

TO: John H. Corcoran
City Manager

FROM: Robert A. Bowyer, Director DATE: February 23, 1973
Planning and Development Dept.

George Teso, Director
Department of Traffic and Parking

SUBJECT: Transit Train Turnback and Storage
Facilities at Harvard Square

In our capacity as joint Directors of Transportation Planning, we are pleased to submit a status report and our current recommendations on MBTA's proposal for construction of new turnback and storage facilities at the Harvard Square terminal.

cc: City Manager's Harvard
Square Task Force

City Manager's Alewife
Extension Tunneling Study
Task Force

Cambridge Planning Board

STATUS REPORT: MBTA PROPOSAL FOR CONSTRUCTION OF
NEW STORAGE AND TURNBACK FACILITIES AT HARVARD SQUARE TERMINAL

INTRODUCTION - MBTA and Cambridge are currently facing a transit operations problem at Harvard Square. Use of the trackage on the Kennedy Library site must soon be discontinued. The "turnback" and storage functions these tracks perform for Red Line trains will be transferred to Alewife Brook when the Harvard-Alewife Extension is built; in the meanwhile MBTA will have to squeeze these end-of-the-line operations into the short tunnel extending from the Harvard Square station to the Library site. MBTA met with Cambridge last fall to ask for support of its effort to continue use of the tracks on the Library site until the Alewife Extension is built. The Department of Planning and Development recommended, instead, that interim turnback and storage tracks be provided in a new 800-foot tunnel that would comprise the first leg of the Alewife Extension. Last month, at a second meeting, MBTA advised that it has accepted this approach and has filed a bill (H-2407) to obtain the necessary funding. Project details and status are discussed below.

NEED FOR TURNBACK AND STORAGE TRACKS - At either end of an MBTA rapid-transit line, trains must be reversed in direction on so-called "turnback" trackage. Additional trackage must also be provided for temporary storage of "out-of-service" trains, as well as for "stand-by" trains needed for replacement or emergency service. Further additional trackage is required for storage of transit cars during off-peak hours, when train size is reduced from four to two cars in length.

MBTA'S HARVARD SQUARE TURNBACK AND STORAGE OPERATIONS - As the northerly terminus of the Red Line, Harvard Square serves as the location of turnback and storage operations. Part of the trackage required is located in a tunnel under Brattle Street just beyond the station platform, where trains outbound from Boston are switched back for the run toward Boston and Quincy. Additional trackage, also needed for efficiency of operation, is in MBTA's Eliot Yards, adjacent to Brattle Square. These yards have, of course, been acquired for redevelopment by the Kennedy Library and Harvard University.

MBTA'S PROBLEM - When MBTA agreed to sell its Eliot Yards, it believed that the transit extension to Alewife could be completed prior to Kennedy Library construction. In this way, an orderly transfer of turnback and storage operations from Harvard Square to Alewife was to have been accomplished. However, the need for replanning the extension prevented this.

A problem therefore emerged which called for joint efforts by MBTA and Cambridge under their Cooperation Agreement. In late 1972, MBTA discussed the problem with the Cambridge Department of Planning and Development and requested the City's assistance. Specifically, as a first step, the Authority sought Cambridge support in negotiating with the Kennedy Library for continued use of the Eliot Yards trackage until transfer to Alewife might become possible. The Authority made several points justifying its request, as follows:

1. Turnback and storage operations have become more complex at Harvard Square since the Red Line extension to Quincy went into service. Additional trackage is necessary in order to keep the Ashmont and Quincy trains lined up in proper sequence. Storage of "stand-by" trains, "out-of-service" trains, and "off-peak" cars for each of the two lines also involves more trackage than was formerly needed. Finally, the introduction of "automatic train operation" will require greater than normal track distances for braking during turnback and storage operations.
2. Under normal operating conditions, however, the trackage in the existing tunnel extending beyond Harvard Square station to the Eliot Yards portal is adequate for handling turnback and storage operations. The three tracks in the tunnel can provide for the normal turning of trains for both Ashmont and Quincy service, as well as provide space for storing one "stand-by" train and receiving one "out-of-service" train. The operational inefficiencies MBTA seeks to avoid will occur when the Harvard terminal must receive more than one "out-of-service" train and/or dispatch more than one "stand-by" train within a short period of time. In recent years this condition has been occurring with significant frequency.

CAMBRIDGE REACTION - Responding to MBTA's request for support of its efforts to secure continued use of the Eliot Yards trackage, Robert A. Bowyer, Director of Planning and Development pointed out that:

1. To continue turnback and storage operations on the Library site until the Red Line extension to Alewife is built would not appear to be in Cambridge's interest because trackage retained on the site would:
 - a. prevent construction of access and service roads required to keep Kennedy Library traffic from being forced out onto city streets;

- b. prevent construction of parking facilities and pedestrian connections without which the Library complex cannot function properly--either for itself or as an integral and major part of Harvard Square.
2. If public funds are to be spent for developing an alternate, temporary turnback and storage facility, such temporary provision of the needed trackage would best be developed, if practical, as a "first leg" of the Harvard-Alewife transit extension. Specifically, such a "first leg" should consist of the projected tunnel from the Harvard terminal, beneath Mt. Auburn Street, to Story Street--a distance of approximately 800 feet.
3. This approach to solving the temporary turnback and storage problem would in no way limit the alternatives currently under study as alignments for the extension to Alewife, as all three alternatives include the "first leg" tunnel under Mt. Auburn Street to Story Street.

MBTA FOLLOW-UP - On January 9, 1973, MBTA met with Cambridge staff again and advised that it had decided to abandon its plan for continuance of temporary turnback and storage facilities on the Library site; instead, it would seek all necessary approvals for designing and constructing a Harvard-Alewife Extension "Phase I" tunnel. This tunnel would provide the additional trackage necessary for handling turnback and storage operations efficiently after loss of the Eliot Yards facility. While MBTA has only a very preliminary notion of the tunnel design, and detailed engineering studies have not begun, the tunnel would be likely to have the following features:

1. The new tunnel would begin at a juncture with the existing tunnel under Brattle Square (see attached map) and would proceed along Mt. Auburn Street for a distance of approximately 800 feet. Its width would be approximately 35 feet for most of the distance. In the vicinity of the Post Office it would begin to widen, in order to reach a width of 50 feet at its terminus under the property at the northwest corner of Mt. Auburn and Story Streets.
2. Because the tracks immediately beyond the Harvard Square station platforms are too near the surface of Brattle Street to permit construction as a deep bore tunnel, these tracks would descend at the maximum permitted grade to a point where the tunnel roof can lie at least 20 feet below the ground elevation. Given the maximum allowable descent of 4% (i. e. four feet down for each

100 linear feet traversed), this point could not be reached until the tunnel passes Story Street.

Thus the tunnel construction from Brattle Street, along Mt. Auburn Street to beyond Story Street, would have to be by open trench--the so-called "cut-and-cover" method of construction. Tunneling, without disruption of the surface--the so-called "deep bore" construction technique--could not physically begin until beyond Story Street where the track level would be deep enough below ground level.

3. Tunnel design would be no different than if the Harvard-Alewife Extension were built all at once. Cambridge would suffer no significant disruption from the Phase I project that might otherwise have been avoided were the whole extension to be built. A temporary platform would be constructed inside the tunnel to hold the stored trains level, but this construction and subsequent dismantling (upon eventual completion of the extension) would have minimal effect on Cambridge.
4. The excavation would take a maximum of six months. More exactly, at the six-month point the full trench would be dug and covered over with its permanent roofing. After this point, Cambridge activities would again enjoy normal conditions in the Brattle Square-Mount Auburn Street area, except for the movement of men and materials through a shaft on the property at the northwest corner of Mt. Auburn and Story Streets. This would continue for an additional 12 months, as work inside the tunnel proceeded to its conclusion.
5. Provision would be made for continuous movement of traffic in a satisfactory manner during the six-month excavation and roofing period. This would be facilitated by performing the digging and roofing in two or three separate, consecutive operations. Thus, Brattle Square might be involved first, with Mt. Auburn Street untouched. When digging began in Mt. Auburn Street, the 35-foot wide tunnel under Brattle Square would already be roofed over.
6. Depending on final engineering design, it appears at least one property, at the northwest corner of Story and Mt. Auburn Streets would need to be acquired and demolished. Beyond Hilliard Street, it appears the tunnel will be deep enough so that no property would need to be acquired. The Story-Mt. Auburn-Hilliard site may serve temporarily as the head of the tunnel

shaft for deep bore construction operations. When the extension is completed to West Cambridge, MBTA will no longer need the land and it could be returned to commercial development.

7. Cost is estimated on a preliminary basis as approximately \$7.4 million for the tunnel and \$2 million for lengthening the Harvard Square station platforms to permit longer trains.
8. The project would involve a sub-contract for acoustical engineering aimed at minimizing noise both in the construction and operations stages.
9. Subject to Cambridge approval, Sverdrup & Parcel and Associates (previously approved by Cambridge for consultant services in MBTA's Harvard-Alewife Extension Tunneling Study) would be asked to perform the preliminary and final engineering work involved.

In response to this information from MBTA the Director of Planning and Development observed the immediate future may be a good time to start construction while nearby land, including the Kennedy Library site, was vacant or under construction to minimize later disruption to buildings then completed or to permit traffic detours if needed.

He expressed three concerns: (1) guarantees about the tunnel project's impact on traffic movements and environmental quality during construction and operational stages; (2) station improvements in the main Harvard Square station, and (3) avoiding construction during the 1975-76 Bicentennial visitor period. Details as to these concerns are as follows:

1. Guarantees - Cambridge will want guarantees, both in the construction and operations stages, on such performance characteristics as: (a) automobile, transit and pedestrian traffic; (b) environmental effects on noise, vibration, air pollution; and (c) restoration of affected public and private property.
2. Harvard Square Station - The Planning and Development Director felt that Cambridge should be reluctant to see the project go forward without an agreement by MBTA that it would include an access improvement program and a major architectural refurbishing for the Harvard Square station long considered a necessary element of the Alewife Extension. It could well happen that after completion of the "first leg", MBTA might find it more difficult to later return--as part of a Phase II project--and perform work within the already-completed first phase of the extension.

The Director pointed out that such access improvements should be aimed at significantly reducing the pedestrian-vehicular conflicts involved in moving to and from the Kiosk, by making possible greatly increased transit-passenger movements by pedestrian tunnels beneath the streets bordering the Kiosk. Specifically, such improvements should include convenient, well-lit, aesthetically-pleasing underground access to the station from Holyoke Center, Brattle Square (in the vicinity of the "Christmass Tree"), and the west side of Massachusetts Avenue (near the Harvard Trust Company). It was further noted that a funding maximum of \$18 million was being sought by MBTA for the project (\$6 million State, \$12 million Federal) and that with only \$9.4 million committed on a preliminary basis this maximum would provide ample reserve for the Harvard Square station improvements Cambridge was requesting.

3. Bicentennial Activities - The Planning and Development Department felt strongly that construction of the tunnel should not be permitted to interfere with Bicentennial activities in Cambridge during the years 1975 and 1976. Specifically, by April 1975, the project should have reached the point at which all cut-and-cover tunneling work has been completed, and further construction can be limited to work inside the tunnel. If a guarantee were received that this point will be reached six months after construction begins, a starting date of August, 1974 or earlier would be workable. If that could not be guaranteed, Cambridge should require postponement of the project until after the Bicentennial. It was noted that in light of MBTA's estimate that preliminary and final engineering will require 12 months, and the retention of a contractor an additional 3 months, it will be necessary to begin engineering work no later than early June, 1973.

CAMBRIDGE STAFF RECOMMENDATIONS - Following the second meeting with MBTA, Planning and Development Department staff members met with the Cambridge Department of Traffic and Parking, the City Manager, and a sub-committee of the City Manager's Harvard Square Task Force to review the Phase I proposal. The two City departments, working together under their joint responsibility for carrying forward Cambridge transportation planning and development work, then prepared a recommendation to the City Manager that he support the MBTA proposal on a preliminary basis because:

1. Despite the inconveniences and short-term hardships, Cambridge and MBTA must cooperate on starting, even if only for 800 feet, the Red Line rapid transit extension to West Cambridge and Route 128--the single most important transportation improvement currently in prospect for Cambridge, as well as for the entire northwest corridor of the metropolitan area.
2. It appears that a Phase I project acceptable to Cambridge can be developed, provided that the following conditions are met:
 - a. That the project include a major refurbishing of the Harvard Square station from the standpoint of both accessibility and environmental quality--and that this refurbishing include, among other improvements, below-grade pedestrian access from Brattle Square and Holyoke Center;
 - b. That project construction involve no more than six months of open-cut activity;
 - c. That if construction cannot begin by August 1, 1974, it be postponed until after completion of Bicentennial activities in 1976;
 - d. That all final design and construction schedule details be subject to approval by Cambridge within the framework of the Cambridge-MBTA Cooperation Agreement;
 - e. That provision be made for satisfactory movement of traffic throughout the open-cut construction period.

PRESENT STATUS - MBTA has filed a bill (H-2407) requesting the Legislature to authorize a bond issue of \$6 million for design and construction of Phase I of the Harvard-Alewife Extension. A copy of this bill is attached. If approved, the \$6 million bond issue could serve as "local share" for an additional \$12 million "matching grant" from the Federal Government. The Legislature's Joint Committee on Transportation considered the bill briefly on February 7, 1973, but at the request of MBTA postponed a full hearing until March (exact date not set). The Cambridge City Manager stated a preliminary position to the Committee (see attached letter from Mr. John H. Corcoran to Senator Burke) and this was presented by the City's Transportation Coordinator, Edward A. Handy. Prior to the next Legislative Committee hearing, MBTA will be requested to meet with the City Manager and with citizen groups such as his Harvard Square Task Force, his Alewife Extension Tunneling Study Task Force, and the Planning Board to review the project in detail, as a basis for preparing a further statement for presentation at the hearing.

HOUSE No. 2407

By Mr. Cole of Lexington, petition of the Board of Directors of the Massachusetts Bay Transportation Authority and Lincoln P. Cole, Jr., relative to the Harvard-Alewife rapid transit extension and increasing the amount of bonds that may be issued by said authority. Transportation.

The Commonwealth of Massachusetts

In the Year One Thousand Nine Hundred and Seventy-Three.

AN ACT RELATIVE TO THE HARVARD-ALEWIFE EXTENSION, AND INCREASING THE AMOUNT OF BONDS WHICH MAY BE ISSUED BY THE MASSACHUSETTS BAY TRANSPORTATION AUTHORITY.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

1 SECTION 1. The third paragraph of section 23 of Chapter
2 161A of the General Laws is hereby amended by striking out in
3 line 1, the words "three hundred and forty-five" and inserting in
4 place thereof the words: - three hundred and fifty-five.

1 SECTION 2. The proceeds of six million dollars of the bonds
2 issued under the authority of section twenty-three of Chapter
3 one hundred and sixty-one A of the General Laws, as amended
4 by this act, shall be expended by the Massachusetts Bay
5 Transportation Authority for all construction, including recon-
6 struction, alteration, reconditioning where applicable, purchase
7 of materials and equipment, project administration and land
8 acquisition necessary for the construction of Phase I of the
9 Harvard-Alewife Rapid Transit Extension, including the necessary
10 alterations to the existing Cambridge Street tunnel.



CITY OF CAMBRIDGE

CAMBRIDGE, MASSACHUSETTS 02139
Tel. 878-0800

EXECUTIVE DEPARTMENT
JOHN H. CORCORAN
City Manager

February 7, 1973

The Honorable Edward L. Burke
Chairman, Joint Committee on Transportation
State House
Boston, Massachusetts

Re: H-2407 - An Act Relative to The Harvard-Alewife Extension

Dear Senator Burke:

In keeping with the Cambridge-Massachusetts Bay Transportation Authority Cooperation Agreement, MBTA's Coordinator for Cambridge transit matters has advised us of subject bill and of the reasons for filing it.

While we must have more information as to the details of the proposed construction before giving our unqualified support, we find ourselves leaning toward concurrence provided that the legislation is expanded to include the following five provisions:

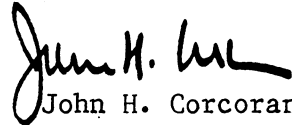
1. The project will include a major refurbishing of the Harvard Square Station from the standpoint of both environmental quality and accessibility. This refurbishing will include, among other improvements, below grade pedestrian access from the south side of Massachusetts Avenue and the west side of Boylston Street.
2. Project construction shall involve no more than six months of "open cut" activity.
3. If construction cannot begin by August 1, 1974, it will be postponed until after completion of Bicentennial activities in 1976.
4. All final design and construction schedule details shall be subject to approval by Cambridge, and shall be worked out by the MBTA and Cambridge in the spirit of their Cooperation Agreement.
5. Provision shall be made for satisfactory movement of traffic throughout the six-month open-cut construction period.

To: Hon. Edward L. Burke (cont.)

February 7, 1973

We will be glad to discuss these provisions with your Committee in greater detail if desired.

Very truly yours,

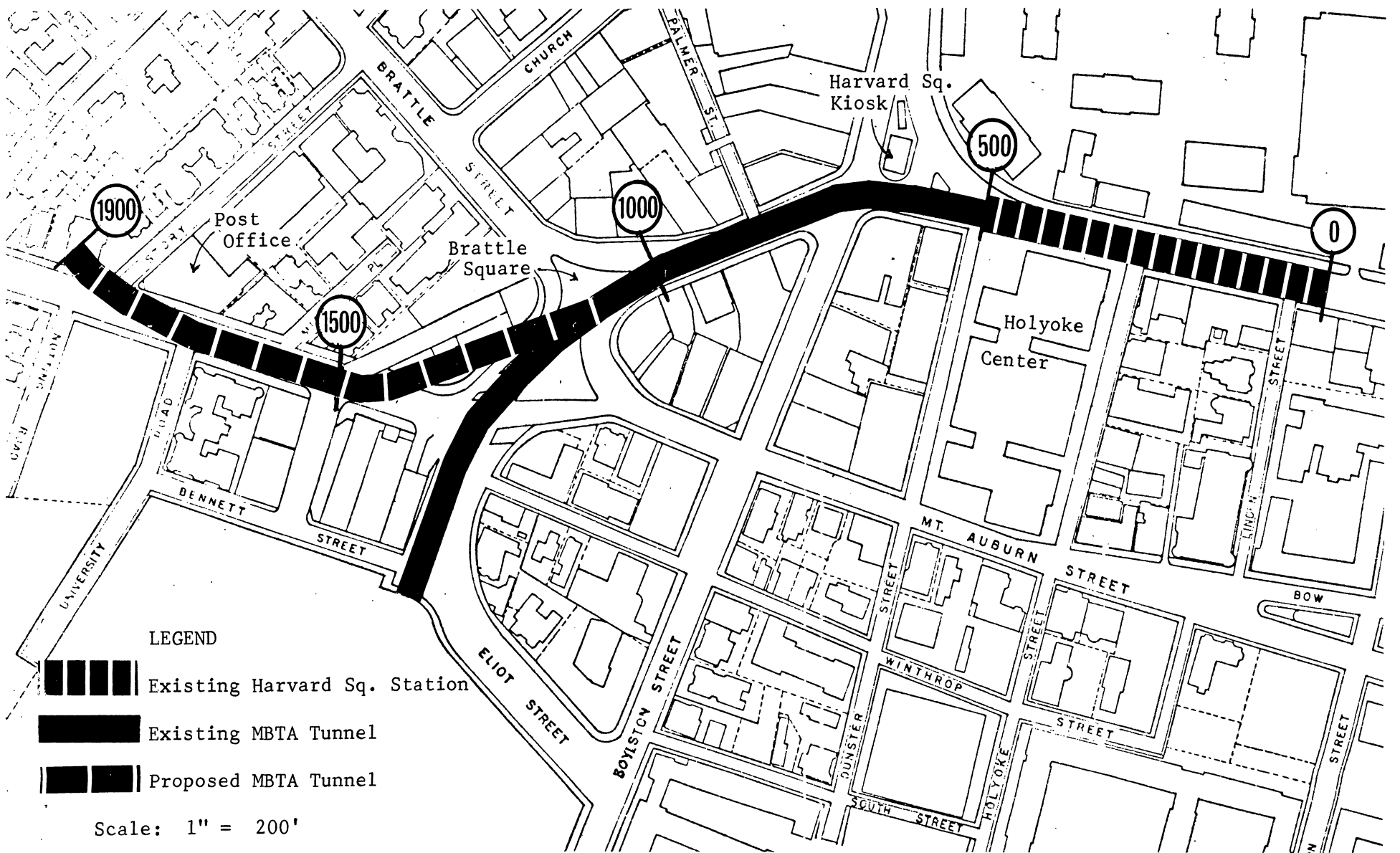


John H. Corcoran
City Manager

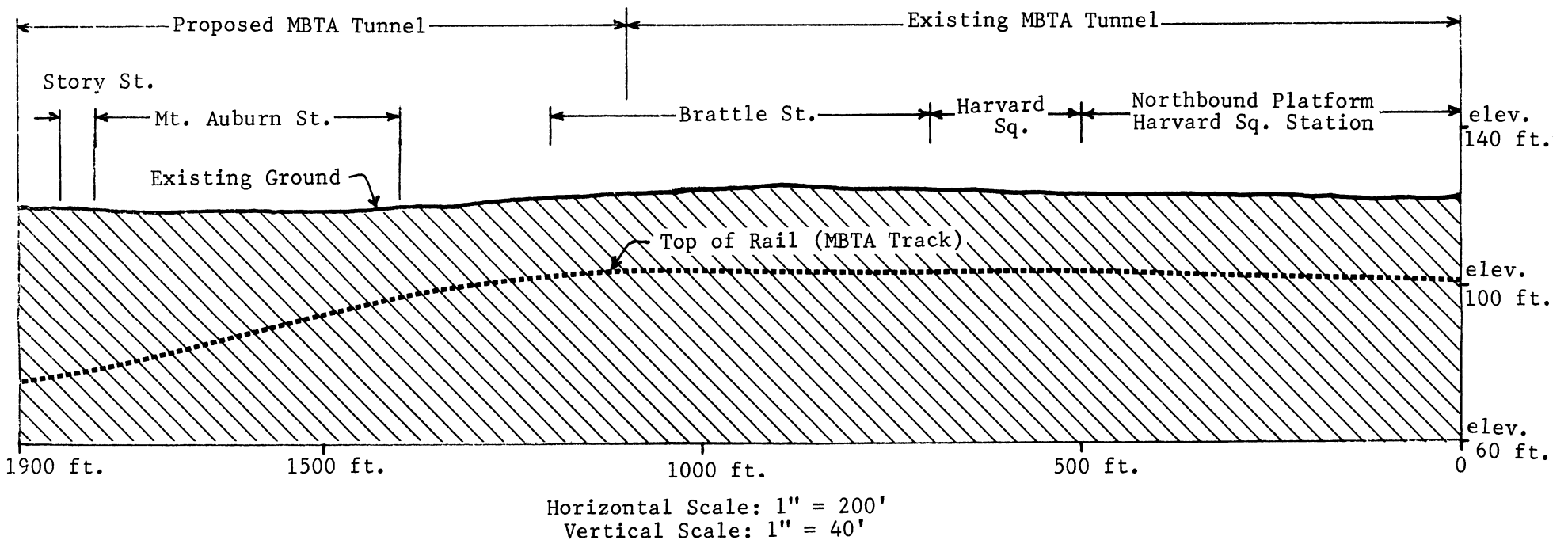
JHC/b

PRELIMINARY PLAN & PROFILE

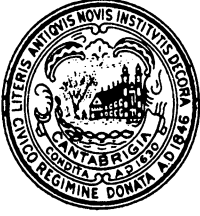
PROPOSED HARVARD SQ. TURNBACK



PLAN



PROFILE



CITY OF CAMBRIDGE

CAMBRIDGE, MASSACHUSETTS 02139
Tel. 876-6800

EXECUTIVE DEPARTMENT
JOHN H. CORCORAN
City Manager

February 26, 1973

To the Honorable, the City Council,

I transmit herewith for review by your Honorable Body, as well as for your comment, a report prepared for me by the Department of Planning and Development and the Department of Traffic and Parking relative to MBTA's proposed Phase I of the Harvard-Alewife Extension Project.

Yours truly,

John H. Corcoran
City Manager

JHC/m

Agenda # 11.

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Relative to MBTA's proposed Phase I of the
Harvard-Alewife Extension Project.

In City Council,
February 26, 1973.

2/27/73

Placed on File