EXECUTIVE SUMMARY

A monitoring survey was conducted in September 2003 at the Central Long Island Disposal Site (CLDS) as part of the Disposal Area Monitoring System (DAMOS). The 2003 field effort consisted of bathymetric and sediment-profile imaging surveys designed to document changes in seafloor topography, evaluate the physical distribution of dredged material, and assess the recovery of the benthic community relative to ambient sediment conditions and previous monitoring surveys.

The September 2003 bathymetric survey was performed over a 1.3 km^2 area in the northeast portion of CLDS. The survey encompassed two older disposal mounds, CLIS 99 and CLIS 00, and two new mounds, CLIS 01 and CLIS 02. CLIS 99 was formed by the placement of 86,000 m^3 of dredged material during the 1999-2000 disposal season. CLIS 00 was formed by the placement of 71,000 m^3 of dredged material during the 2000-2001 disposal season. Both mounds were surveyed during the June 2001 monitoring survey. During the 2001-2002 disposal season, CLIS 01 was formed by the placement of 53,000 m^3 of dredged material on the seafloor approximately 100 m west of CLIS 00. During the 2002-2003 disposal season, CLIS 02 was formed 250 m northeast of CLIS 99 by the placement of 312,000 m^3 of dredged material. The location of these mounds was selected to further the ongoing development of confined aquatic disposal (CAD) cells within CLDS.

The results of the bathymetric survey confirmed the formation of the two new mounds, CLIS 01 and CLIS 02. The CLIS 01 Mound was generally conical in shape, with a base diameter of approximately 90 m and an apex that rose approximately 2.5 m above the surrounding seafloor. The base of the CLIS 02 Mound had an approximate diameter of 300 m and an apex that rose approximately 2 m above the surrounding seafloor. A comparison of the 2003 and the 2001 bathymetry indicated a 0.5 m decrease in the height of the CLIS 00 Mound. This scale of volume decrease is typical of the self-weight consolidation of recently disposed dredged materials in Long Island Sound (SAIC 1995).

The sediment-profile imaging (SPI) survey was performed at the two older mounds, CLIS 00 and CLIS 99, and three historic mounds, CLIS 95/96, NHAV 93 and MQR. SPI results indicated that benthic recovery of the mounds has proceeded at least as well as expected, and conditions at all mounds were indicative of a slightly disturbed or undisturbed benthic environment. Stage I surface feeders and Stage III deposit feeders were abundant, present in at least one replicate SPI image, and generally all three replicates, at every station. The RPD layer was generally deeper than 2 cm, indicative of well-oxygenated sediments and active benthic fauna.

At the CLIS 99/00 Mound Complex, the median OSI value was +8 (ranging from +6 to +10), slightly lower than the median reference OSI value of +9.5, but higher than the 2001 median of +7. The RPD ranged from 0.5 to 4 cm, with a mean of 2.2 cm. The mean RPD was somewhat shallower than both the reference (3.0 cm) and the 2001 survey results (2.7 cm), but the increased presence of Stage III assemblages resulted in higher OSI values. The advanced benthic recolonization status of the CLIS 99/00 Mound Complex observed in the September 2003 survey exceeded initial expectations for recovery.

The CLIS 95/96 Mound Complex was also was in an advanced state of recolonization, with benthic habitat conditions that were improved relative to the 2001 survey and comparable to the ambient conditions observed at the reference areas. The median OSI value was +10 (ranging from +7 to +11), slightly higher than the reference median OSI value of +9.5 (ranging from +8 to +11) and slightly improved from the 2001 median OSI value of +9 (ranging from +5 to +11). The mean RPD was 3.3 cm (ranging from 2.0 to 4.0 cm), comparable to the RPDs observed in 1999 and in the reference areas. The CLIS 95/96 Mound Complex exhibited a stable and fully recovered benthic habitat.

The NHAV 93 Mound and the MQR Mound both exhibited stable benthic conditions, with little change since the last surveys, and were comparable to ambient benthic conditions. Methane bubbles were observed at both mounds, the presence of which was likely due to the high organic content of the dredged material at depth. Despite the continued presence organic-rich surface sediments and the sub-surface production of methane at these mounds, both exhibited advanced benthic recolonization and fully recovered benthic habitat in the September 2003 survey.

A unique result from the 2003 SPI survey was the apparently ubiquitous presence of a thin, rust-colored surface layer on the sediments at all three reference areas and each of the disposal mounds. The color of this material suggested the presence of degrading phytoplankton (phaeopigments or phytodetritus). Approximately 18 to 20 days prior to the September 2003 survey, a chlorophyll bloom event in the surface waters of Long Island Sound was documented by satellite spectral imagery. It is likely that settling of phytoplankton cells following this Sound-wide, five-day event was responsible for producing the flocculant detrital layer observed in the SPI images.

In previous late summer SPI surveys, Stage I (tubiculous) polychaetes were abundant and easily recognized in the images. At all stations surveyed in 2003 evidence of Stage I activity included a highly bioturbated surface and at many stations, broken and

recumbent tubes of Stage I polychaete worms formed from the pigmented layer. It is possible that the influx of fresh organic material (phytodetritus) stimulated Stage I activity and that many of the organisms formed loose tubes of the material as it was processed. Upright tubes were also observed but did not appear to be as abundant as in some past surveys. Stage III infauna appeared to be unaffected. This may be related to the fact that the phytodetritus was confined to the sediment surface, although a few images did show the subduction of pigmented material by deposit feeders and association with active voids. It is recommended that a SPI survey be performed in 2004 to determine if this rust-colored layer continues to be subducted and/or if it remains detectable.