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A SUSTAINABLE ENVIRONMENT

Our Resources, Our Industry, Our Environment



THE CHAMBER OF
MINERALS AND ENERGY
OF WESTERN AUSTRALIA INC.



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GOLDEN GECKO AWARDS FOR ENVIRONMENTAL EXCELLENCE

Some of the case studies featured in this publication have been awarded the Department of Industry and Resources (DoIR) Golden Gecko Awards for Excellence in the Minerals and Petroleum Industries. DoIR instigated the awards to recognise excellence and leadership and to acknowledge the outstanding contribution recipients have made to balance environmental responsibility with the successful development of Western Australia's resources.

A Golden Gecko Award symbolises company or individual commitment to go far beyond basic compliance with regulations, and provides public and industry recognition for their efforts. By recognising these advances and innovations in environmental practice by the minerals and petroleum industries, the Department seeks to encourage continuous improvement throughout the industry and to develop and maintain community confidence in the compatibility of mining and environmental management. The awards also provide an opportunity to pass knowledge on to others, helping improve environmental management across the industry.

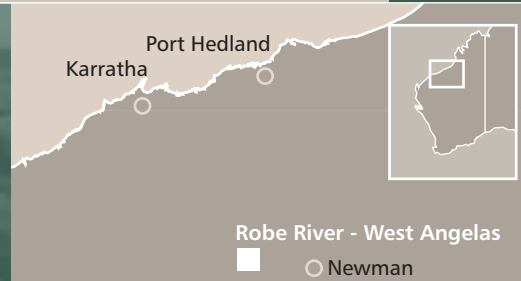


The Chamber of Minerals and Energy of WA would like to thank Newcrest Mining Limited, Robe River Iron Associates and Wesfarmers Premier Coal Limited for supplying the photographs that appear on the front cover.



ROBE RIVER IRON ASSOCIATES

Southern Spur - Construction of a Low Impact Railway



Robe River Iron Associates (Robe) was awarded a Certificate of Merit in the 2003 Golden Gecko Awards in recognition of excellence in environmental management throughout the detailed planning, construction and associated rehabilitation of the West Angelas Southern Spur Rail Project.

The construction of the West Angelas Southern Spur Railway, through an area of difficult terrain and high environmental value, was carried out to an exceptionally high standard and sets a new benchmark for the construction of low-impact railways.

Robe’s approach involved detailed planning, tight procedural controls, open communication and cooperation with contractor companies and government agencies. This ensured the protection of significant vegetation association and priority species along the selected route.

The Southern Spur Rail is a 49 kilometre rail line which connects Robe River’s West Angelas iron ore mine, one of the Pilbara’s newest iron ore mines, to Hamersley Iron’s main railway.

Robe River is a dynamic mining joint venture widely regarded as one of the world’s most cost effective, consistent and reliable suppliers of iron ore. Robe River is committed to minimising the impact of its operations through responsible environmental management and performance.

The Southern Spur Rail Project

The Southern Spur section of the West Angelas Rail was built in a unique and environmentally sensitive landscape, running through the Coondewanna Flats.

The project involved numerous companies, including Robe as the client, North Major Projects as the project manager, ecologia as environmental consultants, Fluor Australia as the main contractor for detailed planning, engineering, procurement and construction management and Henry Walker Eltin for earthworks and drainage construction. The number of organisations involved created a challenge in that there needed to be extremely good communication throughout the extensive project.

There were also significant environmental challenges posed and these were successfully managed in all stages of the project from planning, approval, letting of contracts and construction.

	Coondewanna West	Mt Robinson
Length (km)	42.5	52.4
Rail formation area (ha)	61	81.7
Total impact area (ha)	163.7	257.4
Number of vegetation associations directly impacted	21	14
Number of vegetation associations unique to section	29	14
Aboriginal custodians preference	Preferred	Significant concern
Greenhouse gas emissions (CO2 tonnes for 25 year period)	101,302	124,899
Visual amenity impact from tourist lookout	Low	High



Nature of the Challenge

Rail Route Selection

During the original planning of the West Angelas project and the rail projects, two routes were considered for the last section of the rail into the mine site. These were known as the Coondewanna West route and the Mt Robinson route.

A study into the two routes found that the Coondewanna West Route had significant advantages over the Mt Robinson route (see table). Whilst the Coondewanna West route was the most appropriate because of the lower overall land disturbance due to shorter distance, lower estimated greenhouse gas emissions for railing iron ore and a reduced impact on Aboriginal heritage sites, the potential impact on priority flora species in the area was of concern.

Robe developed a detailed management plan which outlined how the impact on this priority species could be reduced and submitted this to the EPA. The Coondewanna West rail route was finally approved subject to the on-going involvement of the Department of Conservation and Land Management (CALM) prior to ground-disturbing activities and the project strictly adhering to the plans submitted.

Priority Flora Species Protection

The plan identified that the Coondawanna Flats region is made up of tussock grassland and Mulga scrub. Good examples of the grasslands found in the Coondawanna region are relatively

rare as they are usually affected by pastoral activities or feral animal invasion.

Significant flora was also identified, including *oleara fluvealis*, which is known to exist in three areas within the project. *Oleara fluvealis* is a shrub of around 0.5 metres in height that has blue, purple, white or yellow flowers from April to May.

When priority flora was located close to the construction corridor, to prevent any disturbance to the plant, it was mapped by a botanist and tagged for clear identification. The drainage area of the plant was fenced off from the construction corridor, with an additional three to five metre buffer. This approach, taken to minimise the area of disturbance, resulted in reducing the width of the corridor from 200 metres to approximately 40 metres.



Priority flora sites along rail corridor were fenced and tagged with pink flagging for clear identification.



This image, which was taken in August 2001, shows the workshop area and one of the borrow pits used for the rail construction.



This image, which was taken in March 2003, shows the same area after one year of rehabilitation work.

This measure ensured the protection of the oleara fluvealis species from construction activities and no disturbance was made to this priority species. The potentially adverse impact on another rare flora species was also avoided.

Minimising Environmental Impact During Construction

As well as the priority flora species protection, care was taken to minimise the overall environmental impact within the construction corridor (the area of greatest disturbance), both during construction and for the long term operation of the railway.

This involved taking steps to minimise impact on areas through careful selection and management, progressively rehabilitating areas that had been cleared and managing the potential impacts to drainage to minimise the effect of water flows on the surrounding flora.

Selecting and Minimising Impact on Land

A detailed survey of the route for the railway and of 'borrow pit' areas was undertaken which included extensive heritage and environmental surveys of the planned areas.

Borrow pits were used to provide fill for the infrastructure such as roads and railways. There was close consultation and cooperation with CALM for the selection of the borrow pit locations. The location of each pit was determined after looking at the way in which the surface water flows as well as attempting to follow natural topography and considering the appearance of the area after it had been excavated and rehabilitated. Robe had planned to create 24 borrow pits, however because the use of each active borrow pit was maximised, it resulted in only 16 being created, a significant saving not only in cost but in minimising land disturbance.

Boundaries for construction of the railway and the borrow pits were marked and the areas containing priority flora or Aboriginal heritage archaeological sites were fenced to physically ensure there was no disturbance. The boundaries and fencing of important areas helped to ensure that all activities relating to

the construction of the railway were kept within restricted areas and therefore disturbance was kept to a minimum.

Of the available construction corridor area, only around 20 per cent was actually cleared for the project. Activities were maintained well within the corridor limits, with the widest area cleared being only 50 metres. However most sections were only 25 metres wide. Further, approximately 25 per cent of the cleared area has now been rehabilitated.

Progressive Rehabilitation

The implementation of progressive rehabilitation along the rail line and borrow pit areas reduced impacts.

Existing roads and other areas that were no longer being used were rehabilitated, this included some pre-existing tracks and fence lines which were realigned due to the rail project. Of the areas that remained every effort was made to maximise their use. For example, instead of clearing more land for a second workshop the old culvert manufacture and laydown area was used.

Borrow pits were progressively rehabilitated by first backfilling with all available excess material and shaped to match the original surface topography as closely as possible. Due to a higher degree of success in rehabilitation of plants using the first few metres of soil (topsoil), efforts were made to preserve existing topsoil. All excess topsoil and vegetation from under the railway embankment was hauled to the borrow pits and this, including material retained from the borrow pits, was re-spread over the borrow pit areas.

Potential Impacts on Drainage

The interruption of sheet wash water flows, due to construction, and subsequent impact on the vegetation because of the changed water flow pattern was of concern.

To counter the problem Robe conducted extensive planning, taking into consideration current and expected rain events. This involved constructing sufficient culverts that allowed for

drainage under the railway. This prevented the development of surface or sheet flow shadows downstream, or excessive pooling on the upstream side. As a result more culverts were installed than what was typical industry practice to ensure sufficient drainage.

The access road across the Coondewanna Flats was raised, also to enable culverts to be built under the road. This reduced impacts on water sheet flows (and potential impacts on Mulga) on Coondewanna Flats.

Drainage issues have arisen in other rail construction projects in the Pilbara. In the early 1990's these issues were not well understood, but since then our awareness and methods for dealing with drainage have improved. The West Angelas Southern Spur Rail has set world's best practice for minimising the impact on natural drainage patterns from rail construction.

Community Awareness and Participation

The project manager held community information sessions on behalf of Robe in Wickham and Newman. These sessions, together with community information bulletins provided information about the Southern Spur, and gave local residents an opportunity to discuss aspects of the project.

Consultation with local aboriginal groups continued throughout the project, specifically in relation to the changes to the rail project, involvement with the heritage surveys and amendments to the Native Title agreement to facilitate the changes to the rail

project. Several on-site meetings were held with representatives of the local aboriginal communities to address heritage issues and ensure that disturbance could be minimised. The rail route was re-aligned to avoid a significant Aboriginal heritage site, which remained undisturbed by the project. To avoid this site completely, the track alignment was shifted 50 metres, which resulted in six kilometres of the route being modified. Other heritage sites identified were fenced off for protection.

Learning for the Future

The Southern Spur Rail Project has set a new industry benchmark for the construction of a low impact railway.

As a result of the project, Robe identified several key outcomes that can be applied to future infrastructure development in the Pilbara and elsewhere. Such learning experiences are fundamental in the continual improvement of rehabilitation programs and environmental performance. For Robe, these areas included the importance of preserving topsoil for use in progressive rehabilitation, effective water management, planning for minimal disturbance and reviewing environmental performance.

The measures taken to minimise impact on the surrounding environment at the Southern Spur Rail Project were in excess of the regulatory requirements that have applied to previous rail constructions in the Pilbara and have paved the way for future developments.



The Southern Spur Rail Project has set a new industry benchmark for the construction of a low-impact railway.