90
T764
1946a

TR-6.1(B)

REPORT NO. 4378
ON
PROPOSED SOUTH JERSEY RAPID TRANSIT LINES
TO
THE DEPARTMENT OF ECONOMIC DEVELOPMENT
OF THE
STATE OF NEW JERSEY

New Jersey State Library

DAY & ZIMMERMANN, INC.
ENGINEERS
PHILADELPHIA, PA.

REPORT NO. 4378

ON

PROPOSED SOUTH JERSEY RAPID TRANSIT LINES

TO

THE DEPARTMENT OF ECONOMIC DEVELOPMENT

OF THE

STATE OF NEW JERSEY

February twenty-first
Nineteen forty-six

10 Cents

LETTER OF TRANSMITTAL

DAY & ZIMMERMANN, INC.
ENGINEERS
NEW YORK PHILADELPHIA CHICAGO

PACKARD BUILDING
PHILADELPHIA

SUBJECT Proposed South Jersey Rapid Transit Lines
FILE No 4378

June twelfth
Nineteen forty-six

(26) 10 O.S. 12 slug

Hon. Charles R. Erdman, Commissioner
The Department of Economic Development
State of New Jersey
Trenton, New Jersey

Dear Sir:

Pursuant to your authorization, we have made a study of the economic and other possibilities of extending the Delaware River Bridge Line service into the Camden suburban areas. The results of our studies are set forth in detail in the accompanying report and in summary form in this letter of transmittal. The arrangement of our report and the matters presented are shown by the condensed table of contents on page 5 of the report. While the report was completed in February of the current year, it was agreed that delivery should be withheld pending the outcome of conferences with the railroads and other interests concerned.

THE PROJECT AS ASSIGNED

The project as assigned for study is the one covered in the 1938 report of Gibbs & Hill, Inc. to the South Jersey Transit Authority. It contemplates a connection between the Bridge Line and the railroads at Broadway Station and the utilization of existing railroad right of way and other facilities, and the operation of through service between the suburban areas and the central sections of Philadelphia via the Eighth Street and the Locust Street subways. Use of five rail lines is proposed, with the respective outer limits of the service at Burlington, Moorestown, Haddonfield, Clementon and Glassboro. The location of the rail lines and of major radiating highways is shown on the Map facing page 11 of the report.

TERRITORY, POPULATION AND PRESENT TRAFFIC FLOWS

The proposed extension of the Bridge Line would serve directly a large portion of the suburban areas in Camden, Gloucester and the inner portion of Burlington Counties. To a lesser extent it would serve the City of Camden and would provide

ABSTRACTS FROM THIS REPORT ARE NOT TO BE USED FOR ADVERTISING PURPOSES OR OTHERWISE PUBLISHED WITHOUT FIRST OBTAINING OUR CONSENT

outlying connections to transportation facilities serving the areas beyond the 20 mile radius from Camden. The suburban communities which would be directly served by the five proposed lines had a total population of about 190,000 in 1940 or about 151,000 excluding those served by the proposed Burlington line. The total 1940 population within 20 miles of Camden City Hall was about 385,000, including about 117,000 in the City of Camden.

The rate of population growth in the suburban area reached a peak of 55.3 per cent in the decade 1920-1930, reflecting the effect of the opening of the Delaware River Bridge in 1926. In the decade 1930-1940 the rate of increase dropped to 2.9 per cent, which was about the same as for the entire State of New Jersey. A U. S. Census estimate of "civilian" population in November 1943 indicates slight declines from the regular census figures for 1940 for the state as a whole and for the southern counties other than Gloucester County.

The suburban area is served by highways, bus lines and railroads radiating from the City of Camden, facilitating direct transportation to Camden and Philadelphia. In conjunction with the Delaware River Bridge the highways are particularly advantageous to bus and automobile travel to and from the city areas. The basic advantages of "door to door" travel by automobile, and of easy access to bus lines in suburban areas combined with through rides to central city delivery points, place these means of travel in a strong competitive position with respect to the proposed rapid transit service. Railroad travel is subject to the disadvantage of having to transfer to the Bridge Rail Line or use the ferries and other facilities in order to reach Philadelphia destinations.

The Bridge Line serves as a direct connection between the center of Camden and 8th and Market Streets, Philadelphia. The location of its two Camden stations affords only the most limited direct distribution of traffic in Camden. However, the distribution is broadened to a considerable extent by existing interchange with bus lines and railroads and with private automobiles. Delivery facilities of the Bridge Line in Philadelphia are at present limited to the jointly used 8th and Market Streets subway station. Interchange with the Market St. Subway and other P.T.C. facilities is permitted under present operating arrangements.

Eventual extension of Bridge Line service to 18th & Locust Streets via the presently unequipped Locust St. Subway has been contemplated for a number of years and would be necessary to provide sufficient station capacity if the proposed extension of the line into the suburban areas materialized. Delivery along Locust Street would be considerably less central than the present direct delivery by the bus lines along Market Street.

The changes in traffic volumes, and in the distribution of the traffic, experienced subsequent to the opening of the Delaware River Bridge in 1926 were the result of highway and other developments in New Jersey, the rapid increase in the use of the motor bus and the private automobile. Later changes reflected the depression years, the opening of the Bridge Line in 1936, and the greatly increased traffic levels of the war years. These matters are traced in detail in our report. (See Chart No. 3, facing page 38 of the report).

For use as basic data in estimating the potential traffic of the Bridge Line operations as extended, estimates were made of the volume, and of the distribution between areas and facilities, of the total public and private through passenger traffic in the areas tributary to the proposed extensions. These estimates exclude purely local traffic in Camden, etc., but do include a considerable volume of traffic between Camden and Philadelphia as well as traffic between Camden and the suburban areas.

Our estimates of the total traffic "pool" from which the proposed operation would derive its traffic are 42,000,000 passengers per year at 1941 traffic levels and some 53,000,000 at 1944 levels. The former level is viewed as fairly expressive of probable post war averages over a period of years, the latter as indicative of present levels and of probable remote highs.

Based on the distribution of traffic in the year 1941, prior to war effects, the estimates indicate that about 40 per cent of the traffic concerned used bus transportation and 50 per cent used private automobiles. Railroad traffic and direct riding on the Bridge Rail Line has been a small proportion of the total. However, including interchange from other facilities, the Bridge line carried about 12 per cent of the total passengers. The estimates also indicate that about 85 per cent of the total passengers concerned travel between Philadelphia and New Jersey. The Bridge Line carried 5,100,000 passengers in 1941 and 8,200,000 in 1944, and the traffic in the latter months of 1945 and 1944 were at about the same level.

OWNERSHIPS, LEASES, ETC.

The transportation facilities or operations directly concerned in the proposal to extend rapid transit service into the Camden suburban areas collectively present a complicated situation as to ownerships, consents, leasehold interests, operating agreements and competition. They are as follows:

10 solid industrial rgds

New Jersey Bus Lines: A major source of potential traffic for the proposed operation, and holding further potentialities in the way of either competition or of coordinated feeder and supplemental local service.

Public Service Interstate Transportation Co. - New Jersey local and Interstate Bus lines
G. R. Wood, Inc. - Interstate bus line
Gick & Bingemann, Inc. - New Jersey bus line
Century Transit Company - New Jersey local bus line
Several other long distance interstate operators not directly concerned.

Railroads: A basic element in the project, as they own or control the railroad lines in New Jersey over sections of which it is proposed to operate the new service.

The Pennsylvania Railroad Company
The Reading Company
The Pennsylvania-Reading Seashore Lines

Ferries:

Phila. and Camden Ferry Co., the Market St. Ferry of the Penna. R.R.
Kaighn Ave. - South St. Ferry Co. an independent operation.

Delaware River Bridge: Owned by the Delaware River Joint Commission, an interstate agency established by Pennsylvania and New Jersey with Federal consent, authorized inter alia to (a) operate, maintain and improve the bridge and its approaches, and (b) construct and operate, directly or indirectly a passenger railway over the bridge, with extensions to the vicinities of 8th & Race Sts. in Phila. and of Haddon Ave. & Carmen St. in Camden.

Bridge Rail Line: Another basic element in the project. Owned by the Delaware River Joint Commission and constructed between the limits stated above under consent agreements with the cities of Philadelphia and Camden.

The Eighth Street and the Locust Street subways which it uses are owned by the City of Philadelphia and leased for operation to the Philadelphia Transportation Company.

The line is operated by P.T.C. under lease agreement with the Delaware River Joint Commission and approval thereof by the City of Philadelphia.

Connecting Facilities in Philadelphia:

All surface and rapid transit facilities in Philadelphia are operated as a coordinated system by Philadelphia Transportation Company.

P.T.C. owns all surface lines and the Market Street Elevated-Subway Line.

City of Philadelphia owns the Frankford Elevated Line, which connects with the Market St. Subway, and the Broad St. Subway System, both of which are leased to P.T.C. for operation.

The Broad St. Subway System includes the subway in 8th Street now used by the Bridge Line and the unfinished Locust St. subway proposed to be used by the Bridge Line when its operations are extended.

It is to be noted that the agreement between the two states whereby the Delaware River Joint Commission was established, with Federal approval, stated two primary purposes, viz., (a) to own, operate, maintain, and improve the Bridge and its approaches, and (b) to construct and operate, directly or indirectly, a passenger railway over the bridge, with extensions to the vicinities of 8th & Race Streets in Philadelphia and of Haddon Ave. & Carmen Street in Camden. This definition of limits is specifically recognized in the Construction Agreement between the Joint Commission and the City of Philadelphia, in the definition of the demised premises in the Operating Agreement whereby the Bridge Line was leased to a predecessor of Philadelphia Transportation Company, and in a section thereof excluding any future extension of the Bridge Line from being in any way subject to clauses relating to changes, alterations and additions to the demised property. The Operating Agreement required consent of the City of Philadelphia in order to become effective. There are also some relevant cross references to such matters in the lease of the City-owned Broad Street Subway System to Philadelphia Transportation Company.

Incident to the issuance of the Bridge bonds presently outstanding the two states and the Joint Commission made some specific covenants to protect the holders of the bonds against action which might reduce the portion of the earnings proposed to be set aside for interest on and retirement of debt. These included covenants not to diminish or impair the powers of the Joint Commission, nor to authorize or permit the construction of any additional vehicular bridge or tunnel or any railroad bridge or tunnel within ten miles of the bridge, unless and until adequate provision has been made by law for the protection of any bonds then outstanding.

It would seem to follow from the above that insofar as the Joint Commission is concerned its rights to extend the existing construction are quite limited, even though the design contemplated the possibility of a future connection with the railroads at the Camden Terminal. Extension of the service beyond that terminus over facilities owned by others may be within its powers of approval but would at least require its consent and also that of the City of Philadelphia. Unless the present operating lease were terminated, consent of Philadelphia Transportation Company would also be necessary. The indications are that consummation of the project would require legislative action broadening the powers of the Joint Commission and perhaps authorizing the creation of a new agency for the financing and the operation of the extended Bridge line service. The consent of the railroads to the use of their facilities is a basic requisite.

POTENTIAL SERVICE AND TRAFFIC

As a preliminary step in the estimation of the potential traffic on the proposed extended operations, estimates were made of the service which would have to be given and of the fares which would have to be charged in order to meet in reasonable degree the competition of the private automobile and the bus lines in the several areas traversed. As previously stated, users of these facilities accounted for 50 and 40 per cent, respectively, of the estimated total traffic pool from which the new operation would have to divert most of its traffic. Matters of frequency of service, travel times, fares and general convenience factors are considered in detail and appropriate comparisons drawn in our report.

The principal advantage of the proposed rapid transit service would be the avoidance of surface congestion by through passengers diverted from buses and private automobiles or the avoidance of transfer to the Bridge Rail line or to the ferries, etc. by passengers diverted from railroads, buses or automobiles. There would be moderate time saving by passengers to some portions of the Philadelphia business district, particularly in rush periods, but the direct delivery of buses along Market Street will present strong competition in convenience and time, subject to irregularities brought about by surface congestion. Improvements in bus running time may also be had by the introduction of express routes now under study by the operators. Passengers now using the railroads from the suburban area to central Philadelphia will be considerably benefited on account of the proposed direct through service.

The proposed service would contribute to the development of the suburban area and would greatly extend the usefulness of the existing railroads to the communities served. It should be

noted, however, that the proposed service is a suburban service on a number of branches converging into a single section of city subway and would not be comparable in frequency to that of an individual urban rapid transit line with all service consolidated on one line. Furthermore, in this case the overall frequency of service is limited by the joint use of the terminal subway.

The potential traffic has been developed by applying to the traffic carried by each of the existing facilities three assumed percentages of diversion, which percentages we consider as ranging from the low side of to far above our own judgment as to a reasonable expectation under all the circumstances. In broad terms, the middle ground figures assume the diversion of one-third of the bus traffic, 15 per cent of the automobile traffic, and 80 per cent of the railroad traffic. Application to the two selected traffic levels, 1941 and 1944, result in six total traffic estimates ranging from 11,500,000 to 26,000,000 passengers per year. The extremely low traffic density indicated for the Burlington line lead us to exclude it from our subsequent estimates of earnings and expenses. The latter cover four assumed volumes of traffic, ranging from 11,000,000 to practically 20,000,000 passengers per year.

It is impossible for anyone to predict with assurance the future traffic of the proposed lines but we believe that the best measures for testing the economics of the project would be premised on potential traffic somewhere in the field between 12,000,000 and 15,000,000 passengers per year.

NEW INVESTMENTS REQUIRED

We have estimated the new investments required for construction and equipment other than cars by trending the 1937 estimates made by Gibbs & Hill, Inc. to 1945 levels. Cars are included at $60,000 per car. Our estimates are confined to four of the proposed lines, do not include any added investments required in the Locust Street Subway, and cover four assumed traffic volumes ranging roughly from 11,000,000 to 20,000,000 passengers per year.

Total requirements range from $11,000,000 to $13,600,000, of which amounts about $4,000,000 and $6,000,000, respectively represent the cost of cars. The amounts are before any credit for the possible sale or use of the 26 cars presently owned by the Joint Commission.

On the premise of an initial operation limited to the Glassboro line, the required new investment, including cars, would range between $5,500,000 and $6,500,000. In this case, utilization of the 26 cars would seem quite probable because of the dominance of

local service between Camden and Philadelphia, making the figures just stated subject to a possible reduction of about $1,500,000.

EARNINGS, EXPENSES AND DEDUCTIONS

Passenger Revenue estimates were derived by the development of average fares for the several lines from the fare schedules adopted as meeting the competitive and other requirements of the operation, and their application to the respective traffic estimates.

The estimation of operating expenses was carried out in considerable detail. Operating schedules to meet the passenger requirements were developed for each of the four lines and for each of the four assumed traffic levels, and translated into train mile, train hour, car mile and car hour data as a basis for estimating costs and also the number of cars required to furnish the service. To this operating data there was applied appropriate unit costs derived from the reported experience on the railroads and on the local rapid transit lines in 1943 and 1944 respectively. These estimates were planned to cover all operating costs incurred on the proposed rapid transit system. Inasmuch as there would be joint operation along the railroad sections, this has been recognized by an assumed credit of 50 per cent of certain cost items. This amount is necessarily a tentative figure, and would ultimately be determined in connection with the negotiation of an agreement with the railroads covering joint operation matters and compensation for the use of their property.

For present purposes, social security taxes have been included as an item of operating expense, and no allowances have been made for possible other taxes or operating fees. Interest and amortization charges on new investments have been computed on a 5 per cent basis and approximate $600,000 per year. Rentals for the use of the Bridge Line and the Philadelphia subways have been computed on the basis of the present rental charges, 2.5 cents and 2.0 cents per passenger, respectively.

A major rental item, for the proposed use of the railroad right of way and other facilities, has been left open because a satisfactory measure is not available and probably would only become available as a result of specific negotiation.

FINANCIAL RESULTS OF OPERATION

The several estimates of earnings, expenses and deductions described above and the successive balances of income or deficits are summarized on Statement No. 12, opposite page 70 of the report. The

statement also shows major operating and investment data, and two estimates for the operation of the Glassboro line alone. Chart No. 4, opposite page 71 shows the principal economic factors in graphical form. The interpolated results for the 12,000,000 - 15,000,000 passengers volumes considered by us most appropriate for testing the economics of the project are as follows:

	12,000,000 Passengers per Annum		15,000,000 Passengers per Annum	
	Amount	Per Passenger	Amount	Per Passenger
Operating Revenues	$2,068,000	17.2¢	$2,583,000	17.2¢
Operating Expenses	2,575,000	21.4	2,792,000	18.6
Balance	507,000	4.2	209,000	1.4
Credit for Joint Use by Railroad	503,000	4.2	514,000	3.4
Balance	4,000	-	305,000	2.0
Rentals and Fixed Charges	1,036,000	8.7	1,201,000	8.0
Net Balance BEFORE Rental for RR Facilities, Operating Fee, if any, Taxes, if any	$1,040,000	8.7	$ 896,000	6.0

The estimates indicate annual deficits before payment of rentals for use of railroad property in the order of $1,000,000. The corresponding figure for the Glassboro Line alone approximates $600,000. The showings would naturally be better if higher traffic volumes were assumed. At the highest traffic level for which we made specific estimates, about 20,000,000 passengers per year, the indicated annual deficit before railroad rentals is also about $600,000. Projection of our estimates to still higher volumes indicates that it would require from 25 to 30,000,000 passengers per year to enable the project to earn all costs prior to railroad rentals. We see little basis in the existing or near future conditions for such an assumption as to potential traffic. Provision of the proposed service would undoubtedly stimulate development in the areas served and hence lead to greater traffic volumes, but these would be long range effects which cannot satisfactorily be evaluated as to time or extent.

The competitive situation precludes any appreciable increases in assumed revenues, except as an accompaniment of a general increase in competitive fares. Material prices and labor

rates are higher now than in the periods upon which our unit costs are based, and seem to be headed for still higher levels. For reasons stated in our report, there is little likelihood that lower rental rates for the use of the Bridge Line and the Philadelphia Subways can be obtained. Some reductions in costs might be effected by assuming the use of the present Bridge Line cars and that lower carrying charges on the new investments required could be obtained.

It seems to us an inescapable conclusion that the project would have to be subsidized in an amount upward of $1,000,000 per year. Even if it were assumed that the new investment requirements were met by a "grant in aid", or the carrying charges thereon were absorbed by the State of New Jersey, there would still have to be met a deficit before railroad rentals approaching $400,000 per year.

The project is clearly in a class where consummation must depend upon public financing and support, rather than private capital. Justification for subsidizing the project would have to rest upon its potentialities for developing the areas to be served, with the burden of the necessary support carried either alone or in combination by the State and the benefited communities.

OTHER PLANS

Several other plans for the improvement of commuters service are discussed in our report. The proposal to establish a bus interchange terminal in Camden, which was part of the original Bridge Line project and is still recognized in the leases, has not met with public favor and does not afford the desired through service.

The "Jenny Plan" submitted to the Board of Public Utility, Commissioners of the State of New Jersey in 1934 contemplated the connection of the Bridge Line with the railroads and the creation of an inner and outer loop over each of which service would be operated in both directions. The outer loop would embrace an area within about a six mile circle, and traffic from beyond the loop would be carried by the railroads or buses. This proposal likewise fails to meet the present objective of through service.

If the Bridge Line Operations were extended into the New Jersey suburbs as now proposed, and in addition a new subway connection were provided between the Bridge Line and the Pennsylvania Suburban Station in Philadelphia, it would be advantageous in a number of respects. A more convenient central city delivery would be provided than that offered by the Locust Street terminal. The limitations on service and the operating

and costly fare complications imposed by joint use with the City's rapid transit operations of the Eighth St.-Locust St. subway would be avoided, and responsibility for operations could be concentrated in one agency, presumably the railroad. However, operations would be restricted as to the type of equipment used, as the clearances, etc. will not permit the passage of standard railroad electric cars, and traffic would probably be deprived of the transfer privileges in Philadelphia available to it under present leases. The modified proposal raises additional consent and procedural problems, as well as calling for substantial additional investments in the Philadelphia terminal.

The connection of the Suburban Station in Philadelphia with the rail lines in New Jersey by means of a new subway and tunnel under the river would afford the maximum of through railroad service to the suburbs and to seashore points, and would also be a major undertaking by the railroads. It would eliminate the need of connections with the Bridge Line, but would drain the latter of much of its present passenger traffic and tend to substantially reduce bus and automobile traffic on the Bridge. Protective covenants entered into by the two states and the Joint Commission against such eventualities and the need of securing municipal and other consents are involved. Even assuming that the railroads should desire to proceed with such an undertaking, it is clear that formidable legal, financial and legislative hurdles would have to be cleared before the project could be consummated.

GENERAL

In closing, it seems appropriate to record our appreciation of the cooperation so freely extended to us in the supply of traffic and operating data and pertinent general information by the agencies more or less directly involved in the project, some as potential participants, others as potential competitors. We also participated in discussions of the project between representatives of the Department of Economic Development and officials of the principal private interests concerned. Although these conferences did not develop specific answers covering corporate position, rental requirements, etc., they did develop the existence of an attitude sympathetic to any endeavor to promote the general welfare of the metropolitan area by improved public transportation and also a general recognition of the financial, legal and physical problems involved in the proposal. It seems clear that consummation of the project would be dependent upon public initiation as well as public financing and support.

Respectfully submitted,

DAY & ZIMMERMANN, Inc.

H. E. Ehlers

H. E. Ehlers
Vice President

TABLE OF CONTENTS

TABLE OF CONTENTS

	Page
INTRODUCTION	1 - 5
The Present Authorization	2 - 4
Acknowledgments	4 - 5
Presentation	5
THE EXISTING SITUATION	6 - 21
The South Jersey Territory	6 - 7
Population	7 - 11
South Jersey	7 - 8
Statement No. 1 showing Proposed South Jersey Rapid Transit Lines, Population and Rate of Growth 1890-1940	7a
Chart No. 1 showing Proposed South Jersey Rapid Transit Lines-Trends and Rates of Growth of Population	8a
Camden Area	8 - 9
Statement No. 2 showing Proposed South Jersey Rapid Transit Lines-Population of Camden and Gloucester Counties	9a
Camden Area by Zones	10
Chart No. 2 showing Approximate Total New Jersey Population within 20 mile Radius of Camden City Hall	10a
Tributary to Proposed Lines	10 - 11
Map No. 1 showing Railroads and Main Highways Radiating from Camden, N. J.	11a
Existing Transportation Facilities and Highways	11 - 16
Highways	11 - 12
Map No. 2 showing Existing Cross-River Facilities between Philadelphia and Camden	12a
Bus Lines	12 - 13
Railroads	13 - 14
Bridge Rail Line	14 - 15
Cross-River Facilities	15 - 16
Convenience of Transportation	16 - 21
Bus Lines	16 - 17
Railroads	17 - 18
Automobiles	18
Bridge Rail Line	18 - 19
Fares	19
Buses	19 - 20
Railroads	20 - 21
Other Fares and Tools	21

TABLE OF CONTENTS) - 10 entry Gp set when paged

8 wks

	Page
OWNERSHIP AND LEASES	22 - 35
Owners and Operators	22 - 23
Authorizations, Consents and Leases	23 - 25
The Bridge Line Construction Agreement	25 - 27
The Bridge Line Lease	27 - 33
Recitals	27 - 28
Demised Property	28
Term	28 - 29
Rentals	29 - 30
Revenues and Expenses	30 - 31
Rate of Fare	31 - 32
Cars	33
Other Provisions	33
The Broad Street Subway System Lease	34 - 35
STUDY OF PAST AND PRESENT TRAFFIC	36 - 43
Past Developments in Cross-River and Other Facilities	36 - 38
Ferries and Delaware River Bridge	36
Bridge Rail Line	36 - 37
Railroads	37 - 38
Past and Present Traffic	38 - 43
Basis for Estimates	38 - 39
Chart No. 3 showing Estimated Total Annual Passengers Using Existing Facilities in Rapid Transit Area	38a
Total Passenger Traffic	39 - 40
Statement No. 3 showing Distribution of Estimated Total Annual Passengers using Existing Facilities	39a
Detailed Distribution of Traffic	40 - 41
Statement No. 4 showing Detailed Distribution of Estimated Total Annual Passengers Using Existing Facilities	41a
Percentage Distribution	41 - 42
Distribution by Individual Areas	43
Statement No. 5 showing Estimated Apportionment of Total Passengers	43a
Later Use of Basic Traffic Data	43
THE PROPOSED RAPID TRANSIT LINES	44 - 81
Proposed Lines and Service	44 - 54
The Proposed Service	45 - 52
Frequency	45 - 46
Statement No. 6 showing Comparison of Number of Weekday Philadelphia Bound Trips Scheduled on Railroads	46a
Comparison with Other Facilities	46
Travel Times	47 - 48
Schedule No. 7 showing Comparison of Approximate Phila. Bound Travel Times	47a

TABLE OF CONTENTS

	Page
THE PROPOSED RAPID TRANSIT LINES, Cont'd	
Fares	48 - 50
Statement No. 8 - Comparison of Round Trip Fares between New Jersey Suburban Area and Central Philadelphia	48a
Convenience	50 - 51
Traffic Collection and Delivery	51 - 52
New Investment Required	52 - 54
Basic Estimates	52
Trending and Adjustment	52 - 53
Statement No. 9 showing Estimate of 1945 Construction and equipment Costs	53a
Cars	53 - 54
Total New Investment	54
Estimates of Passengers and Revenues	55 - 62
Potential Diversion	55
Bus Passengers	56
Automobile Passengers	56 -57
Railroad Passengers	57
Potential Traffic	57 - 59
Statement No. 10a showing Estimated Annual Total Passengers for Five Proposed Rapid Transit Lines	57a
Statement No. 10b showing Estimated Annual Total Passengers for Five Proposed Rapid Transit Lines	57b
Statement No. 10c showing Basis of Passenger Estimates shown on Statements 10a and 10b	57c
Comment	59 - 60
Average Rate of Fare	61 - 62
Summary of Traffic and Passenger Revenue	62
Estimated Financial Results	63 - 81
Range of Estimates	63
Total Revenues	63
Operating Expenses	64 - 67
Basic Operating Statistics	64
Service	64
Carloading	64
Train Miles, etc.	64 - 65
Cars Required	65
Operating Unit Costs	65 - 66
Total Operating Expenses	66
Statement No. 11 showing Estimates of Total Operating Expenses	66a
Conducting Transportation	66 - 67
Credit for Joint Use of Facilities	67 - 68
Rentals and Other Deductions	69 - 70

TABLE OF CONTENTS

	Page
THE PROPOSED RAPID TRANSIT LINES, Cont'd	
Summary - Results of Operation	70
Statement No. 12 showing Estimated Results of Operation	70a
Results for Four Proposed Lines	70 - 72
Chart No. 4 showing Estimated Results of Operation of Glassboro, Clementon, Haddonfield and Moorestown Lines	71a
Possibilities of Lower Bridge Line Rentals	72 - 73
Possibility of Use of Present Cars	73
Results of Operation of Glassboro Line alone	73 - 75
Other Transportation Plans and Studies	75 - 81
The Proposed Camden Bus Terminal	76 - 77
The Jenny Plan	77 - 79
New Tunnel and Subway to P.R.R. Suburban Station	79 - 80
New Subway Terminal for the Bridge Line	80 - 81
SUMMARY	82 - 84

INTRODUCTION

REPORT NO. 4378 -10 cfp, Ant

ON -8 cfp

PROPOSED SOUTH JERSEY RAPID TRANSIT LINES -12

TO -8

THE DEPARTMENT OF ECONOMIC DEVELOPMENT -10

OF THE -8

STATE OF NEW JERSEY -10

Philadelphia, Pa.
February twenty-first
Nineteen forty-six

INTRODUCTION -10

In February 1938, the South Jersey Transit Authority submitted a progress report to the Governor and the Legislature, based in larger part upon the report of its consulting engineers, Gibbs & Hill, Inc., of New York. The latter had been retained by the Authority to study and report upon the rapid transit situation in South Jersey, particularly in the vicinity of Camden, and means of coordinating the same with the Philadelphia and the Delaware River Bridge transportation operations.

THE GIBBS & HILL REPORT -10 cfp
(Dated Feb. 16, 1938) - 1 Ant

The Gibbs & Hill report, while recognizing the desirability, from the standpoint of the communities served, of an improved through rapid transit service to Philadelphia, concluded that such a service would not be self sustaining.

Its conclusions were based upon: (a) the assumed extension of the Bridge rail line service over four existing railroad lines

ABSTRACTS FROM THIS REPORT ARE NOT TO BE USED FOR ADVERTISING
PURPOSES OR OTHERWISE PUBLISHED WITHOUT FIRST OBTAINING OUR CONSENT
DAY & ZIMMERMANN, INC., ENGINEERS

to Glassboro, Clementon, Haddonfield and Moorestown at an aggregate cost for new capital of some $12,600,000, (b) a total traffic between the areas served and Camden-Philadelphia of 54,000,000 passengers per year, derived by projecting past traffic experience and population growth to 1940 levels; (c) an estimated annual traffic for the project, after seasoning, of 12,253,000 passengers and a corresponding revenue at fares competitive with existing rail and bus fares of $2,262,000, (d) certain, but not all, direct operating costs of $1,679,000, (e) debt service costs averaging $778,000 over the first ten years, an amount greater than the balance left over after meeting the said direct operating costs, with certain other costs and rentals still to be met,

The costs and rentals not specifically estimated because determinable only by negotiation included payments to the Bridge Commission, the Subway Operating Company and the Railroads for the use of their property and for certain operating costs in connection with such use.

THE PRESENT AUTHORIZATION

Towards the close of the war years, and as an accompaniment of Postwar Planning activities, there developed a renewed local interest in the project, a belief that population and traffic growth since 1937 might be sufficient to yield a more favorable answer, and demands for a restudy of the project in the light of developments subsequent to the period of the Gibbs & Hill report. Following discussions as to the matters to be studied and reported upon, we were authorized to proceed with a study of the situation,

using the Gibbs & Hill report as a point of departure and in effect bringing it down to date and supplementing it in accordance with the following outline:

A - Obtain and prepare a presentation of:
Population data for 1940, and of later official estimates, if any, and traffic data from 1937 to date, covering bridge bus and auto traffic, the Bridge rail line, New Jersey Bus Lines, railroads, etc.

B - Make a study and prepare a digest of the general existing situation as it relates to obtaining through Philadelphia-New Jersey service, including a description of present facilities, their adaptability and advantages for such services, the various ownerships and interests concerned and related matters, such as existing terminals, rentals, fares, etc.

C - Participate in conferences between the Department of Economic Development and the railroads and other agencies involved, for the purpose of developing, insofar as proves practicable, their general attitude towards the project, the availability of existing facilities and services and the terms upon which they may be secured or coordinated.

D - Determine the approximate effect of actual traffic and population data for later years upon the traffic estimates made by Gibbs and Hill, on their basis of estimate. Express some general opinions as to the representativeness of the Gibbs and Hill estimates without making new independent estimates.

E - Develop general trends of construction costs and apply them to the Gibbs and Hill estimates as an indication of the cost of the proposed project at about present cost levels.

F - Summarize the above studies and data, including a reflection of the best available measures of annual operating revenues, expenses, rentals, fixed charges and the resulting net earnings. Make general comparisons of the plan studied by Gibbs and Hill and underlying the above studies, with other plans which have been proposed, but without detailed studies of the latter or definite recommendations as to choice.

As the work progressed and later data became available, two things became increasingly evident. A conclusion as to the representativeness of the Gibbs & Hill traffic estimates (Item D above) based solely upon generalities would not prove convincing -- a detailed independent analysis of the basic data was indicated as necessary and was made. Resting conclusions as to the over-all economics of the project upon a single series of premises or estimates likewise seemed questionable under the circumstances and led to an expansion of the program so that estimates were made at each of two traffic levels (1944 and 1941) for three assumed rates of diversions to the proposed lines which might be characterized as ranging from the low side to far above our own judgment as to a reasonable premise under all the circumstances. These departures from our proposed treatment, which added very substantially to the scope of our work, should greatly increase its usefulness.

ACKNOWLEDGEMENTS

A large number of agencies are more or less directly involved in the project, some as potential participants in the proposed extension of the Bridge Line service, others as potential competitors. We wish to record our appreciation of the co-operation so freely extended to us in the supply of traffic and operating data and pertinent general information by representatives of:

10 solid

The Pennsylvania Railroad
The Pennsylvania Reading Seashore Lines
The Delaware River Joint Commission
The Philadelphia Transportation Company
Public Service Interstate Transportation Company
The Board of Public Utility Commissioners of N. J.
Department of City Transit, Philadelphia
Gibbs & Hill, Inc., Consulting Engineers

PRESENTATION

The results of our studies are set forth in our report under the following principal headings:

PART I - THE EXISTING SITUATION - cut flush left

The South Jersey Territory, Population Studies, Existing Transportation Facilities and Highways, Relative Conveniences of Transportation, Fares.

PART II - OWNERSHIPS AND LEASES

Owners and Operators; Authorizations, Consents and Leases; the Bridge Line Construction Agreement; the Bridge Line Lease; and the Broad Street Subway System Lease

PART III - PAST AND PRESENT TRAFFIC

Past Developments in Cross River and Other Facilities; Past and Present Traffic: Basis of Estimates, Distribution of Total Traffic by Facilities, Net Traffic Flows to Camden and to Philadelphia, Percentage Distribution for year 1941 on the basis of originating facilities and destinations; Distribution of 1941 and 1944 total traffic by areas tributary to the several proposed transit lines.

PART IV - THE PROPOSED RAPID TRANSIT LINES

General Characteristics of the Project; Proposed Service: frequency, speed, fares and convenience; Estimate of New Investment Required; Estimates of Passengers Carried and Revenue; Estimates of Financial Results of Operation; Alternate Plans; and Summary.

PART I

THE EXISTING SITUATION

PART I

THE EXISTING SITUATION

THE SOUTH JERSEY TERRITORY

The southern New Jersey territory from just below Trenton to Cape May includes eight counties covering an area of about 3,700 square miles. Five of these counties, Salem, Cumberland, Atlantic, Ocean and Cape May, lie beyond the suburban area of the City of Camden. Salem and Cumberland counties, extending along the Delaware River, are principally rural but include the cities and towns of Bridgeton, Vineland, Salem and Millville. The three remaining counties in this group extend along the ocean from Point Pleasant to Cape May. They include the large southern New Jersey seashore developments but otherwise are generally entirely rural, with much unused land.

The City of Camden and its suburban area is included in three counties, Camden, Gloucester and Burlington, bordering the Delaware River between Bordentown and north of Pennsgrove. They cover a total area of about 1,370 square miles of which 819 square miles are in Burlington County. The latter includes a number of towns along the River, the inland communities of Moorestown and Mt. Holly, and much rural territory beyond the Camden suburban area. Camden County includes the cities of Camden and Gloucester and a large portion of the immediate suburban development. Gloucester County, just south of Camden County, includes the city of Woodbury and the towns of Glassboro and Paulsboro.

Industrial development is centered principally in the City of Camden, which has particularly large plants engaged in shipbuilding, canning and radio manufacturing. Other manufacturing industries are located in the smaller cities along the Delaware River in Burlington County. Considerable truck farming is done in the suburban area, particularly in Gloucester County. The residential population in the suburban area is partly tributary to the industries in Camden and other New Jersey centers but in larger degree to the business and industrial activities in the City of Philadelphia. The Camden industries also employ large numbers of Philadelphia residents. The interrelated situation of the two cities has developed a large volume of daily cross-river travel which has been considerably increased by the Delaware River Bridge.

POPULATION — 4p

South Jersey — county wide

A summary of the U. S. Census records of population of the eight southern New Jersey counties by decades from 1890 is shown in Statement No. 1 on the opposite page. A U. S. Census estimate of civilian population as of November 1, 1943 is included. Percentage increases by decades and the 1940 area and population per square mile are also shown. Chart No. 1 facing the following page gives a visual indication of the population and rates of growth of the general subdivisions of the southern New Jersey area and of the entire State. This chart is plotted to logarithmic scale upon which the rate of growth at any level is indicated directly by the slope of the curve.

STATEMENT NO. 1

Proposed South Jersey Rapid Transit Lines

POPULATION AND RATE OF GROWTH 1890-1940

AND ESTIMATED CIVILIAN POPULATION AT NOV. 1, 1943

FOR

EIGHT SOUTHERN NEW JERSEY COUNTIES

AND ENTIRE STATE

	Population U. S. Census							Per Cent Increase Per Decade					Population Density in 1940	
	1890	1900	1910	1920	1930	1940	Estimated 1943*	1890 to 1900	1900 to 1910	1910 to 1920	1920 to 1930	1930 to 1940	Land Area Sq Miles	Population Per Sq Mile
Western Counties														
Burlington	58,528	58,241	66,565	81,770	93,541	97,013	89,920	0.5	14.3	22.8	14.4	3.7	819	118
Camden	87,687	107,643	142,029	190,508	252,312	255,727	254,085	22.8	31.9	34.1	32.4	1.4	221	1,157
Gloucester	28,649	31,905	37,368	48,224	70,802	72,219	74,793	11.4	17.1	29.1	46.8	2.0	329	220
Sub Total	174,864	197,789	245,962	320,502	416,655	424,959	418,798	13.1	24.4	30.3	30.0	2.0	1,369	310
Salem	25,151	25,530	26,999	36,572	36,834	42,274	42,599	1.5	5.8	35.5	0.7	14.8	350	121
Cumberland	45,438	51,193	55,153	61,348	69,895	73,184	73,370	12.7	7.7	11.2	13.9	4.7	503	145
Eastern Counties														
Ocean	15,974	19,747	21,318	22,155	33,069	37,706	37,088	23.6	8.0	3.9	49.3	14.0	639	59
Atlantic	28,836	46,402	71,894	83,914	124,823	124,066	107,491	60.9	54.9	16.7	48.8	0.6	575	216
Cape May	11,268	13,201	19,745	19,460	29,486	28,919	28,075	17.2	49.6	1.4	51.5	1.9	267	108
Total	301,531	353,862	441,071	543,951	710,762	731,108	707,421	17.4	24.6	23.3	30.6	2.9	3,703	197
State of New Jersey	1,444,933	1,883,669	2,537,167	3,155,900	4,041,334	4,160,165	4,080,485	30.4	34.7	24.4	28.1	2.9	7,522	553

*U. S. Census estimate of Civilian Population November 1, 1943

The estimate of civilian population for 1943 is not directly comparable with the regular census figures since the number of civilians diverted to the armed forces at that time was undoubtedly very large. It is likely that there has been a heavy increase in industrial population during the war period which may have been sufficient to more than offset the diversion to the armed services. At this time it is impossible to gauge what the final effect of the war period upon the permanent population will be.

The data shown in the table and chart indicate that generally the rate of growth of the southern New Jersey areas has been roughly consistent with that of the State as a whole, with a fairly uniform increase of about 25 - 35 per cent per decade between 1900 and 1930. A very sharp decline in the rates occurred in the decade 1930-1940 when the rates of growth dropped to 2 - 3 per cent. In individual counties there has been considerable variation, particularly in the ocean counties.

Camden Area

A closer examination of the population statistics of the Camden area gives a better indication of the population trend more particularly relevent to the proposed rapid transit lines. Statement No. 2 opposite the following page shows the population of the Camden Suburban area separated from that of the City of Camden. The suburban area shown includes Camden and Gloucester County and the part of Burlington County within about 20 miles of

STATEMENT NO. 2

Proposed South Jersey Rapid Transit Lines

POPULATION OF CAMDEN AND GLOUCESTER COUNTIES

AND PART OF BURLINGTON COUNTY 1900-1940

WITH CITY OF CAMDEN SHOWN SEPARATELY

	1900	1910	% Inc.	1920	% Inc.	1930	% Inc.	1940	% Inc.
Camden County (ex Camden City)	52,708	47,491	49.8	74,199	56.2	133,612	80.1	138,191	3.4
Gloucester County	31,905	37,368	17.1	48,224	29.1	70,802	46.8	72,219	2.0
Burlington County (part)*	36,070	43,429	20.4	51,846	19.4	66,265	27.8	68,178	2.9
Sub-Total Suburban	99,683	128,288	28.7	174,269	35.8	270,679	55.3	278,588	2.9
Camden City	75,935	94,538	24.5	116,309	23.0	118,700	2.1	117,536	1.0
Total	175,618	222,826	26.9	290,578	30.4	389,379	34.0	396,124	1.7

*Includes communities within about 20 miles from Camden

Camden. It will be noted that the suburban area showed a rapidly increasing rate of growth from 1900 to 1930 reaching a maximum of 55.3 per cent in the decade ending in 1930 but with a sudden decline to 2.9 per cent in the following decade. The growth between 1920 and 1930 and possibly to a lesser extent that in the previous decade, reflects the influence of the opening of the Delaware River Bridge in 1926 and the anticipation of its opening.

The suburban portion of Camden County, which showed the greatest rate of growth of the three suburban counties in all decades, reached a peak growth of 80.1 per cent. Gloucester County and the suburban portion of Burlington County had peak increases of 46.8 per cent and 27.8 per cent respectively in the same decade. The growth of the entire suburban area from 1930 to 1940 dropped to an average rate of 2.9 per cent. Camden City, which had been increasing at the rate of about 25 per cent prior to 1920, experienced a drop to 2.1 per cent in the next decade and in 1940 the population had decreased about 1 per cent below the 1930 figure.

In Pennsylvania the three suburban counties adjacent to Philadelphia also had their peak rates of growth in the 1920-1930 decade, with a marked falling off in the following ten years. These counties have a much larger total population (708,000 in 1940) than the Camden suburban counties. A comparison of the average rates of growth follows:

	Camden N.J. Suburbs	Phila. Pa. Suburbs
1900-1910	28.7%	19.4%
1910-1920	35.8	25.0
1920-1930	55.3	41.3
1930-1940	2.9	10.1

Camden Area by Zones

Chart No. 2 opposite this page shows the approximate population within 20 miles of Camden City Hall for the four census years 1910, 1920, 1930 and 1940, subdivided by zones, 0 to 5 miles, 5 to 10 miles, and 10 to 20 miles. These data are derived from U. S. Census and an estimated division of population of communities which are intersected by zone lines. Within the 5 mile zone about 60 per cent of the 1940 population was in the City of Camden, the balance all being in the suburban portion of Camden County. Beyond the 5 mile zone, the population is divided among the three suburban counties. Suburban 1940 population totaled roughly 80,000, 90,000 and 100,000 in the three respective zones.

Tributary to Proposed Lines

An estimate of the distribution of the 1940 suburban population with respect to proximity to the proposed rapid transit lines follows:

	1940 Population		
	Direct	Indirect	Total
Suburban			
Glassboro Line	52,000	34,000	86,000
Clementon "	40,000	20,500	60,500
Haddonfield "	24,500	11,500	36,000
Moorestown "	34,500	11,500	46,000
Sub-Total	151,000	77,500	228,500
Burlington Line	39,500	-	39,500
Total Suburban	190,500	77,500	268,000
City of Camden			117,500
Total Population in 20-mile Radius			385,500

The population classified as "direct" includes that of communities through which the proposed rapid transit lines pass and from which the greater portion of their traffic would develop. The "indirect" population would be entirely dependent upon other transportation to reach the rapid transit lines and would yield a minor portion of their patronage.

The "indirect" portion of the tributary population along the several lines ranges from about 25 per cent on the Moorestown line to 40 per cent on the Glassboro line, and for all suburban lines averages about 29 per cent of the total. It will be noted that the population in the areas tributary to the proposed lines is in the following order of magnitude, Glassboro, Clementon, Moorestown, Burlington and Haddonfield.

EXISTING TRANSPORTATION FACILITIES AND HIGHWAYS

The transportation facilities and main highways of Southern New Jersey radiate from the City of Camden. Map No. 1 facing this page shows the railroads and principal highways traversing the territory and the sections of the railroads proposed to be utilized for rapid transit service. Map No. 2 facing the following page shows the existing cross river facilities between Philadelphia and Camden including the general routes followed by the cross river bus lines.

Highways

The main highways in general are through arteries leading from Camden to seashore points and to other important

sections of southern and northern New Jersey. The seashore highways converge into the Admiral Wilson Boulevard, which by-passes the built-up section of Camden and connects directly with the Delaware River Bridge. Important highways to the more westerly portion of southern New Jersey lead into Broadway and Haddon Avenues and thence through the built-up section of Camden to the center of the City. River Road and Federal Street connect with highways leading to northern and western areas respectively. The layout of the highway system is in general very efficient for bus and automobile transportation to Camden and Philadelphia. Plans have recently been proposed to add a superior highway approach to the Bridge.

Bus Lines

The main bus routes follow the arterial highways from Camden to substantially all populated sections in the Camden suburban area and to seashore and long distance destinations. Most of the bus lines are operated by Public Service Interstate Transportation Company. In the Public Service bus system there are about 36 suburban lines and 12 seashore lines. All of the seashore lines and 16 of the suburban routes are operated directly to Philadelphia via the Delaware River Bridge. Twelve suburban routes terminate at the Camden Ferry Terminal, connecting by ferry with Market Street, Philadelphia. There are in addition, certain local routes serving the City of Camden and its immediate surrounding area. Some of these routes terminate at the Kaighn Avenue Ferry Terminal, which connects by ferry to South Street, Philadelphia, Pa.

All of the routes operated to the Camden Ferry Terminal and many of the Philadelphia routes connect with the Bridge Rail Line at Broadway or City Hall Stations, where there is a large volume of interchanging between the buses and the Rail Line by passengers to and from Philadelphia. Bus routes operated via the Admiral Wilson Boulevard do not connect with the Bridge Rail Line.

Bus routes operated over the Delaware River Bridge, with few exceptions, are routed via 6th Street and Market Street to a bus terminal located at 13th and Filbert Streets, (or directly to Broad Street) returning to the Bridge via Broad Street and Race Street.

A bus route serving Palmyra and Riverside is operated across the Tacony-Palmyra bridge. This route connects with the northern terminus of the Frankford Elevated which in turn provides direct delivery along Market Street in Philadelphia. This additional means of access to central Philadelphia is similar to that available to communities in Northeastern Philadelphia traversed by P.T.C. bus lines.

Railroads

The railroad facilities radiate from Camden, originating at Camden Ferry Terminal and diverging after passing through Broadway Station. The passenger railroad lines are as follows:

14

Trenton Line (N.Y. Div. PRR)	Serving sections along the Delaware River north of Camden, - Riverton, Riverside, Burlington, etc.
Mt. Holly-Long Branch Line (PRR)	Serving westerly sections - Merchantville, Moorestown, Mt. Holly, etc.
Haddonfield-Seashore Line (Penna.-Reading Seashore Lines)	Serving Haddonfield, Berlin, etc.
Clementon-Seashore Line (Penna.-Reading Seashore Lines)	Serving White Horse Pike area - via Clementon
Millville Line (Penna.-Reading Seashore Lines)	Serving City of Gloucester, Woodbury, Glassboro, etc. with connecting railway lines to southern and southwestern N. J. points

In addition to the above lines there is also a short line to Grenlock in the Black Horse Pike area which is no longer used for passenger service.

All of the lines listed are two track excepting the Mt. Holly-Long Branch line, which is single track with sidings. Passenger service is operated by steam power on all lines excepting the Millville line, which is electrified.

Bridge Rail Line

The Bridge Rail Line is a two track line extending between Broadway and Carmen Streets, Camden (at Broadway railroad station) to 8th and Market Streets, Philadelphia via subway and the Delaware River Bridge. Stations in Camden are located at Broadway and at City Hall. Philadelphia stations are located at Franklin Square (not used) and at 8th & Market Streets. The 8th Street

subway and station in Philadelphia is used jointly by the Ridge Ave. - Eighth Street trains of the Broad St. Subway system and the Bridge Rail Line trains.

An extension to the Eighth Street subway exists in Locust St. between 8th and 18th Streets in Philadelphia with stations at 9th-10th, 12-13th and 15-16th Streets. The two latter stations are connected to the Walnut-Locust Streets Station of the Broad St. Subway by concourse. This extension is a bare structure not at present equipped for operation, lacking ties, rails, signal system, electrical system, station finish, station control installations, etc.

Cross-River Facilities

The cross-river facilities at central Camden are the Delaware River Bridge, the Bridge Rail Line and the Market St. Ferry. The bridge accommodates bus, passenger automobile, truck and rail line traffic. The ferry serves passenger automobiles, trucks and individual passengers from the railroads and buses, and local ferry passengers. No bus routes are operated over the ferry. The terminus of the ferry in Philadelphia at the foot of Market St. requires passengers with destination in central Philadelphia to use P.T.C. rail facilities. Buses operated over the Bridge give direct central delivery on Market St. as far west as 13th St. The Bridge Rail line provides direct delivery to 8th and Market Streets, and the present lease arrangement provides for interchange with the Market St. Subway, Broad St. Subway system and some surface

rail lines. There are no interchange privileges between the Bridge Rail Line and other facilities in Camden.

A ferry is also operated from Kaighn Ave. in southern Camden to South St. Philadelphia. This ferry route is of particular advantage to highway traffic from southern sections, such as Gloucester County, as it avoids central Camden congestion. It is not an important factor as to bus and other passenger traffic relevent to the proposed high speed lines.

Other nearby cross-river facilities include the Pennsylvania R.R. bridge at Delair, north of Camden, used by trains between Philadelphia and Atlantic City, etc. via Haddonfield. The Tacony-Palmyra Bridge and the Chester-Bridgeport Ferry are the nearest general cross-river facilities outside of Camden.

CONVENIENCE OF TRANSPORTATION

Bus Lines

The bus lines provide a very direct means of transportation between the New Jersey communities and the business centers of Philadelphia and Camden. An important feature of the bus service is the "door to door" service provided by the numerous routes traversing the individual communities, with many local stops along the routes. The principal disadvantage of the bus service is delay resulting from operation through the congested sections of Camden and Philadelphia, particularly the congestion on 6th St. and Market St. in Philadelphia in rush periods. The Philadelphia congestion is avoided by those who find a transfer to

the high speed line advantageous. The frequency of the service on bus routes is another great advantage of this facility which cannot be duplicated by a rapid transit system such as under consideration. The number of bus trips per weekday on some of the important routes range between 70 and 120 trips with average headways in peak periods of between 6 and 12 minutes. Many communities receive the combined service of several routes.

Railroads

The railroads provide direct delivery in the vicinity of central Camden at Broadway Station and at the Camden Ferry Terminal. Connection to central Philadelphia is subject to the inconvenience of transfer either to Ferry or Bridge Rail line, and in most cases to further transfer to a P.T.C. surface or subway line. Stations in the Camden suburban area are spaced at averages ranging between 0.6 and 1.3 miles on the several lines. The stations generally serve the larger population concentrations but in a much more limited manner than the bus lines.

Present service on the railroads consists mainly of commuter service confined very largely to the rush periods and of seashore service, which is greatly augmented in summer. The Millville Electric Line has about 27 one-way trips per weekday, about 19 of which are in the morning and evening rush periods. Service to Haddonfield, including short route connecting trains between Haddonfield and Camden, consists of about 24 one-way trips per day, about 16 of which are in rush periods. On other lines, the service is considerably less and

is confined almost entirely to rush hours and to the heavy direction of travel. The railroad service has been seriously affected by the enormous loss in passengers resulting from the competition of buses and automobiles since the opening of the Delaware River Bridge.

Automobiles

Automobile travel is greatly facilitated by the direct highways and the Delaware River Bridge. Traffic congestion and parking difficulties in central Camden and in central Philadelphia are, however, serious detriments to this form of transportation to the central areas. The convenience of the automobile for individual and private group transportation is widely appreciated and with the facilities available in this situation its use will probably continue as a major means of transportation regardless of mass transportation improvements.

Bridge Rail Line

The Bridge Rail Line provides high-speed cross-river service. The running time between present terminals is 7 minutes. Due to limited length (2.6 miles) it does not provide any material distribution facilities in Camden and its service to suburban communities is dependent entirely upon interchange with other facilities. Its present limited delivery facilities in Philadelphia are greatly augmented by the free transfer privilege to Market St. Subway, etc. but the inconvenience of making a transfer is a distinct disadvantage, particularly in comparison with the through service of the bus lines to the center of the city.

Extension of the Bridge Line service to 18th and Locust Sts. via the Locust St. Subway will improve central delivery to some degree and will provide an interchange connection to the Broad St. Subway at Broad and Locust Sts. Unfortunately, the Locust Street Subway is too far removed from the main business streets to provide a real convenient access to the central business section.

Service on the Bridge Rail line is frequent. During the morning and evening peak hours a headway of about 4.3 minutes is maintained. In the base period of the day the headway is generally 5 minutes.

Fares

A tabulation of rates of fare for the use of present facilities and assumed rates of fare for the proposed rapid transit lines is shown on Statement No. 8 in a later section.

The fares stated herein are all exclusive of the present Federal tax of 15 per cent on one-way fares in excess of 35¢. Only rides from a limited number of the more distant points are affected by this tax.

Buses

The rates of fare on the Public Service bus system are on a zone system basis predicated upon a charge of 5¢ per zone, with strip ticket rates on some lines. The cross-river bus fare between the central portions of Philadelphia and Camden is 10¢ and an additional 5¢ is charged to approximately Camden City Line.

One-way bus fares from Philadelphia to the Camden suburban areas are 20¢ and upward. To the ends of the proposed rapid transit lines the round trip fares are as follows:

Trips to Phila. and Return from	Round Trip Fare	
	Cash	Strip Tickets
Glassboro	90¢	67¢ - 75¢
Clementon	60	50
Haddonfield	40	35
Moorestown	60	50
Burlington	90	75

For a combination cash ride between Camden suburbs and central Philadelphia via bus and Bridge Rail line the fares are the same because in each case the same amount (10¢) is charged for a cross-river trip.

Railroads

Railroad fares between Philadelphia (Market St. wharf) and Camden suburbs range upward from 17¢ per one-way trip. Additional fare to reach central Philadelphia via PTC lines is 7-1/2¢ per trip, making the total minimum fares for one-way combination rides 24-1/2¢. Minimum railroad fares from Camden suburbs to Camden Terminal or to Broadway Station are basically the same as to Philadelphia. The minimum fare for a combination railroad and Bridge Line ride from Camden suburbs to central Philadelphia is 17¢ plus 10¢ or 27¢.

From the ends of the proposed rapid transit lines the present railroad fares to Philadelphia (Market Street Wharf) are as follows:

Trips to Phila. and Return From	Approx. Round Trip Fare Cash	Commutation Tickets 25-Trip 3 Mos.	50-Trip 1 Month*
Glassboro	$.88	$ 0.55	$ 0.41
Clementon	.66	0.42	0.33
Haddonfield	.34	0.31	0.24
Moorestown	.56	0.40	0.31
Burlington	.88	0.55	0.41

*Running month ticket to Market St. Wharf. Lower rates to Camden on calendar month ticket.

For combination ride to central Phila. add 15¢ per round trip via P.T.C. Market St. facilities or add 20¢ per round trip via Bridge Rail Line. Rates of fare for other communities and for combination rides are shown in more detail on Statement No. 8.

Other Fares and Tolls

Passenger automobile toll on the Delaware River Bridge is 20¢ per one-way trip including all passengers. Ticket books good for 40 one-way trips, limited to 30 days, are sold for $6.00. On the Market Street Ferry the passenger automobile toll is 20¢ with 10 tickets for $1.50 (plus 5¢ tax) covering vehicle and driver. Additional passengers pay regular ferry fare of 5¢ cash or 10 tickets for 30¢.

Bus toll on the Delaware River Bridge is 50¢ per one-way trip, including all passengers.

PART II

OWNERSHIPS AND LEASES

PART II

OWNERSHIPS AND LEASES

OWNERS AND OPERATORS

The transportation facilities or operations directly concerned in the proposal to extend rapid transit service into the Camden suburban areas collectively present a complicated situation as to ownerships, consents, leasehold interests, operating agreements and competition. They are as follows:

New Jersey Bus Lines: A major source of potential traffic for the proposed operation, and holding further potentialities in the way of either competition or of coordinated feeder and supplemental local service.

Public Service Interstate Transportation Co. - New Jersey local and Interstate bus lines
G. R. Wood, Inc. - Interstate bus line
Gick & Bingemann, Inc. - New Jersey bus line
Century Transit Co. - New Jersey local bus line
Several other long distance interstate operators not directly concerned.

Railroads: A basic element in the project, as they own or control the rail lines in New Jersey over sections of which it is proposed to operate the new service.

The Pennsylvania Railroad Company
The Reading Company
The Pennsylvania-Reading Seashore Lines

Ferries:

Phila. and Camden Ferry Co., the Market St. Ferry of the Penna. R.R.
Kaighn Ave.-South St. Ferry Co. an independent operation.

Delaware River Bridge: Owned by the Delaware River Joint Commission, an interstate agency established by Pennsylvania and New Jersey with Federal consent, authorized inter alia to (a) operate, maintain and improve the bridge and its approaches, and (b) construct and operate, directly or indirectly, a passenger railway

over the bridge, with extensions to the vicinities of 8th & Race Sts. in Phila. and of Haddon Ave. & Carmen St. in Camden.

Bridge Rail Line: Another basic element in the project. Owned by the Delaware River Joint Commission and constructed between the limits stated above under consent agreements with the cities of Philadelphia and Camden.

The Eighth Street and the Locust Street subways which it uses are owned by the City of Philadelphia and leased for operation to the Philadelphia Transportation Company.

The line is operated by P.T.C. under lease agreement with the Delaware River Joint Commission and approval thereof by the City of Philadelphia.

Connecting Facilities in Philadelphia:

All surface and rapid transit facilities in Philadelphia are operated as a coordinated system by Philadelphia Transportation Company.

P.T.C. owns all surface lines and the Market Street Elevated-Subway Line.

City of Philadelphia owns the Frankford Elevated Line, which connects with the Market St. Subway, and the Broad St. Subway System, both of which are leased to P.T.C. for operation.

The Broad St. Subway System includes the subway in 8th Street now used by the Bridge Line and the unfinished Locust St. subway proposed to be used by the Bridge Line when its operations are extended.

AUTHORIZATIONS, CONSENTS AND LEASES

The agreement dated July 1, 1931 between the two states whereby the Delaware River Joint Commission was established was authorized by the Act of Assembly of the Commonwealth of Pennsylvania approved June 12, 1931 (P.L. 575), and by the Act of the State of New Jersey approved June 30, 1931 (Chapter 391,

Laws of New Jersey, 1931). Included in the purposes to be effectuated by the Joint Commission was the provision and operation of a passenger railway line, the limits of which are very specifically stated to be in the vicinities of Eighth & Race Streets in Philadelphia and Haddon Ave. & Carmen Street in Camden.

It is upon this foundation that the consents and leases referred to below appear to rest. It would seem to follow that insofar as the Joint Commission is concerned its rights to extend the existing construction are quite limited, even though the design contemplated the possibility of a future connection with the railroads at the Camden terminal. Extension of the service beyond that terminus over facilities owned by others may be within its powers of approval and would at least require its consent and also that of the City of Philadelphia. Unless the present operating lease were terminated, consent of Philadelphia Transportation Company would also be necessary. The indications are that consummation of the project would require legislative action broadening the powers of the Joint Commission or perhaps authorizing the creation of a new agency for operation of the extended Bridge line service.

In support and amplification of the above, it seems desirable to outline the provisions of three agreements, interrelated in important aspects, and all relating to the construction or operation or service of the existing Bridge Line and hence bearing upon its proposed extension. They are as follows:

(a) The Agreement between the City of Philadelphia and the Delaware River Joint Commission covering the construction of the line and its connection with the City's subway system, etc.

(b) The Agreement whereby the Delaware River Joint Commission leases the Bridge Rail Line to Philadelphia Rapid Transit Company (predecessor of P.T.C.) for operation, and

(c) The Agreement whereby the City of Philadelphia leases its Broad Street Subway system to Philadelphia Rapid Transit Company for operation.

START

THE BRIDGE LINE CONSTRUCTION AGREEMENT

The ordinance granting the consent of the City of Philadelphia to the construction by the Delaware River Joint Commission of the Philadelphia sections of the Bridge Line, to its connection with the City's subway at Eighth Street, and to the use by the Bridge line of the City's subway, upon specified terms to be incorporated in an agreement, was approved August 16, 1933. The agreement itself is dated Dec. 22, 1933.

The recitals include sections dealing with the establishment of the Joint Commission and its primary purposes of operation of the existing bridge and construction and operation of a proposed high speed electric rail line, in both of which the limits of said line are specifically stated as in the vicinities of Eighth & Race Streets in Philadelphia and Haddon Avenue & Carmen Street in Camden. Other recitals refer to the Need of consent by Philadelphia, and the expressed willingness of Philadelphia Rapid Transit Company to operate the proposed line as lessee of the Joint Commission in conjunction with its operation of the City-owned subways.

The first section of the Agreement, authorizing the construction in Philadelphia at the expense of the Joint Commission in accordance with certain plans and subject to certain other conditions, includes the following:

> " . . . . and shall operate a high speed electric rail transit line for the transportation of passengers across the said Delaware River Bridge, including extensions thereof to Eighth and Race Streets, in the City of Philadelphia, State of Pennsylvania, and to the vicinity of Carmen Street and Haddon Avenue, in the City of Camden, State of New Jersey."

As consideration for the right to connect its rail line with the tracks of the Eighth Street Subway through a Connecting Spur built (but not equipped) by the City, the Joint Commission is required to pay $582,300 to the City, being the cost of said spur. In the event that the Joint Commission, either directly or through an operator who is not the operator of the City's Eighth Street Subway, desires to use the Connecting Spur and the Eighth Street Subway, permission shall be granted upon such terms and conditions as may be mutually agreed upon between the parties in interest.

The costs of construction and equipment of the Bridge Line, and of equipping the Connecting Spur, and of making the physical connections at Eighth Street, are to be borne by the Joint Commission.

The City also grants permission to use its car storage yards, shops and substations, subject to prior need by the City or its lessee and to the consent of the latter to such use. The

rights granted are to remain effective only so long as the Joint Commission or its lessee shall operate the Bridge line under an agreement acceptable to the City and to the lessee of the City-owned lines.

The Joint Commission shall have the right, subject to any applicable provisions of State and Federal laws, to lease or assign or otherwise delegate the operation of the said transit line.

THE BRIDGE LINE LEASE

The Bridge Rail Line was leased to the Philadelphia Rapid Transit Co., predecessor of the Philadelphia Transportation Co. on February 15, 1935. The terms of the lease were amended May 28, 1941. The Philadelphia Transportation Company also leases and operates: (a) the Broad St. Subway System under lease of June 28, 1934 as amended June 12, 1939, and (b) the Frankford Elevated line under lease of May 5, 1922.

Recitals

A number of the recitals are practically the same as described above in connection with the Construction Agreement. In three of them the limits of the proposed Bridge Line are given as in the vicinities of Eighth & Race Streets in Philadelphia and Carmen St. & Haddon Ave. in Camden. Reference is made to the consents of the two cities having been obtained for the construction, maintenance and operation of the proposed line between the said limits, to the Philadelphia consent agreement of Dec. 22, 1933

(described above as authorized by Ordinance of Aug. 16, 1933) and to the construction then under way on the Locust Street extension of the Eighth Street subway, etc.

Demised Property

The demised property is defined as the high speed electric rail transit line beginning at and including the terminal thereof in the vicinity of Carmen Street & Haddon Ave. in Camden, and extending to the place near Eighth & Race Streets in Philadelphia where connection will be made with the Ridge Ave.-Eighth Street Subway by means of the "Connecting Spur", as shown on a certain drawing, together with all appurtenances, equipment, lands, improvements, etc. etc.

In a section dealing with the making of changes, alterations and additions to the demised property, it is provided that:

> "Any future extension of the Bridge Line is not and shall not be deemed to be in any way subject to the provisions of this Section."

Term

The term of the existing Bridge Line lease extends from June 30, 1945 for successive four years periods until terminated by either party on four months' notice at the end of any fourth year subject, however, to other special provisions:

The Delaware River Joint Commission may elect to extend the lease to July 1, 1957 when the following conditions prevail -

(1) An adequate bus terminal is provided at or near the New Jersey end of the Bridge Line and effective arrangements are made for transfer of bus passengers to and from the Bridge Line;

(2) The Eighth-Locust Subway is equipped for operation to 18th & Locust Sts. and

(3) An adequate number of cars is provided to the Philadelphia Transportation Company (by the Commission) for through operation of the Bridge Line to 18th & Locust Streets.

Should the Philadelphia Transportation Company cease to be operating lessee of the Broad St. Subway system either party may end the term of the Bridge Line lease. (The term of the lease of the Broad St. Subway system, originally for four year periods, has been amended to extend to July 1, 1957.)

Rentals

The rental for the Bridge Line is 2-1/2¢ for each fare-paying passenger carried across the bridge, subject, however, to the provision that the Philadelphia Transportation Company be reimbursed out of the rental moneys for actual operating loss during any year. (This reimbursement provided was included in the amendments of 1941. Credits for operating losses were actually made in the year 1943).

In addition to the 2-1/2¢ per passenger rental for the use of the Bridge Line, the Philadelphia Transportation Company under terms of the lease of the Broad St. Subway system, also pays 2¢ per passenger to the City of Philadelphia (over and above the annual base rental of $900,000) for all passengers over 52,000,000 passengers per year carried in the subway system, including

passengers using the Bridge Line. Total traffic on the subway system has been in excess of this figure since about 1934, so that the addition of Bridge Line passengers to the system actually adds a City rental charge of 2¢ per passenger for all Bridge Line passengers.

The gross rental for use of the Bridge Line and the 8th St. Subway (and future Locust St. extension) therefore becomes 4-1/2¢ per passenger, subject to the above mentioned reimbursement for operating loss to the Philadelphia Transportation Company by the Delaware River Joint Commission.

Revenues and Expenses

The revenues of the Bridge Line are defined in Sec. 8(c) of the lease as follows:

> "There shall be credited to the operation of the Bridge Line Service as the gross receipts thereof all fares collected at Bridge Line and Eighth-Locust Street stations between Carmen Street and Haddon Avenue in Camden, New Jersey, and Eighteenth and Locust Streets in Philadelphia, from passengers using Bridge Line Service. Determination of the number of such passengers entering at stations (such as Eighth and Market Streets as now operated) which accommodate patrons of Bridge Line Service as well as riders not using such service shall be by periodic traffic counts. There shall also be included a reasonably proportionate share of the Company's receipts from station privileges and car card and poster advertising."

Total fares received from passengers interchanging between the Bridge Lines and other lines operated by Philadelphia transportation Company are divided between the Bridge Line and other lines as explained under "Rate of Fare" below.

The operating costs of the Bridge Line are defined in Sec. 8(c) of the lease as follows:

"There shall be charged to the operation of the Bridge Line Service as the operating costs thereof all costs and expenses incurred in connection with operation, maintenance and renewals and all taxes incident to the operation of the Bridge Line Service as hereinbefore defined, (including two (2) cents per passenger, except those transferring to the Bridge Line from the City-owned subway system, as required to be paid by the Company to the City of Philadelphia pursuant to the lease of said City-owned subway system dated June 28, 1934 and amended June 12, 1939). The amounts of the expenses so charged shall be determined upon accepted principles of accounting and by the use, where necessary, of appropriate bases of allocation; but there shall not be charged as operating costs of Bridge Line Service any part of rental or expenses of general offices, general corporation or income taxes, interest charges or any like items of a purely corporate or system-wide character and not directly incident to the operation of Bridge Line Service, or any part of salaries of general officers, executive and supervisory officers and employees, or clerks in general offices, departmental offices or storerooms, (not including, however, in the categories just mentioned, service supervisors, clerks in depots or in the collection department or paymasters); provided, however, that if any person in the foregoing categories shall, during any year of any term hereof, spend in the course of his regular duties, fifty per cent or more of his time in the said Bridge Line Service an appropriate allocation of his salary shall be made to said cost of operation."

Rate of Fare

The lease provides for a single fare for use of the Bridge line, including the Locust St. Subway when completed. The rate of fare is prescribed to be not more than the base fare charged by Philadelphia Transportation Company on its subway lines plus 2-1/2¢ per passenger, which latter amount may be collected from passengers as they enter or leave stations in Camden. Provision is made for

interchange privileges with Philadelphia Transportation Company lines based on the same system of privileges in effect on the P.T.C. system.

At present the interchange privileges include 3¢ "exchange tickets" in the central district to and from adjacent P.T.C. surface rail lines and the Market St. Subway. The P.T.C. has, however, established a temporary free transfer privilege between the Market St. Subway and the Bridge Line, limited to rides to 15th St., pending the opening of the Locust St. Subway. Transfer to the Broad St. Subway system is free, at the 8th and Market Sts. station. The lease provides that Bridge Line passengers receive the usual free transfer and exchange privileges on PTC surface lines throughout the city granted other passengers using the Broad St. Subway system.

Present rate of fares on the Bridge Line are:

10¢ - Direct rides between 8th & Market Sts. & Camden or free transfer rides between Philadelphia and Camden.
Eastbound, 7-1/2¢ token paid in Philadelphia and 2-1/2¢ at Camden exit
Westbound - 10¢ paid in Camden

13¢ - "Exchange ticket" rides between Philadelphia & Camden.
Eastbound, 7-1/2¢ token plus 3¢ cash paid in Philadelphia and 2-1/2¢ at Camden exit
Westbound, 13¢ paid in Camden

Note: 8¢ cash fares are used by a few instead of 7-1/2¢ token

It is recognized in the lease that fares are subject to regulatory authority.

Cars

The Delaware River Joint Commission agrees to furnish 26 cars for initial operation (which is the number actually furnished to date) and such additional cars as shall be required by the growth of the Bridge Line service, the number thereof to be mutually agreed upon between the Commission and the Company.

Other Provisions

Philadelphia Transportation Company agrees to maintain property and to renew property lost or worn out, except the bridge structure; carry fire insurance; maintain adequate personnel, methods and standards for operating needs; indemnify Commission against damages resulting from operation, etc. The Commission agrees to indemnify Philadelphia Transportation Company against damages resulting from defects in design and against liability for patent infringements resulting from installation or proper use of any device or appurtenances. The cost of changes, alterations and additions are to be at the expense of the Commission.

Of particular interest are the recognitions by the Commission that certain terms and conditions contained in the construction agreement of Dec. 22, 1933 between the City and the Commission have been adequately extended to the City's lessee of the Eighth Street Subway, and that this lease of the Bridge Line is not to become effective until approved by Ordinance of Council of the City of Philadelphia.

stark

THE BROAD STREET SUBWAY SYSTEM LEASE

The Philadelphia Transportation Company leases and operates the City owned Broad St. Subway System under an agreement between its predecessor company and the City dated June 28, 1934, as amended by agreement dated June 12, 1939.

The lease covers the subways in North and South Broad Streets, Ridge Ave., Eighth St., the sections then under construction in S. Broad St. and Locust St., and the Bridge Line Connecting Spur, with all appurtenances and equipment, all of which are to be operated as a connected system of rapid transit lines, coordinated with the lessee's rapid transit and surface lines.

There is recognition in one of the recitals of the agreement between the City and the Delaware River Joint Commission relating to the construction and connection of the Bridge Line with the Eighth St. Subway and to the contemplated operation of the Bridge Line in said subway, etc. Some of the provisions of the lease relating to the operation of the Bridge Line and to the use of the Locust St. Subway are particularly pertinent to the project under discussion. They are summarized as follows:

Company under no obligation to take possession and operate the Locust St. Subway except in connection with operation of the Bridge Line.

City will not furnish rolling stock for Locust St. Subway.

Company has right to operate rolling stock of Bridge Line on Locust St. and connecting City lines to enable operation of Bridge Line and Locust St. Subway as one continuous system.

Company has right to use City's rolling stock on Bridge Line in emergencies.

If the P.T. Company should not operate the Bridge Line or cease to operate it, the City has the right to use and occupy, either by itself, or its lessee or jointly with P.T. Company, that part of the Ridge Avenue-Eighth Street Subway and also the Locust St. Subway necessary for the operation of the Bridge Line as one continuous system.

If the P.T. Company should cease to operate the Bridge Line, then the Bridge Line Connecting Spur shall be relinquished by the Company.

If there shall be joint operation by the Company and the City or its lessee of the Locust St. Subway and Ridge-Eighth Subway, the expenses of operation and maintenance, etc., shall be equitably divided between the joint operators.

The terms and conditions of agreement made under ordinance of August 16, 1933 between the City and Delaware River Joint Commission remain in full force and effect.

Any lease or operating agreement of Bridge Line proposed to be entered into between the Company and Delaware River Joint Commission or subsequent changes shall be approved by the City.

PART III

STUDY OF PAST AND PRESENT TRAFFIC

START

PART III

STUDY OF PAST AND PRESENT TRAFFIC

PAST DEVELOPMENTS IN CROSS RIVER AND OTHER FACILITIES

The following brief review of past developments in the facilities available for cross-river and suburban passenger transportation is offered as an aid to interpretation of the traffic data presented and analyzed in following sections hereof.

Ferries and Delaware River Bridge

Prior to the opening of the Delaware River Bridge on July 1, 1926 cross-river travel between Camden and Philadelphia was entirely by ferry (excepting PRR railroad bridge at Delair). The Market Street Ferry, the Kaighn Avenue-Chestnut Street Ferry, and the South Street Ferry were the principal facilities. Other ferries were also operated. The opening of the Bridge, followed by New Jersey highway improvements such as the Admiral Wilson Boulevard, the Black Horse Pike, etc., accompanied by extensive development of automotive transportation, greatly increased cross-river traffic and also diverted large volumes of traffic from the railroads and ferries.

Bridge Rail Line

The opening of the Bridge Rail Line in 1936 provided another means of cross-river travel. The line was connected with the two-track Ridge Avenue-8th Street Subway line to avoid the expense of constructing a separate subway terminal for the Bridge Line in Philadelphia. In Camden the terminus was

located adjacent to P.R.R. Broadway Station in a fashion designed to permit its future connection with the railroad lines.

It was proposed to "feed" the Rail Line by establishing a bus terminal in Camden for interchange between bus and rail line passengers. By this means it was expected that the rail line would absorb the greater portion of the cross river traffic carried by the buses. The bus terminal project was actively pursued for a number of years but has not materialized. Traffic actually carried by the Bridge Rail Line reached only a fraction of the official estimates made for it, which were based upon the assumed diversion of cross-river bus traffic. During the war period however, there has been a substantial increase in the Bridge line traffic.

Railroads

In 1938 the Pennsylvania and Reading Railroad systems consolidated their southern New Jersey lines (all lines south of the Moorestown-Long Branch Line) into the Penna.-Reading Seashore Lines, and adopted the PRR Camden Terminal as a common terminal. The Reading RR terminal at Kaighn Ave. was discontinued, as was the ferry service to Chestnut and South Streets, Philadelphia. Ferry service between Kaighn Avenue and South Street was shortly resumed by a new Company. The consolidation brought about the operation of all of the Camden railroad service through the PRR Broadway Station, which somewhat increased the possibilities of traffic interchange between the railroads and the Bridge Line.

Earlier changes in the railroad system included the electrification of the present Millville line, initially to Atlantic City but later terminated at Newfield, and the discontinuance of passenger service on the comparatively short rail line to Grenlock in the Black Horse Pike area. Connecting branch line service was substituted for through service to Camden on certain of the routes serving southerly sections. The railroads have been subject to severe competition for both long distance and local passenger traffic for a number of years.

PAST AND PRESENT TRAFFIC

Basis for Estimates

As a basis for estimating the traffic potentialities of the proposed rapid transit lines we have developed an estimate of the total through passenger traffic in the territory of the proposed lines by public and private transportation means. Our estimates of total traffic are based upon annual data furnished by the Delaware River Joint Commission, Public Service Interstate Transportation Co., Philadelphia Transportation Co., the Pennsylvania and Pennsylvania-Reading Seashore Lines and the Public Utility Commission of N. J., supplemented by special traffic count data from Public Service, Philadelphia Transportation Company, Report of the U. S. Bureau of Public Roads and data from our own files. We have also utilized the traffic survey of the South Jersey Transit Authority made in 1937 and presented in the Gibbs and Hill Report of 1938.

The existing traffic situation is complicated, and regardless of the extent of detail in the available records of traffic, a really precise measure of the total traffic which concerns the proposed rapid transit lines could only be determined by a comprehensive traffic survey including origin and destination studies. The final result desired is the best possible indication of the traffic which will be diverted to the rapid transit lines, which involves the application of judgment to the total traffic figures and is liable to a much greater error than that probably involved in the determination of the basic traffic. The determination which we have made, however, we regard as entirely adequate for the purposes of this study.

Total Passenger Traffic

The total annual traffic on existing facilities in the rapid transit area is shown for the period 1927 to 1944 inclusive on Chart No. 3 opposite the preceding page. Statement No. 3 opposite this page shows the total traffic figures used for the chart and a subdivision as between Philadelphia and Camden traffic. For all years prior to 1936 the figures were obtained from the Gibbs and Hill Report of 1938. All figures in the table have been rounded to the nearest 100,000. The traffic included in this presentation covers that between the Camden suburban area and Camden-Philadelphia and traffic between the cities of Camden and Philadelphia. Purely local traffic in the Camden suburbs and in the City of Camden is not included.

STATEMENT NO. 3

Proposed South Jersey Rapid Transit Lines

DISTRIBUTION OF
ESTIMATED TOTAL ANNUAL PASSENGERS USING EXISTING FACILITIES
IN MOVING BETWEEN THE PROPOSED RAPID TRANSIT AREAS, CAMDEN AND PHILADELPHIA
ON THE BASIS OF TYPE OF FACILITY USED
YEARS 1936 - 1944 INCLUSIVE

18 ant.

Interchange Traffic Included, Camden Local Traffic Excluded

Annual Passengers in Both Directions - Expressed in Thousands -10 ant.

	Philadelphia -6					Camden -6				Total -6				
	Railroad	Bus	Auto	Bridge Rail Line	Total	Railroad	Bus	Auto	Total	Railroad	Bus	Auto	Bridge Rail Line	Total
1936	1,400	13,600	12,900	2,500	30,400	400	2,600	1,800	4,800	1,800	16,200	14,700	2,500	35,200
1937	1,200	11,200	13,900	4,700	31,000	400	2,500	2,100	5,000	1,600	13,700	16,000	4,700	36,000
1938	1,100	10,900	14,100	4,100	30,200	400	2,400	2,200	5,000	1,500	13,300	16,300	4,100	35,200
1939	1,100	11,500	14,300	4,300	31,200	300	2,500	2,200	5,000	1,400	14,000	16,500	4,300	36,200
1940	1,000	11,800	15,800	4,700	33,300	300	2,600	2,400	5,300	1,300	14,400	18,200	4,700	38,600
1941	1,100	12,400	17,300	5,100	35,900	400	3,200	2,600	6,200	1,500	15,600	19,900	5,100	42,100
1942	1,100	19,600	13,400	6,100	40,200	300	4,300	2,000	6,600	1,400	23,900	15,400	6,100	46,800
1943	1,400	25,000	9,700	8,200	44,300	500	5,400	1,500	7,400	1,900	30,400	11,200	8,200	51,700
1944	1,500	24,600	11,600	8,200	45,900	500	5,300	1,800	7,600	2,000	29,900	13,400	8,200	53,500

Notes:

Distribution shown on Chart No. 3 for years prior to 1936 taken from 1938 Report of Gibbs & Hill, Inc.
Distribution shown above for years 1936-1944 inclusive, estimated from basic data by D. & Z. Inc.
Passengers shown for Bridge Rail line include interchange to and from railroad, bus and automobile.
Passengers shown for latter facilities exclude these interchange passengers.

Total annual passengers in the 18 year period to 1944 ranged between a low of 33,800,000 in 1934 to 53,500,000 in 1944. The trend of the total traffic is shown clearly by the chart, including the increase in automobile traffic following the opening of the Delaware River Bridge in 1926, and the effects of the depression and subsequent war activity. It also indicates the large permanent decrease in railroad traffic following the opening of the Bridge; the material increase in Bridge Rail Line traffic in the war period; and the decrease in automobile traffic due to rationing with a corresponding increase in bus traffic in the war period.

Complete traffic data for the year 1945 is not yet available and the effect of the removal of gasoline restrictions and changes in employment, etc. following V-J Day can therefore only be approximated. On the Delaware River Bridge automobile traffic increased appreciably, particularly in the latter months of the year. The number of buses passing over the bridge increased only slightly. Bridge Rail Line traffic was about the same in the latter months of 1945 as in 1944. Traffic on New Jersey bus lines was stated to have fallen off following V-J Day. The combined 1945 traffic with which we are here concerned appears to be close to that of the year 1944.

Detailed Distribution of Traffic

Total passenger traffic for years 1936, 1941 and 1944 was analysed in detail in order to develop the approximate net total passengers with final destinations in the cities of Camden and Philadelphia, respectively, as nearly as practicable on the

basis of the data available. This study involved consideration of the interchange of passengers between the several New Jersey facilities and the cross-river facilities, such as that between the New Jersey facilities (bus, railroad and automobile) and the Bridge Rail Line and between those facilities and the ferry. The results of the study show the net total passenger traffic, eliminating duplication of interchange traffic, and giving a detailed estimate of the flow of traffic over the respective cross-river facilities. These estimates are summarized on Statement No. 4 opposite this page for the years 1936, 1941 and 1944. Similar methods were followed in developing the total traffic to Camden and Philadelphia for the other years between 1936-1945 as summarized on Statement No. 3, excepting that the details were not as finely developed.

Percentage Distribution

For the purposes of our study the year 1941 is probably the most representative of the years studied in detail with reference to relative distribution of traffic among the several existing facilities. At that time the Bridge Rail Line was in seasoned operation and the war restrictions and conditions had not disturbed traffic distribution. Following is a tabulation showing the percentages of total passenger traffic originating on the various facilities in New Jersey and also the percentages of total traffic using the individual cross-river facilities to and from Philadelphia.

STATEMENT NO. 4
Proposed South Jersey Rapid Transit Lines

DETAILED DISTRIBUTION OF ESTIMATED TOTAL ANNUAL PASSENGERS USING EXISTING FACILITIES
IN MOVING BETWEEN THE PROPOSED RAPID TRANSIT AREA, CAMDEN AND PHILADELPHIA - YEARS 1936, 1941 AND 1944

Interchange Traffic Included, Camden Local Traffic Excluded

Annual Total Passengers in both Directions of Travel - Expressed in Thousands

	Year 1936			Year 1941			Year 1944		
	From N.J. Suburban Area	From City of Camden	Total	From N.J. Suburban Area	From City of Camden	Total	From N.J. Suburban Area	From City of Camden	Total
Bus Passengers									
To Phila. via Bridge	9,290	4,000	13,290	8,490	3,620	12,110	16,810	7,200	24,010
" " " Bridge Rail Line	780	-	780	1,470	-	1,470	2,910	-	2,910
" " " Ferry	330	-	330	310	-	310	600	-	600
Sub Total	10,400	4,000	14,400	10,270	3,620	13,890	20,320	7,200	27,520
To Camden	2,600	-	2,600	3,170	-	3,170	5,340	-	5,340
Total	13,000	4,000	17,000	13,440	3,620	17,060	25,660	7,200	32,860
Automobile Passengers									
To Phila. via Bridge	5,160	5,610	10,770	6,950	7,750	14,700	4,650	5,160	9,810
" " " Bridge Rail Line	500	-	500	1,390	-	1,390	930	-	930
" " " Ferry	530	1,590	2,120	700	1,910	2,610	470	1,310	1,780
Sub Total	6,190	7,200	13,390	9,040	9,660	18,700	6,050	6,470	12,520
To Camden	1,800	-	1,800	2,630	-	2,630	1,760	-	1,760
Total	7,990	7,200	15,190	11,670	9,660	21,330	7,810	6,470	14,280
Railroad Passengers									
To Phila. via Bridge	-	-	-	-	-	-	-	-	-
" " " Bridge Rail Line	220	-	220	380	-	380	510	-	510
" " " Ferry	1,430	-	1,430	1,100	-	1,100	1,510	-	1,510
Sub Total	1,650	-	1,650	1,480	-	1,480	2,020	-	2,020
To Camden	400	-	400	360	-	360	490	-	490
Total	2,050	-	2,050	1,840	-	1,840	2,510	-	2,510
Bridge Rail Line Passengers									
To Phila.-From Camden City only	-	980	980	-	1,860	1,860	-	3,880	3,880
" " Suburban interchange incl. above	(1,500)	-	(1,500)	(3,240)	-	(3,240)	(4,350)	-	(4,350)
Totals									
To Phila. via Bridge	14,450	9,610	24,060	15,440	11,370	26,810	21,460	12,360	33,820
" " " H.S. Line	1,500	980	2,480	3,240	1,860	5,100	4,350	3,880	8,230
" " " Ferry	2,290	1,590	3,880	2,110	1,910	4,020	2,580	1,310	3,890
Sub Total	18,240	12,180	30,420	20,790	15,140	35,930	28,390	17,550	45,940
To Camden	4,800	-	4,800	6,160	-	6,160	7,590	-	7,590
Grand Total	23,040	12,180	35,220	26,950	15,140	42,090	35,980	17,550	53,530

Notes: Bridge Rail line began operations June 6, 1936
Interchange passengers between Bridge Rail line and railroad, bus and automobile are included with passengers shown for the latter facilities on the Statement. The estimated total number of interchange passengers is indicated under "Bridge Rail Line Passengers" in brackets.

Per Cent Distribution of Total Passengers Year 1941

By Facility of Origin in New Jersey

	Bus	Auto	R. R.	Bridge Rail	Total
N.J. suburbs to Phila.	24.4	21.5	3.5	-	49.4
" " " Camden	7.5	6.2	0.9	-	14.6
Sub-Total	31.9	27.7	4.4	-	64.0
Camden to Phila.	8.6	23.0	-	4.4	36.0
Total	40.5	50.7	4.4	4.4	100.0
Total to Phila. only	33.0	44.5	3.5	4.4	85.4

By Cross River Facility Used

	Bridge				Ferry	Total
	Bus	Auto	Rail	Total		
Total to Philadelphia	28.8	34.9	12.1	75.8	9.6	85.4
" " "	33.8	40.8	14.2	88.8	11.2	100.0

Note: All percentages except those in the bottom line are based on a grand total of 42,090,000 passengers, in both directions of travel in the year 1941.

As is shown by the above tabulation about 50 per cent of the total passenger traffic originated in New Jersey by auto and about 40 per cent by bus. Traffic originating on the railroads and directly on the Bridge Rail Line was relatively small. However, the total traffic using the Rail Line, including interchange from the other facilities, amounted to about 14 per cent of the total cross-river traffic. Traffic originating in New Jersey suburbs was 64 per cent and in Camden 36 per cent of the total. Cross-river traffic was about 85 per cent of the total.

Distribution by Individual Areas

Statement No. 5 opposite this page shows the estimated distribution of total passenger traffic in the years 1941 and 1944 among various individual New Jersey suburban areas and the City of Camden. The division between traffic to Camden and to Philadelphia is also shown. Total passengers originating in the respective areas are shown for each year, the Glassboro area having the largest of the suburban totals in both years, - 8,960 thousand in 1941 and 12,930 thousand in 1944. Riding between the City of Camden and Philadelphia comprises the largest single volume of any of the areas included - 15,140 thousand in 1941 and 17,550 thousand in 1944.

Later Use of Basic Traffic Data

The analysis of total passenger traffic presented above is used as the basis of the traffic estimates for the proposed rapid transit lines developed in a later section of this report.

STATEMENT NO. 5

Proposed South Jersey Rapid Transit Lines

ESTIMATED APPORTIONMENT OF TOTAL PASSENGERS SHOWN ON STATEMENT NOS. 3 AND 4
TO
NEW JERSEY AREAS TRIBUTARY TO PROPOSED RAPID TRANSIT LINES FOR YEARS 1941 AND 1944

Annual Total Passengers in both Directions of Travel - Expressed in Thousands

	To City	From Suburban Area: Glassboro	Clementon	Haddonfield	Moorestown	Sub Total	Burlington	Sub Total	Turnersville	Total	From Camden City	Total
Year 1941												
Bus	Phila.	4,260	1,890	610	1,810	8,570	670	9,240	1,030	10,270	3,620	13,890
	Camden	980	420	380	720	2,500	370	2,870	300	3,170	-	3,170
	Total	5,240	2,310	990	2,530	11,070	1,040	12,110	1,330	13,440	3,620	17,060
Automobile	Phila.	2,330	2,070	1,800	1,550	7,750	770	8,520	520	9,040	9,660	18,700
	Camden	670	600	530	450	2,250	230	2,480	150	2,630	-	2,630
	Total	3,000	2,670	2,330	2,000	10,000	1,000	11,000	670	11,670	9,660	21,330
Railroad	Phila.	620	330	200	190	1,340	140	1,480	-	1,480	-	1,480
	Camden	100	60	30	40	230	130	360	-	360	-	360
	Total	720	390	230	230	1,570	270	1,840	-	1,840	-	1,840
Bridge Rail Line	Phila.	-	-	-	-	-	-	-	-	-	1,860(A)	1,860(A)
All Facilities	Phila.	7,210	4,290	2,610	3,550	17,660	1,580	19,240	1,550	20,790	-	35,930
	Camden	1,750	1,080	940	1,210	4,980	730	5,710	450	6,160	-	6,160
	Total	8,960	5,370	3,550	4,760	22,640	2,310	24,950	2,000	26,950	15,140	42,090
Year 1944												
Bus	Phila.	8,120	4,110	1,540	3,270	17,040	1,310	18,350	1,970	20,320	7,200	27,520
	Camden	1,650	710	570	1,370	4,300	730	5,030	310	5,340	-	5,340
	Total	9,770	4,820	2,110	4,640	21,340	2,040	23,380	2,280	25,660	7,200	32,860
Automobile	Phila.	1,550	1,390	1,210	1,040	5,190	520	5,710	340	6,050	6,470	12,520
	Camden	460	400	350	300	1,510	150	1,660	100	1,760	-	1,760
	Total	2,010	1,790	1,560	1,340	6,700	670	7,370	440	7,810	6,470	14,280
Railroad	Phila.	980	360	210	270	1,820	200	2,020	-	2,020	-	2,020
	Camden	170	60	40	50	320	170	490	-	490	-	490
	Total	1,150	420	250	320	2,140	370	2,510	-	2,510	-	2,510
Bridge Rail Line	Phila.	-	-	-	-	-	-	-	-	-	3,880(A)	3,880(A)
All Facilities	Phila.	10,650	5,860	2,960	4,580	24,050	2,030	26,080	2,310	28,390	17,550	45,940
	Camden	2,280	1,170	960	1,720	6,130	1,050	7,180	410	7,590	-	7,590
	Total	12,930	7,030	3,920	6,300	30,180	3,080	33,260	2,720	35,980	17,550	53,530

Note: (A) On this statement, passengers interchanging between the Bridge Rail Line and other facilities (bus, auto and R.R.) are included in the figures shown for the latter facilities in the respective suburban areas.
Total Bridge Line passengers in years 1941 and 1944 respectively were 5,100 and 8,230 (expressed in thousands)

PART IV

THE PROPOSED RAPID TRANSIT LINES

PROPOSED LINES AND SERVICE

PROPOSED

PART IV

THE PROPOSED RAPID TRANSIT LINES

PROPOSED LINES AND SERVICE

Map No. 1 opposite page 11 shows the general layout of the passenger railroads radiating from Camden and the proposed extent of electrified operations of five of the lines for rapid transit service to Philadelphia via the Bridge Rail line. The Burlington line extending generally northward is excluded from our conception of the plan for reasons given later in this report.

The modified proposal requires the electrification of the Clementon, Haddonfield, Moorestown lines and the conditioning of the existing electrified line to Newfield for rapid transit service as far as Glassboro. Connections between the railroad lines and the Bridge Rail line would be made at Broadway Station in Camden. A plan for the connection is shown in the 1938 report of Gibbs & Hill, Inc. It involves the joining of two pairs of high level railroad tracks with the subway tracks of the Bridge Rail line, avoiding grade crossings and using maximum grades between 3.66 and 4.4 per cent.

Through service would be operated on each line to Philadelphia via the Bridge Rail line, which is in subway on both sides of the River and now terminates at 8th and Market Sts. station. The service would be extended from 8th St. via the presently

unequipped Locust St. Subway to its most westerly station at 15th - 16th Sts. A more detailed plan of the Bridge Rail line and Locust St. Subway is shown on Map No. 2 facing page 12.

THE PROPOSED SERVICE

Frequency

The estimated service on the four proposed rapid transit lines, serving the Glassboro, Clementon, Haddonfield and Moorestown areas has been based upon 15 minute and 20 minute intervals between trains in the rush periods and 30 minute intervals in the non-rush periods. The 15 minute rush period interval has been applied on the Glassboro and Clementon lines on account of the estimated heavier volume of traffic on these lines.

The total number of trains operated on the rapid transit lines, particularly in the rush period, will be controlled by the operating capacity of the 8th Street Subway. The trains of the rapid transit lines will use a single track in each direction jointly with the trains of the Ridge Ave. - Eighth Street Subway lines. The total capacity of each track is about 28 trains per hour which results in an individual capacity for the Bridge Rail line of 14 trains per hour. This total divided between the four proposed branches would permit the operation of four trains per hour on each of two branches and three trains per hour on each of the remaining two branches resulting in 15 and 20 minute rush hour headways on the individual suburban lines as indicated above.

For non-rush periods, 30 minute intervals have been assumed on each branch in our operating schedules, resulting in a total of 8 trains per hour on the four branches. Additional service would be operated as far as Camden during these periods. The total number of trips per day on the respective branches varies on account of the number of trains per hour in the rush periods and in the late evening and night service.

Comparison with Other Facilities

Statement No. 6 opposite this page gives a comparison of the scheduled number of Philadelphia-bound trips on the existing facilities and on the proposed rapid transit lines. The numbers of weekday trips are shown for the morning rush period of about 2-1/2 hours and for the total day for most of the communities in the Camden suburban area. Bus trips are in general based on 1941 schedules as most representative of probable postwar conditions. Railroad train trips are based on 1945 schedules and probably would not be subject to any great change in the general postwar period. Train trips shown for the proposed Rapid Transit lines are based on operating schedules used in our estimate No. 2, but do not vary greatly for other estimates.

The comparison of number of trips shows the superiority of bus service as to frequency which frequency in most cases could not be approached by the proposed rapid transit service. It also shows the limited frequency of present railroad service, a large proportion of which is confined to rush periods.

STATEMENT NO. 6

Proposed South Jersey Rapid Transit Lines

COMPARISON OF NUMBER OF WEEKDAY PHILADELPHIA BOUND TRIPS SCHEDULED ON RAILROADS (FALL OF 1945) AND ON BUS LINES (FALL OF 1941) WITH THE TRIPS ASSUMED FOR THE PROPOSED RAPID TRANSIT LINES

	Present Facilities				Proposed R.T. Lines	
	Railroad - Fall 1945		Buses - Fall 1941			
	Rush Period	Total	Rush Period	Total	Rush Period	Total
Glassboro Area						
Glassboro	6	13	13	69	10	56
Pitman	6	13	24	101	10	56
Sewell	6	13	-	-	10	56
Wenonah	6	13	12	67	10	56
Woodbury Heights	5	12	18	85	10	56
Woodbury	7	14	46	199	10	56
Westville	6	13	72	306	10	56
Gloucester	6	13	108	419	10	56
Clementon Area						
Clementon	4	5	23	102	9	53
Laurel Springs	4	5	20	90	9	53
Magnolia	4	5	26	108	9	53
Barrington	4	5	56	217	9	53
Haddon Heights	4	5	100	347	9	53
Orston	4	5	113	391	9	53
Audubon	4	5	113	391	9	53
Oaklyn	4	5	113	391	9	53
W. Collingswood	4	5	124	402	9	53
Haddonfield Area						
Haddonfield	6	14*	70	291	7	41
W. Haddonfield	5	6	70	291	7	41
Cuthbert	5	6	70	291	7	41
Collingswood	5	6	70	291	7	41
Moorestown Area						
Stanwick Ave.	3	4	42	172	8	45
Moorestown	3	5	42	172	8	45
W. Moorestown	3	5	42	172	8	45
Lenola	3	5	42	172	8	45
Maple Shade	3	5	47	205	8	45
Merchantville	3	5	108	483	8	45
Burlington Area						
Burlington	3**	7**	12	79		
Edgewater Park	3**	7**	9	64		
Beverly	3**	7**	9	64		
Delanco	3**	7**	9	64		
Riverside	3**	7**	18	91		
Riverton	3**	7**	18	91		
Palmyra	3**	7**	18	91		
Delair	3**	7**	21	105		
Turnersville Area						
Turnersville	-	-	13	43		
Blackwood	-	-	15	65		
Runnemede	-	-	15	66		
Bellmawr	-	-	15	66		
Mt. Ephraim	-	-	26	108		

Notes: Number of railroad trips are from schedules of Fall 1945
*Excludes 7 trains to Philadelphia via Delair Bridge
**Excludes 2 trains to Philadelphia via Delair Bridge
Number of bus trips are from schedule data as of Fall 1941 as furnished by Public Service Interstate Transportation Co. supplemented by data from G.R. Wood Inc. schedules of Fall 1943 for Glassboro area.
Rush Period includes 2-1/2 hours, 6.30 A.M. to 9.00 P.M.

Travel Times

Statement No. 7 opposite this page gives a comparison of approximate travel time to central Philadelphia via the existing and proposed facilities in the A.M. rush period. The present railroad travel time shown is based on average 1945 scheduled time plus an allowance for subway transportation to central Philadelphia. Bus times are based on 1941 scheduled times as furnished by the Public Service Interstate Transportation Co. Times for interchange rides between the Bridge Rail line and bus and railroad lines are also shown and the basis described in the notes on the Statement. Approximate automobile travel times are also shown. Times shown for travel on the proposed rapid transit lines are based upon an assumed rush hour speed of 28 miles per hour beyond Broadway Station, Camden, plus computed running time of the Bridge Rail line to 12th and Locust Streets and a 3 minute allowance for walking to destination.

The lowest times shown are generally via private automobile and of course are subject to delays due to congestion in the city areas and to the present scarcity of parking facilities. Passengers interchanging between automobiles and the Bridge Rail line in Camden avoid the Philadelphia congestion.

Next to the automobile times, present travel times by interchange to the Bridge Rail line from railroad and bus respectively are the shortest shown. The travel times to Philadelphia via bus or via railroad and subway are in most cases not widely different. Use of the railroad and the Market Street

STATEMENT NO. 7

Proposed South Jersey Rapid Transit Lines

COMPARISON OF APPROXIMATE PHILADELPHIA BOUND TRAVEL TIMES IN A.M. RUSH PERIODS TO VICINITY OF 12TH AND MARKET STS., PHILADELPHIA VIA EXISTING AND PROPOSED FACILITIES

10 Cent.

	Travel Time In Minutes					
	Existing Facilities					
	Railroad and Subway (A)	Railroad and Bridge Rail Line (B)	Bus (C)	Bus and Bridge Rail Line (D)	Automobile (E)	Proposed Rapid Transit Lines (F)
Glassboro Area						
Glassboro	58	49	63	60	42	50
Pitman	54	46	58	55	39	45
Sewell	50	43	-	-	34	40
Wenonah	47	38	-	-	31	36
Woodbury Heights	45	33	48	45	28	32
Woodbury	41	32	44	41	26	29
Westville	36	27	36	33	21	24
Gloucester	31	22	30	27	18	20
Clementon Area						
Clementon	55	47	56	54	34	39
Laurel Springs	51	43	52	50	31	36
Magnolia	44	37	40	38	27	30
Barrington	40	33	35	33	24	27
Haddon Heights	38	30	33	31	23	25
Orston	36	28	31	29	22	24
Audubon	34	26	30	28	21	23
Oaklyn	32	25	28	26	20	21
W. Collingswood	30	23	26	24	19	20
Haddonfield Area						
Haddonfield	34	26	35	33	22	24
W. Haddonfield	32	24	40	38	21	23
Cuthbert	28	20	27	25	19	21
Collingswood	26	18	25	23	18	19
Moorestown Area						
Stanwick Ave.	46	38	46	43	30	34
Moorestown	44	36	44	41	29	33
W. Moorestown	42	34	41	38	28	32
Lenola	39	31	38	35	25	29
Maple Shade	36	28	34	31	23	26
Merchantville	30	22	28	25	19	21
Burlington Area						
Burlington	56	49	68	66	39	-
Edgewater Park	52	45	60	58	35	-
Beverly	50	43	57	55	34	-
Delanco	44	37	50	48	30	-
Riverside	42	36	48	46	29	-
Riverton	36	29	39	37	23	-
Palmyra	34	26	35	33	22	-
Delair	28	21	27	25	17	-
Turnersville Area						
Turnersville	-	-	52	49	33	-
Blackwood	-	-	47	44	29	-
Runnemede	-	-	38	35	24	-
Bellmawr	-	-	35	32	22	-
Mt. Ephraim	-	-	32	29	20	-

Notes:

(A) Railroad times are based on average A.M. rush period times from 1945 timetables, to Market St. Wharf Philadelphia plus 9 minutes for transfer time and ride on Market St. Subway.

(B) Times for interchange rides between railroad and Bridge Rail line are based on average A.M. rush period times, from 1945 timetables, to Broadway, Camden plus 12 minutes for interchanges and rides on Bridge Rail line and Market St. Subway. (from 8th St.)

(C) Bus times are running times to 12th & Market Sts. as furnished by Public Service I.T. Co. based on 1941 schedules. (Bus running time is subject to delays in central Philadelphia.)

(D) Times for interchange rides between Bus lines and Bridge Rail line are based on 13-14 minutes less bus time plus an allowance of 10-12 minutes for transfers and rides on Bridge Rail line and Market St. Subway. (from 8th St.)

(E) Automobile times are based on average speed of 35 mph. in New Jersey plus 12 minutes from central Camden to Philadelphia, including parking time.

(F) Proposed rapid transit times are based on estimated running time to 12th and Locust Sts., Philadelphia plus 3 minutes walk.

Subway avoids surface congestion to which the buses are subject.

Travel times shown for the proposed rapid transit lines are in general a few minutes less than via existing facilities. However, the saving in time is less than it would be if it were not controlled by the circuitous route of the 8th Street-Locust Street subway and the necessity of a walk to reach the more important sections of the central Philadelphia area.

These comparisons of travel time are based upon the time to the vicinity of a single point at about the traffic center of the central area. They are of course subject to variations in time to other points, which in turn affects the relative time differences for individual rides and would become a factor in the selection of a particular facility by an individual.

Fares

A review of the rates of fare proposed for the Rapid Transit lines in the 1938 report of Gibbs & Hill, Inc. indicated their general reasonableness and levels meeting the competitive needs of the situation. They have been adopted for our passenger revenue estimates and are shown in comparison with present rates of fare on existing facilities on Statement No. 8 opposite this page. All railroad fares shown include 15¢ added for a round trip subway ride between Market Street Wharf and central Philadelphia. The combined railroad-subway fares for a single round trip to central Philadelphia are in all cases

STATEMENT NO. 8

Proposed South Jersey Rapid Transit Lines

COMPARISON OF
ROUND TRIP FARES BETWEEN NEW JERSEY SUBURBAN AREA AND CENTRAL PHILADELPHIA
PRESENT FARES ON EXISTING FACILITIES VS PROPOSED RAPID TRANSIT LINE FARES

10 Cent-

	Present Fares					Proposed Fares R.T. Lines		Difference between Proposed Rapid Transit Fares and Fares of Existing Facilities					
	Railroad and Subway			Bus Lines				Compared with Railroad and Subway		Compared with Bus Lines		Compared with Lowest Present Rate	
	Single Rd. Trip Incl. 15¢ Subway Fare	25-Trip (3 Mos) Subway Fare	50-Trip (1 Mo) Subway Fare	Single Rd. Trip	Strip Tickets	Single Rd. Trip	30-Trip	Single Fares	Com. Fares	Single Fares	Com. Fares	Single Fares	Com. Fares
								Red = Decrease as compared with present fares Black = Increase as compared with present fares					
Glassboro Area													
Glassboro	$ 1.03	$ .70	$ .56	$ .90	$.75-$.67	$ .70	$ .54	$ .33	$.16-$.02	$ .20	$.21-$.13	$ .20	$ .02
Pitman	.93	.65	.54	.90	.67	.65	.52	.28	.13- .02	.25	.15	.25	.02
Sewell	.81	.60	.50	.80	.67	.60	.49	.21	.11- .01	.20	.18	.20	.01
Wenonah	.81	.57	.47	.70	.57	.55	.46	.26	.11- .01	.15	.11	.15	.01
Woodbury Heights	.71	.53	.45	.60	.50	.50	.44	.21	.09- .01	.10	.06	.10	.01
Woodbury	.59	.52	.43	.60	.50	.45	.40	.14	.12- .03	.15	.10	.14	.03
Westville	.49	.43	.39	.40	.33	.40	.35	.09	.08- .04	.00	.02	.00	.02
Gloucester	.49	.36	.36	.40	.33	.35	.29	.14	.07- .07	.05	.04	.05	.04
Clementon Area													
Clementon	.81	.57	.48	.60	.50	.55	.48	.26	.09-.00	.05	.02	.05	.00
Laurel Springs	.81	.55	.46	.60	.45	.55	.46	.26	.09-.00	.05	.01	.05	.01
Magnolia	.71	.49	.42	.50	.45	.50	.42	.21	.07-.00	.00	.03	.00	.00
Barrington	.59	.45	.40	.50	.35	.45	.38	.14	.07-.02	.05	.03	.05	.03
Haddon Heights	.59	.41	.39	.40	.35	.40	.36	.19	.05-.03	.00	.01	.00	.01
Orston	.49	.39	.38	-	-	.40	.35	.09	.04-.03	-	-	-	-
Audubon	.49	.37	.37	.40	.35	.40	.34	.09	.03-.03	.00	.01	.00	.01
Oaklyn	.49	.35	.35	.40	.35	.35	.30	.14	.05-.05	.05	.05	.05	.05
W. Collingswood	.49	.32	.32	.40	.35	.35	.30	.14	.02-.02	.05	.05	.05	.02
Haddonfield Area													
Haddonfield	.49	.46	.39	.40	.35	.40	.36	.09	.10-.03	.00	.01	.00	.01
W. Haddonfield	.49	.44	.39	.40	.35	.40	.35	.09	.09-.04	.00	.00	.00	.00
Cuthbert	.49	.40	.37	.40	.35	.35	.32	.14	.08-.05	.05	.03	.05	.03
Collingswood	.49	.37	.36	.40	.35	.35	.30	.14	.07-.06	.05	.05	.05	.05
Moorestown Area													
Stanwick Ave.	.71	.55	.46	.60	.50	.55	.45	.16	.10-.01	.05	.05	.05	.01
Moorestown	.71	.55	.45	.60	.50	.50	.44	.21	.11-.01	.10	.06	.10	.01
W. Moorestown	.71	.53	.45	.50	.40	.50	.44	.21	.09-.01	.00	.04	.00	.01
Lenola	.59	.51	.42	.50	.40	.45	.40	.14	.11-.02	.05	.00	.05	.00
Maple Shade	.59	.48	.41	.40	.36	.45	.38	.14	.10-.07	.05	.02	.05	.02
Merchantville	.49	.39	.38	.40	.36	.35	.30	.14	.09-.08	.05	.06	.05	.06
Burlington Area													
Burlington	1.03	.70	.56	.90	.75								
Edgewater Park	.93	.63	.52	.90	.70								
Beverly	.93	.61	.52	.80	.67								
Delanco	.81	.57	.48	.70	.58								
Riverside	.71	.57	.47	.60	.50								
Riverton	.59	.51	.42	.50	.42								
Palmyra	.59	.49	.42	.50	.42								
Delair	.49	.39	.38	.40	-								
Turnersville Area													
Turnersville	-	-	-	.90	.50								
Blackwood	-	-	-	.70	.45								
Runnemede	-	-	-	.50	.32								
Bellmawr	-	-	-	.50	.32								
Mt. Ephraim	-	-	-	.40	.28								

Notes: Railroad fares derived from railroad tariffs plus 15¢ per round trip for subway fare
Bus fares are as furnished by Public Service Interstate Transportation Co.
Proposed Fares for proposed rapid transit lines are from 1938 report of Gibbs & Hill Inc.
Present federal tax of 15% on all one-way fares over 35¢ is excluded on this statement

considerably higher than bus fares. The costs using 50 trip commutation rates on the railroad are, however, in many cases less than the bus strip ticket rates for a through ride.

The Statement also shows the differences between the proposed fares and the railroad bus fares, and also the differences between the proposed fares and the lowest fare, - either railroad or bus. As is shown in the right hand columns of the Statement the assumed rates are in most cases less than either the bus or railroad existing rates. The suggested cash fare rates average about 1.75 cents per mile figured from Broadway Station, Camden. The ticket rates are around 80 per cent of the cash fare rates. The suggested cash fare rates range from 9¢ to 33¢ less than the present railroad (subway) round trip rates. They are generally the same or 5¢ less than the present bus round trip rates, except that on the Glassboro line the differences are greater. Compared with present commutation or strip ticket rates the differences are generally smaller, ranging between 3¢ more and 6¢ less than the lowest present rate on either railroad or bus lines.

Fares for interchange rides between bus or railroad lines and the Bridge Rail line are not indicated on the Statement. Bus-Bridge line interchange fares are the same as through bus fares because of the equal charge of 10 cents one way between Camden and Philadelphia on these two facilities. Railroad-Bridge line interchange fares are 5 cents higher per round trip than shown on the Statement due to a 10 cent fare on the Bridge line as compared to a 7-1/2 cent fare on the Market

Street subway and the fact that the net railroad fares are substantially the same to Broadway, Camden or to Market St. Wharf, Philadelphia.

The estimated average rates of fare resulting from the fare schedule proposed for the rapid transit lines are shown in a following section, in connection with our passenger revenue estimates. The proposed schedule is competitive with the lowest existing fares, which is considered necessary to offer competition sufficient to assure the diversion of substantial volumes of traffic from existing facilities. It is believed that an appreciably higher schedule, resulting in a higher average fare, would probably not increase the total passenger revenue because of its lower potentialities of traffic diversion.

Start Reading

Convenience

In addition to speeds, frequencies and fares, consideration must be given to general convenience factors in appraising the diversion potentialities of the proposed transit lines. The relative convenience of transportation via the existing facilities has been discussed in Part I. The more important convenience factors include: (a) The general advantages of individual use, speed and other conveniences inherent in the use of the private automobile; (b) the wider availability of and the superior local "pick up" afforded by bus lines in the suburban areas, and their direct delivery along Market Street in Philadelphia, subject to the adverse effects of traffic congestion in the city areas, and (c) The

greater general comfort of a train ride, offset by the lack of through service to Philadelphia and the consequent necessity of transferring to the Ferry or to the Bridge Line to complete a cross-river journey.

Traffic Collection and Delivery

The proposed rapid transit lines would provide through service between the New Jersey suburbs and Philadelphia free from delays due to surface congestion. Collection and distribution of traffic in the suburban areas would be subject to transportation to and from the stations, involving a greater average length of walk than to bus lines, or supplemental local transportation by bus or automobile. Direct delivery in central Philadelphia would be greatly improved as compared with present railroad transportation for passengers with destinations reasonably close to the 8th Street and the Locust Street subway stations. However, stations on Locust Street are two to three blocks south of the most important business streets and their use will offer less convenience for the majority than the present direct delivery along Market St. afforded by the bus lines. Present delivery of Bridge Rail line passengers at Market St. subway stations by free interchange at 8th St. Station was established by PTC as a temporary privilege pending the opening of the Locust St. Subway. If this privilege should be withdrawn the passengers using the Bridge Rail line, or the proposed rapid transit lines would be dependent upon 8th St. or Locust St. delivery.

In general terms, the terminal routing in Philadelphia for the proposed rapid transit lines is circuitous and does not offer ideal central delivery for the majority of passengers with destinations west of Eighth St. The limitations as to traffic collection and distribution in New Jersey areas indicate the desirability of developing bus "feeder routes" serving the local railroad stations in order to enhance the usefulness of the proposed rapid transit lines.

NEW INVESTMENT REQUIRED

Basic Estimates

For the purposes of this report, we have based our estimates of required new investment on the estimates presented in the 1938 report of Gibbs & Hill, Inc., supplemented by certain underlying detail which they kindly made available to us. Inasmuch as our presentation includes several estimates at different traffic levels, we have dealt separately with cars and with other equipment and construction needs.

The Gibbs & Hill estimates reflect price levels as of the latter part of 1937, and hence are below current costs, and below those likely to prevail in the near future. We have elected to base our presentation upon estimates reflecting current levels, even though present trends are upward.

Trending and Adjustment

In order to translate the Gibbs & Hill estimates to current levels, we have applied to the underlying estimates for

various types of construction and equipment, trending factors drawn from various published sources, manufacturers data and from our own files. The results are shown on Statement No. 9 on the opposite page. The combination of restricted availability of materials for civilian purposes and particularly price controls on materials, leads to a certain artificiality in some of the results. For this reason we have exercised a judgment and arbitrarily increased the total computed results by about $500,000.

Excluding cars, our trended estimates of construction and equipment costs are $7,000,000 and $7,700,000 respectively for the Gibbs & Hill classifications "Initial Traffic" and "Subsequent Traffic". These estimates compare with the Gibbs & Hill figures, on the basis of 1937 prices, of $5,316,000 and $5,959,000. An apportionment of 1945 costs for the construction and equipment of the Glassboro line for individual through-operation is shown on the right of the table.

Cars

In the matter of passenger cars, the Gibbs & Hill estimates contemplated the provision of special light weight cars of an "articulated" (3 truck) type, then introduced in Brooklyn, at an estimated cost of approximately $60,000 per unit. The initial requirements were estimated to be about 80 cars, the subsequent to be about 111 cars, or total costs of about $4,787,000 and $6,642,000 respectively.

We have reviewed the limited data available as to actual costs of rapid transit cars, and have given consideration to the

STATEMENT NO. 9

Proposed South Jersey Rapid Transit Lines

ESTIMATE OF 1945 CONSTRUCTION AND EQUIPMENT COSTS
BASED ON TRENDING 1937 ESTIMATES OF GIBBS & HILL INC.

10 Apt.

	Four Proposed Rapid Transit Lines Glassboro, Clementon, Haddonfield and Moorestown				Glassboro Line alone	
	Gibbs & Hill, Inc. Estimate based on late 1937 prices		Estimate based on 1945 cost levels		Estimate based on 1945 cost levels	
	Initial Traffic	Subsequent Traffic	Initial Traffic	Subsequent Traffic	Initial Traffic	Subsequent Traffic
Physical connections at Broadway, Camden, including property, other than railroad	$ 1,300,000	$ 1,300,000	$1,900,000	$1,900,000	$1,170,000	$1,170,000
Power supply, including transmission, distribution and substations	3,499,000	4,142,000	4,400,000	5,100,000	1,010,000	1,280,000
Passenger station improvements, additional tracks, interlocking and other construction	267,000	267,000	350,000	350,000	160,000	160,000
Shop Facilities	250,000	250,000	350,000	350,000	270,000	270,000
Total (Excluding Cars)	$ 5,316,000	$ 5,959,000	$7,000,000	$7,700,000	$2,610,000	$2,880,000
			No. of Cars		No. of Cars	
Cars	$ 4,787,000	$ 6,642,000	Est. No. 1 66	$3,960,000 -	Est. No. 1 40	$2,400,000 -
			" No. 2 70	- $4,200,000	" No. 2 43	- $2,580,000
			" No. 3 88	- 5,280,000	" No. 3 52	- 3,120,000
			" No. 2a 98	- 5,880,000	" No. 2a 59	- 3,540,000
Total Including Cars	$10,103,000	$12,601,000	Est. No. 1	$10,960,000 -	Est. No. 1	$5,010,000 -
			" No. 2	- $11,900,000	" No. 2	- $5,460,000
			" No. 3	- 12,980,000	" No. 3	- 6,000,000
			" No. 2a	- 13,580,000	" No. 2a	- 6,420,000

Note:
The distribution of trended costs between "Initial" and "Subsequent" traffic levels reflects the classification and distribution used by Gibbs & Hill Inc. in their 1938 report

trend of costs of street railway cars and other manufacturers data bearing upon the matter of costs. Consideration has also been given to the effect of the characteristics of the proposed service upon the indicated needs to be met by the cars, as well as to the competitive aspects between conventional and light weight type cars. On this basis we have decided that a unit price of $60,000 per car is a reasonable figure to use in testing the economics of the project. The number of cars required naturally varies with the assumptions as to traffic handled. Our estimates cover a range of traffic levels estimated to require between 66 and 98 cars which at $60,000 per car would cost between $3,960,000 and $5,880,000 as shown on Statement No. 9. Estimate No. 2, which contemplates 12,700,000 annual passengers on the four proposed rapid transit lines, calls for 70 cars at an estimated cost of $4,200,000.

Total New Investment

The total trended new investment in construction, equipment and rolling stock for the four proposed lines on the basis of present prices, ranges between $10,960,000 and $13,580,000 as compared with the basic Gibbs & Hill estimates, given for two traffic levels at 1937 cost levels, of $10,103,000 and $12,601,000. For the Glassboro line alone, the total 1945 estimated costs, including cars, range between $5,010,000 and $6,420,000.

These estimates do not include any of the necessary investment required to equip the Locust Street Subway for operation. Official estimates made in 1940 of the cost of equipping this line, including tile finish for stations but excluding cars, totaled about $1,400,000. Trending this cost to 1945 price levels indicates a present cost of about $1,800,000 for completion of this city-owned subway.

ESTIMATES OF PASSENGERS AND REVENUES

ESTIMATES OF PASSENGERS AND REVENUE

The estimated passenger traffic and revenues for the proposed rapid transit lines have been developed by applying to the traffic carried by the several existing facilities three sets of assumed percentages of diversion, which we consider as ranging from the low side to far above our own judgment as to a reasonable expectation under all the circumstances. The percentages have been applied to data representing traffic levels of 1941 and 1944, respectively, resulting in six estimates in all.

Our purpose in preparing a range of estimates is to avoid dependence on a single judgment in determining the economics of the project. For the same reason we have also developed operating cost estimates for several traffic levels.

Potential Diversion

In arriving at the percentage diversion factors used in the passenger estimates we have given consideration to the several factors which are involved, including relative convenience, speed and fares of the respective present and proposed public facilities, the convenience and speed of the private automobile, and the diversion results obtained in other situations.

Bus Passengers

Diversion of suburban bus passengers to the rapid transit lines has been estimated at 25 per cent, 33-1/3 per cent and 50 per cent in the respective estimates. The range of these percentages of diversion we believe brackets the competitive potentialities. In selecting the range we have given consideration to the respective advantages of the competitive facilities including the superior local pick-up and direct city delivery of the bus lines and the ability to provide a considerably closer headway on bus routes than on the rapid transit lines. Consideration has also been given to the avoidance of congestion by the rapid transit lines and the faster time available to many passengers, particularly those destined for the vicinity of the 8th Street-Locust Street subway and to a somewhat lesser extent those who would transfer to the Market Street Subway. Some advantage in rates of fare by use of the rapid transit lines has also been a premise favoring their use.

Automobile Passengers

Experience in other competitive situations has demonstrated that the diversion of private automobile traffic to mass transportation facilities is much more difficult than diversion between public facilities. In fact in normal times the usual situation with respect to established facilities involves the diversion away from the public facility to the automobile. Studies of diversion of automobile traffic to the

Philadelphia Frankford Elevated (1923) and to the Broad St. Subway (1928) indicated very small effects during the periods of their initial operation.

In the South Jersey situation the volume of automobile traffic is a major factor. As is shown in our estimate of total traffic on the basis of 1941 distribution, the automobile carried half of the total through traffic in the rapid transit area. In our judgment the proposed rapid transit lines will be able to divert only a minor portion of this traffic and we have used diversion ratios of 10 per cent, 15 per cent and 25 per cent of the suburban automobile traffic in the respective estimates.

Railroad Passengers

It is assumed that the rapid transit service on the respective railroad lines will supersede the local railroad service, excepting such local service as may be given by through trains at some of the more important stations. The diversion of railroad traffic has been assumed at 75 per cent, 80 per cent and 90 per cent of the traffic on the affected railroad lines in the rapid transit area.

Potential Traffic

Statements Nos. 10a and 10b opposite this page each show summaries of three estimates of annual passenger traffic for the proposed rapid transit lines developed in manner just described. Statement 10c carries some explanatory notes. The statements also show the corresponding estimates of annual

STATEMENT NO. 10-a

Proposed South Jersey Rapid Transit Lines

ESTIMATED ANNUAL TOTAL PASSENGERS FOR FIVE PROPOSED RAPID TRANSIT LINES
AND ESTIMATED TOTAL PASSENGERS AND PASSENGER REVENUE EXCLUDING PROPOSED BURLINGTON LINE
BASED ON 1941 TRAFFIC LEVELS AND THREE ASSUMPTIONS AS TO DIVERSION EFFECTS

Passengers in Thousands and Revenue in Thousands of Dollars

BASED ON 1941 TRAFFIC LEVELS

Area	Estimated Annual Passengers-5 R.T. Lines: Diverted from: Bus (A)	Auto (B)	R.R. (C)	Br. Rail (D)	Total (E)	Total incl. 10% Generation & Terminal Traffic (F)	Estimated Annual Passengers and Passenger Revenue Excl. Burlington Line: Total Passengers (G)	Average Fare (Cents) (H)	Passenger Revenue (I)
ESTIMATE NO. 1									
Glassboro	1,830	620	580	-	3,030	3,330	3,330	20.8	$ 692
Clementon	820	560	310	-	1,690	1,860	1,860	17.7	329
Haddonfield	320	470	180	-	970	1,070	1,070	15.1	162
Moorestown	750	420	190	-	1,360	1,500	1,500	18.8	282
Sub-Total	3,720	2,070	1,260	-	7,050	7,760	7,760	(18.88)	1,465
Burlington	280	210	210	-	700	770	190	-	-
Sub Total	4,000	2,280	1,470	-	7,750	8,530	7,950	-	-
Turnersville	170	80	-	-	250	250	250	-	-
Total Suburban	4,170	2,360	1,470	-	8,000	8,780	8,200	-	-
Camden City	360	480	-	1,860	2,700	2,700	2,700	11.8	371
Total	4,530	2,840	1,470	1,860	10,700	11,480	10,900	(16.84)	$ 1,836
ESTIMATE NO. 2									
Glassboro	2,210	760	610	-	3,580	3,940	3,940	20.8	$ 819
Clementon	980	670	330	-	1,980	2,180	2,180	17.7	386
Haddonfield	400	580	190	-	1,170	1,290	1,290	15.1	195
Sub Total	3,590	2,510	1,320	-	8,370	9,210	9,210	(18.87)	1,738
Burlington	360	250	230	-	840	920	190	-	-
Sub Total	3,950	2,760	1,550	-	9,210	10,130	9,400	-	-
Turnersville	170	80	-	-	250	250	250	-	-
Total Suburban	5,070	2,840	1,550	-	9,460	10,380	9,650	-	-
Camden City	470	720	-	1,860	3,050	3,050	3,050	11.8	412
Total	5,540	3,560	1,550	1,860	12,510	13,430	12,700	(16.93)	$ 2,150
ESTIMATE NO. 3									
Glassboro	2,970	1,020	660	-	4,650	5,120	5,120	20.8	$ 1,065
Clementon	1,310	910	360	-	2,580	2,840	2,840	17.7	503
Haddonfield	540	780	210	-	1,530	1,680	1,680	15.1	254
Moorestown	1,350	680	210	-	2,240	2,460	2,460	18.8	462
Sub Total	6,170	3,390	1,440	-	11,000	12,100	12,100	(18.88)	2,284
Burlington	540	340	250	-	1,130	1,240	190	-	-
Sub Total	6,710	3,730	1,690	-	12,130	13,340	12,290	-	-
Turnersville	170	80	-	-	250	250	250	-	-
Total Suburban	6,880	3,810	1,690	-	12,380	13,590	12,540	-	-
Camden City	720	1,450	-	1,860	4,030	4,030	4,030	11.8	527
Total	7,600	5,260	1,690	1,860	16,410	17,620	16,570	(16.96)	$ 2,811

Note:
See notes on Statement 10-c for the basis of the above passenger estimates

STATEMENT NO. 10-b

Proposed South Jersey Rapid Transit Lines

ESTIMATED ANNUAL TOTAL PASSENGERS FOR FIVE PROPOSED RAPID TRANSIT LINES
AND ESTIMATED TOTAL PASSENGERS AND PASSENGER REVENUE EXCLUDING PROPOSED BURLINGTON LINE
BASED ON 1944 TRAFFIC LEVELS AND THREE ASSUMPTIONS AS TO DIVERSION EFFECTS

Passengers in Thousands and Revenue in Thousands of Dollars

BASED ON 1944 TRAFFIC LEVELS

Area	Estimated Annual Passengers-5 R.T. Lines: Diverted from: Bus (A)	Auto (B)	R.R. (C)	Br. Rail (D)	Total (E)	Total incl. 10% Generation & Terminal Traffic (F)	Estimated Annual Passengers and Passenger Revenue Excl. Burlington Line: Total Passengers (G)	Average Fare (Cents) (H)	Passenger Revenue (I)
ESTIMATE NO. 1a									
Glassboro	3,430	410	920	-	4,760	5,230	5,230	20.8	$ 1,088
Clementon	1,710	370	340	-	2,420	2,660	2,660	17.7	471
Haddonfield	720	330	200	-	1,250	1,380	1,380	15.1	208
Moorestown	1,370	280	260	-	1,910	2,100	2,100	18.8	395
Sub Total	7,230	1,390	1,720	-	10,340	11,370	11,370	(19.01)	2,162
Burlington	560	140	290	-	990	1,090	190	-	-
Sub Total	7,790	1,530	2,010	-	11,330	12,460	11,560	-	-
Turnersville	320	50	-	-	370	370	370	-	-
Total Suburban	8,110	1,580	2,010	-	11,700	12,830	11,930	-	-
Camden City	720	320	-	3,880	4,920	4,920	4,920	11.8	646
Total	8,830	1,900	2,010	3,880	16,620	17,750	16,850	(16.66)	$ 2,808
ESTIMATE NO. 2a									
Glassboro	4,130	510	970	-	5,610	6,170	6,170	20.8	$ 1,283
Clementon	2,460	450	350	-	2,860	3,150	3,150	17.7	558
Haddonfield	1,170	390	210	-	1,572	1,730	1,730	15.1	261
Moorestown	2,040	340	270	-	2,650	2,920	2,920	18.8	549
Sub Total	8,800	1,690	1,800	-	12,290	13,530	13,530	(19.02)	2,573
Burlington	720	170	310	-	1,200	1,320	190	-	-
Sub Total	9,520	1,860	2,110	-	13,490	14,850	13,720	-	-
Turnersville	320	50	-	-	370	370	370	-	-
Total Suburban	9,840	1,910	2,110	-	13,860	15,220	14,090	-	-
Camden City	940	970	-	3,880	5,790	5,790	5,790	11.8	749
Total	10,780	2,880	2,110	3,880	19,650	21,010	19,880	(16.71)	$ 3,322
ESTIMATE NO. 3a									
Glassboro	5,540	680	1,060	-	7,280	8,010	8,010	20.8	$ 1,666
Clementon	2,750	610	390	-	3,750	4,130	4,130	17.7	731
Haddonfield	1,180	530	230	-	1,940	2,130	2,130	15.1	321
Moorestown	2,470	450	290	-	3,210	3,530	3,530	18.8	664
Sub Total	11,940	2,270	1,970	-	16,180	17,800	17,800	(19.00)	$ 3,382
Burlington	1,050	230	340	-	1,620	1,780	190	-	-
Sub Total	12,990	2,500	2,310	-	17,800	19,580	17,990	-	-
Turnersville	320	50	-	-	370	370	370	-	-
Total Suburban	13,310	2,550	2,310	-	18,170	19,950	18,360	-	-
Camden City	1,440	970	-	3,880	6,290	6,290	6,290	11.8	808
Total	14,750	3,520	2,310	3,880	24,460	26,240	24,650	(17.00)	$ 4,190

Note:
See notes on Statement 10-c for the basis of the above passenger estimates

STATEMENT 10-c

Proposed South Jersey Rapid Transit Lines

BASIS OF PASSENGER ESTIMATES SHOWN ON STATEMENTS 10-a AND 10-b

NOTES

Suburban Passengers on Proposed Rapid Transit System include:
100% of present interchange passengers from auto, bus and railroad to Bridge Rail line, and the following percentages of the total non-interchange passengers between the suburbs and Camden-Philadelphia

	Bus	Auto	Railroad – Cont.
Est. No. 1 and 1a	25%	10%	75%
" No. 2 and 2a	33-1/3%	15%	80%
" No. 3 and 3a	50%	25%	90%

An additional allowance of 10% has been added to all estimates to cover generation of additional traffic and terminal traffic at the outer ends of the lines.

Camden-Philadelphia Passengers on Proposed Rapid Transit System include:
100% of Bridge Line Passengers, excluding suburban interchange passengers and the following percentages of the total bus, and automobile passengers between Camden and Philadelphia.

START →

	Bus	Auto – Cont.
Est. No. 1 and 1a	10%	5%
" No. 2 and 2a	13%	7-1/2%
" No. 3 and 3a	20%	15%

Passengers shown from Turnersville area (no R.T. line) and Burlington (when Burlington line is excluded) represent interchange passengers between the Bridge Rail line and other facilities serving these areas. In the computation of passenger revenue these passengers are included with Camden passengers.

Passengers shown for Bridge Rail Line in Column D, exclude suburban interchange passengers carried on this line.

passenger revenue. All passenger and dollar figures are in thousands.

The assumed percentages of diversion of suburban traffic to the proposed rapid transit lines have been applied to the net volumes of traffic on each of the existing facilities after excluding the estimated traffic which feeds into the Bridge line by interchange. The total interchange traffic is included in the rapid transit traffic in addition to the estimated diversion. Ten per cent has been added to the total estimates of suburban traffic to cover generation of additional traffic and terminal traffic at the outer ends of the rapid transit lines.

With respect to the Camden-Philadelphia traffic, smaller diversion percentages were applied to the cross-river bus and automobile traffic to obtain estimates of rapid transit traffic. The estimates reflect the assumed provision of improved transportation service between Camden railroad stations and Philadelphia. The estimated net Bridge Rail Line passengers (i.e. excluding interchange from suburban facilities) are included in the total from Camden.

The traffic estimates developed in Statements 10a and 10b covering the five proposed lines range from 11,480,000 to 17,620,000 passengers per year on 1941 traffic levels and from 17,750,000 to 26,240,000 passengers per year on 1944 levels.

The traffic densities for the respective proposed lines as indicated by our lowest and highest estimates are as follows:

Line	Miles from Broadway Station	Lowest Est. (No. 1) Passengers (Thousands)	Lowest Est. (No. 1) Pass.Per Mi. (Thousands)	Highest Est. (No. 3a) Passengers (Thousands)	Highest Est. (No. 3a) Pass.Per Mi. (Thousands)
Glassboro	17.5	3,330	190	8,010	458
Clementon	12.7	1,860	146	4,130	325
Haddonfield	5.8	1,070	184	2,130	367
Moorestown	10.4	1,500	144	3,530	340
Sub-Total	46.4	7,760	167	17,800	383
Burlington	17.1	770	45	1,780	104
Total	63.5	8,530	135	19,580	308

Note: The above totals do not include the traffic from the City of Camden and the Turnersville suburban area, which are shown on Statements Nos. 10a and 10b.

The table evidences the extremely low traffic density indicated for the Burlington line, and we have eliminated it from later estimates as unduly burdensome from an economic viewpoint. Our opinion concurs with that reached by Gibbs & Hill, Inc. in their 1938 report.

Subsequent to the completion of our estimates, we received certain supplemental information which indicates that the passengers shown for the Burlington line in the above table should be increased 20 and 40 thousand, respectively. This would change the density figures from 45 to 46 thousand for Estimate No. 1, and from 104 to 106 thousand for Estimate No. 3a.

Comment

We are of the opinion that the 1941 traffic level provides the best measure of postwar traffic over a period of years and also in this case the distribution of traffic among the

respective facilities is more representative than the 1944 distribution.

Estimate No. 2, based on the 1941 level and a medium set of diversion percentages, is in our opinion the most indicative of the probable average diversion in the postwar period. Estimate No. 1 is, we believe, on the low side and the premises of Estimate No. 3 are entirely too high. These conclusions are based on an outright competitive situation. The development of a bus feeder system serving local communities and connecting with the stations on the rapid transit lines would, if obtainable, considerably increase the potentialities of rapid transit traffic.

Operation of the proposed rapid transit lines would, we believe, have a very material effect in accelerating the permanent development of the benefited New Jersey area which the population studies presented previously show has lagged in the decade 1930 to 1940. An increase in basic riding due to such development is therefore to be expected.

It is impossible for anyone to predict with assurance the future traffic of the proposed rapid transit lines but we believe that the best measure for testing the economics of the proposed lines would be on the basis of a volume of passenger traffic ranging between 12,000,000 and 15,000,000 annual passengers, nominally based on 12,700,000 passengers of Estimate No. 2, with initial allowance for lag in diversion and later allowance for growth over a period of years.

Average Rate of Fare

In our estimates of passenger revenue we have used, as previously stated, an average rate of fare for each of the proposed suburban lines based on the schedule of fares assumed by Gibbs & Hill, Inc. in their earlier study. The individual rates per round trip to central Philadelphia as compared with the present rates on bus and railroad lines are shown on Statement No. 8.

The average suburban rates of fare used in our revenue estimates for each of the proposed rapid transit lines are based upon the average of the rates shown for the respective stations on the line weighted 30 per cent cash fares and 70 per cent ticket fares, with recognition given to riding to Camden at 20 cents less per round trip than to Philadelphia. Traffic between Camden and the suburbs was estimated at 23 per cent of the total traffic.

The average rate of fare for Camden-Philadelphia traffic was estimated at 11.8¢ on the basis of 10¢ and 15¢ cash fares. No amounts were added to any of the fares for "exchange ticket" charges for interchange to the PTC system. All of the estimated passenger revenue has been credited to the operation of the proposed rapid transit lines, with no credit to the PTC system for interchange rides.

The average rates of fare used in our estimates are as follows:

Line	One-Way Avg. Fare
Glassboro	20.8¢
Clementon	17.7
Haddonfield	15.1
Moorestown	18.8
Camden (all lines)	11.8

The resulting average one-way rate of fare for the combined rapid transit lines ranged between 16.7¢ and 17.0¢ per passenger.

Summary of Traffic and Passenger Revenue

For convenience of reference, the results of the respective estimates of passenger traffic and passenger revenue are summarized below. All figures are stated in thousands per year.

Based on 1941 Traffic				Based on 1944 Traffic			
	Passengers	Excl Burlington Line			Passengers	Excl Burlington Line	
Est.	5-Lines	Passengers	Revenue	Est.	5 Lines	Passengers	Revenue
1	11,480	10,900	$ 1,836	1a	17,750	16,850	$ 2,808
2	13,430	12,700	2,150	2a	21,010	19,880	3,322
3	17,620	16,570	2,811	3a	26,240	24,650	4,190

ESTIMATED

ESTIMATED FINANCIAL RESULTS

ESTIMATED FINANCIAL RESULTS

Range of Estimates

In recognition of the variation in expectable results at different traffic levels, we have prepared estimates of the financial results of operation of the proposed rapid transit lines for a range of traffic levels between approximately 11 million and 20 million annual passengers. This corresponds with the range in our passenger estimates Nos. 1, 2, 3 and 2a and includes the range of 12 million to 15 million annual passengers which we believe is most significant for testing the economic potentialities of the project.

Total Revenues

Estimates of total revenues of the proposed rapid transit lines are based on the passenger revenue estimates as developed in a preceding section plus an estimated amount of $40,000 for "other revenue" including car and station advertising, etc. The respective estimates of passengers and gross revenues for which operating results were developed are as follows:

Estimate No.	Annual Passengers	Annual Gross Revenue
1	10,900,000	$1,876,000
2	12,700,000	2,190,000
3	16,570,000	2,851,000
2a	19,880,000	3,362,000

Operating Expenses

Basic Operating Statistics

Service

Estimated hourly passenger loads for each of the proposed lines were developed from hourly counts of bus passengers crossing the Delaware River Bridge, adjusted for additional railroad traffic in the rush periods. Operating schedules were developed from the hourly passenger requirements and the assumed train headways for the respective individual rapid transit lines. Variation in train lengths and total number of cars required in operation were determined from the hourly passenger requirements and basic car loading assumptions. Resulting train lengths vary from 1, 2 or 3 car trains in non-rush periods to 3, 4, 5, 6 or 7 car trains in rush periods, the larger trains applying to the greater traffic levels and to the routes with heaviest traffic.

Carloading

Carloading standards used assume about 95 to 100 passengers per car in the peak periods at the maximum load point. In non-peak hours the estimated schedules provide for seating of all passengers (on the basis of about 71 seats per car), most of the average non-rush loads ranging less than 60 passengers per car and in lighter traffic hours very much less.

Train Miles, etc.

Train miles, train hours, car miles and car hours were computed on the basis of operating all peak period service between

18th and Locust Streets and the outer terminal of each suburban line. In non-rush periods the through service was taken at a total of eight through trains per hour (2 on each line), with additional short route trains between Camden and Philadelphia. Individual schedule speeds (including layover) used for computation of train hours and car hours averaged about 20 miles per hour.

Cars Required

The total number of cars required in operation were determined from the schedule data with an allowance of 15 per cent added for spare cars necessary for maintenance and special service requirements.

Operating Unit Costs

Operating unit costs used for the proposed lines are based on 1943 costs of Penna.-Reading Seashore Lines as reported to the Interstate Commerce Commission and 1944 costs of the operation of the Bridge Rail Line as furnished by the Philadelphia Transportation Co. In the case of the railroad costs a large amount of prorating and modification was necessary to derive units applicable to the fractional portions of the system concerned and to recognize the electrified operation of the lines. Bridge Rail line expenses are much more definite, excepting "general" expenses of the Company applicable to the Bridge Line which were determined by prorating.

Unit costs for power were based upon rates available to the PTC under its large power contract with Philadelphia Electric

Company for most of the Bridge Line operation. For the New Jersey portion of the proposed operations, higher rates were used based on available data as to New Jersey rates. Wage rates for trainmen were based on PTC 1944 rates for subway-elevated trainmen and surface car operators. Social security and unemployment taxes included in the operating expense estimates were computed at 1.5 per cent of the total operating expenses.

Total Operating Expenses

Statement No. 11 opposite this page shows by major ICC Electric Railway Accounts our estimates of total operating expenses for the four proposed rapid transit lines, including the cost of operation of the Bridge Rail line to 18th and Locust Streets.

The estimates cover full expenses applicable to the lines to be jointly used by the proposed operation, i.e. before credit for such joint use with other operations. Costs of purchased power, trainmen's wages and maintenance and operation of rolling stock apply only to the proposed rapid transit service. In effect the estimates represent the total cost of operation of the proposed rapid transit lines without consideration of other use made of the facilities concerned. No adjustments have been made to reflect operating costs higher than indicated by the 1943-1944 basic data used.

Conducting Transportation

Estimated Conducting Transportation expenses include trainmen's wages and fare collection costs, among a number of other items. The proposed service involves a complication in fare

ESTIMATES OF TOTAL OPERATING EXPENSES
INCLUDING FULL MAINTENANCE COSTS ON JOINTLY USED LINES, GENERAL EXPENSES OF OPERATOR
AND ALSO INCLUDING PAYROLL TAXES

10 ant.

	Four Proposed Rapid Transit Lines Glassboro, Clementon, Haddonfield and Moorestown				Glassboro Line alone	
	Est. No. 1	Est. No. 2	Est. No. 3	Est. No. 2a	Est. No. 2	Est. No. 2a
Way and Structures	$ 421,000	$ 421,000	$ 421,000	$ 421,000	$ 204,000	$ 204,000
Equipment	214,000	243,000	298,000	331,000	134,000	177,000
Power-Maintenance and Operation	631,000	690,000	798,000	864,000	370,000	454,000
Conducting Transportation	1,059,000	1,117,000	1,219,000	1,273,000	661,000	728,000
General and Miscellaneous and Traffic	122,000	122,000	122,000	122,000	73,000	73,000
Total Operating Expenses	2,447,000	2,593,000	2,858,000	3,011,000	1,442,000	1,636,000
Social Security and Unemployment Taxes	37,000	39,000	43,000	45,000	22,000	25,000
Total Including Payroll Taxes	$2,484,000	$2,632,000	$2,901,000	$ 3,056,000	$1,464,000	$ 1,661,000
Total Passengers	10,900,000	12,700,000	16,570,000	19,880,000	7,830,000	10,060,000
Operating Exp. (incl. Payroll Taxes) per passenger	22.8¢	20.7¢	17.5¢	15.4¢	18.7¢	16.5¢

Note: Expenses shown include costs of operation of the suburban lines and the cost of operation of the Bridge Rail line to 18th & Locust Sts., Philadelphia.

Statement No. 11

collection which should be noted on account of its bearing upon operating expenses. Fare collection on the Bridge Rail line is controlled by cashiers at the respective stations. On the suburban lines the control would be by train collection, necessitating a sufficient number of trainmen to perform fare collection duties. In order to prevent the use of suburban-Camden tickets for rides across the Bridge to Philadelphia, it would be necessary to provide a supplemental check of all passengers on trains while crossing the Bridge. This would require the use of some form of fare receipt. This check would be in addition to the usual fare collection on trains in the suburban area, and in addition to cashier collection at Camden and Philadelphia subway stations.

In our estimates of trainmen's wages we have assumed train conductor crews ranging from an average of 1.0 to 0.75 men per car (depending upon train lengths), plus an allowance for "booster" conductors to assist in fare checking in the run between Philadelphia and Camden in rush hours. The estimates also include allowances for cashiers' wages at all Camden and Philadelphia subway stations.

Credit for Joint Use of Facilities

In our estimates of financial results of operation we included an assumed credit to the operating expenses of the proposed lines for joint use of the railroad lines concerned. The amount of the credit used is necessarily tentative and would ultimately be determined in connection with the negotiation of an operating agreement. The credit used was developed on the basis of

dividing equally between the railroad and the proposed rapid transit lines the estimated cost beyond Broadway Station in the following accounts:

Way and Structures
Power (excluding purchased power)
Conducting Transportation (excluding trainmen's wages)
General and Miscellaneous

No credit to operating expenses has been made for joint use of the 8th Street and the Locust Street Subways. The Eighth Street station is now jointly used by the Bridge line and would continue to be so used. The Locust Street subway, now unoperated, would be utilized specifically for the proposed rapid transit lines. On account of the proposed extension of Bridge line service into the Locust Street subway and because of the physical layout of the Eighth-Locust Street subways, it would be necessary to also extend the Ridge-Eighth Streets subway service to 18th and Locust Street, at least in rush hours. This would involve additional expense upon the Philadelphia subway system without accompanying increases in traffic. The primary purpose of the Locust Street subway insofar as Philadelphia is concerned is to serve as a terminal for a proposed subway to extend to West Philadelphia. Under these circumstances any computed credit for the joint use of 8th Street station would probably be at least balanced by the additional costs of operation of Philadelphia subway trains.

Rentals and Other Deductions

In order to afford some indication of the effect upon the end results of rentals and other necessary deductions, we have recognized in our statements estimates of those items for which reasonably tangible measures are available. These are carrying charges on new investments required and rentals which would be due the Delaware River Joint Commission and the City of Philadelphia on the basis of the present per passenger rental charges of 2.5 cents and 2.0 cents respectively.

It is evident that the debt service costs to be experienced will reflect, in addition to money market factors, the manner in which the project is set up, financed and supported. We have assumed public financing and support, and for present purposes have assumed a 5 per cent rate to cover interest and amortization and applied this rate to the total new investments required, arriving at costs in the order of $600,000 per year. Obviously any grants in aid, or more favorable financing assumptions, would reduce this item.

In our statements we have not shown deductions representing fixed charges on any of the existing investment in the facilities to be utilized, because the estimated rental charges for use of the Bridge Line and the Philadelphia subways are presumed to cover the total charges for such use.

A major rental item for which no estimate has been included would be for the proposed use of railroad right of way and other facilities. This has been left as an open item

because a satisfactory gauge of its amount is not available and probably could only become available incident to specific negotiations with the railroads.

Other possible deductions for which no amounts have been included are taxes other than payroll taxes, and management fees for operation of the proposed lines.

Summary - Results of Operation

Statement No. 12 opposite this page shows a general summary of the estimated results of operation of the four proposed lines based upon the premises and estimates previously described. It also shows a similar summary of two estimates based on the operation of the Glassboro line alone, premised upon the possibility that this line might be connected with the Bridge line and Locust Street Subway as an initial step in the proposed rapid transit program. The estimated financial results are shown in the upper portion of the table and corresponding statistics of passengers, new investments, car miles operated and number of cars required are shown in the lower portion.

Results for Four Proposed Lines

The balances of income after total operating expenses, shown on line 6 indicate annual deficits ranging from $608,000 to $50,000 for estimates Nos. 1, 2 and 3, and a net balance of $306,000 for estimate No. 2a based on carrying about 20 million passengers. The balances of income after crediting the tentative amounts for joint operation of railroad lines, shown on line 8,

STATEMENT NO. 12

Proposed South Jersey Rapid Transit Lines

ESTIMATED RESULTS OF OPERATION

ASSUMING A CREDIT TO OPERATING EXPENSES FOR JOINT USE OF RAILROADS; DEDUCTIONS FROM INCOME BASED ON PRESENT PER PASSENGER RENTAL CHARGES FOR USE OF DELAWARE RIVER BRIDGES, AND 5% CARRYING CHARGES ON NEW INVESTMENT

Line	Item	Four Rapid Transit Lines (Glassboro, Clementon, Haddonfield and Moorestown) Estimate No. 1		Four Rapid Transit Lines (Glassboro, Clementon, Haddonfield and Moorestown) Estimate No. 2		Four Rapid Transit Lines (Glassboro, Clementon, Haddonfield and Moorestown) Estimate No. 3	Glassboro Line alone Estimate No. 2a		Glassboro Line alone Estimate No. 2		Glassboro Line alone Estimate No. 2a	
1	Revenue											
2	Passenger Rev.	$1,836,000		$2,150,000		$2,811,000	$3,322,000		$1,209,000		$1,672,000	
3	Other Rev.	40,000		40,000		40,000	40,000		34,000		34,000	
4	Total		$1,876,000		$2,190,000			$3,362,000		$1,243,000		$1,706,000
5	Operating Expenses		2,484,000		2,632,000	2,901,000	2,901,000	3,056,000	1,464,000	1,464,000	1,661,000	1,661,000
6	Balance		608,000		442,000	50,000		306,000		221,000		45,000
7	Credit for Joint Use by R.R.		498,000		506,000	518,000		526,000		237,000		245,000
8	Balance of Income		110,000		64,000	468,000		832,000		16,000		290,000
9	Deductions											
10	Rentals											
11	Del. R. Bridge (2-1/2¢)	232,000		270,000		352,000	422,000		166,000		214,000	
12	City of Phila. (2.0¢)	185,000		216,000		282,000	338,000		133,000		171,000	
13	Total	417,000		486,000		634,000	760,000		299,000		385,000	
14	Debt Service on New Invest.(5%)	548,000		595,000		649,000	679,000		273,000		321,000	
15	Total Deductions		965,000		1,081,000	1,283,000		1,439,000		572,000		706,000
16	Net Balance BEFORE: Rental for R.R. Facilities Operating Fee, if any Taxes, if any		$1,075,000		$ 1,017,000	$ 815,000		$ 607,000		$ 556,000		$ 416,000
	Statistics											
	Total Passengers		10,900,000		12,700,000	16,570,000		19,880,000		7,830,000		10,060,000
	Bridge Passengers (85%)		9,265,000		10,795,000	14,085,000		16,898,000		6,656,000		8,551,000
	New Investments—											
	Cars @ $60,000 each		$ 3,960,000		$ 4,200,000	$ 5,280,000		$ 5,880,000		$ 2,580,000		$ 3,640,000
	Other		7,000,000		7,700,000	7,700,000		7,700,000		2,880,000		2,880,000
	Total		$10,960,000		$11,900,000	$12,980,000		$13,580,000		$ 5,460,000		$ 6,520,000
	Car Miles		4,275,000		4,875,000	5,969,000		6,625,000		2,698,000		3,531,000
	Number of Cars Required		66		70	88		98		43		59

Notes: No allowance made for charges for use of railroad property; operating fees or taxes (except payroll taxes).
Debt Service is computed at 5% on new investment (excl. Locust St. Subway new investment, $1,800,000).
Credit for Joint Use by R.R. is a tentatively assumed distribution of estimated maintenance and operating costs, subject to determination incident to the negotiation of an operating agreement.

indicate a deficit of $110,000 in estimate No. 1 and net balances ranging from $64,000 to $832,000 for the remaining estimates.

Total annual Bridge line rentals, ranging between $417,000 and $760,000, as estimated on the basis of present per passenger charges, are shown on line 13. Adding the estimated annual fixed charges on new investment, estimated at 5 per cent, results in totals for all deductions included in the estimates ranging between $965,000 and $1,439,000, as shown on line 15.

The balances of income after these deductions, shown in line 16, are deficits in all estimates, the annual amounts ranging from $1,075,000 to $607,000 for a spread in traffic ranging from about 11 million to about 20 million total passengers carried. These estimated results are before allowances for rentals for use of railroad property, possible claims for operating fees, or for taxes other than payroll taxes.

The estimated financial results of operation are shown graphically on Chart No. 4 facing this page. On this chart there is shown for Estimates Nos. 1, 2, 3 and 2a a comparison between estimated total revenues, line (1), and the cost of service, before charges for use of railroad property, operating fees or general taxes, line (4). Line (2) shows the amounts estimated for total operating expenses and payroll taxes, and line (3) shows the same item after credit for joint use of railroad facilities. Line (4), cost of service, is the result of adding to the net operating expenses rental charges for the use of the Bridge Line and the Philadelphia subways and debt service costs on required new investment.

It is apparent that on the basis of the estimates the proposed rapid transit lines will be far from self-supporting within the range of traffic considered.

Possibilities of Lower Bridge Line Rentals

It will be noted, however, that the Bridge line rentals computed on the present 4.5 cents per passenger basis increase rapidly to large amounts at the higher traffic levels. This would appear to justify a contention that the per passenger rentals should be materially reduced, and possibly placed on a graduated per passenger scale decreasing in some inverse relationship to the total number of passengers carried. Actual Bridge line rentals in the years 1941 and 1944 were approximately $200,000 and $370,000, respectively. The estimated total Bridge line rentals included in our estimates for the proposed rapid transit lines range between $417,000 and $760,000.

Contrary to the view that rental rates should be reduced, are the facts that: (a) Most of the initial traffic of the proposed rapid transit lines will be diverted from other transportion facilities now paying tolls on the Delaware River Bridge, including bus tolls amounting at present to around 2 cents per passenger and automobile tolls amounting to around 8 cents per passenger; (b) Certain of the covenants in the Official Statement issued by the Delaware River Joint Commission relative to the bonds presently outstanding might serve to limit the Commissions' freedom of action in the premises; (c) In order to provide for the operation of the Locust Street subway, it will

be necessary for the City of Philadelphia to spend approximately $1,800,000 for finish and equipment, resulting in added annual charges to the City of upwards of $75,000 per year; and (d) The 2.0 cents per passenger rental presently payable to the City of Philadelphia for all bridge line passengers using the City's subway is an application of a rental provision applicable to the entire Broad Street Subway System, and the likelihood of concessions in favor of a minor component of its total traffic would appear remote.

Possibility of Use of Present Cars

The Delaware River Joint Commission owns 26 cars, of which only about one half are required in present regular Bridge line service. The Commission assumes the responsibility of providing cars for the Locust Street Subway and it is likely that the cars now owned would be sufficient to provide for the extension of the present Bridge Line service into Locust Street. No credit has been taken in our estimates of financial results of the proposed rapid transit lines for the use of the presently owned cars. If it were decided to continue to use these cars under the rapid transit plan there would be a reduction in estimated new investment of $1,560,000 and a saving in annual fixed charges in all estimates of about $78,000.

Results of Operation of Glassboro Line alone

Operation of the Glassboro line, through-routed with the Bridge line and the 8th-Locust Street subways, has been recognized

as a possible initial step in our estimates. This line serves the concentrated populations of South Camden, Gloucester City and Woodbury and our estimates indicate that it has the greatest potential traffic of any of the proposed lines under the existing state of development of the New Jersey area. The fact that the line is already electrified would be an advantage over the other projected lines in the matter of initial new investment required.

The estimated operating results for this line in combination with the Bridge Line are shown on Statement No. 12 for traffic levels corresponding with those of estimates Nos. 2 and 2a of the broader plan. Passenger traffic would be more than half of the volume estimated for the broader plan because of the large traffic volume tributary to this line, supplemented by the present Bridge line traffic. The latter traffic includes interchange at Camden from facilities now serving the areas tributary to the other proposed rapid transit lines. New investment required would be roughly half of the amount required for the broader plan.

The deduction from revenues of the net operating costs, rentals and debt service charges results in the deficit shown on line (16) of Statement No. 12, and repeated below in comparison with the corresponding figures for operation under the full plan. As previously stated, these deficits are before allowances for rentals of railroad property and rights or for any operating fees or general taxes which might be experienced:

	Deficits from Operation as Defined	
	Traffic Level of Estimate No. 2	Traffic Level of Estimate No. 2a
Full Plan	$1,017,000	$607,000
Glassboro Line Alone	556,000	416,000

It will be noted that the estimates indicate that the cost advantages of curtailment to one line become less under the higher traffic levels of Estimate No. 2a.

OTHER TRANSPORTATION PLANS AND STUDIES

The Camden terminus of the Bridge Line was located adjacent to the P.R.R. tracks at Broadway station in a position convenient for possible future connection between the Bridge line and the railroads. The more immediate plan for traffic distribution at the time the Bridge line was built was that of providing a bus terminal in Camden to enable convenient interchange between New Jersey bus lines and the Bridge Rail line. An official report made by L. Alfred Jenny & Company in May 1934 proposed the extension of the Bridge Line in New Jersey by means of two concentric loops using the existing railroads and new interconnections. This study was followed in 1938 by the official report of Gibbs & Hill, Inc. on the proposed connection of five of the railroad branches with the Bridge line for through operation into the Locust Street Subway.

With respect to the Philadelphia end of the Bridge line a number of routing studies were made prior to construction, including studies of the possibilities of connecting the line with

the Market Street Subway and with the then new 8th Street Subway. Connection with the 8th Street Subway proved to be the only practical plan, other than the construction of a separate subway terminal for the Bridge Line, and was therefore adopted. We understand that over the years, studies have been made by the Pennsylvania Railroad of the possibilities of connecting its New Jersey lines with the P.R.R. Suburban station at 16th & Filbert Streets, Philadelphia, via a new subway in Filbert or Arch Streets and a connecting tunnel under the Delaware River. The possibility of using the Delaware River Bridge in lieu of a tunnel has also been considered.

The Proposed Camden Bus Terminal

The plan for using the New Jersey bus lines as gathering and distributing facilities for the Bridge Rail line by means of an interchange terminal in Camden and the radical reduction of competitive cross-river bus service were definite objectives in the original plans for the Bridge line. The proposal to provide such an interchange terminal is recognized in the lease of the Bridge line to P.T.C. Negotiations for the construction of such a terminal, extending over a period of years, have failed and there is at present no indication that the project will be revived. In 1942 we made a study of and a design for a bus terminal to be located at City Hall Station in Camden. Our estimates indicated that a terminal located in the available space at that point would accommodate about 50 per cent of the total passenger traffic carried over the Bridge in buses at the

1942 traffic level. The studies also showed that this volume of traffic represented about the maximum which could be accommodated at 8th Street Station in Philadelphia without extending the Bridge line operation into the Locust Street Subway.

The curtailment of through bus service over the Bridge and the construction of an interchange terminal to facilitate transferring would undoubtedly increase Bridge line traffic. It is our understanding that there is no public pressure for the construction of a transfer terminal and that the general desire, at least of suburban communities, is for through-service to Philadelphia. However, there is at present a large volume of interchanging between buses and the Bridge Line at both City Hall and Broadway stations. Extension of the Bridge line service over the railroad lines as considered in this report would almost eliminate the need of a bus interchange terminal.

The Jenny Plan

The plan for extension of the Bridge Line Service proposed in the Jenny report was designed to provide a rapid transit service to a rather compact suburban territory lying within a five or six mile circle from the Bridge and leave to the railroads or to feeder bus lines the traffic originating beyond this zone. The plan contemplates the construction of two concentric loops of roughly square shape utilizing existing railroad lines supplemented by newly constructed cross-connections, and the operation of service in both directions around both loops.

The cost of construction and equipment was estimated (in 1939) at about $6,000,000. No estimates of earnings and expenses were presented and the traffic potentialities were touched upon only in a most general way.

The proposed loops would be routed through the more densely populated areas of the Camden suburban territory and would intersect the Camden radial lines, highways, railroad and bus routes, forming junctions for transfer of traffic originating at more distant points. The operation of the loops, particularly the large outer loop, would be subject to the important disadvantage of wasting a considerable proportion of the car-mileage operated due to the round-about routing. Service between Philadelphia and Haddonfield, for example, would be available by two routes, northwardly through Merchantville, and westwardly through Gloucester, both of which would be circuitous and ineffective as compared with the radial routes of existing bus and rail lines. The proposed inner loop would have the same inherent disadvantage but to a very much smaller extent. It would have considerable merit as a traffic distribution facility if supplemented by interchange between it and feeder lines serving the more distant areas. In the event the presently proposed plan of connecting the various railroads to the Bridge Line cannot be consummated, or is rejected, a small delivery loop such as the inner loop proposed in the Jenny report would, in our opinion, merit more detailed study.

New Tunnel and Subway to P.R.R. Suburban Station

As a comprehensive railroad project, the connection of the New Jersey lines with the P.R.R. Suburban station in Philadelphia by means of a tunnel under the Delaware River and a new subway in Arch or Filbert Streets would be highly effective from the viewpoint of public convenience, and also very expensive. Such a connection would permit the operation of both local and long distance (seashore) service directly to the Suburban station and would probably permit the provision of at least one other local station along the Philadelphia portion of the route.

The construction and operation of such a tunnel would eliminate any need for connecting the Camden end of the Bridge Line with the railroads in order to give through rail service to the suburban areas. It would tend to drain much of the present passenger traffic from the Bridge Line and also to reduce the bus and automobile traffic over the bridge.

Protection against the effect of such eventualities has been provided in the covenants made between the two states and the Joint Commission and the holders of the presently outstanding bonds. So long as any of the bonds remain outstanding, or until adequate provision is made by law for the protection of their holders, the two states agree that they:

> "x x x x will not diminish or impair the powers of the Commission to own, operate or control said bridge or the facilities thereon x x x and will not authorize or permit the authorization of the construction, operation or maintenance of any additional vehicular bridge or tunnel, or any additional bridge or tunnel having railroad

> or other facilities for the transportation of passengers between xxxx (the two states) xxxx, over or under the Delaware River, by any other person or body than the Commission, within a distance of ten miles in either direction from the said Delaware River Bridge, x x x x" (Official Statement, July 8, 1943).

Construction in Philadelphia and in Camden would also raise questions of municipal consent. Assuming that the railroads should desire to proceed with such an undertaking, it is evident that formidable legal, financial and legislative hurdles would have to be cleared before the project could be consummated.

New Subway Terminal for the Bridge Line

Construction of a new subway terminal in Philadelphia for the Bridge Line also offers substantial possibilities from the viewpoint of public convenience, although its economic prospects are not so apparent. Such a subway between about 7th & Race Streets and 16th & Filbert Streets, principally via Arch and Filbert Streets, would provide a direct connection between the Bridge Line and the P.R.R. Suburban Station, with probably several intermediate stations for local delivery. It would afford nearer access to points in the central business district than would the Locust Street subway, but on the other hand would deprive the users of the transfer and exchange privileges to the P.T.C. system now available to patrons of the Bridge Line as it is now operated.

If the proposed connection with and electrification of the New Jersey rail lines were then carried out, through railroad service could be operated between the Suburban Station and the

New Jersey Suburban areas. This service would be limited to the use of multiple unit cars of sizes and with other physical aspects compatable with the clearances etc. provided by the existing Bridge Line construction, as the latter would not permit the use of standard railroad equipment, and the Bridge is not designed to carry locomotive loads.

This plan would also have an advantage over the project being reported upon in that it would separate the railroad commuter service from the urban transit service in Philadelphia, the operating and fare collection requirements of which are conflicting in several respects. The separation would remove many of the restrictions or operating burdens imposed upon the extended Bridge Line service by the proposed joint use of the 8th Street-Locust Street subways. It would also place the entire commuter operation under the sole operating control of one agency, presumably the railroads.

The consummation of this plan as a whole would add at least the cost of the new subway section in Philadelphia - roughly $10,000,000 to the approximately $12,000,000 of new investment required if the use of the Locust Street subway is assumed. Operating costs should be somewhat less by reason of simplified fare collection and other transportation procedures. Problems of required municipal, legislative and commission consents would appear in general similar to those described in connection with the project being reported upon, and, because of the lesser adverse effect upon Bridge revenues, less onerous than those which would arise if a new tunnel were under consideration.

SUMMARY

SUMMARY

We have previously referred to the cooperation so freely extended to us in the supply of traffic and operating data and pertinent general information by the agencies more or less directly involved in the proposed extension of Bridge Line service, some as potential participants, others as potential competitors. We also participated in discussions of the project between representatives of the Department of Economic Development and officials of the Delaware River Joint Commission, Pennsylvania Railroad, the Philadelphia Transportation Company and the Public Service Interstate Transportation Company. While these conferences did not develop specific answers covering corporate position, rental requirements, etc., they did develop the existence of an attitude sympathetic to any endeavor to promote the general welfare of the metropolitan area by improved public transportation, but also a general recognition of the financial, legal and physical problems involved in the proposal.

START → The development of the facts and estimates bearing upon the project in prior sections of this report has generally been accompanied by comment as to their significance. In view of the summarization presented in our letter of transmittal, it seems sufficient to present here only the briefest summary of our major conclusions which include:

(1) The characteristics of the suburban areas to be served are such as to give to travel by bus or private automobile a strong competitive position with respect to the proposed extension of the

Bridge Line service. These two types of travel account for about 90% of the estimated "traffic pool" from which the proposed operation will have to divert most of its traffic. We estimate the said pool at about 42,000,000 passengers per year at 1941 traffic levels and about 53,000,000 at war-time levels of 1944.

(2) In our judgment, the surrounding circumstances indicate a total traffic in the field between 12,000,000 and 15,000,000 passengers per year as a reasonable expectation to use for the purpose of testing the economics of the project. The Bridge Line, as now constituted, carried 5,100,000 passengers in 1941 and 8,200,000 in 1944.

(3) The new investment requirements for connecting the Bridge Line with the railroads, converting and equipping four sections of the railroad and providing the necessary passenger cars are estimated to range between $12,000,000 and $13,000,000.

(4) The estimated earnings of the lines, based on competitive fares, are such that the deduction of: (a) system operating expenses less a tentative credit for joint use of the railroad sections; (b) rentals for use of the Bridge Line and the Philadelphia subways; and (c) interest and amortization charges on required new investment; there results deficits in the order of $1,000,000 per year before payment of any rentals for the use of railroad property.

(5) Even if it were assumed that the new investment requirements were met by a grant-in-aid, or the carrying charges thereon were absorbed by the State of New Jersey, there would still have to be met a deficit (before railroad rentals) in the order of $300,000 or $400,000.

(6) The project is clearly in a class where consummation must depend upon public financing and support, rather than private capital. Justification for subsidizing the project would have to rest upon its potentialities for developing the areas to be served, with the burden of the necessary support carried either alone or in combination by the State and the benefited communities.

The foregoing report upon the proposed extension of Bridge Line Service into the Camden suburban areas is respectfully submitted.

DAY & ZIMMERMANN, Inc.

H. E. Ehlers
Vice President

R. G. Berryman
Engineer