



PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

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R E P O R T.

relating to the proposed

construction of

THE EDISON TELEPHONE EXCHANGE.

at

BRISBANE, QUEENSLAND.

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THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

EDISON TELEPHONE EXCHANGE, BRISBANE, Q.

R E P O R T

The Parliamentary Standing Committee on Public Works to which the House of Representatives referred for investigation and report the question of the construction of the Edison Telephone Exchange at Brisbane, Queensland, has the honour to report as follows:-

S E C T I O N I. INTRODUCTION.

Historical.

1. The existing telephone exchange building is on part of the General Post Office site; it contains equipment for Brisbane subscribers' services, a central telegraph office, and the main manual trunk exchange, with its associated trunk line equipment.
2. The telephone development in the city has been such that the original automatic exchange equipment in the Central Exchange has been fully allocated, and it has been found necessary to provide equipment for an exchange of limited capacity, which is in effect the first stage of the Edison area automatic telephone exchange. This was partially achieved by absorbing comparatively large sections of staff amenity accommodation.
3. The second exchange is rapidly approaching the stage where no additional exchange lines can be connected to it. It is predicted that the saturation point of the automatic equipment in the present building will be reached within the next three years, and it will be necessary, therefore, when that stage is reached, either to defer provision of telephone service, or to extend the second exchange in the proposed new building.

2.

4. The long term plan is to serve the city by three major exchanges. The main city area will continue to be served by the existing Central Telephone Exchange; the adjoining area to the East will be served by the proposed Edison Exchange; and the third exchange, Leichhardt, will be established ultimately to provide for expanding demands in the northerly direction.

SECTION II - THE PRESENT PROPOSAL.

The Building.

5. The proposal provides for a multi-storey building to be erected on the site, having a frontage of 104 feet to Elizabeth Street, and it is to contain approximately 14,000^{sq.} feet of space per floor. The building will extend over part of the present General Post Office site, and will comprise basement, ground floor, first to fifth floors, sixth and seventh floors built over part of the area, and a pent house on the roof to provide for machinery and cooling towers.

Estimated Cost.

6. The estimated cost of the project, as submitted to the Committee at the beginning of the inquiry was set down at £776,000, and the time necessary for construction as approximately two and a half years.

SECTION III - THE COMMITTEE'S INVESTIGATIONS.

General.

7. The Committee studied the plans and took evidence in Melbourne from officials of the Department of Works responsible for planning the project, and from officers of the Postmaster-General's Department connected with the preparation of the proposal. A visit was paid to Brisbane, where inspections were made of the site of the proposed building, the existing telephone exchange, and the present General Post Office buildings.

8. Evidence was also taken from other officials of the Postmaster General's Department and Department of Works, and persons interested in the proposal with information likely to assist the Committee in its decisions. As the proposed exchange is to be located in the space at

present being used for mail exchange purposes, the provision of this building is dependent upon the decision to move the mail handling equipment to the new Roma Street Mail Exchange. It was inevitable, therefore, that evidence in connection with this project would be involved with that taken in connection with the Roma Street Mail Exchange proposal being dealt with concurrently by the Committee. Any study of this proposal should therefore be made by reference to the evidence on both projects.

Need for the Building.

9. The City of Brisbane has a population of approximately 600,000, and in recent years there has been a heavy development of secondary industries, with a resultant upsurge in commercial activities. It is apparent that future commercial development of the main city area will be met by the erection of multi-storey buildings which will replace old single and two-storey structures, and a programme on these lines is now in progress. This will result in appreciable increases in the telephone density in the main city area, especially if the present building limit height of 132 feet is raised, as has been done in southern capital cities.

10. The telephone network plan therefore includes a requirement in central Brisbane for a further exchange area, which will be known as "Edison", to relieve the present Central Exchange area, and to cater for anticipated development.

11. Additional equipment will also be needed to provide relief to the existing trunk exchange, and to cater for future development of trunk line services.

12. Automatic telephone exchange equipment for Brisbane subscribers, as well as a central telegraph office and the main manual trunk exchange are at present accommodated in a building situated on part of the General Post Office site, with entrance from Elizabeth street. This building has now reached capacity, and additional space must be provided for both automatic telephone equipment and trunk line equipment, if services are to be provided in the proper manner. It is not economically practicable to extend this structure.

13. The provision of the proposed Edison Exchange building will

not only allow the department to provide the necessary service to meet further demands, but removal of Edison lines from the Central Telephone Exchange building to the new building will also ultimately permit the remaining activities to be progressively re-organised in a modern manner to meet future development.

14. By 1950 the Central Exchange was filled to capacity, and it was necessary to establish the Edison Exchange in a temporary location on the ground floor of the Central Exchange building to meet the growth in subscribers' services. Despite all the relief measures taken, the heavy telephone traffic was still overloading the Central Exchange equipment, and additional racks of switching equipment were installed in the passageways to prevent breakdown of service.

15. There is now a total of 12,160 lines of equipment installed, made up of Central 10,000 lines and temporary Edison 2,160 lines. The effective capacity of the equipment is only sufficient to cater for development for the next three years, after which deferred applications will begin to accrue until the new building is brought into service.

16. Development programme.— The area now served by the equipment in the Central Exchange building has been subdivided into three exchange areas, namely, City, Edison and Leichhardt, and a recent survey indicates the expected growth of subscribers' lines as follows:—

	<u>1959</u>	<u>1965</u>	<u>1973</u>	<u>1979</u>
Edison	4,870	5,780	8,200	10,500
City (now Central)	4,470	4,850	6,600	8,200
Leichhardt	<u>1,410</u>	<u>1,900</u>	<u>2,800</u>	<u>3,800</u>
	<u>10,750</u>	<u>12,530</u>	<u>17,600</u>	<u>22,500</u>

17. These figures emphasize that, if this growth of services is to be met it is essential that building accommodation be available, and provision of the new Edison building is necessary for this purpose. The provision of exchange equipment in the new Edison building will enable the annual growth in the main city area to be met, with the resultant increase in revenue. The proposed installation, if brought into service in 1965 would meet development until 1973, and by that time the additional revenue would have reached approximately £380,000 per annum.

18. The Trunk Exchange.- The main trunk exchange is the focal point for handling interstate and intrastate trunk line traffic in Queensland, and it is essential that modern and adequate equipment should be provided to ensure that the great volume of traffic originating and terminating at, and passing through, the exchange is dealt with in the most expeditious and economical manner. The existing manual trunk exchange consists of 104 trunk positions and 26 miscellaneous positions - it is 30 years old, obsolescent, and uneconomical to operate and maintain. An early replacement is therefore necessary. The following provision is estimated as essential to cater for the future development:-

	<u>Existing</u>	<u>1970</u>	<u>1985</u>
Operating positions	104	120	125
Miscellaneous positions	26	36	51

In the ten years from 1948 to 1958 the number of trunk calls originated by Brisbane subscribers has increased by approximately 2,000,000, and the revenue earned in 1957/58 was £1,068,268. It is estimated that, in 1970 the number of calls will have risen to 8,000,000, and the total revenue from trunk services will be in the order of £2,300,000. This volume of business could not be handled in the existing obsolescent exchange.

19. Present and future demand.- The many factors combining to emphasise the urgent necessity for the building, both for immediate needs and for demands which are certain to be realised in the future, were taken into account by the Committee. It is realised that development in the city is severely restricted by the Brisbane River, and, because of this, expansion will be vertical, with corresponding intensive demand for telephone services. The capacity of the existing building to meet demands on both local automatic and trunk line services will be exhausted by 1965, and further satisfaction of services can only be met by the provision of a new building. The Committee therefore recommends that, as there is an urgent necessity for a new telephone exchange building, the proposed Edison Exchange be approved.

20. Modern Telephone Equipment.- During the inquiry, when the question of the space necessary for the establishment was being

considered, the question of development of modern telephone apparatus arose. Recent information appears to indicate that new types of apparatus of lighter design, and taking up much less space, are being tried out and produced in limited quantities, and the Committee sought evidence to indicate whether all the space being provided would in fact be essential if different equipment is adopted in the future.

21. The Committee was informed that a new type of automatic telephone switching system known as the "Crossbar Type" is being used overseas. It is too early yet to indicate whether actual reductions in floor space and ceiling height will become practicable in the case of equipment manufactured in Australia. The economics of the use of such a method are still to be proved. It was pointed out, moreover, that, if the new system can be fitted into less floor space, the effect would be mainly to extend the useful life of the building before it is filled to capacity, rather than to require a smaller building at this juncture. From the evidence submitted the Committee agrees that it would not be safe to assume that the crossbar equipment can, in fact, be installed in Edison, and, in view of the urgent necessity for the exchange, no alteration to the present plans on this account is recommended.

The Building.

22. The building has two main functional units - the first unit accommodating above the ground floor, the automatic exchange equipment, trunk exchange amplifying and carrier equipment, trunk exchange automatic switching equipment, and the trunk exchange manual switching. The second unit, located adjacent to the "private" laneway accommodates the stairs and lifts, staff amenities, battery and power rooms, and other ancillary areas.

23. There is an existing basement over portion of the site area. The remainder of the site will be excavated to permit basement provision over the whole area of the site. The basement will accommodate the cable tunnel, subscribers' installation centre, emergency power room and boilers, and main electrical switchboard, etc. The ground floor will accommodate

the main distribution frame, power and battery room, subscribers' maintenance centre, installation and stores, parking and loading area, etc.

24. The first floor will accommodate the automatic exchange equipment, time and recording services, exchange management, etc. The second floor will provide for automatic exchange equipment, traffic measurement, conference room, etc. The third floor will accommodate trunk exchange amplifying and carrier equipment, broadcast and T.V. programme rooms, fault statistics, etc. The fourth floor will contain trunk exchange automatic switching equipment, maintenance area, etc. fifth floor, trunk exchange manual switching, class rooms, offices observation etc.; sixth floor, trunk exchange radio telephone equipment, testing laboratory, weather recording, staff luncheon room, and amenities disassociated from the working area: seventh floor will contain air-conditioning plant room and lift machinery room: a pent house on the roof will contain cooling towers, lift machinery room, and radio telephone trunkline frame.

25. Design.— Although the activities to be conducted in the building may be regarded as being industrial in character, its location within the city area necessitates special attention to the design and the selection of materials. The design follows the functional requirements of the building. The treatment of the Elizabeth street frontage shows an area of wall without windows to the first and fourth floors inclusive, because of the location of the equipment and the need to depend on artificial lighting and ventilation. The absence of windows will also assist in reducing the air-conditioning load.

26. The area of the Elizabeth street frontage which is without windows will be patterned to provide a pleasing treatment, and will be a feature of the building. In addition, an appropriately designed motif of contemporary form will be used adjacent to the main entrance.

27. It was explained to the Committee that the cooling towers and radio telephone frame will be on the roof, and they will be surrounded by a suitable screen to harmonise with the design of the building. The Committee studied the model and perspective drawings, and also noted the appearance of the adjacent buildings in Elizabeth street. It is satisfied

that the design will result in a building of eminently suitable character for its purpose, and adequate for the important city position it is to occupy.

Construction.

28. The form and size of the structure are such as to make it economical to use reinforced concrete rather than structural steel. The greater part of the structure will be of flat slab construction. The column spacing, which was chosen to suit the functional requirements of the Postmaster-General's Department for the layout of equipment, is well adapted to this form of construction, and has certain advantages from the erection viewpoint.

29. Externally, the building will be faced with brick; the exposed columns on the Elizabeth street frontage will be covered in marble of suitable colour. The windows throughout will be in aluminium sections, and those to the Elizabeth street frontage will have colour introduced into the spandrels. There will be a base of black granite.

30. Roofing.— The Committee considered the question of the roofing material proposed. The estimate submitted by the Department included £12,100 for copper trough roofing complete with copper gutters, downpipes and flashings. Evidence sought by the Committee revealed that other materials could be used satisfactorily on the roof, the life and cost of construction varying with the type of material selected. Comparative estimates were also given for a roof of galvanised iron, zinc, and copper sheeting. The estimated life of a zinc roof was placed at 50 to 90 years, and copper as practically unlimited, while galvanised iron was reckoned to last 30 years. The following estimates of cost for roofing were given for the Committee's information:—

Copper trough roofing as originally proposed	£12,100
Galvanised iron trough roofing with copper gutters etc.	6,000
Zinc roof sheeting, zinc gutters etc.	9,140
Copper roof sheeting, gutters etc.	14,700

It was stated in the evidence that zinc is made at present in widths which do not permit rolling into troughing, though, if it were available in troughing it would be cheaper than the figure estimated for the zinc roof sheeting. Its use was confidently supported by the Department as suitable for this proposal, and the Committee studied the evidence

on the question. As a result it is therefore recommended that zinc be used for the roofing, with an estimated saving of \$3,000, as indicated by the estimates above,

The Site.

31. Prior to 1947, no land on the General Post Office block was available for the erection of a new exchange building. Several alternative sites had been examined in various sections of the city, and it was apparent that it would be most difficult to acquire a property that would be suitable. As a result of the investigations of a special committee constituted to study mail handling activities in various capital cities, a decision was reached that Mail Exchange Branch operations should not occupy central city locations, and could function more satisfactorily on the outskirts of the city. This decision released the present site of the proposed new telephone exchange building.

32. The decision to locate mail exchange operations on the outskirts of capital cities was challenged in principle in some of the evidence, and the suggestion was made that the proposed site of the Edison exchange should be changed with the one for the Roma street Mail Exchange, a number of points being raised in favour of this variation of sites for the two proposals being investigated concurrently by the Committee. The Committee called evidence in connection with this aspect of the matter, and details of the factors involved were considered at length. Particular attention was given to distances, traffic, peak hours, location of rail and air services, access for staff, and other points relating to the Roma street exchange. They were related to the requirements for the Edison telephone exchange, particularly the areas to be served by the three exchanges planned for the city area in the future. Other requirements, such as the position of the copper centre of the Edison exchange area, proximity to the Central Exchange and availability of existing amenities were also considered.

33. It was evident to the Committee that the complex details of the requirements of these two projects had been carefully weighed by the Department, in the light of the most recent surveys of the areas concerned, and with a view to providing the most satisfactory results for the activities

planned for future expansion. The Committee is therefore satisfied that the site chosen for the Edison Exchange is the most suitable available, and should be developed as submitted in the proposal.

34. Situation.— The site for the proposed building is situated on the north west side of Elizabeth street, between Edward street and Creek street, and is bounded at the rear by Edison Lane, and adjoining the General Post Office.

35. On the south-west side of the site a 28' wide private laneway will be created, and this will connect between Elizabeth street and Edison Lane at the rear of the site, allowing a one way traffic flow to and from the building.

36. The full site has a width of 132 feet and a depth of 136 feet, with a total area of 1 rood 25.11 perches, and at present accommodates three sub-standard buildings. It will be necessary to shore adjoining property on the north east alignment, and provision has been made for this in the estimate.

Cafeteria.

37. The proposal included provision for a light refreshment service only, and the menu would be sandwiches, pies, pasties, cakes, tea, coffee and cool drinks. It was pointed out that this limited service is to be provided as the staff in this building are in relatively close proximity to the General Post Office cafeteria, which provides a full hot meal service for those who have the longer meal break, and are desirous of this service. The amount included in the estimate to cover cost of equipment for the kitchen was set down as £2,000.

38. During the inspection of the existing building the Committee took notice of the services provided in the Cafeteria and Dining Room in the General Post Office, and evidence was obtained regarding the methods of operating the different grades of service, and the costs involved. The service offered is particularly good, and the prices reasonable, and the Committee approves of the use of these amenities by the staff of the existing building, and those who will be in the proposed new building. It is considered that the provision of the light refreshment service included in the new project is reasonable for use by the telephonists and

staff with short meal breaks.

39. Some doubt arose regarding the possibility of the overall service proving inadequate when the whole establishment is in operation on completion of the new exchange building, and inquiries were made about the future scope of the services. It is pointed out that for years the cafeteria and full dining room service has been available to the public, who have been able to avail themselves of the very moderate charges in the establishment. In the past this practice does not seem to have caused any difficulty to the staff in the building, nor does the evidence suggest any considerable opposition to it from any commercial activities.

40. The Committee was informed that the public is not encouraged to use the dining rooms, but no notices were obvious which would indicate that any very effective policy was being observed in this matter. As there will be a considerable increase in staff needing to use the dining rooms when the new exchange begins to operate, the Committee recommends that the policy of allowing use of the dining rooms by the public be carefully reviewed.

Financial.

41. Construction cost.- The estimates of cost for the building were based on prices ruling in July, 1959, and the estimates were prepared by pricing the approximate quantities of materials as measured from the preliminary drawings of the project submitted to the Committee, and making due allowance for the labour content associated with each item.

The details of the estimate are as follows:-

	£
<u>Site preparation</u> - demolition of existing building	4,000
<u>Building work</u> - main structure	425,900
<u>Hydraulic engineering services</u> -	
Sewerage drainage	2,500
Stormwater drainage	450
<u>Roadwork</u> -	
Pavements	1,750
Retaining wall	500
<u>Mechanical engineering services</u>	
Air-conditioning (including boiler plant)	149,500
Ventilation	45,000
Hot water system	2,000
Kitchen equipment	2,000
Fire extinguishers	700
Refrigerated water coolers	2,000
Emergency diesel plant	31,000
Incinerators	300
<u>Forward</u>	<u>667,600</u>

	<u>Forward</u>	£ 667,600
<u>Electrical engineering services -</u>		
Light and power		54,000
Thermal alarm system		4,000
Lifts		42,000
<u>Miscellaneous -</u>		
Venetian blinds		1,400
Items of moveable furniture		7,000
		£ 776,000

42. Capital cost - A more comprehensive statement of the total capital cost of establishing the proposed exchange is available in the details supplied by the Postmaster-General's Department for the information of the Committee. It included the construction of the building as shown above, together with estimated expenditure on exchange equipment to meet the initial installation period which would be completed by 1973. As the demand increases in later years further installations would be made.

Net capital cost of establishing the Edison Building and installing 6,500 telephone subscribers' services and automatic trunk line equipment :-	£.
Site (already purchased) including demolition (4,000)	39,400
Building	424,000
Building services - Air conditioning	194,500
Alternator	31,000
Lifts	42,000
Light & Power	58,000
Miscellaneous	14,500
Automatic Exchange equipment - 6,500 lines	340,000
Line construction-transfer of existing subscribers	422,000
Connection of new subscribers	20,000
Automatic trunk line equipment	97,000
Subscribers' telephones	500,000
Furniture	156,000
	8,000
	£2,006,400

Other financial aspects include:-

Annual revenue from additional facilities made available when initial installation is completed in 1973 (automatic exchange £380,000; trunk traffic £540,000)	920,000
Annual net charges, including working expenses, interest and depreciation.	300,100

Construction Time.

43. The preparation of working drawings, specifications and bills of quantities, and subsequent invitation of tenders and letting of a building contract would take approximately 16 months. The time required

to complete the building is estimated at about two to two and one-half years. As the commencement of construction of the Edison Exchange is dependent on completion and occupation of the Roma Street Mail Exchange, the preparation of contract documents and subsequent calling of tenders for the Edison proposal will be co-ordinated accordingly.

Air-conditioning.

44. As is the practice in all Queensland telephone exchanges of reasonable size, it is proposed to fully air-condition the major portion of the exchange building, as the proper functioning of the equipment depends upon adequate temperature and humidity control. Offices and lunch rooms would also be air-conditioned, but all other areas, other than lobbies and corridors, would be mechanically ventilated.

45. The air handling plant is planned to consist of four separate units of a total air handling capacity of 110,000 cubic feet of air per minute. These air handling plants would be located on the seventh floor of the exchange building in a common plant room with the refrigeration equipment. High efficiency air filtration would be used to protect the exchange equipment. The main ducts supplying air to and returning air from the various areas are grouped in a suitably located riser extending through the building.

46. The refrigeration plant of 210 A.C. tons capacity would consist of three separate self-contained water chillers of equal capacity. These units would comprise medium speed reciprocating compressors and chilled water coolers, all designed for interchangeability and ease of maintenance. Space has been allowed for a fourth chiller set which, on present indications, may have to be installed after the first 5 or 7 years of operation of the exchange.

47. It is proposed to instal in the basement two automatic oil-fired boilers of 1.5 million BTU/hr. capacity each, to provide hot water for the air-conditioning and mechanical ventilation plants, and for hot water calorifiers.

48. Mechanical Ventilation.- Supply and exhaust ventilation is to be provided for all internal locker rooms, power and battery rooms, the whole of the basement, and for the ground floor, except for the

M.D.F. and traffic recording rooms, which are included in the air conditioned portion of the building.

49. Two supply air handling plants complete with filters are proposed, one located in the basement, the other on the 7th floor. The total capacity of the mechanical ventilation plants is approximately 100,000 cubic feet of air per minute. Space has also been allowed for some additional plant if future expansion demands it.

50. Type of Air-conditioning plant.- This proposal was another case in which the Committee was seriously concerned at the high cost of air-conditioning equipment, and a great deal of consideration has been given to the evidence in connection with the Roma Street Mail Exchange, where special efforts have been made to seek out a type of air-conditioning equipment which would permit large economies in capital expenditure. In the Roma street project, where the demands for temperature and humidity control are not so critical, the Committee is continuing to probe the matter deeply, and the possibility of substituting package units to cope with the air-conditioning requirements, in place of the central plant proposed, is still being investigated with care. The question of package units was also studied in relation to the air-conditioning requirements for the Edison Exchange.

51. Evidence with particular reference to the required conditions for the telephone exchange emphasizes that the humidity must not be too high, in consideration of the risk of corrosion and of poor insulation of apparatus. Nor must it be too low in view of the increased dust concentration and drying of the oxidised layer on the contacts, leading to variations in contact resistance. It was stated that experience shows that contact burns on sliding contacts are much more frequent in areas where there are periods of low humidity.

52. In Brisbane, conditions of high humidity prevail for long periods and full air-conditioning plant will assist in excluding harmful dust from the apparatus rooms, and will also control within safe limits the moisture content of the air. It is necessary to include refrigeration in the air-conditioning plant for the purpose of humidity control in this locality.

53. The Committee studied the question of air-conditioning very thoroughly, and, after giving particular attention to the possibility of using package units in the Edison Exchange to reduce the cost of the necessary plant, considers it wise under the existing circumstances to adopt the proposal submitted by the Department for a central type air-conditioning plant in this instance. The Committee is still hopeful however, that a way may be found by the air-conditioning experts to produce equipment which will meet the demands for air-conditioning without the very high expenditure at present involved, and investigations are being continued with this object in view.

SECTION IV - THE COMMITTEE'S CONCLUSIONS.Summary of Recommendations.

54. The following is a list of the Committee's conclusions in summary form only, arrived at after study of the proposal, model, plans, and the evidence involved. The full recommendations are contained in the body of the Report, and may be referred to in the paragraphs quoted at the close of each of the following recommendations:-

Paragraph in Report.

- | | |
|--|----|
| (1) There is an urgent necessity for the proposed Edison exchange. | 19 |
| (2) The design will result in a building eminently suitable for its purpose, and adequate for the important city position it is to occupy. | 27 |
| (3) The roof should be constructed with zinc sheeting, with an estimated saving of £3,000 on the estimated cost | 30 |
| (4) The site chosen for the Edison Exchange is the most suitable one available | 33 |
| (5) The provision of a light refreshment service is reasonable | 38 |
| (6) The policy of allowing use of the dining rooms by the public should be carefully reviewed | 40 |
| (7) Central type air-conditioning plan should be adopted as proposed in this instance | 53 |
| (8) It is not advisable at present to anticipate any alteration in the building requirements which could become effective if "Crossbar" type telephone equipment is adopted in the future. | 21 |

(Allen Fairhall)
Chairman.