

Relocation of Herne Hill Quarry Operation, Amendment of Implementation Conditions

Hanson Construction Materials Pty Ltd

**Section 46 Report and Recommendations
of the Environmental Protection Authority**

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Environmental Impact Assessment Process Timelines

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Summary and recommendations

Pioneer Concrete (WA) Pty Ltd (Pioneer) referred a proposal to the EPA on 12 January 1990 to relocate its then existing Herne Hill quarry (Pioneer No 1 quarry) further east to create a new quarry in Red Hill (Pioneer No 2 quarry). The relocation proposal was assessed by the Environmental Protection Authority (EPA) at the Public Environmental Review (PER) level. The Minister for the Environment issued approval for the proposal on 5 December 1991 subject to conditions and commitments as described in Ministerial Statement 199. The Red Hill quarry, located at Lot 11 Toodyay Road, Red Hill has been in operation since late 1997.

On 12 February 2004, the Minister for the Environment requested advice from the EPA as to whether Commitment 22 of Statement 199 can be included as a Ministerial condition and what additional conditions relating to visual impacts should be imposed to enable adequate enforcement. The Minister also required advice on the scope and definition of the quarry operation.

In accordance with Section 46(6) of the *Environmental Protection Act 1986*, this report provides the EPA's advice and recommendations to the Minister for the Environment on the environmental matters raised in the Minister's letter of 12 February 2004.

In July 2004, Pioneer changed its name to Hanson Construction Materials Pty Ltd (Hanson). In this report the EPA will use the previous proponent name, except in Appendix 4 (Recommended Environmental Conditions and Proponent's Consolidated Commitments), where Hanson is used.

Relevant environmental factors

It is the EPA's opinion that the following environmental factor is relevant to the proposal, which requires detailed evaluation in the report:

(a) Visual Impact.

Conclusion

Term of Reference 1 - Whether Commitment 22 of Statement 199 can be included as a Ministerial condition

The EPA has concluded that the Red Hill Quarry operation is visible from outside land owned by the proponent. The Visual Impact Assessment, as part of the 1990 PER, was inaccurate in its prediction that the operations would not be visible from ground level outside the proponent's property once screening bunds and vegetation were established.

Commitment 22 should be removed from Ministerial statement 199 as it is not achievable.

The use of bunds and vegetation to screen the quarry from view is not practicable during excavation due to the size, orientation and nature of the quarrying operation.

The EPA expects that the visual impact of the West Pit Extension will increase as the proponent continues the development and excavation from this pit.

There are no conditions governing the West Pit Extension under Part IV of the *Environmental Protection Act 1986*. The EPA is now unable to assess the West Pit Extension as a proposal cannot be referred to the EPA more than once. The City of Swan, under its review of the rehabilitation requirements of the Extractive Industry Licence, can require that this area is rehabilitated to the same standard as the other aspects of the Red Hill Quarry operation. The

EPA notes that the City of Swan can also require stakeholder consultation be included as part of rehabilitation of the West Pit Extension.

Term of Reference 2 - What additional conditions relating to visual impacts should be imposed to enable adequate enforcement.

The visual impacts associated with the quarry operation can best be addressed through the preparation of a detailed Rehabilitation Plan for the quarrying operation which includes consultation with key stakeholders. This plan should address the progressive rehabilitation of all disturbed areas and should also include consideration of offsite treatments that may reduce the visibility of the quarry operation at nearby properties.

Term of Reference 3 - The scope and definition of the quarry operation.

It is not possible to determine the exact approved location of the West Pit as the information contained in the PER is not sufficiently detailed. It is apparent however, that the southern edge of the West Pit is outside the approved footprint area.

The overburden dump was not included in the 1990 PER or the 1994 application for an Extractive Industry Licence referred to the EPA. The EPA has recommended that the proponent should remove the overburden dump prior to 31 December 2005, or another date if more appropriate, and rehabilitate the disturbed area to native vegetation, as part of the Rehabilitation Plan. The overburden material should be returned to the West Pit void and used in the reshaping and rehabilitation of this area, unless an alternate use is considered and approved as part of the Rehabilitation Plan.

In addition to the above, the EPA considers that commitments 10, 14, 16, 17, 26, 32 and 33 should be changed to reflect the current operation of the quarry and the fact that the Red Hill Quarry does not contain an asphalt plant.

Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that this report is pursuant to Section 46(6) of the *Environmental Protection Act 1986* and thus is limited to consideration of proposed changes to the original conditions.
2. The Minister notes the report on the Red Hill Quarry.
3. The EPA recommends that the Minister considers the report on the relevant environmental factor as set out in Section 3.
4. That the Minister notes that the EPA has concluded that the visual impacts associated with the quarry operation can best be addressed through the preparation of a detailed Rehabilitation Plan for the quarrying operation which includes consultation with key stakeholders.
5. That the Minister notes that the EPA recommends that the proponent should remove the overburden dump prior to 31 December 2005, or another date if more appropriate, and rehabilitate the disturbed area to native vegetation, as part of the Rehabilitation Plan.
6. The Minister imposes the amended conditions, commitments and procedures recommended in Appendix 4 of this report.

Conditions

The EPA recommends that the following changes to a condition and commitments, which are set out in detail in Appendix 4, be imposed on the implementation of the Red Hill Quarry operation:

- 1 The existing Environmental Conditions applied to the project (Ministerial Statement 199 published on 5 December 1991), be subject to modifications necessary to:
 - remove commitment 22 from Ministerial Statement 199;
 - require the proponent to prepare a detailed Rehabilitation Plan for the quarrying operation which includes consultation with key stakeholders, and;
 - reflect the current operation of the quarry and the fact that the Red Hill Quarry does not contain an asphalt plant.

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1. Introduction and background

In July 2004, Pioneer changed its name to Hanson Construction Materials Pty Ltd (Hanson). In this report the EPA will use the previous proponent name, except in Appendix 4 (Recommended Environmental Conditions and Proponent's Consolidated Commitments), where Hanson is used.

On 12 January 1990, Pioneer Concrete (WA) Pty Ltd (Pioneer) referred a proposal to the EPA to relocate its then existing Herne Hill quarry (Pioneer No 1 quarry) further east to create a new quarry in Red Hill (Pioneer No 2 quarry). The relocation proposal was assessed by the EPA at the Public Environmental Review (PER) level. The Minister for the Environment issued approval for the proposal on 5 December 1991 subject to conditions and commitments as described in Ministerial Statement 199.

In its PER, released in September 1990, the proponent stated that it:

"...hopes, through the proposed relocation, to fulfil several related objectives. These are:

1. to relocate the present operations to an area sufficiently remote from current and future urban development so that undesirable social effects arising from noise, dust, odours and visual impact are eliminated or minimised."

In its 1991 assessment, the EPA stated that:

"it is intended that by moving the quarry operation deeper into the Pioneer landholding impacts on residential areas from dust, noise and odours will be reduced, for both existing and future residential development."

and that:

"The relocation of the Herne Hill quarry is partly in response to social pressures stemming from the proximity of Pioneer No. 1 to urban areas. It is therefore recommended that planning authorities are aware of the need to ensure the Pioneer No. 2 site is given protection from further encroachment of urban areas in order to prevent incompatible land uses being in close proximity to one another."

The main environmental factors of the proposal, as considered by the EPA in 1991, were;

- drainage management,
- conservation value of the area of the proposed relocation,
- rehabilitation of the entire quarrying operation, including the original quarry, and;
- impacts from odour, noise and dust.

Subsequent to the Ministerial approval of the quarry relocation proposal, the Shire of Swan (now City of Swan) referred the proponent's Extractive Industry Licence (EIL) application to the EPA in 1994. The EIL application included an extension to the West Pit, shown in Figure 2 as Area 6, that was not part of the original quarry relocation proposal in 1991.

The EPA considered the 1994 EIL application and concluded that the overall environmental impact of the proposal is not so severe as to require environmental assessment.

On 12 February 2004, the Minister for the Environment wrote to the Chairman of the Environmental Protection Authority (EPA) with regards to Ministerial Statement 199 and requested:

“...advice from the EPA as to whether Commitment 22 can be included as a Ministerial condition and what additional conditions relating to visual impacts should be imposed.”

and,

“...advice on the scope and definition of the quarry operation.”

Section 46(6) of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on whether the conditions and commitments raised in the Minister’s letter of 12 February 2004 should be changed. In addition, the EPA may make other recommendations as it sees fit. Accordingly, this report provides the EPA’s advice and recommendations to the Minister for the Environment.

Further details of the quarrying operation are presented in Section 2 of this Report. Section 3 discusses the matters raised in the Minister’s letter of 12 February 2004. The commitments to which the quarrying operation should be subject are set out in Section 4. Section 5 presents the EPA’s conclusions and Section 6, the EPA’s Recommendations.

References are listed in Appendix 2. Environmental Condition Statement 199, published on 5 December 1991 is presented in Appendix 3. The recommended conditions and procedures and proponent’s commitments are provided in Appendix 4.

2. The quarrying operation

The Red Hill quarry, located at Lot 11 Toodyay Road, Red Hill has been in operation since late 1997.

The quarrying operation involves the extraction of hard rock from the West Pit by blasting and/or excavation by wheeled loader. Quarried rock is then transferred to the onsite crushing and screening plant where it is converted into the various products required in the construction of buildings, roads, railways and other infrastructure.

The approval of this proposal in 1991 included two quarry pits, the West and East Pits. To date, the proponent has extracted rock from the West Pit only and has not commenced development of the East Pit.

A detailed description of the assessed proposal is provided in Section 7 of the PER (Pioneer Concrete (WA) Pty Ltd, 1990).

3. Relevant environmental factor

Section 46(6) of the *Environmental Protection Act 1986* requires the EPA to prepare and give to the Minister a report that includes —

- (a) a recommendation on whether or not the implementation conditions to which the inquiry relates, or any of them, should be changed; and
- (b) any other recommendations that it thinks appropriate.

Having considered appropriate references and submissions from an adjacent neighbour and the proponent, it is the EPA's opinion that its inquiry into the Red Hill Quarry operation should address the following relevant factor:

(a) Visual Impact.

The EPA's description and assessment of the terms of reference in the Minister for the Environment's letter of 12 February 2004 are discussed in Section 3.1 of this report. The description of this issue shows how it relates to the Red Hill Quarry operation. The assessment of these issues is where the EPA provides its recommendations as to whether commitment 22 can be included as a condition, any additional conditions relating to visual impacts, and the scope and definition of the quarrying operation.

3.1 Visual Impact

Description

Term of reference 1 - Whether Commitment 22 of Statement 199 can be included as a Ministerial condition.

In its 1991 report to the Minister for the Environment on the proposal to establish the Red Hill Quarry, the EPA stated that;

An important aspect of the proposal is the progressive rehabilitation of both Pioneer No.1 and No.2 quarries to minimise the visual impact of the operation, reduce the potential for erosion, minimise dust and noise impact, and to revegetate disturbed areas to provide stability and encourage the return of native fauna (Section 5.4 of EPA Bulletin 510).

In 1990, the proponent conducted a Visual Impact Assessment as part of the PER which produced a map (Figure 17) of the area predicting the locations from which the Red Hill quarry was likely to be seen. These locations are shown as shaded in Figure 1 of this report.

The shaded areas are all located either on adjacent quarrying operations (to the east) or then privately owned land to the north-west. To ameliorate any visual impact on the land to the north-west, the proponent made the following commitment which was accepted by the Minister in 1991 and became Commitment 22 of Ministerial Statement 199.

Visual impact

22. *The Pioneer No. 2 operations will not be visible from ground level outside Pioneer property once screening bunds and vegetation are established. Screening vegetation will be established around the Pioneer No. 2 infrastructure site and north-west of the quarry pits to screen the operations from view.*

The aspects of the proposal that influence the visibility of the operation are the size and location of the West Pit, overburden dump (located to the west of the West Pit), buildings for the crushing and screening of quarry material and product stockpiles. The West Pit is located on the southern side of an east-west oriented valley and extends westward to a point where the valley turns north-west.

This north-west turn in the valley forms a spur, that was intended by the proponent to be used as a substrate for vegetation planted to screen the quarry operation from view to the north-west. The proponent stated this in section 8.19.2 on page 89 of the PER, which is reproduced overleaf:

8.19.2 Management

Quarry

As previously discussed, the pits will be easily visible only from within Pioneer property. Screening trees will be planted along the spur north-west of the quarry to further reduce visibility.

Following the issuing of Ministerial statement 199, the land to the north-west was purchased by the proponent.

It may be argued that the purchase of this land by the proponent makes the objective of commitment 22 no longer necessary. However, in EPA Bulletin 510, item 21 of submissions from Private Individuals states that the PER should contain a plan that shows all the areas from where any part of the quarry operation will be visible. The proponent's response to this public submission was that it had;

"...given an undertaking that sufficient screening vegetation and bunds will be established to ensure that no part of the quarrying operation will be visible from outside Pioneer property, and the PER contained a formal commitment (section 10.22) to that effect."

It is clear that the objective of commitment 22 included all property not owned by the proponent and not only the land to the north-west. It is also apparent, from the proponent's response to this submission that commitment 22 was made on the basis that the Visual Impact Assessment map (Figure 1 of this report) developed for the PER was accurate.

The EPA's site visit to the Red Hill quarry and an adjoining property, "Teewana", on 22 April 2004 revealed that the Red Hill quarry operation is clearly visible from land outside the proponent's property, including "Teewana" (Lots 250 and 147). The south-eastern and south-western faces of the West Pit, the upper parts of the crushing/screening plant and clearing for the West Pit Extension were all visible from several locations on "Teewana". These locations include the top of the rise immediately south-west of the main house on Lot 250, a location of higher elevation further north also on Lot 250 and a location in the southern portion of Lot 147 in the south-east of "Teewana".

The overburden dump is visible from "Teewana" and on the coastal plain at the intersection of Toodyay Road and Roe Highway. It is likely that at least some of the quarry operation is visible from other privately held land in the surrounding Darling Range or on the coastal plain.

Term of reference 2 - What additional conditions relating to visual impacts should be imposed to enable adequate enforcement.

The current conditions governing rehabilitation require the proponent to prepare detailed plans for the on-going rehabilitation of the Red Hill Quarry, implement the approved plans and updates and review the Rehabilitation Plan at five-yearly intervals (Appendix 3). The preparation, implementation, updating and review of each Rehabilitation Plan are required to be done to the satisfaction of the EPA on advice from the City of Swan.

In May 1996, the proponent submitted the Rehabilitation Plan for construction of the quarry to the Department of Environmental Protection (DEP) under condition 4-1 of Ministerial Statement 199. This plan has since evolved on a rolling basis to reflect current quarrying procedures. The plan is updated by the proponent as new methods become available and in response to monitoring, site factors (such as the location of the resource and environmental

factors such as soil stability, visual management, soil moisture) and proximity to remnant vegetation.

Each update of the Rolling Rehabilitation Plan is reported by the proponent in annual Environmental Summary Reports (ESRs) which include a description of rehabilitation undertaken to date, an assessment of the success of rehabilitation and details of future revegetation of disturbed areas. In Section 11.0 (page 13) of the 2003 ESR, the proponent stated that:

“The aims of the rehabilitation program listed in the Public Environmental Review for the Red Hill Quarry Site were;

- *reducing the visual impact”*

Rehabilitation work proposed in the 2003 ESR included the placement of fines and overburden in the eastern part of the West Pit to create a batter slope over the upper portions of the south wall. At the time of the EPA’s site visit on 22 April 2004, the proponent had completed the placement of this material and was planning to establish a cover of vegetation to reduce the visibility of the southern face of the West Pit.

Following the completion of the access haul road to the West Pit Extension area, the proponent is now able to dispose of overburden material on the floor of the West Pit instead of adding to the overburden dump. Work proposed for 2004 includes rehabilitation of the overburden dump.

In the long term, the proponent is planning to rehabilitate all disturbed areas with native vegetation that will reduce or eliminate the visibility of the quarry. In the shorter term, that is, during the often long periods when open quarry faces cannot be rehabilitated, but are not actively worked, the proponent can, as an alternative option, establish faster growing non-local trees and other vegetation to reduce the visibility of these areas. Using this temporary screening method however, does increase the risk that the non-local vegetation planted will become established onsite, which then increases the difficulty of establishing a cover of local native vegetation.

In addition to its rehabilitation using local species, the proponent has planned as part of its revegetation for 2004 to use dark grey diorite dust in thin layers over the overburden dump to reduce its visibility.

Term of reference 3 - The scope and definition of the quarry operation.

During this Section 46 assessment, the EPA has referred to Ministerial Statement 199 and the PER for the approved location of the Red Hill quarry operation. The EPA has also obtained information on the scope and definition of the quarry operation from the proponent, an adjacent neighbour and the Department of Land Information (DLI). Information from the adjacent neighbour and the DLI includes maps showing the estimated location of the approved quarry footprint and aerial photographs of the present quarry.

Condition 2 of Ministerial Statement 199 describes the requirements for the detailed implementation of the quarrying operation.

2 Detailed Implementation

Subject to these conditions, the manner of detailed implementation of the proposal shall conform in substance with that set out in any designs, specifications, plans or other technical material submitted by the proponent to the EPA with the proposal. Where, in the course of that detailed implementation, the proponent seeks to change those designs, specifications, plans or other technical material in any way the

Minister for the Environment determines on the advice of the EPA, is not substantial, those changes may be effected.

Neither Statement 199 nor the PER document contain detailed technical material delineating the location of the approved quarry footprint. The PER does contain however, ten aerial photographs and/or maps of the site and surrounds which show an outline of the expected location of the various elements of the quarrying operation. Section 1.2 of the PER, titled "LOCATION", states that Figure 1 of the PER shows the general location of the Red Hill quarry.

In its 1991 response to public submissions, the proponent stated that;

"The visual impacts plan shown in the PER (Figure 17) shows the areas from which the quarry pits will be visible. At the time of preparation of the PER it was not possible to include all bund walls, infrastructure and so on in the plan as the precise locations of these structures had not been finalised."

In its report to the Minister in April 1991, the EPA stated that;

"The quarry site occupies the southern side of a steep valley, through the centre of which flows Susannah Brook which is the major drainage unit of the Project Area."

Other references to the quarry location in EPA Bulletin 510, refer either to one of the figures contained in the PER or that the quarry will be located within the entire 800ha land holding, owned by the proponent.

For the approved location of the quarry, the requirements of condition 2 of Statement 199 relate to the information contained in the PER, principally the figures contained in the PER, the various descriptions of the quarry location throughout the PER and the proponent's response to submissions in EPA Bulletin 510 (April 1991). The EPA considers this information to be indicative only and not a detailed description of the approved quarry location.

In its report to the EPA for this assessment, the proponent has stated that it considers that the scope and definition of the Red Hill quarry operation is contained within the various approvals required in order to operate the quarry. The EPA understands these approvals to include Ministerial Statement 199 (which includes information in the 1990 PER) and the proponent's 1994 Extractive Industry Licence application. The proponent has reported to the DEP, now Department of Environment (DoE), and the City of Swan on the location and size of the quarry operation in annual ESRs since 1993.

As part of this assessment, the EPA has requested access to survey information commissioned by an adjacent neighbour that relates to the scope and definition of the quarry operation.

The Photogrammetric Survey and Data Analysis Report (Appendix 7), undertaken on behalf of the adjacent neighbour indicates that the southern edge of the West Pit is located 94m outside the south-east boundary of the West Pit as shown in the PER. This report also indicates that the highest point of the West Pit's southern wall is at an elevation of 240m, whereas the boundary shown in the PER is at an elevation of 172m - a difference of 68m.

The EPA has acquired two maps (Job Number 881 and Job Number 895) from the DLI showing the location of the Red Hill Quarry operation and an approximate outline of the approved footprint area, taken from the PER (Appendix 5). Both maps indicate that most of the quarrying operation is approximately within the two areas shown in the PER as the West Pit and the infrastructure area and that the approved east pit was not commenced. Areas delineated for the primary and secondary crushers and the conveyor have not been used.

While the Asphalt plant has not been constructed, the area delineated for it has partially been taken up by infrastructure for crushing and screening of quarry products.

The DLI map titled Job Number 895 indicates that, in terms of the horizontal location of the West Pit, the southern wall is approximately 82m outside of the approved West Pit boundary. By applying the combined horizontal accuracy range of $\pm 13.25\text{m}^1$, at most the West Pit is 95.25m outside of the approved West Pit boundary.

Job Number 895 also indicates that the vertical elevation of the most southern point of the West Pit (labelled A on Job Number 895) is between 235m Australian Height Datum 1971 (AHD) and 240m AHD. Point A is the highest point of the West Pit which is most visible to the north-east. At its highest, the south-eastern boundary of the area approved for the West Pit is located at an elevation between 230m AHD and 235m AHD.

The vertical accuracy of the topographic contours represented in the two DLI maps is $\pm 2.75\text{m}$. By using this range, the difference in elevation of point A and the south-eastern boundary of the area approved for the West Pit is, at most, 15.5m. This distance represents the vertical extent of the increase in visibility of the West Pit to the north-east.

The maps provided by the DLI have been produced by overlaying the boundaries of the quarry operation, as shown in Figure 6 of the PER, onto the DLI's aerial photography mosaic for the area. For further information on the method used to produce the maps see Appendix 6.

Assessment

The area considered for assessment of this factor is the Red Hill Quarry, Lot 11 Toodyay Road, Red Hill.

The EPA's environmental objective for this factor is to ensure that aesthetic values are considered and measures are adopted to reduce visual impacts on the landscape as low as reasonably practicable.

Term of Reference 1 - Whether Commitment 22 of Statement 199 can be included as a Ministerial condition

The EPA has determined that the Red Hill Quarry operation is visible from outside land owned by the proponent. The Visual Impact Assessment, as part of the 1990 PER, was inaccurate in its prediction that the operations would not be visible from ground level outside the proponent's property once screening bunds and vegetation were established. At the time of the original assessment, there was no predicted impact on properties to the north-east.

The EPA considers that the then EPA (in 1991) accepted proponent commitment 22 on the understanding that the quarry operation could be screened from view. This understanding originated from the results of the Visual Impact Assessment Plan. However, as the Visual Impact Assessment was inaccurate, the EPA considers that, other than for land to the north-west, commitment 22 cannot be complied with. This due to the size of the quarry operation

¹ The absolute horizontal accuracy of any given pixel in the January 2004 geospatial aerial photography mosaic is $\pm 4\text{m}$ ground distance. The mean horizontal accuracy of the 1:25000 scale topographic base map is $\pm 6.25\text{m}$ ground distance for the depicted topographic features. The accuracy range of the manual scaling process for depicting the west pit boundary onto Job No 895 and Job No 881 is estimated by DLI to be $\pm 3\text{m}$. Combined, these three accuracy ranges total to $\pm 13.25\text{m}$, which is applied to horizontal measurements taken from the maps produced by the DLI.

and related infrastructure and the fact that the quarry is located in the upper portions of the Susannah Brook valley. Even if commitment 22 contained a timeframe for the installation of the screening bunds and vegetation, the EPA considers that the quarry operation would still be visible from outside land owned by the proponent.

Accordingly, Commitment 22 should be removed from Ministerial statement 199.

In its decision not to conduct an environmental assessment of the proponent's EIL application in 1994, the EPA did not recommend that the requirements of Ministerial Statement 199 should apply to the West Pit Extension. When the EIL application was referred in 1994, the EPA had the option of assessing the West Pit Extension either as a change to the conditions of approval under section 46 of the *Environmental Protection Act 1986* or as a new proposal under section 38. As neither of these options were taken, there are no conditions governing the West Pit Extension under Part IV of the Act. Furthermore, the EPA is now unable to assess the West Pit Extension as, under section 38(5j) of the Act, a proposal cannot be referred to the EPA more than once.

While the EPA is unable to assess the West Pit Extension, an opportunity does exist for the City of Swan, under its EIL, to place conditions on this part of the Red Hill Quarry Operation.

The EPA expects that the visual impact of the West Pit Extension will increase as the proponent continues extraction in this area, which is of higher elevation than the original West Pit and closer to adjacent properties to the north-east.

Term of Reference 2 - What additional conditions relating to visual impacts should be imposed to enable adequate enforcement.

The proponent has a Rehabilitation Plan in place to rehabilitate the exposed quarry faces and other disturbed areas. The successful implementation of this plan would alleviate the visual impact of the clearing and excavation work undertaken during the life of the quarry, for the project as approved by the Minister for the Environment on 5 December 1991. However, this would clearly take many years.

The current practice where rehabilitation activities are reported annually in ESRs does not include sufficient scope for input from key stakeholders, especially with respect to the rehabilitation practices used and timing proposed. The proponent should prepare a detailed Rehabilitation Plan for the quarrying operation which incorporates the outcomes of consultation with key stakeholders, prior to it being implemented. This plan should then be submitted to the DoE for approval. Subsequent changes to the Rehabilitation Plan should also use this process prior to the changes being implemented. The key stakeholders consulted should include adjacent land owners and residents.

The development of a Rehabilitation Plan, with comment from key stakeholders, should be completed in parallel with the 2004 ESR, if possible, and reviewed annually.

The Rehabilitation Plan should detail the rehabilitation practices and timetable for all disturbed areas including stockpiles, overburden dumps and quarry pits. The objective for all rehabilitation should be to establish a stable and functioning landform which is consistent with the surrounding landscape and other environmental values, especially the rehabilitation of all disturbed areas to native vegetation.

In addition to the rehabilitation of all disturbed areas, the Rehabilitation Plan should also include, with stakeholder consultation, consideration of offsite treatments that may reduce the visibility of the quarry operation at nearby properties. Offsite treatments may include the

planting of trees or other screening vegetation on or near property boundaries or, if more effective, at locations within nearby properties, subject to the owner's concurrence.

For the management of visual impacts from the West Pit Extension, the EPA notes that the City of Swan can, as part of the EIL, require that this area is rehabilitated to the same standard as the other aspects of the Red Hill Quarry operation. The EPA notes that the City of Swan can also require stakeholder consultation be included as part of rehabilitation of the West Pit Extension.

As part of its submission to the EPA for this Section 46 assessment, the proponent has suggested changes to Ministerial Statement 199. These changes relate to the removal of an unnecessarily restrictive prescription for rehabilitation and the removal of reference to the asphalt plant that was a part of the original proposal but was not relocated to the Red Hill Quarry. The EPA considers that that commitments 10, 14, 16, 17, 26, 32 and 33 should be changed to reflect the current operation of the Red Hill Quarry.

Term of Reference 3 - The scope and definition of the quarry operation.

It is not possible to determine the exact approved location of the West Pit as the information contained in the PER is not sufficiently detailed. The EPA considers that for the approved location of the West Pit, the information contained in the PER is indicative only and not a detailed description of the approved location of this pit.

From information contained in the two mapping exercises undertaken in relation to the scope and definition of the quarry operation, the EPA considers it is likely that the southern boundary of the West Pit extends outside the approved footprint area by between 68.25m and 95.25m.

The large maximum difference (15.5m compared to 68m) between the two information sources in relation to the elevation of the southern wall of the West Pit, is difficult to explain. The discrepancy in results may be due to any one, or a combination of, assumptions and/or estimations made by each individual operator in determining the locations of the topographic contour lines, the indicative footprint areas and geo-referencing the aerial photographs used.

The EPA notes that the topographic contours depicted in the information from DLI closely follow the topography inferred from viewing the aerial photograph of the area. The contour lines in the DLI information are also very similar to those in Figure 2 of the PER.

The EPA is, however, able to determine that the overburden dump was not included in the 1990 PER or the application for an Extractive Industry Licence referred in 1994.

Accordingly, the EPA considers that the proponent should remove the overburden dump prior to 31 December 2005, or another date if more appropriate, and rehabilitate the disturbed area to native vegetation, as part of the Rehabilitation Plan. The overburden material should be returned to the West Pit void and used in the reshaping and rehabilitation of this area, unless an alternate use is considered and approved as part of the Rehabilitation Plan.

The EPA has recommended accordingly.

Summary

The Red Hill Quarry operation is visible from outside land owned by the proponent. The Visual Impact Assessment, undertaken as part of the 1990 PER, was inaccurate in its prediction that the operations would not be visible from ground level outside the proponent's property once screening bunds and vegetation were established.

Commitment 22 should be removed from Ministerial statement 199.

The visual impacts associated with the quarry operation can best be addressed through implementation of a Rehabilitation Plan. This plan should address the progressive rehabilitation of all disturbed areas. The Rehabilitation Plan should also include consideration of offsite treatments that may reduce the visibility of the quarry operation at nearby properties.

The proponent should prepare a detailed Rehabilitation Plan for the quarrying operation and consult with key stakeholders. This plan should then be submitted to the DoE for approval prior to it being implemented. Subsequent changes to the Rehabilitation Plan should also use this process prior to the changes being implemented.

Although the requirements of Ministerial Statement 199 do not apply to the West Pit Extension, the City of Swan can, as part of the EIL, require that this area is rehabilitated to the same standard as the other aspects of the Red Hill Quarry operation. The EPA notes that the City of Swan can also require stakeholder consultation be included as part of rehabilitation of the West Pit Extension.

It is not possible to determine the exact approved location of the quarrying operation, principally the West Pit, as the information contained in the 1990 PER and the 1994 Extractive Industry Licence application is not sufficiently detailed. It is apparent however, that the southern edge of the West Pit is outside the approved footprint area.

The overburden dump was not part of the PER or the 1994 Extractive Industry Licence application referred to the EPA. Accordingly, it is outside current approvals. The EPA has recommended that the proponent should remove the overburden dump prior to 31 December 2005, or another date if more appropriate, and rehabilitate the disturbed area to native vegetation, as part of the Rehabilitation Plan. The overburden material should be returned to the West Pit void and used in the reshaping and rehabilitation of this area, unless an alternate use is considered and approved as part of the Rehabilitation Plan.

4. Conditions and commitments

Section 46(6) of the *Environmental Protection Act 1986* requires the EPA to prepare and give to the Minister a report that includes a recommendation on whether or not the implementation conditions to which the inquiry relates, or any of them, should be changed and any other recommendations that it thinks appropriate.

In developing recommended conditions for each project, the EPA's preferred course of action is to have the proponent provide an array of commitments to ameliorate the impacts of the proposal on the environment.

4.1 Recommended changes to commitments

The proponent has made suggested changes to commitments in Ministerial Statement 199 to reflect the current operation of the Red Hill Quarry. These changes relate to the removal of an unnecessary prescription for rehabilitation and the removal of reference to the asphalt plant that was a part of the original proposal but was not relocated to the Red Hill Quarry. The EPA considers that that commitments 10, 14, 16, 17, 26, 32 and 33 should be changed to reflect the current operation of the Red Hill Quarry. The changes to commitments in Ministerial Statement 199 suggested by the proponent, as shown below (Table 1), should be made enforceable commitments.

Table 1: Summary of proponent's commitments

Commitment No	Commitment (Who/ What)	Objective (Why)	Timing (When)	Measurement Compliance Criteria
10	Local provenance plant species will be used in rehabilitation.	To ensure that rehabilitation achieves a stable and functioning landform which is consistent with the surrounding landscape and other environmental values.	During rehabilitation of all disturbed areas.	Use of local provenance plant species
14	The remainder of the proponent's property, other than those areas required for quarrying and infrastructure, will be maintained as an undisturbed buffer zone for the operation.	To protect the environmental values of areas not required for quarrying and infrastructure.	Over the life of the quarrying operation	All land not used for quarrying and infrastructure to remain undisturbed.
16	Further reduce emissions by a number of means, including enclosure of crushing and screening plants, watering of roads, stockpiles and product transfer points and careful design of blasting.	To ensure that emissions do not adversely affect environment values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.	Over the life of the quarrying operation	Watering of roads, stockpiles and product transfer points and careful design of blasting.
17	Monitor noise levels from blasting and processing, and dust deposition. The results of this monitoring will be made available on an annual basis.	To protect the amenity of nearby residents from noise and dust deposition impacts.	Over the life of the quarrying operation	Monitoring information available in annual Environmental Summary Reports.
26	Inert material originating from dust suppression collection in the crushing and screening plant will be returned to the plant and included in fine product sales or blended with other material to be used as a bunding or rehabilitation material.	To protect the amenity of nearby residents from dust deposition impacts.	Over the life of the quarrying operation	Handling of inert material reported in annual Environmental Summary Reports

32	Monitor noise, dust, water quality, vegetation and public opinion at the Red Hill quarry site. The results of this monitoring will be used by the proponent to optimise its environmental management procedures at the Red Hill Quarry. These results will be available on an annual basis.	To optimise the environmental management procedures at the Red Hill Quarry.	Over the life of the quarrying operation	Monitoring information available in annual Environmental Summary Reports.
33	Continue to monitor research, both within Australia and overseas, into new developments in blasting technology, noise and dust control in the operations of the quarry.	To optimise the environmental management procedures at the Red Hill Quarry.	Over the life of the quarrying operation	Research monitoring reported in annual Environmental Summary Reports

4.2 Recommended conditions

The EPA recommends that the following conditions be imposed on the proponent:

- (a) The existing Ministerial Conditions applied to the project (Ministerial Statement 199 published on 4 December 1991), be subject to modifications necessary to:
- require the proponent to prepare a Rehabilitation Plan with stakeholder consultation.

The amended conditions and amended Consolidated Commitments statement are presented in Appendix 4.

5. Conclusions

Conclusion

Term of Reference 1 - Whether Commitment 22 of Statement 199 can be included as a Ministerial condition

The EPA has concluded that the Red Hill Quarry operation is visible from outside land owned by the proponent. The Visual Impact Assessment, as part of the 1990 PER, was inaccurate in its prediction that the operations would not be visible from ground level outside the proponent's property once screening bunds and vegetation were established.

Commitment 22 should be removed from Ministerial statement 199 as it is not achievable.

The use of bunds and vegetation to screen the quarry from view is not practicable during excavation due to the size, orientation and nature of the quarrying operation.

The EPA expects that the visual impact of the West Pit Extension will increase as the proponent continues the development and excavation from this pit.

There are no conditions governing the West Pit Extension under Part IV of the *Environmental Protection Act 1986*. The EPA is now unable to assess the West Pit Extension as a proposal cannot be referred to the EPA more than once. The City of Swan, under its review of the rehabilitation requirements of the Extractive Industry Licence, can require that this area is rehabilitated to the same standard as the other aspects of the Red Hill Quarry operation. The EPA notes that the City of Swan can also require stakeholder consultation be included as part of rehabilitation of the West Pit Extension.

Term of Reference 2 - What additional conditions relating to visual impacts should be imposed to enable adequate enforcement.

The visual impacts associated with the quarry operation can best be addressed through the preparation of a detailed Rehabilitation Plan for the quarrying operation which includes consultation with key stakeholders. This plan should address the progressive rehabilitation of all disturbed areas and should also include consideration of offsite treatments that may reduce the visibility of the quarry operation at nearby properties.

Term of Reference 3 - The scope and definition of the quarry operation.

It is not possible to determine the exact approved location of the West Pit as the information contained in the PER is not sufficiently detailed. It is apparent however, that the southern edge of the West Pit is outside the approved footprint area.

The overburden dump was not included in the 1990 PER or the 1994 application for an Extractive Industry Licence referred to the EPA. The EPA has recommended that the proponent should remove the overburden dump prior to 31 December 2005, or another date if more appropriate, and rehabilitate the disturbed area to native vegetation, as part of the Rehabilitation Plan. The overburden material should be returned to the West Pit void and used in the reshaping and rehabilitation of this area, unless an alternate use is considered and approved as part of the Rehabilitation Plan.

In addition to the above, the EPA considers that commitments 10, 14, 16, 17, 26, 32 and 33 should be changed to reflect the current operation of the quarry and the fact that the Red Hill Quarry does not contain an asphalt plant.

6. Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that this report is pursuant to Section 46(6) of the *Environmental Protection Act 1986* and thus is limited to consideration of proposed changes to the original conditions.
2. The Minister notes the report on the Red Hill Quarry.
3. The EPA recommends that the Minister considers the report on the relevant environmental factor as set out in Section 3.
4. That the Minister notes that the EPA has concluded that the visual impacts associated with the quarry operation can best be addressed through the preparation of a detailed Rehabilitation Plan for the quarrying operation which includes consultation with key stakeholders.
5. That the Minister notes that the EPA recommends that the proponent should remove the overburden dump prior to 31 December 2005, or another date if more appropriate, and rehabilitate the disturbed area to native vegetation, as part of the Rehabilitation Plan.
6. The Minister imposes the amended conditions, commitments and procedures recommended in Appendix 4 of this report.

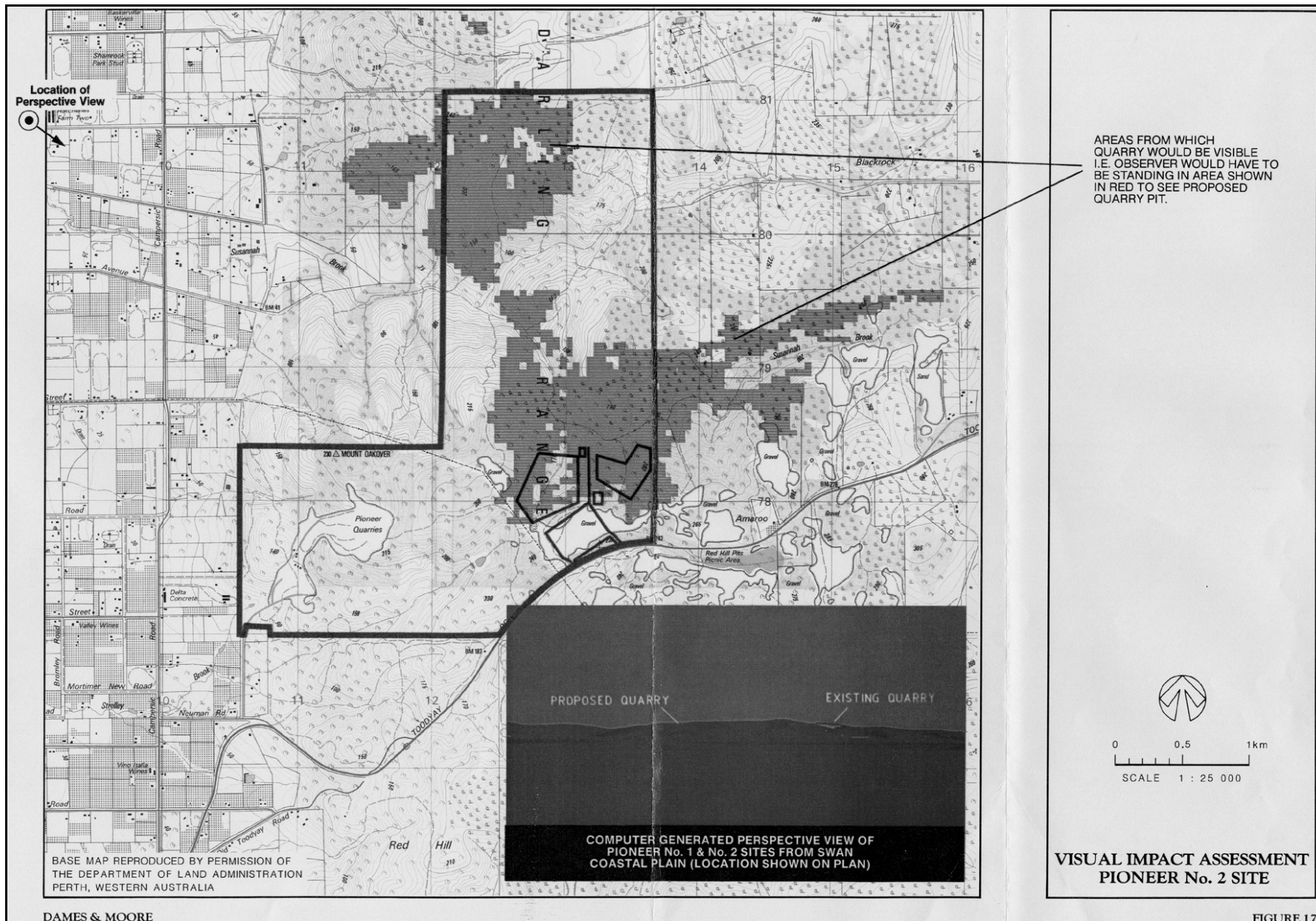


Figure 1: Visual Impact Assessment map

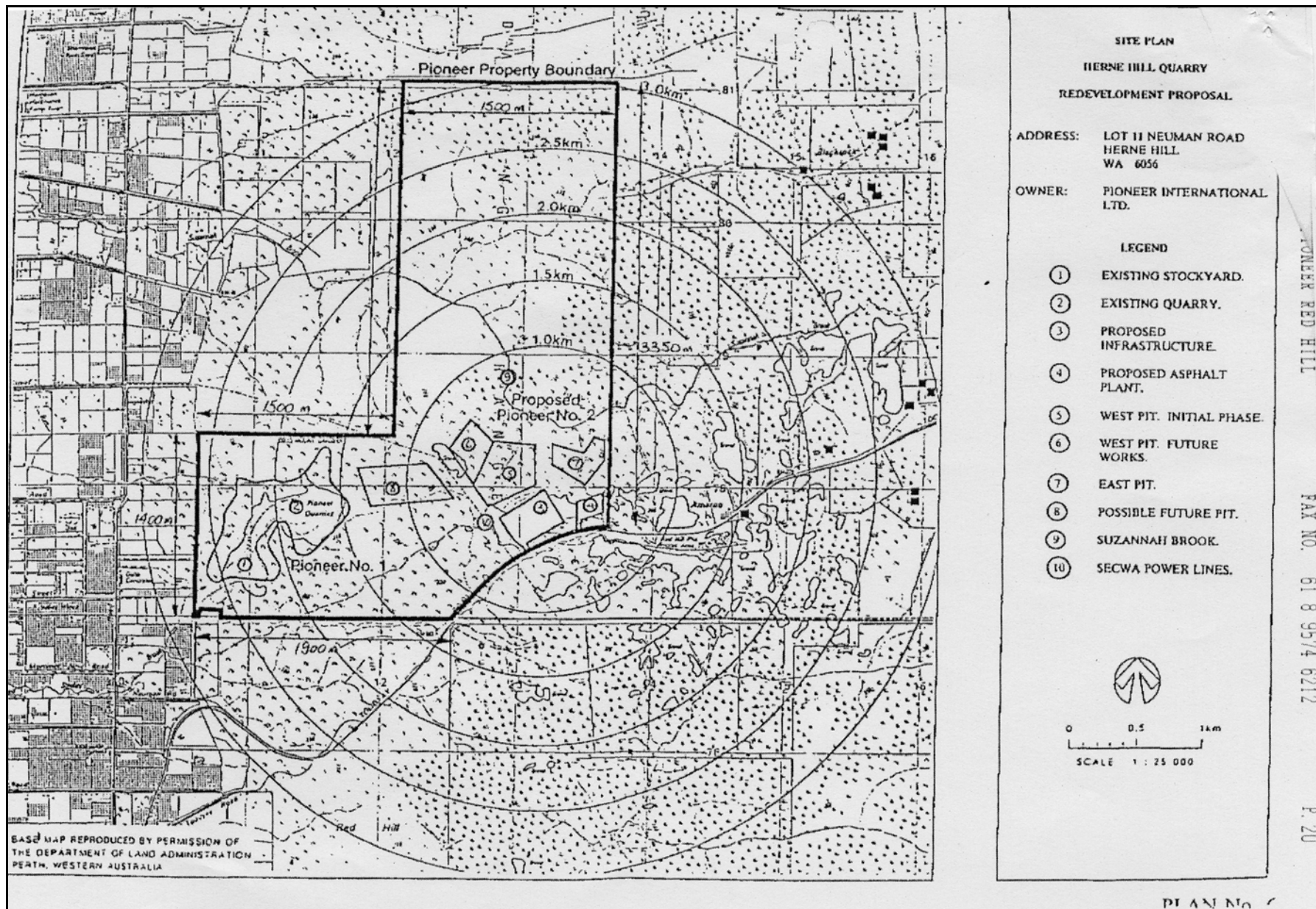


Figure 2: 1994 EIL application map

Appendix 1

List of Submitters

State/Local Government

- City of Swan, Department of Land Information

Organisations

- Pioneer Construction Materials Pty Ltd

Individuals

- Mr A.J. Elwood

Appendix 2

References

Environmental Protection Authority 1991. *Relocation of Herne Hill quarry operation – Report and Recommendations of the Environmental Protection Authority (Bulletin 510)*. Environmental Protection Authority. Perth, Western Australia.

Environmental Protection Authority 1994. Letter to Shire Clerk, City of Swan. *Excavation Licence for quarry and milling works, Lot 11 Neuman Road Herne Hill, Pioneer Concrete (WA) Pty Ltd, Not assessed*. 11 February 1994.

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Pioneer Concrete (WA) Pty Ltd 1990. *Herne Hill quarry relocation. Public Environmental Review. Prepared for Pioneer Concrete (WA) Pty Ltd by Dames & Moore, September 1990*.

Minister for the Environment 2004. Letter to EPA Chairman. *Request to initiate a review of the conditions and approvals for statement 199*. 12 February 2004.

City of Swan 1994. Extractive Industry Licence application referral to the EPA. Renewal of *Excavation Licence (quarry and milling works), Lot 11 Neuman Road Herne Hill, Pioneer Concrete (WA) Pty Ltd*. 2 February 1994.

Premier Mapping Australia, 2003. *Report on Photogrammetric Survey and Data Analysis Relating to the Pioneer Quarries RED HILL QUARRY and its Impact on the General Surrounds and Particular Impact Upon the Property of A.J. Elwood, “Teewana”*, December 2003.

Landform Research, 2003. *Environmental Summary Report and Audit Document 2003, Red Hill Quarry, Pioneer Construction Materials Pty Ltd*, 30 September 2003.

Appendix 3

Statement of Environmental Conditions of Approval (5 December 1991)



Ass # 354

Bull # 510

State # 199

WESTERN AUSTRALIA
MINISTER FOR THE ENVIRONMENT

**STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED
(PURSUANT TO THE PROVISIONS OF THE
ENVIRONMENTAL PROTECTION ACT 1986)**

RELOCATION OF HERNE HILL QUARRY OPERATION (354)

PIONEER CONCRETE (WA) PTY LTD

This proposal may be implemented subject to the following conditions :

1 Proponent commitments

In implementing the proposal the proponent shall fulfil the commitments (which are not inconsistent with the conditions or procedures contained in this statement) made in the Public Environmental Review (A copy of the commitments is attached).

2 Detailed implementation

Subject to these conditions, the manner of detailed implementation of the proposal shall conform in substance with that set out in any designs, specifications, plans or other technical material submitted by the proponent to the Environmental Protection Authority with the proposal. Where, in the course of that detailed implementation, the proponent seeks to change those designs, specifications, plans or other technical material in any way that the Minister for the Environment determines on the advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

3 Susannah Brook

There shall be no unacceptable detrimental effects from drainage of the quarry site on the water quality of Susannah Brook.

3-1 Prior to the commencement of productive mining, the proponent shall prepare a drainage management programme for the quarry operations to the satisfaction of the Minister for the Environment on advice from the Environmental Protection Authority and the Water Authority of Western Australia.

3-2 Subsequent to Condition 3-1, the proponent shall implement the approved drainage management programme to the satisfaction of the Environmental Protection Authority on advice from the Water Authority of Western Australia.

4 Rehabilitation

Pioneer No.1 and Pioneer No.2 quarries are to be rehabilitated.

4-1 Within twelve months of the date of this statement, the proponent shall prepare detailed plans for the on-going rehabilitation of Pioneer No.1 and Pioneer No.2 quarries. These plans shall be to the satisfaction of the Environmental Protection Authority on advice from the Shire of Swan.

Published on

5 DEC 1991

4-2 Subsequent to Condition 4-1, the proponent shall implement the approved plans, and updates as required by Condition 4-3, to the satisfaction of the Environmental Protection Authority on advice from the Shire of Swan.

4-3 Subsequent to Conditions 4-1 and 4-2, the proponent shall review the rehabilitation plans annually for the first two years and thereafter at five-yearly intervals. The reviews shall be to the satisfaction of the Environmental Protection Authority on advice from the Shire of Swan.

5 Decommissioning

Plant and installations are to be removed from the site and its environs.

5-1 The proponent shall be responsible for decommissioning and removal of the plant and installations and rehabilitating the site and its environs, to the satisfaction of the Environmental Protection Authority.

5-2 At least twelve months prior to final decommissioning, the proponent shall prepare a decommissioning and rehabilitation plan to the satisfaction of the Environmental Protection Authority on advice from the Shire of Swan.

5-3 Subsequent to Condition 5-2, the proponent shall implement the approved decommissioning and rehabilitation plan to the satisfaction of the Environmental Protection Authority on advice from the Shire of Swan.

6 Monitoring reports

Monitoring information is to be made freely available to the general public.

6-1 The proponent shall prepare an annual monitoring report for the project to the satisfaction of the Environmental Protection Authority.

6-2 Subsequent to Condition 6-1, the proponent shall provide copies of the annual report to the Environmental Protection Authority and the Shire of Swan for perusal by interested parties, to the satisfaction of the Environmental Protection Authority on advice from the Shire of Swan.

7 Proponent

No transfer of ownership, control or management of the project which would give rise to a need for the replacement of the proponent shall take place until the Minister for the Environment has advised the proponent that approval has been given for the nomination of a replacement proponent. Any request for the exercise of that power of the Minister shall be accompanied by a copy of this statement endorsed with an undertaking by the proposed replacement proponent to carry out the project in accordance with the conditions and procedures set out in the statement.

8 Time limit on approval

If the proponent has not substantially commenced the project within five years of the date of this statement, then the approval to implement the proposal as granted in this statement shall lapse and be void. The Minister for the Environment shall determine any question as to whether the project has been substantially commenced. Any application to extend the period of five years referred to in this condition shall be made before the expiration of that period, to the Minister for the Environment by way of a request for a change in the condition under Section 46 of the Environmental Protection Act. (On expiration of the five year period, further consideration of the proposal can only occur following a new referral to the Environmental Protection Authority).

9 Audit programme

The proponent shall prepare an audit programme for the proposal in consultation with the Environmental Protection Authority which is to be satisfactory to the Minister for the Environment before any site works are commenced. The programme shall list the actions required by these conditions and the commitments, and specify for each action, its scope, how and when it will be performed and the process for verifying that it has been completed satisfactorily. The programme shall include periodic reporting to inform the Minister for the Environment on the progress of the proposal. Subsequently, the proponent shall adhere to the approved audit programme to the satisfaction of the Environmental Protection Authority.

Bob Pearce, MLA
MINISTER FOR THE ENVIRONMENT

4 DEC 1991

Pioneer Concrete (WA) Pty Ltd makes the following specific commitments regarding environmental protection and management at the proposed Pioneer No.2 Quarry.

Quarry development and operation

- 1(a) Access to the Pioneer No.2 site will be direct from Toodyay Road. Accessways will be designed to minimise noise generation and disruption to other traffic, and will be constructed to the satisfaction of the Main Roads Department.
- 1(b) Pioneer will take steps within its power to minimise usage of the local and rural roads by vehicles travelling to or from the Pioneer No.1 and No.2 quarries and promote the use of main roads (e.g. Toodyay Road, Great Northern Highway, Bishop Road) in order to avoid traffic conflict and ensure road safety.
2. Topsoil, vegetation and overburden will be stripped from areas to be developed. These will be used for the building of bunds and for rehabilitation purposes.
3. No physical interference with Susannah Brook will be permitted at any stage during the development or operation of the quarry. To this end, a minimum 50 metre buffer zone will be maintained each side between the Brook and any quarrying activity, and allowing a total 100 metre buffer zone around the Brook.
4. Regional water mains, power, gas and telephone services will not be adversely affected by the development of the Pioneer No.2 site.
5. Process water supplies will be drawn from the existing water storage in the Pioneer No.1 Quarry and from the other surface storages on Pioneer property, with possible occasional augmentation by Water Authority supplies. No water will be drawn from Susannah Brook. There is currently no planned use of groundwater in the proposed development, consequently there will be no effect on groundwater resources.
6. Drilling and blasting will be conducted only during daylight hours. Blast design will be aimed at achieving the required breakage of rock with minimum generation of noise, vibration and dirt.
7. Following the completion of development of Pioneer's No.2 pit and crushing plant, processing operations at Pioneer No.1 will cease and the plant will be dismantled.

Protection of vegetation

8. Site clearance and vegetation removal will be minimised by survey control and supervision of personnel engaged in clearing activities.
9. All vehicles entering the site from regions identified as potentially contaminated with dieback disease will be thoroughly washed to remove adhering soil and weed seeds. All fill or soil used on the site will be obtained from uncontaminated sources. Procedures for preventing its introduction will follow those laid down in the CALM Dieback Manual.
10. Where appropriate, seeds of geographically-restricted plant species will be collected from the site and propagated for later use in rehabilitation.
11. Fire prevention measures as per relevant Shire and Brigade regulations will be enforced within the project area and on the rest of Pioneer's land holding.
12. Unauthorised vehicular access to the Pioneer land holding will not be permitted and the current practice of using security guards to patrol the area will be continued.

13. Pioneer will monitor the vegetation on its property to detect any outbreaks of dieback disease. If any is detected, Pioneer will consult with the Department of Conservation and Land Management to determine a suitable treatment strategy.
14. The remainder of Pioneer's property outside the Project Area will be maintained as a buffer zone for the Quarry.

Noise, dust and odours

15. All emissions of noise, dust and odours from the operations will be within limits laid down in licence conditions by the Environmental Protection Authority or set out in the Environmental Protection Act 1986.
16. Pioneer will endeavour to further reduce emissions by a number of means including enclosure of crushing and screening plants, watering of roads, stockpiles and product transfer points, careful design of blasting, and the use of extraction systems and wet scrubbers in the asphalt plant.
17. Pioneer or its agents will monitor noise levels from blasting and processing, dust deposition, odours and occupational noise and dust. The results of this monitoring will be made available on an annual basis.
18. Occupational noise and dust levels will be monitored and the results reported to the Department of Mines. Pioneer will take any action necessary to ensure that the levels of occupational noise and dust comply with the provisions of the Mines Regulation Act 1946-1974.

Drainage and water quality

19. Pioneer will endeavour to minimise disruption to drainage patterns in areas outside those directly affected by quarrying activities. Rainfall runoff to disturbed areas will be prevented by the use of bunds and drains where necessary. Careful attention will be paid to the minimisation of erosion.
20. No untreated runoff from disturbed areas of the Project Area will be permitted to enter any watercourse. All such runoff will first be treated by means of sedimentation basins or silt traps to remove excess suspended sediments. Any runoff likely to contain oil contamination will be treated to remove such contaminants.
21. The quality of water leaving the Project Area will be monitored by regular sampling.

Visual impact

22. The Pioneer No.2 operations will not be visible from ground level outside Pioneer property once screening bunds and vegetation are established. Screening vegetation will be established around the Pioneer No.2 infrastructure site and north-west of the quarry pits to screen the operations from view.

Aboriginal interests

23. Discussions will be held with representatives of the local Nyungar Aboriginal community regarding the protection of Susannah Brook and the future of the white "ochre" deposit in the vicinity of the tertiary crusher/stockpile site. Pioneer will take steps to ensure that quantities of the "ochre" are made available to Aborigines for their use.

Waste disposal

24. Solid wastes, such as domestic waste, will be disposed of at an approved Council landfill site.
25. Oils and grease separated from contaminated runoff in the area of the workshops and asphalt plant will be collected and removed from the site, either for recycling or for disposal in a Council-approved liquid waste disposal site.
26. Inert slurry originating from dust suppression sprays in the crushing, screening and asphalt plants will be disposed of in the solid waste disposal site located on Pioneer property. This site is situated on a near-impermeable clay base and is bunded to prevent runoff.
27. Sewerage facilities will be designed so as to prevent impacts on ground or surface waters in the area, and will conform to Health Department regulations.

Rehabilitation

28. A programme currently underway at Pioneer No.1 will continue.
29. Pioneer will continue to take responsibility for rehabilitation and will investigate new developments in rehabilitation methods in order to optimise the rehabilitation of the Pioneer No.1 and No.2 Quarries.
30. The progress reports on rehabilitation works at the Pioneer Quarries will be made available to the Environmental Protection Authority as required.

Community liaison

31. Pioneer will continue to maintain a register of public complaints against its quarrying operations at Herne Hill and will respond promptly and individually to each complaint received.

Management, monitoring and reporting

32. Pioneer will continue to monitor meteorology, noise, dust, odours, water quality, vegetation and public opinion at the Pioneer No.2 quarry site. The results of this monitoring will be used by Pioneer to optimise its environmental management procedures at the Pioneer No.2 Quarry. These results will be available on an annual basis.
33. Pioneer will continue to monitor research, both within Australia and overseas, into new developments in blasting technology, noise, dust and odour control in the operations of the quarry and the asphalt plant.

Appendix 4

Recommended Environmental Conditions and Proponent's Consolidated Commitments

RECOMMENDED CONDITIONS AND PROCEDURES

**STATEMENT TO AMEND CONDITIONS APPLYING TO A PROPOSAL
(PURSUANT TO THE PROVISIONS OF SECTION 46 OF THE
ENVIRONMENTAL PROTECTION ACT 1986)**

RELOCATION OF HERNE HILL QUARRY OPERATION

Proposal: To quarry hard rock by blasting and/or excavation by wheeled loader. Quarried rock is then transferred to an onsite crushing and screening plant where it is converted into various products required in the construction of buildings, roads, railways and other infrastructure.

Proponent: Hanson Construction Materials Pty Ltd

Proponent Address: 123 Burswood Road, Victoria Park WA 6100

Assessment Number: 1511

Previous Assessment Number: 354

Previous Statement Number: 199

Report of the Environmental Protection Authority: Bulletin 1152

Previous Report of the Environmental Protection Authority: Bulletin 510

The implementation of the proposal to which the above reports of the Environmental Protection Authority relate is subject to the conditions and procedures contained in Ministerial Statement No. 199 (5 December 1991), as amended by the following:

Condition 1 of Statement No. 199 is deleted and the following conditions are inserted:

1 Proponent Commitments

- 1-1 The proponent shall implement the environmental management commitments attached to Statement No. 199, except commitments 10, 14, 16, 17, 22, 26, 32 and 33, and the environmental management commitments in attachment A to this statement, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

Published on

- 1-2 The proponent shall implement the environmental management commitments as shown in attachment A to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

Condition 4 of Statement No. 199 is deleted and the following conditions are inserted:

4 Rehabilitation

- 4-1 Within 12 months following the issuing of a notice to the decision-making authorities under section 45(7) of the Environmental Protection Act 1986, the proponent shall prepare a plan for the rehabilitation of all disturbed areas at the Red Hill quarry (Pioneer No. 2 quarry), to the requirements of the Minister for the Environment. The objective of this plan is to ensure that rehabilitation achieves a stable and functioning landform which is consistent with the surrounding landscape and other environmental values.

This plan shall: (1) detail the rehabilitation practices and timing of all disturbed areas including stockpiles, overburden dumps and quarry pits; and, (2) include the outcomes of consultation with the owners and residents of land which is adjacent to the proponent's property as shown in Figure 2 of the Public Environmental Review (Pioneer Concrete (WA) Pty Ltd 1990. Herne Hill quarry relocation. Public Environmental Review. Prepared for Pioneer Concrete (WA) Pty Ltd by Dames & Moore, September 1990).

- 4-2 The proponent shall implement the Rehabilitation Plan as required by condition 4-1 and any subsequent updates as required by condition 4-3 to the requirements of the Minister for the Environment.
- 4-3 The proponent shall review the Rehabilitation Plan referred to in condition 4-1 annually and include the outcomes of consultation with the owners and residents of land adjacent to the proponent's property as shown in Figure 2 of the Public Environmental Review to the requirements of the Minister for the Environment.

Proponent's Environmental Management Commitments

29 April 2004

Relocation of Herne Hill Quarry Operation
Lot 11 Toodyay Road, Red Hill
Shire of Swan

(Assessment No. 1511)

Hanson Construction Materials Pty Ltd

RELOCATION OF HERNE HILL QUARRY OPERATION (Assessment No. 1511)

Note: The term “commitment” as used in this schedule includes the entire row of the table and its six separate parts as follows:

- a commitment number;
- a commitment topic;
- the objective of the commitment;
- the ‘action’ to be undertaken by the proponent;
- the timing requirements of the commitment; and
- the body/agency to provide technical advice to the Department of Environment.

No.	Topic	Objective	Action	Timing	Advice
10	Protection of vegetation	To ensure that rehabilitation achieves a stable and functioning landform which is consistent with the surrounding landscape and other environmental values.	Local provenance plant species will be used in rehabilitation.	During rehabilitation of all disturbed areas.	CALM
14	Protection of vegetation	To protect the environmental values of areas not required for quarrying and infrastructure.	The remainder of the proponent’s property, other than those areas required for quarrying and infrastructure, will be maintained as an undisturbed buffer zone for the operation.	Over the life of the quarrying operation	City of Swan
16	Noise, Blasting and Dust	To ensure that emissions do not adversely affect environment values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.	Further reduce emissions by a number of means, including enclosure of crushing and screening plants, watering of roads, stockpiles and product transfer points and careful design of blasting.	Over the life of the quarrying operation	

17	Noise, Blasting and Dust	To protect the amenity of nearby residents from noise and dust deposition impacts.	Monitor noise levels from blasting and processing, and dust deposition. The results of this monitoring will be made available on an annual basis.	Over the life of the quarrying operation	
26	Dust	To protect the amenity of nearby residents from dust deposition impacts.	Inert material originating from dust suppression collection in the crushing and screening plant will be returned to the plant and included in fine product sales or blended with other material to be used as a bunding or rehabilitation material.	Over the life of the quarrying operation	
32	Monitoring	To optimise the environmental management procedures at the Red Hill Quarry.	Monitor noise, dust, water quality, vegetation and public opinion at the Red Hill quarry site. The results of this monitoring will be used by the proponent to optimise environmental management procedures at the Red Hill Quarry. These results will be available on an annual basis.	Over the life of the quarrying operation	
33	Research Monitoring	To optimise the environmental management procedures at the Red Hill Quarry.	Continue to monitor research, both within Australia and overseas, into new developments in blasting technology, noise and dust control in the operations of the quarry.	Over the life of the quarrying operation	

Appendix 5
Department of Land Information Maps
(Job Number 881 and 895)



MAP USER INFORMATION

PROJECTION Transverse Mercator.

DIMENSION DATUMS Horizontal: Geocentric Datum of Australia 1994.
Vertical: Australian Height Datum 1971.

GRID VALUES Map Grid of Australia (MGA) values are shown in metres near sheet corners and at regular intervals, east and north from the false origin of the zone.

GRATICULE VALUES Longitude & latitude values are shown in degrees, minutes and seconds near sheet corners and at regular intervals.

DATA SOURCES Orthophoto sourced from SkyView V1A ortho-rectified mosaics.
Contour information sourced from DJI Topographical Dataset.
Pioneer No. 2 site layout boundaries sourced from Figure 6 - Public Environmental Review September 1990



ORTHOPHOTO MOSAIC INFORMATION

Mosaic Name: Metro North West 2004
Date Flown: December 2003/January 2004
Ground Pixel Size (Metres): 0.4
Scanned at (dpi): 1209dpi
Capture Scale: 1:20 000
Absolute Spatial Position Of The Individual Pixels: +/- 4m

ADDITIONAL DATA:
Pioneer No. 2 site layout boundaries



'A' Represents geo-spatial point interpreted by viewing aerial photography mosaic as the most southerly extent of the West Pit.
Approximate MGA94 coordinate position:
412965.98 mE, 6477939.36 mN



Department of Land Information
Government of Western Australia
Street address: 1 Midland Square, Midland, WA 8056
Postal address: PO Box 2222, Midland, WA 8056
Tel: (08) 9273 7555 Fax: (08) 9273 7205
eMail: sales@dl.i.wa.gov.au
Internet: www.dl.i.wa.gov.au
Digital orthophotos are available from DLi's eShop
www.landonline.com.au
Digital geospatial information is available from DLi's
Land Information Delivery Section
Tel: (08) 9273 7343 Fax: (08) 9273 7855
eMail: geodata@dl.i.wa.gov.au

PIONEER No. 2 SITE Job Number 881

Printed as at:
Thursday, September 30, 2004
This map is Crown Copyright and may not be reproduced
wholly or in part without the written permission of DLi.
Our Ref: 2004-2005/Job_881.mxd

CERTIFICATE

Section 65, Evidence Act

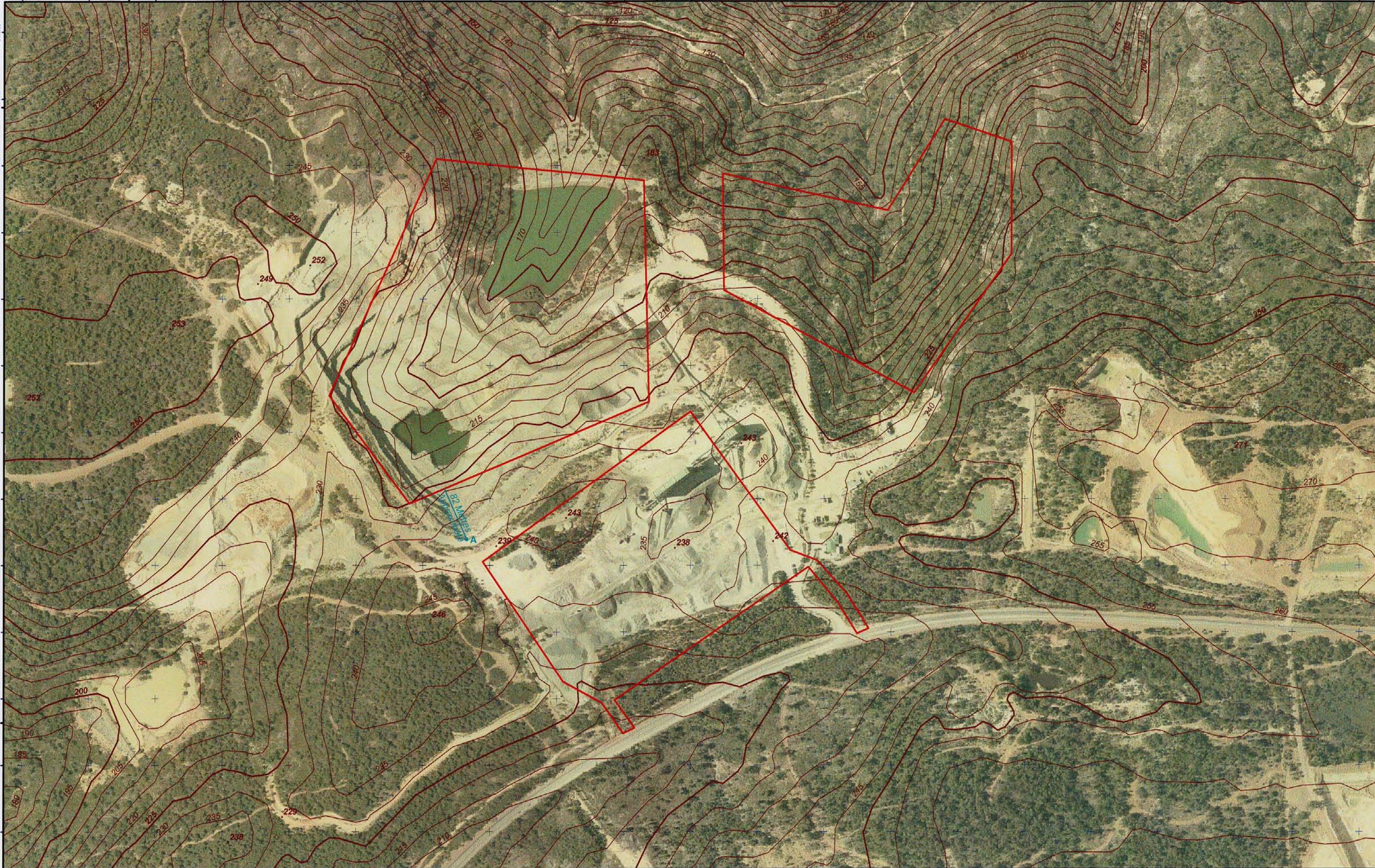
I certify that this digital plot PIONEER NO. 2 SITE is derived from the official digital data file (Job_881.mxd) and recorded as Job Number 881, held in the custody of the Department of Land Information and that I am the officer to whose custody the official digital data file is entrusted.

7/10/04

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DATE

hano

.....
A/MANAGER
PRODUCT & SERVICE DELIVERY



MAP USER INFORMATION

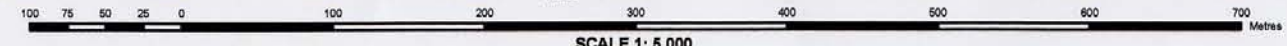
PROJECTION Transverse Mercator.

DIMENSION DATUMS Horizontal: Geocentric Datum of Australia 1994.
Vertical: Australian Height Datum 1971.

GRID VALUES Map Grid of Australia (MGA) values are shown in metres near sheet corners and at regular intervals, east and north from the false origin of the zone.

GRATICULE VALUES Longitude & latitude values are shown in degrees, minutes and seconds near sheet corners and at regular intervals.

DATA SOURCES Orthophoto sourced from SkyView VWA ortho-rectified mosaics.
Contour information sourced from DLI Topographical Dataset.
Pioneer No. 2 site layout boundaries sourced from Figure 6 - Public Environmental Review September 1990



ORTHOPHOTO MOSAIC INFORMATION

Mosaic Name: Metro North West 2004
Date Flown: December 2003/January 2004
Ground Pixel Size (Metres): 0.4
Scanned at (dpi): 1200dpi
Capture Scale: 1:20 000
Absolute Spatial Position Of The Individual Pixels: +/- 4m

DIGITAL TOPOGRAPHIC DATA:

Captured from: 1: 40 000 scale aerial photography flown December 1989
Contour Interval (m): 5
Accuracy (m): +/- 2.75 (vertical)
Source of data: Department of Land Information

Contour Spot Height: 30

ADDITIONAL DATA:

Pioneer No. 2 site layout boundaries

'A' Represents geo-spatial point interpreted by viewing aerial photography mosaic as the most southerly extent of the West Pit.
Approximate MGA94 coordinate position:
412965.98 mE, 6477939.36 mN

Department of Land Information
Government of Western Australia
Street address: 1 Midland Square, Midland, WA 6056
Postal address: PO Box 2222, Midland, WA 6056
Tel: (08) 9273 7555 Fax: (08) 9273 7205
eMail: sales@dl.i.wa.gov.au
Internet: www.dl.i.wa.gov.au
Digital orthophotos are available from DLI's eShop
www.landonline.com.au
Digital geospatial information is available from DLI's
Land Information Delivery Section
Tel: (08) 9273 7343 Fax: (08) 9273 7655
eMail: geodata@dl.i.wa.gov.au

PIONEER No. 2 SITE
Job Number 895

Printed as at: Thursday, September 30, 2004

This map is Crown Copyright and may not be reproduced wholly or in part without the written permission of DLI.

Our Ref: 2004-2005Job_895.mxd

CERTIFICATE

Section 65, Evidence Act

I certify that this digital plot PIONEER NO. 2 SITE is derived from the official digital data file (Job_895.mxd) and recorded as Job Number 895, held in the custody of the Department of Land Information and that I am the officer to whose custody the official digital data file is entrusted.

7/10/04

DATE

Haano

A/MANAGER

PRODUCT & SERVICE DELIVERY

Appendix 6
Department of Land Information
Methodology Report



Your Ref: Assessment Number 1511
Our Ref: 1595/2004

Environmental Protection Authority
Mining and Industrial Assessments Branch
Westralia Square
Level 8, 141 St Georges Terrace
Perth WA 6000

Attention Mr Sean McGunnigle

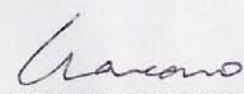
Dear Sir

Pioneer Number 2 Site – Red Hill Locality

In response to your request of July 2004 two certified maps are enclosed. The map titled "Pioneer Number 2 Site, Job Number 881" portrays aerial photography background overlaid with the "linear shapes" of Pioneer Number 2 Site. The map titled "Pioneer Number 2 Site, Job Number 895" portrays aerial photography background overlaid with the "linear shapes" of Pioneer Number 2 Site and contours at five metre interval.

Additionally, as an annexure with this letter is a "Methodology Report" outlining the process to replicate the "linear shapes" of Pioneer Number 2 Site contained in published document Public Environmental Review September 1990 and their depiction on the two certified maps.

Yours faithfully


CRAIG MARIANO
A/MANAGER
PRODUCTS & SERVICE DELIVERY BRANCH
INFORMATION ACCESS DIVISION

7 October, 2004

ckw20999Z

DEPARTMENT OF ENVIRONMENTAL PROTECTION RECORDS SECTION	
- 7 OCT 2004	
FILE NO	A/142/93-02
NAME	S MCGUNNIGLE
FILE NO	
NAME	

(199)

SCANNED

METHODOLOGY REPORT

Production of Certified Maps depicting the “linear shapes” of Pioneer Number 2 Site at Red Hill Locality overlaid onto DLI’s January 2004 orthorectified Aerial Photography Mosaic

General background and context information

In July 2004, the Environmental Protection Authority requested the Department of Land Information (DLI) to supply hard copy maps depicting the “linear shapes” referred to as Pioneer Number 2 Site, overlaid onto DLI’s January 2004 digital geospatial orthorectified aerial photography mosaic. The resultant products required the capture and conversion of the subject “linear shapes” into a digital form and exist as geospatial data based on the current map coordinate system, that is Map Grid Australia 1994 (MGA 1994).

Information regarding Pioneer Number 2 Site is contained in published document Public Environmental Review (PER) September 1990. A number of maps are contained in document PER September 1990 and these maps are identified with a unique Figure number. Figures 1, 2, 6, 11, 17 and other maps within PER September 1990 portray the “linear shapes” of Pioneer Number 2 Site.

In particular Figures 2 and 6 portray the “linear shapes”, as annotated by the document author Dames and Moore, on a topographic line map utilised as a base. This base map includes an acknowledgment, *“base map reproduced by permission of the Department of Land Administration and currently operating as the Department of Land Information”*. The nature of the display of topographic features and other information on the base map indicates the base map is a 1:25000 scale topographic line map Series R 811 published in 1983. Annotation of the “linear shapes” onto this particular line map base gives the “linear shapes” a positional relationship to the portrayed topographic features. Additionally, because the line map base has an inherent grid coordinate system, the Australian Map Grid 1966 (AMG 1966), all portrayed features and the annotated “linear shapes” have a measurable coordinate reference.

Note.

1. The absolute horizontal accuracy of any given pixel in the January 2004 geospatial aerial photography mosaic is considered plus or minus 4 metres ground distance.
2. The mean horizontal accuracy of the 1:25000 scale topographic base map is plus or minus 6.25 metres ground distance for the depicted topographic features.

Method used to digitally replicate the “linear shapes” of Pioneer Number 2 Site portrayed on Figure 6 of PER September 1990, transform into the current mapping coordinate system and produce maps at a desired scale.

The said base map in Figure 2 of PER September 1990 is a 1:25000 scale Published Topographic Map, map reference Mundaring 2134 3 NW Series R 811 published in 1983. The Map’s inherent coordinate system Australian Map Grid 1966 (AMG 1966) is depicted as full grid lines across the body of the map. The geodetic datum of this map is the Australian Geodetic Datum 1966 (AGD 1966).

Figure 6 of PER September 1990 is an enlargement at 1:10000 scale of the 1:25000 scale base map used in Figure 2. Figure 6 is the largest scale map contained in the PER September 1990 which depicts the "linear shapes" of Pioneer Number 2 Site and is a suitable source to derive coordinate values for the corner points of the "linear shapes".

Figure 6 also depicts the coordinate system with grid lines across the body of the map which were utilised to manually "scale" the coordinate values for the corner points of the "linear shapes". An appropriate "northing grid line" (coordinate value 6 478 000 N) and "easting grid line" (coordinate value 413 000 E) were used as starting grid lines with their unique reference values. Using a scale rule the distance of each "linear shape" corner point was measured from the respective starting grid lines to provide a recordable coordinate reference value for each corner point of the "linear shapes".

Note.

1. Measuring ("scaling") was to the centre of the linework on Figure 6. The line width on Figure 6 represents 8 metres ground distance. Scaling was to the nearest one third of a graduation on the scale rule, representing 3 metres ground distance.
2. The mean horizontal accuracy of map Mundaring 2134 3 NW Series R 811 is plus or minus 6.25 metres ground distance for the depicted features.

The recorded coordinate reference value for each corner point of each "linear shape" was captured by direct keyboard entry into an Industry Standard digital mapping system. This activity enabled the creation of a digital spatial data file containing a digitally replicated version of the "linear shapes" portrayed on Figure 6 of PER September 1990. The newly created digital spatial data file was named Pioneer_Quarry_Shapes_amg66. The contents of spatial data file Pioneer_Quarry_Shapes_amg66 were transformed to Map Grid Australia 1994 (MGA 1994) coordinate values (the current mapping system) using an Industry Standard commercial software programme for performing this process and renamed Pioneer_Quarry_Shapes_mga94.

Department of Land Information digital spatial data files January 2004 geospatial orthorectified aerial photography mosaic, five metre interval contour data from Contour Data File 2134 3 NW and the newly created Pioneer_Quarry_Shapes_mga94 are each spatially related to Map Grid Australia 1994 (MGA 1994) coordinate system.

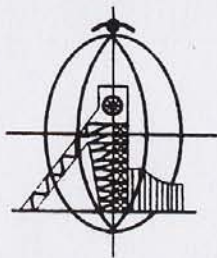
Within an Industry Standard digital mapping system the DLI digital spatial data files were accessed to create two "job specific" spatial data document files and named Job_881.mxd and Job_895.mxd. The creation of the "job specific" spatial data document files enabled the production of maps at a desired output scale. Two maps were produced at 1:5000 scale titled Pioneer Number 2 Site, Job Number 881 and Pioneer Number 2 Site, Job Number 895 with certification Certificates attached.

Certified map named Pioneer Number 2 Site, Job Number 881 produced from spatial data document file Job_881.mxd portrays orthorectified aerial photography background overlaid with the "linear shapes" of Pioneer Number 2 Site.

Certified map named Pioneer Number 2 Site, Job Number 895 produced from spatial data document file Job_895.mxd portrays orthorectified aerial photography background overlaid with the "linear shapes" of Pioneer Number 2 Site and contours at five metre interval.

7 October, 2004

Appendix 7
Photogrammetric Survey and Data Analysis Report



PREMIER MAPPING AUSTRALIA

Level 1 216 Belmont Avenue

BELMONT

Western Australia 6104

Tel: +618 9478 6088

e-mail: premapaust@optusnet.com.au

Postal: PO Box 794

CLOVERDALE

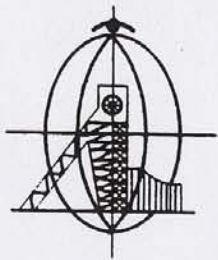
Western Australia 6985

Fax: +618 9478 6608

ABN: 79 357 833 626

Report on Photogrammetric Survey and Data Analysis Relating to the Pioneer Quarries RED HILL QUARRY and Its Impact on the General Surrounds and Particular Impact Upon the Property of A.J. Elwood, 'Teewana'

December 2003



PREMIER MAPPING AUSTRALIA

Level 1 216 Belmont Avenue
BELMONT
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Tel: +618 9478 6088
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Report on Photogrammetric Survey and Data Analysis Relating to the Pioneer Quarries RED HILL QUARRY and Its Impact on the General Surrounds and Particular Impact Upon the Property of A.J. Elwood, 'Teewana'

INTRODUCTION

Premier Mapping Australia, a specialist Photogrammetric firm, was requested to carry out a relevant survey of the current status of the RED HILL QUARRY (the quarry) to affirm or otherwise, the assertions of the original 1991 Public Environmental Review (PER) impact and subsequent statements leading to the current quarry activities.

A small scale graphical copy of the 'Visual Impact Assessment ~ Pioneer No.2 Site' (otherwise known as fig. 17 from the original PER) (*appendix (a)*), and a larger scale print 'Interpreted Surface Geology' (*appendix (b)*), both showing 'footprints' of the then proposed quarry and related infrastructure bounds, were obtained. Both plans showed some coordinates and/or cadastral boundaries sufficient to enable the derivation of their geographical positions to within several metres. The smaller scale plan was scanned and 'fitted' to the digital cadastre whilst the 'Interpreted Surface Geology' plan was scanned and fitted to the GDA94 adaptation of the barely legible coordinates indicated on the plan.

The two, thus independently derived quarry locations showed acceptable correlation and was accepted as within the accuracy suited to this study.

A copy of the 'Site Layout - Pioneer No. 2 Site' (otherwise known as fig. 11 from the original PER) (*appendix (c)*), was subsequently supplied but was more of a scaled schematic with little actual information as to the absolute geographical location that would have affected the original location derivation as mentioned above.

It was recommended that an aerial survey utilising the State Government annual Metro aerial photography would provide the most suitable data from which to carry out the study. Premier Mapping Australia (PMA) enlisted the services of John Bullock & Associates (JBA), Land Surveyors to carry out some ground truthing and site photos within the quarry. (*appendices (g) & (p) to (s)*)

METHODOLOGY

Source Material & Data

It was decided that the most suitable method of obtaining the results was to use aerial photography flown annually by the Department of Land Information (DLI, formerly Dept. of Land Administration). Photogrammetric measurements utilizing the 1:20000 nominal scale imagery and

adjusted control from the DLI January 2003 Metro Region Project, could provide a well defined Terrain model data set from which to analyse the visual impact of the quarry upon the surrounds.

The absolute accuracy disclaimer, by DLI, is +/-3m overall the Metro Project, but the standard error for measurements from this scale of aerial photography is in the region of +/- 0.5 m and the relative accuracy within the 9 stereomodels (stereo-overlapping exposures) covering the area of interest could be expected to be within 1 to 2 m. This is certainly sufficient to determine nominal view sheds from any point within the study area.

The metric scans and control of the 11 images (2 flight lines resulting in 9 stereomodels of 60% overlapping exposures) were purchased from DLI along with the Digital Cadastre, all based on the Geodetic Datum of Australia ~ GDA94.

As the imagery used was flown in January 2003, as part of the DLI annual Metro Project coverage, it was decided to obtain some current imagery using a light aircraft and hand-held cameras. This provided a good indication of the progress over the period from 6 January, DLI photography and 28 November flight.

Photogrammetric Measurement

The imagery from DLI was imported into Premier Mapping Australia's MicroStation-based Digital Photogrammetric Workstation together with the supplied control from the DLI bundle adjustment results, and verified that the fit-to-control was within stated expectations.

The copies of the two plans from the initial PER were scanned and geo-referenced to a 'best-fit' to the digital cadastre and grids. The two plans were separately geo-referenced and the results compared. Both sets of boundary definitions, with the small variations, were then depicted on all plans prepared from the photogrammetric survey. (Subsequent ortho-rectified aerial photographic documentation obtained from Pioneer quarries would confirm the boundaries derivations are within reasonable agreement of each other) (**appendix (d)**). For the purpose of this study, we have combined the area of the 'Approved' West Pit footprint so that the relatively minor differences are fully encompassed in the study (i.e. favouring the quarry by 'allowing' a slightly larger footprint than probably has been generally accepted).

Digital Elevation Model (DEM) data comprising spot elevations and relevant breaklines was auto-correlated and observed with the Digital Photogrammetric Workstation, the data edited in line with standard practice, and contours generated from the DEM. A final interactive check of the veracity of the resulting contours confirmed the DEM auto-correlation

An Orthophoto (ortho-rectified image whereby the usual distortions caused by tip, tilt of the aerial photos and ground elevation variation is geometrically rectified in relation to the true terrain depicted by the DEM) was generated to provide a clear base upon which to illustrate the various data. (*see separate A1+ size Orthophoto Contour Map ~ Pioneer Quarry Views Analysis resulting from the above*)

The near-vertical, non-metric images taken from the light aircraft on 28 November 2003 were also imported as a MicroStation reference file and 'warped' to best fit several control features from the January orthophoto (bushes, track intersections, buildings and the like) which had, recognisably, not changed within the intervening period. (**appendix (e) – transparent overlay**)

This semi-rectified image was then used to delineate the extents to the West-Southwest and Northwest to Northeast progress of the quarry and dumps. A field GPS survey was carried out by a JBA surveyor of several points around the bottom of the Western overburden dump and the top of the quarry embankment at its Northerly extent. This confirmed the 'fit' of the 28 November reference image. (**appendix (g)**)

ANALYSES

Visual Impact

From the DEM, a view shed analysis was generated to viewpoints determined from the elevations at the time of aerial photography (Jan 2003) of the of the 5 nominal points of the 'pentagonal' quarry footprint, together with added views from the Southern extent of the quarry, outside the footprint. (*see separate PMA, A1+ size Orthophoto Contour Map ~ Pioneer Quarry Views Analysis resulting from the above*)

Plots of the results were prepared together with computer generated perspective views (*appendices (h) & (i)*) applying the ortho-rectified to the DEM along defined sight lines. These sight lines were initially determined by visual inspection of the view shed plan and the contours, and forested areas.

These perspective views and the view shed analysis were verified by a visit to the site of the Quarry and to the property 'Teewana'. Five sites at 'Teewana' were chosen from the view shed plan at random and coordinated to within the accuracy of a handheld GPS (about 5 to 7 m) and digital photos taken from each site with a magnetic bearing also recorded. These 5 photos clearly show the visibility of the quarry from the property, and confirm the photogrammetrically generated perspective views, notwithstanding trees which do obscure the quarry view when actually in line with the viewer and the quarry. (*appendices (j) to (n)*)

One of these images was digitally modified to 'revert' the quarry to its probable aspect had the quarry not proceeded, as an illustration only. (*appendix (o)*)

Quarry Extents

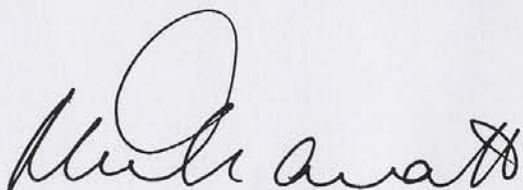
The areas involved in the original application and quarrying activities to January 2003 (as shown by current aerial survey from DLI January 2003 aerial photography) and subsequent semi-rectified photography flown 28th November 2003, were measured both within and outside the application 'footprint'. (*appendices (f) & (e)*)

CONCLUSIONS

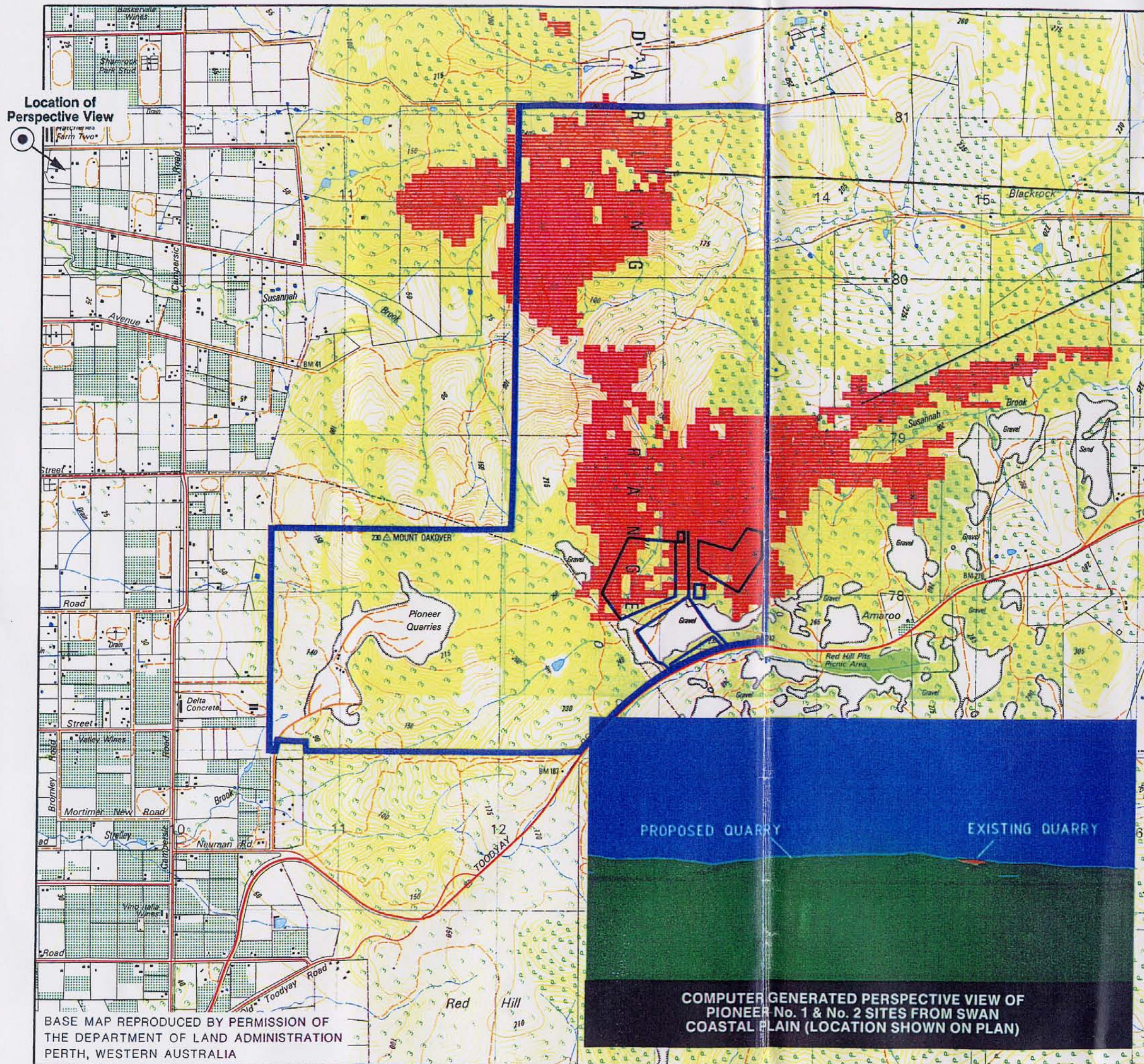
1. The Quarry has certainly extended, and continues to extend considerably outside the pentagonal footprint originally shown in *fig. 17* of the original assessment. The attached illustrations including the aerial images from January 2003 and those taken in November 2003 clearly show the expansions taking place. (*appendices (e) & (f)*)
2. The original Visual Impact Assessment as indicated from the same *fig. 17* has omitted a considerable amount of data to the North East of the Quarry. This may have been caused by missing elevation data at the time of the original Dames & Moore study for that quadrant, as the areas of visibility as depicted appear to be unnaturally 'cut off' in *fig. 17*. Certainly the quarry is visible from many more locations than the original Dames & Moore plan indicated, much of which area falls within the property 'Teewana'. (*appendix (a) & separate PMA, A1+ size Orthophoto Contour Map ~ Pioneer Quarry Views Analysis*)
3. The lowest contour (172m) generated from the January 2003 elevation model straddles the bounds of the 'Footprint' on the Southern side and the quarry wall/s rise to the top at around 94 m outside the 'Footprint' to a level of around 240 m (*appendix (f)*). It is this face around to the centre of the NE facing benches of the quarry that appears to have the

major impact on the visibility of the quarry from 'Teewana'. These faces all have a generally northerly aspect and should have been predictable in their impact upon those areas that were omitted in the original study as shown in *fig. 17(appendix (a))*.

4. The relatively rapidly growing overburden dump on the western side of the quarry is also becoming more and more visible from Toodyay Road. This dump has risen some 5 m, with a concomitant expansion of the base in accordance with the natural 'slump' of dumped material, in a westerly direction since the Jan 2003 aerial photography.
5. It is possible the overburden dump could be acceptably re-shaped and re-vegetated in the course of time. In the opinion of the writer, it is difficult to believe that the quarry faces could be in any way suitably rehabilitated as this may be beyond the economics of such an operation. 8 photographs were taken of various aspects of the operation current to 19th November 2003 to illustrate some of the activities within the quarry and related infrastructure (*appendices (p) to (s)*)



M. E. Goble-Garratt (MISAust)
Premier Mapping Australia

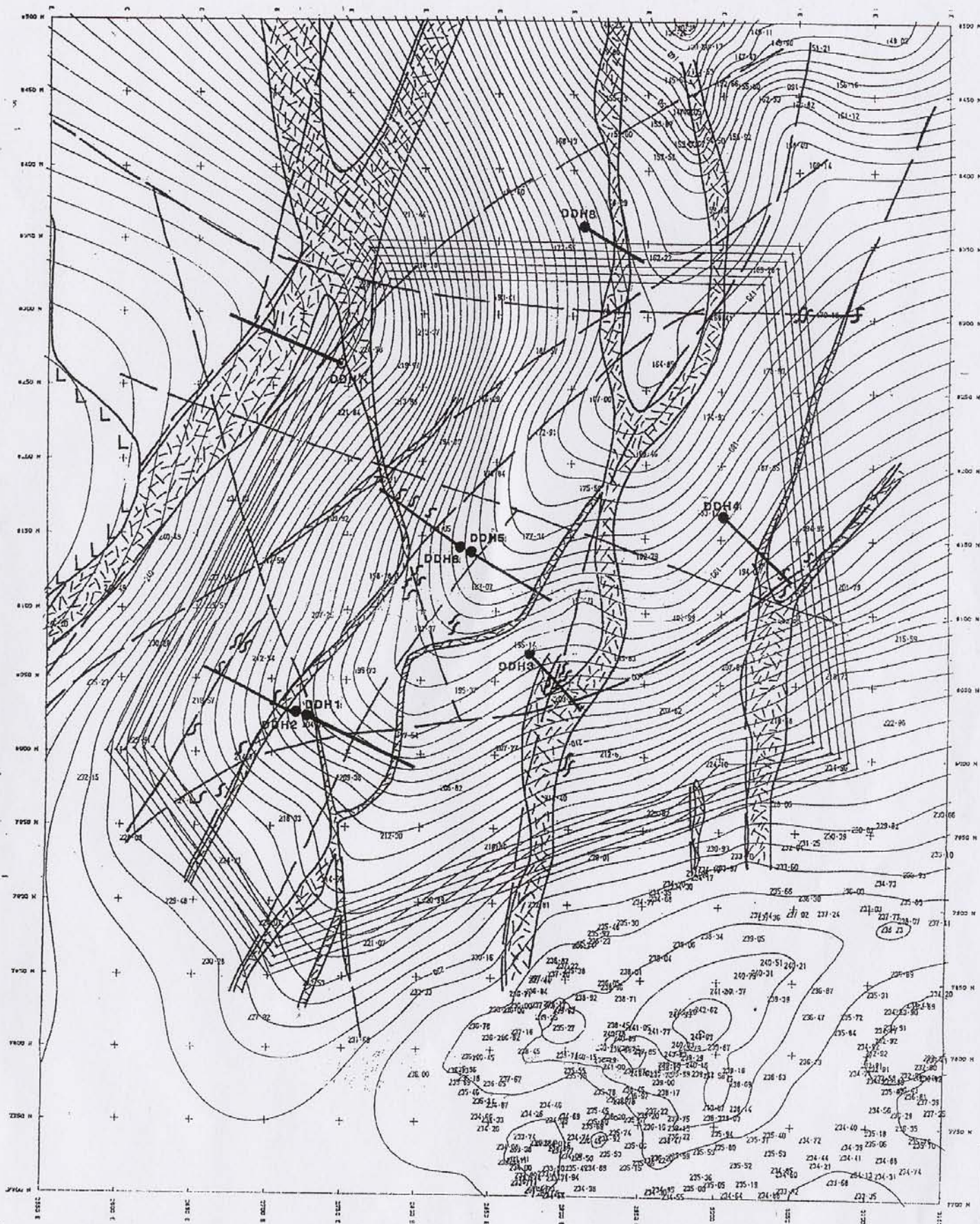


AREAS FROM WHICH QUARRY WOULD BE VISIBLE I.E. OBSERVER WOULD HAVE TO BE STANDING IN AREA SHOWN IN RED TO SEE PROPOSED QUARRY PIT.



0 0.5 1km
SCALE 1 : 25 000

VISUAL IMPACT ASSESSMENT PIONEER No. 2 SITE



INTERPRETED SURFACE GEOLOGY

DOLERITE/DIORITE



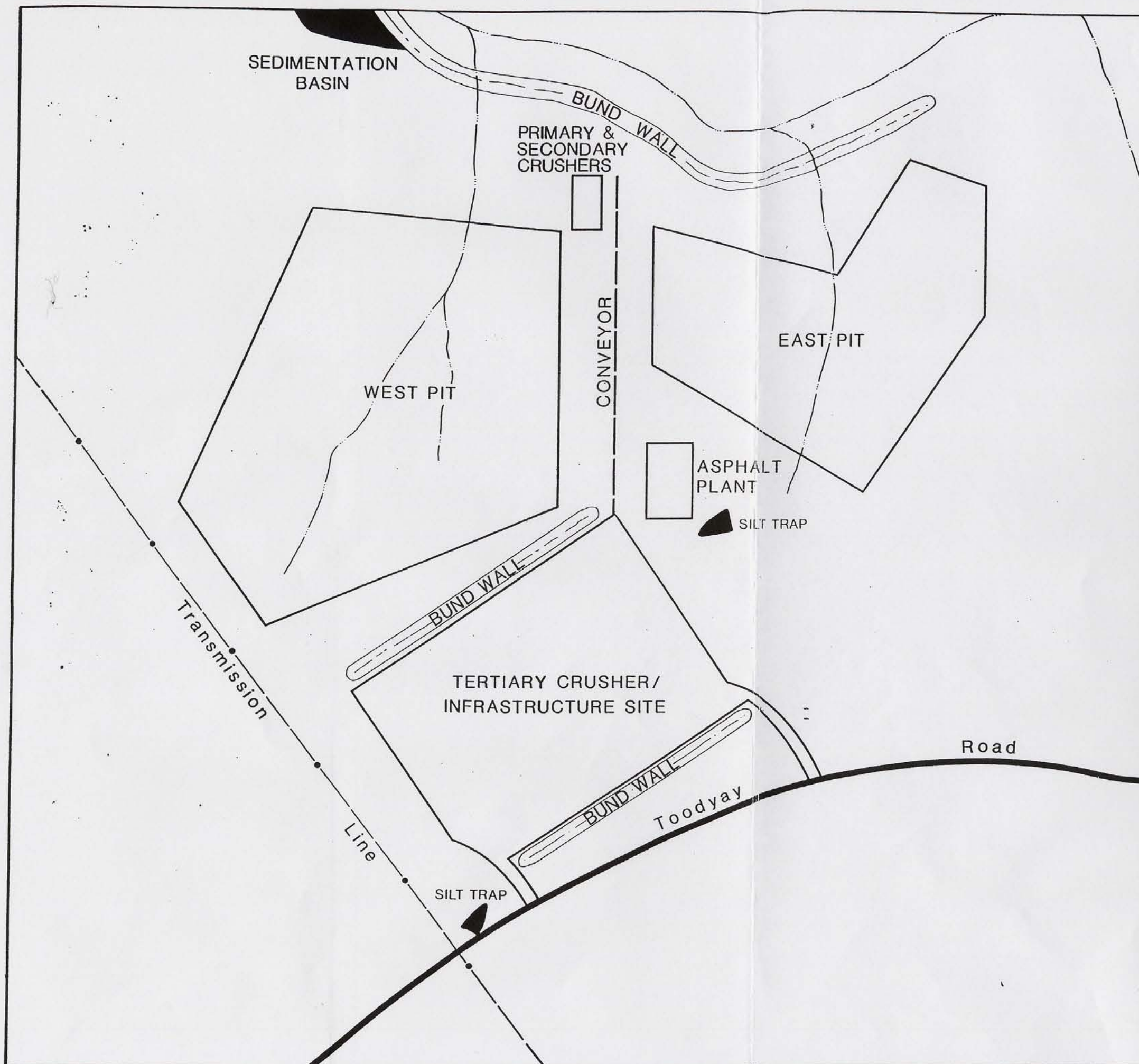
GRANITE



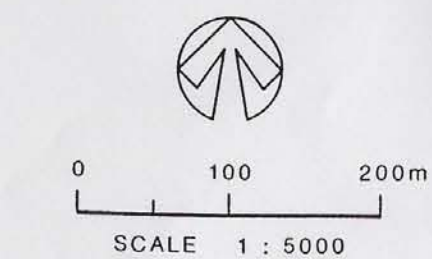
SHEAR/STRUCTURE LINE



Pioneer Quarries



DAMES & MOORE



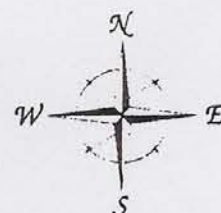
**SITE LAYOUT
PIONEER No. 2 SITE**

FIGURE 11

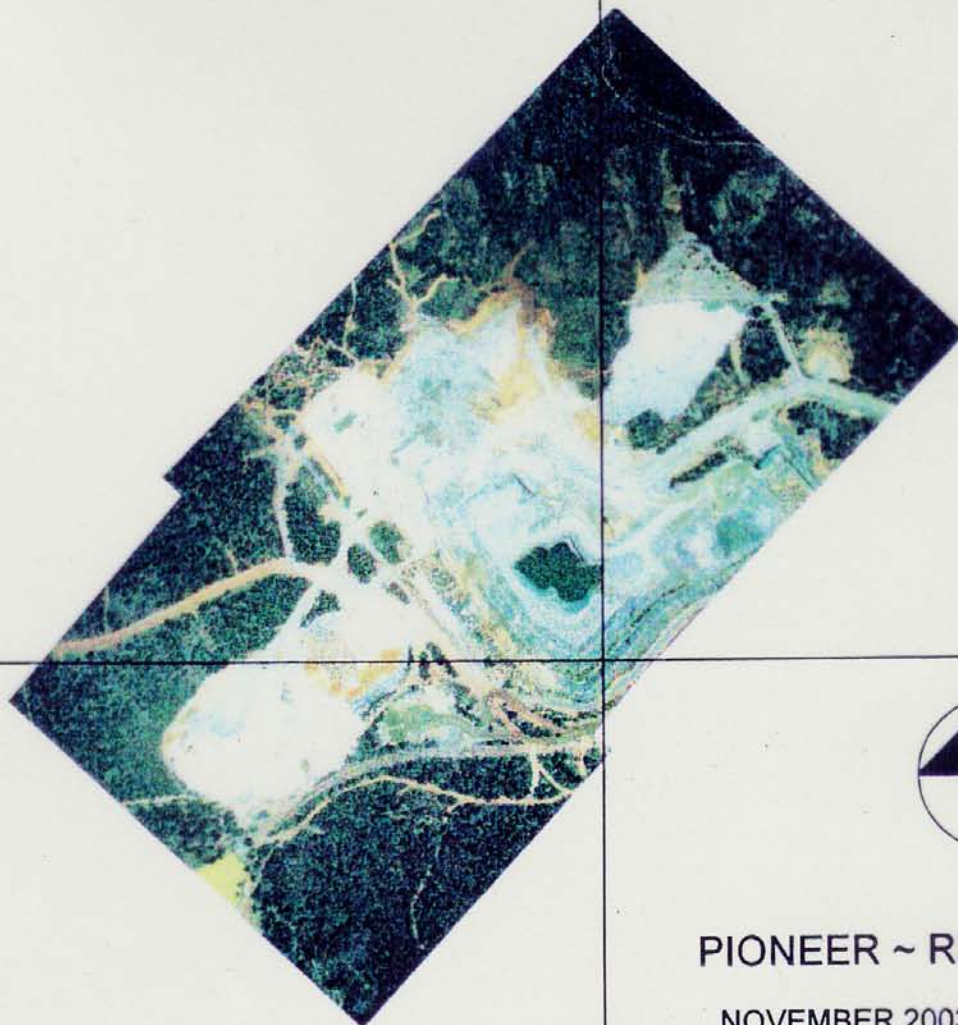


PIONEER SITE NUMBER 2

ORTHOPHOTO PRODUCED BY
 SURVEY GRAPHICS, (08) 9317 8200
 DATE OF PHOTOGRAPHY : 21/01/2001
 SCALE OF PHOTOGRAPHY : 1:12500



412 000 E



413 000 E

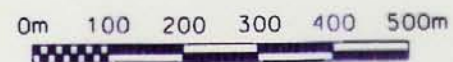


PIONEER ~ RED HILL QUARR'

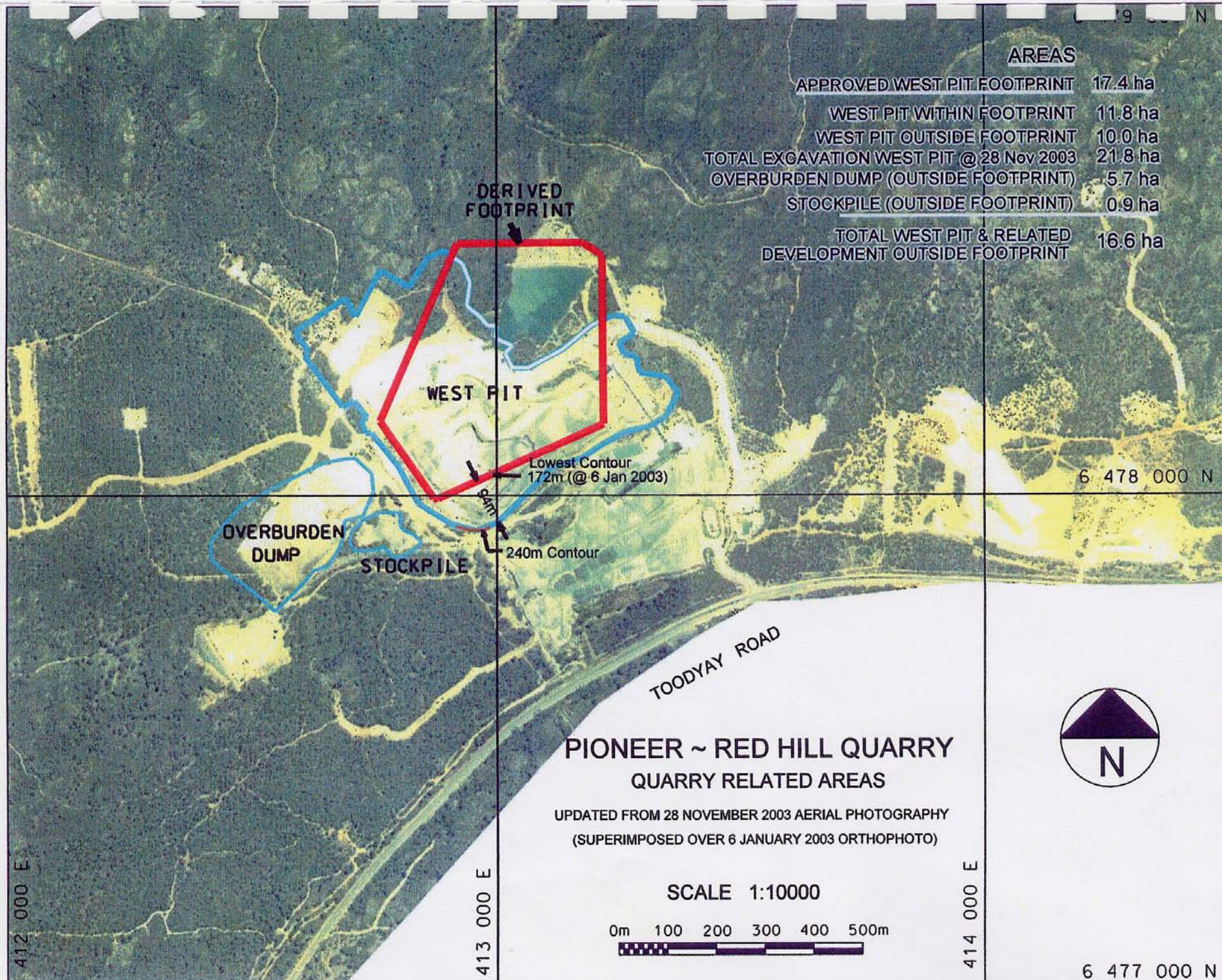
NOVEMBER 2003 UPDATE OVERLAY

(Semi-rectified image)

SCALE 1:10000

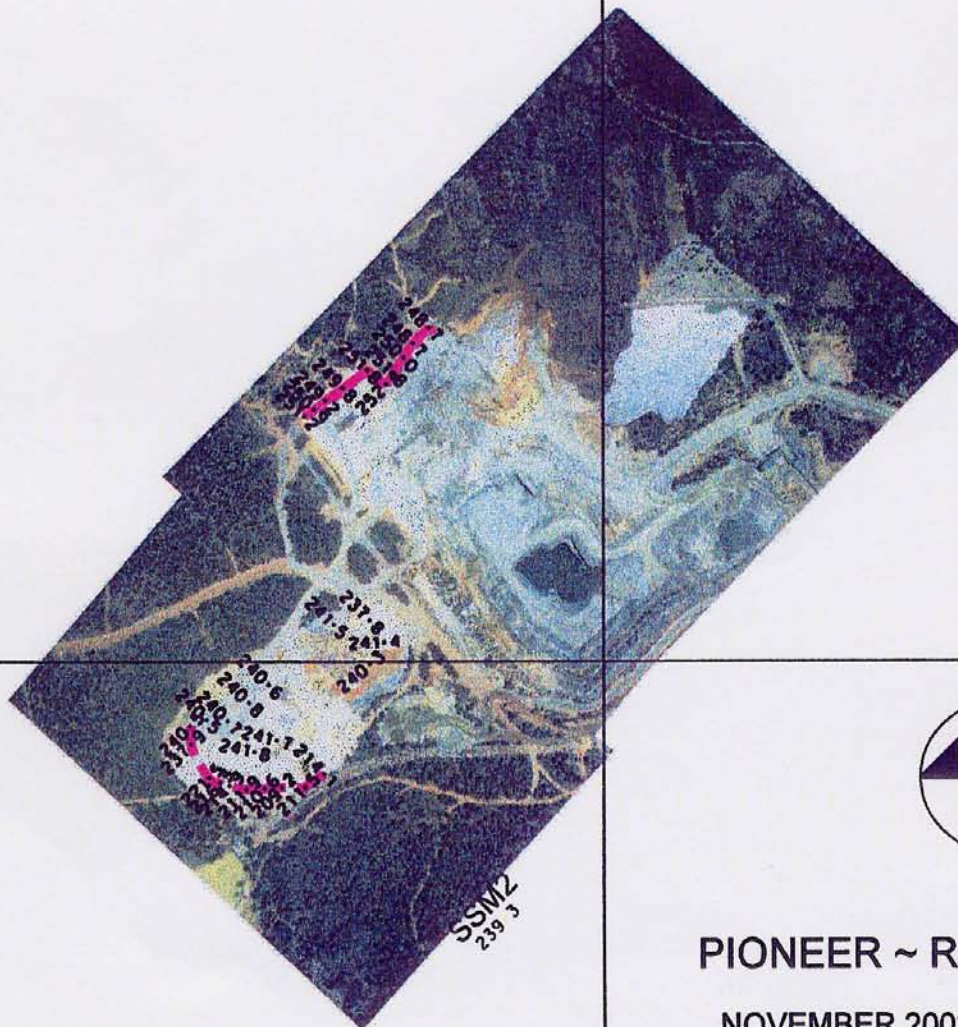


Date of Photography: 28 Nov 2003



6 478 000 N

6 477 000 N



NOVEMBER 2003 UPDATE OVERLAY

SHOWING CONFIRMATION FIELD SURVEY 1 Dec 2003

(Semi-rectified image)

SCALE 1:10000



Date of Photography: 28 Nov 2003

PMA appendix (g)

412 000 E

413 000 E

414 000 E



Digital Orthophoto image draped over Digital Elevation Model (DEM) data depicting the visual Impact on 'Teewana' from digital analysis of DEM for equivalent Photo #1. Orthophoto source imagery flown January 2003



Digital Orthophoto image draped over Digital Elevation Model (DEM) data depicting the visual Impact on 'Teewana' from digital analysis of DEM for equivalent Photo #5. Orthophoto source imagery flown January 2003



Digital Orthophoto image draped over Digital Elevation Model (DEM) data depicting the visual impact on 'Teewana' from digital analysis of DEM for equivalent Photo #2. Orthophoto source imagery flown January 2003



Digital Orthophoto image draped over Digital Elevation Model (DEM) data depicting back-view from the Quarry to 'Teewana' from digital analysis of DEM for equivalent Photo #1. Orthophoto source imagery flown January 2003



'Teewana' Photo #1 taken 21 Nov 2003 from MGA50 413839mE 6481280mN toward Quarry Brg 197 degrees



'Teewana' Photo #2 taken 21 Nov 2003 from MGA50 414256mE 6482066mN toward Quarry Brg 193 degrees



'Teewana' Photo #3 taken 21 Nov 2003 from MGA50 414405mE 6481439mN toward Quarry Brg 200 degrees



'Teewana' Photo #4 taken 21 Nov 2003 from MGA50 414377mE 6481240mN toward Quarry Brg 201 degrees



'Teewana' Photo #5 taken 21 Nov 2003 from MGA50 413835mE 6480908mN toward Quarry Brg 189 degrees



'Teewana' Photo #1 taken 21 Nov 2003 from MGA50 413839mE 6481280mN toward Quarry Brg 197 degrees
Photo modified to illustrate the probable view had the present quarry NOT proceeded in the current location



Pioneer Red Hill Quarry photo #1 19 Nov 2003 taken from MGA50 413154mE 6477776mN Brg 10 degrees



Pioneer Red Hill Quarry photo #2 19 Nov 2003 taken from MGA50 413330mE 6478114mN Brg 325 degrees



Pioneer Red Hill Quarry photo #5 19 Nov 2003 taken from MGA50 412870mE 6477880mN Brg 355 degrees



Pioneer Red Hill Quarry photo #5a 19 Nov 2003 taken from MGA50 412870mE 6477880mN Brg 40 degrees



Pioneer Red Hill Quarry photo #6 19 Nov 2003 taken from MGA50 412669mE 64788188mN Brg 110 degrees



Pioneer Red Hill Quarry photo #6a 19 Nov 2003 taken from MGA50 412669mE 64788188mN Brg 135 degrees