General Electric Company
Albany, New York

Phase 2 Final Design Report for Reach 7
(the Landlocked Area)

Hudson River PCBs Superfund Site

October 2013
# Table of Contents

1. **Introduction** 1

2. **Landlocked Area Dredging Approach** 4  
   2.1 Evaluation of Dredged Material Transport Options 4  
   2.2 Landlocked Area Implementation Approach 8  
      2.2.1 Remedial Action Work Plan Submittals 9  
      2.2.2 Landlocked Area Dredging Schedule 10  

3. **Design Supporting Information – Reach 7** 12  
   3.1 Phase 2 Performance Requirements 12  
      3.1.1 Record of Decision Requirements 12  
      3.1.2 Engineering Performance Standards 13  
      3.1.3 Quality of Life Performance Standards 13  
      3.1.4 Phase 2 Water Quality Requirements 13  
      3.1.5 Monitoring and Reporting 13  
   3.2 Summary of Phase 2 Design Support Activities 14  
      3.2.1 Sediment Sampling and Analysis Program and Supplemental Engineering Data Collection Program 14  
      3.2.2 Bathymetry Surveys 15  
      3.2.3 Habitat Delineation and Habitat Assessment 16  
      3.2.4 Landlocked Dewatering Area – Wetland Delineation 17  
      3.2.5 Biological Assessment and Concurrence by Resource Agencies 17  
      3.2.6 Phase 2 Cultural and Archaeological Resources Assessment Program 18  

4. **Design Summary – Reach 7** 20  
   4.1 Dredge Area Limits 20  
      4.1.1 Dredge Area Delineation 20  
      4.1.2 Shoreline Definition 20  
      4.1.3 Certification Unit Revisions 21  
      4.1.4 Design Dredge Prism Development 22
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1.5</td>
<td>Design Dredging Volume</td>
<td>23</td>
</tr>
<tr>
<td>4.2</td>
<td>Dredging and Dredged Material Transport</td>
<td>23</td>
</tr>
<tr>
<td>4.2.1</td>
<td>Shoreline Vegetation Pruning</td>
<td>24</td>
</tr>
<tr>
<td>4.2.2</td>
<td>Debris Removal</td>
<td>24</td>
</tr>
<tr>
<td>4.2.3</td>
<td>Dredging</td>
<td>24</td>
</tr>
<tr>
<td>4.2.4</td>
<td>Dredged Material River Transport</td>
<td>25</td>
</tr>
<tr>
<td>4.2.5</td>
<td>Access to Dredging Areas</td>
<td>26</td>
</tr>
<tr>
<td>4.2.6</td>
<td>Anchoring Restrictions</td>
<td>26</td>
</tr>
<tr>
<td>4.2.7</td>
<td>Air Mitigation and Sheen Response BMPs</td>
<td>26</td>
</tr>
<tr>
<td>4.2.8</td>
<td>Resuspension Control</td>
<td>27</td>
</tr>
<tr>
<td>4.2.8.1</td>
<td>Analysis of Resuspension</td>
<td>27</td>
</tr>
<tr>
<td>4.2.8.2</td>
<td>Resuspension Control BMPs</td>
<td>28</td>
</tr>
<tr>
<td>4.2.8.3</td>
<td>Resuspension Containment Systems</td>
<td>29</td>
</tr>
<tr>
<td>4.2.9</td>
<td>Archaeological Site Protection Measures</td>
<td>29</td>
</tr>
<tr>
<td>4.3</td>
<td>Sediment Dewatering/Processing, Transport, and Disposal</td>
<td>29</td>
</tr>
<tr>
<td>4.3.1</td>
<td>Archaeological Resources</td>
<td>30</td>
</tr>
<tr>
<td>4.3.2</td>
<td>Wetland Areas</td>
<td>32</td>
</tr>
<tr>
<td>4.3.3</td>
<td>Sediment Dewatering/Processing</td>
<td>33</td>
</tr>
<tr>
<td>4.3.4</td>
<td>Material Handling and Staging</td>
<td>33</td>
</tr>
<tr>
<td>4.3.5</td>
<td>Material Segregation</td>
<td>34</td>
</tr>
<tr>
<td>4.3.6</td>
<td>Water Treatment and Discharge</td>
<td>34</td>
</tr>
<tr>
<td>4.3.7</td>
<td>Air Emission BMPs</td>
<td>35</td>
</tr>
<tr>
<td>4.3.8</td>
<td>Material Transport to the Sediment Processing Facility</td>
<td>35</td>
</tr>
<tr>
<td>4.3.9</td>
<td>Off-site Material Transport and Disposal</td>
<td>36</td>
</tr>
<tr>
<td>4.4</td>
<td>Backfilling/Capping</td>
<td>36</td>
</tr>
<tr>
<td>4.4.1</td>
<td>Backfill/Cap Footprint</td>
<td>36</td>
</tr>
<tr>
<td>4.4.2</td>
<td>Backfill</td>
<td>37</td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td>4.4.2.1 Backfill Material Types</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>4.4.2.2 Base Backfill Layer</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>4.4.2.3 Near-shore Backfill</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>4.4.2.4 Habitat Layer Backfill</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>4.4.2.5 Riverine Fringing Wetland Construction Areas</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>4.4.3 Isolation Caps</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>4.4.4 Backfill and Cap Material Placement</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>4.4.5 Backfill and Cap Material Sources</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>4.4.6 Shorelines</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>4.4.6.1 Shoreline Stabilization</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>4.4.6.2 Shoreline Repair</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>4.5 Landlocked Dewatering Area Decommissioning and Restoration</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>4.6 Habitat Construction – Reach 7</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>4.6.1 Unconsolidated River Bottom Habitat</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>4.6.2 Riverine Fringing Wetlands</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>4.6.3 Submerged Aquatic Vegetation Beds</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>4.7 Quality of Life Standards</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>4.7.1 Air Quality – PCBs</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>4.7.2 Air Quality – National Ambient Air Quality Standards</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>4.7.3 Odor</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>4.7.4 Noise</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>4.7.5 Lighting</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>4.7.6 Navigation</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>5. Remedial Action Implementation</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>5.1 Remedial Action Contracts – Reach 7</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>5.2 Remedial Action Work Plan and Other Remedial Action Submittals</td>
<td>52</td>
<td></td>
</tr>
<tr>
<td>5.3 Remedial Action Implementation Schedule – Reach 7</td>
<td>53</td>
<td></td>
</tr>
</tbody>
</table>
Table of Contents

6. References 54

7. Acronyms and Abbreviations 58

Tables

| Table 1-1 | Reach 7 FDR Organization (in text) |
| Table 4-1 | Basis of Design for Dredging and Dredged Material Transport – Reach 7 |
| Table 4-2 | Basis of Design for Backfilling/Capping – Reach 7 |
| Table 4-3 | Basis of Design for Dewatered Sediment Transportation and Disposal – Reach 7 |
| Table 4-4 | Certification Unit Areas and Design Volumes – Reach 7 |

Figures

| Figure 1-1 | Upper Hudson River |
| Figure 1-2 | Reach 7 Dredge Areas |
| Figure 1-3 | Reach 7 Certification Units – CU61 through CU66 |
| Figure 2-1 | Landlocked Dewatering Area |

Attachments

A  Development of the Elevation of Contamination Surface – Reach 7
B  Dredge Prism Development – Reach 7
C  Habitat Construction Design for Reach 7 Dredge Areas
D  Development of Air Mitigation and Sheen Response BMP Areas – Reach 7
E  Nearshore Border and Set Points – CU61 to CU66
F  Hydrodynamic Grid Cell Velocities – 100-Year Flow Event – CU61 to CU66
G  Evaluation of Dredged Material Transport Alternatives for the Landlocked Area
H  Landlocked Dewatering Area – Wetland Delineation
I  Backfill Plan – CU61 through CU66

Appendices

1  Contract 43B – Landlocked Area Dredging Operations, Specifications
2  Contract 43B – Landlocked Area Dredging Operations, Drawings
CD ROM (electronic files)

- Reach 7 FDR – PDF files
- Dredge Prism Files (Design Dredge Prism XYZ Files, EoC surface, EoC method shapefile, design bathymetry, and clay areas)
- Shapefiles (certification units, shoreline, near-shore border, and conceptual habitat construction locations)
1. Introduction

This Phase 2 Final Design Report for Reach 7 (Reach 7 FDR), prepared on behalf of the General Electric Company (GE), presents the final design for Phase 2 dredging to be conducted in Reach 7 (also referred to as the Landlocked Area), as part of the dredging remedy selected by the United States Environmental Protection Agency (EPA) to address polychlorinated biphenyls (PCBs) in sediments of the Upper Hudson River (the river) located in New York State. That remedy was set forth in a Record of Decision (ROD) issued by EPA for the Hudson River PCBs Superfund Site (the Site) in 2002 (EPA 2002).

This report includes the design for dredging Certification Unit (CU) 61 through CU66, which encompass approximately 29 acres. Reach 7 is located in River Section 2 of the Upper Hudson River between Thompson Island Dam (East and West) at approximately River Mile (RM) 188.5 and the Fort Miller Dam at approximately RM 186.2. Reach 7 is “landlocked” by these dams, meaning that it is not directly accessible by water from the navigable channel of the Hudson River and Champlain Canal system. Figure 1-1 shows the Upper Hudson River and the locations of each lock, dam, reach of river, and designated river section. Figure 1-2 shows the locations of CU61 through CU66 in Reach 7 in relation to the other CUs, Lock 7, Lock 6, Thompson Island Dam, Fort Miller Dam, and the Fort Edward Sediment Processing Facility. Figure 1-3 shows CU61 through CU66 in Reach 7.

It is anticipated that dredging will be conducted in Reach 7 during Phase 2, Year 4 (in 2014), and potentially extending into Phase 2, Year 5 (in 2015), concurrent with dredging in other reaches of the river. This approach is consistent with the Revised Engineering Performance Standards for Phase 2 (Phase 2 EPS; EPA 2010a), which allow for simultaneous dredging in multiple areas of the river to increase productivity.

This Reach 7 FDR has been prepared pursuant to the Administrative Order on Consent for Hudson River Remedial Design and Cost Recovery (RD AOC), effective August 18, 2003 (Index No. CERCLA-02-2003-2027; EPA/GE 2003) and in accordance with the Remedial Design Work Plan (RD Work Plan; Blasland, Bouck & Lee, Inc. [BBL] 2003a) attached to the RD AOC. It builds upon GE’s Preliminary Design Report (PDR; BBL 2004), the Phase 2 Intermediate Design Report (Phase 2 IDR; ARCADIS 2008), the Phase 2 Final Design Report for 2011 (2011 FDR; ARCADIS 2011), the Phase 2 Final Design Report for 2012 (2012 FDR; ARCADIS 2012), and the Phase 2 Final Design Report for 2013 (2013 FDR; ARCADIS 2013). However, it contains a number of modifications, particularly in the approach for
transporting material from this reach, which are necessitated by the fact that this reach is not directly accessible by water from the navigation channel, thus precluding use of the material transport approach used in other areas of the river.

This report has also been developed to be consistent with the Remedial Action Consent Decree (RA CD) for the remedy at this site, which was approved by the U.S. District Court for the Northern District of New York in October 2005 (Civil Action No. 1:05-CV-1270; EPA/GE 2005) and modified in March 2009 and August 2011. The RA CD includes, as Appendix B, a Statement of Work for Remedial Action and Operations, Maintenance, and Monitoring (SOW), which sets forth general requirements for the remedial action and includes several attachments specifying requirements for various aspects of the remedial action. In December 2010, EPA issued revised versions of the SOW (EPA 2010b) and its attachments for Phase 2. The revised attachments to the SOW include the following:

- Attachment A: Critical Phase 2 Design Elements (Phase 2 CDE)
- Attachment B: Phase 2 Remedial Action Monitoring Scope (Phase 2 RAM Scope)
- Attachment C: Phase 2 Performance Standards Compliance Plan Scope (Phase 2 PSCP Scope)
- Attachment D: Phase 2 Remedial Action Community Health and Safety Program Scope (Phase 2 CHASP Scope)
- Attachment E: Operation, Maintenance, and Monitoring Scope for Phase 2 of the Remedial Action (Phase 2 OMM Scope)
- Attachment F: Certification Unit Completion Approval/Certification Forms for Phase 2 (Phase 2 CU Certification Forms)

The remainder of this report is organized as summarized in Table 1-1 below.
Table 1-1 Report Organization

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 2: Landlocked Area Approach</td>
<td>Provides a summary of an evaluation of dredged material transport alternatives for transport from the Landlocked Area and describes the dredging, sediment dewatering/processing, and material transport approach for the Landlocked Area.</td>
</tr>
<tr>
<td>Section 3: Design Supporting Information – Reach 7</td>
<td>Summarizes information used to support the design for the Landlocked Area dredging operations.</td>
</tr>
<tr>
<td>Section 4: Design Summary – Reach 7</td>
<td>Summarizes the design for the Landlocked Area dredging operations and the habitat construction design associated with the Landlocked Area dredge areas.</td>
</tr>
<tr>
<td>Section 5: Contract Summary and Remedial Action Implementation – Reach 7</td>
<td>Summarizes the contracts for implementing the dredging operations and related activities for the Landlocked Area, describes the remedial action submittals for that work, and references the schedule for implementation of the remedial action activities in the Landlocked Area.</td>
</tr>
<tr>
<td>Section 6: References</td>
<td>Provides a list of references cited in this report.</td>
</tr>
<tr>
<td>Section 7: Acronyms and Abbreviations</td>
<td>Provides the definitions of acronyms and abbreviations used in this report.</td>
</tr>
<tr>
<td>Tables</td>
<td>Provides the tables referenced in this report.</td>
</tr>
<tr>
<td>Figures</td>
<td>Provides the figures referenced in this report.</td>
</tr>
<tr>
<td>Attachments</td>
<td>Provides the attachments referenced in this report.</td>
</tr>
<tr>
<td>Appendices</td>
<td>Provides the drawings and specifications referenced in this report.</td>
</tr>
</tbody>
</table>
2. Landlocked Area Dredging Approach

This section presents an overview of the approach for dredging, sediment dewatering/processing, and material transport operations associated with the Landlocked Area.

The Landlocked Area presents a number of operational challenges different from those found in the main stem of the river. The key difference will be the transportation of dredged sediments from the Landlocked Area, which is a critical factor that affects many other aspects of the project. Because the Landlocked Area is not directly accessible by water from the navigable channel of the Hudson River and Champlain Canal system, the material transport operations for this area will necessarily be different from the approach that has been implemented in other areas of the river. The RD Work Plan, which is part of the RD AOC, recognized (on page 3-9) that the specific manner by which dredged material would be transported from the Landlocked Area would be determined during design.

Based on previous discussions with EPA, an evaluation was performed to review potential dredged material transport alternatives associated with the dredging operations to be conducted in Reach 7 and to identify a practical and effective solution for completing the work in this portion of the river. A summary of this evaluation is presented below, followed by a description of the approach for dredging, sediment dewatering/processing, and material transport operations associated with the Landlocked Area.

2.1 Evaluation of Dredged Material Transport Options

Dredged material transport options for transport from the Landlocked Area were previously evaluated as part of the Phase 2 IDR. As part of the Phase 2 IDR, a conceptual sediment transfer operation was proposed to move dredged material from the Landlocked Area over a narrow strip of land at the northern end of Reach 7 to load hopper barges in the “land-cut” section of the Champlain Canal. Under this concept, barges containing mechanically dredged sediment would be staged on the west side of the transfer area and the dredged sediments and debris would be transferred via a crane/large excavator or conveyor to receiving hopper barges staged on the east side of the transfer area in the land-cut portion of the canal.

Although the conceptual approach presented in the Phase 2 IDR appeared at that time to represent a reasonable alternative to address the complexities associated with
dredged material transport from the Landlocked Area to the Sediment Processing Facility, experience gained during the first four years of the dredging project and an improved understanding of the operations necessary to effectively implement the project have led to an awareness that the conceptual approach presented in the Phase 2 IDR still had several serious practicability problems which had not been resolved. These include the following:

- Due to the narrow width of the land-cut section of the Champlain Canal, the use of that section for barge loading has the potential to interfere with navigation of project and non-project vessels. Further, the width of the land-cut section is not sufficient for barges to pass, which would create a bottleneck, interfering with the movement of vessels and thus reducing barge cycle times and the productivity of dredged material transport for other areas of the river.

- Widening the canal is not considered practicable due to the likely presence of bedrock in the area, the volume of material that would require removal, the potential for creating hydraulic connectivity between the canal and river (for canal widening to the west), and the proximity to Route 4 (for canal widening to the east).

- The restricted capacity of the bridges over the land-cut section of the Champlain Canal would limit the ability to bring required equipment and materials to the land west of the canal.

- The available space between the Landlocked Area and the land-cut section of the Champlain Canal is limited, which would limit the equipment that could be used for the transfer of sediments.

- Additional properties along the Landlocked Area would be needed to stage and transfer backfill/cap material into the Landlocked Area and to mobilize equipment (dredges, tugs, monitoring vessels) to the river.

- The work schedule would be limited by the schedule of the New York State Canal Corporation (NYSCC) canal system.

Based on these considerations, the approach for dredged material transport from the Landlocked Area was further evaluated to identify if there was another, more practical and effective solution for completing the work in this portion of the river.
This additional evaluation considered a number of alternative scenarios to transfer the dredged material out of the Landlocked Area, including both mechanical and hydraulic transport options. The alternatives considered during this evaluation were as follows:

- Alternative A: Mechanical transfer of dredged material to barges in the land-cut portion of the canal east of the Landlocked Area (similar to the approach presented in the Phase 2 IDR);
- Alternative B: Mechanical transfer of dredged material to barges in Reach 8 north of Thompson Island Dam;
- Alternative C: Hydraulic transfer of mechanically dredged material to hopper barges located in the land-cut portion of the canal east of the Landlocked Area, in Reach 8 north of Thompson Island Dam, or in Reach 6 south of Fort Miller Dam;
- Alternative D: Hydraulic transport of dredged material from the Landlocked Area directly to the existing Sediment Processing Facility; and
- Alternative E: Mechanical or hydraulic transfer of dredged material to a temporary remote dewatering/staging area on land adjacent to the Landlocked Area, followed by truck transport to the Sediment Processing Facility.

Attachment G presents the evaluation of these dredged material transport options. As discussed in Attachment G, this evaluation indicated that Alternative E is the most practical option to address the challenges and complexities associated with dredged material transport from the Landlocked Area. This conclusion is based on the following factors:

- Navigation along the Champlain Canal would not be affected.
- Barge and recreational vessel traffic would not be impacted. By avoiding impacts to barge traffic in the canal system, productivity in the main stem of the river would not be impacted.
- Property is available adjacent to the Landlocked Area to serve as a remote sediment dewatering/staging area. The same property could also be used to stage and transfer backfill/cap material into the Landlocked Area and to mobilize equipment to the river.
- Multiple property owners have expressed willingness to allow their properties to be used for this portion of the project.
• Access to properties west of the Landlocked Area would not be affected by bridge load restrictions.

• The load on the Sediment Processing Facility would be reduced.

Based on this evaluation, GE proposes to use Alternative E (mechanical or hydraulic transfer to a temporary remote dewatering/staging area adjacent to the Landlocked Area, followed by truck transport to the Sediment Processing Facility) as the dredged material transport approach for the Landlocked Area.

The land available to facilitate dredged material transfer operations from the Landlocked Area is limited to areas that are immediately adjacent to the river. GE has conducted a detailed evaluation of potential sites that could be used for a temporary remote dewatering/staging area, as well as to otherwise support the dredging and backfilling/capping operations in the Landlocked Area. This evaluation was conducted using criteria similar to those used by EPA when it evaluated potential sites for the Sediment Processing Facility. This process involved several steps: (1) identification of evaluation criteria; (2) identification and mapping of potential groups of properties; (3) initial screening of the property groups to screen out properties that are unsuitable from an engineering perspective for use as support facilities; (4) secondary screening of properties that were carried forward after the initial screening; and (5) identification of properties proposed for use to support the Landlocked Area dredging project.

This evaluation process and the results of the evaluation are also presented in Attachment G (Section 3). As discussed there, properties located on islands in the river, those located along the eastern shoreline of the Landlocked Area, and those located in the northern portion of the western shoreline were all screened out as unsuitable for use as part of Alternative E for various reasons (e.g., lack of road or river access, presence of existing residential communities, bridge capacity restrictions, topographic limitations, etc.). Properties located toward the southern end of the Landlocked Area along the western shoreline have been identified as being most suitable for such a facility, because they have direct river access, suitable shoreline frontage, sufficient space and suitable topography (i.e., flat open field) for a dewatering/staging area, and access to West River Road. Property owners in this area have indicated their willingness to allow their properties to be used for this project.

Based on this evaluation, the proposed location for construction of a temporary upland sediment dewatering/staging area (herein referred to as the Landlocked Dewatering Area) is shown on Figures 1-2, 1-3, and 2-1.
The proposed alternative would employ trucks to transport dewatered dredged materials from the Landlocked Dewatering Area to the Sediment Processing Facility. The ROD for the dredging remedy does not specifically address use of trucks to transfer dewatered sediments within the Site from a temporary remote dewatering facility to the main Sediment Processing Facility. Although trucking is less efficient than barge transport (e.g., approximately 15 cubic yards [cy] per truck load versus approximately 500 cy per barge), the use of trucks to transport materials is a more practical option for transporting the dredged materials to the Sediment Processing Facility based on the limitations and restrictions associated with the Landlocked Area. Trucks loaded with dewatered sediment would be lined and covered, and each truck load would be accompanied by a bill of lading. The trucks would travel along designated truck routes, where available. The truck haul routes will be presented in the Remedial Action Work Plan for Reach 7 (Reach 7 RAWP), which will be submitted separately to EPA for review and approval. It is estimated that the truck transport distances from the Landlocked Dewatering Area to the Sediment Processing Facility will be approximately 15 to 20 miles.

Additional details related to the approach for dredging in the Landlocked Area are provided below.

2.2 Landlocked Area Implementation Approach

The dredging, sediment dewatering/processing, and material transport operations for the Landlocked Area will be conducted under Contract 43B in accordance with the specifications and drawings provided as Appendices 1 and 2 of this report. Certain specifications are performance-based. For those portions of the work, the selected contractor will propose the means and methods to comply with the specified requirements. The contractor will be responsible for selecting the types and sizes of processes and equipment that will be used to complete the project. The contractor’s proposed means and methods may include dredging, dredged material transport, and sediment dewatering/processing techniques and technologies that differ from those previously implemented on the project.

As outlined above, the dredging and dredged material transport approach for the Landlocked Area includes construction of a temporary upland dewatering/staging area (the Landlocked Dewatering Area) on property located to the west of the Landlocked Area in the southern portion of Reach 7. The Landlocked Dewatering Area will be used for mobilizing equipment and personnel to the river, dewatering/processing dredged sediment and debris, and staging backfill/cap material prior to transfer onto the river.
The proposed location of the Landlocked Dewatering Area is shown on Figures 1-2, 1-3, and 2-1.

Dredging in the Landlocked Area will be conducted using mechanical or hydraulic dredging equipment (to be determined by the selected contractor). The dredged sediment and debris will be transferred to the Landlocked Dewatering Area via mechanical or hydraulic means. The dredged sediments will be dewatered and otherwise processed at the Landlocked Dewatering Area and transported by truck to the Sediment Processing Facility. After transport to the Sediment Processing Facility, the dewatered material will be loaded into railcars for transport and disposal with sediment dredged from other areas of the river. Backfill/cap material will be transported by truck to the Landlocked Dewatering Area and then loaded onto barges for placement after dredging is completed in each CU. The dredging, dredged material transport, sediment dewatering/processing, and backfilling/capping operations for the Landlocked Area will be conducted under a single contract (Contract 43B). Once the dredged sediments have been delivered to the Sediment Processing Facility, the loading of the dewatered dredged sediment and debris into railcars will be conducted by the Processing Facility Operations Contractor under the existing contract with that contractor (Contract 30).

After the dredging, sediment dewatering/processing, and backfilling/capping operations are completed and the dredged/dewatered materials have been removed, the Landlocked Dewatering Area will be dismantled, decommissioned, decontaminated, and restored to return the area to pre-work conditions, to the extent practicable. A Landlocked Area Demobilization and Restoration Plan will be prepared to describe the proposed methods for demobilization and restoration of the Landlocked Dewatering Area. This plan will be developed in compliance with the requirements described in Section 3.1.4 of the SOW (EPA 2010b) and submitted to EPA for review and approval.

Additional information regarding the design and approach for the Landlocked Area dredging project is presented in the following sections of this report.

2.2.1 Remedial Action Work Plan Submittals

Following contractor procurement/selection, the selected contractor will prepare a Dredging and Remediation Work Plan that will describe the contractor’s proposed means and methods for the various project components, including dredging, debris removal, vegetation removal, dredged material transport, sediment dewatering/processing, material staging, material transport, backfill/cap placement, and
restoration. The Dredging and Remediation Work Plan will include the information outlined in Specification Section 01460 (Remedial Action Work Plan Submittals; Appendix 1).

Information from the contractor’s Dredging and Remediation Work Plan will be incorporated into the Reach 7 RAWP, which will be submitted to EPA for review and approval. The Reach 7 RAWP will include a construction schedule for the Landlocked Dewatering Area and the planned sequence and schedule for dredging and sediment dewatering/processing operations. The Reach 7 RAWP will also incorporate appendices similar to those previously developed as part of the 2013 RAWP (Parsons 2013), but with information relevant and specific to the Landlocked Area, including a Reach 7 Construction Quality Assurance/Quality Control Plan (CQAP), a Reach 7 Performance Standards Compliance Plan (PSCP), a Reach 7 Property Access Plan (PAP), a Reach 7 Transportation and Disposal Plan (TDP), and a Reach 7 Community Health and Safety Plan (CHASP). These plans may, as appropriate, incorporate by reference portions of previously approved plans to avoid unnecessary duplication.

2.2.2 Landlocked Area Dredging Schedule

Construction of the Landlocked Dewatering Area will commence following EPA approval of the Reach 7 FDR and the Reach 7 RAWP and after review of engineering submittals prepared by the selected contractor related to the construction of the Landlocked Dewatering Area as outlined in Specification Section 13756 (Landlocked Dewatering Area Construction, Operation, and Maintenance) in Appendix 1. After construction of the Landlocked Dewatering Area is completed, dredging and sediment dewatering/processing operations will commence. The dredging operations in the Landlocked Area will be conducted concurrently with dredging operations in other downstream areas of the river; however, dredging in the Landlocked Area will not be limited by the schedule of the Champlain Canal, which typically extends between mid-May and mid- to late-November.

As noted in Section 1, it is anticipated that dredging in the Landlocked Area will be conducted in 2014. However, it is possible that implementation of the Landlocked Area dredging project may need to be extended into the following season. The proposed schedule for implementation of the Landlocked Area dredging project will be provided in the Reach 7 RAWP. The actual schedule and duration for dredging operations in the Landlocked Area will depend on numerous factors including, but not limited to, the following:
• The schedule for EPA review and approval of this Reach 7 FDR;

• The schedule for contractor procurement and selection;

• The schedule for EPA review and approval of the Reach 7 RAWP;

• The schedule for construction of the Landlocked Dewatering Area;

• The area and volume of sediment that will be subject to re-dredging based on the residual sampling results compared to the Residuals Performance Standard criteria;

• The productivity of dredging operations in the Landlocked Area, including areas with shallow water and limited access;

• The extent of operational adjustments (slowdowns, shutdowns, adjustments to dredging sequencing) necessary to comply with the Performance Standards;

• The frequency of high river flows or other factors, such as fog, that limit safe and productive dredging;

• The ability to efficiently unload and process the dredged material and water generated at the Landlocked Dewatering Area;

• The ability to efficiently transport dewatered sediment from the Landlocked Dewatering Area to the Sediment Processing Facility; and

• The rate of backfilling and capping operations and CU closure.
3. Design Supporting Information – Reach 7

This section summarizes the Phase 2 performance requirements and discusses design support activities (e.g., engineering data) associated with the design for dredge areas targeted in Reach 7. Much of the supporting information described in the 2012 FDR and 2013 FDR applies to the design for the Reach 7 dredging operations and is not repeated in this report. Instead, this addendum focuses on elements that are specific to Reach 7 or that differ from the design information presented in these reports.

3.1 Phase 2 Performance Requirements

Performance requirements guide the design for Reach 7 and provide a foundation for the basis of design. The performance requirements include elements from the ROD, Phase 2 EPS, Substantive Phase 2 Water Quality Requirements (Phase 2 WQ Requirements), and Quality of Life Performance Standards (QoLPS).

3.1.1 Record of Decision Requirements

The ROD outlines many project-related requirements that serve as a basis for the Phase 2 Design. The major project elements defined in the ROD, as well as EPA’s July 2004 decision in a dispute resolution proceeding on GE’s initial Phase 1 Dredge Area Delineation (DAD) Report, are summarized in the 2012 FDR and are not repeated in this report.

The ROD also identified a number of federal and state environmental laws and regulations as Applicable or Relevant and Appropriate Requirements (ARARs) (see Tables 14-1 through 14-3 of the ROD). Since the Upper Hudson River dredging project is being performed pursuant to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), it is covered by the provisions of Section 121(e) of CERCLA and Paragraph 8.a of the RA CD that no federal, state, or local permit is required for work being performed “onsite.” This would include work in Reach 7 and the Landlocked Dewatering Area, as well as the Sediment Processing Facility operations and the transport of dewatered material from the Landlocked Dewatering Area to the Sediment Processing Facility. However, these activities must comply with the substantive requirements of the ARARs listed in the ROD.

The Phase 2 IDR described generally how the substantive requirements of these ARARs would be incorporated into the Phase 2 design. For design elements that are specific to Reach 7 or differ from the general design information for the overall project,
the relevant substantive requirements of the identified ARARs have been incorporated into the specifications and drawings for dredging, dredged material transport, and sediment dewatering/processing operations in the Landlocked Area, which are provided in Appendix 1 and Appendix 2, respectively. These include provisions to address the pertinent substantive regulatory requirements under the Toxic Substances Control Act (TSCA) and the New York hazardous waste regulations that would apply to the construction and operation of the Landlocked Dewatering Area.

3.1.2 Engineering Performance Standards

The Phase 2 EPS consist of a Resuspension Performance Standard, a Residuals Performance Standard, and a Productivity Performance Standard. These standards are set out in a document titled Hudson River PCBs Superfund Site – Revised Engineering Performance Standards for Phase 2, issued by EPA in December 2010 (EPA 2010a). The Phase 2 EPS, as they apply to the Phase 2 Design, are summarized in the 2012 FDR and are not repeated in this report.

3.1.3 Quality of Life Performance Standards

The Phase 2 QoLPS consist of performance standards applicable to air quality, odor, noise, lighting, and navigation. These standards are described in the Hudson River PCBs Superfund Site QoLPS, issued by EPA in May 2004 (EPA 2004a), as modified by a memorandum titled Quality of Life Performance Standards – Phase 2 Changes, issued by EPA in December 2010 (E&E 2010), and the revised SOW attachments identified in Section 1. These standards, as so modified, are collectively cited as the Phase 2 QoLPS. The Phase 2 QoLPS, as they apply to the Phase 2 Design, are summarized in the 2012 FDR and will be described in the Reach 7 PSCP.

3.1.4 Phase 2 Water Quality Requirements

The Phase 2 WQ Requirements (including turbidity requirements) applicable to Reach 7 will be described in the Reach 7 PSCP.

3.1.5 Monitoring and Reporting

The monitoring programs that GE will conduct during the Reach 7 dredging operations to meet the requirements of the Phase 2 EPS, Phase 2 QoLPS, and Phase 2 WQ Requirements are described in the Phase 2 Remedial Action Monitoring Quality Assurance Project Plan (Phase 2 RAM QAPP; Anchor QEA 2012). Specific actions
that will be taken to address exceedance of the criteria in the Phase 2 EPS, Phase 2 QoLPS, and Phase 2 WQ Requirements and associated reporting requirements will be identified in the Reach 7 PSCP that will be prepared and submitted as part of the Reach 7 RAWP.

3.2 Summary of Phase 2 Design Support Activities

This subsection summarizes activities that support the remedial design for Reach 7. Design supporting information described in the 2012 FDR or 2013 FDR is not repeated in this design report.

3.2.1 Sediment Sampling and Analysis Program and Supplemental Engineering Data Collection Program

The physical and chemical characteristics of the river sediment samples collected in both the Sediment Sampling and Analysis Program (SSAP) and Supplemental Engineering Data Collection (SEDC) Program were used to develop the design for Reach 7.

The SSAP was initiated in October 2002, pursuant to the Administrative Order on Consent for Hudson River Sediment Sampling (Sediment Sampling AOC), effective July 26, 2002 (Index No. CERCLA-02-2002-2023; EPA/GE 2002). Additional sediment sampling for dredge area delineation was performed under the RD AOC, and was included under the SEDC program. The results of the sampling activities were used to develop the Phase 1 Dredge Area Delineation (DAD) Report (QEA 2005) and the Phase 2 DAD Report (QEA 2007). The DAD Reports identified the dredge areas and quantified the volume and PCB mass targeted for removal. The delineation was based on criteria set by EPA for each river section. Data gap cores identified in the Phase 2 DAD Report were collected as part of the 2008 data gap sampling program (Anchor QEA and ESI 2009).

SEDC activities have been performed to support development of the remedial design. The objectives of the SEDC Program are to fill engineering data gaps identified during evaluation of the SSAP data. SEDC activities have included infrastructure documentation, debris/obstruction surveys, select geophysical studies (e.g., magnetometer, multi-beam bathymetry, acoustic Doppler [river velocity]), geotechnical studies in certain areas (e.g., test borings, cone penetrometer testing), and collection of sediment cores to enhance the dredge area delineation. A list of the
documents summarizing SEDC activities performed, and the findings of those activities, is included in the 2012 FDR.

Between June and October 2011, supplemental sediment sampling was conducted in CU31 through CU70 to provide additional data for delineating the depth of contamination (DoC). The 2011 sediment sampling activities were conducted in accordance with the Supplemental Engineering Data Collection Work Plan for Sediment Sampling in Certification Units 31-70 (Anchor QEA and ESI 2011), and the results from the 2011 SEDC sampling program are summarized in the 2011 Supplemental Engineering Data Collection Data Summary Report (Anchor QEA and ESI 2012). The data generated from the 2011 sediment sampling program were incorporated into the development of dredge prisms, along with previously collected data, to establish the DoC and an associated elevation of contamination (EoC; described in Section 4.1.4 and Attachment A). These data were also used to revise the estimate of PCB mass to be removed from the CUs targeted for dredging in Reach 7.

SSAP and SEDC programs are now complete. The results of the sampling activities performed under the SSAP and SEDC programs are included in a database provided to EPA.

3.2.2 Bathymetry Surveys

In 2011, GE conducted surveys to gather additional bathymetry and shoreline elevation data in Reach 7 to support the development of the design, update volume calculations, and verify the location of the delineated shoreline (see Section 4.1.2). The 2011 survey activities were conducted by Thew Associates.

The available bathymetry data were used to estimate the sediment surface elevation. The data for various surveys were combined, with priority given to the most recent survey, to create a single surface that covers the areas targeted for dredging, as well as much of the non-dredge areas. Within CU61 through CU66, the sediment surface elevations have primarily been set using 2011 multi-beam bathymetric data. These data have been supplemented using 2003 single-beam bathymetry data where gaps in the available multi-beam data occur and within the non-dredge areas. For a majority of the non-dredge areas, the sediment surface elevation was estimated using hand-drawn contours developed by OSI based on 2003 single-beam data.
The updated bathymetry surfaces for Reach 7 are provided on the CD-ROM included with this report.

### 3.2.3 Habitat Delineation and Habitat Assessment

Habitat was delineated and assessed in support of the project design to document the nature and distribution of habitats potentially affected by remediation, and to identify reference habitat locations that represent the distribution of existing conditions and that are not likely to be affected by remediation. The habitat delineation and habitat assessment information relating to Phase 2 areas was presented in the Habitat Delineation Report (HD Report; BBL & Exponent 2006) and the Habitat Assessment Report for Phase 2 Areas (Phase 2 HA Report; Anchor QEA 2009).

For the Phase 2 design, the Upper Hudson River was delineated into four different habitat types: unconsolidated river bottom (UCB), aquatic vegetation bed (submerged aquatic vegetation [SAV]), shoreline, and riverine fringing wetlands (RFW), as described in the Habitat Delineation and Assessment Work Plan (HDA Work Plan; BBL 2003b), which is an attachment to the RDAOC. Data were collected in Phase 2 areas from all four habitat types and used to develop the habitat construction design. Detailed habitat maps are included in the HD Report. The results of the detailed habitat assessment of Phase 2 areas are presented and discussed in the Phase 2 HA Report, which was approved by EPA on July 24, 2009.

Subsequent to the approval of the Phase 2 HA Report, formal delineations were conducted for wetlands in Phase 2 areas. The wetland delineation sheets, figures depicting the wetland locations, and brief descriptions of each wetland were provided in the Wetland Delineation Report for Phase 2 Areas (Anchor QEA 2011).

As requested by EPA, the RFW boundaries in Reach 7 were checked in the field on October 15, 2013 in coordination with EPA. Based on those observations, the RFW boundaries are consistent with the previously delineated boundaries, with the exception of CU66 where a small wetland area was identified at the mouth of the small tributary along the western shoreline. In addition, as part of the October 15, 2013 field observations, SAV was identified in CU64 east of Galusha Island in an area that had not been previously delineated. Based on those observations, the extents of SAV in and near CU64 were adjusted. The updated boundaries for the RFW and SAV in these CUs have been incorporated into the design and are shown on the figures included in Attachment C and on the Drawings in Appendix 2.
3.2.4 Landlocked Dewatering Area – Wetland Delineation

Wetlands at the location of the Landlocked Dewatering Area were delineated in the field in December 2012 and in April 2013 by Anchor QEA. A summary of the wetland delineation is presented in Attachment H. Based on this field delineation, wetland areas were identified in low-lying, wooded areas at the properties where the Landlocked Dewatering Area will be constructed. Figure 2-1 shows the locations of the delineated wetland areas.

3.2.5 Biological Assessment and Concurrence by Resource Agencies

In January 2006, E&E completed the Final Biological Assessment (BA; E&E 2006) on behalf of EPA. The primary purpose of the Final BA (developed after a review of comments received on a May 2005 draft) was to evaluate the potential direct, indirect, and cumulative impacts of the remedial action on two threatened and endangered species identified as potentially present in the project area – the bald eagle and the shortnose sturgeon – and where deemed appropriate to specify conservation measures designed to minimize impacts on those species. The overall conclusion of the Final BA was that the project “may affect, but is not likely to adversely affect,” the bald eagle or the shortnose sturgeon. EPA is currently in the process of updating the BA. Components of the revised BA relevant to Phase 2 will be discussed in a separate submittal.

A detailed description of the BA is presented in the Phase 2 IDR and is not repeated in this report. Specific components of the BA relevant to Phase 2 are summarized in Section 2.2.7 of the 2012 FDR and are applicable to Reach 7. As indicated in that report, additional bald eagle observations were coordinated with EPA and conducted within Phase 2 dredge areas in the winter of 2012 and through the summer of 2013. No active eagle nests were observed in the vicinity of areas currently targeted for dredging in the Landlocked Area (CU61 through CU66). Similar observations along those portions of the river to be dredged in Reach 7 and at the Landlocked Dewatering Area will be coordinated with EPA and conducted in the fall/winter of 2013 and prior to any construction activities during the bald eagle wintering period (December through March).

The conservation measures listed for bald eagles in the Final BA will be followed to minimize disturbances to eagles. These have been incorporated into Specification Section 01140 (Work Restrictions; Appendix 1).
3.2.6 Phase 2 Cultural and Archaeological Resources Assessment Program

Archaeological resource assessments have been conducted to document terrestrial and underwater archaeological resources that could be affected during the Reach 7 dredging operations. These are summarized in the following documents:

- Archaeological Resources Assessment Report for Phase 2 Dredge Areas (Phase 2 ARA Report; URS 2008)

- Underwater Remote Sensing Report for Certification Units 31 Through 70 in Phase 2 Remediation of the Hudson River PCBs Superfund Site (URS 2011)

- 2012 Terrestrial Archaeological Survey and Evaluation for the Land-Locked and Fort Miller Dam Sections of the Phase 2 Dredge Areas (URS 2013b)

- Underwater Archaeological Resources Survey: Remote Sensing Analysis and Evaluation of Remote Sensing Targets in Certification Units 60 through 74 of the Phase 2 Dredge Areas (URS 2013c)

Based on these archaeological resource assessments, no sensitive archaeological resources were identified at in-river or shoreline areas within or in the immediate vicinity of CU61 through CU66 in Reach 7. Nevertheless, archaeological protection measures will be implemented during the dredging operations as described in Section 4.2.9.

Archaeological resource assessments have also been conducted to document terrestrial archaeological resources that could be affected by construction and operations at the Landlocked Dewatering Area. These archaeological resource assessments are summarized in the following documents:

- Phase I and II Archaeological Investigations at the Site of Fort Miller (A091-14-0009) (URS 2012)

- Additional Phase I and II Archaeological investigations at Property Containing the Site of Fort Miller (A091-14-0009) (URS 2013a)

Based on the findings of archaeological assessment activities, mid-eighteenth century artifacts with documented, intact, fort-related features have been identified in the certain upland areas in the northeastern portion of the property available for
construction and operation of the Landlocked Dewatering Area. This property has been divided into three zones based on these findings:

- **Archaeological Upland Zone A** – is the portion of the property that has been found to be devoid of cultural materials and features. Archaeological Upland Zone A is located in the southern and western portions of the field adjacent to the river and includes that portion of the property extending to West River Road.

- **Archaeological Upland Zone B** – is an area in the northeastern portion of the property with mid-eighteenth century artifacts but without identified cultural features.

- **Archaeological Upland Zone C** – is an area in the northeastern portion of the property with mid-eighteenth century artifacts and documented, intact, fort-related features.

The locations of Archaeological Upland Zones A, B, and C are shown on Figure 2-1 and Drawing D-2606 (Appendix 2).

The potential effects of facility construction and operations on these resources were evaluated during the remedial design, and measures established to protect these resources are described in Section 4.3.1.
4. Design Summary – Reach 7

This Reach 7 FDR includes design information, drawings, and specifications for dredging, dredged material transport, and sediment dewatering/processing operations associated with CU61 through CU66 in the Landlocked Area. The specifications are provided in Appendix 1, and the drawings for dredging (D-series), backfill (B-series), isolation cap (C-series), Sediment Processing Facility (SP-series), and existing conditions (G-series) are provided in Appendix 2.

This design report also includes the conceptual design for habitat construction planting areas in CU61 through CU66. The final habitat construction design for the Reach 7 CUs will depend on the conditions after dredging operations are completed in these CUs, and the final habitat construction design drawings and specifications associated with these CUs will be provided to EPA in a separate design submittal.

The following subsections and Tables 4-1, 4-2, and 4-3 summarize elements of the design associated with Reach 7, focusing on items that are specific to the targeted dredging areas or that differ from the design approach presented in the 2013 FDR.

4.1 Dredge Area Limits

A summary of the CUs designed for dredging in Reach 7 is provided below.

4.1.1 Dredge Area Delineation

The dredging design process begins with the delineation of dredge areas, including the identification of both the horizontal and vertical extents of dredging. The Phase 2 DAD Report (QEA 2007) identified the dredge areas and quantified the volume and PCB mass targeted for removal in the Reach 7 dredge areas. The initial limits of the Phase 2 CUs were presented in the Phase 2 IDR (ARCADIS 2008).

4.1.2 Shoreline Definition

In July 2012 and March 2013, GE and EPA met to review and discuss the approach for establishing the shoreline elevations and locations in River Sections 2 and 3. The shoreline elevations and locations were established for Reach 7 based on those discussions and as summarized below.
Consistent with the designs for other reaches of the river, the shoreline elevations for Reach 7 have been established based on water surface elevations associated with a river flow of approximately 5,000 cubic feet per second (cfs) at the U.S. Geological Survey (USGS) Fort Edward gage. As described in the approved Phase 2 IDR (ARCADIS 2008), the Upper Hudson River hydrodynamic model (Attachment D to the Phase 2 IDR) was used to estimate the water surface elevations in Reach 7 corresponding to this flow.

As described in Section 3.2.2, GE performed surveys in 2011 to gather additional bathymetry and topographic data in Reach 7 to support the development of the design, update volume calculations, and verify the location of the delineated shoreline. The water surface elevations predicted by the hydrodynamic model were reviewed and compared with the 2011 survey data and the existing shoreline boundary.

The water surface elevations predicted by the hydrodynamic model for Reach 7 correlated reasonably well with the survey data collected in 2011 and the shoreline boundary digitized from aerial photography. The design shoreline elevation established for Reach 7 (CU61 through CU66) is 114.9 feet (ft) (North American Vertical Datum of 1988 [NAVD88])

As with the other reaches of the river, the shoreline boundaries in Reach 7 were initially digitized from aerial photography. The survey data collected in 2011 were used to adjust the existing shoreline location, where appropriate, to approximate the above-referenced shoreline elevation. This revised shoreline has been incorporated into the basis of the design as the horizontal limit of dredging and backfilling for CU61 through CU66.

An electronic data file of the shoreline coordinates for Reach 7 is provided on the CD-ROM included with this report.

4.1.3 Certification Unit Revisions

As part of the final design, the CU boundaries presented in the Phase 2 IDR were adjusted for the Reach 7 CUs. The boundaries for CU61 through CU66 were adjusted based on the results of data gap sampling performed during 2008 as summarized in the Phase 2 Data Gap Data Summary Report (Anchor QEA and ESI 2009) and/or based on the results of the 2012 SEDC sampling as presented in the 2011 SEDC Data Summary Report (Anchor QEA and ESI 2012). Figures showing where the footprints of
these CUs have been impacted by these sampling programs are provided in Attachment A.

Additionally, the internal boundaries of CU63 through CU66 were adjusted as part of the final design. These adjustments were made based on operational considerations (i.e., to improve continuity of the CUs), and did not change the overall acreage of the dredge areas.

An electronic data file of the CU boundaries for CU61 through CU66 is provided on the CD-ROM included with this report.

4.1.4 Design Dredge Prism Development

The Phase 2 CDE requires that GE develop an EoC surface to define the elevation that captures the PCB inventory and meets the removal criteria within the targeted areas. As summarized in the 2013 FDR, the EoC surface is developed using primarily chemistry information (i.e., sediment core profiles of PCB concentrations); but sediment type, bathymetry, historical dredging information (when appropriate), probing information, and sub-bottom information (i.e., the existence of Glacial Lake Albany Clay [GLAC] or bedrock) also influence its development.

The EoC surface was developed for CU61 through CU66 by the same process detailed in Section 2.4 of the Phase 2 CDE and summarized in Section 3.1.4 of the 2013 FDR. As described in Attachment A, an initial EoC surface was developed for CU61 through CU66 to meet the requirements of the Phase 2 CDE. The EoC surface was then adjusted for engineering considerations to create the final dredge prisms (described in Attachment B). The dredge prisms for CU61 through CU66 were developed using multi-beam bathymetry surveys conducted in 2011, where available.

Table 4-4 summarizes the areas, design cut volumes, and estimated PCB mass for CU61 through CU66 based on the EoC surface and the Design Dredge Prism XYZ File.

The electronic EoC and the Design Dredge Prism XYZ files developed by Anchor QEA and Parsons, as well as related files (i.e., existing bathymetry elevations, polygon file showing the EoC method in each area of the river) are provided on a CD-ROM with this report.
4.1.5 Design Dredging Volume

As summarized in Table 4-4, the estimated volume of sediment defined for removal by the Design Dredge Prism XYZ file is 117,500 cy for CU61 through CU66. It is anticipated that re-dredging, where required, may generate as much as 30,000 cy of additional sediment for removal. The actual volume of sediment that will be dredged in Reach 7 will depend on the necessary amount of re-dredging and several other factors including, but not limited to, the following:

- The pre-construction bathymetric survey elevations measured before dredging begins, which may differ from the existing bathymetry elevations used during development of the dredge prisms;
- The extent of shoreline and in-river structure offsets incorporated into the final construction dredge prism based on field surveys conducted prior to the start of dredging operations;
- The amount of over-dredging performed to achieve the required elevations within the specified tolerances;
- The extent and elevations of GLAC and dredge refusal areas encountered during the dredging operations;
- The amount of access dredging that may be necessary to provide access to certain dredge areas;
- The amount of stable side slope dredging that may be conducted by the contractor (i.e., dredging of slopes outside the shoreline edge of the CU boundaries steeper than those shown in the dredge prism); and
- The area and volume of sediment that will be subject to re-dredging based on the residual sampling results compared to the Residuals Performance Standard criteria.

4.2 Dredging and Dredged Material Transport

As described in Section 2, the approach for dredging and dredged material transport for the Landlocked Area will be different from the approach for other areas of the river, because this portion of the river is not directly accessible by water from the navigable
channel of the Hudson River and Champlain Canal system. A summary of the design for the dredging and dredged material transport for the Landlocked Area is presented in the following subsections.

4.2.1 Shoreline Vegetation Pruning

Prior to dredging, shoreline vegetation that overhangs the dredge areas will be pruned. Chipped material and logs generated during removal of shoreline vegetation that have not come into contact with river sediment will be managed for re-use or disposal. Shoreline vegetation will be pruned in accordance with Specification Section 13893 (Removal of Shoreline Vegetation; Appendix 1).

4.2.2 Debris Removal

Debris will be removed prior to or as part of dredging. If the contractor proposes to dredge using hydraulic dredging equipment, debris removal will likely be required using separate equipment prior to dredging. Debris will be removed in accordance with Specification Section 13804 (Landlocked Area Sediment Removal; Appendix 1).

4.2.3 Dredging

Dredging activities will commence after the Landlocked Dewatering Area is constructed and ready to receive dredged material – weather and river flow permitting. Dredging is expected to occur 24 hours a day, 6 days a week. The seventh day of the week will be reserved for maintenance, make-up time for unplanned project interruptions, and as a contingency to achieve production goals.

Dredging in the Landlocked Area will be conducted using mechanical or hydraulic dredging equipment (to be determined by the selected contractor). Specification Section 13804 (Landlocked Area Sediment Removal; Appendix 1) presents the requirements for the dredging operations. The type, number, and size of dredging equipment to be used in the Landlocked Area will be identified by the contractor and presented in the Reach 7 RAWP.

Dredging is expected to begin in the northern end of the Landlocked Area (CU61 and CU62) and generally proceed downstream. The dredging operations in the Landlocked Area will be conducted concurrently with dredging operations in other areas of the river, consistent with the Phase 2 EPS, which allows simultaneous dredging in areas separated by a dam or areas separated by more than 1,000 feet to maintain dredging
productivity and efficiency. Dredging in the Landlocked Area will not be limited by the schedule of the Champlain Canal. The proposed dredging sequence and schedule will be described in the Reach 7 RAWP based on input from the contractor.

The dredging process will involve initial dredging to remove the volume of design inventory sediment identified in the dredge prisms (the “design cut”) and re-dredging (if necessary) in accordance with the Residuals Standard criteria.

The extent of dredging required for each dredging pass (the design cut or re-dredging cuts) will be shown in dredge prism files, which include electronic data that specify the horizontal (X and Y) and vertical (Z) extent of material to be removed as part of the dredging pass. The Design Dredge Prism XYZ File will be modified to incorporate offsets from shoreline riprap and in-river structures in accordance with Drawing D-2860 (Appendix 2) based on the results of field probing and surveys conducted prior to dredging. The Design Dredge Prism XYZ File will also be modified to incorporate setbacks proposed by the contractor. Such setbacks may be necessary where the contractor believes that dredging operations cannot be implemented safely or where the contractor believes that dredging operations cannot be implemented without compromising the integrity of public or private structures or utilities located in or along the banks of the river. These proposed setbacks will be submitted to EPA for approval prior to being incorporated into the dredge prisms. As described in Specification Section 13804 (Landlocked Area Sediment Removal; Appendix 1), Construction Dredge Prism XYZ Files will be provided to the contractor and will serve as the basis for determining whether dredging has achieved the required elevations. The dredging tolerance requirements are presented in Specification Section 13804 (Landlocked Area Sediment Removal; Appendix 1).

4.2.4 Dredged Material River Transport

Dredged sediment and debris will be transported from the dredging areas to the Landlocked Dewatering Area for unloading and subsequent dewatering/processing. The specified requirements for dredged material transport and unloading are described in Specification Sections 13756 (Landlocked Dewatering Area Construction, Operation, and Maintenance), 13804 (Landlocked Area Sediment Removal), and 13811 (Landlocked Area Material Transport) in Appendix 1. The dredged material river transport equipment will be described in the Reach 7 RAWP based on contractor input.
4.2.5 Access to Dredging Areas

Dredging of non-target material may be necessary to provide access to shallow-water dredge areas. The need for and actual extent of access dredging will be determined by the contractor and the Construction Manager and will depend on the dredging approach, schedule, sequence, and field conditions encountered. Any access dredging proposed by the contractor will be reviewed by the Construction Manager based on an assessment of the benefit of the proposed access dredging compared to other potential project impacts. Areas proposed for access dredging will be reviewed to verify that those areas do not contain potential archaeological resources. Plans for proposed access dredging will be reviewed with EPA prior to dredging those areas. In addition, any required backfilling and habitat construction resulting from access dredging areas will be reviewed with EPA prior to dredging those areas.

4.2.6 Anchoring Restrictions

Anchoring will be restricted in areas outside of the CUs where SAV or RFW habitat is present, in areas where SAV has been planted, in backfilled areas designated as SAV planting, contingency, and natural recolonization areas, in backfilled areas designated for RFW construction, and in areas where isolation caps have been placed. The specification requirements for anchoring during dredging operations are documented in Specification Section 13820 (Anchoring; Appendix 1). The anchoring restrictions in Reach 7 are shown on Drawings D-4601 through D-4606 (Appendix 2).

Areas proposed for anchoring will be reviewed to verify that those areas do not contain potential archaeological resources. The proposed anchoring areas will be reviewed with EPA prior to using those areas for anchoring.

4.2.7 Air Mitigation and Sheen Response BMPs

In accordance with the Phase 2 CDE, and as discussed in Section 3.3 of the 2013 FDR, routine air mitigation best management practices (BMPs) are required to be implemented in areas with the potential to emit PCBs to the air at levels close to or exceeding the applicable air quality standard (air mitigation BMP areas). Specification Section 02938 (Air Emissions Restrictions and Controls; Appendix 1) includes requirements for air emissions controls and lists the potential air mitigation BMPs to be implemented. The final air emission BMPs and other control measures will be described in the Reach 7 RAWP and Reach 7 PSCP based on contractor input. Additional mitigation measures must be implemented, as necessary, in dredge areas
where measured PCB concentrations at a nearby receptor results in exceedance of the applicable air quality standard on 3 consecutive days. The additional mitigation measures to be considered in these circumstances will be described in the Reach 7 PSCP.

The Phase 2 CDE also requires that actions be taken to prevent, contain, and clean up oil sheens or evidence of non-aqueous-phase liquid (NAPL) observed in the field or when dredging in areas with total PCB concentrations greater than 200 milligrams per kilogram (mg/kg). Specification Section 13871 (Sheen Response During Dredging Operations; Appendix 1) describes the contractor’s requirements to address sheens and NAPL, including requirements for notification and reporting, implementation of BMPs, and sheen response actions if sheens are observed.

The approach for designating air mitigation BMP areas and sheen response BMP areas in CU61 through CU66 is described in Attachment D. Figures showing mass-weighted average total PCB concentrations associated with design cut sediment are provided in Attachment D. These figures also show where air mitigation BMP areas and sheen response BMP areas have been identified for the design cut based on this review of the total PCB concentrations. The air mitigation BMP areas associated with the design cut are also shown on Drawings D-3611 through D-3616 (Appendix 2).

Air mitigation BMP areas and sheen response BMP areas (if any) associated with re-dredging operations will be identified in the field based on the results of residual sampling and the experience gained during the initial dredge pass.

4.2.8 Resuspension Control

In accordance with the Phase 2 CDE, resuspension control BMPs are required to be implemented during all in-river operations. Implementation of contingent resuspension control BMPs may be required if the Control Level for total PCB concentrations or net loads of PCBs with three or more chlorine atoms (Tri+ PCBs) (measured as daily percent release) under the Resuspension Standard is exceeded.

4.2.8.1 Analysis of Resuspension

Dredging and management of resuspension for the Landlocked Area will continue in a manner similar to the approach used in 2011, 2012, and 2013. GE, the Construction Manager, and the contractor will assess planned dredging rates and sediment PCB concentrations in the targeted areas and (to the extent possible) “balance” dredging of
high-PCB concentration areas with concurrent dredging in relatively low-PCB concentration areas. This will be done for both the design dredging pass using the in-situ design data and any residual passes using residual core information to establish areas of high PCB concentrations. Average total PCB concentrations associated with the design cut are included in Attachment D of this Reach 7 FDR and will be reviewed continually in the field to guide management of operations with respect to resuspension. These average PCB concentrations will be overlaid with the dredging lanes to determine where and when (based on the proposed dredging sequence) particularly high PCB concentrations may be encountered. In the same way, residual core data will be assessed before re-dredging begins to establish whether a relatively high residual concentration area is going to be dredged.

Near-field and far-field data will be collected to provide a basis for whether the operational controls are effective. Because dredging operations in the Landlocked Area will be conducted concurrently with dredging operations in other areas of the river, the near-field and far-field data will be reviewed to determine the source of any exceedance of the Resuspension Performance Standard. If exceedances occur, an analysis will be performed to try to determine what area and/or specific conditions may have led to the exceedance; and, if necessary, operations will be adjusted to prevent future exceedances. If resuspension exceedances continue, and BMPs and operational adjustments prove ineffective, GE will meet with EPA to review conditions. Additional analyses may be required to evaluate targeted areas of the river and identify potential adjustments to mitigate future exceedances.

**4.2.8.2 Resuspension Control BMPs**

The contractor will be required to implement certain resuspension control BMPs during all in-river operations, including, but not limited to, debris removal, dredging, transport of dredged material, vessel movement, and backfill/cap placement. The resuspension control BMPs consist of operational controls to minimize the sediment resuspension and the release of PCBs. Contingent resuspension control BMPs may also be required if there is an exceedance of the Control Level for total PCB concentrations or Tri+ PCB net loads (measured as daily percent release) under the Resuspension Standard.

The routine and contingent resuspension control BMPs are included in Specification Section 13805 (Resuspension Control; Appendix 1). The need for and type of contingent BMPs will be determined in the field based on monitoring
data obtained during operations and will depend on the dredging and dredged material transport approach implemented by the contractor.

4.2.8.3 Resuspension Containment Systems

As discussed in the Phase 2 CDE, the use of resuspension containment systems (i.e., silt curtains) during Phase 1 for containing dissolved-phase PCBs was found to be relatively ineffective in the Hudson River. In addition, the Peer Review Panel did not support the use of silt curtains or other physical barriers to control loss of PCBs due to resuspension during Phase 2. The Phase 2 CDE indicates that the use of silt curtains to control resuspension will not be required in Phase 2 except in specific circumstances identified either by GE or EPA. GE has not identified any areas where silt curtains or other resuspension control barriers are recommended for Reach 7 dredging.

4.2.9 Archaeological Site Protection Measures

Although no sensitive archaeological resources were identified at in-river or shoreline areas within or in the immediate vicinity of CU61 through CU66 (see Section 3.2.6); certain archaeological protection measures will be implemented in accordance with Specification Section 01353 (Cultural Resources; Appendix 1). Specifically, if, during the dredging operations, potentially significant cultural resources are identified in areas where resources were not previously identified, activities in the immediate area that may damage or alter such resources will be halted and EPA will be notified. In addition, the contractor will be required to notify the Construction Manager if debris encountered during debris removal or dredging extends into the riverbank in any dredge area. The contractor will be instructed not to remove debris that extends into the riverbank unless otherwise directed by the Construction Manager, in consultation with EPA.

4.3 Sediment Dewatering/Processing, Transport, and Disposal

As described in Section 2.2, a temporary upland dewatering/staging area (the Landlocked Dewatering Area) will be constructed on property located to the west of the Landlocked Area in the southern portion of Reach 7. Dredged sediment and debris will be transferred to, and unloaded at, the Landlocked Dewatering Area. The dredged sediments will then be dewatered and otherwise processed at the Landlocked Dewatering Area prior to transport to the Sediment Processing Facility.
Requirements for the design, construction, commissioning, operation, and maintenance of the Landlocked Dewatering Area are described in Specification Section 13756 (Landlocked Dewatering Area Construction, Operation, and Maintenance; Appendix 1). This specification presents requirements for the following construction and operational items associated with the Landlocked Dewatering Area:

- Construction of material handling areas;
- Mobilization, training, and startup;
- Dewatering/processing of sediments and debris;
- Material segregation, handling, and staging;
- Stormwater collection/management;
- Water treatment and discharge;
- Flood protection;
- Protection of delineated wetland areas;
- Facility and river access; and
- General facility construction.

The contractor will propose the means and methods to comply with the requirements, including the selection, construction, commissioning, operation, and maintenance of equipment, materials, processes, containment and staging areas, access ways, and other supporting features. Information regarding construction of the Landlocked Dewatering Area and the methods for dewatering/processing dredged sediment and debris will be presented in the Reach 7 RAWP.

Key elements related to the Landlocked Dewatering Area are summarized in the following subsections.

4.3.1 Archaeological Resources

As described in Section 3.2.6, archaeological resource assessments conducted by URS at the location of the Landlocked Dewatering Area have identified archaeological artifacts of the colonial-era Fort Miller. As described in Section 3.2.6, the property available for construction and operation of the Landlocked Dewatering Area has been
divided into three zones based on these findings – Archaeological Upland Zone A, Archaeological Upland Zone B, and Archaeological Upland Zone C. The locations of these zones are shown on Figure 2-1 and Drawing D-2606 (Appendix 2).

Archaeological site protection measures will be implemented as described in Specification Section 01353 (Cultural Resources, Appendix 1). Archaeological site protection measures will be implemented in Archaeological Upland Zones B and C; no specific archaeological site protection measures will be required in Archaeological Upland Zone A. The protective measures to be implemented by the contractor in Archaeological Upland Zones B and C are summarized below:

- **Archaeological Upland Zone B** will be used for heavy and/or light duty operations (i.e., sediment/debris/backfill staging, sediment dewatering and other processing, water treatment, water storage, vehicle access, heavy equipment/material staging/operation, material laydown, office trailers, personnel work area access, personnel break area). The contractor will be required to implement measures to minimize the disturbance of existing soils in Archaeological Upland Zone B (as described further below).

- To the extent practical, the contractor will avoid using Archaeological Upland Zone C during the construction, operation, and restoration of the Landlocked Dewatering Area. If necessary due to property constraints, Archaeological Upland Zone C may be used for light duty operations at the Landlocked Dewatering Area (i.e., office trailers, personnel work area access, personnel break area, personnel decontamination, light material laydown/staging).

- **Archaeological Upland Zone C** will not be used for dredged material unloading, sediment/debris/fill material staging, sediment dewatering/processing, water treatment, water storage, vehicle access, or heavy equipment staging or operation.

- Prior to using any portions of Archaeological Upland Zone C for light duty operations, the contractor will implement measures to protect existing soils from disturbance. At a minimum, the contractor will install a non-woven geotextile marker layer, gravel layer, and/or other approved materials to protect existing soils from disturbance in Archaeological Upland Zone C.

- The contractor will notify the Construction Manager at least 2 weeks before initiating work in or adjacent to Archaeological Upland Zones B and C.
The contractor will mark the limits of Archaeological Upland Zones B and C with high-visibility markers prior to initiation of work in these areas.

No excavation, soil grading, vegetation removal, or other ground intrusive activities will be conducted in Archaeological Upland Zones B or C.

No tree removal will be performed in Archaeological Upland Zones B and C unless approved in writing by the Construction Manager. In Archaeological Upland Zones B and C, all tree removal will be performed using handsaws, chainsaws, and slings. Tree branches and trunks will be cut to the extent necessary to implement the work. Tree trunks/root balls will not be removed.

Sheet piling and/or foundations that extend below the existing ground surface will not be installed in Archaeological Upland Zones B and C.

The contractor will be required to implement measures to distribute wheel loads to minimize disturbance to existing soils in Archaeological Upland Zones B and C (e.g., installation of a geogrid material and/or wood mats).

Archaeological Upland Zones B and C will be restored in accordance with Section 13756 (Landlocked Dewatering Area Construction, Operation, and Maintenance; Appendix 1) and Section 13760 (Site Restoration; Appendix 1).

### 4.3.2 Wetland Areas

As summarized in Section 3.2.4 and contained in Attachment H, wetland areas were identified in low-lying, wooded areas at the properties where the Landlocked Dewatering Area will be constructed. Figure 2-1 shows the locations of the delineated wetland areas.

The contractor will be required to protect the wetland areas from disturbance during the construction, operation, and decommissioning of the Landlocked Dewatering Area. Wetlands and surrounding areas disturbed (if any) during the construction, operation, and decommissioning of the Landlocked Dewatering Area will be restored. Requirements for the protection and restoration of wetland areas are described in Specification Sections 13756 (Landlocked Dewatering Area Construction) and 13760 (Site Restoration) in Appendix 1.
4.3.3 Sediment Dewatering/Processing

Dredged sediments and debris will be dewatered at the Landlocked Dewatering Area to facilitate transport to the Sediment Processing Facility for subsequent transport and off-site disposal. The dredged sediment and debris will be dewatered and otherwise processed so that the resulting material does not contain free liquids (based on paint filter testing and visual observation) before being loaded for transport to the Sediment Processing Facility.

Requirements for the design, construction, commissioning, operation, and maintenance of the Landlocked Dewatering Area are described in Specification Section 13756 (Landlocked Dewatering Area Construction, Operation, and Maintenance; Appendix 1). The provisions of this specification have been developed to comply with the pertinent substantive requirements of the ARARs listed in the ROD, including EPA’s regulations under TSCA and the New York hazardous waste regulations. The contractor will propose the means and methods to comply with the specified requirements and will determine the types, numbers, and sizes of processes and equipment to be used. The sediment dewatering/processing may include gravity dewatering, mechanical dewatering (e.g., belt/filter presses), size separation, thickening, material stabilization, material blending/mixing, and/or other processes. The methods for dewatering/processing and staging of the dredged sediment and debris will be presented in the Reach 7 RAWP based on contractor input.

Construction of the Landlocked Dewatering Area will commence following EPA approval of the Reach 7 FDR and the Reach 7 RAWP. In addition, construction of the Landlocked Dewatering Area will commence following review of engineering submittals prepared by the selected contractor to address requirements for sediment/debris dewatering/processing, water collection/treatment, an impermeable containment system, excavation and grading, site access, flood protection, dredged material receiving/unloading, river access/docking, foundations/structures, and utilities.

4.3.4 Material Handling and Staging

Flood protection measures and an impermeable containment system will be installed in areas of the Landlocked Dewatering Area where PCB-containing materials will be dewatered/processed, staged, and handled. The flood protection measures will be designed and installed to protect areas used for staging of dredged material, dewatering/processing of dredged material, staging of dewatered sediment, and fuel/chemical storage from flooding up to and including a 100-year flood event. The
containment system will be installed to contain and collect stormwater, water generated during the dredging operations and transferred to the Landlocked Dewatering Area, and water generated during sediment dewatering/processing for subsequent water treatment (described below in Section 4.3.6). Specification Section 13756 (Landlocked Dewatering Area Construction, Operation, and Maintenance; Appendix 1) includes requirements for the flood protection system and the containment system, and for managing material staging piles.

4.3.5 Material Segregation

Materials to be disposed of at a facility regulated under TSCA may be segregated from materials that may be sent to a non-TSCA solid waste landfill (i.e., a facility subject to Subtitle D of the Resource Conservation and Recovery Act) throughout the process of dredging, material transport, material unloading, sediment dewatering/processing, and material staging. The resulting materials may then be separately transported to the respective disposal facilities authorized to receive and dispose of such materials.

The approach for segregating and separately managing materials subject to TSCA disposal and materials not subject to TSCA disposal will be described in the Reach 7 RAWP based on contractor input. The Reach 7 TDP (to be provided with the Reach 7 RAWP) will provide a further description of the procedures to be followed in characterizing and handling the sediments and debris to be removed from CU61 through CU66 for purposes of transport and disposal, and in transporting those materials to the selected final disposal facilities.

4.3.6 Water Treatment and Discharge

Water generated during the dredging operations and received at the Landlocked Dewatering Area, process water generated during sediment dewatering/processing, and stormwater collected from dredged material dewatering/processing and staging areas will be collected and treated prior to discharge back to the river.

Specification Section 13756 (Landlocked Dewatering Area Construction, Operation, and Maintenance; Appendix 1) provides minimum requirements for the water treatment system, treatment system effluent concentration criteria, and minimum equipment and operating requirements in general terms. The effluent limitations for the water treatment system are set forth in Specification Section 13756 (Landlocked Dewatering Area Construction, Operation, and Maintenance; Appendix 1). They are the same as those specified for discharges to the Hudson River in Tables 8-2 and 8-3 of the Phase 2
PSCP Scope included as Attachment C of the SOW (EPA 2010b). The equipment and processes necessary to meet the specified requirements, including required effluent discharge criteria, will be determined by the contractor.

4.3.7 Air Emission BMPs

Air emission BMPs will be implemented at the Landlocked Dewatering Area as necessary to maintain compliance with the applicable PCB air quality standard. The air emission BMPs to be implemented will depend on the sediment dewatering/processing means and methods implemented by the contractor. Specification Section 02938 (Air Emissions Restrictions and Controls; Appendix 1) includes requirements for air emissions controls and lists air mitigation BMPs to be implemented during the sediment dewatering/processing and staging operations. The final air emission BMPs and other control measures will be described in the Reach 7 RAWP based on contractor input.

4.3.8 Material Transport to the Sediment Processing Facility

After processing, the dewatered sediment and debris will be transported by truck to the Sediment Processing Facility. The trucks transporting the dewatered sediment and debris from the Landlocked Dewatering Area to the Sediment Processing Facility will be lined and covered. The trucks will travel along designated haul routes that will be presented in the Reach 7 RAWP. The haul routes to be used for transporting the dewatered materials from the Landlocked Dewatering Area to the Sediment Processing Facility will be considered on-site within the meaning of Paragraph 8.a of the RA CD and Section 121(e) of CERCLA. Each truck transporting the dewatered material to the Sediment Processing Facility will be accompanied by a bill of lading to document chain-of-custody. The Reach 7 TDP, to be submitted as part of the Reach 7 RAWP will include a more complete description of the procedures to be used to manage the on-site transport of dewatered sediments from the Landlocked Dewatering Area to the Sediment Processing Facility. At the Sediment Processing Facility, the dewatered materials will be unloaded and staged at locations to be designated by the Construction Manager.

Specification Section 13812 (Processed Material Transport by Truck; Appendix 1) presents the requirements for transporting the dewatered materials and debris from the Landlocked Dewatering Area to the Sediment Processing Facility.
4.3.9 Off-site Material Transport and Disposal

After transport to the Sediment Processing Facility, the Processing Facility Operations Contractor will be responsible for loading the dewatered material from the Landlocked Area into railcars for transport and disposal with sediment dredged from other areas of the river.

Transportation of the dewatered sediment, debris, and other project waste material will be by rail using “unit trains.” Railcars will be equipped with a sift-proof packaging system in accordance with U.S. Department of Transportation (DOT) requirements. Each railcar will be weighed before leaving the Sediment Processing Facility rail yard to verify that the load meets the weight restrictions of the commercial carriers. Once a unit train is filled with dewatered sediment and other project waste material, it will be picked up by the commercial rail carrier.

Once a train is loaded, the dewatered materials will be transported by railroad to authorized commercial disposal facilities to be identified in the Reach 7 TDP to be prepared as part of the Reach 7 RAWP. Upon arrival at the landfill, the railcars will be unloaded and set for the return trip to the Sediment Processing Facility. The unloaded waste material will be disposed of by the landfill operator in accordance with the landfill’s operating permits and authorizations.

4.4 Backfilling/Capping

After dredging is complete in each CU or CU sub-unit, the dredged areas will be backfilled or capped, as appropriate, to isolate residual sediments and support habitat construction. The total and relative acreages of areas to be capped or backfilled will depend on the results of the residuals sampling and the number of CUs dredged.

4.4.1 Backfill/Cap Footprint

Dredged areas will be covered by backfill or cap material, based on residual sample results. The decision to place backfill or isolation caps will be based on the post-dredging distribution of PCB concentrations in accordance with the Phase 2 EPS and the Reach 7 PSCP or as otherwise approved by EPA. The Phase 2 EPS limit the amount of capping that will be allowed in Phase 2. The capping limits, based on the Phase 2 EPS, will be described in the Reach 7 PSCP. Since CU61 through CU66 are located entirely outside of the navigation channel, backfill and cap placement restrictions associated with the navigation channel are not applicable to Reach 7.
Areas not dredged due to offsets from riprap and structures will not be covered with backfill or cap material.

4.4.2 Backfill

Consistent with the design for other areas of the river, there are four main components of backfill in the design: base backfill layer, near-shore backfill, habitat layer backfill, and backfill in RFW construction areas.

4.4.2.1 Backfill Material Types

The backfill material specifications for CU61 through CU66 in Reach 7 are described in Specification Section 02206 (Backfill and Cap Material; Appendix 1). The choice of backfill type will be determined as follows:

- Type 1 backfill material will generally be used in locations with estimated surface water velocities of 1.5 feet per second (ft/s) or less during a 2-year flow event (except as noted below), and Type 2 backfill material will be used in areas with estimated surface water velocities greater than 1.5 ft/s during a 2-year flow event.

- Type 2 backfill material will be used for supporting side slopes associated with the placement of near-shore backfill, habitat layer backfill, and RFW construction areas.

- Type 2 backfill will be designated for use as a base material layer for near-shore backfill and RFW construction areas.

- The upper 1 foot of RFW construction areas will consist of a mixture of Type 2 backfill and topsoil with a total organic carbon (TOC) content between 2 and 5 percent, referred to as Type 5 backfill material.

Consistent with the approved 2013 FDR, the use of Type 1 backfill will be specified for areas where its geotechnical properties provide for it to be stable enough to maintain the desired river bottom slopes and shape. Areas where Type 2 backfill will be placed in low-velocity areas in lieu of Type 1 backfill have been incorporated into the design in low-velocity areas having a slope steeper than five horizontal to one vertical (5H:1V) and near-shore areas adjacent to high-velocity areas or adjacent to slopes steeper than 5H:1V.
Additional areas may be identified in the field by the Construction Manager for placement of Type 2 backfill in low-velocity areas in lieu of Type 1 backfill based on an evaluation of slopes of the river bottom after dredging is completed. These additional areas will be reviewed with EPA prior to backfill placement.

4.4.2.2 Base Backfill Layer

Dredged areas will be backfilled with an approximately 1-foot layer of Type 1 or Type 2 material placed on the river bottom following completion of dredging, except as described in Sections 4.4.2.3, 4.4.2.4, and 4.4.2.5; and except where isolation caps will be placed.

The locations where the base backfill layer will be placed are shown on figures included in Attachment I and are identified on Drawings B-2621 through B-2626 (Appendix 2).

4.4.2.3 Near-shore Backfill

EPA’s November 2006 Final Decision regarding issues disputed by GE (EPA 2006), referenced in the Phase 2 CDE, specified that for dredge areas near the shoreline, the surface water elevation associated with a flow corresponding to the minimum one day average flow that occurs once every three years (1Q3; flow of 1,100 cfs at the Ft Edward gage) is to be used as the basis for the in-river boundary of the nearshore areas that must be restored to pre-dredge bathymetry.

In October 2013, Van Dusen & Steves Land Surveyors surveyed the elevation of the crest of the Fort Miller Dam, which is located at the downstream end of Reach 7. This survey indicated that the elevation of the crest of Fort Miller Dam is 114.46 ft (NAVD88). Because the water surface elevation of the river in the Reach 7 pool will not drop below the dam crest elevation, GE proposed to establish the near-shore elevation in Reach 7 at an elevation of 114.5 ft (NAVD88), consistent with the crest elevation of the dam. In October 2013, EPA agreed that the near-shore boundary elevation of 114.5 ft (NAVD88) is acceptable for Reach 7. This elevation has been incorporated into the basis of the design as the near-shore boundary elevation for CU61 through CU66 in Reach 7.

The near-shore area is defined as the area between the shoreline and the near-shore boundary elevation. Near-shore setpoints were established in near-shore backfill areas at intervals of approximately 100 feet, and at points of inflection, along the near-shore
boundary contour line based on the 2011 bathymetry survey data in CU61 through CU66. The near-shore border extends between the near-shore setpoints to approximate the near-shore boundary bathymetric contour, but is not necessarily at the defined elevation at all locations between the setpoints. Figures showing the near-shore setpoints and near-shore border relative to the near-shore boundary contour line are provided in Attachment E. An electronic data file of the near-shore boundary is provided on the CD-ROM included with this report.

As indicated on Figure E-7 in Attachment E, the portion of CU64 immediately north of Galusha Island will be designated for placement of near-shore backfill. The backfill placement tolerances described in Specification Section 13721 (Backfilling/Capping; Appendix 1) includes specific requirements related to the placement of near-shore backfill in this portion of CU64.

Near-shore backfill will be placed to pre-dredging bathymetry in the near-shore area. The upper 1 foot of near-shore backfill material will consist of Type 1 or Type 2 material. Type 2 material will be used below the upper 1 foot of near-shore backfill as needed. Supporting side slopes of 3:1 (horizontal:vertical) (i.e., the 3:1 near-shore backfill wedge) will be constructed using Type 2 material and will extend from the edge of the near-shore backfill (i.e., at the near-shore border) down to the adjoining backfill layer or cap layer.

Details and example cross-sections for near-shore backfill are shown on Drawing B-2606 (Appendix 2). The near-shore border and near-shore setpoints, along with locations where near-shore backfill materials will be applied, are identified on figures included in Attachment I and on Drawings B-2621 through B-2626 (Appendix 2). The coordinates for the near-shore setpoints are identified on Drawing B-2860 (Appendix 2).

4.4.2.4 Habitat Layer Backfill

In accordance with the Phase 2 CDE, additional backfill (hereafter referred to as “habitat layer backfill”) will be used to reconstruct SAV planting, contingency, and natural recolonization areas in dredged areas where the pre-dredging water depth is less than 8 feet and the water depth after dredging and backfill layer placement will be greater than 8 feet (i.e., an elevation lower than 106.9 ft [NAVD88] in Reach 7 after dredging and placement of the backfill layer or isolation caps is completed).
Habitat layer backfill will be placed to return the area either to pre-dredging bathymetry or to a water depth of 5 feet below the shoreline elevation. In areas where habitat layer backfill is required based on the criteria listed in the Phase 2 CDE and described above, backfill material will be placed in SAV areas with pre-dredging elevations between 106.9 ft and 109.9 ft to return the areas to pre-dredging bathymetry, and in SAV areas with pre-dredging elevation between 109.9 ft and 112.9 ft to return the areas to an elevation of 109.9 ft.

Conceptual SAV planting, contingency, and natural recolonization areas have been developed for CU61 through CU66 as described in Section 4.6.3 and Attachment C. These areas will serve as the basis for determining the locations and extent of habitat layer backfill placement. The conceptual SAV primary planting, contingency, and natural recolonization areas associated with CU61 through CU66 are shown on Drawings B-2621 through B-2626 (Appendix 2) and on figures included in Attachment I. Potential locations where habitat layer backfill may be applicable are also shown on the figures included in Attachment I. Habitat layer backfill will not be placed in areas designated for placement of near-shore backfill (to be backfilled to pre-dredging bathymetry – see Section 4.3.2.3).

After dredging is completed and prior to backfill placement, the Construction Manager will provide the contractor with the locations, extents, and elevations for placement of the habitat layer backfill. The locations and elevations for placement of habitat layer backfill will be based on the post-dredging elevations in the conceptual SAV planting, contingency, and natural recolonization areas. The determination of whether to place habitat layer backfill will also be based on the locations of isolation caps and adjustments (if any) to the conceptual habitat construction locations based on post-dredging conditions. The habitat layer backfill designs developed after the completion of dredging will be reviewed and approved by EPA as part of the CU certification process.

Details and example cross-sections for habitat layer backfill are identified on Drawing B-2608 (Appendix 2). The habitat layer backfill will consist of Type 1 or Type 2 material. At the contractor’s option, Type 2 material may be used as a base material below the upper 1 foot of Type 1 material in habitat layer backfill areas where the Type 1 material is specified. Supporting side slopes of 3:1 (horizontal:vertical) constructed using Type 2 material will be created extending from the edge of the habitat layer backfill down to the adjoining backfill surface. Habitat layer backfill will be placed above caps (where caps are placed in areas to receive habitat layer backfill) and may be placed above the 3:1 supporting side slopes for near-shore backfill.
Based on the analysis summarized in Attachment C, an estimated volume of approximately 3,100 cy of habitat layer backfill will be placed in CU61 through CU66, assuming dredging to an elevation 1 foot below the EoC surface. This volume does not include the backfill that would need to be placed due to dredging (including residual dredging) deeper than 1 foot below the EoC surface or placement of the supporting 3:1 side slopes. The areas receiving habitat layer backfill and the total volume placed in CU61 through CU66 will be determined during the CU certification process.

4.4.2.5 Riverine Fringing Wetland Construction Areas

Approximately 1.7 acres of RFW have been delineated in CU61 through CU66. The RFW construction areas in CU61 through CU66 are identified in Attachment C. As described in Attachment C, RFW areas disturbed during the dredging operations will be restored at their current locations as delineated in the Wetland Delineation Report for Phase 2 Areas (Anchor QEA 2011) and adjusted based on the field review conducted during October 2013 with EPA as described in Section 3.2.3, except for an approximately 0.11-acre portion of the wetland area located in CU65 at the downstream end of Galusha Island. As described in Attachment C, this wetland area in CU65 has been relocated to an area in CU64 along the eastern shoreline of Galusha Island to create a larger, more continuous wetland area.

The backfilling approach for RFW construction areas will be similar to the approach implemented in RFW construction areas during previous dredging seasons. Backfill will be placed in the RFW construction areas to restore pre-dredge bathymetry. The upper 1 foot of RFW construction areas will be constructed using Type 5 backfill. If more than 1 foot of backfill is required to construct the RFW areas to pre-dredge bathymetry, Type 2 material will be placed below the upper 1-foot layer of Type 5 material or, at the contractor's option, Type 5 backfill material will be placed within the entire depth of the RFW construction areas. Supporting side slopes of 3:1 (horizontal:vertical) will be created extending from the edge of the RFW construction area down to the adjoining backfill or cap surface.

Prior to installation of an erosion control fabric over the Type 5 material, the RFW construction areas will be seeded in accordance with existing Specification Section 13701 (Riverine Fringing Wetland Seeding; Appendix 1). Wetland boundary material will not be placed in RFW construction areas in Reach 7, because this area is less exposed to boat wakes due to its location outside of the navigation channel.
Details and example cross-sections for the typical RFW construction areas are identified on Drawing B-2607 (Appendix 2). The RFW construction area locations are identified on figures included in Attachment I and on Drawings B-2621 through B-2626 (Appendix 2).

The backfill placement and tolerance requirements for RFW construction areas restored to pre-dredge bathymetry are described in Specification Section 13721 (Landlocked Area Backfilling/Capping; Appendix 1).

### 4.4.3 Isolation Caps

Engineered caps will be installed in certain dredge areas in accordance with the Residuals Standard criteria to act as a physical barrier that both isolates and stabilizes the residual sediment. The criteria requiring or allowing for installation of an engineered cap based on post-dredging residuals concentrations will be described in the Reach 7 PSCP.

Between June and August 2012, GE and EPA met to discuss technical details regarding the applicability of the cap design for River Sections 2 and 3. Based on those discussions and considerations regarding conservative assumptions that were used as part of the previous modeling for the existing cap design, EPA agreed that, provided the cap design approved in the 2011 FDR and 2012 FDR is applied for the remaining Phase 2 dredge areas, additional data collection (including groundwater flux data) and modeling related to future cap design will not be required. A detailed cap design analysis was presented in Attachment F of the approved 2011 FDR.

The two isolation cap prototypes – medium-velocity isolation cap Type C and high-velocity isolation cap Type C – designed during development of the 2011 FDR will be applied in Reach 7.

River velocities for the 100-year flow conditions were predicted using the hydrodynamic model developed for the Upper Hudson River (see Attachment D of the Phase 2 IDR) to determine areas where medium-velocity isolation caps and high-velocity isolation caps would be designated. Figures F-1 through F-8 in Attachment F show the modeled velocity distributions for CU61 to CU66 under 100-year flow conditions. These figures will serve as a basis for determining armor types for the dredge areas if a cap is required.
Because CU61 through CU66 are located outside the limits of the navigation channel, the design does not include requirements associated with placement of isolation caps in the navigation channel in Reach 7.

Details and example cross-sections for the prototype isolation caps are provided on Drawing C-2605 (Appendix 2). The potential locations for placement of the medium- and high-velocity isolation caps are identified on Drawings C-2611 through C-2616 (Appendix 2).

Long-term monitoring and maintenance requirements for the isolation caps to be installed in Reach 7 will be described in a Cap/Habitat Operation, Maintenance, and Monitoring Plan to be submitted after the caps have been placed. These requirements will be based on those described in the approved Operation, Maintenance, and Monitoring Plan for Phase 2 Year 1 Caps and Habitat Replacement/Reconstruction (Phase 2 Year 1 Cap/Habitat OM&M Plan; Parsons 2012) and the revised Operation, Maintenance, and Monitoring Plan for 2012 Caps and Habitat Replacement/Reconstruction (2012 Cap/Habitat OM&M Plan; Parsons 2013).

4.4.4 Backfill and Cap Material Placement

The backfill and cap material placement and tolerance requirements for Reach 7 are described in Specification Section 13721 (Landlocked Area Backfill/Capping; Appendix 1). Backfill/cap material will be transported by truck to the Landlocked Dewatering Area and for staging prior to placement in the CUs after dredging. It is anticipated that backfill and cap materials will be loaded onto barges at the Landlocked Dewatering Area and placed in the CUs using an excavator with a clamshell bucket. Placement using this method is achieved through surface discharge. This method has proven to meet the placement accuracy and tolerance requirements for the range of materials and in-river conditions. Final details on the methods to be used for backfill and cap placement will be determined by the contractor and described in the Reach 7 RAWP.

4.4.5 Backfill and Cap Material Sources

Potential sources of backfill and cap materials and the routes of delivery to the Landlocked Dewatering Area will be described in the Reach 7 RAWP.
4.4.6 Shorelines

Shoreline construction is separated into two components: shoreline stabilization in areas immediately below the designated shoreline elevation, and shoreline repair in areas above the designated shoreline elevation.

4.4.6.1 Shoreline Stabilization

Shoreline stabilization (or shoreline treatments) will be applied in areas where dredging is performed up to the designated shoreline elevation, and will include implementation of stabilization measures below the shoreline elevation. The types of shoreline treatments include near-shore backfill, RFW construction, and Type P armor stone.

On July 10, 2012, a field inspection was conducted by GE to identify the shoreline treatments to be applied in CU61 through CU66. The determination of the types of shoreline stabilization to be applied was based on the following considerations:

- The presence of shoreline structures, including roads, sheet piling, retaining walls, bridge abutments, boat launches, and outfalls;
- The presence of maintained shoreline, including riprap, armor stone, and gabion baskets;
- The slope of the riverbank;
- Evidence of existing erosion;
- Property ownership along the shoreline; and
- Minimization of hardening of the shoreline, to the extent practical.

Shoreline stabilization requirements are described in Specification Section 13898 (Shoreline Stabilization; Appendix 1). The types and locations of each shoreline stabilization treatment are shown on Drawings B-3621 through B-3626 (Appendix 2). Details for the shoreline stabilization treatments are identified on Drawing B-2609 (Appendix 2).
Long-term monitoring and maintenance requirements for stabilized shoreline areas will be described in a Cap/Habitat OM&M Plan to be submitted after the dredging and backfill/capping operations have been completed in Reach 7.

4.4.6.2 Shoreline Repair

The contractor will be responsible for repairing any disturbed shoreline areas above the designated shoreline elevation.

If areas above the designated shoreline elevation are disturbed, they will be reconstructed as moderate- or low-energy shorelines based on surface water velocity profiles (above and below 1.5 ft/s, respectively). Shoreline construction will consist of seeding (low-energy) or seeding and live staking (moderate-energy).

Typical shoreline repair details are shown on Drawing B-2610 (Appendix 2). Requirements for repair of shoreline areas disturbed during the dredging operations are presented in Specification Sections 02921 (Seeding; Appendix 1) and 13705 (Shoreline Repair and Planting; Appendix 1).

4.5 Landlocked Dewatering Area Decommissioning and Restoration

After dredging, sediment dewatering/processing, and backfilling/capping operations are completed and the dredged/dewatered materials have been removed, the Landlocked Dewatering Area will be dismantled, decommissioned, decontaminated, and restored to return the area to pre-work conditions, to the extent practicable. A Landlocked Area Demobilization and Restoration Plan will be prepared to describe the proposed methods for demobilization and restoration of the Landlocked Dewatering Area. This plan will be developed in compliance with the requirements described in Section 3.1.4 of the SOW (EPA 2010b) and submitted to EPA for review and approval.

The decommissioning will include dismantling, disconnecting, and removing equipment, materials, structures, facilities, utilities, staging areas, access ways, control measures, and services delivered and/or installed as part of the work. Equipment and non-disposable materials that have come in contact with PCB-containing materials will be decontaminated. Materials that cannot be decontaminated and are designed for contact with PCB-containing materials (e.g., the containment system liner, materials placed above the containment system liner, filter media) will be removed and transported to the Sediment Processing Facility for subsequent transport and off-site disposal. Specification Section 13758 (Landlocked Dewatering Area –
Decommissioning; Appendix 1) describes the decommissioning requirements for the Landlocked Dewatering Area.

Following facility decommissioning, the disturbed areas at the Landlocked Dewatering Area will be restored, repaired, and/or replaced. This will include, but will not be limited to, demobilizing Landlocked Dewatering Area construction materials and equipment, importing fill material/topsoil, grading to restore pre-work topography, restoring disturbed wetland areas, and planting/seedling. Specification Section 13760 (Site Restoration; Appendix 1) describes the restoration requirements for the Landlocked Dewatering Area.

4.6 Habitat Construction – Reach 7

Habitat construction areas in Reach 7 are based on river velocity, water depth, presence of SAV vegetation and RFWs prior to dredging, and the results of an SAV model. The model evaluates whether conditions are suitable for planting and growth of SAV and is further described in Attachment H of the Phase 2 IDR. The SAV model was not updated for this Reach 7 design. Estimated locations and volumes for placement of additional habitat layer backfill required by the Phase 2 CDE have been developed as described in Attachment C.

The conceptual design for habitat construction planting areas for CU61 through CU66 is presented in Attachment C. The final habitat construction design for the Reach 7 dredge areas will depend on the dredging operations actually completed in these CUs. Drawings and specifications associated with the final habitat construction design for these CUs will be provided to EPA in a separate design submittal. The habitat construction in these areas will be performed in subsequent years.

4.6.1 Unconsolidated River Bottom Habitat

UCB habitat will be reconstructed through the placement of Type 1 or Type 2 backfill. The locations where Types 1 and 2 backfill will be applied are shown on Drawings B-2621 through B-2626 (Appendix 2).

4.6.2 Riverine Fringing Wetlands

RFWs affected by the remediation will be replaced at their current locations, to the extent practicable, as delineated in the Wetland Delineation Report for Phase 2 Areas (Anchor QEA 2011) and adjusted based on the field review conducted with EPA as
described in Section 3.2.3. As described in Attachment C, an approximately 0.11-acre portion of the wetland area located in CU65 has been relocated to the eastern shoreline of Galusha Island in CU64.

Construction of replacement RFWs will involve backfilling the RFW areas as described in Section 4.4.2.5. RFW areas will then be planted and seeded with species native to the Upper Hudson River. Wetland construction areas are further discussed in Attachment C and shown on figures in Attachment C.

4.6.3 Submerged Aquatic Vegetation Beds

SAV beds will be reconstructed or replaced through both planting and natural recolonization. Planting areas were selected based on the presence of vegetation prior to dredging, the SAV model scores, estimated locations for placement of additional habitat layer backfill material, and water depth, as described in Attachment C. The conceptual SAV planting, contingency, and natural recolonization areas for CU61 through CU66 are shown on figures in Attachment C. SAV contingency areas may be planted if any of the designated SAV primary planting areas do not meet pre-planting bathymetry requirements. All SAV contingency areas that are not planted will be designated as natural recolonization areas.

The conceptual SAV primary and contingency planting areas and natural recolonization areas associated with CU61 through CU66 are shown on Drawings B-2621 through B-2626 (Appendix 2). An electronic data file of the conceptual SAV primary and contingency planting areas and natural recolonization areas is provided on the CD-ROM included with this report.

4.7 Quality of Life Standards

A summary of how the QoLPS parameters have been considered in the design for Reach 7 is provided below.

4.7.1 Air Quality – PCBs

As discussed in Section 4.2.7, air mitigation BMPs will be implemented in dredging areas with a potential to emit PCBs to the air at levels close to or exceeding the applicable PCB air quality standard, based on criteria defined in the Phase 2 CDE. Such areas are shown on Drawings D-3611 through D-3616 (Appendix 2). Air emission
BMPs will also be implemented at the Landlocked Dewatering Area as necessary to maintain compliance with the applicable PCB Air Quality Standard.

The air emission BMPs to be implemented will depend on the dredging, dredged material transport, and sediment dewatering/processing approach and methods implemented by the contractor. Specification Section 02938 (Air Emissions Restrictions and Controls; Appendix 1) includes requirements for air emission controls and lists the potential air mitigation BMPs that may be implemented during the dredging, dredged material transport, and sediment dewatering/processing operations. The final air emission BMPs and other control measures to be implemented will be described in the Reach 7 RAWP and Reach 7 PSCP based on contractor input.

4.7.2 Air Quality – National Ambient Air Quality Standards

An air quality modeling analysis conducted during the Phase 1 design demonstrated that the emissions of criteria pollutants from in-river activities and Sediment Processing Facility operations during Phase 1 were not predicted to cause exceedances of the National Ambient Air Quality Standards (NAAQS). The Phase 2 PSCP Scope and Phase 2 CHASP Scope require GE to evaluate the need to revise the prior analysis to reflect any anticipated operational or equipment changes in Phase 2 that could affect these pollutants. If no such change is anticipated, no additional modeling or further evaluation of criteria pollutants is needed, and no provisions for monitoring or control of those pollutants will be necessary during Phase 2.

NAAQS analyses were previously conducted and presented as attachments to the 2011 FDR and 2012 FDR considering anticipated operational or equipment changes that could affect these criteria pollutants. These previous analyses confirmed that the Phase 1 analysis demonstrating compliance with the NAAQS should likewise apply to the 2011 and 2012 dredging seasons, and that there was no need for a more detailed revised NAAQS analysis.

The need for a revised NAAQS analyses for the Landlocked Area dredging project will be evaluated after the contractor’s proposed equipment is known. If required, a NAAQS analysis for the Landlocked Area project will be submitted to EPA separately.

In any event, preventative or contingency measures are included in the specifications to prevent the generation of particulates in the form of dust during Landlocked Area operations. These measures include the following:
• Dust control measures will be implemented by the contractor to prevent and control on-site dust generation and migration during operations.

• Haul roads at the Landlocked Dewatering Area will be wetted down, as needed, to minimize dust generation.

• The contractor will be required to prevent and mitigate spills of sediment on haul roads.

### 4.7.3 Odor

It is not anticipated that sediments dredged in Reach 7 will generate odors that will reach the concern or exceedance levels established in the QoLPS. Routine monitoring, reporting requirements, and action levels for additional monitoring under the Phase 2 QoLPS for odor are described in the Phase 2 RAM QAPP. Specific actions to be taken to address exceedance of the criteria in the Phase 2 QoLPS and associated reporting requirements will be discussed in the Reach 7 PSCP.

### 4.7.4 Noise

During Landlocked Area operations (as in the prior Phase 2 seasons), noise will be monitored by the contractor at the initial startup of any operation or equipment different from that previously used in this project and that could result in increased noise levels. This monitoring will not be considered monitoring for compliance with the Noise Standard. However, if a sound level based on the contractor monitoring is above the numerical criteria established in the Noise Standard, additional monitoring will be conducted at a location closer to the nearest receptor(s) to assess attainment of those criteria; a noise level above those criteria will be considered an exceedance only if confirmed by that follow-up monitoring. Noise will also be monitored in response to noise complaints. Routine monitoring, reporting requirements, and action levels for additional monitoring under the Phase 2 QoLPS for noise are described in the Phase 2 RAM QAPP.

Specification Section 02931 (Noise Restrictions and Controls; Appendix 1) outlines the noise standards, requirements, restrictions, and controls during the project operations. This specification identifies the routine noise monitoring to be conducted by the contractor at the initial startup of any operation or equipment and for any changes in equipment, procedures, or conditions. If compliance noise monitoring (whether conducted as a follow-up to the contractor monitoring or in response to a complaint)
shows an exceedance of an applicable noise standard, the contractor will be responsible for implementing engineering controls or other mitigation measures, as appropriate, to address such exceedance, as will be discussed further in the Reach 7 PSCP.

### 4.7.5 Lighting

During Landlocked Area operations, light will be monitored by the contractor at the initial startup of any operation or equipment different from that used previously in this project and that could result in increased light levels. This monitoring will not be considered monitoring for compliance with the Lighting Standard. However, if a light level based on contractor monitoring is determined to be above a lighting standard, additional monitoring will be conducted at a location closer to the nearest receptor(s) to assess attainment of the standard. A light level above the level of a standard will be considered an exceedance only if confirmed by follow-up monitoring. Light will also be monitored in response to lighting complaints. Routine monitoring, reporting requirements, and action levels for additional monitoring under the Phase 2 QoLPS for lighting are described in the Phase 2 RAM QAPP.

Specification Section 02936 (Lighting Restrictions and Controls; Appendix 1) outlines the lighting standards, requirements, restrictions, and controls during the project operations. This specification identifies routine light monitoring to be conducted by the contractor at the initial startup of any operation or equipment and for any changes in equipment, procedures, or conditions. If compliance light monitoring (whether conducted as a follow-up to the contractor monitoring or in response to a complaint) shows an exceedance of an applicable lighting standard, the contractor will be responsible for implementing engineering controls or other mitigation measures, as appropriate, to address such exceedance, as will be discussed further in the Reach 7 PSCP.

### 4.7.6 Navigation

The Champlain Canal bypasses Reach 7 via the land-cut area north of Lock 6. As a result, the Landlocked Area dredging project will not hinder overall non-project-related vessel movement or create project-related navigation interferences in the Champlain Canal.
5. Remedial Action Implementation

This section summarizes the contracts under which the Landlocked Area dredging and dewatering area operations will be conducted, and provides a general description of the remedial action activities to be performed under each contract. Also included in this section is a description of the remedial action submittals for the Landlocked Area and a reference to the schedule for implementation of the remedial action activities. The contract associated with the habitat construction for the Landlocked Area dredge areas is not discussed in this report.

5.1 Remedial Action Contracts – Reach 7

The remedial action for Reach 7 has been organized into the following contracts based on the nature of work to be accomplished under each:

- **Contract 43B – Landlocked Area Dredging Operations:** Dredging operations, construction/demobilization/restoration of the Landlocked Dewatering Area, sediment dewatering/processing operations, backfilling/capping operations, and material transport operations associated with the Landlocked Area will be conducted under Contract 43B. Specifications for Contract 43B are provided in Appendix 1 of this report, including specifications for general conditions and requirements (Division 1 specifications) and the technical specifications (Divisions 2 through 13 specifications). Drawings for Contract 43B are provided in Appendix 2.

- **Contract 30 – Processing Facility Operations:** The operations at the Sediment Processing Facility will continue to be conducted under Contract 30, which is the same contract issued for work implemented during 2011, 2012, and 2013 and covers seasonal startup, commissioning, sediment processing, and railcar loading operations at the Sediment Processing Facility. The Processing Facility Operations Contractor will be responsible for loading the dewatered sediments transported from the Landlocked Area into railcars. The specifications for Contract 30 (issued with the approved 2011 FDR and as revised in 2012 and 2013) are not presented with this design report. Any changes to the technical specifications for Contract 30 will be provided to EPA for review under separate cover.

- **Contract 60 – Rail Yard Operations:** The rail yard operations will continue to be conducted under Contract 60, which is the same contract issued for the work implemented during 2011, 2012, and 2013. The specifications for Contract 60
(issued with the approved 2011 FDR and revised in 2012 and 2013) are not presented with this design report. Any changes to the technical specifications for Contract 60 will be provided to EPA for review under separate cover.

5.2 Remedial Action Work Plan and Other Remedial Action Submittals

Section 3.1 of the revised SOW (EPA 2010b) requires GE to submit a RAWP for Phase 2 dredging and facility operations to be performed in each construction year of Phase 2. GE will submit a Reach 7 RAWP separately from this Reach 7 FDR and separately from the 2014 RAWP. The Reach 7 RAWP will describe the dredging and facility operations to be performed for Reach 7 and will include a dredging production schedule. As described in Section 2.2.1, the Reach 7 RAWP will include the following plans as appendices: a Reach 7 CQAP, a Reach 7 PSCP, a Reach 7 PAP, a Reach 7 TDP, and a Reach 7 CHASP. As noted in Section 2.2.1, to avoid unnecessary duplication, these plans may, as appropriate, incorporate by reference portions of previously approved plans.

GE may also submit a Remedial Action Health and Safety Plan (RA HASP), or an addendum to a previously issued RA HASP, to address potential worker health and safety issues for GE and its contractors’ workers, describe potential hazards and impacts to project workers, and identify the steps that GE and its contractors will take to prevent and respond to them.

In 2012, GE submitted and EPA approved a Phase 2 RAM QAPP (Anchor QEA 2012), which describes in detail the monitoring and sampling activities, including sample collection, analysis, and data handling activities, to be conducted by GE during the remainder of Phase 2. Any additions or revisions to the Phase 2 RAM QAPP related to the Landlocked Area dredging project will be submitted to EPA for review under separate cover as Corrective Action Memoranda.

In accordance with Section 3.1.4 of the SOW (EPA 2010b), GE will prepare and submit a Landlocked Area Demobilization and Restoration Plan, which will describe the methods for decommissioning, decontamination, demobilization, and restoration of the Landlocked Dewatering Area after the dredging, backfilling/capping, and sediment dewatering/processing operations are completed and the dredged/dewatered materials have been removed from that area.
5.3 Remedial Action Implementation Schedule – Reach 7

The schedule for implementation of Landlocked Area dredging and facility operations will be provided in the Reach 7 RAWP.
6. References


EPA. 2004b. EPA’s Final Dispute Resolution Regarding General Electric Company’s Disputes on Draft Phase 1 Dredge Area Delineation Report and Draft Phase 1 Target Area Identification Report.


## 7. Acronyms and Abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Q3</td>
<td>Minimum 1-day average flow that occurs once every 3 years</td>
</tr>
<tr>
<td>ARA</td>
<td>Archaeological Resources Assessment</td>
</tr>
<tr>
<td>ARARs</td>
<td>Applicable or Relevant and Appropriate Requirements</td>
</tr>
<tr>
<td>ARCADIS</td>
<td>ARCADIS of New York, Inc.</td>
</tr>
<tr>
<td>AOC</td>
<td>Administrative Order on Consent</td>
</tr>
<tr>
<td>BA</td>
<td>Biological Assessment</td>
</tr>
<tr>
<td>BBL</td>
<td>Blasland, Bouck &amp; Lee, Inc.</td>
</tr>
<tr>
<td>BMP</td>
<td>Best Management Practice</td>
</tr>
<tr>
<td>CD</td>
<td>Consent Decree</td>
</tr>
<tr>
<td>CDE</td>
<td>Critical Design Elements</td>
</tr>
<tr>
<td>CERCLA</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Act</td>
</tr>
<tr>
<td>cfs</td>
<td>cubic feet per second</td>
</tr>
<tr>
<td>CHASP</td>
<td>Community Health and Safety Plan or Community Health and Safety Program</td>
</tr>
<tr>
<td>CQAP</td>
<td>Construction Quality Assurance/Quality Control Plan</td>
</tr>
<tr>
<td>CU</td>
<td>Certification Unit</td>
</tr>
<tr>
<td>cy</td>
<td>cubic yards</td>
</tr>
<tr>
<td>DAD</td>
<td>Dredge Area Delineation</td>
</tr>
<tr>
<td>DoC</td>
<td>Depth of Contamination</td>
</tr>
</tbody>
</table>
NAPL  non-aqueous phase liquid
NAVD88  North American Vertical Datum of 1988
NYSCC  New York State Canal Corporation
OMM  Operations, Maintenance, and Monitoring
OSI  Ocean Surveys, Inc.
PAP  Property Access Plan
PCB  polychlorinated biphenyl
PDR  Preliminary Design Report
PSCP  Performance Standards Compliance Plan
QAPP  Quality Assurance Project Plan
QoLPS  Quality of Life Performance Standards
RA CD  Remedial Action Consent Decree
RAM  Remedial Action Monitoring
RAWP  Remedial Action Work Plan
RD AOC  Administrative Order on Consent for Hudson River Remedial Design and Cost Recovery
RFW  riverine fringing wetland
RM  River Mile
ROD  Record of Decision
SAV  submerged aquatic vegetation
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEDC</td>
<td>Supplemental Engineering Data Collection</td>
</tr>
<tr>
<td>SOW</td>
<td>Statement of Work</td>
</tr>
<tr>
<td>SSAP</td>
<td>Sediment Sampling and Analysis Program</td>
</tr>
<tr>
<td>TDP</td>
<td>Transportation and Disposal Plan</td>
</tr>
<tr>
<td>TOC</td>
<td>total organic carbon</td>
</tr>
<tr>
<td>Tri+ PCBs</td>
<td>PCBs with three or more chlorine atoms</td>
</tr>
<tr>
<td>TSCA</td>
<td>Toxic Substances Control Act</td>
</tr>
<tr>
<td>UCB</td>
<td>unconsolidated river bottom</td>
</tr>
<tr>
<td>USGS</td>
<td>United States Geological Survey</td>
</tr>
<tr>
<td>WQ</td>
<td>Water Quality</td>
</tr>
</tbody>
</table>
Table 4-1
Basis of Design for Dredging and Dredged Material Transport – Reach 7

Phase 2 Final Design Report for Reach 7 (the Landlocked Area)
General Electric Company – Hudson River PCBs Superfund Site

<table>
<thead>
<tr>
<th>Item</th>
<th>Basis</th>
<th>Source/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCB MPA threshold for sediment removal in River Section 2</td>
<td>10 g/m² Tri+ PCBs</td>
<td>• Record of Decision (EPA 2002)</td>
</tr>
<tr>
<td>Surface sediment threshold for sediment removal in River Section 2</td>
<td>30 mg/kg Tri+ PCBs</td>
<td>• Specified in Phase 2 DAD Report (QEA 2007)</td>
</tr>
<tr>
<td>Location and depth of dredging</td>
<td>Design inventory dredge depths are based on removal to 1 mg/kg Total PCBs</td>
<td>• EPA’s Final Decision Regarding GE’s Disputes on Draft Phase 1 DAD Report and Draft Target Area Identification Report (EPA 2004b)</td>
</tr>
<tr>
<td>Post-dredge sediment PCB concentration target</td>
<td>1 mg/kg Tri+ PCBs</td>
<td>• From Phase 2 EPS, additional criteria of 6 and 27 mg/kg Tri+ PCBs and 500 mg/kg total PCBs require various response actions</td>
</tr>
<tr>
<td>Reach 7 CUs</td>
<td>CU61 through CU66</td>
<td></td>
</tr>
<tr>
<td>Design cut volume for each CU</td>
<td>See Table 4-4</td>
<td>• Volumes based on the design dredge prism developed in accordance with the Phase 2 CDE</td>
</tr>
<tr>
<td>Re-dredge volume</td>
<td>To be determined</td>
<td>• Volumes do not account for overdredging to achieve the required elevation tolerances or the application of shoreline or structural offsets to be incorporated into the final construction dredge prism based on field survey and contractor input prior to dredging</td>
</tr>
<tr>
<td>Dredging elevation tolerance requirement</td>
<td>Achievement of required dredge elevation in at least 95% of the dredge area</td>
<td>• Phase 2 EPS and Phase 2 CDE</td>
</tr>
<tr>
<td>Dredging season (both the design cut and re-dredge passes)</td>
<td>To be determined</td>
<td>• Required elevations in field-identified dredge refusal or clay areas, as accepted by the Construction Manager, will be considered to have been achieved (EPA 2012)</td>
</tr>
<tr>
<td>Dredging and in-river dredged material transport hours of operation</td>
<td>24 hours/day; 6 days/week (with contingent seventh day)</td>
<td>• Design assumption – based on Phase 1 and Phase 2 experience</td>
</tr>
<tr>
<td>Dredge type and size</td>
<td>To be determined</td>
<td>• The type, number, and size of dredges will be identified in the Reach 7 RAWP based on contractor input</td>
</tr>
<tr>
<td>In-river dredged material transport type and size</td>
<td>To be determined</td>
<td>• The in-river dredged material transport approach (i.e., from the dredge areas to the Landlocked Dewatering Area) will be identified in the Reach 7 RAWP based on contractor input</td>
</tr>
<tr>
<td>Tugboat sizes</td>
<td>To be determined</td>
<td>• The number and size of tugs will be specified in the Reach 7 RAWP based on contractor input</td>
</tr>
<tr>
<td>Shoreline definition</td>
<td>Reach 7: 114.9 ft elevation NAVD88</td>
<td>• See Section 4.1.2</td>
</tr>
</tbody>
</table>
Table 4-1
Basis of Design for Dredging and Dredged Material Transport – Reach 7

Phase 2 Final Design Report for Reach 7 (the Landlocked Area)
General Electric Company – Hudson River PCBs Superfund Site

<table>
<thead>
<tr>
<th>Item</th>
<th>Basis</th>
<th>Source/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Near-shore area</td>
<td>Reach 7: Area between the 114.9 ft shoreline and the 114.5 ft in-river pre-dredge elevation</td>
<td>• See Section 4.4.2.3</td>
</tr>
</tbody>
</table>
| Existing conditions – river bottom contours     | Multi-beam bathymetry surveys (by Thew) and single-beam bathymetric surveys (by OSI) where multi-beam data have not been collected | • Bathymetric surveys conducted by OSI in 2003 for Reach 7  
• Bathymetric surveys conducted by Thew Associates in 2011 for Reach 7 |
| Water depths                                    | Depth varies                                                         | • Varies based on river flow  
• Pre-dredging water depths based on bathymetric surveys conducted in 2003 and 2011  
• Post-dredge water depths (before backfill/cap material placement) based on the Design Dredge Prism XYZ File |
| Sediment chemistry                              | Key Parameter:  
• PCBs                                                               | • SSAP and SEDC database (see Section 3.2.1)                                                          |
| In-river debris                                 | As shown on figures in the appendices of the Phase 2 Supplemental SEDC Summary Report Addendum (Attachment B to the Phase 2 IDR; ARCADIS 2008) | • Data collected during SEDC Program. OSI surveys conducted in 2002 and 2005. Nature and location could change prior to implementation |
| Presence of shoreline structures and in-water structures | As shown on the G-Series Existing Conditions Reference Drawings | • Data collected during SEDC Program – Nature and location could change prior to dredging  
• Updated to incorporate findings from field reconnaissance conducted by Parsons during 2012  
• To be verified by contractor prior to dredging |
| Sediment type                                   | Varies                                                               | • Based on side-scan sonar and probing data collected during the SEDC Program                          |
| Presence of clay                                | Location and elevation varies (See Attachment A)                     | • Approximate locations and elevation of clay delineated by Anchor QEA based on data collected during the SSAP and SEDC Program  
• The approximate limits of where clay controls the EoC elevations are shown on figures in Attachment A - These limits represent areas where sufficient core data were available to map the elevation of the top of GLAC and GLAC is shallower than or within 2 inches deeper than the chemistry-based EoC |
| Presence and type of vegetation                 | Data summarized in habitat delineation and assessment reports        | • See Section 3.2.3                                                                                  |
| Presence of archaeological resources            | Data summarized in archaeological assessment reports                 | • See Section 3.2.6                                                                                  |
Table 4-1
Basis of Design for Dredging and Dredged Material Transport – Reach 7

Phase 2 Final Design Report for Reach 7 (the Landlocked Area)
General Electric Company – Hudson River PCBs Superfund Site

<table>
<thead>
<tr>
<th>Item</th>
<th>Basis</th>
<th>Source/Notes</th>
</tr>
</thead>
</table>
| Anchoring restrictions                 | See D-series Drawings          | • Anchoring will be restricted within: (i) areas where wetlands and SAV have been delineated outside of dredge areas; (ii) areas where backfill has been placed and accepted by the Construction Manager in delineated SAV areas, conceptual SAV planting areas, conceptual SAV contingency planting areas, conceptual natural recolonization areas, and delineated wetland areas; (iii) areas where SAV and RFW have been planted; (iv) designated natural recolonization areas; and (v) areas where caps have been placed.  
• No anchoring of work-related vessels will be permitted in the navigation channel without approval from EPA in consultation with NYS Canal Corporation |
| Air quality, odor, noise, lighting, and navigation performance standards | See Sections 3.1.3 and 4.7 | • Hudson QoLPS (EPA 2004b)  
• Memorandum titled “Quality of Life Performance Standards – Phase 2 Changes” (E&E 2010)  
• Requirements specified in the Phase 2 PSCP Scope (Attachment C to the Revised SOW for the Hudson River RA CD; EPA 2010b)  
• The Reach 7 PSCP to be prepared as part of the Reach 7 RAWP will describe specific actions to be taken to address exceedances of the criteria in the QoLPS |
| Air emission BMPs                      | See Sections 4.2.7 and 4.3.7   | • Phase 2 CDE  
• Required Adaptive Responses and Design Improvements for Phase 2, Year 2 (EPA 2012)  
• The air emission BMPs to be implemented will depend on the dredging, in-river dredged material transport, and sediment processing approach and methods implemented by the contractor.  
• The Reach 7 PSCP to be prepared as part of the Reach 7 RAWP will describe specific actions to be taken to address exceedances of the PCB air quality standard |
| Resuspension BMPs                      | See Section 4.2.8              | • Phase 2 CDE |
| Sheen response BMPs                    | See Section 4.2.7              | • Phase 2 CDE |
| Sediment dewatering/processing approach | To be determined – See Sections 2.2 and 4.3 | • The contractor will propose the means and methods to comply with specified performance requirements. Information regarding construction of the Landlocked Dewatering Area and the proposed methods for dewatering/processing dredged sediment and debris will be presented in the Reach 7 RAWP. |

Notes:
1. References are defined in Section 6 of the Reach 7 FDR.
2. Acronyms and abbreviations are defined in Section 7 of the Reach 7 FDR.
Table 4-2  
Basis of Design for Backfilling/Capping – Reach 7

Phase 2 Final Design Report for Reach 7 (the Landlocked Area)  
General Electric Company – Hudson River PCBs Superfund Site

<table>
<thead>
<tr>
<th>Item</th>
<th>Basis</th>
<th>Source/Notes</th>
</tr>
</thead>
</table>
| Backfill/cap footprint                       | Approximately 29 acres would be considered for backfill and/or cap placement within CU61 through CU66 | • See Section 4.4.1  
• The Phase 2 EPS limits the amount of capping that will be allowed in Phase 2 (EPA 2010a) |
| Top elevations of caps within the navigation channel | Not applicable                                                        | • CU61 through CU66 are located outside of the navigation channel                               |
| The top elevation of backfill within the navigation channel | Not applicable                                                        | • CU61 through CU66 are located outside of the navigation channel                               |
| Backfill thickness                           | Varies                                                               | • The backfill layer will be 12 inches (1 foot; ROD; EPA 2002)  
• Near-shore backfill will be restored to pre-dredging bathymetry between the shoreline and the near-shore border (as defined below) per Phase 2 CDE  
• Where placed, habitat layer backfill will be placed to either return the area to pre-dredging bathymetry or to an elevation of 109.9 ft (NAVD88) in Reach 7 (equivalent to a water depth of 5 feet below the shoreline elevations; Phase 2 CDE) - Habitat layer backfill may also be required above isolation caps where determined appropriate by EPA (Phase 2 CDE)  
• RFW areas will be restored to original (pre-dredging) bathymetry |
| Near-shore area                              | Reach 7 (CU61 – CU66): Area between the shoreline and the 114.5 ft in-river pre-dredge elevation | • See Section 4.4.2.3  
• The near-shore area is the portion of the CUs between the shoreline and the near-shore border  
• Near-shore backfill will be restored to original (pre-dredging) bathymetry in the near-shore area (Phase 2 CDE)  
• In Reach 7, pre-dredging bed elevation equals 114.5 ft (NAVD88) at near-shore setpoints, which are located along the pre-dredging bathymetric 114.5 ft elevation contour line based on previous bathymetric surveys  
• The near-shore border line extends between the near-shore setpoints |
| Flow velocities and flow return frequency – backfill design | ≤ 1.5 ft/s – Type 1 backfill  
> 1.5 ft/s – Type 2 backfill  
2-year flow return frequency | • These flow regimes are used as the basis for the backfill design, except as noted in Section 4.4.2.1  
• Flow velocities based on the Phase 2 Hydrodynamic Model (Attachment D of the Phase 2 IDR) |
| Backfill Material Types                      | Type 1, Type 2, Type 5                                               | • Type 1 backfill material will be used in locations with estimated surface water velocities of 1.5 ft/s or less during a 2-year flow event, except as described in Section 4.4.2.1  
• Type 2 backfill material will be used in areas with estimated surface water velocities above 1.5 ft/s during a 2-year flow event and as adjusted as described in Section 4.4.2.1  
• Supporting side slopes for near-shore backfill, habitat layer backfill, and RFW construction areas will be constructed using Type 2 material  
• Base materials (depths of greater than 1 foot below the final backfill surface) for near-shore backfill and RFW construction areas will be constructed using Type 2 material  
• Type 5 backfill material will be used to provide a planting surface in restored RFW construction areas |
| Water depth after dredging                   | Varies                                                              | • Function of location in the river and dredging depths (range based on bathymetric data)        |
### Table 4-2
**Basis of Design for Backfilling/Capping – Reach 7**

*Phase 2 Final Design Report for Reach 7 (the Landlocked Area)*  
*General Electric Company – Hudson River PCBs Superfund Site*

<table>
<thead>
<tr>
<th>Item</th>
<th>Basis</th>
<th>Source/Notes</th>
</tr>
</thead>
</table>
| Flow velocities and flow return frequency – cap design | ≤ 5 ft/s – Medium-velocity isolation cap  
> 5 ft/s – High-velocity isolation cap  
100-year flow return frequency | • These flow regimes were used as the basis for the cap design (Attachment F of the 2011 FDR)  
• Flow velocities based on the Phase 2 Hydrodynamic Model (Attachment D of the Phase 2 IDR)  
• The basis for the flow return frequency related to the isolation cap design was set forth in the Phase 2 CDE |
| Maximum residual sediment concentration subject to capping | 500 mg/kg Total PCBs | • Areas with residual total PCB concentrations greater than 500 mg/kg (which is approximately equivalent to 200 mg/kg Tri+ PCBs) will be subject to re-dredging (Phase 2 EPS)  
• See Attachment F of the 2011 FDR |
| Isolation cap design parameters | See Attachment F of the 2011 FDR | • See Section 4.4.3 |

**Notes:**
1. References are defined in Section 6 of the Reach 7 FDR.
2. Acronyms and abbreviations are defined in Section 7 of the Reach 7 FDR.
### Table 4-3
Basis of Design for Processed Sediment Transportation and Disposal – Reach 7

**Phase 2 Final Design Report for Reach 7 (the Landlocked Area)**

**General Electric Company – Hudson River PCBs Superfund Site**

<table>
<thead>
<tr>
<th>Item</th>
<th>Basis</th>
<th>Source/Notes</th>
</tr>
</thead>
</table>
| Estimated tonnage of material to be transported and disposed from Reach 7 | 194,000 tons | • Based on an estimated design cut removal volume of 117,500 cy plus an assumed increase of 30% to account for additional dredging and re-dredging that may be required.  
• Assumes average density of approximately 1.27 tons per in situ cy dredged (based on previous dredging season data)  
• The actual tonnage of material will vary based on the volume of material dredged and the density of the dredged material after sediment dewatering/processing |
| PCB concentration for waste disposal characterization | Varies | • Actual PCB concentrations will vary depending on dredge area and processing  
• Processed sediment and debris will be segregated, as appropriate, into material subject disposal at a TSCA-authorized facility and material that may be disposed of at a non-TSCA (RCRA Subtitle D) facility. The methodology for characterizing, segregating, and managing these types of materials for the purposes of transport and disposal will be specified in the Reach 7 TDP (to be prepared as part of the Reach 7 RAWP). |
| Sediment dewatering/processing approach | To be determined – See Section 4.3 | • The contractor will propose the means and methods to comply with specified performance requirements  
• Information regarding construction of the Landlocked Dewatering Area and the proposed methods for dewatering/processing dredged sediment and debris will be presented in the Reach 7 RAWP |
| Moisture content of dewatered/processed material | Pass paint filter test | • TSCA regulations (40 CFR 761)  
• Disposal facility requirements |
| Material transport to the Sediment Processing Facility | See Section 4.3.8 | • The processed sediment and debris will be transported by truck from the Landlocked Dewatering Area to the Sediment Processing Facility  
• Trucks will travel along designated haul routes to be presented in the Reach 7 RAWP  
• The haul routes to be used for transporting the dewatered materials from the Landlocked Dewatering Area to the Sediment Processing Facility will be considered on-site within the meaning of Paragraph 8.a of the RA CD and Section 121(e) of the CERCLA.  
• Material will meet paint filter test prior to loading into trucks.  
• Trucks will be lined and covered.  
• Other requirements applicable to the transport of dewatered materials to the Sediment Processing Facility will be specified in the Reach 7 RAWP. |
| Landfill destination | To be determined | • The processed materials will be transported by railroad from the Sediment Processing Facility to one or more authorized commercial disposal facilities  
• The selected disposal facility(ies) will be identified in the Reach 7 TDP (to be prepared as part of the Reach 7 RAWP) |
| Delivery mode | Rail, using gondola rail cars | • Rail delivery in unit trains directly to selected disposal facility(ies)  
• Material will be packaged in rail cars by a method meeting DOT performance standards |
| Debris | Size limited and segregated from filter cake | • Debris is defined as any single piece of material greater than 4 feet in any length, or any single piece of material weighing more than 1 ton and less than 6 tons  
• Railcars loaded with debris will be designated so that they can be easily identified at the landfill |
| RCRA designation of sediment | Non-Hazardous | • SSAP data |

**Notes:**
1. References are defined in Section 6 of the Reach 7 FDR.
2. Acronyms and abbreviations are defined in Section 7 of the Reach 7 FDR.
Table 4-4
Certification Unit Areas and Design Volumes

Phase 2 Final Design Report for Reach 7 (the Landlocked Area)
General Electric Company - Hudson River PCBs Superfund Site

<table>
<thead>
<tr>
<th>Reach</th>
<th>Certification Unit (CU)</th>
<th>CU Area (acres)</th>
<th>Estimated PCB Mass (kg)</th>
<th>EoC Surface Volume (cy)</th>
<th>Design Dredge Prism Volume (cy)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total PCBs</td>
<td>Tri+ PCBs</td>
<td></td>
</tr>
<tr>
<td>Reach 7</td>
<td>CU61</td>
<td>4.93</td>
<td>2,460</td>
<td>640</td>
<td>22,300</td>
</tr>
<tr>
<td></td>
<td>CU62</td>
<td>4.10</td>
<td>950</td>
<td>200</td>
<td>14,300</td>
</tr>
<tr>
<td></td>
<td>CU63</td>
<td>6.27</td>
<td>770</td>
<td>280</td>
<td>19,700</td>
</tr>
<tr>
<td></td>
<td>CU64</td>
<td>4.53</td>
<td>1,010</td>
<td>210</td>
<td>14,300</td>
</tr>
<tr>
<td></td>
<td>CU65</td>
<td>4.77</td>
<td>1,450</td>
<td>410</td>
<td>16,800</td>
</tr>
<tr>
<td></td>
<td>CU66</td>
<td>4.65</td>
<td>760</td>
<td>300</td>
<td>22,200</td>
</tr>
<tr>
<td>TOTAL - CU61-CU66</td>
<td>29.3</td>
<td></td>
<td>7,400</td>
<td>2,040</td>
<td>109,600</td>
</tr>
</tbody>
</table>

Notes:
1. Certification Unit (CU) Area based on the area within the CU boundary limits and does not include adjustments associated with offsets/setbacks within the CU limits or engineering sideslopes outside the CU boundaries.
2. The Elevation of Contamination (EoC) surface was developed by Anchor QEA based on the Dredge Prism Development Steps included in the Phase 2 CDE and sediment PCB data (see Attachment A).
3. Design dredge prisms were developed by Parsons based on the Dredge Prism Development Steps included in the Phase 2 CDE and the EoC surface developed by Anchor QEA (see Attachment B).
4. Volumes for the EoC surface and the design dredge prisms are based on comparison with the existing bathymetry data, which is based on bathymetric surveys conducted in 2011 for Reach 7. The Design Dredge Prism Volumes include engineering sideslopes that are outside of the CU boundaries.
5. PCB mass based on method outlined in Chapter 7 of the EPS. Targeted mass based on dredge prism cut depth which is adjusted for engineering considerations.
LANDLOCKED AREA

THOMPSON ISLAND DAM

REACH 7

LANDLOCKED AREA

CHAMPLAIN CANAL

LANDLOCKED DEWATERING AREA

FORT MILLER DAM

4.93 ACRES

4.27 ACRES

4.77 ACRES

4.53 ACRES

4.65 ACRES

CU #61

CU #63

CU #65

CU #66

CU #62

CU #64

REACH 7 CERTIFICATION UNITS
CU61 THROUGH CU66