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Phase 2 Final Design Report for CU85 through CU96

Hudson River PCBs Superfund Site

Revised June 2014

PUBLIC RELEASE VERSION

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Hudson River PCBs
Superfund Site

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- Shapefiles (certification units, shoreline, near-shore border, restricted anchoring locations, thiessen polygon average PCB concentrations, conceptual habitat construction locations, habitat delineation, and habitat matrix output)

1. Introduction

This Phase 2 Final Design Report for Certification Unit (CU) 85 through CU96 (CU85-CU96 FDR), prepared on behalf of the General Electric Company (GE), presents the final design for Phase 2 dredging operations to be conducted in CU85 through CU96 in Reaches 3 through 5 of River Section 3 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 this site in 2002 (EPA 2002). This report constitutes a revised version of the CU85-CU96 FDR, which was initially submitted on February 14, 2014 and revised and re-submitted on April 25, 2014. This revised version reflects comments from and discussions with EPA regarding those prior versions.

This CU85-CU96 FDR includes the design for dredging in the main stem of the river associated with CU85 through CU96 in Reaches 3, 4, and 5. This design report also presents the conceptual design for habitat construction planting areas in CU85 through CU96 (Section 3.9 and Attachment C). The final habitat construction design for these CUs will depend on the conditions after dredging operations are completed. Drawings and specifications associated with the final habitat construction design for these CUs will be provided to the EPA in separate design submittals.

Reaches 3, 4, and 5 are located in River Section 3 of the Upper Hudson River between approximately river mile (RM) 182.3 and RM 163.4. Reach 5 is located between the Northumberland Dam (at Lock 5) and the Stillwater Dam (at Lock 4). Reach 4 is located between the Stillwater Dam (at Lock 4) and the Upper Mechanicville Dam (at Lock 3). Reach 3 is located between the Upper Mechanicville Dam (at Lock 3) and the Lower Mechanicville Dam (at Lock 2). CU85 through CU96 encompass approximately 64 acres. Figure 1-1 shows the Upper Hudson River and the locations of each lock, dam, reach of river, and designated river section. Figures 1-2a and 1-2b show CU85 through CU91 in Reach 5. Figure 1-2c shows CU92 through CU96 in Reaches 3 and 4.

It is anticipated that dredging will commence in some or all of CU85 through CU96 during Phase 2, Year 4 (2014) concurrent with dredging in other areas 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. During Phase 2, Year 4 (2014), dredging may also be conducted in some or all of CU60 in Reach 8, CU61 through CU66 in Reach 7 (the Landlocked Area), CU80 through CU83 in Reach 5, CU97 and CU98 in Reach 2, and CU99 in Reach 1. The designs for dredging operations in these CUs

(i.e., CU60, CU61 through CU66, CU80 through CU83, and CU97 through CU99) are presented in design reports and addenda that have been submitted separately to EPA. The Remedial Action Work Plan for 2014 (2014 RAWP; Parsons 2014a), which has been prepared and submitted to EPA under separate cover, generally covers the remaining Phase 2 CUs with the exception of the Landlocked Area (CU61 through CU66), which is covered by a separate Remedial Action Work Plan for Reach 7 (Parsons 2014g). However, the 2014 RAWP recognizes that not all of these CUs will be dredged in 2014. Areas not dredged in 2014 will be dredged in a subsequent dredging season.

This CU85-CU96 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), the Phase 2 Final Design Report for 2013 (2013 FDR; ARCADIS 2013a), and approved addenda associated with these documents.

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); and

- Attachment F: Certification Unit Completion Approval/Certification Forms for Phase 2 (Phase 2 CU Certification Forms).

This report also references, where appropriate, other documents that have been submitted separately to EPA, including:

- The 2014 RAWP (Parsons 2014a), and several appendices thereto – namely:
  - Appendix A: Phase 2 Dredging Construction Quality Control/Quality Assurance Plan for 2014 (2014 DQAP; Parsons 2014b);
  - Appendix B: Phase 2 Facility Operations and Maintenance Plan for 2014 (2014 Facility O&M Plan; Parsons 2014c);
  - Appendix C: Phase 2 Transportation and Disposal Plan for 2014 (2014 TDP; Parsons 2014d);
  - Appendix D: Phase 2 Performance Standards Compliance Plan for 2014 (2014 PSCP; GE 2014);
  - Appendix E: Phase 2 Property Access Plan for 2014 (2014 PAP; Parsons 2014e); and
  - Appendix F: Phase 2 Community Health and Safety Plan for 2014 (2014 CHASP; Parsons 2014f).
- Phase 2 Remedial Action Monitoring Quality Assurance Project Plan (Phase 2 RAM QAPP; Anchor QEA 2012)

Any additions or revisions to the Phase 2 RAM QAPP will be submitted to EPA for review under separate cover as Corrective Action Memoranda.

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

Table 1-1 Report Organization

Section	Description
Section 2: Design Supporting Information – CU85 through CU96	Summarizes information used to support the design for CU85 through CU96 dredging operations
Section 3: Design Summary – CU85 through CU96	Summarizes the design for CU85 through CU96 dredging operations and the habitat construction design associated with these CUs
Section 4: References	Provides a list of references cited in this CU85-CU96 FDR
Section 5: Acronyms and Abbreviations	Provides the definitions of acronyms and abbreviations used in this CU85-CU96 FDR
Tables	Provides the tables referenced in this CU85-CU96 FDR
Figures	Provides the figures referenced in this CU85-CU96 FDR
Attachments	Provides the attachments referenced in this CU85-CU96 FDR
Appendices	Provides the drawings and revised specifications for the Contract 42A dredging operations in CU85 through CU96

2. Design Supporting Information – CU85 through CU96

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 CU85 through CU96. Much of the design supporting information described in the 2012 FDR applies to the design for the dredging operations in CU85 through CU96 and is not repeated in this design report. Instead, this report focuses on elements of the design specific to CU85 through CU96, or that differ from the design information presented in that report.

2.1 Phase 2 Performance Requirements

Performance requirements guide the design for CU85 through CU96 and provide a foundation for the basis of design. The performance requirements include elements from the ROD, the Revised Engineering Performance Standards for Phase 2 (Phase 2 EPS), the Substantive Phase 2 Water Quality Requirements (Phase 2 WQ Requirements), and the Quality of Life Performance Standards (QoLPS).

2.1.1 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 (EPA 2010b) in a dispute resolution proceeding on GE's initial Phase 1 Dredge Area Delineation (DAD) Report (QEA 2005), are summarized in the 2012 FDR and are not repeated in this report.

2.1.2 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 described in the 2014 PSCP (GE 2014) submitted as part of the 2014 RAWP.

2.1.3 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 described in the 2014 PSCP.

2.1.4 Phase 2 Water Quality Requirements

The Phase 2 WQ Requirements (including turbidity requirements) applicable to CU85 through CU96 are described in the 2014 PSCP.

2.1.5 Monitoring and Reporting

The monitoring programs that GE will conduct during dredging operations in CU85 through CU96 to meet the requirements of the Phase 2 EPS, Phase 2 QoLPS, and Phase 2 WQ Requirements are described in the 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 are identified in the 2014 PSCP.

2.2 Summary of Phase 2 Design Support Activities

This subsection summarizes activities that support the remedial design for dredging operations in CU85 through CU96.

2.2.1 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 CU85 through CU96.

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 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), 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 May and October 2012, supplemental sediment sampling was conducted as part of the SEDC Program in CU71 through CU100 to provide additional data for delineating the depth of contamination (DoC). The 2012 sediment sampling activities were conducted in accordance with the 2012 Supplemental Engineering Data Collection Work Plan for Sediment Sampling in Certification Units 71-100 (Anchor QEA and ESI 2012), and the results from the 2012 SEDC sampling program are summarized in the 2012 Supplemental Engineering Data Collection Data Summary Report *(*Anchor QEA and ESI 2013).

The data generated from the 2012 sediment sampling program were incorporated into the development of dredge prisms for CU85 through CU96, along with previously collected data, to establish the DoC and an associated elevation of contamination (EoC), as described in Section 3.1.4 and Attachment A. These data were also used to revise the estimate of PCB mass to be removed from CU85 through CU96 (see Table 3-3).

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.

2.2.2 Bathymetry Surveys

In 2012 and 2013, GE conducted surveys to gather additional bathymetry and shoreline elevation data in the vicinity of the targeted dredge areas in Reaches 3 through 5 to support the development of the design, update volume calculations, and

verify the location of the delineated shoreline (see Section 3.1.2). The 2012 and 2013 survey activities were conducted by CLE Engineering, Inc. (CLE).

The available bathymetry data have been used to estimate the sediment surface elevations. The data from various surveys have been combined, with priority given to the most recent survey, to create a single surface that covers the areas targeted for dredging, as well as portions of the surrounding non-dredge areas. Within CU85 through CU96, the sediment surface elevations have primarily been set using 2012 multi-beam bathymetric data along with 2012 and 2013 transect survey data in areas not accessible for multi-beam survey. These data have been supplemented using 2003, 2004, and 2006 single-beam bathymetry data where gaps in the available 2012 and 2013 survey data occur and within the non-dredge areas. Additional multi-beam survey data will be collected as work progresses for areas requiring access dredging to ensure safe drafts for vessels to access certain certification units. Additional multi-beam survey of the southern approach route to CU95 will also be performed in the late spring or early summer of 2014 to evaluate potential access to the portion of CU95 east of Quack Island.

The updated bathymetry surfaces for Reaches 3 and 4 and the southern portion of Reach 5 (i.e., south of CU84) are provided on the CD-ROM included with this addendum.

2.2.3 Habitat Delineation and Habitat Assessment

Habitat delineation and habitat assessments were conducted in support of the project design to document the nature and distribution of habitats potentially affected by the remediation, and to identify reference habitat locations that represent the distribution of existing conditions and that are not likely to be affected by the 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 RD AOC. 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 CU85 through CU96 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 the northern portion of CU95, where an additional wetland area was identified adjacent to and extending from a previously delineated RFW area. In addition, as part of the October 15, 2013 field observations, an additional SAV area was identified in CU94 adjacent to and extending closer to the shoreline than a previously delineated SAV area. Based on these observations, the extent of RFW in CU95 and the extent of SAV in CU94 were adjusted (although the extent of previously delineated RFW in CU94 was not adjusted). Additionally, during July 2013, GE performed additional field observations to review the extent of the invasive species water chestnut (*Trapa natans*), previously delineated in and around CU85 through CU96. Based on those observations, the extents of SAV and water chestnut in and near CU89 were adjusted. The updated boundaries for the RFW, SAV, and water chestnut in and surrounding 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.

At EPA's request, GE and EPA will conduct an additional field visit to review the adjusted extents of SAV and water chestnut in CU89.

An electronic data file of the most recent habitat delineation is provided on the enclosed CD-ROM.

2.2.4 Biological Assessment and Concurrence by Resource Agencies

In January 2006, Ecology & Environment, Inc. (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. A detailed description of the BA was presented in the Phase 2 IDR and is not repeated in this report.

The Final BA specified that, although the project is unlikely to adversely affect the bald eagle, several identified conservation measures should be incorporated into the project design to minimize potential direct and indirect project-related effects on the bald eagles. The primary conservation measures related to the in-river dredging work were as follows:

- For nests within 4,000 feet of dredge areas, EPA and the design team will coordinate with the U.S. Fish and Wildlife Service (USFWS) and the New York State Department of Environmental Conservation (NYSDEC) to determine appropriate measures necessary to avoid/minimize disturbance to nesting eagles.

- EPA will work with GE to schedule dredging activities in the vicinity of the site of any discovered nesting pairs after October 1 (or another date acceptable to the USFWS and NYSDEC) to minimize disturbance to nesting pairs.

- No tree cutting activities will proceed until the immediate area is clear of eagles.

- Potential perching or roosting trees within the NYSDEC-classified bald eagle critical habitat areas will not be removed during dredging activities. Preservation of potentially suitable perching, roosting, and nesting trees throughout the study area will be a priority to ensure that tree removal does not directly or indirectly impact eagles.

In 2012 through spring 2014, bald eagle observations were coordinated with EPA and periodically conducted in the vicinity of the dredge areas in Reaches 3 through 5. Based on these observations, two bald eagle nests were identified in Reach 3. **[Redacted]**

GE's proposed approach to minimize potential impacts associated with dredging operations in the vicinity of the eagle nest is described in Section 3.2.6. In addition, as

also described in that section, GE will review with EPA the trees proposed for removal or trimming. Specifically, prior to tree trimming or removal, GE will conduct a field review to ensure that no potential eagle perching or roosting trees are proposed for removal; and plans identifying the trees proposed for removal will be provided to EPA for review and approval prior to tree trimming/removal to verify that potential perching or roosting trees will not be removed.

2.2.5 Phase 2 Cultural and Archaeological Resources Assessment Program

Archaeological resource assessments have been conducted in and around CU85 through CU96 to document terrestrial and underwater archaeological resources that could be affected during the dredging operations. The archaeological resource assessments were conducted in the summer of 2013 in accordance with a terrestrial investigation work plan (URS 2013a) and an underwater investigation work plan (URS 2013b) approved by EPA.

Based on the archaeological resource assessments, no archaeological resources have been identified at shoreline areas in the immediate vicinity of CU85 through CU96. The terrestrial archaeological resource assessment activities for CU85 through CU96 are summarized in the Terrestrial Archaeological Resources Survey, End-of-Fieldwork Summary Report: Evaluation of Phase 2 Dredge Areas Below Northumberland Dam (River Section 3) (URS 2013d) and the Terrestrial Archaeological Resources Survey Report for Phase 2 Dredge Areas Below Northumberland Dam (River Section 3) (URS 2014a).

One in-river area containing one or more archaeological resources has been designated in the areas targeted for dredging in CU85 through CU96 based on archaeological resource assessments. This area contains remnant stone and timber cribs located in and adjacent to CU96 in the western portion of the river north of Lock 2 and the Mechanicville Hydroelectric Plant. Based on field inspection and review of remote sensing data, historical drawings, aerial photographs, and navigation charts, the remnants of ten cribs have been identified in a line extending north of Lock 2 within or immediately east of CU96. These crib remnants are spaced approximately 100 to 150 feet apart, with the southernmost crib remnant about 750 feet north of Lock 2 and the northernmost crib approximately 2,000 feet north of the lock. One additional crib is located west of this line of cribs and is connected to a safety cable north of the hydroelectric facility, and four additional cribs appear to be located immediately north of the intake to the hydroelectric facility.

The cribs were likely built during the early 20th Century to support a boom to deflect boats as well as to reduce ice and other debris from entering into generator intakes for the Mechanicville Hydroelectric Plant, which was originally built in 1897 and 1898 and is listed in the National Register of Historic Places (NRHP) as a historic district. The cribs likely supported cables or chains strung between them, but these components are no longer present. The crib remnants consist of piles of large stone within roughly hewn timber frameworks. Some elements of the frames have eroded from the cribs. Because this line of cribs is likely a contributing element to the NRHP-listed Mechanicville Hydroelectric Plant Historic District, the crib remnant locations have been designated as Sensitive Archaeological River Bottom. Additional information regarding this sensitive archaeological area is presented in the Underwater Archaeological Resources Survey, Interim End-of-Fieldwork Summary Report: Evaluation of Select Targets in Certification Units 75 through 100 (URS 2013c) and the 2013 Annual Report: Evaluation of Remote Sensing Targets in Certification Units 75 through 100 of the Phase 2 Dredge Areas (URS 2014b).

The approximate locations of the crib remnants and the area designated as sensitive archaeological river bottom are identified on Figure 2-1. The potential effects of dredging and backfilling/capping on the resources within this area were evaluated during the remedial design, and measures established to protect these resources are described in Section 3.6.

3. Design Summary – CU85 through CU96

This CU85-CU96 FDR includes design information, drawings, and specifications for dredging operations associated with CU85 through CU96 in Reaches 3, 4, and 5. Many of the design elements presented in the approved 2013 FDR and its addenda apply to the dredging operations in CU85 through CU96 and are not repeated in this design report. Instead, this report focuses on elements of the design specific to the dredging operations in CU85 through CU96 or that differ from the design approach presented in the 2013 FDR and addenda.

The dredging operations in CU85 through CU96 will be conducted under Contract 42A, which also governed the 2012 and 2013 dredging operations. As described below, six of the previously approved Contract 42A specifications (Section 13701 [Riverine Fringing Wetland Seeding], Section 13720 [Backfilling/Capping], Section 13803 [Dredging], Section 13810 (In-Water Material Transport), Section 13860 (Marine Traffic Control, and Section 13871 (Sheen Response During Dredging Operations) have been revised to incorporate specific requirements into the design for CU85 through CU96. These specifications are provided in Appendix 1. The most recent versions of the other Contract 42A specifications issued with the approved 2012 FDR, the approved 2013 FDR, the approved Addendum No. 2 to the Phase 2 Final Design Report for 2013 (2013 FDR Addendum 2; ARCADIS 2013b), or the approved Addendum No. 5 to the Phase 2 Final Design Report for 2013 (2013 FDR Addendum 5; ARCADIS 2013c) will also apply to the dredging operations in CU85 through CU96, but are not provided with this report. The Contract 42A specifications referenced in this report that have not changed are cited herein to their source documents.

The drawings for dredging (D-series), backfill (B-series), isolation cap (C-series), and existing conditions (G-series) in CU85 through CU96 are provided in Appendix 2. These include new drawings as well as previously issued Contract 42A drawings that have been revised to incorporate specific requirements for CU85 through CU96. Other Contract 42A drawings issued with the approved 2012 FDR or 2013 FDR (including addenda) that have not changed will also apply to the dredging operations in CU85 through CU96, but are not provided with this report. The Contract 42A drawings referenced in this report that have not changed are cited to their source documents. Note that certain drawings in Appendix 2 reference other Contract 42A drawings that were issued with previously approved design reports (e.g., 2012 FDR, 2013 FDR, 2013 FDR Addendum 2, 2013 FDR Addendum 5).

The processing facility operations (Contract 30) and rail yard operations (Contract 60) will be conducted under the same contracts issued for the work implemented during

2011, 2012, and 2013. Consequently, specifications for processing facility operations and rail yard operations are not presented with this design report. Any changes to the technical specifications for Contract 30 or Contract 60 will be provided to EPA for review under separate cover.

The following subsections and Tables 3-1 and 3-2 summarize elements of the design associated with the dredging operations for CU85 through CU96, focusing on items specific to the targeted dredging areas or that differ from the design approach presented in the 2013 FDR and associated addenda.

3.1 Dredge Area Limits

A summary of the dredge area limits in CU85 through CU96 in Reaches 3 through 5 is provided below.

3.1.1 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 dredge areas associated with CU85 through CU96. The initial limits of the Phase 2 CUs were presented in the Phase 2 IDR (ARCADIS 2008).

3.1.2 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 Reaches 3 through 5 based on those discussions and as summarized below.

Consistent with the designs for other reaches of the river, the shoreline elevations for Reaches 3 through 5 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 Reaches 3 through 5 corresponding to this flow.

As described in Section 2.2.2, GE performed surveys in 2012 and 2013 to gather additional bathymetry and topographic data in Reaches 3 through 5 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 survey data and the existing shoreline boundary.

The water surface elevations predicted by the hydrodynamic model for Reaches 3 and 4 correlated reasonably well with the survey data collected in 2012 and the shoreline boundary digitized from aerial photography. The design shoreline elevation established for Reach 3 (CU94 through CU96) is 47.8 ft (North American Vertical Datum of 1988 [NAVD88]), and the design shoreline elevation established for Reach 4 (CU92 and CU93) is 70.0 ft (NAVD88).

For Reach 5, as described in the 2013 FDR Addendum 5, the water surface elevation predicted by the hydrodynamic model for Reach 5 did not correlate well with the 2012 survey data and the digitized shoreline boundary. In particular, the hydrodynamic model appears to predict water surface elevations lower than those observed in the field for the northern portions of Reach 5 (CU79 and CU80). Factors contributing to this variability are likely related to the changes in the river elevation associated with the overall length (approximately 14 miles) and fall of the pool.

To further assess the shoreline elevations in Reach 5, an additional evaluation was performed using the water surface elevations predicted by the Upper Hudson River Floodplain Hydrodynamic Model developed as part of the Hudson River floodplain program (referred to herein as the “floodplain model”). The floodplain model uses a stage discharge rating curve similar to the hydrodynamic model, but incorporates variations in upland topography along the river. The water surface elevations predicted by the floodplain model in the northern portions of Reach 5 are higher than the elevations predicted by the hydrodynamic model, correlate more reasonably with the shoreline survey data, and were used as a basis for establishing the shoreline elevations for Reach 5. Although using a single shoreline elevation for each pool is preferable from an engineering perspective for efficient design development and execution of the field operations, two different shoreline elevations have been established for Reach 5 to address the variability in the water surface elevations along this pool. The design shoreline elevations established for Reach 5 are 84.1 ft (NAVD88) in CU79 and CU80, and 83.6 ft (NAVD88) in CU81 through CU91.

As with the other reaches of the river, the shoreline boundaries in Reaches 3 through 5 were initially digitized from aerial photography. The survey data collected in 2012 were

used to adjust the existing shoreline location, where appropriate, to approximate the above-referenced shoreline elevations.

Due to the lack of available survey information in certain areas, additional surveys were conducted by CLE in August 2013 to address gaps in survey coverage. Based on the 2013 survey data, the shoreline boundaries and the shoreline extents of CU91-1 (Reach 5) and CU95-1 (Reach 3) were adjusted to correspond to the surveyed locations of the shoreline elevations for each reach. For CU91-1, the adjusted shoreline location was extended beyond the boundary that was previously delineated using aerial photography. The 2013 survey data for CU95-1 indicated that the northern portion of this CU, which was previously delineated using aerial photography, was above the shoreline elevation. As such, the shoreline boundary for CU95-1 was adjusted to correspond with the shoreline elevation based on the 2013 survey data.

The updated shoreline has been incorporated into the basis of the design as the horizontal limit of dredging and backfilling for CU85 through CU96. An electronic data file of the shoreline coordinates for Reaches 3 through 5 is provided on the CD-ROM included with this report addendum.

3.1.3 Certification Unit Revisions

As part of the final design, the CU boundaries presented in the Phase 2 IDR (ARCADIS 2008) were adjusted for CU85 through CU96 in Reaches 3 through 5. The boundaries for CU87, CU91, CU92, CU95, and CU96 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 2012 SEDC Data Summary Report (Anchor QEA and ESI 2013). Figures showing where the footprints of these CUs have been impacted by these sampling programs are provided in Attachment A.

An electronic data file of the CU boundaries for CU85 through CU96 is provided on the CD-ROM included with this report addendum.

3.1.4 Dredge Prism Development

The Critical Phase 2 Design Elements document (Phase 2 CDE), which is an attachment to the Phase 2 Statement of Work (EPA 2010b), requires that GE develop an EoC surface that defines the elevation which captures the PCB inventory and meets the removal criteria within the targeted areas. As summarized in the 2013 FDR, the EoC surface was 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 influenced its development.

The EoC surface was developed for CU85 through CU96 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 CU85 through CU96 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 CU85 through CU96 were developed using multi-beam bathymetry surveys conducted in 2012, where available.

Table 3-3 summarizes the areas, design cut volumes, and estimated PCB mass for CU85 through CU96 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.

3.2 Dredging

The dredging and dredged material transport approach for CU85 through CU96 in Reaches 3 through 5 will be similar to the approach followed during previous dredging seasons (i.e., mechanical dredging, barge transport of dredged materials). However, the CU85 through CU96 dredging areas present a number of notable characteristics that will require location-specific planning and operations, including:

- Access to certain dredge areas is limited by shallow water. Dredging of non-target material may be necessary to facilitate access to dredge areas in some CUs (see Section 3.2.2).

- Certain CUs targeted for dredging in Reaches 3 through 5 (i.e., CU92, CU93, CU95, and CU96) are in relatively close proximity to existing dams and hydroelectric generating facilities on the river. Work in these areas will require specific planning and coordination to minimize safety hazards for work near these structures (see Section 3.2.3).

- Portions of areas in and surrounding CU85 through CU96 contain water chestnut (*Trapa natans*), an invasive plant species. Control measures will be implemented as part of the dredging operations to limit the potential migration of non-native plant material (see Section 3.2.4).

- The southernmost portion of CU91 is located within the land-cut portion of the Champlain Canal immediately north of Lock 4 (see Figure 1-2b). Dredging in this portion of CU91 will be coordinated to minimize interference with navigation of non-project vessels (see Sections 3.2.1 and 3.10.6).

- Dredging in the portion of CU95 east of Quack Island will present a number of challenges, including the proximity of an observed eagle nest on Quack Island, the presence of water chestnut in and surrounding the targeted dredging area, and limited access to/from and within the CU (i.e., the shallow water depths, the presence of bedrock in the access channel north of the island, and the proximity of the Lower Mechanicville Dam to the access channel south of the island). Work in this area will require specific planning and coordination to minimize disturbance to eagles, control the potential migration of non-native plant material, and access the dredge area with consideration of the overall project productivity and safety goals (see Sections 3.2.2, 3.2.4, and 3.2.6).

- A series of stone crib remnants is located along the eastern boundary of CU96 north of Lock 2 and the Mechanicville Hydroelectric Plant. These stone cribs have been designated as Sensitive Archaeological River Bottom (see Section 2.2.5). Certain crib remnants will need to be removed to allow access to CU96 and complete the dredging operations in this CU. The stone crib remnants that remain in place will be avoided during the dredging operations (see Section 3.6). Removal of stone crib remnants will also be coordinated with the operator of the Mechanicville Hydroelectric Plant.

3.2.1 Dredging

Prior to dredging, shoreline vegetation that overhangs the dredge area 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; ARCADIS 2012). Plans identifying the trees proposed for removal will be provided to EPA for review and approval prior to tree trimming/removal to verify that potential perching or roosting trees will not be removed.

Dredging in CU85 through CU96 is expected to occur 24 hours a day, 6 days a week. It is anticipated that dredging in 2014 will commence in CU80 through CU83 (as presented in the approved 2013 FDR Addendum 5) and then proceed generally from upstream to downstream. However, dredging in certain downstream areas of the river may commence prior to dredging in upstream areas to provide additional time for dredging in areas with lower anticipated productivity, to take advantage of higher surface water elevations for shallow water areas, to balance the overall project productivity by dredging simultaneously in the CUs farther downstream with the remaining CUs in the northern portions of the river, or to account for other relevant factors. In addition, dredging may be conducted concurrently in multiple reaches 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. GE will review any proposed dredging that is not conducted from upstream to downstream with EPA prior to dredging those areas.

The southernmost portion of CU91 is located within the land-cut portion of the canal immediately north of Lock 4 (see Figure 1-2b). As noted on Drawing D-2733 (Appendix 2), dredging operations in this portion of CU91 will be managed to minimize interference with navigation of non-project vessels. This may be accomplished by having the dredging equipment operate on a “move-on-demand” basis or by scheduling dredging and backfilling/capping operations in this area to occur early or late in the dredging season when the Champlain Canal is not operating on its summer schedule. Additionally, the schedule for dredging in the portion of CU95 located east of Quack Island will be restricted based on the proximity of an observed eagle nest on the island (see Section 3.2.6).

The proposed dredging sequence and schedule for dredging in CU85 through CU96 will be described in the 2014 RAWP (or in the RAWP associated with a subsequent dredge season).

Consistent with previous dredging seasons and the Phase 2 CDE, the dredging in CU85 through CU96 will be conducted using multiple mechanical dredges equipped with hydraulically closing environmental clamshell buckets. The number and size of dredges and the type and size of dredge buckets anticipated to be used in 2014 will be presented in the 2014 RAWP (or in the RAWP associated with a subsequent dredge season).

The dredging requirements presented in Specification Section 13803 (Dredging; Appendix 1) have not changed from the version issued with the 2013 FDR Addendum 2. 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. Debris will be removed as part of dredging. In the event that debris cannot be removed with the dredge bucket, the Dredging Contractor will be prepared to use alternate procedures and/or equipment to remove debris as necessary to facilitate dredging to the required elevations.

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-2802 (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 Dredging Contractor. Such setbacks may be necessary where the Dredging Contractor believes that dredging operations cannot be implemented safely or without compromising the integrity of public or private structures or utilities located in or along the banks of the river (also see Section 3.2.3 related to work near dams). These proposed setbacks will be submitted to EPA for approval prior to being incorporated into the dredge prisms.

As described in Specification Section 13803 (Dredging; Appendix 1), Construction Dredge Prism XYZ Files will be provided to the Dredging Contractor and will serve as the basis for determining whether dredging has achieved the required elevations. The dredging tolerance requirements presented in Specification Section 13803 (Dredging; Appendix 1) have not changed from the tolerance requirements implemented during Phase 2, Year 3.

3.2.2 Access to Dredging Areas

With the exception of the portion of CU95 located east of Quack Island, access to and from CU85 through CU96 can be accomplished from the main river channel; however, dredging of non-target material may be necessary to provide access to certain shallow-water dredge areas (e.g., portions of CU91, CU94, CU95, and/or CU96). The need for and actual extent of access dredging will be determined by the Dredging Contractor and the Construction Manager and will depend on the dredging approach, schedule, sequence, and field conditions encountered. The Dredging Contractor may also propose to dredge shallow areas early in the season, when water elevations may be higher. Any access dredging proposed by the Dredging 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. Any required backfilling and habitat construction resulting from access dredging areas will be reviewed with EPA prior to dredging those areas.

Access to the portion of CU95 located east of Quack Island is limited by the physical presence of Quack Island, potential restrictions based on proximity to the observed eagle nest on Quack Island (if applicable), shallow water and the presence of bedrock in the access channel north of the island, and the proximity of the Lower Mechanicville Dam to the access channel south of the island. The approach for accessing this portion of CU95 will be determined based on input from the Dredging Contractor and the results of ongoing data collection. The presence of bedrock across the width of the channel north of the island may limit access and/or transport of dredged material from the north of the island. The route south of Quack Island is located less than 1,000 feet from the Lower Mechanicville Dam and below the safety cable associated with this dam. If it is necessary to use this southern route to access this portion of CU95, the work would need to be conducted in accordance with a Near Dam River Operations Plan to be prepared in accordance with Specification Section 01350 (Health and Safety; ARCADIS 2013a) as discussed in Section 3.2.3 below. Multi-beam bathymetric data and sediment-probing data will need to be collected from the southern access channel and additional sediment-probing data will be collected from the northern access channel before a proposed approach for accessing this portion of CU95 can be finalized. It is anticipated that the additional bathymetric and probing data will be collected in the late spring or early summer of 2014 when river flow and weather conditions allow access to these areas. The proposed approach for accessing this portion of CU95 will be provided to EPA in an addendum to the 2014 RAWP.

3.2.3 Work near Dams and Hydroelectric Generating Facilities

Certain CUs targeted for dredging in Reaches 3 through 5 are in relatively close proximity to existing dams and hydroelectric generating facilities on the river – namely CU92 and CU93 in Reach 4 near the Upper Mechanicville Dam and CU95 and CU96 in Reach 3 near the Lower Mechanicville Dam. Specification Section 01350 (Health and Safety) presented in the 2013 FDR includes establishment of a no-work zone that will extend a minimum of 200 feet upstream of each dam. This specification requirement is unchanged from the version issued with the 2013 FDR and will be followed for dredging in Reaches 3 and 4.

Specification Section 01350 also includes requirements for all contractors to develop a Near Dam River Operations Plan. This plan will provide specific details regarding implementation of all work downstream of any dam safety warning cable or signage or within 1,000 feet upstream of any dam. The plan will include an assessment of conditions in the vicinity of the dams, a description of task-specific safety procedures to be implemented during the work, and identification of emergency response procedures. The plan will also require the contractors to delineate a no-work zone in the vicinity of each dam and/or hydroelectric generating station based on safety considerations. The no-work zone may extend more than 200 feet upstream of each dam based on the contractor's evaluation of required activities, conditions, required equipment, and considering where the contractor believes that its operations cannot be implemented safely. Dredging setbacks associated with the contractors' proposed no-work zones will be submitted to EPA for approval.

A dredge prism offset from the Upper Mechanicville Dam has been incorporated into the Design Dredge Prism XYZ File for CU93 based on the 200-foot no-work zone described above. Attachment B includes figures showing the extent of the 200-foot offsets and provides estimates of the sediment volume and PCB mass associated with the offsets. Additional dredge prism offsets will be incorporated into the Construction Dredge Prism XYZ Files if the final approved no-work zones near dams and/or the hydroelectric generating facilities extend beyond the 200-foot no-work zone referenced in Specification Section 01350.

Any further actions related to dam offsets will be discussed between GE and EPA after receipt of all contractor Near Dam River Operations Plans.

3.2.4 Non-Native Plant Control

Portions of areas in and surrounding CU85 through CU96 contain water chestnut (*Trapa natans*, an invasive species). A total of approximately 20.6 acres of water chestnut was previously delineated within the footprints for CU85, CU87, CU89, CU90, CU91, CU92, CU93, CU95, and CU96. The water chestnut also extends outside of and surrounding the CU boundaries in these areas. Drawings D-2714 through D-2740 (Appendix 2) show the extent of water chestnut in the vicinity of CU85 through CU96 based on the habitat delineations.

Specification Section 13711 (Non-Native Plant Control During Dredging Operations; ARCADIS 2013c), originally developed for dredging operations in the West Griffin Island Area (WGIA), was revised and presented in the 2013 FDR Addendum 5 to include requirements to control the potential migration of non-native plant material as

part of the dredging operations in River Section 3. That specification has not changed and will be followed during dredging operations in CU85 through CU96. Plans for non-native plant control to be developed based on input from the Dredging Contractor will be provided to EPA for review, including the proposed locations for installation of the non-native plant material control barrier.

3.2.5 Air Mitigation and Sheen Response BMPs

In accordance with the Phase 2 CDE, 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 13803 (Dredging; Appendix 1) in the 2013 FDR Addendum 2 describes the air mitigation BMPs. These requirements have not changed from the 2013 FDR and will apply to CU85 through CU96. 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 are described in the 2014 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) in Appendix 1 describes the Dredging Contractor's requirements to address sheens and NAPL, including requirements for notification and reporting, development of a Sediment Oil Sheen Response Plan, implementation of BMPs, and sheen response actions if sheens are observed. Sheen response BMPs will not be required in no-work zones or approved restricted-work zones established upstream of dams or hydroelectric generating facilities. This exception to the sheen response BMPs is noted on Drawings D-2735, D-2739, and D-2740 (Appendix 2). The procedures for responding to sheens (if any) generated as part of the work in CU92 or CU93 have been revised to be consistent with the approach approved by EPA for CU59 during 2013. If a significant sheen is observed related to the work in CU92 or CU93, operations will be temporarily suspended, the situation will be assessed, and GE will contact EPA to determine the appropriate course of action. Potential responses to an observed sheen could include an assessment from the shore and spill containment below the Upper Mechanicville Dam. For CU92 and CU93, deployment of booms and sweeping of areas where sheens are observed will not be required between the work area and the dam. Instead, spill response equipment and materials will be

available for use in Reach 3 downstream of the Upper Mechanicville Dam as a contingency if sheen response actions are needed below the dam. Specification Section 13871 (Sheen Response During Dredging Operations) in Appendix 1 has been revised to include these requirements.

The approach for designating air mitigation BMP areas and sheen response BMP areas for CU85 through CU96 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 and sheen response BMP areas associated with the design cut are also shown on Drawings D-2714 through D-2740 (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.

3.2.6 Proposed Measures Based on the Presence of Nearby Eagle Nests

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

3.3 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.

3.3.1 Analysis of Resuspension

Dredging and management of resuspension for CU85 through CU96 will continue in a manner similar to the approach used in 2011, 2012, and 2013. GE, the Construction Manager, and the Dredging 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 report 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. An electronic data file with the average mass-weighted PCB concentrations associated with the Thiessen polygons developed for CU85 through CU96 is provided on the CD-ROM included with this report.

Near-field and far-field data will be collected to provide a basis for whether the operational controls are effective. If exceedances occur, an analysis will be performed to determine what areas 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 to occur, 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.

3.3.2 Resuspension Control BMPs

The Dredging Contractor will be required to implement certain resuspension control BMPs during all in-river operations in CU85 through CU96, 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 included in Specification Section 13805 (Resuspension Control; Appendix 1) are unchanged from the 2013 FDR and will apply to CU85 through CU96. The need for and type of contingent BMPs will be determined in the field based on monitoring data obtained during operations.

3.3.3 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 reviewing the potential EPS for Phase 2 did not support the use of silt curtains or other physical barriers to control loss of PCBs due to resuspension during Phase 2 (Bridges et al. 2010). 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 CU85 through CU96.

3.4 Dredge Material Transport

Dredged material will be loaded into hopper barges and transported in the river through Locks 3 through 7 to the Sediment Processing Facility in Fort Edward, New York for unloading and dewatering. The equipment to be used for dredged material transport will be described in the 2014 RAWP (or in the RAWP associated with a subsequent dredge season).

In shallow water areas, the use of smaller capacity barges (which require less draft) and/or light-loaded hopper barges may be necessary. Dredged material loaded onto shallow draft barges would be transferred to larger hopper barges prior to transport to the Sediment Processing Facility.

Similar to previous dredging seasons, an internet-based barge tracking system (referred to as the Barge Electronic Reporting System [BERS]) will be used to document and provide up-to-date information regarding the status of each barge loaded by the Dredging Contractor, and project vessel movements will be monitored, recorded, and coordinated using a vessel traffic service (VTS) center.

The specification requirements for barge loading, in-water transport, lock operations, and marine traffic control are documented in Contract 42A Specification Sections 13803 (Dredging; Appendix 1), 13810 (In-Water Material Transport; Appendix 1), 13840 (Transport Procedures Through Canal Locks; ARCADIS 2013c), 13845 (Aids to Navigation During Dredging Operations; ARCADIS 2012), and 13860 (Marine Traffic Control; Appendix 1).

3.5 Anchoring Restrictions

As in previous dredge seasons, anchoring will be restricted in: areas where SAV or RFW habitat is present outside of dredge areas; areas where SAV has been planted; backfilled areas designated as SAV planting, contingency, and natural colonization areas; backfilled areas designated for RFW construction; areas where caps have been placed; and sensitive archaeological areas. Anchoring will also be restricted in areas outside of the CUs where non-native plants have been delineated, in NYSDEC-delineated wetland areas, at the locations of known utility crossings, and at potential sensitive archaeological areas. As described in Section 3.2.6, anchoring will also be restricted near the observed eagle nest on Quack Island if that nest is being used for hatching or rearing young. In addition, no anchoring of work-related vessels will be permitted in the navigation channel without approval from EPA in consultation with the New York State (NYS) Canal Corporation.

Sensitive archaeological areas outside of the CUs were identified in the Archaeological Resources Assessment Report for Phase 2 Dredge Areas (URS 2008) and in the Underwater Archaeological Resources Survey Work Plan for Evaluation of Targets in Certification Units 79 through 100 of the Phase 2 Dredge Areas (URS 2013b), based on historic background research conducted to identify the locations of features or historic activity such as bridges, ferries, and known shipwrecks. These features were incorporated into the design as restricted anchoring areas.

The specification requirements for anchoring during dredging operations are documented in Contract 42A Specification Section 13820 (Anchoring during Dredging Operations) and are unchanged from the 2013 FDR Addendum 2. The anchoring restrictions in CU85 through CU96 are shown on Drawings D-4716 through D-4747 (Appendix 2). An electronic data file with the restricted anchoring areas associated with CU85 through CU96 is provided on the CD-ROM included with this report.

The Dredging Contractor will identify locations where anchoring will be necessary within the restricted anchoring areas to complete the required dredging operations. 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.

3.6 Archaeological Site Protection Measures

As described in Section 2.2.5, the locations of crib remnants in and near CU96 have been designated as Sensitive Archaeological River Bottom based on the findings of

previous archaeological assessments. Dredging offsets will be applied in CU96 at the locations designated as Sensitive Archaeological River Bottom to avoid the crib remnants, to the extent practicable. These areas are shown on the Drawings and on Figure 2-1. The dredge prism offsets incorporated into the Design Dredge Prism XYZ File are described in Attachment B.

The Dredging Contractor has reviewed access to the portion of CU96 west of the crib remnants and has determined that it is not practicable to complete the CU96 dredging operations with all of the crib remnants in place. As such, certain crib remnants will need to be removed to allow access to CU96 and complete the dredging operations in this CU. GE and the Dredging Contractor are reviewing access requirements to the area west of the cribs and discussing potential removal of the cribs with the operation of the hydroelectric power plant. The proposed removal of cribs for accessing this portion of CU96 will be provided to EPA in an addendum to this CU85-CU96 FDR or in a revised version of or an addendum to the 2014 RAWP. It is anticipated that dredging in CU96 will commence in 2015.

Archaeological site protection measures will also be implemented as described in Section 2.3.1.11 of the 2012 FDR and as described in Specification Section 01353 (Cultural Resources) in that FDR.

3.7 Sediment Processing, Segregation, and Disposal

Upon arrival at the Sediment Processing Facility, sediment and debris removed from CU85 through CU96 will be unloaded and dewatered. Dredged sediments and debris will be characterized and managed for transport and disposal in accordance with the 2014 TDP (Parsons 2014d, an appendix to the 2014 RAWP) or the TDP for a subsequent dredge season, as appropriate. Specifically, these activities will be conducted in accordance with the procedures specified in the applicable TDP for characterizing, segregating, and handling materials to be disposed of at a Toxic Substances Control Act (TSCA)-regulated facility and coarse materials that are expected to be suitable for disposal at a Resource Conservation and Recovery Act (RCRA) Subtitle D solid waste landfill, and for testing the latter after dewatering to confirm that they do not constitute TSCA-regulated materials and thus may be sent to a RCRA Subtitle D landfill. The resulting materials will then be separately transported to the respective disposal facilities authorized to receive and dispose of such materials (i.e., a TSCA-authorized facility or a RCRA Subtitle D facility) as described in the applicable TDP.

3.8 Backfill/Cap Placement

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.

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 2014 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, are described in the 2014 PSCP. Areas not dredged due to offsets from riprap and structures will not be covered with backfill or cap material.

3.8.1 Backfill

The backfill material specifications for CU85 through CU96 are described in Specification Section 02206 (Backfill and Cap Material; ARCADIS 2013a) and are unchanged from the 2013 FDR. 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.

- Only Type 2 backfill material will be placed in the navigation channel.

- 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, habitat layer 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.

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.

3.8.1.1 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 3.8.1.2, 3.8.1.3, and 3.8.1.4, 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 G and are identified on Drawings B-2714 through B-2740 (Appendix 2).

3.8.1.2 Near-shore Backfill

Near-shore areas will be restored to pre-dredging bathymetry. 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 1-day average flow that occurs once every 3 years (1Q3; flow of 1,100 cfs at the USGS Fort Edward gage) is to be used as the basis for the in-river boundary of the near-shore areas that must be restored to pre-dredging bathymetry. The Upper Hudson River hydrodynamic model was used to estimate the corresponding water surface elevation in each reach of the river based on a flow of 1,100 cfs at the Fort Edward gage.

For Reach 5, as described in the 2013 FDR Addendum 5, the water surface elevation, based on a flow of 1,100 cfs at the Fort Edward gage as established by the hydrodynamic model, is 82.5 ft (NAVD88). In September 2013, GE and EPA met to review and discuss the near-shore boundary elevations for CU79 through CU84 in Reach 5. Based on those discussions, GE and EPA agreed to establish the near-shore boundary elevations at 82.5 ft (NAVD88) for CU79 and CU80 (which is consistent with the water surface elevation estimated by the hydrodynamic model) and at 82.2 ft (NAVD88) for CU81 through CU84. The same 82.2 ft (NAVD88) near-shore elevation established for CU81 through CU84 has been incorporated into the basis of design as the near-shore boundary elevation for CU85 through CU91 in the southern portion of Reach 5.

For Reach 4, as presented in Section 2.3.1.2 of the Phase 2 IDR, the water surface elevation, based on a flow of 1,100 cfs at the Fort Edward gage as established by the hydrodynamic model, is 68.9 ft (NAVD88). This elevation has been incorporated into the basis of design as the near-shore boundary elevations for CU92 through CU93 in Reach 4.

For Reach 3, because the flow-stage rating curve developed for the hydrodynamic model predicts a low-pool elevation lower than the crest elevation for the downstream dam, the near-shore elevation in Reach 3 has been established at an elevation of 46.2 ft (NAVD88), which is equal to the crest elevation of the downstream dam.

The near-shore area is defined as the area between the shoreline and the near-shore boundary elevation. Near-shore setpoints were established at intervals of approximately 100 feet, and at points of inflection, along the near-shore boundary contour line based on the 2012 and 2013 bathymetry survey data in CU85 through CU96. 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.

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-2122 (Appendix 2), which has been revised to incorporate design elevations for Reach 5. 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 G and on Drawings B-2714 through B-2740 (Appendix 2). The coordinates for the near-shore setpoints are identified on Drawing B-2807 (Appendix 2).

3.8.1.3 Habitat Layer Backfill

In accordance with the Phase 2 CDE, additional backfill (hereafter referred to as "habitat layer backfill") will be used to reconstruct conceptual SAV primary and contingency planting areas, and natural recolonization areas (referred to collectively as "SAV Areas" in the remainder of this section) 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 more than 8 feet. For CU85 through CU96, after dredging and placement of the backfill layer or isolation caps, water depths greater than 8 feet correspond to elevations lower than: 75.6 ft (NAVD88) in Reach 5 for CU85 through CU91; 62.0 ft (NAVD88) in Reach 4 for CU92 and CU93; and 39.8 ft (NAVD88) in Reach 3 for CU94 through CU96.

Habitat layer backfill will be placed to either return the area 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 based on the following:

- In CU85 through CU91 in Reach 5, SAV Areas with pre-dredging elevations between 75.6 ft and 78.6 ft (NAVD88) will be returned to pre-dredging bathymetry, and SAV Areas with pre-dredging elevations between 78.6 ft and 81.6 ft (NAVD88) will be returned to an elevation of 78.6 ft (NAVD88).

- In CU92 and CU93 in Reach 4, SAV Areas with pre-dredging elevations between 62.0 ft and 65.0 ft (NAVD88) will be returned to pre-dredging bathymetry, and SAV Areas with pre-dredging elevations between 65.0 ft and 68.0 ft (NAVD88) will be returned to an elevation of 65.0 ft (NAVD88).

- In CU94 through CU96 in Reach 3, SAV Areas with pre-dredging elevations between 39.8 ft and 42.8 ft (NAVD88) will be returned to pre-dredging bathymetry,

and SAV Areas with pre-dredging elevations between 42.8 ft and 45.8 ft (NAVD88) will be returned to an elevation of 42.8 ft (NAVD88).

SAV Areas have been developed for CU85 through CU96 as described in Section 3.9 and Attachment C. These areas will serve as the basis for determining the locations and extent of habitat layer backfill placement. In addition, the conceptual SAV Areas associated with CU85 through CU96 are shown on Drawings B-2714 through B-2740 (Appendix 2) and on figures included in Attachment G. Potential locations where habitat layer backfill could be applied are also shown on the figures included in Attachment G. 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 3.8.1.2). In addition, habitat layer backfill will not be placed in areas known to be inhabited by water chestnut, because doing so could promote re-colonization by that invasive species.

After dredging is completed and prior to backfill placement, the Construction Manager will provide the Dredging Contractor with the locations, extents, and elevations for placement of the habitat layer backfill based on the post-dredging elevations in the conceptual SAV planting, contingency, and natural recolonization areas. The decision of whether to place habitat layer backfill will also be based on the proximity to the navigation channel, 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-2124 (Appendix 2), which has been revised to incorporate design elevations for Reaches 3 through 5. Specification Section 13720 (Backfilling/Capping; Appendix 1) has been revised to include placement tolerance requirements for Type 2 material, if placed as a base layer below the upper 1 foot of Type 1 material in habitat layer backfill areas. The upper 1 foot of habitat layer backfill will consist of Type 1 or Type 2 material. Type 2 material may be used below the upper 1 foot of habitat layer backfill as needed. 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.

The areas receiving habitat layer backfill and the total volume placed in CU85 through CU96 will be determined during the CU certification process.

3.8.1.4 Riverine Fringing Wetland Construction Areas

Approximately 4.8 acres of RFW have been delineated in CU85 through CU96 – located in CU91, CU94, CU95, and CU96. RFW areas disturbed during the dredging operations are to 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 2.2.3. The RFW construction areas in for CU85 through CU96 are identified in Attachment C.

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 Dredging 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.

The wetland boundary material has not been specified for construction in all RFW construction areas, but will be specified for placement in areas most likely to be impacted by waves resulting from vessel traffic. Wetland boundary material has not been specified in RFW construction areas in CU95 (on the west side of an island near RM 164.4 and on the east side of Quack Island near RM 163.9) and in a portion of CU96 (on the western side of the RFW area near RM 163.5).

Details and example cross-sections for typical RFW construction areas are identified on Drawings B-2127 and B-2128 (Appendix 2), which have been updated to include design elevations for Reaches 3 through 5. The RFW construction area locations are identified on figures included in Attachment G and on Drawings B-2714 through B-2740 (Appendix 2).

The backfill placement and tolerance requirements for RFW construction areas restored to pre-dredge bathymetry are described in Specification Section 13720 (Backfilling/Capping; Appendix 1) and have not changed from the version issued with the 2013 FDR.

The RFW construction areas will be seeded under the dredging operations contract in accordance with Contract 42A Specification Section 13701 (Riverine Fringing

Wetland Seeding; Appendix 1), which has been updated to include reference to the RFW planting zones in CU85 through CU96 and to add pickerelweed (*Pontederia cordata*) to the wetland seed mix for Zone B. Forecasted weather conditions and projected river flows will be considered when scheduling RFW seeding to minimize the potential for washing out of seeds.

RFW seed mixtures will include plant species native to the Hudson River watershed. Seeds will originate from the northeastern United States (covering, New England New Jersey, New York, and Pennsylvania) – except for wild rice seed, which will be provided from sources in Wisconsin, subject to EPA approval. The proposed sources for seed mixtures to be used in 2014 will be identified in the 2014 RAWP.

A description of the RFW seeding approach (including Zones A and B) will be presented in the 2014 RAWP. In addition, GE will provide, as a separate submittal to EPA, seed material certificates as soon as practicable following receipt from the contractor and prior to seeding.

3.8.1.5 CU95 Quack Island Area

Most of CU95 east of Quack Island is located within the limits of a NYSDEC-designated wetland area. Approximately 3.7 acres of RFW was delineated surrounding the small island in this area, of which approximately 1.9 acres is located inside the boundaries of CU95. The area surrounding the delineated RFW is dominated by approximately 6.3 acres of the invasive species water chestnut, with approximately 2.4 acres of invasive species delineated inside the limits of CU95. SAV was delineated in the channel area immediately east of Quack Island with only approximately 0.01 acre located inside the footprint of CU95.

The proposed backfilling for this portion of CU95 area is summarized below:

- The upper 1 foot of RFW construction areas will be backfilled with Type 5 material to pre-dredging bathymetry elevations as described in Section 3.8.1.4 above.

- The near-shore area located outside of the delineated RFW will be backfilled with Type 1 or Type 2 material to pre-dredging bathymetry as described in Section 3.8.1.2 above.

- The portion of CU95 located outside of the delineated RFW area and the near-shore area will be backfilled with a 1-foot layer of Type 1 or Type 2 material.

- Where isolation caps are placed in the backfill layer areas in CU95 east of Quack Island, a 1-foot layer of Type 1 or Type 2 backfill will be placed above the isolation cap (see Drawing C-2228 in Appendix 2).

Specification Section 13720 (Backfilling/Capping; Appendix 1) has been revised to incorporate the placement tolerance requirements for the 1-foot layer of backfill placed above isolation caps, if required, in this portion of CU95.

On April 16, 2014 and May 6, 2014, GE met with EPA to discuss GE's proposed habitat construction approach for the NYSDEC-mapped wetland area CU95 east of Quack Island. GE understands that the habitat construction approach for this portion of CU95 is currently being reviewed by EPA and may be subject to further discussion between GE and EPA. If necessary, changes to the habitat construction design and/or backfilling design for this portion of CU95 will be provided to EPA in an addendum to this CU85-CU96 FDR.

3.8.2 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 installation of an engineered cap based on post-dredging residuals concentrations are set forth in the 2014 PSCP, subject to the capping limits to be discussed therein.

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 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 the approved 2011 FDR (Attachment F of the 2011 FDR).

The two 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 CU85 through CU96. Caps to be placed within the limits of the navigation channel will employ the high-velocity cap design and, in accordance with the Phase 2 EPS and the Phase 2 CDE, the top elevation of such caps after placement must provide at least 14 feet of water depth. For CU85 through CU96 in Reaches 3 through 5, this equates to elevations of:

- 67.7 ft (NAVD88) in Reach 5 based on the NYS Canal Corporation's Barge Canal Datum (BCD) low-pool elevation of 81.7 ft (NAVD88).

- 51.7 ft (NAVD88) in Reach 4 based on the NYS Canal Corporation's BCD low-pool elevation of 65.7 ft (NAVD88).

- 32.2 ft (NAVD88) in Reach 3 based on the NYS Canal Corporation's BCD low-pool elevation of 46.2 ft (NAVD88).

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-28 in Attachment F show the modeled velocity distributions for CU85 through CU96 under 100-year flow conditions. These figures will serve as a basis for determining armor types for the dredge areas outside the navigation channel if a cap is required.

Details and example cross-sections for the prototype isolation caps are provided on Drawing C-2121 (ARCADIS 2013a). This drawing has not changed from the version issued with the approved 2013 FDR. The potential locations for placement of the medium- and high-velocity isolation caps for CU85 through CU96 are identified on Drawings C-3714 through C-3740 (Appendix 2).

Long-term monitoring and maintenance requirements for the isolation caps to be installed in CU85 through CU96 will be described in an Operation, Maintenance, and Monitoring Plan for Caps and Habitat Replacement/Reconstruction (Cap/Habitat OM&M Plan), to be submitted subsequent to completion of dredging operations in CU85 through CU96.

3.8.3 Backfill and Cap Material Placement

Based on experience during previous dredging seasons, it is anticipated that backfill and cap materials will be placed by taking materials from a deck barge 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. Additional details on the methods to be used for backfill and cap placement will be described in the 2014 RAWP (or in the RAWP associated with a subsequent dredge season).

3.8.4 Backfill and Cap Material Sources

Potential sources of backfill and cap materials and the routes of delivery will be described in the 2014 RAWP (or in the RAWP associated with a subsequent dredge season).

3.8.5 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.

3.8.5.1 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 October 17 and 25, 2012, field inspections were conducted to identify the shoreline treatments proposed for CU85 through CU96. 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;
- Proximity of the shoreline to the navigation channel; and
- Minimization of hardening of the shoreline, to the extent practicable.

Shoreline stabilization requirements are described in Specification Section 13898 (Shoreline Stabilization) in the 2013 FDR. The types and locations of shoreline stabilization treatments in CU85 through CU96 are shown on Drawings B-3714 through B-3740 (Appendix 2). Details of the shoreline stabilization treatments are identified on Drawing B-2221 (Appendix 2), which has been revised to incorporate design elevations for Reaches 3 through 5.

Long-term monitoring and maintenance requirements for stabilized shoreline areas will be described in the Cap/Habitat OM&M Plan to be submitted subsequent to completion of dredging operations in CU85 through CU96.

3.8.5.2 Shoreline Repair

The Dredging 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-2222 (Appendix 2), which has been updated to include design elevations for Reaches 3 through 5. Requirements for repair of shoreline areas disturbed during the dredging operations are presented in Specification Sections 02921 (Seeding) in the 2013 FDR and 13705 (Shoreline Repair and Planting) in the 2012 FDR.

3.9 Habitat Construction

Habitat construction in Phase 2 areas will be 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 design addendum. The locations and estimated 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 CU85 through CU96 is presented in Attachment C. The habitat construction planting areas and estimated habitat layer backfill areas presented in Attachment C are preliminary. The final habitat

construction design 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.

3.9.1 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-2714 through B-2740 (Appendix 2).

3.9.2 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 during October 2013 with EPA as described in Section 2.2.3.

Construction of replacement RFWs will involve backfilling the RFW areas as described in Section 3.8.1.4. RFW areas will then be planted and seeded with species native to the Upper Hudson River. Wetland construction areas are further discussed and shown on figures in Attachment C.

3.9.3 Submerged Aquatic Vegetation Beds

SAV beds will be constructed 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 SAV planting and natural recolonization areas for CU85 through CU96 are shown on figures in Attachment C. Those figures also show SAV contingency areas, some of which may be planted if any of the designated SAV 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 CU85 through CU96 are shown on Drawings B-2714 through B-2740 (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 design report. In addition, an electronic data file of the habitat matrix output described in Attachment C is provided on the enclosed CD-ROM.

3.9.4 Invasive Plant Species

As noted in Section 3.2.4 above, water chestnut beds are located within and adjacent to several CUs in Reaches 3 through 5. Areas delineated as water chestnut will be classified as UCB and will not be planted.

In addition, because invasive species such as water chestnut are present in various areas of the Upper Hudson River, including areas that are outside and immediately adjacent to the CUs, there is a potential that invasive species may colonize Phase 2 dredge areas in Reaches 3 through 5. Monitoring and response actions will be implemented in accordance with established benchmarks and success criteria under the approved Phase 2 Habitat Adaptive Management Plan to minimize the potential for establishment of invasive species in the RFW and SAV habitat construction areas. However, it should be noted that elimination of invasive species from Phase 2 areas is not a project goal and is not a requirement for determining the success of the habitat construction.

3.10 Quality of Life Standards

The design has been developed with the objective of achieving the criteria set forth in the Phase 2 QoLPS for air quality, odor, noise, lighting, and navigation, which are referenced in Section 2.1.3. A summary of how the QoLPS parameters have been considered in the design for CU85 through CU96 is provided below.

3.10.1 Air Quality – PCBs

As in to prior dredging seasons, air monitoring will be conducted in accordance with the Phase 2 RAM QAPP in the vicinity of the active dredging operations, at the Sediment Processing Facility, and periodically at each of the locks used to transport dredged sediments. GE will coordinate with EPA regarding the schedule for conducting air monitoring in the vicinity of the locks.

In accordance with the Phase 2 CDE, 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 in CU85 through CU96 are shown on Drawings D-2714 through D-2740 (Appendix 2). The air mitigation BMPs to be implemented in those areas are included

in Specification Section 13803 (Dredging; Appendix 1) in the 2013 FDR Addendum 2 and have not changed.

The air mitigation BMPs to be implemented during the associated processing facility operations (as summarized in Section 2.3.2 of the 2012 FDR) have not changed.

In addition to the routine BMPs to be implemented for air mitigation BMP areas, contingent BMPs will be implemented in dredge areas or areas around the processing facility where measured PCB concentrations at a nearby receptor show an exceedance of the applicable PCB air quality standard on 3 consecutive days. The contingent air mitigation BMPs to be considered in these circumstances will be as described in Section 2.3.2 of the 2012 FDR and will include those listed in the 2014 PSCP.

3.10.2 Air Quality – NAAQS

An air quality modeling analysis conducted during the Phase 1 design demonstrated that the emissions of criteria pollutants from in-river activities and 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 whether any operational or equipment changes are anticipated in Phase 2 that could affect these pollutants. If no such change is anticipated, no further evaluation of the criteria pollutants and no monitoring for such pollutants will be necessary during Phase 2.

In accordance with the Phase 2 PSCP Scope and Phase 2 CHASP Scope, NAAQS analyses were previously conducted and presented as attachments to the 2011 FDR and 2012 FDR to evaluate whether anticipated operational or equipment changes that could affect emissions of criteria pollutants required revision of the Phase 1 NAAQS analysis. Those previous analyses confirmed that the Phase 1 analysis did not need to be revised to reflect such changes. Specifically, the 2012 evaluation (presented in Attachment F to the 2012 FDR) demonstrated that the predicted hourly and annual emissions of the criteria pollutants for the 2012 season were below the Phase 1 design emissions estimates, and it thus concluded that no additional NAAQS modeling or evaluation was required for 2012. In 2013, GE again reviewed potential operational and equipment changes, including the addition of push tugs for the transport of barges over longer distances; and it was concluded that 2013 operations would not involve design changes that would be expected to significantly affect emissions of criteria pollutants, and that thus a revised analysis was not necessary.

Dredging and processing facility operations for CU85 through CU96 are expected to be similar to those implemented in 2012 and 2013, with no operational or equipment changes that would significantly affect emissions of criteria pollutants. As a result, given the EPA-approved evaluations for those prior years, a revised NAAQS analysis is not considered necessary and a revised NAAQS analysis has not been completed for CU85 through CU96. Similarly, no provisions for monitoring, control, or contingency measures for criteria pollutants will be necessary for CU85 through CU96.

Consistent with the 2011 FDR, the 2012 FDR, and the 2013 FDR, preventative or contingency measures are included in the specifications to prevent the generation of particulates in the form of dust. These measures include the following:

- Site-specific Dust Prevention and Control Plans will be prepared by the contractors that detail the methods to be used to prevent and control onsite dust generation and migration from the site during operations.

- Haul roads will be wetted down, as needed, to minimize dust generation.

- The Processing Facility Operations Contractor will be required to prevent and mitigate spills of sediment on haul roads.

3.10.3 Odor

It is not anticipated that sediments dredged in CU85 through CU96 will generate odors that will reach the concern or exceedance levels 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 that will be taken to address exceedance of the criteria in the Phase 2 QoLPS and associated reporting requirements are discussed in the 2014 PSCP.

3.10.4 Noise

The Phase 2 CHASP Scope and Phase 2 RAM Scope require that the Phase 2 design include an updated evaluation of noise intensity generated by equipment, processes, and traffic associated with site operations based on Phase 1 noise measurements. They provide that, if Phase 2 includes equipment changes or changes to the processing facility that could result in increased noise levels over those experienced in Phase 1, this evaluation would include noise attenuation modeling, and GE would conduct a study at the beginning of dredging or processing facility operations (as applicable) to validate the modeling analysis. Given that certain additional equipment

was installed at the processing facility in early 2012, GE conducted a noise monitoring survey in June 2012 at locations around the processing facility. That survey showed that the new equipment did not result in a significant increase in noise levels. The noise levels from dredging operations in CU85 through CU96 and associated processing facility operations are not expected to be significantly different from those in prior dredging seasons. As a result, there is no need for an additional noise monitoring survey prior to the commencement of those operations.

During dredging and processing facility operations for CU85 through CU96 (as in the prior Phase 2 seasons), noise will be monitored by the Dredging Contractor and the Processing Facility 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 monitored by the contractor 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) in the 2013 FDR outlines the noise standards, requirements, restrictions, and controls during the project operations. This specification identifies the routine noise monitoring to be conducted by the contractors 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.

3.10.5 Lighting

The Phase 2 CHASP Scope requires that the Phase 2 design include an updated evaluation, based on Phase 1 light measurements, of light intensity generated by illumination of active dredge areas, processing areas, loading and staging areas, administration areas, and other work areas on and near the river, considering any equipment changes anticipated for Phase 2 that could affect lighting levels. The dredging and processing facility operations for CU85 through CU96 are not expected to

cause an increase in lighting impacts over those experienced during prior dredging seasons.

During dredging and processing facility operations for CU85 through CU96, light monitoring will be conducted by the Dredging Contractor and the Processing Facility 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 monitored by the contractor 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) in the 2013 FDR outlines the lighting standards, requirements, restrictions, and controls during the project operations. This specification identifies routine light monitoring to be conducted by the contractors 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 exceedances.

3.10.6 Navigation

The dredging and dredged material transport operations in CU85 through CU96 will be implemented in a manner similar to those in previous dredging seasons. Approximately 1.2 acres (about 2 percent) of CU85 through CU96 are located within the navigation channel.

To meet the Phase 2 QoLPS for navigation, this project will be implemented to maintain safety and productivity while avoiding unnecessary disruption of non-project-related navigation, allowing efficient performance of the project. The final design incorporates certain accommodations, preventative control systems, notification protocols, contingencies, and mitigation measures to maximize safety and productivity and to avoid unnecessary disruption of non-project-related navigation, while allowing efficient performance of the project. General requirements relating to navigation were

described in Section 3.9.6 of the 2012 FDR and will apply to the operations in CU85 through CU96.

As noted in Section 3.2.1, the southernmost portion of CU91 is located within the land-cut portion of the canal immediately north of Lock 4 (see Figure 1-2b). Dredging in this portion of CU91 will be coordinated to minimize interference with navigation of non-project vessels.

The following specifications set forth the requirements, restrictions, and controls to be implemented during the project operations to meet the Navigation Performance Standard:

- Specification Sections 13845 (Aids to Navigation During Dredging Operations) and 01140 (Work Restrictions) in the 2012 FDR;
- Specification Sections 02936 (Lighting Restrictions and Controls) and 13897 (Marine Equipment) in the 2013 FDR;
- Specification Section 13820 (Anchoring During Dredging Operations) in 2013 FDR Addendum 2;
- Specification Section 13840 (Transport Procedures Through Canal Locks) in 2013 Addendum 5; and
- Specification Sections 13810 (In-Water Material Transport) and 13860 (Marine Traffic Control) in Appendix 1, which have been updated to include additional requirements for the dredging operations.

Additional information regarding the scope of navigation monitoring, notification, contingencies, mitigation, and complaint management are provided in the 2014 PSCP and the 2014 CHASP.

4. References

Anchor QEA, LLC (Anchor QEA). 2009. Habitat Assessment Report for Phase 2 Areas (Phase 2 HA Report). Prepared for General Electric, Albany, NY. June.

Anchor QEA. 2011. Wetland Delineation Report for Phase 2 Areas. Prepared for General Electric Company, Albany, NY. January.

Anchor QEA. 2012. Phase 2 Remedial Action Monitoring Quality Assurance Project Plan (Phase 2 RAM QAPP). May.

Anchor QEA and Environmental Standards, Inc. (ESI). 2009. Phase 2 Data Gap Data Summary Report. Hudson River PCB Site Sediment Sampling and Analysis Program. April 2009.

Anchor QEA and ESI. 2012. 2012 Supplemental Engineering Data Collection Work Plan for Sediment Sampling in Certification Units 71-100. April.

Anchor QEA and ESI. 2013. 2012 Supplemental Engineering Data Collection Data Summary Report. Hudson River PCBs Superfund Site. Prepared for General Electric Company, Albany, New York. January.

ARCADIS of New York, Inc. (ARCADIS). 2008. Phase 2 Intermediate Design Report for the Hudson River PCBs Superfund Site (Phase 2 IDR). Prepared for General Electric Company, Albany, NY. May.

ARCADIS. 2011. Phase 2 Final Design Report for 2011 for the Hudson River PCBs Superfund Site (2011 FDR). Prepared for General Electric Company, Albany, NY. Revised April.

ARCADIS. 2012. Phase 2 Final Design Report for 2012 for the Hudson River PCBs Superfund Site (2012 FDR). Prepared for General Electric Company, Albany, NY. Revised May.

ARCADIS. 2013a. Phase 2 Final Design Report for 2013 for the Hudson River PCBs Superfund Site (2013 FDR). Prepared for General Electric Company, Albany, NY. Revised April.

ARCADIS. 2013b. Phase 2 Final Design Report for 2013, Addendum No. 2 – Reaches 1 and 2 (2013 FDR Addendum 2). Prepared for General Electric Company, Albany, NY. Revised October.

ARCADIS. 2013c. Phase 2 Final Design Report for 2013, Addendum No. 5 – CU79 through CU84 in Reach 5 (2013 FDR Addendum 5). Prepared for General Electric Company, Albany, NY. Revised September.

Blasland, Bouck, and Lee, Inc. (BBL). 2003a. Remedial Design Work Plan (RD Work Plan). Hudson River PCBs Superfund Site. Prepared for General Electric Company, Albany, NY. August.

BBL. 2003b. Habitat Delineation and Assessment Work Plan (HDA Work Plan). Hudson River PCBs Superfund Site. Prepared for General Electric Company, Albany, NY. August.

BBL. 2004. Preliminary Design Report (PDR). Hudson River PCBs Superfund Site. Prepared for General Electric Company, Albany, NY. April.

BBL. 2006. Phase 1 Final Design Report (Phase 1 FDR). Hudson River PCBs Superfund Site. Prepared for General Electric Company, Albany, NY. March 21.

BBL and Exponent. 2006. Habitat Delineation Report (HD Report). Hudson River PCBs Superfund Site. Prepared for General Electric Company, Albany, NY. March.

Bridges, T., Fox, R., Fugelvand, P., Hartman, G., Magar, V., Schroeder, P., and T. Thompson. 2010. Hudson River PCBs Site Peer Review of Phase 1 Dredging Final Report. With contributions from SRA International, Inc. September 10.

Ecology & Environment, Inc. (E&E). 2006. Hudson River PCBs Superfund Site Final Biological Assessment (Final BA). January.

E&E. 2010. Changes to Quality of Life Performance Standards at the Hudson River PCBs Superfund Site for Implementation of Phase 2 of the Remedial Action. Technical Memorandum to the EPA. 6 pp. December 11.

General Electric Company (GE). 2014. Phase 2 Performance Standards Compliance Plan for 2014 (2014 PSCP). Appendix D to the 2014 RAWP. April.

Parsons. 2014a. Remedial Action Work Plan for 2014 (2014 RAWP). Hudson River PCBs Superfund Site. Prepared for General Electric Company, Albany, NY.

Parsons. 2014b. Phase 2 Dredging Construction Quality Control/Quality Assurance Plan for 2014 (2014 DQAP). Appendix A to the 2014 RAWP.

Parsons. 2014c. Phase 2 Facility Operations and Maintenance Plan for 2014 (2014 Facility O&M Plan). Appendix B to the 2014 RAWP. April.

Parsons. 2014d. Phase 2 Transportation and Disposal Plan for 2014 (2014 TDP). Appendix C to the 2014 RAWP.

Parsons. 2014e. Phase 2 Property Access Plan for 2014 (2014 PAP). Appendix E to the 2014 RAWP. April.

Parsons. 2014f. Phase 2 Community Health and Safety Plan for 2014 (2014 CHASP). Appendix F to the 2014 RAWP. April.

Parsons. 2014g. Phase 2 Remedial Action Work Plan for Reach 7 – Landlocked Area. Hudson River PCBs Superfund Site. Prepared for General Electric Company, Albany, NY.

Quantitative Environmental Analysis, Inc. (QEA). 2005. Hudson River PCBs Site Phase 1 Dredge Area Delineation Report (Phase 1 DAD). February 28.

QEA. 2007. Hudson River PCBs Superfund Site Phase 2 Dredge Area Delineation Report (Phase 2 DAD). December 17.

U.S. Environmental Protection Agency (EPA). 2002. Hudson River PCBs Site, New York. Record of Decision (ROD).

EPA. 2004a. Hudson River PCBs Superfund Site Quality of Life Performance Standards. May.

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.

EPA. 2006. EPA's Final Decision Regarding General Electric Company's Disputes Regarding EPA's June 23, 2006 Comments on Phase 1 Final Design Report. USEPA, Region 2, New York. November 9.

EPA. 2010a. Hudson River PCBs Site Revised Engineering Performance Standards for Phase 2 (Phase 2 EPS). Prepared by the Louis Berger Group, Inc. for EPA and USACE. December.

EPA. 2010b. Revised Statement of Work for Remedial Action and Operations, Maintenance, and Monitoring (SOW Appendix B to RA CD), including attachments. December.

EPA. 2012. Hudson River Dredging Project USEPA Adaptive Management Review Required Adaptive Responses and Design Improvements for Phase 2 Year 2. DRAFT. January.

EPA/GE. 2002. Administrative Order on Consent for Hudson River Sediment Sampling (Sediment Sampling AOC) (Index No CERCLA-02-2002-2023). Effective Date July 26, 2002.

EPA/GE. 2003. Administrative Order on Consent for Hudson River Remedial Design and Cost Recovery (RD AOC) (Index No CERCLA-02-2003-2027). Effective Date August 18, 2003.

EPA/GE. 2005. Consent Decree in United States v. General Electric Company, Civil Action No. 05-cv-1270, lodged in United States District Court for the Northern District of New York. (RA CD). October 6.

United States Fish and Wildlife Service (USFWS). 2007. National Bald Eagle Management Guidelines. May.

URS. 2008. Archaeological Resources Assessment Report for Phase 2 Dredge Areas (Phase 2 ARA Report). Hudson River PCBs Superfund Site. Prepared for General Electric Company, Albany, NY. February.

URS. 2013a. Terrestrial Archaeological Resources Survey Work Plan for Phase 2 Dredge Areas Below Northumberland Dam (River Section 3), Hudson River PCBs Superfund Site. Prepared for General Electric Company, Albany, NY. May.

URS. 2013b. Underwater Archaeological Resources Survey Work Plan for Evaluation of Targets in Certification Units 79 through 100 of the Phase 2 Dredge Areas, Hudson River PCBs Superfund Site. Prepared for General Electric Company, Albany, NY. July.

URS. 2013c. Underwater Archaeological Resources Survey, Interim End-of-Fieldwork Summary Report: Evaluation of Select Targets in Certification Units 75 through 100, Hudson River PCBs Superfund Site. Prepared for General Electric Company, Albany, NY. August.

URS. 2013d. Terrestrial Archaeological Resources Survey, End-of-Fieldwork Summary Report: Evaluation of Phase 2 Dredge Areas Below Northumberland Dam (River Section 3), Hudson River PCBs Superfund Site. Prepared for General Electric Company, Albany, NY. August.

URS. 2014a. Terrestrial Archaeological Resources Survey Report for Phase 2 Dredge Areas Below Northumberland Dam (River Section 3), Hudson River PCBs Superfund Site. Prepared for General Electric Company, Albany, NY. February.

URS. 2014b. 2013 Annual Report: Evaluation of Remote Sensing Targets in Certification Units 75 through 100 of the Phase 2 Dredge Area, Hudson River PCBs Superfund Site. Prepared for General Electric Company, Albany, NY. February.

5. Acronyms and Abbreviations

ARA	Archaeological Resources Assessment
ARCADIS	ARCADIS of New York, Inc.
AOC	Administrative Order on Consent
BA	Biological Assessment
BBL	Blasland, Bouck & Lee, Inc.
BCD	Barge Canal Datum
BERS	Barge Electronic Reporting System
BMP	Best Management Practice
CD	Consent Decree
CDE	Critical Design Elements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	cubic feet per second
CHASP	Community Health and Safety Plan or Community Health and Safety Program
CLE	CLE Engineering, Inc.
CU	Certification Unit
cy	cubic yards
DAD	Dredge Area Delineation
DoC	Depth of Contamination

DQAP	Dredging Construction Quality Control/Quality Assurance Plan
E&E	Ecology & Environment, Inc.
EoC	Elevation of Contamination
EPA	U.S. Environmental Protection Agency
EPS	Engineering Performance Standards
ESI	Environmental Standards, Inc.
FDR	Final Design Report
ft/s	feet per second
g/m^2	grams per square meter
GE	General Electric Company
GLAC	Glacial Lake Albany Clay
HA	Habitat Assessment
HD	Habitat Delineation
HDA	Habitat Delineation and Assessment
IDR	Intermediate Design Report
mg/kg	milligrams per kilogram
MPA	mass per unit area
NAAQS	National Ambient Air Quality Standards
NAPL	non-aqueous phase liquid
NAVD88	North American Vertical Datum of 1988

NYS Canal Corporation	New York State Canal Corporation
NRHP	National Register of Historic Places
NTU	nephelometric turbidity unit
NYSDEC	New York State Department of Environmental Conservation
NYSEG	New York State Gas and Electric 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
QEA	Quantitative Environmental Analysis, Inc.
QoLPS	Quality of Life Performance Standards
RA CD	Remedial Action Consent Decree
RAM	Remedial Action Monitoring
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
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
SEDC	Supplemental Engineering Data Collection
SOW	Statement of Work
SSAP	Sediment Sampling and Analysis Program
TDP	Transportation and Disposal Plan
TOC	total organic carbon
Tri+ PCBs	PCBs with three or more chlorine atoms
TSCA	Toxic Substances Control Act
UCB	unconsolidated river bottom
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VTS	vessel traffic service
WGIA	West Griffin Island Area
WQ	Water Quality

Tables

Table 3-1
Basis of Design for Dredging and Dredged Material Transport – CU85 through CU96

Phase 2 Final Design Report for CU85 through CU96
General Electric Company – Hudson River PCBs Superfund Site

Item	Basis	Source/Notes
PCB MPA threshold for sediment removal in River Section 3	10 g/m^2 Tri+ PCBs	· Phase 2 DAD Report (QEA 2007) · RD Work Plan (BBL 2003a)
Surface sediment threshold for sediment removal in River Section 3	30 mg/kg Tri+ PCBs	· Specified in Phase 2 DAD Report (QEA 2007) · EPA's Final Decision Regarding GE's Disputes on Draft Phase 1 DAD Report and Draft Target Area Identification Report (EPA 2004b)
Location and depth of dredging	Design inventory dredge depths are based on removal to 1 mg/kg Total PCBs	· 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) · 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)
Post-dredge sediment PCB concentration target	1 mg/kg Tri+ PCBs	· From Phase 2 EPS, additional criteria of 6 and 27 mg/kg Tri+ PCBs and 500 mg/kg total PCBs require various response actions
Certification Units (CUs)	CU85 through CU96	· The EoC volume for CU85 through CU96 is approximately 310,300 cy (see Table 3-3 and Attachment A)
Design Cut Volume for each CU	See Table 3-3	· Volumes based on the design dredge prism developed in accordance with the Phase 2 CDE · 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
Re-dredge volume	To be determined	· To be determined based on the results of residuals sampling
Shoreline definition	<u>CU85-CU91 – Reach 5:</u> · 83.6 ft elev. NAVD88 <u>CU92-CU93 – Reach 4:</u> · 70.0 ft elev. NAVD88 <u>CU94-CU96 – Reach 3:</u> · 47.8 ft elev. NAVD88	· See Section 3.1.2
Near-shore area	<u>CU85-CU91 – Reach 5:</u> · Area between the shoreline and the 82.2 ft in-river pre-dredge elevation <u>CU92-CU93 – Reach 4:</u> · Area between the shoreline and the 68.9 ft in-river pre-dredge elevation <u>CU94-CU96 – Reach 3:</u> · Area between the shoreline and the 46.2 ft in-river pre-dredge elevation	· See Section 3.8.1.2 and Table 3-2

Table 3-1
Basis of Design for Dredging and Dredged Material Transport – CU85 through CU96

Phase 2 Final Design Report for CU85 through CU96
General Electric Company – Hudson River PCBs Superfund Site

Item	Basis	Source/Notes
Existing conditions – river bottom contours	Multi-beam bathymetry surveys by CLE and single-beam bathymetric surveys (by OSI and CLE) where multi-beam data were unavailable	· Bathymetric surveys conducted by OSI in 2003, 2004, 2006, and 2007 · Bathymetric surveys conducted by CLE in 2012 and 2013
Navigation channel	As shown on the Drawings	· Location provided by Anchor QEA based on information from NYS Canal Corporation, USACE, and field measurements by Anchor QEA
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 · To be verified by contractor prior to dredging
Presence and type of vegetation	Data summarized in habitat delineation and assessment reports	· See Section 2.2.3
Presence of archaeological resources	Data summarized in archaeological assessment reports	· See Section 2.2.5
Anchoring restrictions	See D-series Drawings	· Anchoring will be restricted within areas where: wetlands and SAV have been delineated outside of dredge areas; where non-native plants have been delineated outside of dredge 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; where SAV and RFW have been planted; where natural colonization areas have been designated; where caps have been placed; at locations of known utility crossings; and in sensitive archaeological areas. · 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 Section 3.9 of the 2013 FDR	· Hudson QoLPS (EPA 2004a) · 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) · 2014 PSCP (GE 2014)
Air emission BMPs	See Section 3.2.5	· Phase 2 CDE · Required Adaptive Responses and Design Improvements for Phase 2, Year 2 (EPA 2012) · 2014 PSCP (GE 2014)

Notes:
1. References are defined in Section 4 of the CU85-CU96 FDR.
2. Acronyms and abbreviations are defined in Section 5 of the CU85-CU96 FDR.

Table 3-2
Basis of Design for Backfilling/Capping – CU85 through CU96

Phase 2 Final Design Report for CU85 through CU96
General Electric Company – Hudson River PCBs Superfund Site

Item	Basis	Source/Notes
Backfill/cap footprint	Approximately 63.7 acres would be considered for backfill and/or cap placement within CU85 through CU96	· The Phase 2 EPS limits the amount of capping that will be allowed in Phase 2 (2014 PSCP [GE 2014])
Top elevations of caps within the navigation channel	<u>CU85-CU91 – Reach 5:</u> · 67.7 ft (NAVD88) <u>CU92-CU93 – Reach 4:</u> · 51.7 ft (NAVD88) <u>CU94-CU96 – Reach 3:</u> · 32.2 ft (NAVD88)	· 14 feet of water depth above the cap based on the NYS Canal Corporation's Barge Canal Datum low-pool elevations (BCD low-pool elevations) of 81.7 ft NAVD88 for Reach 5, 65.7 ft NAVD88 for Reach 4, and 46.2 for Reach 3 · Phase 2 EPS (EPA 2010a), Phase 2 CDE (EPA 2010b)
The top elevation of backfill within the navigation channel	<u>CU85-CU91 – Reach 5:</u> · 67.7 ft (NAVD88) * <u>CU92-CU93 – Reach 4:</u> · 51.7 ft (NAVD88) * <u>CU94-CU96 – Reach 3:</u> · 32.2 ft (NAVD88) * *unless compliant residual sampling node locations exceed 1 mg/kg Tri+ PCBs (after rounding) within the first core segment after the first dredging pass	· 14 feet of water depth above the backfill material based on the NYS Canal Corporation's BCD low-pool elevation of 81.7 ft NAVD88 for Reach 5, 65.7 ft NAVD88 for Reach 4, and 46.2 for Reach 3 (Phase 2 EPS, Phase 2 CDE) · Backfill will not be placed in the navigation channel unless the post-dredging elevation is below 66.2 ft (NAVD88) in Reach 5, 50.2 ft (NAVD88) in Reach 4, or 30.7 ft (NAVD88) in Reach 3 - These elevations correspond to a 15.5-foot water depth (the 14-foot post- backfill placement water depth required by the Phase 2 EPS plus the 12-inch thick backfill layer and the allowable backfill placement tolerance) · In accordance with EPA's adaptive responses for 2012 (EPA 2012), at sampling nodes in the navigation channel where the residual Tri+ PCB concentration in the surface sediment after the first dredging pass exceeds 1 mg/kg (after rounding) but does not cause the average Tri+ PCB concentration in the CU to exceed 1 mg/kg or meet the other mandatory conditions for re-dredging as specified in the PSCP, backfill will be placed so long as there is approximately 12 feet of draft above the post-placement backfill surface at low-pool conditions (69.7 ft NAVD88 for Reach 5, 53.7 ft NAVD88 for Reach 4, and 34.2 ft NAVD88 for Reach 3)
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 – see below (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 78.6 ft (NAVD88) in CU85 through CU91 (Reach 5), to an elevation of 65.0 ft (NAVD88) in CU92 and CU93 (Reach 4), or to an elevation of 42.8 ft (NAVD88) in CU94 through CU96 (Reach 3) (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 pre-dredging bathymetry

Table 3-2
Basis of Design for Backfilling/Capping – CU85 through CU96

Phase 2 Final Design Report for CU85 through CU96
General Electric Company – Hudson River PCBs Superfund Site

Item	Basis	Source/Notes
Near-shore area	<u>CU85-CU91 – Reach 5:</u> · Area between the shoreline and the 82.2 ft in-river pre-dredge elevation <u>CU92-CU93 – Reach 4:</u> · Area between the shoreline and the 68.9 ft in-river pre-dredge elevation <u>CU94-CU96 – Reach 3:</u> · Area between the shoreline and the 46.2 ft in-river pre-dredge elevation	· See Section 3.8.1.2 · 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 pre-dredging bathymetry in the near-shore area (Phase 2 CDE) · For CU85 through CU91 in Reach 5, pre-dredging bed elevation equals 82.2 ft (NAVD88) at near-shore setpoints, which are located along the pre-dredging bathymetric 82.2 ft elevation contour line based on bathymetric surveys conducted in 2012 and 2013 by CLE · For CU92 and CU93 in Reach 4, pre-dredging bed elevation equals 68.9 ft (NAVD88) at near-shore setpoints, which are located along the pre-dredging bathymetric 68.9 ft elevation contour line based on bathymetric surveys conducted in 2012 by CLE · For CU94 through CU96 in Reach 3, pre-dredging bed elevation equals 46.2 ft (NAVD88) at near-shore setpoints, which are located along the pre-dredge bathymetric 46.2 ft elevation contour line based on bathymetric surveys conducted in 2012 and 2013 by CLE · 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 3.8.1 · 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 3.8.1 · 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, except as described in Section 3.8.1 · Only Type 2 backfill material will placed in the navigation channel · Supporting side slopes for near-shore backfill, habitat layer 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 · 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. Base materials (depths of greater than 1 foot below the final backfill surface) for habitat layer backfill areas may also be constructed using Type 2 material.
Water depth after dredging	Varies	· Function of location in the river and dredging depths (range based on bathymetric data)
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

Table 3-2
Basis of Design for Backfilling/Capping – CU85 through CU96

Phase 2 Final Design Report for CU85 through CU96
General Electric Company – Hudson River PCBs Superfund Site

Item	Basis	Source/Notes
Caps in the navigation channel	High-velocity isolation caps with the top elevations of caps at or below 67.7 ft (NAVD88) in Reach 5, at or below 51.7 ft (NAVD88) in Reach 4, and at or below 32.2 ft (NAVD88) in Reach 3	· 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 3.8.2

Notes:
1. References are defined in Section 4 of the CU85-CU96 FDR.
2. Acronyms and abbreviations are defined in Section 5 of the CU85-CU96 FDR.

Table 3-3
Certification Unit Areas and Design Volumes - Certification Units 85 through 96

Phase 2 Final Design Report for CU85 through CU96
General Electric Company - Hudson River PCBs Superfund Site

Reach	Certification Unit (CU)	CU Area (acres) [1]	EoC Surface Volume (cy) [2,4]	Estimated PCB Mass (kg) [5]		Design Dredge Prism Volume (cy) [3,4]
				Total PCBs	Tri+ PCBs	
Reach 5	CU85	2.69	13,000	570	200	14,200
	CU86	1.54	5,600	190	60	6,000
	CU87	7.10	33,500	1,600	540	37,600
	CU88	6.13	30,000	1,710	690	34,800
	CU89	7.29	38,800	2,300	750	41,800
	CU90	4.82	23,400	1,000	360	25,400
	CU91	5.53	24,200	1,010	350	25,300
Reach 4	CU92	7.91	36,600	1,610	530	39,300
	CU93	5.16	28,500	2,420	790	28,000
Reach 3	CU94	1.89	9,200	300	130	9,400
	CU95	6.09	28,900	790	360	31,000
	CU96	7.52	38,600	1,250	630	41,900
TOTAL - CU79-CU96		**63.7**	**310,300**	**14,750**	**5,390**	**334,700**

Notes:

1. 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 side slopes 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 2012 and 2013. The Design Dredge Prism Volumes include engineering sideslopes that are outside of the CU boundaries.

5. Estimated PCB mass based on method outlined in Chapter 7 of the EPS. Targeted mass based on the EoC surface.

cy = cubic yards
kg = kilogram
PCB = polychlorinated biphenyl
Tri+ PCB = polychlorinated biphenyl with three or more chlorine atoms

Figures

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XREFS:
XBM-MAJR

RIVER SECTION 1
RIVER SECTION 2
RIVER SECTION 3

CORINTH
FORT EDWARD
LOCK #7
ARGYLE
REACH 8
THOMPSON ISLAND POOL
GRIFFIN ISLAND
WEST GRIFFIN ISLAND AREA
CU50-CU54
THOMPSON ISLAND DAM
FORT MILLER
LANDLOCKED AREA
CU61-CU66
FORT MILLER DAM
LOCK #6
SALEM
REACH 7
LANDLOCKED AREA
NORTHUMBERLAND DAM
REACH 6
NORTHUMBERLAND POOL
BATTEN KILL
LOCK #5
SCHUYLERVILLE
VICTORY
GREENWICH
SARATOGA SPRINGS
CAMBRIDGE
REACH 5
STILLWATER POOL
BALLSTON SPA
STILLWATER
ROUND LAKE
STILLWATER DAM
LOCK #4
REACH 4
UPPER MECHANICVILLE POOL
UPPER MECHANICVILLE DAM
HOOSICK FALLS
MECHANICVILLE
LOCK #3
VALLEY FALLS
REACH 3
LOWER MECHANICVILLE POOL
LOCK #2
SCHAGHTICOKE
LOWER MECHANICVILLE DAM
REACH 2
WATERFORD POOL
WATERFORD DAM
LOCK #1
WATERFORD
REACH 1
TROY POOL
COHOES
MOHAWK RIVER
FEDERAL DAM & LOCK
GREEN ISLAND
TROY
WATERVLIET

0 15000' 30000'
GRAPHIC SCALE

LEGEND:

- PHASE 1 DREDGE AREA (CU01–CU08, CU17, CU18)
- REMAINDER OF PHASE 2 DREDGE AREAS (CU09–CU16, CU19–CU60, CU67–CU84, CU97–CU100)
- LANDLOCKED AREA (CU61–CU66)
- PHASE 2 CUs 85 THROUGH 96
- INCORPORATED AREAS

GENERAL ELECTRIC COMPANY
HUDSON RIVER PCBs SUPERFUND SITE
PHASE 2 FINAL DESIGN REPORT FOR CU85 THROUGH CU96

UPPER HUDSON RIVER

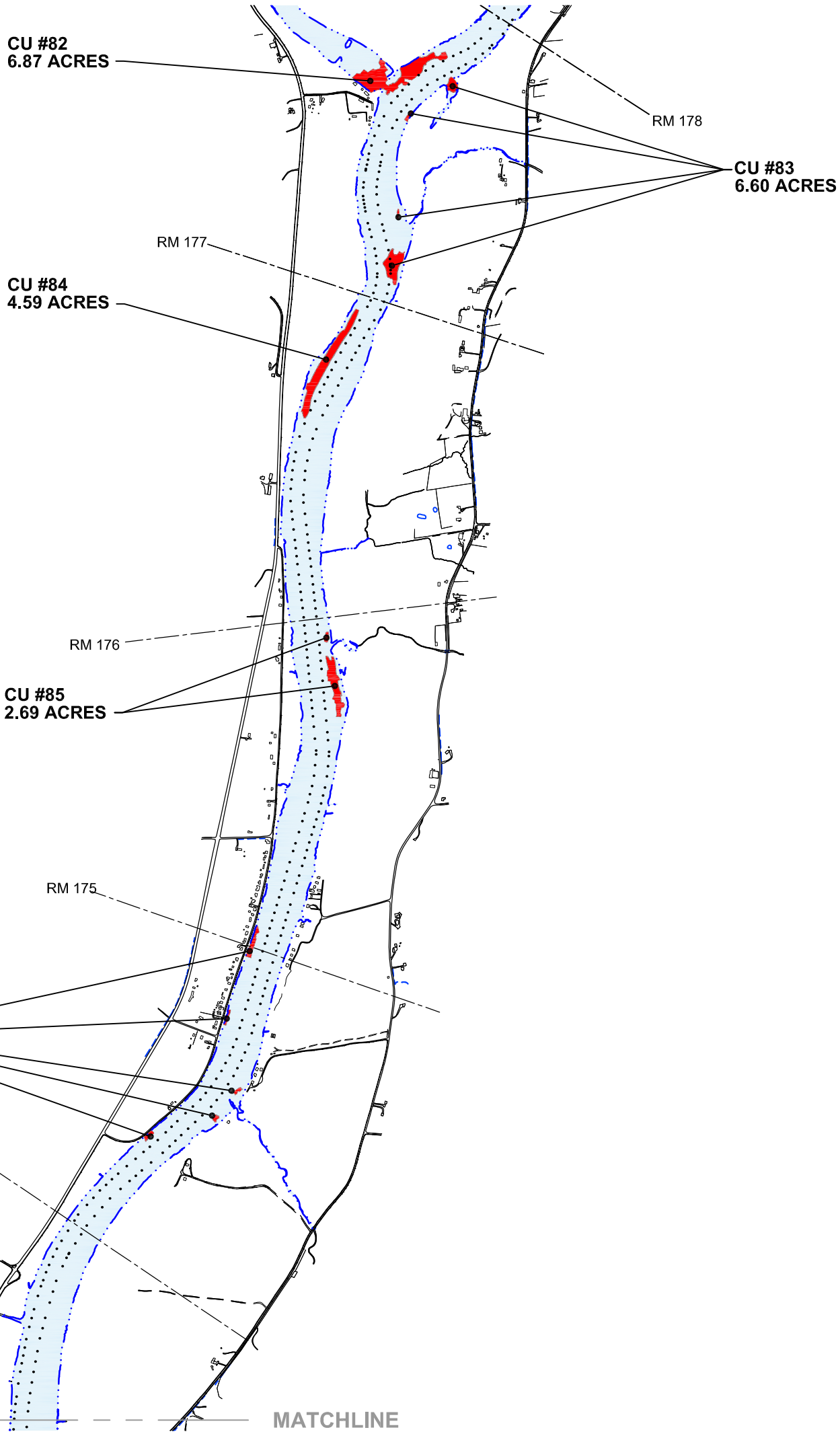
ARCADIS

FIGURE
1-1

CITY: SYRACUSE, NY DIV/GROUP: ENVCAD DB: L.POSENAUER LD: L.POSENAUER PIC:(Opt) PM: C.GUEST TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
V:\ENVCAD\SYRACUSE\ACT\C\B0031087\0003\04810\2014FDR\31087B02.dwg LAYOUT: 1-2A SAVED: 11/21/2013 10:42 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: -- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 11/21/2013 10:48 AM BY: POSENAUER, LISA

XREFS:
XBM-MAJR
XBM-MINR
XRV-NC01
XRV-CU01

REACH 5
STILLWATER POOL



LEGEND:

- CERTIFICATION UNITS
- SHORELINE
- NAVIGATION CHANNEL

0 2000' 4000'
GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
HUDSON RIVER PCBs SUPERFUND SITE
PHASE 2 FINAL DESIGN REPORT
FOR CU85 THROUGH CU96

PHASE 2 CERTIFICATION UNITS
85 THROUGH 96

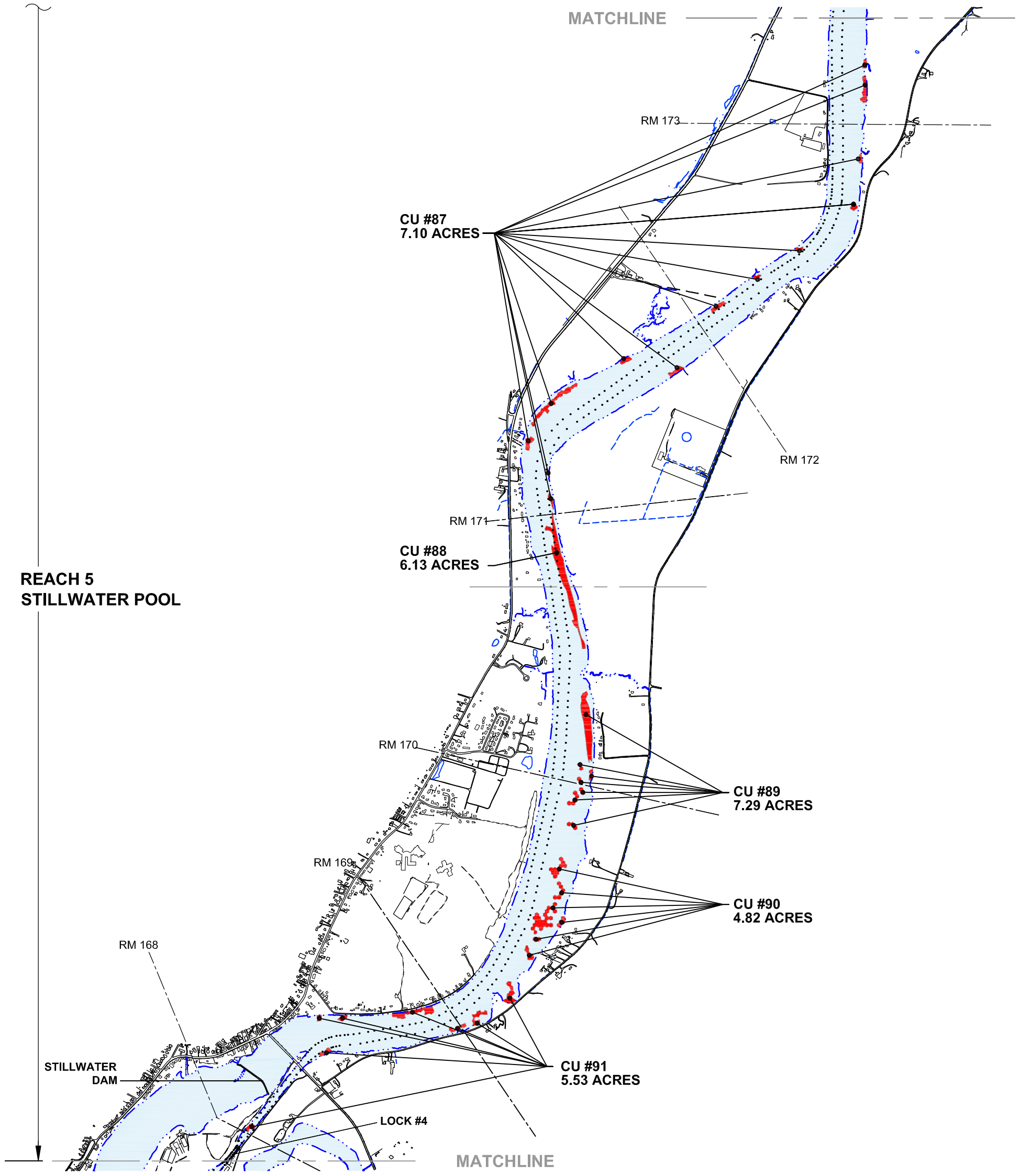
ARCADIS

FIGURE
1-2a

CITY: SYRACUSE, NY DIV/GROUP: ENVCAD DB: L.POSENAUER LD: L.POSENAUER PIC:(Opt) PM: C.GUEST TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
V:\ENVCAD\SYRACUSE\ACT\C\B0031087\0003\04810\2014FDR\31087B02.dwg LAYOUT: 1-2B SAVED: 11/21/2013 10:42 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: -- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 11/21/2013 10:48 AM BY: POSENAUER, LISA

XREFS:
XBM-MAJR
XBM-MINR
XRV-NC01
XRV-CU01

REACH 5
STILLWATER POOL



LEGEND:

- CERTIFICATION UNITS
- SHORELINE
- NAVIGATION CHANNEL

0 2000' 4000'
GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
HUDSON RIVER PCBs SUPERFUND SITE
PHASE 2 FINAL DESIGN REPORT
FOR CU85 THROUGH CU96

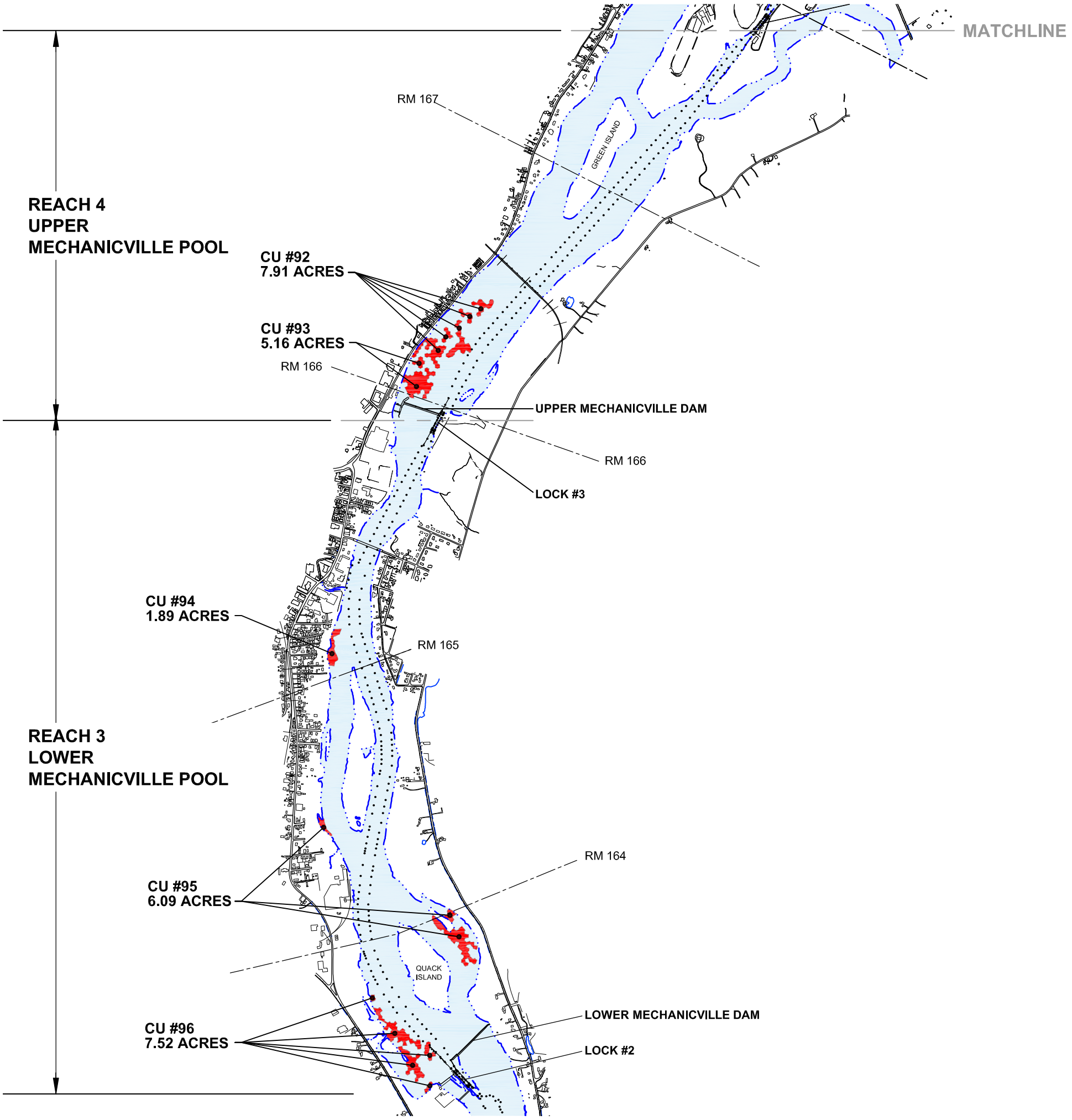
PHASE 2 CERTIFICATION UNITS
85 THROUGH 96

ARCADIS

FIGURE
1-2b

CITY: SYRACUSE, NY DIV/GROUP: ENVCAD DB: L.POSENAUER LD: L.POSENAUER PIC:(Opt) PM: C.GUEST TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
V:\ENVCAD\SYRACUSE\ACT\C\B0031087\0003\04810\2014FDR\31087B02.dwg LAYOUT: 1-2C SAVED: 11/21/2013 10:42 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: —- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 11/21/2013 10:47 AM BY: POSENAUER, LISA

XREFS:
XBM-MAJR
XBM-MINR
XRV-NC01
XRV-CU01



LEGEND:

- CERTIFICATION UNITS
- SHORELINE
- NAVIGATION CHANNEL

0 2000' 4000'
GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
HUDSON RIVER PCBs SUPERFUND SITE
PHASE 2 FINAL DESIGN REPORT FOR CU85 THROUGH CU96

PHASE 2 CERTIFICATION UNITS 85 THROUGH 96

ARCADIS

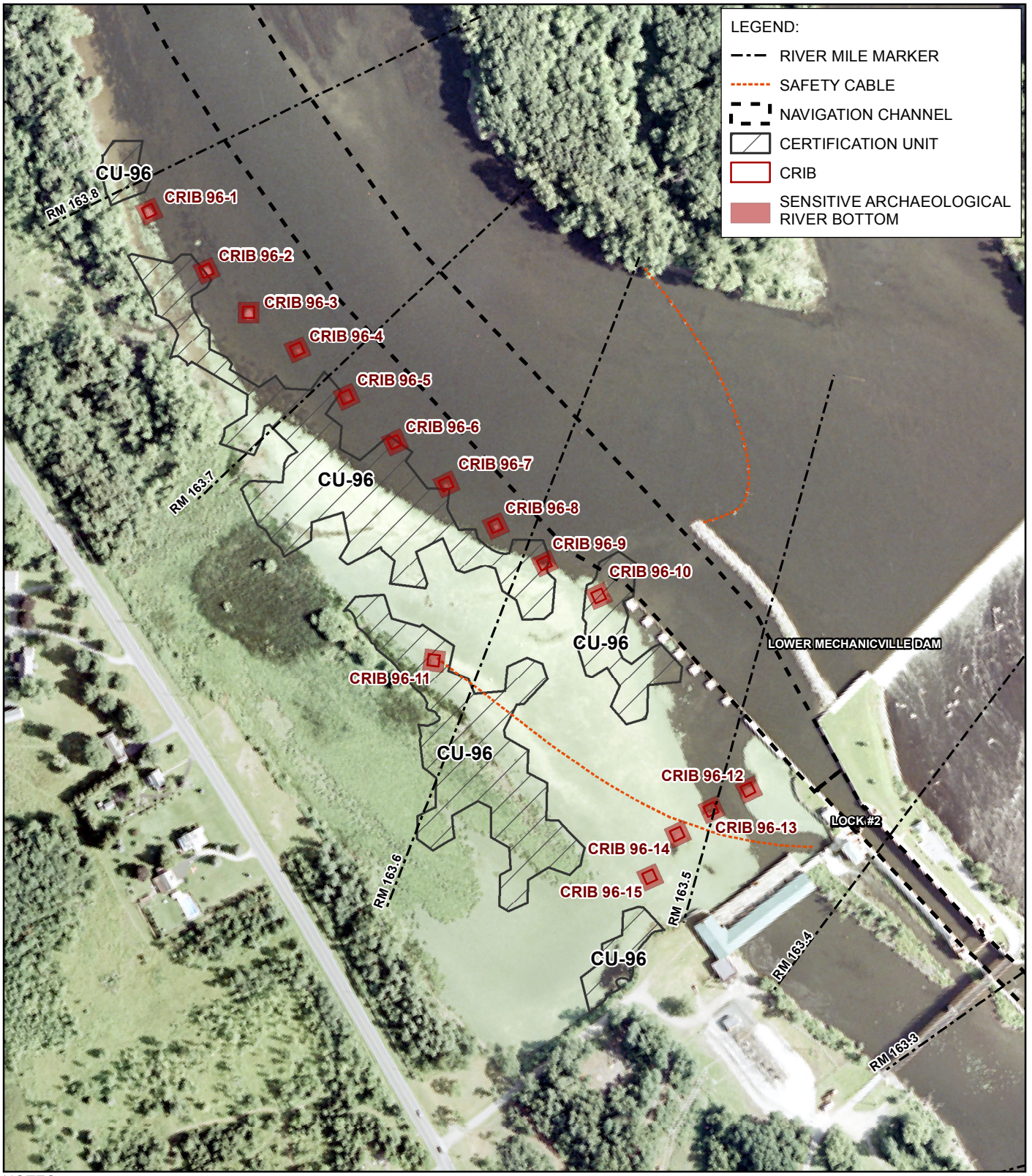
FIGURE
1-2c

Figure 1-3a - Observed Eagle Nest Locations – Reach 3

Redacted

Figure 1-3b - Observed Eagle Nest Locations – Reach 3

Redacted



NOTES:

1. LOCATIONS OF CRIBS BASED ON SURVEY BY CLE IN 2013, WHERE AVAILABLE, AND REVIEW OF AERIAL PHOTOGRAPHY FOR THOSE NOT SURVEYED IN 2013.
2. SENSITIVE ARCHAEOLOGICAL RIVER BOTTOM ESTABLISHED BY APPLYING A 10-FOOT BUFFER AROUND THE ESTIMATED CRIB LOCATIONS. DREDGING WILL NOT BE CONDUCTED WITHIN THE SENSITIVE ARCHAEOLOGICAL RIVER BOTTOM AREA UNLESS APPROVED BY EPA.

0 300 600 Feet

GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
HUDSON RIVER PCBs SUPERFUND SITE
PHASE 2 FINAL DESIGN REPORT
FOR CU85 THROUGH CU96

SENSITIVE ARCHAEOLOGICAL RIVER BOTTOM - CU96

ARCADIS

FIGURE
2-1