Well licence application, Gingin

Report and recommendations of the
Environmental Protection Authority

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Well licence for conventional horticulture, Lot 6 Gingin Brook Road, Gingin

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The proposal

The Environmental Protection Authority has received a proposal which involves an application for a well licence to pursue conventional sprinkler irrigated horticultural production within the Gingin Brook - Moore River catchment.

This proposal is located at Lot 6 Gingin Brook Road, Gingin, and it is proposed to establish 1.2 hectares of fruit and citrus trees, along with 0.5 hectare of vegetable market garden. The proponents have undertaken to perform soil and plant analyses to amend the levels of fertiliser applied. After the third year, fertiliser applications to these trees will be based solely on soil and plant analyses. Once the fruit trees are established and producing fruit for market, the proponent will convert to hydroponics for vegetable production.

The existing environment

Like the Peel-Harvey Estuary, the Moore River estuary and catchment system is located on the Swan Coastal Plain. As with many waterbodies in this region they currently contain significant quantities of both nitrogen and phosphorus, resulting from a number of circumstances:

- there has been extensive clearing of native vegetation (65 - 80%);
- agricultural development, and therefore fertiliser use, has been continuous and extensive along the Coastal Plain;
- soils along the Coastal Plain are valued for intensive horticulture;
- the soils of the Coastal Plain are sandy and have only low potential for adsorbing mineral nutrients; and,
- urban and residential development is concentrated on the Swan Coastal Plain.

At present, the Moore River Estuary is nutrient enriched. However, the large algal blooms experienced in the Peel-Harvey Estuary have not occurred as the waterbody contains significant qantities of tannin, a substance which stains the water and reduces light penetration to bottom growing (benthic) algae. Nutrient concentrations in the Moore River have been measured by Bott and Maling (1989) and found to be similar to the catchment concentrations in the Peel-Harvey system. The nitrogen:phosphorus ratios measured in the Moore River Estuary are considered optimal for phytoplankton growth. As phytoplankton is suspended in the water column its growth is not limited in the same way as benthic algae. Under suitable environmental conditions these waterbodies can alter rapidly and suspended algae (phytoplankton) can proliferate.

It is estimated that the peak nutrient load of the catchment is yet to be experienced and that over the next 5-10 years nutrient loadings and proportions will increase. As the nutient load increases so do the opportunities for massive algal blooms. In the Peel-Harvey estuarine system this excessive algal growth has greatly reduced the estuary's recreational, environmental, social and economic value.

Environmental impacts

The Authority has given consideration to the basic nature of irrigated agricultural practices on the coastal plain as it currently exists and the potential for ameliorating its environmental impacts. In this regard the Authority is aware that:

- nutrient application rates for irrigated crops are generally much higher than those for non irrigated crops (EPA, 1990);
- Western Australian Department of Agriculture surveys have revealed nutrient applications far in excess of recommended rates and that vegetable crops only use a small proportion of the nutrient that is applied (EPA, 1990);
- recent research by the Western Australian Department of Agriculture has indicated that by changing the irrigation method from sprinkler to trickle irrigation, water application could be reduced by 56% and nitrogen application could be reduced by 80% for the same yield (tonnes per hectare) of rockmelons (McPharlin, 1990 cites Luke and Cakler, 1990);

- the existing severe algal problems in the Peel-Harvey Estuary have been caused by average phosphorus applications of the order of 10-15kg per hectare annually;
- the Environmental Protection Authority has received a number of complaints from landholders with grossly polluted groundwater. In most cases the contamination has been linked to nutrient intensive horticulture nearby;
- recent local research on market gardens (Sharma, 1990) has indicated that significant proportions of applied phosphorus (70%) and of applied nitrogen (44%) were leached below the crop root zone;
- irrigation of crops on the sandy soils of the Peel-Harvey coastal plain catchment to which large quantities of phosphorus are applied can cause the nutrient leaching problem to occur more quickly (EPA, 1990); and,
- drainage waters from irrigated clay and loam soils have been shown to have much lower phosphorus concentrations, however the water yield or runoff from these soil types is much higher. As a result the total discharge of phosphorus from irrigated clay soils can be significant due to the total water yield (Technical working Group, 1990). This could be a result of higher applications of nutrients or insufficient management of irrigation tailwaters.

Horticultural development through land use planning

The Environmental Protection Authority is aware that to establish a position or policy on the environmental acceptability of horticulture in the Swan Coastal Plain may create a perception of inequity for those who may have purchased land with the expectation of using it to pursue horticultural practices. It should be noted, however, that prominent publicity has been given to the fertilizer and nutrient related problems of the area over more than a decade, particularly within the Peel-Harvey Estuary and its catchment. Therefore ignorance of the Swan Coastal Plain's problems and constraints should not be an issue.

The matter of perceived inequity will continue unless land use planning authorities assume a strategic and policy oriented approach to directing land use. The Shire of Gingin, in conjunction with the Environmental Protection Authority, is currently developing an horticultural policy for that municipality. The aim of this policy to establish horticulture in areas removed from sensitive water resources and where the soils are capable of adsorbing excess nutrients. Through development and implementation of such a land use planning policy,

- potential detrimental environmental impacts may be avoided;
- developers will understand their opportunities within a policy framework; and,
- speedy and equitable land use decisions can be made.

The Water Authority of Western Australia has established that approximately 60% of the current groundwater resource available for horticulture in the Swan Coastal Plain is located within the Gingin Shire. As the demand for horticultural produce increases over the next 5-10 years considerable pressures will be placed on the land and water resources within the Gingin Shire. Unless an environmentally sensitive approach is taken to land use planning in this area, the municipality's waterways and community may experience the same intractable environmental, recreational and social problems that have resulted in the Peel-Harvey Estuary.

Assessment of the proposal

The Authority has assessed the proposal on the basis of:

- information provided to the Authority by the proponent and in the well licence application;
- discussions with the proponent by officers of the Environmental Protection Authority;
- the Authority's knowledge of current horticultural practice and its environmental effects; and,
- the Authority's knowledge of the current status of the Moore River and associated catchments.

During the assessment the Authority consulted with the Water Authority of W A, the Department of Agriculture, the Shire of Gingin and the proponent. No public comment on the proposal was received during the public review period.

Conclusion and recommendations

The Authority has assessed the proposal on the basis of the information provided in the well licence application, discussion with the proponent and the Authority's knowledge of current irrigated agricultural practice. On the basis of this assessment the Authority concludes that the proposal is environmentally acceptable, and recommends the following.

Recommendation 1

The Environmental Protection Authority concludes that nutrients and irrigation could be managed adequately at Lot 6 Gingin Brook Road, Gingin and recommends that the proposal is environmentally acceptable. The Environmental Protection Authority therefore recommends that this proposal could proceed, subject to the recommendations in this report. Accordingly, the Authority also recommends that a well licence be issued.

Recommendation 2

The Environmental Protection Authority recommends that a Western Australian Department of Agriculture approved irrigation and fertilizer regime be used, and that fertilization be in accordance with Western Australian Department of Agriculture recommendations arising from annual soil testing. This should be to the satisfaction of the Environmental Protection Authority.

Recommendation 3

The Environmental Protection Authority recommends that the proponent plant trees along drainage lines to the satisfaction of the Environmental Protection Authority. The trees species to be used should be selected by the Western Australian Department of Agriculture.

The Authority believes that any approval for the proposal based on this assessment should be limited to five years. Accordingly, if the proposal has not been substantially commenced within five years of the date of this report, then such approval should lapse. After that time, further considerations of the proposal should occur only following a new referral to the Authority.

The Authority's experience is that it is common for details of a proposal to alter as it is established or implemented. In many cases alterations are not environmentally significant or have a positive effect on the environmental performance of the project. The Authority believes that such non-substantial changes, and especially those which improve environmental performance and protection, should be provided for.

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