Jobs in the pipeline

Chris Grove, Publications Officer, Forest Practices Authority

Current and former forestry workers have found employment in the Arthurs Lake Supply Pipeline project, near Tunbridge. Skills gained working under the forest practices system have proved beneficial to workers seeking employment outside traditional forestry, and the project has shown that the forest practices system functions well when applied to other forms of development.

The Arthurs Lake Supply Pipeline project

The Arthurs Lake Supply Pipeline project is constructing a pipeline to carry irrigation water from Arthurs Lake, in the Central Highlands, to farmland in the southern midlands. The project is complex; it crosses private land, State Forest, and land managed by the Parks and Wildlife Service and so it requires 14 forest practices plans (FPPs).

Clearing of the 25 m wide pipeline corridor has just been completed and the cleared vegetation has been heaped at the side of the corridor. The pipeline will be buried below the surface, even down the steep escarpment of the Tunbridge Tiers, except where a few creek crossings will require the pipe to be supported on a bridge. Excavators are currently digging the trench, laying the pipe and re-filling the trench. They are GPS-assisted, enabling the excavator operators to accurately locate the trench and give it 700 mm top cover.

The cleared vegetation will be heaped down the centre of the pipeline corridor once the pipe has been laid. The vegetation piles will be burnt some time before June, with post-fire checks for embers. Any heaps with hot-spots will be spread and doused with water to prevent them starting fires in the summer.

There will be a rough 4-wheel drive access road directly over the pipeline and the rest of the corridor will be revegetated, as prescribed in the FPPs.

The planning process

The forest practices system has helped achieve good environmental and cultural management outcomes for the project through the forest practices plan (FPP) process. The pipeline project required FPPs because forest had to be cleared to enable pipeline construction. FPPs are prepared in accordance with the *Forest Practices Code* and provide details of the operation area and prescriptions for the protection of natural and cultural heritage values, planned harvest systems and reforestation. The Tasmanian Environment Protection Authority and the federal government also required environment plans for the project.

Pipeline fact file

- The pipeline was initiated by Tasmanian Irrigation Pty Ltd. Contractors Fulton Hogan, a Melbourne-based civil and resources contractor, won the contract to design and construct the pipeline from Arthur's Lake to the hydroelectric plant.
- The project is part of the Tasmania Midlands Water Irrigation scheme which aims to support the expansion of agriculture in the Tasmanian midlands through delivering water to 55 000 ha of irrigable land between Ross and Kempton.
- Currently under construction, the project will pump up to 38 500 ML of water annually from Arthurs Lake through a 33 km long underground pipeline to a new mini hydroelectric power station and storage regulation dam west of Tunbridge at the base of the Western Tiers.
- The power generated by the hydroelectric station will be used to pump the water through a combination of pipelines and natural rivers to farms, where it will be used for irrigation.
- The pipes are 1 m in diameter, are made from ductile iron with cement lining and will be connected by rubber seals.
- The area cleared for the pipeline corridor is 25 m wide but the forest practices plans cover a construction corridor 100 m wide and also include access roads.
- Clearing of the corridor was completed in May 2013 with an average width of just less than 25 m. The project is on track to be completed by December 2013.
- The project is funded approximately equally by the Tasmanian Government, the Australian Government and by local farmers.

Due to the complex nature of the project, a very thorough planning process with multiple checks was carried out. Before planning began, Tasmanian Irrigation commissioned reports from experts on special values such as geology, cultural heritage and biodiversity. Forest Practices Officer (FPO) Lyell Dean developed the FPPs and Rob Scott was the FPO representative 'on the ground'. Lyell worked with FPA specialists to develop prescriptions to manage the special values identified in the area.

'This project was a very carefully planned process', Lyell said. 'There was a lot of complex information to be reviewed and incorporated in the FPPs to ensure compliance with the *Forest Practices Code*. There are elements in civil construction projects which are similar to forest management, such as minimising impacts on soil, water, biodiversity and cultural heritage.'

Dennis Lewis, the project's Community Liaison Manager, also has a forestry background. 'The project is just like a long road line clearing except that there is going to be a pipeline down the middle. We had to upgrade some existing roads for this project and it can be difficult determining where road maintenance finishes and road construction starts. I still refer to the *Forest Practices News* article in June 2000 which gave guidance on this issue and I know a lot of other people refer to it as well.'

Describing the planning process under the forest practices system, Dennis said, 'Where there has been an issue and we have called in an FPA specialist, in almost every case the issue has been resolved to our mutual satisfaction through negotiation and working out effective solutions. There is a mutual respect between practitioners and FPA specialists. I think this is one of the strengths of the forest practices system. There is engagement with practitioners, rather than sending down edicts to the people on the ground that have the responsibility to implement these things. This means that we understand why the prescription is there, because we were part of the process.'

Dennis Lewis

Dennis worked as a road surveyor with the Forestry Commission from 1972 to 1986 and then worked with various forestry companies and as a private consultant. 'My forestry experience has certainly helped on this project, especially having the forest practices quarry ticket', Dennis said.

There have been many changes in forestry since Dennis started work, the most significant being the introduction of the *Forest Practices Code* in 1987. 'Most of my colleagues were pleased by the introduction of the code', Dennis said. 'People wanted to be part of a system which allowed their input though discussion and adaptive management.'

Lyell Dean

Lyell Dean prepared all the 14 FPPs required for the pipeline. He has worked for 25 years in forestry; 19 years with Forestry Tasmania before working with Forest Enterprises Australia and then starting his own business as a private consultant.

'I'm keen to do this sort of work again and I really enjoyed the challenge of incorporating civil construction into a forest environment with good forest practices outcomes delivered through the FPPs. One of the good things about the forest practices system is the opportunity for FPOs to update their skills as the system evolves,' Lyell said. 'It's a robust, practical system with foresters and specialists working together to continually improve it.'

Managing special values on the Arthurs Lake pipeline project

Water

The pipeline crosses various areas requiring prescriptions to protect their water values, ranging from drainage depressions to class 1 streams. Measures were developed to keep the impact on water to a minimum, including:

- trees to be felled parallel to the pipeline and not into the adjacent forest or into watercourses
- storage areas to be situated as far from streams as practically possible
- construction in the streamside reserves (SSRs) to only take place in dry weather
- disturbance and sediment entering the watercourse to be kept to a minimum
- bridges to be built to carry the pipeline over class 1 streams
- the SSRs to be rehabilitated after the pipeline is in place.

Soil

The steep slope from Tunbridge Tier to the plains averaged about 25 degrees, making it a potential landslip zone. Fulton Hogan took the extra step of commissioning a specialist geotechnical report to assess the stability of the steep slope from Tunbridge Tier to the plains. This information was used by the FPA specialist and the FPO to develop prescriptions such as:

- construction to be undertaken in a dry period
- clearing of vegetation to be minimised and stumps left in place if possible
- the area to be rehabilitated as quickly as possible
- surface run-off to be managed
- trenches in or alongside Class 4 streams and drainage depressions to be avoided.

Cultural heritage

Several Aboriginal sites found along the pipeline were managed with a 20 m exclusion zone. The plans specified that work should stop within 30 m of any other sites found during the operation and a report should be made to the FPO who was required to seek advice from the FPA.

Biodiversity

The pipeline corridor crossed several threatened native vegetation communities and wildlife habitat strips and included many threatened species, both plants and animals. Prescriptions to protect these biodiversity values were tailored to each circumstance but primarily these species and communities were avoided where possible by realigning the pipeline.

Where this was not possible, prescriptions included these principles:

- restricting the operation area to the 25 m pipeline corridor
- exclusion zones around threatened plants and animals
- aligning the pipeline to cross threatened native vegetation communities and wildlife habitat strips at right angles
- felling trees parallel to the corridor to prevent damaging neighbouring forest
- scheduling operations according to threatened species' life-cycles, such as not burning during the ptunarra brown butterfly breeding season from late February to early April
- careful fire management to prevent fire escaping
- prescriptions to avoid the introduction of weeds and pathogens, such as *Phytopthora cinnammomi*
- informing the contractor about threatened species and requiring operations to cease within 100 m of a suspected species, a 20 m exclusion zone to be established and the FPA to be consulted.

Tasmanian devil

A good example of this process of prescription development was the new prescription to protect potential Tasmanian devil habitat developed by the FPO and the FPA. This involved returning the corridor as close to its natural state as possible to by:

- moving off the operation area any large logs with hollows and then relocating them when operations are over, checking first during the breeding season (March to May) to see if they are being used as breeding dens
- consulting the FPA if a den is discovered during operations
- protecting sites with a diversity of potential devil refuges in streamside reserves, wildlife habitat clumps and rocky outcrops
- retaining mature, dry logs for habitat.

Tasmanian devil. Photograph by Dydee Mann

The operation

Once the FPPs were ready, Rob Scott marked the pipeline corridor and exclusion areas and then walked through the area with the contractors ensuring that they understood the plans. This is a critical stage in the forest practices system; a comprehensive FPP only achieves planned outcomes if contractors interpret and apply it correctly.

Dennis Lewis, the project's Community Liaison Manager, says that the project managers have told him that ex-forestry workers make the best workers. 'They are appreciated for their reliability, work ethic and skills such as map reading, following plans and understanding of accountability,' Dennis said.

The Kevin Morgan group of companies was contracted to prepare and rehabilitate most of the pipeline corridor. Richard Morgan explained the process. 'This involved recording the location of habitat logs with a GPS, placing marketable timber aside for harvesting, clearing the rest of the vegetation to the side of the corridor, heaping it back in the centre of the corridor when the pipe had been buried, returning the cleared area to its original contours, replacing top soil where applicable and returning the habitat logs to their original position. Although it was a complex operation, our knowledge of working with the forest practices system made working on this project a walk in the park because we are familiar with the regulation.'

Craig Broadhurst is an excavator contractor digging the pipeline trench who used to run a logging contracting company. 'My experience in forestry has been useful because I'm dealing with the same sort of guidelines and issues in this construction project as I did with forestry,' he said.

Once the contractors have heaped the vegetation back in the corridor, Forestry Tasmania is engaged to manage burning the heaps on State forest and Parks and Wildlife Service land, whereas one private landowner has decided not to burn but to spread the slash over the cleared corridor.

After burning, natural regeneration will be monitored and locally collected seed will be used where necessary. Peter Williams, of Forestry Tasmania, said that Forestry Tasmania will survey the regeneration on State forest. 'Even though this is not a traditional forestry operation, Forestry Tasmania still needs to ensure that we are complying with the requirements of the forest practices system, including natural regeneration standards.'

Craig Broadhurst

Craig Broadhurst is a contractor who carried out excavation work on the pipeline. He ran a logging contracting company which employed six people but he had to break up the company when Gunns shut down Longreach a few years ago. Most of the workers went to the mainland for work. Craig didn't qualify for the government grants to get out of harvesting as only 45 per cent of his business was on State forest, rather than the required 50 per cent. He sold most of his machinery and kept two excavators, on which he has spend around $20 000 re-tooling. 'This project has been a blessing in disguise', Craig said. 'I needed to do something because I didn't qualify for the pay-out. I'm hoping that I'll get some more work on construction projects like this one.'

The excavators digging the pipeline channel were GPS-controlled (lower right) from a base station (lower left).

Monitoring compliance

The extent to which operations comply with the FPP is monitored on several levels in the forest practices system; the FPA carries out annual assessments on a random sample of FPPs but the first level of compliance checks is carried out by the supervising FPO. This means that compliance issues are often picked up and addressed before they become a serious problem. They are then reported to the FPA and corrective measures are agreed on.

During the clearing stage of this project, a compliance issue was picked up early on due to the diligence of the contractors on site. A minor accuracy issue was found with corridor clearing which resulted in an improved methodology used on the remainder of the pipeline corridor and ensured that Tasmanian Irrigation conducted the works in accordance with the FPA and Commonwealth approvals.

Staff from Technical Forest Services, including FPO Rob Scott, marked out the corridor using a sub-metre GPS system with Omnistar real time correction and the cleared corridor width was then self-audited and was also audited by a registered surveyor. This process highlighted an issue with the accuracy of sub-meter GPS technology under thick canopy. Rob explained, 'It was found that under very thick canopy, such as in tea tree forest with no clear sky view, accuracy drifted out from under a metre to about 2–3 m. This meant that the corridor was about 2 m wider than it should have been for less than a 100 m out of a total length of over 33 kms.'

A new technique was developed to ensure compliance and accuracy of marking under very thick canopy. A dozer cleared a rough centreline 5–8 m wide in the middle of the corridor. This resulted in good satellite coverage and the edges of the corridor were then marked using a range finder.

Rob made contact with the surveying company doing the audits and enquired if they had managed to obtain better accuracy under the tea tree canopy as they had a mobile base station on site. However, the surveyors had found that even with their $30,000 + system, accuracy was not much better than about 2–4 m under thick canopy.

'This situation was a bit unusual as the engineering of the pipeline required a greater level of accuracy than most forest practices,' Rob said. 'But the situation also shows that the skills gained through working in the forest practices system are transferrable to other projects. Technical Forest Services has been involved with several construction projects in the state which have also helped keep staff employed during the down turn within the forestry industry in Tasmania'.

Rob Scott

Rob Scott, from Technical Forest Services, was contracted to mark out the pipeline construction corridor and all the special value areas, including historical and aboriginal sites, threatened fauna areas and stream side reserves and crossings.

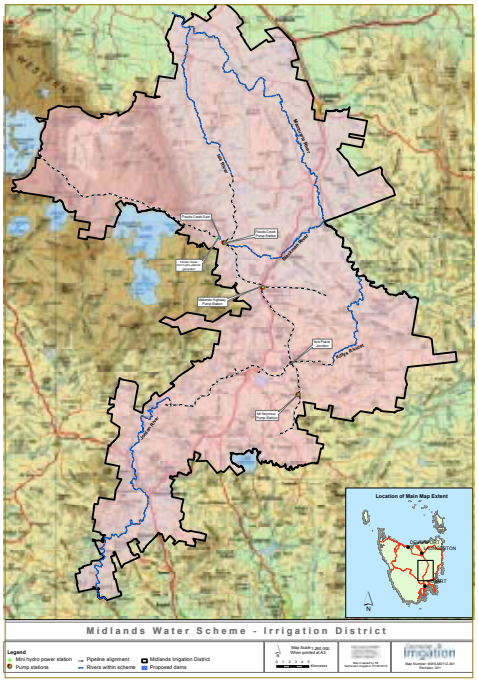
Author's contact:

Chris.Grove@fpa.tas.gov.au

Reference

Wilkinson, G, Hoffman, O and Mitchell, C 2000, 'When does road upgrading become road construction?', *Forest Practices News*, vol 2 no 4, Hobart, Tasmania.

http://www.fpa.tas.gov.au/__data/assets/pdf_file/0007/58165/FPN_June_2000_vol_2_no_4.pdf



Map courtesy of Irrigation Tasmania