

*Parliamentary Standing Committee on Public Works*

## REPORT

relating to

# WAREHOUSE DEVELOPMENT (STAGE 1) FOR 21ST SUPPLY BATTALION, MOOREBANK, N.S.W.

(Ninth Report of 1986)

THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA  
1986

C R E S T

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(STAGE 1) FOR  
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MOOREBANK, N.S.W.

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THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA  
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MEMBERS OF THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS  
(Twenty-Eighth Committee)

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John Saunderson, M.P. (2)

(1) Resigned 13 February 1986

(2) Appointed 18 February 1986

EXTRACT FROM THE  
VOTES AND PROCEEDINGS OF THE HOUSE OF REPRESENTATIVES,  
NO. 109 DATED THURSDAY, 5 JUNE 1986

32 PUBLIC WORKS COMMITTEE - REFERENCES OF WORK - SCHOOL OF MILITARY ENGINEERING, CASULA, N.S.W., AND WAREHOUSE DEVELOPMENT FOR 21ST SUPPLY BATTALION, MOOREBANK, N.S.W.: Mr West (Minister for Housing and Construction), by leave, moved - That, in accordance with the provisions of the Public Works Committee Act 1969, the following proposed works be referred to the Parliamentary Standing Committee on Public Works for consideration and report:

- (1) Redevelopment of the School of Military Engineering, Casula, N.S.W., and
- (2) Warehouse development (Stage 1) for 21st Supply Battalion, Moorebank, N.S.W.

Mr West presented plans in connection with the proposed work.

Debate ensued.

Question - put and passed.

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PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

WAREHOUSE DEVELOPMENT (STAGE 1) FOR 21ST SUPPLY  
BATTALION, MOOREBANK, N.S.W.

R E P O R T

By resolution on 5 June 1986 the House of Representatives referred to the Parliamentary Standing Committee on Public Works for consideration and report the proposed warehouse development (Stage 1) for 21st Supply Battalion, Moorebank, N.S.W.

The Committee is pleased to report as follows:

THE REFERENCE

1. The work proposed under this reference comprises a modern computer-assisted warehouse facility for the Australian Army's 21st Supply Battalion. This Battalion provides supply service support to Army units in N.S.W. and to other depots in Australia.

2. The proposed warehouse will contain:

- central processing;
- administrative functions;
- technical support;
- treatment and packaging facilities;
- small parts storage area.

3. Also included in the proposed work is the provision of associated services, siteworks and the demolition of asbestos-clad warehouses.

4. The estimated cost of the proposed work when referred to the Committee was \$17.9 million at January 1986 prices.

THE COMMITTEE'S INVESTIGATION

5. The Committee's inquiry was advertised in 'The Sydney Morning Herald', 'The Australian', and 'The Liverpool-Fairfield Champion' on 25 June 1986.

6. The Committee carried out a site inspection of the 21st Supply Battalion Complex at Moorebank, N.S.W., on 11 August.

7. A public hearing into the proposed work was held at the School of Military Engineering Assembly Hall on 12 August. At the public hearing the Committee received written submissions from the Department of Defence (Defence) and the Department of Housing and Construction (DHC) and took evidence from representatives of the two departments. The Committee also received a submission and took evidence from Dr John Hutcheson, M.C., concerning the design and cost of the proposed warehouse.

8. At the public hearing Defence undertook to provide written answers to a number of questions. These answers were received on 8 September and were incorporated in the transcript of evidence.

9. A list of witnesses who appeared at the public hearing and the organisations which they represented is at Appendix A.

10. The Committee's proceedings will be printed as Minutes of Evidence.

#### BACKGROUND

11. History of 21st Supply Battalion The origins of the Battalion can be traced back to the First World War. After the cessation of hostilities a decision was taken to locate stores support from the Army around Liverpool and Leichhardt. During the Second World War the expansion of the Army required the construction of a large warehouse complex at Moorebank. The Battalion was created in 1973 following an amalgamation of minor and major stores depots in N.S.W. It now operates a number of depot facilities in N.S.W. with the installation at Moorebank being by far the largest and most important.

12. Location The Moorebank site, comprising 168 hectares, is situated to the east of Moorebank Avenue within the Holsworthy/Moorebank/Casula Military Area. It is 30 kilometres south-west of the Sydney Central Business District.

13. Functions The Battalion provides designated supply services to Defence establishments in the Second Military District. It has the added responsibility of being the national stock holding depot for certain items such as air delivery equipment and is the major Army holding depot for repair parts. As well the Unit is responsible for providing single service stores support in small arms ammunition to 40 millimetres, food preparation and serving equipment and manpack radio equipment.

14. The Battalion serves approximately 200 Regular Army and Army Reserve Units in the Second Military District. Its major customers are the Brigade Headquarters in the Holsworthy area, the School of Military Engineering, the School of Artillery, the recruit training organisation at Wagga Wagga, and major Headquarters in the Second Military District.

15. Organisation The Battalion is organised into three main functional groupings:

- (a) Command, Administration and Support elements - comprising:
  - Battalion Headquarters - command, planning, research, investigation and stocktaking;
  - Administration - personnel, pay, quartermaster's store, security, domestic transport, training;
  - Technical Support - electrical and mechanical engineers for inspection and minor repairs;
  - Warehouse development.

These elements are located at Moorebank.

- (b) Support Control - located at Moorebank, comprising:
  - Stock management for inventory;
  - Local procurement of low cost inventory items;
  - Accounting documentation control, computing research and catalogue data research.
- (c) Warehousing Branch - responsible for storage management, physical distribution and materials handling processing. Elements of the warehousing branch are dispersed at various depots in N.S.W., the Moorebank depot being the largest.

16. The Battalion has the following established strength authorised for employment in warehousing operations:

Officers	Other Ranks	Civilians	Total
4	97	132	233

17. Workload The Battalion warehouse complex at Moorebank holds about 75,000 discrete items of stores valued at \$514 million. It occupies about 100,000 square metres of covered warehouse accommodation of which 5,000 square metres is provided with intruder alarms. All transactions are computer controlled with an average of 250,000 transactions annually.

18. During 1985, 205,000 computer-counted issue actions with a stores value of \$30 million were carried out including 12,000 pallets and 145,000 discrete packages. During the same period there were 31,900 receipt actions with a stores value of \$38.5 million including 8,500 pallets and 120,000 discrete packages.

#### THE NEED

19. 21st Supply Battalion is constrained in being unable to introduce modern warehousing practices due to operational limitations created by warehouses constructed during the Second World War. These limitations have inhibited the capacity to cope with increased workloads and to provide reduced response times. Other developments in operations lending support for the need to modernise warehouses, especially crucial operational areas, are:

- a substantial increase in the range of items stocked;
- more sophisticated stock procurement and inventory control systems; and

- relatively cumbersome material operating methods, caused by the nature and dispersal of key functional areas, to cope within specified response times.
20. Newer Buildings It should be pointed out that not all buildings and operational areas occupied and used by the Battalion in the Moorebank area are old and not conducive to modern warehousing practices. Whilst the majority of warehouses are old, some attempts at improving storage and inspection facilities for critical items, and providing improved administration facilities have been undertaken in recent years.
21. Storehouses in the ammunition area, constructed in the 1930s, have a limited holding capacity. Internal roads have been upgraded to 10 storehouses and a new ammunition inspection facility was completed in July 1984 at a cost of \$450,000.
22. The Headquarters building, located near the main entrance to the complex was completed in 1973.
23. It was purpose-designed to house the command groups, planning, personnel administration, research, investigation and stocktaking staff, and the supply control branch.
24. The Moorebank area clothing store is located in a complex originally constructed as part of an Army Reserve depot. The facility is of brick construction, in good condition and is considered by Defence to be adequate for the retail-type functions which it performs.
25. The foodstuffs and petroleum complex is a newer style purpose-built facility which provides:

- self-service fuel for military vehicles;
- reserve fuel storage tanks;
- pack petroleum products storage areas;

- foodstuffs stores;
- LPG and wood;
- butchers shop; and
- office facilities.

26. Response Times Defence advised that the Battalion is a component in the totality of a delivery system and always aims to meet delivery expectations. The other major component in the delivery system is transport. When 21st Supply Battalion fails to meet its responsibilities within the system, added pressure is placed on the transport system.

27. Response times are measured from when a demand for a particular stores item leaves a unit to when the item arrives at the unit. Transaction levels have declined from 80 per cent of processing standards to 60 per cent.

28. Existing Facilities The following paragraphs describe the existing facilities at Moorebank and deficiencies in the storage and processing systems at present employed.

29. The 23 major warehouses in the area are mainly timber-framed, asbestos-clad buildings constructed during the Second World War. The nature of floors, walls, roof heights, doors, and closely spaced columns, are unsuited to modern warehousing techniques which are based on high stack shelving and modern materials handling equipment. The existing complex is based on a network of manned storage or process warehouses and unmanned back-up warehouses. Existing buildings are generally separated by concrete paving. Nevertheless, because of the extent of stock dispersion the achievement of efficient integrated throughput operations is difficult. Dispersion causes staff fragmentation and productivity is lower than that which would be achieved by using more modern, integrated systems. Defence pointed out that under present operational practices, brought about by the dispersal of key functional elements, there

is an element of stop-start in operations. From the time of receipt, storage and despatching, it is often necessary for items to be handled up to five times more than would be required in a more modern integrated processing system. The present practice of stop-start operations is obviously cumbersome and time-consuming.

30. Of critical concern in terms of operations is the lack of a central processing area with covered loading and unloading docks, turnarounds for large trucks and modern materials handling equipment.

31. Defence stated that technical support activities, including equipment testing and minor repair and the treatment and packaging of stores for extended storage, are carried out in antiquated facilities. These facilities are particularly inappropriate for storing sensitive and expensive items such as electronic spare parts.

32. Treatment and packaging activities are carried out within a temporary building located some distance from receipt and despatch areas. Defence advised that the present facility is inadequate to provide the degree of packaging support necessary for items which may be in storage for extended periods. In addition, treatment and packaging should be integrated with receipt, despatch and stock maintenance functions to reduce inefficiencies such as the multiple handling of stock.

33. Staff amenities within the main warehousing area are ad hoc and sub-standard. Defence advised that toilets, washing facilities, tea rooms, first aid rooms and lunch areas have been the subject of concern to unions and staff associations for considerable time.

34. Spoilage and Deterioration of Stock The Committee questioned Defence about the extent of stock deterioration due to inadequate storage facilities. Defence advised that a review of stock adjustment documentation and an assessment of the cost of manpower required for stock refurbishment during 1985/86 showed:

	\$
- value of stock written off	40,000
- cost of manpower, parts packaging and incidentals to repair or refurbish deteriorated items	250,000
- cost of manpower inspection time to identify stock problems	<u>50,000</u>
<b>TOTAL</b>	<b><u>340,000</u></b>

35. Defence pointed out that these costs, due to inadequate storage facilities, would be considered unacceptable to modern warehousing operations.

36. Committee's Conclusion The size, structural limitations and age of existing warehouses lead to disjointed and inefficient operations. There is a need to improve existing warehouses and to integrate stores processing, materials handling and storage functions which are dispersed throughout the complex.

#### THE PROPOSAL

37. The proposal comprises the construction of a new warehouse, with a gross floor area of 22,000 square metres, which will contain the following functional areas:

- receipt docks and receipts processing areas;
- small parts storage area;
- issues process area and issues docks;

- treatment and packaging;
- an element of technical support; and
- associated offices and amenities.

38. Two existing warehouse buildings and part of a third building will need to be demolished to provide a suitable site within the complex for the new building.

39. Staging Defence advised that the proposed building will be the first stage of a two-stage development planned for the Moorebank Complex. Stage 2 is planned as a horizontal extension of Stage 1 which will provide additional space for high density storage of small arms and a new freight terminal. The Committee questioned the rationale for adopting a two-stage concept for the redevelopment. Defence advised by adopting a two-stage redevelopment strategy it is possible to:

- provide more urgently needed facilities without a commitment to fully develop the site;
- allow warehousing operations to continue during both stages of construction;
- allow the deferment of lower priority works to a time determined most appropriate for the effective management of overall works programming and budgeting by Defence.

40. The disposal of two further warehouses will be required to make way for the Stage 2 extensions. The remaining warehouses will be employed, where required, for low level storage such as the storage of vehicles which are presently parked in the open.

41. The Committee was advised that Stage 2 is programmed for 1988/89, for committal in 1989/90 at a preliminary estimate of \$20 million.

42. Alternatives Considered The design concept of the proposed building is one of four options, aimed at rectifying identified deficiencies in terms of building and functional limitations, identified and examined by Defence. The following paragraphs describe the four options.

43. Option 1 - Upgrade Existing Facilities Under this option the existing complex of warehouses would be retained, existing warehousing facilities and systems would be upgraded and modern materials handling equipment would be installed. Defence maintained that although the cheapest option in terms of capital investment, it would be more expensive in terms of manpower, and slow in response times. It would tend to perpetuate the old structures which are unsuited for the application of modern warehousing practices. For these reasons this option was not considered viable.

44. Option 2 - Automated Warehouse System This would involve the provision of a fully automated warehouse system. Although minimising manpower requirements, such a system would rely on sophisticated fixed equipment which is expensive to install and to maintain. The equipment could not be supplemented to meet peak workloads. It is unsuited to the type of operations involving the receipt, storage and despatch of a wide range of discrete items of different sizes, shapes and weights.

45. Option 3 - High Rise, Mechanised Warehouse A high rise system would rely on manually operated fixed materials handling equipment. It is characterised by relatively slow retrieval and storage operations but would be less manpower-intensive than Option 1. The height of the structure would need to allow for stacks of 15 pallet levels.

46. Option 4 - High Density, Medium Rise Storage Medium rise storage requires roof heights allowing for 8 pallet level stacks. Such a system would employ manually operated, non-fixed materials handling equipment. Defence maintained in their evidence that the system is characterised by acceptable retrieval and storage operating times and could be supplemented by additional equipment.

47. Option 5 - Low Rise, High Density Storage Under this concept a low rise building (5 pallet stack height) would be provided. Defence pointed out that such a concept would allow rapid retrieval and storage operating times, using less sophisticated materials handling equipment which could be supplemented by additional equipment during peak periods. Defence rejected this concept because it is more manpower intensive, requires significantly more materials handling equipment and is expensive in land usage and building costs.

48. Preferred Option Defence and DHC indicated that Option 4, high density, medium rise system, is the preferred option. It offers by far the greatest operating flexibility and speed of operation commensurate with economy of building envelope and manpower.

49. DHC advised that two independent specialist consultants had examined the five options and had concluded that Option 4 was the most suitable solution.

50. Location Defence advised that the site at Moorebank is suitable for the construction of a modern warehouse/logistics complex in N.S.W. for the following reasons:

- It is Commonwealth-owned and controlled by the Army;
- It is large enough to cater adequately for the development of a major modern warehouse/logistics complex;

- It is served by rail;
- It is close to major civil and military transportation facilities; and
- It is close to major suppliers as well as main units such as the Brigade at Holsworthy.

51. The site for the building accords with the Moorebank Zone Plan which provides for the long term development of the area. Siting of the building within the complex was guided by the following functional considerations:

- The need to maintain vehicular access, security and traffic circulation within the complex;
- The need for existing warehouse buildings to continue operating;
- The need to allow for the future integration of Stage 2 works;
- The need to allow for the provision of an adjacent freight terminal;
- The need to provide physical separation between the proposed building and existing buildings to prevent the spread of fire and to allow for the circulation of fire-fighting vehicles.

52. A site plan showing the location of the building and its relationship with buildings envisaged as part of Stage 2 is at Appendix B-1.

53. Description of Building The building will be approximately 22,000 square metres in gross floor area and mainly single level to accommodate stores and processing functions.

54. The new building will be the focal point for receipt, processing, internal distribution and despatching. Functional areas have been located to establish a direct sequence in the movement of stores items. Treatment and packaging functions and small parts and fast moving items will also be stored in the building. Inefficiencies caused by the dispersal of various inter-related functional areas in sub-standard buildings will therefore be eliminated. A two-level amenities area will be located at the western end. Construction details for the building are at Appendix C.

55. Materials Handling and Storage An automatic guided vehicle system will be provided for transporting palletised stores within the building. Gravity and powered roller conveyers will be provided to process stores after receipt or prior to despatch. Multi-tiered hand carts will be used to transport stores to and from the main storage area. Trucks and rail wagons will be loaded and unloaded by forklifts for transfer to and from the automatic guided vehicle system. Heavy items and large containers which cannot be handled by forklift trucks will be loaded and unloaded by a 20-tonne overhead crane located at the eastern end of the building.

56. Pallet racking will be provided for:

- palletised stores in a temporary holding area, awaiting processing, transfer or despatch;
- bulk back-up storage for re-stocking the shelving system;
- storage of packing and processing materials;

- storage of valuable equipment and equipment within security holds.

57. Shelving will be provided for medium rise storage in the main storage area and standard low-rise storage elsewhere.

58. A floor plan of the building showing the location of the areas is at Appendix B-2. Elevations and sections of the building are at Appendix B-3 and B-4 respectively.

59. The Committee questioned the provision of an area for charging batteries within the building. Departments advised that the nature of items stored in the building requires a clean environment. For this reason battery-powered electric tow vehicles will be used. The area set aside for battery charging does introduce a fire hazard into the building. However, the Committee was assured that the battery charging area will be separated from the main warehouse by fire walls and stringent procedures will be enforced during battery charging.

60. The Committee also questioned the extent of local content in the materials handling equipment to be installed in the building. DHC advised the cost of the equipment will be about \$3.4 million of which no more than \$500,000 would be spent on imported equipment, mainly for special motors and guide vehicles.

61. Access Receipts and issue docks will be located on the western side of the building to take advantage of the natural slope of the site to create the required dock height with minimum excavation. Docks will be located close to the entry off Moorebank Avenue thereby controlling the circulation of commercial delivery vehicles throughout the complex. The location of the employees' entry on the western side will minimise walking distances to the employees' carpark.

62. The Committee was assured that truck parking and turning can be accommodated within the areas provided for this purpose. DHC advised that the training radius of the largest semi-trailer currently in use is 12.9 metres. The proposal provides 18-30 metres.

63. Rail Spur Line The main warehouse area was served by rail in past years. The line fell into disuse when the bridge over the Georges River was declared unsafe. Defence advised that the N.S.W. Rail Authority will construct a Defence-funded spur line into the main warehouse area from the new East Hills/Casula line now under construction. This will provide improved movement of bulk stock and large items.

64. Fire Protection The assessed value of lines of stores to be stored in the Stage 1 facility is \$100 million. The matter of the adequacy of fire protection measures to be provided was questioned by the Committee. DHC advised that the building will be compartmentalised by four hour rated masonry fire walls. An automatic wet pipe sprinkler system and early warning smoke detection system will be provided throughout the building in accordance with relevant Australian Standards. Manual fire alarm points will be located throughout the building. Fire hose reels, fire hydrants and extinguishers will provide additional fire-fighting capabilities within the building. A system of automatic roof heat and smoke vents and smoke curtains will be provided at roof level. Finally, a fire indicator board will be located at the main entrance and alarms will be relayed to a central monitoring point and to the Army Fire Service.

65. Benefits to Result from Proposal The Committee also questioned Defence about the benefits which will result from the proposed work. In general terms the new facilities will provide a highly flexible, middle technology, secure warehousing system.

It will be reactive to increases in activity and easily acceptable to changes in warehousing technologies or methodologies well into the next century. There will be greater efficiency of operation, improved support processes such as treatment and packaging, better consolidation of orders and less stock deterioration. The end result will be a more responsive and versatile service to customers.

66. Defence advised the following improvements to stores processing are anticipated:

- the current objective of seven calendar days for processing 80 per cent of stock receipts can be reduced to four calendar days;
- the time taken to release outstanding requests when stock becomes available will be reduced from about three days to a same day/next day routine;
- the present stop-start flow patterns for routing items to stock will be eliminated;
- issue response times will be met, and in addition there will be improved capacity to react to increases in work activity and peak loads;
- packaging times will be reduced by one or two days through consolidation of orders and direct transport of issued stock by conveyers to packaging benches; and
- working conditions will be improved - the new facilities will provide a clean, safe working environment with efficient work flow patterns and modern amenities.

67. Defence advised that savings will result in a number of areas such as:

- improvements in packaging and consignment processes will result in a saving of 20 per cent in packaging material;
- the integrated transport networks will result in improved utilisation of machinery;
- the integrated storage operations will provide the basis for better inventory control, with a subsequent 50 per cent reduction in man hours allocated to checking trading discrepancies;
- improved treatment and packaging and better storage conditions will reduce the costs associated with identifying spoilage, stock losses through spoilage and the rehabilitation of damaged stock.

68. Dibb Report The Committee questioned Defence on the validity of the proposal against the broad thrust of the recommendations of the 'Review of Australia's Defence Capabilities' (Parliamentary Paper No. 163/86). Defence suggested that the recommendations and proposals in the report are dependent on sound logistics. The following passages from the report tend to reinforce that view:

'... the effectiveness of our military forces ... will largely depend upon our ability to support our forces with fuel, ammunition and other supplies, and to repair and replace damaged equipment'. (p.44)

' ... abiding constraints of geography, population and industrial development patterns support the continuing need to locate major bases and support facilities in the South-East'. (p.102)

69. Summary The proposed work is the first stage of a two-stage concept designed to provide a modern integrated processing and storage facility for 21st Supply Battalion. Alternatives considered indicate that for Stage 1 a high density, medium rise storage system is best suited to meet the Army's requirements. The building will be sited within the Moorebank warehouse complex to optimise functionality and to provide for expansion envisaged under Stage 2. Provision has been made to provide a rail spur line to the complex. A range of fire protection measures will be installed in the building.

70. Committee's Conclusion The design of the warehouse building, which provides integrated high-use storage space and areas for stores processing will result in improvements to productivity, response times and inventory control.

#### SECURITY

71. A number of aspects of security were raised by the Committee at the public hearing.

72. A security fence separates the administration area from the main warehouse area. Civilian officers staff a central check point at which all commercial vehicles are logged in and out. Random checks of vehicles are carried out. Private vehicles are not permitted into the warehouse area. There are limitations on the sizes of bags belonging to staff which may be brought into the area. Those entering and leaving are required to submit to random bag-checks.

73. At night civilian staff are employed to carry out patrols of all areas of the depot. Defence advised that civilian staff are employed because it is more expensive to use soldiers. The Army could provide a reaction force in the event of a security incident.

74. The Committee also questioned Defence on the value of stock losses due to pilfering. Defence stated that in 1985/86 the value of losses which were directly attributable to pilfering and for which there was cause to request police investigation was \$500.

75. Defence believes that the extent of undetected pilfering is a small percentage of trading and/or stocktaking discrepancies. The nett trading discrepancy expressed as a percentage of throughput is presently less than 0.05 per cent. The nett write-off for all reasons in the 1985/86 financial year was less than 0.04 per cent of inventory value. Defence maintain that these figures indicate that current security precautions are adequate.

76. Committee's Recommendation The Committee is sensitive to security requirements for establishments of this nature and recommends close attention to that aspect.

#### ENVIRONMENTAL CONSIDERATIONS

77. DHC advised that the proposal involves no increase in site area. The proposal has been assessed by Defence in accordance with the Administrative Procedures under the Environment Protection (Impact of Proposals) Act 1974 and its impact has been determined to be minimal.

78. No additional vehicular traffic is expected to be generated by the proposal except from construction traffic.

CONSULTATIONS

79. The Committee was advised that DHC had consulted with State and Local Government authorities on the proposal. These consultations will continue throughout the tender documentation and construction phases.

80. Defence advised that relevant industrial organisations were briefed on the project and were given the opportunity to comment on and participate in the development of the design.

USE OF CONSULTANTS

81. The Committee was advised that the project had been developed by a team of consultants from the private sector under the management of DHC. Consultants so far employed are specialists in materials handling, cost planning, architecture and structures, and are well experienced. DHC indicated that subject to the proposal proceeding it is intended that similar consultancies would be established during the documentation phase. Construction of the building will be undertaken by the private sector following competitive tendering.

TIMETABLE AND COSTS

82. DHC advised a design and construction period of two and a half years is expected. It is expected to award the initial contract for demolition works about five months after approval to proceed.

83. The Limit of Cost Estimate for the work in this reference is \$17.9 million at January 1986 prices.

84. The Committee raised a number of matters relating to the estimated cost. First, if DHC were confident that the estimated cost would not be exceeded as a consequence of unforeseen exigencies. DHC advised that no areas of uncertainty had been identified at this stage. Site investigations had been carried out, the basic framework of the building is relatively simple and all reasonable contingencies had been accounted for. The removal of asbestos will be carried out in accordance with current State laws.

85. Secondly, in relation to the cost of the building and the materials handling equipment to be installed DHC advised that the basic price for warehouses is currently within the \$350-400 per square metre range. The basic price for the proposed building is about \$400 per square metre. DHC pointed out that a number of additional costs are not reflected in this 'basic price'. These include site services, demolition, fire protection measures, and measures designed to control humidity and ventilation in the treatment and packaging area. Additional specialist items such as shelves, automatic guided vehicles also add significantly to the basic price which brings the total project cost to about \$800 per square metre.

86. Committee's Recommendation The Committee recommends the construction of the work in this reference.

RECOMMENDATIONS AND CONCLUSIONS

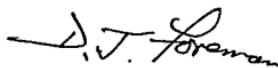
87. The recommendations and conclusions of the Committee and the paragraph in the report to which each refers are set out below:

	<u>Paragraph</u>
1. THE SIZE, STRUCTURAL LIMITATIONS AND AGE OF EXISTING WAREHOUSES LEAD TO DISJOINTED AND INEFFICIENT OPERATIONS.	36
2. THERE IS A NEED TO IMPROVE EXISTING WAREHOUSES AND TO INTEGRATE STORES PROCESSING, MATERIALS HANDLING AND STORAGE FUNCTIONS WHICH ARE DISPERSED THROUGHOUT THE COMPLEX.	36
3. THE DESIGN OF THE WAREHOUSE BUILDING, WHICH PROVIDES INTEGRATED HIGH-USE STORAGE SPACE AND AREAS FOR STORES PROCESSING, WILL RESULT IN IMPROVEMENTS TO PRODUCTIVITY, RESPONSE TIMES AND INVENTORY CONTROL.	70
4. THE COMMITTEE IS SENSITIVE TO SECURITY REQUIREMENTS FOR ESTABLISHMENTS OF THIS NATURE AND RECOMMENDS CLOSE ATTENTION TO THAT ASPECT.	76
5. THE LIMIT OF COST ESTIMATE FOR THE WORK IN THIS REFERENCE IS \$17.9 MILLION AT JANUARY 1986 PRICES.	83

Paragraph

6. THE COMMITTEE RECOMMENDS THE CONSTRUCTION  
OF THE WORK IN THIS REFERENCE.

86



(D.J. FOREMAN)  
Chairman

Parliamentary Standing Committee  
on Public Works  
Parliament House  
CANBERRA

18 September 1986

LIST OF WITNESSES

**Cross, Brigadier F.J., Director-General, Accommodation and Works (Army), Department of Defence, Canberra, Australian Capital Territory**

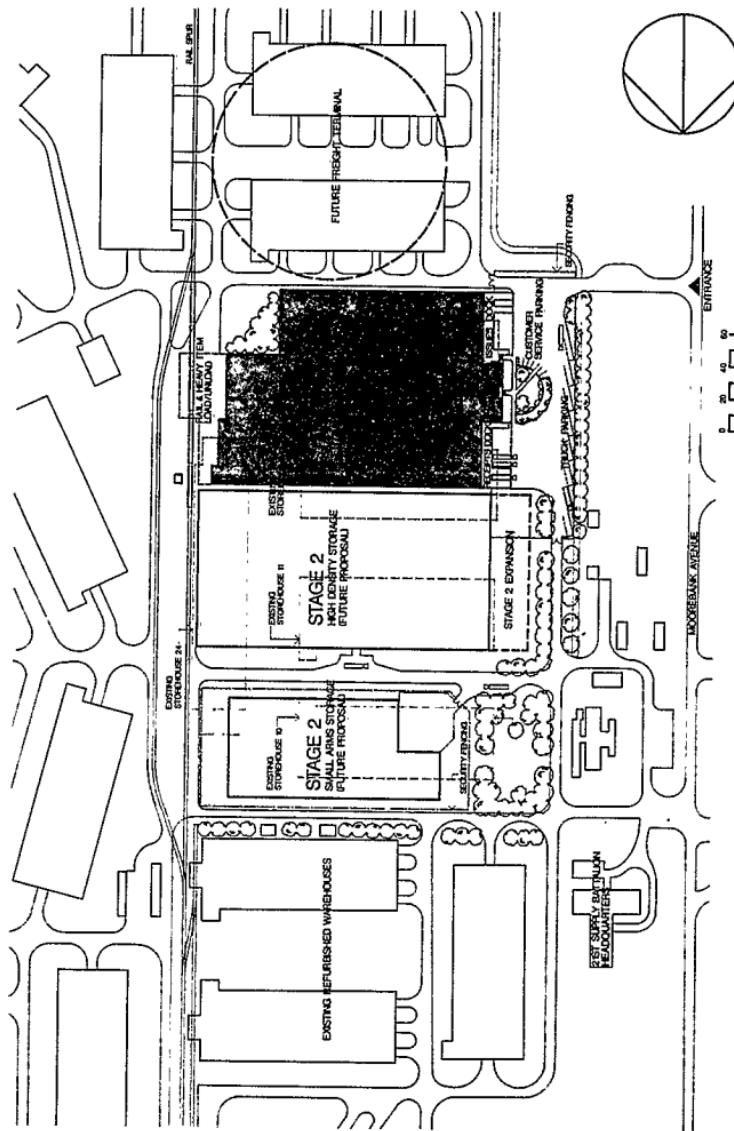
**Hutcheson, Dr J.M., Senior Lecturer, School of Building, University of New South Wales, Sydney, New South Wales**

**Lewicki, Mr M.J., Project Manager/N.S.W. Region, Department of Housing and Construction, Australia Square, Sydney, New South Wales**

**McKinnon, Lt-Col R.J., Project Manager, Directorate-General, Accommodation and Works (Army), Department of Defence, Russell Offices, Canberra, Australian Capital Territory**

**Strachan, Lt-Col J.C., Senior Stores Officer, 21st Supply Battalion, MILPO, Liverpool, New South Wales**

**Williams, Mr M.B., Chief Architect, Department of Housing and Construction, 470 Northbourne Avenue, Dickson, Australian Capital Territory**



WAREHOUSE DEVELOPMENT (STAGE 1)  
FOR 21ST SUPPLY BATTALION, MOOREBANK  
SITE PLAN

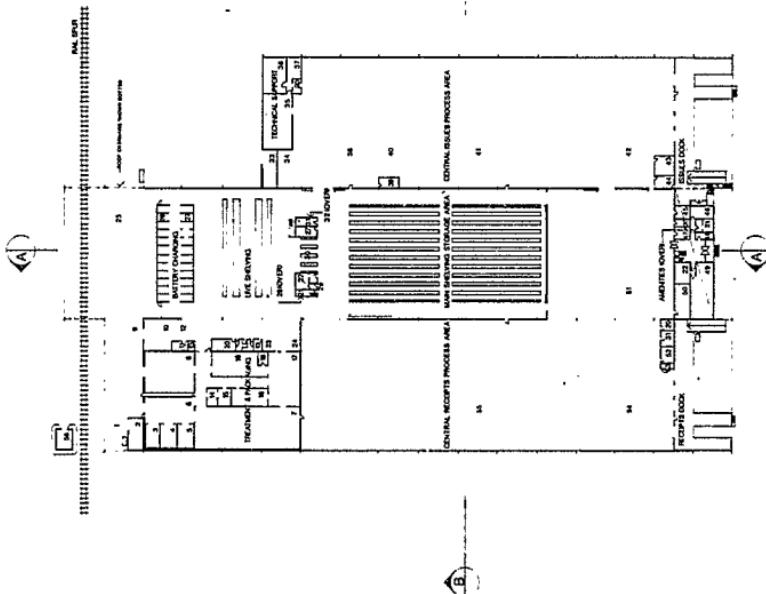
APRIL 1986

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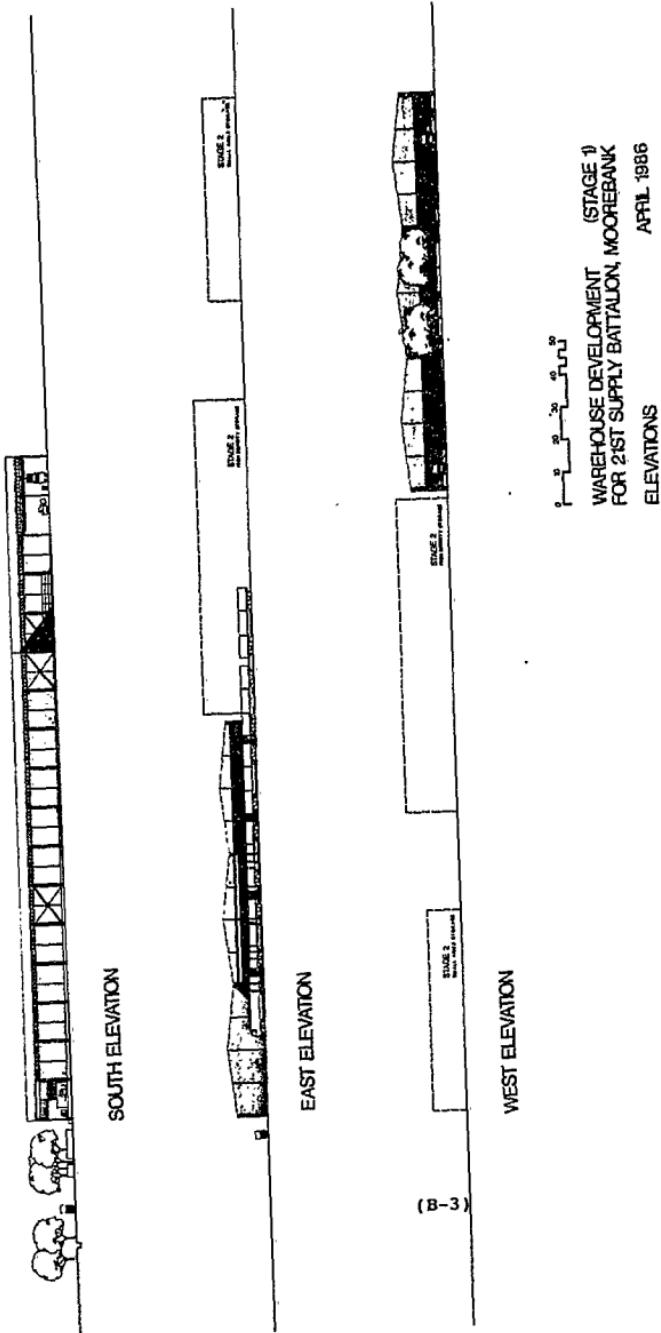
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A circle is divided into four equal quadrants by a horizontal line and a vertical line that intersect at the center. The quadrants are labeled with Roman numerals: I in the top-right, II in the top-left, III in the bottom-left, and IV in the bottom-right.

WAREHOUSE DEVELOPMENT (STAGE 1)  
FOR 21ST SUPPLY BATTALION, MOOREBANK  
FLOOR PLAN  
APRIL 1986



(B-2)





SECTION AA



SECTION BB

(B-4)

WAREHOUSE DEVELOPMENT (STAGE 1)  
FOR 21ST SUPPLY BATTALION, MOOREBANK  
SECTIONS APRIL 1986

CONSTRUCTION DETAILS

1. Technical Standards The design complies with relevant Standards Association of Australia Codes, State Ordinances and Local Authority Regulations.
2. Structure The site is underlain by clay which is moderately reactive to changes in moisture content. The concrete sub-structure of the building will be founded below the surface of the clay at a depth where moisture content variations are expected to be minimal.
3. The super-structure will be steel trusses and beams supported on steel columns with lateral stability achieved by cross-bracing.
4. Column grids will be set out so that columns are located between functional areas to maximise flexibility of floor usage.
5. The floor will be concrete slab on prepared sub-grade. Floors to the main storage area will have a tolerance for the functioning of stores picking equipment.
6. Materials and Finishes Materials will be selected for durability and functional suitability.
7. External wall lining will be low maintenance, prepainted metal cladding used in conjunction with structural steel columns and beams.
8. Internal wall lining to the treatment and packaging and battery charging areas will be masonry, cement rendered and painted.

9. Internal wall finishes elsewhere will generally be either cement rendered, painted or tiled as appropriate.
10. The roofing system will comprise low maintenance pre-painted metal decking, backed with insulating blankets and a reflective sarking membrane.
11. Translucent roof lights will be provided to minimise the need for artificial lighting during daylight hours and assist in providing an overall energy-efficient warehouse.
12. Energy Conservation Measures The building will be oriented to minimise solar heatloads. Large overhangs will shade the east and west facades. The roof area will be insulated and roof lights will be double-glazed to minimise the entry of heat.
13. Mechanical Services Local heating of work areas will be provided by gas fired radiant heaters.
14. Exhausting of air in storage and handling areas will be by means of roof-mounted fans. These fans will also be used for night time cooling of the building.
15. Specific processes within the treatment and packaging area will be mechanically exhausted.
16. Air conditioning will be provided only to special purpose areas within the technical support and the treatment and packaging areas.
17. Electrical Services An 11kV underground supply main will replace the existing overhead supply main between Moorebank Avenue and Greenhills Avenue. Two indoor sub-stations will be provided to ensure reliability of electrical supply.

18. Artificial lighting will be provided with illumination levels to appropriate Standards Association of Australia Codes. Efficient fluorescent and discharge fittings will be provided throughout the building.
19. Emergency, exit, and street lighting will be provided.
20. Battery recharging facilities will be provided for recharging materials handling equipment.
21. Hydraulic Services Sewerage will be connected to the existing sewerage system which reticulates to the Army sewage treatment plant at Holsworthy.
22. Stormwater will connect to existing site systems and be designed to meet 100-year design rainfall intensity and storm frequency criteria.
23. Water will be drawn from the proposed Moorebank area mains system for domestic and fire-fighting purposes.
24. Trade waste from specialised work areas will, where possible, be treated on-site to standards acceptable to the Metropolitan Water Sewerage and Drainage Board and the State Pollution Control Commission before discharging into the sewerage system.
25. Waste that cannot be treated will be stored for removal by contract.