Parliamentary Standing Committee on Public Works

REPORT

relating to the proposed

CSIRO QUEENSLAND CENTRE FOR ADVANCED TECHNOLOGIES STAGE 2 DEVELOPMENT, PINJARRA HILLS, QLD

(First Report of 1999)

THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA

1999

The Parliament of the Commonwealth of Australia

Parliamentary Standing Committee on Public Works

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MEMBERS OF THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

(Thirty-Third Committee—appointed 8 December 1998)

The Hon Judi Moylan MP (Chair)
The Hon Janice Crosio MBE, MP (Vice-Chair)

Senate	**House of Representatives**
Senator Paul Calvert	Mr John Forrest MP
Senator Alan Ferguson	Mr Colin Hollis MP
Senator Shayne Murphy	Mr Peter Lindsay MP
	Mr Bernard Ripoll MP

Committee Secretary:	Bjarne Nordin
Inquiry Secretary:	Michael Fetter
Administrative Officers:	Belynda Zolotto
	June Murphy

EXTRACT FROM
THE VOTES AND PROCEEDINGS
OF THE HOUSE OF REPRESENTATIVES

No. 13 dated 8 December 1998

PUBLIC WORKS—PARLIAMENTARY STANDING COMMITTEE—REFERENCE OF WORKS—CSIRO QUEENSLAND CENTRE FOR ADVANCED TECHNOLOGIES STAGE 2 DEVELOPMENT, PINJARRA HILLS, QLD

Mr Slipper (Parliamentary Secretary to the Minister for Finance and Administrative Services), by leave, pursuant to notice, moved—That, in accordance with the provisions of the *Public Works Committee Act 1969*, the following proposed work be referred to the Parliamentary Standing Committee on Public Works for consideration and report: CSIRO Queensland Centre for Advanced Technologies Stage 2 Development, Pinjarra Hills, Queensland.

Question—put and passed.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

CSIRO Queensland Centre for Advanced Technologies Stage 2 development, Pinjarra Hills, Qld.

On 8 December 1998, the House of Representatives referred to the Parliamentary Standing Committee on Public Works for consideration and report the proposal to construct the CSIRO Queensland Centre for Advanced Technologies Stage 2 development, at Pinjarra Hills, Queensland.

THE REFERENCE

1. The terms of the reference were as follows:

> *The Queensland Centre for Advanced Technologies located at Pinjarra Hills, Queensland, was established by an agreement between the Queensland Government and the CSIRO with the objective of developing a world centre of excellence to expand and diversify research and development in the mining, energy and related manufacturing industries in this State and the country as a whole. The Centre aims to bring together resources from the State Government, universities, kindred CSIRO divisions, Queensland and Australia-wide minerals, energy and manufacturing industries in collaborative activities.*
>
> *The proposed development comprises a research building housing lightly serviced laboratories, offices and open work areas; a technology transfer building providing office style accommodation for a number of independent rental suites; a number of new industrial type buildings; expansion of the existing library and canteen facilities; minor alterations to existing buildings to suit change of function; site works, including new roads, carparking and environmental rehabilitation; extension and modification to site services and relocation and modification of the existing sewage treatment plant.*

2. When referred to the Committee, the estimated out turn cost of the proposal was $22.3 million.

THE COMMITTEE'S INVESTIGATION

3. The reference is identical to a proposal which was referred by the House of Representatives to the former Committee on 8 April 1998.

4. The former Committee received a written submission from the CSIRO and took evidence from CSIRO officials at a public hearing held in Brisbane on 15 June 1998.

5. The former Committee also received written submissions from the following organisations and took evidence from their representatives at the public hearing:

- Queensland Department of Tourism, Small Business and Industry; and
- BHP Coal Pty Ltd.

6. Prior to the public hearing, the former Committee undertook an extensive inspection of CSIRO facilities at Pinjarra Hills and the sites proposed for new construction and extensions encompassing the proposed works.

7. Written submissions for the inquiry undertaken by the former Committee were received from the following organisations and were incorporated in the transcript:

- Environment Australia—Environment Protection Group;
- Commonwealth Fire Board;
- Australian Heritage Commission;
- Queensland Department of Environment;
- Queensland Department of Mines and Energy;
- Queensland Department of Transport;
- Hammersley Iron Pty Ltd; and
- Robe River Limited.

8. The House of Representatives was dissolved on 31 August 1998 and the former Committee was unable to report on the reference. The 39th Parliament commenced on 10 November 1998. Members of the present Committee were appointed by the Senate and the House of Representatives on 8 December and the Committee met for the first time on 10 December. On 11 February 1999, the Committee resolved:

> *That, pursuant to the provisions of section 24 of the Public Works Committee Act 1969, the evidence taken by the former Committee be considered as evidence taken by the present Committee and that a further public hearing into the proposal is not necessary.*

9. A list of witnesses who appeared before the Committee at the public hearing is at APPENDIX A. The Committee's proceedings will be printed as Minutes of Evidence.

BACKGROUND

CSIRO today—a national scientific research institution

10. CSIRO is one of the largest and most diverse national scientific research institutions in the world. It has a staff of 7,000 working at 65 laboratories and field stations throughout Australia.

11. Since its inception in 1926, CSIRO has played a vital role in shaping Australia and generating the nation's wealth. CSIRO is recognised as having an international reputation for excellence and achievement in basic and applied research. Its work contributes to the ongoing prosperity of Australia's primary and secondary industries, and to the creation of new technologies, products and techniques for the continuing development of our manufacturing and service-based industries.

12. CSIRO employs about 2,500 research scientists. Collectively, these scientists possess expertise in almost every major scientific discipline. This enables CSIRO to draw on a large and diverse pool of individual skills to meet emergent scientific or technological challenges.

Objectives

13. CSIRO's major objectives are to:

- carry out strategic research that can be applied by Australian industry or Government for community benefit;

- collaborate with other institutions and industry to strengthen the research effort and ensure its transfer and application; and

- lead, promote an expand science and technology effort in Australia.

Collaboration

14. A key ingredient in the achievement of broad objectives is close collaboration with industry and the maintenance of close and mutually profitable relationships with universities and other research and tertiary education bodies in Australia and overseas.

Budget

15. In 1997/98 the Organisation's budget was $716.8 million. Of this amount, $466.8 million was appropriated to CSIRO by the Commonwealth Parliament. Another $250 million came from industry and other sponsors of research.

Organisational structure—Divisions, Sectors and Alliances

16. CSIRO has been structured to respond to ensure that research efforts and scientific resources are focused on areas of national priority.

17. Research is carried out in 23 Divisions and is directed towards 22 Sectors. These Sectors are sets of socioeconomic activities that in total represent the national economy and its natural resources. Related sets of Sectors are grouped into the following five Alliances:

- agribusiness—field crops, food processing, forestry, wood and paper industries, horticulture, meat, dairy and aquaculture, wool and textiles;

- environment and natural resources—biodiversity, climate and atmosphere, land, water and marine;

- information technology, infrastructure and services—information technology and telecommunications, infrastructure, measurement standards, radioastronomy and services;

- manufacturing—chemicals and plastics, integrated manufacturing, pharmaceuticals and human health; and

- minerals and energy—coal and energy, petroleum, mineral exploration and mining, mineral processing and metal production.

18. The basic business units of CSIRO are Divisions, which are organised along discipline lines. Each Division is each headed by a Chief who plans, guides and evaluates the research efforts.

Corporate governance

19. The Deputy Chief Executives and the Chief Executive form CSIRO's senior management team, which is responsible for implementing policies determined by the CSIRO Board. The Chief Executive, who is a member of the ten-member Board, is responsible for the Organisation's activities as a whole.

ESTABLISHMENT OF QCAT

20. QCAT was established in 1990, by an agreement between CSIRO and the Queensland Government.

21. The Centre seeks to develop a world 'centre of excellence' to expand and diversify research and development in the mining, energy and related manufacturing industries in Queensland and nationally and to provide a major technology precinct in close proximity to Brisbane.

22. The Committee questioned the extent to which QCAT had lived up to the aspirations as an international centre of excellence. CSIRO advised whilst it is a somewhat intangible feature to measure, QCAT has hosted a number of large international conferences which have been well attended. Considerable effort is made in publicising the activities of QCAT overseas. In addition, the Centre undertakes work with overseas equipment manufacturers who publicise QCAT's work.

Objectives of QCAT

23. The agreement between the Queensland Govenment and the CSIRO specified the objectives of the Centre as being the:

- expansion of the overall level of research and development undertaken by CSIRO in Queensland;
- diversification of the scope of research and development beyond that undertaken in other CSIRO facilities in the State; and
- pursuit of other objectives as the State and CSIRO may from time to time agree.

Focus on minerals and mining

24. The Centre has focused research on the following:

- mineral exploration—establishing a node of the Cooperative Research Centre for Landscape Evolution and Mineral Exploration (CRC LEME);
- ore body delineation—establishing expertise in down-hole geophysics and remote sensing of ore body delineation to ensure that the maximum amount of ore can be recovered;
- mining—development of 'next generation' mining techniques, particularly related to coal production and productivity and increasing QCAT's presence in mining equipment research activities;
- mineral processing—enhancement of capabilities in the crushing, grinding, beneficiation and process mineralogy to assist mining companies in designing and fine tuning plant for processing new and existing ore deposits;
- magnesium—the Australian Magnesium Research and Development Program (AMRDP). This is a major venture by industry and the Commonwealth and Queensland Governments to establish a new industry based on Queensland's Kunawarra Magnesite deposits currently under development by Queensland Metals Corporation Ltd; and
- coal utilisation—establishing a centre of expertise in coal utilisation technologies. This will include an Integrated Gasification Combined Cycle (IGCC) reactor facility to investigate the behaviour of Australian black coal in new advanced power generating technologies.

Participants

25. The Centre brings collaborative activities together in research from the State Government, universities, CSIRO divisions, Queensland and Australia-wide minerals, energy and manufacturing industries. Current participants include:

- CSIRO Divisions
  - Exploration and Mining;

- Manufacturing Science and Technology;
- Minerals;
- Energy Technology;

- CRC
  - Landscape Evolution and Mineral Exploration (CRC LEME);
  - Centre for Mining Technology and Equipment (CMTE);
  - alloy and solidification technology;
- Australian Centre for Mine Site Rehabilitation Research (ACMRR);
- Magnesium Foundry Project;
- Other commercial collaborators
  - Queensland Supercomputing Laboratories;
  - Veritas DGC Australia Limited;
  - Cutting Edge Technology Pty Ltd; and
  - Mining Technologies Australia Limited.

Expenditure on research projects at QCAT

26. In 1996/97 QCAT attracted 63 research projects each with an expenditure of over $100,000. The total value of research expenditure at QCAT amounted to $44.1 million of which $10.7 million was funded by CSIRO and $9.0 million from CRC grants and industry funding. Expenditure by the University of Queensland and commercial collaborators totalled $24.4 million.

27. Work undertaken by CSIRO Divisions, CRCs and commercial collaborators at QCAT is described in the following paragraphs.

Coal

28. Research groups at QCAT undertake tasks to deliver applied technology solutions to major industry issues to support the Australian coal mining industry's priorities for increased productivity with reduced costs and high safety standards.

29. CSIRO Energy Technology has a major component of its Coal Preparation Group based at QCAT. This group addresses issues associated with

preparing Australian coals for sale on the international market. CSIRO advised the Committee that a number of projects have been developed which address key components in the research priority areas of fine coal sizing, cleaning and de-watering of coarse coal.

Minerals, mining and processing

30. Research groups from CSIRO Exploration and Mining and CSIRO Manufacturing Science and Technology, together with the CMTE, are working in the areas of alternative mining excavation methods and equipment reliability. The prime objective is to increase the safety and productivity in the Australian metalliferous mining industry.

31. Mineral processing research at QCAT is focused on development of new and improved methods for ore characterisation, pulverising and beneficiation to address the current and future needs of the non-ferrous and iron ore processing industries.

32. CSIRO advised the Committee that in non-ferrous mineral processing, industry impetus has been the linking of ore characteristics with downstream processing performance as well as the continued development of more efficient techniques for processing fine grained ores. For iron ores, the research is aimed at predicting beneficiation and sintering performance.

Mineral exploration

33. CRC LEME specialises in mineral exploration, landscape evolution and in the processing and interpretation of digital spatial exploration data. CRC LEME researchers have made significant advances in the development of knowledge of the landscape evolution of highly prospective and mineralised terrain in Queensland. CSIRO advised the Committee that this research will assist exploration in northern Australia and will also benefit Australian companies exploring similar terrain overseas.

Geophysics

34. This group develops and demonstrates new techniques for deposit delineation and rock mass characterisation necessary for maximisation of recovery of ore reserves. CSIRO believes that geophysical data acquisition systems will drive next century mining systems, monitor real time progression of mining operations as well as contributing to safety in mining by increased automation and improved monitoring of latent conditions.

Mine site rehabilitation

35. This research encompasses the environmental impacts of exploration and mining activities, including mine site emissions, waste minimisation and disposal, structural damage and mine-site rehabilitation.

36. The CSIRO Mine Site Rehabilitation Research program (MRRP) seeks to provide a systems approach to mining environmental research both to address basic scientific issues as well as individual research projects. CSIRO has joined with others to form the Australian Centre for Mine Site Rehabilitation Research (ACMRR) and the Australian Centre for Geomechanics (ACG) to help solve major generic industry problems.

Foundry technology

37. CSIRO Manufacturing Science and Technology is undertaking research in casting technology and in alloy design in three main areas:

- process technology—developing existing casting processes in order to improve both quality and productivity; investigating new processes for making high integrity castings and adapting existing processes for use with new alloys;
- tooling and prototyping—improving the design of dies to reduce their capital cost and to understand the factors that lead to die failure to increase the operating lives of dies; and
- alloy performance—developing and optimising both aluminium and magnesium alloys to produce improved strength, fatigue resistance and tolerance to defects.

Queensland Supercomputing Laboratories

38. CSIRO advised the Committee that the Queensland Supercomputing Laboratories (QSL) is a high performance computing facility operated by CSIRO to deliver high performance computing technology to research, industry and government on a cost recovery basis.

39. Currently the major project of QSL is the Pacific Resource Information Centre which is a petroleum exploration databank and a joint venture between CSIRO and the Queensland State Department of Mines and Energy. The project is designed to attract increased exploration activity within Queensland by making seismic data and related information readily accessible.

Cutting Edge Technology Pty Ltd

40. Cutting Edge Technology Pty Ltd (CET) was established in October 1995. CSIRO advised the Committee that CET has generated two multi-million dollar projects. One of these is part funded by the Commonwealth Government's START Program and is aimed at developing a Steep Dip Highwall Auger System to address Australia's mining conditions. The other project is the development of a guided twin auger, the Super Auger, in association with Brambles Coal Services and the BryDet Development Corporation Inc. of the USA. This machine will be the biggest, most powerful and most productive auger even built. It was scheduled for completion in 1998.

Veritas DGC Australia Limited

41. Veritas DGC Australia Limited is the Australian Branch of Veritas DGC Inc. and is the fifth largest geophysical contracting company in the world. The company, which performs seismic data acquisition and processing services for oil exploration companies, has its Australian headquarters located at QCAT. The facility at QCAT houses the largest seismic data processing centre in Australia.

42. Veritas is a prime commercial tenant and is in its final year of four a year out-sourcing agreement with CSIRO for access to the computing facilities of QSL, a joint venture between CSIRO and the Queensland Government. The Committee was advised that negotiations to extend this agreement are well advanced.

Mining Technologies Australia Limited

43. Mining Technologies Australia Limited (MTA) is a wholly Australian owned company that specialises in the development of unique mining systems and machinery. Its current research at QCAT is to develop a very accurate navigation system for a continuous highwall miner, a refinement of an earlier system, also developed at QCAT. CSIRO advised that further development and research is currently being undertaken to add extra functionality and to make it more user friendly. The Committee was advised that this development has attracted interest from the United States and South Africa. It is believed to be the most advanced navigation system for highwall mining in the world.

Ownership of intellectual property

44. The Committee is aware that the minerals and energy sector is composed of highly competitive entities, each striving to increase profits for shareholders. For this reason, the Committee questioned the extent to which the private funding of research projects undertaken by CSIRO would preclude competitors making use of any improvements to technology or processes which may result.

The Committee was advised that CSIRO policy is, as far as possible, to hold any intellectual property rights derived from research. Nevertheless, CSIRO did acknowledge that if a private company were to engage the CSIRO, and pay full commercial rates for any work undertaken, it would become difficult for CSIRO to assert ownership of any resultant intellectual property.

THE NEED

Location

45. The QCAT complex is located at Pinjarra Hills in the outer western suburbs of Brisbane. It is set within a predominantly semi-rural area, about 16 kilometres from the Brisbane CBD.

46. The facility fronts a major arterial road. Surrounding land uses include rural residential properties and institutions.

Growth in activities

47. The Queensland Government and the CSIRO reached an agreement in October 1990 to establish QCAT. The agreement committed the Queensland Government to:

- the construction of facilities costing $14.85 million;
- expenditure of $3.5 million on hardware and software to establish a supercomputing laboratory; and
- reimbursement of staff and equipment relocation costs of up to $3.5 million.

48. For its part, the CSIRO agreed to lease the new QCAT facilities for 25 years and to aggregate the resources required for the Centre's operations.

49. The Queensland Government believes the joint venture with the CSIRO has been an outstanding success.

50. CSIRO advised the Committee that following the opening of the Centre in 1993, research and commercial activities have grown at a rapid rate leading to problems of accommodation shortage and overcrowding. Currently, the Centre provides accommodation for bench scale laboratories, associated offices and work spaces, technical and process bays, administration and amenities for approximately 250 research and support staff drawn from CSIRO Divisions and commercial collaborators, compared with an original design complement of 130 staff.

51. Further accommodation to overcome space shortages and to encourage commercial collaborators to QCAT was constructed in 1994. This was, however, only a short-term solution to the problem.

52. CSIRO advised the Committee that the growth in industry support has enabled recruitment at a level twice that anticipated when QCAT was established. CSIRO expects that this growth will continue as industry endorses the relevance of research undertaken, new initiatives, and recognises the value added to their enterprises.

Second stage—Queensland Government

53. The Queensland Government advised the Committee that the Centre was originally designed for 130 staff and is now occupied by 260 personnel. There is a pressing need for increased accommodation.

54. The Queensland Government advised the Committee that several research discoveries made at QCAT have now been developed to the stage where they are suitable for commercialisation. To realise commercial benefits of the intellectual property involved, it is necessary now to provide additional resources for the marketing and transfer of these technologies to potential users. The Queensland Government advised that, in this context, agreement has been reached with several participants to expand existing research activities. As a consequence, the CSIRO and the Queensland Government have renegotiated the original agreement to provide for the construction of a Second Stage of the project on terms similar to those which applied to Stage 1.

55. Under the new agreement, the Queensland Government is providing $22.3 million for the construction of Stage 2 and an additional $2 million for relocation expenses. The Queensland Government believes that with the completion of Stage 2, QCAT will have the critical mass and breadth to provide a capability to operate as a world class research facility in mining, energy and resource processing.

Coal gasification facility

56. The Queensland Government advised the Committee that research into coal gasification is required to position Queensland coals for use in new coal technologies. These technologies include Integrated Gasification Combined Cycle (IGCC) power plants which are being constructed overseas. The technology involved is considered to be energy efficient and greenhouse friendly.

57. A gasification unit, described as a pressure entrained flow gasifier research facility, to be located at QCAT, is currently under manufacture in

Germany. Recent decisions by Japanese and Korean power companies to commit to IGCC trials, with the Koreans using Queensland coal, have provided considerable impetus to the early completion of works for the gasifier. This factor, in turn, has wide-reaching ramifications for the Australian coal industry in the context of the Kyoto conference on greenhouse gas emissions held in December 1997.

58. The value of Australia's coal exports amounts to more than nine billion dollars per annum. The Committee therefore questioned the longer term future of coal, especially for power generation. CSIRO confirmed that, arising from the Kyoto conference, there is now considerable pressure on the continued large-scale use of coal. Nevertheless, CSIRO does not believe the level of the use of coal will decrease over the next decade. For this reason, CSIRO believes that Australia can counteract any negativity by pursuing technological advances designed to minimise the environmental impact of coal, especially carbon dioxide emissions

59. The purpose of the research work to be undertaken with the gasifier, will be to test Australian coals for use in new generation coal-fired power stations at a scale at which the results will be meaningful. Application of the new generation technology is expected to lead to considerable decreases in greenhouse gas emissions and fewer nitrous oxides. A further indication of the importance of the research to be undertaken is reflected by the sources of funds for the acquisition of the gasifier. The Committee was advised that the cost of the project will be funded from the following sources:

- Queensland Government (Department of Mines and Energy)—$0.6 million;
- Commonwealth Government—$0.6 million;
- Australian Coal Association—$1.0 million; and
- Black Coal CRC—$0.2 million.

Additional staff

60. Under the terms of the agreement with the Queensland Government, an additional 80 staff will either be relocated or recruited as part of a research initiative to enhance and expand the research effort at QCAT. The Committee was advised that the expanded level of resourcing will come from the transfer of existing CSIRO staff from Sydney and would comprise ten staff from mineral processing activities and five staff from coal utilisation activities. New staff will be recruited locally, from interstate and overseas as required. Assistance with recruitment and appointment costs will be provided as part of the financial arrangements supported under the Agreement.

Hammersley Iron Pty Ltd

61. Hammersley Iron, with headquarters in Western Australia, advised the Committee that it has worked closely with the CSIRO Division of Minerals for many years and has very high regard for the integrity and expertise of the scientists employed. Despite difficulties arising from laboratories being located in the eastern States—in Melbourne, Sydney and Brisbane, Hammersley Iron indicated that some excellent work in the field of iron ore processing has been carried out as a result of collaboration. Nevertheless, Hammersley advised the Committee that it has long held the view that if a national centre of excellence in iron ore processing is to be established, the logical location would be in Perth. This would be adjacent to the offices of all major iron ore producers in Australia, as well as a short flight from key operations.

62. CSIRO confirmed that discussions on the location of iron ore related research had taken place with Hammersley which indicated that Hammersley would prefer to have the iron ore sintering group, which is currently located at North Ryde, to be located in Perth.

63. CSIRO advised the Committee that the advantages and disadvantages of alternative sites for mineral and iron ore processing research were carefully considered and believes it can best serve the minerals industry by relocating the iron ore sintering group to Pinjarra Hills and consolidating its mineral processing activities on the site as planned. The basis for the relocation of staff from North Ryde is to consolidate activities involving sintering and pelletising in the one location. This, CSIRO believes, would generate substantial scientific synergies.

64. A project is being developed, for consideration by the Committee, similar to QCAT in Western Australia. This will be solely devoted to the metals industry. The approach adopted by CSIRO has been to locate mineral and mining-specific research facilities close to the customer. At QCAT, CSIRO is close to the coal industry. The Committee did, however, point out that the proposed work will include an ore beneficiation bay and an iron ore processing bay and questioned the need for these facilities to be provided at Pinjarra Hills and not in Western Australia. CSIRO advised the Committee that the Division of Minerals has adopted a three-pronged long-term strategy for minerals research at three locations:

- pyrometallurgy in Melbourne;
- hydrometallurgy in Western Australia; and
- mineral processing at QCAT.

Committee's Conclusions

65. The mining and energy sectors are important to the Queensland and national economies.

66. The need to expand and diversify research and development in mining, energy and related manufacturing industries resulted in the CSIRO and the Queensland Government entering into an agreement, in 1990, to establish the Queensland Centre for Advanced Technologies at Pinjarra Hills, Brisbane.

67. Originally designed to cater for research and development projects involving 130 staff, research activities at QCAT have grown at a rapid rate and existing facilities will be inadequate to support planned increases in research personnel and projects.

68. There is therefore a need to provide additional facilities at QCAT to house and support these planned increases in personnel and research projects.

SITE

Description

69. The QCAT site occupies approximately 23.8 hectares, formerly used for dairying, divided into three allotments. The land is moderately undulating and mostly cleared of original vegetation although some large eucalyptus trees have been retained. The site is dominated by a localised knoll located between two small gullies. A spur runs roughly north to south from the top of the knoll and existing buildings are sited on the eastern slopes.

70. A designated Main Roads reserve exists within the site across the entire northern boundary.

71. The larger and more easterly of two creek lines is locally known as One O'Clock Creek. The area along One O'Clock Creek is densely vegetated with medium height trees, shrubs, grasses and aquatic plants. CSIRO staff have undertaken an extensive rehabilitation project in these areas to restore native vegetation and provide pleasant, low maintenance landscaping and a wildlife habitat.

72. One O'Clock Creek flows south as a short tributary of Pullen Pullen Creek which discharges into the Brisbane River. Flow in One O'Clock Creek is reduced in dry periods but may be subject to local flooding after heavy rain.

73. Two areas within the site subject to flooding are:

- Flood Regulation Lines defined along One O'Clock Creek; and
- a gully west of the existing QCAT development. The Committee was advised that this gully is subject to periodic inundation which will be controlled by flood detention basins constructed as part of the development of an adjacent residential subdivision.

74. The Flood Regulation Lines for One O'Clock Creek have been determined by the Brisbane City Council and any building development is precluded within the defined zone.

Geological conditions

75. Previous field investigations have indicated that the site is underlain primarily by weathered andesite in elevated areas, and weathered phyllite, shale and mud-stone in the lower areas along the creek banks.

76. In general, two distinct subsurface profiles have been encountered on the site. One is the hill slope areas which are characterised by shallow, residual slopewash clays overlying rock. The second is in the area of One O'Clock Creek, which is characterised by deeper deposits of alluvial clay overlying rock. The Committee was advised that any excavation in the rock at the site is likely to require heavy equipment.

Master planning

77. In 1995, CSIRO adopted a site master plan, which provides the basis for future development. The siting of the proposed Stage 2 facilities will be consistent with the Plan. The design of the proposed facilities and support services will conform with the principles of the master plan.

78. Buildings in the proposed Stage 2 development will be located on the eastern slopes of the hill and the spur in close proximity to the existing Stage 1 facility. Carparking areas are proposed for the flat gully area on the eastern side of One O'Clock Creek, adjacent to the existing complex.

79. Some elements of the master plan will not be realised at the completion of the proposed Stage 2 development. CSIRO advised the Committee that the location and extent of the proposed work will ensure the long term viability of the master plan is not compromised. The opportunity to provide these facilities at a later date will consequently remain.

80. The Committee questioned the adequacy of the site for future expansion. CSIRO advised that a study of the capacity of the site revealed that the site could support about 600 staff. The sites of additional buildings required have been master planned. The master plan will cater for requirements well into the next century.

Development options

81. Before adopting the proposed configuration of Stage 2 elements, CSIRO undertook a number of alternative site planning studies to ensure compliance with the master plan and, in particular, to include the following features:

- expansion of process bays to the north of the site;
- extension of the laboratories and office support areas along the major pedestrian spine;
- development of the Technology Transfer Building in a distinct commercial precinct;
- provision of a ring road that will serve future development to the east of the site; and
- preserving the environmentally sensitive area surrounding One O'Clock Creek.

82. Preliminary options were developed as relationship diagrams integrating site constraints, visual amenity, climate and environment, together with desired functional relationships.

83. These options were enhanced after clarification of the Main Roads reserve width as a 62 metre wide constraint to building development on the northern boundary and alternative options were developed with buildings allowed to infringe on this road reserve. A total of 13 options were considered in this phase.

84. A review process involving CSIRO staff and specialist consultants refined four options for evaluation and further development. Criteria for assessment were established at a Value Management Workshop where these options were evaluated, resulting in the selection of a preferred option forming the basis for the proposed development.

Committee's Conclusion

85. Master planning studies of the site, undertaken by the CSIRO, have identified areas suitable for further expansion well into the next century.

THE PROPOSAL

86. The extent of the proposed work encompasses the following elements:

- research building;
- technology transfer building;
- bay compound;
- technical and process bays;
- storage building;
- library and canteen expansion;
- some work in existing areas; and
- roads, carparking and landscaping.

87. The elements of the proposed work are described in the following paragraphs.

Research building

88. A new three storey Research Building of approximately 1,900 square metres of gross floor area is proposed. This is intended to provide discrete, lightly serviced bench scale laboratories, discrete laboratory offices, meeting rooms and shared open work areas. The new building will be linked to the research wings of the existing complex.

89. The building will be designed for flexibility of function, low maintenance and running costs and a high planning efficiency.

90. The Committee was advised that the configuration and concrete frame structure will allow for a variety of future planning options. For this reason, internal partitions will be non-load bearing. Plant areas, toilet facilities and lifts will be located to serve future expansion.

91. The building will be orientated with its major axis running east-west, with horizontal sun control provided to openings on the north and south. East facing windows will be kept to a minimum and will be deeply recessed. West facing windows will be avoided.

92. Elevations will reflect the adjacent buildings with corrugated metal spandrels and strip glazing to the north and south. Rendered masonry walls will provide a more robust finish at ground level.

93. Disabled access will be provided to all levels and will include lift access designed to also serve a future adjoining building of similar area. Links will be provided to the existing QCAT main circulation spine at all levels.

94. The wing will be capable of contiguous expansion to double the usable floor without any change of level at any floor.

Technology transfer building

95. This building, of approximately 2,400 square metres of gross floor area, will provide suites of offices, accommodation for a major computer complex and open plan work areas. It will be designed with maximum north-south exposure and limited openings to the west. The building will have a concrete framed structure and no internal load bearing partitions.

96. The Computer Centre will be a separate self contained area, effectively isolated and independent of the rest of the building in terms of fire isolation, services and security. The computer suite will be at the lowest level of the building with direct vehicle access to a loading dock. The two upper areas will contain a combination of open planned and individual offices.

97. Main access to the building will be served by a vehicle turn-around designed to suit both the current facility and any future expansion. The entry will be located centrally to limit internal travel distances. A lift will be located adjacent to the entry to serve all three levels.

98. Discrete access will be provided to the lower ground floor to further enhance the security of the computer facility.

99. The loading bay and central plant will be located to support future expansion.

100. The building will be sited and designed to allow a staged expansion by up to 100 per cent.

Bay compound

101. The new technical and process bays will be aggregated in the bay compound around a central hardstand area. This aggregation will provide for maximum flexibility. The hardstand will be configured to include a turn-around for heavy vehicles and semi trailers and will be integrated with a loading and unloading area adjacent to the stores areas.

102. Several discrete enclosures will be provided in the compound to hold specific bulk materials. These include coal, rocks, mine technology rock stores and a mine automation bay field equipment store.

103. Buildings will be sited to suit their functional relationships to laboratories and office facilities.

104. The building platform for the technical and process bays will set the buildings into the existing hillside, thus lessening visual impact particularly from the residential areas to the north. The tallest buildings will be sited closest to the existing complex, further reducing the building profile seen from adjoining properties.

Technical and process bays

105. A new technical bay will accommodate mine safety research activities utilising semi-permanent rigs or plant at a larger scale requiring less critical control of the working environment than those conducted in bench scale laboratories.

106. New process bays will accommodate pilot scale research activities. Generally, these will be at a large or semi industrial scale, utilising permanent rigs, operating in an industrial environment. The proposed process bays will include facilities for coal processing, mine safety, mine automation, ore

beneficiation, ferrous ore processing and non ferrous ore processing research activities.

107. The technical and process bays will be of variable height, steel framed, metal clad industrial-type buildings with masonry walls at the base. They will be designed for low maintenance and easy serviceability.

108. These buildings will have limited internal divisions to ensure any future change of use can be accommodated. Gantry cranes will be provided within most buildings.

109. Buildings will be designed with flow-through ventilation as well as hot air exhaust. Filtered mechanical exhaust systems will be provided for dust and fume producing processes.

110. The mine safety and mine automation process bays will be combined in a single building to economise on construction, services and craneage costs.

111. The coal process bay and the minerals beneficiation and ore preparation and processing bays require discrete plant rooms. These plant rooms will be constructed as structures substantially independent of the facility they serve to reduce vibration and noise.

Storage building

112. The storage building will be a 6.5 metre high industrial-type facility providing general store areas and drum storage to support technical bays. The storage of rocks will be on the lower ground floor of the research building.

Library and canteen expansion

113. The existing library and canteen facilities will be extended to cater for increased staff numbers. The existing kitchen and servery will be altered to increase preparation space and enlarge the display and service counter. The character, finishes and furnishings of the existing facilities will be maintained. Improved access and acoustics treatment will be provided for the canteen.

114. The capacity of the canteen will be increased to seat 180 people, which represents a ratio of 50 per cent of the staff. The library will also be increased. The floor areas of the library and canteen will be increased by 235 square metres.

Interaction between staff

115. The Committee questioned the extent to which the design of buildings containing individual offices will facilitate formal or informal interaction between research staff. CSIRO advised that the existing architecture offers considerable scope for staff interaction and this approach will be continued in Stage 2. For example, both the research building and the technical transfer building will contain meeting rooms and areas described as interactive spaces. The inclusion of these spaces followed an analysis of comments from staff who indicated strong support of the design development process.

Work in existing areas

116. Minor modifications will be carried out in one existing process bay and in Levels 2, 3 and 4 of an existing research building to provide for changed functions. Modifications will include major changes at the ground floor level and minor works on the upper two floors to accommodate new research activities. These require lightly serviced, discrete laboratory offices and shared open work areas.

117. The ground floor will be altered to provide the only laboratories in this building. The work will include demolition of the computer floor, removal of the air handling plant external to the north wall, removal of partitions and doors, and replacement of external doors and windows as well as the fitout of lightly serviced bench scale laboratories.

Roads

118. The site will be served by a new main entry road from a roundabout forming part of a future adjoining subdivision.

119. The Committee questioned the need for a new entrance, recognising that development of the site has been in accordance with a master plan. CSIRO advised that the site entry, from Moggill Road, is not optimally located. It does not provide a simple entry and considerable funds would be required to make improvements. CSIRO therefore believes a new entry would improve access and safety to the site. The existing main road, which serves as a traffic spine, will be extended and widened to give access to the new technical and process bays. This spine will terminate in a hardstand to enable articulated vehicles to turn around.

120. A ring road will be provided on the eastern side of One O'Clock Creek, designed to serve future development on the eastern side of the creek and to provide access to 130 new carparking bays as well as emergency vehicle egress.

121. The Committee noted that currently, the access road to existing process bays would not provide adequate manoeuvring space, especially for large vehicles. For this reason and for reasons of safety, CSIRO proposes to extend the access road to service the new process bays. In addition, a new ring road is proposed to be constructed to the east of the new and existing compound to provide alternative access and egress.

Parking

122. A further 80 staff carparks will be provided adjacent to the technology transfer building. Visitor carparking will be increased by 10 spaces.

Landscaping

123. Further planting and weed eradication will be carried out in the environmentally sensitive area surrounding One O'Clock Creek. A four metre wide zone of planting will be provided to reinforce the fragile environment on the creek bank with a further four metre wide buffer zone.

124. Tree planting will be provided for areas surrounding the new bay compound and landscaping will be provided adjacent to the research building, the technology transfer building, library and canteen extensions.

Impact of construction on work

125. Research work will need to continue during construction and CSIRO confirmed that this could present some difficulties in coordinating work to ensure minimal disruption. Soil conditions could also present some difficulties, although CSIRO believes these are not insurmountable. It is proposed to undertake excavation work for the process bays and the excavated rock material will be used to fill other areas on the site.

Adequacy of proposal

126. Given the success of QCAT, the Committee questioned the CSIRO about the adequacy of the scope and extent of the proposed work and if, in future, it is likely that further stages for the development of the site will be required. CSIRO advised that it is probable that further development will be required in the future. The proposal under consideration by the Committee will increase the number of staff to 350 which would generate an additional $10 million worth of research effort, bringing the total cost of research to $35 million. Whilst a considerable investment in research by industry, CSIRO believes the success of

QCAT will be self-sustaining, with industry requiring larger and higher impact research projects to be undertaken. The gas fired generator is an example of the future scale of research envisaged and CSIRO believes more similar projects will emerge.

Committee's Conclusion

127. The extent of the proposed works will provide for the planned expansion of research and development projects and provide capabilities expected to stimulate their further expansion.

BUILDING STANDARDS AND DESIGN PRINCIPLES

Standards

128. All buildings, services and external infrastructure will comply with relevant town planning, Commonwealth and State building, health and safety regulations, the Building Code of Australia and all relevant Australian Standards.

Principles

129. The built form, choice of materials, external and internal finishes and provision of services will be consistent with the present complex. The design of the new facilities will be compatible with those of the existing complex, functionally, in the provision of services and in overall visual impression. The reticulated services installed will maintain compatible plant and equipment which will provide the opportunity for common, recurring maintenance contracts. Similarly, new built-in fixtures and fittings will be compatible with those existing.

130. Cladding to the new technical and process bays will be compatible with the existing external fabric of the existing bays with rendered masonry bases and colorbond metal clad upper walls and roofs. External weather protection will be provided for entries and for links between structures where appropriate.

131. External characteristics of the new research building will be similar and in context with the existing research buildings.

132. The technology transfer building will reflect a different image commensurate with its distinct function and separate location adjacent to the new main site entry and its proximity to Moggill Road.

Acoustics

133. Partition design will ensure that noise levels in the various occupied spaces, especially in noise sensitive areas will meet or exceed Australian Standards and comply with the Environment Management Plan performance criteria. Particular attention will be paid to control rooms within the process bays and meeting and seminar rooms within the research and technology transfer buildings. Background noise levels from plant rooms will be in accordance with Australian Standards.

Occupational health and safety

134. CSIRO already pursues an active Occupational Health and Safety policy within the workplace and this will be extended to include the new Stage 2 facilities. Strict compliance with the requirements of the Workplace Health and Safety Act will be adhered to in all construction work.

Provisions for people with disabilities

135. Access for disabled persons will meet the requirements of the Building Code of Australia, relevant parts of AS 1428, and the Disability Discrimination Act. Facilities to be incorporated into the development will include:

- disabled carparking bays;
- continuous pathway access to new buildings;
- accessible entrances and doorways;
- passenger lift or disabled hoist access to all building levels not used solely for storage; and
- disabled toilet and shower facilities.

Child-care provisions

136. A new residential subdivision west of the QCAT complex will include a Community Services Centre, incorporating child-care facilities, which will be available to CSIRO staff. Initial staff surveys have indicated a significant degree of interest in the utilisation of these facilities.

BUILDING SYSTEMS AND SERVICES

137. Details of proposed building systems and services to be provided are at APPENDIX B. The following paragraphs describe some of the more significant features raised by the Committee at the public hearing or in written submissions.

Fire detection and protection

138. In response to a submission to the Committee from the Commonwealth Fire Board, CSIRO advised that all buildings, services and external infrastructure for the proposed development will be designed and constructed to comply with:

- relevant town planning;
- Commonwealth and State building, health and safety regulations; and
- the Building Code of Australia and all relevant Australian Standards, including those applicable to fire prevention, detection and protection.

139. Fire protection requirements for the proposed facilities have given consideration to potential loss of life, asset protection and property damage. As a matter of course, CSIRO pursues an ongoing risk assessment of all procedures and facilities on all sites, including QCAT, to ensure that appropriate action is implemented to minimise risk to life, function and property. This includes fire safety induction and training as well as regular fire drills.

140. CSIRO assured the Committee that upon completion, the proposed facilities will be certified by an independent specialist consultant to ensure appropriate fire protection measures are incorporated which meet functional and operational standards and comply with relevant legislative requirements and Australian Standards.

141. Further details of fire detection and suppression systems proposed are at APPENDIX B.

Sewage treatment

142. The site is serviced by a gravity sewer system that currently discharges to an existing pump station servicing the site sewage treatment plant. Minor relocation of existing sewer pipe lines will be carried out to avoid sewer mains beneath existing and new buildings.

143. A new sewage pump station will be constructed to service the technology transfer building. This pump station will be constructed to allow the servicing of future development zones.

144. The existing sewage treatment plant will be relocated away from the proposed bay compound, to an area on the site that is not planned for future building development. Modifications will be carried out to the existing sewage pump station to cater for the repositioned treatment plant and improve the system controls. The plant will have the capacity to meet all anticipated future sewage discharges.

145. The sewer will be constructed from materials that are appropriate to the nature of the works carried out on site and that allow for flexibility of future use.

146. The Committee noted that the site is serviced by a dedicated conventional sewage treatment plant and questioned if, as a centre of excellence, the CSIRO could not use its undoubted scientific and engineering resources to design and construct a more sophisticated system encompassing the latest environmentally friendly treatment and water purification measures. CSIRO advised the Committee that it was anticipated when work commenced on Stage 1 of the complex that the site would be sewered. This did not eventuate and the on-site treatment works were constructed as an interim measure, pending connection of the site to the local system. CSIRO now understands that connection to the local system is extremely unlikely. As a consequence, CSIRO now faces a need to provide on-site sewage treatment works which meet long term requirements. The scope of the proposed treatment works will be designed to serve up to 600 people.

Australian-made building and fitout material

147. The Committee questioned if contract documents will exclude the provision of Australian-made materials and fittings by specifying the use of foreign made proprietary products. CSIRO advised that it is not intended to exclude any Australian or New Zealand products from projects. Where a brand name may be specified, it is really used as a base standard or equivalent. If CSIRO were to specify a proprietary brand of tap and if there is an Australian equivalent which can meet prescribed standards and represents value for money and performance, CSIRO will use the Australian-made product. CSIRO also advised that considerable care is taken to find products on the market which meet requirements.

CONSULTATION AND COMMENTS

Consultation

148. A list of Commonwealth, State and local government authorities contacted by the CSIRO is at APPENDIX B. A number of submissions were received from large Australian companies with an interest in the continued expansion of research at QCAT.

BHP Coal

149. BHP Coal is a major industry supporter of research organisations based at QCAT. The Committee was advised by BHP that the level of support of QCAT since it was formed in 1993 can be directly attributed to the enhanced access to research teams and the new laboratories and equipment available. The level of support of QCAT by BHP is reflected in the following factors:

- BHP Coal is a supporter of 44 of the 77 research projects listed in the most recent QCAT annual report. This proportion rises to 44 of 53 projects which are directly applied to the coal industry;
- the type of support from BHP Coal includes:
  - fully funded contract research
  - as a CRC participant
  - as a contributor to the Australian Coal Association Research Program
  - as one of several industry sponsors contributing to an Australian Mining Industry Research Association project;
- the extent of support ranges from the provision of data assistance through to more than $4 million for a single project; and
- since 1992, funding to the Cooperative Centre for Mining Technology and Equipment has exceeded $7.5 million.

150. BHP Coal advised the Committee that the coal gasifier will be a key requirement to enable the Black Coal CRC research program to investigate the behaviour of Australia's coal resources for advanced high efficiency utilisation technologies.

151. BHP Coal also believes that the proposed technology transfer centre will assist in the critical stage of commercialisation and implementation within industries of the major advances in technology which emerge from research projects.

152. In evidence, BHP Coal advised the Committee of the benefits which stem from its support of research:

> *Although I am not saying that all of that research was done through the QCAT organisations—in fact, probably around one-sixth of that research involved direct funding of the organisations at QCAT—I would think that the value calculation that was associated with that is still quite relevant. That calculation says that for every dollar that was spent in research, the return to BHP Coal is of the order of at least five times, and quite possibly eight times, when you measure the benefit in both improved technology and improved processes.*[1]

Robe River

153. Robe River also indicated strong support for the proposed work, in the following terms:

> *Robe's particular interest is the research on iron ore characterisation, beneficiation, sintering and pelletising that will be consolidated at the new facilities at QCAT. This research is currently being supported by Robe River Mining and is world class. The consolidation of CSIRO's mineral processing activities at QCAT will significantly enhance their research capabilities.*[2]

Queensland Department of Mines and Energy

154. The Queensland Department of Mines and Energy indicated strong support for the project in the following terms:

> *Mining is now a major and essential component of the Queensland Economy enhancing employment opportunities and bringing wealth and prosperity to this State. CSIRO*

[1] Mr A.L. Davies, Manager, Research Administration, BHP Coal Pty Ltd, Minutes of Evidence, public hearing, 15 June 1997, p. 107

[2] General Manager, Marketing, Robe River Mining Co, Minutes of Evidence, public hearing 15 June 1997, p. 140

endeavours in the fields of mineral exploration, mining, minerals processing and utilisation are already world renowned.[3]

ENVIRONMENT AND HERITAGE

Impact assessment

155. In May 1990, a draft Environmental Impact Assessment Study for the first stage of the QCAT development was prepared for and endorsed by the Queensland Department of Administrative Services. This Study has been reviewed as part of the Stage 2 development. Environmental impacts particularly in respect to water quality, noise and vibration, air quality, energy and water conservation, waste and hazardous materials management and archaeology and heritage have been further defined and addressed.

156. Associated issues such as flooding, traffic, transport and social and economic concerns raised in the 1990 study have also been addressed.

157. In order to minimise the potential environmental impacts of the development during construction and operation of the new facilities, an Environmental Management Plan (EMP), consistent with Queensland legislation and Brisbane City Council requirements, will specify the environmental actions to be implemented and managed by CSIRO.

Queensland Government

158. The Queensland Department of Environment provided the Committee with copies of correspondence with consultants engaged by CSIRO to prepare the EMP. The Department recommended that the format for the EMP should be expanded and should follow departmental guidelines in relation to:

- performance criteria—agreed performance criteria and objectives for each issue with potential impact, taking into account relevant legislation, policies, standards and guidelines;
- management—tasks and actions to be implemented to achieve performance criteria;
- monitoring—the requirements which will measure actual performance, for example, specified limits to preselected indicators of change;

[3] Director-General, Queensland Department of Mines and Energy, Minutes of Evidence, public hearing 15 June 1997, p. 126

- auditing—the requirements which will demonstrate implementation of agreed environmental management and compliance with agreed performance criteria;

- reporting—the format, timing and responsibility for auditing and monitoring results; and

- corrective action—actions and commitments to be implemented if a performance requirement is not met.

159. The Department also requested the opportunity to review and to provide comment on the EMP upon completion.

CSIRO environmental management

160. CSIRO advised the Committee that specific action in relation to the environmental management of the site will include:

- further planting and weed eradication in the sensitive area surrounding One O'Clock Creek which runs adjacent to the eastern side of the existing complex. A planting zone will be provided to reinforce the fragile environment on the creek bank together with a further buffer zone beyond the planting zone;

- tree planting for areas surrounding the new bay compound and landscaping adjacent to the research building, the technology transfer building and extensions to the library and canteen;

- the filtering of all stormwater runoff to prevent any potential pollutants from reaching the creek basin;

- the siting of buildings to provide minimum impact on the natural environment and the adjacent properties;

- sound attenuation and vibration isolation within the new facilities to maintain acceptable noise and vibration limits on the site and at the boundary with adjacent residential properties;

- maintaining air quality at the site and surrounding areas in accordance with best management practices as outlined in the Brisbane City Council Draft Industrial Provisions. Particle filters will be provided to the process and technical bay exhaust systems as required;

- the treatment of non toxic, liquid waste prior to discharge to sewer in accordance with the Queensland Department of Primary Industry Model Trade Waste Policy;

- collecting any wastes such as solvents, potentially flammable liquids, oils and toxic liquids at the point of use in waste containers. The containers will be collected for disposal by a licensed industrial waste collector; and

- community consultation through a newsletter distribution to local residents to enable them to contribute to the development of the EMP.

161. The Committee believes the suggestions made by the Queensland Department of Environment should be included in the EMP. The EMP should also be made available to the Department for comment. The Committee also believes that, as a world class scientific research complex, construction and the operation of new facilities should reflect high environmental consciousness and standards which, at the very least, should comply with State requirements.

Commonwealth agencies

162. Environment Australia and the Australian Heritage Commission advised the Committee that the proposed work will not affect any places entered on the Register of the National Estate, in the Interim List or the Indicative List.

Adjacent property owners

163. The Committee questioned the extent to which adjacent property owners had been advised of the extent of the proposed works. CSIRO advised the Committee as follows:

> *As far as consultation goes, we have consulted at length with local community groups. We had a newsletter drop to something like 300 houses in the area to seek their input in the preparation of an environmental management plan for the site...*[4]

[4] Minutes of Evidence, public hearing, 15 June 1997, p. 92

Native Title

164. CSIRO advised the Committee that there are no native title implications in this proposal. The question of ownership of the site was also raised by the Committee in the context of native title. CSIRO advised that:

> *Going back to the 1980s, all of CSIRO's land was Commonwealth land. I believe that it was in the late 1980s that the land was transferred generally to CSIRO title in its own right. It is owned by CSIRO. We have the opportunity to sell or buy that land within our portfolio without it being considered Crown land as such, or Commonwealth owned land...[T]he land is not, as such, untitled Crown land [and] it does not come under the category of a claim for native title. In fact we have gone further from there and our understanding is, from consultations with various groups that have been approached, that there are no claims on the site anyway, or there were not intended to be any claims on the site.*[5]

LOCAL EMPLOYMENT

165. The proposed facility will have a positive effect on the local economy as follows:

- during the construction period, construction and associated industries will benefit with up to 180 persons working on site at any one time;
- post construction benefits will result from the research and development opportunities generated; and
- the completed facility will employ an additional 80 persons.

[5] *Ibid*

PROGRAM AND COST

Program

166. It is expected that construction will be staged over a 15 month period. Subject to a favourable report from the Committee and Parliamentary approval, it is planned to commenced construction in March 1999 with completion by June 2000.

Cost

167. The estimate for this proposal is $22.3 million at April 1998 prices, inclusive of escalation costs, contingencies, all professional fees and charges. The estimate does not include the cost of relocating staff and equipment from other existing CSIRO sites.

Future Works

168. CSIRO advised that research and development activities at QCAT will continue to expand in the areas of mineral exploration, geophysics, mineral mining, mineral processing, underground communications, sea floor mining, roadway development and safety, stability of rock slopes in large open pit mines, drilling and mine site rehabilitation.

169. Any future site development will be located in the western area, currently used as the major site car park, and in the larger development area located on the eastern side of One O'Clock Creek.

Committee's Recommendation

170. The Committee recommends the construction of the CSIRO Queensland Centre for Advanced Technologies Stage 2, Pinjarra Hills, Queensland, at an estimated out turn cost of $22.3 million.

CONCLUSIONS AND RECOMMENDATIONS

171. The Committee's conclusions and recommendations and the paragraphs in which they appear in the report are set out below:

1. **The mining and energy sectors are important to the Queensland and national economies. (Paragraph 65)**

2. **The need to expand and diversify research and development in mining, energy and related manufacturing industries resulted in the CSIRO and the Queensland Government entering into an agreement, in 1990, to establish the Queensland Centre for Advanced Technologies at Pinjarra Hills, Brisbane. (Paragraph 66)**

3. **Originally designed to cater for research and development projects involving 130 staff, research activities at QCAT have grown at a rapid rate and existing facilities will be inadequate to support planned increases in research personnel and projects. (Paragraph 67)**

4. **There is therefore a need to provide additional facilities at QCAT to house and support these planned increases in personnel and research projects. (Paragraph 68)**

5. **Master planning studies of the site, undertaken by the CSIRO, have identified areas suitable for further expansion well into the next century. (Paragraph 85)**

6. **The extent of the proposed works will provide for the planned expansion of research and development projects and provide capabilities expected to stimulate their further expansion. (Paragraph 127)**

7. **The Committee recommends the construction of the CSIRO Queensland Centre for Advanced Technologies Stage 2, Pinjarra Hills, Queensland, at an estimated out turn cost of $22.3 million. (Paragraph 170)**

Judi Moylan MP

Chair

11 February 1999

APPENDIX A

WITNESSES

Hobbs, Dr. Bruce Edward, Chief of Division of Exploration and Mining, CSIRO, Wembley WA.

Hill, Dr. Roderick Jeffrey, Chief of Division CSIRO Minerals, CSIRO, Clayton South Victoria.

Wright, Dr. John Kelvin, Chief of Divisions Division of Energy and Technology, North Ryde, NSW

Moody, Dr. Trevor Laurence, Assistant General Manager (Corporate Property), Dickson ACT.

Stephenson, Mr. Martin Conrad, Associate Conrad and Gargett, Brisbane Qld.

Corke, Dr. Peter Ian, Principal Research Scientist, CSIRO Manufacturing Science and Technology, Pinjarra Hills Qld.

Maconochie, Dr. Alexander Paul, Manager, Minesite Rehabilitation Research Program.

Gladwin, Dr. Michael Thomas, Research Group Leader, Minescale Geophysics Group, Kenmore Qld.

Carpenter, Mr. Warwick James, Site Operations Manager, Division of Energy Technology, North Ryde NSW.

Harley, Dr. George Johnston, General Manager (Corporate Property), Dickson ACT.

Scott, Dr. Alan Thomas, Site Operations Manager, Queensland Centre for Advanced Technologies, Pinjarra Hills, Qld.

Wolfe, Mr. Bruce John, Associate, Conrad and Gargett Pty. Ltd., Brisbane Qld.

Sanders, Mr. Norrie, Manager Environmental, Gutteridge, Haskins and Davey (GHD), Brisbane, Qld.

Knott, Mr. Robert Gordon, Manager Engineering Services, Gutteridge, Haskins and Davey, (GHD), Brisbane, Qld.

Butcher, Mr. Malcolm, Director, Davis Langdon and Beattie, Brisbane, Qld.

Whaley, Dr. Brian Charles, Senior Associate, Ove Arup and Partners, Spring Hill, Qld.

FIRE

Protection

1. The scope of the fire services for the facility will comprise:

- wet pipe fire protection system to all new buildings;
- alterations to the fire detection system in the existing Research Building (Block 'N') and Library/Canteen extensions; and
- Emergency Warning and Intercommunication Systems (EWIS).

Detection and suppression

2. An automatic wet pipe sprinkler system will provide fire protection for all of the new buildings in accordance with the requirements of AS 2118.

3. The new buildings and extensions will be serviced by a hydrant and hose reel system in accordance with the Building Code of Australia. Portable fire extinguishers will also be provided at required locations.

4. The existing site fire indicator panel in the existing main entry foyer will be expanded to accommodate alarms from detectors, sprinklers and smoke control systems in each of the new buildings. A new mimic panel will be provided at the main entry to the site.

5. Fire detectors will be relocated as necessary in the modified existing facilities and extensions to maintain integrity of the existing fire detection system.

Smoke control

6. Smoke detectors will be installed throughout the facilities to provide smoke control systems to air handling plant in accordance with AS 1668.

ELECTRICAL

Scope

7. The scope of the electrical services will include:

- new high voltage reticulation and substations at the Technology Transfer Building and the Bay Compound to service the new facilities;
- new low voltage area switchboard servicing the Bay Compound;
- building main switchboards at each of the Technical and Process Bays, the Research Building and the Technology Transfer Building;
- sub-mains and distribution switchboards;
- lighting systems including emergency and exit lighting;
- un-interruptable power supply and standby generator for the Computer Centre;
- general and special purpose power outlets;
- cable management systems;
- lighting protection;
- voice and data communications systems including a new microwave communications link; and
- electronic security and access control.

Electricity supply

8. High voltage substations will be established at the Technical Transfer Building (500 kVA) and the Bay Compound (1500 kVA) on a radial feed from the existing Energex high voltage supply point. Master planning of the electrical distribution services will allow future development of the site to close these radial feeds in a ring main to enhance the reliability of site distribution.

Switchboards and reticulation

9. Main switchboards will be installed in each discrete building. Within the Bay Compound, power will be reticulated to each building from a new low voltage area switchboard within the substation building.

10. Energy metering will be provided to each main switchboard and to discrete tenancy and functional areas to permit monitoring of energy usage.

11. External power cabling will be installed underground within a pit and duct system.

12. Extra low frequency electromagnetic radiation levels will be minimised throughout the facility for the protection of staff and sensitive equipment. This will be achieved through the careful selection of switchboard locations and major cable routes throughout buildings and the installation of shielding material where required.

Computer centre

13. An un-interruptable power supply (UPS) will be provided to the Computer centre to ensure no break of supply to computer equipment in the event of a short term power failure.

14. An emergency power generator in the Technology Transfer Building will provide a backup supply for the UPS and dedicated Computer centre air conditioning equipment.

Lighting

15. Lighting will be provided to building interiors in accordance with the requirements of AS1680. Lighting will utilise energy efficient low brightness fluorescent luminaries within the Research Building, the Technology Transfer Building and the office areas of the Technical and Process Bays. Lighting control systems will be provided as appropriate to minimise energy use.

16. Natural lighting will be maximised for the Technical and Process Bays. Supplementary artificial lighting systems will comprise fully enclosed high bay discharge luminaries.

17. External security lighting for building entrances and site access routes will be installed to match existing site provisions with daylight and time clock control.

Emergency

18. Emergency and exit lighting will be provided as required in accordance with the Building Code of Australia. The lights will comprise single point units with integral batteries and charging equipment. A manually initiated test facility will be provided for the emergency lights at each distribution board.

General power

19. General and special purpose power outlets will be provided as required. Outlets in Technical and Process Bays, plant rooms and outdoor areas will be suitably protected against ingress of dust and moisture.

20. Power to all laboratory areas will be installed in accordance with AS2243.

21. Residual Current Detection (RCD) protective devices will protect all general and special outlets in the Technical and Process Bays and laboratory areas.

Lightning

22. All building structures and equipment will be protected against damage from lightning with bonding and protective systems complying with AS 1768. Surge suppression systems will be provided to all external copper cables. Electricity Supply

23. High voltage substations will be established at the Technical Transfer Building (500 kVA) and the Bay Compound (1500 kVA) on a radial feed from the existing Energex high voltage supply point. Master planning of the electrical distribution services will allow future development of the site to close these radial feeds in a ring main to enhance the reliability of site distribution.

Energy conservation and management

24. Passive energy conservation measures will be incorporated in the building and landscape design, and active measures incorporated in the design of mechanical, electrical and hydraulic services.

25. Energy conservation measures will include:

- orientation of the Research Building and the Technology Transfer Building towards the north to maximise passive solar energy and reduce heat load;
- use of adequate and efficient insulation in the roof and walls to reduce ambient internal heat gain or loss;

- north facing windows to the Research Building and the Technology Transfer Building protected with generous overhangs and sunshades;

- use of refractive glass to maximise use of natural light deep into buildings, reducing dependence on artificial lighting;

- provision of reflective roofs (where not exposed to view) to reduce thermal gain;

- predominantly natural ventilation to Technical and Process Bays, enhanced by wall openings to encourage cross ventilation, wind turbines on roof ridges to expel hot air and ventilation at low and high level to produce “stack” effect ventilation where there is no natural air movement;

- separate air handling systems for each floor, incorporating economy cycles, utilising where feasible outside air for free cooling control of the systems, with variable air volume and electronic temperature controls for energy minimisation;

- separate air handling plants for specialised areas to allow independent control and operation;

- selection of cost effective and energy efficient mechanical plant;

- use of long life, low energy light fittings together with lighting controls to minimise use of lighting when areas are unoccupied;

- time clock and photo cell controls to external lighting to minimise energy consumption; and

- water consumption reduction measures, e.g. flow control systems, dual flush WC pans, programmable boiling water units, etc.

26. These initiatives and measures are consistent with a continuing commitment by CSIRO to reducing energy use through the adoption of better and more efficient energy management practices.

MECHANICAL

Scope

27. The scope of mechanical services will include:

- air conditioning for comfort conditions and equipment requirements in the new Research Building, Technology Transfer Building, Library/Canteen extensions, discrete areas of the Technical and Process Bays and alterations to existing systems to suit building changes in the existing Research Building (Block 'N');
- exhaust ventilation systems to serve the amenities areas, lift motor rooms and hoods;
- extraction systems in the Technical and Process Bays;

28. A new cool/freezer room will be constructed in the Canteen areas comprising a package cold room with 'drop-in' coolers for each compartment.

29. Refrigerated drinking water units will be provided to all office floors and Technical and Process Bays as appropriate.

Airconditioning

30. The Research Building and the Technology Transfer Building will be air conditioned for staff comfort conditions and equipment requirements by standard packaged type plant, comprising air handling units on each floor and air cooled condensing units in the roof top plant rooms. This technical solution was selected on the basis of a life cycle cost analysis of the capital, operation and maintenance of a range of possible solutions and provides the optimum flexibility and efficiency for normal and after hours use.

31. Airconditioning temperature control will include variable air volume systems designed to accommodate thermal zoning characteristics and changing room occupancy rates.

32. Indoor air quality will be maximised with outside air intakes located to avoid discharges from existing site cooling tower plant and potential discharges from the Bay Compound.

33. Separate airconditioning plant will be provided to specific laboratory areas in accordance with the appropriate classifications as defined in the Laboratories Construction Code.

34. Modifications to the existing Research Building and the Library/Canteen extensions will involve upgrading and alterations to the existing systems to ensure satisfactory air distribution and temperature control of the renovated areas.

35. Airconditioning to the various control rooms and laboratories in the Technical and Process Bays will be served by individual self contained packaged air conditioning plant as appropriate for the application and minimisation of energy consumption.

36. Separate 24 hour airconditioning systems will be provided for the Computer Centre in the Technology Transfer Building and other areas as required for process cooling. Critical installations such as for the Computer Centre will be appropriately sized to allow the Centre to remain operational while plant is off line for routine or emergency maintenance.

Ventilation

37. General exhaust ventilation systems will be provided as required by the Building Code of Australia to service the amenities areas and nominated equipment rooms.

38. Specialised hoods and spot exhaust systems will be provided as required to nominated laboratories and other discrete areas.

39. Other specific exhaust systems will be provided to the areas of the Technical and Process Bays as required for the specific equipment.

Lifts

40. The scope of services of the vertical transportation services will include :

- 16 person passenger lifts will be installed in both the Research Building and the Technology Transfer Building; and
- a single person disabled persons hoist will be provided in the Coal Process Bay to allow access to the first floor level.

HYDRAULIC

Scope

41. Hydraulic services will include :

- water supply;
- internal hot and cold water reticulation;

- sanitary plumbing and drainage;
- trade waste plumbing and drainage;
- site sewer reticulation;
- sewerage pump stations; and
- drainage.

Regulations and standards

42. The hydraulic services will be designed and constructed in accordance with the following regulations and standards :

- Building Code of Australia;
- Water Supply and Sewerage Act;
- Brisbane City Council Requirements;
- The Department of Primary Industries Model Trade Waste Policy;
- The relevant Australian Standards; and
- Workplace Health and Safety Act.

Sanitary plumbing and drainage

43. Sanitary plumbing and drainage within the new buildings will gravitate to the existing and extended site sewer.

Trade waste plumbing and drainage

44. Appropriately sized pre-treatment devices will be installed either within buildings or in close proximity to the fixtures that generate trade waste within the Research Building, the Technical and Process Bays and the Canteen extension. These wastes shall be treated in accordance with the Department of Primary Industry Model Trade Waste Policy and the Brisbane City Council requirements all in accordance with the Environmental Management Plan.

Stormwater drainage

45. Localised surface, roof and sub soil drainage will be collected and discharged to the main stormwater system throughout the site.

46. Surface water drainage will be designed to an average recurrence interval storm of 1:20 years with provision for a 1:100 year flood path around buildings and other structures.

Water supply

47. The existing water supply infrastructure to the site has the supply capacity to cater for the fire and domestic requirements of the proposed development.

48. A new fire ring main and new domestic water ring main will be extended from the existing complex to service the new facilities. This will also provide additional flexibility and serviceability in the water supply to the entire site.

49. The entire water supply installation will incorporate the necessary backflow protection requirements.

Internal hot and cold water reticulation

50. Cold water supply will be delivered to all fixtures and fittings as required. Where necessary these outlets will have the appropriate level of cross connection protection.

51. All reticulated areas will be provided with the facility to isolate either individual or groups of fixtures for servicing purposes.

52. Hot water will be provided through the use of individual hot water storage units, servicing areas as required. This has been determined as the most efficient method of water heating and storage given the low usage patterns. A reticulated system with central plant would not be cost effective.

Solar

53. Use of solar hot water heating has been assessed in terms of comparison of capital cost to recurrent cost savings per annum. It has been determined that the payback period would exceed the life of the equipment making the proposal not viable.

OTHER SERVICES

Gas Storage

54. Oxygen and Nitrogen will be stored in a bulk gas storage area within the Bay Compound. This installation will be in accordance with Australian Standard 1894.

55. An existing LPG storage container will be relocated to accommodate the proposed site layout. The LPG installation will comply with the requirements of Australian Standard 1596.

56. Stand alone bottled gas storage systems will be provided for other required gasses to the Research Building and Technical and Process Bays in accordance will Australian Standard 4332. Hydrogen storage will comply with Australian Standard 1894 and relevant codes.

57. Reticulated gas services will be provided to all required benches and areas in the laboratories and Technical and Processing Bays.

Security services

58. The access control and security system installed within the existing complex will be upgraded and extended to serve the new buildings. The security system will comprise card reader door controls at nominated access points and monitoring and alarming of all external doors.

Communication services

59. Structured communications cabling services will be provided throughout the new buildings and to interconnect with the existing cabling systems in accordance with the requirements of AS3080.

60. The system will comprise Category 5 unshielded twisted pair and fibre optic cabling with patch panels and RJ45 outlets providing voice and data services to nominated areas.

61. Fibre optic data backbone cabling will be installed between buildings.

62. Network hubs and routers will be installed to provide full connectivity with the existing site network.

63. Voice services will be connected to the existing site PABX.

64. An existing microwave link to the University of Queensland will be upgraded as part of the data system extension.

CONSULTATIONS AND SUPPORT

Consultation

65. The following authorities and Departments were contacted or consulted by CSIRO and its consultants prior to the Committee's public hearing:

Commonwealth Government:

- Department of Industry, Science and Tourism
- Department of Finance and Administrative Services
- Department of Primary Industries and Energy
- Department of Environment, Sport and Territories
- Department of the Prime Minister and Cabinet
- Department of the Treasury
- Attorney-General's Department
- Department of Transport and Regional Development
- Department of Health and Family Services
- Department of Industrial Relations
- Department of Employment, Education, Training and Youth Affairs
- Department of Communication and the Arts
- Commonwealth Fire Board

State and Local Government

- Queensland Department of Environment
- Queensland Department of Economic Development and Trade
- Queensland Department of Local Government and Planning
- Queensland Department of Mines and Energy
- Queensland Department of Natural Resources
- Queensland Department of Training and Industrial Relations
- Queensland Treasury Department.
- Queensland Department of Transport

- Queensland Fire and Rescue Authority
- Queensland Department of Main Roads
- Energex
- Brisbane City Council

Federal and State and Local Members

- The Hon John Moore, MP
- The Hon David Watson, MLA
- Councillor Margaret de Wit

Union

- CSIRO Division of Community Public Sector Union (CPSU)

Other Authorities and Organisations

- Telstra
- ACROD
- Paraplegia and Quadraplegia Association of Queensland
- Queensland Master Builders Association
- Various local resident action groups

APPENDIX C

PROJECT PLANS

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