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ecologia Environment
1025 Wellington Street
WEST PERTH WA 6005
Phone: 08 9322 1944
Fax: 08 9322 1599
Email: garry.connell@ecologia.com.au
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1.0 Responses to Submissions

A total of 14 submissions were received in response to the Grange Resources Limited (Grange) Southdown Magnetite Proposal (EPA Assessment No. 1596) Public Environmental Review. From these submissions, 123 individual comments/questions were identified. Grange has collated the responses received and responded to the submissions in this document. As many of the answers are of a similar nature, questions/statements that have a similar answer have been grouped together. These have then been categorised into chapters (based on the theme of the question/statement).

Questions have been coded according to submission number (see table below) and the number of the question within the submission. For example, the second question in the Department of Health Submission (7) is coded as 7.2.

A copy of all submissions have been included on the data CD at the back of this document.

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Grange has responded to each question raised via the submissions. Through the responses, Grange aims to provide submitters with the most accurate information that is available at this stage of development and design of the Southdown Magnetite Proposal.

Grange would like to extend their appreciation to all groups that chose to forward a submission to the Western Australian Government as part of this environmental approvals process.
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2.0 Environmental Impact Assessment

2.1 Environmental Approvals Process

10.3, 5.6 The Department of Water is responsible for implementation of the Country Areas Supply Act, Water and Rivers Commission Act and Waterways Conservation Act. DEC is not responsible for implementation of these Acts as shown in the PER.

Grange Resources acknowledges that the DoW is responsible for implementation of the Country Areas Supply Act, Water and Rivers Commission Act and Waterways Conservation Act.

2.2 Principles of Environmental Protection

13.1 The project area will disturb approximately 1590ha of rural land, including 253ha of remnant vegetation in an area that has been described as a world biodiversity hotspot. It is thus vital that the values for which it was so described are not lost.

Grange Resources is committed to adopting all practicable measures to avoid unacceptable environmental consequences, and is confident that this can be achieved. The high conservation significance of the vegetation in the region has been recognised throughout project planning and has been demonstrated through measures such as; minimisation of the project footprint through backfilling the mine void, selection of a pipeline alignment to avoid impacts to remnant vegetation where possible and the preservation of a minimum of 30 ha of remnant vegetation on the mine site (Figure 9.2).

Grange is also developing an offset package in consultation with DEC that includes:

- rehabilitation or restoration of an existing degraded ecosystem to re-establish biodiversity corridors and preserve vegetation units represented at the mine site;
- purchasing and/or covenanting vegetation for conservation estate; and
- collection of genetic resources from areas to be cleared to be used for rehabilitation.

9.11 The cumulative impact should be evaluated having regard to sustainability principles as well as an appraisal of risks, safeguards and contingencies.

The Public Environmental Review examines the environmental implications associated with the construction and operation of the mine site, pipeline and port infrastructure associated with the Southdown Magnetite Proposal. The environmental objective of the Project’s design is to address the sustainability principled through implementing the following approach, in order of priority, to:

- Completely avoid the impact if possible.
- Substitute with a lesser impact.
- Include rehabilitation and engineering solutions to reduce the degree and risk of impact.
- Design operational controls and emergency response around reduction of impact consequences.
• Provide primary environmental offsets for the impact.

Additional infrastructure and potential impacts associated with the proposal, such as the upgrading of power lines in the south west, dredging and land reclamation at the port, and land sales and housing to accommodate Albany’s growing population are not included in this assessment.

3.0 Stakeholder Engagement

3.1 Peer Review Process

5.8 Table 3.1 (pg 33) Peer Review for Project Investigations. No reviewers are nominated for Mine Site and Pipeline Flora Surveys. Does the proponent propose to have these documents peer reviewed? If so the nominated person(s) should be included in the table or the reference to these surveys removed. If not, information on this decision should be included.

Flora surveys conducted for the Southdown Magnetite Proposal have not been peer reviewed, however, these surveys have been conducted in consultation with the DEC at both state and regional levels, and in compliance with the EPA Guidance Statement No. 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (2004).
4.0 Project Justification

1.1 The potential impacts and problems seem to very much outweigh any benefits. Impacts to the ecological system will certainly upset all mammals, birds, insects and wildflowers.

Extensive flora and fauna surveys have been undertaken for the assessment of the environmental values of the region. Grange is in continued consultation with relevant government agencies to determine appropriate environmental conditions and an offset package for the proposal. The aim of the offset package will be to achieve a net benefit to the environment as a result of the project being implemented.

The potential environmental impacts associated with the project will be managed as outlined in the PER document, with a series of supporting management plans to ensure impacts are minimised.

3.1, 3.30 The Conservation Council questions the assumption that this project is needed for the economic health of Albany. Albany is currently undergoing a boom time through tourism, agricultural revival, wine growing and the export of plantation timber. Albany’s reputation is built on its natural beauty and rural scenery.

Further industrialization of Albany and associated loss of visual amenity, both at the foreshore and through even greater pressure to convert more remnant bush and quality farmland to housing will threaten these other industries. This project may result in further population growth in Albany. Increased need for housing is already impacting on environmentally sensitive areas (such as the remnant vegetation near the Kalgan River). The mine will also place further pressure on the ability of existing industry to source skilled employees. In a sustainability analysis these factors must be considered but are not by the proponent.

Whilst Albany is currently experiencing strong economic and employment growth this has not always been the trend. As the first mining project of this size for the Great Southern region, the Southdown Magnetite mine and associated port operations will assist to further diversify Albany’s economy and provide financial and social benefits for the area through long term employment, infrastructure and flow-on effect to the non-mining sector.

It is anticipated the project work force will be sourced predominantly from existing residents in the Albany area and Great Southern region. It is also anticipated that the Southdown Magnetite mine will allow local workers currently employed in the mining industry elsewhere to gain employment without a fly-in-flyout roster. The City of Albany and the DPI have procedures in place for selecting and releasing land for housing, and as such, this issue has not been addressed in the PER scope.

12.1 As the mining and export operations are inextricably linked, the submitter believes it is pertinent that the proponents are made aware that other factors that may influence the long-term viability of their preferred sea port location, such as the State Infrastructure Strategy 2006; Rainbow 2000 – a Regional Planning Strategy for Albany and the Great Southern.

This comment and the attached documentation has been reviewed and noted.
4.1 Evaluation of Alternatives

2.6 The mine should go ahead leaving the two large areas of native vegetation intact, the ore pelletised at the mine site, transported to Albany Port by truck, the pellets stockpiled on an existing part of the port and exported in ships with a draft of 11.5 m or less. This is one option that would preserve the most viable native vegetation areas at the mine site, minimise dust and not require reclamation or dredging. Admittedly this option puts the environment first but given the challenge of making the environmental impact footprint smaller I am sure Grange Resources can come up with creative ways to make a profit.

A large portion of the ore body is located directly below the largest remnant vegetation block on the mine site (as shown in Figure 2.2 and Figure 2.4 of the PER), and therefore most if it needs to be cleared for mining to proceed. However, Grange has committed to retaining 30 ha of this block that is not within the mine pit footprint. The second remnant native vegetation block is located adjacent to the pit area and within the area identified for waste rock storage. There is insufficient space on the mining tenements to site the waste dump if the second remnant native vegetation block is to be avoided.

The concept of pelletising the magnetite concentrate at the mine or elsewhere near Albany port has been considered by Grange. Construction and operation of the pellet plant at the mine site is not feasible due to the lack of access to natural gas (via a pipeline from Bunbury) which is used in the pelletisation process. Alternative fuels used by pellet plants include diesel fuel or coal (the nearest source being Collie) but neither of these options are considered viable due to the costs of the fuel itself and for road transport.

Road haulage of the pellets or magnetite concentrate would significantly increase the number of heavy vehicles traversing the City of Albany to an unacceptable level (~240 road trains/day) resulting in increased noise in residential areas and increasing the accident risk to other road users and pedestrians.

Locating a suitable size iron ore pellet or concentrate stockpile within the existing land area at the Albany port is not possible. All unoccupied land is earmarked for future port expansion by other port users. Accordingly additional land is needed to accommodate a covered storage shed for the iron ore product to be exported.

Whilst the project is sub-economic if Cape size vessels are not used for the transport of iron ore, the matter of land reclamation and dredging are not within the scope of this assessment. The potential impacts from dredging and land reclamation are addressed in the Albany Port Authority Albany Port Expansion Proposal PER (EPA Assessment No 1594) and the associated Dredge and Land Reclamation Management Plan.

9.9 The siting and design of infrastructure (including roads; camp site layouts; proposed pipelines; and port berths) should consider the potential impacts on the foreshore reserve as well as upon the surrounding marine and terrestrial environments.

Siting and design objectives for the proposed Port berth and any land reclamation areas should have regard not only to environmental impacts but also to security/safety; visibility; tidal influences; storm surge; safe passage of vessels; loading capacities; and construction phasing/staging posts.
Location and placement of infrastructure has been developed by mining, mechanical and port engineers with full consideration of operational requirements, safety, visual and environmental requirements. The aim of design work has been to achieve the least environmental impact wherever possible.

2.2 Reclamation of Princess Royal Harbour will cause the further degradation of the waterway. In my opinion the Albany Port Authority is biased as far as reclamation is concerned as it allows the authority to create further land for its operations and ultimately create more revenue. The proposal is pro reclamation for these very reasons. Other options not covered in the proposal need to be considered. The only operations that should be in the port area are those that stockpile and export, CBH, the wood chip industry and silica sands. Summit Fertiliser, Vital Foods etc should be in the Down Road light industrial area. Summit Fertiliser would most likely be there if the Albany City Council were part of the approval process. In my opinion the port should consider relocating these businesses to Down Road making space available for Grange Resources, and load ships with a draft of 11.5 m using berth 6. This is just one option I am confident there are number of others that would become possible with the relocation of non-export businesses. I simply think not enough lateral thinking has been put into avoiding reclamation and dredging. I am opposed to dredging the harbour entrance and King George Sound for environmental reasons however if this does go ahead the excess dredged material must be disposed of on land usefully for example why to replace sand that has been eroded from Emu Point? My limited reading in this area suggests that it has becoming increasingly unacceptable to dump dredged material in the ocean (Riddell, 2000). Why does the Albany Port believe it is acceptable?

The matter of non-export orientated businesses using port land is not within the control of Grange and as such has not been considered as a possible solution. Overall there is a shortage of available land at Albany port.

The alternatives considered for the placement of the Grange port infrastructure are outlined in the Albany Port Expansion PER (EPA Assessment Number 1594). Expansion of existing facilities will result in the smallest possible impact to the environment along with lower operation and maintenance costs for the Port and its users. Land reclamation is consistent with the existing foreshore, and locating the new berth next to an existing industrial area will result in a smaller overall environmental footprint.

Cape size vessels are required for the economically viable export of magnetite. Smaller vessels can be berthed at the Albany Port, however, have a lower carrying capacity requiring more frequent trips. The environmental cost of using smaller ships includes increased fuel usage, extra greenhouse gas emissions and increased vessel passage through King George Sound.

A portion of the dredge material (~5%) will be used for land reclamation, with the remainder dumped at a deep water offshore disposal site. It is not possible for all the remaining dredged material to be dumped onshore due to the quantity (and in some cases the nature) of the material to be dredged. The Albany Port Authority has applied for a Federal ‘Sea Dumping Permit’ through the Department of Environment and Water Resources (DEWR).
The potential impacts from dredging and land reclamation are addressed in the Albany Port Authority Albany Port Expansion Proposal PER (EPA Assessment No 1594) and the associated Dredge and Land Reclamation Management Plan.
5.0 Project Description

5.1 Mining Operations

5.1.1 Tenure and Zoning

9.1, 9.10 Environmental Planning Context: DPI’s project screening submission under the Integrated Project Approvals System identified the need for more information on:

- Community infrastructure in line with PDD guide criteria;

The Southdown Magnetite Proposal will not impact on terrestrial sites of high public interest. The infrastructure associated with the supply of additional housing in Albany and Wellstead and power supply for the mine site are not within the PER scope, and are being addressed by City of Albany and Western Power Networks respectively.

- Port infrastructure, particularly integration with existing facilities & its operational management;

Grange is liaising closely with the Albany Port Authority regarding integration and requirements for the Grange infrastructure at the Albany Port.

- Transport in line with the Transport Assessment Guidelines;

The Southdown Magnetite Proposal is not anticipated to significantly impact traffic volume in the Albany area. Accordingly a Transport Assessment has not been completed as part of the PER process. Grange will liaise closely with the City of Albany and Main Roads Department on road transport and road safety matters during implementation of the project.

- Zoning & conveyancing of reclaimed lands;

Zoning and conveyancing of the reclaimed land will be undertaken in consultation with the DPI and City of Albany by the Albany Port Authority as part of the Albany Port Expansion Proposal (EPA Assessment No 1594).

- Subdivision siting and design;

Urban subdivision requirements are not planned by Grange and are outside the scope of this assessment.

- Land title requirements and in particular crown land transactions; and

Land tenure and zoning has been addressed in Section 5.1.2 of the PER.

- Local government engagement.

Grange has, and will continue to liaise and consult with relevant local government agencies at all stages of planning and development.

These points along with current WAPC’s planning policies and bulletins should be appraised. Relevant WAPC environmental planning publications include:

- State Planning Policy No:2.6 – State Coastal Planning
- State Planning Policy No:2.9 – Water Resources
- State Planning Policy No:3 - Urban Growth & Settlement
• State Planning Policy No:4.1 – State Industrial Buffer
• Planning Bulletin 64 – Acid Sulphate Soils
• Planning Bulletins 55 & 71 - Subdivision
• General, Residential and Rural development control policies
• Liveable Neighbourhoods for subdivisions and any new off-site workforce accommodations
• Any other relevant regional and/or local environmental planning strategies or structure plans – Refer to DPI’s Albany Office.

The Planning Bulletin 64 – Acid Sulphate Soils has been addressed in Section 8.2 of the PER. The remainder of these planning issues do not form part of the PER scope, however, these Planning Bulletins and Policies will be addressed where appropriate through the DPI, WAPC and local government authority.

Approvals may be required under the Jetties Act and Shipping & Pilotage Act as well as the Marine & Harbours Act (if DPI decided to use it for leasing the port sea bed). Areas to be declared as a port and/or maritime areas over which exclusivity is proposed for security reasons must be identified.

Grange and the Albany Port Authority acknowledge that these approvals may be required, however, these planning issues do not come under the scope of the original environmental impact assessment for the Southdown Magnetite PER. Grange and the Albany Port Authority will liaise directly with the DPI to ensure these issues are adequately addressed.

5.1.2 Waste Rock Management

3.8 Waste Characterisation: It is not clear if the PAF materials in the ore body have been mapped during drilling of the ore body. This should have occurred, or else the proponent should re-drill the site to ensure that the distribution and volumes of PAF are known prior to any mining occurring.

The geology of Southdown is well understood and has been interpreted and modelled in three dimensions. All drill holes were fully logged and sampled throughout the mineralised zone including waste material. The logged drill core provides accurate information on the presence or absence of acid generating minerals, such as pyrite, but this does not correlate directly with the net acid producing potential of the rock. More than 1500 samples were analysed to assess rock geochemistry. Some areas of significant sulphur content have been identified. The non-mineralised host rock is quartz feldspar gneiss and contains insignificant concentrations of sulphur. Host rock geochemistry was routinely tested across the deposit to check for isolated sulphur inclusions.

Three stages of geochemical work have been undertaken for the Southdown Magnetite Mine:

Stage 1 was a scoping study that included static acid base accounting and metal leaching potential test of five low sulphur tailings samples and 88 waste rock samples from 13 major lithological units, covering 188m of drill core.
The Stage 2 scope of work included an additional 220 samples covering another 1150 m of core, analysed using acid base accounting methods to increase the understanding of the distribution of lithological units within the pit that may contribute to acid mine drainage. Under the Stage 2 scope of work kinetic leach tests were commenced and continue on Type 2, Type 4 and PAF tailings slimes. These tests are scheduled to reach completion in March 2008 after 20 leaching events that are being conducted over 20 months.

The Stage 3 scope of work, which is scheduled to commence in June 2007, includes additional kinetic leach tests on fresh, transition and weathered oxide waste types, the Pallinup formation, high sulphur-containing tailings and the coarse fraction of low sulphur tailings. The kinetic leach tests under this scope of work are investigating, at a laboratory scale, the potential of using co-disposal of low sulphur tailings combined with PAF waste rock to reduce the potential for AMD to occur. This scope of work is also testing the use of accelerated oxidation and treatment to manage high sulphur containing tailings.

It would be possible to create a waste rock block model using the existing data set of the total sulphur percentage (total S%), logged lithology and data from the various stages of geochemical testing.

6.8 Acid Rock Drainage: One issue that still needs to be addressed is developing a management strategy for the most sulphidic component of the waste stream. As this material contains in the order of 12% sulphur mostly in potentially very highly reactive pyrrhotite, the kinetic behaviour of this material on exposure to oxygen needs to be assessed to ensure it is managed sufficiently quickly to prevent oxidation, and to enable the long-term leachate quality from this material to be predicted with a higher level of confidence.

To date, potential leachate quality from waste rock and tailings has only been assessed for a limited range of metals that are mobilised in acidic drainage. However, there are a number of other metals and metalloids of environmental concern often associated with iron-skarl type mineral deposits which have not currently been tested. Many of these including vanadium, molybdenum, selenium and uranium (from a chemical toxicity, not a radiological point of view) are mobile under neutral or alkaline conditions and have the potential to adversely affect the health of wildlife that may access the final pit void water body. It is recommended that existing geochemical data for the mineral deposit are assessed and additional leaching trials are carried out if necessary to ensure that the full range of toxicants that could be leached from waste rock at the site is addressed and managed.

Grange acknowledges that a management plan will be required for all material types and that detailed plans will be required for materials that are identified with elevated total S %.

From the Stage 1 assessment, it was determined that the Type 2 and Type 4 lithological units are potentially acid forming and are likely to contribute to acid mine drainage. The kinetic behaviour of the Type 2, Type 4 and tailings waste is currently being assessed by Golder using kinetic leach tests under the Stage 2 scope of work. It is important to understand that these units represent approximately 1% of the deposit and as such represent a very small tonnage of material (~250,000 tonnes) to be managed each year.

The data from the Stage 2 kinetic tests has confirmed that the rate of acid generation in the Type 2 and Type 4 materials is rapid. The data suggests that under operational conditions it
is likely that the onset of acid generation would occur in these lithological units before they can be encapsulated. Golder is conducting kinetic leach tests to determine whether the onset of acid generation can be reduced or controlled in these highly reactive potentially acid forming materials using the addition of lime as CaCO$_3$ and Ca(OH)$_2$. The data has shown that, under the conditions of the laboratory scale kinetic leach test, acid generation can be controlled to a point using this approach that is;

- After nine leaching events neutral pH (pH 7.3) is being maintained in the Type 4, material that has been treated with lime, whereas the untreated column has a pH of < 3.6.

In the Type 2 untreated material the pH has always been < 4, whereas the lime-treated material has been maintaining neutral pH. The data shows that after nine leaching events the capacity of the lime to continue to neutralise acidity is being reduced and the leachate in the treated material is now just below pH 6. This has important implications for the management of these waste types and demonstrates that the onset of acid mine drainage may be able to be controlled for a period of time that is long enough for sustainable management solutions to be implemented on site.

Under the Stage 3, scope of work Golder is using kinetic leach tests to assess potential management solutions for controlling acid mine drainage from the Type 2 and Type 4 waste rocks.

These solutions include assessing the effects of the co-disposal of Type 2 and Type 4 potentially acid forming waste with tailings that has had its acid neutralising capacity increased through the addition of lime. It is anticipated that this approach could reduce the need for large amounts of lime to be used to control the onset of acid mine drainage in high sulphur waste. This approach may also provide, in part, improved solutions to the long term management of high sulphur waste.

Under an approved Stage 3 scope of work, the kinetic behaviour of tailings with elevated sulphur and oxide, transition and fresh waste rock is also being assessed using kinetic leach tests.

Grange acknowledges that the analysis of leachate should include a full range of elements. Under the Stage 1 assessment, static leach test were conducted and a limited range of elements was assessed, as this assessment was a pre-screening scan for the major metals. However, under the Stage 2 work, where kinetic leach tests are being used, a full range of metals (initially 49 metals) in addition to major ions, pH, EC alkalinity and acidity are being analysed on the leachate from Type 2, Type 4 and tailings. This same range of elements and parameters will be assessed during subsequent stages of work that have recently commenced on mineralised waste, oxide waste, fresh waste, Pallinup formation and coarse tailings.

4.3 The proposal talks about restricting movement of groundwater within the tailing material, both during operation and post closure. Backfill should not become a barrier to groundwater movement. Provisions are required to allow groundwater flow from north of the mine site to the south. They may install PVC pipes at different depths so that deep and shallow aquifers continue to flow.

The above ground tailings storage facility (TSF) will store dry-stacked tailings at relatively low moisture contents. These tailings will be compacted and contoured/shaped to shed
rainfall run-off into collection drains. Only a limited area will be open for tailings deposition, leaving other areas either undeveloped or covered with compacted inert waste. All these will assist with the restriction of water movement into and through the tailings. Therefore, it is likely that the surface TSF will not interfere with either near surface or deep aquifers.

Pit backfill for tailings is restricted to the upper 75 m. Below this level, would be high permeability waste rock. The top of the tailings backfill would also be waste rock. Containment berms constructed with waste rock and oriented across the pit at several locations along its length would provide means of water flow across the pit (north to south) at the backfilled tailings level. However there are no aquifers actually cut by the pit although there is some water inflow from fracturing around the fault zones.

5.1.3 Tailings Storage

3.5 The tailings storage plans seem to be preliminary. Whilst the use of pit backfill in this case appears to be a sensible option in terms of post mining visual amenity and rehabilitation, the implications for potential acid and metalliferous drainage into groundwater needs to be fully understood by appropriate modelling such that a full assessment of potential impacts can be made.

The issue is complicated by the lack of any acid reducing neutralising material available in the waste with which to line the waste dump or tailings facility.

As the proposal currently stands there is no way the EPA or the community can assess the risk to the environment from the PAF tailings.

Deferring this issue to a management plan is not an acceptable solution. Recent events at Esperance Port should be enough of a warning about the danger of deferring key unaddressed project issues to future management plans.

History has shown that some mines, had they adequately considered AMD issues, would never have been opened from both an environmental and an economic perspective. Deferring critical issues to a management plan removes the option of avoiding unacceptable impacts altogether by rejecting the project.

Results from the Stage 2 Kinetic test work indicate that the bulk of tailings (approx 263.5 Mt) are non-acid forming, maintaining near neutral pH after nine leachings.

The TSF plans are of a preliminary level. Golder is waiting on results of geochemical testwork to indicate the level of management required for the tailings to satisfy the environmental requirements. While geochemical pit lake modelling is outside of the geochemical scope of work, Golder acknowledges the importance of appropriate modelling. In order to commence any geochemical modelling of the pit for the operational period or post closure, a significant amount of data is required, which includes but is not limited to hydrological, limnological, geochemical and biological studies. The kinetic geochemical data that is required for input to the modelling codes is currently being collected by Golder.

The intention is to compact the tailings to limit the amount of water and oxygen ingress to the tailings, thereby limiting its capacity to oxidise. By depositing the tailings into discrete
cells, small areas can be progressively and sequentially filled, compacted, and then covered, further restricting tailings oxidation.

The Stage 1 assessments confirm that there is limited acid consuming material in the waste rock. However, some of the waste rock does have a capacity to neutralise acid and may have the potential to be mined for exclusive use as construction material for managing potentially acid forming waste.

The Stage 2 kinetic tests also indicate that the tailings, which are classified as potentially acid forming under a standard static assessment, have in fact maintained neutral conditions for the first nine leaching events conducted monthly. This is likely to be due to the low sulphur content of the tailings 0.7% total S, the fine grained nature of the tailings and the inherent acid neutralising capacity in the tailings.

Under a Stage 3 scope of work, Golder is using kinetic leach tests to test the applicability of using co-disposal of tailings and waste rock at a laboratory scale to reduce the potential for acid mine drainage from potentially acid forming waste.

In the absence of geochemical testwork results, we have proposed what the design should achieve. Once the results are available, further design work can be completed. The management plan is only being proposed until the time when the geochemical testwork yields results that can be used to assess the level of tailings management required.

3.7 Sulphur Rich Tailings: The nature of the magnetite production process appears to produce very concentrated acid forming tailings yet there is no defined management procedure for these tailings. A range of options is presented but the implications of each of these are not explored and a preferred option is not offered. No management commitments are made around this issue.

Options using a supposedly impermeable liner are not supported as these are not long term solutions and present a risk of a “time bomb” scenario where a plume of built up pollution may be released.

Deferring this issue to a management plan is not an acceptable solution. Recent events at Esperance Port should be enough of a warning about the danger of deferring key unaddressed project issues to future management plans.

The Conservation Council recognizes that a higher than normal level of planning has gone into the tailings storage for this project; however, also points out that this project has a higher than usual level of risk associated with it. This is both because of the nature of the materials and the environmentally sensitive location and because of the fact that it is the first magnetite mine that has been assessed by the WA EPA.

Reverse flotation will produce a relatively small amount (approximately 250,000 tonnes per annum, or 5 Mt total) of high sulphur floats containing 12% sulphur. These high-S tailings will be managed separately from the bulk of the tailings which are non-acid forming. The nature of the high-S tailings and the level of acidity that would be produced upon its oxidation have not yet been confirmed. This work is scheduled to commence in June 2007 when these material types are available. As a result, the options presented are only very preliminary.
Once geochemical testwork is conducted on this material, an indication of the management requirements can then be made.

3.4, 5.9 Sourcing of Lime: The proponent plans to use lime for the neutralisation of sulphuric acid produced during production, for neutralization of acidic tailings and for neutralisation of slurry before transportation in the pipeline. Increasingly the mining of lime (for agricultural and industrial purposes) is impacting on sensitive coastal environments. The impacts of sourcing this lime as well as the environmental implications of transporting substantial quantities of lime should be considered as an important part of this proposal.

The quantity of lime to be utilised by the project each year is estimated to be approximately 100,000 tonnes. Such quantities will be sourced from an existing lime supplier in the area and delivered to site by normal road transport methods. It is not anticipated that quantities of lime required each year and the road transport thereof will have any significant environmental implications.

The bulk of the limestone required by the project will be for the neutralisation of the high sulphur tailings. The neutralisation of the slurry prior to transportation in the pipeline is estimated to require approximately 640 tonnes per annum of lime and if the pipeline is lined neutralisation may not be required prior to transport.

The management plan for the neutralisation of the acid tailings and estimates of annual usage of limestone can not be finalised until the results of the Stage 3 geochemical test work on the tailings and waste rock has been completed. The results of the Stage 1 and Stage 2 test work indicate that some of the waste rock does have some capacity to neutralise acid and may have potential to be used in the management of potentially acid forming waste. This is being investigated as part of the ongoing geochemical test work programme. Consequently the requirement for limestone may be less than the current estimate of 100,000 tonnes per annum.

The company will also be investigating potential uses of the potentially acid forming tailings including the sale of the material to appropriate businesses that produce or require sulphuric acid.

3.9 Rehabilitation of Fine Tailings: The minerals sands industry has struggled for many years to integrate the fines from minerals sands processing into rehabilitation because the fines tend to dry and crack like clay and creating a hostile environment for plant growth. It appears from the proposal that this problem may also exist for the fines from Magnetite processing and may be complicated further by acid forming chemicals.

The Council is concerned that this issue has not been considered and may result either in considerably greater land being required for treatment of the tailings before backfill, or else failure of large trees in the rehabilitation.

The tailings being proposed for rehabilitation is the total tailings stream, ranging from gravel down to silt/clay size. This well-graded material will be unlikely to crack from desiccation. The use of the tailings fines only is not being proposed.
3.6 Acidic Pit Lake: The potential to have a highly acidic pit lake following closure is of concern and if this is likely to be a reality then the implications of this lake for the terrestrial environment (water and fauna) and groundwater need to be considered.

Although the development of a pit lake model is not part of the geochemical scope of work at present, we understand that these issues should be addressed.

The data obtained from the geochemical assessment of waste will provide some of the data inputs that are required for a predictive surface / ground water geochemical model.

Golder has commenced six kinetic leach tests on three material types. Golder also proposes to conduct another eight kinetic leach tests on soil and rock from within the pit and from the material types that are likely to constitute some of the final pit lake wall materials at closure. The data from kinetic leach tests such as these will be the focus of any geochemical inputs for a pit lake model.

During mining operations, the monitoring programme will provide information about the water inflows and quality in the pit. We cannot, as yet, assess whether or not the post-closure pit lake would be acidic. However, there are neither water courses nor significant aquifers in the vicinity of the proposed open pit that could be impacted. In addition, evaporation significantly exceeds rainfall in the region and hence, provided there are no other water inflows into the pit after closure, it is unlikely that the pit lake will overflow.

5.10 There is no information on management strategies to deter fauna from accessing acid tailings storage areas (pg 59). Information addressing this issue is required.

It is anticipated that the tailings product will be dewatered for storage as a solid product (13% moisture), posing little threat to fauna.

5.2 Pipelines

5.2.1 Pipeline Route and Construction

3.10 Pipeline Alignment: Pipeline alignment in the approach to the City of Albany has not been finalized. These basic issues that affect the community and environmental impacts of the project need to be finalized before the PER process.

The majority of the pipeline route presented in the PER has been finalised. Some sections of the route are still being negotiated with the land holders or government agencies, however these sections are not traversing, or adjacent to any sensitive sites that are not already disclosed in the PER.

10.4 Under the Waterways Conservation Act, the construction of the pipeline within Princess Royal Harbour, and on its foreshore, will require approval from the DoW. A license would be required for any reclamation or dredging. The 0.425 ha of reclamation would need a license under this Act.

Licences and approval from the DoW for reclamation along the foreshore will be obtained as required.
10.5 It has been suggested the reclamation would be used as means of enhancing access along the shoreline in the areas proposed. This is not mentioned in the document.

The project provides potential opportunity for enhancement of the Albany foreshore area via the construction of a dual-use cycle/pedestrian path. Grange is in ongoing dialogue with the City of Albany to discuss suitable options however no firm commitment has been reached at this time. For this reason it was not mentioned in the PER document.

3.13 Pipeline Reclamation: The source of rock armour and fill for the reclamation area has not been stated. What are the impacts of (presumably) quarrying for this material? These may be significant for increasingly threatened remnant bush in the Albany area.

The source of rock armour will most likely be the same as per the reclamation in the port. Firstly the existing rock armour will be recovered and re-used. Additional material will be obtained as required from established sources close to Albany. Such suppliers are independent of Grange and operate within their own approved operating licences which cover such matters as clearing of remnant vegetation.

10.6 The reclamation is unlikely to have direct impacts on seagrass, but the refraction of wave action may lead to loss of seagrass in the near shore environment. Any such loss would need to be addressed in the environmental offset policy. This can be applied through implementation of the Waterways Conservation Act’s licensing powers (a no net loss of seagrass is used by the DoW in its application of the Act in the Albany harbours).

The reclamation associated with the pipeline will not have direct impacts on seagrasses in Princess Royal Harbour as there are no seagrasses within the reclamation or construction footprint. Refraction of wave action is also unlikely to change from current conditions due to the alignment of the reclamation parallel to the existing seawall & shore line. Nonetheless Grange will conduct monitoring of seagrass in the vicinity of the pipeline reclamation route during construction as required.

The potential impacts from dredging and the 9.0ha land reclamation are addressed in the Albany Port Authority Albany Port Expansion Proposal PER (EPA Assessment No 1594) and the associated Dredge and Land Reclamation Management Plan.

5.20, 3.11 Horizontal Direct Drilling: In areas where the water table is above the base of the pipeline trench excavation, and where conventional trenching techniques would be inappropriate, horizontal directional drilling may be used for pipeline installation (Technical Appendix 13.18 pg 21). DEC supports this approach and recommends that these areas be identified in the Pipeline Construction and Operation Environmental Management Plan.

The proponent should also commit to HHD underneath the Point Melville Reserve. It is not acceptable to propose an option that is acceptable to the community in the PER with a proviso that would allow the proponent to avoid this commitment.

The final Pipeline Construction and Operation Environmental Management Plan will identify areas requiring special construction techniques such as HDD. A geotechnical
survey of the Point Melville Reserve will need to be completed before the ultimate construction technique can be finalised.

3.12 King and Kalgan River Crossings: The King and Kalgan River’s are important environmentally and also to the local community. The river crossing method and its impact must be included in the public environmental review.

River crossing methods are described within the PER (Section 5.2.6 p71). Under current plans the King River will be crossed by means of a pipe bridge whilst crossing the Kalgan River will be by open trenching techniques.

5.2.2 Pipeline Monitoring and Accident Response

3.14 The Conservation Council has been advised (from an informal source) that there are serious implications for a magnetite slurry pipeline if it is shut down, such as potential for the slurry to dry like concrete in the pipeline. If this is true it would have implications for the commitment that the pipeline would be shutdown immediately in the case of a leak.

The commitment to put a containment line around the pipeline immediately following a leak is also questioned without further information. The pipeline is over 100km long and it would take some time to mobilize a bulldozer. Does the company have agreements with farmers along the pipeline who have the appropriate machinery to rapidly respond to a breach? How much material would be lost from the pipeline in the expected response time?

It is accepted that a breach is unlikely; however, the implications should be understood, especially for potential breaches in sensitive areas, such as at river crossings.

The transport of iron ore and other minerals as slurry is an economical and environmentally sustainable technique which is widely used throughout the world.

The design work for the pipeline was undertaken by one of the world’s leading experts in the design and operation of slurry pipelines. The comments in the PER are based on their study and accumulated experience.

The pipelines will be subjected to real time monitoring systems so any rupturing of the pipelines will be immediately identified for response. Shutting the pipeline down would involve ceasing to pump the slurry, rather than emptying the pipeline. It is highly unlikely, therefore that the wet slurry would dry in the pipeline. If the pipeline did breach, the nature of the material (fine magnetite particles in water) and the depth of the buried pipeline would result in a localised accumulation of magnetite around the pipeline.

An immediate response to the location of any rupture would occur and then appropriate repair procedures implemented. Wherever possible, the spilt magnetite would be recovered and returned to the mine for reprocessing. As magnetite is an inert mineral with no harmful properties any slurry spilt into a water course should not adversely affect aquatic life.

The project management will maintain a database, and regular contact with all landowners along the route of the pipelines to ensure effecting a timely response in the unlikely event of...
a pipeline rupturing. It is highly unlikely that farmers would be tasked in the first instance to assist in any major way in pipeline repair activities.

5.3 Port Infrastructure and Process

13.3 Port Reclamation: We are concerned with possible impacts on the marine environment of the nine hectares of land to be reclaimed for the project at Albany Port. The seagrass in Princess Royal Harbour and King George’s Sound have been affected historically by fertilizer and other nutrient run off. Any plans need to ensure that there are no further impacts on the marine environment.

Management and offsets for potential seagrass losses associated with the land reclamation area do not form part of the Southdown Magnetite Proposal PER. The potential impacts from dredging and land reclamation are addressed in the Albany Port Authority Albany Port Expansion Proposal PER (EPA Assessment No 1594) and the associated Dredge and Land Reclamation Management Plan.

6.11 It is recommended that the proposal to use the dredge spoil as construction material should be done only after extensive testing as similar spoil from the Peel Estuary has been found to contain substantial amounts of pyrite and stored actual acidity in the form of soluble secondary iron sulphate minerals such as jarosite.

Dredging and land reclamation in King George Sound and Princess Royal Harbour do not form part of the Southdown Magnetite Proposal PER. The Albany Port Authority Albany Port Expansion Proposal PER (EPA Assessment No 1594) presents data regarding marine sediment characteristics. The marine and port engineers have undertaken extensive sediment analysis to ensure dredge material used in the land reclamation will be structurally stable and not acid forming.

3.29 Losses of seagrass, turbidity, dumping of spoils and other marine impacts have not been considered in this document. These are all potentially significant impacts.

Impacts include potential to impact on marine animals of conservation significance that utilize the King George Sound, including cetaceans, seals and sea lions. It is likely that a number of other marine fauna of significance could be impacted by lost seagrass beds, increased shipping and turbidity.

The use of a deep water spoil location does not imply a lack of environmental values; in fact the deepwater sponge diversity off WA’s south coast is impressive.

Potential marine impacts from dredging and land reclamation in King George Sound and Princess Royal Harbour do not form part of the Southdown Magnetite Proposal PER. Losses of seagrass, turbidity, dumping of dredge material and other marine impacts have been addressed in the Albany Port Authority Albany Port Expansion Proposal PER (EPA Assessment No 1594).

5.4 Ancillary Infrastructure

5.4.1 Power Supply

3.15 The environmental implications of the connection to the SWIS are not discussed. These may be significant for:
• Remnant vegetation;

• Visual amenity in the important tourism area around the Stirling Ranges.

Given that this issue has already caused some controversy it is a significant oversight and the Council questions how this EIA process can be further advanced without addressing this issue as a part of the PER process.

The supply of power for the operation of the Southdown mine site is not within the scope of the Southdown Magnetite Proposal PER. The upgrading of the South West Integrated System by Western Power Networks is subject to a separate approval process being undertaken by them. Impacts on remnant vegetation and visual amenity will be considered within that approvals process.

4.4 Information could be sought from Western Power on the availability of alternative power supply sources for meeting the 550 GWh pa demand at the mine site. Time frames may preclude the use of alternative supply strategies for this project.

Grange has been working closely with Western Power Networks on transmission line solutions for the project since March 2005.

Grange undertook a power supply study in February 2005 to determine the most cost effective power solution for the project. It was found that access to the South West Interconnected System would provide the project with cheap and reliable power however a transmission line would be needed to the site. Grange commissioned Western Power Networks to undertake a network systems study in mid-2005 to determine the best network solution for the project. Connection into the South West Interconnected System via a 220kV transmission line from Muja was determined by Western Power Networks through this study to be the best solution.

Following this advice Grange asked Western Power Networks to secure an alignment for a 220kV transmission line to Southdown. Since mid-2006 Western Power Networks has been consulting with the community on a number of transmission line routes to service the project. This work is ongoing with one solution being referred recently to the EPA for approval.

Grange is also considering a staged development of the mine in the first few (2-5) years which would reduce the overall power demand initially to about half of the full 550GWh pa. A staged development would allow alternative network solutions to be considered and these are being fully explored with Western Power Networks at the present moment. Western Power Networks plans to construct a new transmission line to Albany by 2011/12 at which point Grange could expand its operations to full production.

A supplementary power supply strategy based around renewable energy generation in the Albany area is also being investigated with biomass and wind solutions being explored with a number of potential generators. Regardless of their location, all of these possible solutions will need network access to the South West Interconnected System via a transmission line between Southdown and the connection point. This network access is required to allow back-up power to be provided when output from renewable generators is low.
5.5 Workforce

7.7 The DOH supports Grange’s proposal to implement a local employment policy and the requirement for professional positions to reside in the Great Southern region. This should have extended benefits to families and potentially reduce the disruption, stress and other adverse impacts that can arise from key family members being absent from home for extended periods of time.

This comment has been noted.

9.6 Suggest Sections 5.5 be revised to appraise workforce accommodations outside of the mine site which may require local planning approval. The siting, design and phasing of physical and human infrastructure support for workforce accommodations should be considered up front rather than later.

The City of Albany together with other government agencies at the local level has been consulted on planning issues that will arise from the Southdown Project. At this stage there are no rezoning requirements for an accommodation village to be established adjacent to the existing Wellstead community as such a facility can fit within the existing zoning plans for the community.

The construction phase of the project will see a temporary accommodation village established on the mine-site. It is intended that this village will also service the needs of the project in the initial operational phase until a more permanent village is established at Wellstead. The scale of this permanent village will not be defined fully until full workforce planning has been completed.

3.17, 7.1 Submitters advise that recognition and implementation of the DOH regulatory requirements for the provision of public facilities for an on-site camp for workers (Workforce page 39) should be further addressed by Grange Resources. It is presumed that the mine camp, to be built under a separate permit from the City of Albany, will not impact further on remnant vegetation.

The mine camp will be constructed on cleared land. Grange acknowledges that the mine camp will be subject to the DOH regulatory requirements. This will be addressed through the site works approval application for the facilities operating licence.

7.4 The Australian Drinking Water Guidelines (2004) (Section 8.6.2) have been identified but no detail to address its requirements for potable water for workers has been provided

Total potable water requirements have not been finalised, however Grange is considering a number of potable water supply options and is working with Water Corporation on this matter. A study of potable water supply solutions for the accommodation village at Wellstead will be undertake in co-operation with Water Corporation in the near future. The ultimate potable water solution for the accommodation village at Wellstead will most likely also provide potable water for the greater Wellstead community and the mine-site potable water requirements.
6.0 Environmental Sustainability and Offsets

5.3 The proponent should commence development of an offsets package in consultation with DEC, based on the following considerations:

- Using the model adopted in the EPA approval of the Ravensthorpe Nickel Operation, also in the South Coast region, a positive environmental rehabilitation ratio, of native vegetation rehabilitated versus native vegetation cleared, of at least 1.4:1 should apply. Suitable areas and design considerations for rehabilitation should be discussed with DEC.

- Acquisition of land for the purpose of a contributing offset should be “like for like or better” and result in a positive environmental ratio of land cleared versus land acquired.

- Potential land acquisitions should be discussed with and agreed to by DEC prior to inclusion in the offset package.

- Areas acquired for long-term conservation as a contributing offset should be transferred directly to the State of Western Australia for inclusion in the public conservation estate.

The offset package outlined in the PER will be developed at a regional level in consultation with local catchment groups, DOW and the DEC. Grange will then hold discussions with relevant regulators through ODAC to finalize the offset package. Discussions will include selection of vegetation blocks for preservation, environmental corridors for restoration and the total area to be rehabilitated.

5.4, 10.2 The use of the environmental offset policy is supported. This policy is applied through use of Primary and Secondary offsets relating to vegetation. No mention is made of impacts or loss of wetlands – a point that was made by the DoW on the draft PER. In view of the apparent high significance of the remnant vegetation and vegetation units impacted by the proposal in the local and regional context, the proponent is encouraged to commence the development of a suitable offset package in consultation with the Department. It is recommended that a plan be developed to spatially show the application of the offset policy, with the objective of achieving a net environmental benefit for the conservation of biodiversity in the region. The revegetation of similar or greater areas than those cleared, in key strategic locations, in consultation with local catchment groups and Department of Agriculture, DEC and DOW is recommended. It is felt that mention of only DEC in regards to application of this policy is inappropriate given the integrated NRM issues involved.

Grange will develop an appropriate offset package in consultation with local catchment groups, DoW and the DEC to ensure an integrated approach to Natural Resource Management issues is applied.

3.23 Fauna: The high diversity of fauna recorded, and the presence of a number of species of conservation significance suggests this site is important to fauna. The potential for any offset sites, should these be required by the proposal going ahead, to house these fauna will also be important to determine. The significance of pine
plantations at the proposed mine site to cockatoos for feeding should also be assessed and offset or managed if necessary.

The offset package outlined in the PER will be developed further in consultation with local catchment groups and the DEC. Vegetation blocks of similar vegetation to the mine site vegetation and containing fauna habitat will be selected as offsets where possible.

Rehabilitation of the mine site will include re-establishment of feeding habitat for Carnaby’s Black Cockatoo.
7.0 Project Environment and Potential Environmental Impacts and Management

7.1 Management Plans

14.4 There are several commitments made as to management plans. We request that these all be made publicly available and also that each one is covered by a legally enforceable condition. We would expect to see these details outlined in the EPA Bulletin including any proposed bond levels.

All approved Management Plans for the Project will be publicly available on the Grange website (www.grangeresources.com.au). The Management Plans will be enforceable through ministerial conditions in the EPA Bulletin.

5.21 Native vegetation rehabilitation at the mine site is proposed to be addressed in the Threatened Flora and Conservation Management Plan (pg 321). The rehabilitation prescriptions should address the following:

- Soil Management and Landform Construction
- Vegetation Establishment Program
- Monitoring and Research Program
- Recalcitrant Species Program
- Progressive Re-vegetation
- Completion Criteria


7.2 Potential Environmental Impacts and Management, Commitment 4 (Section 8) should indicate that the Environmental Management Plan will also cover closure activities

Closure activities have been addressed in the Southdown Magnetite Proposal Conceptual Mine Closure Plan. This plan has been developed and will be finalized 24 months prior to closure in consultation with DEC and DoIR as outlined in Commitment 42 and 43 of the PER.

10.1 It is noted many of the environmental issues will be addressed through later management plans. Of particular interest to the DoW would be the Construction EMP, Acid Rock Drainage MP, Surface Water MP, and Groundwater MP. The DoW would ask that it be a stakeholder in the preparation of these plans, particularly the surface water plan.

The DoW has been included as a stakeholder and will be consulted in the preparation of project management plans.
5.5 Project Construction Environmental Management Plan: The recommendations presented in Section 8 of Technical Appendix 13.9, to reduce the impact of the project on fauna, should be included in the detailed Project Construction and Operation Environmental Management Plan.

Uncommon and unreserved vegetation was recorded along the pipeline route and important conservation values are present in many of the wetlands traversed by the pipeline route (Technical Appendix 13.8 pg 95). The recommendations presented in Section 8 of Technical Appendix 13.8, to reduce the impact of the project on sites of high conservation significance along the pipeline route, should be included in the detailed Project Construction Environmental Management Plan.

In order to reduce the impacts of clearing at the Fuller Road reserve, the proposed pipeline should be constructed within, or adjacent to the existing driveway or the previously cleared strip connecting the formed roadway to the adjacent paddock, and be immediately rehabilitated. This procedure should be detailed in the Project Construction Environmental Management Plan and include detailed maps indicating minimised trench widths in areas where the trench traverses native vegetation.

The recommendations presented in Technical Appendix 13.10, to reduce the impact of the project on SRE fauna species, should be included in the detailed Project Construction Environmental Management Plan.

A staged approach to clearing native vegetation is recommended to provide opportunities for displaced fauna to recolonise.

Wherever appropriate, recommendations and details presented in the technical appendices relevant to construction will be included in the Construction Environmental Management Plan and the Pipeline Construction and Operation Environmental Management Plan. As a principle, clearing of remnant vegetation for construction will be kept to a minimum.

The Project Operation Environment Management Plan will be developed prior to commencement of operations.

7.2 Soils

14.3 We note the pipeline passes through areas of high risk of acid sulphate soils. Should the project proceed the EPA should see that an environmental bond of sufficient magnitude is imposed. This should be done under the Environmental Protection Act as the Department of Industry and Resources has a history of imposing bonds which are likely to be less than 25% of the estimated remediation cost. This is clearly unacceptable in a high risk area. In any case the remediation should also be the subject of a legally enforceable ministerial condition.

The Southdown Magnetite Proposal; including the mining tenements and the pipeline easement are subject to the Mining Act 1978 and the bond condition setting of that Act.

6.10 The proponents should seek to minimise soil disturbance and dewatering at all sites where the proposed pipeline crosses rivers and wetlands, not just those mapped as being of ‘high risk’ on the acid sulphate soil risk maps. The preferred method of
laying the pipeline in these areas is via one of the trenchless technologies rather than trenching and dewatering.

Detailed soil testing will be conducted in areas identified to be of high acid sulphate soil risk (not just those identified on soil risk maps) before construction to aid in construction planning.

Dewatering can be minimised through using HDD, or conducting creek crossings during summer where possible. Construction methods at sensitive sites will be finalised after the geotechnical work for the pipeline has been finalised. Construction methods to minimise impacts to sensitive sites including areas adjacent to remnant vegetation and potential acid sulphate soils will be detailed in the Pipeline Construction and Operation Management Plan.

3.25 The important issue of acid sulphate soils should not be relegated to a management plan. This issue could have unacceptable impacts on the King River, Kalgan River and the marine environment. At the very least drilling around these key areas should have been carried out. Options for river crossings that minimize the potential for acid sulphate soils should have been examined to reduce the impact on the river.

Deferece to an acid sulphate soils management plan is not an acceptable response from the proponent for a potentially critical issue. The community and the EPA need to have an opportunity to assess and comment on these issues. This cannot happen when the issue is deferred to a management plan. Such deference should only be allowed for very minor and routine issues with low potential impacts.

To minimise disturbance along the pipeline route, a targeted acid sulphate soil survey will be conducted as part of the geotechnical testing of the pipeline route for construction purposes. Sampling and analysis will be undertaken in compliance with ‘Identification and Investigation of Acid Sulphate Soils (DoE, 2004) and the Acid Sulphate Soils Planning Bulletin No. 64 (WAPC, 2004).

Field data on soil profiles and pH at the sampling sites will be collected, with samples submitted for laboratory analysis to determine the existing and potential acidity of the soil. Should laboratory results indicate high risk associated with disturbance of soils along the pipeline route, a detailed investigation will be conducted. This will involve mapping of acid sulphate soil, determining concentrations of sulphide material present and, the depth of sulphide materials and groundwater in the vicinity of sensitive sites. This information will be used to plan construction methods suitable for the ground conditions.

Site specific Acid Sulphate Soil Management Plans will be developed as required in consultation with DEC. These plans will be developed as part of the Pipeline Construction and Operation Management Plan (PER Technical Appendix 13.18) to address site specific soil characteristics of high risk acid sulphate soils. Management plans will include management of dewatering activities (if required), and outline contingency measures to demonstrate that disturbance of acid sulphate soils in the vicinity of sensitive sites along the pipeline route will be adequately managed.
7.3 Contaminated Sites

Based on the information provided in the PER, it is understood that there will be disturbance of an existing contaminated site during installation of the pipeline corridor for the project. The PER identifies this site as “Location 9 Rail Depot” and proposes that a “Phase 2A Intrusive Investigation” is conducted in this area. From the Figure provided (Figure 6.7 of the PER), it appears that this site may be within the ‘Albany Waterfront Development’ project. The Albany Waterfront Development project has been assessed by the EPA (EPA Bulletin 1241). Detailed contamination investigations and management plans have already been developed for the Albany Waterfront Development project. It is recommended that the proponents for the Albany Waterfront Development Project liaise with the proponents for the Albany Waterfront Development project in relation to contamination issues at this site.

Alternatively, it is recommended that site investigations are carried out in this area according to the DEC Contaminated Site guidelines, and any contaminated soil is managed appropriately.

The DEC has not yet been provided with a copy of the Phase 2A Intrusive Investigation or the Phase 2B Intrusive Investigation so cannot yet comment on these reports.

It should be noted that, in accordance with Regulations 31(1)(c) of the Contaminated Sites Regulations, 2006, any further reports regarding contamination investigations prepared as part of the PER process or to comply with any future Ministerial Conditions for this project will need to be accompanied by a contaminated sites auditor’s report.

Site investigations have been carried out in this area in compliance with the DEC Contaminated Site guidelines. Results of the Phase I Site Investigation were included in the PER (Technical Appendix 13.6). A Phase 2A Site Investigation of “Location 9 Rail Depot” has been carried out since the submission of the PER. The contaminated site report was released to the EPA on 29th May 2007 for consideration and is available for downloading from Grange’s website.

Grange have had limited access to Albany Waterfront development contaminated sites survey data.

7.3 The second objective in the Contaminated Sites, Management Objectives (Section 8.4) should also include protection of the public. There may also need to be flow-on changes to other parts of the PER where this issue objective is listed.

The first reference in the Applicable Standards and Guidelines (Section 8.4.2) to contaminated sites should refer to the Contaminated Sites Regulation 2006. This correction and associated guidance should also be appropriately designated elsewhere in the PER.

All excavation and construction associated with the pipeline will comply with applicable regulations and standards. In addition, where the pipeline transects ‘Location 9 Rail Depot’, excavation will be confined to 1 m to 2 m width, and 1.5 m to 2 m depth. Excavated contaminated material will be remediated on site or removed to a land fill site and the area
backfilled with clean fill. The area will be wet down as required to minimise dust, and an exclusion zone will be demarcated. Access to the excavation and construction site will not be granted to the public to prevent exposure to compounds of concern.

Grange acknowledges the *Contaminated Sites Regulation 2006* and will comply with this legislation as required.

### 7.4 Hydrogeology

4.1 Monitoring and evaluation of the impact on groundwater levels and quality have not been considered. Monitoring and evaluation needs to become an integral part of the process. This raises questions such as; what would be the impact of the process on small but important water resources in Wellstead?

It has been assumed that the Pallinup siltstone has low hydraulic conductivity. This is not the case around the mine site. Spongolite and coarse material are likely to overlay the ore body. These materials have high hydraulic conductivities. Storage of water over these areas may cause high recharge rates.

Groundwater salinity increases with depth, and salinity of the deep groundwater aquifer is higher than the shallow aquifer. The report needs to describe the preventative methods to avoid contaminating the shallow aquifer with saltier water from depth.

Figure 8.2 shows that dewatering may reduce groundwater levels in an area up to 1000 m away from the mine site. This figure may be underestimated. Werillup Formation to the south and to the north of the ore have high hydraulic conductivity. Dewatering will increase hydraulic gradient. The present rates of groundwater flow (1 m per day) will increase under high hydraulic gradient and conductivity. The areas impacted by the process will be much more than the proposed area.

Grange agrees that monitoring and evaluation need to become an integral part of the process. Golder has undertaken a comprehensive hydrological study of the site which included hydraulic testing and the installation of several groundwater monitoring bores. These bores are being monitored on a monthly basis to collect background groundwater quality data, which will be used for future groundwater monitoring purposes. The results of the study were also used to develop a groundwater monitoring programme for the site, which will be modified as additional data is collected prior to development. Groundwater levels and quality will be monitored throughout the mining operations to identify potential impacts, which can then be addressed.

Extensive hydraulic testing has been carried out in all of the formations, including the Pallinup Formation and spongolite. The results of this testing program have been used by Golder to develop the groundwater model. Some formations have medium hydraulic conductivity and these have been considered in the numerical groundwater model.

Any impacted water, including dewatering water, which may or may not contain higher salinity concentrations, will be pumped into the Impacted Water Storage Facility. This facility will be designed to minimise seepage into the environment.
The numerical groundwater model considered all the water-bearing formations that might be intercepted during mining, including the Werriup Formation, which we agree has a higher hydraulic conductivity compared to the bedrock. The numerical groundwater model also considered increasing hydraulic gradients as mining develops. All of these factors and others (such as the impacts of preferential pathways along fracture zones) have been incorporated into the model to derive the drawdown cone around the proposed open pit.

### 7.5 Water Harvesting and Supply

3.3 The decision to source harvest production water from the pit supported by the Conservation Council. It is considered that sourcing water from the Werriup Formation has potential to pose significant and difficult to predict risks given the current (preliminary) knowledge of this aquifer. A separate approval process and assessment for this source must be required if insufficient water is able to be sourced at site.

This comment has been noted. If groundwater from the Werriup Formation would be required to meet water requirements, a separate study will be compiled discussing the potential impacts.

6.9, 10.7 Dewatering and Groundwater Flow: Although the overall hydraulic conductivity of host rock for the mineral deposit is low, the area is structurally complex with extensive shearing and there are likely to be preferred flow paths for underground flow which have a much higher permeability than the bulk rock. Groundwater flow modelling of fractured rock environments such as this is much less reliable than modelling uniform porous medium aquifers. Due to the higher level of uncertainty, a contingency plan for water supply and measures to cover the possibility that the groundwater flow system does not behave as predicted should be prepared (in consultation with the DEC and DoW). Although it is likely that any contaminants generated by dewatering will eventually flow back to the pit void, how will this be assessed and what will be done if this is found not to be the case?

The hydrogeological investigation indicated that, even though the geology is structurally complex, most of the structures have since been healed and are practically impermeable. However, some open fractures have been identified which may transmit groundwater. These higher permeability fracture systems, related to fault zones, have been incorporated in the numerical model.

A groundwater monitoring programme will be put in place to measure groundwater inflow rates. The impacts of marginally higher than predicted groundwater inflow rates are considered beneficial to the project, since these groundwater inflows will be used for processing, resulting in less reliance on additional water sources.

3.16 The detailed water supply has only accounted for 87%-93% of the required water supply for the mine. Given that rainfall is generally declining in the region it is likely that the use of historical data in the modelling may have led to an overestimate.

The proposal to source a significant amount of additional water, up to 13% of the project requirement, from adjacent catchments or groundwater with no assessment of the impact on these areas is not acceptable. Water is an increasingly important issue both for environmental flows and human use. It is of great interest to the community.
and the company should be required to address its entire water consumption prior in the PER.

Grange acknowledges that available information indicates that pit dewatering and water harvesting from the mine site cannot supply 100% of the make up water requirements for the project. Grange is assessing other sources of water for the project including water harvesting from adjacent catchments, groundwater and treated waste water from the Albany waste water treatment facility. Subsequent to the completion of the PER document Golder has completed a study on the potential for harvesting rainfall run-off from catchments adjacent to the Southdown site. Golders have also developed a strategy to provide a reliable water supply for the Southdown Project based on the currently known resources of water that could be available to the project.

Following discussions with the Water Corporation about the possible use of the waste water from the Albany waste water treatment facility an option agreement has been signed. The agreement provides Grange with access to a minimum of 5,000 kilolitres per day of water which represents two thirds of the total required for the project. Grange believes the use of the waste water would be of significant benefit to both the Albany community and the project.

4.5 The extraction of almost 3 GL per annum for process water may impact on local groundwater systems. This has been shown in results of studies in a water balance model, which provides some evidence that it is sustainable. We are not sure of the function of the process water and how much is actually used. Is it a valid assumption that the process water is largely recycled than an actual annual consumption of 3 GL of water?

Considerable effort has been made in the processing design to recycle as much water as possible (for example, the dry tailings process and recycling of water back from Albany port). However, some water losses are unavoidable (losses to water entrained in tailings and moisture losses through the exported product) and the 2.7 GL/year is the make-up water required to account for the water losses.

5.11 Section 5.4.2 Water Supply (pg 90) states “non-impacted water that meets environmental criteria may be discharged off-site”. There is no information on what these criteria are or descriptions of the receiving environment. The environmental impact of this action requires assessment.

The water management strategy has been modified since the submission of the PER. Adequate storage capacity will now be allowed for in the non-impacted water storage facility to retain a 1:100 year 72 hour duration storm event, in addition to the water requirements for day-to-day operations. Off-site discharge, therefore would not be required.

7.5 Mosquito management strategies have been identified however DOH would like to reinforce the need to ensure these are developed for application during initial construction stages as well as during ongoing operations.

Mosquito management strategies will be applied throughout the Southdown Magnetite Project.
7.6 Vegetation and Flora

7.6.1 Vegetation

5.1 Conservation significance of mine site remnant vegetation and vegetation units: Information presented to date confirms that areas of vegetation on the mine site described as being in good to excellent condition are considered to be of very high conservation significance in a regional context. The very high conservation significance of the remnant vegetation at the mine site that is proposed to be cleared should be taken into account in the evaluation of this proposal.

DEC is unable to provide a complete assessment of the conservation significance of the vegetation units or plant assemblages mapped in the project area because a comprehensive regional dataset on the ecological values and current extent, distribution and condition of these assemblages in the region does not exist.

In October 2006 the proponent undertook a further field reconnaissance survey of relevant nature reserves and other remnant bushland (beyond the immediate footprint of the Southdown Magnetite project) on the Pallinup Sandplain between the Kalgan and Pallinup Rivers, south of the Stirling Ranges. Information from this survey has not yet been provided to the Department, however this report should clarify the regional distribution of vegetation units, provide information to support a better understanding of the significance of plant assemblages of the mine site and pipeline route in the regional context, and facilitate evaluation of the potential impacts of the proposal on their conservation status. The report may also provide information that could support recommendations as to whether any of the vegetation units should be considered for listing as Priority or Threatened Ecological Communities.

The Southdown Magnetite Proposal Regional Flora and Vegetation Survey report has been completed and submitted to the DEC for review.

5.12 The Albany Hinterland Vegetation Inventory (referred to on pg 125 of the PER) is considered to be a very coarse level data reference source, particularly in relation to vegetation type descriptions. The paucity of reliable data on vegetation communities east of Albany and in the Wellstead area should be noted in the PER.

The paucity of reliable data on vegetation communities east of Albany and in the Wellstead area has been commented on in the Flora and Vegetation report (PER Technical Appendix 13.8.)

6.4 As stated in the flora and vegetation technical report (page 83), and the PER, “The 20.6% total unreserved remnant vegetation in the three sub-catchments falls below (on total vegetation measures, let alone individual vegetation units or ecosystems that might have been represented) the threshold level of 30%, below which species loss is considered to accelerate exponentially at the ecosystem level (EPA, 2000).” Hence, the significance of the vegetation to be impacted by this proposal is clearly high.

This comment has been noted.

14.1 About 14.85 ha of the mine site is remnant vegetation and less than 30% of this type of vegetation remains in the region. In addition only 4.6% of the original
vegetation of the region is in a reserve. As much as possible of the site vegetation should be protected. The site should only be progressively cleared as the mine is developed. This should be detailed in the management plan and be a ministerial condition.

The project proposes clearing 252.6 ha of native vegetation yet Grange Resources is only proposing to “conserve” 30 ha. This is grossly inadequate. Whilst the Society does not support the clearing of native vegetation for this project we recognise there is a likelihood of the project being allowed in some form. As a consequence the company should be arranging to purchase an equivalent area of high quality vegetation for vesting in the conservation estate. This should be a ministerial condition. From our experience this process can be frustrated by a number of agencies and the agreement of all decision making authorities and ministers should be obtained for this to be completed before any ground disturbing works are allowed. It has been our experience that promises made are broken once work proceeds. We cite as a specific example the commitment to extend the Mount Manning Nature Reserve as part of the Portman Mining approval process.

Any revegetation works is a legal requirement following mining. It will be impossible to replace what is lost so the company should not be seeing this work as in some way contributing to a ‘net environmental outcome’.

The potential impacts of the mine site to vegetation have been clearly outlined in the PER. Grange has committed to conserving as much remnant vegetation as practicable (a minimum of 30 ha), given the land requirements for mine site infrastructure and the spatial restrictions of the mining leases and freehold land tenure.

Grange is considering appropriate offsets in consultation with government agencies.

1.2 It is very doubtful if rehabilitation on disturbed areas will ever be properly produced to its former growth, particularly where large trees have to be removed in order to lay the Slurry pipes.

These trees have taken centuries to grow and some of them are of course habitats for various species of birds into which nest in them, or live off the nuts or blossoms etc.

The slurry pipeline route has been selected to traverse ground which is clear of trees, particularly remnant native trees, wherever possible. This generally has been achieved through the co-operation of landowners who have agreed to the pipeline route being sited on their cleared farmland.

2.1 Clearing of native vegetation at the mine site in Wellstead: There are a number of small areas of remnant vegetation at the proposed mine site, its likely that if these are not currently degraded they will become so in the future as a consequence of their size. However, the two largest areas of native vegetation appear to be viable and in my opinion should not be cleared. I base my opinion on two facts firstly its most unlikely the people who farmed this land would have been given a license to clear this remnant vegetation due to land degradation risk and the high percentage of cleared land in the area so why should Grange Resources? Secondly it’s my understanding that few studies of the Wellstead native flora and fauna have been undertaken and as such clearing of native vegetation could risk the loss of rare and endangered species.
If the project goes ahead it should be a condition of the licensee that the two largest areas of native vegetation not be cleared.

These comments have been noted. A large portion of the ore body is located directly below the largest remnant vegetation block on the mine site (as shown in Figure 2.2 and Figure 2.4 of the PER), and therefore most if it needs to be cleared for mining to proceed. However, Grange has committed to retaining 30 ha of this block that is not within the mine pit footprint. The second remnant native vegetation block is located adjacent to the pit area and within the area identified for waste rock storage. There is insufficient space on the mining tenements to site the waste dump if the second remnant native vegetation block is to be avoided.

The acceptability of the proposal is being assessed by the EPA through this PER process. Conditions will be set by the Minister for Environment through the Project Bulletin.

3.19 It is unlikely that the clearing of native vegetation for this proposal will meet the Native Vegetation Clearing Principles given that:

- Only about 14.85 ha of the mine site is remnant vegetation and less than 30% of this type of vegetation remains in the region of which only 4.6% is in a reserve;
- Some of the vegetation is Yates vegetation, i.e. associated with a wetland; and,
- The vegetation supports a high level of biological diversity, including a number of species of threatened fauna.

Thus the clearing should not go ahead for this proposal. However, if the principles are to be overruled and clearing is allowed, then all of this clearing must be directly offset by the purchase or restoration and protection of equivalent areas of the same vegetation types that are otherwise threatened in the local area. Given the importance of remnant vegetation in this heavily cleared area and the risk of loss of biodiversity, the proponent should also be required to provide a greater than 1:1 offset ratio.

Any offsets must be in place before clearing commences.

Revegetation work following mining is not considered an offset for clearing, especially given concerns about acidic tailings in the revegetation area.

It is disappointing to see no concrete commitments relating to offsets in the PER proposal for the community to comment on. There is a need to improve the transparency and integrity of offsets if this controversial tool is to be accepted by all stakeholders.

These comments have been noted. The acceptability of the proposal to clear remnant vegetation for the mine site and the adequacy of the proposed offset package is being assessed by the EPA through this PER process.

Grange is in continued consultation with relevant government agencies to determine appropriate environmental conditions and offset package for the proposal. The aim of the offset package will be to achieve a net benefit to the environment as a result of the project being implemented.
The small portion of high sulphur tailings from the flotation process will be encapsulated and therefore will not impact revegetation associated with rehabilitation of the mine site.

3.21 The fact that no priority weeds were recorded at the mine site adds to the significance of the site and should be considered in assessment, and if necessary in determination of offsets. Any offset sites should have these weeds removed by the proponent.

These comments have been noted. The proponent is developing appropriate offsets in consultation with government agencies. The acceptability of the proposal and the adequacy of the proposed offset package is being assessed by the EPA through this PER process.

7.6.2 Flora

3.20, 14.2 Seven priority flora will be impacted by the mine. One of these Commersonia sp. Mt Groper (RG Cranfield & D. Kabay 9157) would probably be declared flora but it has not been processed completely by the Department of Environment and Conservation. As such, the species should be avoided as though it had already been declared as DRF. The commitments given should be made ministerial conditions. We wish to mention Ministerial Statement 627 which related to Portman Mining which has established a baseline for the management of flora and the contributions expected of proponents towards their conservation. This was made in 2003 and we believe with this statement and the EPA bulletin 1242 Mt Gibson Iron Ore and Infrastructure Project the bar has been raised and the proponent in this instance should be making far greater efforts to minimise the effects on the environment and the protection of significant areas. We would be happy to provide further details particularly in relation to the Portman situation.

With significant flora we note the location of the Commersonia sp. Mt Groper (RG Cranfield & D. Kabay 9157) and believe the area it occurs should not be included in the mine and sufficient buffer be retained around it. This should at least be the case until the conservation status and the appropriate management of the species can be determined.

These comments have been noted. Commersonia was gazetted as rare flora in January 2008. The population area of Commersonia sp. Mt Groper (RG Cranfield & D. Kabay 9157) is located at the eastern end of the proposed mine pit, and will therefore not be impacted until years 10-15 of the mine life. As outlined in Commitment 24, the proponent commissioned an additional regional survey in spring 2007 to determine the distribution and abundance of Commersonia sp. Mt Groper (RG Cranfield & D. Kabay 9157). Additional surveys were undertaken in October and November 2007 and to date one hundred and twenty five wetlands have been searched and a further two populations found.

A Threatened Flora Recovery Management Plan will be prepared as outlined in Commitment 22. In addition to this an Interim Recovery Plan for Commersonia sp. Mt Groper is currently being developed in consultation with DEC and their Threatened Flora Seed Centre. This plan will outline practical management strategies for the species. Conditions will be set by the Minister for Environment through the Project Bulletin.

5.2 Impacts on Significant Flora: Should the proposal be approved, DEC recommends that further exploration for extant populations of Commersonia sp. Mt
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Groper in the Wellstead region be undertaken. The Department understands that the proposed timing of the clearing of the *Commersonia* sp. Mt Groper is 10-15 years after project commencement. A recovery plan for this species should be developed in consultation with DEC, and satisfactorily implemented to meet predefined objectives prior to disturbance of the two wetlands on the mine site that support suitable habitat for this species. These two wetlands should be managed carefully in the interim to increase the chances of germplasm recovery from these sites should this become necessary. Stock currently grazing in the wetland close to the current mine site office should be excluded from the wetland as soon as possible and prior to project commencement.

Information quantifying the impact of the proposal on each population of priority flora species at the mine site and the size and extent of other populations in the local area and region (as appropriate) is required to enable informed assessment of the significance of project impacts.

The proponent has undertaken further searches for this taxon. Spring surveys were carried out in October and November 2007, as the taxon is more visible when flowering in spring. Previously searched wetlands will also be revisited as *Commersonia* may be present in the seed bank and could establish in favourable conditions.

A table outlining the potential impacts of the mine site and pipeline to known populations of flora of conservation significance has been provided in Table 6.8 of the PER. This table has been updated with information regarding population sizes from Flora Base and field surveys conducted to date (attached).

An Interim Recovery Plan detailing management strategies for *Commersonia* is being developed in consultation with the DEC.

5.14 Regional surveys are considered necessary to confirm the conservation status of Priority flora species listed on pg 145 - *Monotoca arista* (P2) *Chordifex leucoblepharus* (P2), *Microcorys lenticularis* (P2), *Calectasia obtusa* (P3) and *Dryandra calophylla* (P3) and may be regarded as a useful contribution to conservation of threatened flora in the local region. These surveys should be documented in the Threatened Flora and Conservation Management Plan.

Most of these Priority species were found in the regional offsets survey and their locations have been provided in the Southdown Magnetite Proposal Regional Flora and Vegetation Survey report.

Relevant survey information will be used to inform the Threatened Flora and Conservation Management Plan.

5.17 The proponent has indicated it is committed to retaining a minimum of 30 ha of Albany Blackbutt (*Eucalyptus staeri*) mallee heath and chittick scrub-heath (pg 257). The current status and location of this vegetation is not mentioned in the PER. DEC requires information describing the location, floristic structure and composition of this vegetation and what measures Grange will be employing to protect this vegetation from the impacts of mining in close proximity. This area needs to be identified as soon as possible and actions taken to protect it from uncontrolled access, Phytophthora
dieback and other detrimental impacts. This assessment should also incorporate a Phytophthora dieback assessment of this vegetation.

The location of the 30 ha of Albany Blackbutt mallee heath and chittick scrub-heath to be retained is provided in Figure 9.2. Management strategies to protect this block of vegetation will be outlined in the Threatened Flora and Conservation Management Plan.

5.18 The avoidance of impacts to “Priority flora or Conservation Significance” (pg 258) is included as a management strategy, however the implementation of this strategy is not described in sufficient detail, hence there is no information available to evaluate this potential management strategy. DEC recommends an aerial photograph be produced that is overlain with mine site vegetation units, population boundaries of Priority flora, the Albany Blackbutt conservation area, remnant vegetation within the mining lease not proposed to be disturbed, proposed pit outline, waste dump, tailings storage facility and other infrastructure. This will provide the Department with an indication of vegetation (primarily Priority flora and significant vegetation communities) avoidance and disturbance minimisation measures.

The pipeline alignment has been adjusted to avoid impacts to sensitive vegetation and flora of conservation significance. A map of the pipeline route and known populations of priority flora is provided in Figure 9.1.

A map of the mine site vegetation and locations of priority species, overlain with the mine site infrastructure is provided in Figure 9.2.

5.19 The proponent is proposing a Threatened Flora and Conservation Management Plan (pg 258) as a management strategy to address threatened flora impacted by the proposal. It is unclear how a plan of this nature will address or mitigate impacts of the proposal and an outline of the key actions and objectives of this plan should be provided for decision-makers.

A Threatened Flora and Conservation Management Plan will be developed in consultation with DEC and implemented prior to ground disturbing activities.

The occurrence of Cephalotus follicularis (Technical Appendix 13.8, pg 253) at the Kratochvill wetland is of conservation significance and additional information is required on the disturbance to this species’ habitat from pipeline construction, what efforts the proponent will make to minimise impact, and what the proposed impact to this population would be.

This species inhabits most of the intact vegetation in this permanently-waterlogged wetland. The location of the pipeline will be along an already cleared firebreak along the fence-line, so the pipeline works will not involve the clearing of any of this species. However as the pipeline will be laid in ground that is permanently waterlogged wetland sediment, there may be an issue with acid sulphate soils and the possible release of highly acidic water from the disturbed area into the adjacent wetland vegetation. Site specific Acid Sulphate Soil Management Plans will be developed as part of the Pipeline Construction and Operation Management Plan to ensure wetland vegetation, including populations of Cephalotus follicularis is not adversely impacted.
Technical Appendix 13.8, pg 253 states “Lepidosperma viscidum [sic] recorded at the Parker Brook Reserve along the originally proposed pipeline route is potentially a new species as it does not conform well to the current circumscription of Lepidosperma viscidum (E. Sandiford, pers. comm.).” Further collections and subsequent identification of this species are required. DEC requires information on the level of disturbance to this population.

This taxon was located along an earlier alignment of the pipeline and the information was included for interest. The proposed pipeline route does not pass through this area therefore there will be no disturbance of this population.

Comment is unable to be provided on taxa at the extremes of their range, recently discovered range extensions, or isolated outliers from the main range (refer Technical Appendix 13.8 pg 254), without contextual information about the distribution of these species. This warrants further survey effort through the inclusion of these taxa in the regional survey program that DEC has recommended be included in the Threatened Flora and Conservation Management Plan. Species included include Hibbertia hibbertoides var. meridionalis, Urticularia simplex, Banksia nutans var. nutans, Hakea baxteri, Stylidium caespitosum, Eremaea pauciflora var pauciflora.

Some of these taxa were found to occur in the regional offsets survey sites. This information will be presented in the forthcoming Southdown Magnetite Proposal Regional Flora and Vegetation Survey report.

The species Caladenia fuscolutescens and Chordifex capillaceus appear to warrant listing as Priority 1 or 2 flora due to their restricted distribution (Technical Appendix 13.8, pg 256). Further advice from Ecologia is requested regarding these proposed additions to the Priority flora list.

Chordifex capillaceus was found in some of the regional offsets survey sites and this information will be presented in the forthcoming report. Caladenia fuscolutescens was not found in the regional offsets survey but DEC staff (e.g. Andrew Brown of WATSCU Woodvale) may be able to provide further information regarding the conservation status of this taxon.

While Adenanthos apiculatus is restricted and Phytophthora dieback susceptible (Technical Appendix 13.8, pg 256), it is locally abundant (e.g. in Waychinicup National Park and Stirling Range National Park). Its status should be monitored over time as it occurs on Phytophthora dieback prone habitat.

This comment has been noted.

Cyperochloa hirsuta has a broader range than stated (Technical Appendix 13.8, pg 256) but its habitat may be degraded (Yate swamps) as noted by Ecologia. DEC seeks clarification on this.

This grass is not a conspicuous plant but it was a dominant component of several wetlands searched during the extensive wetland surveys of this project. It was only present where the understorey vegetation was in very good to excellent condition. It is likely that this species was previously quite widespread in wetlands of the region but now most of these wetlands are privately owned and have been degraded by grazing, clearing, cultivation, burning etc.
This grass is probably one component of the native vegetation that is sensitive to such disturbance. Other factors that may contribute to its being poorly documented certainly include lack of botanical surveys in the region.

*Schoenus multiglumis, Andersonia depressa, and Drosera dichrosepala* have narrow ranges (Technical Appendix 13.8, pg 256), however it is unclear as to whether these species will be impacted by the pipeline. DEC seeks clarification on this.

*Schoenus multiglumis* was found at the Walmsley wetland which is no longer in the proposed pipeline route.

*Drosera dichrosepala* was found at the Gravel Hill Site 12 in the remnant vegetation block located adjacent to the pipeline route. This vegetation will not be impacted by the pipeline construction. It was also found at Site 14 and 15 at Parker Brook Reserve where the pipeline route has been adjusted to avoid any impact on vegetation from construction.

*Andersonia depressa* was found at the Belfield remnant but this bushland is no longer adjacent to the proposed pipeline route.

*Banksia dryandroides* is Phytophthora dieback susceptible. Its status should be monitored over time as it occurs in Phytophthora dieback prone (low-lying, seasonally moist) habitat. The community (or communities) in which *B. dryandroides* occurs could be potentially threatened also and DEC seeks information to clarify the conservation of this community.

*Banksia dryandroides* occurs in the *Eucalyptus pleurocarpa* wetland vegetation unit (Vegetation type 4) and sometimes around the fringes of *Eucalyptus occidentalis* wetlands (Vegetation type 5) at the mine site. The species itself is not an uncommon one (there are 41 records for it on FloraBase) and *B. dryandroides* was also found at three sites surveyed in the regional offset survey (Southdown Magnetite Proposal Regional Flora and Vegetation Survey report to be released to DEC shortly). However, dieback assessment will be carried out at the mine site prior to construction, to assess the dieback status of the blocks of remnant vegetation.

The conservation status of the community in which *B. dryandroides* occurs is discussed in the Southdown Magnetite Proposal Regional Flora and Vegetation Survey report (as mentioned above).

*Leucopogon elegans* has 44 records on Florabase, so it is likely to be locally abundant, e.g. Cape Riche. *Leucopogon corynocarpus* is locally abundant in Stirling Range National Park and Fitzgerald River National Park.

This comment has been noted.

6.2 The PER states that ‘no DRF were recorded in the project footprint…a total of 11 taxa of conservation significance were recorded during the surveys’ (page 144). These species appear in Table 5.2 (page 69), with an indication of percentages of the population of each that are expected to be impacted by the proposal. This table should be updated to indicate the estimated percentage of the known populations that occur in reserves/secure conservation areas, particularly considering the relatively large proportions of some of these species that are expected to be impacted by the proposal:
eg Commersonia sp. Mt Groper-33%, Monotoca aristata-20%, Calectasia obtusa – 18%, Chordifex leucoblepharus – 15% and Goodenia filiformis – 12%, before acceptability of the loss of these proportions of these species and several other species can be considered.

In addition to the large number of Priority species to be impacted by the proposal, there are numerous significant species listed in Appendix E of the flora and vegetation report, the management of which doesn’t appear to have been addressed in the PER, and it is unclear whether impacts to these species can be adequately managed.

Ecologia will provide an update to Table 5.2 using all information gathered during its surveys along with relevant information provided on FloraBase.

Significant species will be managed in the same way as Priority Flora taxa along the pipeline route. As vegetation is to be cleared at the mine site, seeds will be collected from these taxa to use in any rehabilitation undertaken at the mine site.

6.5 The Flora and Vegetation Technical Report shows that further searching for the previously Rare, currently Priority 1 species Commersonia sp Mt Groper was undertaken in March and October 2006, and that ‘an extensive search by ecologia in October 2006 found a single small (50 to 100 plants) population of Commersonia sp. Mt Groper in an unprotected location outside the mine and pipeline footprint. Further exploration to determine any additional extant populations and the development of a recovery plan for this species (in consultation with the WA Threatened Species and Communities Unit of DEC) is recommended.’ Further targeted surveys for this species and propagation and management of this species in combination with DEC, Kings Park and Botanic Gardens, Threatened Flora Seed Centre and UWA are supported.

Further targeted surveys were undertaken in spring of 2007 in October and November and a further two populations were found. The plants are easier to identify when they are flowering and therefore it is most appropriate to search for Commersonia sp. Mt Groper in spring.
7.7 Terrestrial Weeds and Dieback

3.22, 5.15 To date there has been no dieback assessment of the proposed mine site (pg 153). The Department recommends an initial Phytophthora assessment be conducted as soon as possible to determine the disease status of the mine site. This will help avoid the potential spread of *Phytophthora cinnamomi* to the conservation significant units described previously, in particular the highly susceptible mallee heath communities, from current vehicle movement around the site. A further Phytophthora dieback occurrence map will be required within 12 months of disturbance to ensure contaminated soil is kept separated from disease-free soil.

Grange has committed to undertake a dieback assessment within 12 months of commencing ground disturbing activities. An initial Phytophthora assessment is not deemed necessary, as exploration activities have been completed and there are currently very few vehicle movements around the site.

7.8 Terrestrial Fauna

6.6 Habitats at the proposed mine site have a rich and diverse vertebrate fauna assemblage with 149 species recorded, comprising 15 native mammal species, 97 bird species, 20 reptile species and 11 amphibian species. Vegetation clearing at the mine site will impact on fauna populations, but it is claimed that as these species are all represented in national parks in the region no significant regional impacts are predicted. While this is probably true, little assessment is made on local impacts and no information is presented on the nearest secure populations. A significant question arises, should clearing of native vegetation be endorsed in a subcatchment area where only 24.15% of reserved and un-reserved vegetation remains.

The impact of mining operations to local fauna will generally be 100% loss of animals within clearing areas, except for animals recovered and translocated. Grange has also committed to retaining a minimum of 30 ha of remnant vegetation on the mine site.

Clearing associated with the mine site is anticipated to reduce the total reserved and unreserved native vegetation within the East Sandplain sub-catchment from 24.1% to 23.42%. This represents a corresponding decrease in fauna habitat, rather than a loss of species or biodiversity. None of the species recorded are dependent on the mine site habitat.

The acceptability of the proposal is being assessed through this PER process, and will be decided by the Minister for the Environment.

5.16 The document should acknowledge that the Western Ringtail Possum (*Psuedocheirus occidentalis*) occurs in the Albany area in vegetation types not confined to those dominated by Peppermint (*Agonis flexuosa*) (pg 177).

The Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) (pg 179) is known to feed on some proteaceous species, including *Hakea oleifolia*, which may extend the area of interest for this species.

The Western Ringtail Possum occurs in the Albany area in a variety of vegetation types. The fauna survey conducted by *ecologia* Environment recorded Western Ringtail Possums
at a site comprising a Jarrah and Sheoak woodland with a dense understorey of sedges and herbs.

It is acknowledged that the Forest Red-tailed Black Cockatoo also feeds on proteaceous species including *Hakea oleifolia*.

### 7.9 Short Range Endemic Invertebrate Fauna

3.24, 5.4 DEC supports the recommendation for additional surveying as soon as possible to ascertain the local distribution of *Bothriembryon* species (*B.* sp “Wellstead”) and hence to more accurately define the impact of the proposal on this species. Surveying should be undertaken consistent with the recommendations in Technical Appendix 13.10.

To fully determine the conservation status of *Yilgarnia currycomboides*, and therefore the impact the project poses to this species, additional surveying is required as soon as possible as recommended in Technical Appendix 13.10. Surveying should be undertaken consistent with the recommendations in Technical Appendix 13.10.

To fully determine the conservation status of *Chenistonia palludigena* and therefore the impact the project poses to this species, additional surveying is required as soon as possible as recommended in Technical Appendix 13.10. Surveying should be undertaken consistent with the recommendations in Technical Appendix 13.10.

Proponents should finish their environmental surveys before coming to the public with a PER document.

Grange is aware of the need to clarify the distribution, conservation significance, and hence impact of the project on the *Bothriembryon* land snail species “Wellstead” and the two potential SRE Mygalomorph spider species, *Yilgarnia currycomboides* and *Chenistonia palludigena*. Additional surveys were undertaken in June – July 2007 (*Bothriembryon* and *Yilgarnia currycomboides*) and October 2007 – January 2008 (*Chenistonia palludigena*).

Work involved pitfall trapping and foraging. The work confirmed species abundance and as such the mine development will have no material impact.

*Chenistonia palludigena*, have been recorded only from the Fuller Road reserve near Albany. The works associated with the pipeline installation are likely to pose little or no threat to this species.

A report detailing survey results from both series of additional work is complete and has been submitted to the EPA for distribution. In summary, both species were found outside the project footprint impact area.

### 7.10 Stygofauna

13.2 The Executive Summary states that there are no stygofauna of conservation significance in the vicinity of the mine site and notes that there are Candonidae and Syncarida. This is a finding of great significance and represents the southernmost known distribution of stygofauna in WA. Both these higher taxa are of considerable conservation significance being Gondwanan, the latter possibly Pangean, relicts.
Both taxa are of high importance in Australia where basal taxa are present and both are known to occur as short-range endemics.

Why do the Parabathynellidae sp. and Bathynellidae sp. 1 have no bore designation in Table 6.22, only a ‘1 km NW’ of deposit which could place them well into the drawdown area. There is an active research programme, including DNA work, being undertaken on Bathynellacea in Western Australia and considerable data are available, specifically in the Yilgarn region to which this project relates. There is no reason why the taxonomic position of these taxa should not have been resolved by this stage.

The statement “…there are no stygofauna of conservation significance in the vicinity of the planned mine pit” should have ended “… whose conservation status is likely to be adversely impacted by groundwater level drawdown as a result of the Southdown proposal”. Grange acknowledges the significance of Candonidae and Syncarida and has undertaken numerical modelling to investigate the potential for drawdown of groundwater levels at sites where these taxa have been recorded.

Table 6.21 lists the stygofauna recorded from the Southdown area and Table 6.22 lists the stygofauna from the Redmond–King River area. Stygofauna of potential conservation significance in the vicinity of the proposed Southdown mine includes Parabathynellidae sp. and Bathynellidae sp. 1. These taxa were recorded from site WST2, a disused farm bore northwest of the proposed mine pit at Southdown. Their absence from Table 6.22 is explained by the fact that they were not recorded from sampling sites in the Redmond–King River area.

Southdown site WST2 is located approximately 1.5 km northwest of the planned mine pit and 0.6 km north of the modelled 22 year 1.0 m groundwater drawdown contour (Golder 2005c). The groundwater level drawdown at site WST2 is likely to be considerably less than one metre in an aquifer of at least 8.0 m saturated thickness over the 20+ year life of the project.

The taxonomy of Parabathynellidae and Bathynellidae in Western Australia is poorly known. Although many specimens have been collected, few have been formally described and published. As far as Grange is aware, the Bathynellid DNA work is not available in the public arena as it has not yet been published. Grange supports additional taxonomic work on the stygofauna of conservation significance relating to Southdown and will arrange for the specimens to be vouchered with the WA Museum at the conclusion of the project.

The only candonid ostracod recorded by the sampling programme was sampled from a bore in the Redmond area, approximately 80 km southwest of the Southdown deposit, and as such, this taxon will not be impacted by the proposal. The specimen has been lodged at the WA Museum.

7.11 Air Quality – Dust

2.4 It is stated in the proposal (5.3.2) that the magnetite iron ore slurry is not dangerous or carcinogenic. To my knowledge this statement was correct however after a quick search in the internet I found a review which examined the association between iron and cancer in humans (Huang, 2003). Huang states that “Workers of iron ores and steel foundries have an elevated risk of lung and stomach cancers.
Although some investigators have suggested that inhaled iron compounds are merely carriers of other carcinogens such as polycyclic aromatic hydrocarbons, nickel and chromium there is increasing evidence that iron can be a principal carcinogenic hazard in inhaled dusts.” After reading this review I believe the statement in section 5.3.2 of the proposal is incorrect the magnetite iron ore slurry is potentially dangerous and carcinogenic and the proponents need to reconsider their dust control measures in line with the best toxicology information available. In my opinion the magnetic iron ore should be pelletised at the mine site and transported by truck and dust levels monitored at both the mine and port (dust monitoring I believe is proposed to some extent). Other benefits of this approach would be a smaller area required at the port.

Magnetite is not listed by the International Agency for Research on Cancer (World Health Organization) as carcinogenic (http://monographs.iarc.fr/ENG/Classification/index.php accessed 15th May 2007). The possibility of carcinogenicity of iron bearing particulate matter is an occupational health, rather than an environmental issue. The mine site employees will be provided with adequate personal protective equipment.

A comprehensive dust management programme will be developed and outlined in the project Operation Environmental Management Plan. It is expected that this plan will involve a periodical dust monitoring regime at the mine and the port. The plan will be developed in consultation with relevant regulators, including DEC and DOH.

3.18 Dust Impacts at Mine Site: The potential for dust to impact on remnant vegetation needs to be addressed as a risk assessment. The Conservation Council does not believe that no dust will leave the mine site, especially given the strong winds typical of the area.

Any impacts on the Stirling Range national park would be considered unacceptable given the environmental and social importance of this park, and the prevalence of existing threats such as dieback, weeds and fire.

The modelling conducted to date indicates that mining will generate dust, however, based on available criteria, nearby remnant vegetation will not be at risk. The Stirling Ranges National Park is some 18 kilometres distant from proposed operations, and there is no indication that there will be any unacceptable impacts to the park.

3.26 Dust Management at Port and Ship Loading: Dust management at the port will be critical to avoid both environmental damage and damage to Albany’s other sustainable economic activities.

The Conservation Council encourages strict and enforceable conditions on all port operations to avoid the problems that most other minerals export ports are having across WA (Port Hedland, Geraldton, Esperance).

This comment has been acknowledged. The Operational Environmental Management Plan will include a Dust Management Plan for Port Operations and Ship-loading, which will be developed in consultation with the Port Authority and relevant Government regulators.
7.11.1 Dust Modelling

6.1 There has been no attempt to develop an emissions inventory for the site that explicitly represents activities. Were predicted dust concentrations well below air quality limits, this would not be a major issue (assuming that a general emissions inventory is appropriately conservative). However, there are indications of breaches of NEPM standards for PM10 concentrations. As noted in the air quality modelling consultants report (TA 13.12): "PM10 concentrations are below the NEPM standards at most nearby residences (Receptors 11 to 25) except at Grasfeld (Receptor 13), Beulah (Receptor 24) and Nymann (Receptor 25). These three receptors are located within 2 kilometers from the project site. Estimated PM10 concentrations at Grasfeld, Beulah and Nymann are 141, 187 and 117ug/m³ respectively, representing 282%, 374% and 234% of the NEPM standard.'

It is stated in the consultants report that particle emissions are likely to be overestimated. However, even if this is the case it does not render the breaches acceptable. It only indicates that more careful modeling should have been conducted.

The use of a constant dust emission rate was also stated to be a limitation of the modeling. The possibility that this may have contributed to an overestimation of dust concentrations was noted. However, because of the strong wind speed dependence of some forms of dust emission, the actual effect of a constant-emissions presumption can not be estimated without an explicit hourly emissions inventory for the site.

The existence of limits for dust deposition (4g/m²/month) has been mentioned, but there is no mention of deposition rates in the main report. Since the most significant impact of open-cut mining operations tends to involve deposited dust, this is a significant oversight. In the consultant’s report, an assessment of dust deposition is reported, and this indicates that, at receptors 13, 24 and 25, the dust deposition rates are also well in excess of the deposition standard. The proponent also needs to justify why the deposition limit is relevant for this operation. It is understood that the limit was developed for coal mining areas in NSW.

The modeling has been performed using the Gaussian plume model “Ausplume”, which has some limitations in the modeling of dust deposition. This should be discussed in the report.

Meteorological data were derived using the meteorological modeling component of the dispersion model “TAPM”. TAPM has some limitations in the modeling of nocturnal wind speeds. This may not be an issue in this case, because of the common dominance of daytime periods in episodes of high dust concentrations from open cut mining. However, it would have been useful for a comparison to have been made between the TAPM estimates and measurements at either Albany or Mettler, particularly in terms of wind variations through the day.

The report mentions an intention to implement a dust management plan to minimize impacts. However, it is not clear whether the sites used as bases for the emissions estimates incorporate dust management plans, so the potential for emissions reduction when a dust management plan is in operation is also unclear. The proponent should clarify this point.
The Dust Impact Assessment is a screening study, undertaken at an early stage with the information available at the time. As such, the screening study has served to demonstrate that significant potential impacts due to dust will be limited to locations very close to the proposed operations. Other relevant receptors in the area, such as the Stirling Range National Park, other reserves, and other residences will not be subject to significant dust impacts.

Since submission of the PER, Grange has committed to ensuring, through commercial arrangements, that the three nearest sensitive receptors; the Grasfeld, Beulah and Nymann homesteads will not be occupied throughout the mine life. Modelling indicates that NEPM standards will be met at all other sensitive receptors. In addition, Grange will implement standard dust suppression methods (not modelled) to ensure compliance throughout operation. This will be detailed in the Construction Environmental Management Plan and Operation Environmental Management Plan.

The criteria used were not developed specifically for magnetite mines in the south-west of WA, as there are no regulatory guidelines for dust deposition prescribed for use in Western Australia. The criteria were, therefore, sourced from available guidelines including the Environmental Protection (Kwinana) (Atmospheric Wastes) Policy 1999, the Queensland Environmental Protection Authority and the National Environmental Protection Measure for Ambient Air Quality.

In particular, the daily dust deposition guideline of 120 mg/m$^2$/day was introduced some years ago by the then Queensland Department of Environment and Heritage (now the EPA), and is generally applied at nearby residences as sensitive receptors. The Qld EPA (2003) recommends this guideline for preparing environmental management plans for non-standard mining projects. This informal guideline is consistent with the NSW Department of Environment and Conservation (2005) guideline for deposited dust, which limits the maximum dust deposition rate to 4 g/m$^2$/month.

NSWDEC (2005) does reference a study of air pollution from surface coal mining (NERDDC, 1988), however in both Queensland and New South Wales the guideline is applied generally to assess predicted dust deposition levels.

The AUSPLUME dispersion model is routinely used for dust impact assessments throughout Australia, including mining operations in the Pilbara and Eastern Goldfields. A greater degree of modelling sophistication is not considered appropriate for a screening study.

TAPM generated meteorological data was used because no local monitoring data is available. The Mettler meteorological station measures rainfall only, and Albany is a distant coastal site that is not applicable to the inland Southdown project location.

Meteorological data was derived using the TAPM model, which is known to over-estimate wind speeds in low wind conditions. This is currently an area of active research by CSIRO. Over-estimation of wind speeds will serve to increase dust transport and broaden the impact footprint, and so is considered to introduce a conservative bias to the assessment.

Higher wind-speeds would serve to increase estimated dust emissions, but in the absence of an emissions inventory the emissions are not wind-speed dependent in any case. All dust emissions have been treated as a large, above-ground volume source, neglecting the
dependence of the emissions on wind-speed and, critically, moisture-content and retention within the mining pit. This simplistic approach is believed to over-estimate dust emissions and produce a conservative result.

7.6 The full nature and application of dust management procedures in Air Quality - Dust, Management (Section 8.13) are not clear and in particular the Dust Management Plan. Most of the issues are covered but there are apparent inconsistencies, uncertainties and gaps in what is being proposed. The main points that need to be better enunciated and implemented are:

- Development of a dust management plan that will apply throughout the construction and operation phases of the project;
- Consultation with the Department of Environment and Conservation and DOH in regard to the plan and other relevant environmental management documents;
- Air dust monitoring at receptors where the levels may exceed or approach NEPM levels;
- Proactive management and responses to possibly excessive dust levels, including acute episodes;
- Full adherence to the NEPM guidelines; and
- Checking and management if necessary of mine dust in regard to any heavy metals it contains.

A comprehensive dust management programme will be developed and outlined in the project Construction Environmental Management Plan and Operation Environmental Management Plan. These plans will be developed with consultation with relevant regulators, including DEC and DOH.

Modelling indicates that the Grange operations will comply with NEPM guidelines at the nearest occupied residences. In addition, Grange will implement standard dust suppression methods to be detailed in the Construction Environmental Management Plan and Operation Environmental Management Plan.
7.12 Noise and Vibration

7.12.1 Noise Modelling: Mine Site

6.13 Lack of Information: Useful information for a proper technical assessment is missing due to the short report and simplified modelling that has been undertaken. For instance, the sound power of a haul truck was given as 120dB(A) in the Noise Assessment of the Proposed Operations at the Southdown Magnetite Project (Ref. 60W-05-1649-TRP-185082-1-Wrd) [Report 1], and was estimated to be 110dB(A) in the Noise Assessment of the Proposed Albany Port Development (Ref 60W-05-1649-TRP-185124-0-draft) [Report 2]. While it can be accepted that the above reports referred to two different models of haul truck, because the make, model and power of the equipment was not listed in the reports, it is not possible to assess whether the noise information provided is reasonable, or whether the equipment selected is the quietest available.

The lack of information is also seen in the noise modelling. It is difficult to understand how the predicted noise levels were obtained and how the noise contours were plotted.

The noise modelling reports have been prepared as a screening study to determine likely impacts based on the best estimates available at the time of writing. Report 1 gives sound power for Haul Trucks as 120dB(A) which is based on the sound power of similar equipment operating at other mines. The preference for actual measured data is acknowledged however until such time as the make, model and power of the equipment has been determined (through the specification or acquisition of the equipment) this modelling cannot be done. Furthermore the screening study sufficiently identifies the areas needing further consideration. In the case of the mine site this is the noise impacts on three nearby residences to the east of the mine. In the case of the Albany Port, the study has identified that some shielding will probably be required on key noise sources to ensure noise limits at the nearest domestic residences are not exceeded.

Grange operations at the mine site and the port will comply with the Environmental Protection (Noise) Regulations 1997.

2.5 Overall the proposal appears adequate in terms of noise at both the mine site and port. However in my experience living closer to the port is that at times operations continue between the hours of 11pm and 7am which are unacceptably loud and keep residents awake irrespective of the noise limits. In my opinion residents should be able to have activities stopped between 11pm and 7am that inhibits sleep by ringing the EPA and complaining. This in my opinion needs to be a condition of any license given to Grange Resources.

Background noise monitoring is being undertaken at the Port to assess the existing noise levels and inform decision making for future port operations.

6.14 Predicted noise contours (Report 1): The predicted 35dB noise contours – with and without the noise barriers were portrayed as round circles, which appears to oversimplify the model. No topography information is included in the calculation (unless it is uniform in all directions). Neither is there any information on barrier location, structure and dimensions.
A 20 m noise barrier that is accommodated by the noise bund in the western end was proposed and discussed. However, more information of this barrier is required, such as where it is to be located, how it will be built, and its structure and dimensions etc. The noise insertion loss of the proposed barrier is about 11dB, which seems high. More information is required on how this performance was estimated.

The modelling was comparatively simplified, however the topography at the mine is relatively flat and the errors associated with this assumption are small.

Since submission of the PER, Grange has committed to ensuring, through commercial arrangements, that the three nearest noise sensitive premises; Grasfeld, Beulah and Nymann homesteads will not be occupied throughout the mine life. In this case the operation will no longer require the construction of a noise barrier.

6.15 Fixed plant noise concentrated at one location (Report 1): All fixed plant noise is assumed to be centralised at the location of the Secondary Crusher. While it is generally acceptable to treat fixed noise sources as centralised point sources when predicting noise at far field, the conveyor is better treated as a line source, due to its length (3000 m) that is comparable to the modelling distance.

Tonality Problem: Tonality of the noise emission was not mentioned in Report 1, but was briefly discussed in the Noise Assessment of the Grange Resources Operations at the Albany Port (Ref 60W-05-1649-TRP-185163-0)[Report 3]. Which indicated that ‘Purchasing specifications will need to exclude equipment that may have impulsive, tonal or modulation characteristics”, and hence the assumption of broad-band noise with no tonality was made. However, it is generally recognised that most mining equipment has tonal or even impulsive characteristics and it may not be practicable to purchase items to the above-mentioned specifications. For instance, both conveyor and conveyor drive noise are tonal. Most motors, pumps, and mobile equipment also have tonal characteristics. The inclusion of these noise characteristics will increase the non-compliance of the noise emission. The proponent needs to provide more information to demonstrate how the tonality and impulsiveness of their noise emissions at mining site and in the Albany Port operations will be addressed.

Fixed plant noise has been calculated from a centralised location as the 3000 m of conveyor is the assumed total length of multiple conveyors lying in a relatively small plant area in the vicinity of the secondary crusher. There is no 3000 metre long conveyor as suggested in the comment received.

Tonality problems are highly unlikely (unless the plant is very small, or the noise field is dominated by a few sources). Individual items of plant/equipment may well have tonal/impulsive characteristics, however, when averaged over a large number of items and over different source to receiver distances, tonality and impulsiveness tend to ‘wash out’ producing a smooth broad band constant spectrum.

6.18 Proposed noise management at mine site: Non-compliance with Environmental Protection (Noise) Regulations, 1997 would occur at the mine site, especially when mining approaches the eastern end. As such, Commitment 32 in the PER document which states that “The management plan will ensure the Project complies with Environmental Protection (Noise) Regulations 1997”, cannot stand. Instead of making every effort to minimise the noise level at NSPs and achieve full compliance, the
proponent proposes to offer noise reduction treatments for residential houses within 4.5km of the mine site, such as double glazing the windows, installing air-conditioner units, or implementing other appropriate noise control strategies. While this proposal is sufficient to cover all possibly affected areas around the mine site, non-compliance will still occur outdoors, also, the acceptability of this proposal by the potentially affected residents is unknown. The proponent needs to look at what is needed to achieve full compliance. For instance, the proponent should assess the effect of limitation on hours of operation, depth of pit and weather conditions and a means of minimising noise emission and achieving compliance.

Since submission of the PER, Grange has committed to ensuring, through commercial arrangements, that the three nearest noise sensitive premises; Grasfeld, Beulah and Nymann homesteads will not be occupied throughout the mine life. The mine site operations will, therefore, achieve full compliance with the Environmental Protection (Noise) Regulations 1997 at the nearest noise sensitive premises of Severn Hills and North homesteads.

7.12.2 Noise Modelling: Port Operations

6.16 Predicted noise levels at noise sensitive premises: Though the predicted noise level at the nearest noise sensitive premises (NSPs) around the Port was given, it is not clear how this result was obtained. A significant amount of information is missing in Report 3, such as what modelling was used, how noise sources were distributed and modelled, and what other parameters were selected. A noise contour diagram for the areas around the Grange operations would be helpful.

Background noise levels at NSPs: No background noise or existing noise levels at the nearest NSPs were measured or mentioned. The existing noise levels may play an important role in determining the acceptable noise levels for the Grange operation at these sites. The Grange operation may ‘significantly contribute’ to any existing noise exceedances, in which case the noise emissions would need to meet criteria 5dB below the Assigned Level. This is more important for the NSPs around the Port operations. Due to the proximity of the residences to the industrial-classified land, the existing noise level could already be too high to be ignored. Information of the current existing noise level and the predicted cumulative noise levels at these NSPs is required.

The modelling results were obtained from point to point (source to receiver) calculations using worst-case meteorological conditions (CONCAWE category 6).

Since submission of the PER Albany Port Authority has undertaken noise monitoring at the port to determine the cumulative noise generated by existing port operations. Noise measurements were conducted around the port during ‘worst case’ conditions (loading woodchips. Noise measurements at the nearest noise sensitive premise indicate that the current cumulative noise from the port operations is within 1dB of the night time LA_{10} level prescribed by the Environmental Protection (Noise) Regulations 1997. Grange operations at the port are therefore required to limit their noise emissions to 42dB (A) so as to not significantly contribute to exceedances.

The initial report has been revised, taking into account the re-calculation of cumulative noise and shielding of the drives associated with the ship loader. The results of this
modelling conclude that the noise from the slurry and ship loading operations at Albany Port will be approximately 40 dB (A) and will not significantly contribute to existing noise levels at the port.

The revised report ‘Noise Assessment of Grange Resources Operations at the Albany Port’ was submitted to the EPASU on 5th September 2007.

6.17 Proposed noise management for Port operation: The estimated noise level at the nearest NSP is about 2dB over the Assigned Level. To achieve compliance with the Environmental Protection (Noise) Regulations, 1997, noise reduction was proposed by enclosing all drives on the shiploader. It was estimated that this treatment would enable the operation to just meet the regulations. Using the information in Table B2 in Report 3 it has been calculated that this treatment will at its maximum reduce the total noise from the Grange operation to about 45.3dB(A) at the nearest NSP which is marginally above the Assigned Level of 45dB(A). As indicated previously, Grange may need to reduce its operational noise to 5dB below the Assigned Level. Grange should look at reducing noise as far as practicable. Analysis of Table B2 demonstrates that the treatment of the agitator’s motor and pump may be at least as effective as treating the shiploader. Further treatment of the agitator noise will reduce the noise at the nearest NSP to below 42dB(A). This option needs to be considered where necessary. Grange Resources should make a firm commitment to achieve full compliance for Port operations.

Due to the conservative nature of the calculations (eg each source acting in a free field, all sources running simultaneously etc) enclosing all drives on the ship loader is anticipated to reduce noise levels below criteria. Grange will investigate other noise reducing treatments as required to ensure the operations achieve full compliance.

7.13 Gaseous Emissions

3.27 Magnetite mining and processing is a more greenhouse intensive way to source iron ore than traditional mining methods. As such, this difference must be made up for in some way if the project is to be approved, i.e. by appropriate offsets. These would best be incorporated into biodiversity offsets projects. The overall emissions profile of the project should also be reduced by funding the addition of additional renewable energy capacity into the SWIS, such as a new wind farm, given that the majority of emissions come from direct energy use from the SWIS.

If this makes the project uneconomical then clearly magnetite mining is an unacceptable way to produce iron ore due to its excessive greenhouse gas emissions.

The purchase of existing remnant vegetation as suggested in the PER is not a greenhouse gas offset.

Reporting greenhouse gas emissions and increasing efficiency (often marginally) is not an acceptable response in this era where the overwhelming scientific consensus is that we need to immediately begin reducing greenhouse emissions to avoid dangerous climate change.
The scope of the Southdown Magnetite Proposal PER includes the mining, magnetic separation, pumping as slurry and export of magnetite. Processing of the magnetite will occur in Malaysia and will therefore be assessed under the relevant Malaysian legislation.

Whilst it is agreed that the refining of magnetite ore to produce an iron ore concentrate is more energy intensive than mining Hematite Direct Shipping Ores as is done in the Pilbara, its use in downstream processes to make steel are extremely energy efficient with less environmental impact, which must be taken into account when considering the overall environmental (climate changing) effects.

Power generation for the proposed Southdown Magnetite Proposal represents a significant source of greenhouse gas emissions, however Grange has fully complied with both state and federal government policy in relation to best practice greenhouse gas emission management and reduction measures in designing the proposed facility. Grange will continue to work within the framework set by government in respect to addressing environmental matters such as climate change.

Nonetheless, Grange is investigating with a number of potential generators, a supplementary power supply strategy based around renewable energy power generation in the Albany area, with particular focus on biomass and wind solutions being explored. The results of these investigations will not be known in the short term.

Grange acknowledges that the purchase of remnant vegetation is not a greenhouse gas offset.

7.14 Visual Amenity, Landscape and Geo-heritage

2.3 The proposed reclamation, processing and storage facility is extremely poor aesthetically compared to the current coastline this must have an impact on tourism and recreational users on the waterway. The proponents appear to put little value on this and once the development goes ahead we will have lost a beautiful part of Albany. To me this is unacceptable.

The proposed land reclamation is located adjacent to the existing reclaimed land of the Albany Port and the industrial site occupied by Vital Foods. The visual impact of the reclamation area and the storage sheds will be in keeping with other structures within the Albany port precinct. Nonetheless architectural advice will be sought on ways of minimising the visual impact of the buildings before final design and construction.

3.2 The rural and natural character of Albany that supports tourism in Albany and the surrounding regions may also be threatened by the mine itself. During operation and potentially after closure the mine will be visible from important tourism destinations such as the Stirling Ranges.

These social and economic impacts should be considered more seriously by the proponent.

The infrastructure in the town and the mine site itself both have potential to seriously impact the visual amenity of these important tourism areas. It is highly unlikely that a visual impact management plan will make any difference whatsoever to this critical issue.
Grange considers that it is highly unlikely that the existence of the mine will adversely impact nature-based tourism in the Stirling Range National Park or other tourist destinations within the Great Southern region. Evidence from other mining operations such as the Kalgoorlie Super Pit demonstrates that mines in fact attract tourist interest and as such some form of Visitors’ Centre may need to be included at or near the mine site to manage such public interest.

As indicated in the visual impact assessment (PER Technical Appendix 13.15) the mine site is potentially visible from the peaks within Stirling Range National Park on clear days (Figure 9.3). The mine site infrastructure, however, will be in the far distance as the mine is approximately 25 km from Bluff Knoll. It is not anticipated that mine site infrastructure will adversely impact the views or the landscape character of the Stirling Range National Park.

The mine will result in visible, medium to permanent changes to the landscape. This impact will be minimised through designing stockpiles that blend into the surrounding landforms and construction of infrastructure with non-reflective building material. Staged clearing, ongoing rehabilitation throughout the life of mine, and the use of tree screening will also be implemented to minimise the visual impact of the mine site to surrounding view locations.

After the mine closes, all buildings will be removed from the site leaving rehabilitated and revegetated contoured landforms that will blend into the surrounding landscape and be difficult to see from peaks within the Stirling Range National Park.

As the existing Port is located adjacent to the City of Albany, the Grange Port facilities will be clearly visible from adjacent tourist lookouts. These facilities are not anticipated to significantly decrease the visual amenity of the area overall, as the Project is an expansion of the existing Port and industrial area, and substantial parts of the infrastructure will be enclosed.

Grange will minimise the visual impact of the proposal by constructing sheds and structures using non-reflective, neutrally coloured building materials, and capping the seawall of the land reclamation area with granite to mimic the colour and texture of the adjacent shoreline.

The social and economic impacts of the project have been and continue to be seriously considered by Grange together with other government agencies, however discussion of these impacts are not within the scope of the PER document which only addresses environmental issues.

9.2 The visual impacts on the shoreline and landscape of the entrance to the harbour is significant. Impacts stem largely from the berth’s location immediately adjacent to the prominent rocky headland that forms the northern side of the natural entrance to the harbour, and its proximity to Possession Point.

The PER does not adequately address problems with the design method as noted by John Cleary in Technical Appendix 13.15. Of particular importance is the need to identify potential negative visual impacts, especially on the south side of the entrance, and indicating ways in which these impacts can be addressed.

Visual impacts have been reduced by orientating the eastern edge of the reclaimed area back towards the shore at a tight angle, thus protecting a portion of the natural
shoreline at the headland on the north side of the harbour’s entrance. However, it is recommended that this angle be even tighter.

The proposed outer rock layer on the edge of the reclaimed area will comprise local granite. This will assist in integrating the berth into its landscape setting, as the colouring will blend better than other options, such as orange lateritic rock.

Several feasibility and conceptual investigations into the expansion of Albany Port operations have been conducted over the past twelve years. A discussion of the investigations into these options is included in the Albany Port Expansion PER, however; it was found that expansion of existing facilities will result in the smallest possible impact to the environment along with lower operation and maintenance costs for the Port and its users. Land reclamation is consistent with the existing foreshore, and locating the new berth next to an existing industrial area will result in a smaller environmental footprint overall.

The management objective for Possession Point and the entrance to Princess Royal Harbour is (Zone A); ‘maximum retention of visual quality’ (PER Technical Appendix 13.5: Table 4.3), with the development protecting the natural landscape character in the long term.

This management objective will not be achieved at Possession Point (Figure 9.4 and Figure 9.5) or the entrance to Princess Royal Harbour (Figure 9.6 and Figure 9.7) due to their close proximity to the proposed land reclamation area and port infrastructure. Grange will reduce the visual and landscape impacts through construction of the port infrastructure with non-reflective material, and construction of the storage shed using appropriately coloured building material to visually blend with the surrounding landscape. The seawall of the land reclamation will also be capped with granite rocks to maintain the character of the adjacent coastline. These measures will minimise the visual impacts of the project infrastructure as far as is practicable.

The Port facilities have been developed to meet Grange’s requirements for the receival, dewatering, storage and ship loading of the magnetite. The location of the new berth has been the subject of a number of geotechnical and maritime safety studies to ensure that there are no adverse impacts on port operations and to ensure the stability of the existing berth 6 seawall. The area at the eastern end of the reclaimed area allows for any necessary eastward shift of the berth and/or storage facilities. An area at the eastern end of the reclaimed area may also be required to accommodate infrastructure to meet requirements of the Department of Water for retention of stormwater.

9.3 The colour and design of the storage shed are of vital importance in reducing potential visual impacts and as such should receive more attention in the PER. The advice of an architect should be sought in finalising the shed’s colour and design.

The shed as depicted in simulations is a simple, single structure that stands out due more to its bulk and length rather than its height or width. Accordingly, simulations should be produced to show several design options for the height, bulk and scale of the proposed shed in a visually prominent and unique site context.

The simulations should also outline alternative site plan layouts that demonstrate surface and sub-surface disturbance has been minimised and the visual and ecological values are maximised.
The appearance of the shed’s large bulk and scale could be reduced by utilising architectural features and/or modulations such as ridges, ribs or just flat roof sections of a different colour (e.g. white) at even intervals along the shed’s length. The use of natural landscape elements could also be used to soften the hard structural elements of the shed.

For example, if the shed were divided into the appearance of having four segments, each individual segment would be more comparable in scale to nearby existing infrastructure.

The smaller shed located to the north-east of the storage shed should be of similar design and the same colour as the larger shed.

Grange will seek architectural advice before final design and construction in order to minimise the visual impacts of the shed. Simulations based on this advice will be produced to show several design options for the proposed shed and distributed to relevant stakeholders for review.

9.4 Simulations should be produced which show several colour options. The current simulations use a dull, dark grey-green colour for the shed. However, greens tend to fade to a yellow tone over time, and it is rare that the green chosen actually blends with the particular green of the surrounding vegetation.

It is therefore suggested that the alternative of a dark grey be considered. The grey could be chosen to blend with surrounding rock outcrops, specifically those areas that are stained darker by algae, wave action etc. The grey would blend with both nearby rock outcrops and the water.

The surface of the reclaimed area would look less intrusive where visible (eg from elevated positions above the site) if material of a dark or earthy colour is used, eg black asphalt, as opposed to a light, reflective colour such as concrete.

Grange is amendable to changing the shed colour. This matter will be addressed when seeking architectural advice before final design and construction occurs.

9.12 Simulations of land form, land values, land use and land tenure options should be further explored.

A number of development scenarios have evolved over the life of the project planning culminating in the design layout contained in the PER document. Originally up to 14 hectares of land reclamation was considered by the Albany Port Authority however this has been reduced to the current requirements. The shape of the land reclamation area and infrastructure to be built thereon is based upon practical constraints such as seabed slope and seawall stability, ship’s safety and adjoining land use constraints.

7.15 Social and Cultural Environment

8.1 Grange Resources, and their heritage consultants have been in discussion with the DIA for some time regarding their obligations under the Aboriginal Heritage Act 1972. The Public Environmental Review report clearly details Grange’s understanding of their obligations under the Aboriginal Heritage Act 1972, and a
commitment that appropriate permissions will be sought prior to any Aboriginal heritage sites being impacted.

This comment has been noted.

11.1 Two properties, which are located close to the proposed pipeline, are listed on the city of Albany’s Municipal Inventory;

- Albany Airfield and ‘Sigint’ Radar System, located at Albany Airport, Albany Highway, Willyung; and

- Napier Hall, located on Chester Pass Road, Napier.

I suggest you also contact the City of Albany for any recent additions to their Municipal Inventory.

Grange has consulted with the City of Albany and conducted a search of the City of Albany’s Municipal Inventory. The proposed pipeline will not impact any sites listed on the Municipal Inventory.

13.4 The document states that the objectives for the management of the social and cultural environment are to avoid disturbance to maritime, cultural and heritage sites. It states that no registered heritage sites will be removed, damaged or altered. However, the impacts are as yet unknown as heritage, both indigenous and European is more than a matter of ‘sites’. The 100 km pipeline trench from the mine to the port for the transport of magnetite concentrate might be a low impact solution, but it could well be costly in terms of heritage. We are concerned that the excavations required will possibly expose sites and artefacts of significance, particularly as the pipeline reaches the town. A more detailed historic and archaeological survey is required. Heritage, it must be remembered, is more than individual sites – it also includes the landscape.

The City of Albany is the site of Western Australia’s first European settlement. The possibility that items of historic significance will be found is real, particularly in the area around the Western Australian Museum. We consider that there could be an opportunity to build on that Albany history already known with an historical archaeology project, with educational outcomes.

The WA Museum Albany is situated within Heritage Site 9312, one of the most historic locations in Western Australia. The residency was built in 1856 as a depot for hiring convicts and converted into a house for the government residents in 1873. It became a branch of the Western Australian Museum in 1975 - the first outside Perth. The Museum is located within 100 metres of the proposed pipeline corridor and it is to be hoped that consultation on the nature and impacts of the work will be ongoing.

Grange has conducted extensive heritage desktop surveys for both Indigenous and European heritage, and undertaken field surveys for indigenous heritage in August 2005 and March 2006. These surveys were undertaken by qualified archaeologists and assisted by members of the local indigenous community. A systematic survey strategy was designed to inspect a 30% sample of the mining project area, and 60% of the pipeline corridor, extensions and harbour.
Grange acknowledges that the construction for the pipeline may uncover additional heritage sites. Grange will comply with all requirements under the *Aboriginal Heritage Act 1972*, implement a Heritage Management Plan, and ensure a traditional custodian or monitor is present during pipeline construction.

The proposed pipeline route is located approximately 50 to 100 m from the WA Museum Albany, which forms part of the Heritage Site 9312. The proposal has been referred to the Heritage Council to assess whether a development application is required.

The Act requires that any development matter pertaining to a place adjacent, behind or across the road from a registered place be referred to the Heritage Council as a development application.

9.7 Suggest Section 8.20 be revised to include the environmental impact and management of physical and human infrastructure needed to service the life of the project. This requires identification of infrastructure types, capacity and phasing up front rather than later.

Physical and human infrastructure needed to service the life of the project have been identified and described in Section 5 ‘Project Description’ of the PER. The potential environmental impacts associated with the infrastructure has been addressed in Section 8 ‘Potential Environmental Impacts and Management’ of the PER.

9.8 Section 8.20 should also outline the economic flow-on effects and impacts on local marine based and recreational / tourism industries.

The Southdown Magnetite Proposal is unlikely to impact local marine based and recreational / tourism industries as the proposal only represents one additional ship per week traversing Albany waters. Potential impacts to local marine based and recreational / tourism industries from dredging undertaken by the Albany Port Authority are addressed in the Albany Port Expansion PER (EPA Assessment No. 1594).

7.16 Decommissioning and Rehabilitation

3.28 Closure Planning: Closure planning has been done to standards from 2000. Standards have changed significantly in the last 7 years and the proponent should pick some more up-to-date documents. An example may be the Australian Government leading practice booklets.

Grange acknowledges the Commonwealth Department of Industry, Tourism and Resources (DITR) Leading Practice Sustainable Development Program for the Mining Industry. The Southdown Conceptual Closure Plan will be revised taking into account:

- Mine Closure and Completion (DITR, 2006);
- Mine Rehabilitation (DITR, 2006); and
- Review of Environmental Performance Bonds in Western Australia (DoIR, 2006).

4.7 Given the extraction and export of material from the proposed mine site, the surface topography is likely to be affected. On decommissioning of the mine, it might be assumed that surface contours may be altered from the original landscapes and sumps or areas of depression may be created. These sumps may have an impact in the
routing of both groundwater and surface water within the landscape, and this may result in areas surrounding the rehabilitated mine site having an altered hydrological system. The predicted enduring effects that the decommissioned and rehabilitated landscape may have on the groundwater, surface water and surrounding landscape were not apparent in this report (to this reviewer) and further information may be required to assess ongoing impacts following mine decommissioning.

Sumps will be constructed in existing surface depressions. After closure, sumps will be removed and the surface depressions rehabilitated to their original status.
7.17 Ship Loading

6.19 What are the potential environmental impacts of the spillage of magnetite into the marine environment in terms of sediment and water quality and effects on marine fauna? Are there likely to be any other additives in the final processed magnetite product that require discussion in this section of the PER in terms of impacts on the marine environment?

The proponent should provide confirmation as to whether the loading/unloading operations will be regulated under Part V of the Environmental Protection Act 1986. Has Grange received advice from DEC confirming that a Works Approval and License will be required for the Port component of the proposal?

There is still no information on contingency measures for the spillage of product and material from loading operations. The mention of the Albany Port Authority’s Oil Spill Contingency Plan is unlikely to be applicable to the issue of magnetite product spillage.

The statement that “The loading process will be monitored to ensure no significant spillages of magnetite occur’ requires further discussion. How will this occur? What performance targets will be employed?

It is unclear how the marine impacts from the loading and unloading will be monitored by the proponent. For example, will the proponent commit to undertake regular sediment/water quality monitoring and analysis to confirm the effectiveness of loading management measures? How will marine monitoring/management relate/interact with the APA’s monitoring of marine environmental quality?

What type of environmental requirements/conditions will be imposed on the proponent by the Albany Port Authority?

The impact on the marine environment in terms of sediment and water quality and effects on marine fauna from a spillage of magnetite concentrate will be very limited. Magnetite (CAS# 1317-61-9) is an insoluble, dense, non-toxic material. If it is introduced to a marine environment it will settle to the seabed rather than dissolve.

The Grange magnetite loading operations will be regulated under Part V of the Environmental Protection Act 1986. The ship loader is a Schedule 2 Prescribed Premise requiring a Works Approval and an operating license. These will be obtained prior to operation.

The risk of potential operational spillages during ship loading in the Port will be mitigated through engineering controls. The ship loader will have enclosed conveyors to capture any spilt material, which will be recovered either by a vacuum system, or by washing down the ship loader in its storm position and capturing the material. The berth will also be constructed with a concrete bunded area on the western most dolphins that is long enough to capture the entire length of the ship loader in its storm position. This will allow any magnetite from the bunded area to be pumped back to a landside holding tank for reprocessing through the filter plant; and ensure all water for maintenance, servicing and clean down of the ship loader is contained.
From the shed, the concentrate filter cake will be transported on a fully enclosed conveyor to a mobile ship loader. Typically, the ship loader will traverse on a dolphin berth, with a 300 m ground level wharf conveyor and tripper located on the quay. The two will be linked by a traversing inclined transfer conveyor. For ship loading there will be one transfer station over the sea. This transfer will be sealed and internal spillage will be controlled. The ship loader will have chutes directing the concentrate into the ship’s hold to minimise dust generation.

The ship loader will undergo regular maintenance checks to ensure components are functioning correctly and any faults are identified early. This will be addressed in further detail in the application for works approval for construction of the ship loader.

The berthing of ships at the Albany Port will be monitored by the Harbour Master, with ship loading co-ordinated and monitored by stevedores. Monitoring systems most probably will include SCADA systems, Closed Circuit Television and physical observation and inspections.

Performance targets will be developed between Grange and the APA to achieve industry-wide best practice outcomes.

The Albany Port Authority expects all industries operating on Albany Port land to meet or exceed all relevant regulatory requirements.
8.0 Miscellaneous

8.1 Data Collection

4.2 During the exploration and operational phase of the Southdown Magnetite Proposal, significant groundwater, soil and geological data would be expected to be produced. Without compromising the commercial nature of any data set, the proposal is in a position of ‘sharing’ data with the Department of Agriculture and Food (and other Govt. Agencies) that may result in greater understanding of hydrological, soil, environmental and geological systems that impact agriculture, water and the environment. Consideration should be given to a data sharing agreement between Grange Resources Limited and the Government of Western Australia in order to access and utilise any data set for the advancement of knowledge and science.

Grange is agreeable to sharing non-commercial information on groundwater, soil and geology with the various government agencies.

4.6 At the stage of doing the trenching for the pipe-laying there is an opportunity for soil specialists to undertake soil surveys. Rarely are there whole-of-landscape transects and soils scientists often have to resort to soil pits to study the sub soil profiles. Some co-operation between the contractors and the soil surveyors could provide some excellent soil information about the landscapes the pipeline will be intersecting. This type of knowledge does assist decision making on the management of our soils.

Grange is willing to co-operate with government soil specialists to undertake soil surveys in the open trenches during pipeline construction.

8.2 Fire Management

9.5 The document should outline the methodology for investigating and determining the appropriate fire regime to achieve protection of human life and infrastructure while simultaneously managing landscape, flora and fauna values.

More information may be needed to appraise:

(a). "Proposed Investigations" - the determination of optimal fire regimes to minimise the threat of fire to human life as well as achieving the objectives for visual impact, landscape and water quality management; and

(b). Compliance with the Building Code of Australia AS: 3959 including building protection zones around facilities, camp sites and other operational areas.

Fire management is not anticipated to be an issue as the Southdown Magnetite mine site is located in cleared farmland with no fuel loads. A minimum of 30 ha of vegetation will be retained within the mining footprint, with the majority of the remnant vegetation to be cleared to facilitate the mine pit and associated infrastructure.

All buildings on site and at the accommodation village will be built to appropriate building codes for the region.
8.3 Document Edits

The following document edits have been recommended by the submitters. These edits have been noted, however, the PER document has been finalized, approved for public release and printed for the Public Review period. As such, no further changes to the document can be made.

5.7 Figure 2.5 (pg 27) of the PER is misleading as nature reserves and national parks are not given recognition on this map and are incorrectly depicted as Park and Recreation reserves. This diminishes the conservation significance of these areas to the reader. Further, Down Road Nature Reserve is incorrectly shown as Public Purpose (incl. Railways), not as a nature reserve. The status of these reserves should be amended, as it could be interpreted as downplaying the conservation significance of these reserves.

This comment has been noted.

Flora

5.13 The numbers shown on Figure 6.10 (pg 133) are not labelled and should be identified as flora sampling quadrats.

This comment has been noted.

6.3 EPA Guidance 6: Rehabilitation and Terrestrial Ecosystems also needs to be referred to in the Executive Summary Table S3, with regard to the applicable standards for decommissioning and rehabilitation.

This comment has been noted.

The following minor issues have been identified in the PER document:

- The word ‘Conservation’ needs to be added into the extended EPDC Act Reference on pg 144;
- Figure 6.10 is not very clear; the grey needs to be represented in the legend, and the proposed development area indicated;
- *Eucalyptus occidentalis* is misspelt on Figure 6.11;
- Figure 6.13 is poorly annotated and no key/legend is provided;
- Figure 6.16 should read ‘fauna sites’, rather than ‘flora sites’;
- *Cortaderia selloana* is misspelt on pg 151; and
- *Eucalyptus staeri* should use a small ‘s’ on page 257.

These comments have been noted.
Fauna

6.7 The following technical errors have been identified in the fauna sections of the PER:

- *griseoventer* misspelt twice on page 154, twice on page 158;
- *geoffroyi* misspelt on page 154;
- *fusciventer* is misspelt on page 158 and page 170;
- *gouldii* misspelt on page 158;
- *eyrie* and *pelobatoides* misspelt on page 159;
- *apicalis* misspelt on page 169;
- *naso* and *Sterna* are misspelt on page 172;
- Why are two subspecies of Western Whipbird included on page 172. This conflicts with the fauna appendix;
- Why is the threatened subspecies of xanthogenys for Western Rosella included on page 174? This conflicts with the fauna appendix; and
- The heading category for the Western False Pipistrelle and the Australian Bustard on page 179 do not accord with the correct Priority status given in the subsequent text.

These comments have been noted.
9.0 Figures

Figure 9.1  Pipeline Route and Locations of Priority Flora.
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Figure 9.2  Mine Site Infrastructure, Vegetation Units and Locations of Priority Flora.
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Red: Predicted extent mine-site infrastructure

**Figure 9.3**  Bluff Knoll Summit (View Location 30).
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Figure 9.4  Panorama of View to the North from Possession Point (View Location 20).
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Figure 9.5 Possession Point Panorama Depicting Proposed Land Reclamation and Port Infrastructure (View Location 20).
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Figure 9.6  View of Entrance to Princess Royal Harbour.
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Figure 9.7  View of Entrance to Princess Royal Harbour Depicting Proposed Land Reclamation and Port Infrastructure.
## 10.0 Tables

**Table 10.1 Priority species located on the mine site and percentage impacts.**

<table>
<thead>
<tr>
<th>Priority Species</th>
<th>P Status</th>
<th>Mine Site Populations</th>
<th>Pipeline and Port Populations</th>
<th>% KNOWN Populations Impacted</th>
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</thead>
<tbody>
<tr>
<td>Commersonia</td>
<td>DRF</td>
<td>1 population area (0 extant)</td>
<td>-</td>
<td>20%</td>
</tr>
<tr>
<td>Chordifex leucoblepharus</td>
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<td>2</td>
<td>-</td>
<td>8.69%</td>
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<tr>
<td>Chordifex ornatus</td>
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<td>2</td>
<td>-</td>
<td>16.67%</td>
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<td>Microcorys lenticularis</td>
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<td>1</td>
<td>-</td>
<td>4.35%</td>
</tr>
<tr>
<td>Monotoca aristata</td>
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<td>2</td>
<td>-</td>
<td>7.41%</td>
</tr>
<tr>
<td>Acacia bifaria</td>
<td>3</td>
<td>1</td>
<td>-</td>
<td>4.55%</td>
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<td>2</td>
<td>1</td>
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<tr>
<td>Dryandra calophylla</td>
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<td>2</td>
<td>-</td>
<td>4.55%</td>
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<td>Goodenia filiformis</td>
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<td>3</td>
<td>-</td>
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<td>Latrobea recurva</td>
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<td>Petrophile longifolia</td>
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<td>-</td>
<td>10.71%</td>
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</table>
11.0 References

