

**ENVIRONMENTAL MANAGEMENT PROGRAM  
CLAY EXCAVATION  
LOTS 23 AND 51 APPLE STREET  
UPPER SWAN**

**(Ministerial Statement 659)**

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## 1.0 INTRODUCTION

The potential environmental impacts of a proposal by Pilsley Investments Pty Ltd (Austral Brick) to excavate clay from Lots 23 and 51 Apple Street, Upper Swan (Figure 1) was formally assessed by the Environmental Protection Authority (EPA) at the level of Consultative Environmental Review (CER). The CER was prepared as a joint document regarding this and other clay excavation proposals, to examine the potential cumulative impact of these operations on the nearby habitat of the extremely rare and endangered Western Swamp (or Short-Necked) Tortoise (*Pseudemydura umbrina*).

Following assessment and public review of the CER, which included provision of additional information by the Company, the EPA concluded that the proposal is environmentally acceptable, and that the environmental issues identified are manageable through both the commitments to environmental management made by Pilsley Investments (Appendix A), and provided the proponent prepares and implements and Environmental Management Program (see EPA Bulletin No. 614 (1992), Assessment No. 160).

The Environmental Management Program (EMP) is a condition of approval set by the Minister for the Environment (Appendix A), which was fulfilled by the preparation of the original EMP (Bowman Bishaw Gorham, 1993). Following a Section 46 Review of the project in 2004, revised Ministerial Conditions were issued. These conditions are presented in Appendix B. The requirement for preparation and implementation of the EMP remains under the new approval.

This revised document has been prepared at the request of the Department of Environment and Conservation in order to document any changes agreed since preparation of the original EMP.

## 2.0 OVERALL OBJECTIVES AND CORPORATE ENVIRONMENTAL STATEMENT

### (i) Objectives

The Primary objective of the Environmental Management Program (EMP) is the protection of the habitat of the endangered Western Swamp Tortoise (*Pseudemydura umbrina*) at the Ellen Brook Nature Reserve (EBNR) and in potential future extensions to the EBNR habitat. To achieve this objective, the EMP addresses;

- Management of excavation procedures (Excavation Plan)
- Management of drainage waters (Drainage Management Plan), and
- Management and protection of groundwater resources (Groundwater Protection Plan)

Other Objectives of the EMP are related to the management of local environmental and social impacts, and include;

- Management of noise, dust and visual impacts
- Management for community health and safety, and
- Rehabilitation of the site.

Subsequent sections of this EMP provide details for each of the elements listed above.

### (ii) Corporate Environmental Statement

Additional to the objectives listed above, Austral Brick provides the following statements as a reflection of its corporate position in relation to the protection of the EBNR and the Western Swamp Tortoise, and to emphasise its commitment to the overall environmental management philosophy outlined in this EMP and earlier documents.

1. The management and staff of Austral Brick (Pilsley Investments) are committed to operating the site in a manner which minimises the environmental impact of the operation. In particular, the company recognises that the survival of the Western Swamp Tortoise is at grave risk. Water quality in the EBNR is critical to its survival. The company will ensure full implementation of this EMP to avoid disturbance to the tortoise habitat.

2. Austral Brick will comply with all the EPA and City of Swan conditions and monitoring requirements, and be pro-active in anticipating and eliminating potential risks to the environment resulting from the Company's operation.
3. Austral Brick will consult the relevant Planning Authorities should special circumstances arise, and employ specialist services if the knowledge or experience is not available within our own organisation.

Further, Austral Brick commits to assist in the strategic planning for the locality, which at all times recognises and accepts the interim priority land use for clay extraction.

4. Austral Brick has established inter-company liaison to enable a co-ordinated approach between all three proponents with respect to addressing potential cumulative operational effects and rehabilitation goals.
5. Austral Brick recognises its duty to ensure that sub-contractors employed in excavation, cartage and rehabilitation are fully informed of the requirements of this EMP and enforce those requirements by stating that breaches of the EMP or negligence by the sub-contractor may result in their dismissal.
6. The management techniques described in previous documentation and this EMP will be implemented to ensure that no adverse effects are experienced, particularly in respect to:
  - Potential noise and dust disturbance of the local residents.
  - Potential visual intrusion.
  - Potential erosion of bunding, stockpiles and working areas which could transport unwanted volumes of silt to local drainage.
  - Management of run-off or dewatering to prevent intrusion of silt laden water into the EBNR.
  - Excavation areas to be sequentially rehabilitated, the pits being restored progressively while clay excavation continues.

(iii) Implementation and Responsibility

Coordination and on-site supervision will be provided by the Resource Manager (Mr Craig O'Connor).

Ultimate responsibility for the implementation of all aspects of the EMP rests with the proponent, Pilsley Investments Pty Ltd.



### 3.0 EXCAVATION PLAN

#### Objective

*To implement a quarrying strategy which will minimise the total area of disturbance and allow effective water management, and minimisation of noise, dust and visual impacts of the quarrying operation off-site.*

#### 3.1 Buffer Zone

The Environmental Protection Authority has concluded that the 100 metre no-quarrying buffer imposed on other clay excavation proposals to protect the tortoise habitat in the EBNR is not applicable in this case because the proposed excavation on Lots 23 and 51 will result in quarrying at greater distances; no closer than 300 metres to the existing reserve, and 120 metres to the proposed extension of the reserve (Bulletin 614, Assessment No. 160).

However, buffer areas between the excavation area and road reserves (40 metre buffer) and other lot boundaries (20 metres, excluding the common boundary between lots 23 and 51) will be maintained.

#### 3.2 Quarrying Strategy

##### 3.2.1 Basis

The extraction of clay from the deposit identified on Lots 23 and 51 is a relatively simple process. However, in order to minimise the area disturbed at any one time, Austral Brick intends to quarry the clay in sixteen discreet stages. The trial mining phase (stage 1) commenced in December 1993, and 4 stages have been completed to date. In summer 2006/07 mining will be undertaken within stages 5 to 8.

The deposit occurs on land previously developed for pastoral use, and all trees have previously been removed from the site and replaced by pasture. However, Austral Brick replanted approximately 1,100 trees on the entire boundary of this site in May 1992.

Following skimming of the pasture and surface detritus and stockpiling of topsoil and overburden, clay is removed by hydraulic excavator and loaded directly into trucks for transport to the brick manufacturing plant.

### 3.2.2 Timing

The anticipated life-span of the clay deposit is approximately 12 – 16 years, depending predominantly on brick demand. There is approximately 12 years of resource remaining on the site, at present usage rates. Clay will be excavated from November to May, in short campaigns according to demand and available storage capacity at the brickworks.

No stockpiling of clay will occur, with excavated material being removed from the site immediately. As a general rule, between 40 and 50 truck movements per day are required for the 2 week annual excavation and cartage program which is split into approximately 2 one week campaigns in December and March

### 3.2.3 Excavation Plan

Within its recommendations for the project, the EPA (1992) considered that a trial mining phase should be conducted, with “the first excavation to commence at the furthest point away from the Wildlife Sanctuary”. This point corresponds to the southwest corner of the site, approximately 500m from the extension of the Tortoise Reserve (western portion of Lot 23), but would also be closest to existing residential areas, and additionally create problems relating to the containment of potentially turbid run-off given the existing northerly direction of surface drainage of the site. The south west corner of the site also proposes difficulties for the planned progressive rehabilitation of the excavation area. It was therefore proposed that the initial trial mining and monitoring phase be carried out in the north-western extremity of the site (Figure 2), which still maintained an approximate 400m separation distance from the Reserve. The 100m separation difference in the two options was not considered significant.

The north west corner of the site for the trial mining was considered to have a number of significant advantages, as described below:

The ponds created on the northern half of the site due to mining would be permanent, as there would be insufficient overburden to fill the excavations. Conversely, all excavation stages on the southern half of the site would be backfilled and rehabilitated during the excavation process for the site. Therefore by mining in the north of the site first, should there be a need to remove rainwater from a southern stage before the continuation of

excavation, or prior to final backfilling, the northern ponds would always be available to receive water pumped from a pit or from directed surface run-off. Additionally, the natural northerly direction of surface drainage within the site means that any surface flow will be towards the pits, and not the drain or Apple Street. This important facility would not be available if the southern sector was mined first.

- Progressive excavation stages would be generally moving away from existing residential areas south-west of the site (in an east-west context), rather than encroaching as would be the case if mining was in a southerly or westerly direction. This was considered to be of social benefit.
- Existing bores on the northern boundary of the site would be able to be utilised for groundwater monitoring purposes.
- The area of ground disturbed at any one time, and therefore the potential for the generation of turbid run-off, would be minimised.

Excavation would commence in the western quadrant of the deposit, and continue east in a further fifteen stages (1 per year) until the resource is exhausted. Each stage will remove approximately 15,000m<sup>3</sup> of clay. The total area to be disturbed is approximately 7.6 ha. This revised excavation plan was approved by the then Department of Environment Protection through acceptance of the EMP.

Prior to removal of clay from Stage 1 of the excavation plan in 1994, topsoil was skimmed and stockpiled on the perimeter of the property, which is approximately 360m x 240 metres in size. Bunds approximately 4-5 metres high with a base thickness of (say) 15 metres were formed on all sides of the property using overburden and topsoil.

The Bunding on the boundaries of the property are multi-functional, serving the following purposes:

- To significantly reduce potential noise and dust export from the site;
- To provide visual screening of the excavation to residents and nearby road-users, and

- 
- To catch and divert all water from operational areas into the dams formed by excavation, thereby avoiding discharge of turbid water to drainage lines and consequently at the Ellen Brook Nature Reserve.

As the site is progressively excavated, the excavations and associated machinery are contained within the screening bunds on the boundary of the property. A clay wall approximately 1 metre thick is maintained between stages, to ensure that any rainwater collected in the previous stage is prevented from entering the currently active stage. Excess overburden is used to progressively back-fill and rehabilitate the southern stages of the pits following each excavation campaign, as detailed in Section 7.0.

## 4.0 DRAINAGE MANAGEMENT PLAN

### Objectives

- *To ensure the retention of turbid water from areas disturbed during excavation, within the exhausted clay pit within each stage.*
- *To modify, where necessary, existing drainage patterns between the site and the Ellen Brook Nature Reserve (approximately 300m north-east of the site), to ensure that drainage waters bypass the tortoise habitat within the reserve.*
- *To monitor drainage water quality which will enable the success of drainage management to be confirmed, or remedial action to be instigated, where necessary.*

## 4.1 Run-off Management

### 4.1.1 Basis

In accordance with the ministerial Conditions for this project:

- All drainage waters from the south western side of the Great Northern Highway were required to be diverted from entering any of the fenced tortoise habitat enclosure at the EBNR, within 2 years of the Minister for the Environment's approval.
- All drainage waters generated from the operational areas are to be detained on-site for the life of the mine, to avoid deleterious effects on the tortoise habitat.

### 4.1.2 Containment

The following management strategies have been and will continue to be implemented to ensure the containment of turbid waters from the operational area on-site:

- The pit created during each excavation campaign (stage 1,2,3...16) are utilised for containment of turbid run-off.

- Run-off from disturbed ground adjacent to the pit is diverted to the pit by strategic formation of the surrounding bunds (and spoon-drains if necessary).
- To avoid the necessity for dewatering of drainage which collects in the operational area, prior to excavation during subsequent campaigns the “drainage” pit created in each stage is left as a discrete cell until eventually rehabilitated. In the case of the stages in the northern half of the site, these cells will eventually be amalgamated to form permanent lakes.

Based on exploratory drilling data and topographical information, it was estimated that the clay deposit extends to a depth of approximately 10 metres below the surface. However, in order to avoid the necessity for dewatering, clay will only be excavated to a depth of approximately 8 metres. However, it is possible that in the process of clay mining a shallow zone of water-bearing sediments may be intersected, in which case water will drain into the pit. Experience with existing clay pits in the locality strongly suggests that large cells of perched groundwater are very much an exception; a factor supported by monitor bore data presented in the CER.

Loss of water occurs from the pits through evaporation over the summer months, and can additionally be used for dust suppression and tree watering if required. As each stage is mined in discrete, self-contained cells, it is not necessary to dewater any pit at the commencement of each excavation season, however pumping of rainwater caught during winter is required in some cases before recommencing extraction of backfilling with overburden.

In the event that dewatering of rainwater from a pit is necessary, or that a lens of groundwater is intersected, Austral Brick will pump low volumes of water as a lateral sheet flow to undisturbed ground for disposal via evaporation within the site, or to a previously excavated stage in the northern half of the site. In any event, water will not be discharged to the surrounding drainage network under any circumstances.

#### 4.1.3 Drainage Diversion

Originally surface drainage waters from the site flowed in a northeast direction, towards and eventually into (at least to some degree) the fenced habitat area of the EBNR. The EPA and CALM were satisfied that the main habitat area in the EBNR could be maintained primarily by direct rainfall, and that the tortoise’s survival would benefit by the elimination of the risk of contaminated drainage waters entering the reserve.

With the construction of diversion bunds, clean drainage waters from undisturbed non-operational areas of the site now enter the Apple Street drain, which flows east to a table-drain within the road reserve on the western side of Great Northern Highway. Some clean sheet-flow may also directly enter this drain from the site. This table-drain discharges to the EBNR approximately 800 metres further north from the intersection of Apple Street and Great Northern Highway, on the eastern side of the highway.

## 4.2 Monitoring and Remedial Action

### 4.2.1 Monitoring

The objective of monitoring was to ensure the success of turbid run-off containment during the initial years of operation. Monitoring of drainage continued after the drainage diversion was completed. The EPA has acknowledged that this is no longer required, and cleared the Condition in June 2000.

### 4.2.2 Remedial Action Plan

Remedial action will be dependent on the nature and extent of the identified problem, and may include:

- Repairs to perimeter bunds;
- Diversion of additional run-off into the clay pit for containment;
- Use of hay bales in areas of sheet run-off to reduce water velocities and filter sediment loads;
- Hydro-mulching of disturbed ground to prevent water erosion; and
- Enlargement of the settling/compensation basin.

It should be noted that as 'ground-disturbing' activity will only occur during the drier months of the year, and as most rainfall would be expected to occur when the operation is dormant, turbidity will not be as excessive as one would expect if machinery were operating or stock were on the site. Therefore, with the exception of the excavation area and internal access route, the remainder of drainage from the site is anticipated to be relatively "clean" water.

### **4.3 Reporting**

If remedial action is considered necessary the EPA will be advised at the time.



## 5.0 GROUNDWATER PROTECTION PLAN

### Objectives

- *The primary objective of the Groundwater Protection Plan is to ensure that clay excavation does not intersect and drain any perched groundwater aquifer, which may be connected to the tortoise habitat and its planned extensions.*
- *The secondary objective of the Groundwater Protection Plan is to prevent pollution of the underlying groundwater systems (Guildford and Leederville aquifers) from such agents as fuel and oil spillages.*

### 5.1 Groundwater Level Monitoring

Austral Brick previously supplied evidence to the EPA that the EBNR is not hydrologically linked to the clay deposit on Lots 23 and 51. Consequently, the EPA concluded that excavation of clay on the site is most unlikely to interfere with the perched groundwater regime in the vicinity of the EBNR (EPA Bulletin No. 614, 1992), provided that stringent controls and management procedures are adopted. Nonetheless, clay excavation from the site commenced with a trial mining phase.

Austral Brick will monitor for potential perched groundwater using the three shallow (4m) monitor bores which were installed within the site in March 1989, and two deep bores already in existence on the property (Figure 3; bores 1, 2, 3, 4 and 14). Measurements from these bores was utilised to establish the position of the water table prior to excavation of Stage 1.

Monitoring of the shallow bores is conducted to allow determination of any effects on the perched groundwater found on the site, and also any lateral seepage occurring from the excavated cells should they fill with water from winter rains.

Potential groundwater levels in the shallow bores will be compared with water level variations in the tortoise swamp, as measured by CALM.

## 5.2 Groundwater Protection and Pollution Control

- Clay will not be excavated below the water table.
- The deeper groundwater resources will be protected from potential hydrocarbon contamination
- Only the excavation machinery (dozer and hydraulic excavator) will be refuelled on-site; the trucks and water cart will be refuelled elsewhere.
- On-site refuelling will be conducted via a fuel truck, which only visits the site for the duration of re-fuelling.
- No fuel or other lubricants will be stored on-site.
- Machinery will not be left on-site in the period between excavation campaigns.
- In the unlikely event that a substantial spillage occurs, the contaminated sediments will be excavated and removed from the site to an approved disposal location.

## 5.3 Reporting

- The results of monitor bore investigations will be reported to the EPA, CALM, City of Swan and Swan River Trust within the performance and compliance reports.
- Any unusual seepage event observed within the excavation will be documented and reported within the PCRs.
- In the event of a significant diesel spillage, Austral Brick will immediately inform the appropriate District Officer of the DEC, to enable consultation regarding appropriate recovery action.
- Austral Brick will advise the DEC of the conclusion of each annual excavation period to enable its officers to make an inspection to evaluate the impact of fuelling and mechanical servicing on the site.

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## 6.0 MANAGEMENT OF POTENTIAL SOCIAL IMPACTS

### Objectives

*Austral Brick will operate the clay quarry:*

- *Within noise and dust limits which can be tolerated by the local community with minimal inconvenience;*
- *To ensure that community health and safety standards are maintained in terms of such factors as pit safety and mosquito breeding potential.*

## 6.1 Noise and Dust

### 6.1.1 Noise and Dust Controls

The noise and dust controls which are practised by Austral Brick at other clay excavation sites will be applied to quarrying on Lots 23 and 51.

Haulage truck operation is restricted to between the hours of 7.00am and 5.30pm, Mondays to Fridays.

The road and access track at the entrance to the site will be watered as required to reduce the potential dust generation. Random checks will be made by the resource manager (Mr Craig O'Connor) to ensure that the watering regime is rigidly adhered to and dust generation is minimised.

The 4-5 metre high bunds formed around the perimeter of the property, and the 1,100 trees which were planted around the perimeter of the site in May 1992, will significantly reduce the potential for the off-site export of both dust and noise emissions. Installation of the bunds means, with the exception of haulage vehicles entering and exiting the site, machinery operates well below sight levels.

### 6.1.2 Complaints Procedure

On-site personnel are advised to report all complaints immediately, including name and contact details of complainant and nature of complaint, to Mr Craig O'Connor (Resource Manager). A complaints record is maintained by the Company.

In the event that a complaint is received, the matter will be investigated and the complainant advised of the reasons for the perceived nuisance and the remedial action (in necessary) to prevent a re-occurrence of the problem.

Every endeavour will be undertaken to respond to complaints within 2 working days.

### 6.1.3 Inter-company Liaison

In accordance with the Proponent's CER Commitment 2, the operations supervisor from Austral Brick will liaise with other operations supervisors to ensure that the cumulative environmental impacts during excavation are acceptable.

## 6.2 **Community Health and Safety**

Austral Brick will liaise with the Health Surveyor from the City of Swan, prior to the commencement of rehabilitation works, to obtain advice in relation to the mosquito breeding potential in the completed clay pits. Where possible, the configuration of the pits will be amended to avoid the creation of mosquito breeding habitat.

It is anticipated that other completed clay pits which hold permanent water could be inspected in the locality to assess mosquito breeding activity; special action may not be require at rehabilitated clay pits.

The existing fences and gates will be maintained in functional condition to deter public access to the site. "Danger – Open Pit" signs have been placed at appropriate intervals on the perimeter fence. If necessary, a low-voltage electric fence may be placed inside the boundary fence to discourage trespassers. Gates are locked when the pit is not in operation.