



# **AVON VALLEY (TOODYAY) QUARRY DEVELOPMENT**

**WESTERN QUARRIES PTY LTD**

**Report and Recommendations  
by the  
Environmental Protection Authority**



Department of Conservation and Environment  
Western Australia

Bulletin 194 May 1985

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## *SUMMARY AND RECOMMENDATIONS*

*The proposal to establish the Avon Valley (Toodyay) hard rock quarry arose from protracted negotiations involving a number of parties (including the Environmental Protection Authority) concerning the existing Westrail quarry at Chris Hill within the Avon Valley National Park.*

*Because of the magnitude, duration and environmental implications of the proposed new quarry, the Authority called for preparation of an Environmental Review and Management Programme (ERMP) for the project. In so doing, the Authority maintained that the proposed quarry and rehabilitation of the Chris Hill site should be linked.*

*Some difficulties confronted the Authority in assessing the quarrying proposal. Doubt as to the need for an additional quarry and operator to service the market for hard rock produce raised concern that establishment of the proposed quarry could lead to the premature closure of some small-scale quarrying operations, or to a reduced commitment to environmental protection and management programmes at existing quarries (both perceived as possible consequences of diminishing the viability of present operations). Abandonment of the proposed quarry (if non-viable) was also of concern.*

*Discussions with the proponent of the Avon Valley quarry suggested that a centralised rehabilitation fund, sustained by a production-based levy (as operates in South Australia), might be an appropriate response to these concerns. The Authority examined the South Australian situation and concluded that introduction of a similar system in Western Australia would be beneficial in terms of improving the standard of rehabilitation and environmental management practices throughout the State's extractive industry. Although this would require significant change to the present system, the Authority believes that it should be pursued and has, therefore, recommended as follows:*

*RECOMMENDATION NO. 1*

*Through the Land Resource Policy Council, Government should undertake an urgent review of the existing situation of extractive industry and examine the most appropriate way of introducing a centralised rehabilitation fund sustained by a production-based levy in W.A.*

*The absence of a planning framework within which to examine the proposed quarry was of fundamental concern to the Authority because, without such, there is a risk that ad-hoc decisions on development proposals could seriously detract from the intrinsic values of the Avon Valley and militate*

*against realisation of its full potential as a regional resource. Delaying a final decision on major development proposals (such as the Avon Valley quarry), pending preparation of a guiding regional strategy, may appear to be a desirable response to this situation. However, notwithstanding recent Government initiatives in the areas of land-use planning and management, mechanisms to achieve such are unlikely to be available for some time. Therefore, delaying a decision on the quarrying proposal pending adoption of an overall planning strategy for the Avon Valley cannot be regarded as practicable.*

*If there is to be decision to proceed with the proposed quarry at this time, it is essential to ensure that its impact on the Avon Valley is ameliorated as fully as possible. Thorough and effectively integrated operation, management and rehabilitation programmes would be necessary to achieve this objective. In addition, the Authority also believes that it should maintain an involvement with the proposed quarry (if established), to ensure that it proceeds in accordance with the agreed programmes. Accordingly, the Authority has made the following recommendations in response to the detailed proposals that have been put forward in the ERMP, and the public submissions thereon.*

*RECOMMENDATION NO. 2*

*In the absence of any guiding framework, the Authority is concerned that any decision to proceed with the proposal at this time should ensure that all necessary safeguards are instituted and, therefore, recommends that the proposed quarry should only proceed if:*

- . all subsequent recommendations in this report are adopted;*
- . all undertakings given in the ERMP are implemented by the proponent; and*
- . the additional commitments required from the proponent are provided in an acceptable and binding form.*

*Where appropriate, commitments should be reflected in any Extractive Industry Licence issued by the Shire of Toodyay.*

*RECOMMENDATION NO. 3*

*The Shire of Toodyay should increase the bond on the area excavated to a minimum of \$12,000 per ha and place a bond of \$2,000 per ha on all remaining disturbed areas until the areas are adequately rehabilitated or a suitable rehabilitation fund is established.*

*RECOMMENDATION NO. 4*

*The developer should submit an annual environmental report to the Shire of Toodyay outlining the year's progress on environmental and management matters.*

*RECOMMENDATION NO. 5*

*Every three years, the proponent should submit a detailed environmental report to the Shire of Toodyay in which the previous three years' developments are reviewed and the proposed programmes for the forthcoming three years are presented.*

*RECOMMENDATION NO. 6*

*The Shire of Toodyay should provide copies of the annual and triennial reports to the EPA for consideration and comment, and where appropriate the licence conditions should be amended to reflect the Authority's advice.*

*RECOMMENDATION NO. 7*

*Any initial licence for the proposed quarry should be limited to three years, with consideration being given to longer term approvals once the adequacy of operation, management and rehabilitation programmes has been demonstrated.*



*RECOMMENDATION NO. 8*

*Throughout the plant and stockpile area of the proposed quarry, special attention should be given to preservation of as much of the existing screening vegetation as possible, and all supplementary planting should be limited to existing species or species of compatible colour and form.*

*RECOMMENDATION NO. 9*

*Water for dust suppression purposes should not be drawn from the Avon River.*

*RECOMMENDATION NO. 10*

*The proponent should monitor water quality in the dust suppression water supply dam to ensure that salinity levels do not become unacceptably elevated, and should install a bottom discharge pipe in the dam to enable disposal of saline waters if a salt build-up occurs.*

*RECOMMENDATION NO. 11*

*Conservation and landscape protection should be the designated end land use for the quarry floor, benches and faces, and other areas of the site disturbed as a result of the quarrying operation.*

*RECOMMENDATION NO. 12*

*A regular weed control programme should be maintained in and around the plant area and amenities block (where both agricultural and weed species are well established at present) to prevent weeds being spread to nearby rehabilitation areas and the National Park, or being distributed in the product.*

*RECOMMENDATION NO. 13*

*All existing ballast from the Chris Hill stockpile and railway facilities should be removed and rehabilitation earth works completed within 12 months of the proposed quarry plant becoming operational.*

*RECOMMENDATION NO. 14*

*Excess material in the fines waste dump should be removed so that the dump can be reshaped to an aesthetically acceptable and stable form suitable for revegetation within 12 months of the proposed new quarry becoming operational.*

*RECOMMENDATION NO. 15*

*Until such time as the Chris Hill quarry site and ancillary areas revert to the control of the body managing the Avon*

*Valley National Park, the periodic reports to be submitted by the proponent should document progress in the rehabilitation of these areas.*

## 1. INTRODUCTION

In terms of the decision-making processes involved, the proposed Avon Valley quarry differs from other major development proposals the Environmental Protection Authority (EPA) has dealt with.

Normally, when the Authority has assessed a development project, its report and recommendations are forwarded, through the Hon. Minister for the Environment, to the 'action' Minister (ie the Minister within whose portfolio the responsibility for State Government decisions regarding the proposal lies). However, because of the way in which the Avon Valley quarrying proposal has evolved, there is now no apparent action Minister.

This is the case because, although various State statutes affect different aspects of a quarrying operation (eg the Mines Regulations Act and Regulations, the Noise Abatement Act 1972, and the Noise Abatement (Hearing Conservation in the Workplace) Act and Regulations 1983), decisions as to whether the proposed quarry should proceed and, if it does, the conditions that would be applied, are the responsibility of the local government authority involved (ie the Shire of Toodyay). The authority for such decisions is provided by the Council's Town Planning Scheme (T.P.S.) and its by-laws relating to extractive industry.

The Avon Valley proposal could also be regarded as unusual because, when it was first submitted, the Shire of Toodyay's T.P.S. did not permit extractive industry within the Council's municipal district, and the Council did not have any by-laws relating to extractive industry. Therefore, under the circumstances prevailing at the time that the Avon Valley quarrying proposal was submitted, because it is a form of extractive industry, the proposed quarry could not have been permitted.

Accordingly, it was necessary for the Shire of Toodyay to amend its T.P.S. to provide for the establishment of extractive operations within its municipal district, and for the Council to adopt by-laws to enable the control of such operations. As both have now been done, all mechanisms necessary to enable extractive industry to proceed within the Shire of Toodyay are in place.

The T.P.S. amendment adopted provides for the referral of certain extractive proposals to the EPA. The proposed Avon Valley quarry would, for example, require referral to the Authority and in that it has been so referred, it might seem that it is being advanced in accordance with the Council's planning requirements. This situation has, however, only arisen following a complex sequence of events.

Because the background to the Avon Valley proposal is complex, the Authority considers it necessary to explain this in some detail. This is done in the following section of the report.

## 2. BACKGROUND

Westrail and the South Australian-based basic raw materials producer Quarry Industries Ltd have entered into a joint venture known as Western Quarries Pty Ltd (hereinafter referred to as the proponent) to develop a new hard rock quarry and associated processing plant. The development is proposed for a site (Part Lots 3 and 102 of Portion Avon Loc. 1953) in the Avon Valley adjacent to the Avon Valley National Park in the Shire of Toodyay (see Figure 1).

Westrail has controlled a small quarry known as Chris Hill on a Railway Reserve within the National Park for many years. This quarry has been operated on an intermittent contract basis to supply railway ballast. It has been very poorly sited and environmental management has been unsatisfactory. There have been lengthy negotiations over recent years between the National Parks Authority (now part of the Department of Conservation and Land Management), the Department of Conservation and Environment (DCE), the EPA, and Westrail in an attempt to remedy rehabilitation and operating problems. There have also been proposals from Westrail to extend the quarry.

The current proposal arose from the desires of Westrail and Quarry Industries to undertake a commercial joint venture operation at the existing Chris Hill Quarry site. The original intention to expand the existing quarry within the

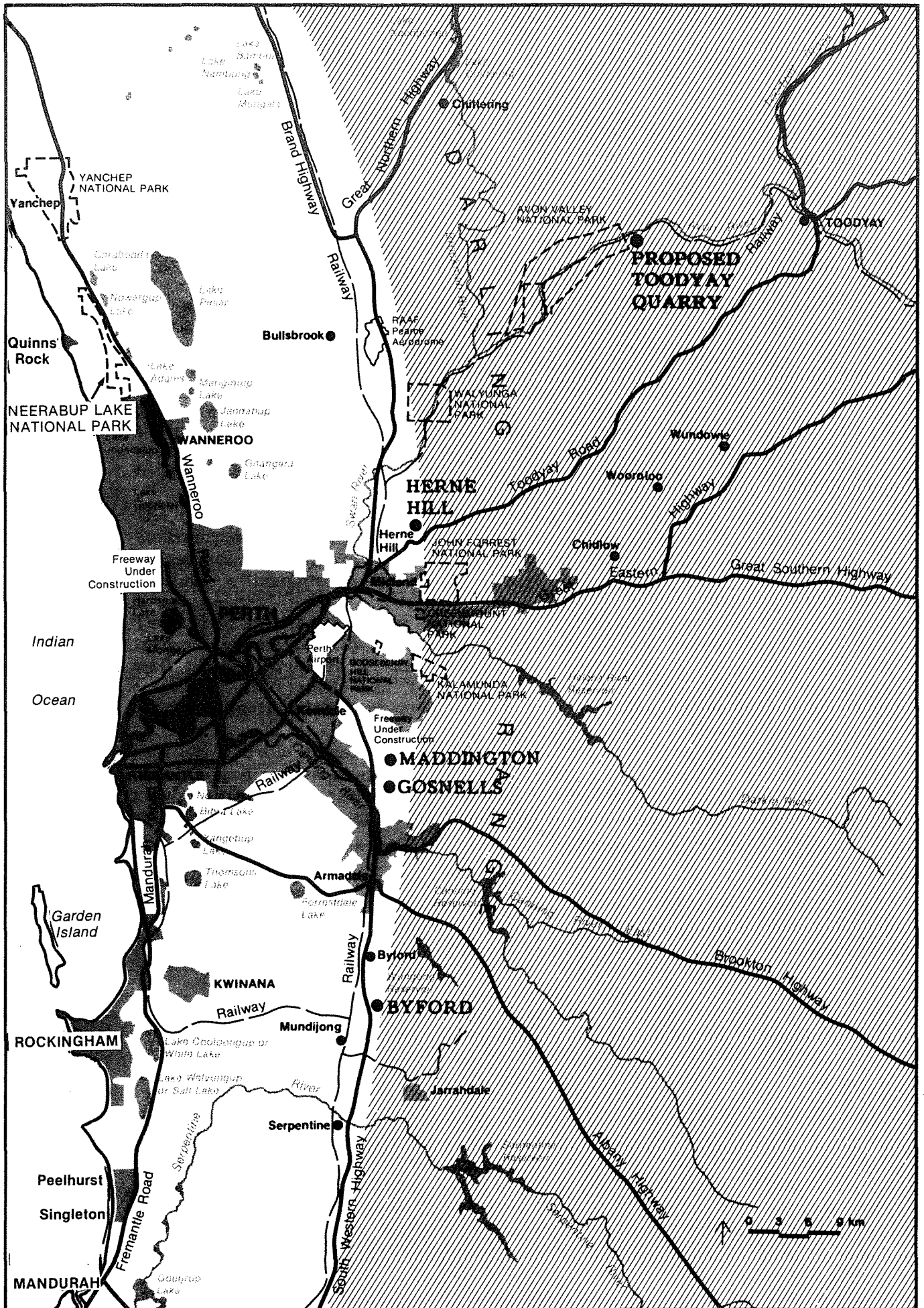


Figure 1

LOCATION PLAN FOR PROPOSED QUARRY

(Source - Western Quarries Pty. Ltd., Toodyay Quarry ERMP).



National Park was generally accepted as being undesirable, and the nature of the rock and size of the reserves at the Chris Hill site also made this inadvisable. Consequently, Westrail/Quarry Industries were advised to seek an alternative site, outside the boundaries of the National Park. The Environmental Review and Management Programme (ERMP) addresses a proposed quarry on an alternative site, beyond the boundaries of the National Park.

Because of the original nexus between the Chris Hill Quarry, for which Westrail is responsible, and the move into the new joint venture and new site, the EPA sought a commitment from Westrail that the Chris Hill Quarry would be closed and rehabilitated in consultation with, and to the satisfaction of, the National Parks Authority. The EPA was concerned that unless a proposed rehabilitation plan for the existing Chris Hill Quarry working site, stockpile area and railway siding was prepared as part of the ERMP, the joint venture proposal could possibly be seen as a means by which rehabilitation of the existing Chris Hill Quarry and associated facilities could be avoided (see Section 5 of Appendix B of the ERMP giving the guidelines for the document). It is for this reason that the EPA secured assurances from Westrail that rehabilitation of the Chris Hill Quarry would be completed and that irrespective of the outcome of the assessment of the ERMP for the new site, the Chris Hill Quarry rehabilitation work would be carried out. This commitment is given in the ERMP.

The new quarry proposal is intended to supply Westrail's regional ballast requirements, and the existing railway infrastructure would be used to supply Quarry Industries' requirements and a portion of the Perth metropolitan crushed rock aggregate market. Metropolitan distribution would be achieved by road transport from a facility to be established at the Kewdale rail terminal. Additional markets could be developed using the rail freight cost advantage to country areas served by Westrail. The quarry would also supply the very small local market by road from the quarry.

The proposed quarry represents an extractive industry that would be developed on privately-owned land. As such, it is primarily the responsibility of the local government authority in whose municipal district the development would occur (in this case, the Shire of Toodyay), the relevant control mechanisms being the local authority's T.P.S. and its extractive industries by-laws.

As previously indicated, at the time the proposal was submitted, Council's T.P.S. did not provide for extractive industry, and the Council did not have any by-laws to control extractive industry.

Council's Scheme was subsequently amended to provide for the establishment of extractive industry in the following land-use zones:

- Rural 2 - Landscape Interest
- Rural 3 - Landscape Protection
- Rural 4 - General Farming
- Rural 5 - Resource Conservation
- Rural 6 - General Farming

The Scheme amendment was gazetted on 7 December 1984, and is included in the ERMP at Appendix A. In its submission on the ERMP, the Town Planning Department pointed out that the amendment included in Appendix A varies from the amendment that was actually gazetted.

The gazetted amendment provides for extractive industry in the Rural Zones 2, 3, 4 and 6 'subject to the approval of Council and to the provisions of Council's by-laws relating to Extractive Industry'. The amendment provides for the referral of proposals within the Rural Zones 2 and 3 to DCE and indicates that 'where the comments of that Department are received within 30 days of Council having sent the application to it, Council shall take into account such comments in making its determination.'

For proposals within the Rural Zone 5 (wherein the proposed quarry occurs), the amendment specifies the following requirements:

- . submission of a Notice of Intent;

- . referral of this to the EPA for advice as to whether approval should be granted, or more detailed documentation (ie an ERMP) should be prepared;
- . if advised that the latter is the case, 'Council will as a condition of granting its approval, require the preparation of a satisfactory ERMP'; and
- . 'following receipt of advice from the EPA that the ERMP is satisfactory, the Council shall consider and determine the application.'

Council's 'By-laws relating to Extractive Industry' have also been finalised, being gazetted on 26 October 1984. These provide the detailed mechanisms to control extractive operations within Council's municipal district, and follow a relatively standard format.

The mechanisms to allow extractive industry within the Shire of Toodyay are, therefore, in place. Further, as a Notice of Intent for the project has been submitted to the EPA, and an ERMP has been prepared and is being assessed, the project is, in essence, progressing in accordance with Council's planning requirements. However, the proposal predates these requirements and, as indicated by the following chronology, this position has been reached as the result of lengthy negotiations.

September 1983 - Quarry Industries/Westrail proposal to expand the existing Chris Hill quarry within the Avon Valley National Park was raised. DCE advised the Hon. Minister for the Environment that this would be controversial as it would represent a commercial operation within a National Park.

October 1983 - EPA considered the proposal and advised that it considered that mining in a National Park was not warranted. However, if the proposal was to be further pursued, then the EPA would call for an ERMP.

1 February 1984- Shire of Toodyay forwarded to DCE a copy of a submission to Council for development of a quarry on the Avon Valley site immediately east of the National Park, and advised that an amendment to its Town Planning Scheme to permit extractive industries 'under stringent conditions' was being prepared.

16 February 1984-Westrail forwarded to DCE a Notice of Intent (in letter form) for the Avon Valley quarry.

- 5 April 1984 - EPA was briefed on the Avon Valley proposal and resolved that an ERMP should be prepared for the project, the rationale being:
- . the magnitude of the development;
  - . its duration; and
  - . the environmental issues it raised.
- 22 May 1984 - guidelines for the ERMP were issued by the EPA. These emphasised (at Section 5) the need for rehabilitation of the Chris Hill Quarry to be addressed as part of the ERMP.
- 6 September 1984 - the ERMP for the Avon Valley project was submitted to the EPA and accepted for release for public review (for a two-month period). The ERMP contained a commitment from Westrail to rehabilitate the Chris Hill Quarry in consultation with, and to the satisfaction of, the National Parks Authority.
- 22 September 1984 - commencement of the public review period.

- 26 October 1984 - Shire of Toodyay's by-laws relating to extractive industry gazetted.
- 22 November 1984 - completion of the public review period.
- 7 December 1984 - gazettal of the Shire of Toodyay's T.P.S. amendment relating to extractive industry.

### 3. THE PROPOSAL

The quarry and processing plant would be developed on land owned by the proponent adjacent to the eastern boundary of the Avon National Park and on the southern side of the Avon Valley (Figure 1) some 15 km west of Toodyay town site.

The proposed operation would differ from the existing major hard rock aggregate producers in the Perth region in that the product would be transported by rail from the site to a secondary stockpile and distribution facility at the Kewdale railway terminal. From Kewdale it would be transported to the various metropolitan consumers by road.

Both participants in the venture are significant consumers of crushed rock. Westrail uses the material for railway ballast in both the upgrading and maintenance of the railway network. Quarry Industries currently operates four concrete batching plants to supply the construction industry. It also operates an asphalt plant and is involved in the more general marketing of crushed rock and basic raw materials.

In addition to these existing requirements, the proponent expects to be able to capture a significant section of the crushed rock market in the Perth region currently supplied by the three existing producers. While annual production would be dependent upon the level of market penetration and



growth rate, the proponent anticipates a production level of between 400,000 and 600,000 tonnes per annum.

The quarry would be developed in a conventional manner in a series of stages.

In a conventional quarrying operation, topsoil and vegetation is first removed and either stockpiled for later use or directly re-spread on rehabilitation areas. Next, any weathered material, usually referred to as overburden, is removed and again, re-spread or stockpiled for rehabilitation. The fresh rock is then drilled and explosives are placed to break it to a suitable size for loading into large haul trucks for transport to the crushers. Drilling, blasting and removal is normally carried out on a series of benches at 15 metre vertical intervals. As the quarry progresses further into the valley side, more benches are established. In most hard rock operations, an overall slope of about  $60^{\circ}$  is maintained on the quarry walls, to ensure stability and provide enough space for efficient working on the benches. Less steep slopes are required in overburden or where adverse rock conditions (such as sheer zones) are encountered.

Under conventional quarrying procedures, as individual quarry faces and benches approach their final design limits, they are prepared for rehabilitation. Usually, some form of

final shaping or the formation of extra intermediate benches is required. Special blasting techniques are often employed at this stage to achieve the required landform. In areas to be revegetated, a subgrade of overburden or waste rock is dumped and shaped. Next, major drainage and erosion control work are established. When optimal seasonal conditions occur, top soil is spread over the area and seeding or planting undertaken along with associated activities such as mulching and fertilization. In this way, once the initial quarry workings have been established, it is possible for rehabilitation to become a permanent and ongoing part of the operation, with the top soil and overburden being stripped in front of the working faces and re-spread on rehabilitation areas in a single operation.

In the case of the proposed Avon Valley quarry, the processing plant would be made up of a series of crushers and associated screens linked by conveyors. A surge stockpile would be needed between the primary crusher and subsequent crushing circuits. A range of products would be produced, variations in aggregate size and in size distribution depending upon the enduse requirements. The various product types would be stockpiled by a conveyor system adjacent to the plant site. Product would be recovered from the stockpiles by using a conveyor and recovery tunnel under the stockpiles and loaded into rail cars from a loading

facility over a railway siding that would be constructed between the existing railway and the plant site.

Visual screening and amenity planting would be carried out around the plant site and railway siding at the completion of the construction phase.

The proposed development would require construction of a 22 Kv power transmission line from the existing grid south of the site. The line would be on private land adjacent to the eastern boundary of the National Park. A considerable water supply would be needed for the dust control system.

Initially, this would come from a dam that would be built in a small valley east of the quarry. An access road would be constructed to the site from the existing Shire road at Cobblers Pool, a distance of some 2 km. This road would replace an existing track between the railway and Avon River and would be used as the primary access to the quarry and in the distribution of any product sold locally.

A workshop for maintenance and repair of equipment and a staff amenities facility would be built east of the plant site and would have a domestic water supply and a sewage disposal unit.

The three stages of quarry development outlined in the ERMP would provide sufficient reserves for an operation of

21 years' duration. This time frame has been used for planning and feasibility study purposes, and the various detailed programmes described in the ERMP are also orientated towards an operation of this duration. However, the site contains considerable additional reserves of suitable rock which could enable the operation to continue for 200 to 500 years at projected extraction rates.

However, such a long life would obviously depend upon market and economic viability factors as well as public attitudes and continued local government approvals. These are factors which cannot be predicted over such long time-spans. The Extractive Industry Licence issued by the Shire of Toodyay would be for a finite term and would need to be renewed on a number of occasions in the life of the quarry. (See Recommendation No. 7.)

#### 4. PLANNING CONSIDERATIONS

##### 4.1 Hardrock Quarrying - Historical Perspective

In the past, quarries were sited on the most suitable rock as close as possible to the potential market. The results of this approach are today only too obvious on the Darling Scarp. With more recent developments visual impact has been considered and quarry sites have been chosen where exposure to view from the coastal plain is avoided or where the quarry development can be managed so as to lessen the visual impact through screening bunds, changed orientation of the working faces, and landscaping.

The government and the various agencies concerned with extractive industry have become aware of the need to site extractive industries in suitable locations, and also of the need to protect potential extractive deposits from non-compatible land uses which could lead to their sterilization. There has been a number of planning initiatives in this area in recent years aimed at establishing an integrated approach to planning which would assist in resolving land-use conflicts. Examples of these initiatives are the EPA's System Six Study, the Darling Escarpment Aggregate Resources Committee set up by the then Minister for Urban Development and Town Planning, and the Basic Raw Materials Committee chaired by the Department of Resources

Development. While much remains to be done in the area of long-term planning to adequately manage both material and environmental resources, the situation concerning hard rock reserves in the Perth metropolitan region is fairly well defined.

The existing quarry operators in the escarpment area have control over extensive reserves of suitable rock in areas where approval to quarry has either already been given or is likely to be obtained. Reserves in these categories are sufficient to provide crushed rock for more than 100 years at expected consumption levels.

#### 4.2 The Proposed Quarry - Regional Context

The proposal by Western Quarries has introduced a new concept into the supply of crushed rock for the Perth market which has not previously been considered. This involves the use of a relatively low cost bulk transport link to bring crushed rock from a site further removed from the potential market than would normally be considered viable with road transport. Transport costs make up a very significant percentage of the final cost to the consumer of basic raw materials such as crushed rock. Therefore, provided the cost of rail transport was low enough, and the distribution centre was suitably situated, it could be possible to compete with the scarp-based quarries. However,

there would be additional costs arising from the need to double handle the material and increased capital costs to consider. A distribution centre at Kewdale would not result in any major difference in road freight costs to metropolitan consumers over the existing scarp-based operations. Several of the submissions received on the ERMP question the need for another operator in the crushed rock industry, and query the viability of the proposed operation. While the Authority is normally not concerned with commercial aspects of proposed developments per se, the economic effects of establishing another hard rock quarry could have environmental consequences. The proponent has not shown that there is any basic need for an additional hard rock quarry to service the Perth market. As outlined above, there are adequate long-term reserves in existing and approved quarries and, in fact, at present there is an excess of production capacity installed at existing quarries. The proponent has, however, argued that it has its own requirements for the product which it currently has to obtain from its competitors. The proponent has also put the case that it could capture a portion of the existing market through competitive pricing of its product. This means that the 'need' for the development is based on the commercial considerations of the proponent, and that it is unlikely to lead to any reduction in long-term utilization of existing scarp-based reserves, although it may alter the rate at which they are extracted.

If the proposed venture was highly successful, it could place existing operations under increased economic pressure which, in turn, may lead to the curtailment of the operations, including cutbacks in environmental management and rehabilitation works. In an extreme case, premature closure of an existing operation may result without adequate rehabilitation being completed. The other possibility is that the new operation might not meet the proponent's expectations in terms of viability and be abandoned.

The Authority has, for some time, been concerned with the problem of extractive industry sites which have been abandoned or become non-operational without adequate rehabilitation having been completed. Even in the case of some current sites for which local authorities hold bonds, it is unlikely that there would be sufficient funds available to adequately rehabilitate the sites if abandoned.

In the course of discussions with the proponent, the usefulness of a rehabilitation fund based on a production levy was raised. Such a fund has operated in South Australia for a number of years and, based on its experience in that State, one of the joint venture partners believes it to have been very successful.

The EPA believes that such a fund may be useful in ensuring that rehabilitation of extractive industry sites both



current and abandoned is adequately carried out by the industry. The Authority has had a consultant examine the South Australian scheme and report upon its effectiveness and applicability to Western Australia.

The Authority is concerned at the implications for the overall industry of the introduction of a new operator and quarry. These could be considerable, and have undesirable consequences in terms of reduced rehabilitation. If the Authority's concern was realised, the existing problem of land dereliction through extractive industry sites being abandoned or becoming non-operational without adequate rehabilitation would be worsened.

The information it has received on the South Australian Extractive Areas Rehabilitation Fund has led the Authority to conclude that the introduction of a similar system in this State would contribute significantly towards the attainment of adequate environmental management and rehabilitation practices throughout Western Australia's extractive industry, thereby allaying concerns arising from the introduction of another operator to the industry.

The Authority considers that a centralised rehabilitation fund sustained by a production-based levy should be introduced, but recognises that such a scheme would require considerable consultation between the industry, Government

and other control and licensing agencies, and changes to the various Acts of Parliament which relate to extractive operations.

Consideration of a centralised rehabilitation fund would extend across various areas of both Government and non-government administration and interest. As a consequence, such would require careful co-ordination. The Authority is aware that the Land Resource Policy Council has a brief to examine rehabilitation and landscaping after disturbance by mining, and believes that the matter of a centralised fund could be appropriately dealt with by the Council in conjunction with this brief.

#### *RECOMMENDATION NO. 1*

*Through the Land Resource Policy Council, the Government should undertake an urgent review of the existing situation of extractive industry and examine the most appropriate way of introducing a centralised rehabilitation fund sustained by a production-based levy in W.A.*

#### 4.3 The Avon Valley - Regional Context

The importance of the Avon Valley as a scenic, recreation and conservation resource is reflected in the 'Resource Conservation' Zoning over much of the valley (ie through

the Shire of Toodyay's T.P.S. No. 1) and the System Six 'Red Book' recommendations for expansion of the Walyunga and Avon Valley National Parks, and the planning and management of these areas as regional parks. However, no overall planning framework or co-ordinated development control policies for the Avon Valley, against which major proposals affecting the valley could be assessed, have been formulated. Until such exist, individual proposals will tend to be considered in isolation and, consequently, there is a real risk that the valley's value as a regional resource will be progressively diminished. Particular initiatives directed towards protection and conservation of the Avon Valley are presently lacking, a condition which prevents realisation of its full potential as a regional resource.

However, recent Government initiatives in the areas of land management and planning are likely to be beneficial in terms of providing the broad framework wherein the future of important areas such as the Avon Valley can be more adequately addressed. The report of the Task Force on Land Management in Western Australia highlighted shortcomings in the present system of land management and planning in this State, and has resulted in establishment of the Department of Conservation and Land Management (CALM). The envisaged functions of this new Department have obvious and beneficial implications for areas such as the Avon Valley. The report of the Committee of Inquiry into Statutory Planning in

Western Australia similarly identified deficiencies in the present land-use planning processes, and the recommendations made emphasise the need for an enhanced commitment to regional planning in non-metropolitan areas. Clearly, the existence of an effective regional planning framework is central to any initiative directed towards the protection of an area such as the Avon Valley.

The Avon Valley is currently used for both passive and active recreation. Activity is highly seasonal and usage is focused along the river and valley floor. It also tends to be far more concentrated in areas where road access and extra facilities are provided.

The use of the Avon Valley as the major rail corridor east from Perth has obviously had a detrimental effect on the valley, especially in terms of noise and visual impacts. Agricultural development over the past 150 years in the Avon's very large catchment has dramatically altered the river's salinity, turbidity and flow characteristics. It has also led to the spread of exotic plants along the valley floor.

The Avon Valley is a major regional resource within which human intervention has produced significant and, in some instances, detrimental change. Although the full potential of the Avon Valley as a regional resource has not been

realised, and may not be for a number of years, it is essential to recognise that it will be needed in the future to satisfy needs, demands and expectations arising from the regional community.

Notwithstanding its broad-scale value, co-ordinated planning policies and development control strategies for the Avon Valley have not been formulated. Because of its intrinsic values and the inevitable future demands that will be placed upon its resources, in the absence of such policies and strategies, the land-use planning and management priority for the Avon Valley should be the preservation of future options, rather than a commitment to a long-term activity (such as hard rock quarrying) which could both preclude alternative use of the specific site involved, and constrain activities within, and use of, adjoining areas.

#### 4.4 Conclusions

It is against this complex background that the Authority has assessed the acceptability and overall impact of the proposed quarry. Just as many people question the wisdom of allowing development of the existing Darling Escarpment quarries, future generations may well question any decision to site a quarry in the scenic Avon Valley. The siting of a major long-term extractive industry in the valley will limit future options for the area, especially as a landscape, recreation and conservation resource.

Conflict between such uses and hard rock quarrying is almost inevitable, because rugged, scenic areas frequently contain hard rock resources suitable for quarrying. It is therefore essential to ensure that the adverse effects of quarrying in areas with these intrinsic values be minimised, and this can be achieved in the following ways.

1. Avoiding the proliferation of ad hoc quarry development - the existence of a proper regional context in which to assess specific proposals is an obvious requirement in this regard.
2. Appropriate control of quarrying - once the decision to establish a quarry at a particular site has been taken, thorough and effectively integrated planning, operation and rehabilitation programmes must be ensured, and commitments to excessively long-term or indefinite operations avoided.

With the present proposal, the lack of any regional framework and of the planning instruments to achieve it, are concerns the Authority has already expressed. Nevertheless, if a decision to establish a quarry at the Avon Valley site is to be made it will be necessary to achieve detailed operation, management and rehabilitation programmes that will ensure that the quarry's impact on the valley's regional values, and users of the valley, will be

ameliorated as fully as possible. With regard to the duration of the proposed quarrying operation, it would be unwise for the proponent to assume that community perceptions in the future will allow the quarry to continue indefinitely or for the life of its reserves.

For the proposed quarry to proceed, it will be necessary for the proponent to maintain a very high standard of environmental planning and management, and to accept that there will be constraints imposed upon the manner in which the quarry could be developed and operated. Additionally, because of the inevitable consequences of establishing a hard rock quarry in an area of high intrinsic value like the Avon Valley, it will also be necessary for the proponent to provide appropriate commitments in various directions. Requirements in this regard are identified at various points throughout the Authority's report and unless the necessary commitments are given, the Authority would not favour establishment of the proposed quarry.

#### *RECOMMENDATION NO. 2*

*In the absence of any guiding framework, the Authority is concerned that any decision to proceed with the proposal at this time should ensure that all necessary safeguards are instituted and, therefore, recommends that the proposed quarry should only proceed if:*

- . *all subsequent recommendations in this report are adopted;*
  
- . *all undertakings given in the ERMP are implemented by the proponent; and*
  
- . *the additional commitments required from the proponent are provided in an acceptable and binding form.*

*Where appropriate, commitments should be reflected in any Extractive Industry Licence issued by the Shire of Toodyay.*



## 5. CONTROL OF THE DEVELOPMENT

In WA, extractive industry on private land is subject to control by the local government authority in whose district the site occurs. This is usually achieved through extractive industry by-laws which require the developer to apply for and be issued with a licence before commencing excavation. When issued, the licence specifies the conditions under which the operation can proceed. The licence can be issued for a defined period usually between one and ten years. Renewal is usually dependent upon conditions applied having been satisfied.

Although the licensing is the responsibility of the local government authority, all quarries are also subject to the State Mines Regulations Act and Regulations. This covers areas of operational and public safety, dust control, the use and storage of explosives and certification of certain staff.

Under the existing Shire of Toodyay licence conditions, the proponent would be required to lodge a bond of \$2,000 per ha of area excavated. This can be used by the Shire to complete rehabilitation in the event of the operation being abandoned. While this level of bond may be suitable for small local operations, it is totally unsuitable for a major hard rock quarry. Rehabilitation costs for such an operation will be in the order of \$12,000 to \$15,000 per ha,

while the \$2,000 per ha figure would be appropriate to all non-excavated areas that are disturbed by the operation. This problem faces many local authorities and demonstrates the need for the production-based levy and centralised rehabilitation fund discussed earlier (see Recommendation No. 1). Such a fund could remove the need for bonds to be held, however, as there is no guarantee that such a system will eventuate in WA, the EPA believes that effective interim measures must be implemented.

### *RECOMMENDATION NO. 3*

*The Shire of Toodyay should increase the bond on the area excavated to a minimum of \$12,000 per ha and place a bond of \$2,000 per ha on all remaining disturbed areas until the areas are adequately rehabilitated or a suitable rehabilitation fund is established.*

Perth's existing hard rock quarries are located in urban local government areas where councils have considerable experience with extractive industry, and access to staff resources to ensure that planning and licence conditions are both adequate and adhered to. This proposal will place a new requirement on the Shire of Toodyay which is predominantly rural in character and has no previous experience with large-scale extractive industry. For this reason, the Authority believes that, in the initial stages of the development, it (ie the EPA) should maintain an

involvement to ensure that the proposal is developed according to the agreed plans, and that environmental impacts have been correctly assessed and adequately managed. Accordingly, the Authority believes that there should be a requirement for the proponent to submit periodic progress reports on the operation, these reports to address such matters as:

- . the stage that has been reached in terms of the various operation, management and rehabilitation programmes being implemented;
- . results from monitoring programmes instituted (eg in respect of salt levels in dust suppression water, efficacy of rehabilitation procedures, drainage programmes, etc);
- . modifications to the various programmes that have been implemented in response to monitoring results (particularly in terms of rehabilitation for example); and
- . maintenance programmes that have been instituted (eg regarding the drainage systems, and rehabilitation and landscaping areas).

This listing of matters to be dealt with in the periodic reports is not exhaustive. It merely indicates the type of matters that should be addressed.

*RECOMMENDATION NO. 4*

*The developer should submit an annual environmental report to the Shire of Toodyay outlining the year's progress on environmental and management matters.*

*RECOMMENDATION NO. 5*

*Every three years, the proponent should submit a detailed environmental report to the Shire of Toodyay in which the previous three years' developments are reviewed and the proposed programmes for the forthcoming three years are presented.*

The above reporting requirements have been discussed with, and are acceptable to, the proponent.

*RECOMMENDATION NO. 6*

*The Shire of Toodyay should provide copies of the annual and triennial reports to the EPA for consideration and comment, and where appropriate the licence conditions should be amended to reflect the Authority's advice.*

The EPA believes that there would be considerable merit in the Shire of Toodyay using the three-year review period as the initial licensing period; longer licence periods may be suitable in later years. The proponent believes that a much

longer licence period is justified because of the large capital investment required for the development.

*RECOMMENDATION NO. 7*

*Any initial licence for the proposed quarry should be limited to three years, with consideration being given to longer term approvals once the adequacy of operation, management and rehabilitation programmes has been demonstrated.*

## 6. ENVIRONMENTAL MANAGEMENT

As previously indicated, the Authority believes that thorough and effectively integrated operation, management and rehabilitation programmes would be needed to ensure amelioration of the quarry's impacts. A number of issues will require particular consideration in this context, and these are examined hereunder.

### 6.1 Visibility

Visual impact is usually an important environmental consideration when assessing a quarry site. This is because a visually prominent operation has the potential to affect large numbers of people at considerable distances from the quarry site and can significantly downgrade landscape values. In this case, the deeply incised nature of the valley and its sinuous form will limit visual impact, especially for people who use the valley floor or travel through the valley by train.

The proponent has agreed to modify the conceptual design of the eastern flank of the quarry shown in the ERMP so that more of the natural ridge is retained to improve screening from vantage points east of the quarry. The staged development proposal should ensure that the western margin of the quarry is developed first and rehabilitation

completed before the higher ground to the east is removed, thus further reducing visual impact from the east (see Figure 2 for details).

The quarry will remain highly visible from the north for all of its operational life. This will affect both the valley and most of the catchment of Julimar Brook. This area however has no permanent residents and is not presently used by the public for recreation.

Provided careful attention is given to the landscaping and tree planting, and to the colour of buildings and other structures therein, it should be possible to adequately screen the plant and stockpile area from view by rail passengers and people on the river or valley floor. Special attention will need to be given to preserving as many of the existing trees as possible during the construction phase. New plantings should be strictly limited to existing species or species of compatible colour and form.

#### *RECOMMENDATION NO. 8*

*Throughout the plant and stockpile area of the proposed quarry, special attention should be given to preservation of as much of the existing screening vegetation as possible, and all supplementary planting should be limited to existing species or species of compatible colour and form.*

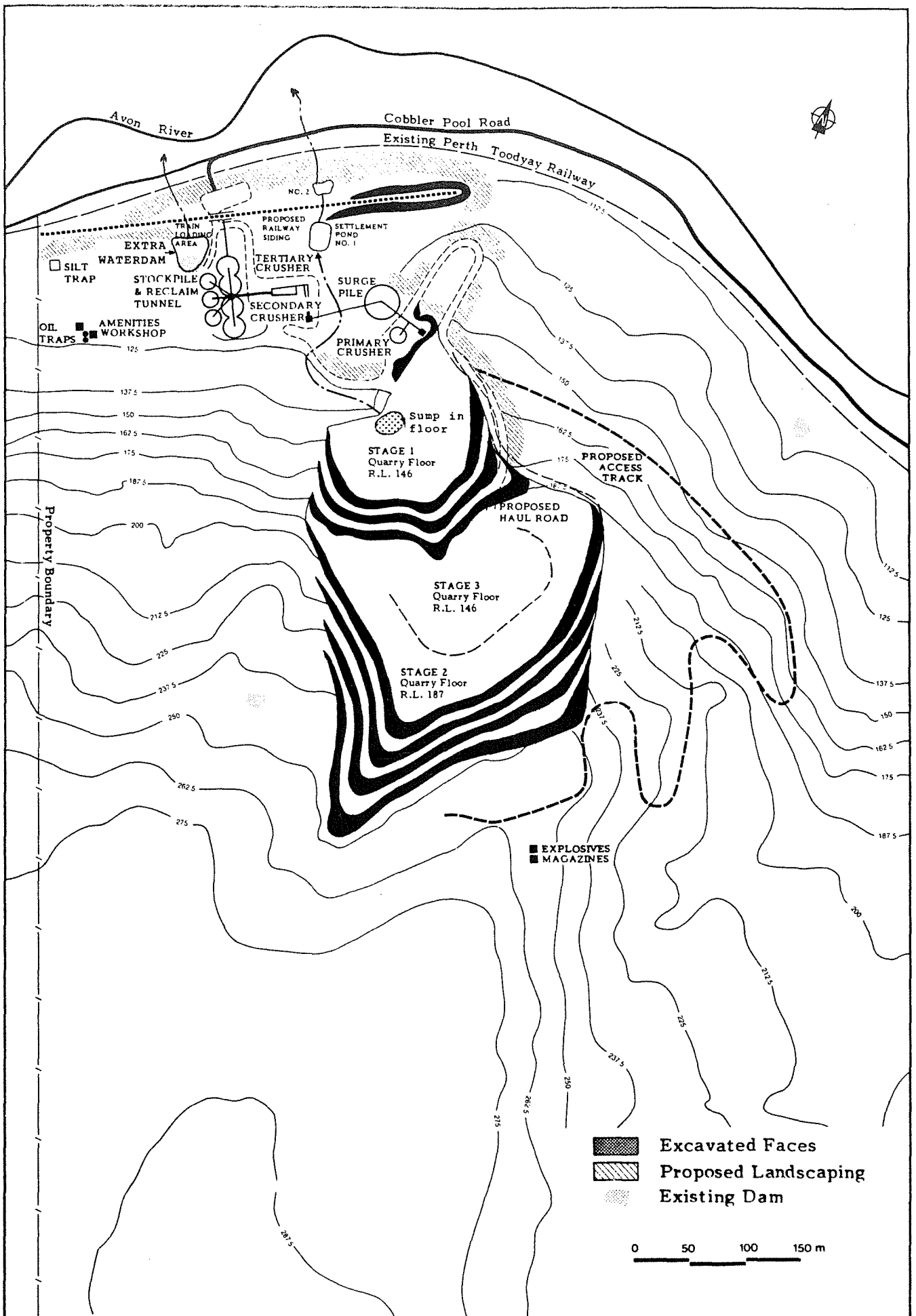


Figure 2

PROPOSED QUARRY DEVELOPMENT AS MODIFIED BY PROPONENT

(Source - Modified Figure 3.1, Western Quarries Pty Ltd, Toodyay Quarry ERMP).



## 6.2 Dust Control

The control of dust in quarries, crushing plants and associated stockpiles and loading facilities is of importance because of the health risk dust poses for workers as well as for the environmental problems it could cause (eg vegetation damage, contamination of water resources, and increased visual prominence). Current methods and technology for dust control are very efficient and are accepted as an integral part of the design and operation of a modern quarry. Dust control is also required under the Clean Air Act and the Mines Regulations Act. Plants must be licensed and are subject to regular inspections.

In this particular case, there have been some doubts expressed as to the adequacy of the proposed dust suppression water supply. The proponent has however supplied additional data which indicate that the supply would be adequate for the first stages of the development at least and has given a commitment to install additional water storage in the plant and quarry areas and maintain an adequate supply at all times. This commitment needs to be formalised.

Because the Avon River is highly saline in the summer and autumn and is reduced to a series of pools with virtually no surface flow, the proponent should not use water from the

Avon for dust control because of the adverse effect the saline water would have on surrounding vegetation and future rehabilitation. There could also be adverse effects on the pools if large volumes were withdrawn.

*RECOMMENDATION NO. 9*

*Water for dust suppression purposes should not be drawn from the Avon River.*

In the longer term, it may be necessary to develop additional water storage dams. This could be done without any significant environmental effects and no other downstream user would be involved. It is not anticipated that there would be salinity problems with the proposed water storage due to the deeply dissected nature of the site and low salt storage capacity of the shallow soils involved. However, it will be necessary to monitor the dam water quality from time to time to ensure that this is the case. Provision should also be made in the dam construction for a bottom discharge pipe so that more saline bottom water can be disposed of to the Avon River if a salt build-up occurs.

*RECOMMENDATION NO. 10*

*The proponent should monitor water quality in the dust suppression water supply dam to ensure that salinity levels*

*do not become unacceptably elevated, and should install a bottom discharge pipe in the dam to enable disposal of saline waters if a salt build-up occurs.*

The proponent will also need to provide a firm commitment to provide alternative water supplies for dust suppression in the event that unacceptably high salt levels occur in on-site supplies.

### 6.3 Drainage

The quarry will result in considerable surface disturbance which will result in soil erosion and increasingly turbid run-off water. There is also the possibility of run off becoming polluted with spilt or waste oil and fuel products. The proposals made in the ERMP are adequate to ensure that any discharges to the Avon will not have any adverse effects. Furthermore, the proponent has agreed to an additional sediment retention dam in the plant area and to install a sump in the floor of the Stage 1 quarry development. Adequate maintenance of oil traps and sediment traps or sumps is important for their continuing efficiency. Provision for the disposal of waste oil and adequate fuel storage facilities need to be addressed in the design detail.

With the additional commitment provided, drainage proposals would be considered adequate. There is, however, a need to formalise the additional undertakings given, and for the proponent to provide a commitment towards monitoring of the drainage systems to be installed, and all such remedial works as may become necessary.

#### 6.4 Rehabilitation

For rehabilitation to be successful and cost effective, it needs to be integrated into the normal operation of the quarry and carried out in a progressive manner, rather than being thought of as an optional extra that can be carried out at the end of the quarry's life. It needs to be considered right from the initial site selection and planning stage.

The proponent has demonstrated an understanding of the need to consider the matter of rehabilitation from the outset, and has put forward a good conceptual plan which will enable an early start to rehabilitation work on the western margin. However, the Authority believes that the rehabilitation proposals included in the ERMP lack an appreciation for the landscape importance of the site. The proposal to rehabilitate for a conservation end land use is acceptable provided the landscape values are also considered. Special consideration will need to be given to the final landform to

be adopted for the worked-out sections of the quarry to ensure that when they are rehabilitated the area will be compatible in form as well as vegetation with the surrounding valley.

*RECOMMENDATION NO. 11*

*Conservation and landscape protection should be the designated end land use for the quarry floor, benches and faces, and other areas of the site disturbed as a result of the quarrying operation.*

The rehabilitation plans given in the ERMP would not fulfill conservation and landscape protection objectives as no attempt has been made to understand or appreciate the existing landforms and vegetation types as they relate to the landscape value of the site. Instead, a simplistic engineering solution to rehabilitation, which would not produce a satisfactory result on this particularly sensitive site, has been provided. The approach taken needs to be far more imaginative and probably needs the involvement of a landscape architect to assist in the design of the final landform to be adopted.

For the site to meet these landscape objectives, rehabilitation would need to recreate large areas of rock outcrop as well as areas with shallow soils and the distinctive heath vegetation typical of the present site.

Tree planting should be restricted to areas where deeper soil profiles can be established and preserved between outcrops. Because of the volume and intensity of run-off that would occur from the rock surfaces, particular attention would need to be given to the control of soil erosion on the steep slopes that would be created. As previously indicated, a review of the detailed rehabilitation programmes proposed would need to be included in the detailed reports submitted for assessment by the EPA (ie in accordance with Recommendation No. 6).

The proponent has acknowledged that the introduced weed Paterson's Curse (Echium plantagineum), which is well established on the site, would need to be controlled and that special attention would be given to preventing it being spread to non-infected areas of the site. Fertilizer usage on rehabilitation areas would need to be strictly controlled as certain types of fertilizer can favour introduced plants at the expense of native species.

#### *RECOMMENDATION NO. 12*

*A regular weed control programme should be maintained in and around the plant area and amenities block (where both agricultural and weed species are well established at present) to prevent weeds being spread to nearby rehabilitation areas and the National Park, or being distributed in the product.*

## 6.5 Noise

Like dust control, noise emissions are the subject of legislative requirements. The Noise Abatement Act 1972 will apply to any noise problems off site, while the Mines Regulation Act Regulations, and Noise Abatement (Hearing Conservation in the Work Place) Act and Regulations 1983 will apply to any on-site noise which could affect employees.

The deeply incised nature of the site could lead to unpredictable noise propagation within the valley especially from blasting. The proponent has, therefore, agreed to undertake monitoring of air blast propagation in the event of any reports of adverse noise impacts and to modify the timing or technique of blasting to prevent such effects. A formal commitment to this needs to be provided.

The possibility of noise having an adverse effect on wildlife was raised in one submission received on the ERMP. However, experience elsewhere has shown that noise from operations such as this do not have any adverse effects on wildlife within the impact zone.

## 7. CHRIS HILL QUARRY REHABILITATION

The rehabilitation of the Westrail Chris Hill Quarry site for re-inclusion in the Avon Valley National Park is considered by the EPA to be a priority. Accordingly, the Authority adopted the position that the current joint venture proposal and rehabilitation of the Westrail Chris Hill site are linked.

Westrail has undertaken to complete the rehabilitation of its existing quarry at Chris Hill one kilometre west of the proposed new quarry. Both the Department of Conservation and Environment and the National Parks Authority (now part of CALM) have attempted to have this environmentally unsuitable quarry formally closed and adequately rehabilitated for some considerable time. Although Westrail has given undertakings on previous occasions, progress to date has been unacceptably slow and the work undertaken far from satisfactory. There are several matters in the Westrail undertaking which the EPA considers to be unsatisfactory especially in relation to the timing of rehabilitation work.

The proponent has advised that all existing ballast stockpiles and material from the spillage area around them could be trucked to the new plant and re-treated to recover



all usable product. This could be done well within 12 months of the new quarry starting operations. The EPA therefore recommends that this be done.

*RECOMMENDATION NO. 13*

*All existing ballast from the Chris Hill stockpile and railway facilities should be removed and rehabilitation earth works completed within 12 months of the proposed quarry plant becoming operational.*

The fines waste dump is another area requiring attention. The dump is unstable and eroding as well as being visually obtrusive. Westrail has claimed that it requires intermittent use of the material for the next 10 years by which time the dump would have been reduced in height and would be suitable for final rehabilitation. The EPA cannot accept this proposition as similar fines waste would be available from the new quarry as soon as it is operational and so there can be no justification for the continued use and retention of the Chris Hill fines dump.

*RECOMMENDATION NO. 14*

*Excess material in the fines waste dump should be removed so that the dump can be re-shaped to an aesthetically acceptable and stable form suitable for revegetation within 12 months of the proposed new quarry becoming operational.*

The proponent is requested to make maximum use of excess fines material from Chris Hill in construction and earthworks associated with the proposed quarry. Any material which cannot be used in this way should be spread as a sub-grade for revegetation work in the Chris Hill Quarry pit. Commitments in these regards are needed.

The current access road to the Chris Hill Quarry and fines dump should be deep ripped and re-contoured and revegetated to prevent any future use for vehicle access to the site. The environmental reports required for the proposed quarry (Recommendations 4 and 5) should include progress reports on the Chris Hill rehabilitation work until it is completed and the area is under the control of the Avon Valley National Park management.

*RECOMMENDATION NO. 15*

*Until such time as the Chris Hill quarry site and ancillary areas revert to the control of the body managing the Avon Valley National Park, the periodic reports to be submitted by the proponent should document progress in the rehabilitation of these areas.*

## 8. THE ERMP AND PUBLIC COMMENT

The EPA considers that the ERMP was well researched and prepared and that all important environmental issues were presented. The document sought to bring individual impacts together in an impact synthesis section as required by the EPA's guidelines.

The ERMP was made available for review on 22 September 1984 for a period of two months. A total of 23 submissions was received. Details of these are given in Appendix A. Three of these were from the existing hard rock quarry operators. All were highly critical of the ERMP section on Project Substantiation and disputed many of the claims made by the proponent on the need for the project and of the economic benefits to be generated. Many of the matters raised are beyond the EPA's responsibilities and it is only where matters have a potential environmental impact that they have been considered. The submissions also raised a number of technical issues which have been considered and, where necessary, additional information has been obtained from the proponent.

The Royal Australian Airforce and Department of Aviation commented on possible interaction with aircraft. The matters raised have been resolved by the parties involved.

Nine State Government departments or agencies made comments on the ERMP on matters in which they had legislative responsibilities or expertise. Many of the issues were of a technical or procedural nature and have either been resolved by the proponent supplying additional information or through further discussions with the agency involved. In some cases, such as rehabilitation of the Chris Hill Quarry, matters raised have been incorporated in the EPA's recommendations.

The Shire of Toodyay made a submission in support of the project, while two adjoining land owners made submissions, one giving qualified support to the project, the other opposing it because of perceived adverse effects on the operation of the existing rural enterprise.

There were two submissions from conservation groups. One questioned drainage and effluent control and the adequacy of the flora and fauna surveys, and the other opposed the project because of its proximity to the National Park. This submission also made a number of comments on environmental management proposals and rehabilitation of the Chris Hill site. The matters raised have been considered by the proponent and in some cases are reflected in the EPA's recommendations.

One submission was received from an individual in which some additional information on place names was supplied, and questions about the maintenance of public roads and the proposed public recreation site were raised.

APPENDIX A - Summary of Submissions Received

List of Names and Addresses of People/Agencies Making Submissions

Total Number of Submissions: 23

Note: Reference numbers of submissions bear no relation to numbers in the summary table of submissions.

- |   |   |
|---|---|
| 1. Bell Basic Industries Ltd<br>136-138 Great Eastern Hwy<br>SOUTH GUILDFORD WA 6055                | 11. Main Roads Department<br>Waterloo Crescent<br>EAST PERTH WA 6006                  |
| 2. Conservation Council of WA Inc<br>794 Hay Street<br>PERTH WA 6000                                | 12. National Parks Authority<br>Hackett Drive<br>NEDLANDS WA 6009                     |
| 3. Department of Aviation<br>CAGA Centre<br>256 Adelaide Tce<br>PERTH WA 6000                       | 13. Pioneer Quarries<br>123 Burswood Road<br>VICTORIA PARK WA 6100                    |
| 4. Department of Local Government<br>Superannuation Building<br>32 St George's Tce<br>PERTH WA 6000 | 14. R.J. Posselt & Co<br>Glenronda Farm<br>Goomalling Road<br>NORTHAM WA 6401         |
| 5. Department of Mines<br>Mineral House<br>66 Adelaide Tce<br>PERTH WA 6000                         | 15. Public Works Department<br>Dumas House<br>2 Havelock Street<br>WEST PERTH WA 6005 |
| 6. Department of Resources<br>Development, "Atrium"<br>170 St George's Tce<br>PERTH WA 6000         | 16. Royal Australian Air<br>Force, Headquarters<br>RAAF Base<br>PEARCE WA 6085        |
| 7. V. Donegan<br>207 Hale Road<br>WEMBLEY DOWNS WA 6019   | 17. Shire of Northam<br>55 Fitzgerald Street<br>NORTHAM WA 6401                       |
| 8. Forests Department<br>50 Hayman Road<br>COMO WA 6152   | 18. Rhonda Sinclair   |
| 9. Health Department<br>60 Beaufort Street<br>PERTH WA 6000   | 19. The Readymix Group<br>1091 Albany Hwy<br>BENTLEY WA 6102                          |
| 10. Health Department<br>Occupational Health Branch<br>57 Murray Street<br>PERTH WA 6000            | 20. Toodyay Naturalists' Club<br>P O Box<br>TOODYAY WA 6566                           |

APPENDIX A (contd)

21. Toodyay Shire Council  
Council Chambers  
Fiennes Street  
TOODYAY WA 6560

23. Western Australian Museum  
Francis Street  
PERTH WA 6000

22. Town Planning Department  
22 St George's Tce  
PERTH WA 6000

## EXPLANATION OF CATEGORIES USED IN SUMMARY OF SUBMISSIONS

- A. Quarry not justified on basis of existing, currently worked stone reserves (including comments relating to expected life of reserves, ballast requirements).
- B. Quarry not justified on basis of location which does not produce any advantage or satisfy any need (including comments relating to the rail journey and double handling which would reduce the price advantage, access to major arterial roads, adjacency to Avon Valley National Park).
- C. An increase in the availability of competitively priced aggregate has not been proven, and so quarry not justified.
- D. Detrimental impact on community (including comments relating to taxpayers subsidising the operation, employees of existing quarries being made redundant, local area being unable to provide skilled workers and specialized goods and services).
- E. Time scale not clearly stated in ERMP.
- F. Additional information required on the existing environment (quality and reserves of granite, extent of surface weathering, overburden thickness, slope stability, rare plants and animals, aboriginal sites).
- G. Fire risk assessment (including comments relating to implications for the Avon Valley Fire Management Plan, inspection by officers of the Bush Fires Board, increased fire risk for the Avon Valley National Park, and need for increased hazard reduction burns in the National Park).
- H. Water requirements for dust suppression (including comments relating to the proposed storage dam, projected daily demands, yield from catchment area and other water sources unreliable over summer, impact of the diversion of water from Mortingup Brook).
- I. Noise and airblast levels (including comments relating to inadequacies of the buffer zones between Toodyay and the proposed quarry, and the National Park and the proposed quarry, more definitive statements required on anticipated levels, need for a monitoring programme, suspension of blasting on weekends and public holidays and when unfavourable atmospheric conditions occur, correction of noise levels for special characteristics).
- J. Hydrological effects of proposed quarry (including comments relating to superficial information in the ERMP, impact on drainage systems affected by impounding run-off, potential impact on Mortingup Brook of drawing water from it, overburden character and depth).



- K. Location of the power line in relation to its potential for erosion and as a source of wildfire ignition.
- L. Effluent discharge and waste management not considered in ERMP (including comments relating to maintenance workshops, plant refuelling, prevention of pollution).
- M. Rehabilitation procedures (including comments relating to adequate depth of top soil and overburden, stockpiling, rehabilitation of quarry floor, specification of species, aesthetic objectives, weed proliferation, existing situation at Chris Hill Quarry, negotiations between Westrail and the National Parks Authority).
- N. Pit batter slopes (60<sup>0</sup>) need to be made secure (hazard to bushwalkers and fauna) by erecting a windrow or rock wall barrier.
- O. Impact of quarry on aircraft, river users, rail traffic, bushwalkers and picnickers (including comments relating to noise, flyrock, dust).
- P. Impact of quarry on Avon Valley National Park (including comments relating to fire hazard, noise, light spill, dust, restriction of operating hours to mitigate impacts).
- Q. Impact of quarry on agricultural amenity (including comments relating to dust contamination of stock water and sheep fleeces, vibration from blasting disturbing stock and damaging concrete water tanks, decreased property values).
- R. No legally binding obligation on the proponent to abide by commitments given in the ERMP.
- S. Other (includes comments on subjects not dealt with by the EPA, and letters acknowledging that the ERMP has been viewed, but no comment made).
- T. The proposal is supported (including comments relating to minimal impact on the environment, economic advantage).