



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

Executive Summary

**Final Supplemental
Environmental Impact Statement
November 1989**

**Long-Term Residuals Management
for Metropolitan Boston**





Long-Term Residuals Management for Metropolitan Boston

Final Supplemental Environmental Impact Statement

November 1989

U.S. Environmental Protection Agency, Region I

The U.S. Environmental Protection Agency has just released the Final Supplemental Environmental Impact Statement (SEIS) on Long-Term Residuals Management for Metropolitan Boston. This Final SEIS responds to comments received on the Draft SEIS issued on May 19, 1989, and incorporates new information and analyses provided since then.

Since the release of the Draft SEIS in May 1989, there have been several modifications to the Massachusetts Water Resources Authority (MWRA) recommended plan including elimination of composting as a residuals management technology; a slight reduction in the landfill footprint to provide a buffer between the proposed Walpole-MCI landfill and abutting prison; design specifications for the proposed landfill; designation of an alternative truck route to the Walpole-MCI site for periods of high truck traffic; and a plan for extending water and sewer utilities to the Walpole-MCI site. In addition, EPA has conducted expanded technical evaluations of several issues including sludge quality, ground and surface water impacts at the Walpole-MCI site, property values and construction impacts. Based on the additional environmental evaluation of sites and residuals management options, and with addition of several recommendations and mitigation measures outlined in the Final SEIS, EPA confirms its original acceptance of MWRA's preferred plan: digestion at Deer Island, dewatering and heat-drying at the Quincy Fore River Staging Area and landfilling at the Walpole-MCI site.

A 60 day public comment period will commence on December 8, 1989, with formal notification in the

Federal Register, and end February 6, 1990. Written comments on the Final SEIS will be accepted throughout the 60 day comment period. After the 60 day public comment period ends, all public comments will be reviewed and considered for the Record of Decision to be released in the spring of 1990.

The Final SEIS is available for your review at the repositories listed below:

Boston Public Library, Boston
Hough's Neck Community Center, Quincy
Malden Public Library, Malden
MWRA Public Library, Charlestown.
Norfolk Public Library, Norfolk
Revere Public Library, Revere
State House Library, Boston
Stoughton Public Library, Stoughton
Thayer Public Library, Braintree
Thomas Crane Public Library, Quincy
U.S. EPA Library, JFK Building, Boston
Walpole Public Library, Walpole
Winthrop Public Library, Winthrop

**WRITTEN PUBLIC COMMENT MAY BE
SUBMITTED UNTIL FEBRUARY 6, 1990 TO:**

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Long-Term Residuals Management for Metropolitan Boston

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November 17, 1989
Date

EXECUTIVE SUMMARY

BACKGROUND AND PURPOSE

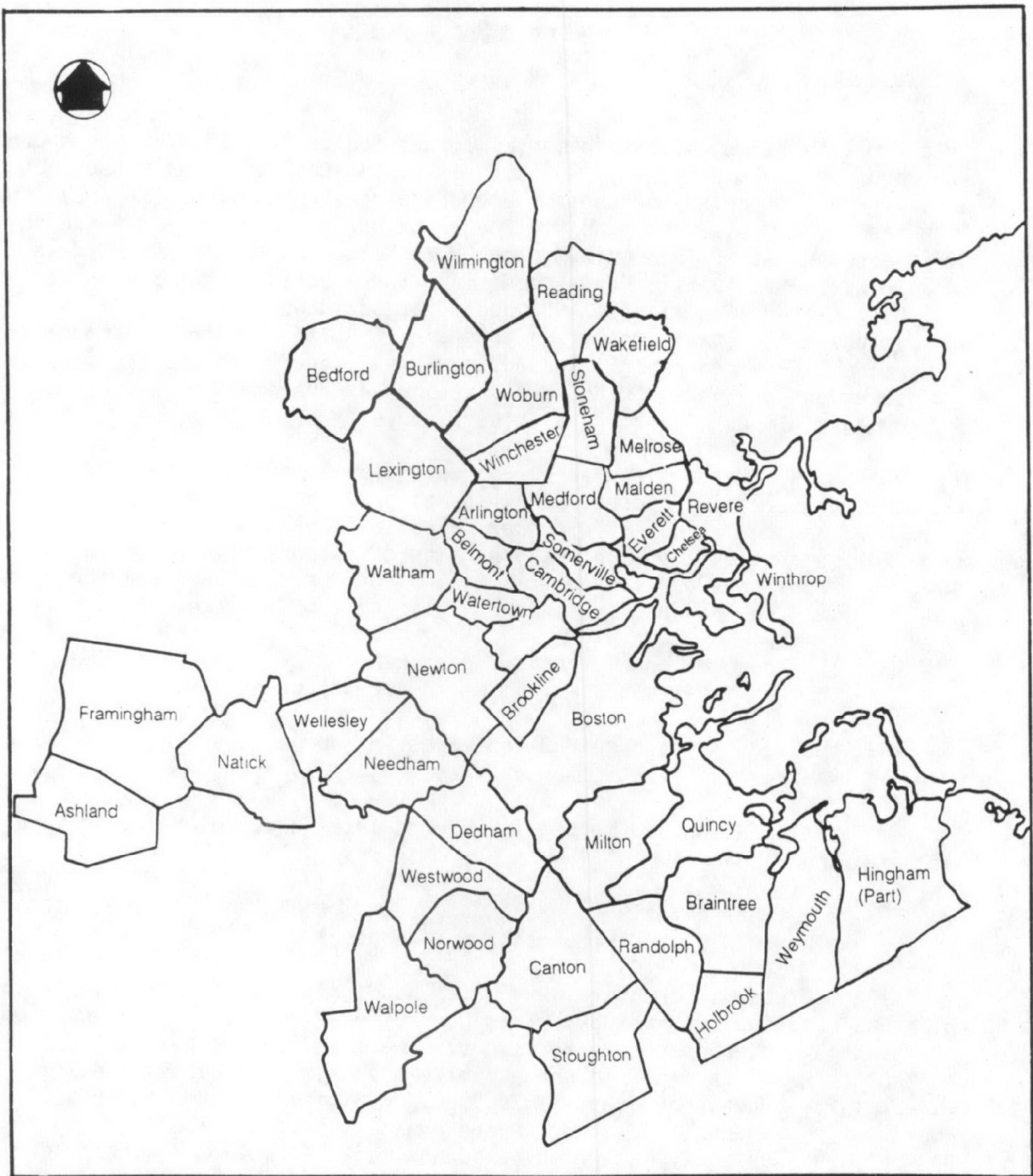
This Final Supplemental Environmental Impact Statement (SEIS) is the second of two documents that constitute an analysis by the Environmental Protection Agency (EPA) of the Massachusetts Water Resources Authority's (MWRA's) long-term residuals management plan for Boston Harbor. The purpose of both the first document of EPA's analysis, the Draft SEIS, and this Final SEIS is threefold: 1) to fulfill EPA's commitment for additional environmental analysis, as specified in the 1986 Record of Decision on the siting of MWRA's new wastewater treatment plant; 2) to ensure compliance with the provisions of the National Environmental Policy Act and Clean Water Act; and 3) to provide an independent analysis of the MWRA's residuals management plan and its Environmental Impact Report/Facilities Plan (EIR/FP).

The Draft SEIS developed and screened residuals management alternatives by evaluating a variety of potential sites and processing technologies. The Draft SEIS and this Final SEIS address questions related to the long term method of processing, reusing and disposing of residuals generated as by-products of the new Deer Island treatment plant, which will serve the entire MWRA service area (Figure 1). In particular this SEIS addresses:

- the location and method for disposing of grit and screenings removed from the wastewater stream at the remote headworks;
- the location and method for digesting and dewatering sludge from the Deer Island treatment plant;
- the location and method for processing sludge for reuse or disposal; and
- the transportation of residuals from Deer Island and the remote headworks to the processing and disposal sites.

Several acceptable alternatives were presented in the Draft SEIS (Table 1), which was released in May 1989. This was followed by a period in which both government agencies and the general public were invited to comment on the document. During this period three public hearings were held and nearly 200 comment letters were received. This Final SEIS presents and responds to those comments; it also contains a review and evaluation of modifications to the MWRA-proposed residuals management plan and new information that has become available since the release of the Draft SEIS. Additional technical analysis of the issues that were of greatest concern to EPA and the commentors has also been performed and the results are contained herein.

The Draft SEIS is not reproduced in this document, but modifications of and additions to it are contained in the Final SEIS as necessary. A reexamination of the conclusions and recommendations made by EPA in the Draft SEIS is made in this document, taking into account public and agency comments and the technical information and modifications generated since the release of the Draft SEIS. Additional mitigation measures and recommendations are made as necessary.



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

FIGURE 1. MWRA SERVICE AREA

TABLE 1. ACCEPTABLE RESIDUALS MANAGEMENT ALTERNATIVES

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	X		

MODIFICATIONS TO THE PROPOSED ACTION

Five substantive modifications have been made to the MWRA-recommended plan since the release of the Draft SEIS: composting was eliminated as a residuals management technology; the landfill footprint was reduced slightly to provide a buffer between the proposed Walpole-MCI landfill and the abutting prison; a modification of the EPA-recommended alternate Walpole truck route was incorporated into the plan; more detailed provisions were made for supplying water and sewer services to the Walpole-MCI site; and more detail was developed on design specifications of the proposed landfill.

Residuals Management Technologies

At the time that the Draft SEIS was released, MWRA had recommended a residuals management plan that included composting one third of the sludge and heat drying the remainder. MWRA has more recently decided to eliminate composting from the plan and heat dry all of the sludge cake, on the basis that composting could cause significant odors, traffic and land use impacts. MWRA has also finalized its decision on a dewatering technology, deciding to install solid bowl "high solids" centrifuges, thus the solids content of the dewatered sludge is expected to be at least 25 percent and could be as high as 29 percent. The belt filter presses used during the interim residuals management program, which dewater sludge to a lower solids content, will be retained as backup.

The elimination of the composting as a second processing technology reduces the redundancy and flexibility in the sludge processing system and increases the importance of 1) having reliable, sufficient capacity in the heat drying system; 2) marketing most of the heat dried pellets; and 3) having a reliable backup method for disposing of unmarketable sludge product. In the event that one or more of the heat drying trains is not operational, or if the centrifuges produce a sludge cake that is not at least 25 percent solids, the currently planned six heat drying units will not provide sufficient capacity to pelletize all of the sludge after 1999. Therefore, as MWRA has proposed

that excess dewatered sludge be disposed of in the minor residuals landfill, the potential impacts of eliminating composting are primarily associated with the ultimate capacity of the landfill.

Landfill Capacity

Given the reliance on the residuals landfill as a backup technology, it must be able to accommodate sludge cake during heat dryer down-time due to breakdowns and maintenance, excess sludge cake that can not be accommodated by the heat driers if dewatering equipment performance is less than predicted, and non-marketable heat dried pellets. The landfill capacity used for these purposes depends upon the percentage solids in the sludge cake and the required quantity of bulking agent required to stabilize the sludge cake. Under a middle range scenario in which sludge cake of 25 percent solids is landfilled at a 2:1 ratio of bulking agent to sludge cake, no pellets are landfilled, and one heat drying unit is inoperable, the landfill will be filled in approximately 20.5 years, 4.5 years short of the project life. If 25 percent of the pellets produced needed to be landfilled the useful life would be reduced to approximately 12.5 years, or one-half the project period. The Final SEIS contains a full analysis of potential landfill scenarios.

To address this situation, EPA and the MWRA have signed an agreement in which MWRA has committed to a specific rate of use of the Available Remaining Capacity (ACR) of the landfill to ensure that there is sufficient capacity for the entire planning period (1995-2025).

Walpole Truck Route and Utilities

MWRA has also committed to the use of a second truck route to the Walpole-MCI site in the event that more than 24 trucks per day are needed for disposal of residuals at the landfill. A similar alternative route was described and recommended in EPA's Draft SEIS. A sufficient number of alternatives have been provided to ensure that MWRA can provide utilities to the Walpole site without disrupting local water and sewer service, including the use of water storage facilities and dedicated water or sewer lines.

Landfill Design Details

MWRA's proposed landfill design will include a system of double liners, leachate collection systems, and runoff control systems. The primary leachate collection system, which will be installed above the upper synthetic liner, will collect leachate from open cells. A second leachate collection system will be installed between the upper and lower (clay) liner, and will serve as a leak detection system for the upper liner. Existing runoff patterns will be maintained wherever possible by dikes, trenches and berms designed to divert runoff from exposed portions of the landfill.

EXPANDED TECHNICAL EVALUATIONS

EPA supplemented its technical evaluation of the MWRA-recommended plan with additional analyses of the following issues: sludge quality, ground and

surface water quality, residential property values and construction activities.

Sludge Quality

Analysis of an additional seven months of sludge quality data from the Deer Island and Nut Island monitoring programs confirmed the analysis provided in the Draft SEIS for most pollutants. The only substantial difference found was for molybdenum. The Massachusetts limit for molybdenum application on non-agricultural and non-grazing lands is 40 mg/kg. The new analysis found an average concentration for molybdenum (41 mg/kg) that was higher than the earlier average (26 mg/kg) and exceeds the land application standard. When adjusted for secondary treatment, the predicted molybdenum concentration would be 108 mg/kg. Should these predicted concentrations be accurate, they could inhibit marketing or distribution of the sludge pellet product in Massachusetts.

Groundwater

Potential contamination of two private wellfields near the Walpole-MCI site was evaluated. Contamination could occur in the event that the landfill double liner and double leachate collections systems fail, leachate penetrates at least 25 feet of unsaturated soils, is not detected by monitoring wells and travels 800 feet or more to the wells. A computer model was used to simulate the transport of a plume of contamination to evaluate the potential effects on the private wellfields and was run until peak contaminant concentrations were observed. Peak pollutant concentrations at the private wells were predicted to be below the Massachusetts groundwater criteria, even under the worst case scenario of a fifty percent leak for ten years. The time required to reach peak concentrations at the public or private wells would be more than sufficient for any unexpected contamination to be remediated.

Surface Water

Additional investigations were conducted for this Final SEIS in order to determine a range of flows which could be expected for the Stop River; estimates were derived for the ten-year, seven-day low flow and the two-year flood. These extreme conditions were used to predict a range of potential contaminant concentrations in the Stop River that could potentially occur as a result of a landfill leak at the Walpole-MCI site. The two-year flood flow is over 6,000 times greater than the maximum potential leachate flow; thus leachate concentrations would be sufficiently diluted so that no adverse water quality impacts would be expected.

Water quality impacts under low flow conditions from a potential undetected, unmitigated leak in the Walpole-MCI landfill were evaluated using the same computer model of groundwater contaminant transport as used in the private well analysis described above. Under low flow, worst case conditions, the peak concentrations above background are all predicted to be well below the applicable freshwater standards; the time required to reach these peak concentrations is on the order of hundreds to hundreds of thousands of years.

Property Values

No information was found specifically for effects of a sludge landfill on property values; however, inferences were drawn from studies of other negatively perceived facilities, such as airports, sanitary landfills, highways and power plants. In general, the studies showed that environmental factors usually account for only a small proportion of housing price differentials. The major determinants of the differences between prices of different properties at a particular point in time are house quality and size, lot size, characteristics of the municipality and quality of services. Major determinants of the difference in the price of a single property over time are demand, interest rates and the regional economy.

The only quantifiable relationship found between environmental factors and property value was for excessive noise (above 75 dBA). Excessive noise at the Walpole-MCI site during active construction and closure of three of the landfill cells could affect three properties on Winter Street. However, the literature indicates that should negative effects on property values occur the impacts are lessened once the impacts are mitigated; thus it is not expected that the Walpole-MCI landfill would have any significant long-term effects on property values.

CONSTRUCTION ACTIVITIES

Construction activities could cause temporary impacts on the areas surrounding the residuals sites; however, most of these impacts can be mitigated or will have no long-term adverse effects.

Potential fugitive dust impacts at the Walpole-MCI site can be controlled by using standard dust control techniques such as water spray, hay, mulch, dust suppressants, or revegetation. Excess truck traffic can be mitigated by using the alternate Pine Street route to the site.

MWRA has indicated that meteorological and dust monitoring equipment will be installed at the Quincy FRSA site during construction of the residuals facilities to monitor volatile organic compound (VOC) and particulate matter in the air. Dust control measures at this site would include, in addition to the measures described above, revision of the work pattern or temporary reduction in the excavation area. Excavation will be minimized by the use of pile-supported foundations for all residuals facilities at the Quincy FRSA. In addition, excavated contaminated soil would be handled and disposed of in accordance with Massachusetts Department of Environmental Protection guidelines. Contaminant levels in pumped groundwater associated with dewatering will be closely monitored and the water will be treated, if necessary, before discharge into the Fore River. Construction activities that would exceed noise level significance criteria should be limited to daytime, weekday periods.

Residuals facilities at Deer Island are to be located at the southern portion of the island, away from residential areas; therefore construction of these facilities is not expected to have significant impacts.

COMMENTS

After the release of the Draft SEIS, EPA held three public hearings and distributed the draft document to an extensive mailing list and several public repositories in order to allow for public and agency review. Another 5,000 people or agencies were notified by mail that the document was available for review. Nearly 200 comment letters were received from Federal and State agencies, local officials, a pre-established Citizens Advisory Committee (CAC) and the general public. These comments addressed all aspects of the Draft SEIS, including its technical and legal scope and adequacy, the alternatives considered, the analyses conducted, the decision-making methodology and the recommendations made. The vast majority of the comments received addressed (in order of occurrence): ground and surface water impacts (particularly at the Walpole-MCI site); adherence to state and federal policies and regulations; the proposed landfill design; air quality and odors at all sites; the quality of the residuals materials and public health. A list of issues was developed from the comment letters and each issue is addressed in the Final SEIS.

ACCEPTABILITY OF MWRA-RECOMMENDED PLAN

Based on the additional environmental evaluation of sites and residuals management options, EPA confirms its original acceptance of the site/technology alternatives described in the Draft SEIS (Table 1). In addition, EPA believes that the MWRA-recommended residuals processing plan of dewatering and heat-drying at the Quincy FRSA and landfilling at the Walpole-MCI site is environmentally acceptable.

As discussed in the Draft SEIS, EPA supports the goal of 100 percent reuse of sludge and believes that it is imperative that sufficient sludge product distribution takes place to ensure that sludge discharge to Boston Harbor does not resume. In fact, MWRA's recommended plan is built around the supposition that distribution and marketing of sludge product will be successful. To that end, and because the exact amount of sludge product that will be marketed is somewhat uncertain, in the Draft SEIS EPA outlined five steps that would help guarantee adequate distribution of the sludge pellets; actions taken by MWRA to address the steps is described below.

1. MWRA has committed in its Final EIR that if it needs to use the Walpole-MCI landfill for backup sludge disposal, it will preserve landfill capacity by heat drying the sludge prior to landfilling or by other means as discussed in the recently established EPA/MWRA agreement on landfill capacity (see page 5 of this Executive Summary).
2. MWRA has committed in the Final EIR to negotiate with the Massachusetts Department of Public Works (which maintains the state highway system), the Department of Environmental Management (which maintains the state park system) and other government agencies to use MWRA's heat dried sludge product for their fertilizing and soil enhancement needs.

3. MWRA has not yet obtained a classification from the Massachusetts DEP (formerly DEQE) of the compost being produced by the Deer Island pilot plant, or begun a program of significant distribution of the product. Although composting is no longer included in the long-term residuals management program, MWRA should continue to pursue classification and distribution of the compost in order to establish itself as a producer of beneficial sludge products and to demonstrate its ability to successfully negotiate the regulatory process and market its product.
4. MWRA has not yet established a plan for confirming, through additional sludge and influent monitoring, the projected levels of metals which will potentially exceed regulatory standards for distribution of sludge products (mercury, copper, cadmium and molybdenum). Such a plan must be prepared and implemented, and if exceedances are projected, a plan for reducing these levels through pretreatment, source reduction or targeted enforcement should be formulated.
5. MWRA presented in the Final EIR the outline of a marketing strategy which involves market and applied research, quality monitoring, toxics reduction and program administration and planning. The methods that will be used to contact potential buyers, to advertise and transport its product, and to assist buyers in obtaining appropriate permits must be addressed as well.

MWRA must continue to pursue these five steps in order to ensure the long-term viability of its recommended plan.

Additional recommendations developed as a result of the analyses undertaken in this Final SEIS relate primarily to preservation of landfill capacity, and because emergency and excess sludge could constitute the largest quantity of material to be landfilled, to the effectiveness of the heat drying trains. Because all six of the proposed heat drying units will be required to process sludge in the maximum months, the heat drying facilities should have the flexibility to allow for full use of all operational heat drying units regardless of which centrifuges are operational. In addition, the performance of the residuals processing trains (centrifuges and heat dryers) should be closely monitored prior to implementation of secondary wastewater treatment (1999) in order to assess their performance level. After 1999, less than optimum performance would render the proposed residuals processing facilities incapable of heat drying all of the sludge; thus space for at least two additional heat drying trains or other residuals processing facilities should be reserved at the Quincy FRSA. As discussed earlier in this document, MWRA and EPA have signed an agreement regarding husbanding of the landfill to ensure adequate capacity throughout the 25 year planning period. EPA's acceptance of MWRA's plan is conditioned on MWRA adherence to that agreement.

Additional recommended mitigation measures are related to protection of groundwater resources at the Walpole-MCI site, and are described below. The existing monitoring wells on the site should be used to collect background data between now and initiation of the landfill construction, and to help

define the exact number, spacing and location of the permanent monitoring wells. Also in this time frame, piezometers should be installed to determine in more detail the overall groundwater flow patterns. Generally, monitoring wells should be located along the slope between the landfill and the eastern side of the Stop River and adjacent to the Stop River impoundment, along the northern boundary of the site between the landfill and the private wells, and along the western site boundary between the landfill and the Neponset Sole Source Aquifer. A cluster of wells at some locations might be necessary in order to obtain samples at various depths of the aquifer. A well should be located upgradient of the site to provide representative background water quality data and bedrock wells will be needed to monitor flow in fractured bedrock.

All materials which are to be deposited in the landfill should be monitored, including soil used in the construction of the landfill liner, leachate collection and capping systems, residuals and residuals products.

The water quality monitoring wells should be sampled at least quarterly and compared to background data, particularly for contaminants that are known to be found in the residuals such as metals and total organic carbon, and for contaminants that have low retardation factors; sampling should be refined as necessary. Samples should be analyzed to the most current water quality standards and guidelines. The private wells near the site should be sampled, at MWRA's cost, upon reasonable request by the homeowners.

A sampling and testing program should be developed to monitor surface water; although no contamination is expected to occur, surface waters should be monitored at regular intervals. The Stop River should be sampled above, below and adjacent to the site. The Stop River impoundment should also be monitored at various locations.

A combination of state of the art technology and rigorous environmental monitoring is expected to provide complete mitigation of impacts from the proposed residuals landfill at the Walpole-MCI site. However, a detailed contingency plan must be prepared prior to construction of the landfill that would identify all appropriate design features and monitoring that would be required to prevent contamination of the site and surrounding areas. The contingency plan should also include a discussion of measures to be taken in the event that remedial action is necessary. These measures should include, in the event of contamination, MWRA remediation or replacement of public and private water supplies.