and the owners. It secures for the public without charge:

1. A new station site with proper "Place" 72 feet wide for street traffic and station purposes, apart from the extra width secured also for station buildings, etc.

2. Roads 66 feet wide adjoining the railway.

3. A main through traffic avenue 66 feet wide, which ultimately will connect with the Bay Road and provide a new direct route to the sea from the City of Adelaide.

4. Drainage reserves and diversion of the Brownhill Creek to remove danger of flooding; and

5. Five acres of park, recreation reserve, etc., which have been transferred free to the District Council of West Torrens.

Cold Storage Accommodation

Ferro-Concrete Design in London

The impetus given to the production of New Zealand produce, and particularly meat for export through the Imperial Government's purchase of our output has caused a number of local firms to extend their storage accommodation. The same question has been occupying the minds of the London authorities and a description of the Charterhouse street cold storage buildings belonging to the Port of London Authority will no doubt prove of great interest to those contemplating extensions in this direction. The description below was given before the Concrete Institute, London, by Mr. H. J. Deane quite recently.

The building, which was brought into use in the autumn of 1914, stands on a raft or platform constructed of built-up steel girders over the railway connecting Farringdon street and Snow hill stations. The allowable loading on the platform was restricted to 8 cwt. per square foot and in one portion to 4 cwt., and this limitation naturally had an important effect on the design. The building generally is constructed of reinforced concrete, faced on the Charterhouse street side with granite and Portland stone. It has three floors in addition to the ground floor, the six cold storage chambers being on the ground, first, and second floors, while the top floor is utilised for the sorting and distribution of produce and for office accommodation. The chambers, access to which is normally obtained only from the top floor, have a capacity of about 386,000 cubic ft., and can store 78,000 carcases of sheep. If the building had been required to conform strictly to the London Building Act regulations, the floors would have had to be designed to carry "warehouse" loads of 224lb. per square foot, and this would have so greatly reduced the allowable live loading that the storage capacity would have been reduced below the point at which the stores could be made to pay. As it is, the capacity is some 6,000 carcases fewer than was originally anticipated when negotiations for the lease of the site were first entered into with the City Corporation.

Features of Construction

Owing to the necessity for restricting as little as possible the space allowed for the cart area in the front of the building, it was decided to employ, in place of reinforced concrete, nine solid steel columns, varying from 6in. to 7in. in diameter, and 12ft. 8in. long. These columns were continued upwards as concrete columns. Under London County Council Regulations this arrangement would have been impossible, as the requirements of the Building Act in respect of steel-frame buildings and the Reinforced Concrete Regulations cannot be applied at the same time in any one building.

The live loads to be provided for were 40lb. per square ft. on a horizontal plane for the pitched roof (including the dead load for the roof itself), 56lb. on all flat roofs, 1½cwt. on the first and second floors, and 1 cwt. on the third floor. The weight of the reinforced concrete work was taken as 150lb. per cubic ft. and of the insulating materials as 18lb. All walls were considered as subject on each side to a uniform pressure of 40 lb. per square ft. over the whole area. The worst possible combinations of the above loadings were taken in arriving at the maximum stresses. In general the methods and formulæ outlined in the second report of the R.I.B.A. Committee on reinforced concrete, dated 1911, were adhered to.

The concrete was composed of clean crushed Thames ballast passed through a ¾ in. and retained on a ¼ in. screen, mixed with Ham River grit in the proportion of 2 to 1, with latitude for variation when necessary so as to ensure the whole of the voids being properly filled. The cement used was in the proportion of one bag of 224 lb. to every 4½ cubic ft. of sand, and complied with the requirements of the British Standard Specification, the initial set being between 50 and 90 minutes and the final set between 5 and 7 hours.

The beam moulds were so arranged that the sides were readily removed without disturbing the bottom until the beam was sufficiently set, the camber allowed for in the moulds being $^1/_{300}$ to $^1/_{350}$ of the span, according to the dimensions of the beam. The column moulds were all arranged with one open side, and this was built up as the concreting proceeded. The steel reinforcing bars were of plain circular sections, having an ultimate strength of 28 to 30 tons per square in., with an elongation of not less than 20 per cent. in 8in., and otherwise generally conformed to the British Standard Specification. These bars were covered with at least 1in. of concrete in the case of beam columns, etc., and ½ in. in the case of the floor slabs, except where such slabs were in contact with the insulation, when not less than 1 in. cover was provided.

The minimum time allowed before removing the supports from the reinforced concrete was, in the case of the main beams and floors, 14 days, and in the other cases 8 days. The maximum test loads to be applied to the floors and beams provided for an excess of 50 per cent. over the live load for which the particular portion of the structure was designed,