APPENDIX I

PRELIMINARY
CLEAN WATER ACT
SECTION 404(b) (1) ASSESSMENT

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APPENDIX I - PRELIMINARY CLEAN WATER ACT SECTION 404(b)(1) ANALYSIS

Proposed Masonville Dredged Material Containment Facility
Final Environmental Impact Statement

BALTIMORE HARBOR, MARYLAND

May 2007

I. PROJECT DESCRIPTION

A. Location – The proposed Masonville Dredged Material Containment Facility (DMCF) is located within the estuarine reaches of the Patapsco River, which is generally considered Baltimore Harbor (a tributary of the Chesapeake Bay), Maryland. The site is located approximately 4 miles upstream of the Key Bridge and approximately 1 mile downstream of the Hanover Street Bridge, on the southern shore of the Patapsco River. The land portions of the site lie within Baltimore City, Maryland. Immediately west of the proposed DMCF is approximately 55 acres of habitat protection area known as Masonville Cove. Masonville Cove and adjacent land are undeveloped and used by area fish and wildlife, but also contain large amounts of debris. Cleanup and enhancement of this area has been integrated into the DMCF site development plan as compensatory mitigation.

There is an offsite, in-water borrow source that would be used as part of the preferred alternative adjacent to Seagirt Marine Terminal. This area is referred to as the Seagirt dredging area. The Seagirt dredging area covers 128 acres of open water that have previously been dredged to a depth of -42 ft MLLW. This area is adjacent to the Seagirt and Dundalk Marine Terminals and is located at the mouth of Colgate Creek, less than 2 miles east of Fort McHenry.

B. General Description – The Masonville DMCF is being proposed as a containment facility for Harbor dredged materials, which are required to be contained due to State law (due to known or suspected sediment contamination). The project has one recommended alignment of approximately 141 acres (see Section I.C), which would tie into the existing shoreline along an old industrial complex and a previously filled containment facility. The total impacted footprint would be 127 acres of open water. There is an additional 3 acres of previously unauthorized fill, 10 acres of upland habitat, and approximately 1 acre of vegetated wetlands that would be affected by the proposed Masonville DMCF. Of the 127 acres of impacted open water, there is a loss of 123 acres of river bottom (and a conversion of 7 acres of river bottom to manmade bottom at shallower depths due to the dike slope and need to move several sunken barges outside the proposed footprint). Ten of the 141 acres is upland habitat along the current shoreline that would be affected by the proposed Masonville DMCF. The site would operate for up to 20 years with an

annual sediment inflow of 0.5 million cubic yards (mcy). The mostly likely end use of the facility would be for terminal expansion, predominantly for cargo storage.

This Section 404 evaluation applies to the following components for the construction of and operation of the proposed project that may result in discharge into a Water of the United States, in this case the Patapsco River and ultimately the Chesapeake Bay, from pre-dredging of unsuitable materials, excavating of dike construction materials for dike construction, perimeter dike construction, and discharge of water through spillways.

To accommodate dike construction, approximately 15 feet (ft) of unsuitable (silty) overburden material (approximately 1.7 mcy) would be removed from parts of the proposed site to expose the sand and clay below, which is suitable for dike construction. The unsuitable material would be removed with a mechanical (clamshell) dredge (pre-dredged) and taken to a pre-existing contained facility [(Hart Miller Island (HMI) DMCF]. The containment (perimeter) dikes would be similar to those used for the existing DMCFs in the area and would consist of a fine sand core with exterior slopes faced with various thicknesses of armor stone. Approximately 2.8 mcy of sand and clay are required for dike construction. Hydraulic dredging would be used for dike building activities. Dredged material from Harbor navigation channels and berthing areas would be placed within the facility and dewatered to accelerate consolidation of the dredged material. As a result of this process, water would be discharged through project spillways into the Chesapeake Bay via the Patapsco River. The majority of the construction for this project would be in the water, involving filling up to 127 acres of open water in the lower Patapsco River.

An additional 128 acres of open water in the Seagirt dredging area would be excavated for borrow material. A variable depth of unsuitable material also overlays this site. After the unsuitable material is removed and placed at the HMI DMCF, between 0.5 and 0.8 mcy (depending on material recovery) of borrow material would be used for construction at the proposed Masonville DMCF. Seagirt would be dredged to a depth of -50 ft MLLW (plus 2 ft of over dredging) under an existing permit as part of the Seagirt and Dundalk Marine Terminal access channel deepening and widening project. Under the preferred alternative for the proposed Masonville DMCF, the Seagirt dredging area would be dredged to either a depth of -51 or -52 ft MLLW (plus 2 ft of over dredging) to utilize borrow material at this site. The unsuitable construction material would be placed at the HMI DMCF. Suitable materials would be loaded onto a split-hull scow and placed directly along the dike line of the Masonville site from the bottom of the scow.

In order to construct the facility where it is planned, several additional activities would need to occur. A stormwater outfall needs to be relocated from the eastern part of the alignment to the northwestern side at the mouth of Masonville Cove. A Baltimore City water line that runs under the western side of the proposed alignment and the City has indicated that it must be moved so that it can be accessed for future maintenance. The most significant pre-development task involves remediation of up to 25 derelict vessels on the eastern side of the site near the former Kurt Iron and Metal (KIM) facility. Some are known to contain hazardous or other regulated wastes. A cleanup plan is being

negotiated with the Maryland Department of the Environment (MDE). Removal of debris from both the aquatic and terrestrial areas of Masonville Cove prior to any habitat enhancement would also need to occur. A cleanup plan may also be required for that area.

C. Authority and Purpose – The State Dredged Material Management Act (of 2001) mandated that dredged material placement options be identified to meet the short- and long-term shortfalls in dredged material placement capacity for both the Chesapeake Bay Approach Channels and Harbor Channels. In December 2002, the executive committee of Maryland's Dredged Material Management Program (DMMP) submitted a report to the Governor and State Legislature recommending Plan 2003, which included a short and long-term strategy for managing dredged material. Noting that sediment dredged from the Patapsco River upstream of the line between North Point and Rock Point is statutorily required to be managed in a confined placement facility if placed in the water, the report concluded that additional options for managing Harbor material were needed to meet both the short and long-term Harbor dredging needs. The Maryland Port Administration (MPA) identified areas with the potential to meet the dredging needs (manage approximately 1.5 mcy annually). Through the State DMMP, a special committee (known as the Harbor Team) was established to develop a strategy for managing sediments dredged from upstream of the North Point-Rock Point line. The Harbor Team, along with federal and local resource agencies, screened hundreds of potential options for upland placement, island creation, fastland creation, and innovative reuses. The most promising Harbor options (those where the land was potentially still available) were ranked by rigorous evaluation of 52 natural resources, human use attributes, and potential benefits. Along with general policy recommendations for the MPA to move toward increased management of dredged materials through innovative reuse (0.5 mcy annually by 2023), three sites were selected for State feasibility-level study: Masonville, Sparrows Point, and the former British Petroleum (BP) Amoco Asphalt Terminal in Fairfield (BP-Fairfield).

From an in-depth analysis of the innovative reuses, it became apparent that implementation of innovative reuses would take more research and development than time allowed to meet the short-term placement needs of the Harbor. Large volume upland options, such as mine and quarry reclamation that are already occurring at other ports, require infrastructure, expansion/renovation, and development. Creation of bricks and aggregate materials requires development of manufacturing facilities and dewatering of dredged materials. In addition to dewatering, reuse for land applications such as landfill capping or agricultural application would require identification of suitable sites. It has been suggested that the Cox Creek facility could act as a dredged material dewatering/excavating source to support innovative reuses, although infrastructure redevelopment and onsite processing facilities would be required. The engineering and NEPA requirements for implementation of these reuse options would make them impossible to implement in time to meet the 2007 shortfall and, therefore, not practicable for the short-term need.

The alternatives assessment found that upland and innovative reuse options currently identified were not practicable in the short-term (in time to meet the current need) due to: (1) land ownership issues; (2) local statutory restrictions; (3) the need to develop major infrastructure or processes; and (4) lack of sites of substantial size. Consequently, in-water options became the most practicable to meet the short-term need. At the point where it became apparent that in-water impacts were unavoidable in the short term, the viable in-water options were evaluated to choose an option that minimized impacts. Masonville was selected as the most viable in-water option based upon meeting ecological, engineering, and real estate constraints. Several alignments were evaluated at Masonville in order to avoid unsuitable construction areas and minimize impacts to the waterway while still meeting the minimal annual inflow requirements to meet the Harbor placement needs. In addition, an alternate borrow source (sand from a permitted dredging project at Seagirt Marine terminal) was evaluated to minimize the use of on-site clays. Alignment 3 with the use of sand from the Seagirt dredging project was chosen as the Least Environmentally Damaging Practicable Alternative. However, this option could not avoid in-water impacts and will require mitigation for 131 acres of open water and vegetated wetlands (Section I.B).

The U.S. Army Corps of Engineers (USACE) – Baltimore District, recently completed a Chesapeake Bay-wide study (screening) [*Baltimore Harbor and Channels Dredged Material Management Plan and Tiered Environmental Impact Statement* (USACE 2005)] to address the predicted regional dredged material placement capacity shortfall. This Federal DMMP assessed placement capacity for material dredged from Federal Channels for a 20-year planning horizon. The Federal DMMP is a tiered EIS that contains recommendations for placement of dredged material, but does not make site-specific determinations for future placement sites for material dredged from the Harbor, including Masonville (USACE 2005). For sediments dredged from the Baltimore Harbor channels sediments, the Federal DMMP recommended the: further study of multiple confined placement facilities in or along the Patapsco River; optimization of existing dredged material management sites in Maryland [e.g., the HMI DMCF, and Cox Creek DMCF (Figure ES-1)]; and continued investigation of innovative reuse alternatives. The further study of the Masonville site for a DMCF is consistent with these recommendations.

D. General Description of Dredged Material – The sand used to construct the dikes for the expansion project would be dredged from borrow areas located beneath the proposed site and from within the Seagirt dredging area. In order to access the onsite material, approximately 10 to 25 ft of silty overburden would need to be pre-dredged (stripped off) and removed to a contained facility. The Masonville borrow area and sand source lie entirely within the proposed Masonville DMCF footprint. These sediments are expected to consist of fine sand with some silt and clay lenses.

Additional sand and gravel material from the Seagirt dredging area would be used to construct the dikes. Between 0.5 and 0.8 mcy of sand and gravel would be removed from this site and used during dike construction at the proposed Masonville DMCF. Some of the material is scheduled for dredging to deepen the channel (from -42 to -50 feet) and widen some areas adjacent to the Seagirt and Dundalk Marine Terminals for navigational

safety. Some of the material already permitted for dredging under the harborwide permit would be innovatively reused for dike construction. The preferred alternative for the construction of the proposed Masonville DMCF also includes excavating of additional sand and gravel within the dredging area that would be beneficial to dike construction at Masonville. The use of this additional borrow material from the Seagirt dredging area would increase the dredging depth of the Seagirt project from -50 ft MLLW (the already permitted depth) to a depth of either -51 or -52 ft MLLW (a permit application for this action has been submitted). There is an additional 2 ft of over dredging under both scenarios. Unsuitable construction material from the Seagirt dredging area would be transported to the HMI DMCF. Suitable materials would be loaded onto a split-hull scow and placed directly along the dike line of the Masonville site from the bottom of the scow.

The sediment that would be contained within the DMCF would be dredged from various areas within the Baltimore Harbor. It is expected that most of the material would be from maintenance dredging operations from the State and Federal navigation channels although some could be from new work projects (such as berthing facilities) or smaller private channels. The sediment is expected to consist of relatively low cohesion silts and clays with some fine sands. Much of the material that would be dredged is known to contain elevated concentrations of typical urban, riverine sediment contaminants such as metals, polychlorinated biphenyls (PCBs), and other pesticides. Concentrations of some of the contaminants are expected to exceed sediment quality guidelines for probable ecological effects.

E. Description of Proposed Discharge Site – The proposed discharge site for the pre-dredged material is the HMI DMCF in Baltimore County. The HMI DMCF is a currently existing and operational facility that is permitted to take dredged materials from Baltimore Harbor Channels and Approaches, including materials from within the North Point-Rock Point line.

The proposed Masonville DMCF lies along the south shore of the Patapsco River waters that generally range from –5 to –17 ft MLLW with one deeper area along the eastern side that was previously dredged and is approximately -40 ft MLLW. The area is tidal with an average range of 1.1 ft and weak tidal currents. Salinities range from approximately 3 to 9 parts per thousand (ppt). The substrates are predominantly silty sand and have elevated contaminant levels. Water quality and the benthic conditions are degraded or severely degraded over much of the area. The adjacent land areas are industrial facilities and a previous DMCF with average elevations of +36 ft MLLW. Immediately west of the facility is a habitat protection area (Masonville Cove), which ranges in depth from approximately -1 to -12 ft MLLW. Substrates and benthic conditions within Masonville Cove are generally better than within the proposed DMCF footprint and are currently supporting submerged aquatic vegetation (SAV). Masonville Cove is bordered by the existing Masonville Marine Terminal Phase II to the east and undeveloped lands to the south and west. The undeveloped lands are dominated by opportunistic plant species and contain large amounts of rubble and debris.

F. Description of Discharge Method – Unsuitable materials would be mechanically dredged into barges and removed to the HMI DMCF. At the HMI DMCF, the materials are mixed with water (to resuspend the solids) and pumped into the containment cells.

Stones used to construct the DMCF perimeter dike would be placed using mechanical (heavy equipment) methods. It is expected that sand to be used during construction of the proposed Masonville DMCF perimeter dikes and breakwaters would be dredged hydraulically and pumped into place. The process would involve mounding up sand to create "training dikes" into which the material would be pumped. Additional mechanical shaping of the sand would be required to move the material into its final location before armor stone can be placed on the exterior slopes. Turbidity curtains would be used around the placement point to minimize the turbidity plume dispersion.

Material (sand and gravel) from the Seagirt borrow area would be dredged mechanically using a clamshell dredge and placed in barges. The filled barges would be towed or pushed to the proposed placement site where the material would be placed using a split-hull barge.

II. FACTUAL DETERMINATION

A. Physical Substrate Determination

i. Substrate Elevation and Slope – The water depth within the proposed project DMCF footprint ranges from -5 to -40 ft MLLW. The dike would be raised in two stages. The initial dike raising would be raised to +10 ft MLLW and made fully functional to accommodate dredged material inflow by the 2009-2010 dredging season. Eventually, the dikes would be raised to a temporary height of +42 ft MLLW to accommodate filling of the site and graded to +36 ft MLLW to match the grade of the adjacent land mass. The dike side slopes would vary, depending upon the dike section. The armored sand dikes would be a 2:1 slope. Along the western shoreline of the proposed facility, the dike would be unarmored and the section is proposed for development into a fringe marsh. For stability and to create a more natural shoreline gradient, these slopes would be 10:1. Onshore dikes on the former KIM facility property would also be 2:1.

ii. Sediment Types – The surface sediments in the vicinity of the proposed project are typical of urban, riverine systems in Maryland and consist mainly of silts clays, and sands, with some gravel. The sediment that would be used to construct the containment dikes is fine-grained sand with some silt and clay lenses. The dredged materials proposed for placement in the proposed expansion project are likely to be silt, with some clay and fine sand.

iii. Discharged Material Movement – The fine-grained sand used to construct the perimeter dikes would be dredged and placed to avoid unnecessary loss of materials. When completed, the perimeter dikes would contain the movement of

the dredged material, and the discharge spillways would be managed to restrict movement of dredged material beyond the containment dikes.

iv. **Physical Effects on Benthos** – Non-mobile benthos within the site footprint would be lost as a result of pre-dredging and sand borrow activities. However, the benthic community in much of the proposed DMCF footprint is already stressed and degraded due to poor sediment and water quality. Benthic communities in Masonville Cove would not be disturbed by DMCF construction activities. Construction of the DMCF has the potential to increase fine-grained sediment deposition in to the western side of the alignment and in parts of Masonville Cove by up to 50 percent annually. The current sedimentation rate may increase by approximately 0.4 to 0.8 inches per year. The benthic community is expected to be able to adapt to this change because deposition would be gradual. The proposed improvements to Masonville Cove would improve substrates for benthic macroinvertebrates. The rock dikes and hard fisheries habitat structures (rock and reef balls) would provide vertical habitat for epibenthic colonization. Piling sand among the hard structures would increase the potential area for benthic colonization.

v. **Other Effects** – Construction of the DMCF has the potential to increase fine-grained sediment deposition on the western side of the alignment and in parts of Masonville Cove by 0.4 to 0.8 inches per year. The western side of the dike is proposed as a fringe marsh to soften the shoreline and diversify the habitat adjacent to Masonville Cove. In addition, Masonville Cove enhancements include a proposal to improve the substrates by augmenting with sand to improve SAV habitat potential in Masonville Cove. Reef habitat features (reef balls, sand mounds and rock) are proposed installation in the deeper areas of Masonville Cove to diversify fish habitat. Masonville Cove improvements also include creation or enhancement of tidal wetlands.

vi. **Actions Taken to Minimize Impacts** – Fill area was minimized by evaluation of multiple alternatives; the smallest practicable alternative was chosen in order to minimize open water impacts. Dredging and construction activities would require time of year (TOY) restrictions to minimize impacts to sensitive life stages of anadromous fish from February 15 to June 15. Most of the borrow material for dike construction would be excavated from within the proposed footprint or other areas slated for dredging so no additional areas of river bottom would be disturbed.

B. Water Circulation, Fluctuation, and Salinity Determination

i. **Water Quality** – Temporary, localized changes are expected in clarity, color, and quality of Chesapeake Bay waters in the immediate vicinity during pre-dredging, perimeter dike construction, dredging in the sand borrow areas, and discharge of ponded water through the spillways.

To assess the potential extent and impact of the dredging and dike building plumes, the USACE DREDGE model [developed by the Engineer Research and Development Center (ERDC) in Vicksburg, Mississippi was run for site-specific operations. The DREDGE model indicated that turbidity plumes for the pre-dredging and at dredge point of the borrow material were relatively small and would easily meet Maryland surface water regulations [150 nephelometric turbidity units (NTU) instantaneous maximum, 50 NTU monthly average] within the allowable 10 percent cross-sectional (affected) area. The plume generated at the discharge point would be larger and would exceed the monthly average conditions over approximately 25 percent of the cross section of the Patapsco River if minimization techniques are not employed. STFATE modeling was also conducted on the materials proposed for borrow from the Seagirt dredging project to simulate the larger-grained materials (sand/gravel) being directly deposited from the split-hull barge (scow). This modeling indicated that state turbidity regulations would be achieved within 10% of the cross-sectional area during average tidal conditions.

In addition to turbidity, the DREDGE model was also used to predict release of nutrients and toxics. For the metals and total PCBs, the model predicted that concentrations would be well below the chronic water quality criteria within 20 meters of the dredging point. Similar results were found for the dredging and dike building operations even considering the much higher pumping and discharge rates of the dike building activities. The model assumes that background levels are zero which is a limitation of the model and does not reflect the natural condition. However, the results were confirmed using standard bench (elutriate) tests of both the on-site (Masonville) and proposed Seagirt materials, which did include measurements of background conditions. Standard elutriate testing was completed at five locations at both Masonville and Seagirt and the resulting samples were analyzed for the full suite of priority pollutants recommended by the U.S. Environmental Protection Agency (USEPA) for dredged materials in inland waters. The results of the elutriate analyses for both the Masonville and Seagirt borrow indicated that all of the nutrient parameters evaluated met USEPA's saltwater acute and chronic criteria and State of Maryland saltwater surface water criteria (where criteria exist). DREDGE modeling was also used to predict the potential for nutrient releases. Concentrations of Total Kjeldahl Nitrogen (TKN), nitrate and nitrite, and total phosphorous were calculated for the overburden dredging and dike building activities. The highest nutrient releases would be caused by placement (dike building) operations using the Masonville borrow due to the high volumes of water and dredged material and agitation within the hydraulic dredge. The maximum nutrient concentrations were within 20 meters of the placement point and fell off quickly along the centerline of the plume. Elutriate testing confirmed the initial release of nutrients although the background (control) concentrations were higher than the elutriate values for some locations.

STFATE modeling for contaminant dispersion was also conducted for the Seagirt sand/gravel. The Seagirt sands generally contain very low levels of most contaminants, although a couple of metals were found exceeding TELs at one location. Concentrations of some metals were also elevated in the elutriates at a couple of locations. Although a poor quality site water sample appeared to be driving some of the results, a reanalysis indicated that in one area, (Stations 01/02 in the southern reach of the Dundalk West Seagirt approach channel) nickel and zinc were elevated in the elutriates. Nickel exceeded the US EPA acute criterion at this location. The elutriate values were subjected to STFATE modeling which found that even the highest elutriate concentrations were diluted below the chronic criterion within approximately 300 meters of the discharge point for the worst-case scenario (shallowest depth). All parameters would meet the chronic criteria within 10% of the cross-section of the river (which is the state standard for conventional pollutants). However, because the Masonville elutriates were relatively free of contaminants, the materials at Seagirt Station 01/02 would not meet the criteria of Least Environmentally Damaging Practicable Alternative and will not be used to build the Masonville dikes unless/until the area with elevated metals can be more clearly identified.

During placement of dredged material into the facility, dewatering, and materials management within the facility, water would be discharged via spillways. These discharges could contain elevated levels of nutrients and total suspended solids (TSS). Discharges from facility operations at Masonville would require a National Pollutant Discharge Elimination System (NPDES) Permit, which would mandate the discharge water quality requirements for the project. Estimates of nutrient and toxics loadings were made based upon the monitoring data for the HMI DMCF (scaled to the lesser inflow volumes predicted for Masonville). It is anticipated that discharges at Masonville would be managed to meet an equivalent standard with respect to the current operations at the HMI DMCF, which has not had a measurable impact to the resources within the adjacent waters since it began operations over 20 years ago.

a. Salinity – No change is expected because water discharge would be of similar salinity to those surrounding placement areas.

b. Chemistry – Temporary fluctuations in nutrient concentrations, pH, and some metal concentrations are possible in the immediate vicinity of the placement site spillways during dewatering operations. These discharges would be intermittent and (based upon previous experiences at the HMI DMCF) would only occur over approximately 60 to 70 days per year. The Masonville facility would be managed similar to the HMI DMCF. Discharges from the existing HMI DMCF have been monitored and although elevated metals and nutrients levels have been found at the spillways, no significant changes to the water quality have been identified in 20 years of operation. Since similar conditions are anticipated for discharges from the Masonville DMCF, no substantial long-term changes to the water chemistry are anticipated.

However, the water chemistry of discharges from the project would be monitored according to an MDE-approved monitoring framework as part of the NPDES permit that would be required for site operation.

c. Clarity – Minor and temporary changes are expected in the immediate vicinity of the project during pre-dredging, perimeter dike construction, dredging in the sand borrow areas, and at the placement site spillways because of elevated turbidity.

d. Color – Minor and temporary changes are expected in the immediate vicinity during pre-dredging, perimeter dike construction, dredging in the sand borrow areas, and at the placement site spillways because of elevated turbidity.

e. Odor – No change is expected.

f. Taste – Not applicable.

g. Dissolved Gas Levels – Localized reductions in dissolved oxygen may occur in the immediate vicinity of pre-dredging, perimeter dike construction and dredging in the sand borrow areas due to the reduction of ammonia and some other constituents. Some areas within the Baltimore Harbor already experience anoxia in warmer months. Dredging activities and site operations could exacerbate the problem in a localized area due to the release of nutrients and nutrient cycling. Pre-dredging, borrow and dike building would alter the depths in the project area and Seagirt dredging area below the pycnocline and depressed oxygen levels can be expected. However, the area would be within the DMCF footprint, which would already be disturbed, and a navigation channel, which would be dredged without use of borrow material for the proposed project.

h. Nutrients – The release of nutrients from the sediments during dredging is expected to be short term, temporary, and localized during the pre-dredging and construction of the DMCF. Minimal releases of phosphorus and nitrogen (ammonium) are expected during construction and dredging, but are not expected to be significant. The sandy sediments that are proposed for dike construction have less nutrients but some elevation in nutrients is expected during dike building activities (described above). Intermittent nutrient releases can also be expected during site operations (filling) when dewatering must occur. The existing HMI DMCF has been managing Harbor dredged materials since 1982. Discharges from the HMI DMCF, have been monitored, and no significant changes to the water quality have been identified. The same conditions are anticipated for discharges from the Masonville DMCF, and therefore, no significant changes to water quality are anticipated. However, nutrient concentrations in the discharges would be monitored according to an MDE-approved monitoring framework as part of the NPDES permit that would be required for site operation.

i. Eutrophication – Baltimore Harbor water quality is improving, but ambient nutrient levels are still quite high in warmer months and eutrophication is evident. Site construction and spillway discharges would release nutrients which can stimulate algal growth and cause an oxygen demand. The spillway discharges for the proposed DMCF would be permitted and monitored to meet MDE requirements for Total Maximum Daily Loads (TMDLs) for the watershed. It is anticipated that this would serve to decrease the potential for the site to exacerbate the current eutrophication in Baltimore Harbor.

j. Others as Appropriate – The sediments within the proposed project (Masonville DMCF) footprint are known to have elevated concentrations of metals and some organics (particularly PCBs) due to past industrial activities on the adjacent shorelines. Dredging activities tend to resuspend chemicals within the sediments and short-term elevations in these constituents can be expected near the site during pre-dredging and dike construction activities. Modeling and elutriate analysis have indicated that toxics releases are not likely to be significant.

ii. Current Patterns and Circulation

a. Current Patterns and Flow – Based on the hydrodynamic modeling conducted for the Masonville DMCF, water surface elevations would be unaffected by construction of the project (Proposed Masonville DMCF EIS, Appendix A). Following construction, water flow would be trained around the DMCF, with slight velocity increases to the north over Ferry Bar Channel. Slight increases in flow are likely to result in downstream sections of Ferry Bar Channel with slight decreases in the upstream end, Masonville Cove and along the shoreline southeast of the DMCF. Marginally longer residence times are predicted in Masonville Cove, resulting in potential for increased sedimentation. Displacement of flow toward the Ferry Bar Channel could result in potential for increased sedimentation rates in some part of Ferry Bar Channel.

b. Velocity – Based on the hydrodynamic modeling conducted for the Masonville DMCF, minor changes to current speeds were predicted (Proposed Masonville DMCF FEIS, Appendix B). Following construction, surface velocities would be slightly increased to the north over the Ferry Bar channel. Slight increases in surface velocity are likely to result in the downstream section of Ferry Bar Channel with slight decreases in the upstream end, Masonville Cove and along the shoreline southeast of the DMCF.

c. Stratification – Although some parts of the Masonville site are over 15 ft deep, little stratification was noted during existing condition surveys. Pre-dredging and sand excavation on-site would increase depths to approximately -60 ft MLLW in some parts of the proposed Masonville DMCF footprint and

stratification is expected to occur in those areas. However, these areas would be within the dike of the proposed Masonville DMCF. No changes in stratification are predicted for areas outside the Masonville DMCF footprint.

Seagirt is permitted to be dredged to a depth of -52 ft MLLW without the use of borrow material at Masonville Under the preferred option, Seagirt would be dredged to either a depth of -53 or -54 ft MLLW to utilize borrow material at this site. Stratification already occurs within the existing channels (which are -42 feet MLLW) and would continue to occur if the area is dredged to either the permitted or proposed depth.

d. Hydrologic Regime – No significant changes are expected.

e. Alteration to Bottom Contours – Pre-dredging and sand excavation on-site would increase depths to -60 ft MLLW in some parts of the proposed Masonville DMCF footprint. However, these would be within the dike of the proposed Masonville DMCF. No changes in depth or bottom contour are predicted for areas outside the Masonville DMCF footprint.

Seagirt is permitted to be dredged to a depth of -52 ft MLLW without the use of borrow material at Masonville. Under the preferred option, Seagirt would be dredged to either a depth of -53 or -54 ft MLLW to utilize borrow material at this site.

iii. Normal Water Fluctuation – No significant changes are expected.

iv. Salinity Gradients – No changes are expected.

v. Actions to Minimize Impacts – All in-water borrow material for dike construction that would be excavated from within the proposed footprint or an area that would be dredged regardless of the Masonville project so that no additional areas of River bottom would be disturbed.

C. Suspended Particulate/Turbidity Determination

i. Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Project Site – Minor, temporary and localized increases in turbidity are expected during pre-dredging and perimeter dike construction The DREDGE model indicated that turbidity plumes for the pre-dredging and at the dredge point of the borrow material were relatively small and would easily meet Maryland surface water regulations (150 NTU instantaneous maximum, 50 NTU monthly average) for the allowable 10 percent cross-sectional area. The plume generated at the discharge point would be larger and would exceed the monthly average conditions over approximately 25 percent of the cross section of the River if minimization techniques are not employed. Intermittent increases in turbidity would also be associated with spillway discharges during dewatering. These

would be managed to meet State surface water criteria and NPDES permit limits. As described in Section II.B.i, dewatering activities require release of ponded site waters through the spillways. This is an intermittent activity that is expected to result in elevated turbidity within the adjacent waterway. Spillway discharges would be managed with a NPDES permit and monitored so the discharges would conform to State surface water regulations

ii. Effects on Chemical and Physical Properties of the Water Column – Minor, temporary and localized increases in turbidity are expected during pre-dredging, perimeter dike construction, and discharge from the spillways.

a. Light Penetration – A minor, temporary decrease in light penetration is anticipated in the sediment plumes that result from the perimeter dike construction and pre-dredging in the sand borrow areas. No changes in light penetration are expected from the spillway discharges because turbidity would be managed and monitored during discharge through the spillways, and would meet the limits set in the NPDES permit.

b. Dissolved Oxygen – Localized reductions in dissolved oxygen may occur in the immediate vicinity of perimeter dike construction and pre-dredging in the sand borrow areas at Masonville These are expected to be short-term effects outside the proposed Masonville DMCF. The deeper areas (created by pre-dredging and sand excavation for dike construction) would very likely become anoxic in warmer months. However, these would be within the dike of the proposed Masonville DMCF. Nutrient releases may stimulate algal growth, which could increase the oxygen demand in a localized area. Oxygen demand would also increase from the reduction of nutrients such as ammonium.

Seagirt is permitted to be dredged to a depth of -52 ft MLLW without the use of borrow material at Masonville Under the preferred option, Seagirt would be dredged to either a depth of -53 or -54 ft MLLW to utilize borrow material at this site. Stratification already occurs within the existing channels (which are -42 feet MLLW) and would continue to occur if the area is dredged to either the permitted or proposed depth. Because the depths of the preferred option would be within 2 feet of the controlling depths of the adjoining channel, potential exacerbation of the low oxygen conditions is expected to be minimal.

c. Toxic Metals and Organics – Perimeter dike construction, pre-dredging in the sand borrow areas, and pre-construction remediation of derelict vessels could result in release of contaminants from the sediments within the footprint of the proposed Masonville DMCF. Dredging activities tend to resuspend chemicals within the sediments and short-term elevations in these constituents can be expected near the site during pre-dredging and dike construction activities. The effects are expected to be very localized (see Section II.B.i)

and are expected to only have short-term impacts on water quality. Modeling and elutriate analysis have indicated that toxics releases are not likely to be significant.

As described in Section II.B.i, dewatering activities require release of ponded site waters through the spillways. This is an intermittent activity that is expected to result in release of nutrients and some metals to the adjacent waterway. Spillway discharges would be managed with a NPDES permit and monitored so the discharges would conform to State surface water regulations. During dredged material dewatering, the pH significantly decreases and metals become soluble potentially altering the water quality of effluent discharged through the spillways. However, exterior water quality monitoring in the vicinity of the HMI DMCF, which has handled Baltimore Harbor materials for years, has not identified any significant impacts due to toxics releases as a result of dredged material placement.

d. Pathogens – Perimeter dike construction, pre-dredging in the sand borrow areas, and discharges from the spillways are not expected to result in the release of any measurable amounts of pathogens into the water column.

e. Aesthetics – Temporary increases in water column turbidity during perimeter dike construction, pre-dredging in the sand borrow areas, and discharges from the spillways may constitute a short-term decrease in aesthetic values.

f. Others as Appropriate – None.

iii. Actions to Minimize Impacts – Dike construction would be phased in order to minimize turbidity plumes. The cofferdam structure on the eastern side of the site would be constructed first. The western dike would be constructed next in order to protect the resources within Masonville Cove. Dike construction would involve mounding of material and formation of training dikes, which would act as a discharge control structure. Turbidity curtains will be installed around the placement point to decrease the potential spread of turbidity plumes within the waterbody. Assuming 50 to 60 percent effectiveness in turbidity reduction, turbidity curtains should make it possible to comply with surface water turbidity regulations.

Exterior dikes would be raised to +4 ft MLLW around the entire perimeter of the site in order to isolate the dike building activities from the Patapsco River as quickly as possible. Borrow material for dike construction that would be excavated from within the proposed footprint and the Seagirt dredging area (which would be dredged without the proposed Masonville DMCF project), so that no additional areas of river bottom, not slated for dredging or construction, would be disturbed. Off-site, upland borrow would be minimized to the extent possible. The fine, unsuitable overburden would be removed mechanically (with a mud bucket dredge) in order to minimize resuspension of fine particulates and

potential mobilization of contaminants. Any Arundel clay borrowed from below the sand would be excavated after the basic perimeter dike is constructed to +4 ft MLLW in order to contain the plume of fines within the site. The clay would, therefore, be used on the interior of the dike. The dikes would be lined to further isolate any contaminants within the site.

D. Contaminant Determination

Fine-grained sand and gravel used to construct the proposed containment dikes would be dredged from within the footprint of the proposed Masonville DMCF and the Seagirt dredging area. The dike construction materials lie beneath a silt overburden that would need to be pre-dredged (removed) to expose the dike materials. The sediments within the proposed footprint borrow area have been tested and the results indicate that the surficial materials are contaminated with various contaminants. Metals, pesticides and PCBs were detected at levels above sediment quality guidelines for probable effects to the ecosystem. The sediments from within the Seagirt borrow area have also been tested. Sediment quality analysis for both the Seagirt and onsite borrow sources has been completed and these sources were found suitable as dike construction materials. An area in the southern Dundalk West Channel is excluded from consideration for borrow because of the results of this screening. The DREDGE model was used to predict release of contaminants during dredging and dike building activities. For the metals and total PCBs, the model predicted that concentrations would be well below the chronic water quality criteria within 20 meters of the dredging point. Similar results were found for the dredging and dike building operations even considering the much higher pumping and discharge rates of the dike building activities. The results were confirmed using standard bench (elutriate) tests of the on-site materials which did include measurements of background conditions. Standard elutriate testing was completed at five locations and both Masonville and Seagirt and the resulting samples were analyzed for the full suite of priority pollutants recommended by the USEPA for dredged materials in inland waters. The results of the elutriate analyses indicated that all of the parameters evaluated met USEPA's saltwater acute and chronic criteria and State of Maryland saltwater surface water criteria (where criteria exist) with the exception of materials from the southern Dundalk West Channel area (Seagirt Station 01/02). Materials from the vicinity of Seagirt Station 01/02 would not meet the criteria of Least Environmentally Damaging Practicable Alternative and will not be used to build the Masonville dikes unless/until the area with elevated metals can be more clearly identified.

The sediment that would be contained within the proposed Masonville DMCF would be dredged from various areas within the Harbor. It is expected that most would be from maintenance dredging operations from the State and Federal navigation channels although some could be from new work projects (such as berthing facilities) or smaller private channels. Sediments from the Federal navigation channels are currently tested for priority pollutant concentrations every three years according to Inland Testing Manual (USEPA/USACE 1998) methods

and guidance. The sediment was found to consist of relatively low cohesion silts and clays with some fine sands. Much of the material that would be dredged is known to contain elevated concentrations of typical urban, riverine sediment contaminants such as metals, PCBs, and other pesticides. Concentrations of some of the contaminants are expected to exceed sediment quality guidelines for probable ecological effects. Studies on the dispersion of these materials during dredging in the Harbor indicated that few contaminants were detected above background levels (see Section II.B.i).

The proposed Masonville DMCF would require a NPDES Permit, which would mandate the discharge water quality requirements for the project. Estimates of nutrient and toxics loadings were made based upon the monitoring data for the HMI DMCF (scaled to the lesser inflow volumes predicted for Masonville). It is anticipated that discharges at Masonville would be managed to meet an equivalent standard with respect to the current operations at the HMI DMCF, which has not had a measurable impact to the resources within the adjacent waters since it began operations over 20 years ago.

The project would remediate or cap contaminated sediments on the western side of the site, isolating them from the Patapsco River ecosystem. This is expected to have a long-term positive impact on tissue contamination at all trophic levels.

E. Aquatic Ecosystem and Organism Determination

The single, most significant effect of the proposed action would be to fill 130 acres of open water within the ecosystem. Three of these acres are existing unauthorized fill. Of the 130 acres of open water filled, 123 acres are also lost river bottom habitat and 7 acres are being converted to manmade substrate at shallower depths. This would constitute a net reduction in Patapsco River bottom habitat, benthic habitat, and open water in the Baltimore Harbor. Fisheries resources currently utilizing the area would be displaced.

i. Effects on Plankton – Short-term increases in turbidity associated with perimeter dike construction, pre-dredging in the sand borrow areas, and discharges from the spillways could temporarily and locally depress phytoplankton communities. Long-term effects are expected to be negligible. Minor, localized, and temporary increases in nutrient concentrations could potentially stimulate phytoplankton growth, but are not expected to be significant based upon observations in the vicinity of the Poplar Island facility for nutrients, chlorophyll *a* and phaeophytin. Pre-dredging and dike construction may release some toxics to the water column but the effects are predicted, based upon modeling and elutriate testing, to be minor and very localized. Plankton studies in the area found zooplankton and fish species that are ubiquitous to the Chesapeake Bay. No early lifestages of sensitive anadromous or other commercially important species were found at the site. Therefore, any effects on plankton would be localized and negligible to the ecosystem. Masonville Cove improvements are expected to improve water

quality in a localized area, which should have positive impacts on plankton in that area.

ii. Effects on Benthos – The largest, adverse effect to benthos would be a loss of 123 acres of river bottom habitat and a conversion of 7 acres to manmade substrate at shallower depths. Non-mobile benthos within the site footprint would be lost as a result of pre-dredging and sand borrow activities. However, the benthic community in much of the proposed DMCF footprint is already stressed and degraded due to poor sediment and water quality. Construction of the DMCF has the potential to increase fine-grained sediment deposition in the western side of the alignment and in parts of Masonville Cove by 0.4 to 0.8 inches per year. The benthic community is expected to be able to adapt to this change because deposition would be so gradual. The proposed improvements to Masonville Cove would improve substrates for benthic macroinvertebrates. The rock dikes and hard fisheries habitat structures (rock and reef balls) would provide vertical habitat for epibenthic colonization. Piling sand among the hard structures would increase the potential area for benthic colonization.

Pre-dredging and dike construction may release some toxics to the water column but the effects are predicted (based upon modeling and elutriate testing) to be minor and very localized. Invertebrates are sensitive to dissolved metals and dredging/construction activities could have a short-term impact on benthic conditions in a localized area As stated elsewhere, Masonville Cove improvements are expected to improve water quality and substrates in a localized area, which should have positive impacts on benthos within the area.

Nutrient releases during construction and operations could stimulate phytoplankton growth, increasing oxygen demand and potentially exacerbating hypoxia/anoxia in the short term. Benthic areas below the pycnocline (depths greater than -15 ft MLLW) would be most affected by this potential impact.

iii. Effects on Filter-Feeders – Short-term effects on filter-feeders, are expected as a result of the increased turbidity associated with perimeter dike construction and pre-dredging in the sand borrow areas. No natural oyster bars lie within the vicinity of the site. There is an oyster restoration (planting) area near Ft. Carroll, but that is over 4 miles downstream of the project. Platform mussels and barnacles are known to occur in Masonville Cove. Both are robust native species that already grow in the highly turbid waters of the lower Patapsco River and should be able to adapt to temporary increases in turbidity.

As stated elsewhere, pre-dredging and dike construction may release some toxics to the water column but the effects are expected to be minor and localized. Dredging/construction activities could have a short-term impact on filter feeders in a localized area near the construction point. Turbidity curtains would be employed to minimize the extent of the turbidity plume. As stated elsewhere, Masonville Cove improvements are expected to improve water quality in a

localized area and provide hard substrates that would improve habitat conditions for filter feeders.

iv. Effects on Nekton – Short-term and indirect effects on the early life stages of some species, specifically during egg and larval stages, are expected as a result of the increased turbidity associated with perimeter dike construction and pre-dredging in the sand borrow areas. Suspended particles readily adhere to many of the fish eggs, making them less buoyant (in the case of pelagic eggs) or smothering them (in the case of demersal eggs). Short-term, localized impacts could also result from the entrainment of fish eggs and larvae during hydraulic dredging. Suspended sediments could also indirectly affect finfish by impairing their ability to feed (by limiting sight and ability to detect prey) of some larval and juvenile fish, including striped bass that are dependent on vision to detect prey. Short-term increases in turbidity are expected to have a negligible effect on larger, more mobile members of the fish community that would likely avoid the areas of highest turbidity.

Pre-dredging and dike construction may release some toxics to the water column although, based upon modeling and elutriate testing, the effects are expected to be minor and localized. Early lifestages of fish are sensitive to dissolved metals. Dredging and construction activities could have a short-term impact on early lifestages of fish in a localized area. The estuarine portion of the Patapsco is known to support young of the year (YOY) anadromous species such as river herring and white perch. Spawning occurs in freshwater parts of the river at least 5 miles upstream. The fish are post-larval and more robust by the time that they reach the study area and would be less sensitive to water column toxics. TOY restrictions from February 15 to June 15 would be required for pre-dredging and construction to protect anadromous fish.

As stated elsewhere, Masonville Cove improvements are expected to improve water quality and fish habitat, which is expected to have a positive impact on nekton in that area.

v. Effects on Aquatic Food Web – The long-term project effects are expected to be minor. Although the loss of 127 acres of open water is significant, the compensatory mitigation for the proposed project would improve the Masonville Cove area immediately adjacent to the site. Loss of benthics within the footprint would occur in an area that is already degraded. Decreases in plankton during pre-dredging and dike construction may have short-term impacts to food availability for some fish and avian species. However, the project will improve the benthic conditions within the adjacent cove and add in-stream habitat (reef structures) that will support a variety of aquatic species. It would also remediate contaminated sediments on the western side of the site, removing them from the ecosystem. This has the potential to have a long-term positive impact on tissue contamination at all trophic levels in the study area.

vi. **Effects on SAV –** A small area of SAV (0.38 acres) occurs within the footprint of the proposed DMCF. In addition, approximately 10 acres of shallow water habitat (SWH) and Tier II/III SAV habitat are located within the proposed alignment. These areas would be impacted by site development and would be mitigated as part of the larger mitigation efforts for the open water habitat. Some SAV occurs within Masonville Cove and should not be impacted by pre-dredging, dike construction, or DMCF operations. The predicted increase in sedimentation to Masonville Cove is expected to occur on an annual basis and should not affect SAV in the Cove. Some Masonville Cove improvements are specifically targeted to improve substrate, which would encourage SAV expansion. The hard substrates that would be installed for fish habitat would provide attachment points for encrusting bivalves such as platform mussels, which are expected to improve water quality in a localized area.

vii. **Effects on Special Aquatic Sites** – Less than 1 acre (delineated as 0.4 acres) of vegetated wetlands would be impacted. Improvements to Masonville Cove are the centerpiece of the compensatory mitigation package. Masonville Cove is a Designated Habitat Protection Area (DHPA) within Baltimore City, mainly due to bird utilization. This function would be protected and enhanced as part of the project.

The Patapsco River estuary lies within the general area that provides Essential Fish Habitat (EFH) for seven species managed under Section 305 (b)(2) of the Magnuson-Stevens Fishery Conservation & Management Act (MSFCMA). Based on coordination with the National Marine Fisheries Service (NMFS), it was determined that the project area lies within waters designated as Essential Fish Habitat (EFH) for juvenile and adult summer flounder, adult and juvenile bluefish and contains a small amount of SAV, which is designated as Habitat Areas of Particular Concern (HAPC) for summer flounder. Low numbers of both species were collected in site-specific studies, so an EFH assessment was conducted. The assessment concluded that because both species were uncommon to the area and the in-stream habitat and forage impacts would not be significant to bluefish or summer flounder populations within the Chesapeake Bay.

a. **Sanctuaries and Refuges** – Not applicable.

b. **Wetlands** – Less than 1 acre of vegetated wetlands (delineated as 0.4 acres) would be affected by the proposed project and would require mitigation as part of the tidal wetlands permit. The wetlands occur at the southern extent of the KIM Channel and the condition of the area is degraded or severely degraded.

c. **Mud Flats** – No mud flats would be affected. Some mud flats may be expanded within Masonville Cove as a result of wetlands creation and restoration and increased sedimentation.

d. Vegetated Shallows – A small area of SAV (0.38 acres) occurs within the footprint of the proposed Masonville DMCF. In addition, approximately 10 acres of SWH and Tier II/III SAV habitat are located within the proposed alignment. These areas would be impacted by site development and would be mitigated as part of the larger mitigation efforts for the open water habitat. Masonville Cove improvements are designed to positively impact vegetated shallows in that area.

e. Coral Reefs – Not applicable.

f. Riffle and Pool Complexes – Not applicable.

vii. Threatened and Endangered Species – The applicable Federally-listed species of importance noted for the project area include for this project include the Federally threatened bald eagle (*Haliaeetus leucocephalus*), the federally endangered shortnose sturgeon, and four species of sea turtles: loggerhead (*Caretta caretta*), Kemp's ridley (*Lepidochelys kempii*), leatherback turtle (*Dermochelys coriacea*), and the green sea turtle (*Chelonia mydas*).

In a letter dated October 14, 2005, Maryland DNR indicated that an active bald eagle nest was located on the northwestern tip of Masonville Cove and that the site lies within the general area that could potentially provide habitat for hooded merganser and common moorhen. No hooded mergansers or common moorhen were observed during site-specific surveys. In winter 2006, the eagle tree was blown down and the status of their ability to use the remaining trees is uncertain. In an email dated April 1, 2006, the Maryland DNR concurred that the eagle nest and nesting tree was no longer present at the site.

Consultations with NMFS in October 2005 and March 2006 indicated that an Endangered Species Act Assessment (ESA) assessment needed to be prepared for the sea turtles, shortnose sturgeon, and listed large whales. The assessment has indicated that the project poses no threat to aquatic rare, threatened, and endangered (RTE) species. The closest shortnose sturgeon collection is 7 miles away near the mouth of the Patapsco River. The species is not known to occur at the project site and is, at most, transient to the area. Therefore no impacts are expected. Sea turtles occur within the Chesapeake Bay but are exceedingly rare in the northern Chesapeake Bay and no sightings or strandings have been reported within Baltimore Harbor, indicating that sea turtles are not likely utilizing the project area.

The ESA assessment also includes an assessment of impacts to large listed whales predominantly from ship strikes resulting from increased traffic due to site activities. The assessment included: northern right whale (*Eubalaena glacialis*), humpback whale (*Megaptera novaeangliae*), fin whale (*Balaenoptera physalus*), sei whale (*Balaenoptera borealis*), blue whale (*Balaenoptera musculus*), and the sperm whale (*Physeter macrocephalus*). Direct impacts to whales from site

development and operation are not expected because whales do not occur in this part of the Bay. Projections of port calls indicate that ship traffic to the Port of Baltimore may increase 1.8 times within the next 20 years but the contribution of the current project to that increase is difficult to ascertain. Because listed whales are relatively rare in the Mid-Atlantic region, except during migrations and current ship strikes are relatively low in the area, the project is not expected to significantly increase the risk of ship strikes along the shipping routes to and from the Port of Baltimore.

In a letter dated July 28, 2006, NMFS indicated concurrence with the no significant impact assessment for shortnose sturgeon, sea turtles, and listed whales.

viii. Other Wildlife – Impacts to wildlife are not expected to be significant because few wildlife utilize the industrial areas adjacent to the proposed Masonville DMCF. The Masonville Cove supports a wide variety of avian species as well as deer and some other mammals. Improvements to Masonville Cove are expected to have positive impacts to wildlife.

ix. Actions to Minimize Impacts – It is expected that the pre-dredging and dike construction activities may need to adhere to TOY restrictions for the protection of aquatic species. Dike construction would be phased in order to minimize turbidity plumes. The cofferdam structure on the eastern side of the site would be constructed first. The western dike would be constructed next in order to protect the resources within Masonville Cove. It is expected that turbidity curtains would be installed around the placement point to decrease the potential spread of turbidity plumes within the waterbody. Assuming 50 to 60 percent effectiveness in turbidity reduction, turbidity curtains should make it possible to comply with surface water turbidity regulations.

Exterior dikes would be raised to +4 ft MLLW around the entire perimeter of the site in order to isolate the dike building activities from the River as quickly as possible. Borrow material for dike construction would be excavated from within the proposed footprint and the Seagirt dredging area so that no additional areas of Patapsco River bottom would be disturbed. Off-site borrow would be minimized to the extent possible. The fine unsuitable overburden material from the Masonville site would be removed mechanically (with a mud bucket dredge) in order to minimize resuspension of fine particulates and potential mobilization of contaminants. Any Arundel clay borrowed from below the sand would be excavated after the basic perimeter dike is constructed to +4 ft MLLW in order to contain the plume of fines within the site. The clay would, therefore, be used on the interior of the dike. The dikes would be lined to further isolate any contaminants within the site.

E. Proposed Placement Site Determination

i. Mixing Zone Determinations – It is anticipated that the proposed Masonville DMCF would need to comply with State NPDES permit conditions and that any discharges from the facility would be managed for limits set at the spillways (assuming no mixing zone). Nutrient and toxics loadings were estimated based upon the HMI DMCF spillway data, scaled to the proposed Masonville project. The loadings would be used as a basis for the NPDES permit application or the spillways.

For construction, it is assumed that mixing would be allowed over 10 percent of the cross-sectional area of the Patapsco River. As described previously, DREDGE modeling determined that construction activities would create turbidity plumes that could exceed surface water criteria for turbidity on a monthly average basis if no minimization techniques are employed. Turbidity curtains will be utilized around the construction area to decrease the spread of TSS in order to comply with surface water regulations. DREDGE modeling and elutriate testing indicated that release of contaminants would be minor and short-lived. All constituent concentrations met acute and chronic surface water criteria in the elutriate preparations.

ii. Determination of Compliance with Applicable Water Quality Standards – See II.f.1. DREDGE modeling determined that construction activities would create turbidity plumes that could exceed surface water criteria for turbidity on a monthly average basis over the allowable affected cross-section if no minimization techniques are employed. Turbidity curtains will be utilized around the construction area to decrease the spread of TSS in order to comply with surface water regulations. DREDGE modeling and elutriate testing indicated all contaminant concentrations met acute and chronic surface water criteria in elutriate preparations. Nutrient and toxics loadings were estimated based upon the HMI DMCF spillway data, scaled to the Masonville project. The loadings would be used as a basis for the NPDES permit application. Discharges through the spillways would be monitored and would need to meet State water quality standards and the turbidity and TSS limits prescribed in the NPDES permit required for site operations.

iii. Potential Effects on Human Use Characteristics

g. Municipal and Private Water Supply – No effect is expected.

h. Recreational and Commercial Fisheries – The proposed DMCF lies within a part of the Harbor that supports only minimal commercial harvesting due to gear restriction, fish tissue contaminants, and abundances of key species. Therefore no effect on commercial fisheries is expected. The Masonville area is not an important recreational fishing area at present, so no negative impacts

are expected. In the long-term, Masonville Cove improvements should have a positive impact to recreational fishing.

i. Water Related Recreation – Little water-related recreation currently occurs around Masonville so no negative impacts are expected. In the long-term, Masonville Cove improvements, which would include a non-motorized boat launch, should have a positive impact to water related recreation.

j. Aesthetics – The proposed Masonville DMCF has the potential to be a major element in the landscape from some vantages. However, it would be similar to the surrounding industrial views in the current urban Harbor landscape. Masonville Cove improvements are expected to diversify the plants in the critical area buffer, which should help improve aesthetics.

k. Parks, National and Historic Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves – Fort McHenry lies within 1 mile of the proposed DMCF, along the North side of the River. Viewshed analysis has indicated that the proposed DMCF would be similar to the shoreline views of the existing DMCF and would not constitute an impact. Consultation with the National Park Service (NPS) has been completed. The development plan for the proposed Masonville DMCF includes debris cleanup and derelict vessel remediation along the eastern side of the site (near KIM), which improves the view at Fort McHenry. No other national parks or recreation areas are within 3 miles of the site.

F. Determination of Cumulative Impacts on the Aquatic Ecosystem – Activities warranting greatest attention from the cumulative impacts perspectives are those activities that in combination with development of the proposed Masonville DMCF would potentially magnify what are perceived by resource agency personnel and the public as the largest, adverse impacts of the proposed work in Baltimore Harbor and adjacent areas of the Chesapeake Bay. These activities meriting particular scrutiny include: 1) conversion of large areas of open water and Patapsco River bottom habitat, including shallow water habitat, to upland habitat, 2) other major nutrient or turbidity inputs, and 3) other major in-water construction projects or dredging operations.

Most of the large in-water construction projects that have impacted taking of Patapsco River bottom were not constructed very recently. For this analysis, only projects constructed since approximately 1980 were considered recent. Recent and reasonably foreseeable human actions that have converted or would convert open water habitat to uplands include the HMI DMCF, the rehabilitation of the Cox Creek DMCF, the proposed Masonville DMCF, the proposed second and third harbor placement options (Sparrows Point and BP-Fairfield sites), the proposed AES Sparrows Point LNG Terminal, and several miscellaneous small projects (totaling 2 acres) within the Patapsco River. The Cox Creek facility was constructed in the 1960s by Kennecott Refining Company and was rehabilitated to accept Harbor materials beginning in

2002. At that time, 5 acres of in-water construction were necessary to rehabilitate the existing dikes. The acreages of the current and proposed facilities are as follows:

Facility	**Status**	**Acres**
Hart-Miller Island DMCF	Existing	1,140
Seagirt Marine Terminal	Existing	149
Cox Creek DMCF	Existing	5*
Masonville DMCF	Proposed	130
Sparrows Point DMCF	Proposed	Up to 460
BP-Fairfield DMCF	Proposed	146-199
Other Pending Projects in the Patapsco River	Proposed	2

** acres added as part of site rehabilitation*

It is anticipated that at least one additional placement site would be required after the proposed Masonville DMCF (either Sparrows Point, BP-Fairfield, or both). It is also anticipated that the current end use of the project would be a terminal facility. To accommodate that use, the existing Pier 3 would need to be demolished and replaced with a relieving platform to accommodate cargo ships. Some widening of the existing channel may also be required. This would involve approximately 2 additional acres of impact to open water areas of the Harbor. In addition, other non-Federal projects may be implemented in the Patapsco River. If all of the proposed projects are implemented and terminal improvements are required, approximately 2,085 acres of open water habitat would be lost and bottom habitat would be lost and/or disturbed in or near the Patapsco River. Additional temporary disturbances are expected due to channel maintenance and other maintenance dredging operations including such projects as the AES Sparrows Point LNG Terminal. However, these projects will not constitute a permanent loss of Bay bottom and are already at a depth that would have lower DO in warmer months (constituting no additions to anoxia/hypoxia).

The proposed Masonville DMCF and the other proposed (fill) facilities would add to the waste load (within the water) in and around Baltimore Harbor. The HMI DMCF, because it is closing, would only be actively discharging for the first 2 to 3 years of Masonville operations (until 2011 or 2012) during HMI capping activities, so that this source of nutrients and other constituents would not be cumulative after 2011. Discharges beyond that point would be minimal and predominantly storm-water. The second or third harbor options, if implemented, would constitute additional point sources and loadings to the Patapsco-Back River complex. Based upon the proposed sizes of the BP-Fairfield and Sparrows Point sites, the loadings are expected to be between one to two times those at Masonville, respectively. However, the current proposed implementation schedule has them coming on line after the HMI DMCF is closed.

The projected daily loadings from Masonville or any of these DMCFs are substantially lower than those of most of the major point source contributors in the

Patapsco River, but would add to the overall loadings within the lower Patapsco River, which is already designated as impaired for nutrients. Excessive nutrients can stimulate phytoplankton growth and contribute to anoxic conditions. Because the discharges are intermittent, these would be short-term effects. It is anticipated that Masonville and any or all future DMCF loadings would need to be offset or mitigated in order for the Patapsco-Back River tributary complex to meet maximum daily load future TMDL requirements for the tributary.

The conversion of 2,085 acres of open water habitat within the Patapsco River and adjacent areas of the Chesapeake Bay would permanently displace fisheries resources from these areas. Because the lower Patapsco River supports both anadromous and marine species, both migratory and resident fish are likely to be displaced. The Patapsco estuary lies within the general area that provides EFH for seven species managed under the MSFCMA. Based on NMFS coordination, it was determined that the project area lies within waters designated as EFH for juvenile and adult summer flounder, adult and juvenile bluefish. Low numbers of both species were collected in site-specific studies, so an EFH assessment was conducted. The assessment concluded that because both species were uncommon to the area, therefore the in-stream habitat and forage impacts would not be significant to bluefish or summer flounder populations within the Chesapeake Bay. Many of the mitigation options being considered would be designed to improve water quality and enhance fisheries habitat within the lower River, which could be a net improvement in some areas.

Commercial fisheries harvesting is minimal near Masonville and the BP-Fairfield site, but does occur in the outer Harbor near Sparrows Point. Because Sparrows Point is the only current or future site that potentially supports significant commercial harvesting, direct cumulative impacts to commercial harvesting areas are not expected from the development of the proposed Masonville DMCF. Although losses of open water habitat are projected, the associated mitigation and enhancement of fisheries habitat within the lower Patapsco River could have a positive effect on harvestable resources by lowering the tissue contaminant levels in some areas of the lower watershed. The cumulative effect of capping or remediation of sediment contaminants as a result of the proposed DMCFs or associated mitigation projects will lower the amount of legacy contaminants that are available within the foodchain in some areas.

No other potential cumulative impacts are expected.

G. Determination of the Indirect Impacts on the Aquatic Ecosystem – Indirect impacts to the aquatic ecosystem have the potential to improve conditions in some parts of the Patapsco estuary. Although 2,085 acres of open water would be converted to uplands within the area, many of the mitigation projects that are ongoing or proposed will increase wetlands creation in the area. Some have the potential to produce indirect positive impacts by improving (capping) sediment contamination, softening shorelines, adding wetlands and instream habitat features, improving storm water and other waste

systems, stocking and restoring fisheries and improving the critical area around the lower Patapsco River.

III. FINDING OF COMPLIANCE

A. No adaptations of the Section 404(b)(1) Guidelines were made for this evaluation.

B. Evaluation of Alternatives:

The proposed Masonville DMCF has been identified as the least environmentally damaging practicable alternative as a result of the alternatives analysis undertaken in accordance with the Guideline given in 40 Code of Federal Regulations (CFR) 230.10(a). The project is a specific recommendation of the State of Maryland DMCF and further investigation of confined disposal facilities (CDFs) are specifically recommended for Harbor dredged material management in the *Baltimore Harbor and Channels Dredged Material Management Plan and Tiered Environmental Impact Statement* (USACE 2005).

Placement of a CDF in the Patapsco River is the most practicable alternative for management of Harbor materials at this time. The location of the alignment for the proposed Masonville DMCF was carefully selected in order to protect the adjacent Masonville Cove, which is defined as a DHPA. Ecosystem-level improvements in Masonville Cove are being integrated into the site development plan.

The plan formulation process for the expansion study included analysis of hundreds of potential options for upland disposal, island creation, fastland creation, and even innovative reuses. The screening involved Federal and local resource agencies and citizen stakeholders. The assessment found that upland and innovative reuse options currently identified were not practicable in the short-term (in time to meet the current need) due to: (1) land ownership issues; (2) local statutory restrictions; and (3) the need to develop major infrastructure or processes. Consequently, in-water options became the most practicable to meet the short-term need and of the most viable in-water options, Masonville was selected based upon best meeting ecological, engineering, and real estate constraints.

C. The proposed construction and fill with dredged material is not contrary to other State and Federal laws for the protection of water quality, aquatic species, or habitat; as follows:

- **i.** The proposed construction, dredging, and placement of dredged material would be in compliance with State water quality standards.
- **ii.** The proposed construction, dredging, and placement of dredged material is not expected to violate the Toxic Effluent Standard of Section 307 of the Clean Water Act. No contaminants would be discharged in toxic concentration in violation of Section 307 of the Clean Water Act.
- **iii.** The proposed project would not negatively affect any endangered species.

iv. No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are in the project area.

v. The proposed construction, dredging, and placement of dredged material would not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife would not be adversely affected.

vi. The proposed construction, dredging, and placement of dredged material would not result in significant, adverse effects to aquatic diversity, productivity, or stability.

vii. The proposed construction, dredging, and placement of dredged material would not result in significant, adverse effects to recreational, aesthetic, or economic values.

Thus the proposed construction, dredging, and placement of dredged material satisfies the requirements test of 40 CFR 230.10(b).

D. The proposed construction, dredging, and placement of dredged material during the operation of the proposed Masonville DMCF would not contribute to the degradation of waters of the United States and as such, the proposed project and proposed use of the placement sites does comply with the requirements of 40 CFR 230.10(c).

E. Appropriate steps to minimize potential impacts of the placement of the material to aquatic systems, as discussed in the relevant sections above, would be followed. Thus the proposed construction, dredging, and placement of dredged material satisfies the requirements test of 40 CFR 230.10(d).

On the basis of the Guidelines, the proposed placement site for the discharge of dredged material is specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem.

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