
The Parliament of the Commonwealth of Australia

CSIRO Clayton (Eastern Precinct) Development Works, Vic.

Parliamentary Standing Committee on Public Works

30 September 1999
Canberra

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Membership of the Committee

Chair Hon. Judi Moylan MP

Deputy Chair Hon. Janice Crosio MBE, MP

Members House of Representatives

Mr John Forrest MP

Mr Colin Hollis MP

Mr Peter Lindsay MP

Mr Bernie Ripoll MP

Senate

Senator Paul Calvert

Senator Alan Ferguson

Senator Shayne Murphy

Committee Secretariat

Secretary Mr Bjarne Nordin

Inquiry Secretary Mr Michael Fetter

Administrative Officer Mrs Angela Nagy



Extract from the Votes and Proceedings of the House of Representatives

No. 36 dated Wednesday 12 May 1999

3. PUBLIC WORKS—PARLIAMENTARY STANDING COMMITTEE— REFERENCE OF WORK—CSIRO CLAYTON (EASTERN PRECINCT) DEVELOPMENT WORKS, VIC.

Mr Slipper (Parliamentary Secretary to the Minister for Finance and Administration), 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 Clayton (Eastern Precinct) Development Works, Vic.

Question—put and passed.



1. On 12 May 1999, the House of Representatives referred to the Parliamentary Standing Committee on Public Works for consideration and report the proposed CSIRO Clayton (Eastern Precinct) Development Works, Vic.

THE REFERENCE

2. The terms of the reference were as follows:

CSIRO proposes to consolidate the Victorian activities of its Divisions of Manufacturing Science and Technology, Mathematics, Information Science, Information Technology Services and Petroleum Resources at its Clayton site in Victoria. The consolidation and rationalisation of accommodation for CSIRO throughout Australia and replacement or refurbishment of outdated, substandard facilities are key elements of the CSIRO property management plan.

The project will enable CSIRO to vacate sites at Preston and Syndal, freeing up these sites for sale. It will also relocate staff and resources from leased premises at Carlton and Clayton into accommodation at the Clayton site, which is owned by CSIRO and is located adjacent to the campus of Monash University.

The Clayton site is one of CSIRO's largest sites and is occupied by more than 700 staff. It is the organisation's major Victorian site and the centre for CSIRO research into mineral, forest products, molecular and polymer science, manufacturing science and technology, and mathematical and information sciences.

The development will provide approximately 7,000 square metres gross floor area of new building accommodation, together with another 7,000 square metres of refurbishment in the 35-year-old 'David Rivett' laboratories and provide accommodation for over 370 staff. The work will provide laboratories, offices, process and technical bays, research support facilities and staff amenities.

3. When referred to the Committee, the estimated cost of the project was \$28 million.

THE COMMITTEE'S INVESTIGATION

4. The Committee received a written submission from CSIRO and took evidence from CSIRO officials at a public hearing held at Oakleigh (Melbourne) on 8 July 1999.
5. Submissions were also received from the following organisations:
 - South Australian Ambulance Service;
 - Melbourne Water;
 - Environment Australia—Environment Protection Group;
 - Australian Heritage Commission;
 - Victorian Environment Protection Authority; and
 - City of Monash.
6. Prior to public hearing, the Committee undertook an extensive inspection of the following CSIRO sites and facilities:
 - Preston—Division of Manufacturing Science and Technology;
 - Syndal—Division of Petroleum Resources; and
 - Clayton—Division of Manufacturing Science and Technology and the proposed site.
7. Witnesses who appeared before the Committee at the public hearings are listed in APPENDIX A. The Committee's proceedings will be printed as Minutes of Evidence.

BACKGROUND

Clayton site

8. The Clayton site is currently one of CSIRO's major sites and is occupied by more than 700 staff. It is CSIRO's largest site in Victoria and is divided into three precincts which accommodate CSIRO research activities on:
 - western precinct—Minerals;
 - central precinct—Forest Products, Molecular and Polymer Science; and

- eastern precinct—Manufacturing Science and Technology, Telecommunications and Industrial Physics and Mathematical and Information Sciences.

Clayton property

9. CSIRO acquired the Clayton property in 1960 as a site to consolidate all of the Organisation's mineral and chemical industrial research activities in Victoria. The property is located 15 kilometres south east of the Melbourne Central Business District (CBD) and is within two kilometres of the Monash Freeway. This freeway forms part of City-Link which will give rapid access to the CBD and Tullamarine Airport.
10. The property adjoins Monash University and is surrounded by many large commercial and light industrial sites. Several commercial and institutional laboratory complexes are located within the greater Clayton area.

Description

11. The site is mainly flat and is approximately 75 per cent occupied by existing CSIRO developments. The main site has an area of 15.37 hectares. Extensive native landscaping has been developed on the site over the period of CSIRO occupancy.

Development of Clayton property

12. Progressively, since 1961, five major research complexes have been erected, all of which have been reviewed by the Committee. The Committee has inquired into the proposed construction of:
 - a new chemical physics laboratory's (Committee's Second Report of 1961, Parliamentary Paper 27/1961);
 - a research laboratory (Committee's Seventh Report of 1973, Parliamentary Paper 167/1973);
 - a research laboratory complex for the Division of Chemical Technology (Committee's Third Report of 1979, Parliamentary Paper 147/1979);
 - research laboratory complexes for the Divisions of Applied Organic Chemistry and Materials Science (Committee's Fourth Report of 1980, Parliamentary Paper 85/1980); and
 - a laboratory complex for the Division of Minerals (Committee's Fourteenth Report of 1995, Parliamentary Paper 117/1995).
13. These facilities have aimed to provide CSIRO scientists with modern, efficient accommodation and replace outmoded and obsolete facilities on sites

subsequently vacated by CSIRO under its long term program of rationalisation and consolidation.

14. CSIRO has planned existing developments on the Clayton site within three precincts—western, central and eastern. Each precinct contains related research activities, for example, the eastern precinct is concerned with activities related to the manufacturing industry.

THE NEED

Property rationalisation

15. The program of progressive replacement of obsolete facilities and property rationalisation continues. CSIRO advised the Committee that the property development and rationalisation program will result in:
 - the consolidation and rationalisation of CSIRO accommodation, where practicable, onto major sites; and
 - the replacement/refurbishment of outdated, substandard facilities.
16. At the Clayton site, CSIRO believes there is a need to:
 - maximise the use of infrastructure available;
 - provide appropriate accommodation for research activities to foster greater research integration within CSIRO;
 - reduce overhead costs associated with multiple site management; and
 - vacate the CSIRO sites at Preston and Syndal for sale and to abandon rental accommodation.
17. These objectives could be achieved by relocating elements of a number of divisions and support groups located in CSIRO-owned or leased properties in other Melbourne suburbs. The Divisions and support groups involved are:
 - Manufacturing Science and Technology;
 - Mathematical and Information Sciences;
 - Telecommunications and Industrial Physics;
 - Petroleum Resources; and
 - CSIRO Information Technology Services—Information Management.

MANUFACTURING SCIENCE AND TECHNOLOGY

Aim

18. CSIRO Manufacturing Science and Technology works closely with Australian companies to provide strategic and applied research and development expertise to enhance and sustain their international manufacturing competitiveness.

Budget, staffing and locations

19. The Division has an annual budget of \$48 million (\$18 million external revenue). The Division's 340 staff are located at:
 - Clayton—150;
 - Preston—100;
 - Adelaide—60; and
 - Brisbane—30.

Focus of research

20. CSIRO advised that about 70 per cent of the research commitment is allocated to the integrated manufactured products sector. The remainder is spread across another eight research sectors. The Division currently works in six Co-operative Research Centres (CRCs) with other research providers, such as universities, to bring complementary expertise to bear on specific areas of industrial technology.
21. The Division's key research areas are:
 - casting and alloys—based mainly at Preston and Clayton, with a small group in Brisbane. The research group provides research into practical metallurgy through to fundamental materials science, process modelling and simulation, casting design and production engineering. It has an extensive array of casting pilot plant equipment and foundry and laboratory infrastructure which supports high level skills in foundry technology and its long-standing collaboration with the die casting industry. The Committee was able to see the extent of equipment available during its inspection of the Preston site;
 - joining and thermal processing—based mainly at Adelaide, with a small group at Preston. It investigates thermal processes for joining, cutting, forming and surface treatment of ferrous and non-ferrous metals. Their facilities include a welding laboratory equipped for high productivity automated and robotic arc welding;

- manufacturing systems and automation—based mainly at Preston with small groups at Adelaide and Brisbane. It has expertise in manufacturing system and enterprise design methodologies and software tools to engineer reliable and flexible systems. Research includes areas such as vision technology—for high-speed machine control, transport and traffic management, measuring objects in manufacturing processes. It is also involved in process control and automation technologies, and studies on use of computer networks and tools of information technologies to link globally distributed work groups;
- materials processing—based at Clayton, this research program develops new products, processes and applications for the manufacturing, mining and mineral processing industries; and
- photonics and micromanufacturing—also based at Clayton, this group is a world-leading Photonics team using light and other forms of radiant energy in areas of optics, spectroscopy and X-ray science for development of leading edge expertise. Notable areas of industrial applications include Optically Variable Devices for high security anti-counterfeiting applications (bank notes), specialised metal finishing for corrosion resistant applications and Phase Contrast Imaging technology to dramatically improve the clarity of X-rays. The group also develops Micro-manufacturing applications for micro-optical and micro-electronic devices which have provided Australia with prototyping capability that acts as a catalyst for development of a significant Australian micro-manufacturing industry.

Current research

22. Examples of some of the current developments currently being undertaken by the Division of Manufacturing Science and Technology include:

- Henderson Automotive Group—lightweight magnesium car seat frames;
- Nissan Casting Australia—quality improvements in high pressure die casting;
- American Express—use of Exelgram anti-counterfeiting technology on its travellers' cheques;
- X-ray Technologies Pty Ltd—soft-tissue X-ray imaging technique to be extended to applications in aerospace, microelectronics and food safety; and

- Ceramic Fuel Cells—a consortium with energy sector agencies and companies developing an efficient and environmentally sound fuel cell for the generation of electricity from fossil fuel.

Support and administration

23. The mainstream research requires the involvement of commercial and other support groups to support the development of:
- commercial arrangements—managed from Clayton. Activities include collaborative research, contract research, commercial licensing, and consulting and technical services;
 - business relationships—sought with companies that are, or have the capacity to be, internationally competitive and have a long-term commitment to operating in and exporting from Australia; and
 - resources—required for the development and fabrication of the highly specialised equipment used in much of the Division’s research at Clayton.

Cooperative Research Centres

24. The recently announced Cooperative Research Centre (CRC) for Microtechnology will include groups from the Division at Clayton. This CRC will investigate micro-manufacturing technologies which will lead to new approaches to high volume, low cost production. Its research focus will include
- alternative materials to silicon—silicon alloys, diamond substrates;
 - design, simulation and testing of high-performance micro-devices—environmental and bio sensors;
 - microfluidic devices—drug delivery devices; and
 - integrated systems—the coupling of sensors with transmitters for remote interrogation.
25. The Division, at the Clayton site, is a key participant in the recently renewed CRC for Intelligent Manufacturing Systems and Technologies. This CRC involves the Division in research on organisation of manufacturing enterprises to achieve productivity levels equal to, or better than, world’s best. The focus of the research addresses:
- the Australian machine tool industry;
 - plastics processing and machining;
 - aerospace design and assembly;

- metal cutting and forming; and
 - new machine specification, design and control.
26. The Division's material processing program work on polymeric-active packaging is a key contribution to the CRC for International Food Manufacture and Packaging Science. This involves research on preservation and packaging methods to extend shelf life and enable long distance transport of Australia's fresh food products to foreign markets, environmental aspects of packaging materials, sensory research on customer perceptions and intelligent manufacturing systems.
27. The CRC for Alloy and Solidification Technology Metals Manufacturing has recently been renewed. CSIRO staff at Preston are involved in development and implementation of key technologies to assist in the growth and international competitiveness of the Australian light metals—involving aluminium and magnesium.
28. Research groups from the Division in Brisbane and Adelaide, respectively, are also key participants in the CRC for Mining Technology and Equipment and the CRC for Materials Welding and Joining. A small number of the Division's staff at Preston are also involved with these Centres.

MATHEMATICAL AND INFORMATION SCIENCES

Expertise

29. CSIRO Mathematical and Information Sciences has particular expertise in computer science and engineering, applied mathematics, operations research, statistics and related disciplines.

Budget and staff

30. The Division has an annual budget of \$33.7 million and a total of 280 staff at sites in the major capital cities.
31. There are 33 staff located in leased premises at Carlton.

Research activities

32. The Division's knowledge base can be applied across most industry sectors. The primary focus is, however, on the information technology and telecommunication sector and the service sector comprising finance, health, retail, and tourism. The Division delivers research solutions to industry through collaboration, consultancies, technology transfer and staff training. In addition, CSIRO advised the Committee that strong interaction exists with

several of the sectors supported by CSIRO research at Clayton, including manufacturing and minerals processing.

33. The Division's research, which is relevant to other CSIRO research if adequate facilities were provided at Clayton, encompasses:
- applied mathematics
 - ⇒ computational fluid dynamics—mainly located at Clayton and collaborates with CSIRO Minerals
 - ⇒ mathematical modelling of industrial processes—there is close collaboration with the Division of Manufacturing Science and Technology;
 - decision support
 - ⇒ applied artificial intelligence—works with food manufacturers and mining companies and is currently located in leased premises at Carlton
 - ⇒ operations research—group members are located at Clayton and Adelaide and the work is linked to the Division of Manufacturing Science and Technology's factory layout expertise and to research activities at Carlton
 - ⇒ production process improvement—there is some collaboration with the Division of Manufacturing Science and Technology, with the majority of the research group located Clayton;
 - E-commerce
 - ⇒ distributed systems—Internet commerce—this group aims to develop infrastructure which provide flexible and integrated access to information and services on large networks and is located at Carlton
 - ⇒ technologies for electronic documents—conceives and demonstrates systems for the management and exploitation of electronic resources and is located at Carlton; and
 - software development and engineering
 - ⇒ advanced distributed software architecture and technologies—this group assists develop distributed computing systems, with members in Sydney and Canberra.

Computing power and inter-disciplinary collaboration

34. Computer-based research undertaken by the Division for other CSIRO Divisions and industry requires sophisticated computer systems and networks. These are not available in the current accommodation at Clayton.

35. CSIRO advised that there have been major contributions to industry resulting from the integration the work of several disciplinary groups. For example, solutions in electronic commerce may involve contributions from operations research, applied artificial intelligence and distributed systems. Developments to improve manufacturing systems involve contributions from sensing technologies, operations research, and production process improvement, applied artificial intelligence and distributed systems. Location of these groups together on the one site will enhance the opportunities for productive collaborations.

Cooperative Research Centres

36. The Division of Mathematical and Information Sciences is currently involved in the following CRCs:
- Co-operative Research Centre for Enterprise Distributed Systems Technology;
 - Co-operative Research Centre for Advanced Computational Systems; and
 - The Research Data Network Co-operative Research Centre.

TELECOMMUNICATIONS AND INDUSTRIAL PHYSICS

Responsibilities

37. The Division discharges, on behalf of CSIRO, legislative responsibilities under the *Science and Industry Research Act 1949* and the *National Measurement Act 1960*.

Location

38. The Division has its headquarters and the majority of staff located in Sydney, with telecommunications activities based at Marsfield and industrial Physics at Lindfield—location of the National Measurement Laboratory. A group of nine staff is located at Clayton. This group performs instrument calibration testing for industry in the region and has a research program on mass standards related to defining the standard kilogram.

PETROLEUM RESOURCES

Aim

39. The Division of Petroleum Resources is a supplier of research and development and related technology services to the oil and gas industry. The Division's research covers the development of Australia's oil and gas resources, from exploration through to the delivery of processed products. It includes the investigation of gas in coal as energy source and the environmental implications of off-shore oil and gas development.

Staff and location

40. The Division currently has 80 staff at sites in Syndal (Melbourne), Bentley (Perth) and North Ryde (Sydney).

Committee approves new facility at Bentley, WA

41. Earlier this year, the Committee recommended the construction of a new Centre for Petroleum and Mineral Resources Research at Bentley, WA to better serve the growth in the Australian petroleum industry based around Perth and the North West Shelf region. The Centre will accommodate the majority of the Division's staff currently at Syndal (Committee's Second Report of 1999, Parliamentary Paper 35/1999).

Need for Melbourne-based staff

42. Two of the Division's research programs, currently located at Syndal, will not be transferred to Bentley. These programs have research activities orientated towards clients and activities located on the eastern coast of Australia. These programs are:
 - a unit of the reservoir management program—which undertakes research using numerical modelling techniques to increase the quality of appraisal and the efficiency of oil and gas field development and resource recovery. The unit is developing technology to enable economic flow rates from low permeability reservoirs, with a focus on sandstone and coal seam gas reservoirs in central and eastern Australia. The unit has extensive collaboration with scientists at Monash University, the Australian National University and the Division of Mathematical and Information Sciences at Clayton. CSIRO advised that the geographic location of the reservoirs being studied and of the collaborating scientists makes it more efficient to retain this group in Melbourne; and

- the 'hydro fracturing' group—which is investigating techniques to extract gas from eastern Australian coal seams. The techniques have relevance to understanding mineralisation and coal formation and has a potential application in the utilisation of underground 'hot rock energy'. Again, the geographic locations of the target resources and research collaborators make it more efficient to not transfer this group to Perth.

CSIRO INFORMATION TECHNOLOGY SERVICES— INFORMATION MANAGEMENT

Aim

43. Information Technology Services is one of CSIRO's corporate support groups. A subsidiary group specialises in information management and provides a CSIRO-wide service to acquire and manage scientific and technical information from internal and external sources using modern information management techniques.

Need for location at Clayton

44. CSIRO advised the Committee that the group is heavily dependent on access to a fast and reliable electronic communication network and will therefore benefit from direct access to the CSIRO IT network which is available on the main Clayton site. Other benefits will include more direct access to its client base on the Clayton site and access to available site support services.

Committee's Conclusions

45. **Since 1961 substantial investments have been made by the Commonwealth in the construction of five major CSIRO research laboratory complexes on a 15 hectare site at Clayton, Victoria.**
46. **The site now houses the largest concentration of CSIRO scientific expertise in Victoria. It is the centre of CSIRO research into minerals, forest products, molecular and polymer science, manufacturing science and technology and mathematical and information science.**
47. **A number of elements of research Divisions, in particular Manufacturing Science and Technology and Petroleum Resources remain at other centres within the Melbourne metropolitan area in properties owned or leased by CSIRO.**
48. **Capacity remains at the Clayton site for further collocation and**

rationalisation of research activities. This rationalisation would result in reduced overheads and realise proceeds from property sales for investment in new and upgraded research facilities at Clayton. It would also facilitate interaction between research groups and between Divisions, cooperative research centres and staff and post-graduate students from Monash University.

49. **In property terms, sites at Preston and Syndal and leased premises at Carlton and Clayton could be vacated and staff relocated to Clayton.**
50. **A need therefore exists to provide additional research facilities at the Clayton site for more than 370 CSIRO staff.**

THE PROPOSAL

Scope

51. The proposal involves the following elements:
 - the mid-life refurbishment of the David Rivett Laboratory;
 - the construction of new research accommodation and minor refurbishment of the Bastow buildings in the eastern precinct at Clayton; and
 - the upgrade and extension of research offices on the North Clayton site—immediately opposite from main Clayton site.
52. The proposed works will provide research and support facilities for the Victorian-based activities of four CSIRO Divisions and a group providing support services:
 - Manufacturing Science and Technology;
 - Mathematical and Information Sciences;
 - Telecommunications and Industrial Physics;
 - Petroleum Resources; and
 - CSIRO Information Technology Services.
53. The proposed accommodation on the eastern precinct at Clayton will comprise laboratories, research and administration offices, modern computer facilities and open-planned work areas, seminar and meeting rooms. The research facilities will include facilities for industrial measurement testing laboratories, modern analytical instruments—including nuclear magnetic

resonance imaging, transmission electron microscopy and scanning electron microscopy, and technical bays for large scale and process rigs.

54. Within the eastern precinct, the majority of support services, staff amenities, and infrastructure will be shared. These will include the existing library and common workshop, chemical, gas and consumables stores, a new canteen, passive recreation areas and a common reception for all the precinct occupants.
55. The proposed works include the long overdue mid-life refurbishment of the David Rivett Laboratory, which was completed in 1964. The buildings are currently occupied by the Clayton section of the Division of Manufacturing Science and Technology and the Division of Telecommunications and Industrial Physics.
56. The Committee asked CSIRO to explain the rationale for the upgrading of some existing buildings. CSIRO advised that the property management plan has a program for the half-life refurbishment of buildings every 20 years. This approach can be applied to buildings with a design life of 40 years. The Rivett building is 35 years old and is well overdue for refurbishment on the current program. The form of refurbishment will involve retaining the existing basic structure but all services, ceilings, floors and finishes will be replaced or refurbished.
57. The design of the Rivett Building incorporated adaptability and flexibility to meet the requirements of changing research programs current at the time. Since the building was constructed, laboratory requirements have changed and today, research programs change even more rapidly. For this reason, the new buildings will be designed for easy adaptation to changing research programs. This will be achieved by opening up internal spaces and providing a servicing system which will allow benches to be relocated, the provision of non-load bearing walls.
58. The complete proposal will include associated site and road works, car parking, engineering services and landscaping.

Relocation of elements

59. The proposed eastern precinct development will, when complete, accommodate 370 staff. Almost 200 of these are currently located at Clayton. Of the others, 100 staff from the Division of Manufacturing Science and Technology will relocate from Preston, 33 staff from the Division of Mathematical and Information Sciences from Carlton and 30 staff from the Division of Petroleum Resources currently at Syndal.

60. In terms of specific research groups, it is planned to utilise the new and refurbished accommodation as follows:
- amalgamating the activities of the Carlton and Clayton groups of CSIRO Mathematical and Information Sciences at the Clayton site and dispensing with rented accommodation at Carlton;
 - consolidating two programs from the CSIRO Division of Petroleum Resources research with kindred activities at Clayton;
 - re-housing the Victorian arm of the National Measurement Laboratory (CSIRO Telecommunications and Industrial Physics) into refurbished accommodation in the David Rivett Laboratory; and
 - relocating the CSIRO Information Technology Services Information Management group from rented accommodation remote from the CSIRO Clayton site into refurbished accommodation in the CSIRO-owned North Clayton site building opposite the eastern precinct, closer to research activities.
61. Staff of the Division of Mathematical and Information Sciences will increase to 65, after the relocation of 33 staff from Carlton and a planned increase of 10 staff. A small group will remain in the Melbourne CBD at the joint CSIRO/Bureau of Meteorology High Performance Computing and Communications Centre.

Property rationalisation

62. The proposed research complex will totally replace all resources on sites presently owned by CSIRO at Preston and Syndal and occupied by the Divisions of Manufacturing Science and Technology and Petroleum Resources and replace facilities currently leased for the Division of Mathematical and Information Sciences and CSIRO Information Technology Services at Carlton and Blackburn Road, Clayton, respectively. The Preston and Syndal sites will be offered for sale and the leases at Carlton and Blackburn Road will be surrendered upon completion of the project.

Proceeds from sale

63. The Committee asked CSIRO about the financial return from sites owned by the Organisation which will be vacated. CSIRO advised that proceeds from the sale of the two sites are anticipated to be \$3.75 million. The proceeds from any sale will be retained by the CSIRO and in the long term will assist the funding of the proposed project.
64. There was initially a negative reaction from the local government area which encompasses the Preston site. Concerns from a councillor was expressed in

the media. However, the Committee was advised that the Council of the City of Darebin is aware of the reasons for the relocation and is working closely with CSIRO to identify alternative site uses.

Vacating leased premises

65. The Committee questioned CSIRO about the penalties which may arise from vacating leased premises before the expiration of leases. CSIRO confirmed that the lease on the Carlton site will expire on 31 March 2001 with an option for a one-year extension. The site is leased from the University of Melbourne. There will be no penalties. The lease for the second site, at Blackburn Road, Clayton will expire on January 2000. The site is leased from Monash University and the lease could be extended if required. Again, there will be no penalties.

Savings in overheads

66. The Committee questioned the amount of overhead costs associated with current multiple site management. CSIRO advised that studies have been undertaken into the cost of operating and maintaining services, utilities and building maintenance. These studies indicate that overheads associated with buildings to be relocated are about \$1.2 million. A similar study has been undertaken into the cost of providing services at Clayton. This study indicates annual costs will be about \$980,000, resulting in a saving of \$200,000 per annum. In addition, CSIRO has also estimated that savings arising from the consolidation of administrative support infrastructure will be about \$900,000 per annum.

Benefits of collocation of CSIRO research activities

67. CSIRO advised that the collocation of complementary research divisions on the Clayton site will enhance existing and generate new opportunities for research interaction, both at the site and with collaborators at the adjacent Monash University. It will permit sharing and optimise the use of costly major items of equipment, generate administrative efficiencies and enhance staff access to appropriate amenities, extensive library services, meeting rooms, canteen, an existing auditorium and child care centre.
68. During questioning on the benefits of collocation, CSIRO advised that there are clear and distinct synergies which develop when researchers are collocated. For example, new ideas for research are generated when research groups are brought together. The thrust of collocation is also consistent with the broader policy of researchers being brought together by the establishment of cooperative research centres which frequently see non-university researchers collocated with or adjacent to university campuses.

69. CSIRO advised that collocation will result in the optimisation of the use of costly major items of equipment and the Committee asked to be provided with examples of this. CSIRO advised that equipment includes scanning and transmission electron microscopes which groups at the Preston and Clayton sites need to access. In terms of items such as mechanical testing equipment, both groups would be able to rationalise their inventories at the end of the useful lives of individual items.
70. The proximity to the adjacent Monash University will also offer potential benefit for the staff relocating from Preston. These scientists will have access to more scientific colleagues in their particular area of research, access to the very large University library and increased access to postgraduate students.
71. Further specific examples of the benefits of collocation are:
 - the relocation from Preston to Clayton of Division of Manufacturing Science and Technology activities—this will significantly advance the integration of the research activities in the new Division and greatly facilitate productive scientific interaction within CSIRO. At Clayton, the former Preston research groups will also have ready access to colleagues in related disciplines at CSIRO Molecular Science and CSIRO Minerals;
 - the Division of Petroleum Resources Reservoir Management Program, to be relocated to Clayton, collaborates extensively with scientists at Monash University and the Division of Mathematical and Information Sciences at Clayton. Collocation will greatly enhance interaction;
 - the proposed development will enable the physical collocation of Mathematical and Information Sciences Research groups and lead to significantly increased integration and collaboration in their research activities; and
 - CSIRO Information and Technology Services will greatly benefit from more direct access to its client research base and to available site support services on the Clayton site. Close proximity to the Division of Mathematical and Information Sciences will facilitate closer collaboration on the implementation of information technology research.

Relocation of staff

72. The Committee recognised that should the proposal proceed, the workforce currently at Preston, some distance from Clayton, will need to drive to work. Some staff may resign as a consequence. The Committee therefore asked

CSIRO to provide details of measures which will be adopted to facilitate the transfer of staff to Clayton.

73. CSIRO advised that issues of staff mobility have been and will continue to be addressed. After it was mooted that planning was underway to close the Preston site, a management-staff relocation committee was formed initially to provide a discussion forum for matters of concern to staff. In addition, CSIRO advised that:

a standard set of conditions ... applies in such cases of intra-city transfers so that if peoples' travel time increases by more than a certain amount or if the distance they have to travel to work increases by a certain amount then the organisation is able to offer them either some assistance with transport for a fixed period of time or it can offer them the costs of relocating their house. So we are very mindful of the concerns that staff have expressed and we are aware that the new workplace of some staff will be a long way from their home. ...[W]e do have a number of staff already at Clayton who live in the far northern suburbs of Melbourne and who already travel that distance so it is not an unreasonable distance for people to travel, but for those for whom it is a real problem we have a means of looking at it.¹

74. CSIRO confirmed that additional costs associated with staff relocation have not been quantified because the number of people who will seek relocation assistance is not known at this stage.

EXTENT OF PROPOSED WORK

Area and scale

75. Proposed development works on the main Clayton site will include approximately 16,400 square metres gross floor area, comprising some 53 per cent upgraded existing and 47 per cent new facilities. The new and existing spaces will be integrated in the form of a number of connected wings, each with distinct generic functions:

- the generic functional entities have been formed into three elements:
- 9,300 square metres of research facilities comprising new and upgraded laboratories and laboratory offices;
- 1,400 square metres for new process bays, technical bays and support areas;

¹ CSIRO, *Transcript*, p. 54.

- 4,800 square metres for shared new and upgraded facilities, comprising the foyer and reception area, seminar room, library, canteen, administration, management, plant and gallery space; and
 - galleries, an atrium area, link wings and connecting bridges will be incorporated in the design to not only give access to the various functional facilities but also provide the opportunity for interaction and casual exchange between staff.
76. All new areas of the complex will be capable of future expansion.
77. Proposed development works on the North Clayton site will be confined to upgrading the existing two storey office wing plus a small extension to the entrance. The existing road system and car parking on the North Clayton site is satisfactory and will be unchanged.

Design and construction standards

78. Design of the facilities will be consistent with general design principles adopted for all CSIRO research accommodation:
- long term flexibility—with multiple use of space;
 - adaptability—with capacity for ready conversion of layouts and relatively simple re-servicing; and
 - simplicity of maintenance—with easily accessible services.
79. 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.

City of Monash

80. The Council of the City of Monash advised that Planning Permit approval will not be required for land uses or buildings and works on land designated Reserved for Other Public Purposes. CSIRO advised the Committee that although Council approvals will not be required for works to be undertaken on the main Clayton site, it will continue to liaise with the Council during the design and documentation of the project.
81. The Council also advised the Committee that works are to be carried out on the North Clayton site which is located within the Monash Precinct Zone. CSIRO advised that the works to be carried out will be mainly minor building refurbishment works, estimated to cost \$370,000, to accommodate 25 staff from CSIRO Information Technology Services. CSIRO will liaise with the Council during ongoing design development and documentation. Detailed

plans and documentation will be submitted for Council assessment and endorsement prior to the commencement of any building or works on the site.

Materials and finishes

82. The new laboratories and office building will be reinforced concrete and steel framed construction with reinforced concrete floors.
83. Roof decking will be 'Colorbond' metal and external walls will comprise performance glass and metal faced sandwich panels. Floor finishes will be vinyl to laboratories and carpet to offices.
84. The new process and technical bays will be conventional portal steel framed structures with precast concrete walls and 'Colorbond' metal deck roofs. Floors to the process bays will generally be monolithic concrete finish with vinyl floor finishes to the support areas.
85. The walls of the existing David Rivett Laboratory will be retained as face brickwork with new stainless steel downpipes and flues expressed externally.
86. The Committee questioned the need for stainless steel downpipes and flues. CSIRO advised that provision of stainless steel downpipes are proposed for their durability. A lesser quality product would have a shorter design life.

Committee's Recommendation

87. **The need for stainless steel downpipes proposed for the refurbished David Rivett Building should be reviewed.**

Landscaping

88. All external unpaved areas will be landscaped to harmonise with the prevailing planting, which is predominantly native flora and in accordance with the requirements of the local authority.
89. All existing native trees will be retained as far as is practicable.

Site planning

90. The current proposal is consistent with the CSIRO Strategic Development Plan for the CSIRO site at Clayton. The proposed development on the North Clayton site, providing refurbished office accommodation and general storage, will continue current use.
91. A number of planning studies were undertaken in consultation with staff to develop a preferred development option for the main eastern precinct and North Clayton sites.

92. The preferred development option on the eastern precinct addresses and incorporates the following key issues:
- generic functional and performance groups;
 - orientation and environmental conditions;
 - site slope and height restrictions;
 - access for the public, staff and for service vehicles;
 - future expansion;
 - carparking needs;
 - landscape; and
 - presence, identity and imagery.
93. The key features of the preferred site development option include:
- the location of buildings to enable easy future expansion to the east with visual prominence of the main entry from the south;
 - public and community orientated facilities—reception, seminar room—at the lower, southern site frontage;
 - the refurbishment of the existing David Rivett Laboratory for lightly serviced research facilities, offices and shared facilities—library, seminar room, workshops;
 - new research facilities, more highly serviced laboratories and associated offices located on the eastern portion of the site as an extension to the existing David Rivett Laboratory;
 - new process bays, technical bays, and support facilities located on the north eastern portion of the site adjacent to the existing workshop/hardstand area in the northern—Bastow wing, accessible at grade for loading/unloading by large vehicles; and
 - carparking distributed on the site to provide direct access for staff to the research facilities and laboratories, with management of the natural site slope to provide easy access for the disabled and for heavy vehicles.

Committee questioning

94. The Committee suggested to CSIRO that there may have been a lack of foresight in the development of the site in master planning terms. The Committee noted that the building footprint takes in pavement areas and also, possibly, underground services. The Committee therefore sought an assurance that this will not occur in future. CSIRO advised that the proposal

is consistent with the strategic master plan. Areas suitable for development are on the eastern side of the Clayton site. The extent of the proposal represents what CSIRO described as the 'semi-final' stage of development towards the east. In the longer term, a grassed area, further east—which will remain, is regarded as the last remaining area for development on the site.

95. CSIRO acknowledged that the need to use former roads and hardstand areas for the development will be at a cost but also suggested to the Committee that they have limited lives. They are, however, in good condition but their removal and use of the land for the proposed works are a necessary means of providing an economic solution. The Committee expressed disappointment at the level of cost of external works but also recognises that these costs are also attributable to excavation.

Committee's Recommendation

96. **CSIRO should develop a master plan for the further development of the site which will avoid costly removal of existing facilities and infrastructure.**

Geotechnical

97. A geotechnical investigation of the site has confirmed that the soil profile comprises approximately 200–600mm of fill overlying a very stiff to hard silty clay down to a depth of approximately 2.5 metres. The clays are generally red-brown and grey mottled and of intermediate to high plasticity. Ground water was not encountered in any of the test probes.
98. Conventional pad and strip footings are considered to be suitable foundation types for the proposed new buildings, which is consistent with the foundation types of existing buildings.

Research facilities—design and scope

99. The research facilities will comprise computer orientated work areas of an office nature for research scientists and technicians; and two distinct types of laboratory facilities:
- wet chemistry laboratories and support rooms requiring some fume extraction cupboards and reticulated services; and
 - dry laboratories for precision microscopy work requiring vibration and natural light control such as the electronic, x-ray and electron beam facilities.

100. Where laboratories are functionally dependent they will be grouped together with associated offices and write up areas for research scientists and technicians in close proximity.
101. The central atrium area in the new eastern research wing will consist of a linear open space extending over two levels with open balcony walkways, bridge links and overhead south facing skylights. This design solution will assist in creating both a functional and efficient building envelope and an open interactive working environment.
102. Both the new office and laboratory wings can be easily expanded to the east with minimal disruption.
103. All laboratory and office facilities will be secured beyond the public areas by key card access.

Process bays, technical bays and stores

104. The process bays, including die casting, plasma cutting and rock mechanics test bays, will be light industrial buildings which will vary in height depending upon the technical equipment to be accommodated.
105. The support offices and laboratories closely associated with the process bays, will be accommodated in the new two level structures to the south and linked by an enclosed bridge. The existing workshops immediately to the north will service the new process bays and technical bays.
106. Some storage facilities will be provided in the existing warehouse building on the North Clayton site.

Shared facilities

107. The complex will include a new canteen, with an outdoor eating area, a large seminar conference space, meeting rooms and a joint library. Common support facilities will include workshop, chemical, gas and consumables stores. All of these facilities will be shared. The collocation of respective Divisions in the eastern precinct will enable all of these facilities to be shared by those Divisions.

Features to enhance research interaction

108. A new main entry foyer will serve as the main focal point for the complex. A two level gallery will provide access between the foyer/reception, seminar room, new office/laboratory wing and administration areas.
109. Beyond, the combination of north-south links and bridges and the east-west atrium/connecting gallery will integrate the complex's new and existing buildings with the main entry.

110. A two level gallery will provide access between the foyer/reception and the seminar room, the new office/laboratory wing and administration areas.
111. The proposed design takes advantage of the difference in level across the site to enable first floor enclosed bridges to link offices, laboratories, as well as the canteen and process bays, with the adjoining Bastow building to the north.
112. CSIRO expects that movement through all of the enclosed links will foster a high degree of interaction and opportunity for casual exchange. The link spaces will also provide an outlook into a variety of landscaped courtyard spaces.
113. The gallery and link spaces will also have the potential to display high profile or 'high tech' research equipment and projects for public and commercial interests.

Disabled access

114. The complex will be designed to ensure access for disabled people will meet the requirements of the Building Code of Australia and relevant Australian Standards.
115. The main entry of the research building will provide on grade access from the main vehicular drop off point to the central lobby area. From this point a lift will provide access to all floors of the research complex. In addition, new disabled access will be provide to adjacent facilities together with disabled toilets and carparking to serve the development. A new entry to the North Clayton complex will provide lift access suitable for disabled people.

Road works, carparking and public transport

116. Owing to the lack of public transport in the Clayton area, extensive internal roads and car parking have been developed on the Clayton site to provide for staff and visitor needs. The existing internal road system will be altered as part of this project to separate the various movements of visitor, staff and heavy service vehicles, and provide safe movement throughout the site for vehicles and pedestrians. An additional 140 carparking bays will be provided in the eastern precinct.
117. The Committee assessed that about 190 extra staff would be transferring to the site. It is proposed to provide 140 extra carparking spaces including 20 for visitors. The Committee therefore asked CSIRO to explain the rationale for what appears to be a shortfall in the number of parking spaces to be provided. CSIRO advised that the basis normally used for the provision of parking spaces for staff is 80–85 per cent of the site population with an allowance for visitors. The current ratio at Clayton is over 90 per cent. As a

result of the proposed development, the ratio will remain close to the percentage of site population.

118. CSIRO acknowledged that public transport to the site and the Monash University campus is not as good as other parts of Melbourne. The University and CSIRO site are serviced by buses although motor vehicles remain the primary mode of transport. Accordingly, extensive carparking facilities are provided on the site.
119. Access to the new complex will be via the existing site entrances to the north off Normanby Road and at the south off the Monash University Ring Road. A new internal road, east of the new complex will link the two entrances and provide service vehicle access to buildings and to the existing and new car parking areas.
120. Provisions will be made for:
- carparks to accommodate all staff plus 20 visitor spaces, including disabled parking bays;
 - manoeuvring space and new loading dock areas for service vehicles; and
 - pedestrian footpaths to link desire lines.
121. The Committee asked the CSIRO to confirm that large, articulated vehicles will have sufficient manoeuvring room to the loading dock. CSIRO advised that there will be manoeuvring space between the process bay and the new research wing. Similarly, between the proposed new process bay and the existing process technical bay a vehicle would be able to enter but would need to reverse to exit.
122. The Committee questioned CSIRO about the need to provide traffic management devices on the site and for traffic entering and leaving the site. CSIRO advised that there is a number of entries to the Clayton site.

City of Monash

123. CSIRO advised that traffic management and parking has been discussed with the Council of the City of Monash. A submission to the Committee from the Council advised that local planning requirements detailing carparking requirements for different types of uses are based on the total floor area of each use. The submission noted that 140 carparking spaces will be provided for a total increase in floor area of 7,905 square metres. This, the Council believes, would appear to be insufficient to satisfy planning requirements.
124. In response, CSIRO advised that it considers it to be inappropriate to allocate carparking requirements based on floor area because of the specialised usage

of its buildings. CSIRO believes it to be more appropriate to provide carparking based on population. The additional 140 carparking spaces will provide a total of 939 spaces which will serve an expected site population of 985. Thus, parking will be provided for more than 90 per cent of the site population.

125. The Committee was advised by the Council that there are bicycle lanes in Gardiner and Forster Roads which connect with the Scotchmans Creek Linear Trail. Ideally, to reduce reliance on private motor vehicles it would be worthwhile to include bicycle parking facilities within the scope of the proposed development. CSIRO confirmed that additional bicycle parking facilities will be provided. In addition, change and shower facilities will be supplemented through the proposed development.
126. The Council also raised the possibility that staff at the North Clayton site would need to cross Normanby Road to gain pedestrian access to the main site. The Council suggested that consideration be given to reduce pedestrian movement across Normanby Road.
127. CSIRO advised that it expects pedestrian movement to continue to be low. A 'self help' canteen has been provided for staff at the North Clayton site.

STRUCTURE

New laboratory and office building

128. The new research wing will be a reinforced concrete framed structure with a regular grid of reinforced concrete columns supporting a reinforced concrete floor slab.
129. The roof structure will be primarily constructed from steel fabricated beams supported on steel columns that extend up from the first floor slab and located over the concrete columns below. Metal roof sheeting is supported off steel roof purlins spanning between the rafters.
130. This design approach results in adequate drainage systems, ease of construction, minimum cost and compatibility with the overall development.
131. The ground floor slab will be cast on ground with the concrete columns having independent pads. Areas of the slab that may be over fill material will be designed as a suspended flat slab.
132. A waterproof membrane will underlay the total floor area with a slab thickness and a concrete quality selected to prevent moisture ingress.

New process bay

133. The proposed new process bay will be a 9.5 metre high industrial type building comprising steel portal frames and clad with 150mm thick precast concrete wall panels spanning the full height of the building. The panels will be supported by strip footings at the base and a wind beam at the top and mid-span to resist lateral wind loads.
134. A 200mm thick concrete floor slab has been designed to cater for the excessive loadings expected with an industrial building of this nature.

Proposed canteen

135. The proposed new canteen will be located above the existing substation and tool shed. In this location the canteen is at the centre of the precinct and most readily accessible to the majority of the staff. The substation will remain operational during the construction process.
136. The existing substation walls and footings will be utilised as load bearing elements for the new structure. The floor of the new canteen will be constructed of precast hollow core planks which will be designed to span between the substation walls. The extent of the canteen floor that extends beyond the walls of the substation will be supported by a steel column and beam support structure.

MECHANICAL

Scope

137. The mechanical service installation has been designed for efficiency and economy. It will comprise airconditioning systems to all new and refurbished buildings, including laboratories, technical bays, offices, seminar rooms, workshops, administration areas, canteen and general circulation spaces.
138. Evaporative cooling and radiant panel heating systems will be used in the new process bays. General mechanical exhaust systems will be provided for all areas as required, including plant rooms, service areas, atriums and workshops.
139. Where there is a need, specific mechanical exhaust systems for laboratory areas will be installed, including fume cupboard and fume hood extract systems, welding booth exhausts, etc.
140. Bottled gases storage and reticulation of specialist gases, including alteration and extension of the existing bulk nitrogen system, will be provided to

supply needs of laboratory areas. Compressed air systems, including all compressors, receivers and pipe work reticulation to laboratory and workshop areas, will be located as required.

141. A Building Management System (BMS) will be provided to monitor and control the mechanical services installations.

Airconditioning

142. The airconditioning systems for the development have been designed using the criteria of energy efficiency, access for maintenance, system reliability, best life cycle costs, acoustic and aesthetic considerations and suitability for expansion.
143. CSIRO advised that as far as possible, airconditioning systems will be zoned for specific uses. The extent to which this can be carried out is mainly governed by economic factors. For example, it would not be provided to individual rooms. Instead, it is more practical and efficient to provide zoning on the basis of functions. This would enable office areas to be airconditioned for longer periods if required and adjacent laboratories, when not in use, to be placed on night setback temperatures and air circulation.

Ventilation

144. Mechanical exhaust systems will be provided where required by regulation and codes of good working practice for areas such as toilet and service blocks, fume cupboards and hoods within laboratories and process/technical bays.
145. Smoke exhaust systems will be installed for fire/smoke control and be fully integrated with the relevant air handling systems.

Chilled and heating water reticulation

146. Chilled water and heating hot water will be reticulated throughout the development from the central plant chillers and boilers to all fan coil units, air handling units, as required. Pipework will be concealed in office and administration areas and exposed in areas such as process bays, technical bays and some laboratories.

Bottled gas storage and reticulation

147. The bottled laboratory gases will generally be stored in a central area and be reticulated throughout the laboratories and process bays, as required.
148. Selected specialist gases will be provided locally where extensive reticulation is not necessary. The existing bulk liquid nitrogen tank will be retained, with pipe work extended, as required.

Building Management System (BMS)

149. The BMS will be able to monitor and control the following plant and equipment:

- airconditioning and heating systems;
- access and security systems;
- internal and external lighting; and
- energy consumption can also be monitored for selected items and areas.

150. To maintain control over energy consumption, load shedding will be utilised for the main and distribution switchboards.

ELECTRICAL

Scope

151. The electrical services will comprise modification to the existing high voltage switchboard and upgrading of the existing substation. Auxiliary power supply will be installed, comprising generator backup and uninterruptible power supply to special equipment as required. A modern lighting system with high efficiency luminaires, including floodlighting, emergency and exit lighting will be installed throughout.

Need for reliable power

152. The Committee noted that much of the work at Clayton requires reliable power sources. The Committee therefore asked CSIRO to explain the measures which will be provided to ensure that power failures will not cause problems. CSIRO advised that emergency power generation is generally provided only for essential services which need to be maintained. Ventilation systems and emergency evacuation systems are usually top priorities. In addition, if any specialist equipment is likely to suffer long-term damage from power disconnection, it will be connected to the emergency supply.

153. It is also proposed to install throughout laboratory areas a telecommunication block cabling network, electronic and access control system, emergency warning intercommunication system with public address facility and voice/data terminal points.

Supply

154. The existing 22 kV underground power supply to the site will be expanded. The existing substation adjacent the new building will be upgraded to approximately 2 MVA to suit the new electrical load.

Distribution

155. A new low voltage main distribution switchboard will be provided to control the power reticulation to the existing David Rivett Laboratory and the proposed new buildings.
156. A main switchboard will be provided in each building. Power will be reticulated from the main switchboard to local distribution boards within the area to be serviced.
157. Radiation levels from electrical switchboards and cables will be minimised through selection of switchboard types and location for cable routes through the building. Shielding will be provided where required.

Lighting

158. Lighting will be provided to building interiors in accordance with appropriate Australian Standards. In offices and research areas the lighting will be energy efficient, low brightness, fluorescent type. Control systems will be provided to achieve minimisation of energy consumption.
159. Technical and process bay lighting will comprise high bay luminaires. External lighting will be provided for both security and for after hours use.
160. Emergency lighting will be installed in accordance with Australian Standards and the Building Code of Australia.

Reticulation

161. Power reticulation will be installed in accordance with AS 3000.
162. Residual current detection devices will protect all general and special outlets in the technical, process bays, laboratory areas and wet areas. Surge diverters and filters will be installed where necessary.
163. Electromagnetic shielding to achieve appropriate levels of shielding will be installed to specific areas as required.

Voice and data

164. An integrated voice and data structured cabling system, with a main distribution frame, a PABX and communications rack will be provided.

165. Cabling systems will be provided in accordance with CSIRO and Australian Standards. Fibre optic data backbone will form part of the structured cable system.

Security

166. Nominated entrances will be provided with electronic access and with intrusion detection as required. Intercoms will be provided to aid visitors contacting staff in secure areas after hours when there is no receptionist on duty.

Emergency warning and intercommunication

167. Evacuation sounders will be installed to warn occupants in the event of a fire alarm. A public address system will be integrated with a new building emergency warning and intercommunication system.

Lift services

168. The new laboratories will include a lift of three tonne lifting capacity and capable of holding 42 persons. It will be used primarily for heavy items associated with research programs. It will also be designed to provide disabled access between floors.

169. The Committee noted that a lift with a capacity of three tonnes, capable of holding 42 people, will be provided. CSIRO advised that the main criterion in terms of capacity is not the number of people the lift can hold. Rather, the weight criterion has been specified to enable the movement of heavy items of equipment between floors.

HYDRAULIC

Scope

170. The hydraulic services will comprise domestic cold water supply reticulation, sanitary plumbing and drainage, trade waste plumbing and drainage, internal cold and hot water services, process cooling water and stormwater drainage.

171. Fire sprinkler, hydrant and hose reel services plus fire extinguishers will be installed for fire protection.

172. To meet the requirements for laboratory grade water, throughout the development a reverse osmosis water generation plant, with capability of supply to the prescribed international standards will be provided and reticulated to outlets in specific laboratories.

Domestic cold water supply

173. The existing cold water supply to the Bastow, David Rivett and North Clayton buildings has sufficient capacity and pressure for the proposed refurbishment and redevelopment works. It will be modified and extended as required.

Sanitary plumbing and drainage

174. Sanitary plumbing will be designed and installed in accordance with appropriate Australian Standards.

175. Sewage will be discharged into the existing gravity sewerage system, which has sufficient capacity for the proposed works. Modification and extension of the existing property sewer will be required to suit refurbished and new plumbing installations.

Trade waste

176. Trade waste discharge will be connected to the existing acid drains which discharge to neutralising pits for treatment prior to discharge to sewer.

177. The existing acid drain will be modified to suit both the refurbishment and new works with no major alterations to the trade waste discharge system.

178. The existing waste treatment system is satisfactory to meet the proposed demands.

Internal cold and hot water services

179. Water supply branches to laboratories and dark rooms will be fitted with backflow prevention devices to prevent potential cross contamination of water supplies.

180. Hot water will be generated by gas or electric storage units.

Process cooling water

181. The existing process cooling water systems in the David Rivett Laboratory and Bastow building will be modified and extended to serve the proposed development works

Stormwater drainage

182. Any internal box gutters will be sized for one in 100 year storm recurrence with appropriate overflows. Eaves gutters will be sized for one in 20 year storm recurrence. Downpipes will be oversized to cope with potential leaf litter blockages.

FIRE PROTECTION

Scope

183. Fire protection will comprise fire hydrants, hose reels and extinguishers, wet pipe fire sprinkler system, smoke detection and special gas protection to selected areas.

Sprinklers

184. An automatic wet pipe sprinkler system will be provided in all new and existing buildings (except die-casting process bays) and will be connected to the existing pumped supply in the Bastow building plant room. The existing sprinkler system in the Bastow building will be modified and extended to suit the proposed refurbishment works. Minor modifications to the existing fire sprinkler pumps will be required to ensure the pressures and flow meet current code requirements.

Alarms

185. Alarms from detectors, sprinklers, break-glass switches and smoke control systems in each of the buildings will connect to a fire indicator panel within each separate building.

Hydrants

186. The existing fire hydrant ring main has sufficient capacity for any of the proposed works, and can be modified and extended, as required.

187. Existing and proposed fire hydrants and hose reels will be located in accordance with the Building Code of Australia. Portable fire extinguishers will be provided at the required locations.

Consultation

188. The Committee asked CSIRO if there had been any major fires in buildings at Clayton and if fire drills are conducted on a regular basis. CSIRO advised that regular fire drills are held. There have been no major fires on the site. CSIRO also confirmed that discussions have taken place with the local fire brigade in relation to fire protection, detection and suppression measures. The Committee believes these consultations should continue throughout the design and construction phases.

ENERGY CONSERVATION AND MANAGEMENT

189. Passive energy conservation measures will be incorporated into the buildings and landscape design, and active measures incorporated in the design of the mechanical, electrical and hydraulic services to reduce the usage of conventional fossil fuel energy.

190. Energy conservation and management measures will include:

- building orientation on an east west axis to maximise opportunity for solar control in summer and passive solar energy in winter;
- north facing windows screened to provide control of summer sun penetration;
- thermal insulation to reduce heating and cooling loads;
- significant daylight being incorporated into the design to minimise use of artificial lighting;
- Building Management System to operate, control and monitor engineering services;
- provision of economy cycles on all air handling plant;
- interconnection of exhaust and associated air conditioning systems to ensure outside air introduction is reduced when exhaust systems are not operating;
- variable volume air handling technology to allow reduction in supply of air to designated areas when appropriate;
- variable speed drives for all variable air volume air handling;
- provision of low loss ballasts and high efficiency lamps for all light fittings;
- lighting movement control systems including time based and movement detection controls;
- multiple step control to all chiller water and heating plant to match building load profiles; and
- adoption of measures to reduce water consumption – water flow control tapware, dual flush WC pan cisterns, programmable boiling water units, etc.

191. These initiatives are consistent with a continuing commitment by CSIRO to reduce energy through the adoption of better and more efficient energy management practices in the design and operations of its facilities.

ENVIRONMENT

Site development

192. There is no evidence of earlier activities on the site that may have caused site contamination. Management procedures will be put in place to deal with any unforeseen discovery during construction. Suitable site topsoil will be reclaimed, stockpiled and, following construction, used in rehabilitation.
193. The development will retain as many native trees as is practicable and will respect the presence of existing fauna.

Occupational health and safety

194. CSIRO pursues an active Occupational Health and Safety Policy within the workplace and this will be extended to include all new facilities. Strict compliance with these requirements will be adhered to in all construction work.

Noise and dust

195. The site works will take into account the proximity of adjoining premises to ensure noise and dust emissions are maintained within acceptable levels. Noise emissions from the site for both the construction period and occupancy of the building will be controlled to meet the requirements of Victorian Environmental Protection (Noise) Regulations.

Community impact

196. There are no residential properties in the immediate proximity of the proposed complex. Adjacent occupancies are other CSIRO research facilities, light industry immediately to the north and the Monash University campus to the south. Appropriate safeguards will be introduced in the building design and the management structure of the facility to assure that noise, dust and other emissions are maintained within acceptable limits, both during construction and during subsequent operation.

Ongoing operational issues

197. Provision of scrubbers to process bay exhausts and installation of fume cupboards will ensure compliance with CSIRO's policy to minimise any unacceptable gaseous emissions.
198. Liquid laboratory waste will be connected to the existing external neutraliser pits. Acid wastes will be diluted and neutralised by means of existing automatic pH dosing.

199. All storage of dangerous goods, chemicals and gases will be in accordance with the respective codes for each; and where required by the Controlling Authority, the appropriate licenses will be obtained for their storage.

Flora and fauna

200. A survey of the site involved a general census of the animal species occurring on the site as well as an assessment of the quality of the habitat present. The census techniques used included: daytime observation of active animal species, active searches beneath suitable ground cover, listening for bird calls and spotlighting at night. Records from the Victorian Wildlife Atlas supplemented the data collected during the survey. Incidental observations from CSIRO personnel and Monash staff of the Department of Biological Sciences were also used.
201. A total of 23 fauna species was recorded on the site of the proposed development, 18 of which were native species. No threatened species were observed to be present.
202. The current CSIRO practice of planting of general native plant species within the site will continue to attract wildlife to the site.

Soil contamination

203. A historical review of the eastern portion of the Clayton site indicated that fill and levelling had been used in land formation works in the early 1960s. This warranted an environmental soil contamination survey which was carried out in conjunction with the geo-technical soil survey.
204. Interviews, search of records and examination of aerial photography formed the key components of a historical survey. Analysis of the soil contamination results included factors such as soil type, water table, topology, location, intended use, contaminants and their levels, historical factors, geology and chemistry.
205. Analysis of soil samples for contaminants indicated that the site is free of contaminants and conforms to ANZECC soil guidelines for uncontaminated sites.

Sites to be sold

206. The sites to be vacated are being assessed for their environmental condition, including any possible residual asbestos, chemical and soil contamination. Any such materials that may be detected will be dealt with by employing appropriate measures.

207. CSIRO confirmed that soil contamination surveys of the sites to be sold have been carried out. Based on the site reports, the Syndal site is free of contamination. On the Preston site, it is understood that any contamination will not have any impact on what is seen as its long term use as an industrial estate.

Committee's Conclusion

208. **The scope of the proposed development includes refurbished and new accommodation at a standard commensurate with modern research requirements and on a scale consistent with the number of staff to be employed. There is capacity for expansion. The scope of the project can be justified as making adaptive reuse of refurbished buildings with new construction reflecting contemporary generic research facilities already provided at other sites.**

CHILD CARE PROVISIONS

209. A Childcare Centre is located on the Clayton site within the central precinct. This centre is owned by CSIRO and is managed commercially. It has a current capacity of 48 places. This centre provides childcare for CSIRO employees and other institutions in the Clayton area.

LOCAL IMPACT

210. The proposed project will have a positive effect on the local economy during the construction period with up to 120 persons working directly on the site and many more in off-site supply activities. Post-construction benefits will result in collaborative and technological transfer initiatives within the Clayton site. Opportunities will be provided for student interaction from the nearby Monash University.

CONSULTATIONS

211. The following authorities and Departments were contacted and/or consulted by CSIRO and its consultants during the preparation of the proposal:

Commonwealth Government

- Department of Foreign Affairs and Trade;

- Department of Education, Training & Youth Affairs;
- Department of Employment, Workplace Relations and Small Business;
- Department of Industry, Science and Resources;
- Department of the Treasury;
- Department of Environment and Heritage;
- Department of Communications, Information Technology & The Arts;
- Department of Agriculture, Fisheries and Forestry;
- Department of Transport and Regional Development;
- Attorney-General's Department;
- Department of Prime Minister and Cabinet; and
- Department of Finance and Administration.

State and Local Government

- City of Monash;
- Melbourne Water Operations; and
- Victorian Environment Protection Authority.

Union

- Community and Public Sector Union (CPSU) - CSIRO Division.

Other Authorities and Organisations

- ACROD;
- Multinet Gas Pty Ltd;
- Telstra;
- Yarra Valley Water;
- United Energy;
- Monash University; and
- Metropolitan Fire Brigade.

COST AND TIMETABLE

Cost

212. The estimated cost of the proposal is \$28 million at May 1999 prices, inclusive of escalation costs, contingencies, all professional fees and authorities' charges. The estimate does not include for loose furniture and fittings or for relocating staff and facilities from existing sites.
213. Authorities' charges are an allowance for fees levied by utilities for alterations to supply, reconnections or new connections. Headwork charges are the most significant.

Committee questioning—contingency

214. The Committee questioned CSIRO about the need for a considerable proportion of the construction budget being allocated to contingencies. CSIRO advised that the contingency has two components—one for design purposes and one for construction.
215. The design contingency is required in the early stage of design and is five per cent of the total cost. It is justified on the grounds that changes may occur during detailed design. As more detail is assembled, it will be determined if more funds are required or refinements will be required.
216. The second component is the construction contingency—again five per cent of the total cost. This may be absorbed into the cost of the project if latent conditions are not as predicted at this stage. CSIRO also advised that the budget also contains an escalation provision which is based on anticipated increases in prices from now until the completion of the project.

Committee questioning—relocation costs

217. Relocation costs are not included in the estimate. These costs are currently being refined although initial estimates are in the order of \$2 million. These funds will be required to pay for the relocation of equipment which will need to be moved to Clayton from the other sites. The funds will be attributed to relevant divisions and will not require absorption by the CSIRO capital investment budget.

Committee questioning—Parliamentary appropriations

218. The Committee noted that the CSIRO's revenue budget is about \$720 million annually, of which \$475 million is appropriated by Parliament and with about \$250 million derived from industry and other sources.

219. The Committee asked CSIRO if there is potential for the non-appropriation funding to increase. The Committee was told that the Government has set a target of 30 per cent of budgetary requirements from industry and other sources. Currently returns from these sources are above this level. In a recent planning process, in which CSIRO undertook to plan for the next triennium, the targets set for different research sectors ranged up to 50 per cent, particularly in the mining and resource areas.
220. CSIRO also told the Committee that if revenue from non-appropriation sources were the sole funding source, it could rapidly increase its earning by becoming a consultancy involved in projects of a short-term nature. Parliament has, however, legislated that CSIRO undertake longer term strategic research for the benefit of industry and the wider community. In this context, a balance needs to be maintained between longer term work—where the benefits may be more distant, in contrast with short term work which is likely to generate revenues more rapidly.

Timetable

221. It is anticipated that, subject to a favourable report from the Committee and Parliamentary approval, construction will commence in early 2000 with completion and occupancy taking place in late 2001.

Committee's Recommendation

222. **The Committee recommends the construction of the CSIRO Clayton (Eastern Precinct) Development Works at an estimated cost of \$28 million at May 1999 prices.**

CONCLUSIONS AND RECOMMENDATIONS

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

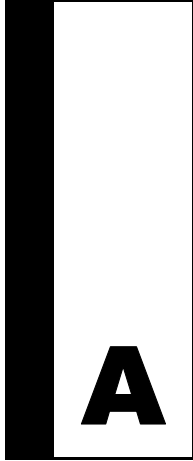
1. **Since 1961 substantial investments have been made by the Commonwealth in the construction of five major CSIRO research laboratory complexes on a 15 hectare site at Clayton, Victoria. (paragraph 45)**
2. **The site now houses the largest concentration of CSIRO scientific expertise in Victoria. It is the centre of CSIRO research into minerals, forest products, molecular and polymer science, manufacturing science and technology and mathematical and information science. (paragraph 46)**
3. **A number of elements of research Divisions, in particular Manufacturing Science and Technology and Petroleum Resources remain at other centres within the Melbourne metropolitan area in properties owned or leased by CSIRO. (paragraph 47)**
4. **Capacity remains at the Clayton site for further collocation and rationalisation of research activities. This rationalisation would result in reduced overheads and realise proceeds from property sales for investment in new and upgraded research facilities at Clayton. It would also facilitate interaction between research groups and between Divisions, cooperative research centres and staff and post-graduate students from Monash University. (paragraph 48)**
5. **In property terms, sites at Preston and Syndal and leased premises at Carlton and Clayton could be vacated and staff relocated to Clayton. (paragraph 49)**
6. **A need therefore exists to provide additional research facilities at the Clayton site for more than 370 CSIRO staff. (paragraph 50)**
7. **The need for stainless steel downpipes proposed for the refurbished David Rivett Building should be reviewed. (paragraph 87)**
8. **CSIRO should develop a master plan for the further development of the site which will avoid costly removal of existing facilities and infrastructure. (paragraph 96)**

- 9. The scope of the proposed development includes refurbished and new accommodation at a standard commensurate with modern research requirements and on a scale consistent with the number of staff to be employed. There is capacity for expansion. The scope of the project can be justified as making adaptive reuse of refurbished buildings with new construction reflecting contemporary generic research facilities already provided at other sites. (paragraph 208)**

- 10. The Committee recommends the construction of the CSIRO Clayton (Eastern Precinct) Development Works at an estimated cost of \$28 million at May 1999 prices. (paragraph 222)**

Hon. Judi Moylan MP
Chair

30 September 1999



Appendix A—Witnesses

BOSCI, Mr Peter John, Business Manager, CSIRO Division of Petroleum Resources

CAMERON, Dr Murray Athol, Deputy Chief of Division, CSIRO Mathematical and Information Sciences

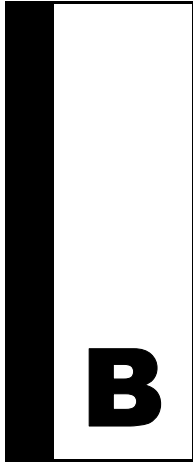
COOK, Mr Ronald Roy, Officer in Charge—Melbourne Branch, CSIRO Telecommunications and Industrial Physics, National Measurement Laboratory

HICKS, Mr Alan Russell, Project Manager, CSIRO

MACDONALD, Mr John Andrew, Director, Architect, Eggleston Macdonald Design

MOODY, Mr Trevor Laurence, Assistant General Manager, CSIRO Corporate Property

SARE, Dr Ian Richard, Chief of Division, CSIRO Manufacturing Science and Technology Inc. Pty Ltd



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