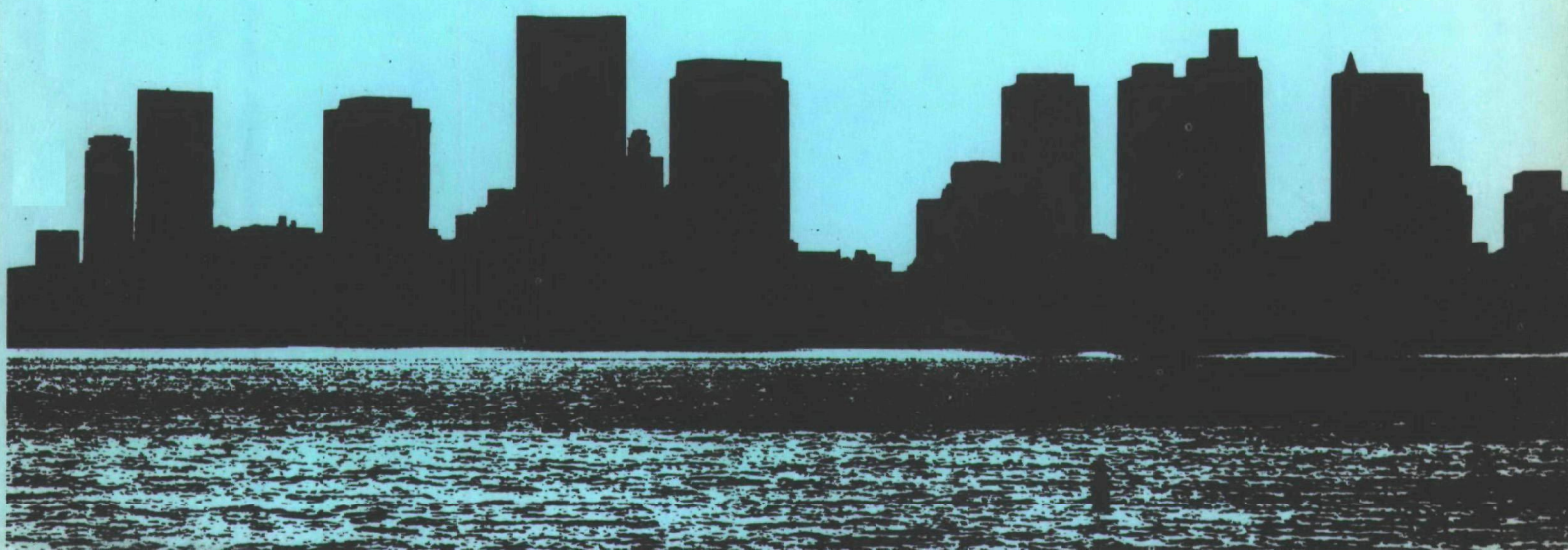
United States
Environmental Protection Agency
Region 1
JFK Federal Building
Boston, Mass. 02203

Executive Summary

Draft Supplemental Environmental Impact Statement May 1989

Long-Term Residuals Management for Metropolitan Boston



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Prepared by:

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Michael R. Deland May 19, 1989

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EXECUTIVE SUMMARY

PURPOSE AND NEED FOR ACTION

More than 70 dry tons a day of sewage sludge, generated by 43 cities and towns in the metropolitan Boston area, is currently being discharged to Boston Harbor. In the short-term this discharge results in significant degradation of the water quality and aesthetic value of the Harbor and its associated resources. Over the long-term, sludge discharges contaminate Harbor sediments and biota, resulting in environmental impacts which persist long after the actual discharge has ceased.

Over the last several years the Massachusetts Water Resources Authority (MWRA) and the U.S. Environmental Protection Agency (EPA) have taken significant steps to remedy this problem. The two agencies issued environmental documents in 1985 which recommended that a new wastewater management system be constructed for metropolitan Boston's sewage, consisting of a consolidated secondary wastewater treatment plant on Deer Island and a separate sewage sludge management system. Following this decision, MWRA and EPA issued environmental evaluations and proposals to address more specific aspects of the management system including: wastewater treatment methods; construction staging; transport of construction personnel and materials; and location and methods of effluent discharge. The MWRA also issued an environmental evaluation of its short-term (1991 to 1995) sludge management program (to treat and dispose of sludge from the existing primary wastewater treatment plants on Deer and Nut Islands).

This Draft Supplemental Environmental Impact Statement (SEIS) represents the most recent of EPA's environmental documents addressing the clean-up of Boston Harbor. This document addresses the long-term (1995-2020) treatment, transport, and disposal (collectively termed "management") of "residuals" from the new MWRA wastewater treatment system. Residuals include:

- grit - heavy particles settling from the wastewater stream;
- screenings - large objects screened from the wastewater;
- scum - floating material skimmed from the surface of the wastewater; and
- sludge - solids settling from the wastewater during treatment.

Between October 1988 and February 1989, MWRA issued the results of its own environmental review of residuals management alternatives in an eight volume Draft Environmental Impact Report and Facilities Plan (EIR/FP). This Draft SEIS is a "piggy-back" document because it makes use of the information generated by the MWRA where possible. The independent analyses and opportunities for public review provided by the MWRA's EIR/FP and this Draft SEIS offer an exhaustive review of the potential environmental impacts of residuals management alternatives, and an opportunity to tailor each document to fit the applicable regulatory requirements and responsibilities of each agency.

The purpose of this Draft SEIS is fourfold: to fulfill EPA's commitment for further environmental review as specified in EPA's 1986 Record of Decision on the siting of the new wastewater treatment plant; to assure compliance with the requirements of the National Environmental Policy Act (NEPA); to provide an independent review of the MWRA's EIR/FP; and to ensure that all aspects of the plan will result in compliance with the Federal Clean Water Act.

DEVELOPMENT AND SCREENING OF ALTERNATIVES

The EPA is required under NEPA to evaluate a reasonable range of alternatives in an EIS. Because of the great number of available residuals processing and disposal technologies and potential residuals processing or disposal sites, and the even greater number of combinations of sites and technologies, it was necessary to refine the alternatives to be evaluated in detail in the Draft SEIS. Consequently, a screening procedure was developed to use information gathered at progressive stages of the review process to analyze the potential alternatives under consideration and gradually reduce their number. This screening of alternatives was an iterative process that parallelled MWRA's screening, with EPA employing NEPA-mandated criteria to ensure that a full, reasonable range of alternatives was retained for evaluation at each stage of the process.

The goal of the screening was to maintain a reasonable number and variety of technologies, sites and site/technology combinations based on available information at each stage of the screening process. In addition, EPA tried to maintain the maximum flexibility to mix and match site/technology components into different integrated residuals management plans to facilitate comparison of a full, diverse range of such plans.

The first step in the screening process was evaluation of system alternatives, defined as combinations of residuals processing and transportation modes (see Figure 1). At this stage the screening relied primarily on costs; physical, legal, or institutional constraints; and compliance with regulatory requirements. As a result of screening, five processing technologies were dropped from further consideration: ocean disposal, direct land application of sludge, landfilling of sludge as a primary disposal method, co-combustion or co-composting of residuals with solid waste, and long-term privatization of the residuals management system. Composting, heat drying, and fluidized bed incineration of sludge, and landfilling of minor residuals (grit, screenings, and ash) were retained for more detailed analysis. It also was determined that the residuals management plan should be based on flexible use of at least two sludge processing technologies, based in part upon the recognition that although "beneficial reuse" or "recycling" technologies such as composting are desirable, they have not yet been shown to be sufficiently reliable without adequate backup.

The second screening step combined the system alternatives with site alternatives to establish a list of "candidate options", or site/technology combinations, to be considered. The site inventory under consideration included 300 potential sites, mostly within the 43 community MWRA sewer service area. The criteria used to screen the sites included their engineering and environmental suitability for the chosen technologies, site-use flexibility (including a cost component), permitability and potential site-use conflicts.

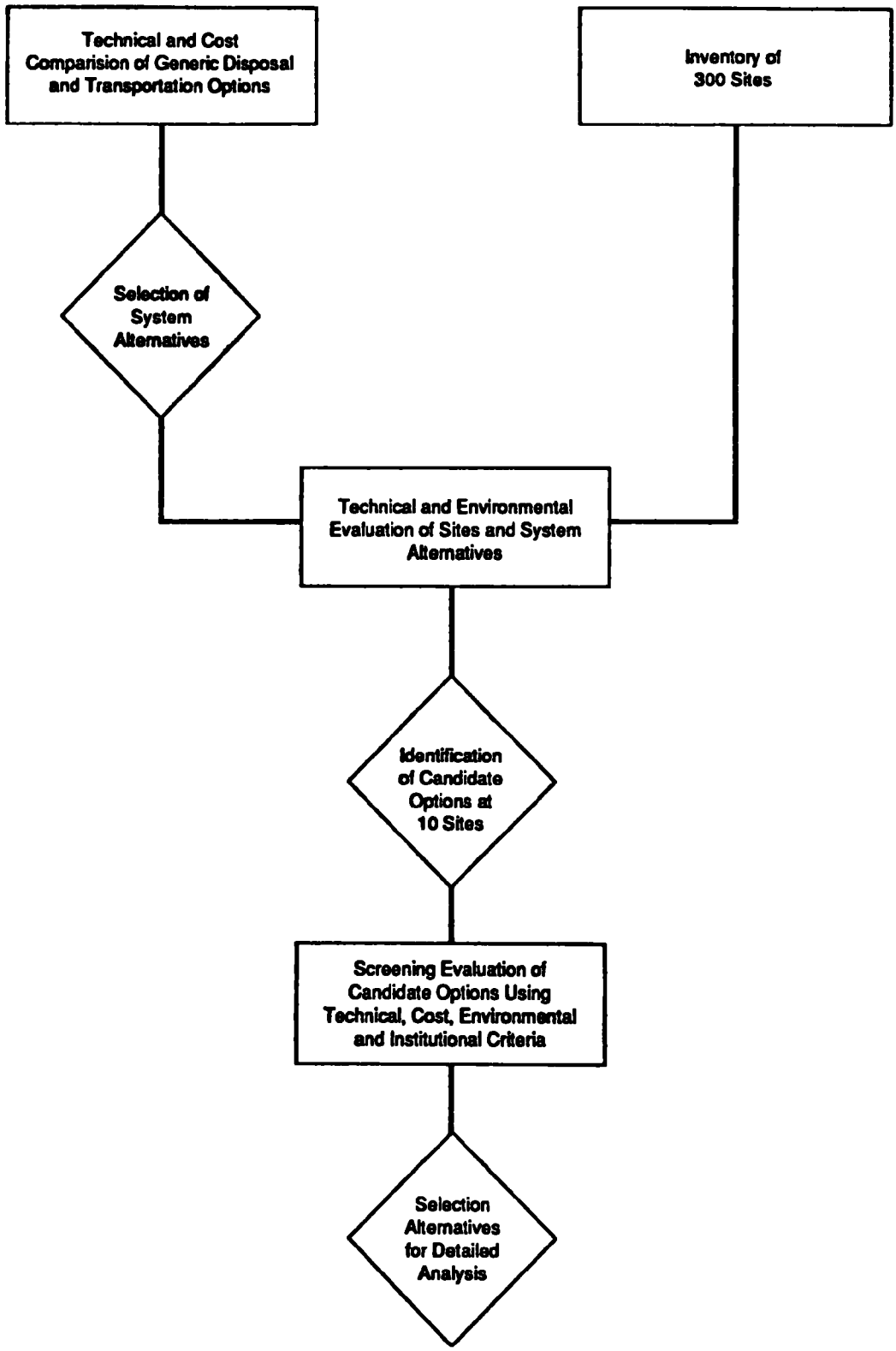


FIGURE 1. OVERALL LOGIC OF THE SEIS ALTERNATIVES SCREENING

The final screening step compared the candidate options to four categories of criteria: technical, cost, environmental, and institutional. This screening step resulted in the selection of those site/technology alternatives that were given detailed evaluation in the Draft SEIS (Table 1 and Figure 2).

TABLE 1. SITES AND POTENTIAL USES RECOMMENDED FOR DETAILED ANALYSIS IN THE SEIS

Site	Transfer	Dewater	Heat Dry	Combust	Compost	Landfill
Walpole MCI						X
Rowe Quarry						X
Stoughton			X	X	X	
Quincy FRSA	X	X	X		X	
Spectacle Isl.		X	X	X	X	
Deer Isl.*		X	X	X		

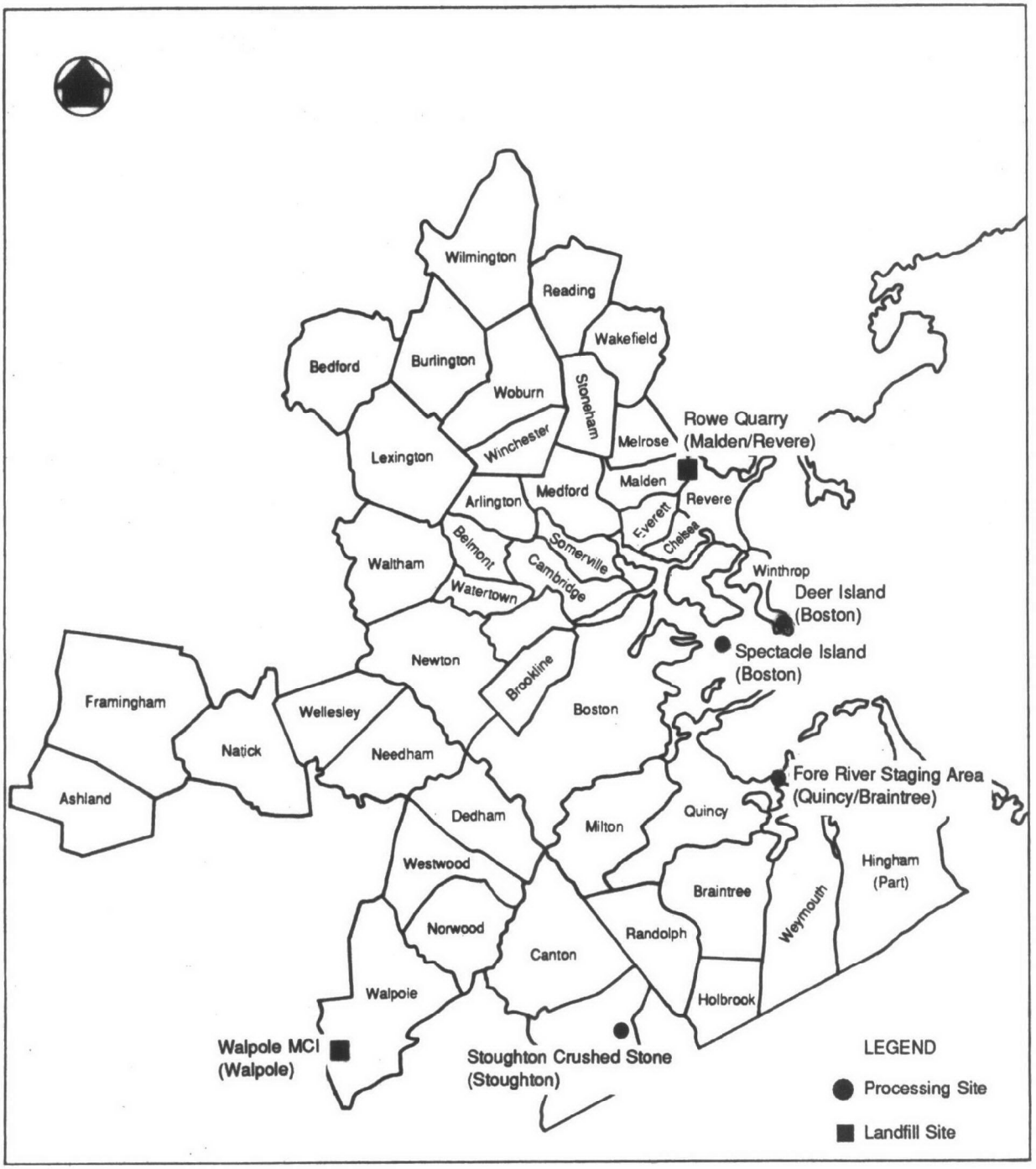
* Deer Island components carried only as secondary, or back-up options in recognition of the burden borne by the City of Winthrop as a result of the new secondary wastewater treatment facility.

DESCRIPTION OF TECHNOLOGIES

Four sludge processing and disposal technologies were retained for detailed analysis in the Draft SEIS. These are composting, heat drying and incineration of sludge, and landfilling of grit, screenings, scum, and sludge or sludge products that cannot be disposed of otherwise. Sludge digestion, thickening, and dewatering would be used in combination with all four of the major technologies.

Digestion of the combined primary and secondary sludge will occur at Deer Island using a two-stage, high-rate anaerobic digestion process. Sludge will be thickened both before and after digestion to aid in handling and treatment. Dewatering removes water from sludge to produce "sludge cake" and reduces the volume of material to be handled.

Composting is a process that results in the decomposition of organic components of sludge and in the reduction of pathogenic (viral) bacteria. The primary product of composting is a soil-like material. Compost can be used to improve the workability of soil, making it easier for plant roots to penetrate. Most compost contains only small amounts of plant nutrients and thus is not useful as a primary fertilizer. It can, however, be useful as an organic base (with fertilizer amendments), mulch, soil top



Source: MDC, 1979 and MWRA, RMFP, DEIR, 1, 2, 1989

FIGURE 2. RESIDUALS MANAGEMENT CANDIDATE OPTION SITES

dressing, or soil-like product for soil conditioning or erosion control. Compost can be marketed for sale or distribution either directly to consumers or in bulk quantity through a retailer. Once a potential user has been identified, the distance to market, transportation costs, quality of compost, and costs of competing products must be accounted for in determining market viability.

Heat drying uses an external heat source to increase the solids content of dewatered sludge cake, preparing the sludge for subsequent packaging, reuse, or incineration. Because of the high solids content of heat-dried sludge, it also makes a good fuel for an incinerator. Dried sludge is brown to olive-brown in color, and typically has an odor similar to fertilizer. An advantage of heat drying is that the sludge product retains useful nutrients and can be marketed as a fertilizer. Similar to compost, heat-dried sludge can either be sold or distributed. There are a variety of constraints on the use of such a sludge-derived product, however, from legal and institutional to environmental, health and safety, and economic.

Combustion, or incineration, is a process of burning sludge to reduce its volume by 70 percent or more. The combustion reaction chemically combines oxygen with the volatile solids in sludge, converting them to carbon dioxide and water that exit as exhaust gases. Metals present in the sludge remain through the process and exit with the exhaust ash. The heat created by the combustion process generally reduces or destroys the toxic organic chemicals and pathogens present in sludge.

Landfilling is the method selected for management of grit and screenings from the Deer Island wastewater treatment plant and remote headworks. It is also a potential method for disposal of incinerator ash, dewatered sludge cake (during emergency break-downs of the sludge processing equipment), and heat-dried pellets (if they are not marketable). The landfill would be designed with a double liner (one of synthetic material, a second of natural material). Leachate would be collected by two leachate control systems, with one above each liner. Groundwater and surface water monitoring would be conducted to ensure the integrity of the liner system. Material that is landfilled would be covered on a daily, intermediate, and final basis. Use of cover material minimizes disease-transmitting organism breeding and animal attraction, helps control water and gas movement, controls odors, and improves appearance. The operation of the landfill depends on cover to aid in compaction, decrease settling, minimize wind erosion, increase slope stability, increase crack resistance, and provide a good soil for vegetative growth after landfilling.

The between-site transportation requirements of the residuals management facilities vary depending on the type of material being transported and the site combination chosen for processing. Table 2 summarizes the transport mode options for each residual material.

RESIDUALS CHARACTERIZATION

The quantity and quality of residuals that will be generated at the MWRA's Deer Island wastewater treatment plant was projected, as was as the quantity and quality of sludge products from composting, heat drying, and combustion. These projections are summarized in Tables 3 and 4.

TABLE 2. POSSIBLE TRANSPORT MODE/RESIDUALS COMBINATIONS

Transport Mode	Residual Type: Liquid Sludge	Thickened Sludge	Dewatered Sludge	Pellets/ Compost	Minor Ash	Residuals
Truck		X	X	X	X	X
Barge	X	X	X	X	X	X
Pipeline	X	X				

Source: Adapted from MWRA, Tech., 1987

Similar projections were also made for the minor residuals components. Future characteristics of these components are not expected to differ from existing characteristics. Analysis of grit, screenings, and scum indicates that contaminant concentrations in these materials are well below the maximum allowable limits for non-hazardous waste and would therefore be suitable for landfilling.

EVALUATION OF ALTERNATIVES

The existing environmental conditions and the impacts of residuals management at each alternative site were assessed in the areas of: land use; transportation and traffic; air quality and odors; water and soils; noise; visual; aquatic and terrestrial ecosystems; public health; historic and archaeological resources; and socioeconomics. The significant findings for each site are summarized below.

Walpole MCI

No significant impacts are expected at the Walpole MCI site in the areas of air quality or odors under any operating conditions. Grit and screenings could potentially generate odors; however, they would be landfilled only in relatively small quantities. Using proper management procedures such as daily cover, grit and screenings would not generate noticeable odors or air quality concerns. The ash and heat-dried pellets would not contain volatile materials, which are generally the source of odors. Thus, if brought to the landfill, these materials are not expected to cause odors. Dried sludge cake, when landfilled, could generate odors, but these would be controlled through the use of daily cover. Therefore, air quality and odor impacts at the site would be acceptable.

Under normal operating conditions there would be no surface or groundwater impacts because all water from the landfill and associated contaminants would be contained on site. The landfill's double liner, leachate collection system, and runoff control system should prevent contaminants from reaching surface or groundwater. In the unlikely event that all of these controls fail and a leak develops in the liner system, there would be the potential for contaminants to reach adjacent groundwater

TABLE 3. SUMMARY OF PROJECTED RESIDUALS QUANTITIES

	Digested Sludge to Process (dtpd)	Volume of Product (cu yd/day)
1995		
Digested Sludge	85	504
Heat-dried Sludge[a]	57	98
Compost[b]	28	354
Ash Plus Scrubber Solids[c]	0	0
1999		
Digested Sludge	109	647
Heat-dried Sludge[a]	73	125
Compost[b]	36	455
Ash Plus Scrubber Solids[c]	109	112
2000		
Digested Sludge	165	979
Heat-dried Sludge[a]	110	189
Compost[b]	55	703
Ash Plus Scrubber Solids[c]	165	169
2020		
Digested Sludge	180	1068
Heat-dried Sludge[a]	120	206
Compost[b]	60	767
Ash Plus Scrubber Solids[c]	180	184

Notes: (a) 67 percent of digested sludge would be heat dried
(b) 33 percent of digested sludge would be composted
(c) Assumes 100 percent of digested sludge would be incinerated

TABLE 4. SUMMARY OF PROJECTED RESIDUALS POLLUTANT CONCENTRATIONS

	Digested and Heat Dried Sludge Concentration (mg/kg)	Compost Concentration (mg/kg)	Combustion Ash Concentration (mg/kg)
Antimony	27	25	63
Arsenic	11	9.9	25
Beryllium	<16	<15	<38
Boron	220	210	510
Cadmium	12 to 26	11 to 24	27 to 59
Chromium	190 to 300	180 to 284	440 to 695
Copper	910 to 1240	860 to 1172	2100 to 2862
Cyanide	190	180	440
Lead	154 to 230	140 to 209	364 to 544
Mercury	12 to 13	10.7 to 12.6	26 to 28
Molybdenum	30 to 69	28 to 64	70 to 161
Nickel	77 to 99	73 to 93	187 to 240
Selenium	74	70	170
Silver	45 to 70	42 to 65	110 to 162
Thallium	<26	<24	<60
Zinc	1895	1700	4500
PCB-1254	0.61 to 1.86	0.58 to 1.76	-

and surface waters. However, more than half of the leachate from a leaking active cell would have to reach the nearest groundwater supply wells before water quality criteria and standards for drinking water would be exceeded, and it is predicted to take over 30 years for groundwater from under the landfill to reach the wells. In order to doubly ensure that contamination of a local water supply would not occur, the EPA recommends that the MWRA install a groundwater monitoring system as mitigation. A properly designed and executed monitoring plan would detect any landfill leaks in sufficient time to remediate any groundwater contamination before significant impacts occurred, based on the calculated times that would be needed for contaminants to travel to the groundwater resources of concern.

Because no significant air or water impacts are expected, there are no pathways for public health impacts.

Noise generated by trucks and earth-moving equipment, particularly during emergency landfilling of dewatered sludge, could generate significant impacts for the closest receptors. At some receptors, including the Stop River wetlands and associated wildlife habitat, the change from a relatively quiet ambient condition creates a potentially significant impact. The EPA recommends that noise impacts be mitigated through berm construction, using excess on-site material, and the use of earth-moving equipment specially modified to reduce noise.

Also, during emergency landfilling of dewatered sludge there could be significant traffic and noise impacts at the site and along the Winter Street transportation route. Under these conditions truck traffic could more than double on local residential streets. The physical characteristics of the streets are not well suited to heavy trucks, which exacerbates the impact. EPA recommends that the impacts of trucking during this emergency situation be mitigated by splitting the truck traffic between the Pine Street and the Winter Street access routes. Adverse traffic impacts would remain but they are not expected to be significant because they are not expected to occur for periods longer than a few days. During other operating conditions the increased truck traffic is not expected to significantly impact traffic or land uses along the transportation corridor.

The Walpole MCI site is relatively isolated and generally buffered from neighboring residential areas by wooded and undeveloped land. Also, the prisons, which are among the adjacent land uses, are less susceptible to land use, visual, and socioeconomic impacts than are residential or commercial uses. Consequently, landfill development at the Walpole MCI site is not expected to generate significant adverse impacts in these areas. There are no known cultural or ecological resources on the site, so significant impacts in these areas are not expected. There is, however, the potential for archaeological remains at the site and an archaeological survey would be required before construction.

The Walpole MCI site is environmentally acceptable for a landfill, however there could be potentially significant impacts in the area of noise, traffic, and water quality. The EPA recommends that the mitigation measures discussed above be implemented to reduce the significance of such impacts.

Rowe Quarry

As at the Walpole MCI site no air quality or odor impacts would be expected for a landfill at Rowe Quarry, assuming standard landfill operating practices are used such as daily cover. Also similar to Walpole MCI, the Rowe Quarry landfill would have a double liner and leachate collection and runoff control systems, so there should be no groundwater or surface water impacts. Even if the liner system leaked, groundwater implications are not considered significant because the concentrations of contaminants would be low and the groundwater in the area is not a significant resource. A major leak in the liner system would have to occur for there to be a risk of exceedances of applicable criteria at the nearest surface water body, the adjacent Rumney Marsh, a significant ecological resource. Again, this possibility could be mitigated by the installation of a groundwater monitoring system downgradient of the landfill and a commitment to remediate any groundwater contamination caused from a landfill leak before it reached the marsh.

Because no significant air or water impacts are anticipated, there are no expected pathways for public health impacts.

Noise generated by trucks and earth-moving equipment, particularly during emergency landfilling of dewatered sludge, could generate significant impacts for the closest receptors. However, noise impacts already exist at receptors around the Rowe Quarry site from ongoing quarry operations. Noise impact could be somewhat mitigated by requiring specially modified equipment; however, other forms of mitigation are limited because material is not available on site to construct berms and because the raised nature of the receptors relative to the landfill operations would make berms less effective.

Although residences and other active land uses are close to the site and there is only minimal buffer, no significant land use, socioeconomic, or visual impacts are expected because landfill activities would not be significantly different from the current quarry operations. Similarly, although there is a nearby important ecological area (Rumney Marsh), the change in activity from quarry to landfill operation is not expected to alter any ecological resources or processes. There is the potential for significant historical resources on the Rowe Quarry site, and a survey would have to be conducted before construction to determine if the quarry or buildings are eligible for the National Register of Historic Places.

Projected traffic along the access route to Rowe Quarry generally is not excessive and the addition of residuals vehicles would not result in deteriorated service under any operating conditions. The relatively small percentage increase in trucks is not seen as significant and even this small increase would be at least partially offset by elimination of trucks associated with quarry operation if the site is converted to a landfill.

The Rowe Quarry site is environmentally acceptable for a landfill; however, there could be potentially significant impacts in the area of water quality and noise. The EPA recommends that the mitigation measures discussed above be implemented to reduce the significance of such impacts.

Stoughton

Some adverse air quality impacts could result from the incineration of residuals at Stoughton. One exceedance of DEQE Threshold Effects Exposure Limits (TELs, equivalent to maximum 24-hour Allowable Ambient Limits, or AALs) is predicted. TELs are not regulatory limits but are used as guidelines in the state permitting process, and this one exceedance is not considered by the EPA to be unacceptable because it would not result in severe environmental or public health impacts. No significant air quality impacts or AAL exceedances are predicted from any combination of heat drying and composting at the site. Composting would be the most odorous process at the site, but the distance to the nearest receptor is far enough that no odor impacts are expected.

There are predicted to be significant adverse water quality impacts from incineration at Stoughton. Dry weather deposition from incinerator emissions could result in numerous exceedances of aquatic life and human health water-quality criteria in nearby Brockton Reservoir and Glen Echo Pond. Additional deposition of contaminants during wet weather was not estimated but would increase the magnitude of the adverse impact. The predicted water quality impacts would have significant adverse effects on aquatic life in the two water bodies and could have public health impacts because Brockton Reservoir is slated to become a public water supply. The water quality and public health impacts from deposition due to heat drying and composting, however, are not predicted to be significant.

If all materials handling were conducted outdoors at the Stoughton site, there would be significant noise impacts, which in turn could potentially affect adjacent land uses. However, the noise impacts could be mitigated by confining most of the handling operations to areas shielded by noise barriers. There are also potentially significant adverse impacts from processing operations; noise from fans and blowers could be particular problems. These impacts could be mitigated by designing low noise generating mechanical systems and minimizing building openings.

Under the maximum traffic scenario (heat drying and composting), the transportation impacts would be significant because of the large number of trucks going to and from the site. This impact could be at least partially mitigated by expediting the planned reconstruction of the Route 24/Route 139/Page Street area and by upgrading and signalizing the affected Route 139 intersections. Because composting is the greatest contributor of traffic, if incineration and heat drying occur at the site (together or alone) no significant traffic impacts are predicted. With composting only at the site the number of trucks is reduced by about 30 percent from the maximum. Although this would still result in adverse traffic impacts, these impacts would be mitigated by the above Route 139 improvements.

No significant visual, land use, or socioeconomic impacts are expected from residuals processing at the Stoughton site because the industrial nature of the site and surrounding area are generally compatible with residuals processing; thus no substantial change is expected to occur as a result of developing the site for any combination of heat drying, composting, or incineration. Also, much of the operation at the site could be buffered from any sensitive visual resources.

The Stoughton site is environmentally acceptable for either heat drying or composting, alone or in combination. Incineration is not acceptable at the Stoughton site because even though state-of-the-art air pollution control equipment is proposed for the incinerator, it is not presently predicted to be sufficient to mitigate the predicted water quality impacts from an incinerator on the site. For heat drying and compost there is a potential for significant impacts in the areas of traffic and noise. The EPA recommends that the mitigation measures discussed above be implemented to reduce the significance of such impacts.

Quincy FRSA

No significant air quality impacts are expected from heat drying and composting at Quincy FRSA, either alone or in combination with impacts from other sources in the area. However, significant odor impacts could result from the composting operation, particularly because of its proximity to potential receptors. Such odor impacts can be mitigated with good engineering practices including monitoring of the scrubber to ensure control of mercaptan, the main odorous compound of concern.

No significant water quality impacts are predicted for the Quincy FRSA site either. Deposition of air pollutants would not be significant because any pollutants deposited into the Weymouth Fore River would be sufficiently flushed and diluted by the river so as not to exceed water quality criteria. Due to the absence of predicted significant air and water quality impacts, no pathways for public health impacts are predicted.

Noise impacts are expected to result from residuals processing and handling at Quincy FRSA. The noise impacts are minimal at the heat-drying and off-loading facilities because of the

distance from these facilities to receptors. Operating noise at the compost facility can generally be mitigated by designing low noise generating mechanical systems and by minimizing building openings. Materials-handling activities, particularly at the compost facility, could also be noisy. This impact could be mitigated by enclosing all loading and off-loading areas and by providing a bermed area for idling trucks that are waiting to load or off-load. Use of enclosed, insulated pipes for conveying materials would also mitigate noise impacts.

There would be increases in truck traffic resulting from residuals processing activities at Quincy FRSA, and the traffic could overlap truck traffic generated from the MWRA's use of the site as a staging area for construction of the new secondary wastewater treatment plant on Deer Island. The site access route is already heavily used by truck traffic, and the impacts from the additional traffic related to residuals facilities are not considered to be significant.

Potential land use and visual impacts at the site are not significant, largely because the site has a long history of intense industrial use and residuals processing would be a similar use of the site. Similarly, the industrial nature of the site has generally preempted the existence of ecological resources at the site; thus, use of the site would not have significant ecological impacts. Long-term residuals processing at Quincy FRSA would not have significant socioeconomic impacts and could potentially decrease effects of the departure of General Dynamics on the local commercial community by making at least part of the site active again.

It has been determined that the Quincy FRSA is eligible for the National Register of Historic Places as an historic district. One building in the composting area is considered as contributing to the historical significance of the shipyard, and thus mitigation measures would need to be developed if demolition or other adverse effects to the structure would result from construction of the compost facility.

The Quincy FRSA site is environmentally acceptable for transfer, dewatering, heat drying and composting (alone or in combination); however, there could be potentially significant impacts in the area of odor, noise, and historic resources. The EPA recommends that the mitigation measures discussed above be implemented to reduce the significance of such impacts.

Spectacle Island

One exceedance of DEQE Threshold Effects Exposure Limits (TELs, equivalent to maximum 24-hour Allowable Ambient Limits, or AALs) is predicted from incineration at Spectacle Island. TELs are not regulatory limits but are used as guidelines in the state permitting process, and this one exceedance is not considered by the EPA to be unacceptable because it would not result in severe environmental or public health impacts. The DEQE recently established annual average AALs; however, annual average concentrations from incineration at Spectacle Island have not been predicted. The combination of heat drying and composting with no incineration would not have significant air quality impacts.

Since no water quality impacts are predicted from processing at Spectacle Island (any pollutants deposited in the harbor around the island would be diluted and would not exceed water quality criteria), water quality would not impact public health. As discussed above, the one predicted exceedance of a DEQE TEL is not considered to be unacceptable. Further analysis would need to be conducted to determine potential exceedances of annual average AALs (and therefore potential public health impacts).

The isolated nature and public ownership of Spectacle Island render the noise, land use, visual and socioeconomic impacts of any residuals-processing scenario on the island minimal. The ecology on Spectacle Island reflects decades of disturbance, and although a large nesting bird colony was reported to exist on the island it appears to have been abandoned, so ecological impacts from residuals facilities would not be significant.

Barge transportation to and from the island is not predicted to result in any significant impacts. Use of piers constructed by the DPW would minimize or eliminate any additional impacts from construction of piers for residuals facilities. Construction of a pipeline from Deer Island to Spectacle Island could have significant impacts on water quality and aquatic life during dredging operations. In order to mitigate these impacts, the planning and design for the pipeline would have to consider and minimize impacts in the areas of dredging and construction methods, location of pipeline route, quality of dredged material, and dredged-material disposal sites and methods.

Spectacle Island is environmentally acceptable for heat drying and composting (either alone or in combination) and is also acceptable for incineration (subject to further analysis to assess predicted annual average pollutant concentrations relative to annual average AALs and to determine the significance of any predicted exceedances). EPA recommends that the mitigation measures discussed above be implemented to reduce the significance of the potential impacts.

Deer Island

As at Stoughton and Spectacle, one exceedance of DEQE Threshold Effects Exposure Limits (TELs, equivalent to maximum 24-hour Allowable Ambient Limits or AALs) is predicted from incineration at Deer Island. TELs are not regulatory limits but are used as guidelines in the state permitting process, and this one exceedance is not considered by EPA to be unacceptable because it would not result in severe environmental or public health impacts. DEQE recently established annual average AALs; however, annual average concentrations from incineration at Deer Island have not been predicted. Any combination of digestion, dewatering, and heat drying with no incineration would not have significant air quality impacts at Deer Island. The pollutants emitted from an incinerator or a heat dryer would not be the same as those emitted from the new wastewater treatment plant, so no impacts are predicted from interactions between these emissions.

Since no water quality impacts are predicted from processing at Deer Island (any pollutants deposited in the harbor around the island would be diluted and would not exceed water quality criteria), water quality would not impact public health. As discussed above, the one predicted exceedance of a DEQE TEL is not considered to be unacceptable. Further analysis would need to be conducted to determine potential exceedances of annual average AALs (and therefore potential public health impacts).

There are no significant environmental impacts in any other areas predicted for any of the processing options at Deer Island. The island is already designated for wastewater treatment and it is publicly owned, so no land use, visual, socioeconomic, or ecological impacts are anticipated. All transportation of sludge and sludge products would be by barge using pre-existing piers, and thus no transportation impacts are expected. The residuals area of the island is far removed from any noise receptors, so the elaborate noise mitigation measures employed for the wastewater treatment plant (which is much closer to the receptors) would be adequate to prevent noise impacts.

Deer Island is environmentally acceptable for digestion, dewatering, and heat drying (either alone or in combination) and is also acceptable for incineration (subject to further analysis to assess predicted annual average pollutant concentrations relative to annual average AALs and to determine the significance of any predicted exceedances).

ACCEPTABLE RESIDUALS MANAGEMENT OPTIONS

Based on the above environmental evaluation of sites and residuals management processing and disposal options there are several site/technology alternatives which EPA believes would be acceptable as components of the MWRA's long-term residuals management program (Table 5). The MWRA, as the entity that will have to build and operate the residuals facilities, has the primary voice in determining what combination of acceptable sites and processes would most optimally serve its needs for residuals management. The EPA's role is to evaluate the MWRA's proposed program and alternatives to it in accordance with NEPA and to ensure that the sites and technologies chosen are environmentally acceptable and will result in long-term compliance with the Clean Water Act.

TABLE 5. ACCEPTABLE SITE AND TECHNOLOGY COMBINATIONS

Site	Transfer	Dewater	Heat Dry	Combust	Compost	Landfill
Walpole MCI						X
Rowe Quarry						X
Stoughton			X		X	
Quincy FRSA	X	X	X		X	
Spectacle Island		X	X	X	X	
Deer Island			X	X		

The MWRA Board has chosen as its recommended plan a combination of heat drying and composting of sludge at the Quincy FRSA and landfilling of grit, screenings and dewatered sludge (on an emergency basis) at the Walpole MCI site. Each of these components was found to be acceptable in the Draft SEIS evaluation (which also recommended appropriate mitigation). However, the EPA is not fully convinced that this plan by itself will adequately provide for the treatment and disposal of all residuals generated during the planning period (1995 - 2020). MWRA's recommended plan relies on the beneficial reuse of sludge products with projected contaminants in concentrations that could jeopardize its marketability, especially in New

England. In addition, competition from other generators of similar products could decrease the potential market available to the MWRA. MWRA would have to successfully distribute at least 60% of the sludge products it produces over the 25 year planning period, and heat dry the rest prior to landfilling, in order to avoid using all the available backup capacity in the Walpole MCI landfill prior to the year 2020.

Although EPA supports the goal of 100 percent reuse of sludge through the production of compost and heat dried sludge, EPA also believes that it is imperative that the recommended residuals management plan reasonably ensure that sludge discharge to Boston Harbor does not resume. The following steps would help guarantee that adequate sludge product distribution will take place throughout the planning period.

1. MWRA should commit (in its Final Environmental Impact Report) that, in the event it is unable to successfully market its sludge products and needs to use the Walpole MCI landfill as a backup sludge disposal option, to maximize landfill capacity it will heat dry that sludge prior to landfilling.

2. MWRA should enter into agreements with or obtain commitments from the Massachusetts Department of Public Works (which maintains the state highway system), the Massachusetts Department of Environmental Management (which maintains the state park system) or other governmental agencies to use MWRA's compost or heat dried sludge product for their landscaping, fertilizing or soil enhancement needs. These agreements or commitments should be described in MWRA's Final Environmental Impact Report (EIR).

3. Prior to issuance of its Final EIR, MWRA should obtain a classification from the Massachusetts Department of Environmental Quality Engineering of the compost being produced by the compost pilot plant currently operating on Deer Island, and should begin a program of significant distribution of that compost.

4. For metals which potentially exceed regulatory standards for distribution of sludge products (mercury, copper, cadmium and molybdenum) the MWRA should present in its Final EIR a plan for first confirming the projected levels of these chemicals through additional sludge and influent monitoring and then, if confirmed, for reducing these levels through pretreatment, source reduction or targeted enforcement.

5. MWRA should also present in its Final EIR a marketing strategy for sludge products which describes the methods that MWRA will use to contact potential buyers, to advertise its product, to transport its product and to assist buyers in obtaining appropriate permits if necessary.

Like MWRA, EPA supports beneficial reuse of sludge and sludge products. However, without the assurances listed above or other equally effective measures that MWRA can provide, EPA does not believe, based on current information, that the MWRA Board's recommended plan establishes a reasonably adequate program for residuals management for the full 25 year planning period. Should such assurances not be forthcoming in the Final EIR, EPA believes that there are two alternative residuals management plans which can provide an adequate program for the full planning period.

The first alternative combines heat drying and composting at the Quincy FRSA (MWRA's preferred site) with landfilling at both the Walpole MCI and Rowe Quarry sites. If a significant

portion of the sludge products were not successfully distributed and were heat dried, adequate capacity would exist to dispose of all sludge in the two landfills.

The second, and less desirable, alternative combines heat drying and composting at Quincy FRSA and landfilling at Walpole MCI with incineration at either Spectacle Island or Deer Island. This alternative is contingent on the results of additional air quality analysis for incineration (to determine potential annual average AAL exceedances) being acceptable. If this alternative were chosen, Spectacle Island would be preferred over Deer Island as the incinerator site because the Town of Winthrop (which could be impacted by incinerator emissions) already hosts the MWRA's wastewater treatment plant, and fairness concerns dictate that it should not have to bear further waste treatment burdens beyond those currently planned unless absolutely necessary.

PUBLIC PARTICIPATION

The Environmental Impact Statement process ensures that the public is offered the opportunity for involvement in assessing projects subject to environmental review under NEPA. The public participation program for this Draft SEIS provided the public with information on the EIS process and the progress of related studies, and created opportunities for the public to provide input and consultation to the SEIS study team and responsible agencies.

Upon release of the Draft SEIS, public hearings will be held by EPA in the areas affected by the project. These hearings will be held to solicit public comment (which will be recorded) in order to determine any additional public concerns regarding the Draft SEIS. The Final SEIS will be prepared taking these and any written comments submitted into account, and will contain a summary of the public comments and the EPA's responses to the issues raised.