HOUSE . . . . No. 1569

The Commonwealth of Massachusetts.

SPECIAL REPORT OF THE MASSACHUSETTS HIGHWAY COMMISSION, UNDER CHAPTER 57 OF THE RESOLVES OF 1913, RELATIVE TO THE ADVISABILITY AND EXPENSE OF MAINTAINING AS A STATE HIGHWAY A PORTION OF NORTH BEACON STREET IN BOSTON AND WATERTOWN.

MASSACHUSETTS HIGHWAY COMMISSION,
15 ASHBURTON PLACE, BOSTON, Jan. 13, 1914.

To the Honorable Senate and House of Representatives in General Court assembled.

The Massachusetts Highway Commission, by chapter 57 of the Resolves of 1913, was authorized to investigate, and report to the General Court of 1914, as to the advisability and probable expense of taking and constructing as a State highway, at a width of not less than 70 feet, North Beacon Street in the city of Boston and the town of Watertown, from Union Square in Boston to Watertown Square in Watertown.

The commission has had an investigation and surveys made by its engineers, and transmits herewith the report of its chief engineer, giving the result of his investigation, and a preliminary estimate of the probable expense of constructing said street 80 feet in width.

It appears from this investigation that the estimated cost of laying out and constructing such a highway, including the new bridge which would be necessary over the Charles River, would be $848,850; the estimate for the cost of the portion in the city of Boston being $502,450, and in the town of Watertown, $346,400.

This estimate of cost includes the cost of constructing side-

walks, but does not include the widening of the bridge carrying the tracks of the Boston & Albany Railroad. The engineers of said railroad estimate that it will cost $203,350 more to widen that bridge.

This would bring the total estimated cost of the improvement up to over $1,000,000.

The estimate of cost does not include the expense of moving water and gas pipes, conduits, electric and telephone wires, car tracks, etc., nor the expense of replacing the same in a new location, — all of which would be necessary; but it seems as if the cost of that work should be borne by the corporations, or departments, owning or having charge of the same.

The value of the land taken and the amount of damages are necessarily approximate only, and this estimate is based upon the assessed value of the property taken or affected. It is impossible to determine in advance what these damages will amount to.

A cerain amount of land now owned or controlled by the United States government as a part of the Watertown Arsenal grounds, and also some land controlled by the Metropolitan Park Commission, will be needed if the improvement is made, but the estimate does not include any money for this land, as the Board assumed that it could be secured without any money payment.

A portion of the present road is located on land owned or controlled by the government, and an act of Congress would probably be necessary before anything could be done on the government land.

Before the new bridge was built the plans would have to be approved by the War Department in Washington.

North Beacon Street.

North Beacon Street is one of many thoroughfares in the metropolitan district entering into the city of Boston which is inadequate, and which needs widening and reconstruction.

It is the direct road to Watertown, Waltham and a few towns beyond. It has a certain amount of teaming and quite a little traffic, but of course it has very much less traffic, and is not nearly as important as a main thoroughfare, as the main routes through Cambridge, Somerville, Charlestown or Chelsea,

on the north, or the main routes through Dorchester, Quincy, etc., on the south. On all of these main routes there is a great necessity for wider and better highways, with new and more adequate bridges.

The commission believes that the question of adequate main thoroughfares in the metropolitan district should be taken up by the cities and towns in the district, and some comprehensive plan should be adopted so that the necessary improvements would be made in a series of years; the most important being made first, and the others from time to time, in the order of their importance, as fast as funds could be made available.

The commission does not believe it would be wise public policy for the Commonwealth, through this commission, to inaugurate the policy of constructing these main thoroughfares, in such a thickly settled and rich district, as State highways.

It would require an expenditure of a great many millions of dollars in the next few years, not only for highways, but for bridges as well.

The commission has for many years adopted the policy of constructing State highways on the main through routes in the country districts and poorer towns, on the roads connecting the larger cities and towns in the Commonwealth.

The State highways have rarely been constructed through the village streets, or in thickly settled districts, as it has seemed fair that the local communities should build such streets themselves. A very large number of the cities and towns have done this, and more and more are doing it every year. Many of them are also contributing large sums of money towards the cost of constructing State highways, and some towns and cities have paid the whole cost of construction. By no other policy can the main through routes, some two thousand miles in length, be completed in any reasonable length of time, or for any reasonable expenditure. About a thousand miles of State highway are already constructed.

Before the advent of the motor vehicle, when plain macadam or gravel roads, with 15 feet in width of hardened surface, were adequate to carry the traffic, State highways cost on the average about $10,000 a mile to construct.

Even to-day, when stronger and wider roads are needed

on the main routes, the cost will probably average from $15,000 to $18,000 a mile for some years, and on many routes, where the traffic will not be heavy, gravel, or sand and oil, or some much cheaper form of construction, can still be used, at perhaps one-half the cost, or less.

It is evident, therefore, that the construction of 1 mile of city street, or of one large bridge near any big city, would cost as much as the construction of from 10 to 60, or more, miles of State highway on these main routes which are much needed for intercity and interstate traffic.

Whenever a State highway has been laid out or constructed, the commission has required the county, city or town to furnish, and pay for, all the land and grade damages, drainage rights, and often to furnish the sub-grade as well, the Commonwealth merely paying for the construction of the road surface, — usually only 15 or 18 feet in width, with 3-foot shoulders. By law, all sidewalks are to be built and maintained by the cities and towns.

This policy of the State and of the commission has resulted in the construction of many more miles of highway than could have been built if any more expensive policy had been adopted. It seems wise to continue this same policy in the future, and thereby complete our trunk lines within a reasonbale number of years.

About 300 of the towns in the Commonwealth have a valuation of $10,000,000 or under. These towns altogether pay less than 20 per cent. of the State tax. About 80 per cent. of all the State highways already constructed are located in these towns.

Two hundred towns have a valuation of about $2,000,000 or less, and probably more than half the State highways are in these towns.

The main routes in these towns are now used daily by hundreds of motor vehicles from the cities and larger towns, as well as from other States. It is self-evident that these towns cannot possibly afford to build highways which can stand this traffic, nor can they afford to maintain them.

If Massachusetts is to retain its reputation for good roads, these highways must be built and maintained by the Commonwealth. This means, of course, that most of the cost of

construction and maintenance (excepting the quarter that is paid by the county and the small amount of maintenance that is paid by the towns) is paid through the State tax by the relatively rich communities, that pay most of the State tax. Their citizens are using and wearing out the road, and it seems only fair that they should pay for it.

If the Commonwealth is to bear any part of the cost of constructing main thoroughfares in the metropolitan district, or the larger cities and towns in the Commonwealth outside of the country districts, — where construction is relatively inexpensive, — it would seem fair that the counties, cities or towns should pay all the expenses incurred, except for the construction of the roadway itself, of some reasonable width, comparable to what has been expended in the other cities and towns where State highways have been constructed in the past.

This is what was done by the Legislature in 1907, by chapter 574, when the construction of about a mile of highway on Washington Street in Boston was authorized. A continuation of this construction was authorized by chapter 527 of the Acts of the year 1910, but before taking effect this act had to be accepted by the city council of the city of Boston, and it was never so accepted. The commission has been informed that some of the city officials thought it was better for the city of Boston to construct the road itself rather than pay for the rights of way, damages, drainage, etc., which the local communities usually provide or pay for when State highways are laid out in other parts of the State.

The commission realizes fully that the policy of the Commonwealth is settled by the General Court and not by the commission, but it seemed to it that the Legislature was entitled to know what policy the commission had adopted in the past, and the reasons which led to its adoption, and the results that would be secured if it were continued.

WM. D. SOHIER,
F. D. KEMP,
JAMES W. SYNAN,
Massachusetts Highway Commission.

CHIEF ENGINEER'S REPORT.

JAN. 1, 1914.

To the Massachusetts Highway Commission.

GENTLEMEN: — Chapter 57 of the Resolves of 1913 reads as follows: —

Resolved, That the Massachusetts highway commission is hereby authorized to investigate and report to the general court, not later than January fifteen in the year nineteen hundred and fourteen, as to the advisability and probable expense to the commonwealth of taking, constructing and maintaining as a state highway, at a width of not less than seventy feet, North Beacon street in the city of Boston and the town of Watertown, from that part of Boston called Union square, Allston, to that part of Watertown called Watertown square, and the commission may expend a sum not exceeding five hundred dollars for carrying out the provisions of this resolve. [*Approved April 10, 1913.*

For information for your use in preparing the report above called for, I respectfully report that surveys, cross-sections and estimates have been made, so that now we have quite complete data.

LENGTH.

The total length of North Beacon Street is 13,300 feet, the length in the city of Boston, Suffolk County, being 6,700 feet, and that in the town of Watertown, Middlesex County, being 6,600 feet.

WIDTH.

The width of the present street varies somewhat, but is everywhere approximately 50 feet. The estimates furnished herewith are based upon widening to a uniform width of 80 feet, that being a good width to provide for sidewalks and double-track street railway, and two clear roadways.

Alignment.

The alignment of the present street should not be materially changed, except at or near the property of the United States government in Watertown, and easterly of same across the Charles River, and for a short distance at the approach to said river in Boston. The reason for changing the alignment at these sections is to provide better grades, flatten objectionable curves, and provide better junction at the intersection of the metropolitan park roadway. Most of the widening in Watertown should be made by taking land on the southerly side, while in Boston, most of the widening should be on the northerly side at the Boston end and on the southerly side at the Charles River end.

Grades.

The maximum grade of the present street is about 5 per cent., and there are four sections of moderate length where the grade is about 4 per cent. It would be advisable, and it is possible without serious damage to abutters, to reduce all grades to a maximum of 3 per cent.

Drainage.

The matter of drainage has been taken up with the sewer department of the city of Boston, and the estimate of their engineers of the cost of sewerage and drainage work is $78,750. This estimate appears liberal, and includes an entirely new separate system of drainage. While it is probable that the existing sewerage system in Watertown is inadequate for a long period, no estimate has been prepared for cost of renewing and extending same. The estimated cost of providing suitable surface drainage, however, is $12,000.

Land Damage.

Inasmuch as many of the buildings along the street are old dwelling houses, set back several feet from existing street lines, an 80-foot location can be secured without excessive damage; $125,000 appears to be a safe estimate of the damage in Boston,

and $55,000 in Watertown. These figures would be mery materially reduced if authority were secured to take land beyond the 80-foot boundary lines in order to provide locations for existing buildings that might be moved back. It is assumed that land controlled by the Metropolitan Park Commission would be available without payment therefor, and, consequently, such land is not included in the estimate, nor is the land of the United States government adjoining the Watertown Arsenal. The United States government owns the roadway adjoining the arsenal property, and any lay-out along that property would require an act of Congress.

Boston & Albany Railroad.

There is one bridge over Beacon Street, 1,500 feet east of the Charles River. The superstructure of this bridge has just been renewed, but the new structure is designed in such manner that it can be utilized, should the street be widened to 80 feet. The widening at this bridge should be so made that one abutment will remain practically intact, the widening being all made on one side. The engineers of the railroad have submitted an estimate of $203,350 as the cost of a new structure, utilizing the existing steel works and one existing abutment. In checking their estimate, however, it is found to be extremely liberal. A short distance west of this bridge is a siding crossing the street at grade. The elevation of this siding must be changed somewhat to provide a good street grade, and in order to change elevation it may be necessary to change its location somewhat. The cost of the changes in this siding might well be included in the above bridge estimate with safety.

Bridge over Charles River.

The existing bridge is a wooden pile bridge provided with a draw. If sufficient way for navigation of small boats is left, no draw will be required in a new bridge. Estimates have been prepared for a single-span concrete arch (slightly larger than bridge 1 mile above on same stream) and for a three-span concrete arch (of about same span as Lars Anderson bridge below), and it appears that there would be very little difference in the cost, which for either design is estimated at approxi-

mately $100,000. If such a bridge were to be built upon a State highway, the street railway company would be expected to pay for a width of 18 feet, if occupied by double tracks, or, approximately, $18,000.

Street Railway.

The Boston Elevated now operates over this street with a single track and turnouts. If the street were made wider and suitable, a double-track street railway would naturally follow. The estimate submitted herewith assumes a double-track location in the center of the street, paved with granite blocks on concrete base. The estimated cost of such pavement, not including any grading, for an occupied width of 18 feet, is $92,000.

Sidewalks.

The estimate is based upon sidewalks 10 feet in width, the walks to be paved 6½ feet wide with concrete (granolithic), existing curbs to be reset and new curbing built where necessary, the pole space on portion between curb and concrete to be filled with loam.

Pavement.

There is no pavement in the present street. Should the street be widened and made suitable for traffic, it appears from the traffic censuses taken that it would be most economical to pave the street with granite blocks on a concrete base. This street if properly improved, would become a main artery from Boston to the cities and towns west and southwest of Boston. Many of the pleasure vehicles would quite naturally pass over the metropolitan parkway; but even so, the remaining traffic would be of such nature that a block pavement of some nature is advisable.

Pipes and Conduits.

Before any pavement is laid all gas and water pipes necessary should be laid under the dual system, and conduits should be constructed to take the wires of public-service corporations.

Estimates.

An estimate of the cost of laying out and constructing this street to a width of 80 feet follows. In this estimate the usual allowance is made for contingencies, and while minor items and quantities are not shown they are all included.

Items.	Watertown.	Boston.	Totals.
Land damage,	$55,000 00	$125,000 00	$180,000 00
Grading (including gravel subgrade),	38,400 00	55,600 00	94,000 00
Bridge over Charles River,	50,000 00	50,000 00	100,000 00
Drainage,	12,000 00	78,750 00	90,750 00
Guard rail (pipe),	5,000 00	5,200 00	10,200 00
Sidewalks and curbing,	34,300 00	36,200 00	70,500 00
Paving (not including 18 feet in center),	105,700 00	105,700 00	211,400 00
Paving (18 feet in center),	46,000 00	46,000 00	92,000 00
Totals,	$346,400 00	$502,450 00	$848,850 00

Respectfully submitted,

A. W. DEAN
Chief Engineer.