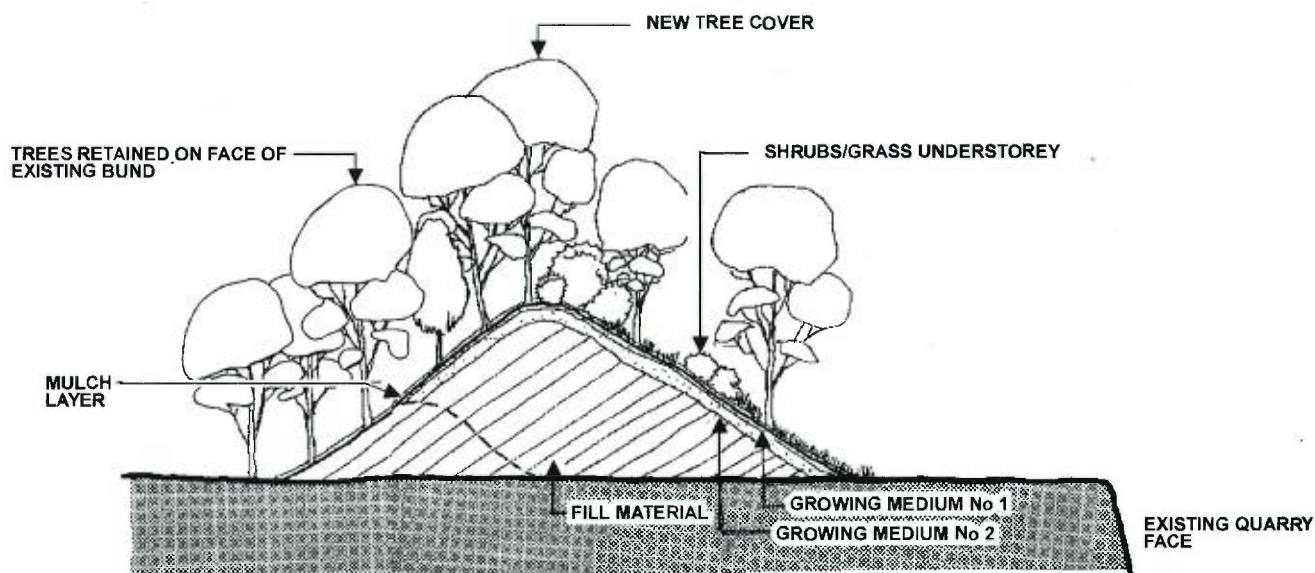
During quarrying (about three months of the year) a percentage of the overburden will be retained in the quarry as cover for the incoming waste. About 10,000 m³ will be stockpiled adjacent to the pit and used as cover material during the remainder of the year.

LANDSCAPED MOUNDS

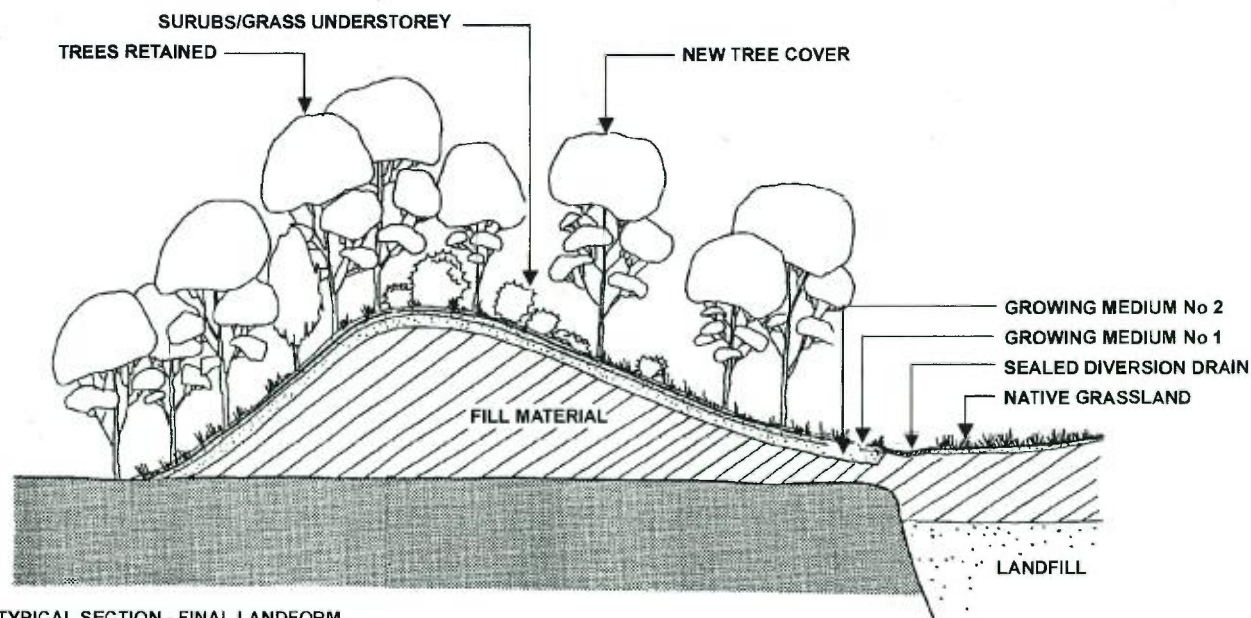
ENVIRONMENTAL IMPACT STATEMENT PGH SITE SCHOFIELDS BLACKTOWN



TYPICAL SECTION - EXISTING BUND



TYPICAL SECTION - PROPOSED BUND DEVELOPMENT



TYPICAL SECTION - FINAL LANDFORM

Overburden will be stockpiled between the quarry and landfill workings. Following cessation of quarrying and during the final stages of landfilling (on the northern and southern areas), overburden will be stockpiled on a completed section of landfill, in sufficient quantity for completion of landfilling and site capping.

Final Landform

The final landform will be in the form of a slightly mounded surface approximating to the original ground profile as shown on **Figure 2.1e**. Allowance for settlement, estimated to be about 15% of the depth of waste, will be made while still providing for surface water to be shed without ponding. Generally surface gradients will be about one vertical to 20 horizontal (5%) to promote free surface drainage and minimise the potential for erosion. These areas will be stabilised and landscaped as discussed in **Section 2.5**.

No excavation or landfilling will take place within or to the north of, the electricity transmission easement which crosses the northern part of the site.

2.4.5 Site Management

Traffic Generation

At present, clay/shale material is transferred to and from the site in 26 tonne trucks. The volume of material transferred and the number of truck movements will increase as a result of the proposal.

For calculation purposes it has been assumed that a combination of truck types ranging from semi-trailers to small vehicles would deliver waste. The proportions of waste vehicles of ranging types has been based on experience from similar landfills in western Sydney. A small number of additional vehicles will be generated by employees associated with landfill operations.

Whilst it has been assumed that the number of waste vehicles would be evenly distributed throughout the year, the number of quarry vehicles will be related to the 'campaign' periods of extraction (approximately 3 months per year).

Based on the above assumptions the number of vehicles generated by the proposal is estimated in **Table 2.3** (and assessed in more detail later in **Section 5.2**).

TABLE 2.3 AVERAGE DAILY VEHICLE TRIPS GENERATED BY PROPOSAL

Reason	Quarry Vehicles	Landfill Vehicles	Total Vehicles
Export of clay/shale	26 ⁽¹⁾	-	26
Receipt of waste fill	-	86	86
Staff ⁽²⁾	8 ⁽¹⁾	8	16
Total	34	94	128

Note 1: These activities take place over a period not exceeding 3 months per year.

Note 2: Quarry staff use the existing staff car park near the manufacturing plant and access the site via the main western site entrance.

Water Management

Management of water on site will be in accordance with the following principles:

- preventing deterioration of water quality in surface waterways and groundwater external to the site;
- ensuring that water is available for operational requirements;
- using the poorest quality of available water, acceptable for each particular task; and
- ensuring compatibility between quarry and landfill operations, and existing management controls.

The water management plan will specifically address:

- provision of adequate water supply for operational and domestic uses;
- potentially turbid runoff from disturbed areas;
- leachate generation, groundwater inflow and runoff from uncovered waste;
- sewage treatment and effluent disposal; and
- workshop wastes.

Water Usage and Available Supply

Water will be required for staff amenities, dust suppression and irrigation of areas undergoing revegetation.

Proposed operations will not greatly affect the level of site activity or the number of employees already working on the site. The site is currently serviced by a reticulated water supply and this will adequately cater for the small number of additional staff generated by the proposal.

Dust suppression will be required during dry weather on the unsealed access road and active quarry and landfill work areas. Dust suppression requirements may marginally increase as a result of simultaneous quarrying and landfill operations. However, similar operations in the past have been adequately controlled by storing and using water from stormwater runoff. When necessary this is supplemented by the reticulated water supply. Based on a water application rate on active areas of 1.5 times the average evaporation rate (1.2 metres per year), the maximum water demand (based on the maximum length of haul road) is estimated to be approximately six megalitres per year.

Landscaping and quarry rehabilitation areas will require some watering. However the proposal incorporates the use of local native plant species which are adapted to local climatic conditions. Watering will therefore be restricted to the first few months of plant or grass growth. It is anticipated that watering will be required at a rate of 300 mm per year over an area of about one hectare. This is equivalent to a demand of about three megalitres per year.

The total annual requirement for non-potable water will therefore be approximately nine megalitres.

Water collected in the current quarry is also used to supplement brick manufacturing water requirements. This practice will continue when sufficient water is available.

The majority of the site drains to the existing quarry. Water is then pumped to a seven megalitre dam located on the surface. A smaller three megalitre dam collects runoff from the stockpile area. As described above, this water, supplemented where necessary by the town water supply is available for non-potable uses.

A water balance was calculated to determine the availability of water to meet demands under average and dry climatic conditions, and during highest operational demands. Rainfall data from the Prospect Dam meteorological station was used to determine average and dry years which are respectively defined as the average (884 mm) and driest 10 per cent (547 mm) of annual rainfalls.

Previous years reflecting these rainfalls were selected and water balances calculated to simulate the monthly variability of non-potable water demands and storage characteristics under dry, average and wet conditions. The water storage was assumed to be half full at the beginning of the year (for calculation purposes). It was assumed that half the available runoff would be available to replenish dam storages. It was also assumed that collected runoff would be available for dust suppression and plant watering purposes as a priority use. Any surplus could then be used to supplement brick manufacturing requirements. Modelling results are presented in **Tables 2.4 and 2.5**.

TABLE 2.4 WATER BALANCE RESULTS - AVERAGE YEAR (MEGALITRES)

Month	Supply	Demand	Storage (max. 10 megalitres)	Surplus
			5.0	
January	1.8	1.2	10.0	-
February	6.6	1.0	10.0	1.2
March	7.0	0.9	10.0	6.1
April	4.9	0.5	10.0	4.4
May	0.5	0.5	10.0	-
June	11.4	0.6	3.0	10.8
July	8.5	0.6	3.0	7.9
August	9.1	0.7	2.6	8.4
September	2.3	0.7	3.0	1.6
October	5.4	0.9	3.0	4.5
November	0.5	1.0	3.0	-
December	1.0	1.1	2.0	-

Source: Woodward Clyde (1997)

TABLE 2.5 WATER BALANCE RESULTS - DRY YEAR (MEGALITRES)

Month	Supply	Demand	Storage (max. 10 megalitres)	Surplus
			5.0	
January	4.6	1.0	8.6	-
February	1.8	1.0	9.4	-
March	10.7	0.8	10.0	9.3
April	0.4	0.7	9.7	-
May	0.2	0.7	9.2	-
June	2.0	0.6	10.0	0.6
July	1.4	0.6	9.5	-
August	0.8	0.7	9.6	-
September	9.1	0.7	10.0	8.0
October	2.8	0.9	10.0	1.9
November	0.7	1.1	9.6	-
December	1.3	1.1	9.8	-

Source: Woodward Clyde (1997)

Non-potable water demands could be adequately met from dam storage (during both an average and unusually dry year). Based on this model a sufficient quantity of water could be sourced from dam storages to meet non-potable water demands during most climatic conditions. Should a deficit occur, water could be sourced from the reticulated supply.

Water Quality

The site drains to Eastern Creek and Bells Creek which join immediately to the south of Garfield Road, Riverstone. Eastern Creek flows northward from here to South Creek and then ultimately the Hawkesbury River. These waterways are not classified under the *Clean Waters Act* and therefore no specific water quality criteria apply for industry discharges. It is expected that water quality guidelines published by the EPA (SPCC, 1990) and the Australian and New Zealand Environment and Conservation Council (ANZECC, 1992) will form the basis for new water quality standards. Guidelines are based on protection categories which define beneficial uses of a waterway and appropriate water quality standards.

Water from Eastern Creek is occasionally used for irrigation. This usage and protection of aquatic ecosystems further downstream have been considered in proposing water quality criteria for these beneficial uses, as shown in **Table 2.6**.

TABLE 2.6 PROPOSED WATER QUALITY CRITERIA

Parameter	Proposed Limits	
	Irrigation	Protection of Aquatic Ecosystems
pH	4.5 - 9.0	6.0 - 9.0
Salinity (mg/L)	<500	not more than 10% of background.
Suspended solids (mg/L)	no limit	10 + 6 N (Where N = background = <25)
Dissolved oxygen (mg/L)	no limit	>6
Turbidity	no limit	Does not decrease photosynthetic activity by more than 50%

Assuming a background suspended solids concentration of about 10 milligrams per litre, the maximum discharge limit would be about 70 milligrams of suspended solids per litre. The EPA generally applies a suspended solids limit of between 30 and 50 milligrams per litre for most industry discharges. A comprehensive surface water management scheme will be implemented as part of the project. This will be developed in stages as the project progresses. Details of this system are set out in **Section 5.7**. It is anticipated that this will achieve the above criteria and a suspended solids limit of 50 milligrams per litre.

The groundwater has a high natural salinity. However any groundwater entering the pit would be significantly diluted by stormwater runoff. Water derived from the cells prior to landfilling will generally be used for non-potable uses or to supplement brick manufacturing water requirements. Overflows from the surface storage dam will be monitored to ensure that salinity is within an acceptable range.

Surface Water Management

A water management plan is currently in place for existing operations. This includes provision of sediment ponds, diversion drains and other measures designed to minimise the impacts of operations on natural waterways. These measures will also apply to proposed operations and, when required, will be modified to reflect changes in topography, areas of disturbance and progression of rehabilitation. A description of the existing drainage and water management system is given in **Section 5.7**.

There are a number of problems with the existing drainage system which requires upgrading. In particular, the capacity of a reinforced pipe culvert under Meadow Road has become substantially reduced due to siltation and this causes local flooding during periods of heavy rainfall.

The revised and extended drainage system has been designed on the basis of the following:

- on-site drainage will be fully controlled with adequately designed sedimentation ponds on both sides of Meadow Road provided as part of the redevelopment works;
- limiting the number of discharge points from the site to one from the southern section will improve water management;

- pipeline the flow wherever possible will reduce the ingress of sediment from external sources;
- the existing outlet structure in the existing dam on the northern art of the site requires desilting;
- new drainage pits will be precast wherever possible;
- all council requirements for engineering design and material specifications will be met; and
- the performance of the existing road culvert will need to be improved by desilting to minimise the possibility of local flooding.

A total of four dams will be required for the ultimate development of the whole site. Dam 3 is located to the north of the power line easement and would discharge indirectly to Bells Creek. This is not part of the proposal included in this EIS, although it will need to be increased in capacity.

Surface dams will have sufficient volume to accommodate at least a once in 10 year, six hour duration storm (Department of Conservation and Land Management, 1992) without interfering with site operations. This is equivalent to about 200 cubic metres per hectare of disturbed catchment.

Completed landfill areas and earth mounds undergoing revegetation will drain to temporary sediment ponds and silt fences which will remain in position until these areas are sufficiently stabilised. Storage capacity of ponds will also be based on Department of Conservation and Land Management Guidelines (200 cubic metres per hectare of disturbed catchment). Sediment ponds will have filtered outlets and water will drain directly to Eastern Creek.

Leachate Management

The overall strategy for the management of leachate can be summarised as follows:

- ensuring that minimal leachate pollution of adjacent ground and surface water resources takes place;
- identifying potential leachate generation;
- minimising the generation of leachate; and
- collecting leachate and treating on site.

The potential sources of leachate are as follows:

- water already contained in the waste during placement and created during any decomposition;
- groundwater infiltration through the sides and base of the landfill;

- stormwater runoff from adjacent areas percolating into the waste;
- precipitation falling directly onto the site during landfilling operations; and
- precipitation falling directly onto the site and percolating into the waste after landfilling is complete.

Table 2.7 indicates potential leachate sources and means of minimising its production.

TABLE 2.7 POTENTIAL LEACHATE SOURCES

Potential Source	Typical Value	Means of Minimising Production
Water in waste	25-35% by volume	None
Groundwater	Site dependent	Lining and separation
Direct infiltration	100% of incident rainfall	Increasing cover and slope to drain
Stormwater infiltration on daily cover	Site dependent	Diversion of stormwater
Direct infiltration of final cover	30% of incident rainfall	Capping and vegetating

Source: Woodward Clyde.

The majority of waste will be delivered, compacted and covered during dry weather. Waste has the capacity to absorb water and will continue to do so until its retention capacity is exceeded. Moisture will seep from the landfill at varying rates depending on a number of factors such as rainfall, evaporation, infiltration, groundwater inflow, surface runoff, soil characteristics and depth, temperature and make up of the fill.

The onset of regular leachate production can be delayed for several years depending on circumstances of the landfill. A tightly compacted clay cover material can slow the ingress of moisture to the landfill. In a confined quarry site, the continual placement of dry waste over the top of previously buried waste will further delay the ingress of water to the lower layers of the landfill.

Higher leachate production may be expected during placement because:

- daily cover layers are only about 200 mm thick, hence allowing greater infiltration; and
- leachate volumes will also include operational leachate, which is runoff collected from exposed waste each time it rains.

Maximum leachate production is expected to be less than one cubic metre per month during landfill operations. This is based on leachate generation rates in the adjoining completed landfill. Groundwater inflow is estimated in to be less than one cubic metre per day. Following completion, a clay covering layer 900 mm thick will be placed and compacted to significantly reduce the quantity of rain water entering the landfill.

The base of the landfill will be lined with a 900 mm thick layer of recompacted clay to ensure that leachate is contained on site. This material has a very low hydraulic permeability (not less than $K = 1 \times 10^{-9}$ m/sec) and will be constructed according to

AS2990 by excavation contractors. The clay liner will be continued up the side slopes of the landfill cells to assist in leachate containment. The extent of the clay liner required for each landfill cell will be determined after the detailed design is complete.

The clay liner which would be founded on a sandstone base would be graded to a central low point to act as a leachate collection sump. A number of drainage trenches will be constructed over the liner at the base of the landfill cell. These would have an average thickness of 300 mm and would consist of a drainage filter medium with a minimum permeability of 1×10^{-3} metres per second.

The permanent sump will be constructed in the clay liner on the floor of the landfill. A permanent riser will be provided from the sump to the surface. The length of the riser will be adjusted as the depth of landfill increases.

A temporary sump will also be provided to collect surface water runoff from the active landfill surface. A drainage system will direct any runoff or leachate into the temporary sump. A temporary riser will be provided from the temporary sump to the surface. After each ten metre lift of the landfill has been completed, the temporary sump will be relocated to that higher level for easier management of the filling and leachate control. The decommissioned sump will be sealed with compacted clay prior to overtopping with waste material.

Downward movement of leachate to the collection sump will be facilitated by occasionally breaching of the cover material layer prior to placement of subsequent layers of waste. Collected leachate will be pumped from the permanent and temporary sumps to dry wells located in the surface of the landfill. Here it will either be allowed to evaporate, be used for dust suppression if its quality is acceptable or recirculated over the landfill. No leachate will be discharged from the site.

It is inherent in the design of the landfill that no leachate can be released to the exterior until saturation levels in the landfill equal those of the external groundwater. Collection and removal of the leachate during the operational phase will ensure that this cannot occur. The management programme would therefore only incorporate specific monitoring of the leachate during the post closure period or in the event that it proves necessary to discharge leachate from the site (surface and groundwater monitoring would however be undertaken throughout). It is not expected that leachate will contain excessive pollutant concentrations due to the nature of waste accepted at the landfill.

Where stormwater comes into contact with uncovered waste it will be collected in a bunded area below the tipping face to evaporate or be pumped to a leachate collection sump.

Sewage Treatment and Disposal

The proposal will necessitate provision of toilet and wash facilities for landfill employees. All wastewater generated by these facilities will be collected in a storage tank and regularly collected by a licensed sullage contractor.

Employees working in the quarry currently use amenities located near the brick manufacturing plant. Wastewater is treated in a licensed aerobic treatment system and effluent is spray irrigated over landscaped areas. This system will not require modification as a result of the proposal.

Workshop Runoff

The proposal will require a small workshop to be located near the office/weighbridge for minor equipment maintenance associated with landfill operations. All runoff arising from within the workshop will drain to a trade waste sump which will be regularly emptied by a licensed waste contractor.

Site Stabilisation and Landscaping

Earth mounds around the boundary of the site will be quickly stabilised and landscaped following construction. Landfill areas will be progressively rehabilitated as final contours are reached. The final surface will be capped with a clay layer approximately 900 mm thick followed by a drainage layer made up of gravel 300 mm thick and covered with a 1000 mm layer of topsoil prior to revegetation. These cover material requirements are set out in Environmental Guidelines: Solid Waste Landfills (EPA 1996). Contour drains will be incorporated in the final landform to minimise soil erosion.

The site is currently deficient in topsoil. It is therefore proposed to import topsoil/compost to assist in conditioning the surface layers of soil prior to seeding and planting. This will be mixed with topsoil, if available.

A landscaping plan will be developed in consultation with Blacktown City Council and the Department of Land and Water Conservation. A fast growing annual grass species such as Japanese millet will be sown to provide initial stabilisation. In the longer term rehabilitation will include the use of grass species such as *Phalaris serosa*, Hypha, White Clove, Couch or Wimmera Rye Grass. Native trees and scrubs will be planted on the earth mounds (to improve visual amenity from surrounding areas).

Once the landfill is completed the perimeter earth mound will be recontoured to conform with the final landform, subject to consideration of the value of vegetation then growing in these areas. The following are recommended plant species:

Trees	<i>Eucalyptus moluccana</i>	Grey Box
	<i>Eucalyptus teretecornis</i>	Forest Red Gum
	<i>Eucalyptus fibrosa</i>	Broad-leaved Ironbark
	<i>Eucalyptus longifolia</i>	Woollybutt
	<i>Eucalyptus eugeniodes</i>	Thin-leaved Stringybark
Shrubs	<i>Acacia suaveolens</i>	Sweet-scented Wattle
	<i>Acacia parramattensis</i>	Parramatta Green Wattle
	<i>Allocasuarina littoralis</i>	Black Sheoak
	<i>Bursaria spinosa</i>	Blackthorn
	<i>Grevillea juniperina</i>	Prickly Grevillea
	<i>Melaleuca decora</i>	Feather Honeymyrtle
	<i>Melaleuca nodosa</i>	Ball Honeymyrtle
Native Grass	<i>Danthonia species</i>	Wallaby Grass
	<i>Themeda australis</i>	Kangaroo Grass

Additional earth forming is proposed to recontour the steep earth bunds. This will generally occur within the perimeter, taking into account site drainage requirements. The development of the earth bunds from existing to the final form is proposed as a two stage process which protects vegetation viewed from outside the site and ensures maximum preservation of existing trees and improved visual amenity.

2.4.6 Other Management Measures

Day to day site operations would include a number of measures aimed at ensuring that the landfill is operated to the highest standards. These include:

- litter control;
- dust suppression;
- pest control;
- landfill gas control;
- odour suppression;
- bird control; and
- fire fighting procedures.

A wide range of measures relating to good site practice are included as part of the operating procedures at the site. These can be considered to include both mitigation measures to address potential impacts and monitoring programmes to identify a potential non-conformance with operating standards.

These measures are therefore described as part of the project which is the subject of this EIS and listed under the description of the specific impact where appropriate.

Many of these issues can be managed via the normal landfill operating procedures especially by ensuring that a high level of compaction of the waste is achieved and the daily cover is routinely applied.

Litter Control

There are a number of measures that will be taken to control litter at the site. The following will be implemented as appropriate:

- movable litter screens or fences would be installed downwind of the active face and litter collected from there on a regular basis;
- planting of vegetation screens as part of the rehabilitation programme as parts of the landfill reach completed levels;
- restriction of the working face to the minimum practical. Barriers and screens would be used to direct traffic. Those would also serve to trap/control litter; and
- collection of stray litter which might blow around the site by pickers who will regularly patrol the landfill workplace area and site boundaries to recover such matter if required.

In addition to these measures, a community education programme will be developed and implemented to advise users of the landfill adequately to cover and secure loads, as well as ensuring that all waste, especially lightweight plastic and paper has been removed from the vehicle prior to leaving the site.

Dust Suppression

Grassing of interim finished areas and the immediate rehabilitation of areas on reaching the final landform profile will assist in suppressing dust from large areas of the site. Exposed areas will be watered by tanker as necessary to suppress dust. A water tanker will be kept on site, particularly during summer and dry weather periods.

Pest Control

The absence of food waste in the material accepted at the site will assist in ensuring that the landfill is not attractive to many pests. However, some organic material which is received at the site will inevitably be attractive to some pests.

Normal site operating procedures including compaction and the application of daily cover should result in keeping insects and vermin at acceptable levels as outlined in the control programme in the draft Landfill Environmental Management Plan (DLEMP). However, should this not be achieved, consideration will be given to the use of pesticides.

Minor pest problems will be dealt with by site personnel. Care will be exercised in the use of pesticides and the operators will be informed of the nature of the materials they are handling, instructed in their use and would be provided with appropriate equipment and protective clothing. Should a vermin problem arise at the site, it will be eliminated by the use of a specialist firm of exterminators.

Landfill Gas Control

Gases and natural decomposition occur in landfills as a result of the microbial degradation of organic wastes. Carbon dioxide and methane are the two major types of gases produced, both of which are odourless and colourless. Odorous gases such as hydrogen sulphide and a large number of other organic and inorganic gases are also produced in much smaller amounts, usually from the decay of putrescible wastes.

The rate of gas production is dependent on factors such as moisture content, temperature and the degree of waste compaction. At landfills where waste food and other rapidly degradable material is absent, gas production is generally limited to that resulting from the decay of vegetation. Site procedures, including the operation of the leachate control system and the application of daily cover will, in conjunction with high levels of compaction, result in the maintenance of low moisture levels in the landfill. This will significantly retard gas production.

Any gas produced in the landfill will either concentrate in the leachate collection sump or percolate upwards through the landfill. Generation of landfill gas will be monitored during the active filling period and beyond. If excessive concentrations occur, a gas extraction system will be installed. This may involve drilling of temporary gas wells which would be connected to a suction and pumping system. The gas removed from the landfill would be flared. A permanent gas collection system would be installed in the completed landfill if required. This is unlikely for a landfill of the type proposed, due to it containing non-putrescible waste.

Odour Suppression

There are two principal methods of minimising the generation of landfill odours. These are:

- good waste compaction and cover with suitable gradients to minimise water ingress; and
- immediate deposition of any potentially odorous waste on delivery.

As material which is likely to break down rapidly and produce odour will not be accepted at the landfill, this is not expected to present a problem. However, if complaints are received it may be necessary to take further action. This might include the introduction of improved drainage to minimise the occurrence of standing water and the use of deodorisers.

Bird Control

Birds, in particular gulls and crows are often attracted to landfills in search of food sources. Birds are undesirable since they may transfer pathogens to nearby reservoirs or crops as well as depositing excreta and food scraps over surrounding areas. It is very unlikely that birds will be attracted to the landfill due to the lack of food waste and the management measures in place which will discourage such foraging activities. The strict application of daily management procedures will prevent any build-up of bird populations at the site. This will be achieved by using the following measures:

- covering waste regularly at the tipping face;
- operating as small a tipping face as possible; and
- proper compaction of the waste.

Fire Fighting Procedures

Annual advice will be sought from the local Fire Brigade zone office. This is likely to include the following:

- open burning of waste is not permitted;
- a water tanker will be kept on site filled with water so that it is available to extinguish minor fires;
- a stockpile of soil will be maintained on site for use in fire fighting;
- in the event of a fire, the local Fire Station should be contacted for assistance;
- leachate and stormwater can be used to extinguish fires; and
- all machinery on site would be fitted with an appropriate extinguisher for diesel fuel fires. In addition, portable extinguishers will be fitted to allow any minor fires which might accidentally start around the working face to be dealt with.

The possible impacts of bushfires and the likely effects of the proposal on air emissions are discussed in **Sections 5.1 and 5.11** respectively.

2.4.7 Monitoring Programme

The monitoring programme is an integral part of the overall management of site operations. It consists of four components as follow:

- pre-landfilling monitoring programme;
- monitoring and control during operation;
- post closure monitoring; and
- contingency plans in the event that monitoring indicates unsatisfactory conditions.

The site currently operates within a management system which is aimed at achieving the requirements of the EPA licence.

Pre-Landfilling Monitoring Programme

Groundwater

Monitoring bores have already been established at locations around the completed landfill and an initial programme of testing undertaken. The initial testing programme is discussed in **Appendix G**. The analysis of these data provides background water quality information which will be used to provide the basis for the second stage monitoring continued throughout the operational phases of landfilling.

A groundwater investigation of the site was conducted by Woodward-Clyde in November 1996 to assess the nature and quality of the groundwater. Four boreholes were drilled at various locations around the site supplementing six earlier shallow bores constructed by Coffey and Partners. The four new bores were installed for permanent groundwater monitoring with depths set at approximately four metres below the expected final depth of the proposed landfill.

Existing landfill management and performance

One of the boreholes established in 1996 is located close to the southern edge of the completed landfill on the northern part of the site. The objectives of the investigation programme were to evaluate groundwater conditions and collect samples that may have come into contact with leachate from the completed landfill.

The investigation concluded, among other things, that based on current results, there is no obvious contamination of the groundwater due to organic or inorganic compounds.

A pre-landfilling monitoring programme for surface and groundwater will be initiated once appropriate approvals are available. As landfilled activities will not start for at least three years, a significant amount of background information can be accumulated and analysed during this period. This programme would include a quarterly groundwater sampling regime to be implemented to identify variations in its quality and determine current and background conditions prior to the establishment of landfilling operations.

A similar programme would be established for surface water.

Monitoring During Operations

Incoming Waste

The following records of incoming waste will be maintained:

- daily record of incoming vehicles by type:
 - compactor truck (volume);
 - tip truck (volume);
 - one tonne truck utility;
- daily weighing of vehicles by type;
- record of instructions for all waste excluded from the site and directions to alternative approval sites;
- record of all waste from spills, fires or the like, which have been temporarily stored on site, and a record of treatment and disposal action taken; and
- record of the results of route checks on incoming waste and record of action taken where appropriate.

Fire Prevention and Control

A record of fire prevention methods undertaken and action to control fire outbreaks within and adjacent to the operating landfill cell will be maintained.

As Constructed Drawings

An up to date record of as-constructed drawings for all infrastructure (such as roads, drainage, leachate collection and control facilities) on site will be maintained. This will facilitate on-going maintenance of this infrastructure and would include the following:

- monthly visual inspections of the performance of leachate collection and treatment systems. These inspections would focus on the identification of blockages. Performance monitoring will be required by the EPA; and
- assessment of the need to upgrade or decommission the leachate collection and treatment system based on the monitoring data collected.

Groundwater

Sampling of the monitoring bores established during the initial phase will be continued and expanded as the extent of landfilling develops. This will take place on a quarterly basis with a detailed report prepared every 12 months. The analysis will initially cover the full suite of analytical parameters as follows:

- pH, electrical conductivity, redox potential, dissolved oxygen, temperature;
- cations/anions: sodium, calcium, magnesium, potassium, chloride, sulphate, bicarbonate, carbonate, total alkalinity;
- nitrogen as nitrate, nitrite and ammonium;
- total kjeldahl nitrogen;
- total phosphorus;
- fluoride;
- magnesium;
- manganese;
- iron;
- total phenolics;
- chemical oxygen demand (COD);
- total organic carbon (TOC);
- biological oxygen demand (BOD₅);
- suspended solids;
- *E. coli*; and
- metals: cadmium, chromium, copper, lead, zinc, iron, arsenic, mercury, aluminium.

If necessary, a surface water sample could be collected from Bells Creek for analysis for the sample range of parameters. These would be compared with those for the groundwater to detect any inconsistencies.

Landfill Gas

Landfill gas (LFG) monitoring consists of measuring the percentage of Lower Explosive Limit (LEL) and the gas composition. A trigger level of 25% LEL in any monitoring bore

off-site will cause a review to take place for consideration of the installation of a gas collection system.

Monitoring will commence prior to and during the filling stages to build up a picture of any potential leakage paths. This initial programme will be undertaken on a weekly basis gradually extending in time as knowledge of the site increases. Monitoring will be carried out to ensure that gas concentrations remain below specified limits.

LFG monitoring will be carried out during the landfilling operation and for an agreed period following cessation. At the end of this period any hazards resulting from gas concentrations will be assessed to determine whether further monitoring is necessary.

Odour

It is unlikely that odour will be a problem due to the nature of the waste to be accepted at the site. However, any odour complaints will be recorded and action taken to investigate and control the source. Normal site operating procedures as described in **Section 2.4.4** will minimise the possibility of any odour occurrence and resulting nuisance to adjoining owners.

Litter

A monitoring programme will be undertaken to assess the effectiveness of litter control measures, record improvements and identify the need for any modification of the controls included in the site procedures. This will be undertaken by regular visual inspection by the site manager.

Modifications to the control programme could include the following:

- more frequent collections, concentrated in certain sections;
- modifications to portable litter control fences; and
- restrictions on certain types of litter and/or requirements on the acceptable methods of disposal of certain items such as loose plastic bags.

Dust

Dust from the site will continue to be monitored by the existing dust deposition gauges which were previously installed in accordance with AS2471.1, 1984. These gauges are equally spaced around the boundary of the site. The results will be compared with relevant EPA criteria. The need for dust mitigation measures and additional monitoring will be evaluated on an annual basis.

Complaints relating to dust by users of the site and neighbours will be recorded and the action taken noted. Weekly inspections will be used to note potential dust problems and any modifications necessary to water tanker spraying, irrigation and establishment of grassed areas on interim cover.

Flies and Vermin

Monitoring of the occurrence of flies and vermin will result from counts, regular inspections and complaints received from users and neighbours. If levels of flies and

vermin reach unacceptable levels, remedial action, as described in **Section 2.4.8** will be undertaken.

Control of Birds

Birds are perceived as creating a problem at landfill sites. While it is possible that the proposal would attract birds to this area, their number will be few due to site management practices. Primary control practices include the following:

- covering waste regularly and promptly;
- restricting the active face to as small an area as possible; and
- undertaking compaction of the waste.

Other measures are available and will be implemented should birds cause problems at the site.

2.4.8 Contingency Plans

The environmental monitoring system is designed to alert site management to the possibility that a non-conformance with operating standards may occur. Contingency plans will be prepared as an integral part of overall site management procedures to ensure that all potential environmental effects remain within acceptable levels. This section describes measures which would be effective in ensuring that various operating standards are maintained. However, specific measures will need to be designed in response to the situation identified from the monitoring results prior to any implementation.

Fires

On site fire protection will consist of earth stockpiles near the working face, fire breaks and water retention (sediment control) basins. Daily cell construction, which utilises compacted cover spread over the work face acts as an effective firewall.

If a fire was to develop in the landfill, the first action will be to apply an additional thickness of heavily compacted cover. This is usually sufficient to prevent oxygen from reaching the affected area and the fire would normally burn out. If this did not prove sufficient the affected area would be dug out systematically and the exhumed material thoroughly wetted until the fire is extinguished. After the fire is put out, the waste cells will be rebuilt.

In the event of a fire in equipment storage or other areas, this will be handled by appropriate fire extinguishers which will be available at all times. These will be checked periodically. Site personnel will be regularly instructed in the most efficient fire fighting procedures including the use of breathing equipment.

Incoming Waste Controls

If routine inspection of the waste identifies the presence of any material that contravenes the licence conditions, attempts will be made to determine its source. Appropriate action (information, warnings or prosecution) will be taken in such cases.

If the annual survey of waste characteristics identifies significant quantities of valuable recyclable material, measures to encourage particular waste stream recycling will be considered.

Groundwater

If a chemical quality concentration parameter exceeds an established upper limit, further investigation will be initiated. These limits will be established for selected indicators based on the baseline groundwater monitoring. They may be modified periodically as more data becomes available.

If there is an exceedance the following procedure will be implemented.

- a report is prepared for the Site Manager;
- appropriate individuals are notified;
- an information review consisting of the following is undertaken:
 - checking laboratory results
 - comparison with other groundwater well results
 - leachate test results
 - field blank results
 - laboratory logs
 - well condition, sample appearance and weather conditions
 - comparison with earlier well condition
 - information on local spills
 - water depth in comparison to well casing screen depth; and
- the well is inspected:
 - above ground condition
 - surrounding area
 - dedicated well pump and its position according to well information data
 - up gradient of the well for spills
 - condition of the well casing.

If there is no explanation for the exceedance the following steps will be implemented:

- indicator parameters and total anions/cations for the wells in question are resampled;
- leachate is sampled for indicator parameters and total anions/cations; and
- groundwater and leachate chemistry is compared.

If the exceedance is confirmed, the well is resampled for a comprehensive set of parameters. If the results are confirmed, an assessment review will be undertaken. This would include the following:

- assessment of hydrogeological, construction and operational records to determine potential leakage pathway;
- implementation of an additional sampling programme;
- monitoring for a broader range of analytes relating to the characteristics of the leachate; and
- installation of additional monitoring wells.

If the assessment confirms the impact, an appropriate programme of remedial action will be implemented.

Odours

The primary means of controlling odour is through the application of cover material. It is unlikely that odour would be a problem. However, if monitoring indicates unacceptable odours at the site boundary, the following will be considered:

- improvement of the characteristics and depth of cover to provide more effective odour removal;
- mixing of compost with the cover to enhance its absorptive capacity; and
- planting of additional trees along the boundary to cause the odour containing air stream to rise and become diluted with more turbulent air to reduce concentrations beyond the limits of the site.

Stormwater

In addition to the implementation of routine silt removal, weed control and repair of the drainage system, improvements to decrease the stormwater content of on site stormwater would include the following, where appropriate:

- removal of silt from the retention basins;
- enlargement of the basins; and
- provision of rock/sand/geotextile filters in the retention basins.

Flies and Vermin

If monitoring indicates unacceptable levels of flies and vermin, the following measures will be considered:

- increased application of daily cover to provide an improved barrier to vermin and flies;
- more frequent application of cover (2-4 times each day); and

- consultation with specialists prior to the implementation of active control measures.

2.5 SITE REHABILITATION, CLOSURE AND END USE

2.5.1 Introduction

The proposed continuation of quarrying will create a void at the rate of approximately 120,000 m³ per year. It is proposed that the quarry void is rehabilitated by progressive filling with solid waste and quarry overburden. As sections of the quarry are filled, the final landform will be capped and landscaped. The landfill component has been included in the proposal as the most practical and cost-effective means of rehabilitating the site. Alternatives are discussed in **Section 8.5**.

Landfill operations were recently completed on the northern part of the site, adjacent to the proposed development area. Fill for this void was received predominantly from the local area, at a rate of approximately 500 tonnes per day.

Landfilling operations for the proposed development will commence some three years after development consent is issued when the quarry has advanced sufficiently to allow simultaneous quarrying and landfilling. It is anticipated that landfilling will proceed continuously until the site north of Meadow Road is completely quarried and the void filled. Operations will then move progressively to the site to the south.

The gross quarry void will be approximately 3.6 million cubic metres. Approximately 0.36 million cubic metres of quarry overburden will be returned to the void, mostly as cover material. Some 3.24 million cubic metres of the void will be filled with solid waste imported to the site (including 0.18 million cubic metres of solid waste which is suitable for cover purposes (such as soil fill)).

The rate of landfilling will be similar to the rate of void creation: approximately 120,000 m³ per year. This volume is equivalent to about 360 tonnes of waste per day, or about 70% of the receipt rate enjoyed by the previous landfill operation on the site.

A more detailed description of operations is given in **Sections 2.3 and 2.4**.

2.5.2 Closure of the Site

The final landform of the site (see **Figure 2.1e**) will result in a marginally different profile from that existing prior to any activity taking place. The ground profile will be raised in a dome shape in order to accommodate long term settlement (up to 15%) and maintain drainage run-off to the periphery. The perimeter bunds will be reshaped on their inner faces to remove any unnatural appearance and to blend into the recontoured profile resulting from the overtopping. This new profile will be designed to achieve the following:

- encourage maximum runoff from the site thereby reducing the potential for infiltration and the production of leachate; and

- provide an interesting final landform of a natural appearance suitable for an appropriate end-use.

The landform will be finished with a gas drainage layer followed by an impervious cap. The former will consist of a number of trenches, 300 mm thick, constructed across the surface of the waste and terminating at appropriate locations around the perimeter of the landfill. These trenches will be filled with a suitable drainage media which will allow any collected landfill gas to be directed to the selected venting points for passive dispersion or flaring, depending on the volume of gas.

The construction of the impervious cap is designed to achieve the following:

- minimise the infiltration of rainwater;
- contain the waste to minimise the effects of windblown litter, dust and odour;
- assist in the management of surface water; and
- provide a growing medium for the rehabilitation of the site.

The general slope of the final cap is 1 in 20 (5%). This will be at least 900 mm thick constructed of compacted clay with a permeability of at least 1×10^{-9} m/sec. Final covering of the clay cap will comprise a 300 mm drainage layer plus a revegetation layer of a minimum of 100 mm.

2.5.3 Landscape Proposals

Screen planting has already been established along the boundaries of the site. This will be reinforced with fast growing native tree species to provide an appropriate screen, filtering views to the landfill site and improving the overall landscape and visual amenity of the area. The use of native tree species would also increase the wildlife habitat values, particularly due to the close proximity of the site to the Eastern Creek corridor.

On the completion of site consolidation and grading to the final landform, the final cover layer will be completed. This will consist of the compacted clay top layer followed by a 300 mm drainage layer and a vegetative layer with a minimum thickness of 300 mm. Where possible, seeding of the final cover will take place immediately after placement. The final topsoil level will consist of an approved medium with particles no larger than 50 mm in diameter.

All grassing will be carried out using a machine drill working up and down the slopes. Hydromulching is recommended to speed the growing of vegetation on final slopes and provide some soil stability until the vegetation cover develops.

Seeding would be accompanied by a heavy application of superphosphate fertiliser including trace elements. The rate of application will be determined following the testing of the soils on the reconstructed landfill.

Grass planting will be established as an initial cover crop to minimise erosion potential, using the following seed mix:

- Kangaroo Valley Ryegrass 9 kg/ha
- Red Clover 5 kg/ha
- White Clover 3 kg/ha
- Rhodes Grass 5 kg/ha.

Final rehabilitation may also include tree planting to complete the landscape works for the site with special provision to ensure that tree roots do not penetrate the clay capping layer. On-going management will involve supplementary sowing/planting works, maintenance fertiliser applications, slashing and/or controlled grazing. In order to make a positive and significant contribution to the ecological resources of the area it is proposed as far as possible to raise seedlings from seed collected on site.

Once the initial grass cover has been established to reduce the risk of erosion, the long term objective is to re-establish native grasses (including Kangaroo Grass and Wallaby Grass) which formed part of the original Cumberland Plain woodland community. These grasses would have originally occurred on the site and their use would supplement the ecological values of the Eastern Creek open space corridor as well as reducing on-going maintenance requirements.

2.5.4 Future Uses of the Site

The rehabilitated site would provide the opportunity to return the area to its earlier use as a grazing property or alternatively it would provide a significant passive recreation resource if the adjacent population substantially increased due to urban development. Final usage would be determined closer to the completion date of the landfill activities when local requirements were much clearer. However, whatever uses are eventually determined, the rehabilitation and future management of the site will recognise and reinforce its contribution to local habitat values. The final contours of the site resulting from site rehabilitation are illustrated in **Figure 2.1e** and the proposed future use of the site illustrated as a landscape concept plan is shown in **Figure 2.1f**.

2.5.5 Post Closure Site Management

Continuing site management would need to be undertaken following closure of the site for landfilling. This would consist primarily of continuing monitoring of the site and any remedial action should this be required. Routine site management procedures would also include various surveys and inspections.

Annual Topographic Surveys

Topographic surveys of those parts of the landfill provided with final cover would be undertaken to achieve the following:

- confirm the achievement of final landform contours; and
- provide an indication of settlement patterns and the need for remedial filling to maintain run-off patterns.

Stormwater

Monthly visual inspections and inspections during storm events would be undertaken of the cut-off drains and pipes. Particular note should be taken of the following:

- the need for maintenance of any items (silt removal, weed/grass cutting in open drains);
- evidence of capacity exceedance and means to overcome deficiencies if appropriate;
- sediment loads in stormwater discharges from the site and identification of the need to upgrade sediment removal;
- evidence of siltation of stormwater dams decreasing their efficiency to treat stormwater; and
- summary testing of stormwater should be carried out every three months with detailed testing every twelve months.

Leachate

Leachate monitoring will consist of the following:

- volume measurements undertaken on a regular basis. These flow records would be compared to the estimates to check on the adequacy of the treatment/disposal system in place; and
- quality assessments would also be made to determine if on site storage and treatment is required.

2.5.6 Post Closure Monitoring

Following completion of active waste landfilling operations, the site will need to be monitored in compliance with agreements reached with the EPA and Blacktown City Council. Frequency of monitoring will decline as the landfill progresses towards the desired final storage quality.

At this time (indicated by monitoring), monitoring and the operation of environmental controls may cease. Enviroguard will make adequate provision during the operational period expressly for future requirements to ensure that adequate post-closure monitoring is undertaken.

Vegetation

The health of trees and shrubs planted as part of the revegetation programme is a good monitor of the pressure of the landfill gas. Monitoring of the success of plantings will indicate where improvements in landfill gas control may be required.

Settlement

Regular visual inspection (6 monthly intervals) of the completed site will indicate the presence of localised settlement which may pond rainfall. A survey of depressions would be undertaken and recorded together with the date and action taken. Settlement markers are an effective method of monitoring these movements.

Stormwater

Monitoring of the condition of the stormwater management system would continue on an annual basis.

Leachate

The performance of the leachate treatment system will need to be monitored to ensure compliance with the EPA licence conditions.

On-going monitoring of the leachate will also be required in order to detect the onset of final storage quality, at which time the leachate collection system may be decommissioned. The timing will need to be approved by the EPA according to criteria current at the time of decommissioning.

Leachate monitoring would be for flow and characteristics with the frequency of sampling and analysis reduced to the following:

- monthly, analysis to be undertaken quarterly; and
- six monthly, analysis to be undertaken annually.

Groundwater

Groundwater monitoring should continue as described for the operational phase. However, as for leachate monitoring the frequency of testing/analysis may decrease.

Inspection and Maintenance

Table 2.8 sets out a checklist of inspection and maintenance activities to be undertaken during the post-closure period. **Table 2.9** lists the measures to be taken when problems are identified.

2.6 ERSKINE PARK EXAMPLE

CSR is currently involved in a joint venture with Brambles Industries Ltd and in particular its major division, Cleanaway. This has resulted in the creation of Enviroguard Pty Ltd, in which CSR and Brambles each have a 50% stake. Enviroguard was established in 1993 principally to restore old quarry sites using solid waste as landfill. It is overseen by a management committee comprising two directors from CSR and two directors from Brambles. Enviroguard will be contracted by PGH as the operators of the proposed Schofields landfill. Their ongoing involvement in the Erskine Park landfill within Penrith provides a good example of the processes and procedures which will be developed at Schofields.

TABLE 2.8 POST-CLOSURE INSPECTION AND MAINTENANCE

Item	Inspection and Maintenance
Grass Cover	Bare or dead areas Large or deep rooted vegetation
Landfill Cover (Structural)	Erosion, cracks and holes Ponding of water
Primary Leachate Collection Sumps	High leachate level ⁽¹⁾ Riser and sump deterioration Large leachate quantity removed
Run-off and Run-on Berms and Ditches	Erosion, side tracks and holes Ponding of water
Fences	Holes, tears, missing or damaged posts Broken gates or locks
Monitoring Wells	Riser condition Broken or problem locks Testing problems

Note 1: Frequency of inspection will be increased if the leachate level exceeds 300 mm above the rim of the sump during two consecutive monthly inspections. Frequency would normally be weekly during the first year following closure, monthly thereafter.

TABLE 2.9 POST-CLOSURE REPAIRS

Item	Measures to be taken
Loss of Cover Vegetation	Reseed
Holes, Cracks or Opening to the Cover in the Cap	Reconstruct replacing all materials, soil and vegetation. Annotate as constructed drawings as necessary
Ponding of Water	Drain or pump off, fill depression and reseed
Fluid in Leachate Sump	Remove and treat as appropriate
Erosion or Degradation of Berms or Ditches	Repair and reinforce original structures or re-route if required
Fences Damaged	Repair or replace
Gates or Locks Inoperable	Repair or replace
Signs and Warning Unreadable or Missing	Repair or replace
Monitoring Wells Inaccessible	Repair or replace caps and/or locks
Monitoring Wells Bent or Broken	Repair

2.6.1 Background to Erskine Park

The first Enviroguard operation was the establishment of the Erskine Park solid waste landfill within the former CSR Readymix St Mary's quarry, located on the corner of Erskine Park Road and Mamre Road, Erskine Park. The quarry itself was for hard rock providing aggregate and roadbase material. The underlying rock was Jurassic Volcanic Breccia, located within the Bringelly Shale unit of the Sydney basin Wianamatta Group. This was quarried from 1904 for about 90 years until quarrying operations ceased in 1993. Development consent for the landfill and rehabilitation proposal was given by Penrith City Council on 11 November 1992, and commercial operators commenced the landfill operation in April 1994. The site was opened for public use in August 1994.

The quarry is located within a CSR landholding of 168 hectares and the quarry hole itself occupies 15 hectares. This was originally 100 metres deep with a void capacity of approximately 6,000,000 m³. It is expected to be filled at a rate of between 500,000 and 600,000 tonnes per year. Currently 40-50 metres of the hole have been filled and it is estimated that the site has 10-13 years remaining as a landfill operation.

2.6.2 Management Details

The Erskine Park site is one of the first solid waste landfills to be operated under a strict management regime. An approved landfill management plan explains how the landfill is to be managed during its active and post-active phases. The plan details environmental controls for the development as required by various government departments and Penrith City Council. Conditions for the operation of the landfill involve weighbridge and gate supervision, tipping supervision, operation of a transfer station for small vehicles, submission of annual reports to Council and the EPA and stringent monitoring of the site for a variety of factors.

Currently the site accepts non-hazardous waste which is deemed unsuitable for recycling or reprocessing and an EPA licence issued in October 1996 now allows the acceptance of Category 3 Asbestos waste and Low Level Contaminated Soils. A transfer station (an unloading bay away from the active tipping face) allows safe access to the site for small loads of waste from households or small businesses. This is then transferred by Enviroguard vehicles to the actual landfill area. Larger loads are directed firstly to the weighbridge and then escorted to the active tipping face for unloading. Enviroguard minimises the amount of recyclable material which enters the landfill area with provision of a recycling centre on the site. 'Green Waste' in particular is shredded and screened to be sold through a subsidiary of Enviroguard, Envirogreen Pty Ltd.

Site monitoring is an integral part of site management. The EIS which accompanied the 1992 Development Application concluded that the landfill development would have no significant adverse impacts on aspects such as noise, traffic, air quality, aesthetic value, soil erosion, water quality and flora and fauna. Monitoring of these factors is an ongoing condition of the development. In particular, parameters which are monitored include noise, dust generation, water quality, litter, progress of rehabilitation and leachate and gas generation. Groundwater monitoring ensures that leachate and runoff are satisfactorily managed on-site. The annual report to Penrith City Council and the EPA

ensures that the monitoring procedures, site integrity and management practices are sound.

2.6.3 Community Involvement

One of the major objectives of the Erskine Park development proposal was to rehabilitate the quarry to a form which is compatible with surrounding employment and residential areas. Thus it is necessary that the landfill operation and the final land use remain acceptable to the community. Enviroguard has sought to achieve this through ongoing interaction with the local community.

Interaction between the community and Enviroguard has occurred in several ways. Annual Open Days at the landfill site form a development condition which is beneficial in maintaining active links with the community. In 1996, over 1,500 people attended the Open Day, which demonstrated to the community how the landfill site is operated. It also allows the progress of the operation to be assessed by the general public, who remain interested in the project. Enviroguard is also a member of the Schools Visit to Industry Programme, under which Enviroguard offer to receive a school for a two hour visit every second Thursday. Recycling facilities are also an aspect of the development which also provides a community service.

The aim of the Erskine Park landfill project is ultimately to convert the hole remaining from quarrying operations to public parkland, effectively restoring restricted land to the local community. When full, the landfill site will be landscaped to form a public park including bicycle and walking tracks. It will form a low, landscaped hill which is intended to be a focus for the surrounding area. Other features of the site will include a recreation centre, creche, retail centre and a lagoon and wetlands.

2.6.4 Summary

The proposed development at Schofields is similar to the development at Erskine Park in many ways. The principles behind the landfill operation and its management are essentially the same. Consequently the benefits of the Erskine Park landfill and rehabilitation can foreseeably be applied to the landfill and rehabilitation of the PGH Schofields site.

The proposed waste management activities at Schofields have been designed to complement the activities already established by Enviroguard at its Erskine Park landfill (see **Section 1.5.5** earlier).

3. THE LOCATION

3.1 PLANNING CONTEXT

The site is located within the Blacktown local government area (LGA). Development on the property is subject to state, regional, and local planning instruments.

3.1.1 State Environmental Planning Policies (SEPPs)

The following SEPP's are relevant to the subject proposal:

State Environmental Planning Policy No. 11 - Traffic Generating Developments

SEPP No. 11 establishes the Roads and Traffic Authority (RTA) as the sole traffic management authority to be consulted, and ensures that the RTA is given the opportunity to make representations on a development application before Council makes a determination.

The proposed development, being "*extractive industry or mining*" is included in Schedule 1 subclause (m) of the above policy.

Under Clause 7(3) the Council is required to forward a copy of the submitted Development Application to the Authority within seven days of receipt.

State Environmental Planning Policy No. 32 - Urban Consolidation (Redevelopment of Urban Land)

SEPP No. 32 aims to promote improved efficiencies in the use of urban land by encouraging redevelopment for multi-unit housing and related development in appropriate locations. This policy applies to all urban land and the responsibility for identifying suitable areas for such activity lies with the appropriate council.

While this SEPP has no direct affect on the proposed development, its overall aim of producing more efficient urban areas by raising residential densities at appropriate locations should result in increasing population levels within the catchment of the landfill.

State Environmental Planning Policy No. 33 - Hazardous or Offensive Development (SEPP No. 33)

SEPP No. 33 applies to any "potentially hazardous or offensive development". This policy defines a development as potentially hazardous or offensive if it could pose a significant risk to the surrounding locality if measures were not employed to minimise its impact. As such, the policy requires a "*preliminary hazard analysis*" to be prepared in accordance with the guidelines of the NSW DUAP.

Hazards, risks and health issues are discussed in more detail in **Section 5.10** within this document. The assessment concludes that the preparation of a preliminary hazard analysis is not required and the provisions of SEPP No. 33 do not therefore apply to the proposed DA.

Statement Environmental Planning Policy No. 44 - Koala Habitat Protection

SEPP No. 44 aims to encourage the proper conservation and management of areas of natural vegetation that provides habitat for koalas. This would be achieved by the following:

- preparation of management plans before development consent can be granted in relation to areas of core koala habitat;
- identification of areas of core koala habitat; and
- including areas of core koala habitat in environment protection zones.

As there is no core koala habitat within the site boundary or likely to be affected by the proposal, this SEPP is not relevant to the project.

State Environmental Planning Policy No. 46 - Protection and Management of Native Vegetation

The aim of SEPP No. 46 is to prevent the inappropriate clearance of native vegetation. This policy requires the assessment of proposals to clear native vegetation in order to ensure that it is protected and managed in the environmental, social and economic interests of the State. Such clearing can only be carried out with the consent of the Director-General of the Department of Land and Water Conservation.

Schedule 1 lists these local government areas to which this policy applies. It does not include Blacktown LGA or any adjacent local government area.

3.1.2 Regional Planning

The following Regional Environmental Plans apply to the site and the proposal:

- SREP No. 9(2) - Extractive Industry;
- SREP No. 19 - Rouse Hill Development Area; and
- SREP No. 20 - Hawkesbury/Nepean River.

Sydney Regional Environmental Plan No. 9 - Extractive Industry (No. 2)

Development of the site as an extractive industry is regulated by SREP No. 9(2). The subject site is listed as a clay/shale extraction area of regional significance in Schedule 1 of the Plan. The SREP contains the following aims:

- "2(a) *to facilitate the development of extractive resources in proximity to the population the Sydney Metropolitan Area by identifying land which contains extractive material of regional significance;*
- (b) *to permit, with the consent of the council, development for the purpose of extractive industries on land described in Schedule 1 or 2;*
- (c) *to ensure consideration is given to the impact of encroaching development on the ability of extractive industries to realise their full potential;*

- (d) *to promote the carrying out of development for the purpose of extractive industries in an environmentally sensitive manner";*

Clause 7 of the SREP allows, with the consent of Blacktown City Council, extraction of materials from the site, which is listed in Schedule 1. Furthermore, clause 7(3) of the SREP states that Council shall not grant consent to any extractive industry unless:

- "(a) *it has considered the effect of the development on flood behaviour, the water quality, quantity and hydrodynamics of any watercourse or underground waters and also the effect of flood behaviour on the development and operations associated with the development in the vicinity; and*
- (b) *it has considered a rehabilitation plan prepared in accordance with the Guidelines for Rehabilitation Plans in the Extractive Industry Report; and*
- (c) *it is satisfied that, while the development is being carried out, noise and vibration levels will generally be in accordance with the guidelines in the State Pollution Control Commission Environmental Noise Manual (1985 edition) available at the offices of the Environment Protection Authority and the councils of the areas specified in Schedule 4; and*
- (d) *it is satisfied that rehabilitation measures will be carried out in accordance with the guidelines in the Urban Erosion and Sediment Control Handbook (1992) prepared by the Department of Conservation and Land Management and available at the offices of the Department of Land and Water Conservation".*

Clause 8 requires Council to forward a copy of any development application in respect of the property to the Department of Mineral Resources within seven days of receipt. The application should not be determined until the Council has considered any representation that Department may wish to make. The Department has 21 days to make a representation after which Council may assume that the Department does not wish to comment on the development application.

Clause 9 requires Council, when considering an application for extractive industry on the subject site, to take into account the "recommendations for future extraction" outlined in the Extractive Industry Report (DUAP, 1994). The Planning Industry Report recommends that extraction of the clay/shale resource on the subject site "should proceed subject to environmental and economic constraints".

In order to avoid unreasonable restrictions being placed on obtaining the clay/shale resource, other clauses of the SREP require Council to notify PGH of any draft LEP affecting land in the vicinity of the Schofields property and to seek the views of the Department of Mineral Resources prior to exhibiting the draft LEP.

Clause 16 requires that development consent can only be granted in respect of land "in the vicinity" of the PGH property if Council is satisfied that:

- "(a) *the proposed development will not be adversely affected by noise, dust, vibration or reduced visual amenity from any nearby extractive industry; and*

- (b) *the proposed development will not in any way adversely affect any existing nearby extractive industry or prevent any such extractive industry from realising its full economic potential by adversely affecting future expansion of the extractive industry of which the council is aware".*

Clause 19(2) requires Council to be satisfied that the proposed means of extraction will be carried out *"in such a way as maximises the quality of material extracted and minimises the creation of waste"*, before granting consent to the proposal.

Sydney Regional Environmental Plan No. 20 - Hawkesbury-Nepean River

SREP No. 20 Hawkesbury-Nepean River provides a framework for long term planning in the Hawkesbury-Nepean river valley. The general aims of the plan are:

- *"to improve water quality in the river;*
- *to provide a wide range of recreational opportunities along the river;*
- *to protect and promote the economy of the river valley;*
- *to protect the significant vegetation and wildlife habitats of the river valley;*
- *to retain the farmland character of the river valley;*
- *to protect the environmental heritage of the river valley;*
- *to protect and enhance the scenic quality of the river and the river valley;*
- *to regulate the future extraction of sand in and around the river;*
- *to permit urban expansion to take place in an environmentally sensitive manner, taking into account water quality; and*
- *to promote the principles of total catchment management and provide a framework for more detailed future planning by local and state government authorities".*

There are specific aims dealing with water quality, extraction, recreation and tourism, economy of the river valley, agriculture, vegetation and wildlife habitats, farmed landscape, environment heritage and scenic quality.

Schedule 3 of the SREP details matters to be considered by the consent authority when determining a development application in the area covered by the Plan. These matters relate to water quality, significant vegetation habitats (including wetlands), extraction, environmental heritage and scenic quality, recreation and tourism and agriculture. The proposed development will not adversely impact on natural waterways or sensitive natural environments.

Draft Sydney REP No. 20 (Amendment No 2)

The draft amendment to the SREP was exhibited for public comment in 1994. If gazetted, the amendments will:

- require the consent of Council and the concurrence of the Hawkesbury Nepean Catchment Management Trust for certain types of development;
- require Councils to consult with the Hawkesbury Nepean Catchment Management Trust for certain development types before granting consent to a development application;
- improve identification and protection of regionally significant wetlands;
- make the plan apply to additional land in the Sydney Region; and
- clarify the provision regulating sand extraction from the river.

Under clause 9A concurrence from the Hawkesbury Nepean Catchment Management Trust is required for waste management facilities or works.

The Trust has a Draft Code of Practice for developments which require consultation with the Trust.

Sydney Region North West Sector Regional Environmental Study (RES)

The subject site falls within the North West sector which is an area identified by the State Government for possible urban development over the long term. The main purposes of this study were to:

- compile a comprehensive database on the characteristics of the North West Sector;
- analyse issues that would affect any urban development in the study area; and
- prepare a draft regional environmental plan for urban and other land use proposals.

The potential mineral resources of the Rouse Hill study are discussed in chapter 2 of the RES. *Sydney's Extractive Industry Regional Environmental Study* forms the basis of the discussion. The Monier PGH site is identified as an existing clay/shale resource. The proposed management strategy for all potential mineral resources, is that:

- "(i) existing operations should be allowed to continue as long as economically possible and environmentally feasible, with appropriate buffering provided to ensure full extraction of resources is not restricted; and
- (ii) the regionally significant resources should be reserved to allow their development as required or to enable more detailed investigations to be undertaken of the implications of their extraction".

Mineral resources within the area of Riverstone/Rouse Hill/Marsden Park including the subject site were identified as being a constraint to urban development.

Sydney Regional Environmental Plan No. 19 - Rouse Hill Development Area

SREP No. 19 is applicable to Sydney's north west sector. The subject site falls within the Rouse Hill Development Area of the north-west sector. The SREP is intended to assist in the long term development of the Sydney region by providing a mechanism for the identification of land suitable for urban purposes and by providing for the orderly and economic development of the region. The SREP addresses aspects of relevance to development of the Rouse Hill area, specifically the natural environment, economic activity, the provision of services and facilities and the provision of housing.

The subject site is designated Living Area under the provisions of SREP No. 19. The structure plan which forms part of SREP No. 19 is shown in **Figure 3.1**. This designation aims to promote residential development and the establishment of associated services within that area.

3.1.3 Local Planning

Blacktown Local Environment Plan 1988

The PGH property is zoned General Rural 1(a) under the Blacktown Local Environmental Plan (LEP) 1988. Agriculture (other than intensive lot feeding of livestock or which requires the filling of flood liable land) is permissible without development consent in this zone. Prohibited uses include purposes such as bulk stores, hazardous industries, industries (other than rural industries or extractive industries) mineral sand mines and mines. Other purposes are permissible but only with development consent. Therefore, the proposed development is permissible with development consent as it is not listed as a prohibited use.

The site is split in two parts by Meadow Road which is zoned Special Uses 5(c) (local road and local road widening). Surrounding land is zoned predominantly General Rural 1(a) as shown on **Figure 3.2**.

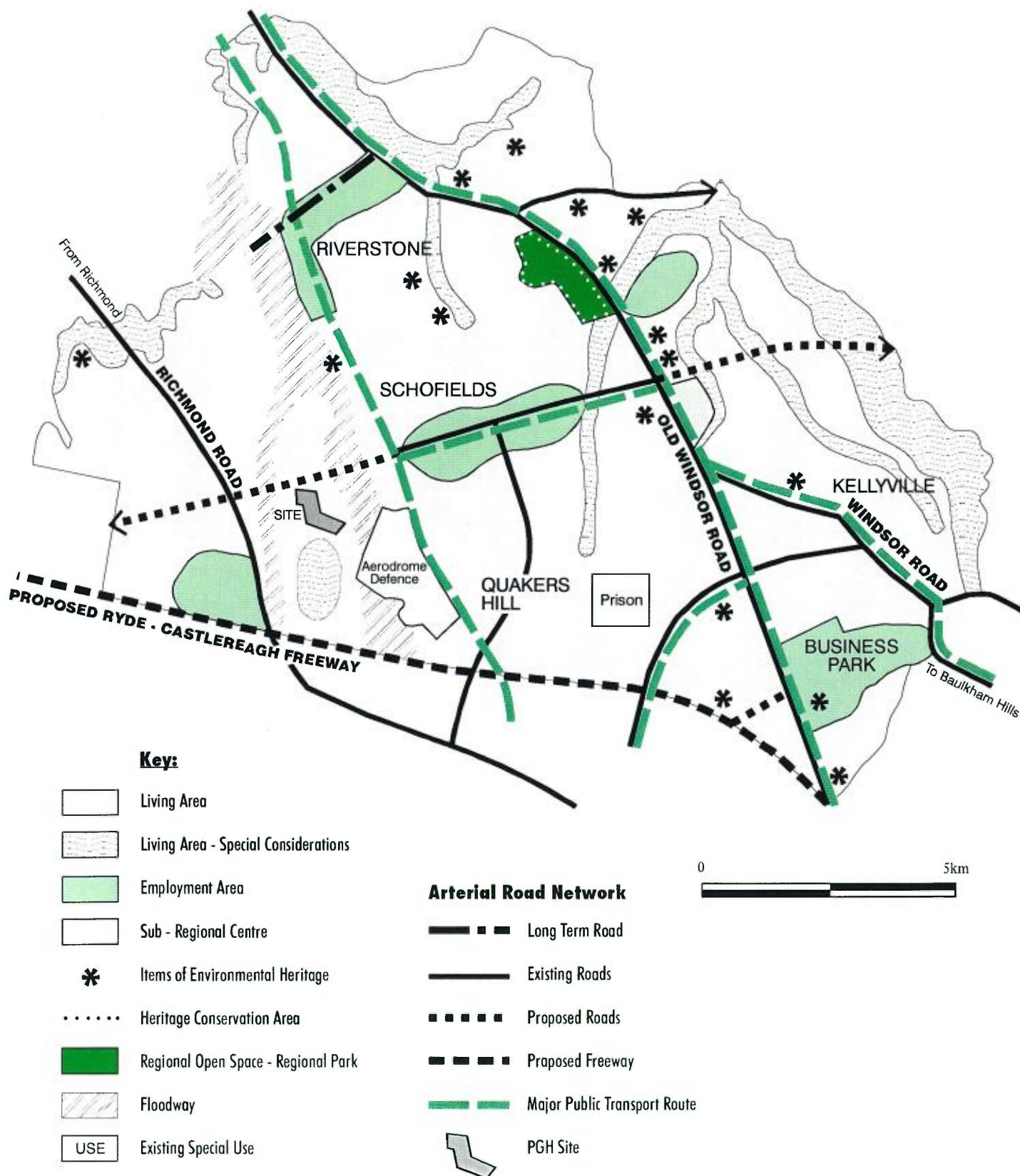
3.1.4 Blacktown Development Control Plan 1992

Development in Blacktown LGA is governed by Blacktown Development Control Plan (DCP) 1992 Part A - Introduction and General Guidelines, and Parts B to F for development in the rural, residential, business, industrial and private recreation zones. The quarry is zoned rural, therefore DCP Part B - Development in the Rural Zones is applicable. Part A provides guidance for all developments in the Blacktown LGA addressing issues such as environmental protection, roads, car parking, services, and development on flood prone land.

Part B of the DCP addresses similar issues incorporating specific requirements for the rural zone. Of particular relevance to the proposed development are the requirements for the provision of services and environment protection. On-site disposal of sewage and drainage and the provision of an adequate water supply are required by Council and the water authority. In addition to the issues discussed in Part A, items of environmental and

SREP 19 STRUCTURE PLAN

ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN



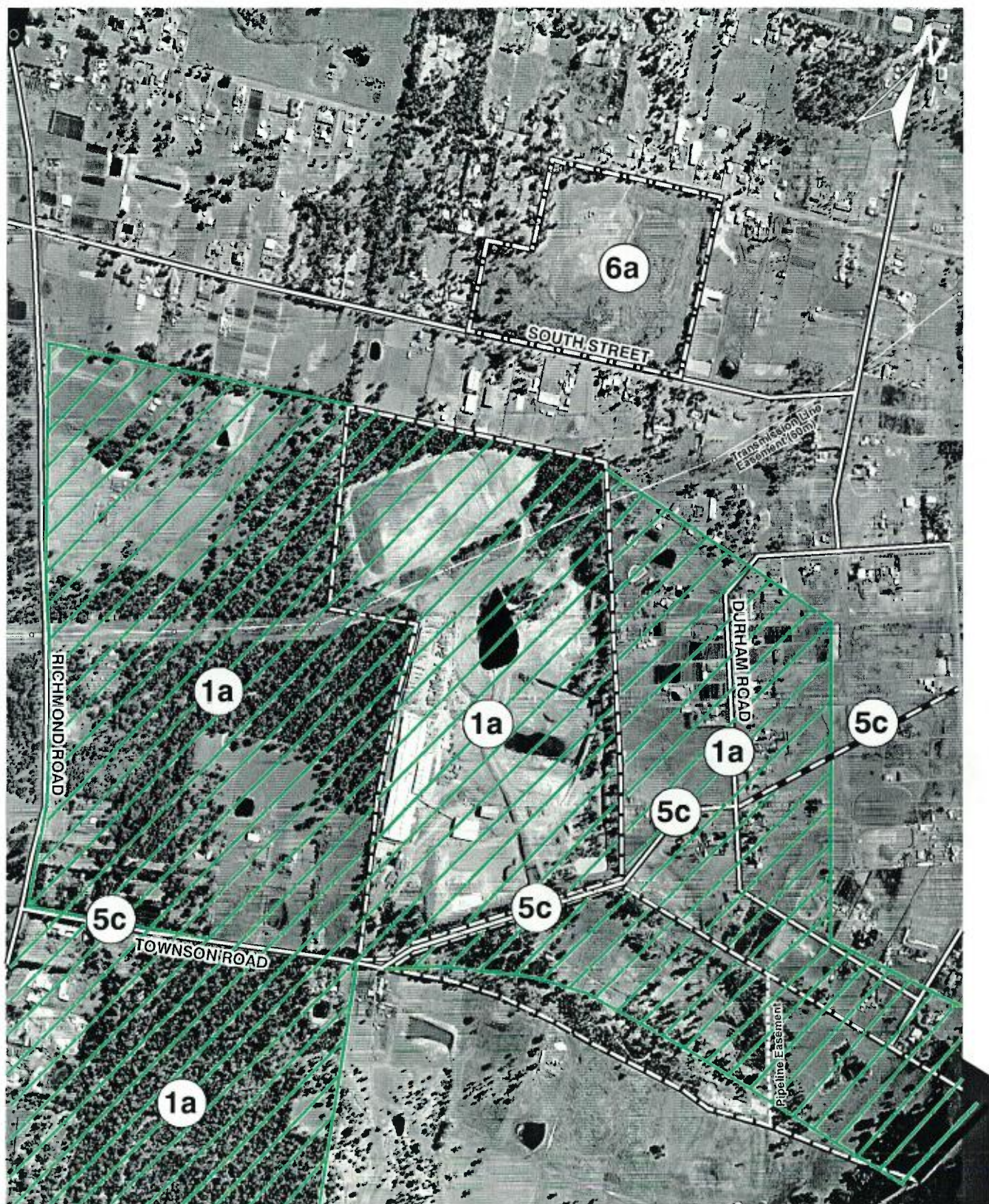
Date : May 1997

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Figure 3.1
CMP&F

ZONING BLACKTOWN LEP 1988 (DCP 1992)

ENVIRONMENTAL IMPACT STATEMENT PGH SITE, SCHOFIELDS BLACKTOWN



KEY

Site Boundary

Area of High Archaeological Significance

1(a) General Rural

5(c) Local Road & Local Widening

6(a) Public Recreation

0

800m

Figure 3.2

CMS&F

Date : May 1997

File Name : F:/DATA/VH/0009/VH000932.cdr

archaeological significance require particular consideration when assessing the impact of a proposal.

3.1.5 Previous Development Approvals

Quarrying and manufacturing first began at the Schofields site in 1961. It was purchased by PGH from Autobrick Industries in 1979 and in the late 1980s commenced operation as a non-putrescible landfill. The known development approvals issued for the site are listed in chronological order in **Table 3.1**.

**TABLE 3.1 PREVIOUS DEVELOPMENT APPROVALS WITHIN THE SITE
(BLACKTOWN CITY COUNCIL)**

Date	Approval
1969	The construction of additional kilns (Permit No. 512)
1974	Clay Storage Shed (Permit No. 3937)
1975	Dam (Permit No. 3969)
1979	Extensions to Offices (Permit No. 13977)
1979	Extensions of Cladding Shed (Permit No. 14194)
1981	Proposed additions and new buildings to existing extractive industry (Permit No. 528)
1982	Rebuilding of Offices (Determination No. 2021)
1986	The extension of existing extraction of clay minerals for brick making purposes (Stage 2) (Determination No. 4714)
1987	Shed for storage of clay (Determination No. 5907)
1988	First Landfill (Determination No. 395)
1989	Office Addition to Existing Factory/Office (Determination No. 276)
1990	Rehabilitation of an exhausted clay and shale quarry by filling with non-putrescible solid waste (Determination No. 9154)
1990	Second Landfill (Determination No. 205)
1992	Refurbishment of and addition to an existing factory building with associated car parking and landscaping (Determination No. 10657).

Source: Letter from Blacktown City Council dated 27 November 1996, ref 170096/2 96-61039C.

3.2 SITE DESCRIPTION/LOCALITY INFORMATION

3.2.1 Property Details

The subject property is shown on **Figure 3.3**. It consists of two areas of land separated by Meadow Road. Both are part of Lot 3 in DP 232474 within the Parish of Gridley and County of Cumberland. Lot 3 is owned by freehold title by a business unit of CSR, Monier PGH Holdings Limited. The land to the north has an area of approximately 46 hectares of which 19 hectares are available for further development as a quarry and landfill.

The southern part of Lot 3 in DP 232474 covers an area of approximately 21 hectares and is partly timbered and undeveloped. A high pressure gas line easement traverses the property near its eastern boundary, defined by Eastern Creek.

Both properties are within Blacktown City and are identified in SREP No. 9 (2) - *Extractive Industry* as containing a clay/shale resource of regional significance.

The PGH property at Schofields is located in the Eastern Creek catchment approximately 2.5 kilometres south-west of Schofields railway station. The property has an area of approximately 67 hectares and is divided into two discrete portions, separated by Meadow Road.

That part of the property to the north of Meadow Road is currently used for quarrying, clay/shale stockpiling and paver and brick manufacture. Extending north from Meadow Road the site is approximately 500 by 900 metres. Near the northern boundary a recently completed landfill is currently being revegetated. The landfill forms a low hill which slopes generally towards the east. A buffer area of native vegetation surrounds the landfill to the west, north and east. A transmission line easement traverses the site from west to east immediately to the south of the landfill. The easement contains a 330,000 volt transmission line owned by Transgrid.

The remainder of the northern portion has been extensively altered due to quarrying and brick manufacture. A brick manufacturing plant together with associated staff facilities, administration centre, workshops and product stockpiles is located on the western part of the site. Adjoining the southern boundary is an extensive clay/shale stockpile area which is used for storing material quarried from the site as well as material imported from other quarries. A quarry approximately 200 metres square is centrally located adjacent to the eastern boundary. It is approximately 30 metres deep. A three metre high bund extends part way along the eastern perimeter of the site. This supports mature eucalypts and is within a 50 metre buffer between the quarry and the eastern boundary. An unsealed access road extends through the centre of the site from Meadow Road to the northern area. A separate sealed road provides access to the offices and brick manufacturing area from Meadow Road.

That portion of the property located to the south of Meadow Road is relatively undeveloped. This area extends east-west and is approximately 280 by 950 metres. The western boundary adjoins Meadow Road while the eastern boundary is defined by Eastern Creek. A gas pipeline easement located about 600 metres from Meadow Road traverses the site from south to north. East of the pipeline the site is low-lying and prone to inundation. Natural vegetation and grassed areas characterise the area to the west. Previous land uses include trail bike riding and grazing.

Figure 3.3 shows existing site characteristics including topographical features and developments. The 1 in 100 year and 1 in 20 year estimated flood limits of Eastern Creek are also shown on the figure.

EXISTING SITE CONDITIONS

ENVIRONMENTAL IMPACT STATEMENT PGH SITE, SCHOFIELDS BLACKTOWN



Date : May 1997

File Name : F:/DATA/VH/0009/VH000933.cdr

Figure 3.3
CMP&F

4. IDENTIFICATION AND PRIORITISATION OF ISSUES

4.1 OVERVIEW OF THE METHODOLOGY

The method of identifying the relevant issues and determining those which are crucial to the assessment of this project is based on the following approach:

- Determining the processes to be undertaken on the site in terms of inputs from outside, activities on the site and outputs to the environment.
- Understanding the natural and man-made environment within which these activities would take place.
- Assessing the interactions between the identified activities and the environment and determining all the issues which are expected to be relevant.
- Identifying those issues which need to be addressed in detail via a broad process of assessment and ranking. The aim is to achieve an objective view of the overall benefits and costs accruing to the community as a result of this proposal and takes account of all legislative requirements, current guidelines relating to resource extraction and landfilling, experience gained on similar projects and inputs from interested authorities and the local community.

4.2 REVIEW OF RELEVANT SOURCES OF INFORMATION

Input to the identification and prioritisation of issues is derived from a large number of sources as follows:

- requirements of the Director-General of DUAP;
- DUAP EIS guidelines for extractive industries and landfilling;
- EPA environmental guidelines for solid waste landfills;
- existing legislation covering planning, environmental and waste management issues;
- responses by key stakeholders;
- experience of the site operators;
- consultants' experience of other similar projects;
- preliminary site assessment;
- input from other EIS documents;
- discussions with Council and EPA staff;
- input from community consultation; and
- experience of the specialist sub-consultants.

4.3 OUTCOME OF CONSULTATION WITH STAKEHOLDERS

Consultation with Authorities

In preparing this document, DUAP was contacted as indicated above. The Director-General requires consultation with specified authorities. The authorities that have been notified of the proposal include:

- Australian Heritage Commission;
- Daruk Land Council;
- Department of Agriculture;
- Department of Fisheries;
- Department of Land and Water Conservation (DLWC);
- Department of Mineral Resources;
- Department Urban Affairs and Planning;
- Department of Water Resources (now incorporated into DLWC);
- EPA;
- Hawkesbury-Nepean Catchment Management Trust;
- National Parks and Wildlife Service;
- NSW Health;
- NSW Fire Brigade;
- Pacific Power;
- RTA; and
- Transgrid.

Responses received from authorities are included in **Appendix C**. The following issues have been raised for consideration:

- local and regional planning provisions;
- impacts, including cumulative impacts, on local amenity, including noise, visual, dust and traffic impacts;
- water management, including means for preventing potentially contaminated runoff and groundwater entering the Hawkesbury-Nepean River System;
- effects of flooding;
- measures to minimise potential dust, noise and visual impacts;
- waste management, with specific regard to waste characteristics, the suitability of the site to accept waste, proposed environmental safeguards and the need to prepare a preliminary hazard analysis;
- consideration of proposed future development of the area and any constraints resulting from the proposed operations which might impact upon these developments;
- a full description of the proposal including rehabilitation and revegetation;
- potential impacts on local and regional flora and fauna, and proposed mitigation measures;

- traffic and transport impacts having regard to the capacity of the existing road network;
- environmental monitoring and reporting; and
- archaeological importance of the site.

In addition to addressing the above issues, DUAP requires that the proposal be justified, alternatives canvassed and a full description of the works provided.

Community Consultation

PGH distributed a community newsletter to properties in the vicinity of its Schofields Site in March 1995. The newsletter advised residents and other occupiers of the details of the proposal and invited comment or discussion. In response, the company received a number of phone calls. A copy of the community newsletter is included in **Appendix D**.

A second newsletter was distributed by mail to all residents in the vicinity of the site in December 1996. The location of adjacent and adjoining residents to the subject site is illustrated in **Figure 4.1**. The newsletter advised residents of the proposal to continue extraction and to landfill over the next 25 years. A copy of this newsletter is included in **Appendix D**. In addition, comments were invited from all residents on any issues associated with the proposal.

A community meeting was held on Tuesday 17 December to discuss the proposal and associated issues/impacts. Again all residents in the vicinity of the site were invited. Twenty four residents attended the meeting which was held within the brickworks on the site. Following a presentation of the proposal, questions and comments were invited. The minutes from the meeting are provided in **Appendix D**. The key issues, as seen by the residents, were:

- water management;
- traffic;
- noise;
- dust;
- impacts from the proposed landfill; and
- impacts on property values.

It was resolved to form a committee comprising four or five residents, which would meet regularly with the PGH quarry plant manager to discuss problems or complaints experienced by all residents. In addition, a second community meeting was agreed to be held near the time of lodgement of the development application.

4.4 OUTCOME OF THE PROCESS

4.4.1 Introduction

The most significant environmental issues arising from landfilling are as follows:

- traffic;
- visual intrusion;

- litter;
- dust and odour;
- water quality;
- noise; and
- landfill gas.

The first two are directly related to the locality chosen and are therefore very site specific; while the third is merely a matter of good or bad housekeeping, sometimes exacerbated by locational difficulties, such as strong prevailing winds or exposed landfill siting.

Dust and odour generation will also be dependent on the application of good management practices at the site, and landfill gas, if it is generated in sufficient quantities can be managed by the installation of an appropriate collection and flaring system. Noise is a function of the methods employed and can be managed by a combination of sensitive operational procedures and the inclusion of appropriate mitigation measures.

There is evidence that irresponsible landfilling can cause water pollution when it is not adequately controlled or sites are not properly chosen and prepared. The results of inappropriate disposal have caused considerable community concern and cost, particularly in the United States. No extensive evidence of such problems has been found in Australia to date mainly due to a smaller industrial base and the minimal utilisation of groundwater in which any pollution is usually first detected. Community concern however, remains high in spite of the engineering measures that are now available to ensure that such problems do not occur.

Water pollution by leachate from the landfill can be controlled by collection, treatment and controlled disposal, avoiding contact with groundwater or surface streams.

Property values, if they are affected at all by the presence of landfills, are only likely to be influenced by new developments in existing urban or semi-urban areas. The proposal assessed in this EIS consists of the extension of existing activities over a longer period and over a larger area than previously envisaged. Existing values would have taken account of the activities at the site some time ago and it is difficult to envisage how the current proposal could have any measurable effect.

4.4.2 Key Issues

The following key issues have been identified as a result of the approach described in this section of the EIS.

- air quality including dust, landfill gas and odour;
- transport and traffic;
- noise;
- economic effects;
- land and strategic planning issues;
- energy and utility service provision;
- water issues;
- visual impacts;
- hazard and risk;

COMMUNITY CONSULTATION

ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN



KEY

1 - 48 Adjacent and Adjoining Residents
Invited to Community Meetings.

For details of property
descriptions see Table 5.14
later.

0 600m

Figure 4.1

CMP&F

Date : May 1997

File Name : F:/DATA/VH/0009/VH000904.cdr

- heritage; and
- flora and fauna.

These are considered in detail in the following section.

5. THE ENVIRONMENTAL ISSUES

5.1 AIR QUALITY

5.1.1 Climate

Climatic information was obtained from the Bureau of Meteorology for the nearest meteorological station, at Prospect Reservoir, for temperature, rainfall and evaporation data, and Penrith for wind data. Climatic information is summarised below.

- *Temperature*

Seasonal temperature variations are in the order of 10 °C at Prospect Reservoir. The average daily maximum temperature ranges from 28 °C in January to 17 °C in July. Average daily minimum temperatures for these months are 18 °C and 6 °C respectively.

Temperature inversions resulting in fogs occur on average for two days during summer and up to nine days during winter.

- *Rainfall*

The mean annual rainfall at Prospect Reservoir over 104 years of record is 884 mm. Average seasonal rainfall varies considerably from 109 mm in March to 37 mm in July. The average number of rain days per month varies between 14 days a month during summer to 8 days a month in winter.

- *Evaporation*

Evaporation has marked seasonal variations ranging from 298 mm in December to only 54 mm in June. In winter, evaporation is lower than rainfall, leaving the possibility of soil saturation. However in summer a relatively large soil moisture deficit is expected as evaporation is more than twice the average rainfall.

- *Wind*

Winds are predominantly from the north-east to south in summer, from south to west in autumn and winter and are variable in spring. Strongest winds are from the west and south-west, particularly in autumn and winter.

5.1.2 Existing Environmental Conditions

Background Levels of Dust

An assessment of the potential dust generation of the proposal has been undertaken and is included in **Appendix E**. Dust gauges on the site have collected dust for analysis since 1994 at locations shown on **Figure 5.1**. The results confirm a general background level of dust deposition of approximately two grams per square metre per month, although

there are some months when gauges located close to the quarry and raw material stockpiles record significantly higher levels.

Air Quality Criteria

The EPA has established air quality goals for dust deposition. These are based on an incremental approach in which acceptable increases in deposition depend on the background level up to a specified maximum. These criteria are summarised in Table 5.1.

TABLE 5.1 DUST DEPOSITION CRITERIA

Existing Dust Level (g/m ² /month)	Maximum Acceptable Increase over Existing Dust Level	
	Residential/Suburban (g/m ² /month)	Other (g/m ² /month)
2	2	2
3	1	2
4	0	1
above 4	0	0

Source: NSW EPA

Therefore, in residential areas with annual average deposition levels of two grams per square metre per month (g/m²/m) an increase of two g/m²/month would be the maximum acceptable increase above the background.

The NHMRC guideline for concentrations is a maximum of 90 micrograms per cubic metre with the additional EPA criteria of 50 µg/m³ (annual average) and 150 µg/m³ (24 hour average) for particles smaller than 10 microns (PM₁₀).

Modelling

The dust assessment used a gaussian plume dispersion model to estimate dust deposition and dust concentration rates associated with the proposal. The study considered the likely activities on site and the rate of dust emission associated with each. Wind data for the model was obtained from a meteorological station near Penrith, the closest available source.

The likely environmental impacts will vary over the life of the project. As a result, four scenarios were modelled for Stages 1, 2, 3 and 6 of the extraction. The estimated rates of dust emission were applied together with the meteorological data to derive estimates of dust dispersion. A computer plotting routine was used to draw isopleths of the predicted deposition rates and concentrations of particulates in the air.

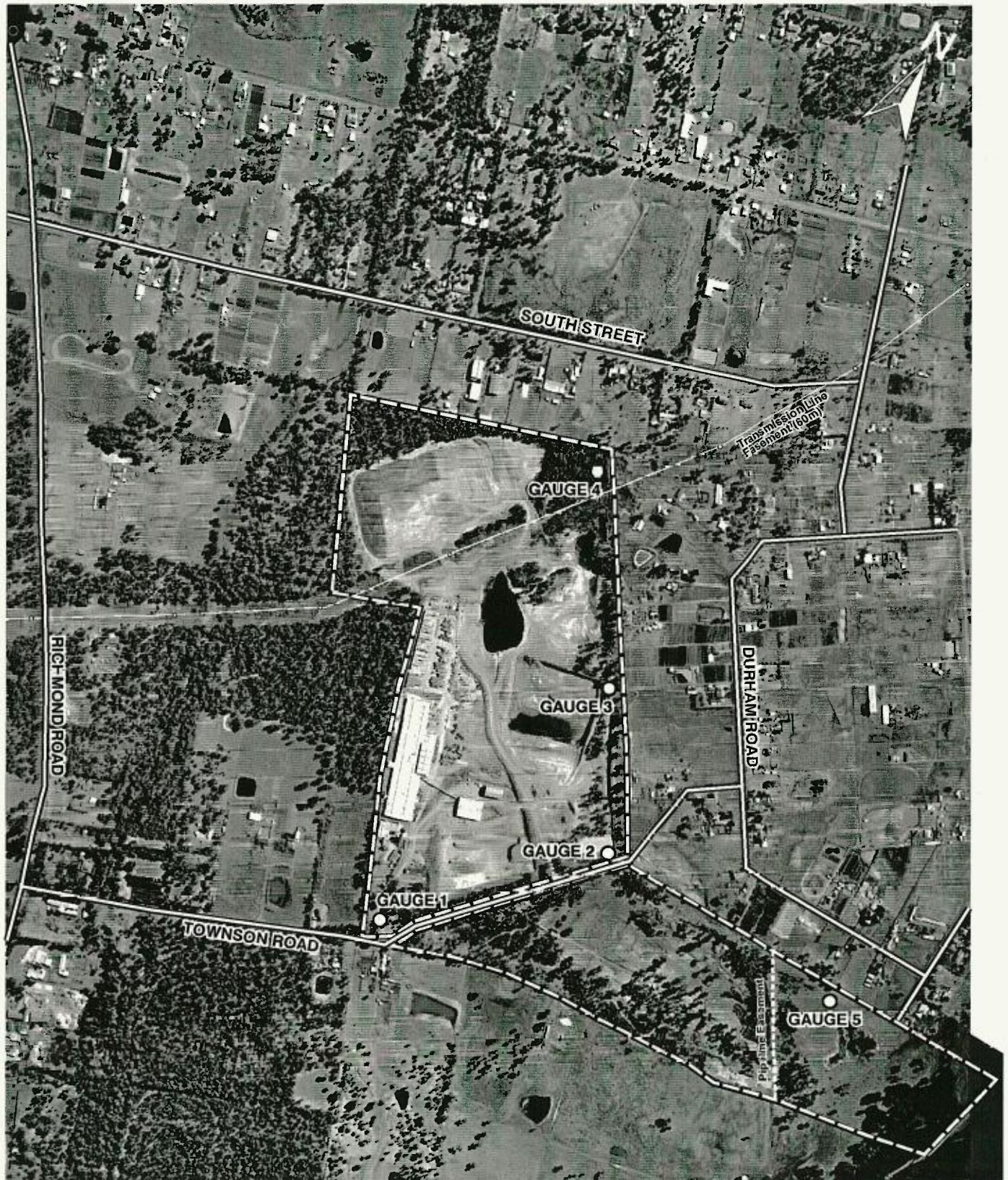
5.1.3 Detailed Analysis of Potential Impacts

Dust and Particulate Matter

The impact of the proposed development on air quality may be assessed in terms of the EPA objective, which for the existing ambient dust deposition level of 1.5 g/m²/month considers an increase of 2.5 g/m²/month as the maximum, acceptable. Deposition

DUST

ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN



KEY

- Site Boundary
- Dust Deposition Gauges (1-5)

0 800m

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increases of 2.5 g/m²/month along the critical eastern and southern boundaries adjacent to the nearest houses are typically contained within the boundaries of the site.

A small exceedence is expected to take place although no privately owned houses are likely to experience deposition rates significantly above 2.5 g/m²/month (annual average) as a result of activities at the site. As a result, no existing houses or any potential housing development area will experience a loss of amenity during activities taking place during Stages 1, 2, 3 and 6 of the proposed project.

The model predicted similar results for dust concentration. The area predicted to experience an increase in dust concentration up to the criterion is generally contained within the PGH property.

Short term dust episodes are a significant contributor to annoyance in the local community. These relate to temporary increases in the amount of dust raised from disturbed areas by strong winds in dry weather conditions. Such episodes are rare as they require a combination of dry weather and high wind conditions.

The nature, strength and duration of a dust episode is determined by a variety of factors which are difficult to quantify. Typically these occur when wind speeds exceed 10 metres per second. Local wind data shows that wind speeds equal to or greater than this occur less than 2% of the time.

The likelihood of a short term dust episode is reduced by the incorporation of measures specifically designed to minimise the possibility of their occurrence. The most effective of these are temporary revegetation, early implementation of rehabilitation works and regular watering.

Gas and Odour

It is not anticipated that the landfill will generate gas at a significant rate. The Class 2 degradable component of waste accepted at a solid waste landfill includes packaging, timber and green (tree and garden) waste. These materials will degrade slowly so that gas emission would be almost imperceptible at the landfill surface. The EPA has indicated that green waste may be prohibited from landfills in the foreseeable future. This would further reduce the potential for landfill gas generation from the site.

PGH will install a landfill gas collection system should monitoring show that landfill gas is being generated at a rate which could have an impact on the amenity of surrounding land or create any risk or hazard on the property.

Odour from landfills is associated with landfill gas. The most common gaseous products of waste breakdown are carbon dioxide and methane. There can be traces of other gases such as hydrogen sulphide and mercaptans. These latter gases, even in small concentrations can generate an odour.

The proposed landfill will not be a significant generator of gas because of the nature of waste received. Loss of amenity on surrounding properties due to odour from the landfill would be prevented, should the issue ever arise, by installation of a landfill gas collection system.

5.1.4 Proposed Mitigation, Management and Monitoring

The dispersion model predicts that on average, dust from the quarry/landfill should not increase background levels at residences by more than the recommended criteria.

Results of dust monitoring on the site over the last 18 months show occasional periods when dust deposition levels at two of the five gauges are significantly above the annual average. These variations may result from episodic events (significant wind storms), sampling and measurement errors or misadventure.

In order to obtain further information and generally reduce dust deposition levels in the area, a series of measures are proposed, including:

- installation of a meteorological station on the property;
- installation of a wheel wash to be used by all departing vehicles during and following wet weather;
- sealing the access road between the wheel wash and Meadow Road;
- use of a polymer based binder to spray over product stockpiles and other bare surface material whenever it is not being worked;
- establishment of grass cover over the large bare area north of the existing quarry until this area is needed for quarrying;
- watering unsealed roads during dry weather to suppress dust; and
- ceasing all significant dust generating activities including quarrying, stockpile addition or subtraction and landfilling should the average wind speed over any 30 minute period exceed 10 metres per second.

These measures will assist in reducing dust levels from the site to below that currently experienced. Continued monitoring of the installed dust gauges will confirm the effectiveness of these measures.

5.2 TRANSPORT AND TRAFFIC ISSUES

5.2.1 Existing Transport/Traffic Conditions

Background

The existing quarrying and brick manufacturing operations at Schofields generate traffic in the form of material delivery, product exporting and staff movements. Until recently, the site also operated as a landfill, backfilling an excavation created by quarrying.

The proposed development would tend to re-establish the level of traffic generation from the site during the recent period of simultaneous quarrying and landfilling. As such the development would be expected to result in little significant change from the levels of traffic experienced until quite recently. The development has however been assessed

as if the landfill operation was new, to determine the full range of potential traffic impacts.

Road Network

The location of the site provides convenient access to and from Blacktown, Parramatta and to the north west-via Richmond Road. Access to Liverpool and Penrith to the south and west is via Rooty Hill Road. Access to Windsor and the north/north west is provided by Garfield Road, Schofields Road and Windsor Road.

In the longer term, the proposed construction of the M2 Motorway would facilitate inter regional access. The proposed motorway would intersect with Richmond Road between Rooty Hill Road and Townson Road and would further increase the already good accessibility of the site.

Meadow Road and Townson Road have sealed widths of approximately seven metres with one traffic lane in each direction. The intersection of Townson Road and Richmond Road is an unsignalised T-intersection with Townson Road the minor road. Richmond Road, at the Townson Road intersection has one marked traffic lane in each direction, a right turn lane of approximately 50 m length and tapered shoulders for left turning traffic. Richmond Road is a State Road, maintained and controlled by the RTA and is designated an arterial road within the road hierarchy. Meadow Road and Townson Road are lightly trafficked Council roads and are designated as local.

The road network adjacent to the site is shown in **Figure 1.1**.

The quarry and landfill access point is located approximately half way along the 500 metre frontage of the site to Meadow Road, while the access to the brickworks is located further west off Townson Road. At both of these access points the road carriageway is level with a sealed surface width of approximately seven metres. Sight distance in both directions from the quarry access is satisfactory for the prevailing conditions. The quarry access has an eight metre wide entry drive which conforms to adopted design standards of the RTA and Blacktown City Council.

The local road network in the vicinity of the site is subject to a 5 tonne vehicle weight restriction. This also applies to Grange Avenue, the railway bridge just north of Schofields and Townson Road. However, vehicles with a destination to the quarry site are exempt from the restriction on Townson Road. Consequent upon the current weight restrictions, truck access to the site is achieved via Townson Road and its intersection with Richmond Road to the west.

Traffic volumes on the local road network are shown in **Table 5.2**.

TABLE 5.2 EXISTING TWO WAY DAILY TRAFFIC VOLUMES ON SELECTED LINKS IN THE ROAD NETWORK

Location of Count	Local Daily Flow	Date of Count
• Windsor Road MR184 (North of Bandon Road)	22389	1993
• Windsor Road MR184 (Southeast of Old Windsor Road)	19355	1993
• Richmond Road MR537 (North of Garfield Road at South Creek bridge)	17342	1993
• Richmond Road MR537 (North of Grange Avenue)	18587	1993
• Richmond Road MR537 (North of Rooty Hill Road)	23060	1991
• Richmond Road MR643 (South of Rooty Hill Road at Eastern Creek Bridge)	34194	1993
• Grange Avenue (east of Eastern Creek)	3568	1993
• Railway Terrace (South of Brighton Street)	5982	1993
• Garfield Road West MR546 (at Eastern Creek bridge)	10468	1993
• Schofields Road (west of Windsor Road)	4179	1993
• Meadow Road ⁽¹⁾	700	1990
• Townson Road ⁽²⁾	1000	1996

Sources: 1: PGH (1990)
2: CMPS&F

Peak hour traffic volumes on Richmond Road are 10 per cent of the total. This is typical for an arterial road. Volumes shown for Meadow Road are the result of counts undertaken in 1990 to which the traffic generated by the brick manufacturing operation has been added. The counts undertaken in 1990 indicated that the morning peak occurred between 6.00 am and 7.00 am, and the evening peak between 5.00 pm and 6.00 pm.

Roads are classified according to the role they fulfil and the volume of traffic they carry. At the upper end of the hierarchy there are arterial roads which cater for major through movements. At the lower end of the scale are the local roads whose primary function is property access. The latter should be managed to inhibit use by through traffic.

The RTA has set down guidelines for traffic flows appropriate for each road classification. These are shown in Table 5.3.

TABLE 5.3 ROAD TRAFFIC VOLUME RANGE FOR VARIOUS ROAD TYPES

Classification	Vehicles per day	Peak hour
Arterial	over 15,000	over 1,500
Sub Arterial	5,000 - 20000	500 - 2,000
Collector	2,000 - 10,000	200 - 1,000
Local	below 2,000	below 200

Source: RTA Guidelines and Procedures

The traffic volumes on Richmond Road are consistent with its arterial road function (greater than 15,000 vehicles per day), while the those on Meadow Road/Townson Road are consistent with their local road status (up to 2,000 vehicles per day) with spare capacity readily available.

5.2.2 Existing Intersection Performance

Intersections are the critical points which control the capacity of the road system. INTANAL computer analysis determines the average delay that vehicles encounter and the degree of saturation of the intersection. By comparing intersection operating conditions with the performance criteria set out in **Tables 5.4 & 5.5**, intersection level of traffic service can be ascertained. Average delay per vehicle is the more accepted criterion. For intersections under Give-Way/Priority control and roundabout control the average delay per vehicle is selected from the movement with the highest average delay per vehicle. For intersections under traffic signal control the average delay is calculated as delay divided by all vehicles.

TABLE 5.4 INTERSECTION LEVEL OF SERVICE BASED ON AVERAGE VEHICLE DELAYS

Level of Service	Average Delay per Vehicle (seconds)	Expected Delay to Traffic
A	< 14	Little or no delay
B	15 - 28	Short traffic delays
C	29 - 42	Average traffic delays
D	43 - 56	Long traffic delays
E	57 - 70	Very Long traffic delays
F	> 70	Extreme delays

TABLE 5.5 INTERSECTION LEVEL OF SERVICE BASED ON DEGREE OF SATURATION

Level of Service		Degree of Saturation
Unsignalised Intersection		
A/B	Very good operation	< 0.60
C	Satisfactory	0.60 - 0.65
D	Near capacity	0.65 - 0.75
E/F	Roundabout/traffic signals or other major treatment required	> 0.75
Signalised Intersection		
A/B	Very good operation	< 0.80
C	Satisfactory operation (with spare capacity)	0.80 - 0.85
D	Operating near capacity	0.85 - 0.90
E/F	Bad, extra capacity required	> 0.90

Traffic counts were undertaken at the key intersection of Richmond Road/Townson Road on Wednesday the 11th of December 1996 during the traditional morning and evening peak periods on the network. Traffic flow diagrams are shown in **Figures 5.2a** and **5.2b**. Intersection performance has been analysed using INTANAL computer analysis.

TABLE 5.6 INTERSECTION PERFORMANCE

Intersection	Degree of Saturation		Average Delays Secs/Vehicle		Level of Service	
	AM	PM	AM	PM	AM	PM
(A) Richmond Road / Townson Road Existing	0.31	0.12	53.5	34.8	D	C
(B) Richmond Road / Townson Road plus 3 -5 years growth in base flows ie 12% growth	0.43	0.15	72.0	43.8	F	D
(C) ie (B) with Seagull configuration	0.43	0.15	48.7	22.6	D	B

The results set out in **Table 5.6** indicate that the intersection is currently operating near capacity in the morning peak period. The intersection will be failing to provide effective level of service within 3 to 5 years of base traffic growth (based on annual growth rate of between 2 and 4%), and some improvements will be required.

Closer inspection of the intersection performance indicates that the poor level of service reflects the long delays experienced by small numbers of right-turning traffic emerging from Townson Road. This current "problem" could be ameliorated at minimal cost by the installation of a Seagull configuration at this intersection providing a right-turn acceleration lane on Richmond Road for vehicles emerging from Townson Road. This turning traffic would then only have to give way to southbound traffic on Richmond Road rather than both north and southbound traffic as is the case with the current arrangement.

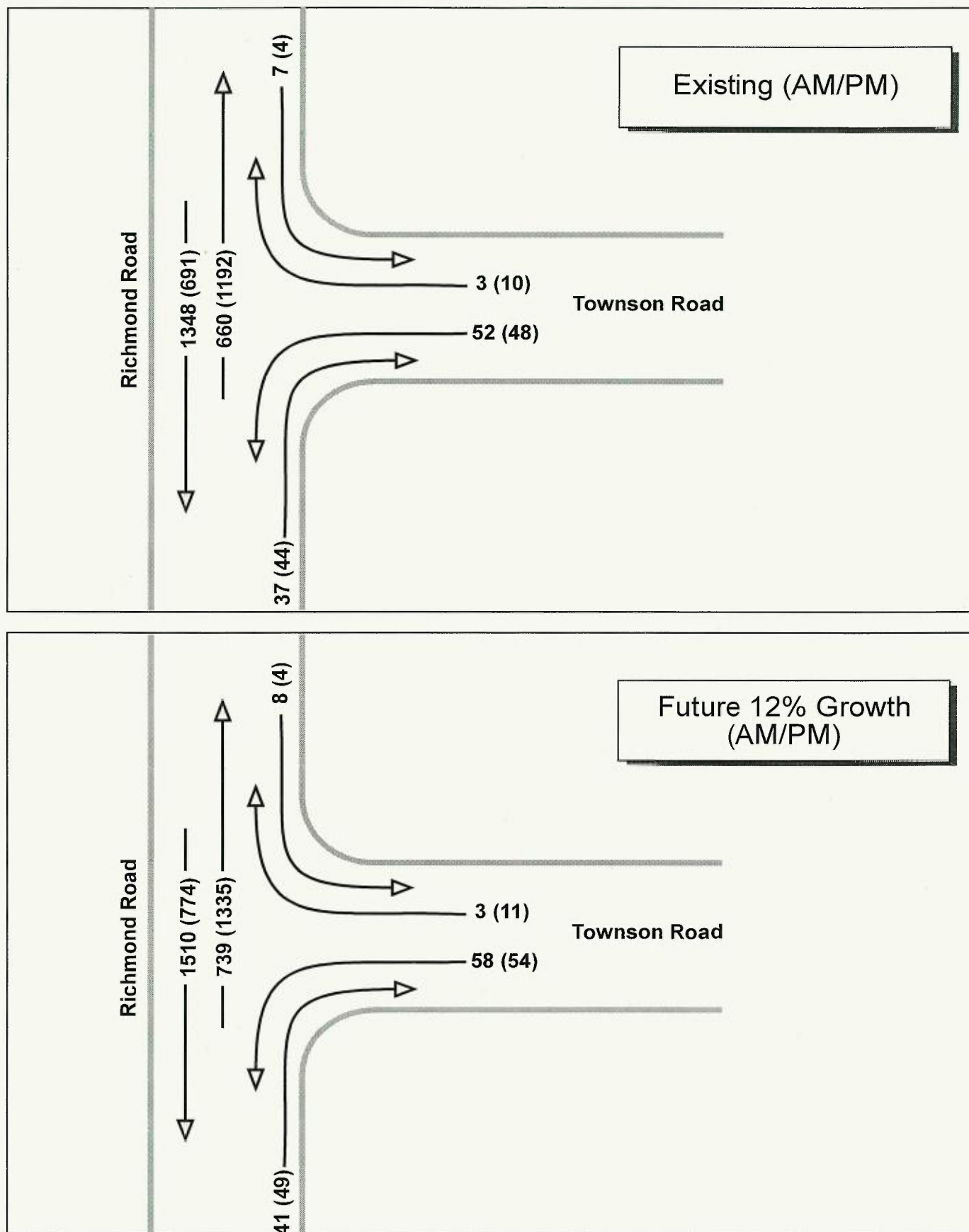
Such an arrangement will be necessary irrespective of any future development related traffic activity.

Existing Site Generated Traffic

The traffic generated by the quarry and recently closed landfill development is summarised in **Table 5.7**.

PEAK HOUR INTERSECTION TURNING MOVEMENTS (PASSENGER CAR UNITS)

ENVIRONMENTAL IMPACT STATEMENT
PGH SITE, SCHOFIELDS BLACKTOWN



Date : May 1997

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Figure 5.2a
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PEAK HOUR INTERSECTION TURNING MOVEMENTS (LIGHT & HEAVY VEHICLES)

ENVIRONMENTAL IMPACT STATEMENT
PGH SITE, SCHOFIELDS BLACKTOWN

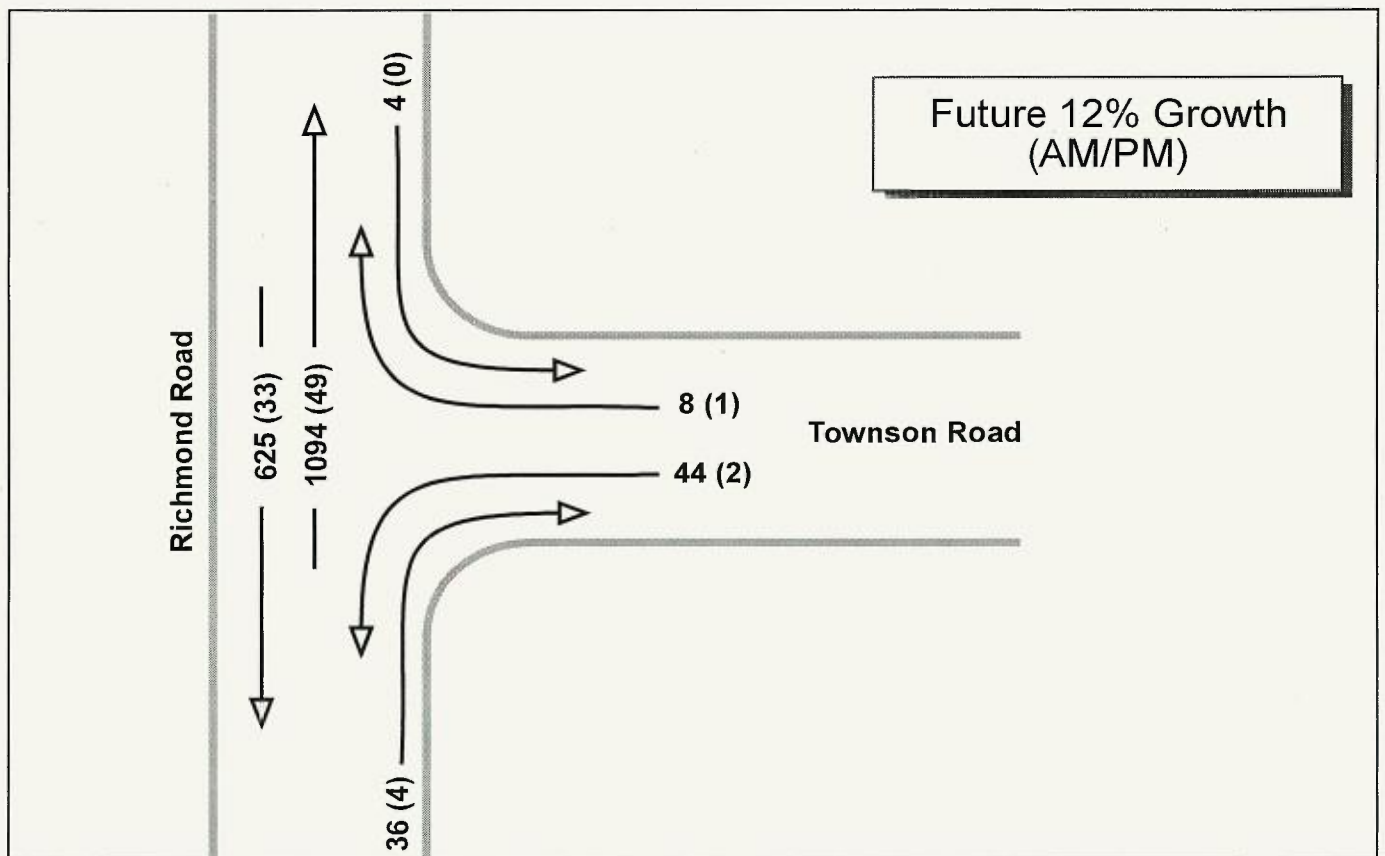
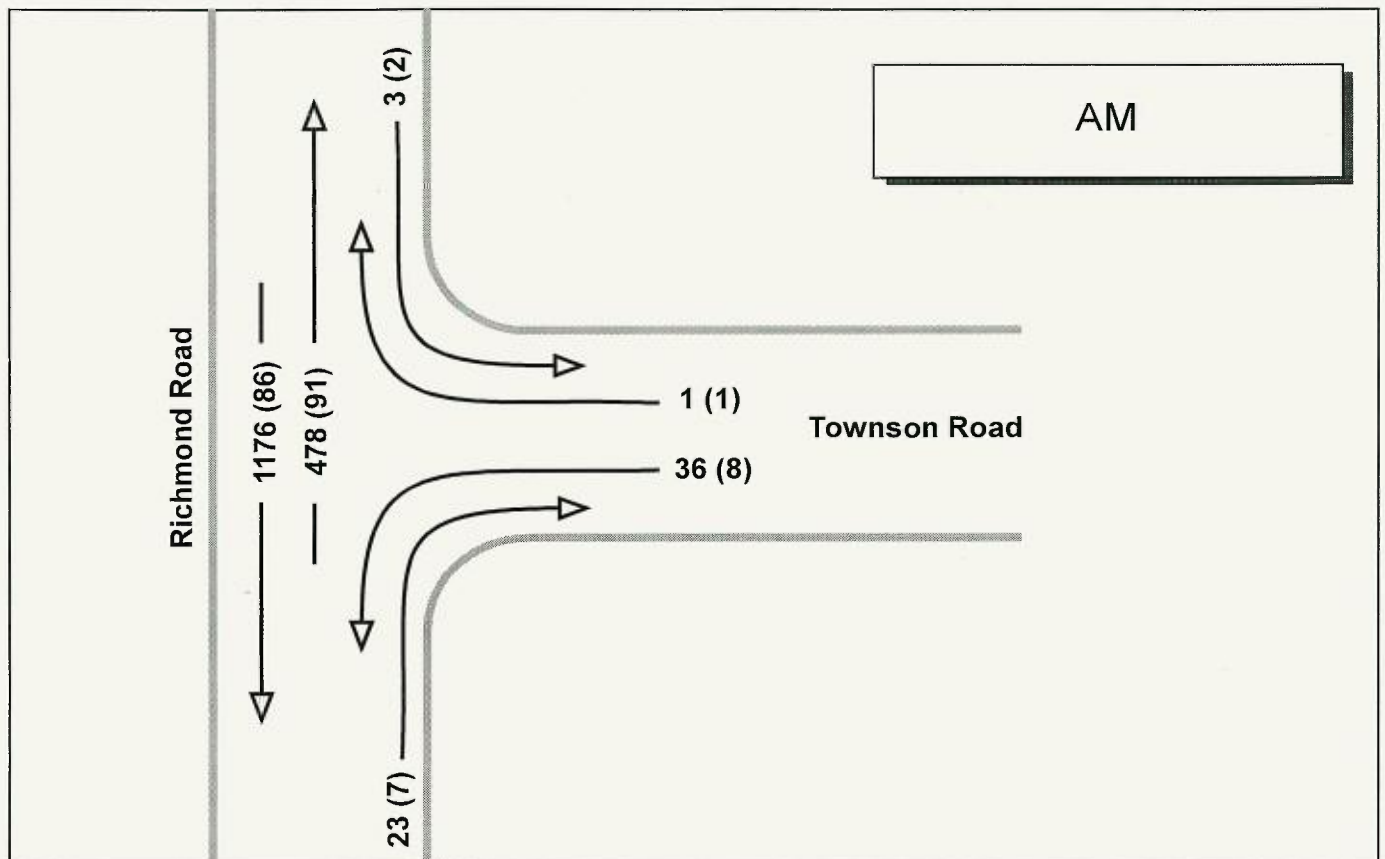


TABLE 5.7 RECENT DAILY SITE GENERATED TRAFFIC

Origin	Quarry Vehicles	Landfill Vehicles ⁽²⁾	Brickworks Vehicles	Total Vehicles
Import	17	89	30	136
Export	7	-	35	42
Staff ⁽¹⁾	-	7	50	57
Total	24	96	115	235

Notes 1: Quarry staff use a car park near the brick manufacturing plant and access the site via the main western site entrance.
2: Average of typical weekly load sheet for Schofields quarry.

The total number of vehicles using the site creates 470 vehicle movements (to and from the site) along Meadow Road per day.

Distribution of traffic volumes was estimated by PGH (1990) to be as follows:

- Imported Materials
 - 80% Richmond Road
 - 20% Windsor Road;
- Exported Product
 - 70% Richmond Road
 - 30% Windsor Road; and
- Staff
 - 80% Richmond Road
 - 20% Windsor Road.

Due to the low traffic volumes on Townson Road and Meadow Road ingress and egress to the site is achieved safely and efficiently.

5.2.3 Accident History

Accident data was obtained from the RTA for Townson Road and Meadow Road covering the period from October 1990 to December 1995 inclusive, totalling five years and three months. Table 5.8 provides a summary of local accident statistics.

TABLE 5.8 ACCIDENT HISTORY (OCTOBER 1990 TO DECEMBER 1995)

Location	Fatal	Serious	Minor	Tow-away	Total
• Townson Road :					
1 km north of Richmond Rd	0	0	0	1	1
750m north of Richmond Rd	0	0	0	1	1
• Meadow Road	0	0	0	0	0
• Intersection of Townson Rd with Richmond Rd	0	0	0	0	0
Totals	0	0	0	2	2

This table indicates an extremely low level of recorded accidents over the last five years, with none recorded at the intersection of Townson Road / Richmond Road or on Meadow Road. RTA data includes only police-reported priority accidents and excludes any self-reported low priority accidents (less than \$500 damage to vehicle). Nevertheless, the RTA data clearly shows that the network in the vicinity of the site has a very good accident record.

5.2.4 Analysis of Potential Transport Impacts

Introduction

The quarry/landfill and brick manufacturing plant will be run as separate operations with a separate access point for each operation. The proposed development does not include any changes in arrangement or layout of the brickworks and it has therefore not been considered as part of the proposed development. Vehicles generated by the brickworks form part of the existing background traffic.

The activities included in this proposal will result in additional demand for transportation compared to the present. Current activities relate to those operations carried out in the context of brick and tile production on the site and include the following:

- export of clay/shale from the site to other PGH plants;
- import of clay/shale from other quarries for use on the site;
- export of finished products from the site;
- routine maintenance activities; and
- staff movements and customers visiting the display centre.

Changes resulting from this present proposal are as follows:

- an increase in the export of clay/shale from the site as a result of the increase in the quantity extracted;
- import of solid waste to the site for landfilling;
- export/sale of surplus material from the site;
- small increase in staff movements to account for the landfill operations on the site; and
- truck movements will take place across Meadow Road during certain phases of this project. This will have limited effect on traffic movements on the surrounding road network. Impacts would be accommodated by the development of an appropriate intersection and necessary maintenance of the road pavements.

Any other changes would be related to increases in brick and tile making activities on the site which are not included in this assessment.

Export of clay/shale to other PGH sites

Approximately 27,000 tonnes of the clay/shale currently extracted from the site is transported to other plants each year. As extraction increases, the volume of material exported would increase to a maximum figure of 110,000 tonnes per year. The transport of this increase (83,000 tonnes) would result in a minimum of 13 additional truck loads per day or 26 truck movements. This assumes that the material would be transported in 22 tonne loads for 300 working days per year. The export of clay/shale is however carried out in a series of campaigns throughout the year. The traffic will therefore be concentrated over several days per month followed by minimal export traffic for the remainder of the month.

Import of solid waste to the site for landfilling

Waste would be transported to the site in a range of vehicles with differing capacities. The proportion of each in the total vehicle mix will determine the average load carried which in turn will determine the total number of trips based on an annual waste receipt rate of 108,000 tonnes. The total number of trips is set out in **Table 5.9**. The proportions of waste vehicles of various types has been estimated from experience gained in similar landfills amended to reflect the anticipated market at Schofields.

TABLE 5.9 TRANSPORT OF SOLID WASTE TO THE SITE

Vehicle Type	Average Load (tonnes)	Load Transported (tonnes) % of total		Trips per day (one-way) ⁽¹⁾
Ro-Ro Bins	7.0	21,600	20	10
Skips	1.5	5,400	5	12
Front Lifts	8.0	10,800	10	5
Small Tipplers	10.0	27,000	25	9
Large Tipplers	20.0	43,200	40	7
Total		108,000	100%	43⁽²⁾

Notes 1: Based on 300 days per year

2: Total number of trips is double this figure

Export of Surplus Material from the site

It is anticipated that approximately 1.4 million tonnes of waste material would be excavated from the site over the life of the project. Approximately 0.65 million tonnes would be used for bund construction around the site perimeter and the remaining 0.75 million tonnes will be returned to the excavations as daily cover for the waste and the final capping. Thus it is anticipated that there will be no surplus overburden material which will need to be transported off-site.

Staff Movements

Staff movements are expected to increase marginally, corresponding to the number of employees responsible for landfill operations. This is expected to result in an additional eight trips per day.

Traffic Crossing Meadow Road

Direct movement across Meadow Road would be undertaken during the transport of material from stockpiles for bund construction around the perimeter of the southern section of the site and the movement of excavated material from that part of the site to the stockpiles in the north. This would involve the movement of approximately 1.1 million tonnes of material and would be undertaken over a period of about 15 years. This would result in some 24 crossings of Meadow Road each day (ie 12 loads) although this could be reduced by two-way loading.

Total Trip Generation

The total number of trips expected to be generated by the increased activity at the site as described in this EIS is summarised in **Table 5.10**.

TABLE 5.10 TRAFFIC GENERATED PER DAY

	Number of Trips	Percentage of Total Trips
Existing		
Quarry Vehicles		
- import	34	12.2
- export	14	5.0
Brickworks Vehicles		
- import	60	21.6
- export	70	25.2
- staff	100	36.0
Sub-Total	278	100.0
Additional		
- export of clay/shale	26 ⁽¹⁾	20.3
- receipt of waste	86	67.2
- staff	16	12.5
Sub-Total	128	100.0
Total	406	

Note 1: These activities take place over a period not exceeding 3 months per year. Total trips per day for the remainder of the year are likely to total 102 (ie. waste receipt and staff movements only). The figures in this table therefore represent a worst case scenario.

The proposal would generate an additional average of 128 vehicle movements per working day during the peak three months of the year on Townson Road and Meadow Road. This equates to about 13 movements in the peak hours. This level of additional traffic activity would have a negligible impact on traffic flow/safety conditions on the network and at the intersection of Townson Road with Richmond Road. (These movements are in addition to existing site generated traffic of 278 total vehicle movements per day outlined in **Table 5.10** which equates to about 28 vehicle movements in the peak hours).

Future traffic volume increases on Richmond Road to the north and south of Townson Road, occurring as a result of the proposal, would not be significant. A large volume of traffic already uses this road and any increases are within its capacity.

Increases along Townson Road and Meadow Road would result in a total additional number of trips in the order of 128 vehicles per day. This is about a 13% increase in traffic on Meadow Road which currently carries about 1,000 vehicle trips per day. This increase is however well within the road's functional capacity.

Additional traffic resulting from the proposed development will not have a significant impact on traffic conditions.

The minimal impact of the proposal as a new development is best illustrated by the traffic conditions experienced until recently when the previous landfill was operating. This resulted in no significant adverse traffic conditions.

5.3 NOISE ISSUES

Vipac Engineers and Scientists Ltd were commissioned by CSR to examine the acoustic environment and assess the likely impacts on the surrounding residential properties from the proposed development. The report is included in **Appendix F**.

Computer noise model impact assessments were undertaken on both the existing brickmaking plant operations and the proposed quarrying and landfilling operations, using SoundPLAN software package and SURPAC data (supplied by Australian Mine Design and Development).

The noise predictions detailed below were carried out in accordance with the German Standards VDI 2714/VDI 2720 Model for plant and mobile equipment noise and with the United States Federal Highway Administration (USFHWA) prediction method for road traffic noise.

During November 1996, Vipac engineers carried out limited environmental noise monitoring at locations within and around the perimeter of the Schofields site to compare to the computer model noise predictions for existing operational noise levels. This consisted of logging noise levels at both near-field and far-field sites of interest. It is to be noted that no extraction activities took place within the site during this period.

The validity of the SoundPLAN model results was checked through comparison between computer-calculated single point receiver values for the current operational noise levels and on-site values measured at noise logging stations during November 1996. The field noise measurements showed good agreement with the computer model noise predictions for existing operational noise levels. Noise predictions at the residences of interest indicate L_{A10} levels within (± 1 to 1.5 dBA) of the measured field data.

5.3.1 Existing Acoustical Environment

The current brickmaking plant equipment is defined as 'background' noise, as defined by the EPA, and includes the following noise sources:

- brick manufacturing equipment;
- crushing equipment;
- forklifts; and
- conveyors.

All of this equipment is operational during the day-time. During the night-time only the brick manufacturing equipment is operational.

The background noise models were developed for current brickmaking operations:

- background brick making and mobile brickmaking equipment noise, L_{10} day-time; and
- background brick making without mobile equipment noise, L_{10} night-time.

This is based on the noise level exceeded 10% of the time (L_{10}). The current EPA licence for brickmaking activities state that the L_{10} limits are 57 dBA during the day-time and 50 dBA during the night-time.

The noise levels were predicted for nine residences surrounding the Schofields site. **Table 5.11** summarises the day-time and night-time L_{10} noise level predictions for the nine residences and **Figure 5.3** shows the location of these residences.

TABLE 5.11 EXISTING NOISE LEVELS

Residence ⁽¹⁾	Day-time L_{10} (dBA) ⁽²⁾	Night-time L_{10} (dBA) ⁽³⁾
1	52.0	44.5
2	49.0	43.0
3	50.0	42.0
4	50.5	42.5
5	49.0	40.5
6	51.0	46.5
7	44.0	38.5
8	45.0	35.5
9	47.5	40.5

- Notes 1: Refer to **Figure 5.3**.
2: Day-time EPA standard is 57 dBA.
3: Night-time EPA standard is 50 dBA.

NOISE

ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN



KEY

— Site Boundary

○ Noise Monitoring Sites (1-9)

0 800m

Date : May 1997

File Name : F:/DATA/VH/0009/VH000970.cdr

The noise levels predicted for the existing day-time activities were well below 57 dBA EPA limit, with the highest recording at 52 dBA. The night-time predictions were also well below the 50 dBA EPA limit, with the highest night-time recording being 46.5 dBA.

The results clearly indicate that the noise levels generated by the existing site activities comply with the current EPA license day-time and night-time limits at all residences close to the site boundary.

5.3.2 Analysis of Potential Impacts of the Proposal

The proposed quarrying and landfilling operations were examined using selected 'worst case' scenarios, namely:

- Simultaneous Stage 2 quarrying and Stage A landfilling (Q2/LA);
- Simultaneous Stage 3 quarrying and Stage B landfilling (Q3/LB);
- Simultaneous Stage 4 quarrying and Stage C landfilling (Q4/LC);
- Simultaneous Stage 5 quarrying and Stage D landfilling (Q5/LD);
- Simultaneous Stage 6 quarrying and Stage E landfilling (Q6/LE);

The proposed quarrying and landfilling operations assumes no activity at night-time, thus only day-time operations were modelled.

The quarrying and landfilling pairings were modelled with two options each, with the relevant operations at the top and near the bottom of each void. Superimposed upon the above operations was car and heavy vehicle traffic on Meadow Road which was assumed to be similar for all future scenarios, regardless of the particular quarrying/landfilling pairing. Noise levels were predicted for a 3 to 5 metre and an 8 metre bund wall. Nine receiver points were located around the Schofields site, refer to **Figure 5.3**.

Following recent negotiations between the Clay Brick and Pavers Association and the EPA, (see Richard Heggie Associated Pty Ltd letter in **Appendix F**) the EPA have determined the maximum day-time noise level for quarrying and landfill operations to be 55 dBA and maximum night-time noise levels to be 40 dBA.

Table 5.12 shows the predicted day-time noise levels for the proposed operations with the existing incomplete 3 to 5 metre bund wall along the eastern site boundary. **Table 5.13** shows the predicted day-time noise levels for the proposed operations with the bund wall along the eastern site boundary upgraded to be continuous and 5 metres high, and with an 8 metre bund wall along the southern site boundary constructed.

TABLE 5.12 NOISE LEVELS OF THE PROPOSED OPERATIONS (3-5 METRE BUND)

Residence ⁽¹⁾	Day-time L ₁₀ (dBA) ⁽²⁾				
	Q2/LA ⁽³⁾	Q3/LB	Q4/LC	Q5/LD	Q6/LE
1	55.0	50.5	51.0	49.0	48.0
2	50.5	47.0	47.0	48.5	46.5
3	49.5	47.5	47.0	43.5	41.5
4	49.5	51.0	48.5	43.0	41.5
5	45.0	49.5	46.0	39.0	38.0
6	47.0	45.5	50.5	46.5	45.5
7	40.0	38.5	40.5	38.5	37.0
8	34.5	40.5	37.5	25.5	25.0
9	48.5	45.5	46.0	49.5	48.0

Notes 1: Refer to **Figure 5.3**.

2: Day-time EPA standard is 55 dBA.

3: Q2 refers to quarrying Stage 2 and LA refers to Landfilling Stage A.

TABLE 5.13 NOISE LEVELS OF THE PROPOSED OPERATIONS (8 METRE BUND)

Residence ⁽¹⁾	Day-time L ₁₀ (dBA) ⁽²⁾				
	Q2/LA ⁽³⁾	Q3/LB	Q4/LC	Q5/LD	Q6/LE
1	53.5	50.5	50.5	48.5	47.0
2	49.5	46.5	47.0	47.0	45.5
3	48.5	47.5	46.0	43.0	41.0
4	49.0	50.0	48.0	42.5	40.5
5	44.5	47.5	44.5	38.5	37.0
6	47.0	45.5	50.5	46.0	44.5
7	40.0	38.5	40.5	38.0	36.5
8	34.5	40.5	37.0	25.0	24.0
9	48.0	45.0	46.0	47.0	46.0

Notes 1: Refer to **Figure 5.3**.

2: Day-time EPA standard is 55 dBA.

3: Q2 refers to quarrying Stage 2 and LA refers to Landfilling Stage A.

From **Table 5.12**, it is evident that with the exception of residence 1 for stage 2 quarrying and stage A landfilling, the predicted day-time noise levels for the proposed operations with a 3-5 metre bund are below the recently agreed EPA limit of 55 dBA.

From **Table 5.13**, it is evident that with the construction of a 5-8 metre bund wall, day-time noise levels are well within the accepted limits, with the highest estimated level at 53.5 dBA (at residence 1).

Standard night-time levels for quarrying and landfilling operations have been set at 40 dBA. However, with no night-time quarrying or landfilling activity occurring, there was no need for modelling on the night-time scenarios for the proposed operations.

5.3.3 Proposed Mitigation, Management and Monitoring

Whilst it is evident that the bund wall did not need to be increased in height as an acoustic mitigation measure, the proposed heights were selected to assist in improving visual amenity and also as a means of utilising excess overburden.

The study found that all of the noise levels at residences comply with the EPA standards for the existing operations (brickmaking and/or mobile plant equipment) and the proposed quarrying and landfilling operations with the bund walls proposed.

5.4 ECONOMIC IMPACTS

There is an existing brick and tile making operation on the site utilising significant investment in a modern plant. This is located on a significant natural resource which is recognised in SREP No. 9 as of regional significance.

The Schofields area forms part of the western Sydney industrial belt. It is an area of diverse business and socio-economic activity. Extension of quarrying and landfilling will retain previous employment opportunities on the site. The proposal will also generate external employment mainly from the servicing and transport industries.

The surrounding urban areas, with retail and servicing facilities, will at best marginally benefit from the employment and incomes derived from the site. The proposal will not significantly affect further urban development in the surrounding area.

The proposal is a necessary component of the infrastructure requirements for achieving development of western Sydney. It will secure the future of the brick and clay paver manufacturing plant at Schofields by providing a long-term source of raw material at controlled costs. This will be of economic benefit to Schofields and western Sydney and provide increased security to the employees at the plant.

The continuation of quarrying of the resource creates significant void spaces which need to be restored and provide an opportunity for the disposal of solid waste as backfill. Not only does this respond to the demand for suitable and environmentally acceptable landfill space but allows the site to be rehabilitated to a profile consistent with the topography prior to the start of industrial activities. The completed site will provide the opportunity for appropriate uses to be determined nearer the closure period. This is likely to be an open space or recreational use which will be of benefit to the surrounding community at that date.

The continuation of quarrying and backfilling with solid waste will result in economic benefits for the proponent, the community in the form of job security and the local economy.

5.5 LAND/STRATEGIC PLANNING ISSUES

The regional setting within which the subject site is located is illustrated in **Figure 5.4**. The land is on the western side of Eastern Creek which flows north through Riverstone. A large area of land north of the site is flood prone land.

The planning context of the area in which the site is located has been described earlier in **Section 3.1**. The land is currently zoned general rural 1(a) within the Blacktown LEP 1988, although it is also within the Rouse Hill Development Area as illustrated in **Figure 5.4**.

5.5.1 Geology, Soils and Surface Characteristics

Regional Geology

The site is located within the geological formation known as the Bringelly Shale which is the uppermost formation of the Wianamatta Shale group. A superficial covering of Tertiary sediments known as the St Marys Formation covers the ridge crest area of the site and extends to the south.

The maximum thickness of the St Marys Formation is recorded as being some ten metres, however it is considered to be only a metre or two thick over the ridge crest area of this site. This formation consists of siliceous sandstones and shales, however the near surface materials would be expected to be extensively weathered with some remnant siliceous material.

The underlying Bringelly Shale is dominantly composed of fine-grained sediments; claystone, siltstone and laminite with fine to medium grained sandstone strata. Minor carbonaceous shale bands are also present. The Bringelly Shale is underlain by the Minchinbury Sandstone, a persistent quartz-lithic sandstone band up to six metres thick. This is in turn underlain by the Ashfield Shale Formation. As the Bringelly Shale is commonly 150 metres or so thick in this area, it is the principal geological formation of interest in this study.

The Bringelly Shale is a major resource for brick and tile making in the Sydney region. Clay minerals form some 45 to 60% of the shales; quartz being the other main constituent, with siderite comprising up to 15%. The clay minerals kaolinite, illite and mixed layer illite-smectite occur in approximately equal proportions.

Geological structure within this formation is generally very gentle, with bedding dip usually less than a few degrees from the horizontal. A regional shallow dip towards the south-west would be expected due to the presence of the Penrith Basin syndline structure in this area. The principal lineaments (topographic expressions of underlying geological structure) in the region are oriented north-south. Consequently jointing would be expected to be oriented approximately north-south and commonly near vertical.

REGIONAL SETTING

ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN



KEY

	Existing Residential		Flood Prone Land		Railway
	Industrial		Rouse Hill UDP Release Areas (Stage 1)		Transmission Lines
	Town Centre		PGH Site		Proposed Major Arterial
	Scheduled Lands (Major Areas)		Main Roads		Rouse Hill Development Area

Date : May 1997

File Name : F:\DATA\WH\0009\WH000954.CDR

Stratigraphy

Site stratigraphy consists of 6 to 16 metres of residual clays and silty clays formed by in situ weathering of the shale bedrock which is the main type underlying the area. The residual soil cover thins towards the eastern section of the site. Beneath the overburden clays the bedrock is predominantly shale/siltstone units. Some of these shale units are black and carbonaceous. The dark carbonaceous units tend to overlie a lighter coloured, possibly leached, zone of shale. Well cemented sandstone units up to six metres are present, considered to be lenticular and of limited lateral extent. A more extensive lenticular sandstone unit of greater than eight metres thickness is encountered in the eastern section of the site. This well cemented sandstone unit also contains isolated zones of coal and carbonaceous organic material which have provided planar weaknesses along which fractures have developed (Golder Associates, 1994).

An indicative soil profile of the land to the north and south of Meadow Road is attached as **Figure 5.5**.

Soil Characteristics

Soils are typically part of the 'Blacktown' series. Higher landscape positions (crests, upper slopes and mid-slopes) are characterised by red and brown podzolics with texture contrast profiles. The soils of this series have friable A horizons and hard-setting mottled B horizons. Lower slopes are characterised by yellow podzolic soils that exhibit similar features (Bannerman and Hazelton 1989).

Eastern Creek is part of the 'South Creek' soil series. These soils evolved from Quaternary alluvium derived from the Wianamatta Group, and are dominated by brown loams and bright brown clays.

Where the site has not been significantly disturbed, soils vary in depth from approximately 50 mm on elevated parts to 300 mm on lower sections.

Erosion Potential

The characteristic hardsetting B horizons and moderate to high organic matter content of the soils, combined with the relatively low relief give a moderate erosion potential for the site (Bannerman and Hazelton 1989). Furthermore, visual inspection of the disturbed quarry site did not show any significant erosion. The compacted road surfaces are resistant to erosion.

Erosion from the site is currently controlled by a series of water management measures and revegetating disturbed areas. A detailed rehabilitation plan will be developed prior to placement of earth mounds and will detail an ongoing strategy for minimising soil erosion from the site. The basis for this plan is described in **Section 2.4**.

Large exposed areas not required for immediate quarrying or landfilling will be grassed to minimise erosion.

5.5.2 Existing Land Use/Zoning Issues

The first recorded production from the Schofields site was in 1962. Autobrick Industries Pty Ltd produced 19,300 tonnes during that first year. There has been continuous production from the site since then.

History of Previous Use of Land

North of Meadow Road the property is predominantly used for brick manufacture and associated quarrying and stockpiling. A former quarry void within the northern part of this site has been filled using solid waste and is being revegetated. An electricity transmission line traverses the northern property and is contained within a 60 metre wide easement.

South of Meadow Road the land was previously used for grazing. The property is presently used by the Blacktown and Districts Mini Bike and Mini Cycle Club. The club has no tenure on the land by way of a lease and accepts that it is permitted to use the land until it is required for other purposes by the Company. The club has constructed a rudimentary clubroom and extensive dirt racing track over approximately 60% of the site. Further east is a 15 metre wide easement for the Sydney-Newcastle oil and gas pipeline. A small area located to the east of this easement was excavated in the past to determine its suitability for brick manufacture.

Surrounding Land Use

The dominant land use surrounding the site is rural residential. Agricultural activities consist mainly of market gardens, with some animal husbandry and associated practices. A privately operated educational establishment is located immediately east of the quarry while near the northern boundary is an amusement/entertainment facility. Fifteen residences are within 250 metres of the site boundaries, most being located east of the quarry area and north of the completed landfill. Much of the western surrounds are forested land, with a smaller area adjoining the south west boundary occupied by an orchard.

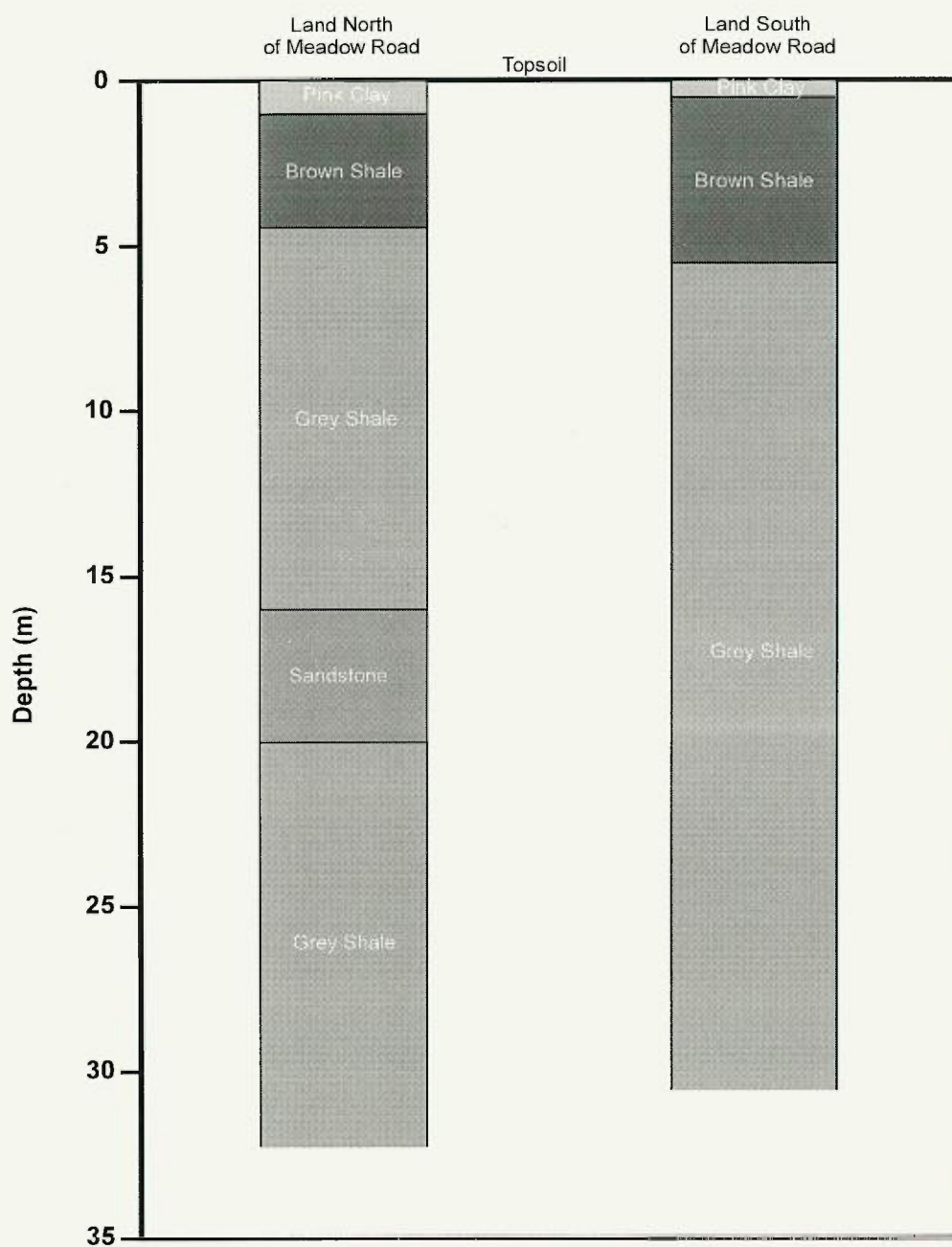
Surrounding land use and important features are shown on **Figure 4.1**.

Property Ownership

A total of 27 properties adjoin the site. Property descriptions and existing land use of both adjoining and adjacent properties are given in **Table 5.14**. Location of these properties is shown on **Figure 5.6a**. A summary of the land use in the local area is illustrated in **Figure 5.6b**.

INDICATIVE SOIL PROFILES

ENVIRONMENTAL IMPACT STATEMENT PGH SITE, SCHOFIELDS BLACKTOWN



ADJOINING PROPERTIES (LAND USE)

ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN



KEY

1 - 48 Adjacent and Adjoining Properties.

For details of property descriptions and land use see Table 5.14.

0 600m

Date : May 1997

File Name : F:/DATA/VH/0009/VH00094a.cdr

Figure 5.6a
CMP S&F

LAND USE (LOCAL AREA)

ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN



Date : May 1997

File Name : F:/DATA/VH/0009/VH000955.cdr

Figure 5.6b
CMP&F

TABLE 5.14 LAND USE OF ADJOINING AND ADJACENT PROPERTIES

Ref. on Fig. 5.6A	Property Description	Uses
1, 2	Lots 21 & 22 DP 584915	Dwelling/Animal-Breeding Accommodation/Vet..
3	Lot 11 DP 17048	Dwelling/Agriculture
4	Lot 10 DP 17048	Dwelling
5	Lot 9 DP 17048	Dwelling
6	Lot 8 DP 17048	Dwelling
7	Lot 7 DP 17048	Dwelling, Retail Nursery
8	Lot 4 DP 27536	Derelict Building
9, 10, 11, 12	Lots 5, 6, 7 & 8 DP 27536	Vacant Land
13	Lot 9 DP 27536	Dwelling
14	Pt. P 30	Dwelling
15	Lot 2 DP 232574	Vacant Future Use (Dwelling under construction)
16	Lot 4 DP 853847	Disused Aerodrome and HMAS Nirimba, Campus, Driving school
17	Lot 23 DP 12076	Dwelling/Storage Structure
18	Lot 24 DP 12076	Dwelling
19	Lot 25 DP 12076	Dwelling
20	Lot 26 DP 12076	Vacant Future Use
21	Lot 27 DP 12076	Dwelling/Agriculture
22	Lot 28 DP 12076	Dwelling
23	Lot 29 DP 12076	Dual Occupancy Dwelling
24	Lot 100 DP 583063	Multiple Dwelling/ Storage structure
25	Lot 32 DP 12076	Dwelling/Agriculture
26	Lot 33 DP 12076	Dwelling/Agriculture
27	Lot 34 DP 12076	Dwelling/Agriculture
28	Lot 35 DP 12076	Dwelling
29	Lot 36 DP 12076	Building under construction/storage structure
30	Lot 37 DP 12076	Dwelling/Educational establishment
31	Lot 8 DP 193074	Dwelling
32	Lot 9 DP 193074	Dwelling
33, 34	Lots 110 & 111 DP 787965	Dwelling & Animal Husbandry
35	Lot 2 DP 115178	Building under construction/Storage structure
36	Lot 1 DP 115178	Amusement/Entertainment Centre (Croatian Cultural, Educational Association)
37, 38	Lots 114 & 115 DP 129063	Recreational establishment (Centro Sociale Italiano)
39, 40	Lots 16 & 17 DP 193074	Vacant future use
41	Lot A DP 376106	Dwelling/Agriculture
42	Lot 58 DP 12076	Dwelling

TABLE 5.14 LAND USE OF ADJOINING AND ADJACENT PROPERTIES (Cont'd.)

Ref. on Fig. 5.6A	Property Description	Uses
43	Lot 590 DP 815588	Dual Occupancy Dwelling
44	Lot 60 DP 12076	Dwelling, Kennel/Cattery
45	Lot 61 DP 12076	Dwelling
46	Lot 62 DP 12076	Dwelling/Agriculture
47	Lot 41 DP 12076	Dwelling
48	Lot 42 DP 12076	Dwelling

5.5.3 Analysis of Potential Impacts of the Proposal

Land Disturbance resulting from Construction and Operational Activities

The northern part of the site is already established for quarrying, including provision of all necessary infrastructure and has been substantially altered. The proposal will create a relatively minor change to activities which are currently being undertaken on the site. Landfilling of the quarry void with non-putrescible waste will rehabilitate the quarry to allow for future use. The quarry void itself would serve no useful purpose.

Quarry operations have been undertaken on the site for over 20 years while landfilling has occurred for several years until approximately 12 months ago. There have been few complaints regarding these activities. Continuation of quarrying and landfilling will not alter the scale of operation or activity on the site. Placement of the earth mound on the property south of Meadow Road, where there are no current earthworks, will be completed over a period of about eight years depending on the rate of extraction. This mound will reduce existing noise transmission from mini-bike racing on the property which would continue until extraction commences. Potential impacts on surrounding properties arising from the proposal would mainly relate to:

- traffic movements along Meadow and Townson Roads. However, the number of vehicles generated by the proposal will be fewer than that which was characteristic of past site operations;
- noise and dust emanating from the site, but controlled by improved safeguards;
- visibility of machinery over a short period during earth mound construction; and
- creation of mounds on the property south of Meadow Road which will limit views from some nearby residences, but following revegetation will effectively blend in with the rural landscape.

A range of control measures will be implemented to ensure that potential impacts arising from operations are kept to within contemporary environmental limits.

Groundwater Impacts

The claystones, siltstones and sandstones underlying the site are rocks of negligible primary porosity and permeability due to their fine grained nature and the high degree of intergranular cementation. Groundwater in these formations is stored and migrates principally in fractures and joints and the extent to which such joints are open and interconnected determines the extent of secondary permeability.

Surface clays form a capping layer over the less weathered rock mass restricting rainfall infiltration and groundwater recharge. High salinity and low yields are a common feature of the groundwater in the formations of the Wianamatta Group.

The overall hydraulic gradient is towards the east and north east in the direction of Eastern Creek. Existing quarrying at the site has produced a small depression in the water table adjacent to the pit which is likely to result in the creation of an inward gradient which would impede migration of any potential leachates outwards from the proposed landfill cells. This is expected to be repeated for each cell as extraction occurs across the site.

While it is possible that groundwater may seep into the excavations depending on the permeability and integrity of the surrounding formations, the hydrogeological conditions at the site are such that the migration of any leachate produced within the landfill is unlikely while operations are underway.

5.5.4 End Use of the Site

It is proposed that the final end use of the site will be for the purposes of recreation/open space, and will be finalised in conjunction with Blacktown City Council. As the site is located within the Rouse Hill Development Area, the requirements of SREP No. 19 need to be taken into consideration when determining the end use of the site. In particular, the plan encourages the conservation of areas of landscape, flora and fauna, cultural, historic and architectural value. The growth of population in the Rouse Hill Development Area will increase the demand for recreational facilities. As the rehabilitated site will not be suitable for building development, it is appropriate that the site be rehabilitated to provide an appropriate recreational area for an increasing urban population. A landscape concept plan illustrating the potential open space/recreational use of the site after rehabilitation is completed is included earlier in **Figure 2.1f**.

5.6 ENERGY AND UTILITY SERVICES ISSUES

5.6.1 Existing Provision

Power

Power is currently connected to the site to supply existing needs. This will be adequate for any future activity, including simultaneous operation of the manufacturing plant, quarry and landfill operations.

Water

The site is connected to the Sydney Water supply system. This will be adequate to service the needs of future operations.

Sewerage

A proprietary aerobic sewage treatment and effluent irrigation system currently operates on the site. This facility is licensed by the EPA and is adequate for the requirements of employees working in manufacturing and quarry related activities. There will be no additional loading as a result of the proposal. The landfill contractor will provide its own portable facilities for the duration of landfill operations.

5.6.2 Proposed Requirements

It is not expected that any augmentation of existing utility service supply to the site will be necessary.

5.6.3 Assessment of Energy Use

Energy Expenditure

The estimate of the energy likely to be expended in relation to the operation of the site at Schofields can be divided into three separate components:

- Operational requirements at the site mainly consisting of the consumption of diesel fuel used to power mobile plant. Relatively small amounts of electricity will also be consumed to provide lighting, to operate pumps and for general service requirements. Energy is also consumed at the site in relation to brick and tile manufacture but this is not included in these estimates as it does not constitute part of the present proposal.
- Excavation of the clay/shale material from the site and transport of a proportion to other locations for brick and tile manufacture.
- Transport of the solid waste from its source to the site for landfilling. This would consist exclusively of the consumption of diesel fuel used to power the trucks bringing waste to the site.

A broad energy audit has been based on the consideration of these three components. An annual average of 120,000 tonnes of landfill will be placed at the site over its life under the medium waste generation scenario. Landfilling is assumed to take place for 300 days per year, although working hours for each activity will vary depending on specific requirements.

Site Operations

These have been divided into three main operations as follows:

- extraction of the clay/shale providing airspace for subsequent landfilling;
- transfer and placement of cover material; and
- waste placement and general operations.

Extraction of Clay/Shale

This represents a total activity of 69 months over the first 23 years of the project and none over the following 10 years. Average activity over the whole life of the project is 47 days per year. **Table 5.15** shows the energy expenditure for various extraction equipment.

TABLE 5.15 ENERGY EXPENDITURE PER ANNUM - EXTRACTION

Equipment	Time (Hours)	Fuel Consumption (litres/hour)	Total (litres)
Bulldozer	250	55	13,750
Scraper (Two)	940	25	23,500
Front end loader	470	15	7,050
Water truck	250	5	1,250
Total			45,550

Transfer and Placement of Cover Material.

This activity involves the removal, stockpiling, trucking and placement of 36,000 tonnes of cover material each year. **Table 5.16** shows the energy expenditure for the transfer and placement of cover.

**TABLE 5.16 ENERGY EXPENDITURE PER ANNUM - TRANSFER AND PLACEMENT
OF COVER**

EQUIPMENT	Time (Hours)	Fuel Consumption (litres/hour)	Total (litres)
Front end loader	800	15	12,000
Dump truck	800	20	16,000
Water truck	400	5	2,000
Total			30,000

Waste Placement and General Operations

This includes the placement and compaction of an average of 102,000 tonnes of waste a year, construction of a number of earth mounds on the site and the energy requirement related to the management of operations. **Table 5.17** shows the energy expenditure for the placement of cover and general operations.

TABLE 5.17 ENERGY EXPENDITURE - WASTE PLACEMENT AND GENERAL OPERATIONS

Equipment	Time (Hours)	Fuel Consumption (litres/hour)	Total (litres)
Compactor	2,100	15	31,500
Bulldozer	1,500	55	82,500
Water pump	250	5	1,250
Water truck	1,500	5	7,500
General site operations	(equivalent)		2,500
Total			125,250

Transport of Clay/Shale and Waste

The total amount of waste (and cover) transported to the site from all sources is 108,000 tonnes. Approximately 83,000 tonnes of clay/shale will be moved from the site for brickmaking at other PGH plants. Table 5.18 shows the energy expenditure for the transport of clay/shale and waste.

TABLE 5.18 ENERGY EXPENDITURE PER ANNUM - TRANSPORT

Trips	Average Distance (km)	Total Distance (km)	Fuel Consumption (km/litre)	Total (litres)
3,810	20	76,200	4	19050
29,160	30	874,800	6	145,800
3,250	35	9,800	4	2,450
Total				167,300

In addition, some 152,000 tonnes of clay is imported from other quarries for brickmaking each year. The energy expended in moving this material is not included in the estimates set out in Table 5.18.

Annual energy consumption resulting from the proposal set out in this document can be summarised as shown in Table 5.19:

TABLE 5.19 ANNUAL ENERGY EXPENDITURE

Activity	Fuel Consumption (litres/diesel)	Energy ⁽¹⁾ (Gigajoules)
Site operations	200,800	7,722
Transport	167,300	6,434
Total	368,100	14,156

Note 1: A heating value of 38.5 megajoules/litre of diesel fuel has been used in this calculation.

5.6.4 Consideration of Alternatives

Energy Use Management

All activities at the site and the transport of clay/shale and waste are reliant on the use of mobile equipment fuelled predominantly by diesel. A proportion of the trucks used to transport waste to the site would use petrol and a small proportion of equipment will derive its energy from electricity. At present, none of the activities proposed can be undertaken using alternative fuel sources.

All vehicles and equipment used on site will be of recent origin, working at high levels of efficiency. Regular servicing and the replacement of older equipment over the life of the project will ensure that this is maintained.

5.6.5 Greenhouse Gas Implications

Human activity has led and is still leading to increased atmospheric concentrations of existing greenhouse gases (carbon dioxide, methane, nitrous oxide and ozone) as well as to the presence of new gases such as chlorofluorocarbons. It is now believed that the presence of these additional greenhouse gases will affect the radiation balance of the earth's surface. The consequent impact on global climate is likely to be complex but is expected to lead to changes to sea level, diurnal temperatures, rainfall and other climatic variations. Unless large reductions in emissions occur concentrations of most greenhouse gases will continue to rise well into the next century.

The most significant greenhouse gases are carbon dioxide (73%), methane (23%) and nitrous oxide (3%). Emissions of these gases are dominated by the combustion of fossil fuels which accounts for two-thirds of the total. The majority of the fuel combustion emissions are generated by the energy and transformation industries (61%), industry (13%) and transport (25%).

Other significant contributors to total greenhouse emissions are land use change, forestry and agriculture. The industrial processes, solvents and waste sectors make relatively minor contributions.

In the context of this proposal the most significant emissions are related to transport (CO₂) and the landfill itself (CH₄ and CO₂). Methane is a major constituent of landfill gas. However due to the nature of waste material to be accepted, the production of gas and hence its methane component (64% of the total) is expected to be minimal.

Carbon dioxide emissions from the production and use of energy result predominantly from electricity generation from coal (48% of energy sector emissions). Petroleum products account for 34% and natural gas 13% (ABARE 1993). Reductions in the production of greenhouse gases from transport will require a widespread response including the introduction of more efficient vehicles and petroleum driven machinery, switching to cleaner fuels and a firmer focus on better process management. Apart from the latter, none of these will have any affect at the scale of a single project.

5.7 WATER ISSUES

Water is required on-site for staff amenities, brick making activities, the suppression of dust on unsealed active haul roads, material stockpiles and excavation areas and the irrigation of rehabilitation areas. Potable water is supplied to the site via Sydney Water reticulation pipelines. The capturing of stormwater provides the site with a significant volume of water which is suitable for non-potable needs. Dust suppression and irrigation requirements are estimated to be a total of nine megalitres per annum.

5.7.1 Existing Water Environments

Hydrogeological investigations have been undertaken by Golder Associates and Woodward-Clyde. The Woodward-Clyde reports are included in **Appendix G**.

Groundwater

Beneath the site, the subsurface conditions of the site comprise a 2 to 3m thick capping clay layer underlain by a low porosity sedimentary bedrock of up to 14m thickness. The clay layer restricts rainfall infiltration and groundwater recharge. However, where the clay layer is absent, such as within the quarried areas, localised recharge will be greater. In dry periods the quarry acts as a groundwater sink, with inflow expected to be less than one cubic metre per day per 100 metre length of face exposed. The groundwater level is generally quite deep, ranging from 9 to 20 metres below existing ground surface. This level is slightly above the base of the existing quarry area and some 10 metres above the projected base elevation of the planned quarry.

The most significant characteristic of the groundwater is its high salinity, with a total dissolved solids concentration of 13,800 to 18,500 milligrams per litre. Because of its salinity, the existing groundwater has limited beneficial use, being unsuitable for drinking by humans or stock and of marginal application for crop watering. Groundwater samples were tested for potential contaminants arising from the completed landfill in the northern part of the site. No cyanide, phenolic compounds, petroleum hydrocarbons or volatile aromatic hydrocarbons were detected. Metals are present in generally low levels and are considered to be of natural origin.

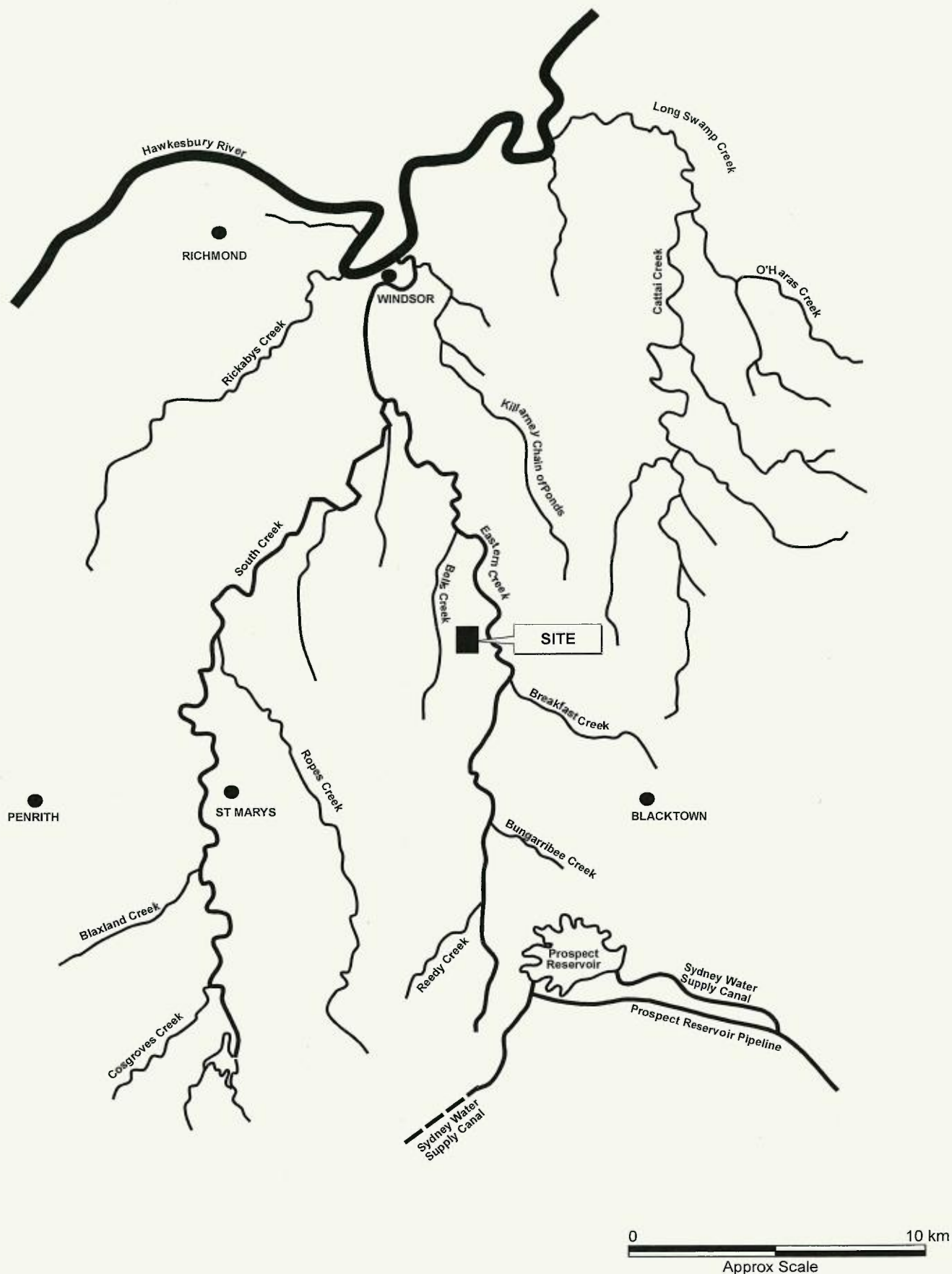
Surface Water

The site topography is relatively flat with no pronounced ridge lines. The major natural water course is Bells Creek located to the west of the site. Bells Creek flows in a northerly direction and ultimately joins Eastern Creek about 3.5 kilometres north of Townson Road. Eastern Creek then continues in a northerly direction joining South Creek, which eventually enters the Hawkesbury River at Windsor. The receiving waters surrounding the site are shown in **Figure 5.7a**.

A limited sampling programme in June 1996 determined that the quality of the surface water in the dam in the main quarry is satisfactory. It is expected that the water in the surrounding natural water courses is of sufficient standard to be suitable for livestock purposes except for short periods after periods of heavy rainfall, when high concentrations of bacteria from the adjacent pastures would tend to wash into the creeks and dams.

RECEIVING WATERWAYS

ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN



Date : May 1997

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Figure 5.7a
CMP&F

The overburden soils are generally clayey with low permeability. This results in a low infiltration rate and a high runoff rate. Four subcatchment areas have been identified within the site as shown on **Figure 5.7b** and described below:

- **Catchment 1**

This catchment consists of the land bounded by Meadow Road and the northern perimeter of the existing quarry. This includes the manufacturing plant and product/raw material stockpile. All runoff from the quarry and its immediate surrounds accumulates in the quarry floor. A small undisturbed area of land in the south-west corner and along the northern side of Meadow Road drains directly to a road culvert and a natural drainage path. The remainder of the catchment drains to a settlement pond in the south east corner of the catchment with overflows proceeding through a culvert under Meadow Road and then to a surface drain which joins Eastern Creek on the eastern extremity of the site.

- **Catchment 2**

This area is bounded by the transmission line to the north and the quarry to the south. The area is extensively disturbed as a result of past clay extraction. A large storage dam is centrally located to intercept surface runoff and receive water pumped from the quarry in the adjoining catchment. Water from this pondage is used on the site or overflows during major storms to a drainage channel near the eastern boundary. Further east, surface runoff drains to two small sediment ponds and then through a gap in the bund to a natural watercourse which flows from the property. This watercourse feeds a number of farm dams before joining Eastern Creek.

- **Catchment 3**

This catchment is bounded by the transmission line, and the northern and western site boundaries. The catchment drains westwards to Bells Creek and includes the recently completed landfill which is undergoing revegetation in accordance with a management plan developed for the area.

- **Catchment 4**

This catchment relates to the undeveloped part of the site east of Meadow Road up to the underground gas pipeline. It includes a natural depression which drains northwards to the bend in the road where a narrow trench has been excavated parallel to the boundary of the site. The trench combines flows from catchments 1 and 4 into a single watercourse which crosses the natural gas pipeline near the northern boundary of catchment 4. The area to the east of the pipeline drains into Eastern Creek. This area is subject to inundation in the 1 in 100 year flood. A permanent dam is located between the 20 year and 100 year flood contours.

All runoff generated from disturbed quarry and stockpile areas is stored in dams. Water is then used for dust suppression, plant watering, brick manufacture, or overflows to natural watercourses. If required, runoff from an extreme storm can be stored in the quarry and discharged to natural drainage once it is sufficiently settled. This system of

runoff control is effective in ensuring that water leaving the site meets acceptable water quality criteria as discussed in **Section 2.4**.

Bells Creek and Eastern Creek are not classified waterways under the *Clean Waters Act* and thus no specific water quality criteria is applicable for industrial discharges. However any discharge, other than uncontaminated stormwater, to the watercourses in the area will be subject to a licence issued by the EPA under the *Pollution Control Act 1970*. The conditions of such a licence will reflect the existing water quality of the receiving waters as well as the agricultural water uses and aquatic systems in the lower Hawkesbury River.

The site currently has only one EPA licensed discharged point which is associated with the land application system for treated sewage effluent. The system is designed to discharge waters only during and/or after rainfall.

Due to its elevation and natural drainage the site is unlikely to be flood prone. Significant ponding of stormwater may occur in the vicinity of Meadow Road following heavy rainfall. Instances of flooding of adjoining properties to the south-east site have occurred. These occurrences have recently been addressed by the reconstruction of the dam in the south-eastern corner of Catchment 1 and by the regular maintenance of the culvert which takes stormwater flow under Meadow Road. **Figure 3.3** shows the westward extent of a 1 in a 100 year flood of Eastern Creek. It is evident that such a flood would not extend as far west as the gas pipeline and thus have no effect on any activities taking place on the remainder of the site.

5.7.2 Analysis of Potential Impacts of the Proposal

Groundwater

The proposal will result in quarrying below the groundwater level and filling the resulting void with solid waste. Saline groundwater seeping into the quarry will mix with surface runoff before being pumped to a surface dam for use in dust suppression, plant watering and in the manufacturing plant. The relatively large quarry catchment would effectively dilute the expected small quantity of saline inflow to levels similar to that of natural runoff. As the surface dam fills, with potential to overflow to natural drainage, its contents will be sampled and analysed. If water quality criteria are not met, overflows will be directed back into the quarry.

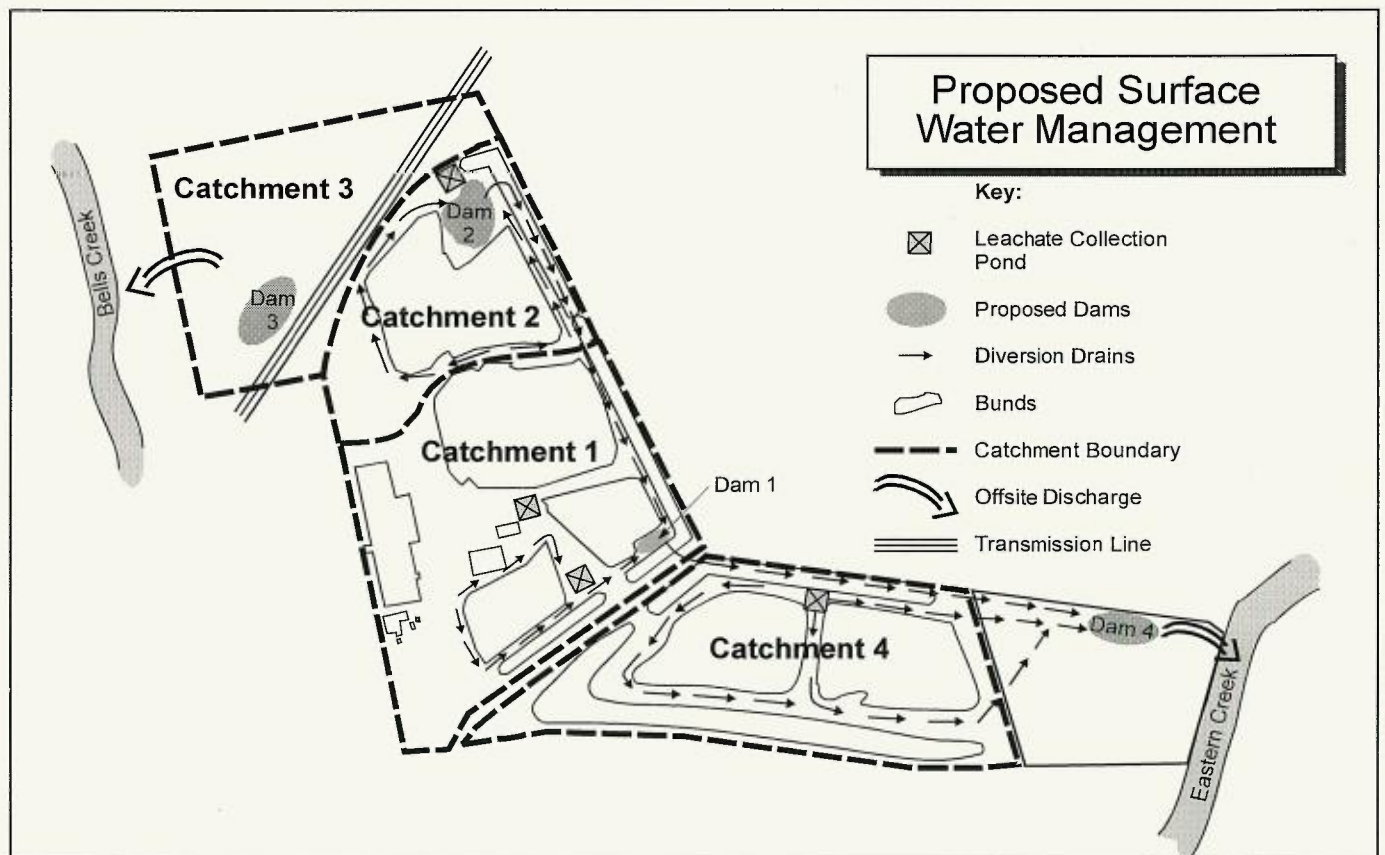
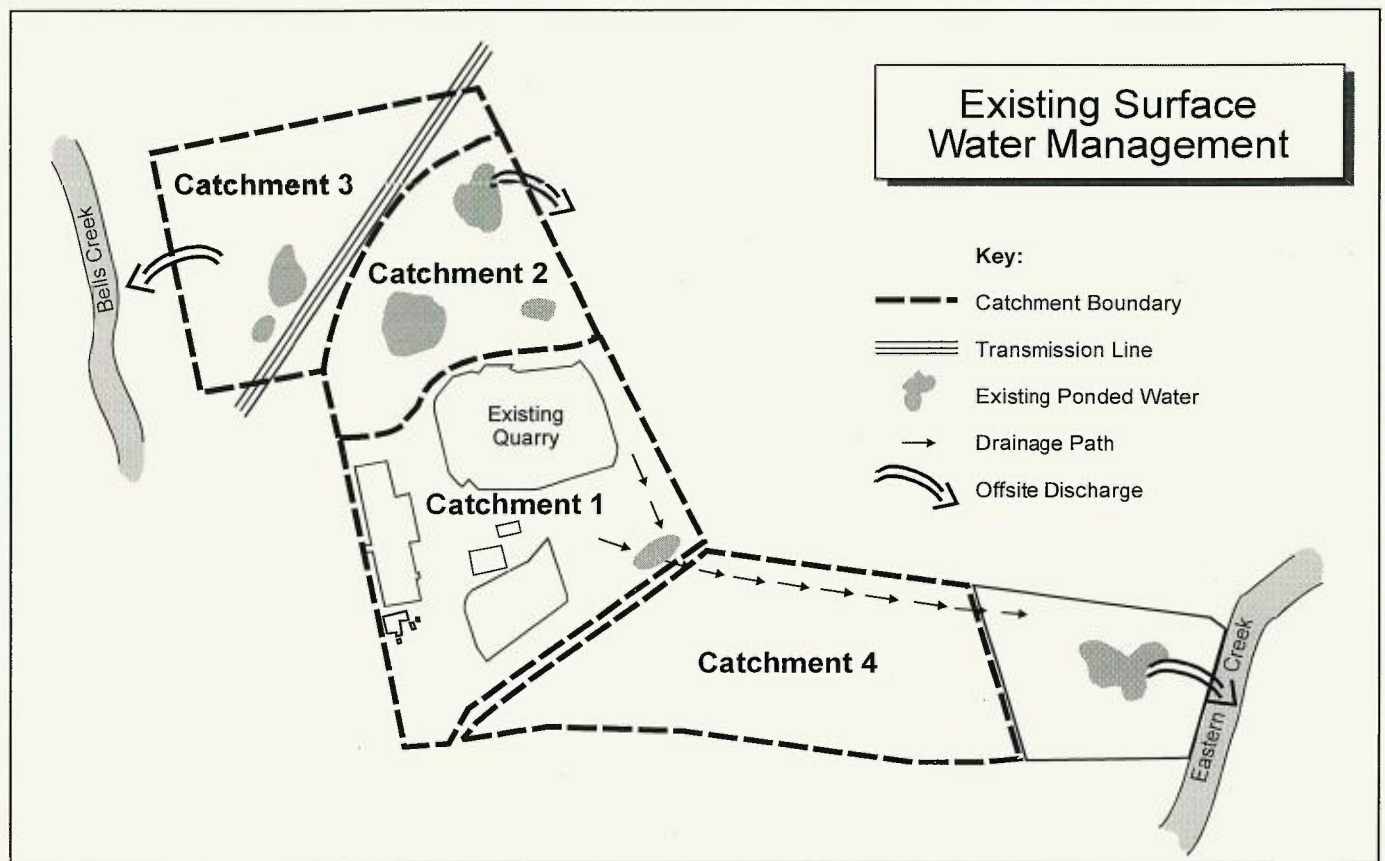
Surface Water

The proposal of continued quarrying and thence landfilling and rehabilitation, will result in the following potential sources of contamination for surface water:

- disturbed areas stripped of vegetation
- brick making and associated activities
- active quarrying areas
- active landfill areas

SURFACE WATER MANAGEMENT

ENVIRONMENTAL IMPACT STATEMENT PGH SITE, SCHOFIELDS BLACKTOWN



- occasional leachate generation from the landfill areas

The water quality resulting from the above contamination sources varies from mildly turbid, to a significant suspended solids contamination. In addition there is potential for leachate generation which will chemically reflect the contents of the landfill.

In the absence of any mitigation measures there is the potential for essentially clean runoff from minimally disturbed areas to become contaminated by entering any of the above areas. Such contamination will significantly increase the volume of contaminated runoff which will require collection and treatment prior to release off-site. However, with the implementation of the pollution control measures outlined in **Section 5.7.3** such contamination can largely be eliminated. These mitigation measures will also restrict off-site discharges to storm events. In these conditions the discharge is unlikely to have a significant impact on water quality in Eastern Creek and Bells Creek due to the dominance of upstream contributions.

5.7.3 Proposed Mitigation, Management and Monitoring

Groundwater

A 900 mm compacted clay layer will be placed over the base of the cell prior to landfilling to act as an appropriate barrier between the waste and the surrounding formations. Grading the base layer and installation of drainage pipes will facilitate collection of leachate into sumps. Leachate will then be pumped to a dry well where it will evaporate or be recirculated back into the landfill. The effect of the leachate drains and pumping arrangement will be to maintain the groundwater sink after the completion of quarrying. The small inflow of groundwater above the clay barrier will be collected and recirculated along with the leachate

Due to low permeability, site conditions and the proposed management controls it is concluded that there will be no significant impact on groundwater characteristics. After a period of 30 years following the completion of landfilling, the potential for leachate generation will have diminished and the ground water quality and level will return to its former conditions.

Surface Water

The existing water management system will remain in place during the proposed quarrying and landfill operations. Modifications to this system are detailed in the LEMP (see **Section 7**) for progressive implementation to reflect changes in topography, areas of disturbance and progression of rehabilitation. The major change to surface water drainage resulting from the proposal will be the placement of earth mounds on the property south of Meadow Road. This will alter the flow paths from some of the catchment draining to this area, but will not affect any other property. Diversion of runoff will occur within the PGH property. Extending the earthen mound along the eastern site boundary (north of Meadow Road) will require installation of culverts to allow continued overflow drainage from the site. Culverts will be designed to pass flows from a 1 in 20 year storm so that minimal alteration to existing drainage characteristics will occur.

As indicated in **Section 5.7.1** the proposed operations are all located above the 1 in 100 year flood level.

After the landfill commences operation, water collected on the quarry floor will be tested prior to each pumping episode to confirm its suitability for storage in the leachate collection ponds. Criteria and treatment options are outlined in the LEMP and will be further developed in consultation with the EPA.

Water balance modelling concluded that under most climatic conditions, dust suppression and irrigation water demands could be adequately met by stormwater dam storage. Any surplus stormwater could be used to supplement brick manufacturing requirements. Should a deficit occur, water could be sourced from the reticulated supply from Sydney Water.

Proposed pollution controls aimed at minimising the quantity of contaminated stormwater and minimising the occurrence of uncontrolled discharges onto adjoining properties, include:

- **Clean Water Diversion**

Wherever practical, clean water runoff will be diverted around disturbed areas to minimise the volume of sediment laden water which requires collection and treatment. Such diverted clean runoff will be acceptable for discharge into the local watercourses. **Figure 5.7b** provides indicative locations of the proposed diversion channels. The diversion channels are designed in accordance to the DLWC (formerly CALM) guidelines. (Department of Conversation and Land Management 1992). Design details are provided in the DLEMP.

- **Runoff from Disturbed Areas**

Runoff from areas stripped of vegetation will be directed by open earth vee drains to settlement dams. **Figure 5.7b** provides indicative locations of these dams. After settlement, the clarified water will be suitable for on-site irrigation and dust control purposes. The settlement ponds are also designed in accordance to the DLWC (formerly CALM) guidelines. Design details are provided in the DLEMP. These designs also provide details of the development of the diversion works and settlement dams with regard to the extraction and landfill staging.

- **Landfill Runoff and Leachate Management**

Stormwater infiltration is one of the major contributors to the generation and migration of leachate in landfills. Management strategies will be implemented to minimise stormwater infiltration on the clean fill cover material including the daily compaction and covering of the landfill material. On completion, each landfill cell will be capped and graded to promote the movement of runoff away from the active cells, thereby minimising the potential of infiltration and leachate generation. Stormwater runoff from within the landfill area will be directed into a dedicated sump and thence pumped to leachate collection ponds. In addition, a riser pipe in the centre of the landfill will allow for the collection and monitoring of any leachate which is generated. Collected leachate will be pumped to the leachate ponds and disposed of by evaporation, irrigation, dust suppression or

recycling over the active landfill as appropriate. **Figure 5.7b** provides indicative locations of these ponds which will vary as the landfilling progresses. Design details are provided in the DLEMP.

- **Truck Wash Down Water**

Before leaving the site all trucks will be washed down using a high pressure, low volume water hose. The wash down area will consist of a bitumen area sloped towards a collection pit. The water from the collection pit will be coarsely screen and then piped to the leachate collection ponds.

Figure 5.7c shows typical surface water drainage details.

It is important that monitoring of the site is carried out on a regular basis to ensure that the impacts of the landfill remain acceptable. Any unforeseen contamination can be detected and appropriate modifications implemented. Commencement of the monitoring programme prior to landfilling will allow the true impact of landfilling activities to be determined. The full monitoring programme is provided in the DLEMP. The following outlines the proposed initial inclusions in the site monitoring programme:

- Quarterly monitoring of the groundwater depths and the laboratory determination of 38 analytes in groundwater samples.
- Bi-annual sampling and laboratory analysis of surface water samples from Bells Creek.
- Monitoring of leachate in the post closure period or in the event that it becomes necessary to discharge leachate off-site.

5.8 SOCIAL ISSUES

Potential impacts on the local community can be considered under the following headings:

- direct and indirect effects in terms of local employment;
- effects on local businesses;
- impacts on the amenity of local residents.

The re-establishment of landfilling activities at the site will result in four additional permanent jobs over current levels. However the continuation of extraction of clay/shale over the next 23 years will guarantee the security of the existing jobs employed in brick and tile manufacture at the existing plant on the site.

Local businesses have already benefited from activities undertaken at the site resulting from injection of spending into the economy. The continuation of these plus the re-introduction of landfilling will ensure that these benefits continue over a long period.

The proposed continuation of site operations and their extension to a larger area than currently affected will have some impacts on local amenity. These result from the unavoidable impacts of such activities in the form of noise, dust, traffic and visual

changes to the area and have been assessed in detail in other sections of this EIS together with the measures included to minimise their effects.

When taken together, these impacts influence the amenity of local residents and this can be considered to be a social issue. Overall, the amenity of those areas adjacent to the site has been influenced by the activities undertaken there over a number of years. The intensity of these activities is not expected to increase greatly although the area affected will be extended to include the land to the south of Meadow Road. However, various amelioration measures will be introduced which will both minimise those impacts which influence the amenity of this area and ensure that ultimately the site is restored to a state which represents a substantial improvement over the present.

5.9 VISUAL IMPACTS

5.9.1 Existing Visual Environment

The local visual environment is characterised by rural land holdings, market gardens and associated dwellings. There are some large areas of forested land (to the north and east). Significant viewing points to be considered are nearby residences and along local roads.

The existing quarry is obscured due to its location near the centre of a large property and the presence of the landscaped bund and surrounding vegetation. An illustration of the existing visual environment is shown in **Figures 5.8b(i),(ii) and (iii)**. A continuation of current quarrying and landfill operations will not greatly alter the appearance of the site. The landscaped earth mound on the eastern boundary will be extended, stabilised and raised as appropriate. Landscaping on the mound will partly obscure the barrier, softening any change to the appearance of the PGH property when viewed from adjoining areas. Careful maintenance and irrigation of the landscaping will be undertaken to assist in developing the screen.

The southern half of the site exhibits a different visual character. In addition, due to the topography of the area it is significantly more visible from adjacent roads than the existing quarry. While a substantial proportion of its original vegetation remains parts of the site have been cleared and activities taking place there (mini-bike racing) have resulted in a high level of modification. The area is generally flat and low lying with approximately 35% of native vegetation remaining. That part of the site closest to Eastern Creek is swampy with a consequent change in vegetation and visual quality.

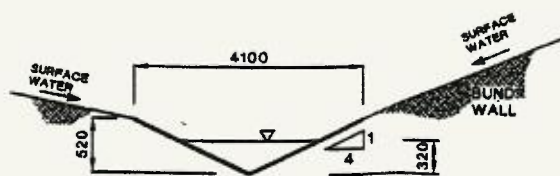
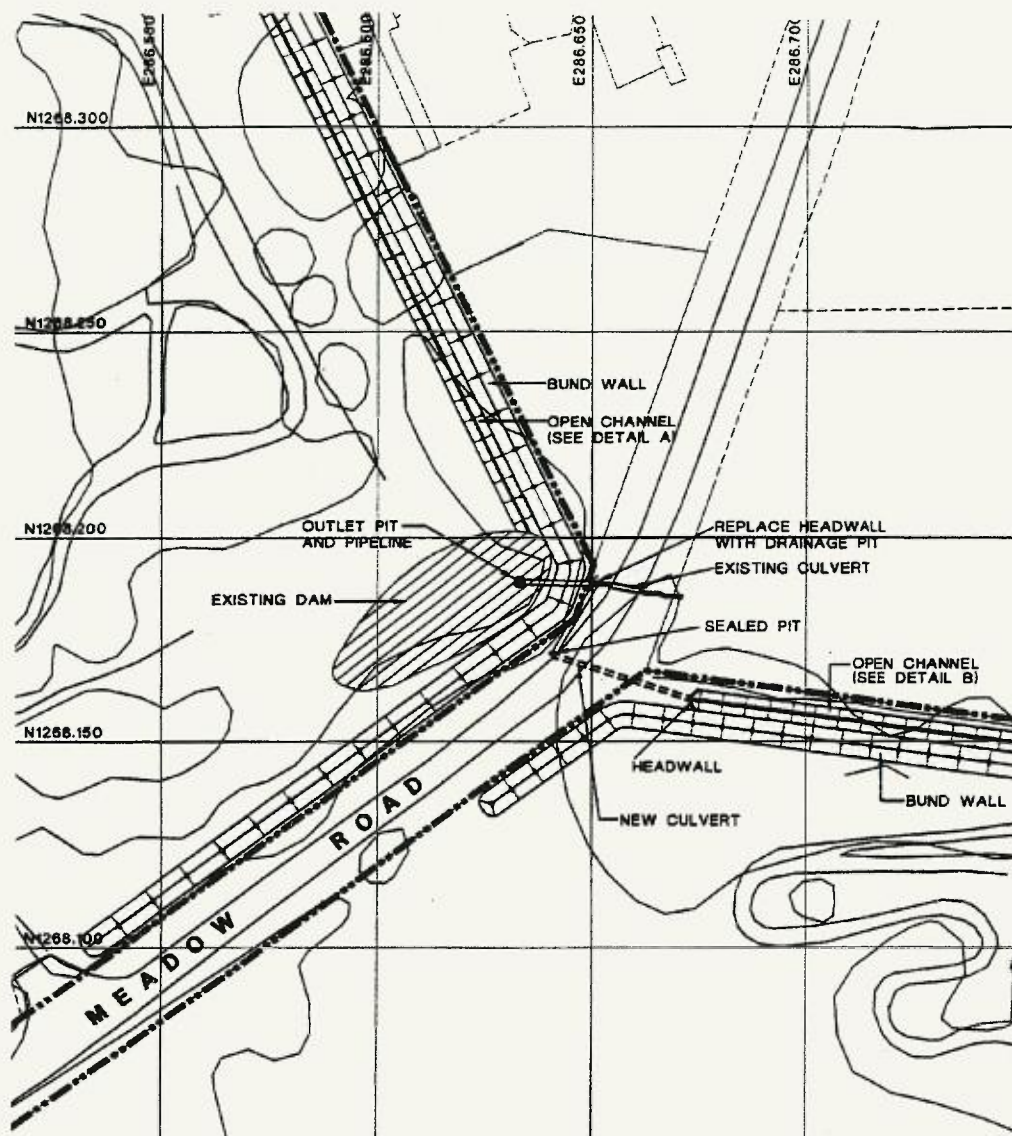
5.9.2 Analysis of the Potential Impact on the Visual Environment

The potential visual impacts of the proposed development have been assessed in terms of the following:

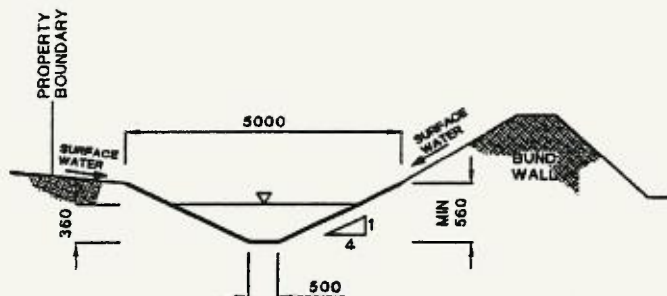
- visibility of the final landform; and
- the number of people who will see it as well as the distance and context of those views.

TYPICAL SURFACE WATER DRAINAGE DETAILS

ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN



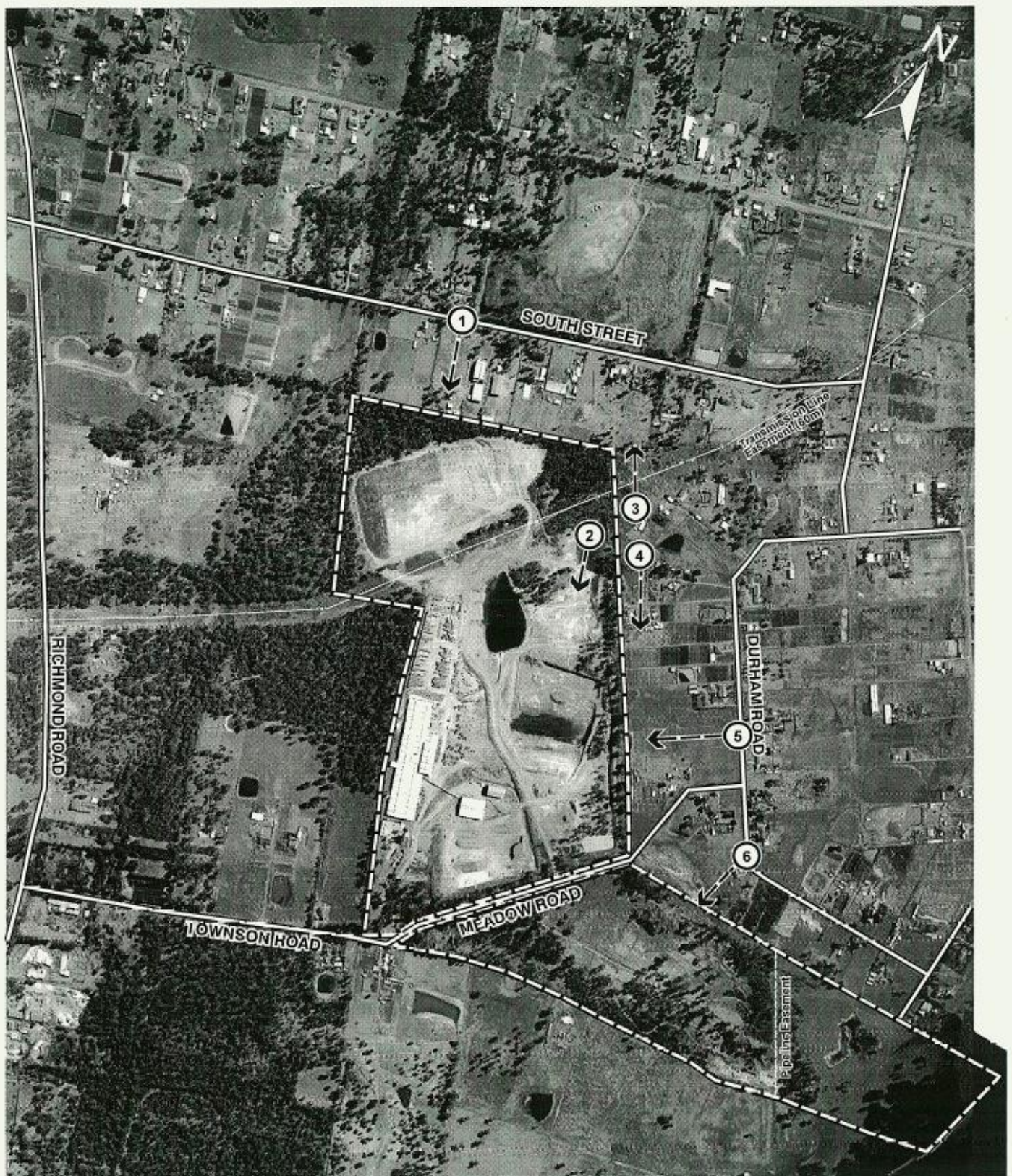
DETAIL A
TYPICAL X-SECTION OF NORTHERN
AREA V-DRAIN
Not To Scale



DETAIL B
TYPICAL X-SECTION OF
EASTERN AREA OPEN CHANNEL
Not To Scale

MAJOR VIEWING POINTS

ENVIRONMENTAL IMPACT STATEMENT PGH SITE, SCHOFIELDS BLACKTOWN



KEY

- Site Boundary
- 1-6 Viewing Points

0 800m

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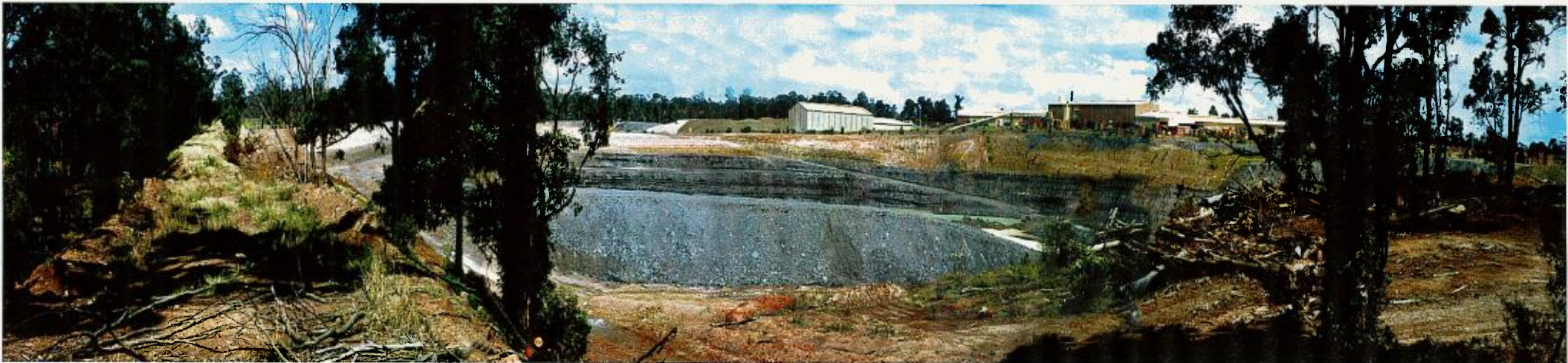
Figure 5.8a
CMP&F

EXISTING VISUAL ENVIRONMENT

ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN



View 1: Looking south across the Italian soccer club grounds from the South Street. Existing screening provided by trees along the northern boundary of the site will remain.



View 2: Looking south along the eastern landscape bund across the existing quarry void towards the brickworks. The trees on the horizon screen the site from Meadow Road.

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Figure 5.8b(i)
CMP&F

EXISTING VISUAL ENVIRONMENT

ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN



▲ **View 3:** Looking north along the existing landscaped bund. Adjoining rural residential properties to the east.



▲ **View 4:** Looking south along the eastern perimeter fence and landscaped mound. The mound will be increased and landscaped on its western side to further screen site buildings and activities.

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Figure 5.8b(ii)
CMP&F

EXISTING VISUAL ENVIRONMENT

ENVIRONMENTAL IMPACT STATEMENT PGH SITE, SCHOFIELDS BLACKTOWN



▲ **View 5:** Looking west from Durham Road towards the site. Existing landscaped mound along eastern boundary of the site already provides an effective screen.



▲ **View 6:** Looking west from Jersey Road towards the line of trees which marked the edge of the southern part of the PGH site. Edge trees will remain and be enhanced by a landscaped mound along the boundary.

Date : May 1997

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Figure 5.8b(iii)
CMP&S

In addition to the assessment of the desired end-state of the development, it is also appropriate to consider various intermediate stages due to the very long period over which activities will be taking place on the site.

A distinction should also be made between any anticipated impacts on local residents and on those who will merely experience a view of the site when travelling along one of the peripheral roads or from a particular viewpoint.

Landform Visibility

The visibility of the landform, existing buildings and other structures and the various activities taking place on the site is determined by the physical characteristics of the site and the surrounding areas and the visual catchment within which it is located. The major factors influencing visibility are vegetation and landform.

Visual Catchment

The visual catchment of the site includes all areas from which it is visible. This includes roads, rural residential and horticultural land uses. The visual catchment together with major viewing points within the study area are shown on **Figure 5.8a**. **Figures 5.8b(i), (ii) and (iii)** show the views from each of the points.

Visual Usage and Sensitivity

The extent to which the existing population (or in the case of a developing or urbanising area, the future population) is likely to be affected by the proposed development is assessed in terms of visual usage and sensitivity. The number of dwellings, roadways and other land uses which fall within the visual catchment is referred to as visual usage. Sensitivity is a measure of how critically the development will be viewed by these users as a result of any change to the character of existing views. Visual usage and the sensitivity associated with various land uses have been ranked on the basis of professional judgement and are listed in **Table 5.20**.

TABLE 5.20 VISUAL USAGE AND SENSITIVITY

Land Use	Visual Usage	Sensitivity
Rural lands	low	low
Rural residential	low	moderate/high
Market gardens/orchards	low	low
Educational/social/recreational	moderate	moderate/high
Extractive	low	low
Regional roads	moderate	moderate/high

The results set out in **Table 5.20** indicate that the greater visual impacts of the proposed development will relate to rural residential areas and adjacent roads and especially to specific facilities where numbers of people are concentrated, in this case a school and sport and recreation facility. While the visual sensitivity of rural residential areas is high, the number of people affected is relatively small.

The potential visual impact on residents resulting from the development will vary according to their distance from the site. This variation is as follows:

0-2 km (foreground views)	high-moderate visual impact
2-4 km (middleground views)	moderate-low visual impact
<4 km (background views)	very low visual impact.

It is quite possible that views will not be obtainable from distances even approaching four kilometres. In addition, the screening effects of vegetation and other objects located between the views and the site can significantly reduce potential visual impacts.

Existing roads adjacent to, or within the visual catchment of the site have the highest level of usage with a moderate to high visual sensitivity. This is offset by the fact that views to the site are not continuous but will be glimpsed and are generally only available from one direction.

Tree canopy heights of the Cumberland Plain woodland are generally 15 to 20 metres. Tree cover adjacent to the site and at a distance increases screening potential. In general the existing woodland and the stands of trees along the site perimeter provide a degree of screening although the lack of understorey in a number of places means that this is incomplete.

The quarry site itself is elevated above its surroundings. This compared with the presence of bunds around part of the site means that existing ground levels are not visible from the surrounding areas. The dominant visual features associated with the site are the existing brickmaking plant and the power line crossing it.

The completion of landfilling at the site will result in a ground profile very similar to that existing prior to excavation taking place. This land will be contoured to provide a slope away from the centre of the site to minimise rainwater infiltration and to aid runoff and, at the same time the bunds will be integrated into the overall landform to provide a more natural profile. This final shape will be grassed and planted with native shrubs and small trees.

Those parts of the site which have not been excavated will be able to accommodate larger trees which will both assist in improving the visual amenity of the area and its habitat value.

The northern part of the site - or more accurately the existing brickmaking plant - is only partially visible when in close proximity except along the western boundary where limited views are available from Townson Road. However, its appearance is more prominent from any elevated surrounding location. In particular it can be clearly viewed across the valley of Eastern Creek from Railway Terrace to the east and the parallel Windsor Railway line. This viewpoint is however in excess of 2 kilometres from the site. The buildings are not visible from long distance in other directions due to the lack of elevated viewpoints and the presence of intervening vegetation.

Even though the brickworks are visible from long distance from the east, the final form of the landfill will be far less prominent and will become an indiscernible part of the local landscape.

In contrast, the southern part of the site will be visible to users of Townson and Meadow Roads plus a limited number of local residents. These views will be restricted once the proposed bunds are in place. On completion the site will merge imperceptible into its surroundings. This part of the site is difficult to discern from a long distance due to the absence of any prominent features and the presence of intervening vegetation.

Given the visual character of the development and the low level of visual interaction with the existing surroundings, the potential visual impact of the proposed landfill development is generally assessed to be low. The final site profile will not be visible except at close quarters and will then be indistinguishable from its surroundings. The various measures included to ensure that the final land profile merges imperceptible with the existing topography and landscape are as follows:

- Design of the final landform to reflect the character of the surrounding natural landscape.
- Staging of the landfill operations with the establishment of a bund and planting to screen site activities from adjacent areas.
- Retention of native vegetation around the site periphery both to screen views from outside and to maintain as far as possible the existing ecological values of this area. This vegetation will also provide the basis for regrowth and will be reinforced by additional planting of native vegetation.
- The establishment of additional tree planting on those areas not subject to quarrying in order to maintain as large an area of Cumberland Plain vegetation as possible and reinforce the habitat value of the site and its linkages to Eastern Creek.

Proposals for planting at the site are shown on **Figure 2.1f**. It will provide an opportunity to enhance local vegetation communities and provide a wildlife habitat connection to Eastern Creek. It is intended to use plant material which is indigenous to the area, thus increasing habitat values, enabling increasingly rare vegetation communities to be preserved and integrating the development with the existing landscape setting.

Uses of the site on completion are expected to be rural, essentially open grazing where only native grass is a feasible ground cover and environmental protection. However, if this surrounding area is more intensively developed for urban purposes, the site has the potential for use as a major park.

5.10 HAZARDS, RISKS AND HEALTH ISSUES

5.10.1 Identification of Potential Hazards

The objectives of a Preliminary Hazard Analysis (PHA) are to assist in the decision making process in relation to land use safety planning as set out in the Hazardous Industry Advisory Papers (Department of Planning 1992) and to determine if the proposal is a 'potentially hazardous or offensive development' as defined by SEPP No. 33.

A qualitative assessment is undertaken to provide an estimate of the overall risk to the public and the environment resulting from the proposal. This assessment covers the following headings:

- air quality
 - airborne dust
 - landfill gas
 - fire and fumes
 - volatile liquids and gases;
- water quality
 - groundwater
 - surface water;
- soil quality; and
- transportation.

All these issues are covered in detail in the relevant sections of this EIS. The measures included within site operating procedures including contingency plans will ensure that the overall risk is minimised.

Health related issues, while not included in SEPP No. 33 focus on the potential for the transmission of disease by means of the following:

- fly and vermin control;
- dust and windblown material;
- leachate control;
- protection of watercourses;
- control of waste entry;
- prevention of unauthorised entry;
- prevention of scavenging;
- control of indiscriminate tipping;
- ponding and stormwater control;
- liquid waste disposal for staff amenities; and
- storage of cover material.

The maintenance of health and safety on site relates predominantly to materials handling, appropriate landfill management practices and the incorporation of the necessary quality assurance procedures into day-to-day activities. All these are included in the operator's standard site management procedures and will be reflected in the LEMP.

5.10.2 Proposed Mitigation, Management and Monitoring

Evaluation and Listing of Safeguards

The main health hazards of landfilling result from unsuspected or accidental contact with contaminated waste. Risks are maximised by poor landfill design and inadequate site procedures but can be minimised by the following:

- acceptance of Solid Waste Class 2 only and careful scrutiny of all loads entering the site;
- restriction of public access to the tipping face;
- continuous waste compaction and application of cover at regular intervals;
- appropriate engineering design of the landfill followed by timely and effective maintenance.

The landfill would be implemented to a high standard in conformity with the design and procedures currently operating at Erskine Park. The site will be operated using well developed and well documented procedures based on broadly accepted international standards.

The maintenance of high operating standards leading to the minimisation of risk to the public and the environment provides the basis for site procedures summarised in Section 2.5.

5.11 HERITAGE ISSUES

5.11.1 Sites or Relics of Heritage Significance (Indigenous or Non-indigenous)

Non-Aboriginal Heritage

The Blacktown LEP 1988 lists 50 items of environmental heritage occurring in the Blacktown LGA. However, none of these items are located in the suburb of Schofields.

Aboriginal Heritage

The Cumberland Plain has been identified as containing numerous Aboriginal sites and areas. Over the last decade, considerable work has been undertaken in this region to assess the extent of Aboriginal occupation on the plain. Kohen initiated work by researching the western section of the plain in the early 1980s (Kohen 1981). Numerous site surveys by other archaeologists followed.

Mostly "open camp" sites were found on the western Cumberland Plain, while in the north-west, sites other than "open camps" were recorded in those areas typified by Hawkesbury Sandstone.

The NPWS has recorded 83 sites in an area of 100 km² around the PGH quarry. The majority of these are "open camp" sites. A "quarry extraction" site was recorded on Plumpton Ridge which runs north-south between Bells Creek and Eastern Creek. The PGH quarry is located on the eastern side of this ridge.

Plumpton Ridge has been investigated by five different archaeologists over the last fifteen years revealing several archaeological sites. Kohen (1981) located an "open site" containing red silcrete flakes, flaked pieces and cones. The site was thought to extend for several hectares. Brayshaw (1982a, 1982b) recorded two "open sites" at the southern end of Plumpton Ridge. Dallas (1983) conducted more detailed investigations on two or three of these sites and identified an additional "open site" which appeared to be undisturbed. Dallas concluded that the entire ridge should undergo further archaeological investigations and be treated as archaeologically sensitive. Further sites have been subsequently discovered by Brayshaw.

Cornyers (1983) undertook a regional study of the entire ridgeline. This found that the south-west area was the most undisturbed and also contained the greatest evidence of Aboriginal activities. The report recommended that this area was preserved. However it further recommended that development could continue in other areas where the land had already been extensively disturbed.

A study by McDonald (1986) indicated again that Aboriginal occupation had occurred across the entire area with the density of surface material on Plumpton Ridge being the highest recorded anywhere on the Cumberland Plain. Artefact densities remained low in areas away from the ridge. McDonald reaffirmed earlier conclusions that the area had enormous scientific significance.

All these studies have confirmed that Plumpton Ridge and the Cumberland Plain are archaeologically significant areas.

On the basis of these studies the NPWS proposed the creation of a Conservation Area in the vicinity of Plumpton Ridge. This is situated to the south of Townson Road extending for approximately 1.5 km along Plumpton Ridge.

In addition to these, Blacktown City Council undertook a study to review all Aboriginal sites in the city. This resulted in the classification of land into the following groups, as detailed in Blacktown DCP 1992:

- known archaeological sites - sites which have been recorded by the NPWS and are shown on the DCP maps;
- areas of high archaeological significance;
- areas of potential, archaeological significance- areas where there is a possibility of sites occurring; and
- areas of low archaeological significance; areas where there is little likelihood of finding archaeological sites, and no further archaeological survey is required;

The areas of high archaeological significance are found all along Eastern Creek, Ropes Creek, Reedy Creek, Bells Creek and the area between Bells and Eastern Creek. Areas of potential archaeological significance are shown on the DCP as extending north from Second Ponds Creek, in the north western corner of the LGA from Eastern Creek to South Creek, and just north of Prospect Reservoir around Reedy Creek.

Most of the subject site is within an area identified by Blacktown City Council as having high archaeological significance (see **Figure 3.2**).

5.11.2 Archaeological Research within the Subject Site

Because that part of the proposed development to the north of Meadow Road is within land which has already been extensively disturbed, it is unlikely to have any archaeological significance.

A search of the Aboriginal Sites Register at the NPWS undertaken in December 1996 revealed a total of 7 sites within the quarry and a further 12 sites within the immediate adjoining southern property (Lot 2 of DP232574). Of these adjoining 12 sites, sites SA11 and SA12 are closest to the boundary of the PGH property and their location is shown on **Figure 5.9**. The seven sites within the subject site exist on the less disturbed area of the PGH property, south of Meadow Road (see sites S1-S7, **Figure 5.9**). The 9 total sites identified both within and immediately adjoining the site are illustrated in **Figure 5.9** are also detailed within **Table 5.21**.

TABLE 5.21 ABORIGINAL SITES WITHIN, OR IN CLOSE PROXIMITY TO THE SUBJECT SITE (ALL OPEN CAMP SITES)

Ref ⁽¹⁾	Site No. ⁽²⁾	AmgE	AmgN	Recorded	Recorder
SA11	45-5-0547 SA11	301840	6267020	) Oct. 1986	) McDonald J
SA12	45-5-0548 SA12	301650	6267030	)	)
S1	45-5-0826 Schofields 1	301800	6267100	)	)
S2	45-5-0827 Schofields 2	301100	6267200	)	)
S2	45-5-0828 Schofields 3	301600	6267200	)	)
S4	45-5-0829 Schofields 4	301700	6267100	) Sept. 1989	) Nicholson A
S5	45-5-0830 Schofields 5	301500	6267200	)	)
S6	45-5-0831 Schofields 6	301400	6267200	)	)
S7	45-5-0832 Schofields 7	301300	6267200	)	)

Notes 1: Site reference identified on **Figure 5.9**.
2: NPWS reference details.

The recording of the seven sites within the project area was as a result of research undertaken by National Heritage Studies Pty Ltd in September 1989 (Nicholson 1990). These sites are all located on the southern side of Meadow Road on the eastern slopes of the main Plumpton Ridge between 25 and 30m AHD. They ranged from small sites comprising a few artefacts (Sites 2 and 3) to a relatively extensive scatter of artefacts extending over approximately 200m² (Sites 6 and 7). The conclusions and recommendations of this study are included in **Appendix H**.

A subsequent site investigation was undertaken in May 1990 by Peter Dowling of National Heritage Studies Pty Ltd and Steven Lalor, Sites Co-ordinator for the Daruk Local Aboriginal Land Council, in order to reassess the recommendations of the National Heritage Studies report. Sites 2, 5, 6 and 7 were relocated and examined. However, the remaining three sites (1, 3 and 4 - adjoining the gas pipeline) could not be located due to heavy rain which made access to and recognition of the sites difficult.

National Heritage Studies Pty Ltd performed test excavations in the area between sites 5 and 7 in August 1990 (National Heritage Studies 1990). Only two artefacts (silcrete flakes) were recovered, one of which was probably lodged in surficial grass roots and the second was considered unlikely to have been located in situ. The study area was reinvestigated at the time of excavation, however no further sites were located.

5.11.3 Assessment of Significance and the Potential Impact of the Development

The investigation by the National Heritage Studies Pty Ltd undertaken in September 1989 concluded that:

- all seven sites have been profoundly disturbed by European activities;
- sites 1 to 4 are considerably more fragmented and disturbed than sites 5 to 7;
- sites to the south of the area proposed for development, contain similar but considerably more extensive and less disturbed sites than the PGH property;
- sites to the south of the area proposed for development have been proposed for protection and the area defined as a Conservation Area to preserve a representative sample of the archaeological resources in the region; and
- a consent to destroy for the seven sites on the PGH property should be applied for and the development allowed to proceed.

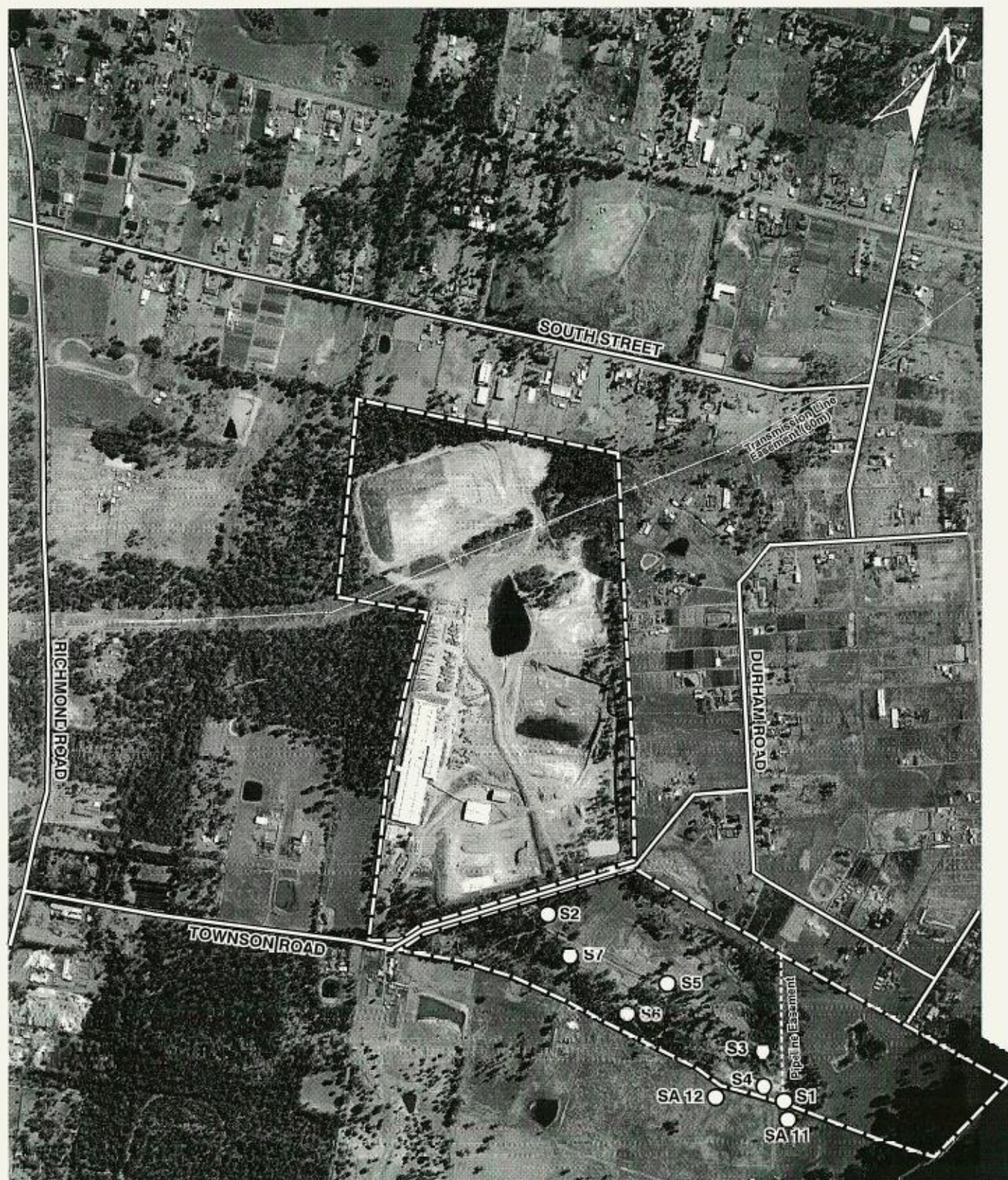
Following the May 1990 site investigation Mr Lalor of the Daruk Local Aboriginal Land Council (LALC), recommended that a consent to destroy be given for the sites that were highly disturbed (sites 1 to 4) but that test excavations be carried out on sites 5 to 7 in order to ascertain the subsurface distribution and abundance of artefacts. The latter recommendation was supported by Peter Dowling. Test excavations were undertaken in August 1990.

In the light of information from these excavations and from previous studies, National Heritage Studies concluded that the Aboriginal sites located on Plumpton Ridge are highly significant to future archaeological research and also to the Daruk LALC. However, the sites in the actual study area have largely been disturbed, and in themselves would contribute little to further cultural or scientific knowledge. Based on this information, the 1990 excavation report by National Heritage Studies recommended that:

- the Daruk LALC apply to collect the artefacts from the recorded sites; and
- no further archaeological work is necessary on the project site.

HERITAGE

ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN



KEY

Site Boundary

Area of "Aboriginal Significance"
See Fig 3.1 Blacktown Zoning

Registered Aboriginal Sites (NPWS)
(See Section 5.11.1)

○ S1 - S7 - Schofields
Sites (1-7)

○ SA11 & SA12
(Lot 2 DP232574)

0

800m

Date : May 1997

File Name : F:/DATA/VH/0009/VH000958.cdr

Figure 5.9
CMP&F

5.11.4 Proposed Mitigation Measures

During the preparation of this EIS a copy of all information relating to previous archaeological work has been provided to the Daruk LALC and a meeting was held with representatives of the Daruk LALC on 24 April 1997. A request for a consent to destroy the seven sites previously identified will be made to the NPWS after lodgement of this EIS.

The NPWS and Daruk LALC have been informed of the current proposal. Both NPWS and the Daruk LALC will however be informed of the timing of each stage of extraction. In particular, advice will be given of the timing of Stages 6 and 7 (ie. 10 to 15 years), which will occur on the property south of Meadow Road.

In accordance with the *National Parks and Wildlife Act 1974*, work will cease if any Aboriginal sites or relics are discovered during operations and the NPWS and Daruk LALC will be contacted immediately.

5.12 FLORA AND FAUNA

5.12.1 Existing Environment

The area north of Meadow Road has been extensively disturbed. Vegetation is generally restricted to a small strip along the property boundaries. South of Meadow Road the site is only partly cleared, with some stands of natural vegetation having been retained. A survey of flora, fauna and fauna habitats on the property was undertaken in March 1996. The report of the survey is included as **Appendix I**.

Survey of Vegetation Communities

Four vegetation communities were identified on the site and are shown on **Figure 5.10**:

- Grey Box Woodland - around the perimeter of the northern property and in patches on the southern property;
- Ironbark/*Melaleuca* Woodland - in the north-east corner of the northern property near the transmission line;
- *Casuarina* Open Forest - part of a continuous band along the Eastern Creek boundary of the southern property; and
- Reed Swamp - several swamps, mainly in the southern site.

The proposed development will not affect the Ironbark/*Melaleuca* Woodland or the *Casuarina* Open Forest as these communities are outside of the proposed work area. Some Grey Box Woodland would be removed in providing earth mounds around the perimeter of the southern property and extending the earth mound along the eastern edge of the northern property. The same species, propagated from local seed sources, would be used for revegetating these areas.

As shown on **Figure 5.10**, the most significant area of Reed Swamp is east of the gas pipeline easement on the southern property. This vegetation community will not be disturbed by the proposal, although some smaller areas of reed vegetation may be affected by the perimeter mound.

All of these communities are remnants of former Cumberland Plain vegetation which has been extensively cleared for rural and more recently, residential development. All remaining Cumberland Plain vegetation is considered to have conservation value. Vegetation on the Schofields property however is disturbed and degraded.

The vegetation on the northern property is restricted to the site boundaries. The southern property has been partly cleared for grazing and more recently has been disturbed by minibike tracks.

There are no special natural features identified on the properties associated with any vegetation unit.

Threatened Species

Threatened plant species in New South Wales are listed in Schedules 1 and 2 of the *Threatened Species Conservation Act, 1995*. There are four plant species listed in the Act for which records exist in the region, listed in **Table 5.22**.

TABLE 5.22 THREATENED PLANT SPECIES IN THE REGION

Plant Species	Status ⁽¹⁾
<i>Pultenaea parviflora</i>	endangered
<i>Acacia pubescens</i>	vulnerable
<i>Dillwynia tenuifolia</i>	vulnerable
<i>Persoonia nutans</i>	endangered

Note 1: As listed in the *Threatened Species Conservation Act, 1995*.

None of the above species were observed on the site during the flora assessment, although *Pultenaea parviflora* was recorded on the property in 1967.

Survey of Fauna and Habitats

The survey of fauna and habitats included bird surveying, searches for amphibians and reptiles, searches for evidence of mammals, and habitat assessment. There are three fauna habitats: woodland, open forest and reed swamp, closely paralleling the vegetation communities.

A range of birds was sighted as listed in **Appendix I**. Evidence was found of introduced mammals, although the site is also expected to be used by native mammals including echidnas, possums and bats. No reptiles or amphibians were observed on the site, but again there is an extensive list of potential species expected to be present, included in **Appendix I**.

FLORA

ENVIRONMENTAL IMPACT STATEMENT PGH SITE. SCHOFIELDS BLACKTOWN



KEY

- | | |
|-------------------------------|-------------------------|
| ① Greybox Woodland | ③ Casuarina Open Forest |
| ② Ironbark/Melaleuca Woodland | ④ Reed Swamp |
| --- Site Boundary | |

0 800m

Date : May 1997

File Name : F:/DATA/VH/0009/VH000959.cdr

Figure 5.10
CMP&F

Threatened Fauna Species

No fauna species listed in the schedules to the *Threatened Species Conservation Act, 1995* were observed on the property and none have been recorded for the area in the NPWS database.

It is possible that threatened species such as the Green and Golden Bell Frog (*Litoria aurea*) and Common Bent-wing bat (*Miniopterus schreibersii*) may use the site, along with four other threatened bat species.

The site has some conservation value for fauna because of the relative scarcity of remnant Cumberland Plain vegetation and the linkage provided by Eastern Creek with other remnant bushland areas. The linking vegetation in the vicinity of Eastern Creek however, will not be disturbed.

5.12.2 Analysis of Potential Impacts of the Proposal

Need for a Species Impact Statement

The eight point test under Section 5A of the *EP&A Act 1979* was applied to the site in respect of the plant and animal species listed in the *Threatened Species Conservation Act 1995* which may be present or utilise the site.

None of the threatened species has been observed on the site except *Pultenaea parviflora* which has not been recorded in recent years.

The eight point test is intended to assist decision makers in determining whether the proposal will have a significant effect on threatened species, populations or ecological communities or their habitats. In view of the degraded nature of the property, the absence of recent sightings of threatened species and the limited disturbance to vegetated areas resulting from the proposal, it is considered that no such significant effect will occur. Accordingly, it has been assessed that a species impact statement (SIS) is not required to be prepared to accompany this environmental impact statement.

Potential Impacts

North of Meadow Road the proposal will result in a small loss of vegetation along the eastern boundary as sections of the existing bund are upgraded and extended. The proposal does not include any development north of the transmission line, so there will be no impact on the existing woodland communities in that area of the site. South of Meadow Road approximately 2.5 hectares of vegetation will be removed along the western, northern and southern boundaries. Although all remnant natural vegetation in the Cumberland plain is considered important, the loss of vegetation on the site will not greatly affect the regional representation of vegetation communities. The earth mound will be replanted utilising indigenous species, so there will be no net loss of vegetation resulting from clearance, over the medium term. In the longer term the vegetated area of the property will be increased.

The area to the east of the gas pipeline will not be affected by the proposal and the habitat and wildlife corridor functions provided by the dam and vegetative fringe along Eastern Creek will not be affected.

5.12.3 Proposed Mitigation, Management and Monitoring

The effect on flora and fauna will be minimised by:

- commencing the construction and landscaping of the perimeter earth mounds in advance of excavation/landfilling activities;
- avoiding disturbance to vegetation not strictly required to be removed, wherever possible;
- replanting earth mounds with species of the Grey Box Woodland, grown from seed or cuttings sourced on the site;
- incorporating Grey Box Woodland species in sections of the site revegetation, following landfilling; and
- noxious weeds that occur onsite will be controlled by a programme of spraying with herbicides, to prevent spreading of weeds into other areas.

5.13 CUMULATIVE IMPACTS OF THE PROPOSAL

The project is essentially the continuation of activities which have been undertaken at the site for a number of years. The intensity of the activity will not change greatly although the rate of clay/shale extraction would increase somewhat. However, a larger area would be affected by the site operations and the combined quarrying and landfilling would continue over a longer period (approximately 33 years in total).

There are two former landfills in close proximity to the proposal. Both are complete and are currently at various stages of rehabilitation. The first makes up a substantial portion of that part of the PGH site to the north of the power line. This was licensed to accept non-putrescible waste, and was completed in 1994. The second, located approximately 700 metres to the north, between South Street and Grange Avenue, is owned by Blacktown City Council and operated from May 1971 to September 1975. This site accepted putrescible material over this period.

As both these landfills are in the post-closure phase of their operations, any potential impacts are restricted to air quality effects if landfill gas is being generated, groundwater and possibly surface water, visual impacts and flora and fauna.

Both are relatively recent and in the case of the PGH site at least, will have been subject to appropriate licensing by the EPA. This would normally include the preparation of a management plan and the monitoring of potential environmental problems. Any exceedence of a parameter would result in the introduction of systems designed to protect the environment or reduce the impact to acceptable levels.

Existing monitoring (Woodward Clyde, 1996) on the PGH site has not indicated any problems with groundwater. Ongoing monitoring will continue in accordance with EPA post-closure licence conditions. Blacktown Council has indicated that no problems have been experienced in relation to the landfill on Grange Avenue (Blacktown City Council: Letter dated 16 January 1997).

Quarrying inevitably leads to a loss of vegetation cover and the requirement for secure capping of the completed landfill reduces the potential for replanting when rehabilitation takes place. However the opportunity exists for a substantial programme of replanting associated with the proposed bunds located around the periphery of the site. Shallow rooting varieties can also be considered for planting on the completed landfill areas in selected locations where the vegetated layer could be thickened.

The proximity of a number of completed landfills has the potential to produce adverse impact on the immediate area. This could result from a combination of vegetation loss (especially where Cumberland Plain communities are becoming increasingly rare) which cannot be replaced and the presence of relatively large areas of land with a minimal potential for future beneficial use. Programmes of rehabilitation including substantial replanting of the site with indigenous species will reduce the cumulative impact of continuing vegetation loss and careful planning of the surrounding area. When further subdivision take place, in accordance with the provisions of SREP No. 19, within the local area, future residents will benefit from the increased open space/recreational area that the PGH site and the former Council landfill site to the north will provide.

The proposal described in this EIS will be undertaken and managed to the highest standards. The programmes of monitoring to be undertaken as part of the project will detect any exceedence of acceptable levels for the whole range of appropriate environmental parameters. The necessary measures will then be put in place to ensure that any impacts are minimised.

Under these circumstances, the proposal is unlikely to contribute to any cumulative impacts resulting from the effects of the three adjacent landfills. Remediation of any future impacts of the two existing landfills would be the responsibility of others.

6. LICENCES AND APPROVALS

The proposal described in this document is the subject of a development application (DA). It is also designated development within the meaning of Schedule 3 of the *Environmental Planning and Assessment (EP&A) Regulation 1994* and the DA must therefore be accompanied by an EIS.

Accordingly this EIS has been prepared in conformity with the *EP&A Regulation 1994* under the *EP&A Act 1979*.

This document has been prepared in line with the Director-General's requirements from the DUAP, regarding form and content. These requirements are set out in **Appendix A**. As such this document also includes consideration of matters listed for inclusion in Clause 51 of the regulation.

The responsibility for consent to the development rests with the consent authority, in this case, Blacktown City Council. Its options when considering the application are governed by Section 90 and 91 of the Act.

The site is classified as a Regional Resource for the extraction of clay/shale in SREP No. 9. As a result the proposal will require the concurrence of the Director General of the Department of Mineral Resources.

If the development application is approved by Council, further statutory and regulatory approvals will be required. These are as follows:

- Licence from the EPA to operate a **controlled waste facility** in conformity with the *Waste Minimisation and Management Regulation 1996* under the *Waste Minimisation and Management Act 1995*; and
- Pollution Control Approval from the EPA and issuance of a licence under the *Pollution Control Act 1970*.

A draft LEMP is included in **Appendix G** in accordance with the requirements of the EPA solid waste landfill guidelines. When the DA is approved the draft LEMP will be finalised and the resulting LEMP will be used to obtain EPA approval for landfilling.

7. MEASURES PROPOSED TO MITIGATE ADVERSE EFFECTS

7.1 INTRODUCTION

Potential impacts resulting from the proposal will be kept within contemporary environmental standards. Pollution controls and operational procedures will be in accordance with EPA requirements. A draft landfill environmental management plan (DLEMP) has been prepared in conformity with the *Environmental Guidelines: Solid Waste Landfills* (EPA, 1996) for submission to the EPA in support of a licence application. The DLEMP has been prepared is included in **Appendix G** and will be lodged and exhibited with this EIS.

A range of pollution controls are currently in place which will also cater for proposed operations. Prior to modifying existing controls or installing new ones, approval will be obtained from the EPA under section 17K of the *Pollution Control Act 1970*.

A summary of control measures and environmental safeguards is given in the following section. These controls would form the basis of environmental management of the site.

7.2 SUMMARY OF MITIGATION MEASURES

Clause 51 of the *EP&A Regulation 1994* requires that measures proposed to mitigate the effects of the proposal on the environment be compiled in a single section of the EIS. The following list summarises mitigation measures:

Erosion

- early revegetation of constructed mounds;
- early revegetation of existing bare ground north of the quarry;
- progressive revegetation of completed landfill areas;
- contour drains in the completed landform; and
- erosion control details in the DLEMP.

Surface Water Quality

- implementation of the Water Management Plan;
- sediment controls in accordance with guidelines published by the Department of Conservation and Land Management (1992);
- quarry water will be tested prior to pump out; and
- surface pondwater will be tested if there is a risk of overflow and if necessary directed back into the quarry.

Hydrology

- culverts under earth mounds to maintain the existing drainage system on the northern property; and
- diversion of runoff within the southern property to avoid alteration to drainage patterns on neighbouring properties.

Groundwater Quality

- compacted clay base below the landfill graded and drained to leachate collection sumps.

Flora and Fauna

- control of noxious weeds by a programme of spraying with herbicides, to prevent spreading of weeds into other areas;
- minimise disturbance to vegetation;
- replant earth mounds with endemic species sourced from the Grey Box Woodland on the site; and
- regenerate sections of completed landfill using local species.

Litter

- compact and cover waste as soon as practicable;
- collect any escaped litter from within the property or surroundings;
- remind drivers of the requirements to cover loads;
- remove any waste illegally dumped along the road frontage of the site;

Landfill Management

- leachate pumping and recirculation system;
- inspect and verify that incoming waste meets acceptability criteria for the landfill; and
- minimise rainwater infiltration by covering waste each day and applying a final capping layer of compacted clay over the landfill.

Noise

- extend the perimeter mound on the northern property;
- ensure that mobile plant is fitted with residential class silences, maintained in good working order; and

- construct an acoustic barrier of appropriate height along the eastern boundary.

Visual

- landscape perimeter mounds as soon as possible and maintain vegetation growth;
and

Air Quality

- stabilise existing unvegetated areas north of the quarry with grass;
- stabilise completed landfill areas as soon as possible;
- water all unsealed roadways in dry weather;
- install a wheel wash and scaled road from there to Meadow Road;
- use a polymeric binder on surface stockpiles;
- install a meteorological station; and
- cease dust generating activities if the average wind speed exceeds 10 metres per second over 30 minutes in dry weather.

7.3 LANDFILL ENVIRONMENTAL MANAGEMENT PLAN (LEMP)

In compliance with the *EIS Practice Guidelines - Landfilling* published DUAP and included in the requirements of the Director-General (**Appendix A**), the DLEMP has been prepared to accompany this EIS and is included in **Appendix G**. A summary of the contents of this DLEMP is outlined below.

Introduction

The introduction explains the purpose of the DLEMP and details the conditions of development consent and other requirements to be met in operating the quarry/landfill.

Development

Preparation of the site for operation is explained in more detail than is relevant for this EIS. For example, dam sizes and locations, roads, buildings weighbridge and landfill preparation will be explained. The initial edition of the DLEMP provides detail for the first five years of the proposal and an overview from thereon. Updates of the document will provide detail for later stages.

Operations

All of the operational practices such as hours of working, waste control, leachate management, surface water management are included. A detailed rehabilitation plan is part of the DLEMP.

Environmental Management

Environmental management controls expanded in the DLEMP are outlined below:

- **Water**

Water management controls currently in place for quarrying will be upgraded as described in the DLEMP. Water quality objectives and monitoring methods will be specified together with a response strategy.

- **Noise**

Noise levels will be controlled by provision of residential class silencers on plant and equipment, installation of earth mounds and restricted operating hours. The DLEMP specifies the location for noise barriers and the monitoring parameters.

- **Dust**

All active work areas and the access road will be sprayed with water to suppress dust mobilisation. A large disturbed area north of the existing quarry will be grassed to minimise dust generation from the source. Implementation details of dust safeguards outlined in this EIS are developed in the DLEMP, including frequency of watering, management of the wheel wash and operation of the meteorological station.

- **Litter**

Litter associated with landfill operations may be windblown from disposal areas or originate from vehicles transporting waste. The working face will be somewhat protected from wind by the quarry walls until the landfill is nearing completion. The DLEMP specifies litter controls and indicates circumstances which would require litter control fencing to be installed around the landfill area. For example the frequency of monitoring Meadow Road and the internal access road will be documented together with the requirement for vehicles bringing waste to the depot to have covered loads.

- **Insects and Pests**

In most modern landfill operations, the high compaction densities of solid waste and cover material combined with the daily covering of waste provide the most effective measures for insect and pest control.

Non-putrescible waste should not provide a food source for insects and pests. After compaction and daily covering, waste will not be available to scavenging animals or as a refuge for insects or pests. The DLEMP indicates monitoring requirements and appropriate response action.

- Fire

Buildings, structures and equipment associated with the quarry/landfill will be equipped with portable fire extinguishers. Water carts used for dust suppression will also be equipped with high pressure fire hoses.

The outbreak of any fires within will be controlled by isolating and exposing the fire, applying water from the water cart, and smothering the fire with cover material. The practice of placing waste into lifts separated by cover material will help to contain any fires. The DLEMP details an emergency response strategy for fires on the site.

- Odour and Gas

In a non-putrescible depot, only minor gas production is experienced, generally limited to that from decay of vegetation. The DLEMP provides for landfill gas to be monitored during the filling period and beyond. It is unlikely that any significant concentration will occur due to the small proportion of organic waste accepted into the landfill. Any gas produced in the landfill will either concentrate in the leachate collection sump or will percolate up through the main body of the landfill. The DLEMP details the need to progressively seal any join lines in the landfill, such as the edge of the quarry, to prevent uncontrolled concentration of gas. As the landfill shrinks away from the wall, additional cover material will be placed to seal the gap.

The DLEMP provides for the operator to install a landfill gas collection system if landfill gas or odour increases to the point that it affects the amenity of adjoining premises.

- Waste Input and Traffic

The DLEMP describes the mechanism for all waste vehicles entering the site to be weighed and categorised and for the type of waste to be recorded in accordance with EPA requirements. Numbers of quarry trucks entering and leaving the site will also be recorded.

- Noxious Weeds

As part of the requirements of the Department of Land and Water Conservation, noxious weeds that occur on the site shall be controlled by a programme of spraying with herbicides, to prevent spreading of weeds into other areas.

Monitoring

The DLEMP includes a detailed monitoring plan to be implemented over the life of the operation. There will be processes for varying frequency of monitoring or analysis of samples as monitoring results are accumulated over several years. Parameters to be monitored include:

- meteorology;
- surface water quality;
- groundwater quality;
- quarry water quality;
- leachate;
- landfill gas;
- dust;
- noise;
- litter;
- traffic;
- noxious weeds;
- rehabilitation;
- waste control; and
- erosion and sediment controls.

8. JUSTIFICATION OF THE PROPOSAL

8.1 SUMMARY

This EIS has demonstrated that continuation of **quarrying** on the PGH property at Schofields is justified for three reasons:

- the clay/shale resource has been identified as being of regional significance in SREP No. 9 - Extractive Industry (No 2) and the site has been protected by that planning instrument with a view to permitting extraction of its resource;
- PGH has committed considerable investment to establishing its new brick and paver manufacturing plant on the site, the viability of which hinges on the availability of suitable raw materials at an acceptable price; and
- quarrying is already an established activity on the property, the continuation of which will not introduce new environmental impacts to the area. The application provides an opportunity for existing impacts to be further controlled.

The progressive **landfilling** of the resulting quarry void is justified because it is the most appropriate method of rehabilitating the site within a reasonable time and in an environmentally controlled manner.

Failing to rehabilitate the quarry would result in the land remaining in a degraded and unusable state. Deferral of rehabilitation to some future time would either prolong or reintroduce the impacts of earthmoving activities and traffic in the area.

Justification for the continuation of quarrying and landfilling on the property is further considered under the following headings.

8.2 SOCIAL AND ECONOMIC CONSIDERATIONS

Continued quarrying will be of economic benefit to PGH and the Sydney region. The Company's perspective has been outlined above. The Sydney region will benefit because it will enable the Schofields resource to be fully extracted and defer the need for brickmakers to turn to other, less economic resources. After the completion of works on both properties, although beyond the planning horizon of existing residents, there will be a benefit to the area in that its future can be planned with the certainty that extractive industry will not return on this site.

Continued quarrying on the site provides direct employment and adds greater certainty to the jobs of the workforce in the brick and paver plant. There will be no additional demands on community facilities nor will there be a need for additional local accommodation.

The landfill component of the proposal will also bring a benefit to north-western Sydney and to the Sydney region generally. This proposal will ensure that landfill capacity for non-putrescible waste is maintained in the sub-region to the benefit of industry and other waste generators.

8.3 BIOPHYSICAL CONSIDERATIONS

The proposal will result in a continuation of impacts on the biophysical environment although safeguards will result in a reduction of their degree. The clay barrier to be installed at the base of the landfill has been included to give greater certainty that leachate will be collected by the under-drainage system, notwithstanding that existing groundwater is highly saline and of limited beneficial use.

Surface water management has already been upgraded and will be further improved during the life of the project to provide adequate sediment ponds for runoff and containment for saline groundwater entering the quarry.

Noise will be attenuated to meet EPA goals by the upgrading of existing acoustic barriers around the site and the construction of new ones. The existing mound is already partly covered with trees and with further landscaping will further screen the site.

Dust impacts will be controlled by initially revegetating existing exposed areas on the site and then progressively revegetating completed sections of the landfill. Roadways will be sprayed with water during dry weather, particularly on the surface level where the effect of the wind will be greatest.

Environmental management and monitoring of the site will be detailed in a forthcoming landfill environmental management plan prepared in accordance with EPA guidelines. Monitoring will provide evidence of the operation's performance and a basis for confirming that environmental safeguards are achieving the required goals.

8.4 ECOLOGICAL SUSTAINABILITY

The *EP&A Regulation 1994* requires that the justification for the proposal should have regard to the principles of ecologically sustainable development. There are four matters specified for consideration which are addressed as follows:

- **the precautionary principle** - requires that measures to prevent environmental degradation should not be postponed for lack of full scientific certainty if there are threats of serious or irreversible environmental damage. The justification of the proposal is not affected by this principle as it is capable of being undertaken in a manner which does not threaten serious or irreversible environmental damage. There is no suggestion that appropriate environmental safeguards outlined in this document would be postponed.
- **inter-generational equity** - requires that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations. The proposed facility will realise clay/shale resources for the Sydney brick and clay paver market. It will provide additional landfill space for Sydney, which is becoming in short supply. By accepting only non-putrescible waste, the proposal will result in low gas generation and largely benign leachate production which should not be a burden for future users of the land.

- **conservation of biological diversity and ecological integrity** - is not relevant to the current project as it affects a mostly cleared rural site. By reintroducing some tree cover to the area as landscaping progresses, increased habitat for native species will be created. By providing additional landfill space on a cleared site, other less suitable locations which may have an impact on biological diversity need not be developed.
- **improved valuation and pricing of environmental resources** - the proposal will affect the pricing of environmental resources in that it will help to maintain the price of clay/shale and maintain clay products at an affordable level for the residents of Sydney. The proposal helps to control the cost of landfilling, which is increasing to the detriment of industry.

Consideration of the principles of ecologically sustainable development does not subtract from the justification for the proposal. A desire for society to achieve ecological sustainability adds to the reasons for undertaking the proposal.

8.5 CONSIDERATION OF ALTERNATIVES AND JUSTIFICATION OF THE PREFERRED OPTION

DUAP has published EIS practice guidelines for quarrying and landfilling (see **Appendix A**). The guidelines include site selection principles for quarry and landfill proposals of which the landfill requirements are more stringent.

8.5.1 Site Selection and the DUAP Guidelines

The Schofields proposal does not involve site selection for either quarrying or landfilling. In particular, landfilling is part of the proposal strictly because it is the most practical and cost-effective means of rehabilitating the quarry void. PGH has not been motivated by a desire to develop a landfill as a primary commercial enterprise.

Notwithstanding the purpose and immovability of the landfill proposal, it is beneficial to consider the DUAP site selection principles for landfills. These are based on five considerations:

- whether the location has been identified in any strategic waste management plan;
- permissibility of the land use;
- avoiding environmentally sensitive areas;
- compatibility with surrounding land uses; and
- site investigations to confirm suitability.

Each of these principles is considered below.

Strategic Waste Management Plan

A Regional Waste Plan is currently being developed by Western Sydney Waste Planning and Management Board. Consultation however has taken place with representatives of the Waste Planning and Management Board, the EPA and with Blacktown City Council to seek their views of the proposed development.

As discussed in **Section 1.5** however, there are currently no strategic Waste Management Plans for the area within which the site is located.

Permissibility of Land Use

Consultation with Blacktown City Council has confirmed that quarrying and landfilling is a permissible use within the General Rural 1(a) zone. Existing development consent is held by PGH for quarrying and landfilling on parts of the property. Zoning is further discussed in **Section 3.1**.

Avoiding Environmentally Sensitive Areas

Table 8.1 is an extract from the DUAP guidelines which lists six types of areas which are considered to be environmentally sensitive and hence should be avoided when selecting a landfill site. The proposed quarry and landfill at Schofields avoids all of the sensitive areas with the exception that it is located within 250 metres of neighbouring dwellings.

The regionally significant clay/shale resources which are identified and protected by SREP No. 9 (2) - *Extractive Industry* cannot be developed without quarrying and quarry rehabilitation. The environmental effects on the amenity of a neighbourhood from landfilling with solid waste are similar to those from quarrying. Given that the separation objective is unable to be achieved at the Schofields site, it will be necessary to incorporate impact attenuation measures such as noise barriers in the proposal to achieve environmental objectives.

TABLE 8.1 ENVIRONMENTALLY SENSITIVE AREAS TO BE AVOIDED

Sensitive Area	Objective
A site in or within 250 metres of an area of significant environmental or conservation value identified under relevant legislation or environmental planning instruments, including: • national parks, marine national parks; • historic and heritage areas, buildings or sites protected under the <i>Heritage Act</i> or <i>National Parks and Wildlife Act</i> or areas on the Register of the National Estate; • any reserves for environmental protection, eg. aquatic, marine, nature, karsts; • areas covered by a conservation agreement or identified as critical habitat under the <i>Threatened Species Conservation Act</i>; • wilderness areas identified or declared under the <i>Wilderness Act</i>; • world heritage areas; • areas mapped under SEPP 14 - Coastal Wetlands, SEPP 26 - Littoral Rainforests; • areas zoned under a LEP or REP for environmental protection purposes, eg. high conservation, scenic, scientific, cultural or heritage; • other areas protected under the <i>National Parks and Wildlife (NP&W) Act</i>, <i>Crown Lands Act</i> or <i>Fisheries Administration Act</i> or any other legislation.	To avoid the risk of damaging areas of high environmental value.
Sites within an identified sensitive location within a drinking water catchment, including: • any lands nominated or mapped as "Special Areas" under the <i>Sydney Water Regulation</i>; • lands within 3 kilometres from the top water level of the following storages: Wingecarribee Reservoir, Fitzroy Falls Reservoir and the Tallowa Dam; • any lands nominated as Special Areas (or similar wording) by local water supply authorities or in the vicinity of a groundwater bore used as drinking water.	To avoid the risk of polluting drinking water should failure of the landfill occur.
Sites within 250 metres: • of a residential zone; • from a dwelling, school or hospital not associated with the facility.	To protect the amenity of residential areas.
Sites located: • in or within 40 metres of a permanent or intermittent waterbody (including rivers, lakes, bays or wetlands); • in an area overlying an aquifer which contains drinking water quality groundwater which is vulnerable to pollution (Consult DLWC for criteria to determine the vulnerability of groundwater).	To protect groundwater and surface water resources.
Sites located: • within a karst region (either protected under the <i>NP&W Act</i> or not); • with substrata which are prone to land slip or subsidence.	To avoid sites with unsuitable substrata.
Sites within a floodway which may be subject to washout during a major flood event. Councils should be consulted for information about local flooding characteristics. A major flood event is considered to be a 1 in 100 year event.	To avoid landfill washout risk if a significant flood event was to occur.

Source: DUAP (1996).

Compatibility with Surrounding Land Uses

The DUAP landfill guideline nominates a series of land uses which might require separation from landfills including:

- airports - bird hazard;
- residential areas - odour, visual characteristics, noise, dust, seepage;
- surface waters - pollution, future use, ecological value;
- groundwater recharge zones - groundwater quality and future use; and
- environmentally sensitive areas - maintain environmental qualities.

The proposed Schofields quarry/landfill maintains separation from all of the above land uses.

Site Investigation

The suitability of the Schofields site for a quarry/landfill has been investigated and demonstrated by its past use for quarrying and landfilling. Investigations have confirmed the site is suitable for landfilling in terms of the eight criteria included in the DUAP guideline for assessing suitability:

- operational requirements;
- geological and soils assessment;
- hydrological assessment (surface water and groundwater);
- topographic and meteorological assessment;
- flora and fauna assessment;
- transport issues;
- community issues; and
- cumulative issues.

More detailed consideration of the issues associated with these criteria is included in **Section 5** and the appendices of this EIS.

In summary, consideration of the site selection principles incorporated in the DUAP landfill guideline indicates that the Schofields site is suitable for the proposed quarry/landfill. The proximity of surrounding rural dwellings will impose more stringent requirements on the site manager to contain amenity impacts than would be the case if a greater separation had been available. As indicated earlier, the clay/shale resources on this property which are protected by SREP No. 9 (2) can only be won by quarrying. Landfilling is a consequence of that process with similar potential effects on amenity. If it is considered that quarrying is appropriate on the site, and clearly this is the intent of SREP No. 9 (2), then landfilling with non-putrescible waste is also appropriate.

8.5.2 Alternatives

Consequences of Not Proceeding

Should the quarry and landfill proposal not proceed a valuable resource would be denied to the community. Failure to win the clay/shale would be contrary to the purpose of including the site in Schedule 1 of SREP No. 9 (2).

Not proceeding with the proposal or limiting the extent of quarrying would result in additional demands on an already limited supply of selected clay/shale in the Sydney metropolitan area. Limiting the further extraction of the Schofields site would lead to increased transport of clay/shale to the site from other suppliers. Restriction of the Schofield supply could also potentially create product shortages.

PGH has committed considerable investment to its recently commissioned brick manufacturing plant at Schofields. In part, this investment hinges upon a continuing supply of raw materials at an acceptable price. If the Company were not to continue quarrying on the site this would eventually require all raw materials to be transported to Schofields, substantially increasing the cost of brick manufacture at that plant.

Quarry infrastructure is already developed at Schofields and the opportunity to minimise costs associated with such a development would be lost if the proposal did not proceed.

Furthermore, should the proposal not proceed, a valuable site for landfilling would be lost to the Sydney region.

The do-nothing option is not therefore viable for the Company or for the most efficient use of one of Sydney's valuable clay/shale and landfill resources.

Limited Approval

A possible alternative would be to seek approval for quarrying, without the landfill component. Such a plan would leave an unrehabilitated quarry void in Schofields which would be both a hazard and a denial of future beneficial land uses. From both an environmental and economic viewpoint, it is preferable to fill the void as quickly as possible after it has been created.

It is probable that eventually most quarry voids in the metropolitan area will be filled, in some cases years or decades after quarry workings have ceased. Such proposals reintroduce truck movements and noise-generating activities to dormant sites to the detriment of surrounding communities.

It is preferable for rehabilitation to proceed in parallel to quarrying so that the time during which environmental disturbance occurs can be minimised. The Schofields proposal embodies this principle: rehabilitation work will overlap with quarrying so that the site will be restored within a few years of the cessation of other activities.

Approval to quarry without progressive rehabilitation would not be in the public interest.

Alternative Sites

It is not practical for PGH to seek alternative sources for its clay/shale in preference to continuing quarry operations at Schofields. The considerable investment in the brick manufacturing plant hinges on a supply of raw materials at an acceptable price. If a new quarry was to be developed on another site, the cost of transporting clay/shale to Schofields would affect the economics of brick manufacture at the site and put at risk the Company's investment.

Inert Waste Landfill

The objective of filling the quarry void may be achievable if an inert waste landfill were to be established at Schofields. However, the increasing diversion of building materials to recycling centres may result in the Schofields site not receiving sufficient waste for the landfill operation to be viable, or to maintain a sufficient rate of progress in rehabilitation, if it were confined to the receipt of inert waste only.

Enviroguard would prefer to receive a licence for a Solid Waste Landfill Class 2 which should guarantee sufficient waste input to achieve effective rehabilitation. If necessary, the landfill operator could voluntarily restrict waste to inert materials if the site began to receive waste at a greater rate than desired to keep pace with quarrying.

8.6 SECTION 90 CONSIDERATIONS

Section 90(1) of the *EP&A Act, 1979* sets down matters to be considered by the consent authority when determining a development application.

Each of the matters included in section 90(1) is reproduced below together with a summary of the consideration of the proposal under that heading.

"(a) *the provisions of:*

- (i) *the relevant planning instrument and*
- (ii)(iii) *any relevant draft planning instruments and*
- (iv) *any development control plan that applies to the land to which the development application relates;"*

The relevant planning instruments are the Blacktown LEP, 1988, SREP No 9(2) - Extractive Industry, SREP No 19 - Rouse Hill Development Area and SREP No 20 - Hawkesbury/Nepean River. The provisions of these planning instruments are discussed in **Section 3.1**.

"(b) *the impact of that development on the environment (whether or not the subject of an environmental impact statement) and, where harm to the environment is likely to be caused, any means that may be employed to protect the environment or to mitigate that harm;"*

The impact of the proposal on the environment and proposed mitigation measures are assessed in **Section 5**.

"(c) *the effect of that development on the landscape or scenic quality of the locality;"*

The proposal will not significantly alter the landscape or scenic quality of the area. Works within the northern property are largely obscured from view. There will be some alteration to views of the southern property owing to construction of perimeter mounds. The change will be noticeable from adjoining properties and Meadow Road, but will become obscured as mound landscaping progresses.

- "(c1) the effect of that development on any wilderness area (within the meaning of the Wilderness Act 1987) in the locality;"

There are no wilderness areas in the locality.

- "(c2) the effect of that development on critical habitat;"

The site does not contain critical habitat.

- "(c3) whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats;"

As discussed in **Section 5.12** the assessment carried out indicates that there would be no such significant effect.

- "(c4) any relevant recovery plan or threat abatement plan;"

There are no recovery plans or threat abatement plans relevant to the site.

- "(c5) the effect of that development on other protected fauna or protected native plants within the meaning of the National Parks and Wildlife Service Act, 1974;"

The assessment contained in **Section 5.12** concluded that there are no recent records of threatened flora or fauna on the site. There will be no significant effect on any other protected fauna or protected native plants.

- "(d) the social effect and the economic effect of that development in the locality;"

The proposal will not in itself affect the social and economic characteristics of the locality. It is a proposed continuation of current and recent activities on the site.

- "(e) the character, location, siting, bulk, scale, shape, size, height, density, design or external appearance of that development;"

The development will essentially retain the physical characteristics of the site with the exception of construction of earth mounds around the southern property and creation of a more domed landform on the northern property.

- "(f) the size and shape of the land to which that development application relates, the siting of any building or works thereon and the area to be occupied by that development;"

The proposal does not involve erection of buildings apart from minor office and amenities structures near the entrance. The works will occupy, in stages, the area available for quarrying on the northern property.

- "(g) whether the land to which that development application relates is unsuitable for that development by reason of its being, or being likely to be, subject to flooding, tidal inundation, subsidence, slip or bush fire or to any other risk;"

The land is not subject to any of the nominated risks.

- "(h) the relationship of that development to development on adjoining land or on other land in the locality;"

The proposal is a continuation of existing and previous land use on the site which is permissible in the rural zoning. Appropriate safeguards are proposed to protect the amenity of surrounding properties.

- "(i) whether the proposed means of entrance to and exit from that development and the land to which that development application relates are adequate and whether adequate provision has been made for the loading, manoeuvring and parking of vehicles within that development or on the land;"

Vehicular access will be provided via the existing eastern gate in Meadow Road which is of adequate width and provides adequate sight distance on the roadway. There is plentiful room for parking.

- "(j) the amount of traffic likely to be generated by the development, particularly in relation to the capacity of the road system in the locality and the probable effect of that traffic on the movement of traffic on that road system;"

Traffic has been assessed in **Section 5.2**. The proposal will result in less traffic from the site than during the previous simultaneous quarry and landfill operation.

- "(k) whether public transport services are necessary and, if so, whether they are available and adequate for that development;"

Public transport services are not available or necessary.

- "(l) whether utility services are available and adequate for that development;"

Power, telephones and water services are already available and in use. Sewage will be collected in a storage tank and removed by a sullage contractor.

- "(m) whether adequate provision has been made for the landscaping of the land to which that development application relates and whether any trees or other vegetation on the land should be preserved;"

All trees not in the way of quarrying, landfilling and mound construction will be preserved. Detailed landscaping plans will be developed within the context of the landfill environmental management plan.

- "(m1) whether the development is likely to cause soil erosion;"

Erosion and siltation controls have been incorporated in the proposal with a view to limiting soil erosion and preventing silt-laden water leaving the site.

- "(n) any representations made by a public authority in relation to that development application, or to the development of the area, and the rights and powers of that public authority;"

Various authorities were contracted in preparation of this EIS. Their responses have been taken into account in preparation of the document. Council may receive further representations from public authorities in response to exhibiting the EIS.

- "(o) the existing and likely future amenity of the neighbourhood;"

The neighbourhood will experience a continuation of quarrying and landfilling. The principal amenity issues are noise, dust and traffic which are discussed in **Section 5**.

- "(p) any submission made under section 87;"

Council will receive submissions when the application is advertised.

- "(q) the circumstances of the case;"

The land has been used for quarrying and brickmaking for many years. Landfilling has taken place on the site in recent years as a means of quarry rehabilitation. The clay/shale resource is identified as regionally significant in SREP No. 9(2).

- "(r) the public interest; and"

It is in the public interest to have the clay/shale resource extracted and the land rehabilitated.

- "(s) any other prescribed matter including -

- (a) whether adequate provision has been made to enable disabled persons to gain access to the development or to the land on which the development is proposed to be carried out;"

Disabled access is not required.

- "(b) the Government Coastal Policy.....;"

Not relevant in the Blacktown City Council area.

- "(c) the effect of the development on:

- (i) any protected or endangered fauna (within the meaning of the National Parks and Wildlife Act 1974); and"

The impact on fauna is assessed in **Section 5.12**. The proposal is not considered to create a significant impact on protected or endangered fauna.

- "(ii) the habitat of any such protected or endangered fauna, and the means to be employed to protect them from harm, or to mitigate the harm, if the development is likely to cause them harm;"

The site is not considered to provide significant habitat for protected or endangered fauna.

- "(d) whether the development will endanger any species of animal, plant or other form of life, whether living on land, in water or in the air;"

No species will be endangered by the proposal.

- "(e) the matters set out in the document entitled "Planning for Bush Fire Protection (published by the Department of Bush Fire Services) or in any publication of that Department published in substitution for that document and approved for the time being by the Director".

Bushfire control is a prescribed matter under clause 65 of the EP&A Regulation 1994. The bushfire risk of the site has been considered in the light of Department of Planning Circular C10 - Planning in Fire Prone Areas. It is considered that the northern property is not at significant risk from a bushfire. The southern property is partly vegetated and could potentially be at risk. Access to this unused land for fire fighting, will be retained at all times.

8.7 CONCLUSION

The justification for the continued extraction of clay and shale from the site followed by its progressive landfilling and site rehabilitation is well demonstrated. With the implementation of the appropriate measures and controls outlined in this EIS and detailed in the DLEMP, the physical environment and the amenity of local residents will be safeguarded. We support this application and recommend that Blacktown Council grant its approval.

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