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EPA Environmental News

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8/1/90

EPA OPPOSES FILLING BOSTON HARBOR TO DISPOSE OF FILL FROM ARTERY/THIRD HARBOR TUNNEL PROJECT

BOSTON -- The U.S. Environmental Protection Agency (EPA) today formally recommended to the U.S. Army Corps of Engineers (COE) that it deny the Massachusetts Department of Public Works' (DPW) request for a permit to dump 9.3 million cubic yards of material in harbor waters around Spectacle Island. The material would come from excavation and dredging activities during construction of the Central Artery and Third Harbor Tunnel (CA/THT) project.

Said Julie D. Belaga, EPA's Regional Administrator, "Despite today's temporary setback for the DPW, I see no reason why this project cannot be designed to achieve the multiple goals of landfill capping and park creation on Spectacle Island and materials disposal while minimizing the risk to the environment.

"We are more than eager to work with the DPW and Army Corps to ensure that the project is developed in an environmentally sound manner. This is not the final step in the process. We look forward to continuing the dialogue as the DPW addresses our concerns," she added.

EPA expressed several objections to DPW's proposal which, if permitted, would be the largest filling of harbor waters since the Section 404 regulations of the Clean Water Act were issued in 1980.

The agency explained that as currently proposed, DPW's disposal plans do not comply with several Section 404 regulations governing issuance of a permit under the Clean Water Act. In addition, it determined that the fill would cause significant adverse impacts to the surrounding environment.

(more)

Filling would destroy a large acreage of biologically productive intertidal and shallow tidal habitat. These areas currently support over 55 invertebrate species, including soft-shell clams, blue mussels, and lobsters; provide food sources for water birds such as black ducks, eiders, gulls and mergansers; and provide habitat for numerous species of fish.

EPA also determined that DPW failed to demonstrate that no environmentally preferable alternatives existed. It did not adequately explore other disposal options, including upland sites. Preliminary research done for EPA indicates that environmentally acceptable upland disposal sites likely exist.

Explained Belaga, "We do not oppose using some of the material from this project to cap the abandoned landfill on Spectacle Island and to create a park at this site.

"But, federal regulations do not allow filling in the harbor if it can be avoided or if it would cause a significant adverse impact. This project fails the test on both counts," she concluded.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION I

J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203-2211

September 24, 1990

Anthony Fusco
Division Administrator
Federal Highway Administrator
55 Broadway, 10th Floor
Cambridge, MA 02142

Dear Mr. Fusco:

The Environmental Protection Agency, in accordance with its responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, has reviewed the Final Supplemental Environmental Impact Statement (FSEIS) for the proposed South Boston Haul Road, South Boston, Massachusetts.

The proposed project is a two-lane 1.1-mile limited access road to be built substantially within an existing, below-grade railroad right-of-way from Dorchester Avenue and Congress Street. According to the FSEIS, its use would be restricted to trucks associated with the construction of the Central Artery/Third Harbor Tunnel Project, other commercial trucks, and empty buses travelling from the Massachusetts Bay Transportation Authority (MBTA) Cabot Yard bus facility and service routes. The purpose of the project is essentially to provide an alternate route for construction and commercial trucks that would otherwise have to use local streets in South Boston.

We appreciate the considerable efforts made by the Massachusetts Department of Public Works (MDPW) and the Federal Highway Administration (FHWA) to address the concerns raised in our July 26, 1989 comments on the DSEIS. As a result of these efforts, we believe our concerns have essentially been resolved and the project has the potential for substantial environmental benefits.

The FSEIS demonstrates to our satisfaction that the project, though linked to the Artery/Tunnel Project through its function as a construction mitigation measure, has independent transportation and environmental merit. At its peak year, 4720 vehicles are expected to use the Haul Road daily. 1700 of these will be construction trucks, and of these 900 are expected to be from the Artery/Tunnel Project. By relieving local streets of this truck traffic, the project has the potential for substantial improvements to traffic flow and thus to air quality independent of the Artery/Tunnel Project. The project also has the potential for other environmental benefits, such as remediation of contaminated soils, while at the same time causing few significant adverse impacts. For all of these reasons, we believe that the project can



and should proceed without awaiting resolution of EPA's concerns about the Artery/Tunnel Project.

Additional comments and recommendations are as follows:

1) Contaminated Soils:

The FSEIS is responsive to the concerns we expressed in our DSEIS comments about contaminated soils. We support the MDPW's commitment in the FSEIS, in response to EPA's comments on the DSEIS, to remediate soils contaminated with polychlorinated biphenyls (PCBs), including removal of soils contaminated at 50 parts per million (ppm) or greater, at the Boston Junk Company property in advance of construction of the Haul Road in this area.

We also support the commitment for further sampling and analysis of the PCB runoff area to determine the extent of contamination, confirmatory sampling during and after removal, development of a remediation plan for EPA and Massachusetts Department of Environmental Protection approval, and ultimate disposal at an EPA-approved site in accordance with the Toxic Substances Control Act. We request that these commitments be incorporated as enforceable conditions in the Record of Decision.

In addition, as we have discussed regarding the applicability of the Resource Conservation and Recovery Act (RCRA), EPA has promulgated several new RCRA hazardous waste regulations that may have an impact on the project. The MDPW is aware of these from discussions with MADEP and EPA staff. Among the most significant of these new regulations are the Toxicity Characteristic (TC) rule, and the regulations to implement prohibitions on land disposal of hazardous waste (LDR). The TC rule adds 25 organic constituents to the Toxicity Characteristic list which is used to identify hazardous waste. The rule also replaces the Extraction Procedure (EP) Toxicity Test with the Toxicity Characteristic Leaching Procedure (TCLP). This rule was published in the Federal Register on March 29, 1990 (55FR11798) and becomes effective September 25, 1990. The LDR rule has consisted of a series of regulations in which certain hazardous wastes are prohibited from land disposal unless specific conditions and treatment standards are met. The most recent LDR rule was published in the Federal Register on June 1, 1990 (55FR22520) and became effective on May 8, 1990. It will be important for the MDPW to keep abreast of the changes to the federal and state hazardous waste programs as they occur to ensure that the project is kept in compliance.

2) Water Quality:

The FSEIS adequately responds to our request for additional information on stormwater/groundwater flows and water quality impacts to Fort Point Channel. We understand from the FSEIS that no direct wastewater discharge to surface waters, either from drainage or construction dewatering, is proposed for this project; hence, no NPDES permit under Section 402 of the Clean Water Act

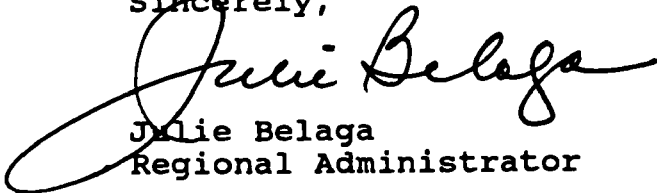
will be required. Further, we would not object to the proposed drainage design described in the FSEIS which would connect stormwater flows to the Roxbury Conduit, provided the connection enter the system downstream of the structures that regulate overflows from the combined sewer overflow (CSO) system. We are pleased that the FSEIS recognizes the planning studies being undertaken by the Massachusetts Water Resources Authority (MWRA) concerning the need for treatment of the CSOs, including the Roxbury Conduit. When this planning effort is completed, treatment or separation of the Haul Road flow could be required. We therefore request that the FHWA and MDPW commit in the Record of Decision to participate in the funding and implementation of any new drainage requirements or treatment of drainage from the Haul Road that may result from the MWRA studies.

Finally, we request that the Record of Decision contain a commitment to development of a formal Best Management Practices plan for purposes of controlling sediment and construction activity runoff. The FSEIS alludes to such a plan on page 13-1.

In conclusion, we support the construction of the South Boston Haul Road because we believe it could benefit public health and environmental quality. We further believe the FSEIS adequately assesses the project's impacts and demonstrates that it is justified both as an Artery/Tunnel truck traffic mitigation measure and as an alternate route for overall truck traffic in South Boston.

My staff and I would be pleased to respond to any questions you may have. We would appreciate receiving a copy of your Record of Decision when it becomes available.

Sincerely,



Julie Belaga
Regional Administrator

cc: Frederick Salvucci, Secretary
Executive Office of Transportation and Construction



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION I

J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203-2211

September 24, 1990

Anthony Fusco
Division Administrator
Federal Highway Administration
55 Broadway, 10th Floor
Cambridge, MA 02142

Dear Mr. Fusco:

The Environmental Protection Agency, in accordance with its responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, has reviewed the Draft Supplemental Environmental Impact Statement (DSEIS) for the proposed Central Artery (I-93)/Third Harbor Tunnel (I-90) project.

These statutes require that EPA, from the standpoint of its areas of jurisdiction and expertise, formally comment on the environmental impacts of the project and the adequacy of the environmental analysis as presented in the DSEIS that was filed in May of 1990. The results of our review are detailed below and in the attachments to this letter. However, since the filing of the DSEIS, there have been a number of positive discussions between the EPA, the Federal Highway Administration (FHWA), the Massachusetts Department of Public Works (MDPW), and other agencies. Additional information has been developed, and on the basis of this, we are hopeful that the concerns we are required to formally present in this letter will be resolved. I have attached a copy of a September 10, 1990, letter to me from Secretary Fred Salvucci and MDPW Commissioner Jane Garvey that contains specific expectations for project improvements in several areas of concern to EPA. We believe this indicates progress towards resolution of EPA's concerns.

The May 1990 DSEIS describes the MDPW's \$5 billion proposal to construct approximately 7 miles of roadways in Boston, the key elements of which are a widened, mostly underground Central Artery (I-93); an extension of I-90 via a Seaport Access Road and Third Harbor Tunnel to Logan Airport in East Boston; and extended frontage roads along the Central Artery and Southeast Expressway. (The proposal also includes a new South Boston Haul Road for which a separate EIS was prepared. EPA's comments on the Final EIS for the Haul Road are being submitted today in a separate letter). The DSEIS, the fifth in a series of EISs that began in 1982, is



intended to address issues that were left unresolved at the time the Final EIS was issued in 1985 (see Appendix 1).

The project has multiple public goals which are, in essence, to improve traffic flow in the Boston metropolitan region and to do so in a manner which permits a more livable city, reconnected to its waterfront and without the barrier that the elevated Central Artery now poses. The project also has the potential to bring other environmental benefits: to improve air quality; to remediate any harm that may be occurring as a result of the historic landfill on Spectacle Island; and to create a park on the island.

EPA supports these objectives and recognizes the importance of their fulfillment. As the DSEIS recognizes, this project, by virtue of its enormity and its location, raises substantial environmental concerns, which EPA has addressed in numerous meetings and letters throughout the project's history.

In summary, EPA does not object to the proposed project as a whole. We do, however, believe that certain key elements of the project as proposed in the DSEIS would cause adverse environmental impacts. These impacts are of sufficient magnitude that the project should not proceed until they are resolved in the FSEIS in accordance with the substantive requirements of the Clean Water Act, NEPA, and, potentially, the Clean Air Act. We further believe that the DSEIS, while comprehensive in some areas, does not fulfill NEPA's requirements for disclosure of significant environmental impacts and evaluation of less damaging alternatives. We are pleased, however, as mentioned above, that MDPW and others are already working to fill these information gaps in the FSEIS.

EPA's principal concerns are as follows:

- 1) The materials disposal program, described as the preferred alternative in the DSEIS and in current applications for federal permits, would place significant amounts of dredged and excavated material in 103 acres of Boston Harbor surrounding Spectacle Island. In its review of the Corps of Engineers' public notice, EPA concluded that this fill would violate Section 404 of the Clean Water Act, particularly the regulatory requirements concerning alternatives and significant impacts. Similarly, we conclude that the fill proposal in the DSEIS would violate parallel requirements under NEPA that agencies fully assess all reasonable alternatives and use all practicable means to avoid or minimize any possible adverse effects (Council on Environmental Quality Regulations at 40 CFR 1500.2(e) and (f)). (A copy of EPA's July 31, 1990 comments under Section 404 is included at the end of Appendix 3).

We note, however, that during the months since the DSEIS and the public notice were issued, the MDPW has been making a serious effort to respond to our objections to the proposed 103-acre fill in the Harbor. For example, the MDPW has identified portions of

the project where excavated material can be minimized or re-used. Further, the MDPW is re-evaluating upland disposal sites and is examining the size and impacts of the island landfill. We are optimistic that there will emerge from this effort a number of sites that alone or in combination would be less environmentally damaging, reasonable alternatives to the 103-acre fill at Spectacle Island. We are therefore hopeful that the MDPW will ultimately submit a revised materials disposal plan which satisfies the requirements of the Clean Water Act and NEPA.

2) The DSEIS does not discuss the potential for adverse effects to public health due to high levels of carbon monoxide from the currently proposed ground-level ventilation exhaust from the Dewey Square tunnel portal in the vicinity of Chinatown. To ensure compliance with the Clean Air Act and NEPA, the FSEIS must quantify this impact and evaluate the effectiveness of options for ensuring that no violations of applicable air quality standards will occur.

3) The DSEIS does not evaluate the potential for adverse air quality impacts from exposure to high levels of truck and automobile exhausts throughout downtown Boston during the 8-10 years of project construction. The DSEIS mentions the potential for major construction-related impacts to cause elevated levels of carbon monoxide at 34 locations in Boston, but defers the evaluation of air quality impacts and mitigation planning to a time after completion of the EIS process. Because of the potential seriousness of this impact and the large numbers of people who would be exposed to it, the FSEIS must identify the key locations that will be impacted by construction activities and quantify predicted air quality impacts.

We are also concerned that the DSEIS does not adequately identify construction-phase mitigation measures that the MDPW had promised to include. A further evaluation of such measures must be included in the Final SEIS. Moreover, since some mitigation measures from the Maintenance of Traffic Plan and the Construction Mitigation Program will not be finalized until after the EIS process is completed, the FSEIS must also define future air quality commitments and commit to the inclusion of EPA in a process that will insure that these commitments satisfy air quality criteria and are implemented in a timely manner.

4) One of the most serious long-term environmental policy issues involved in the Central Artery decision is how to increase the likelihood that the construction of the Central Artery is accompanied by an array of mass transit improvements and regulatory actions sufficient to permit the project to succeed in its purposes: to avoid traffic strangulation and to permit a more liveable city. Dramatic changes in intra-city and inter-city transportation are required, along with farsighted control over such growth and traffic generators as new infrastructure and land use.

The FSEIS must commit to treat mass transit improvement as an integral part of the project. There must be a commitment to a reasonable group of mass transit projects and transportation control measures and to a process (that will include EPA) to determine that the projects will be done and the promised improvements will be achieved.

The Executive Office of Transportation and Construction has a long record of commitment to mass transit. The upgrading and expansion of mass transit, however, will be as difficult as implementing the Central Artery project itself. We fear that, in an era of fiscal and government retrenchment, the steps will not be taken to change the transit mix from a reliance on the private automobile to a mix relying on mass transit. Many public comments reflect this sense of urgency and a sense of unease that these "other" projects will fall by the wayside and the Central Artery will dominate the transportation agenda.

Therefore, we expect that the FSEIS will contain commitments, linked to the policies of other state cabinet offices through the Massachusetts Environmental Policy Act process, to schedules of mass transit improvement and associated transportation control measures. The first category would be to assure the completion of those projects the success of which is assumed in the air quality modeling that predicts pollution improvements as a result of this project. The second would be an aggressive program of construction-period transit-enhancing measures, with the commitment to continue successful measures on a long term basis. The third category would be the design of features, such as HOV and carpool lanes, and fringe parking, which could be built into or with this project to provide long-term benefits. The fourth program should be one of farsighted regulatory and environmental review actions to prevent unplanned growth from cancelling the traffic capacity benefits of the project and thus frustrating its purpose.

EPA is committed to use its regulatory authority, through the Massachusetts State Implementation Plan (SIP) for air pollution control, to assist in meeting these objectives.

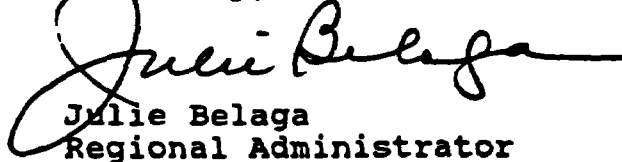
Furthermore, we encourage FHWA to take a creative approach to evaluating the myriad mitigation and environmental enhancement measures which would be appropriate for a project of this magnitude. FHWA's new Environmental Policy Statement (April 1990) places emphasis on "avoidance, minimization, and mitigation of environmental impacts," and places special emphasis on "the need to consider environmental enhancement measures." In addition to the mitigation measures identified above, we see an opportunity, consistent with the new policy, for FHWA to ensure that any environmental harm posed by the historic fill on Spectacle Island will be remediated and that the island will be transformed into a public park.

The attachments to this letter detail these concerns as well as others, such as the need for additional analysis of the impacts of and alternatives to the proposed Scheme Z design for the crossing of the Charles River Reservation and of secondary effects from the future development of the 27 acres on top of the depressed Central Artery.

In accordance with EPA's national rating system, an explanation of which is attached in Appendix 2, we are required at the Draft EIS stage to assign a rating to the environmental impacts of the proposed action described in the EIS, and to the adequacy of the EIS. We have rated this DSEIS "EU--Environmentally Unsatisfactory" and "2--Insufficient Information." It should be noted that we are required to rate the project based on the information in the DSEIS provided by the FHWA and MDPW in May, 1990. Since that time, however, a series of meetings has been held that should result in important improvements to the project and should address the concerns that we have raised. As we receive this information, we will review it promptly and expect that it should be incorporated in the final SEIS. This "EU-2" rating is appropriate in cases where the proposed action has the potential to cause a substantive, long term violation of a federal environmental standard, as would occur under Section 404 if the MDPW were to pursue the 103-acre Harbor fill, and where the DSEIS does not contain sufficient information to fully assess environmental impacts that should be avoided, such as the air quality concerns above.

We are pleased at the positive steps and the cooperative effort that have taken place over the past few months. The issues we have raised are being discussed but do require resolution in the FSEIS. We believe that they can be resolved and an environmentally sound project achieved. My staff and I are committed to working with the FHWA and the MDPW to that end.

Sincerely,



Julie Belaga
Regional Administrator

Enclosures

cc: Frederick Salvucci, Secretary
Executive Office of Transportation and Construction

APPENDIX 1

SIGNIFICANT ISSUES THAT WERE UNRESOLVED IN THE 1985 FEIS.

Source: Third Harbor, Interstate 90/Central Artery, Interstate 93 Final Environmental Impact Statement and Final Section 4(f) Evaluation; Volume 1 FHWA/MA DPW August, 1985, pages xvi and xvii.

Sections where the issues appear in the FEIS are identified in parentheses ().

- (1) The extent of federal-aid construction funding for specific project components of the Preferred Alternative (6.1, 6.2).
- (2) Selection of the materials for sunken tube tunnel construction: concrete or steel (4.1).
- (3) Selection of tunnel fabrication site, including additional analysis as needed (4.1).
- (4) Selection of site(s) for replacement parking (4.2, 4.4).
- (5) Identification of disposal sites for excavated and dredged materials (4.13).
- (6) Design of the new bridges and ramps across the Charles River, and analysis of their effects on Charles River Reservation, including existing and proposed MDC park facilities, navigation, traffic on Storrow Drive, BRA North Station plans, etc. (1.4, 4.2, 4.9, 4.10, 4.11, 4.14, 4.16, 5.1, 5.2).
- (7) Approvals of all required Federal, State, and local permits necessary for project to proceed (no specific section).
- (8) Identification of appropriate staging areas for construction (4.1).
- (9) The establishment of process to assure environmentally-sensitive future joint development activity with full citizen and agency participation (4.4).
- (10) Construction impacts on traffic, air quality and noise levels in the project area (4.2, 4.7, 4.8).
- (11) Location and height of ventilation buildings (4.4, 4.5, 4.7, 4.14, 4.16).
- (12) The extent of work for the Phase I, Step 2/Phase II Archaeological Survey and final mitigation details for impacts on archaeological resources, consistent with the Section 106 Memorandum of Agreement (4.14, 5.3).
- (13) Construction staging and sequencing of the project (4.1).
- (14) Further study of business relocation impacts, including a case by case analysis of whether specific private facilities will be taken or modified (4.3).

APPENDIX 2 SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION

Environmental Impact of the Action

LO--Lack of Objections

The EPA review has not identified any potential impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC--Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO--Environmental Objections

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU--Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1--Adequate

EPA believes that draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2--Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3--Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

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- v. Post-Construction Impacts.
- vi. Operational Commitments: Carbon Monoxide in Tunnels.
- vii. Technical Comments.

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- vi. Tunnel fabrication site(s).
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C. NPDES Permitting Issues.

D. Section 404 Issues.

- i. Summary of EPA'S July 31, 1990 Findings under Section 404.
- ii. Description of Interagency Discussions Subsequent to Corps' Section 404 Public Notice.

Attachment: Text of EPA's Letter of July 31, 1990 concerning Section 404.

A. NEPA AND CLEAN AIR ACT COMMENTS ON AIR QUALITY.

- i. Ground Level Emissions from the South Portal.
- ii. Construction Impacts.
- iii. Emissions from Vent Shafts.
- iv. Promoting Mass Transit.
- v. Post-Construction Impacts.
- vi. Operational Commitments: Carbon Monoxide in Tunnels.
- vii. Technical Comments.

This DSEIS was intended to fulfill a commitment made by FHWA and the MDPW in the 1985 FEIS to address in a draft supplemental EIS fourteen issues left unresolved at the time the FEIS was approved (including those related to construction impacts, vent locations and impacts, and long term air quality) as well as any other issues that have surfaced in the intervening years.

i. Ground Level Emissions from the South Portal of the Central Artery.

The MDPW intends to connect the new Central Artery tunnel at its southern end to the existing tunnel section at South Station (Dewey Square). The DSEIS, however, does not evaluate the air quality impacts from this tunnel section and portal emissions either on the south portal or on the adjacent vent system to the north. Emissions from this ventilation system are of particular concern because they are released at ground level and may cause air quality violations.

The FSEIS must include an evaluation of the air quality impacts from this tunnel section. This analysis must be submitted to EPA for review and comment as soon as possible and prior to the submission of the FSEIS.

ii. Construction Impacts on Traffic and Air Quality.

One of the significant unresolved issues from the 1985 FEIS was the need to identify construction impacts on traffic, air quality and noise. Despite the MDPW's commitment in the FEIS, however, the DSEIS fails to show that impacts due to construction will not cause air quality problems. Indeed, the DSEIS states that approximately 34 intersections (including the Leverett Circle underpass; the Sumner-Callahan Tunnel approaches; the Leverett Circle/CA ramps) are expected to be impacted by construction activities. The DSEIS also identified 60 major detours and road/bridge crossings (Chapter 20, page 27). Construction activities are expected to occur over a ten-year period and will impact high volume roadways as well as congested intersections. The FSEIS must identify the key locations that will be impacted by

construction activities and quantify predicted air quality impacts.

Moreover, the air quality analysis contained in the DSEIS is dependent upon traffic mitigation measures being implemented before, during and after the construction phase. Many of these mitigation measures have yet to be fully developed. While the DSEIS describes and commits to implement several traffic mitigation measures, it relies primarily on its commitments to establish a process (the Maintenance of Traffic Plan), which is intended to encourage transit ridership, improve traffic management and provide public information. This Plan is to be part of the Construction Mitigation Program, which will oversee the development and implementation of all construction-related traffic mitigation measures. The DSEIS commits to use the Construction Mitigation Program to re-evaluate traffic and construction impacts as the details of construction are developed or changed.

The construction mitigation measures must be evaluated in the FSEIS itself so that a determination as to the acceptability of construction impacts can be made. NEPA requires that EISs disclose impacts so that alternative mitigation measures can be evaluated for their potential effectiveness and the likelihood that they will be implemented. To the extent that agencies (e.g., the City of Boston) other than the project proponent will be responsible for their implementation, it is important for the FSEIS to discuss the ways in which the public will be assured of their implementation.

Many additional mitigation measures from the Maintenance of Traffic Plan and the Construction Mitigation Program will not be developed or finalized until after the EIS process is completed. Therefore, EPA requests that a formal document be executed with EPA that defines the commitments made to satisfy air quality criteria, provides for their implementation in a timely manner and includes EPA involvement.

Issues to be addressed in the document could include the following:

- Traffic Detour Management
- Maintenance of Traffic Planning
- Traffic Surveillance and Control Systems
- Construction Management Planning
- Construction Mitigation
- Ambient Tunnel Monitoring
- Vent Stack Monitoring

The FSEIS should also respond to the following issues related to construction impacts:

Section 20.2.1(b) on page 20 to 22 of Chapter 20 states that "workers will be required to park in facilities away from the work area, use public transportation, or park in the contractor remote parking area and be bused to and from the work site." The location of the contractor remote parking areas, as well as any additional remote parking areas to be

used by workers or commuters, needs to be described in the FSEIS.

Section 2.7 on page 17 (Appendix 4 of 5) lists several mitigation measures as temporary solutions to the loss of parking spaces. Procedures to select measures to be implemented must be described in the FSEIS. After the appropriate measures have been implemented, there should be an evaluation to determine whether any measures would continue to be effective in reducing vehicle-miles-travelled (VMTs) (such as remote parking lots) if they were made permanent.

Section 2.2.2 on page 3 (Appendix 4 of 5) states that "close coordination will be maintained with MBTA, Amtrak, and Conrail during construction of the South Boston Bypass Road viaduct over existing active transit and railroad tracks". Procedures to implement this should be described in the FSEIS. Coordination among these agencies should include increases in service on lines that serve areas whose roadways will be impacted by construction.

Section 2.4.4 on page 6 (Appendix 4 of 5) discusses expansion of alternative modes of transportation. The FSEIS should describe the process that will be used to evaluate and implement these activities.

Section 2.6.3 on page 9 (Appendix 4 of 5) discusses emission abatement measures for construction activities. Control of fugitive dust emissions during construction is important because of the close proximity of the general public to the proposed project. Procedures should be created to identify and reduce excessive fugitive dust emissions during construction.

Section 4.3 "Pollutants for Analysis" on page 4-6 of Chapter 4 fails to note that the project may generate greater PM10 [small particulate] emissions from construction activities and entrainment by vehicular traffic than could result from tailpipe emissions. PM10 emission inventories often neglect such activities; but when they do not, PM10 from entrained road dust often dominates emissions from other sources. The FSEIS must include an air quality analysis of PM10 emissions from temporary construction activities and planned changes in the highway system. EPA's Control of Open Fugitive Dust Sources (EPA-450/3-88-008) should be used to estimate PM10 emissions from open sources and identify applicable control measures.

iii. Emissions from Ventilation Buildings.

Section 8.5.3 on page 8-16 states that seven buildings are required to house the equipment necessary to ventilate the project's tunnels. According to page 9-15, the stack heights as described in the DSEIS (see table below) are "maximums", which could be

reduced as a result of more detailed analysis during the design process.

Vent 1	Dorchester Ave.	320'w x 80'd x 90'h	130'	stack height
Vent 2	Frontage Rd.	160' x 135' x 80'	120'	stack height
Vent 3	Atlantic Ave.	Below grade	240'	stack height
Vent 4	Parcel 7	Entire parcel x 80'h	125'	stack height
Vent 5	Summer St. (exh.)		120'	stack height
	[2 bldg.] (int.)	210' x 150'	120'	stack height
Vent 6	Subaru Terminal	200' x 130' x 75'	115'	stack height
Vent 7	Bird Island Flats	310' x 100' x 65'	95'	stack height
	Dewey Square Vent(s)	_____	_____	stack height(s)

While extensive air quality modeling has already been conducted for the ventilation stacks, changes in the design of stack heights would require new air quality analyses. The air quality analysis in the DSEIS states that future design changes in the vent buildings will be evaluated at that time. If and when such changes are made, EPA must be able to review, comment and concur on the acceptability of design changes. EPA must concur in any new ventilation stack - air quality analysis associated with changes in the ventilation systems.

In addition, we request that the FSEIS include the following: an analysis of PM10 and NOx impacts inside the tunnel and at the sensitive receptor locations.

iv. Encouraging the Use of Mass Transit through Commitments to Infrastructure Improvements and Regulatory Support.

The FSEIS must include specific commitments to develop and implement those mass transit projects that were included in future traffic projections upon which the air quality analysis was based.

Section 1.4 of Chapter 1 (Part I) states that one of the major policy issues (policy theme 5) affecting project development is the need to integrate the project elements into larger regional public transportation and high occupancy vehicle (HOV) strategies. The traffic analysis forecasts a 45% increase in transit ridership by the year 2010 without indicating how these trips will be accommodated. The FSEIS must commit to the implementation of transit projects which will achieve the increased ridership. Integration of project elements should include such activities as the mass transit connection between North and South Stations, Old Colony restoration, fringe parking lots for commuters and extending HOV lanes. The proposed project describes numerous mass transit improvement projects, but does not discuss a connection between North and South Station. Providing a network of fringe parking lots could offer an alternative to vehicle users in corridors not served by mass transit. Finally, while the proposed project includes HOV lanes, these lanes exist for relatively short distances. The proposed project must accommodate the development and implementation of expanded HOV lanes such as the proposed HOV lane on the expressway from Braintree to Boston. The FSEIS must

also evaluate the potential to integrate and extend the existing HOV lane on I-93 into the proposed project.

The FSEIS should evaluate procedures that would help isolate the high speed lanes (both north and southbound) of the depressed central artery to facilitate through traffic.

Page 3-67 describes the surface artery corridor as providing a virtually continuous frontage road. The FSEIS should describe the function of the surface artery.

v. Post-construction Impacts.

An air quality analysis task for the DSEIS identified air quality impacts from the operation of the proposed Central Artery/Third Harbor Tunnel project. Mobile source pollutants of concern include carbon monoxide, ozone, nitrogen oxides, hydrocarbons and PM10 (particulate). The results of the air quality analysis must comply with the Clean Air Act (CAA) (Sections 110 and 176) and the 1982 Massachusetts State Implementation Plan (SIP) (40 CFR Section 52.1120(c)(53)(i)) project level criteria (Table V-8). In order to comply with the CAA and the Massachusetts State Implementation Plan (SIP) for air pollution control, the DSEIS must satisfy two air quality criteria:

- 1) The hydrocarbon emissions must be less under the build alternative than the no-build alternative for similar years, and
- 2) The build alternative must not result in new CO violations or exacerbate existing CO violations.

The DSEIS used modeling procedures that were reviewed and agreed to by EPA. These procedures are defined in a document titled "Protocol for Air Quality Analysis for the Central Artery/Third Harbor Tunnel Project," dated January 1989. EPA did not approve the revision of the Air Quality Analysis Protocol, referred to on page 20-105 of the DSEIS, that delays assessment of air quality impacts of the construction impacts.

The results of the DSEIS indicate that, based on the assumptions contained therein, the operation of the proposed project satisfies the review criteria and will have a positive impact on air quality. The areawide pollutant levels are presented in Tables 4.15 and 4.20 of the DSEIS. This table indicates that hydrocarbon (HC) emissions will be less under the build alternative (17% less in 1998 and 19% less in 2010) than under the no-build alternative. Similarly, reductions are predicted for Carbon monoxide (CO) (22% less in 1998 and 2010) and for NOx (7% less in 1998 and 8% less in 2010).

The CO concentrations are presented in Tables 4.8, 4.12, 4.13, 4.17 and 4.18 of the DSEIS. These tables indicate that there are no violations of either the one or eight-hour CO standards under the build alternative for 1998 or 2010. However, one analysis site (number 17) has an eight-hour CO value within 10% of the standard. The FSEIS must include a discussion and commitment to implement all reasonable and feasible mitigation measures to reduce CO emissions for this site.

vi. Operational Commitments to Control Carbon Monoxide (CO) in the Tunnels.

Based on an average time exposure in the CA/THT, the ventilation system must be operated in such a manner so as to insure that the CO level does not exceed the concentration allowed for that time exposure. We understand that, upon completion of the depressed artery and harbor crossing, a vehicle travel run (to determine maximum duration in the tunnel) will be calculated, and re-calculated at pre-determined intervals thereafter.

Section 8.5.2 commits to base the selection of fresh air supply and exhaust rates on traffic flow evaluated by the Traffic Surveillance and Control System. EPA expects that evaluation of traffic flow will identify the maximum amount of time an individual can spend in the tunnel system during a peak hour and that this time period will be used to determine which air quality criteria (from Section 8.5.1) that the fresh air supply and exhaust rates must be set at to meet.

Section 4.8.1, on page 4-41, discusses the ventilation criteria for exposure to carbon monoxide. However, it only discusses the 15 minute exposure criteria and must discuss the other criteria, which apply to exposure durations of more than 15 minutes. Section 8.5.1 on page 8-15, also describes EPA's in-tunnel air quality criteria and commits to install continuous CO monitors. The FSEIS must commit to maintain these monitors and to submit the monitoring data to Massachusetts Department of Environmental Protection (DEP). This can probably be best accomplished by incorporating the tunnel monitors into DEP's monitoring network.

vii. Technical Comments on Air Quality Modeling Parameters.

The FSEIS must include a discussion of the monitoring data used to develop the CO background values for the microscale analysis.

The FSEIS must evaluate data from the nearest monitoring station and determine a project-specific eight to one hour persistence factor. (The DSEIS used a 0.7 persistence factor to convert eight hour CO results to one hour results.)

Table 4.1 on page 4-3 of Chapter 4 states that the 24 hour PM10 National Ambient Air Quality Standard (NAAQS) is "...not to be exceeded more than once per year per site." This is technically incorrect: the standard is met when the expected number of days per calendar year, with 24 hour concentrations over 150 ug/M3, is less than or equal to one. The statements of the one hour ozone and annual PM10 NAAQS are also technically incorrect.

Section 4.4.2(a) on page 4-10 includes a description of "neutral" versus "unstable" conditions which is incorrect: neutral conditions occur when air temperature decreases 1 deg.C/100 M., unstable conditions when the decrease is less, and stable conditions when it's higher. Other factors can also play a role. The FSEIS should correct this language.

Section 4.4.2(a) also asserts that neutral conditions and low mixing heights generally result in reduced pollutant dispersion. For ground level sources, like intersections, this is not true; lowest dispersion rates and highest impacts generally occur under stable conditions.

Section 4.4.3(c) on page 4-19 states that 70°F was used as an average summertime temperature in estimating daily pollutant emissions. EPA guidance during the development of the modeling inputs recommended 70°F. However, new data indicates that this value must be revised. All future runs of EPA's MOBILE emission model for estimating summertime daily pollutant emissions must use 64°F as the minimum daily temperature and 96°F as the maximum daily temperature.

The DSEIS used EPA's guidance to develop idle emission factors for the CO microscale analysis. Recently, EPA has developed a procedure to more accurately estimate idle emission factors. This adjustment must be used in the FSEIS. The vehicle speed of 2.5 MPH used to adjust the MOBILE4 idle emission factor must be developed in the following manner: 1) Run MOBILE4 for calendar year (CY) 1990 at the desired conditions; 2) Determine the projection year CO emission factor (EF) by reducing the CY 1990 EF, obtained in step 1, by the percentage given below for the projection year.

CY	% Reduction	CY	% Reduction
1990	0.0	2001	51.1
1991	9.4	2002	52.2
1992	16.8	2003	52.4
1993	23.3	2004	52.7
1994	30.6	2005	52.8
1995	35.2	2006	52.8
1996	39.3	2007	52.9
1997	42.8	2008	53.0
1998	45.7	2009	53.0
1999	50.2	2010	53.0
2000	50.2	2011-2020	53.1

Section 4.10.2(a) on page 4-48 does not, but should, note that ISC more commonly evaluates impacts on elevated receptors by plane displacement. It should also explain why flagpole receptors are more suitable for the DSEIS's analysis.

Section 4.10.2(a). Although the CO point source modeling considered impacts from, and interactions with, "microscale" CO (i.e., roadways and intersections), the NO2 point source modeling did not consider mobile source NO2 impacts. Also, no major NO2 point sources were modeled for interactions with the tunnel vents. Unless the DSEIS can establish that NO2 background reflects worst case annual NO2 levels from the unmodeled sources, it should justify the exclusion of mobile and background point sources from its NO2 dispersion modeling.

Section 4.10.7 on page 4-69 should reference Table 4.31 instead of Table 4.21. (Note, the table does not show the 1.1 ppm CO impact the text claims). Also, Section 4.10.7 should cite Tables 4.12 and 4.13 instead of 4.13 and 4.14.

Comments Concerning the MDPW Central Artery/Tunnel Traffic Analysis

1) The DSEIS did not include a traffic report that evaluates the traffic impacts of the proposed project at locations outside the project study area; it states that this study is being prepared (Section 3.2.4, Part 1, p. 3-57). This analysis must be submitted to EPA when it is completed to allow review and comment prior to the submission of the FSEIS.

2) The DSEIS used "worst case," i.e. maximum land use development and employment projections, as a basis for future trip generation. There should be an explanation why the future numbers are higher than the Metropolitan Area Planning Commission's estimates? (Page 2.2-13)

3) The FSEIS must include a discussion of the calibration method, data, and values used for trip distribution and mode choice models.

4) The FSEIS must discuss why the trip distribution model for future trip interchanges does not include consideration of travel times throughout the proposed highway network for the final estimates of traffic volumes.

5) A forecasted 45% increase in transit ridership by the year 2010 is indicated. There is no indication of how these trips will be accommodated or how key elements of the modal choice models incorporate the possible changes in travel time. The FSEIS must include more information about future public transportation volumes, capacity, travel times, and other measures of effectiveness.

6) The FSEIS must adjust the final traffic volumes to relate trip distribution estimates to initially assumed speeds for the trip distribution.

7) The DSEIS predicts an increase in average travel times for the region in 2010 over 1987. The FSEIS must include a crosscheck of travel times throughout the project study area.

8) The FSEIS should include additional information on commercial vehicle volumes at key locations on the network.

9) The FSEIS must include, to the extent reasonably foreseeable, traffic information describing the traffic impacts of the proposed North-South station transit connection.

B. OTHER ISSUES PERTINENT TO THE NATIONAL ENVIRONMENTAL POLICY ACT

i. General NEPA Requirements, including mitigation.

In addition to meeting the requirements imposed by the Clean Air Act and Section 404 of the Clean Water Act, the proposed project must comply both substantively and procedurally with NEPA and CEQ's Regulations (42 U.S.C. sec. 4332 (c)(1) and 40 CFR Parts 1500-1508). In general terms, these require federal agencies to take actions that protect and avoid harm to the environment; and to provide "full and fair" discussion of direct, indirect and cumulative impacts, of alternatives which would avoid or minimize adverse impacts, and of any adverse effects which cannot be avoided. Ultimately, federal agencies must implement mitigation measures it has committed to carrying out (40 CFR 1505(3)). In our opinion several aspects of the proposed project and DSEIS fall short of these requirements.

The DSEIS discusses various possible mitigation measure to lessen traffic, air and water quality impacts. It is not always clear, however, which measures have been assumed as necessary preconditions in the impact analyses, which measures are being definitively adopted to reduce identified impacts and which are merely being considered as possibilities, and who will be responsible for implementing the various measures. These points must be cleared up in the FSEIS to ensure that environmental impacts and mitigation measures are adequately analyzed and discussed.

This DSEIS was intended to fulfill a commitment made by FHWA and the MDPW in the 1985 FEIS to address fourteen issues left unresolved at that time and any other issues that have surfaced in the intervening years. This section discusses EPA's NEPA concerns about the DSEIS' treatment of several of these issues: the materials disposal program; the Charles River crossing; the future development of land as a result of the project; the tunnel fabrication/outfitting sites; and the Cross Town Boulevard. The previous section discusses EPA's air quality concerns under NEPA.

ii. Disposal of Excavated and Other Materials.

As the cover letter indicates, EPA has concluded that the placement of dredged and excavated materials in 103 acres of Boston Harbor around Spectacle Island, as proposed in the DSEIS and current applications for permits under the Clean Water Act and other federal statutes, would cause environmentally unsatisfactory impacts. The basis for this conclusion is that we believe the proposal would violate the substantive and procedural requirements of both Section 404 of the Clean Water Act and NEPA.

EPA's July 31, 1990 comments under Section 404 describe the basis for EPA's findings that the proposed fill would violate EPA's Section 404(b)(1) Guidelines. They are both summarized and incorporated in full as part of this NEPA comment (see Part D of this Appendix) because they detail EPA's concerns about the direct impacts of the proposed fill and about the inadequacies of the DSEIS' analysis of alternatives for materials disposal.

NEPA and CEQ regulations require that, in this DSEIS, FHWA and MDPW "rigorously explore and objectively evaluate all reasonable alternatives" to the proposed 103-acre fill and "devote substantial treatment to each alternative" (40 CFR 1502.14). As discussed in part in the 404 comment, the analysis in the DSEIS was flawed in that it gave only cursory attention to land-based options, involved little or no on-site investigation of potential alternative sites, applied overly narrow site screening criteria, and eliminated sites inappropriately. Further, the DSEIS eliminated from detailed consideration such options as use of some of the material for backfill and use of rail as opposed to trucks for transporting the material. As noted in the cover letter, since issuance of the DSEIS, the MDPW has been developing information in response to some of these concerns. We trust that in addition to providing the project changes and information required under Section 404, the FSEIS will, for purposes of complying with NEPA, correct the deficiencies in the DSEIS that have been identified here and in EPA's July 31, 1990 letter (attached to Part D of this Appendix). Additional NEPA issues regarding the materials disposal plan are discussed below.

iii. Cumulative Impacts of Harbor Fill.

The filling of 103 acres of Boston Harbor adjacent to Spectacle Island would have a significant cumulative impact when viewed in the context of both past and reasonably foreseeable future fills. CEQ Regulations require (40 CFR 1508.7, 1508.25) that an EIS examine cumulative impact and consider the degree to which the proposed filling would set a precedent for future actions with significant impacts or would represent a decision in principle about a future consideration (40 CFR 1508.27(6)). The DSEIS does not fulfill these requirements in its treatment of the impacts of materials disposal in Boston Harbor.

The area in which the proposed filling is to occur is within the Section 4(f) boundaries of the Boston Harbor Islands State Park.¹ The 1967 MAPC report, which first formally proposed the creation of the state park, had noted "There are only a few areas of the Harbor that are officially designated and reserved for conservation

¹St. 1970, ch. 742, sec. 9 (Mass.). See, Section 4(f) of the Department of Transportation Act, 49 U.S.C. Sec. 303; Section 18 of the Federal Aid Highway Act, 23 U.S.C. Sec. 128.

purposes or for public recreation;"² consequently, the Island Plan, called for in the Act, adopted the twin legislative goals of conservation and recreation.³

In its 1967 Report, the MAPC noted the vast historic filling of the tidal flats of the harbor. The report pointed out that significant fill had continued in the twentieth century, such as the Commonwealth Pier area, the connection of Castle Island to the mainland, and the filling of 2,200 acres for Logan Airport.⁴ Elsewhere in the harbor, the MAPC noted the following:

In recent years there have been only limited filling activities in areas such as Columbia Point or at the mouth of the Neponset River.... An exception may be in the area of Squantum and Thompson Island -- the proposed site for the 1975 World's Fair. Present plans for the Fair suggest new fill projects around Thompson Island and Columbia Point, and the reforming of the mouth of the Neponset River into protected water basin."⁵

Since 1967, fill has continued: hundreds of acres have been filled at Logan Airport (Bird Island Flats, etc. and at the end of the easterly runway) and in the South Boston shipping channel area. The Outer Harbor and its islands continued to be candidates for harbor fill: more than three quarters of the harbor has a mean low-water depth of ten feet or less.⁶

The 1970 Special Legislative Commission which proposed the islands park legislation was aware of the threat of harbor fill; its report stated: "Landfill could obstruct the tidal flushing action necessary to remove pollutants, do permanent injury to marine life or interfere with shipping."⁷

² Open Space and Recreation Program for Metropolitan Boston, Volume 2, "Boston Harbor," (Metropolitan (Boston) Area Planning Council, 1967), p. 16.

³ Boston Harbor Islands Comprehensive Plan (Department of Natural Resources-MAPC, under c. 742 of the Acts of 1970), (Oct., 1972) p. 18-20, 31, 69.

⁴ 1967 MAPC Open Space Report, p.14.

⁵ 1967 MAPC, p.14.

⁶ Second Interim Report of the Special Legislative Commission on the Boston Harbor Islands, February, 1970, p.17.

⁷ Second Interim Report, February, 1970.

A recent report states that the cumulative loss of intertidal habitat, flats, and saltmarsh in Boston Harbor to date is 3200 acres.⁹ The US Fish and Wildlife Service calls this loss one of the largest on the east coast.⁹ Thus, the current proposal to fill 103 acres would cause an additional cumulative loss. The existence of this proposal is already creating other proposals for additional fill: for example, during this comment period a public agency has suggested the further expansion of the MDPW's proposed fill at Spectacle Island to accommodate contaminated dredge spoils from maintenance dredging projects over the next 10-20 years.

Furthermore, the Corps and EPA are faced each year with many proposals to fill the harbor for a variety of public and private purposes, and must apply consistent standards to their evaluation under NEPA and regulatory statutes. EPA, in its 1985 NEPA selection process for the Waste Water Treatment Plant for the Boston Harbor cleanup, avoided creating a precedent by rejecting the many suggestions that filling the harbor would facilitate the siting of the treatment plant.¹⁰ EPA went to great lengths to avoid the fill of Boston Harbor, seeking both state-of-the-art engineering alternatives that would reduce the size of the treatment plant (e.g., considering double-decking the tanks at Deer) and requiring study of many alternative locations and configurations. For example, EPA decided that a treatment plant alternative site that required three acres of harbor fill (adjacent to Nut Island) was environmentally unacceptable for reasons that included the "serious impacts of filling tidal areas."

⁹ "Cumulative Impacts of Fill in Boston Harbor," Denise Breiteneicher (Save Our Shores with Boston Environmental Department, Boston Shipping Association, MA Coastal Zone Management and MassPort, April, 1988), p.13.

⁹ Letter, U.S. Fish & Wildlife Service, Vernon Lang, Acting Supervisor, New England Field Office, July 17, 1990, p.3.

¹⁰ Siting options suggested to EPA included a 154 acre man-made island; a 19 acre fill or a 3 acre fill at Nut Island; and a 20 acre fill at Deer Island.

¹¹ EPA's FEIS "Siting of Wastewater Treatment Facilities for Boston Harbor." Vol. 1, p. 56. Referring to the decision criteria, EPA's Boston Harbor FEIS concluded: "EPA found Split Deer-Nut to be environmentally unacceptable because of its severe impact on its "Neighbors" at Nut Island and on "Natural Resources," and strong barriers to "Implementation." EPA's FEIS, Vol. 1, p.63.

Pollution abatement in and the protection of Boston Harbor has become an issue of national significance.¹² As U.S. District Judge A. David Mazzone observed in his Sept. 5, 1985 decision finding the Commonwealth to be in violation of federal law:

"Boston Harbor is a powerful ecological system which is capable of reconstituting itself as long as the system is not overloaded...."

Though Judge Mazzone was referring to the massive inflow of pollutants as a cause of the overload, the continued loss of natural habitat could frustrate the reconstituting of the harbor's "powerful ecological system," the restoration of which is the purpose of the Clean Water Act.

iv. The proposed recreation area at Spectacle Island.

EPA does not dispute that certain curative measures on Spectacle Island may be beneficial, provided they are done in compliance with the Clean Water Act, or that island recreation plans can be modified to fit changing circumstances. None of the official park plans, however, called for major harbor filling at Spectacle Island either to remedy existing conditions or to create new park land:

A. The 1967 MAPC plan did not call for any fill, bank stabilization or capping to prepare for Spectacle Island's projected use as an "open, natural area for picnicking and other day-long recreational uses."¹³

¹² For example, the Congress has passed specially designated, Boston Harbor pollution control appropriations of up to \$100 million. EPA has commenced its major enforcement action to remedy what has been cited many times as one of the nation's worst pollution violations. U.S. District Judge A. David Mazzone, in granting the motion of the United States for summary judgement, noted on Sept. 5, 1985, that the harbor "is of unique historical, natural, and recreational significance"; and on June 29, 1987, EPA Administrator Thomas noted that "The importance of [the Boston Harbor-Massachusetts Bay] estuary to the nation and the need for additional pollution abatement and control programs are well documented." Furthermore, special interest and concern has been asserted by the Commonwealth through the creation of the Boston Harbor Island State Park; the designation of two bays within the Harbor as Areas of Critical Environmental Concern; and the Governor's nomination of Boston Harbor-Mass Bay-Cape Cod Bay as an "estuary of national significance."

¹³ 1967 MAPC, "Boston Harbor," p.36.

B. The 1972 MAPC-Department of Natural Resources (DNR) plan called for compaction after extinguishing the fires, which had then burned for twelve years, followed by a gradual vegetative restoration program. A seawall was proposed at the toe of the eastern dump slope. Future uses included natural trails and boardwalks on the northern portion; boat facilities and playfields in the middle; picnic areas on the south hill; and potential small swimming areas on the southwest beaches. No other fill or capping was suggested.¹⁴

C. The 1986 Department of Environmental Management (DEM) plan, the last major park plan revision, for the first time suggests capping the island and filling against the eroding slopes. It also suggests installing rip-rap (behind which there would be an artificial saltmarsh). The acreage of proposed fill (including the newly created saltmarsh) appears to be small. Central Artery or other public project spoil materials are suggested as the source. The cost of stabilization is estimated to be only \$3 million, with an additional \$10 million estimated for development. Future uses, except for the area close to the docks, are proposed to be such medium intensity uses as nature paths, lookouts, and meadows.¹⁵

Nevertheless, if one purpose of MDPW's request to fill the harbor at is to "create a park" at Spectacle Island, it is important to assure that in fact a park would be created if fill is authorized and the FSEIS should provide these assurances. It should be noted that in 1984-5 EPA was asked by the Commonwealth and the City not to consider Long Island, another island in the Harbor, as a site for the Massachusetts Water Resources Authority's wastewater treatment plant, because of the plans that Massachusetts and Boston had to create a park on Long Island, which the 1986 DEM plan shows to be the premier park opportunity remaining in the Harbor. For example, at that time the DEM Commissioner cited the "great importance and consequence to the Commonwealth" of Long Island as a potential park and noted that in DEM's view three million five hundred thousand people annually would be deprived of what he describes as a sorely needed recreational experience if Long Island were to become the site for Boston's treatment plant. He stated that the loss of Long Island for park use would be "severe" and added that "no other island offered equivalent opportunities."¹⁶ Representations such as these from state and city officials were definitely a factor in EPA's decision to approve the use of Deer Island for the new treatment plant. These Long Island promises,

¹⁴ 1972 DNR-MAPC Comprehensive Plan, p. 69.

¹⁵ Department of Environmental Management Boston Harbor Islands State Park, 1986 Master Plan, p.20-23.

¹⁶ EPA's FEIS on Siting, Vol. 1, p. 42 (1985).

however, have never been fulfilled: Long Island remains closed to the public for general recreation."

In the case of Spectacle Island, the DSEIS indicates that the MDPW is not committed to complete the park at Spectacle Island. It is, rather, planning to leave the Island, after materials disposal, in such a form that some other agency can create a park there. The FSEIS should contain commitments by the FHWA/MDPW and others as to which agency is to construct a usable park on Spectacle Island, using whose funds, and by what date.

v. The secondary impact of the future development of land occurring as a result of the project.

As we have stated in previous letters (e.g., November 1, 1989 letter to William V. Twomey), under NEPA and the CEQ regulations, FHWA has an obligation to evaluate reasonably foreseeable consequences, or "secondary impacts", including induced changes to the pattern of land use and related effects on the human environment, that flow from this project (40 CFR 1508.8). One of these, as FHWA has stated in this and previous EISs, is the environmental impact associated with development of the 27 acres of land through downtown Boston which the project will make available because of the depression of the Central Artery. Indeed, one of the significant, unresolved issues which FHWA, in its 1985 FEIS, committed this DSEIS to address is how to ensure an environmentally sound combination of uses for this land.

Unfortunately, the DSEIS describes a process for "joint development" which, as currently proposed, does not provide a role for NEPA. As we understand the CEQ regulations, FHWA's obligation to address these secondary impacts could be fulfilled in one of two ways: either evaluate in this SEIS the reasonably foreseeable impacts from an assumed maximum development scenario, or commit in this SEIS to undertake the analysis later as part of a tiered EIS process.

EPA's concern is that the proposed federal action (which includes funding for construction of the supporting foundations for future development) not result in violations of the National Ambient Air Quality Standards or exacerbate existing violations, and that the build condition be no worse than the no-build condition with respect to air quality. Ultimately, the future air rights development should also be compatible with the Massachusetts State Implementation Plan (SIP) which currently includes a parking freeze component.

¹⁷ A planning process undertaken by the island's owner, the City of Boston, has been delayed.

Further, for the reasons discussed above, we believe FHWA has an obligation to evaluate "secondary" impacts and induced changes to land use that could result from the creation of large areas of developable land at upland disposal sites for excavated material. As discussed elsewhere in these comments, the DSEIS gives scant attention to both the direct and secondary effects associated with land-based materials disposal sites. As suggested above, a tiered EIS approach might be an appropriate means for providing the requisite analysis of any significant secondary impacts at materials disposal sites.

vi. Tunnel Fabrication Site(s).

One of the fourteen unresolved issues that FHWA and the MDPW, in the 1985 FEIS, committed to addressing in the DSEIS is the selection of the tunnel fabrication site and evaluation of associated impacts. The DSEIS does not fulfill this commitment. In lieu of the analysis, it states (p. 1-2) that existing shipyards will be used and tunnel sections will be towed to the site from long distances, leaving to the contractors the choice of which shipyards to use. The DSEIS further states that nine potential outfitting sites for finishing the sections have been identified in the Boston area.

While we agree with the inference that use of existing facilities is likely to be environmentally preferable to the development of new sites, we do not believe this absolves FHWA and MDPW of its obligation to fulfill either its 1985 FEIS commitment or NEPA's requirement for disclosure of impacts associated with this aspect of the project. We request, therefore, that the FSEIS identify the locations of the sites most likely to be used, their current baseline use and environmental condition, changes from the current conditions necessary to permit their use as outfitting/finishing sites (i.e., whether dredging will be needed to accommodate moving the 40-foot draft tunnel sections), any impacts during construction or operation of these sites, and appropriate mitigation.

vii. Cross Town Boulevard

As we have discussed in previous correspondence (see May 2, 1989 EPA letter to William V. Twomey) and meetings, we believe that FHWA and the MDPW have an obligation under NEPA to describe in the DSEIS the "Cross Town Boulevard," a proposed divided road from the new Leverett Circle to Congress Street at Government Center. As this project would be built parallel to and concurrently with the CA/THT, and would function interdependently with the CA/THT, the CEQ regulations require that it be addressed in this EIS (40 CFR 1508.25). As the DSEIS does not refer to the existence of this project proposal and evaluate its impacts in combination with the construction and operation of the CA/THT, this obligation remains unfulfilled. We therefore request that the information be provided in the FSEIS.

viii. The Charles River Crossing

This issue known as "Scheme Z" is shorthand for the complex of issues better called "Charles River Crossing" issues. We note that efforts have been made to address some of the open space concerns that have been raised: the proposed design avoids the Paul Revere Landing Park and historic area and the DPW, in its September 13, 1990 letter, has agreed to modify a major ramp. We continue to be distressed, however, by the massive size of the bridges. The DSEIS's proposed crossing of the Charles River Reservation by the Central Artery and its Storrow Drive Connector (now, Scheme Z) is much more intrusive than the solution proposed in the 1985 FEIS. In the FEIS, the bridges carrying the main body of the road were narrower and less massive; also, the then-proposed Storrow Drive connector (Alternative 5A Modified) required a less elaborate web of ramps and did not require a separate, double-decked bridge.

EPA has long-standing policies to safeguard and encourage the public uses of the waters and shorelines that have been improved with federal funding under the Clean Water Act. Enthusiastic public enjoyment of clean water is the best guarantee of continued public support for both clean-up and continued protection. Thus, EPA agreed that there was a benefit to the Central Artery project's effort to reconnect the city with its waterfront by removing the barrier of the elevated artery. We have expressed our concern, however, that the massive highway structure, 17 lanes wide, passing low over the river bank then ascending to a 90' high spiral of ramps, would blight the potential of this portion of the water park.

We hope that the FSEIS will more fully examine alternatives to the Scheme Z Storrow Drive Connector and to the Charles River Crossing. As part of this re-examination, please state whether the state's decision to proceed with the MBTA parking garage at North Station foreclosed in any way the selection of Alternative T Modified because of conflict either with the garage or associated structures or prospective uses.

An alternative that should be more fully discussed in the FSEIS is that of diverting all or part of the through traffic off Storrow Drive, thus permitting its use as a lower-volume road, principally serving Boston but without the necessity for elaborate ramp connections (such as Scheme Z) to connect to the Central Artery. For example, diverting suburban traffic bound for Logan to the Mass Pike at Western Avenue would reduce Storrow Drive volume, and noise and air quality impacts on the adjacent water park. It is possible that this and other traffic diversions could permit smaller-scale solutions or a surface connection to the Central Artery using the Cross Town Boulevard. Such solutions would respect the public importance and potential of the Charles River Reservation.

The FSEIS should also contain commitments as to how the impacts of any chosen alternative are to be mitigated. These should include design modifications and significant parkland improvements that reduce or offset the impacts of the Charles River Crossing and facilitate, to the maximum extent possible, public open space to connect the historic water park of the Charles River Reservation with Boston Harbor.

C. NPDES PERMITTING ISSUES.

According to Page 3, "The National Pollution Discharge Elimination Systems permits may be required" (emphasis added) for the project. We are concerned that such a tentative statement would be included in the DSEIS after our many discussions and letters on this issue. While groundwater injection or tie-in to existing stormwater and/or combined sewer systems may potentially be alternatives to direct discharges to surface waters, we believe that direct discharges will be the most likely method of disposal and must be more completely discussed in the FSEIS. NPDES permits will be required for any direct discharges of effluent to surface waters, including construction site dewatering, stormwater, and tunnel wastewater. Such discharges will be required to satisfy technology and water quality requirements, and the permits may contain stringent effluent limits and best management practices.

Considering that major construction is projected to begin within the year and extensive preliminary design work has been undertaken, information regarding whether surface runoff from dewatering basins will discharge to surface waters should be available. Hence, we believe that information on NPDES permit requirements, including data to support permit issuance, should be presented in the FSEIS.

Specific information for NPDES permit applications should consist of approximate discharge points/areas, receiving waters, and estimated discharge volumes taking into consideration appropriate storm events and dewatering practices. MDPW as the permit applicant should correlate the soil and groundwater quality associated with specific discharge points/areas. Also, any construction or related practices which may affect the quality or quantity of the discharge should be addressed. We recommend that MDPW include specific practices which are mentioned in the DSEIS such as water table level maintenance, spill minimization and prevention, fuel storage and sedimentation control in their NPDES permit applications. These and other issues which could potentially affect the quality of the discharge should be addressed because the eventual NPDES permits will most likely include such best management practices (BMPs) as conditions. Existing soil and groundwater samples taken for material disposal (which yields estimated pollutant loadings associated with discharge areas) should provide sufficient data to initiate the permit issuance process.

For the proposed dewatering activities, we recommend that the areas where groundwater will be withdrawn should be characterized as best as possible for NPDES permit application purposes. MDPW's application should include well detailed maps showing primary construction areas and discharge points. Sufficient groundwater sampling should be performed so as to obtain as best an estimate as possible of effluent quality. Since the time frame from NPDES application completion to permit issuance is at least six months to a year, it would be in the project's best interest to file

applications expeditiously in order to avoid possible construction/operation delays.

Stormwater discharge permits will be required in either 1991 or 1992, pursuant to Section 402(p) of the Clean Water Act (1987), depending on how the discharges are characterized. EPA plans to issue regulations in October, 1990 for stormwater discharges associated with industrial activities. If "industrial activities" is defined to include large scale construction projects, then stormwater from the CA/THT project will be required to comply with the new regulations and will be required to obtain an individual permit or coverage under a general permit. The FSEIS should contain information explaining the applicability of the new regulations and discussing measures MDPW will take to comply with such regulations. If the new regulations do not define "industrial activities" to include construction activities, then stormwater permits will be required in 1992, or sooner if EPA determines that the discharges will be significant contributors of pollution. The FSEIS should contain information sufficient to allow EPA to make such a determination, including information concerning discharge locations, projected discharge volumes for various storm events, projected pollutant loadings, and best management practices to reduce the quantity of pollutants reaching surface waters.

The tunnel wastewater, which includes tunnel washdown and stormwater, may not be accepted by MWRA and Boston Water and Sewer Commission (BWSC) into their sewer systems. The DSEIS does not address alternative methods of wastewater disposal. Alternative discharge schemes for this wastewater need to be explored, especially discharge to surface waters, which would require NPDES permits. The FSEIS should describe MWRA and BWSC policies related to allowing additional tie-in of stormwater/tunnel wash down into an already overloaded Combined Sewer Overflow (CSO) system. If tunnel wastewater is discharged to surface water, sedimentation and oil/water separation may be required, depending on wastewater composition.

Leachate collection systems associated with the material disposal areas - including the historic landfill at Spectacle Island, and upland disposal sites - may result in discharges requiring NPDES permits. According to Volume 3 page 11-2, "The dike will be used to contain and treat water trapped behind the dike during the fill operation prior to discharging into the harbor." It would seem that this operation would require an NPDES permit, and the permit application should include information on the discharge location and excavated material quality.

D. SECTION 404 ISSUES

i. Summary OF EPA'S July 31, 1990 Findings under Section 404.

EPA has objected to MDPW's proposal for the 103-acre fill in the Harbor for the reasons explained in the Agency's July 31, 1990 letter to the Corps of Engineers pertaining to the MDPW's application for a permit under Section 404 of the Clean Water Act. (The July 31, 1990 letter is attached to this section.) EPA concluded that the proposed fill would violate EPA's Section 404(b)(1) guidelines in several ways. First, MDPW failed to show that the proposed action is the least environmentally damaging, practicable alternative and therefore has not demonstrated compliance with Section 230.10(a) of the guidelines. Second, EPA believes that the proposed filling of 103 acres of harbor waters would cause or contribute to significant degradation of the aquatic environment, in violation of Section 230.10(c) of the guidelines. Third, the significant adverse impacts on the marine environment would cause a loss of existing uses, thereby violating Massachusetts's federally approved water quality anti-degradation regulation and, in turn, Section 230.10(b) of the guidelines. EPA has recommended that MDPW modify its materials disposal plan to eliminate or greatly reduce fill in the waters around Spectacle Island, in a way that both complies with the requirements of the Clean Water Act and achieves the project objectives of environmentally sound materials disposal and remediation of Spectacle Island.

ii. Description of Interagency Discussions Subsequent to Corps' Section 404 Public Notice.

During the months since the May 1990 issuance of the DSEIS and the Corps' public notice, we believe that MDPW has been making a serious effort to respond to our 404 objections. We have been meeting on a weekly basis with the MDPW, the Corps, and other federal, state, and local agencies. The interagency dialogue fostered by these regular meetings has been constructive, and we hope ultimately that they will result in MDPW's submission of a revised materials disposal plan which satisfies the requirements of the Clean Water Act.

While it is premature to predict the elements of a revised disposal plan, it is useful to describe some of the work MDPW has undertaken to avoid or minimize the need to fill waters of the U.S. First, as a result of value engineering, MDPW has identified areas along the Central Artery where less material would have to be excavated than originally believed. Design changes for these areas may result in a 0.8 million cubic yard (mcy) reduction in the amount of material excavated (thereby reducing disposal needs).

Second, MDPW is exploring the feasibility of reusing approximately 0.7 mcy of excavate in the East Boston portion of the alignment for structural backfill, and disposing of the remaining 1.6 mcy of excavate from that portion at the Governors Island area of Logan Airport.

Third, MDPW has developed a revised methodology for evaluating upland alternatives for materials disposal and is currently screening a large number of potential sites. We are optimistic that there will emerge from this effort a number of sites which, alone or in combination, would be less environmentally damaging practicable alternatives to filling waters at Spectacle Island.

Finally, MDPW has been gathering additional information about the biological resources at Spectacle Island and the nature and extent of landfill material at the Island. MDPW's consultants have been conducting lobster surveys around the island and we expect the results to be available later this fall. On September 5, 1990, MDPW submitted to EPA and the Corps a report entitled "Results of Field Program to Locate Landfill Material Offshore of Spectacle Island." The report, which is still under review by EPA, presents soil characterization data to delineate the limits of landfill material along and offshore of the eastern and western shorelines of the island. This information will be important to our evaluation of MDPW's materials disposal purpose related to landfill capping and park creation. Equally important will be the information still to be developed by MDPW, related to the nature of the environmental harm being posed by the landfill material and alternatives to remediate whatever harm exists.

In summary, MDPW has entered into a cooperative process to address the concerns EPA identified in its July 31, 1990 letter commenting on the § 404 permit application, and we anticipate that MDPW will continue its efforts to find alternatives to filling Boston Harbor waters.

**Attachment: Text of EPA's Letter of July 31, 1990 concerning
 Section 404.**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION I

J F KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203-2211

July 31, 1990

Stanley J. Murphy, Lt. Colonel
District Engineer
U.S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, MA 02254-9149

Dear Colonel Murphy:

This letter responds to your May 18, 1990 public notice seeking comment about the Central Artery/Third Harbor Tunnel (CA/THT) project. The Massachusetts Department of Public Works (MDPW) proposes to build approximately 7 miles of new and reconstructed roadways in Boston. Key features of this \$5 billion project include placing most of the rebuilt Central Artery underground and constructing a new Seaport Access Road and Third Harbor Tunnel to Logan Airport. Because the proposal involves considerable dredging, filling and placement of structures in marine waters, as well as ocean disposal of dredged material, it requires federal permits under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act and Section 103 of the Marine Protection, Research and Sanctuaries Act (MPRSA). Our comments center primarily on the request for a §404 permit; we also briefly address the request for §§103 and 10 permits.¹

The case raises several environmental concerns, the most significant of which stems from the disposal of more than 13 million cubic yards of material dredged or unearthed during the course of the project. MDPW and the City of Boston seek approval to place 9.3 million cubic yards of this material in over 100 acres of Boston Harbor around Spectacle Island. While the primary reason for filling the harbor waters is disposal, the permit applicants have indicated that the fill would also serve to cap the historic landfill at the Island and accommodate creation of a park. The Island would be expanded to more than double its size by sacrificing 103 acres of marine habitat. Both intertidal and

¹The Federal Highway Administration (FHWA) on May 10, 1990 issued a Draft Supplemental Environmental Impact Statement. EPA has responsibility to comment to FHWA on the project and the adequacy of the DSEIS under the National Environmental Policy Act (NEPA) and will do so by September 22, 1990; we anticipate raising substantial concerns in the NEPA comment letter. Those comments, which shall incorporate the conclusions set forth herein, will also address the full range of environmental issues within EPA's jurisdiction and expertise. We understand that the NEPA comment letter will be made part of your administrative record for purposes of the Corps' NEPA and §§404, 103 and 10 permit decisions.



subtidal areas which provide habitat for fish, shellfish and various waterbirds would be destroyed.

EPA opposes this extensive filling of Boston Harbor because, as explained below, it would cause severe and unnecessary environmental impacts. At the same time, however, we emphasize that we do not object to capping the old Spectacle Island landfill and creating a park. We recognize the need to devise a final materials disposal plan for the CA/THT project which minimizes overall environmental consequences. We are confident that these objectives can be realized without major impacts to the aquatic environment at Spectacle Island and in a manner which complies with the requirements of the Clean Water Act.

We conclude that the project as currently proposed cannot receive a Clean Water Act permit because it violates the EPA §404(b)(1) guidelines on several counts. First, EPA believes the record does not support the conclusion in the DSEIS that the proposed action is the least environmentally damaging practicable alternative. The record developed to date contains convincing evidence that other disposal options, including several land based alternatives, likely exist. The applicant has therefore not demonstrated compliance with §230.10(a) of the guidelines. Second, we believe the proposed filling of 103 acres of marine habitat would cause or contribute to significant degradation of the aquatic environment in violation of §230.10(c) of the guidelines. We base this conclusion on the unmitigated permanent destruction of aquatic functions and values of the intertidal and subtidal habitat. If permitted, this fill of harbor waters would be the single largest allowed in New England since the publication of the §404(b)(1) guidelines (December 24, 1980). Sheer size aside, the fill would destroy productive marine habitat and cause severe impacts to the species that utilize the area. Third, the significant adverse impacts to the marine habitat would cause a loss of existing uses thereby violating Massachusetts' federally approved anti-degradation regulation. Hence, the current proposal also fails §230.10(b) of the guidelines which prohibits violations of any state water quality standard.

EPA's concerns are long a matter of record. As early as 1982 we alerted MDPW that since the project would be subject to regulation under §404, avoidable or significant losses of aquatic habitat would be prohibited. We commented on the draft and final EIS for this project in 1983 and 1985, respectively. Since 1987 we have participated in numerous meetings and subcommittees to help MDPW design a project that would comply with the requirements of federal environmental laws. Our involvement has substantially increased in the last two years with reviews of draft portions of the current DSEIS. By October 1988 we had alerted MDPW that Spectacle Island "Scheme 1," which would have filled 62 acres of coastal and aquatic resources, appeared to be unacceptable under §404. We are dismayed that concerns repeatedly raised by us and others remain

unresolved.² The delay and difficulty the project faces in obtaining a §404 permit could have been avoided if environmental issues identified years ago had been dealt with squarely. We nevertheless continue to believe that the basic project--depression and widening of the Central Artery and construction of the Third Harbor Tunnel -- can satisfy the guidelines if these longstanding issues can be resolved. Our §404 concerns, while serious, can be remedied if the materials disposal plan is modified. We remain committed to working cooperatively with MDPW and other involved parties to ensure that the CA/THT project is developed in an environmentally acceptable manner. To that end, we recently have been participating in a series of meetings with the Corps, MDPW, the Department of Environmental Protection (DEP), the Department of Environmental Management (DEM) and the City focusing on issues related to material disposal alternatives.

This letter presents our evaluation of the impacts of this proposal to the aquatic environment, our assessment of the existence of practicable alternatives to filling the waters of Boston Harbor, and our conclusions with respect to the requirements of the §404(b)(1) guidelines.³ Attachment A contains our comments pertaining to the permit applications under §10 of the Rivers and Harbors Act and §103 of MPRSA as well as several §404 issues unrelated to the Spectacle Island fill proposal. In conducting this review and formulating our position, we have relied upon the Corps public notice and the DSEIS, information received during our extensive involvement in the project, and recent work done by Metcalf and Eddy (M & E), a consultant retained by EPA to assist in the review of the DSEIS and the federal permit applications.

We requested M & E to examine the impacts to the marine environment associated with the MDPW's proposed filling of waters at Spectacle Island; evaluate MDPW's alternatives analysis for the materials disposal program; and assess the feasibility of alternative disposal scenarios which would have less environmental impact. In so doing, M & E devised one potential capping/park creation alternative for Spectacle Island and identified several potential upland disposal sites. The scenarios identified by M & E do not

²Through impressive in size, the DSEIS analyzes certain key §404 issues inadequately, incompletely or not at all. Attachment B lists the additional information we feel should be provided so that we can completely assess the project's impacts. Despite deficiencies in the DSEIS, enough information exists for us to conclude that the present proposal does not comply with the guidelines.

³While we have reviewed the proposal primarily in light of the requirements of the guidelines (40 CFR 230), we believe many of our comments are also germane to your public interest review.

represent the only choices available; they demonstrate, however, that even a relatively quick (i.e., less than two month) analysis reveals several apparently practicable and less environmentally damaging options. The M & E report is appended hereto as Attachment C.

Section 404 Permit for Filling Waters at Spectacle Island

1. The Massachusetts DPW Has Not Demonstrated the Unavailability of Feasible Less Environmentally Damaging Alternatives.

The alternatives analysis performed to date is not adequate for the purposes of compliance with §404(b)(1) guidelines. These regulations prohibit discharges if there exists a practicable alternative which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant environmental consequences. It is the applicant's obligation to demonstrate that no such alternatives exist.⁴ The regulations consider practicable alternatives to include, but not be limited to, activities which do not involve a discharge of dredged or fill material into the waters of the United States or ocean waters, or which involve discharges of dredged or fill material at other locations in waters of the United States or ocean waters. "Practicable" alternatives are available and, either singularly or in combination, capable of satisfying the basic project purpose taking into account cost, logistics and existing technology. (§230.10(a)(1) and (2)). Any alternative which would appear to satisfy the basic project purpose and cause less environmental damage should be considered in the §404 analysis. This could include examining alternatives to the basic highway/tunnel project itself, as discussed in the U.S. Fish and Wildlife Service comment letter of July 17, 1990. However, since our primary concern centers on the adverse impacts of filling the waters around Spectacle Island rather than the actual construction of the artery and tunnel, and since we believe there are alternative disposal options, we do not here address alternatives to the overall project.

⁴Nonwater dependent projects which fill wetlands, mudflats or other special aquatic sites as defined by the guidelines must rebut a presumption that practicable alternatives which do not involve a special aquatic site are available and have less impacts on the aquatic ecosystem [§230.10(a)(3)]. Courts have held that the guidelines impose a substantial evidentiary burden on the applicant to demonstrate the unavailability or infeasibility of alternatives (e.g., Hough v. Marsh). The CA/THT proposal (including the landfill capping and park creation aspects) is not water dependent and the area MDPW proposed to fill includes some saltmarsh and mudflats. Since MDPW has failed the general requirement to comply with §230.10(a), it clearly has not overcome the rebuttable presumption insofar as it applies to this case.

The evaluation of disposal alternatives by MDPW is wholly inadequate. Indeed, it does not appear that a coherent analysis of alternatives was performed at all, let alone the searching look required by the guidelines. Instead, MDPW employed a set of "siting criteria," not all of which EPA agrees with for purposes of the §404 analysis, to reject alternatives other than Spectacle Island. Even accepting MDPW criteria, the record does not support the conclusion reached in the DSEIS that the proposed project is the least environmentally damaging practicable alternative. On the contrary, there is ample evidence that less environmentally damaging, practicable alternatives likely exist to filling the marine habitat around Spectacle Island. We treat each of these issues in turn.

a. Inadequacy of Current Alternatives Analysis

The §404(b)(1) guidelines mandate a serious evaluation of alternative sites for disposal of materials other than in the waters around Spectacle Island. The materials disposal alternatives analysis provided in the DSEIS was flawed for several reasons. First, the evaluation of land-based disposal options was cursory and apparently involved little or no on-site investigation of potential alternate sites. Second, MDPW applied overly narrow site screening criteria, effectively eliminating potential alternatives. Third, even accepting the site screening criteria, the MDPW eliminated sites inappropriately or without justification.

Working with the MDPW and the Corps as recently as April 5, 1990, we reviewed the Massachusetts Water Resources Authority (MWRA) list of 296 sites to determine if these sites should be eliminated or assessed further based on information contained in the MDPW files. This process resulted in approximately 200 sites that warranted further investigation to determine feasibility for use as a materials disposal site. MDPW planned to eliminate most of these sites based on a criterion which required sites to be at least 80 acres in size. EPA and the Corps stated that the minimum size criterion should be reexamined and supporting documentation provided. In response to this request, consultants to MDPW provided information suggesting that 20 acre sites could be economically feasible for disposal. Nevertheless, MDPW adhered to the 80 acre criterion in the DSEIS and rejected most potential disposal sites on that basis. Similarly, it appears that MDPW eliminated a number of sites by presuming endangered species concerns. While we agree that effects on endangered species ought to be considered in evaluating alternatives, the potential adverse impacts should be documented before sites are eliminated on that basis. It also appears that MDPW inappropriately excluded sites on the basis of "program implementation issues"

(DSEIS, VOL. II. B., PP. 4-35) such as the delays that might result from acquiring necessary regulatory approvals.⁵

Even accepting the applicant's screening criteria uncritically, the MDPW retained sites that should have been eliminated and dropped sites that should have been further analyzed. For instance, the Bedford site should have been eliminated based on wetland and water supply impacts. In our October 4, 1989 letter to MDPW, we recommended that the Governors Island Flats and Hull Bay sites be eliminated based on concerns about the aquatic environment, yet MDPW retained the sites in the DSEIS. Of greater concern, we believe a number of sites have been eliminated prematurely. Of the roughly 200 sites identified by the agencies in April, 1990, approximately 70 of the sites evaporated from the list of alternatives with no explanation. Furthermore, the MDPW eliminated from further consideration the use of the 524 existing landfills in the State, based on DEP's objections to using the very limited capacity available in the remaining landfills for disposal of materials other than sanitary waste (Appendix Vol. 3 of 5, page 7-4). EPA agrees with DEP that the limited capacity of the State's existing operating landfills needs to be reserved for municipal refuse disposal. However, MDPW could have considered existing closed sites for possible vertical or horizontal expansion, as well as the possible beneficial re-contouring of landfills that have not been properly capped.

In summary, the MDPW alternatives analysis is seriously flawed and the record does not support the conclusions in the DSEIS. That the DSEIS eliminated sites which appear to meet MDPW's own screening

⁵ MDPW has also stated to EPA and the Corps that it believes upland sites are generally impracticable because of perceived difficulties in overcoming community objections. In considering community concerns in the §404 alternatives analysis, several factors should be kept in mind. The regulations define a "practicable" alternative as being available and feasible taking into account cost, logistics, and existing technology. EPA and the Corps have consistently held that generalized and undocumented difficulties encountered in making siting decisions do not serve as a basis for rejecting otherwise feasible alternatives. In unusual cases, community objections may render an alternative unavailable if it becomes impossible to obtain, manage, or utilize. However, we do not believe MDPW would have difficulties obtaining sites because it has the power of eminent domain. In any case, a general expectation of community opposition, without documentation of diligent but unsuccessful efforts to utilize an alternative, falls far short of the showing required by the guidelines. Moreover, we believe MDPW could ameliorate community concerns by showing that the material is not hazardous, traffic impacts are not severe or permanent, and the filled areas can be put to productive private or public use.

criteria and for which we sought further study, and meanwhile retained sites that appear to fail the same criteria or which we recommended be dismissed, is baffling and casts doubt on both the quality and fairmindedness of the analysis. Based on current information, the MDPW has failed to show that there are no less environmentally damaging practicable alternatives to filling 103 acres of harbor waters, and the proposed discharge does not comply with the requirements of §230.10(a).

b. Practicable Disposal Alternatives Likely Exist

Not only has MDPW failed to show there are no alternatives, but the current record and the work by our consultant demonstrate the probable availability of feasible, less environmentally damaging alternatives. These alternatives include options identified in the DSEIS and others not included in the document. The following discussion underscores our conclusion above about the inadequacies of the MDPW analysis and, further, illustrates the likelihood that feasible alternatives do in fact exist. The sites examined by M & E do not necessarily reflect a conclusion by EPA that these are the only potentially less environmentally damaging practicable alternatives or that these should be selected over other less environmentally damaging alternatives that may be identified in the future.

Based on the DSEIS and other sources M & E examined several potential land-based disposal options that look promising from the standpoint of §404 requirements.⁶ They conducted a preliminary evaluation of how each of the options would affect wetlands, traffic, water quality, land use, relocation, air quality, noise and historic resources (see Attachment C; Section 3.0). Based on this preliminary analysis, it appears that these sites would be less environmentally damaging practicable alternatives to the Spectacle Island proposal. Of these, two have already been identified in the DSEIS: the Rowe Quarry in Revere and Malden and the Bates Quarry in Weymouth.⁷

⁶Based on discussions with your office, we understand that the New England Division staff reviewing this project have identified other alternatives which merit further study.

⁷ We recognize that the MWRA has selected the Rowe Quarry site as a back-up alternate site for disposal of residuals from the Deer Island wastewater treatment plant. If (and only if) the state legislature prevents the MWRA from using its preferred site at Walpole, thereby resulting in the use of Rowe Quarry, EPA would agree that, from a public health standpoint, it is a more urgent priority to use the quarry for residuals disposal rather than excavated materials disposal.

The Rowe Quarry site, for instance, drains to salt water, has direct access off Route 1, and is only 6 miles from the project sites. The Weymouth Quarry site could be developed in a manner to avoid impacts to any significant wetlands, affecting only some quarry ponds that have been used for rock washing operations. Residential traffic impacts associated with the use of the Weymouth Quarry site could be eliminated by provision of a new direct access and egress from the adjacent Route 3. Concerns about protection of water supplies could be mitigated by construction of properly lined landfills at these sites. These sites need additional study to determine the extent of federally regulated wetlands and waters of the United States within the sites, measures to avoid or minimize the loss of any valuable aquatic habitat within the Weymouth site, the extent of other potential environmental impacts, and means to maximize site volume capacity for the materials disposal program.

Other quarries⁸ may also be suitable for disposal of excavated and/or dredged material from the project. For example, M & E identified three additional sites, two of which are quarries, which combined may be able to contain 4.6 million cubic yards of material. The estimates of capacity are conservative, based on achieving full compliance with DEP solid waste siting criteria. M & E's preliminary evaluation suggests that these other sites would be far less environmentally damaging than filling 103 acres of harbor waters around Spectacle Island.

In addition, the DSEIS briefly evaluated the potential use of Logan Airport infield areas as a disposal site for some of the material from the project. This alternative may be able to accommodate at least 0.5 million cubic yards of material in the infield areas to a height of approximately one to two feet within FAA restrictions. This alternative involves little or no wetland impacts and minimal traffic worries. It appears to be practicable and less environmentally damaging, and clearly warrants further study.

We believe that MDPW should also reassess its proposal to use only a small fraction (100,000 cubic yards) of excavated material as backfill. The project will require roughly 4 million cubic yards of backfill, and we have not seen a compelling explanation of why excavated material could not be used for this purpose. EPA

⁸Quarries generally offer a number of advantages because they are heavily disturbed sites, often connect to major rail and road networks, and can contain substantial volumes of material. Moreover, quarries typically blight the landscape and are sometimes a safety hazard. Once filled and capped, quarries could be put to productive public (e.g., park, open space) or private (development) use. Apparently several quarry owners have recently expressed interest to the Corps and MDPW in accepting excavated material from the CA/THT project.

recognizes that suitable grade material may be necessary in certain areas (e.g., utility corridors, roadbeds) to prevent differential settling. However, after taking measures to protect utilities and any other especially sensitive zones, it would appear that perhaps as much as several million cubic yards of material could be utilized as backfill. Insofar as excavated material can be used in this fashion, it has the twin advantages of reducing the volume of material for offsite disposal and the need to truck in backfill material. This alternative re-use of the excavated material should be explored in further detail.

Your staff has also identified a marine disposal alternative of nearshore confined aquatic disposal. Under this approach, shallow areas would be isolated, dredged and backfilled with material generated by the CA/THT project. At first blush, this option appears to have certain advantages: the material dredged from the cells could be used as cap at the Massachusetts Bay disposal site; environmental impacts to the Harbor, while long-term, would not be permanent; with careful site selection, it is unlikely to violate the prohibition against significant degradation, in contrast with the proposed project; and it appears to be cost-effective. We recommend studying this option further to determine whether environmentally suitable nearshore areas exist which could accommodate a contained dredge and backfill alternative.

In summary, the record developed to date indicates that less environmentally damaging practicable alternatives likely exist to the current disposal scheme. These include recycling more material as backfill, land-based alternatives, and, possibly, nearshore confined aquatic disposal. EPA need not prove the existence of practicable alternatives, let alone devise an actual disposal plan. However, the evidence in the record that other feasible options exist reinforces our conclusion that the current proposal fails the guidelines and underscores the need to redirect the materials disposal evaluation towards a plan that will comply with the Clean Water Act requirements.

c. Less Environmentally Damaging Landfill Capping and Park Creation Alternatives Exist

The MDPW has joined with a co-applicant, the City of Boston, in seeking the §404 permit to fill waters at Spectacle Island. The City hopes to use MDPW's dredged and excavated material to cap the historic landfill at the Island in a manner which can accommodate future use of the site as a park. This multi-purpose proposal complicates the alternatives analysis under §404.

A proper §404 analysis in this case can be handled two different ways. First, the Corps could consider the capping of the landfill and creation of a park to be secondary benefits of the basic transportation project proposed by MDPW. If the alternatives analysis for the materials disposal demonstrates that some fill in

Harbor waters around Spectacle Island is unavoidable and would not cause significant degradation of aquatic resources, we would support designing the disposal operation with these secondary benefits in mind.

Alternatively, and more consistent with the Corps public notice, the Corps could determine that there are three distinct project purposes: materials disposal from the transportation project, landfill capping or remediation, and park creation. Under this approach, there must be a separate inquiry to determine the least environmentally damaging practicable alternative for each project purpose. There is no requirement that all of the purposes be accomplished at the same site. So, for example, if the alternatives analysis for materials disposal shows that filling waters at Spectacle Island is avoidable, then the inquiry would turn to the minimum amounts of fill needed to remediate the landfill and to enable a park to be built.

As discussed above, MDPW has failed to show that filling 103 acres of harbor waters is the least environmentally damaging practicable alternative for disposing of excavated and dredged materials. Similarly, MDPW and the City have failed to show that such filling is unavoidable in order to cap the historic landfill or to create a park. Indeed, the current record supports the opposite conclusion.

The MDPW agrees that the 103 acre fill for which it seeks a permit exceeds the amount necessary to cap the landfill. It has stated that a minimum of 800,000 cubic yards of clay and fill material is needed to cap the landfill and that this would require filling 23 acres of the waters surrounding the Island. EPA is unconvinced that 23 acres of filling in harbor waters is necessary to cap the landfill and remediate the environmental problems at the Island.

Numerous questions must be answered before we can determine the minimum amount of fill needed to accomplish this purpose. For example, the dimensions of the landfill are unknown. MDPW has assumed, but has not yet documented, that the landfill extends seaward from the eastern shore of the island approximately 200 feet beyond mean high water. Until the areal extent and depth of the landfill are determined, it is impossible to know the scope of the problem. Also, we have questions regarding the nature of the environmental hazards posed by the landfill. Even if the landfill extends below mean high water, it is not clear that it is causing harm to the aquatic ecosystem. If so, it may be possible to remove the material rather than filling intertidal and subtidal habitat to cap it. Similarly, while some data have been gathered concerning the leachate, more information is needed to determine the potential environmental harm. Also, we would need information about the leachate contribution which would be expected from the additional solid waste MDPW intends to place on the island.

Finally, alternative ways to control the remaining leachate should be studied.

Based on current information, M&E prepared a preliminary plan (Attachment C, Section 2.0) to cap the existing landfill while minimizing encroachment into the intertidal and subtidal areas (i.e., a design which would comply with the §404 guidelines). It is apparent that with appropriate re-grading of portions of the existing steep landfill slope, and with the use of new steep slopes and possibly some vertical sea walls, the encroachment into waters of the United States could either be eliminated entirely or at least significantly reduced below the MDPW's stated 23 acre minimum fill proposal. The M & E initial design, which may need to be adjusted and refined as additional information becomes available, would affect 37 acres of the historic landfill and less than 1 acre of intertidal habitat below mean high water, which would be converted to riprap slope.⁹ This capping plan would accommodate approximately 0.6 million cubic yards of material and would have minimal impact to the aquatic environment.

Finally, the applicants have failed to show that filling 103 acres of waters around Spectacle Island is necessary in order to create a park. There have been several state plans which discuss the use of Spectacle Island as a park; none of them envisions substantial filling of the waters. The 1967 Metropolitan Area Planning Council (MAPC) plan does not call for any fill, bank stabilization or capping to prepare for Spectacle Island's projected use as an "open, natural area for picnicking and other day-long recreational uses."¹⁰ The 1972 MAPC-DNR plan, an outgrowth of the 1970 Islands Park statute, called for compaction and a gradual vegetative restoration program. A seawall was proposed at the toe of the eastern dump slope. Future uses included nature trails and boardwalks on the northern portion; boat facilities and playfields in the middle; and potential small swimming areas on the southwest beaches. No other fill or capping is suggested.¹¹

The 1986 Boston Harbor Islands State Park Master Plan recommends capping to remediate effects of the historic landfill, using clay

⁹ This does not involve capping the area underwater where it is alleged that historic landfill materials have eroded. As noted above, there is inadequate information to conclude that the landfill extends under water or, even if it does, that it is causing environmental problems which require remediation by capping and the consequential loss of intertidal and subtidal habitat.

¹⁰ MAPC Open Space and Recreational Program for Metropolitan Boston, Vol. 2, "Boston Harbor," p. 36.

¹¹ MAPC-Department of Natural Resources "Boston Harbor Islands Comprehensive Plan," October 1972, p. 69.

soil material from a public works project such as the CA/THT project. In addition to capping, the conceptual plans suggest filling against the eroding slopes, installing riprap, and creating a salt marsh behind the riprap to add environmental habitat value as well as a wetland water quality treatment system for leachate coming from the landfill. Future uses would include a docking and "arrival" area, nature trails and boardwalks, meadows, and a small swimming beach on the southwest side. These plans do not appear to contemplate substantial filling in waters around the Island in order to achieve these goals.¹² Indeed, it appears that the M & E plan referred to above would successfully accommodate a park with features similar to those identified in the 1986 Master Plan.

As discussed above, it appears that landfill remediation and park creation could be accomplished with far less fill than any of the Spectacle Island alternatives presented in the DSEIS. However, MDPW has suggested that disposing of a small volume of material at Spectacle Island may not be cost effective on a per cubic yard basis. In our view, it would be improper under the guidelines to authorize filling harbor waters for landfill capping and park creation beyond what is necessary to achieve those purposes, because of the economics of the CA/THT project. We acknowledge that in determining the practicability of alternatives, cost is a consideration. However, cost is to be viewed from an objective standpoint, not from the standpoint of the financial circumstances of particular applicant. It is improper to reject a less environmentally damaging alternative based on the applicant's assertion that it cannot afford the alternative, as long as the alternative has a reasonable cost. It would be particularly bizarre if such an analysis resulted in approving more fill than necessary for the project purpose, and at a greater overall cost!

Even if this were a proper approach under the guidelines, we remain unconvinced by MDPW's unsupported assertions. It has not provided any documentation to support the claim that small disposal options would be too costly. MDPW would incur costs to send the materials elsewhere if it abandons Spectacle Island; it is unlikely that the incremental increase in the cost of going to the island would be great, compared to the overall cost of the entire CA/THT project. In addition, even if a small disposal scenario is not "cost effective" for a transportation project, it may well be cost effective for the landfill capping and park creation purposes. If these are important priorities for the City and the State, these goals might be achieved through the CA/THT project even if there are poor economies of scale from the materials disposal standpoint.

The applicants have also failed to demonstrate that there are no alternative ways to fund a small disposal option. For example, it

¹² Department of Environmental Management Boston Harbor Islands State Park, 1986 Master Plan, pp. 20-23.

may be possible to devote for this purpose some funds from the sale of air rights over the depressed artery. At worst, it may be necessary for the City of Boston and the Massachusetts DEM to contribute financial assistance.¹³ (Indeed, the City already may be obligated under existing state solid waste laws to spend whatever is necessary to cap the existing uncontrolled landfill.)

Finally, we think the question is more complex than just economies of scale. There may be other reasons why it would be advantageous for MDPW to spend the start up costs to establish barging facilities at the Island, such as to facilitate handling peak loads.

In conclusion, regardless of whether the landfill capping and park creation are viewed as secondary benefits or distinct project purposes, the filling of harbor waters cannot exceed the amount demonstrated to be the least environmentally damaging practicable alternative. MDPW has failed to demonstrate that filling 103 acres of Boston Harbor is unavoidable for any of the project purposes.

2. The Proposed Filling of 103 acres of Boston Harbor Would Cause or Contribute to Significant Degradation of Waters of the United States.

a. Site Characteristics

Located on the western edge of the outer Boston Harbor, Spectacle Island originally consisted of two drumlins connected by a tombolo. The City of Boston gradually covered the tombolo with waste from roughly 1920 to 1960. The shoreline consists of rocky intertidal areas, coastal banks and beaches and a small area of high saltmarsh. Biologically productive intertidal and shallow subtidal habitat populated by benthic macroinvertebrates and shellfish surround Spectacle Island. Over 55 invertebrate species, including soft-shell clams, extensive blue mussel beds, and lobsters¹⁴ live

¹³ We note that the expected cost of landfill stabilization is less than a third of the expected cost of park development (\$3 million vs. \$10 million), according to the 1986 Master Plan. Presumably the City and/or DEM will need to obtain funding for the park development; we see no reason why their funding request could not be increased to encompass some or all of the costs of stabilization if MDPW will not agree to carry out a small disposal alternative.

¹⁴ MDPW has commenced but not completed a lobster survey. The presence of numerous lobster trap buoys within the vicinity of Spectacle Island offers evidence of their presence in harvestable numbers. For example, according to the MWRA, a 1-day count of lobster pots located within 500 yards of the perimeter of Spectacle

within the areas proposed for filling. A number of birds--black ducks, mergansers, and eiders to name a few--undoubtedly frequent the intertidal and shallow waters around the island. Nearly four dozen species of fin fish have been observed in Boston Harbor waters. The DSEIS concludes that the same fish that inhabit other parts of the Harbor should also be common around Spectacle Island, including the winter flounder. Marine mammals such as harbor porpoises and seals probably visit the proposed fill area occasionally. The M & E report (Attachment C) discusses the aquatic resources of Spectacle Island in greater detail.

Both soft shell clams (Mya arenaria) and blue mussels (Mytilus edulis) inhabit the intertidal areas. Mya occurs in low densities because of the limited availability of soft bottom substrate which the clam prefers. Nevertheless, the soft shell clam remains a viable part of the benthic community of the Island and contributes to its overall diversity. The organism contributes to the secondary productivity of the benthos by providing food for diving ducks, demersal fish, true crabs, horseshoe crabs, and moon snails. Smaller predators such as the mummichog prey on the young clams.

The blue mussel favors the cobble substrate surrounding the mid to low tide level and exists in relatively high densities at the Island. Mussel beds occur along the entire northern and eastern shores of the island; a particularly large bed occurs to the southeast near the southern drumlin. Mussels inhabit nearly 15 acres of the intertidal zone and extend well into the subtidal area. Densities average 62 individuals/square foot with a high of 267/square foot. Because of their high density and wide distribution, the mussels contribute more than any other species to the secondary productivity of the lower intertidal areas around the island. They provide food for diving ducks such as the common eider, gulls, and fish such as tautog and cunner. Lobsters eat them as do the lobsters preferred prey, Cancer crabs. The extensive shellfish mats also create a multitude of microhabitats for numerous organisms and burrowing opportunities for crabs and lobsters. The results of the lobster survey of the waters surrounding Spectacle Island may shed additional light on the value of the subtidal areas.

Several bird species have historically bred at Spectacle Island including glossy ibis, black crowned night heron, green backed heron, snowy and great egrets. When present, these species would likely use the marine habitat around the island as feeding grounds. A 1984 survey revealed nesting pairs for one great egret, 40 snowy egret, 60 night heron, and 10 glossy ibis (DSEIS. IIB 4-87). The heron rookery was not occupied during the 1988 and 1989 breeding seasons.

Island showed a total of 149 buoys (August 1989 Draft Materials Disposal Program, Chapter 8, p. 8.4-27).

The biological communities at Spectacle Island are normal for Massachusetts Bay and do not appear adversely affected by past disposal activities at the Island. The chemical composition of the sediments in the area of proposed fill correspond to those in other areas of Boston Harbor. Because of its close proximity to the existing Boston Harbor wastewater and sludge outfalls and because the sediments resemble those found in the rest of the harbor, the project area reflects the prevailing condition of the harbor more than pollution emanating from the landfill.

The benthic community at the Island is typical of New England urban estuaries and indicative of a functioning, but moderately stressed, benthic community. Although organisms such as Polydora connata, Nephtys spp. and tubificid worms commonly occur in stressed environments, none of these species significantly dominates any of the sampling stations. Nearly half the stations reported codominant populations of amphipods which characterize healthy communities. Ampelisca abdita, an organism sensitive to sediment contaminants and often used as a barometer of sediment toxicity, exists at the Island.

b. Significant Adverse Effects of Fill

The proposed filling of 103 acres of marine habitat in Boston Harbor would cause or contribute to significant degradation of waters of the U.S. in violation of the §404(b)(1) guidelines. Section 230.10(c) states, in part, that "no discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of waters of the U.S. Findings of significant degradation shall be based on appropriate factual determinations...with special emphasis on the persistence and permanence of the effects...." The regulation then states that effects contributing to significant degradation include, among other things, "significant adverse effects" to fish, shellfish, wildlife as well as aquatic ecosystem diversity and productivity.

We believe the impacts of filling 103 acres of aquatic habitat would cause significant degradation within the meaning of the guidelines. This is true from either an individual or cumulative perspective. Even assuming for the sake of argument that the project would not directly cause significant impacts, it contributes to them, an outcome the regulations also prohibit. We reach this conclusion after examining the quality and quantity of the affected aquatic habitat, the direct and cumulative effects of the fill, the persistence of the impacts, and the difficulty of effectively mitigating the habitat loss that would result. MDPW itself at one time appeared to recognize the potential seriousness of the impacts at Spectacle Island. In the June 1988 Draft Disposal Site Screening Report (p. 5-11), MDPW concluded that the advantages of filling 62 acres of water around Spectacle Island, "may be outweighed, however, by potential environmental impacts

such as the loss of aquatic habitat, and by the high disposal costs associated with construction of the dikes."

As noted earlier, MDPW's revised proposal to destroy 103 acres of marine habitat would be the largest permitted fill in New England in the decade since issuance of the §404(b)(1) guidelines. The sheer magnitude of the loss is itself a significant factor. In addition, the record shows that the habitat at risk is not depauperate, highly stressed or otherwise incapable of functioning typically. The natural resource values of the area have been independently verified by our own biologists, MDPW's consultants (see Aquatic Resources of Spectacle Island, Cortell and Associates), the Fish and Wildlife Service (July 17, 1990 letter), and the National Marine Fisheries Service (C. Mantzaris, pers. comm.).

The most severe impacts caused by the proposed fill would be among those proscribed by §230.10(c) of the guidelines. Specifically, the benthic macroinvertebrates and shellfish that now live in the 103 acre fill area would be smothered and killed. Because the area would be converted to fastland, there would be no opportunity for these organisms to recolonize and so the impact would be permanent.¹⁵ Although fish and birds that now utilize the area may escape direct mortality, the fill would destroy the existing habitat for those species. In addition to the immediate impacts, the value of the site for food web support, nutrient cycling, spat export, and other functions of the estuary at large would be lost. Although all the habitat that would be filled has value, the loss of intertidal habitat particularly troubles us. Intertidal habitat--that area between mean low and mean high water--is relatively scarce to begin with and has historically suffered a disproportionate share of adverse impacts. Past encroachments into the harbor typically affect the intertidal zone first by replacing the natural gently sloped habitat with vertical bulkheads or steep riprap slopes.

Viewing the issue from a broader cumulative context reinforces our concern about the significance of this impact. According to a report entitled "Cumulative Impacts of Fill in Boston Harbor"

¹⁵MDPW has stated that the riprap slope of the dike would provide suitable habitat for marine species (even suggesting that the acreage of new habitat will be greater than what is lost if the interstitial pore space in the dike is counted). While the dike would be colonized by some species, such as Fucus, periwinkles and clumps of blue mussels, it would not even begin to replace either the quantity or quality of the lost habitat.

(Breiteneicher, 1988),¹⁶ approximately 3,200 acres of Boston Harbor mud flats, saltmarshes and shallow waters have been filled since the late 1700's. While that finding is hardly surprising, it illustrates how we have already squandered the majority of Boston Harbor's most valuable natural resources and the need to protect the remainder from avoidable or significant losses. In addition to habitat loss, the cumulative impact of past filling has resulted in a loss of tidal prism adversely affecting the water quality because of reduced flushing of the harbor waters.

An analysis of cumulative impacts should also take a prospective view and we are mindful of the implications of this project for future proposals to fill harbor waters for development or disposal purposes. EPA and the Corps have consistently sought to minimize impacts to harbor waters. EPA went to considerable lengths in the MWRA wastewater treatment siting EIS to avoid impacts to the aquatic environment. EPA rejected options that would have involved three acres of fill in Hingham Bay at Nut Island or 20 acres at Deer Island. The Corps, in its Saugus Pines River estuary hurricane barrier project, eliminated three acres of in-harbor fill because of environmental concerns.¹⁷

In evaluating whether the adverse impacts of §404 discharges would be significant, EPA considers whether compensatory mitigation could reduce the impacts sufficiently to comply with the guidelines. In this case, we believe it would be difficult to replace the lost functions and values at Spectacle Island with confidence for several reasons, including the scientific uncertainty associated with successful recreation of shellfish habitat. A more fruitful approach to achieving compliance with all aspects of the guidelines

¹⁶Breiteneicher, Denise. Cumulative Impacts of Fill In Boston Harbor. Prepared for Save Our Shores in Conjunction with Boston Environment Department, Boston Shipping Department, Massachusetts Coastal Zone Management Office and Massachusetts Port Authority. April, 1988.

¹⁷Several recent §404 cases also illustrate the successful efforts to protect valuable marine habitat even when the initial fill proposals had less significant impacts. The original proposal by the Flatley Company to fill 3.3 acres of intertidal habitat in the Mystic River was reduced to 1.8 acres. A more dramatic reduction was achieved by the MDPW in the Salem-Beverly Bridge project. The original project would have filled over 7 acres of intertidal mud flat; the final plan calls for 0.75 acres of permanent loss.

would be to eliminate (or drastically reduce to the minimum practicable) fill in the marine habitat around Spectacle Island.¹⁸

3. The Proposal to Fill 103 Acres of Boston Harbor Violates §230.10(b) of the Guidelines.

The Massachusetts anti-degradation policy expressed in 314 CMR §4.04(1) states in part "the quality of the waters of the Commonwealth shall be maintained and protected to sustain existing beneficial uses." This absolute protection guaranteed to existing water uses by Massachusetts is taken directly from EPA's water quality standard regulation 40 CFR 131.12(a)(1). The existing beneficial uses found in the proposed fill area include benthic organisms, shellfish, lobsters and other fisheries. The significant impacts associated with the proposed fill in 103 acres of intertidal and subtidal areas would eliminate these existing beneficial uses in contravention of the Massachusetts anti-degradation policy. This would therefore violate §230.10(b) of the Guidelines.

4. Public Interest Review Considerations

In addition to determining compliance with the EPA §404(b)(1) guidelines, the Corps also conducts a public interest review pursuant to its own regulations (33 CFR 320.4). No permit can issue which the Corps determines would be contrary to the public interest. As noted earlier, the issues discussed above should be relevant to determinations under both the §404 guidelines evaluation and the public interest review. In addition, the overall project affects nearly all the factors considered in the public interest review. One issue we believe you should evaluate is the effect of the proposal to fill waters at Spectacle Island in light of the broader concerns for the well being of Boston Harbor.

MDPW's proposed fill area at Spectacle Island lies within the boundaries of the Boston Harbor Islands State Park. The enabling legislation adopted the goals of conservation and recreation (including the policy to prevent the destruction, exploitation or neglect of the natural resources of the harbor islands).¹⁹ The 1970 report of the Special Legislative Commission which proposed the

¹⁸If unavoidable adverse impacts to the aquatic environment remained after thus revising the project, MDPW would need to develop a compensatory mitigation plan in order to comply with §230.10(d) of the guidelines. The nature and extent of the mitigation plan would be ascertained after completion of the alternatives analysis.

¹⁹Boston Harbor Islands Comprehensive Plan (Oct. 1972) under c. 742 of the Acts of 1970, p. 18-20; 31; and 69.

creation of the island park reveals that the legislature was mindful of the threat of harbor fill:

Landfill could obstruct the tidal flushing action necessary to remove pollutants, do permanent injury to marine life, or interfere with shipping. Before additional areas of the Harbor are filled, it is essential that the consequences of such action be known.²⁰

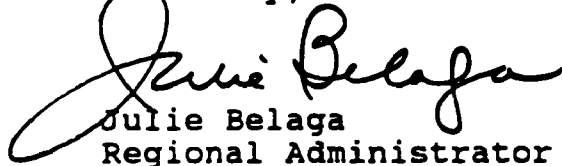
Apart from the state's action in setting aside an area for recreation and conservation, Boston Harbor is an area of regional and national significance and its resources merit special protection. The MWRA's substantial cleanup expenditures and EPA's major enforcement action testify to the high level of interest in remedying past insults to the harbor. Although much of the effort to date has focused on the major inflows of pollutants into the system, incremental destruction of habitat could just as easily frustrate reconstituting the harbor.

Conclusion

We object to issuance of a §404 permit for the CA/THT project as currently proposed. By causing an avoidable and significant loss of aquatic habitat, the project would violate the EPA §404(b)(1) guidelines. We recommend that the MDPW modify its materials disposal plan to eliminate or greatly reduce fill in the waters around Spectacle Island as discussed above. We believe it is entirely possible to redesign the proposal so that it both complies with the requirements of the federal Clean Water Act and achieves the project objectives of environmentally sound materials disposal and remediation of Spectacle Island.

Our NEPA review letter providing additional comments on the project and evaluating the adequacy of the DSEIS will be available by September 22, 1990. In the meantime, feel free to call me or have your staff contact Ed Reiner or Doug Thompson at 565-4421 if you have any questions about this letter.

Sincerely,



Julie Belaga
Regional Administrator

Attachment

²⁰Second Interim Report of the Special Commission on the Boston Harbor Islands, February 1970.

cc: Fred Salvucci, Comm., MDPW
William Lawless, Chief, RB, USCOE
Joan Drake, USCOE
Daniel Greenbaum, DEP
Thomas Bigford, NMFS
Gordon Beckett, USFWS
Janet McCabe, MEPA Unit
Jeffrey Benoit, MCZM
Richard Kendall, MDEM
William Twomey, DPW
Ed Hammond, B/P/B

ATTACHMENT A

Comments on CA/THT Project Aspects Other Than Spectacle Island

1. Section 404 and Section 10 Issues

With exception of the material disposal issue, EPA has no objection from a §404 standpoint to a tunnel being constructed across Boston Harbor, including the placement of screeded gravel foundation material and protection with rock and borrow backfill material. This also includes the reconstruction of the existing seawalls at Bird Island Flats in East Boston and the Boston Marine Industrial Park in South Boston. Item No. 10 of the Corps Public Notice describes a small (0.07 acre) corner of the General Ship Slip which will be permanently filled to protect the Third Harbor Tunnel. EPA has no objection to this small amount of permanent fill as shown on sheets 22 and 23 of 38 of the public notice.

a. Fort Point Channel

Work in the Fort Point Channel consists of placement of 5.25 acres of permanent underwater fill (conversion of bottom sediments to concrete tunnel box) associated with the construction of the I-90 Tunnel across the Fort Point Channel, and 3.1 acres of channel bottom fill (conversion to upland) for the ramps and depressed roadway portions of the I-93/I-90 Interchange that lead to the I-90 Tunnel. A portion of Vent Building No. 1 will be constructed on the proposed permanent fill in Fort Point Channel. Approximately 2,500 linear feet of existing granite block seawall, will be replaced by a combination of granite block surfacing, concrete and rip rap in the area of the proposed temporary casting basin and the proposed 3.1 acre permanent fill.

In addition to the permanent fills, temporary fill is associated with the construction of cofferdams along the Dorchester Avenue and Gillette sides of the Channel. Other work in the Fort Point Channel consists of the relocation of the existing Gillette water intake north of the proposed I-90 tunnel crossing, construction of a temporary barge loading terminal and the temporary and permanent modifications to numerous existing Fort Point Channel bridges.

The current plan appears to represent the least damaging alternative of all previously studied alternatives with respect to permanent alterations of Fort Point Channel. Nevertheless, EPA has concerns that the impacts of the proposed temporary and permanent fills in the Channel may not be adequately mitigated.

According to the public notice and DSEIS, the top of the proposed tunnel box across the Fort Point Channel will protrude seven to nine feet above the level of the existing mudline, maintaining an eleven foot depth of water below mean low water to the top of the tunnel box structure (including armoring). Because the tunnel box

will extend above the existing channel bottom, acting like a submerged concrete weir, it will adversely affect water flushing within the channel. Sediments will accumulate on the south side of the tunnel box, potentially leading to undesirable substrate conditions which will require periodic dredging to maintain the efficiency of the Gillette thermal discharge.

Because of changes in the hydrographics of the Fort Point Channel, i.e., increased flow velocities due to areas of the channel being constricted by fill, the DSEIS (Part 1 - Vol. 2 of 2 page 13-28) states "additional studies and design of Channel protection features such as riprap slopes or gabion will be performed during the preliminary and final design phases." The DSEIS also describes the possible need for additional HEC-2 computer modeling run based on the use of more recent depth soundings. Furthermore, studies of the effect of the submerged tunnel box on the existing thermal regime in the Channel are continuing (page 13-30). The DSEIS also states on pages 13-28 and 13-29:

To partially mitigate these hydrographic and flushing impacts, abandoned piles and piers in the work areas near Dorchester Avenue will be removed, which will eliminate certain obstructions to flow and will therefore enhance flow and flushing. Riprap armor will mitigate for the increase in flow velocities.

Mitigation measures described in the DSEIS in section 13.3 include the relocation of the Gillette cooling water intake, and removal of approximately 800 derelict piers, piles, and other structures in 4.5 acres of Fort Point Channel to promote improved flushing. EPA needs further information about the specifics of these mitigation measures and the results of the studies mentioned above. The nature of impacts on the Fort Point Channel will be better understood once the thermal studies concerning the Gillette cooling water discharge and other studies concerning the hydrographic changes in Fort Point Channel are complete.

EPA is also concerned with the proposed temporary filling in the Fort Point Channel along the Dorchester Avenue and Gillette sides of the Channel. These structures, described in the public notice as generally cofferdams, will be removed at the completion of construction. As shown on sheet 13 of 38, the cofferdam would narrow the channel to a minimum of only 30 feet. Increased velocities in the constricted channel may be highly erosive to the bottom substrate and the shoreline. The channel construction may affect flushing and mixing characteristics with respect to upstream discharges. EPA questions whether there may be ways to mitigate for the lost channel cross-sectional area caused by both the temporary and permanent fills.

The Public Notice item No. 2 states that fill may be placed for the construction in Fort Point Channel of the railroad bridges. EPA would like further information on this aspect of the project.

Even with the inclusion of the mitigation measures mentioned in the DSEIS designed to enhance flow and flushing, a net loss of aquatic resources in the Fort Point Channel would result from the project. The proposed plan would permanently convert 3.1 acres of Fort Point Channel to new roads and a ventilation building. This 3.1 acres of fill in the Channel includes the loss of 0.83 acre of intertidal mudflat, and 0.06 acre of wetlands. The potential to widen the Fort Point Channel by upland excavation to create additional aquatic resources, for instance on the southern side of the Channel, should be examined. If upland excavation is not feasible within the Fort Point Channel, off-site, in-kind, or out-of-kind mitigation can be considered.

b. Charles and Millers Rivers

Item No. 2 of the Public Notice describes that backfill material and concrete will be placed for various bridge pier footings in the Millers River, Charles River as well as the Fort Point Channel.¹ As the placement of the piers will be performed within the confines of cofferdams, the direct adverse impacts to water quality will be minimized if appropriate best management practices are used for the work, including filtering sediments from cofferdam dewatering prior to discharge back into the Charles or Millers Rivers. The bridge, bridge piers and other associated work are the subject of a separate U.S. Coast Guard permit application. It is unclear what fill is under the jurisdiction of the Corps of Engineers. In any event, EPA believes either the Corps or Coast Guard permit should contain the appropriate best management practices.

From information contained in the DSEIS, we understand that new bridge piers will be placed in the Charles River and Millers River temporarily affecting 0.66 acre of existing river bottom in the Charles River and 0.29 acre of river bottom in the Millers River. The existing 0.44 acre wetland in the Millers River would be removed during construction, and replaced with shade tolerant species after construction.

¹The DSEIS contains conceptual plans for relocating the Millers River as mitigation for the impacts associated with the construction of the ramp system. This is not discussed in the public notice and needs to be addressed as part of the Corps review since a relocated river implies that the existing Millers River would be filled.

The impact of the project on the Millers and Charles River is not limited to the temporary construction of cofferdams for bridge pier construction, or the permanent displacement of river bottom by the bridge piers themselves. The proposed three bridges over the Charles River and the maze of roads and ramps above the Millers River will cause shading impacts to 1.23 acres of the Millers River and 4.38 acres of the Charles River. These indirect impacts will adversely affect the proposed MDC park along the north side of the Charles River and the aquatic biology of the rivers themselves. The large highway viaduct structures in this area will create traffic noise and shadows, thereby reducing the potential attractiveness of the park under them.

In addition, the proposed configuration of bridge piers in the Charles River will likely create an impediment to safe navigation at this important gateway to the Charles River. EPA questions whether there is any environmentally preferable alternative to the proposed construction of viaducts and ramps at this location. While the temporary construction impacts to the Charles River of "Option T Modified" would be greater than the proposed action, the permanent impacts of the overhead structures associated with "Option T Modified" on park and river use are of lesser magnitude.

2. Ocean Disposal Issues

EPA has concerns relative to the proposed ocean dumping of dredged material from the project. Additionally, we have addressed the acceptability of excavated material for ocean disposal based on the floatability tests.

a. Dredged Material

i. Fort Point Channel

If the sediments from the Fort Point Channel are proposed for ocean disposal, we believe that they should be retested according to the revised dredged material testing protocol. First, the chemical data from these sediments show high levels of contamination and appear to demonstrate the potential to cause an adverse biological effect. In particular, we recommend a flow-through bioassay using the amphipod, Ampelisca abdita, which is very sensitive to the presence of pollutants in dredged material; Macoma sp., a deposit-feeding bivalve, which will represent maximum bioaccumulation potential for the sediment contaminants, including PAHs; and Nereis sp., a deposit-feeding worm. As indicated in the regional dredged material testing protocol, bioaccumulation testing would not be required for Ampelisca.

Second, the most recent data we have is from the 1982 DSEIS. This outdated data may not accurately reflect current degrees of contamination. The nature of the sediments may have changed because the incidence of spills and effluents discharging into the

area. Additionally, substantial advancements in testing methodologies have been made in the past eight years.

Page IIB 4-21 incorrectly states that 140,000 yd³ of dredged material from the Fort Point Channel may be suitable for ocean disposal. This statement cannot be supported until bioassays have been conducted.

Additionally, although the amounts were not quantified, the Soil Characterization Report (May 1989) indicated the presence of cinders which appear to be floatable in these sediments composed largely of historic fill. If this material is classified as dredged material, ocean disposal may present a floatability problem. Since we do not have sufficient information regarding the quantities of floatable materials present in the fill, we cannot determine compliance with the ocean dumping regulations.

According to the public notice, one million cubic yards of dredged material would be removed from existing lands adjacent to the Fort Point Channel for construction of the graving basin. As this material is currently not below Mean High Water, but rather isolated from the Fort Point Channel by a sea wall, EPA considers this to be excavated material rather than dredged material. We will need further clarification regarding the relative quantities above and below the high water mark. An additional one million cubic yards of material is also not dredged material in the ordinary sense. This material is coming from the excavation of present upland primarily at Bird Island Flats on Logan Airport in East Boston and the Boston Marine Industrial Park area in South Boston where the Third Harbor Tunnel will meet land. At least at the East Boston Bird Island Flats area on Logan Airport and in South Boston at the Boston Marine Industrial Park, according to the DSEIS (Appendix Vol 4 of 5, page 9) normal methods of land excavation would be utilized to bring the level of the land to the tide level, where the remainder of excavation is proposed to be performed by a large clamshell dredge.

ii. Third Harbor Tunnel

Since the alignment has changed, MDPW must demonstrate that material along the new alignment is also suitable for ocean disposal.

Based on historical test data compiled in our Boston Harbor data management system, the presence of outfalls, groundwater discharges, runoff, and other contaminant sources, we believe that the sediments along the proposed alignment should be retested because they could be more contaminated than previous test data indicates. We suggest that Tier II chemical testing be performed on sediments along the proposed alignment. We believe this should be done without compositing because of the spatial variability evidenced in historical data. Based on this analysis we will

jointly review this data and determine the need to proceed with biological testing.

iii. Charles and Miller's Rivers

The preferred disposal options for these sediments were not clearly presented in the DEIS. If they are proposed for ocean disposal, we recommend that biological testing be conducted as the bulk sediment analysis demonstrates the potential to cause unacceptable biological effects.

b. Floatables in Historic Fill

The regulations at 40 CFR §227.5(d) prohibit the ocean dumping of anything that will materially interfere with legitimate uses of the ocean. Section 4.8.3(a) appears to eliminate the ocean disposal alternative from further consideration based on this prohibition. As discussed at previous meetings with MDPW, EPA does not necessarily endorse the floatability tests performed on the excavated fill. We believe that the analyses may be overly conservative and therefore may overpredict the potential for material to float. However, considering these test results, the soil boring logs, historical records of filling in the areas, and the amount of material to be generated, we are convinced that there may be enough of a floatability problem to cause an adverse effect to the marine environment. In particular, we are concerned that floatables would adversely affect the foraging of the severely endangered right whale and impair recreational uses of the area such as whale watching. Consequently, we accept MDPW's recommendation not to consider further the ocean disposal option for the historic fill material.

ATTACHMENT B

LIST OF INFORMATION AND DOCUMENTS YET TO BE RECEIVED

1. New bulk sediment chemistry analysis and grain size distribution for the THT alignment using the current regional testing protocol (see Attachment A).
2. Bioassay/Bioaccumulation testing results for all of the proposed dredging within the Fort Point Channel.
3. A clear representation of which areas will be dredged from the Fort Point Channel and proposed for disposal at the Massachusetts Bay Disposal Site. Additionally, a diagram depicting where the dredged material which was considered by MDPW to be unacceptable for ocean disposal is located accompanied by MDPW's plans for its disposal.
4. The DEIS in Part II, Section 4.2.4(b), on page IIB 4-21 stated the results of which additional sampling and analysis would be performed for the 925,000 cubic yards of dredged material to be removed from East and South Boston for the Third Harbor Tunnel and in the Fort Point Channel.
5. The results of the Lobster survey surrounding Spectacle Island. This information was not included in the Draft version of the report received June 25, 1990 entitled "The Aquatic Resources of Spectacle Island". A note on the cover of the report stated: "A section of lobster surveys will be added to this report before it is finalized."
6. Bioassay/bioaccumulation tests for the material to be dredged around Spectacle Island in relation to the installation of the proposed dikes if ocean disposal is being proposed rather than upland disposal.
7. A report cited in an Appendix as "Slope Stability and Related Design and Construction Considerations" by Bechtel/Parsons Brinkerhoff dated March 1989.
8. Thorough evaluation of alternative sites to Spectacle Island for disposal of materials in accordance with the 404(b)(1) guidelines. An evaluation regarding the practicability size limit and accompanying cost analysis should be included for each of the alternatives.
9. Detailed justification regarding the basis for rejection of the use of rail transport for dredged or excavated material to upland disposal sites other than the hypothetical Conrail and Pennsylvania coal mine alternative should be included.
10. Report concerning the studies of the effect of the submerged tunnel box on the existing thermal regime in the Fort Point Channel related to the Gillette cooling water intake and

discharge. Any additional reports or studies concerning the hydrographic changes in the Fort Point Channel and the proposed mitigation measures including details concerning the removal of approximately 800 derelict piers, piles and other structures in the Fort Point Channel.

11. Details concerning any proposed compensatory mitigation including but not limited to the following:
 - a) The proposed two acre salt marsh creation on Spectacle Island;
 - b) The restoration of the existing Millers River wetlands with shade tolerant species, or the complete relocation of the Millers River;
 - c) Mitigation for losses of intertidal and subtidal aquatic habitat off Spectacle Island; and
 - d) Mitigation for permanent losses of aquatic habitat in Fort Point Channel including the degradation in sediment quality expected to result as a result of the submerged tunnel box weir.
12. Additional information on options being considered for disposal of 31,000 tons of Category 5 debris ("unsalvageable metal", p. 20-7, DSEIS), especially the feasibility of constructing an artificial reef and potential environmental impacts from the lead-based paint on the reef, and the feasibility of stripping and salvaging the metal for reuse.
13. The report entitled "Numerical Modeling Studies of the Water Quality Impact in Boston Harbor" dated May 1990.

ATTACHMENT C

Metcalf and Eddy Report, "Review of MDPW Central Artery/Tunnel Supplemental Environmental Impact Report" July 30, 1990.

The July 30, 1990 report by Metcalf and Eddy, Inc. (78 pages) cited as Attachment C to EPA's July 31, 1990 letter to Lt. Colonel Stanley J. Murphy of the U.S. Army Corps of Engineer is available for review at EPA's Regional Library. EPA's Regional Library is located on the eleventh floor of One Congress Street in Boston. A limited supply of copies will be made available for Federal, State and local agencies upon request.



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Secretary
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M.B.T.A. Chairman

September 10, 1990

Ms. Julie Belaga
Administrator, Region I
Environmental Protection Agency
One Congress Street
Boston, MA 02108

Dear Ms. Belaga:

As you know, since the joint public hearing held on June 21 and 22 on the draft SFEIS and the Section 404 Permit application for the Central Artery/Tunnel (CA/T) Project, the Massachusetts Department of Public Works (MDPW) has continued to pursue design refinements to further reduce the environmental impacts of the Project. Extensive dialogue among permitting agencies and the MDPW has also continued, particularly on issues concerning the capping of Spectacle Island, and disposal of fill from the CA/T Project at locations other than Spectacle. On July 31, 1990, you wrote to the Army Corps of Engineers ("the Corps") regarding EPA's concerns about the CA/T 404 Permit application. In addition, considerable public testimony has been received on the Project, and Environmental Affairs Secretary John DeVillars has certified the adequacy of the Draft SEIS/R and included a series of requirements and recommendations which are to be incorporated into the Final SEIS/R. In reference to your comments on both the 404 Permit application and your anticipated EIS comments, we thought it would be useful to summarize the results of these processes to date, particularly on issues concerning the capping of Spectacle Island, creation of a park and alternative fill disposal sites, issues of air quality, issues concerning the crossing of the Charles River, and issues concerning air-rights developments.

SPECTACLE ISLAND

As you are aware, we have been working cooperatively with staff from several environmental agencies to achieve agreement on an acceptable material disposal program, and have made some significant progress.

The SDEIS indicated that the landfill at Spectacle has historically extended at least 200 feet north of the current water edge. (Wave action has eroded the visible part of the island, leaving the dramatic 85 foot high cliff of rubbish at the water edge, but there continues to exist in the intertidal area and below the low tide line a considerable area of historic landfill.) The SEIS proposes that to properly cap the landfill will require significant construction of dikes, capping of areas now under water, and installation of a drainage system to curtail the seepage of leachates which now contributes to the pollution of Boston Harbor.

After additional in depth field work we have established the lateral extent and depth of the existing landfill at Spectacle Island. We have confirmed and expanded upon the information contained in the DSEIS and produced a brief report containing those findings. Additionally the above report also contains new information on the chemical composition of the landfill. We have forwarded to you the report detailing the findings of our consultant on this issue. This information will be incorporated into the Final Supplement.

Second, we are working cooperatively to identify the most appropriate means to cap this landfill in a manner that will ensure proper closure and long term stability consistent with your comments on the 404 Permit. The Massachusetts Department of Environmental Protection has indicated that this closure cannot be adequately accomplished with "minimum DEP landfill closure standards and guidelines". We are working with both State and Federal staff to delineate just what will provide adequate closure of this landfill, particularly in view of its end state of active park and recreational use, as agreed to in our recent meetings, and as outlined in the August 20th letter to a number of environmental organizations by the CA/T Project, which commits us to a cooperative process to design the Harbor Island Park.

ALTERNATIVE SITES

Upland Sites

Your comments have encouraged the Department to continue looking for new upland disposal sites; but there are several cautions we must be aware of while conducting this analysis. One is that the State DEP has recently "adopted tough regulations for both existing and new landfills".

Taking these comments into consideration the Department will further explore the idea of larger volumes of project material being disposed of in already sited and/or permitted commercial landfills. This may be a more achievable way of disposing some of these materials in an upland environment.

Coastal Sites

Logan Airport continues to show significant potential for receipt of excavated materials from East Boston and will very likely be the site for disposal of all such excavated materials, a quantity we expect to exceed two million yards.

Design Refinements

Through design refinements in the South Boston and South Bay portions of the Project, we have been able to reduce our total of excavated material we need to dispose of by approximately one million cubic yards.

Backfill

You and the DEP and the COE have all expressed interest in the more extensive use of project excavated material as backfill material to meet the approximately 4 million cubic yards demand for backfill. Our DSEIS did address this issue and identify some opportunities for use of excavate as backfill. In order to fully respond to these comments we are further analyzing ways of obtaining all project backfill from our own excavation as a way to minimize the amount of material needed for disposal.

In summary, we are addressing the comments of your staff in a comprehensive way that will allow us to respond to all of these issues in our final document.

Our current plans for display of this information in the final SEIS is to produce a combination of potential material disposal options that would be consistent with the Project for use in the permitting process.

As we have discussed, this approach would contain options of placing various amounts of material on Spectacle Island, in combination with other alternatives for disposal of material, such as: upland sites; commercial landfills; coastal sites, and increased use of backfill. Each appropriate material disposal program would then be analyzed for environmental impacts, and would therefore be available for use, dependent upon the permitting process. This approach will clearly document in the final a range of options for material disposal as requested in your comments.

DESIGN REFINEMENTS NORTH OF CAUSEWAY STREET

Over the past month, we have been working to refine the Project design in the area of the Charles River. Based on our extensive review process with DEP, MDC and other agencies, and based on a public mediation process encouraged by the private group "1000 Friends of Massachusetts", and the requirements of Secretary DeVillars' Certificate, we have adopted the following course of action:

- 1) The MDPW will modify the basic bridge structure across the Charles to an appropriate longer span structural system which will decrease the number of piers in the water from approximately 17 to under 9. These design modifications will be undertaken in cooperation with DEP Division of Waterways, the United States Coast Guard and the Army Corps of Engineers.
- 2) The MDPW will modify the design of ramp "CS" so that to the extent possible, the new ramp will be placed over the CANA ramp and extend no closer to the northern bank of the Charles River than the CANA ramps authorized in waterways licence # 1742.
- 3) The MDPW will modify the design of the bridge in such a manner as to maximize effective usable space under the bridge at critical crossings for pedestrians and bicycles.
- 4) The MDPW will create a gap between major structural elements of the bridge to increase the amount of light and natural ventilation experienced by those crossing under the bridges, whether by vessel or by land.

I believe you will find these design refinements will result in a considerable improvement to the Project.

In short, we have taken the Charles River area comments of the respondents very seriously. Based on a review of engineering design refinements available to the Project, we now believe that the outer-most highway ramp affecting the north bank of the river can be pulled back to directly over the presently approved CANA ramp along the north bank. We believe that this will make a major improvement in our ability to achieve the mutually held goals of optimizing the quality of the environment along the north bank. We further believe that use of longer span engineering technology for the major bridges can considerably decrease the need for supporting piers in the water and on the riverbanks.

AIR QUALITY ISSUES

Sensitivity Analyses

We concur in the desirability of undertaking a sensitivity analysis to help us understand the potential for mitigating measures to play a part in a total policy towards transportation implementation in the region. To recap the basic information presented in the SEIS, the Project is expected to reduce total vehicle hours of travel by 29%. Perhaps this is the most important statistic in the entire DSEIS. But we do not perceive the Artery/Tunnel Project to be carried out in a vacuum, nor ever have we. Many questions about associated policy issues merit

further attention and will be addressed in the sensitivity analysis. We will examine the implications of greater and lesser job growth than initially forecast; the implications of parking policies being more or less restrictive than assumed in the models; and the implications of a greater and smaller transit networks than assumed in the models. .

The sensitivity analysis will allow each of the input assumptions to be tested separately in order to understand the relative importance of possible mitigation and support programs in each of these areas.

In conclusion, we are confident that the traffic assumptions included in the forecasting process were indeed correct to make cautious conclusions about the possible air quality benefits of the project, and most importantly to compare the design year with the project to the design year without the project. We look forward to undertaking the sensitivity analysis to help us understand the relative importance of each of the component parts of the transportation network, and to help us to guide policies to achieve even greater benefits.

Air Quality During Construction

Both your agency and our State DEP have asked us to develop a "protocol" for assessing, defining and permitting air quality impacts from our construction activities and traffic hours during construction.

We are agreeable to such a process and will be meeting with appropriate agencies to agree on a protocol for inclusion in our final document.

Dewey Square

Based on recent discussions, we note your concerns about the operations within the Dewey Square Tunnel. At present the Project does not intend to reconstruct the Dewey Square Tunnel, or to make major changes in the nature of the ventilation system. The traffic studies undertaken show a significant improvement in the flows through this tunnel segment. Based on our conversations, we have undertaken further analysis of this issue, which we will share with you as the information is developed. Through this process we will determine an optimal policy in this area. The results of this examination will be incorporated into the Final EIS.

Level of Transit Commitment

We are committed to construct as integral elements of the Artery/Tunnel Project, major transit improvements at South Station, at Blue Line Airport Station, and the provision of a new transit right-of-way for the South Boston Piers access

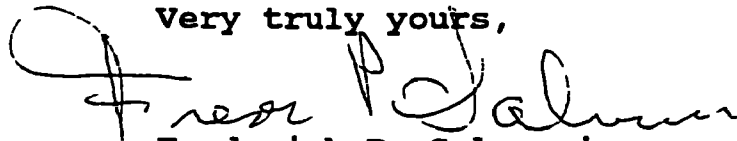
transitway. In addition, the Project includes a major HOV roadway system for both I-90 and I-93 as an integral part of the Project. Based on the EOEa MEPA Certificate we have committed that none of these elements will be deleted from the Project.

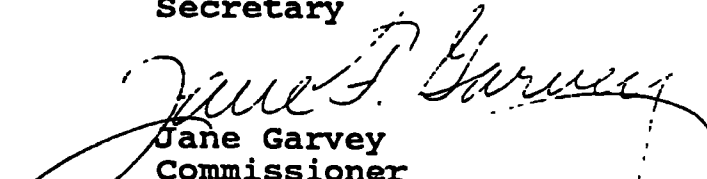
AIR RIGHTS DEVELOPMENT

Massachusetts Secretary of Environmental Affairs John DeVillars in his August 29, 1990 Certificate on our DSEIR (copy enclosed) wrote at some length on the issue of air rights development. The conclusion of the Secretary's analysis of this issue was a strong suggestion that approximately 75% of the land created by the Artery depression should be maintained as publicly accessible open space and that the surface streets should be limited to three lanes in each direction, (in several locations it is presently six lanes per direction). The BRA is proposing such a plan, which is now being reviewed in a series of community meetings. This plan, now undergoing public review, will be included in the FSEIS.

I hope this update on our work in these areas will be of value to you and your staff. As always, if we can further clarify any of these issues, please call either of us directly.

Very truly yours,


Frederick P. Salvucci
Secretary


Jane Garvey
Commissioner

ATTACHMENT C

Metcalf and Eddy Report, "Review of MDPW Central Artery/Tunnel Supplemental Environmental Impact Report" July 30, 1990.

The July 30, 1990 report by Metcalf and Eddy, Inc. (78 pages) cited as Attachment C to EPA's July 31, 1990 letter to Lt. Colonel Stanley J. Murphy of the U.S. Army Corps of Engineer is available for review at EPA's Regional Library. EPA's Regional Library is located on the eleventh floor of One Congress Street in Boston. A limited supply of copies will be made available for Federal, State and local agencies upon request.

**REVIEW OF MDPW CENTRAL ARTERY/TUNNEL
SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT**

30 July 1990

**Metcalf & Eddy, Inc.
30 Harvard Mill Square
Wakefield, MA 01880**

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1.0. Introduction

The Massachusetts Department of Public Works (MDPW) has proposed the disposal of 9.3 million cubic yards (mcy) of excavated and dredged material on Spectacle Island in Boston Harbor, as part of the materials disposal program for the Central Artery/Tunnel (I-93/I-90) project. They have recommended the use of Spectacle Island for disposal of all excavated material (and some dredged material) in their Draft Supplemental Environmental Impact Statement/Report (SEIS/R). Metcalf & Eddy (M&E) has been contracted by the Environmental Protection Agency (EPA) Region 1 to review the project's materials disposal program.

1.1. Scope of Report

This report presents our findings on the review of the MDPW's proposed materials disposal program presented in the SEIS/R. Our review to date has focused upon; (1) the impacts associated with the MDPW's proposed landfill on Spectacle Island; (2) the MDPW's alternatives analysis for the materials disposal program; and (3) development of an alternative disposal scenario. Section 2.0 reviews the MDPW proposed use of Spectacle Island, and provides an alternative approach to minimize impacts to the island's aquatic resources. Sections 3.0 and 4.0 review the alternatives analysis used by MDPW to select Spectacle Island; in addition, in Section 3.0 an alternative approach to materials disposal which utilizes several upland disposal sites, is presented.

1.2. Project Constraints

Data has been gathered from several sources for this analysis. These sources include (1) MDPW files; (2) MWRA databases; (3) Bechtel/Parsons-Brinckerhoff (B/PB) reports; (4) state and federal data sources; (5) field visits; and (6) personal communications. In some cases, data files were not complete or were unavailable for analysis. Due to time constraints, certain sources (such as wetland inventory maps and aerial photographs) were not available for use in the analysis. Quantity estimates for the materials disposal program presented in the SEIS/R are assumed to be generally correct (although various sections of the SEIS/R present different figures); no independent review of the MDPW calculations of material generated has been conducted. Also, calculation of disposal quantities for M&E alternative sites were based solely upon USGS 1:25,000 topographic mapping which may not accurately reflect current site conditions; as a result, all capacity estimates are necessarily conservative. Finally, field visits have been restricted to publicly-accessible areas; rights-of-entry to privately-controlled sites were not obtained. As a result, information and observations of these sites are limited. For example, the extent and quality of wetlands and other significant resource areas at the disposal sites could not be field-verified.

2.0. Proposed Materials Disposal Program

2.1. MDPW Proposed Plan (Spectacle Island)

The proposed plan for materials disposal includes the disposal of the 13.5 million cubic yards (mcy) of dredged and excavated material from the Central Artery/ Third Harbor Tunnel construction project as follows:

- 9,283,000 mcy to Spectacle Island
- 1,205,000 mcy to Massachusetts Bay Disposal Site(MBDS)
- 2,666,000 mcy for landfill capping
- 379,000 mcy for disposal at landfills

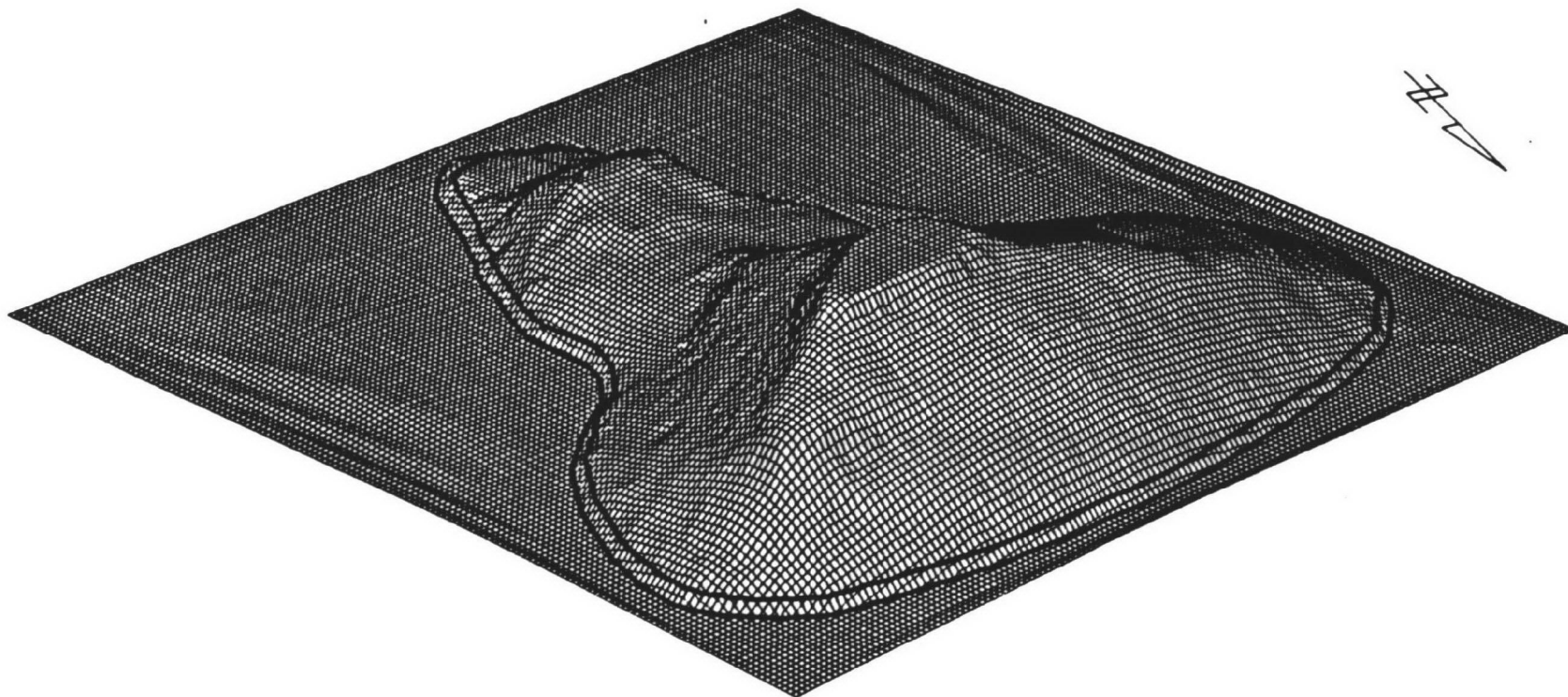
This plan results in an increase in the size of Spectacle Island from 83 to 186 acres and requires the filling of 85 acres of subtidal coastal habitats and 18 acres of intertidal shoreline areas.

The proposed plan would change the topography of all but the southern tip of the island (see Figure 2-1). The new fill would rise to an elevation not to exceed 140 feet above mean sea level, which represents an increase of 50 vertical feet in the peak elevation. All existing structures on the island would be demolished and approximately 80 percent of the island covered with fill. Material would be contained by the construction of a rock containment dike around most of the island. A construction haul road could be placed on the top of the dike and encircle most of the island.

Following completion of the disposal phase, the island would be regraded and revegetated for park use. Some portions would be restored for use as wildlife habitat.

2.2 Spectacle Island Aquatic Resources

A number of studies have been undertaken by the project to document the potential for impacts to the island's aquatic resources. Biological sampling was conducted by MDPW consultants in the marine waters surrounding Spectacle Island in November, 1988 by Jason M. Cortell and Associates. Benthic macroinvertebrates were collected at 11 stations using a 0.05 square meter Ponar grab. Three samples were collected at each site and combined. Sediment chemistry was also measured at each of these stations. A standing crop survey of the abundance and distribution of soft-shell clams (*Mya arenaria*) and blue mussels (*Mytilus edulis*) around the island using protocol developed cooperatively by Massachusetts Department of Public Works and Federal and State environmental agencies (Cortell, 1990). A lobster survey was also conducted by the MDPW, but the results have not yet been released.



SPECTACLE ISLAND
MDPW PROPOSAL

2.2.1. Benthic Macroinvertebrates

Fifty-five benthic species were identified around Spectacle Island. Fifty percent of these species were polychaetes, 22 percent were arthropods, and the remainder were molluscs. As is typical of all of Massachusetts Bay (EPA, 1988) spionid polychaetes were the dominant family of polychaetes. Species densities ranged from 167 organisms per square meter to 3107 organisms per square meter. These densities are relatively low for Massachusetts Bay where densities are generally in the tens of thousands per square meter. The benthic community within the area of fill is very similar to the stations sampled by Cortell outside the fill area. The species composition is typical of Massachusetts Bay hard bottom communities interspersed with sandy patches. The densities of organisms in this area are relatively low ranging from 167 organisms per square meter to 2820 organisms per square meter.

The chemical composition of the sediments in the area of proposed fill are similar to those in other areas of Boston Harbor (see Table 2-1). Cadmium, chromium, copper and lead concentrations are up to twice the concentrations found in Quincy Bay. Since Spectacle Island is located in close proximity to the existing Boston Harbor wastewater and sludge outfalls and because the sediment contaminants are similar to those found in other areas of Boston Harbor, it is likely that the source of the contaminants in the vicinity of Spectacle Island is sediment deposition from the discharges. The SEIS/R notes in Appendix 1, Chapter 9, that tests are presently being performed on boring samples taken offshore of Spectacle Island to determine the presence of hazardous materials. Additional sampling of water and sediments around the island are also underway to determine the presence of contaminants and extent of the original landfill (SEIS/R, Appendix 1, pp. 9-19 to 9-20). We consider this information to be critical to any decision on the final size and type of containment facility for the island.

The structure of the biological community in the vicinity of Spectacle Island does not appear to be affected by the contaminants in the sediments, as evidenced by the diverse community composition and presence of sensitive species. The low densities of organisms in the area may be the result of a combination of sediment type, sampling methodology, and sediment contaminants.

2.2.2. Shellfish Resources

Table 2-2 provides a summary of clam and mussel densities at Spectacle Island and two reference sites. Soft-shell clams were found in low densities around Spectacle Island (averaging 0.4 clams per cubic foot), as compared to Thompson Island (1.6 to 7.8 clams per cubic foot); they were comparable to those densities observed on Long Island (0.25 to 0.4 clams per cubic foot). This is due to the minimal amount of soft bottom substrate preferred by the clam. Even in areas of soft bottom substrate, densities of clams are

TABLE 2-1 SUMMARY OF SPECTACLE ISLAND SEDIMENT CONTAMINATION (ppm)

Parameter	Spectacle Island Station			Range observed to Cause No Effect*	Range Causing Non-mortality Adverse Effects*	Range Causing Mortality*	Range at Known Contaminated Site (Quincy Bay**)
	at 1-1 0 - 0.5'	at 1-2 0 - 2'	at 1-10 0 - 0.5'				
Arsenic	39.1	12.3	15.7	<54 to <72	<70	ND	
Cadmium	6.7	5.7	2.2	<1 to 5800	<1 to >5800	6.9 to >5000	0.1 to 1.62
Chromium	282	68.8	84	<86 to 1430	<95	ND	5.6 to 215
Copper	181	271	81.4	20 to 4000	<53 to <17.8	ND	6.8 to 141
Lead	187	310	110	<21 to 380	<33 to >120	>130 to >300	6.6 to 164
Mercury	1.31	1.6	0.48	<0.18 to 1.7	<0.28 to >1.1	ND	0.02 to 248
Nickel	43	57.4	22.1	13.9 to >96	<85	ND	ND
Zinc	308	1210	140	<99 to <51,000	51 to >200	ND	ND
PAH (total)	ND	18.75	3.3	2 to <129	2 to <3900	<122 to 200,000	1.27 to 113
PCBs (total)	1.14	0.76	0.25	0.1 to 1.22	0.16 to 36.8	>0.13 to >0.16	0.1 to 1.22

* Based on review of more than 35 scientific studies.

** Source: EPA, 1988

ND = no data

TABLE 2-2 SUMMARY OF SOFT SHELL CLAM AND MUSSEL DENSITIES
AT SPECTACLE ISLAND AND REFERENCE SITES

sediment type	mean clam densities per cubic foot (low tidal)		
	Spectacle Island	Thompson Island	Long Island
cobble	0.75	7.8	0.25
pebble	0.5		0
sand	0.13	6.3	0.4
shell	2		
silt	0.31	1.6	
wave exposure	high	protected	high
	mean mussel densities per square foot		
	Spectacle Island	Thompson Island	Long Island
cobble	36.3	12.5	4.6
pebble	24.8		
sand	42.1	1	78.4
shell	62		
silt	15.8	1.7	0.6
wave exposure	high	protected	high

relatively low due to continued disturbance by high wave exposure during storms.

Mussel densities around Spectacle Island are relatively high (15.8 to 62 mussels per cubic foot), as compared to Long Island (0.6 to 78.4 mussels per cubic foot) and Thompson Island (1 to 12.5 mussels per cubic foot). This is due to the prevalence of physical conditions preferred by blue mussels. Mussels readily colonize substrate dominated by secured cobbles and boulders which is common around Spectacle Island. Mussels also prefer areas of high wave energy since they are filter feeders.

Available data is insufficient to determine the extent of impacts from the island's historic landfill activities on the area's biological resources. This is due to (1) the lack of comparable sampling transects (with similar physical substrates) within and outside the inferred landfill boundary; and (2) the presence of other sources of contamination (e.g. wastewater outfalls) in the vicinity of the island.

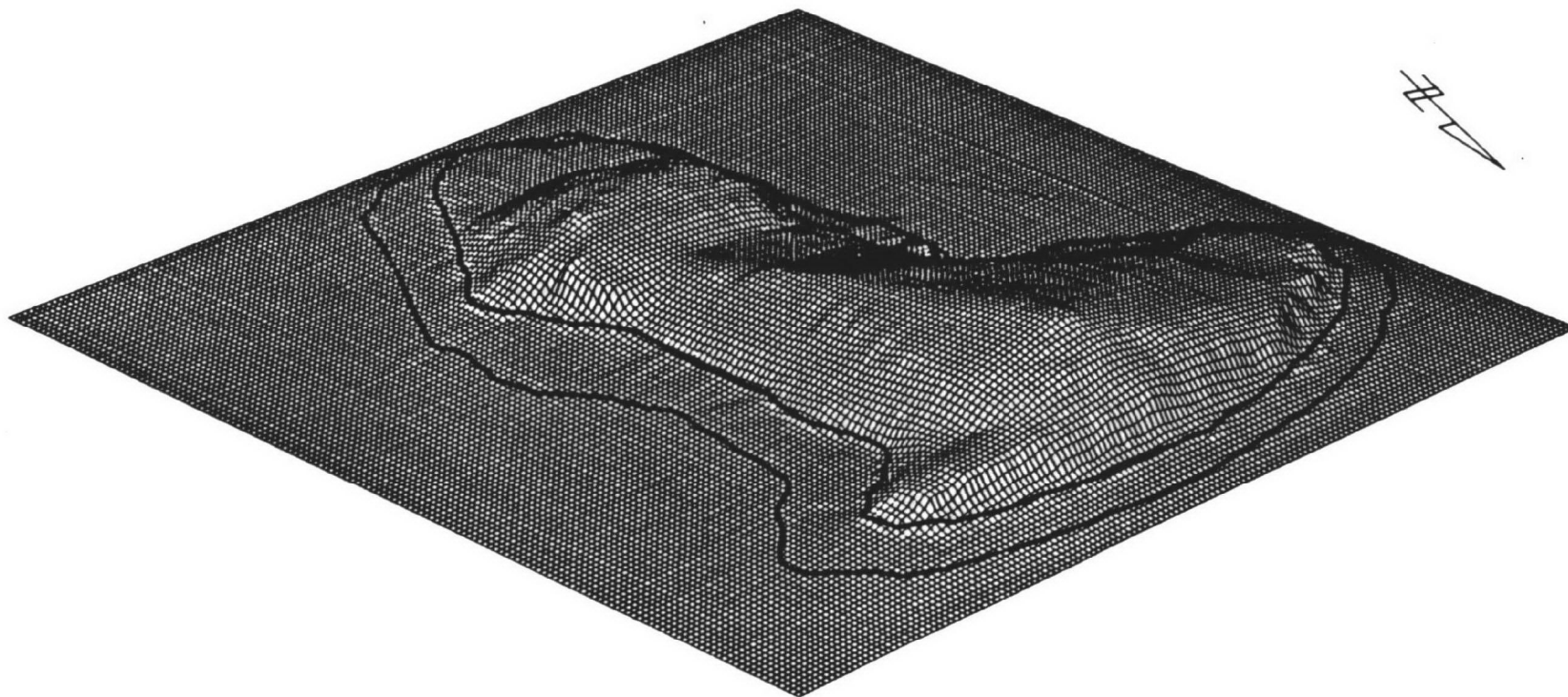
2.3 M&E Minimum Fill Alternative Proposal

An alternative proposal for Spectacle Island has been prepared which limits the disposal of material on the island to the minimum amount required to adequately cap the historic landfill in accordance with current state landfill closure regulations (see Figure 2-2). This proposal would utilize a combination of upland containment areas for the disposal of the majority of the excavated and dredged material from the CA/THT construction project. This alternative is intended to minimize the filling of coastal waters of the United States subject to regulation under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. It is recognized that this alternative proposal would be relatively expensive, based upon cost per volume of material disposed.

2.3.1. Methodology and Assumptions

A grading plan for the capping of the historic landfill at Spectacle Island was prepared in accordance with all existing DEP regulations. The grading plan is intended to cap those portions of the historic landfill above mean high water (MHW). The intertidal and subtidal boundaries of the landfill have not yet been confirmed by the MDPW; they are currently conducting additional investigations to determine the extent of the historical landfill. For purposes of this analysis, the landfill boundary does not extend into the intertidal area, and this area remains unchanged by the proposed landfill cap.

It was assumed that the landfill would be capped with a two foot layer of the Boston Blue Clay that will be excavated during the CA/THT construction project. In order to minimize the filling and consequent impacts to the adjacent coastal waters, the grading plan



SPECTACLE ISLAND
M&E ALTERNATIVE

utilized the maximum allowable side slope of 33 percent and limited capping to areas above elevation 105 (mean high water). Ten foot wide benches were placed for slope stabilization every 20 vertical feet in areas with the maximal side slope. A maximum top slope of 3.4 percent was used along the north-south axis of the island in accordance with DEP regulations. An erosion control dike would be required in order to minimize the undermining of the fill material. At a maximum, the dike would extend from mean low water (elev. 95) to mean high water (elev. 105).

2.3.2. Results

A final grading plan was prepared that would allow for the capping of the historic landfill on Spectacle Island. The total volume of fill required to cap the existing landfill is approximately 550,000 cubic yards. This grading plan would result in the filling of some acreage of intertidal zone (between elevation 95 and 105) on the eastern and western side of the island. No subtidal area is permanently filled with this plan, although temporary disturbance during construction of the rock dike is likely in both the intertidal and subtidal areas.

This alternative will allow for the beneficial re-use of the island as a park or conservation area. It is anticipated that walkways and trails would traverse the island, utilizing where possible the landfill benches, to provide suitable viewing and walking conditions. The island could be revegetated following landfill activities with a variety of meadow grass species, and low native trees/shrubs to match the vegetation of other Boston Harbor Islands. A comparison sea level view from Boston Inner Harbor of both the MDPW and M&E approaches is shown in Figure 2-3. (This view is intended to show differences in island heights between the two alternative approaches and does not show the lateral extent of the new fill areas.)

2.4. Comparison of Aquatic Resource Impacts

The MDPW proposal would result in the permanent loss of 18 acres of intertidal aquatic habitat, and over 85 acres of subtidal aquatic habitat. The impacted substrates range from rocky intertidal shoreline to sand/silt and clay/silt benthic substrates which are prevalent in the subtidal areas to the north, east, and west of the island (Cortell, 1990). These fill areas will replace suitable benthic invertebrate, clam, mussel and lobster habitats of low to moderate quality. Surrounding areas outside the containment dike are also likely to be temporarily impacted (i.e. increased turbidity and contaminant redistribution) due to dredging and rock placement activities.

The M&E-proposed alternative configuration greatly reduces the severity of Spectacle Island aquatic habitat impacts from the levels presented in the MDPW SEIS/R. Permanent impacts to the

SPECTACLE ISLAND



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intertidal zone will be limited to the installation of a granite or similar riprap structures on the east and west sides of the island to preserve the integrity of the new landfill. No permanent subtidal impacts are anticipated, although some temporary disturbance (i.e. physical displacement, increased turbidity, and contaminant resuspension) is possible during construction of the riprap structure (from barge unloading and stone placement activities). However, the reduced length of necessary riprap and dike placement shoreward of the low water mark result in significantly lower impacts due to dike construction. This riprap will also provide suitable intertidal habitat for a variety of invertebrate and shellfish species.

3.0. Evaluation of Alternative Disposal Sites

3.1. Summary of MDPW Alternative Site Selection Process

The MDPW materials disposal site selection process commenced following publication of the initial project EIS/R in 1985. That document deferred identification and selection of candidate disposal sites to the supplemental EIS/R. In May, 1989, the MDPW released a Disposal Site Screening Report (Bechtel, 1989) which identified approximately 30 sites (primarily municipal landfills and confined marine disposal areas) as candidate sites. The report recommended the exclusive use of Spectacle Island for materials disposal (with the exception of acceptable dredged material disposal at the Massachusetts Bay Disposal Site (MBDS)).

Following release of this report, the MDPW undertook a screening analysis of approximately 824 sites (primarily the 296 MWRA residuals landfill site alternatives and over 500 municipal landfills). With the assistance of an interagency working group, all but approximately 97 sites appear to have been eliminated from further consideration due to cost, logistics, availability or technology criteria established by MDPW.

The recently-released SEIS/R documents the elimination of approximately 15 additional sites from this list, but only evaluates nine sites in detail (4 upland and 5 marine sites); Spectacle Island has again been recommended for exclusive use for disposal of all excavated material and a portion of dredged material. No documentation is currently available for elimination of the other 73 sites from this screening analysis. The SEIS/R indicates that additional sites are being evaluated during the document's review period (MDPW, 1990).

3.2. M&E Alternative Site Evaluation Process

Because several alternative materials disposal sites had either (1) dropped from consideration within SEIS/R as preferred disposal sites; or (2) not screened from final consideration (by the

interagency working group) as candidate sites, M&E initiated an independent screening process to identify potentially feasible site locations. This screening process consisted of several steps, as discussed below.

3.2.1. Evaluation of MDPW SEIS/R "Finalist" Sites

As mentioned above, 4 upland sites were retained for analysis as disposal sites within the Draft SEIS/R. These sites included (1) East Brookfield; (2) Bedford; (3) Malden (Rowe Quarry); and (4) Weymouth (Bates Quarry). Upon review of these 4 sites, M&E initially concurred that E. Brookfield and Bedford should be dropped from consideration, due to excessive potential impacts to wetlands, aquatic and terrestrial wildlife, and existing traffic conditions. However, 2 of the 4 finalist sites, Rowe and Bates Quarry, were retained as viable candidates, and existing information on wetlands, public water supplies, land use, and traffic were reviewed (where available). Field visits and literature review confirmed the potential viability of these sites. They also appeared desirable as they provided potential disposal sites to both the north and south of the project site.

3.2.2. Evaluation of MDPW/MWRA Site Database

The 73 sites which were apparently not eliminated by the MDPW were evaluated to select those which appeared to be most promising, in terms of location, size, and amount of surface water on site. This information was retrieved from the MDPW summary data file prepared for the April 1990 interagency site working group. Most of these 73 sites evaluated, but not eliminated by MDPW, were obtained directly from the Massachusetts Water Resources Authority (MWRA) Residuals Site database, which included 296 candidate locations within the MWRA service area. This list is provided as Table A-1 in Appendix A of this report.

From this list, 17 sites were selected for more detailed analysis based upon the initial criteria discussed above. During this phase, M&E staff reviewed the project consultant's data files for the sites and prepared a summary matrix of key attributes for the sites and a recommendation on the need for further investigation. This analysis is presented in Table A-2, in Appendix A of this report. Of the 17 selected sites, 7 were selected for more rigorous analysis. These 7 sites were visited and evaluated using a variety of information sources, including USGS quad sheets, land use maps, and discussions with town officials. Of the seven sites evaluated, only one, Framingham-13, was retained as a candidate site following the site visits. Other sites were rejected due primarily to access concerns (through residential areas), present land uses (new commercial or residential development), or regulatory status (designation as state hazardous waste sites).

3.2.3. Evaluation of New Sites

In addition to review of MDPW sites, many of which were taken directly from the MWRA residuals landfill screening database of 296 sites, other candidate sites were identified from discussions with EPA and the Army Corps of Engineers Regulatory Branch personnel. This site identification process was largely subjective, and focused upon area quarries which might be available for use as landfills. Quarries are generally considered to be favorable locations for landfills, as they are (1) heavily disturbed; and (2) often connected directly to major rail and road networks. Some of these sites were not considered eligible for use by MWRA as landfill sites, as they were located outside the MWRA service area.

As a result of these initial investigations, two quarries (Saugus/Melrose and Weston) were identified for further investigation. They were selected as potentially feasible due to their proximity to the project, existing adjacent land use, and access from major road and rail networks.

3.2.4. Results

A total of 7 upland sites were evaluated in detail as a result of this screening process. Two SEIS/R finalist sites (Weymouth and Malden); one MWRA residuals site (Framingham-13); and two new quarry sites (Saugus/Melrose and Weston) were retained for consideration. Those new sites not previously analyzed by MDPW were reviewed in relation to state solid waste landfill siting criteria; this analysis is summarized in Table A-3, in Appendix A of this report.

The Spectacle Island (minimum capping alternative) and the filling of depressed areas between Logan Airport runways have also been retained as potentially feasible disposal alternatives. All sites (except Logan and Spectacle Island) were visited and all were evaluated in detail. They are discussed individually below, in section 3.3.

3.3. Feasible Alternative Disposal Sites

The 7 candidate sites were evaluated in terms of significant resources (e.g. groundwater/wetlands, floodplains, cultural properties); on-site and adjacent land use, including zoning, traffic and existing development; and size/capacity. Each of these site characteristics is summarized below for specific sites. Table 3-1 summarizes the capacities and potential constraints on use of these sites.

It is important to note that the potential institutional constraints (e.g. the time required to obtain a DEP Solid Waste Landfill Assignment) are considered to be roughly equivalent for

SUMMARY OF PROPOSED ALTERNATIVE MATERIALS DISPOSAL SITES

<u>SITE</u>	<u>SOURCE</u>	<u>CAPACITY (MCY)</u>	<u>POTENTIAL CONCERNS</u>
Rowe Quarry (Malden)	DPW/MWRA	3.0	Minimal
Bates Quarry (Weymouth)	DPW/MWRA	2.5	Minor Residential Impacts Quarry Pond Losses
Logan Airport	DPW	0.7	FAA Restrictions
Framingham-13	DPW/MWRA	1.0	Access & Site Constraints
Weston Quarry	EPA/COE	2.0	Site Constraints Quarry Pond Losses
Saugus	EPA/COE	1.6	Minimal
Spectacle Island	DPW	0.6	Cost/Unit Storage
	Total	11.4	

Table 3-1

each alternative upland site and thus not used in the evaluation of individual sites. Costs of landfill site acquisition and development, and materials transport costs have also been excluded from this analysis.

3.3.1. Rowe Quarry (Malden)

The Rowe Quarry (Malden) site, an MWRA residuals finalist site, is located directly off Route 1 North with access from Lynn street (see Figure 3-1). The site is approximately 3.6 miles from downtown Boston and is surrounded on the north, south, and west by residences. Residences on the south side of the site are owned by the quarry. Forest, open space and Route 1 serve to buffer adjacent residences from the quarrying activities. The site is approximately 60 acres and is expected to provide approximately 3.0 million cubic yards of storage volume.

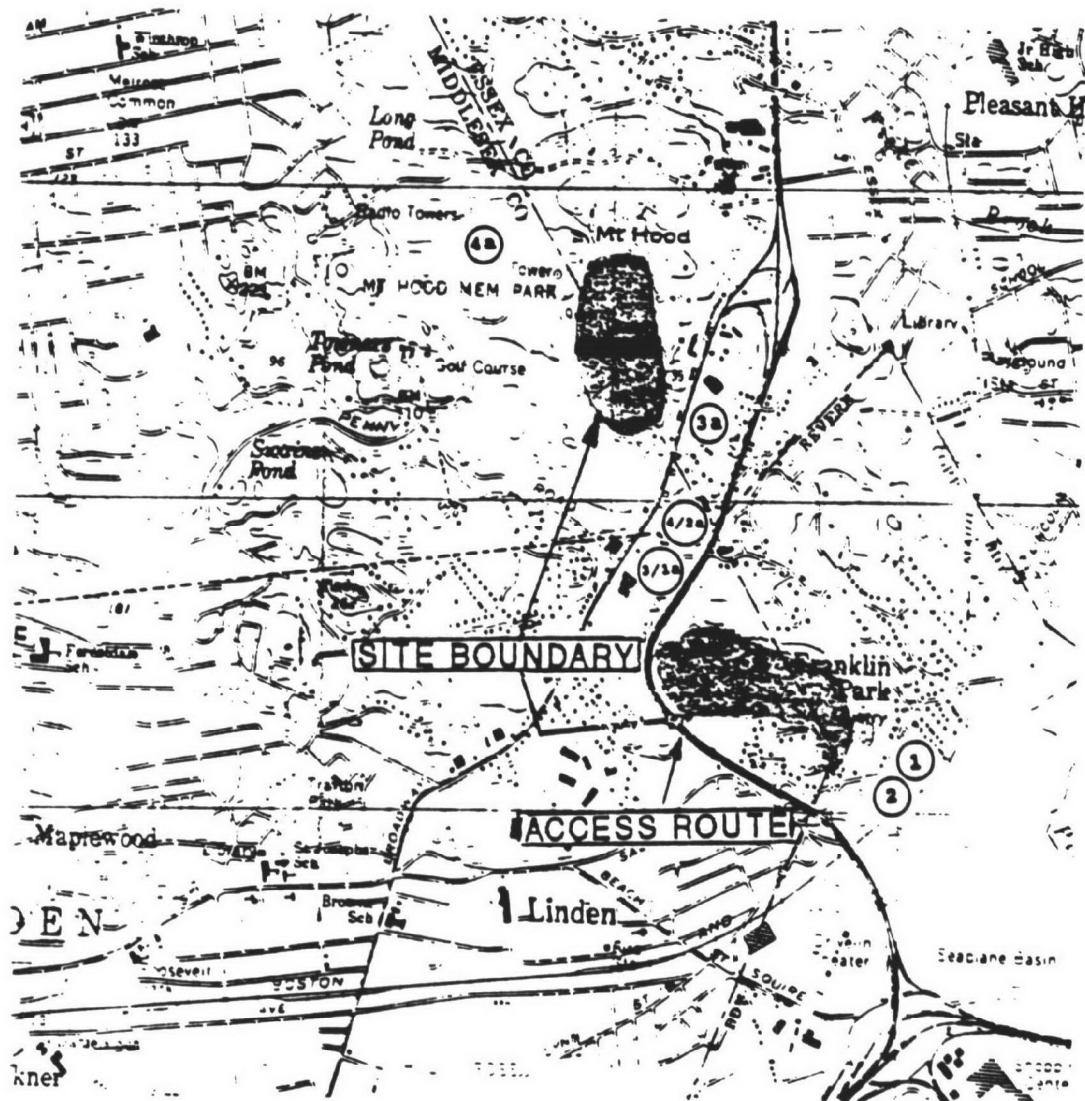
Wetlands. The SEIS indicates that up to 4 acres of wetland are present on the site and that all of these wetlands would be impacted by the landfill operations. However, the MWRA's Residuals Management Study and EPA's Residuals SEIS, which also evaluated the impacts associated with similar use of the Rowe Quarry site, did not indicate the presence of any wetlands on the site. Any wetlands which may be present on the site are most likely man-made and highly disturbed by the quarrying activities. Therefore, low impacts to wetland would be anticipated from use of the site.

Water Quality. The site drains to a portion of the Rumney Marshes, which was recently designated as an Area of Critical Environmental Concern (ACEC) by the state Coastal Zone Management Program. A leachate collection system would be required to minimize impacts to this area. Low impacts would be anticipated with a properly designed leachate collection and treatment system.

Transportation Route. The proposed transportation route to Rowe Quarry is Route 1 North to the Lynn Street (Saugus) exit (the Salem St. interchange) to the quarry on the left. Route 1 is a busy double-lane highway lined with numerous businesses.

Traffic. Access to the site would be from Route 1 and Salem Streets. Traffic on Route 1 and Salem Street is heavy at times and includes a high percentage of truck traffic. Average daily traffic (ADT) counts for Route 1 near the quarry are 87,700 vehicles/day (CTPS, 1990). As a result, low to moderate impacts would be anticipated from truck traffic along this route (see section 3.4). The SEIS evaluated the traffic impacts from accessing the site using Route 1A. The impacts from the use of this alternate route are high and therefore access should be provided from Route 1.

Land Use. Although the site is surrounded by single family and multiple family residences, low impacts would be anticipated from



ROWE QUARRY SAUGUS/MELROSE QUARRY

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Figure 3-1

the landfill operations due to buffering to the north, south and west by wooded areas, open space and Route 1.

Sensitive Receptors. Sensitive receptors identified in the vicinity of the quarry are indicated (by number) on Figure 3-1. They include:

1. Annemark Nursing Home, east on Lynn Street
2. Williamsburg Square Condominiums, east on Lynn Street
3. Northshore Assembly of God - on west side of Route 1 South
4. Trailer Park, Route 1, Malden

Relocation. A relocation plan would be required for the quarry business. It may be difficult to relocate the business in close proximity to the Boston area.

Air Quality. The SEIS indicates that 7 tons of non-methane hydrocarbons and 24 tons of oxides of nitrogen will be emitted by the truck traffic. These emissions will increase the levels of pollutants in the air along the route. However, this is not expected to have a significant impact above the existing conditions due to the presence of heavy truck traffic along the route.

Transportation Noise. The selected route is along commercial roadways with relatively few sensitive receptors which are exposed to high noise levels from truck traffic. As a result, low impacts would be anticipated along the route.

Operations Noise. There are seven residences within 100 feet and 30 residences within 400 feet of the site boundary. The impact to these residences would be high at times. However, these residences are exposed to high noise levels from the traffic and the quarrying operations in the area. In addition, the houses on the southern edge of the quarry are owned by the quarry, and could thus be temporarily closed during site landfiling operations. As a result, the landfill operations are not expected to result in high impacts above already existing conditions.

Historic Resources. The MWRA Residual Management Study indicated that potentially significant impacts could occur from the landfill operations at the site. However, it is expected these impacts can be mitigated through consultation and data recovery under Section 106 of the National Historic Preservation Act. The SEIS did not address the impacts to historic resources.

3.3.2 Bates Quarry (Weymouth)

The Bates Quarry (Weymouth) site is located north of Route 3 just

west of the Hingham town line, approximately 18.6 miles from downtown Boston (see Figure 3-2). The site, as delimited by MDPW, is approximately 130 acres and currently supports an operating quarry as well as forested and undeveloped area.

Some dumping has been reported along the periphery of the site. The quarry area is reported to cover only 62 acres. Other gravel pits are located northwest, north, northeast and south of the site. The disposal plan for the site, which was evaluated in the SEIS/R, included placement of approximately 3.9 million cubic yards of material on 81 acres of landfill area. The M&E-recommended use of the site would focus on disposal of material within the 60 acre disturbed quarry area, allowing a disposal volume of approximately 2.5 million cubic yards.

Wetlands. The total wetland and open water area is reported to be 12.2 acres of the 130 acre site. The SEIS states that approximately 9 acres of the 62 acre quarry area consists of open water and wetlands. The quality and size of these wetlands and aquatic habitats has not been fully field-verified by the MDPW. The MDPW-selected landfill footprint, which covers 81 acres of the site, is reported to impact 12.2 acres of wetlands as well as 5.4 acres of open water (greater than the total area reported to be occupied by the open water and wetlands on the site). Impacts to wetlands at the site could be reduced by utilizing only the active quarry area for disposal. Impacts to wetlands would then be limited to those which are either manmade or heavily disturbed from the active quarrying work in the area.

Water Quality. Runoff collection and sedimentation would minimize impacts to receiving waters. Some elevation of turbidity and suspended particulates would be expected. A liner and leachate collection system would also be required to protect local groundwater supplies due to the presence of fissured rock in the quarry area. Public water supply wells are reported to be located northwest and southeast of the site. Zone II delineation has been requested for these supplies. The SEIS does not specify the actual distance to these supply wells. However, our discussions with the town of Weymouth Department of Public Works have confirmed that the nearest public water supply is located approximately 0.9 miles north of the site.

Transportation Route. There are several alternative transportation routes to the Bates Quarry. One route involves construction of a direct access road to the quarry from Route 3 North. The SEIS/R route utilizes Route 3 South to Exit 15 to Derby Street (Route 228) to Whiting Street (Route 53). Several options exist from Route 53. From Derby Street, the route could turn left into the Weymouth Industrial Park on Woodrock Road and then either turn left onto Morse Road (west) and proceed along an access route to the quarry, or turn right on Morse Street (east) to Pleasant Street (south) to the quarry. A fourth alternative involves traveling directly from



BATES QUARRY

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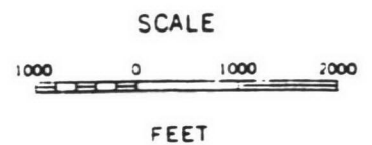


Figure 3-2

Whiting Street to Pleasant Street (south) to the quarry.

Derby Street is a two-lane road with commercial buildings and industrial parks. The intersection of Derby Street and Route 53 is very heavily travelled, but requires a sharp turn. The southern portion of Whiting Street is heavily wooded and the speed limit is 30 m.p.h. After the intersection with Cushing Street, the speed limit increases to 45 m.p.h. Land use along Route 53 is predominantly commercial with light residential. The industrial park roads appear to be quiet and not heavily travelled. Pleasant Street is a busy road. The Libby Industrial Park access road is located across from the current quarry entrance.

Our review of the site location indicates that traffic impacts could be significantly reduced if access to the site were improved. This could be accomplished by construction of a temporary direct access route from Rt. 3 into the quarry area. Loaded trucks could then exit Rt. 3 at Rt. 228, cross over the highway, turn north onto Rt. 3 northbound, and access directly into the disposal site. The use of this alternative direct access route would eliminate the traffic impacts projected for Rte. 53 and the potential need for at least some of these bridge repairs.

Traffic. Recent traffic counts for the site vicinity range from 17,770 vehicles/day (at the Rt. 3/Rt. 228 interchange) to 26,023 vehicles/day (at the Derby St./Old Derby Street interchange), indicating a moderately heavy level of commercial and residential usage. Route 53 counts (22,180 vehicles/day) also indicate relatively high traffic volumes of both commercial and residential vehicles (Vanasse, Hangen and Brustlin, Inc, 1989). According to the SEIS/R, use of the site would have a low impact on Rt. I-93, with an increase of 9 percent in daily truck traffic. The impact on Rt. 3 would also be low with an increase of 20 percent in daily truck traffic. However, the SEIS/R predicts that a very high impact would occur on Rt. 53, with a maximum increase of 259 percent. Although unknown, we assumed that this represents peak, not average traffic for a larger site than the active quarry on which the M&E alternative scenario is based. Thus, impacts could be reduced from these levels. Pavement life would be reduced by 0.3 years, 0.7 years, and 9.5 years for Routes I-93, 3, and 53, respectively. This was considered by MDPW to be a moderate to high impact for Routes I-93 and 3 and a very high impact for Route 53. The route would require repair of three bridges to handle increased truck traffic. As mentioned above, a direct access from Rte. 3 into the quarry could significantly reduce these potential impacts.

Land Use. Residential and commercial development along access streets and the Pratt School (now a condominium development) which is near to the site could be impacted by truck traffic and landfill operations if the MDPW access route were used. Impacts could be significantly reduced with the use of a direct access route and application of DEP minimum site buffer criteria.

Sensitive Receptors. No sensitive receptors were identified along the direct access road from Route 3 North to the quarry. Several sensitive receptors including numerous single family residences along the route, were identified along the transportation routes involving Derby, Whiting, and Pleasant Streets. Other receptors are indicated (by number) on Figure 3-2. They include:

1. Old Colony Montessori School, Derby Street, Hingham
2. Queen Anne's Gate, apartments and townhouses, Route 53, Weymouth
3. Kindercare school, located on the east side of Pleasant Street, Weymouth, after the intersection with Morse Road
4. Woodridge condominium development, under construction at the site of the former Pratt School, Pleasant Street, Weymouth

Another sensitive receptor was identified near the MDPW-proposed access route:

5. Church, Rte 53, Weymouth, just north of intersection with Pleasant Street

Relocation. A relocation plan would be required for the quarry business. It may be difficult to relocate this business in close proximity to the Boston area.

Air Quality. Although the level of impact was not addressed, the SEIS states that 9 tons of non-methane hydrocarbons and 50 tons of oxides of nitrogen would be emitted during peak year operation of the site. Direct access into the site would reduce air quality impacts to surrounding areas, and would confine peak truck emissions to the Route 3 area.

Transportation Noise. The level of impact was not addressed. The SEIS states that noise increases of up to 5 dBA over the existing ambient would be expected in the area of the Pratt School. In other areas noise level increase would be less than 1 dBA. Although the SEIS/R states that twenty-four hour operation would not be possible because of the proximity to sensitive noise receptors, direct access to the site from Rt. 3 would reduce transportation noise and allow extended periods of operation.

Operation Noise. The SEIS indicates that insignificant noise impacts would occur during landfill operations. There is no discussion of the noise level increases. This level of impacts is probably valid as no residences are located within 500 feet of the landfill.

Historic. No historic resources were identified on the site.

3.3.3 Saugus/Melrose Quarry

This site is located just north of Rowe Quarry, off Rt. 99 and Rt. 1 on the Saugus/Melrose border (approximately 4 miles from Boston; see Figure 3-1). It currently supports an active quarrying operation; most of the equipment and facilities are concentrated in the southern portion of the site. A conservative estimate of site capacity is 1.6 million cubic yards; this figure could possibly be revised upward, as the site appears to be similar in size to Rowe Quarry, but detailed topographic information is needed to confirm site capacity.

Wetlands. Limited access to the site prevented complete evaluation of the wetland area. However, the site is mostly disturbed and it is likely that if there are wetlands on the site, they are man-made, such as quarry ponds. Therefore, impacts are expected to be minor in nature. There is some upland forest on the site. No threatened or endangered species habitats have been reported on or directly adjacent to the site.

Water Resources. There are no surface water resources on the site. A liner may be required to comply with DEP requirements for a minimum depth to groundwater of 4 feet. The site is not in the 100 year floodplain, Zone II or Interim Wellhead Protection Areas.

Transportation Route. The transportation route to the Melrose/Saugus quarry is along Route 1 North to Essex Street (Melrose) to Route 99 South to the quarry on the right. The portion of the route along Route 1 North passes numerous businesses including motels, gas stations and restaurants. The route continues to the Essex Street overpass toward Melrose, then south on Route 99, a heavily-travelled state highway (traffic count information not available). Route 99 development near the quarry is predominantly commercial, with businesses such as office parks, motels, car dealers, restaurants/nightclubs, and stores. There are some residences along Route 99, including a trailer park on the east side.

Traffic. Traffic on Route 1, a major regional arterial, is heavy, with ADT counts ranging from 98,000 to 110,000 vehicles/day (MDPW, 1990, and CTPS, 1990). The truck traffic associated with the Central Artery disposal is not expected to result in significant impacts to Route 1 traffic. Impacts to Route 99 are expected to be higher, but only for a very short segment of the road which is dominated by commercial and industrial uses. It appears that one or more bridges crossing over Route 1 would require improvements to handle project truck traffic. This could be accomplished as a mitigation measure associated with the project. The area immediately adjacent to the site is mostly commercial although

there are some residential properties near the intersection that could be affected by the truck traffic.

Land Use. The Mount Hood Park is located to the north-northwest of the site. Noise from the operation of the landfill would have some impact upon the users of the park, but is buffered by wooded areas. The closest park land uses (parking and golf) would not be significantly affected by landfiling. In addition, any impacts would be similar to what is experienced now as a result of the active quarrying operation. Therefore, it is not expected that the landfill activity would present a significant impact to the park use. The land uses to the south and southwest of the quarry are primarily commercial and residential. Penny Lane, located to the south of the site, is primarily a residential street. If access to the landfill is prohibited in this area, impacts will be minimized. The land uses to the east are primarily highway commercial. The conversion of the quarry to a landfill should not result in a significant impact to these uses.

Sensitive Receptors. There are a number of single family residences along the proposed access route, near the Essex Street overpass and on Route 99. These residences are presently subject to relatively high noise and visual impacts due to Route 1 development. Other sensitive receptors on the route to the Melrose/Saugus quarry are indicated (by number) on Figure 3-1. They include:

- 1a. Northshore Assembly of God - on west side of Route 1 South
- 2a. Trailer Park, Route 1, Malden
- 3a. First Baptist Church - opposite quarry off Osprey Road
- 4a. Mount Hood Golf Course, Melrose

Relocation. Relocation of the current quarry operation would be required. This would present a significant impact if an appropriate location could not be found, or if an equitable monetary settlement could not be arranged. A secondary impact related to the relocation of the quarry activity is the loss of tax revenue for the towns of Saugus and Melrose. Depending upon the amount of tax revenue contributed by the quarry this could represent a significant impact.

Air Quality. As this site is similar in size and located very near Rowe Quarry, the impacts on air quality discussed earlier for Rowe would also apply to this site. Due to the heavy volumes of truck traffic and assumed levels of particulates associated with the quarrying operations, significant additional impacts to ambient air quality due to landfiling are not expected. However, additional site-specific data are needed to confirm this.

Transportation Noise. As noted above, transportation noise impacts are possible, but can be reduced by keeping truck traffic routed on Route 1 to Route 99, maintaining traffic volumes to the same levels as are recommended for Rowe Quarry. There are some residences near the intersection of Route 1 and 99, and there are also some residences on the Route 1 overpass which would be used to allow truck traffic to change direction on Route 1. As mentioned above, these residential properties are already experiencing negative impacts associated with heavy traffic (including trucks) associated with Route 1 commercial activities (and the existing quarry). Depending upon the final access route, the project truck traffic could have a moderate negative impact upon these residences.

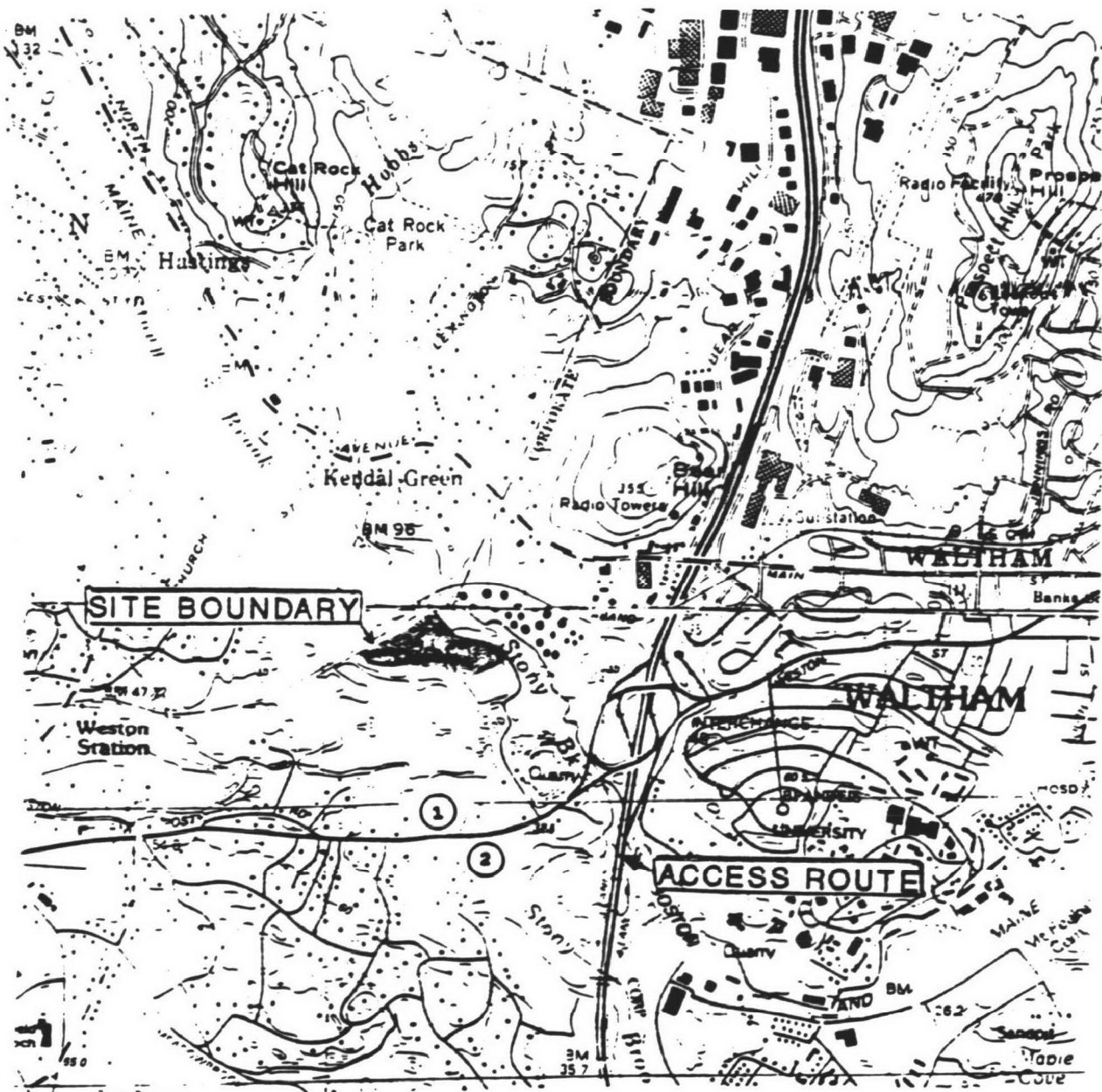
Operation Noise. As noted above, the operation of the landfill could negatively impact users of the Mount Hood recreational area, and residential properties located to the south of the site. Acoustic and visual buffers (such as the vegetated area on the west edge of the quarry) would reduce impacts to the Mt. Hood golf course users. The noise levels would be expected to be similar to those generated by an active quarry, and therefore the impact is not expected to be significant as long as the hours of operation are similar to the quarry's current operation. Use of the landfill during night-time hours or during weekends would result in more significant impacts.

Historic Resources. There are no historic resources recorded on the site.

3.3.4 Weston Quarry

This site is an active quarry (currently owned by Massachusetts Broken Stone Co.) located at the junction of Route 128 and Route 20 in Weston (see Figure 3-3). The site contains large areas of historic excavation activity; several deep pits (60-80 foot depth) are apparently on site, and at least some of them appear to contain water (depth and extent unknown). The site is bounded on the northwest by the Town of Weston's municipal landfill and to the north and east by the MBTA commuter rail tracks, a fuel tank farm and the Route 128/Route 20 interchange. A small stream, Stony Brook is located just to the north of the commuter rail tracks, and a large pond is located just to the south of the site. Total site capacity is estimated at 2.0 million cubic yards, after applying necessary DEP siting buffers. The bulk of this capacity is expected to be within large open excavated pits on the north and west side of the site.

Wetlands. The site is highly disturbed due to the quarry activity. In the southernmost portion of the site there is a fairly large pond associated with the quarry. It is approximately 5-10 acres in size, and may be the detention pond for the quarry. Because of difficulties to accessing the entire site, it was not possible to



WESTON QUARRY

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Figure 3-3

confirm the size or values of these ponds and wetlands on site. It is likely that the landfill would have to occupy at least a portion of the quarry pond area in order to provide sufficient storage volume.

Water Quality. According to the DEP Water Sources overlay, an unverified well exists just north of the Weston quarry site. It is not expected that landfill activity, with proper design, would impact the well, however, additional investigation should occur to insure that DEP site assignment criteria can be met. As portions of the site are located within 0.5 miles of the Stony Brook Reservoir and within 250 feet of Stony Brook, site buffers will be necessary to meet DEP site assignment criteria. The site is not located within a Zone II, or Interim Wellhead Protection Area. Although there is 100 year floodplain located on site (associated with the pond on the southern portion of the site), disposal would already be avoided in this area to meet other criteria regarding minimum distance to surface water bodies. More investigation is needed regarding the precise location of the surface water features shown on the USGS map before a more definitive determination of impact can be made.

Transportation Route. The proposed access route for the Weston site is Route 128 North to Route 20 West (for .1 miles) to the quarry entrance on the north side of Route 20. There is limited development along the transportation route. Several businesses which generate truck traffic are located on Sibley Road, to the east of the site on Route 20.

Traffic. As Route 128 is already a heavily-used truck route at present, it is not expected that there would be any significant additional impacts related to traffic access for that highway. Route 20 volumes, while lower, are still substantial (26,800 vehicles/day west of the Rte. 128 interchange) (MDPW, 1990). In addition, there is an active railroad line that runs along the eastern boundary of the site, and an abandoned railroad line bordering the north and west site boundaries. The active line, at a minimum, could be used to reduce truck traffic to the site.

Land Use. Part of the site is an active quarry. The other part of the quarry appears to be abandoned. A railway runs adjacent to the site along the northern and eastern borders. There is some residential development on Route 20 just off Route 128 (at the end of the quarry access road) as well as to the north of the railway. There is some commercial and industrial development to the north/northeast of the site. The town of Weston's landfill is also located to the north of the site and railway. Significant impacts to surrounding land uses related to truck traffic or landfill operation are not expected if the hours of operation are the same as for the current quarry activity. If extended hours are necessary, there could be minor to moderate impacts upon adjacent residences due to increased traffic and elevated noise levels.

Sensitive Receptors. No sensitive receptors were identified along the proposed route to the quarry in Weston. Nearby sensitive receptors include some single-family residences on or near Route 20, although none are located directly adjacent to the quarry area. Two additional sensitive receptors are indicated (by number) in Figure 3-3. They are described below:

1. **Weston Veterinary Clinic:** located about 700 feet west of the quarry entrance on the south side of Route 20
2. **The Gifford School:** school located about 1000 feet west of the quarry entrance on the north side of the road

Relocation. There would be a need to relocate the existing quarry company, Massachusetts Broken Stone. There is the potential for a significant impact if an appropriate location can not be found or if an equitable monetary settlement can not be found. There is also a potential for a negative impact to the community as a result of lost tax revenue generated by the private quarry activity. Depending upon the amount of tax revenue generated by Mass Broken Stone, this could represent a significant impact.

Air Quality. Although no estimates of existing air quality conditions for the site are currently available, it is reasonable to assume that, if the site is operated at comparable levels to Rowe or Weymouth, incremental air quality impacts would not significantly change from existing conditions (due to the presence of active quarrying and the proximity to Route 128. However, additional site-specific data is needed to confirm this preliminary finding.

Transportation. The site has excellent direct access from Route 128 or from adjacent rail lines. If the same hours of operation are maintained for the landfill as for the quarry it is not expected that there would be any significant impacts to surrounding land uses. If hours of operation are extended it is possible that the additional truck traffic would result in some negative impacts to the nearest residences located (1) on Route 20 at the end of the access driveway; and (2) in the Kendall Green area north of the site.

Operations Noise. Significant negative impacts related to operation noise would not be expected if the hours of the landfill are maintained the same as for the current quarry operation. If nighttime hours are added, the noise from the landfill might carry to the residences which are located at the end of the quarry (landfill) access road from Route 20 and in the Kendall Green area. Other land uses would probably not be affected. The site boundary has been reduced to account for minimum DEP siting criteria from residences (500 feet).

Historic Resources. There are no known historic resources recorded on site.

3.3.5 Logan Airport

This site refers to the areas between runways at the airport which are currently below the runway surface grade (see Figure 3-4). They are presently used only for drainage and navigational flight aids; both of these functions can be accommodated during and after the landfilling operation. Assuming a level deposition of project material in these areas to a height of approximately 2 feet above existing grade (but still below runway elevation), total site capacity is estimated to be approximately 0.7 million cubic yards. The site is briefly discussed in the SEIS/R, and is apparently being investigated further.

Wetlands. Although some (unknown) areas of the site may potentially meet the federal jurisdictional criteria as wetlands, they are all essentially non-native disturbed areas which would not provide significant wetland values and functions. Further site-specific information is needed to confirm this finding.

Water Quality. The site would drain directly into Boston Harbor, allowing for disposal of sodium-contaminated materials without treatment or lining. No impacts to groundwater or public water supplies would be expected.

Traffic. This site offers significant traffic advantages to other upland sites, as material could be brought directly from the project alignment by truck or barge to the runway areas without direct impacts to residences. This would allow use of the site on a 24-hour basis; proper site scheduling would allow maximum use when airport traffic is lowest. Federal Aviation Administration (FAA) and Massport coordination would be necessary to ensure that impacts are minimized.

Land Use. As the surrounding land use is primarily commercial and industrial, and the airport activities presently affect surrounding communities to a larger extent than the proposed landfilling, no significant impacts would be expected.

Relocation. No permanent relocation of airport functions would be necessary, although some temporary displacement of certain airport lighting and navigational aids would likely be required.

Air Quality. Although exact data is not currently available, it is expected that existing ambient air quality at the airport would not be significantly affected by the addition of project-related traffic.

Transportation Noise. The access route and disposal locations are

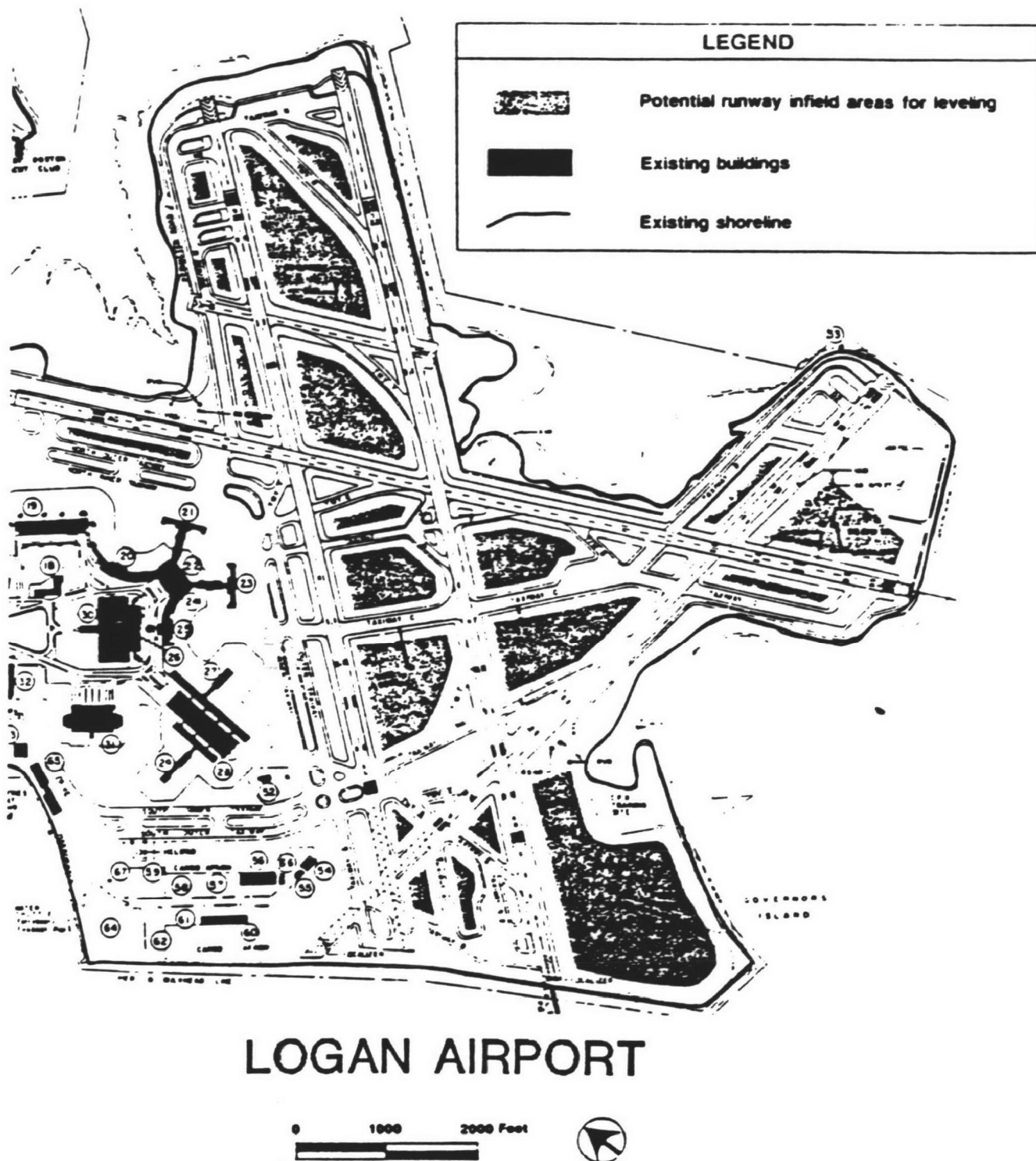


Figure 3-4

within heavily-travelled areas with high levels of existing ambient noise levels. No significant impacts are thus expected.

Operations Noise. As stated above, the airport is a current source of relatively high ambient noise levels, and project related activities are not expected to contribute a significant new source of noise to the environment.

Historic Resources. As the runway areas are all on filled land, and thus previously disturbed, the potential for impacts to historic resources due to disposal activities is considered minimal.

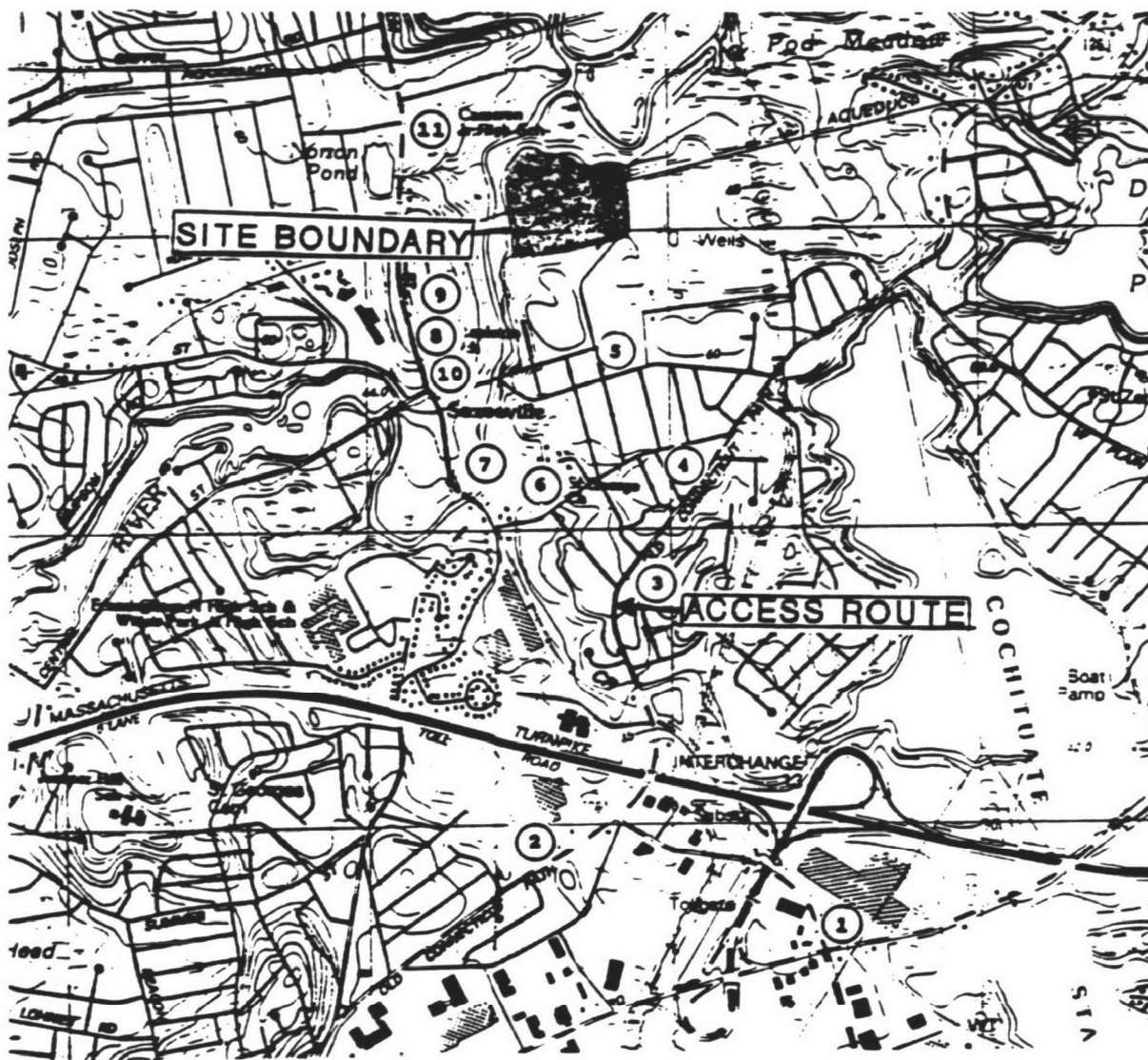
3.3.6 Framingham Site (FRA-13)

This site, located approximately 20 miles from the project area, is approximately 1.5 miles north of the Massachusetts Turnpike, in an active gravel pit and quarry (see Figure 3-5). It is bounded on the north and west by the Sudbury River, and to the south and east by open land and commercial/residential development. The MWRA Sudbury Aqueduct runs through the center of the site. As a result of these site constraints, and the application of minimum DEP landfill siting criteria, the site capacity has been revised downward from the original MWRA estimate to 1.0 million cubic yards.

Wetlands. The USFWS wetlands map does not indicate the presence of any wetlands on the site. However, regulated wetlands are likely to occur on the site in the area adjacent to the Sudbury River. The DEP siting criteria require a 250 foot buffer from non-drinking water bodies such as the Sudbury River. This buffer would probably also provide the required 100 ft buffer from any wetlands which are present along the river. As a result, impacts to wetlands are expected to be minimal.

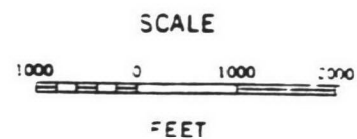
Water Quality. Runoff collection and sedimentation would be required to minimize impacts to the Sudbury River. Some elevation of turbidity and suspended solids would be expected. A liner and leachate collection system would be required to protect the local groundwater supplies due to the likely presence of fissured rock within the quarry area. Four wells, one of which is a public water supply well, are located to the northeast, within 3300 feet (1000 meters) of the site. The closest well is 1250 feet north of the site. The site is adjacent to, but not within, a Zone II recharge area associated with the nearby Pod Meadow/Sudbury River system.

Transportation Route. Access to the Framingham site is possible from either the Massachusetts Turnpike (Route 90) West, to Route 30 North, to Speen Street and Old Connecticut Path (north). Another alternative route runs from the Massachusetts Turnpike (Route 90) West to Route 30 south, to Burr Street, onto the Legatt-McCall Office Park connector road, to Speen Street and Old Connecticut



FRAMINGHAM-13

SENSITIVE RECEPTORS



① Sensitive Receptor

Figure 3-5

Path.

The Legatt-McCall connector road is newly paved, wide single lane road with office buildings. Land use along this portion of Speen Street is exclusively commercial and industrial. The southern portion of the route on Old Connecticut Path is commercial, while the northern portion passes through a residential area.

Traffic. Truck traffic would most likely have a low impact on Rt. I-90 and a moderate impact to Rt. 30, Speen St. and Old Connecticut Path, which are 2-lane striped roadways with substantial commercial, industrial and residential development. Traffic counts for Route 30 (33,350-35,200 vehicles/day at the turnpike interchange area, according to CTPS, 1990) indicate moderate to heavy usage. Old Connecticut Path traffic is somewhat lower, at approximately 18,000 vehicles/day north of Route 30 (CTPS, 1990). Although the northern portion of Old Connecticut Path is residential, the area appears to currently receive some truck traffic from at least three heavy industrial operations (the Ellingwood Construction Company gravel pits, American Precast Concrete, and the New England Sand and Gravel Co.) all of which are located at the end of Meadow Street, on or adjacent to the site.

Land Use. Land use on the site consists of 50 percent industrial development, 45 percent forest and 5 percent open space. There are occupied residences within 500 feet of the site and a few single family homes adjacent to the quarry. A residential neighborhood lies south and east of the site. As mentioned, earlier, a MWRA Aqueduct runs from west to east through the site. A powerline also runs north to south, along the eastern border of the site. However, this easternmost portion of the site would be used for disposal, as it lies within the Zone II recharge area.

Sensitive Receptors. Numerous single family residences are located along Old Connecticut Path and one of the access roads to New England Sand and Gravel Company. Other sensitive receptors are indicated (by number) on Figure 3-5. Those sensitive receptors located along the proposed transportation route include:

1. Office Building, 160 Speen Street, located about 10 feet from road
2. Saxony Apartments, Old Connecticut Path (west side)
3. Children crossing sign at the corner of Old Connecticut Path and Hamilton, (assumed to be for a bus stop)
4. Wheelchair handicapped sign north of the intersection of Old Connecticut Path and Fenton Street

Sensitive receptors identified in the area surrounding the gravel pits include:

5. Danforth Street/Meadow Street single-family residences
6. Church of Saint George - Catholic church at the intersection of School Street and Hamilton
7. Saxonville Village Condominiums - east side of Concord Street, between Hamilton Street and Stapleton School
8. Mary E. Stapleton School - elementary school on east side of Elm Street
9. Edwards Church, United Church of Christ and Jonathon House Childrens Center - church, parsonage and nursery school on 45 Edwards Road, off of Maplewood Street
10. Boston Taiwanese Church - next door to (south of) Stapleton School, on Elm Street
11. Cameron Middle School - located on the east side of Elm Street

Relocation. A relocation plan would be required for the affected industries. Due to their need to locate at commercially-viable sources of rock/quarrying material, it may be difficult to relocate these businesses in close proximity to Boston.

Air Quality. As discussed under land use, several occupied residences are located within 500 feet of the site. Air quality impacts to these residences could be mitigated by (1) reducing traffic volumes and hours of operation for the site; and (2) constructing the landfill with an adequate buffer distance from residences. The truck traffic along residential sections of Old Connecticut Path could have a moderate impact to the area's air quality. Additional data on existing traffic and air quality conditions for the site vicinity are needed to confirm this finding.

Transportation Noise. The residential neighborhood south and east of the site would have a moderate to high impact from the truck traffic to the site. Yet, the neighborhood is already exposed to a moderate noise level from the gravel truck traffic. Noise impacts to the neighborhood could be mitigated by restricting hours of operation for the site and by carefully scheduling truck traffic during the day to a maximum rate of 100 truck loads per day.

Operation Noise. The landfill operations would have a moderate to high impact, as some residences are located within 500 feet of the present site. Impacts could be mitigated by constructing the project landfill with an adequate visual and acoustical buffers and maximum distance from these residences.

Historic. According to Massachusetts Historical Commission records, one archaeological dig is located on the site. They have been contacted to obtain additional information on the status and nature of the site.

3.3.7 Spectacle Island Capping

As mentioned previously, The M&E-recommended alternative would limit the disposal of material at Spectacle Island to the minimum amount required to adequately cap the historic landfill in accordance with current state landfill closure regulations (see Figure 2-2). This alternative would significantly decrease the levels of impacts for all site categories, as the material to be disposed of on the island would be reduced to approximately 6 percent of the MDPW proposal. In addition, no permanent subtidal impacts would occur, and intertidal impacts would be limited to rock dike construction. Accordingly, the level of impacts is presumed to be acceptable.

Wetlands. Approximately 0.2 acres of coastal salt marsh may be lost, and some permanent intertidal and temporary subtidal impacts are likely with the M&E alternative.

Water Quality. The construction activities could, as discussed earlier, result in some short term increases in turbidity and contaminant resuspension. However, the new landfill cap will stabilize the existing landfill and reduce contaminant flows into the harbor, resulting in a permanent positive benefits to the area's water quality.

Traffic. A small fraction of the MDPW barge traffic would be expected to the site (approximately 450-500 total barge trips over 3-4 years). This is not expected to significantly affect current Boston Harbor navigation conditions; much of the barge traffic would be expected at night, when harbor commercial and recreational use is lowest.

Land Use. As the island is presently not available for widespread use as a park, the landfill cap will create a positive net benefit in site land use activities; landfilling activities will not significantly affect use of the island.

Relocation. As no industries or residences are presently on site, no impacts are expected.

Air Quality. Minor impacts due to truck and tow boat traffic are possible, but are not expected to be significant increments to the current existing conditions in the harbor.

Transportation Noise. Barge loading and unloading operations will generate some noise, and care will be required to mitigate noise

at shore-side loading facilities. However, as mentioned earlier, levels are significantly reduced from MDPW alternative. No significant impacts to sensitive receptors are expected during barge transport to Spectacle Island.

Operations Noise. Island landfilling activities are not expected to result in significant noise impacts, due to the distance to sensitive receptors.

Historic Resources. According to MDPW, one potentially significant cultural resource site exists on the south drumlin of the island. It is likely that this site could be avoided, if not within the area of historic landfill (as is expected). If it cannot be avoided, data recovery efforts in accordance with Section 106 of the National Historic Preservation Act would be undertaken to fully mitigate the site.

3.3.8. Supplemental Site Investigations

Our most recent site investigations and review of available data indicates that significant site constraints exist for the Framingham-13 site. First, the relatively low traffic counts for Old Connecticut Path and the number of sensitive receptors (schools and residences) along portions of the access route could require significant reductions in truck traffic volumes. In addition, further consultation with the MWRA Water Division indicates that landfill activities directly on the Sudbury Aqueduct would not be permissible, and adjacent landfill work would have to be done under stringent controls to ensure that landfill contaminants could not infiltrate the aqueduct structure. Finally, although the site is not within a Zone II recharge area, its proximity to the Zone II area and existing, presently-unused water wells would also require very stringent design and operational controls in order to protect these resource areas. Thus, the MWRA staff contacted did not encourage use of this site.

In view of this, we have conservatively assumed that the site may not be available for use, due to these potential impacts and limited storage capacity (1.0 mcy). Thus, the site has been excluded from the following disposal site traffic analysis (Section 3.4).

3.4. Disposal Site Traffic Projections

3.4.1. Introduction and Assumptions

A component in the analysis of alternative sites for disposal of excavated material is the determination of the total daily truck traffic which would be directed to each site from the various Central Artery project areas. The alternative disposal sites vary in capacity and surrounding land-use character, and therefore, there are differences as to the maximum daily truck traffic which

could be allocated among the various alternative sites. In addition, consideration is given to meeting the disposal needs of the MDPW in terms of coordinating the geographic location of disposal to the Central Artery project area of generation, and also assuring adequate disposal capacity during peak periods of excavation. As noted above in Section 3.3.8, the Framingham site is not included in this analysis, as we have assumed for purposes of this analysis that it may not be available for use.

The analysis consisted of five steps, which are described in more detail below. In order to estimate the total daily truck traffic to each site for each year of MDPW excavation, the following assumptions were made:

- In residential areas, an average of 100 trucks per day would be allowed to access the site over a period of 8-12 hours.
- At sites where direct access was available, thus minimizing contact with residential areas, an average of 180 trucks would be allowed to access these sites for periods of 8-16 hours per day.
- Total traffic volumes were based upon the use of 12 cubic yard (cy) trucks.
- Total material disposal volumes were calculated on 260 day per year operation.

3.4.2. Methodology and Results

As noted above, the analysis consisted of the following five steps. These are described below, along with summary results of the analysis.

1. Determination of maximum excavated material quantities for the alternative landfill sites

Data from the SEIS/R report were used to determine the amount of excavated material which was intended for disposal at Spectacle Island, and, therefore, would need to be deposited at the alternative sites. However, it should be noted that there was a discrepancy in the numbers reported for the total volumes of excavate to be deposited at Spectacle Island. One reported volume leaving the barge unloading facilities was 11.5 mcy, while the other reported volume was 9.28 mcy of material going to Spectacle Island. It is believed that the higher volume includes "new material" which would have to be transported to the island, in addition to the material actually excavated from the Central Artery project. This new material may include rock riprap material, liner material and topsoil for the landfill and containment structure to

be constructed on the island. Therefore, the smaller number, believed to represent the actual volume of material to be disposed, was used for this analysis.

2. Determination of the maximum quantity of fill that could go to each of the alternative sites.

As noted above in Section 1.2, the capacity of each of the alternative sites was calculated utilizing USGS topographic mapping and the results of field visits. The following disposal site capacities are anticipated:

Rowe Quarry:	3.0 mcy
Bates Quarry:	2.5 mcy
Logan Airport:	0.7 mcy
Weston Quarry:	2.0 mcy
Saugus/Melrose Quarry:	1.6 mcy
Spectacle Island:	0.6 mcy

3. Determination of the annual material volumes which would be generated from each of the project sites.

These volumes were calculated based upon MDPW estimates of barge loading facilities traffic data provided in Appendix 1, Chapter 9 of the SEIS/R (see Figure 3-6). The volumes used represent the lower of the two volumes to be deposited at Spectacle Island cited by MDPW (9.28 mcy versus 11.5 mcy). As the volumes to be moved from individual barge loading facilities roughly correspond to specific project excavation areas, the facilities totals can be generally grouped into material destined for disposal north, south/west, and east (to Spectacle Island or Logan Airport) of the project area.

4. Determination of the maximum daily truck volumes permitted for each alternative site, and subsequent determination of the maximum annual volumes of excavated material which could be deposited at each site.

The maximum number of truck volumes permitted at each site was based upon the character of the area in which the site was located. If access to the site required travel through residential areas, a maximum of 100 trucks (200 trips) per day was allowed. Therefore, a maximum of 100 trucks per day was considered for the Weston site. At the Rowe, Bates, and Saugus/Melrose Quarries, where access to the sites from major roadways is relatively direct, and residential areas are less impacted, an average of 180 trucks per day were considered. The total for Bates Quarry assumes direct access from Route 3. Logan Airport and Spectacle Island were considered separately since the movement of materials to those locations would primarily involve barging.

Total maximum annual volumes of materials which could be deposited (using these rates) at each of the alternative sites were then

TRUCK LOADS PER DAY FOR LAND DISPOSAL

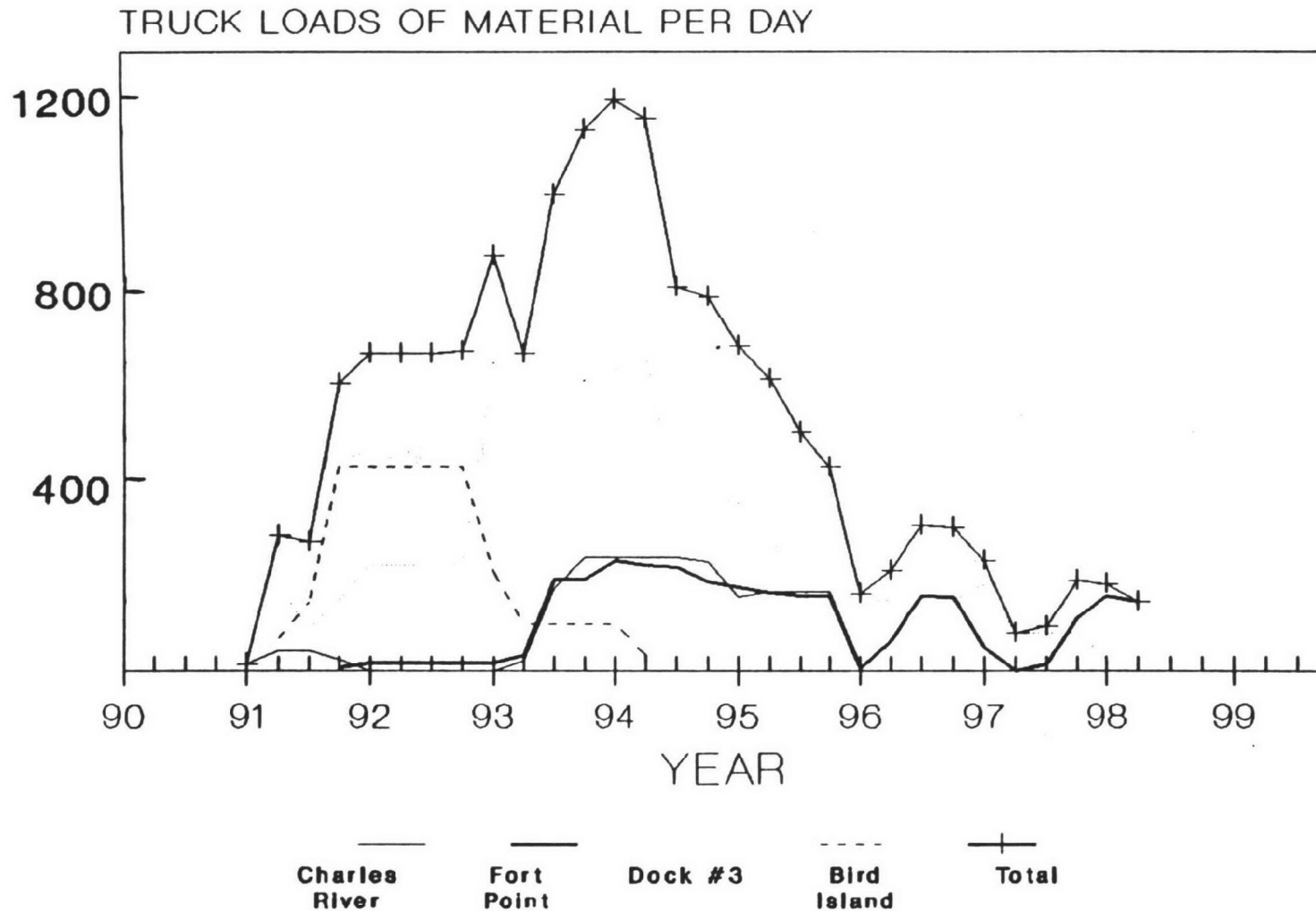


Figure 3-6

calculated. The maximum annual volumes ranged from 300 mcy at the Weston site, to 562 mcy per year at the Rowe, Bates, and Saugus sites.

5. Determination of anticipated daily truck trips based upon disposal need for each of the planning period years, including peak periods.

The SEIS/R and Figure 3-6 indicate that peak years for disposal are expected to be 1992, 1993, and 1994. During that time period it was assumed that several of the alternative sites would have to be utilized at maximum rates to handle the peak excavation volumes.

A bar graph (see Figure 3-7) were prepared indicating the projected need for disposal at each of the alternative sites over the planning period. The disposal scenario is focused upon the need to provide MDPW disposal sites to both the north and south/west, and to utilize Spectacle Island and Logan Airport during peak excavation periods when 3 shifts are underway.

In 1991, when the project excavation is beginning, two sites would be designated to receive material. These two sites, Rowe and Bates Quarries, would permit convenient disposal to both the north and south of the project excavation areas. In 1992, the MDPW requires greater disposal capacity. Thus, total volume deposited at Rowe Quarry increases slightly. However, one additional northern site (Saugus/Melrose Quarry) and one western site (Weston Quarry) are also added. In 1993, the peak year for excavation activity, the sites at Logan and Spectacle Island are added, thus providing maximum disposal capacity for the peak excavation volumes. All sites are again utilized in 1994. In 1995 and 1996, disposal of excavate material may continue at the northern sites if the need arises, however, as the bar chart shows, the disposal volumes can be met by trucking the excavate to the southern and western sites.

It is important to note in 1993, when peak excavation volumes are projected, excess material will have to go to a combination of sites in order to accomodate these peak volumes. Material disposal at Spectacle Island and Logan Airport (chiefly by barge) is maximized (assuming total combined capacity of 1.3 mcy), and the remaining volume (approximately .5 to .7 mcy) of material could then be sent by rail to either the Weston or Rowe sites. If (1) storage capacity at Spectacle or Logan is increased (by slight increases in the height of these landfill areas); or (2) additional material, beyond the 100,000 cubic yards proposed, can be used for backfill (see Section 4.2), the rail scenario is unnecessary.

In summary, this disposal scenario can provide for peak excavation volumes at traffic levels which can be accommodated at specific sites. Additional traffic projections and documentation of existing conditions at each disposal site (which could not be done under our review time frame) would be necessary in order to refine

PROJECTED DISPOSAL SITE TRAFFIC

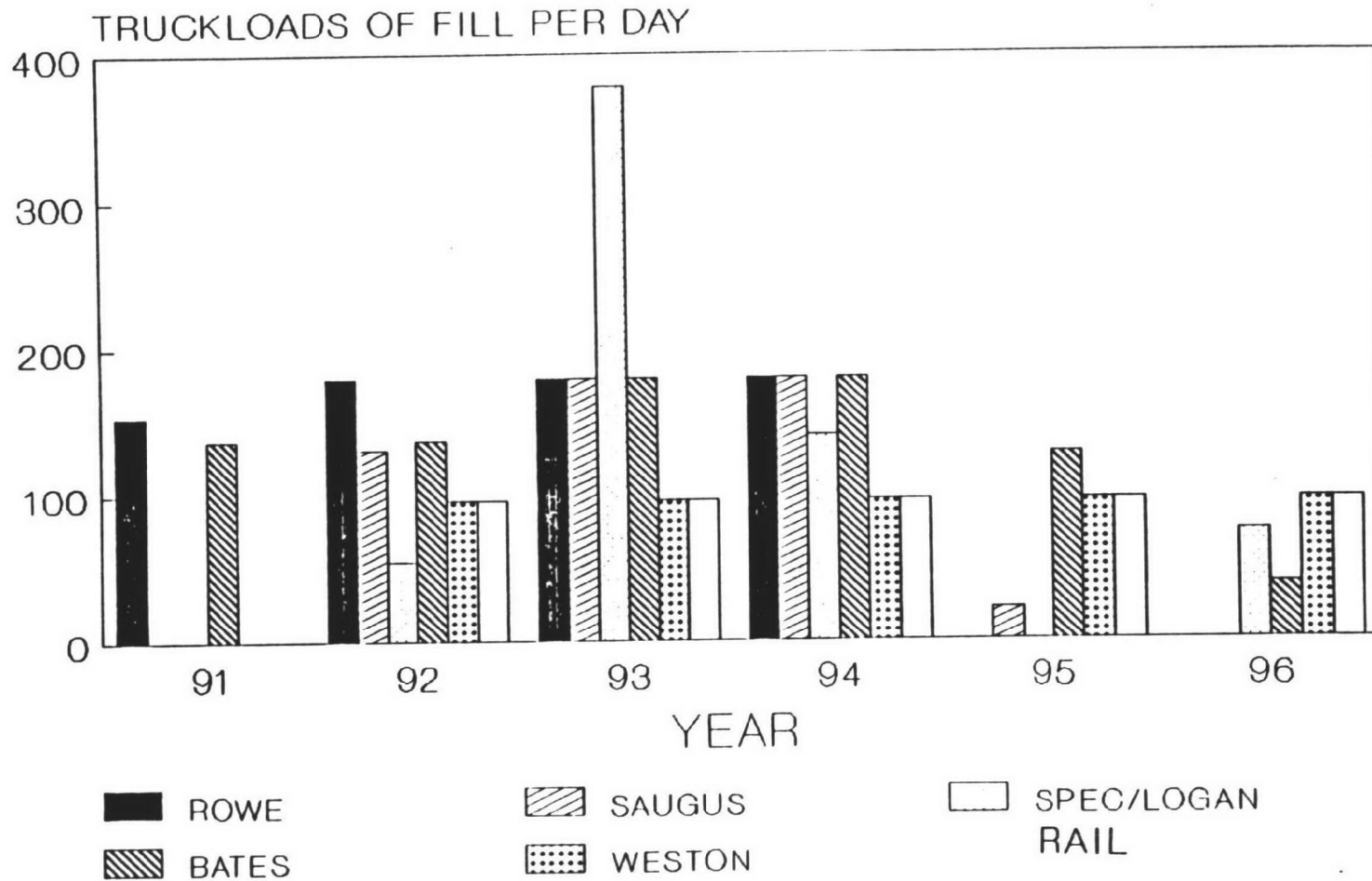


Figure 3-7

this analysis. Confirmation of final materials disposal volumes (exclusive of project backfill and Spectacle Island capping) are also needed to more accurately define the optimum disposal scenario.

4.0. Evaluation of Other Alternatives

4.1 Ocean Disposal

In order to determine the feasibility of disposing of a portion of the excavated material from the project, a study was conducted by Bechtel/Parsons Brinckerhoff in February, 1990. This study, summarized in their report on the Potential for Fill Material to Float, concludes that "...potentially floatable material exists throughout the fill and that dumping this material would result in unacceptable wood rafts and scum floating on the ocean, potentially resulting in a hazard to navigation, significant fouling of the beaches and an adverse impact on aquatic life and the fishing industry" (Bechtel/Parsons Brinckerhoff, 1990b).

Review of this study indicates that the testing conducted on the material was somewhat conservative, thereby overestimating the floatability. One of the greatest limitations of the study was the amount of material sampled and the testing methodology. Samples were obtained from the borings or by excavating test pits with a backhoe at selected locations along the alignment and the floatability analyzed in small 16 oz. jars. In order to simulate the handling of the material prior to disposal, (excavation, loading onto trucks and barges, and transporting to the disposal site), the samples were excessively separated, and dried. In reality, many large clumps of material would be likely to remain in contact and these clumps would sink more easily than the separated grains. Very few clumps were present in the study samples due in part to the small size selected for the samples.

In order to simulate the dumping of the material into 300 feet of water, the samples were mixed with twice their volume of water in jars. This test does not appear to accurately reproduce the downward pull on the material that would result from the dumping of material from a 1200 cubic yard capacity barge. It is likely that many of the smaller constituents would be entrained in the bulk of the dump. This effect would only partially apply to wood pieces which could be cleaned of the attached soil during the 300 foot descent and would return to the water surface due to their high buoyancy.

In addition, the determination of the floating volume fraction was conducted by visual estimation of 5 judges. The accuracy of the results is somewhat questionable since the results are generally less than one percent. A more quantitative approach, used in conjunction with larger sample volumes and larger dump depths,

would have provided more accurate results.

However, despite the conservative nature of the tests, soil boring data indicate that the fill material appears to contain significant fractions of material that would be likely to float. This would severely limit the volumes available for open ocean disposal. A more realistic testing study would probably not significantly change this general conclusion. It should also be noted that there is presently no local approved ocean disposal site for excavated materials; a complex and lengthy site designation process would be necessary to allow use of such a site.

4.2. Suitability of Excavated Material for Project Backfill

We have conducted a qualitative evaluation of the character of the materials and issues raised by the MDPW related to the handling and re-use of these materials. In general, the MDPW analysis for re-use of excavated materials concludes that the potential logistical difficulties associated with re-use severely limits their options. They have also made several simplifying assumptions to assess the feasibility of re-use of excavated materials. In addition, there is some inconsistency between statements made about the potential for sorting materials for reuse, and the proposed action to dispose 100% of the excavated materials at Spectacle Island. These items are discussed in greater detail below.

4.2.1. Character of Materials

The materials to be excavated within the project alignment have been categorized by the MDPW into three general groups for discussion. These are:

- O Fill placed in former tidal or subtidal lands for land reclamation
- O Native soils lying at or below the ground surface prior to reclamation
- O Bedrock

The MDPW has further subdivided the native soils to distinguish between the upper portions (characterized as very soft and unworkable or mixed with elements of the fill), and lower portions which are stiffer and free of contamination. They have conservatively estimated that the quantity of native-mixed soils is approximately 25% of the total native soil quantity to be excavated.

Table 4-1 summarizes potential re-use options for each material group expected to be found within the project alignment. Table 4-2 presents the estimated quantity of each material group (as

TABLE 4-1

POTENTIAL DISPOSAL OPTIONS FOR CA/T EXCAVATED MATERIALS

<u>MATERIAL</u>	<u>DISPOSAL/REUSE OPTION</u>
Wood	Compost, burn, wood chips
Brick	Re-use (donate); crush and use in backfill
Concrete	Crush for aggregate or backfill, roadway base, or subbase
Asphalt	Recycle, crush and use as base course or improved subbase
Leather	Incinerate or landfill
Glass/Ceramic	Crush and use in backfill, recycle
Coal/Cinders/Ash	Incinerate separable quantities of coal, landfill remainder
Organic Native Soils	Compost, or landfill
Metals	Scrap and recycle

NOTE: Available disposal options may be limited by potential soil contamination within the project alignment

TABLE 4-2

SUITABILITY OF CAYT EXCAVATED MATERIALS FOR BACKFILL

EXCAVATED * MATERIAL TYPE	QUANTITY *	WHERE * LOCATED	OPTIMUM DISPOSAL/REUSE	EXPECTED DISPOSAL	SUITABILITY AS FOUNDATION SOIL (STRUCTURAL FILL)	SUITABILITY AS ROAD EMBANKMENT OR BASE	SUITABILITY AS GENERAL BACKFILL
FILL- including sand and gravel; demolition materials; abandoned timber piers; refuse; coal & cinder-ash	6.5 MCY 41% Sand & Gravel: 2.7 MCY 7% Wood: 0.46 MCY 8% Coal: 0.5 MCY 19% Cinder-Ash: 1.2 MCY 8% Brick: 0.5 MCY 3% Ceramic: 0.2 MCY 3% Glass: 0.2 MCY 5% Concrete: 0.3 MCY 3% Asphalt: 0.2 MCY 3% Leather: 0.2 MCY	1.6 MCY- E. Boston 84000 CY- Charlestown 1.06 MCY- CA/Nor. 0.8 MCY- CA/Sou. 2.1 MCY- Interchange 1.65 MCY- S. Bost.	LANDFILL large pieces of wood should be incinerated. Documents state that 90% of wood removable. Would reduce excess fill quantity 7% Recoverable concrete and brick from foundations, and pavements should be crushed and reprocessed as raw materials or general fill.	LANDFILL	UNSUITABLE Some zones, part in E. Bost. may be fairly clean sand & gravel. This may be used but probably won't be evident until excavation proceedes. Quantity which may suit a structural fill would be very limited- not more than 1% of the total excavation.	UNSUITABLE Fill in E. Bost. likely to be suitable as embankment fill below frost depth. Must avoid use of compressible and frost susceptible soils Sorted sand and gravel may be suitable as road embankment; Quantity is indeterminant from available data.	POOR TO FAIR Represents current use Fair if wood, combustibles degradables & elasto-plastic elements removed. Remaining brittle elements/glass composites, ceramics are crushed fine. Elements must be blended to uniform consistency. May require mixing virgin soil materials to establish acceptable gradation. Will require an area for stockpiling, sorting, and batching. May be used above tunnel structures if air rights surface areas are restricted to passive uses.
NATIVE-MIXED Naturally occurring soils (organic silt, peat, outwash, alluvium clay & glacial till) which are either fouled by fill solids or will be virtually inseparable from fill due to proposed excavation methods	1.15 MCY Equals 25% of total native soils expected to be encountered		LANDFILL	LANDFILL	UNSUITABLE	UNSUITABLE	UNSUITABLE TO POOR May be very difficult to sort mixed landfill elements Difficult to process.
NATIVE-CLEAN Remaining native soils expected to be encountered	3.45 MCY Equals 75% of the total Native soils to be encountered	.6 MCY E.Bos .45 MCY CA-N .95 MCY CA-S .22 MCY I-90 1.2 MCY S.Bos	LANDFILL CAPPING OR LINER	LANDFILL CAPPING OR LINER	UNSUITABLE Difficult to handle	UNSUITABLE Frost susceptible possibly expensive Will consolidate after placement.	POOR TO FAIR Difficult to place Thick deposit would be subject to considerable settlement (likely differential)
ROCK	0.34 MCY	Mostly from Harbor Tunnel	Reuse as trap rock	Reuse in rock dike	Good if processed and unweathered	Good if processed	Wasteful

* As reported in MDPW SEIS/R

reported by the MDPW) and their suitability for various re-use or disposal options.

Most of the information related to the character of the soils to be excavated has been obtained from the Soils Characterization Report, prepared for the MDPW by Jason M. Cortell Associates. Cortell made approximately 130 borings within the project alignment. The borings extended through the fill and into the native soils. Samples removed from each boring were batched to create a bulk sample representative of the soil column for each material at each boring location. Testing was performed on the bulk samples to evaluate the physical and chemical qualities of these materials.

The fill consists primarily of fine to coarse sand with little gravel and a trace of silt. Also detected within the fill was wood, concrete, brick, asphalt, glass, coal and cinder, leather and other refuse and demolition debris. The soil portion of the fill is estimated to represent 41% of the total volume. The percentages and quantities of the other fill constituents as estimated by the MDPW are presented in Table 4-2.

It should be noted that the boring locations were not selected at random. Borings were taken at sites that were currently or formerly developed, especially by industry. Project-wide quantity estimates made based upon the findings at these selected locations are rough approximations. Additional soils testing would be needed to confirm these estimated percentages.

Sieve analyses were performed on bulk samples of the fill from each of 43 different borings. The report does not state whether the bulk samples for testing contained appreciable quantities of non-soil elements. The sieve analyses show that the fill materials sampled had relatively low quantities of fines, with a maximum size of between $\frac{1}{4}$ -inch and $1\frac{1}{4}$ inches (typically $\frac{3}{4}$ -inch). On average, the percent finer than the number 200 sieve (fines) was 3.5% by weight. Of these 43 sieve tests, only two samples possessed fines in excess of 10%, the maximum being 15.6%.

4.2.2. Suitability for Re-use

Assuming these materials were relatively clear of degradable or combustible elements, the sieve data suggests that the material could qualify as "Ordinary Borrow" per Section M1.01.0 of the Massachusetts Department of Public Works Standard Specifications for Highways and Bridges, 1988. As ordinary borrow, it would be suitable for use in road embankments below frost depth. If the soils contain minimal amounts of organic soil, they should be suitable as general fill or backfill.

Chapter 4 of the SEIS/R states that "Most of the material... cannot be used for backfill because it lacks the necessary engineering

characteristics required to stabilize the backfilled structures." In fact, backfill above buried structures would have little if any impact upon the stability of the structures. Thus, use of the area above the tunnels as an urban park would not impose very stringent physical requirements or restrictions on fill usage. Based upon the grain-size distributions presented in the soils report, the fill material should not be subject to significant long-term consolidation which prevent passive uses. In fact, the area would require a roughly similar level of compaction and consolidation as that which is presently proposed to prepare Spectacle Island as a park. However, roadways or utility beds constructed in these materials would require clean granular material within the frost and bedding zones.

Structural fill placed below or along side of buried structures will have a substantial impact upon the stability of the structure. We concur that the excavated materials, by themselves, would not be suitable for reuse as structural backfill in these areas. We also concur with the MDPW that these materials would not be suitable, by themselves, for support of "air rights" structures above buried structures. Additional structural support (e.g. beams, piles, or columns) would be necessary to provide suitable foundations for buildings directly above the tunnels; these supports could be tied directly into the support structures for the tunnels. Because the decision for ultimate re-use of above-ground areas within the project alignment has not been made, final structural requirements are unknown.

The SEIS/R indicates that some of the fill constituents are actually the remains of building foundations or marine wharves which were abandoned or demolished and buried in place. The document indicates that most of the wood which will be encountered is either piles or intact logs, and that approximately 90% of the wood is rather easily separable from the fill. The SEIS/R also states that the MDPW plans to "process and reuse" excavated raw materials including brick, concrete, asphalt and "high quality granular materials." However, none of these quantities are reflected in the Proposed Action for landfilling at Spectacle Island.

Of the 7.27 mcy of excavated materials destined for Spectacle Island under the Proposed Action, approximately 1.2 mcy may be separable wood, brick, concrete, asphalt, and "high quality" granular materials. This figure is based on the stated MDPW 90% recoverability of wood and 100,000 cubic yards of clean granular fill located at Bird Island Flats, plus an estimated 75% of the brick, concrete and asphalt quantities. The quantity of recoverable granular soils could exceed the 100,000 cubic yards included above, as this quantity estimate appears to have been based upon the results of limited sampling.

The results of the borings indicate that the excavated material

from certain zones within the project alignment may be too contaminated with degradable or combustible materials to be sorted. This is particularly true along the proposed Seaport Access Road at the South Boston toll plaza and tunnel portal, and at the I-90/I-93 interchange. These zones have particularly high concentration of coal, cinders and ash which would be very difficult to separate.

The MDPW's assertion that the quantity of unsuitable, mixed-native soils will equal 25% (or 1.2 mcy) of the total native soil excavation cannot be evaluated, given present information. While mixing has undoubtedly occurred within the soft organic soils and harbor sediments, quantification is difficult. It is likely, however, that the only fill elements which would have penetrated deeply into the native soils (more than 3 feet) would be the more massive and easily-recovered items such as wood piles, concrete or brick. Therefore, the quantity of native soils which may be suitable for uses such as for capping of landfills could be increased slightly above current estimates. The very wet, soft organic soils and peat, whether or not they are mixed with fill elements, would clearly not be suitable backfill or capping materials. Thus, the MDPW's estimate, though conservative, may be reasonable (from the standpoint of construction planning) for assessing potential project impacts.

The remaining portion of the 9.3 mcy of material destined for Spectacle Island under the Proposed Action includes approximately 1 million cy of dredged material which cannot be dumped at the Massachusetts Bay Disposal site, 800,000 cubic yards of suitable capping materials and 200,000 cubic yards of rock to be incorporated into a shore protection dike. If additional material can be sorted and separated for re-use as shown in Table 4-2, the quantities for disposal, capping and dike construction at the island can also be reduced somewhat.

4.2.3. Handling of Excavated Materials

Assuming that approximately 1.2 mcy (16%) of the excavated materials may potentially be separated and reused, and an undetermined quantity may be used as general fill or be disposed away from Spectacle Island, there remain several issues which must be considered. These include excavation methods, transport, sorting, and stockpiling.

On page 4-24 of Chapter 4 of the SEIS/R, the MDPW indicates that the materials cannot be easily separated:

"During the excavation process, substantial mixing of material from the different geological strata is unavoidable because of the construction methods. The excavation support systems will consist primarily of struts that extend across the excavation to support the exterior walls. The use of these

struts will dictate methods of excavation that will cause more mixing of the soil strata than would occur if a tieback system were used to support the sidewalls. Unfortunately, a tieback system will not be possible for most excavations because of the character of soil strata and/or the close proximity of adjacent properties."

This statement is an example of where a conservative, though common, scenario is used to make a projectwide generalization. In fact, it seems likely that tieback systems could and will be used on some portions of the project including East Boston and at the I-90/I-93 Interchange.

The MDPW further states that the upper 10 to 15 feet of the excavated materials will be removed by backhoe and dumped directly into trucks. The backhoe is expected to cause substantial mixing of the soils. While there is no doubt that portions of the work will be excavated in this manner, backhoes may not be effective in excavating areas which are characterized by bulky debris. It is more than likely that large bucket front end loaders would be used to the maximum practical extent, and that crane-mounted clamshells will be used where bulky items must be picked from above the excavation.

An alternative method of excavation could also be used. The contractor would begin the excavation by "stripping," using bulldozers, loaders, or scrapers. The excavation would proceed as deeply as possible with this type of equipment before the first level of struts are constructed. For a relatively narrow excavation of 30 feet or less, stripping might continue to a depth of four or five feet. This which would permit relatively clean removal of pavements and base materials. For wider excavations, deeper stripping may be possible after subsurface utilities are relocated. As proposed by the MDPW, trapezoidal trenches at the bottom of relatively deep and wide excavations may allow access to the lower depths by track-mounted equipment. If stripping methods are utilized to the greatest practical extent, mixing of the general fill soils and the native soils caused by excavation methods should only result at the interface between these strata or where piles and concrete foundations must be removed from native soils.

Perhaps the most significant concern for re-use of project materials involves the logistics of transporting, sorting and stockpiling excavated soils, due to the lack of available land area and increased labor requirements. If rough sorting of reusable elements from excavated materials at the project sites is required, several trucks will need to stand by the excavation site to receive the separated materials. These trucks must be available to go directly to processing or stockpiling sites with the sorted materials. Additional laborers and equipment would be needed at these sites.

Rail transport is one possible option for removal of excavated material. The MDPW has stated that some portion of the borrow materials which they expect to use for backfill will be transported to the project area by rail. Although excavated materials could also be transported by rail away from the project site, this may slow the rate of construction progress and add a significant cost. There will clearly be some lag time between peak excavation and backfilling activities, requiring either (1) interim storage and cleaning of railcars; or (2) excess railcar storage capacity. It may also be difficult to locate project borrow locations that have the capacity (at least 25-30 acres) to accept, stockpile and process excavated materials over possibly 2-3 years.

Transport of excess excavated materials by rail to other project designated disposal locations (e.g. Rowe Quarry or Weston Quarry) is also potentially feasible, but would also require additional railcars, handling equipment and personnel at disposal site. Portions of the site which are lined, but not yet filled would likely be needed for storage and processing of materials. This option could, however, reduce truck traffic impacts for disposal sites.

For processing, areas would be required for dumping incoming materials, separating rough sorted materials into like piles for processing, and for storing processed materials. It may also be necessary to perform some very fine storing of like materials such as creosoted and uncreosoted wood, or different brick composites. While some initial processing is possible within the project alignment (to remove large elements such as timber and pavement/concrete rubble), any additional screening and processing facilities would be more feasible at off-site areas.

In conclusion, logistical and handling difficulties may be a greater obstacle to re-use of the excavated material than the physical suitability of the materials for backfill or other uses.

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APPENDIX A

ALTERNATIVE SITE SCREENING ANALYSIS

APPENDIX A

ALTERNATIVE SITE SCREENING PROCESS

As discussed in Section 3.2, a systematic screening analysis was conducted in several phases to identify potential materials disposal sites. The first phase involved review of SEIS/R finalist sites. Of the 4 upland sites considered, two sites, (Rowe Quarry and Bates Quarry) were considered potentially feasible, based upon review of available information and results of field visits.

The second phase involved a summary level review of the MDPW/MWRA database files to identify other suitable sites which had not been screened out of the SEIS/R. The attached Table A-1, which was provided by MDPW to the interagency working group in Spring, 1990, was reviewed to identify potentially feasible sites. The criteria which we used to select the most promising sites (which could be analyzed in the time available) were size, proximity to the project site, and amount of upland acreage (as documented by MDPW). This process identified 17 sites which appeared to warrant further detailed investigation.

The third phase involved a detailed evaluation and review of the MDPW/MWRA site data files in order to gather specific background information on the 17 selected sites. Following this review, 7 sites were subjectively selected for more rigorous analysis, based upon a number of factors, including capacity, present land use, wetland type and acreage on site, access, and surrounding development. These 7 sites were visited by a team of M&E planners and biologists. One site, Framingham-13, was retained for consideration as a result of this more detailed analysis. The results of this initial screening, and reasons for our initial and final recommendations on all 17 sites are summarized in Table A-2 (attached).

The final phase involved (1) detailed review and field visits of some additional sites (outside the MWRA service area) identified by the Army Corps of Engineers; and (2) evaluation of these new sites (not considered by MDPW) in accordance with the Massachusetts Department of Environmental Protection (DEP) Solid Waste Landfill siting criteria (as stated in 310 CMR Part 16). A summary of the results of this review is provided in Table A-3 (attached).

TABLE A-1
INTERAGENCY WORKING GROUP SITE LIST

Ed. H. ... Bpb
 Jett ... BSC
 ED ... EPA
 ... EPA
 ... Corps

Site	Location	USGS Quad	ACREAGE		Maximum Fill	PRACTICABILITY CRITERIA			Site Rating	Remarks
			Tot. Water	Total Resources		Capacity	Costs/ Avail.	Avail. Logistics Tech.		
						Not (mil CY's)				
BED-08	BillERICA	96	18	78	2.300	X			o	VA Hosp, sewage disposal plant, Sprgs Brk Pk.
BED-09	BillERICA	124	26	98	3.200					
BRN-04	Blue Hills	20	18	2	0.000					
BRN-05	Blue Hills	26	0	26	0.339	X			o	Drive-in theatre; buildings ...
BRN-09	Blue Hills	22	10	12	0.028	X			o	90% of site occupied by res'l development
BRN-12	Blue Hills	206	10	196	8.900					
BRN-14	Blue Hills	198	157	39	0.768					
CAN-03	Blue Hills	24	11	13	0.040					
CAN-04	Blue Hills	12	0	12	0.028	X			o	Now office buildings occupy site
CAN-08	Blue Hills	38	35	1	0.000					
CAN-09	Blue Hills	53	18	35	0.620					
CAN-12	Blue Hills	124	0	124	4.700					
CAN-13	Blue Hills	188	60	128	4.900				X	
CAN-14	Blue Hills	79	21	58	1.149					
CAN-16	Blue Hills	188	1	185	8.000	X			o	state hospital school
CAN-17	Blue Hills	445	381	64	1.170				X	
CAN-20	Blue Hills	213	15	198	8.900	X			o	Ponkapog Golf course
ILB-01	Blue Hills	8	0	8	0.000		X			Site dimensions are below the minimum required.
ILB-02	Blue Hills	14	0	14	0.050		X			Site dimensions are below the minimum required.
ILB-03	Blue Hills	11	0	11	0.018	X			o	Occupied by now commercial/industrial bldgs.
ILB-04	Blue Hills	34	5	29	0.427	X			o	Site occupied by res'l development
ILB-05	Blue Hills	17	6	11	0.018		X			Site dimensions are below the minimum required.
ILB-07	Blue Hills	23	13	10	0.009				X	
ILB-08	Blue Hills	28	0	26	0.339	X			o	Occupied by hsg, rec. facilities of JFK School
ILB-09	Blue Hills	50	11	39	0.758				X	
ILB-10	Blue Hills	105	7	98	3.150				X	
MIL-01	Blue Hills	449	42	407	21.000	X			o	Town conservation area; res'l abuts; used for rec.
MIL-02	Blue Hills	306	19	287	14.000				X	
MIL-03	Blue Hills	4200	641	3559	205.000	X			o	Blue Hills Reservation; 13 historic sites
NAT-02	Blue Hills	31		31	0.490				X	
QUI-00	Blue Hills	148	5	143	6.000				X	
QUI-08	Blue Hills	523		523	27.900	X		X		Hazardous waste site; active parkland

Site elim
per Corps
meeting

MIDH XAT

Site	Location	USGS Quad	ACREAGE		Maximum Fill	PRACTICABILITY CRITERIA			Site effm per Corps meeting	Remarks
			Total	Water Resources		Costs/ Avail. Logistics	Avail. Tech.	Retained		
					Net (mil CY's)					
RAN-01	Blue Hills	26	0	26	0.340				X	
RAN-02	Blue Hills	66	15	51	1.160				X	
RAN-03	Blue Hills	62	46	16	0.080				X	
STO-03	Blue Hills	48	14	34	0.585				X	
STO-04	Blue Hills	114	11	103	3.200					
STO-05	Blue Hills	382	33	349	17.800					
STO-06	Blue Hills	187	38	149	6.200				X	
BOS-07	Boston North	6	0	6	0.000	X			o	Occupied by industrial use
BOS-09	Boston North	8	0	8	< 0.005	X			o	Occupied by industrial use
BOS-10	Boston North	18	0	18	0.122	X			o	Occupied by commercial and industrial uses
CHA-01	Boston North	9	0	9	<.005	X				Site dimensions are below min req'd; Site NA <i>possible example</i>
CHA-02	Boston North	4	0	4	0.000	X				Site dimensions and small size
CHA-03	Boston North	18	0	18	0.122	X			o	Occupied by commercial and industrial uses
CHA-05	Boston North	8	0	8	<.005					
CHA-06	Boston North	18	0	18	0.122	X				Site dimensions and small size <i>possible example</i>
CHA-07	Boston North	12	0	12	0.028	X			o	Occupied by industrial uses
CHA-08	Boston North	10	0	10	0.009	X			o	Site is occupied by Ryan's Playground
CHA-09	Boston North	53	0	53	1.128	X			o	Charlestown Navy Yd, hist sites, comm/res'l uses
CHA-10	Boston North	5	0	5	0.000	X			o	Occupied by industrial use
CIE-04	Boston North	4	0	4	0.000	X				Site dimensions and small size <i>TANKS - (possible example)</i>
CIE-05	Boston North	4	0	4	0.000	X			o	Occupied by industrial use
CIE-06	Boston North	8	0	8	0.000	X			o	Occupied by oil tanks
CIE-08	Boston North	18	0	18	0.122	X				Site dimensions and small size
CIE-09	Boston North	5	0	5	0.000	X				Site dimensions and small size
CIE-10	Boston North	8	0	8	<.005	X				Site dimensions and small size
CIE-12	Boston North	11	0	11	0.018	X			o	Occupied by res'l uses
CIE-13	Boston North	14	0	14	0.053	X				Site dimensions and small size
CIE-14	Boston North	91	0	91	2.288	X			o	US Naval Hospital
EVR-01	Boston North	10	0	10	0.009	X			o	Completely occupied by industrial uses
EVR-04	Boston North	23	0	20	0.165	X			o	Partially occupied by ind. uses; rest is wetlands
EVR-05	Boston North	20	0	29	0.427		X			Hazardous waste site <i>contains Edison which is o. site</i>
EVR-06	Boston North	19	0	19	0.143	X			o	Boston Edison power plant; playground

Site	Location	USGS Quad	ACREAGE		Maximum Fill Capacity Not (mil CY's)	PRACTICABILITY CRITERIA				Site clim per Corps meeting	Remarks
			Total	Water Resources		Costs/ Avail.	Logistics	Tech.	Retained		
EVR-07	Boston North	28	0	28	0.397	X				0	Occupied by Industrial uses
WAL-01	Boston North	47		47	1.050				X		
MED-01	Boston North	21	0	21	0.191		X				Small size
MED-03	Boston North	31	30	1	0.000	X				0	comm, res'l, industrial uses; 75% wetlands
MED-07	Boston North	3158	902	2257	129.000	X				0	Mid'sex Falls Reservation; pk/water supply; 3 hist
MEL-04	Boston North	169	12	157	6.500	X				0	Mt. Hood Memorial Park; golf course
MEL-05	Boston North	65	12	53	1.128	X				0	Pine Barks Park
MEL-06	Boston North	98	9	89	2.790	X				0	golf course/country club and res'l development
MEL-07	Boston North	48	3	45	0.900	X				0	Park and pond
REV-01	Boston North	10	4	6	0.000						
REV-02	Boston North	15	3	12	0.020	X				0	Commercial development
REV-04	Boston North	10	0	10	9.000	X				0	Commercial development
REV-05	Boston North	145	145	0	0.000						
SOM-01	Boston North	8	0	8	< 0.005	X				0	Commercial development
SOM-02	Boston North	109	0	109	3.800	X				0	Mystic R. Reservation; rec uses; Hornet Stadium
STN-01	Boston North	82	0	82	2.480	X				0	golf course/residential development
STN-02	Boston North	35	0	35	0.620	X				0	Bear Hill Golf Course
WAK-03	Boston North	598	78	520	27.700	X				0	Breakheart Res;rec and conservation land;power lines
BOS-04	Boston South	8	0	8	< 0.005	X				0	Occupied by Industrial uses
BOS-08	Boston South	5	0	5	0.000	X				0	Site is a pier.
BOS-08	Boston South	8	0	8	< 0.005	X				0	Occupied by Industrial use/Boston Edison
BOS-11	Boston South	10	0	10	0.009	X				0	VA Hospital on site
BOS-12	Boston South	12	0	12	0.028	X				0	Site occupied by Industrial uses
BOS-13	Boston South	22	0	22	0.230				X		
BOS-15	Boston South	16	0	16	0.084		X				Site dimensions are below the minimum required.
BOS-18	Boston South	19	0	19	0.143	X				0	Waterfront site; piers
BOS-17	Boston South	24	0	24	0.280	X				0	Occupied:EDIC, ind. and comm. uses; waterfront site
BOS-18	Boston South	17	0	17	0.100	X				0	Waterfront site; Pan Pier
BOS-19	Boston South	19	0	19	0.143				X		
BOS-20	Boston South	68	28	40	0.780	X				0	Back Bay Fens Park
BOS-21	Boston South	150	10	140	5.900				X		
BOS-22	Boston South	268	14	254	12.000	X				0	Franklin Pk;abuts Shattuck State Hosp,golf, rec area

Site	Location	USGS Quad	ACREAGE		Maximum Fill	FRACTICABILITY CRITERIA				Site elim per Corps	Remarks	
			Tot. Water	Resources		Capacity	Avail	Costs/Avail.	Logistics Tech			Silo Retained
BOS-23	Boston South	50	0	50	1 160					X		
BOS-28	Boston South	143	61	82	2.248	X					o	Actively used for education and recreation
BOS-29	Boston South	10	0	10	0.009		X					Site dimensions and small size
BOS-30	Boston South	13	0	13	0.040		X					Site dimensions and small size
BOS-31	Boston South	105	0	105	3 100	X						Not available; Conley Terminal <i>transp. development MPA</i>
BOS-32	Boston South	32	0	32	0.520							
QUI-03	Boston South	44	21	23	0.250							
HLB-12	Brockton	139	79	60	1.550					X		
STO-07	Brockton	204	37	167	7.000	X					o	Town conservation area; res'l abuts; used for rec.
BED-06	Concord	53	27	26	0.339					X		
BED-10	Concord	183	35	148	8.100							
BED-11	Concord	609	40	569	30.540	X					o	Air Force Base
HLL-01	Concord	212	10	202	9.000					X		
LEX-01	Concord	27	8	19	0.140							
LEX-02	Concord	76	42	34	0.571							
LEX-07	Concord	98	8	90	2.800	X					o	Pine Meadows Country Club and golf course
LEX-08	Concord	50	9	42	0.840	X					o	Commercial uses on site <i>st-nest will (Luh. nfo)</i>
LEX-09	Concord	32	0	32	0.520	X					o	Occupied by park, historic area
LEX-10	Concord	64		64	1.700	X					o	large bldg. in center of site used as a retreat
STO-08	Concord	34		34	0.585					X		
ASH-01	Framingham	8	0	8	0.000	X					o	Occupied by active recreation uses
ASH-02	Framingham	22	21	0	0.000	X					o	Occupied by Sudbury River
ASH-04	Framingham	23	0	23	0.260	X						Some residential development on site; small size
ASH-05	Framingham	35	1	34	0.587					X		
ASH-06	Framingham	30	20	10	0.009		X					Site dimensions are below the minimum required. <i>next to 1004</i>
ASH-09	Framingham	80	0	80	2.390	X					o	80% is reservoir; rest surrounds Ashland Res. No. 2
ASH-10	Framingham	65	1	65	1 700							
ASH-13	Framingham	22	19	3	0.000							
ASH-18	Framingham	130	10	120	4 600			X			o	NYANZA Superfund site
ASH-20	Framingham	187	8	179	8 000					X		
BEL-07	Framingham	108	2	106	3.200	X					o	Belmont Country Club and golf course
FRA-01	Framingham	941	894	47	1.050	X					o	Cochituate State Pk; Lake, MHC reservoir; 7 hist sites

Site	Location	USGS Quad	ACREAGE		Maximum Fill Capacity Net (mil CY's)	PRACTICABILITY CRITERIA			Site elim por Corps meeting	Remarks
			Tot. Water Total Resources			Costs/ Avail. Logistics	Avail. Tech.	Site Retained		
FRA-03	Framingham		14	0	14	0.053	X		o	Sudbury River; Occupied by park and playground
FRA-06	Framingham		27	1	26	0.339	X		o	Commercial use; power lines through site
FRA-07	Framingham		11	0	11	0.018	X		o	Occupied by park uses
FRA-08	Framingham		34	29	5	0.000		X		
FRA-09	Framingham		29	7	22	0.230	X		o	Industrial uses; Beaver Dam Brook; Sudbury aqueduct
FRA-11	Framingham		12	1	11	0.020	X			Site dimensions are below the minimum required.
FRA-12	Framingham		82	24	58	1.148		X		
FRA-13	Framingham		103	1	102	3.000		X		
FRA-14	Framingham		28	0	28	0.397	X		o	Framingham State College
FRA-15	Framingham		111	0	111	3.800	X		o	Framingham State Hosp.; Barter Elem. School
FRA-16	Framingham		171	5	166	7.000		X		
ASH-07	Holliston		24	0	24	0.280	X		o	Fully developed w/ht res'l and commercial uses
ASH-08	Holliston		51	3	48	1.085		X		
ASH-12	Holliston		50	4	46	1.160		X		
ASH-16	Holliston		114	4	110	3.800				
ASH-17	Holliston		425	236	189	8.500	X		o	Ashland State Park; reservoir in center of site
ASH-21	Holliston		186	74	112	3.900		X		
ASH-22	Holliston		125		125	4.800	X		o	excluding pipeline assessment
BOS-24	Hull		184	3	181	8.000	X		o	Occupied by Long Island Hospital; park uses
BOS-25	Hull		77	0	77	2.220		X		
BOS-26	Hull		179	2	177	7.500	X		o	Occupied by sewage treatment plant
BOS-27	Hull		35	8	27	0.368	X		o	Boston Harbor Islands State Park; historic site
HIN-02	Hull		14	0	14	0.053	X			Site dimensions below the minimum required.
QUI-01	Hull		6	0	6	0.000	X		o	Occupied by industrial uses
QUI-02	Hull		15	1	14	0.050	X		o	Site dimensions below the minimum required.
QUI-05	Hull		87	15	72	2.050		X		
QUI-09	Hull		50	0	50	1.160	X		o	Occupied by sewage treatment facilities
QUI-10	Hull		13	0	13	0.040	X		o	Occupied by sewage disposal plant
MEY-05	Hull		24	0	24	0.280	X		o	Wright Memorial State Park
MEY-06	Hull		26	0	26	0.338	X		o	Fully occupied with residential uses
WLP-14	Hull		616	496	120	4.600		X		
ARL-01	Lexington		27	5	22	0.230	X			Site dimensions below minimum required.

Site	Location	USGS Quad	Actual		Maximum		Practicability Criteria		Site of Interest	Site of Interest	Remarks
			Total	Water	Capacity	Net (mil CY's)	Avail	Costs/Avail			
			Resources					Logistics	Retained	per Corps	
BED-01	Lexington	9	7	2	0.000			X		0	Cost prohibitive due to small size
BEL-02	Lexington	16	9	7	< 0.015			X		0	Cost prohibitive due to small size
BEL-03	Lexington	19	6	13	0.040	X				0	Beaver Brook Reservation
BEL-04	Lexington	89	2	87	2.600	X				0	Residential uses; Belmont Hill Country Club
BEL-05	Lexington	82	33	49	1.120				X		
BEL-06	Lexington	205	8	197	8.900	X				0	McLean Hospital; water tower at center of site
BRO-02	Lexington	118	3	115	4.500	X					Brookline Golf course and Country Club
BLR-02	Lexington	65	24	41	0.825				X		
BLR-03	Lexington	259	13	246	11.900				X		
CAM-01	Lexington	41	41	0	0.825				X		
FRA-10	Lexington	37		37	0.689				X		
LEX-03	Lexington	39	9	30	0.452	X					Metropolitan State Hospital (same with site 08 (site 08))
LEX-04	Lexington	225	135	90	2.800				X		
LEX-05	Lexington	108	21	87	2.690				X		
LEX-06	Lexington	97	10	87	2.690	X				0	Town conservation area
MLT-02	Lexington	151	2	149	6.100	X					School on site. (same with site 08 (site 08))
MLT-04	Lexington	34	0	34	0.588				X		
MLT-05	Lexington	29	0	29	0.425	X				0	Mass College of Agriculture
MLT-08	Lexington	227	52	175	7.500				X		
MLT-09	Lexington	132	9	123	4.800	X				0	Storer Conservation; historic sites; abuts Waltham HS
MLT-10	Lexington	169	17	152	8.200	X				0	YMCA camp and buildings; residential development
MLT-11	Lexington	74	0	74	2.100				X		
WNC-01	Lexington	140	9	131	5.000	X				0	Winchester Country Club
WNC-02	Lexington	234	38	196	8.900				X		
WNC-03	Lexington	58	3	53	1.250				X		
WOB-04	Lexington	10	1	9	<.005			X			Site dimensions below the minimum required.
WOB-05	Lexington	29	0	29	0.425				X		
WOB-06	Lexington	37	11	26	0.338				X		
WOB-07	Lexington	9	7	2	0.000	X				0	Most of site occupied by commercial use
WOB-09	Lexington	60	22	38	0.770				X		
WOB-10	Lexington	169	23	146	5.900				X		
WOB-12	Lexington	460	213	247	11.900	X				0	Roc and conservation area; power lines

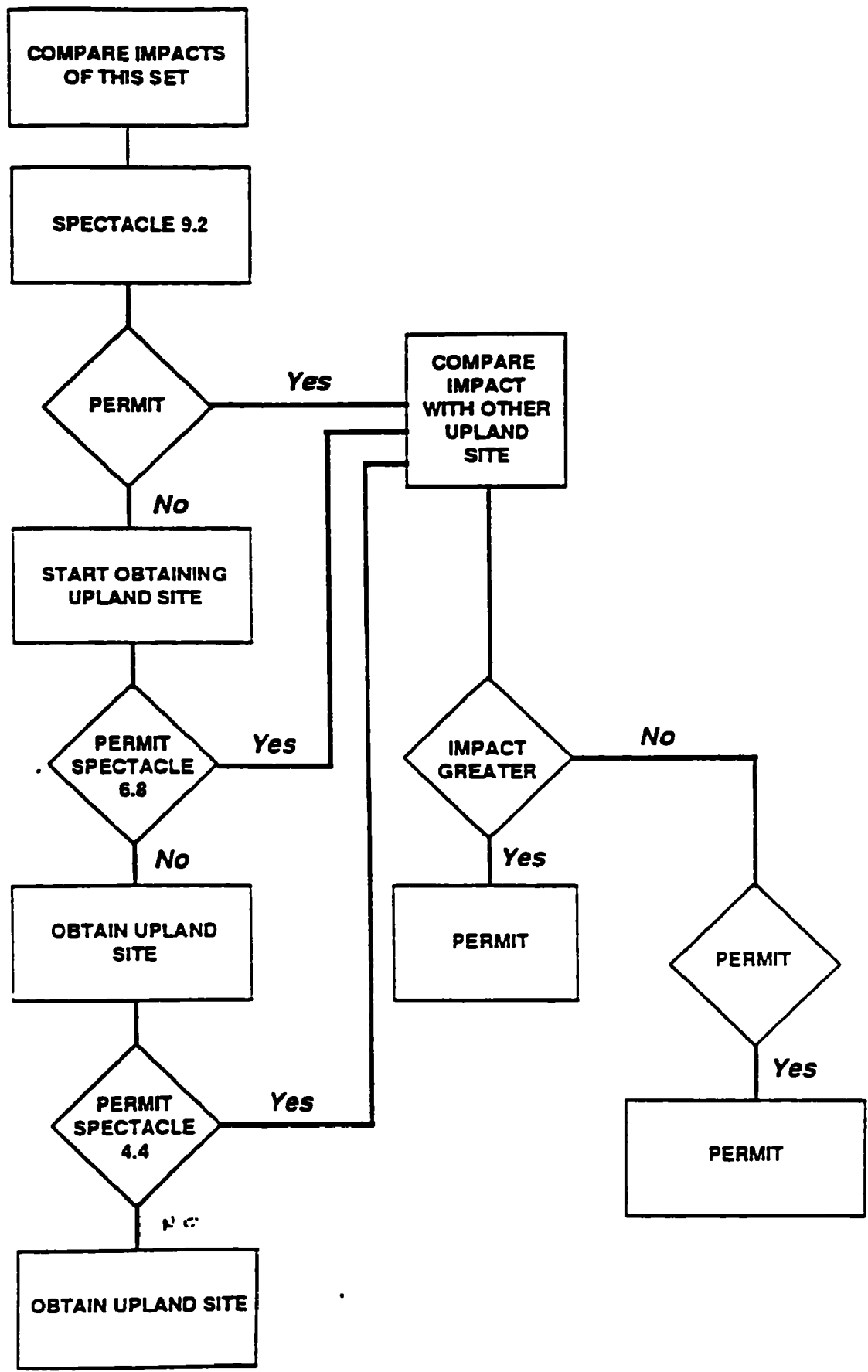
Site	Location	USGS Quad	ACTUAL		Maximum Fill	QUALIFIABILITY CRITERIA		Site Retained	Site elim per Corps meeting	Remarks
			Total	Water Resources		Capacity Not (mil CY's)	Avail. Logistics Tech			
LYN 01	Lynn		104	0	104	3 (1A)	X		0	GL manufacturing plant; rail yards
LYN 02	Lynn		87	10	77	2 240	X			MLP Municipal landfill; wastewater treatment
REV 06	Lynn		76	8	68	1 870	X			Suffolk Downs Racetrack
REV 07	Lynn		32	1	31	0 400	X		0	Wendland dog track and parking
WIN 02	Lynn		24	22	2	0 000	X		0	DEP Municipal landfill impacts - ACEC - 0000000000
WIN 03	Lynn		47	45	2	0 000	X		0	Town park with Winthrop Golf Course
MLP-09	Mansfield		84	6	78	2 300		X		
ASL-11	Marlborough		86	1	85	2 600		X		
ASL-23	Marlborough		646	270	376	19 000	X		0	Wickinton State Park; reservoir; 3 historic sites
MLP-10	Medfield		124	84	40	0 790		X		
MLP-13	Medfield		291	62	229	10 800	X		0	DEP landfill siting crit.
MLP-15	Medfield		589	64	525	28 000	X		0	DEP landfill siting crit.
NAT-01	Natick		10	0	10	0 000	X			Dimensions below min req'd; development on site
NAT-03	Natick		25	0	25	0 310	X			National Guard on site (check) - 0000000000
NAT-04	Natick		45	2	43	0 900	X		0	Army Base on site - 0000000000
NAT-05	Natick		75	2	73	2 100		X		
NAT-06	Natick		65	1	64	1 700		X		
NAT-07	Natick		224	2	223	10 500		X		
NAT-08	Natick		113	0	113	4 000		X		
NED-02	Natick		117	1	116	4 100		X		
NED-05	Natick		272	115	157	6 300		X		
NED-06	Natick		79	14	65	1 750		X		
NED-07	Natick		160	29	131	5 000		X		
NEW-03	Natick		22	0	22	0 210	X		0	Site dimensions below the minimum required
NEL-01	Natick		99	0	99	3 200		X		
NEL-02	Natick		125	22	104	3 300	X		0	Wellesley Country Club
NLT-08	Natick		163	130	33	0 540	X		0	Stony Brook Reservoir
BRO-01	Newton		65	0	65	1 175		X		
BRO-03	Newton		134	7	127	4 800	X			Brookline golf course and Country Club
BRO-04	Newton		19	0	19	0 143	X			Site dimensions below the minimum required.
NED-03	Newton		149	5	144	5 900		X		
NED-01	Newton		493	239	254	12 100	X		0	Outlot Park; borders Chas. R.; high yield aquifer

Site	Location	USGS Quad	ACQUISITION		Maximum Fill	PRACTICABILITY CRITERIA			Site eliminated per Corps meeting	Remarks
			Total Water Resources	Tot. Water		Costs/ Avail.	Avail. Logistics Tech.	Retained		
RED-03		Reading	172	38	134	5.400				
WAK-02		Reading	193	134	59	1.500				
WAK-04		Reading	128	55	73	2.050				
BRN-06		Weymouth	40	0	40	0.700				
BRN-07		Weymouth	31	5	26	0.330				
BRN-08		Weymouth	34	4	30	0.445				
BRN-10		Weymouth	46	19	27	0.380				
BRN-11		Weymouth	121	87	34	0.571				
BRN-13		Weymouth	145	58	87	2.680				
ILB-06		Weymouth	11	6	6	0.000				
ILB-11		Weymouth	108	3	105	3.300				
ILB-13		Weymouth	336	48	288	14.300				
QUI-04		Weymouth	82	4	78	2.200				
QUI-07		Weymouth	150	0	150	6.200	X		0	Massachusetts 21E site
WEY-03		Weymouth	9	3	6	0.000				
WEY-04		Weymouth	28	21	7	0.000				
WEY-07		Weymouth	32	12	20	0.175				
WEY-08		Weymouth	35	21	14	0.051				
WEY-09		Weymouth	56	9	47	1.020				
WEY-10		Weymouth	47	16	31	0.485				
WEY-11		Weymouth	41	12	29	0.420				
WEY-12		Weymouth	89	78	11	0.022				
WEY-13		Weymouth	130	28	104	3.300				
WEY-14		Weymouth	120	27	93	2.900				
WEY-15		Weymouth	1410	404	1006	56.000				
WEY-18		Weymouth	82	18	68	1.750				
WIL-07		Weymouth	152	68	84	2.580		X		
BED-05		Wilmington	21	1	20	0.170		X		
HIN-04		Wilmington	47	24	23	0.260				
RED-04		Wilmington	274	101	173	7.500		X		
WIL-03		Wilmington	13	0	13	0.040	X			
WIL-04		Wilmington	43	34	9	< .007		X		

Industrial development on site entire site

Site	Location	USGS Quad	ACREAGE		Maximum Fill	PRACTICABILITY CR			Site elim per Corps	Remarks
			Tot. Water	Resources		Capacity	Costs/	Avail.		
						Not (mil CY's)	Avail. Logistics	Tech.	Retained	
WIL-05	Wilmington	15	3	12	0.078	X				Developed industrial zone
WIL-06	Wilmington	63	14	50	1.078	X				Municipal landfill; industrial uses
WIL-08	Wilmington	79		79	2.371					
WIL-09	Wilmington	118		118	4.411					
WIL-10	Wilmington	110	6	104	3.300				X	
WIL-11	Wilmington	119	56	63	1.650				X	
WOB-08	Wilmington	132	59	73	2.050				X	
WOB-11	Wilmington	89	7	82	2.500	X				Sanitary landfill
WLP-02	Wrentham	18	8	10	0.019		X			Site dimensions below the minimum required. Pond was filled 7
WLP-06	Wrentham	17	0	17	0.100		X			Site dimensions below the minimum required. 1/2 mile development
WLP-08	Wrentham	105	9	96	3.050	X				MMRA landfill site
Cholsea Creek							X			restrict navigation
Conrail							X			excessive cost/mat ratio
Franklin Industrial Pk									X	
Hopping Brook Bus Pk.									X	
Long Island						X				LI chron. disease hosp.
Neponset Cir. Drive in									X	
Newburyport									X	
North End Park							X			Truck access thru park
Pembroke						X				site filled
Penn Stripoline									X	road access hand-up
Providence Harbor						X				local dredge
Quincy Quarries East						X				previously filled
Quincy Quarry West									X	study for development
Raynham Woods									X	
Southbay Area						X				proposed CSO facility
Squantum Point						X				park-Dorr Island Project
Thompson Island						X				chalk - with-MDC

531 DEP sites



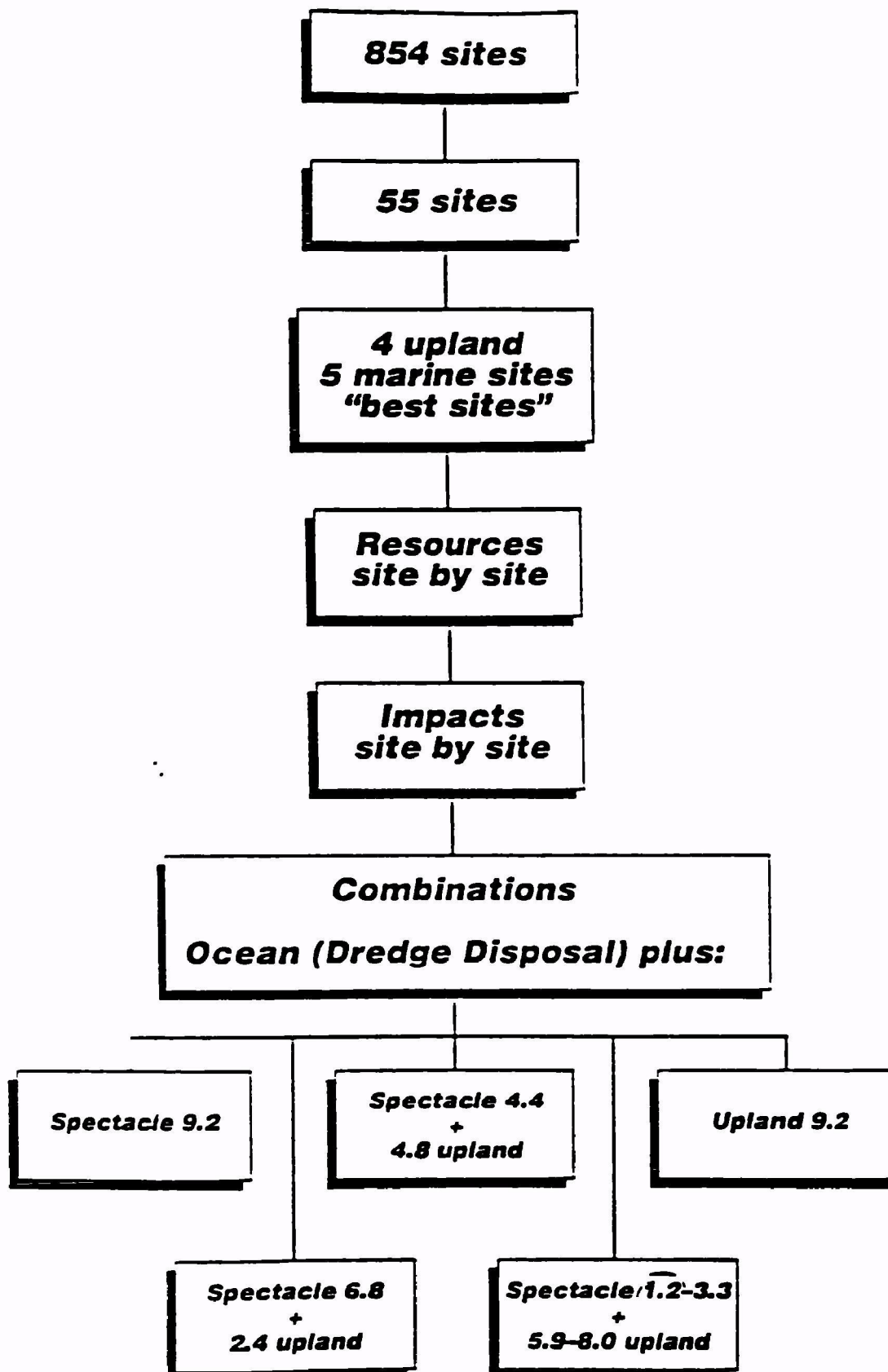


TABLE A-2
SUMMARY OF M&E ALTERNATIVE SITE SCREENING PROCESS

TABLE A-2 SUMMARY OF M&E/EPA CENTRAL ARTERY/TUNNEL MATERIALS DISPOSAL SITE SCREENING PROCESS

Site	Size (acres)	Preliminary Recommended Status (1)	Reason for Recommended Status	Field Visit Status (2)	Comments
QUI-06	148	Investigate Further	Zoned industrial; site - 80 % disturbed (Quarry); no apparent ecological or wetlands concerns.	Site dropped (Development on-site)	Parts of the may be in residential/commercial development. Some sensitive receptors in bordering areas. Both of these need to be quantified.
FRA-13	103	Investigate Further	Zoned industrial; site disturbed (gravel pits); no apparent ecological or wetlands concerns.	Site retained	Potential problems to be investigated and one potential historic site and potential groundwater concerns (high & medium yield aquifers). Conflict- ing info on whether or not public wells on site.
DED-03	149	Investigate Further	Low numbers of wetlands acres (2 streams on site however; apparently no sensitive receptors within 1 km.	Site dropped (access; res. impacts)	Site mostly forested; some new construction needs to be investigated - site is zoned residential. 2 possible historic sites. Some potential terrestrial habitat impacts.
BOS-21	150	Investigate Further	Few uplands; apparently room for development. No apparent water, cultural, or ecological concerns.	Site dropped (access; res. impacts)	Zoned residential - Dorchester Mental Health Center may occupy part of site. Bordering sensitive receptors include schools and 2 cemeteries. Portion of site may be reasonable. Probable community concerns.
NAT-07	224	Investigate Further	Very low wetland acres; no wells, aquifer low yield. Few sensitive receptors and all > 1 km.	Site dropped (access; res. impacts)	One possible historic site. Zoned residential and used primarily for agriculture (45%) - orchards. Potential terrestrial habitat impacts (50% forests). Classified prime farmland??? Poor access.
NOR-06	83	Investigate Further	No wetlands. No wells or water concerns. Few sensitive receptors and all > 2 km. No apparent ecological concerns.	Site dropped (Development on-site)	2 possible historic/arch. sites. Zoned 5% industrial and 95 % residential. Need to investigate extent of new housing being built and possible power line corridor. May be same site as MLP-09. Small size.
WES-03	126	Investigate Further	Apparently 28% forested wetlands and brook through site. Potential land use problem. Appears marginal.	Site dropped (Development; access)	New housing construction - extent unknown. Zoned 95% residential; 5% industrial. Nearby receptors and historical (14) sites.
WLT-08	227	No Further Investigation	Site 25% wetland and zoned as conservation/recreational land. Metropolitan State Hospital on portion of site. Numerous sensitive receptors nearby.		MWRA Data Sheet Compiler recommend that site be investigated further.

TABLE A-2 SUMMARY OF M&E/EPA CENTRAL ARTERY/TUNNEL MATERIALS DISPOSAL SITE SCREENING PROCESS

Site	Size (acres)	Preliminary Recommended Status (1)	Reason for Recommended Status	Field Visit Status (2)	Comments
ASH-20	187	No Further Investigation	Land use and potential ecological impacts. Fish & Game/Town forest lands.		Low wetland acreages. Worksheet compiler recommended further investigation.
WNC-02	234	No Further Investigation	Apparently extensive new residential construction. Numerous receptors in nearby areas including 2 hospitals, churches, 1 park & numerous schools; nearby historical (11) sites. Off-site T&E flora.		About 12% wetlands and 5% standing water area. Good terrestrial habitat in forested areas. Poor access. Compiler recommended further investigation.
WIL-07	152	No Further Investigation	Site nearby 50% wetlands (quality? - due to mine). On medium to high yield aquifer, but no public wells noted. 40% of off-site wells contaminated.		75% of site industrial zoned. Active mine on site. Possible power line across site.
WES-04	322	No Further Investigation	Site are one-third wetlands according to NWI maps; 60% swamp with brook through site center according to site visit notes. 50% town land. Receptors off-site include a conservation area. Poor access. Fairly pristine area - good terrestrial habitat.		Database compiler recommended further investigation.
FRA-16	171	No Further Investigation	2 surface impoundments hazardous waste sites on-site. One possible historical site. State prison on part of site; numerous other sites.		25% of site industrial zoned. Hazardous waste sites classified 2IE.
NED-07	160	No Further Investigation	1 possible historic site. Site ~20% wetlands (NWI), but 95% of the site may have hydric soils. Site apparently mostly forested and with terrestrial habitat value.		T&E flora and fauna off-site.

TABLE A-2 SUMMARY OF MSE/EPA CENTRAL ARTERY/TUNNEL MATERIALS DISPOSAL SITE SCREENING PROCESS

Site	Size (acres)	Preliminary Recommended Status (1)	Reason for Recommended Status	Field Visit Status (2)	Comments
BOS-23	50	No Further Investigation	On site hazardous waste site. Two possible historic sites. Small size. Conflicting wetland info: NWI - no wetlands; field notes - 60% swamp; notes on land use map - 90% salt wetlands.		Hazardous site classified as 21E and apparently closed site with 55 gallon drums (contents not specified).
NED-05	272	No Further Investigation	1 historic site. Site 40-50% wetlands (NWI) and potential aquatic habitat. Potential terrestrial habitat (60% forested). Poor access.		Zoned residential. One T/E spp on-site.
CAN-19	330	No Further Investigation	Site 50% wetlands (NWI); 70-90% swamp according to notes and borders Neponset River. 3 possible on-site historical resources. 90% of site in 100 year floodplain. 60% of site over high or medium yield aquifer.		Area zoned industrial. Within "Foul Meadows" - this may be a name for a wildlife area.

(1) Based on initial review of MDPV/MWRA database files at project offices.

(2) Recommendation for site following site visits and detailed investigations.

TABLE A-3
APPLICATION OF DEP SOLID WASTE LANDFILL SITING CRITERIA
TO POTENTIAL NEW SITE ALTERNATIVES

**BLE A-3 Application of DEP Solid Waste Landfill Siting
Criteria to Potential New Site Alternatives**

Affected Resource	Buffer Zone or Restriction	FRA-13	Weston Quarry	Saugus/Melrose Quarry
Sole Source Aquifer Recharge Area	Conditional Restrictions	OK	OK	OK
Private Wells	500 feet	OK	LOW(1)	OK
Height Above Groundwater	4 feet	LOW(2)	LOW(2)	LOW(2)
Occupied Residential Buildings	500 feet	MOD(3)	LOW(3)	LOW(3)
Nondrinking Water Bodies	250 feet	MOD(4)	OK	OK
Wetlands	100 feet	MOD(5)	LOW(5)	LOW(5)
Floodplains	Banned	LOW(6)	LOW(6)	OK
Zone II	Banned	OK(7)	OK	OK
Interim Wellhead Protection Area(IWPA)	Banned	OK	OK	OK
Upgradient of a Wellhead (If pending Zone II Determ.)	15,000 feet	LOW(8)	OK	OK
Potential Water Supplies	Banned	OK	OK	OK
Upgradient of a Surface Drinking Water Supply	0.5 mile	OK	MOD(9)	OK
Downgradient	500 feet	OK	OK	OK
Streams Feeding a Water Supply within 1 Mile	250 feet	OK	MOD(9)	OK
Agricultural Lands Buffer Zone	100 feet	OK	OK	OK
Area of Critical Environmental Concern	Banned	OK	OK	OK
Traffic Access	Unacceptable danger to Public Health and Safety	MOD	LOW	LOW
Wildlife/Habitat	No Adverse Implications to Species/Communities	LOW	OK	OK

NOTES ON DEP SITING CRITERIA RATINGS

Rating System

- "OK" - In full compliance with criteria.
- "LOW" - Minor impact; can be mitigated.
- "MOD" - Moderate impact; can be mitigated.
- "HIGH" - Significant impact; cannot be mitigated.

Specific Notes:

1. According to the Concord quad DEQE Water Source overlay, an unverified well exists just north of the Weston quarry site.
2. Some excavation has occurred at each of these sites. Excavations may have penetrated down to the water table or below. In such a case, a landfill would have to be constructed so that the liner/containment system were at least four feet above the groundwater.
3. There are occupied residences within 500 feet of each site. A few single family homes are adjacent to the two quarry sites, and a residential neighborhood lies south and east of the FRA-13 site. At each site, potential noise/air quality impacts could be mitigated by constructing the landfill an adequate distance from the residences.
4. The FRA-13 site borders the Sudbury River. Proper mitigation would require that a landfill be constructed at least 250 feet from this river.
5. Regulated wetlands (bordering vegetated wetlands and riverbank wetlands regulated by Mass. DEP, and palustrine forested, palustrine shrub-scrub, and riverine wetlands regulated by USACE/EPA) likely occur on the FRA-13 site adjacent to the Sudbury River. The 250 foot buffer zone required for (4) above would satisfy the buffer zone requirement for wetlands. Wetlands may exist on the two quarry sites; limited access prevented a complete view of those sites. Nonetheless, wetlands on those sites are probably man-made and/or man-altered.
6. The FRA-13 site is bordered to the north and west by the floodplain of the Sudbury River. The Weston quarry site is bordered to the west by a pond. Both sites are therefore somewhat restricted by floodplains.
7. The FRA-13 site is adjacent to, but not in, a Zone II recharge area.
8. The FRA-13 site is upgradient of four wells. Because these wells are within a Zone II area, and are apparently abandoned,

according to DEP Water Sources Overlay Maps, the site appears to currently be in compliance with the regulation. However, MWRA has expressed serious reservations about the use of the site, due to concerns for potential impacts to the wells and the Zone II recharge area.

9. The Weston quarry site is within 0.5 miles of the Stony Brook Reservoir and within 250 feet of Stony Brook. Proper mitigation would require that buffers be used to ensure that the landfill is greater than these minimum distances from water sources.