

SUMMARY IEE REPORT

1 INTRODUCTION

The RMIT International University Vietnam (RIUVN) is to be established in Ho Chi Minh City (HCMC) on a site within the Saigon South Development. In March 2000 an Initial Environmental Examination (IEE) was undertaken to determine whether or not significant environmental impacts warranting assessment are likely. The IEE was based on (i) a consultant's site assessment study in February 1999¹; (ii) an assessment of infrastructure requirements²; (iii) an analysis of the socio-economic impact³; (iv) a review by an environmental specialist⁴; and (v) an assessment by a study team in Vietnam led by Dr Le Trinh, Vice President of the Vietnam Association for Conservation of Nature and Environment (VESDEC). This document is a summary of the IEE.

The Project has been advised by the HCMC People's Committee that under the Ministry of Science Technology and the Environment (MOSTE) guidelines, no reporting is required on environmental effects since this is considered to be an education project. The Committee has also advised that based on Item 2, Article 39 of the Decree No. 12/CP of 18 February 1997 on implementation of the Law of Foreign Investment in Vietnam, reporting on environmental effects is not required. However the investor is required to explain activities which may have environmental impacts, and to provide solutions and commitment to mitigate impacts during construction and operation.

2 DESCRIPTION OF THE PROJECT

This project involves the establishment of a new university campus on a 62 hectare site within the Saigon South Development approximately 5 kilometres south of HCMC. The campus site was designated as the site of a university in the Saigon South Master Plan which has been approved by the Government of Vietnam. The master plan was developed to provide HCMC with the necessary amenities, services and infrastructure to accommodate a projected increase in population to 10 million.

¹ by Meinhardt (Vic) Pty Ltd

² by Bonacci Winward (Vic) Pty Ltd

³ by Dr Robert Noakes

⁴ by Dr David Petch

The campus will be developed incrementally with the central nucleus of activity situated on the Ong Lon River. The main campus buildings comprising education and training buildings, an education resource centre, research and innovation institutes, a staff/administration building, a multi-purpose amenities building and staff and student housing, will be constructed in the initial stage of development to 2003. Expansion through other stages to 2007 and 2013 will occur in phase with demand. As part of the approval process for the Zone Planning Certificate, the campus master plan has been approved by the HCMC People's Committee.

The university will be Vietnam's first fully international campus, contributing to the country's development through training, education, consultancies, and research and innovation. It is anticipated that in the first year of operation the campus will have a population of approximately 2000 students and staff, growing to 9,000 by Year 10. The campus will also include retail outlets, public and recreational facilities and a range of other ancillary services.

3 DESCRIPTION OF THE ENVIRONMENT

Physical Resources

HCMC is Vietnam's largest city and major industrial centre, with a population of approximately 6 million people, most of whom live in the 18 inner urban districts. The site for the proposed campus currently consists of wetlands and reclaimed agricultural land to the east of the Ong Lon River. Elevation of the site is approximately 0.8 metres and it is subject to periodic flooding. The land is part of a river delta system, and waterways through the site are of a tidal nature. At the North of the site, the area has been reclaimed for agriculture along the Ong Lon River and inland from the River. To the East of the site, there is a small road with a high level of urban development along it.

Much of the site is reclaimed land developed by draining and the excavation or importation of fill material to build paddy levees, pathways and areas for housing. Soils on the site have levels of sulphate and are acidic. The acid nature of the soil is likely to be caused by the high levels of organic material and the waterlogged anaerobic conditions of many of the soils, but may also indicate the presence of oxidising acid sulphate soils. There are also isolated instances of heavy metal contamination. River sediments appear to be free of significant levels of contamination, but indicate pollution of waterways by fuels and oils. The subsurface conditions at the site comprise up to 15 metres of very soft organic clay, overlying further soft to firm clays.

The hydrologic factors which influence flood and water quality issues in the area are tides, releases from hydroelectric projects on tributaries to rivers within the area, rainfall-runoff to

channels and waste water discharges. The tidal range is relatively high but its yearly variation is low. Critical flood events in the Saigon South area are caused by high tides. The waterways within the Saigon South area are polluted by sewage, nutrients and litter from local residences and from HCMC. The volume of freshwater flowing down the Saigon River and other major waterways connecting to waterways on the site is so great that waterways surrounding and on the site appear to be freshwater rather than brackish or saline. Air quality on the site has been assessed as good.

Ecological Resources

The survey of ecological resources undertaken by VESDEC indicated that there are two dominant ecosystems on the site: lowlands influenced by tide and dry land along the roads. The site is covered by fresh water vegetation. In general, the number of plant species is not abundant and includes many common species. Inland fauna was not identified during the study. In terms of aquatic organisms, a number of species of *zooplankton*, *zoobenthos* and *phytoplankton* are found on the site.

Human and Economic Development

Education and training is an area of identified priority for the Government of Vietnam. As part of the process of reform, modernisation and integration with the international community, Vietnam is keen to access formal training from developed countries such as Australia. However the numbers of private students who can afford to study overseas is low compared with other Asian countries.

Vietnam has a population of 78 million, of whom 18 million live in urban areas. This figure is predicted to grow to 100 million by the year 2010 and 112 million by 2030. Trends suggest that 20% of the population is between the ages of 15 and 24 and that the number of students enrolling in secondary education is about half of the relevant age group population. This ratio is expected to increase with the improvement in Vietnam's economic situation.

One of the major challenges for Vietnam is to ensure that the system of education and training responds to the emerging demands of a growing market economy. Expansion and modernisation of the education and training system are important elements of the Government's strategy to sustain rapid economic growth and alleviate poverty. There has been a rapid increase in tertiary or higher education enrolments with an annual average rate of increase of 11.1% between 1985 and 1995. The Government target is for a 65% increase in enrolments between 1994 and 2004. A number of strategies will be required to achieve this, including user fees and private sector development as well as increased public spending. The rate of return to family investments in tertiary education is high and students

who attend colleges and universities should be expected to share significantly in the burden of costs of their education. This should help the Government to meet its medium to long term targets and reduce what must be recovered from the State budget. By encouraging private alternatives for families with financial resources, the Government subsidies already going to education will redistribute themselves automatically in favour of poorer families.

Land use on the campus site consists of areas of uncultivated marshland and rice cultivation on reclaimed agricultural land. There are several clusters of dwellings. The current occupants of the site, their livelihoods and houses, as well as land use and cultural properties, have been fully surveyed. The conditions of relocation and costs of compensation have been agreed with the HCMC authorities. To meet the costs of resettlement of the 50 households on the site and compensation for relocation of livelihoods and cultural properties, the Saigon South Management Authority (MASD) has prepared a detailed compensation plan in consultation with RIUVN. It is consistent with national regulations and HCMC decree. A full Resettlement Action Plan is being prepared through a process consistent with IFC and ADB guidelines.

4 SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impacts during construction:

Any negative impacts expected to occur during construction are no more severe than what would be expected from any construction project. Companies shortlisted for construction of the project will be required to submit evidence that the following management systems are in operation in their day to day construction activities: a Quality Management System; an Environmental Management System; and a Health and Safety Management System. Contract documents will require a site specific Environmental Management Plan to be developed and submitted for approval prior to commencement of construction.

Land Fill: A major land filling operation will be required, which may have the potential to interfere with surface hydrology. The Contractor will be required to undertake the works to ensure minimal disruption during construction and that there will be no permanent impact on agricultural practices on the areas surrounding the site. Material for the landfill will be obtained from a range of sources including sand from the Saigon River. Dredging practices will be in accordance with government regulations and the material will be tested for suitability as landfill prior to transportation to the site.

Traffic: Additional traffic will be generated during construction. Contractors will make their own temporary access roads to the construction site. The South Saigon Parkway and the

other feeder roads are adequate to handle this increased traffic without significant disruption to the normal traffic flow. Dust and vibration will be created by vehicles and equipment during the construction phase. Measures to reduce dust and vibration will be the responsibility of the Contractor. These will include the use of dust control agents such as water and the paving of roads subject to heavy traffic. Construction activities will raise noise and vibration levels. Management of these levels will be part of the Environmental Management Plan, ensuring that noise is limited to daylight hours, barriers are constructed where necessary and equipment is regularly serviced.

Disposal of sulphate rich soils: Acid sulphate soils as they occur on the site may cause problems, particularly during the construction phase. An acid sulphate soil management plan will be implemented including descriptions of the soil characteristics and the location of potentially sensitive environmental receptors such as water bodies. The plan will also include a description of the acid sulphate soil management strategies incorporating the proposed construction schedule and the volume and proposed disposal location of the acid sulphate soil. A monitoring program for soil, surface and groundwater quality; and discussion of contingency measures will be included. The measures adopted for treating sulphate soils will include: minimisation of disturbance of the soils and treatment or management of the acid sulphate soil by burial, neutralisation and separation. Treatment techniques will be based on either reducing the oxygen flux to negligible levels through burial beneath low permeability sediments or increasing the neutralisation capacity of the sediments by the addition of lime. Measures may also include allowing acid sulphate soil to oxidise but managing the leachate by its neutralisation as it runs off. This may be incorporated into landscaping with drains lined with crushed limestone or concrete to neutralise the acid being generated.

Impacts during operation:

An Environmental Management Plan will be developed and implemented in relation to activities associated with the operation of the University. This plan will include:

- details of monitoring of impacts on physical resources, human and economic development and quality of life values;
- details of measures to mitigate any anticipated negative impacts.

Traffic: The campus operation will result in increased traffic. The South Saigon Parkway, National Highway 1 and Provincial Road 15 will provide adequate links with HCMC and surrounding areas. A transportation plan will be developed for the campus to link the internal road system with these major transit corridors.

Site flooding: Hydrological issues in relation to the waterways will be addressed during the detailed design. Culverts will flush the canals twice daily with the natural ebb and flow of the tide which occurs twice daily. This twice daily flushing will prevent a build up of nutrients from effluent discharge, which could lead to weed or algae growth if not controlled by flushing. Water will flow into the canals each day as the tide rises but because the outlet culverts from the canal are set at level higher than the low tide level and also higher than the excavated depth of the canals, there will always be some water in the canals.

The maximum recorded high tide level in the streams and river adjacent to the site is 1.5 metres. The proposed fill platform for the campus is 2.5 metres with building floor levels at at least 2.7 metres. The river levees have a proposed top level of 2.5 metres. The runoff from the campus is designed to discharge entirely into the adjoining rivers and canals. A spillway set at 2.1 metres will allow water from behind the levee to flow back to the river and prevent flooding of the site. The provision of levees will allow the canals to provide some detention of stormwater runoff from the site. The runoff will be released to the river through the culverts at a reduced rate because of the restricted capacity of the culverts. This will reduce the peak runoff rate but will not change the total volume of runoff. It will lessen the likelihood of the project contributing to flooding of downstream sites during peak rainfall events.

Liquid Effluent Treatment and Disposal: A package treatment plant will cater for the first stage of the development and similar units will be added progressively to suit the future growth of the University. Primary treatment will involve screening. Secondary treatment will involve the oxidation of sewage solids by aeration and then settling out and removal of sludge. Chlorination will also be included as part of the secondary treatment when discharging directly to the canals during the wet season. Tertiary treatment will include filtering and chlorination. The treatment plant will probably be located in a landscaped zone so that it will be screened by suitable vegetation. Odour control may be required, depending on the plant's final location and adjacent land use. Additional filtration through a properly designed sand filter could be added, if the need arises. The plant will comprise separate tanks for screening, aeration and settlement. The standard adopted by the project for waste water discharge is the Vietnam Standard on "Industrial Waste Water Discharge Standards". This allows waste water to be discharged into water bodies used for sources of domestic water supply if the BOD is less than 20 mg/l and the suspended solids are less than 50 mg/l. The packaged sewage treatment plants to be installed on the campus plants produce effluent with BOD of 10 mg/l and suspended solids of 10-15 mg/l so that effluent would be of much better quality than required by the standard. The standard will be achieved by setting requirements for production of effluent in the Contract Documents, and by requiring tenderers to provide evidence of having installed similar plants producing effluent of the

required quality at other sites. With tertiary treatment, the effluent quality can be further improved to BOD of 5 mg/l and suspended solids of 2-3 mg/l. It is proposed to spray irrigate the landscaped and conservation areas of the site with effluent during the dry season. This additional treatment will assist with odour control and will also limit nutrient build up in the canals within the site which could promote algal growth. During the wet season, effluent will be disposed of directly to the internal canals.

Solid and Hazardous Waste Disposal: The campus will be serviced by the Urban Environment Company which will collect solid waste on a daily basis and transport it to an appropriate landfill site. In accordance with RMIT's Environmental Policy, the recycling and re-use of goods and materials used on the campus will be encouraged. Clean and readily identifiable receptacles for materials to be recycled will be provided. The material will be collected by recycling contractors on a regular basis. Procedures dictating the handling, storage and disposal of hazardous wastes (chemical, radioactive and clinical) will be implemented in accordance with RMIT University's Waste Management Strategy. These procedures will indicate who is responsible, methods and locations of disposal of wastes as well as monitoring to ensure compliance with the procedures. This will ensure that hazardous wastes will be stored separately from other solid wastes, and will be collected by an appropriate contractor in dedicated vehicles and using separate disposal areas. Enclosed refuse collection vehicles will be used as necessary.

Air Emissions: The services infrastructure will not include boilers. The generators used will only operate in periods of electricity failure and will have emission controls fitted in accordance with world's best practice for good commercial quality engines. If necessary to further reduce emissions, catalytic converters can be fitted to the generators. These would reduce emissions of nitrogen oxides, carbon monoxide and hydrocarbons. The air conditioning systems to be installed will not include CFC refrigerants. R22 refrigerant gas will be phased out in 2001 and thus the refrigerant selected will be chosen for optimum ecological sustainability.

Life Safety and Fire Protection: A program of monitoring and maintenance of all laboratory and workshop equipment will be developed and implemented. Procedures for working in laboratories and workshops will be documented and compliance monitored. Fuel storage tanks will be designed to meet appropriate technical requirements including location, fire prevention walls, anti-thunder systems automatic smoke and fire warning systems. The site infrastructure includes a reticulated external fire hydrant system with street hydrants

located in accordance with the Water Reticulation Code of the Water Services Association of Australia. Within the campus buildings, hose reels, fire sprinklers, fire detectors, smoke detectors, emergency warning systems and emergency/exit lighting will be installed based on Australian codes and regulations.

Ecological Impact: Development of the campus will involve loss of some wetland area but the project site is not located in the planned biologically protected zone. This Saigon South area has been designated as a development zone to be used for the construction of roads, buildings and parks. The Cangio Mangrove Forest, which is one of the best mangrove ecological zones in Vietnam, is located about 20 kilometres from the project site to the South. The project activities will not have direct impact on this forest. The design of the campus will enable retention of significant areas of the 62 hectare site as a wetland environment. Natural vegetation will be retained wherever possible. To reduce impact on the wetland areas, a series of connected elevated walkways will be constructed within the campus.

Social Impact: There are significant long term benefits of the Project in terms of human resource development, employment and economic growth in Vietnam. This will be achieved through an increase in skill levels, the creation of job opportunities during construction and operation of the campus, and the stimulus to economic activity. These benefits will be local, regional and national. They will result in increased personal/household income and therefore in increased expenditure on food, rent, transport, entertainment, clothing, education and health. Higher education and training in Vietnam will be strengthened. The University will provide a valuable model to assist Vietnamese institutions to develop appropriate flexibility in terms of curriculum, technology and methods of delivery.

5 INSTITUTIONAL REQUIREMENTS AND ENVIRONMENTAL MONITORING PROGRAM

The Board of Management of the University will be responsible for all aspects of construction and operation of the campus. This will include responsibility for implementation of the monitoring program in relation to impacts on physical resources, human and economic development and quality of life values. The Board will establish an environmental management unit to supervise and monitor the implementation of the proposed mitigation measures during the construction and operation phases. The unit will include an environmental engineer who will conduct day-to-day supervision and monitoring of the program.

The Contractor undertaking construction of the campus will be required to submit an Environmental Management Plan with the tender. Adherence to the plan will be monitored by regular inspections by RIUVN's Representative. The Plan will include details of: traffic and noise management; appropriate location of the construction camp and concrete batching plants; temporary drainage works to prevent disruption to the hydrology of surrounding areas and minimise erosion; educational programs for workers; methods of waste disposal and sanitation systems for workers; and measures to limit water turbidity during dredging activity.

Monitoring of air quality will be undertaken during construction. This will be the responsibility of the Contractor as part of the Environmental Management Plan. During the operational phase, it is intended that Environmental Engineering students will monitor air quality as part of their course work. Parameters for monitoring of ambient air quality will include temperature, humidity, wind velocity, dust sulphur dioxide, nitrogen dioxide, carbon monoxide and lead. Parameters for motor vehicle emissions will include carbon dioxide, nitrous oxide, hydrocarbons, lead, benzene, particulates and carbon monoxide.

Acid sulphate soil management will require monitoring of the sediments and the leachate generated. A monitoring program will be developed including: parameters to be monitored; medium to be monitored; monitoring locations on site and frequency; analyses to be conducted; laboratory conducting the analyses; procedures to be undertaken if monitoring indicates that thresholds are being exceeded: and reporting procedures to relevant authorities.

Surface, ground and leachate water associated with any disturbance of acid sulphate soils will require monitoring for parameters including aluminium, iron, salinity or total dissolved solids (TDS), sulphates, chlorides and pH. In shallow groundwater areas, hydrogeological factors including freshwater inflows, tidal water levels and water table fluctuations would be monitored to ensure development is not affecting maintenance of an adequate water cover over acid sulphate soil horizons. Any soils stockpiled on site will be monitored to assess the ongoing status of any oxidation occurring within the soils. Regular testing for pH is required to assess if the sediments are generating acid. During and immediately after the disturbance of acid sulphate soil, pH of the sediment may need to be monitored daily or more frequently.

Leachate emanating from stockpiles excavated should be, where practicable, banded. Leachate collected in this bund should be monitored for pH and TDS on a regular basis. TDS, pH and heavy metals in water should be monitored on a fortnightly basis. If pH levels are consistently neutral, sampling for heavy metals will not be necessary after initial sampling. A significant pH drop will require remedial works such as liming and further monitoring.

Monitoring of water and sediment quality and noise will be implemented using standard monitoring equipment and methods as regulated by the Vietnam National Environmental Monitoring System. The Vietnamese regulations (TCVN 5942 and TCVN 5944) set maximum allowable concentrations of pollutants in surface water (29 substances) and ground water (22 substances). Permissible noise levels in residential areas vary from 45 to 60 decibels according to the time of day (TCVN 5949).

Resettlement Monitoring Programs will be designed and monitored in accordance with the Resettlement Action Plan. The main indicators that will be monitored regularly are: payment of compensation to Project Affected Persons; public information dissemination and consultation procedures; adherence to grievance procedures; resettlement site location, design, site construction and plot allocation; house construction, technical assistance, payment of subsistence and shifting allowances; employment generation; provision of training and credit availability; coordination and completion of resettlement activities and commencement of civil works.

An independent monitoring agency will also evaluate resettlement using the following indicators: payment of compensation; coordination of resettlement activities with construction schedule; public consultation and awareness of compensation policy; construction of dwellings; restoration of economic activities; provision of training; level of satisfaction; and standards of living.

6 FINDINGS AND RECOMMENDATIONS

The Project's most significant impact will result from the resettlement of the households currently occupying the site. The Resettlement Action Plan prepared for the Project will be fully implemented and will adequately compensate and resettle those people. The campus site was designated as the site of a university in the Saigon South Master Plan which has been approved by the Government of Vietnam. The master plan was developed to provide HCMC with the necessary amenities, services and infrastructure to accommodate a projected increase in population to 10 million. This Project is therefore consistent with regional and national planning objectives. Development of the campus will involve loss of some wetland area but the project site is not located in the planned biologically protected zone.

Any negative impacts are expected to occur during construction are no more severe than what would be expected from any construction project. The Contractor will be required to present for approval by RMIT and the Vietnamese authorities an Environmental Management Plan for implementation during the construction period. A major land filling operation will be required, which may have the potential to interfere with surface hydrology. The Contractor

will be required to undertake the works to ensure minimal disruption during construction and that there will be no permanent impact on agricultural practices on the areas surrounding the site. Additional traffic will be generated during construction. Contractors will make their own temporary access roads to the construction site. The South Saigon Parkway and the other feeder roads are adequate to handle this increased traffic without significant disruption to the normal traffic flow. Dust and vibration will be created by vehicles and equipment during the construction phase. Measures to reduce dust and vibration will be the responsibility of the Contractor. These will include the use of dust control agents such as water and the paving of roads subject to heavy traffic. The exposure of the acid sulphate soils on the site during construction may result in acidification of soils, surface water and ground water. Measures will be introduced to minimise this impact. Construction activities will raise noise and vibration levels. Management of these levels will be part of the Environmental Management Plan, ensuring that noise is limited to daylight hours, barriers are constructed and construction activities are located away from residential areas.

An Environmental Management Plan will be developed and implemented in relation to activities associated with the operation of the University. This plan will include details of: monitoring of impacts on physical resources, human and economic development and quality of life values; and measures to mitigate any anticipated negative impacts.

The campus operation will result in increased traffic. The South Saigon Parkway, National Highway 1 and Provincial Road 15 will provide adequate links with HCMC and surrounding areas. A transportation plan will be developed for the campus to link the internal road system with these major transit corridors. The proposed campus development will incorporate a sewage treatment plant, with treated effluent being recycled for irrigation or discharged into the canal system. Stormwater will be discharged to the naturally occurring wetlands and the canal system. Hydrological issues in relation to the waterways will be addressed during the detailed design. Culverts will be laid to ensure twice daily flushing of the canals.

There are significant long term benefits of the Project in terms of human resource development, employment and economic growth in Vietnam. This will be achieved through an increase in skill levels, the creation of job opportunities during construction and operation of the campus, and the stimulus to economic activity. These benefits will be local, regional and national. They will result in increased personal/household income and therefore in increased expenditure on food, rent, transport, entertainment, clothing, education and health. Higher education and training in Vietnam will be strengthened. The University will provide a model to assist Vietnamese institutions to develop appropriate flexibility in terms of curriculum, technology and methods of delivery.

7 CONCLUSIONS

There are no significant environmental impacts associated with the campus construction and operation. The development of appropriate Environmental Management Plans during the construction and operational phases should ensure monitoring and the implementation of appropriate mitigation measures as required.

The Project has been classified by ADB under Category B, a project with minor environmental impact, which could be mitigated through integrated corrective measures by RIUVN.

The Project represents a valuable step in the development of tertiary education in Vietnam. It will enhance the country's sustainable economic and social development and contribute to the growth of the region.

ABBREVIATIONS

BOD	Biological Oxygen Demand
CFC	Chlorofluorocarbons
HCMC	Ho Chi Minh City
IEE	Initial Environmental Examination
MASD	Management Authority South Saigon Development
MOSTE	Ministry of Science, Technology and the Environment
pH	Logarithm of the reciprocal of the hydrogen ion concentration
RAP	Resettlement Action Plan
RIUVN	RMIT International University Vietnam
RMIT	Royal Melbourne Institute of Technology
SIEE	Summary Initial Environmental Examination
SS	Suspended Solids
TDS	Total Dissolved Solids
VESDEC	Vietnamese Association for Conservation of Nature and the Environment

