

APPENDIX I  
ESTIMATE RIVER VELOCITIES DURING  
DREDGING

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## **APPENDIX I**

### **ESTIMATE RIVER VELOCITIES DURING DREDGING**

#### **I.1 INTRODUCTION**

In order to explore the potential relationship between river velocity and release of polychlorinated biphenyls (PCBs) during dredging that is described in Section 5, the calibrated Upper Hudson River hydrodynamic model was used to provide estimates of velocity at locations dredged. This model was developed in 2005 by Quantitative Environmental Analysis, LLC (QEA) to support the design of the Upper Hudson River dredging program and is based on the Environmental Fluid Dynamics Code (EFDC) supported by the U.S. Environmental Protection Agency (EPA) (<http://epa.gov/athens/wwqtsc/html/efdc.html>). It calculates depth-averaged velocity on a grid that averages about 33 feet by 157 feet. A detail description of the model can be found in Phase 1 Intermediate Design Report (QEA 2005).

The following sections briefly summarize the refinements to the model made to simulate river conditions during Phase 1 dredging as well as the methodology to compute daily velocities where dredging occurred.

#### **I.2 UPDATE IN UPPER HUDSON RIVER HYDRODYNAMIC MODEL**

This Upper Hudson River hydrodynamic model was extended to 2009 with a few additions in order to compute river velocities during Phase 1 dredging in Thompson Island Pool:

- A small portion of the river bottom bathymetry was updated using multi-beam data conducted by OSI in 2005 that were not available when the hydrodynamic model was initially constructed. This update resulted in minimal change to model results. Hence, the model calibration remained the same.
- Hourly inflows were generated using U.S. Geological Survey 15-minute real time flow at Fort Edward and tributaries.
- The rock dike located at the upstream of the East Channel of Rogers Island (Figure I-1) was simulated as a “thin barrier” through which there is zero flux. The daily discharge through the rock dike was assigned based on flow data collected downstream of the rock dike by the dredging contractor.

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- Sheet piling at Certification Unit (CU) 18 in the East Chanel of Griffin Island (Figure I-1) was also simulated as a thin barrier. This barrier was established on July 10 and dismantled on August 20 to approximate the in-river activities.

### **I.3 CALCULATE AVERAGE VELOCITY DURING DREDGING**

The daily dredge footprint determined from the dredging contractor's DREDGEPACK® software (see Appendix G for details) was overlain on the model grid. The daily-average velocity for the grid cells under the dredge footprint were averaged and recorded for each CU and each day of the dredging program. These results can be found in Table I-1. The velocities were combined with the dredging information to evaluate the impact of velocity on PCB release (see Section 5).

### **I.4 REFERENCE**

Quantitative Environmental Analysis, LLC. 2005. Phase 1 Intermediate Design Report  
Attachment E – Dredge Resuspension Model, August 2005

# TABLES

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**Table I-1  
Summary of Daily Average Velocities by CU During Dredging**

| Date      | Average Velocity (m/s) |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-----------|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|           | CU01                   | CU02 | CU03 | CU04 | CU05 | CU06 | CU07 | CU08 | CU09 | CU10 | CU11 | CU12 | CU13 | CU14 | CU15 | CU16 | CU17 | CU18 |
| 5/15/2009 |                        |      |      |      |      |      |      |      | 0.40 |      |      |      |      |      |      |      |      |      |
| 5/16/2009 |                        |      |      |      |      |      |      |      | 0.52 |      |      |      |      |      |      |      |      |      |
| 5/17/2009 |                        |      |      |      |      |      |      |      |      | 0.55 |      |      |      |      |      |      |      |      |
| 5/18/2009 |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 5/19/2009 |                        |      |      |      |      |      |      |      |      | 0.72 |      |      |      |      |      |      |      |      |
| 5/20/2009 |                        |      |      |      |      |      |      |      |      | 0.64 |      |      |      |      |      |      |      |      |
| 5/21/2009 |                        |      |      |      |      |      |      |      | 0.62 | 0.63 |      |      |      |      |      |      |      |      |
| 5/22/2009 |                        |      |      |      |      |      |      |      | 0.65 | 0.67 |      |      |      |      |      |      |      |      |
| 5/23/2009 |                        |      |      |      |      |      |      |      | 0.77 | 0.77 |      |      |      |      |      |      |      |      |
| 5/24/2009 |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 5/25/2009 |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 5/26/2009 |                        |      |      |      |      |      |      | 0.47 | 0.64 | 0.65 |      |      |      |      |      |      |      |      |
| 5/27/2009 |                        |      |      |      |      |      |      |      | 0.66 | 0.61 |      |      |      |      |      |      |      |      |
| 5/28/2009 |                        |      |      |      |      |      |      |      | 0.67 | 0.60 |      |      |      |      |      |      |      |      |
| 5/29/2009 |                        |      |      |      |      |      |      |      |      |      |      |      |      | 0.34 | 0.36 |      |      |      |
| 5/30/2009 |                        |      |      |      |      |      |      |      |      |      |      |      |      | 0.34 |      |      |      |      |
| 5/31/2009 |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 6/1/2009  | 0.00                   | 0.08 |      |      |      |      |      |      | 0.54 | 0.58 |      |      |      |      |      |      |      |      |
| 6/2/2009  | 0.06                   | 0.13 |      |      |      |      |      |      | 0.52 |      |      |      |      |      |      |      |      |      |
| 6/3/2009  | 0.12                   | 0.17 |      |      |      |      |      |      | 0.45 |      |      |      |      |      |      |      |      |      |
| 6/4/2009  | 0.12                   | 0.14 |      |      |      |      |      |      | 0.47 |      |      |      |      |      |      |      |      |      |
| 6/5/2009  | 0.13                   | 0.10 |      |      |      |      |      |      | 0.57 |      |      |      |      |      |      |      |      |      |
| 6/6/2009  | 0.00                   | 0.04 |      |      |      |      |      |      | 0.48 |      |      |      |      |      |      |      |      |      |
| 6/7/2009  |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 6/8/2009  | 0.03                   | 0.05 |      |      | 0.47 | 0.47 |      |      | 0.28 |      |      |      |      |      |      |      |      |      |
| 6/9/2009  | 0.02                   | 0.04 |      |      | 0.56 |      |      |      | 0.48 |      |      |      |      |      |      |      |      |      |
| 6/10/2009 | 0.01                   | 0.03 | 0.03 |      | 0.58 | 0.61 |      |      | 0.50 | 0.36 |      |      |      |      |      |      |      |      |
| 6/11/2009 | 0.03                   | 0.04 |      |      | 0.61 | 0.60 |      |      | 0.56 | 0.38 |      |      | 0.28 |      |      |      |      |      |
| 6/12/2009 | 0.02                   | 0.03 |      |      | 0.55 | 0.56 |      |      |      |      |      |      |      |      |      |      |      |      |
| 6/13/2009 | 0.03                   | 0.04 |      |      | 0.68 | 0.79 |      |      |      |      |      |      |      |      |      |      |      |      |
| 6/14/2009 |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 6/15/2009 | 0.03                   | 0.04 |      |      | 0.67 | 0.72 |      |      |      |      |      |      |      |      |      |      |      |      |
| 6/16/2009 | 0.03                   | 0.04 |      |      | 0.61 | 0.67 | 0.56 |      |      |      |      |      |      |      |      |      |      |      |
| 6/17/2009 | 0.04                   | 0.05 | 0.06 |      | 0.71 | 0.79 |      |      |      |      |      |      |      |      |      |      |      |      |
| 6/18/2009 | 0.06                   | 0.05 |      |      | 0.67 | 0.78 |      |      |      |      |      |      |      |      |      |      |      |      |
| 6/19/2009 | 0.03                   | 0.04 | 0.04 |      | 0.72 | 0.88 |      |      |      |      |      | 0.01 |      |      |      |      |      |      |
| 6/20/2009 | 0.03                   | 0.03 |      |      | 0.60 |      |      |      |      |      |      | 0.07 | 0.31 |      |      |      |      |      |
| 6/21/2009 |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 6/22/2009 | 0.04                   | 0.03 |      |      | 0.63 |      |      |      |      |      |      | 0.15 | 0.38 |      |      |      |      |      |
| 6/23/2009 | 0.02                   | 0.02 | 0.02 |      | 0.72 |      |      |      |      |      |      | 0.25 |      |      |      |      |      |      |
| 6/24/2009 | 0.03                   | 0.03 |      |      | 0.68 |      |      |      |      |      |      | 0.19 | 0.13 |      |      |      |      |      |
| 6/25/2009 | 0.05                   | 0.04 |      |      | 0.68 |      | 0.76 |      |      |      |      | 0.12 |      |      |      |      |      | 0.37 |
| 6/26/2009 | 0.04                   | 0.04 |      |      | 0.74 | 0.88 | 0.75 |      |      |      |      | 0.20 |      |      |      |      |      | 0.36 |
| 6/27/2009 | 0.05                   | 0.04 |      |      | 0.74 | 0.80 |      |      |      | 0.63 |      |      |      |      |      |      |      | 0.34 |
| 6/28/2009 |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 6/29/2009 | 0.04                   | 0.03 |      |      | 0.68 | 0.78 |      |      |      |      |      |      |      |      |      |      |      | 0.35 |
| 6/30/2009 | 0.05                   | 0.04 |      |      | 0.65 | 0.79 |      |      |      |      |      |      |      |      |      |      |      | 0.33 |
| 7/1/2009  | 0.05                   | 0.03 |      |      | 0.62 | 0.69 |      |      |      |      |      |      |      |      |      |      |      | 0.25 |
| 7/2/2009  | 0.04                   | 0.03 |      |      | 0.64 | 0.69 |      |      |      |      |      |      |      |      |      |      |      | 0.24 |
| 7/3/2009  |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 7/4/2009  |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 7/5/2009  |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 7/6/2009  | 0.04                   | 0.03 | 0.03 |      | 0.63 | 0.69 |      |      |      |      |      |      |      |      |      |      |      | 0.23 |
| 7/7/2009  | 0.05                   | 0.04 | 0.03 |      | 0.53 | 0.54 | 0.43 |      |      |      |      |      |      |      |      |      |      | 0.19 |
| 7/8/2009  | 0.01                   | 0.01 | 0.02 |      | 0.51 | 0.53 | 0.41 |      |      |      |      |      |      |      |      |      |      | 0.18 |
| 7/9/2009  | 0.01                   | 0.01 | 0.01 |      | 0.59 | 0.53 | 0.52 |      |      |      |      |      |      |      |      |      |      | 0.12 |
| 7/10/2009 | 0.02                   | 0.02 | 0.02 |      | 0.48 | 0.52 | 0.43 |      |      |      |      |      |      |      |      |      |      | 0.14 |
| 7/11/2009 | 0.01                   | 0.01 | 0.01 |      | 0.50 | 0.53 | 0.42 |      |      |      |      |      |      |      |      |      |      | 0.14 |
| 7/12/2009 |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 7/13/2009 | 0.02                   | 0.02 | 0.02 |      | 0.59 | 0.57 | 0.52 |      |      |      |      |      |      |      |      |      |      | 0.18 |
| 7/14/2009 | 0.03                   | 0.02 | 0.02 |      | 0.59 | 0.52 | 0.45 |      |      |      |      |      |      |      |      |      |      | 0.11 |
| 7/15/2009 | 0.03                   | 0.02 | 0.02 | 0.02 | 0.62 | 0.52 | 0.48 |      |      |      |      |      |      |      |      |      |      | 0.11 |
| 7/16/2009 |                        | 0.02 | 0.02 | 0.02 |      | 0.49 | 0.46 |      |      |      |      |      |      |      |      |      |      | 0.10 |
| 7/17/2009 |                        |      | 0.02 | 0.02 |      | 0.48 | 0.36 |      |      |      |      |      |      |      |      |      |      | 0.08 |
| 7/18/2009 |                        | 0.02 | 0.02 | 0.02 |      | 0.47 | 0.33 |      |      |      |      |      |      |      |      |      |      | 0.08 |
| 7/19/2009 |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 0.18 |
| 7/20/2009 |                        | 0.01 | 0.01 | 0.01 |      | 0.39 | 0.40 | 0.33 |      |      |      |      |      |      |      |      |      | 0.03 |
| 7/21/2009 | 0.00                   | 0.03 | 0.03 |      |      | 0.41 | 0.39 | 0.25 |      |      |      |      |      |      |      |      |      | 0.09 |
| 7/22/2009 | 0.01                   |      | 0.03 |      |      | 0.39 | 0.40 | 0.31 |      |      |      |      |      |      |      |      |      | 0.04 |
| 7/23/2009 | 0.01                   |      | 0.04 | 0.03 |      | 0.38 | 0.40 | 0.29 |      |      |      |      |      |      |      |      |      | 0.13 |
| 7/24/2009 | 0.00                   |      | 0.03 |      |      | 0.32 | 0.34 | 0.28 |      |      |      |      |      |      |      |      |      | 0.11 |

**Table I-1  
Summary of Daily Average Velocities by CU During Dredging**

| Date      | Average Velocity (m/s) |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-----------|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|           | CU01                   | CU02 | CU03 | CU04 | CU05 | CU06 | CU07 | CU08 | CU09 | CU10 | CU11 | CU12 | CU13 | CU14 | CU15 | CU16 | CU17 | CU18 |
| 7/25/2009 | 0.01                   |      | 0.03 |      |      | 0.37 | 0.29 | 0.27 |      |      |      |      |      |      |      |      |      | 0.10 |
| 7/26/2009 |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 7/27/2009 | 0.01                   |      | 0.02 | 0.02 |      | 0.37 | 0.23 | 0.25 |      |      |      |      |      |      |      |      |      | 0.09 |
| 7/28/2009 | 0.03                   | 0.04 | 0.03 |      |      |      | 0.21 | 0.21 |      |      |      |      |      |      |      |      |      | 0.08 |
| 7/29/2009 | 0.03                   | 0.03 | 0.03 |      |      | 0.37 | 0.23 | 0.31 |      |      |      |      |      |      |      |      |      | 0.07 |
| 7/30/2009 | 0.02                   |      | 0.02 |      |      |      | 0.34 | 0.33 | 0.39 |      |      |      |      |      |      |      |      | 0.08 |
| 7/31/2009 |                        |      | 0.02 |      |      | 0.58 | 0.60 | 0.45 |      |      |      |      |      |      |      |      |      | 0.15 |
| 8/1/2009  |                        | 0.01 | 0.01 |      |      |      | 0.71 | 0.45 | 0.52 |      |      |      |      |      |      |      |      | 0.14 |
| 8/2/2009  |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 8/3/2009  | 0.01                   | 0.02 | 0.02 |      |      |      | 0.77 | 0.41 |      |      |      |      |      |      |      |      | 0.17 | 0.22 |
| 8/4/2009  | 0.02                   |      | 0.02 | 0.02 |      | 0.68 | 0.65 | 0.41 |      |      |      |      |      |      |      |      | 0.11 | 0.21 |
| 8/5/2009  | 0.03                   |      | 0.04 | 0.04 |      |      | 0.47 | 0.43 |      |      |      |      |      |      |      |      | 0.16 | 0.14 |
| 8/6/2009  | 0.02                   | 0.02 | 0.02 | 0.02 | 0.69 |      | 0.42 | 0.49 |      |      |      |      |      |      |      |      | 0.19 | 0.05 |
| 8/7/2009  | 0.02                   |      | 0.03 |      | 0.63 |      |      | 0.28 | 0.82 |      | 0.63 |      |      |      |      |      | 0.19 | 0.05 |
| 8/8/2009  |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 8/9/2009  |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 8/10/2009 |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 8/11/2009 | 0.02                   |      |      |      | 0.60 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 8/12/2009 | 0.04                   |      |      |      | 0.62 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 8/13/2009 | 0.01                   | 0.01 | 0.01 |      | 0.63 |      |      | 0.50 |      |      |      |      |      |      |      |      |      |      |
| 8/14/2009 | 0.02                   | 0.01 | 0.01 |      | 0.56 | 0.64 |      | 0.38 | 0.32 |      |      |      |      |      |      |      |      |      |
| 8/15/2009 | 0.01                   | 0.01 |      |      | 0.48 | 0.48 |      | 0.28 |      |      |      |      |      |      |      |      |      |      |
| 8/16/2009 |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 8/17/2009 | 0.00                   | 0.00 | 0.01 |      | 0.42 | 0.42 |      | 0.24 | 0.20 |      |      |      |      |      |      |      | 0.08 |      |
| 8/18/2009 | 0.00                   | 0.00 |      |      | 0.47 | 0.42 |      | 0.20 |      |      |      |      |      |      |      |      | 0.06 |      |
| 8/19/2009 | 0.00                   | 0.00 |      |      | 0.45 | 0.45 | 0.42 | 0.19 |      |      |      |      |      |      |      |      | 0.07 |      |
| 8/20/2009 | 0.01                   | 0.01 | 0.00 | 0.00 | 0.44 | 0.37 |      | 0.11 |      |      |      |      |      |      |      |      | 0.06 |      |
| 8/21/2009 | 0.01                   | 0.02 |      | 0.02 | 0.42 | 0.42 | 0.39 | 0.35 | 0.07 |      |      |      |      |      |      |      | 0.08 |      |
| 8/22/2009 | 0.00                   | 0.01 | 0.01 | 0.01 | 0.43 | 0.40 | 0.38 |      |      |      |      |      |      |      |      |      | 0.10 | 0.10 |
| 8/23/2009 |                        |      |      |      | 0.57 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 8/24/2009 | 0.01                   | 0.01 | 0.01 | 0.01 | 0.54 | 0.51 |      |      |      |      |      |      |      |      |      |      | 0.13 |      |
| 8/25/2009 | 0.01                   | 0.01 | 0.01 | 0.01 | 0.50 | 0.46 | 0.33 |      |      |      |      |      |      |      |      |      | 0.08 |      |
| 8/26/2009 | 0.00                   | 0.02 | 0.02 | 0.02 | 0.53 | 0.49 | 0.37 |      |      |      |      |      |      |      |      |      | 0.11 | 0.08 |
| 8/27/2009 | 0.02                   |      | 0.03 | 0.03 | 0.61 | 0.57 | 0.44 |      |      |      |      |      |      |      |      |      |      | 0.14 |
| 8/28/2009 | 0.01                   | 0.01 | 0.01 | 0.02 |      | 0.63 | 0.54 |      |      |      |      |      |      |      |      |      |      | 0.16 |
| 8/29/2009 | 0.00                   | 0.00 | 0.00 | 0.00 |      | 0.56 | 0.46 |      |      |      |      |      |      |      |      |      |      | 0.15 |
| 8/30/2009 |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 8/31/2009 | 0.02                   | 0.02 | 0.02 | 0.02 | 0.70 | 0.63 | 0.53 |      |      |      |      |      |      |      |      |      |      | 0.16 |
| 9/1/2009  | 0.01                   | 0.02 | 0.02 | 0.02 | 0.70 | 0.62 | 0.56 | 0.11 |      |      |      |      |      |      |      |      |      | 0.17 |
| 9/2/2009  | 0.03                   |      | 0.03 |      | 0.76 | 0.73 | 0.64 | 0.19 |      |      |      |      |      |      |      |      |      | 0.20 |
| 9/3/2009  | 0.02                   | 0.01 | 0.01 | 0.01 | 0.66 | 0.70 | 0.63 |      |      |      |      |      |      |      |      |      |      | 0.20 |
| 9/4/2009  | 0.03                   |      | 0.02 | 0.02 | 0.65 | 0.70 | 0.56 |      |      |      |      |      |      |      |      |      |      | 0.18 |
| 9/5/2009  |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 9/6/2009  |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 9/7/2009  |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 9/8/2009  | 0.02                   | 0.02 | 0.01 | 0.02 | 0.59 | 0.65 | 0.51 |      |      |      |      |      |      |      |      |      | 0.10 | 0.17 |
| 9/9/2009  | 0.03                   | 0.02 | 0.02 | 0.02 | 0.53 | 0.38 | 0.32 | 0.42 |      |      |      |      |      |      |      |      | 0.08 | 0.13 |
| 9/10/2009 | 0.01                   |      | 0.01 | 0.01 | 0.47 |      | 0.18 | 0.33 |      |      | 0.02 | 0.02 |      |      |      |      | 0.12 | 0.12 |
| 9/11/2009 | 0.01                   |      | 0.01 | 0.01 | 0.41 |      | 0.22 | 0.28 |      |      | 0.01 | 0.01 |      |      |      |      | 0.09 | 0.09 |
| 9/12/2009 | 0.01                   |      | 0.01 |      | 0.36 |      |      | 0.23 |      |      |      |      |      |      |      |      | 0.09 | 0.08 |
| 9/13/2009 |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 9/14/2009 | 0.01                   |      | 0.01 | 0.01 | 0.37 |      | 0.19 | 0.20 |      |      |      |      |      |      |      |      | 0.08 | 0.09 |
| 9/15/2009 | 0.02                   | 0.02 | 0.01 |      |      |      | 0.18 | 0.18 | 0.16 |      |      |      |      |      |      |      |      | 0.09 |
| 9/16/2009 | 0.01                   | 0.01 | 0.01 | 0.01 |      |      | 0.26 | 0.23 |      |      |      |      |      |      |      |      | 0.09 | 0.09 |
| 9/17/2009 | 0.01                   | 0.01 | 0.01 |      |      |      |      | 0.18 | 0.27 |      |      |      |      |      |      |      |      | 0.08 |
| 9/18/2009 | 0.01                   | 0.02 | 0.01 | 0.02 |      | 0.42 |      | 0.08 |      |      |      |      |      |      |      |      |      |      |
| 9/19/2009 | 0.02                   | 0.01 | 0.01 | 0.01 |      | 0.41 |      | 0.06 |      |      |      |      |      |      |      |      |      |      |
| 9/20/2009 |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 9/21/2009 |                        | 0.00 | 0.00 | 0.01 |      | 0.43 | 0.13 | 0.10 |      |      | 0.02 |      |      |      |      |      |      |      |
| 9/22/2009 |                        | 0.01 |      | 0.01 |      | 0.35 |      | 0.07 |      |      |      |      |      |      |      |      |      |      |
| 9/23/2009 |                        | 0.01 | 0.01 | 0.01 |      | 0.35 | 0.36 | 0.10 |      |      | 0.01 | 0.01 |      |      |      |      |      |      |
| 9/24/2009 |                        | 0.01 | 0.01 | 0.01 |      | 0.29 | 0.31 | 0.16 |      |      |      |      |      |      |      |      |      | 0.07 |
| 9/25/2009 |                        |      | 0.01 | 0.01 |      |      | 0.32 | 0.28 |      |      |      |      |      |      |      |      |      | 0.10 |
| 9/26/2009 |                        | 0.01 | 0.00 | 0.01 |      |      | 0.29 | 0.27 |      |      |      | 0.20 |      |      |      |      |      |      |
| 9/27/2009 |                        |      |      | 0.01 |      |      | 0.40 |      |      |      |      |      |      |      |      |      |      |      |
| 9/28/2009 | 0.01                   |      | 0.01 |      |      |      | 0.35 | 0.24 |      |      |      |      |      |      |      |      |      |      |
| 9/29/2009 | 0.01                   | 0.01 | 0.01 |      |      |      | 0.43 | 0.36 |      |      |      |      |      |      |      |      |      |      |
| 9/30/2009 | 0.02                   |      | 0.02 |      |      |      | 0.37 | 0.28 |      |      |      |      |      |      |      |      |      |      |
| 10/1/2009 | 0.02                   |      | 0.02 |      |      |      | 0.41 | 0.09 |      |      |      |      |      |      |      |      |      |      |
| 10/2/2009 | 0.03                   | 0.02 | 0.02 |      |      |      | 0.43 | 0.14 |      |      |      |      |      |      |      |      |      |      |
| 10/3/2009 | 0.02                   | 0.03 | 0.03 |      |      |      | 0.34 | 0.16 |      |      |      |      |      |      |      |      |      | 0.09 |

**Table I-1  
Summary of Daily Average Velocities by CU During Dredging**

| Date       | Average Velocity (m/s) |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------------|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|            | CU01                   | CU02 | CU03 | CU04 | CU05 | CU06 | CU07 | CU08 | CU09 | CU10 | CU11 | CU12 | CU13 | CU14 | CU15 | CU16 | CU17 | CU18 |
| 10/4/2009  |                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 10/5/2009  | 0.02                   |      | 0.02 |      |      |      | 0.48 | 0.17 |      |      |      |      |      |      |      |      |      | 0.13 |
| 10/6/2009  | 0.01                   | 0.02 | 0.02 |      |      |      | 0.51 | 0.32 |      |      |      |      |      |      |      |      |      | 0.15 |
| 10/7/2009  | 0.02                   | 0.03 | 0.02 | 0.02 |      |      | 0.54 | 0.50 |      |      |      |      |      |      |      |      |      | 0.16 |
| 10/8/2009  | 0.01                   | 0.01 | 0.01 | 0.01 |      |      | 0.60 | 0.35 |      |      |      |      |      |      |      |      |      | 0.21 |
| 10/9/2009  | 0.00                   |      |      | 0.01 |      |      | 0.51 | 0.18 |      |      |      |      |      |      |      |      |      | 0.23 |
| 10/10/2009 | 0.01                   |      |      | 0.01 |      |      | 0.42 | 0.29 |      |      |      |      |      |      |      |      |      | 0.20 |
| 10/11/2009 | 0.03                   |      |      | 0.03 |      |      |      | 0.37 |      |      |      |      |      |      |      |      |      |      |
| 10/12/2009 | 0.02                   |      |      | 0.02 |      |      | 0.68 | 0.41 |      |      |      |      |      |      |      |      |      |      |
| 10/13/2009 | 0.01                   |      |      | 0.02 |      |      |      | 0.26 | 0.69 |      |      |      |      |      |      |      |      |      |
| 10/14/2009 | 0.01                   |      |      | 0.02 |      |      |      | 0.26 |      |      |      |      |      |      |      |      |      | 0.17 |
| 10/15/2009 | 0.00                   |      |      | 0.03 |      |      |      |      |      | 0.04 |      |      |      |      |      |      |      | 0.16 |
| 10/16/2009 |                        |      |      | 0.01 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 10/17/2009 |                        |      |      | 0.02 |      |      | 0.46 |      |      |      |      |      |      |      |      |      |      |      |
| 10/18/2009 |                        |      |      | 0.04 |      |      | 0.34 |      |      | 0.04 | 0.04 |      |      |      |      |      |      | 0.15 |
| 10/19/2009 | 0.01                   |      |      | 0.02 |      |      |      | 0.09 |      |      |      |      |      |      |      |      |      | 0.12 |
| 10/20/2009 | 0.00                   |      |      | 0.01 |      |      |      | 0.11 |      | 0.03 | 0.02 |      |      |      |      |      |      | 0.14 |
| 10/21/2009 | 0.00                   |      |      |      |      |      |      | 0.22 |      |      |      |      |      |      |      |      |      | 0.13 |
| 10/22/2009 | 0.01                   |      |      |      |      |      |      | 0.16 |      |      |      |      |      |      |      |      |      | 0.13 |
| 10/23/2009 | 0.02                   |      |      |      |      |      |      | 0.10 |      |      |      |      |      |      |      |      |      |      |
| 10/24/2009 | 0.05                   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 0.16 |
| 10/25/2009 | 0.06                   |      |      | 0.04 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 10/26/2009 | 0.03                   |      |      | 0.02 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 10/27/2009 | 0.01                   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |

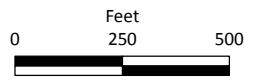
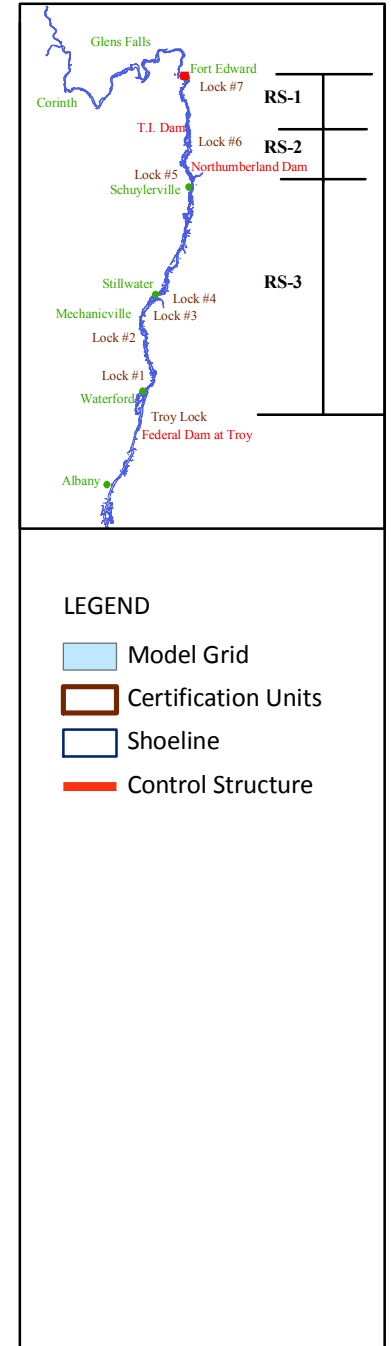
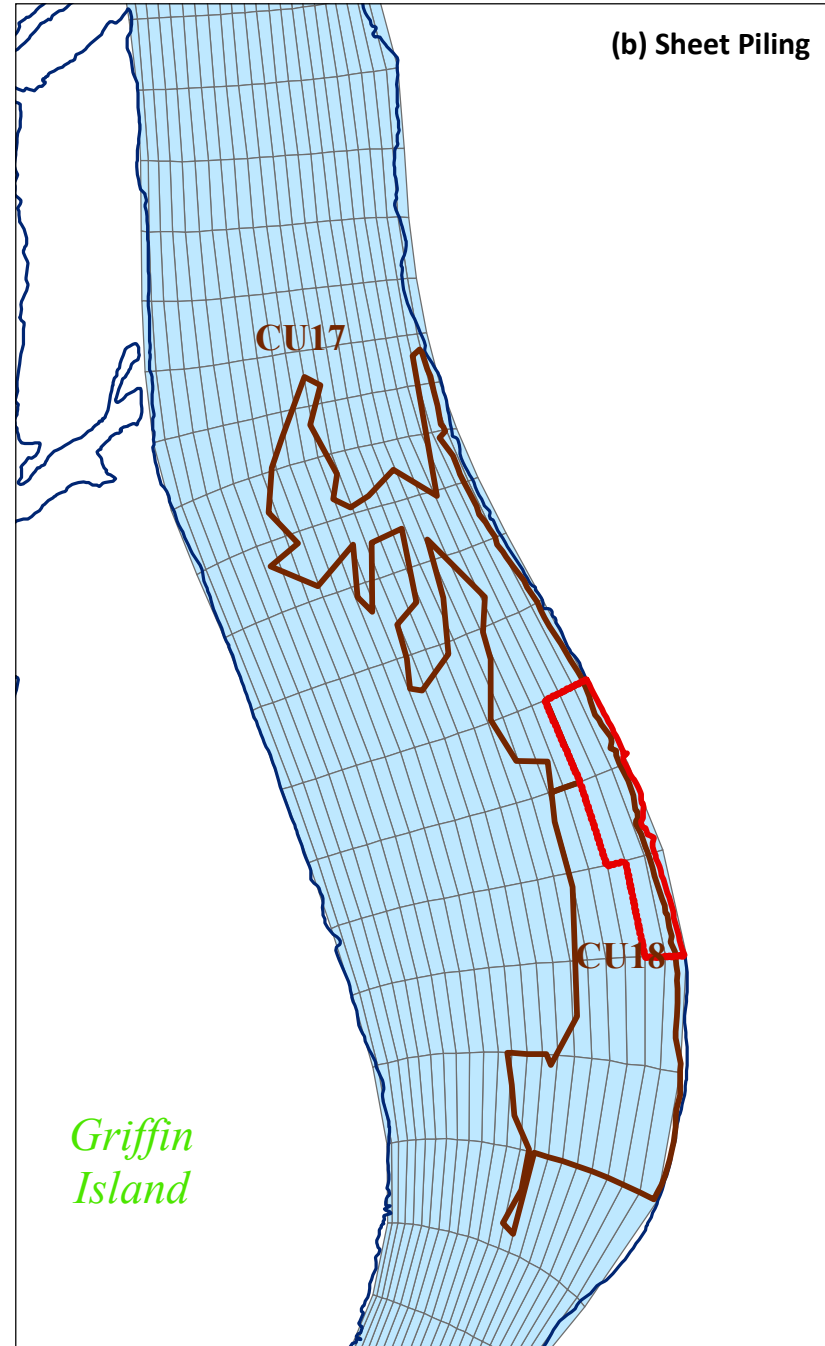
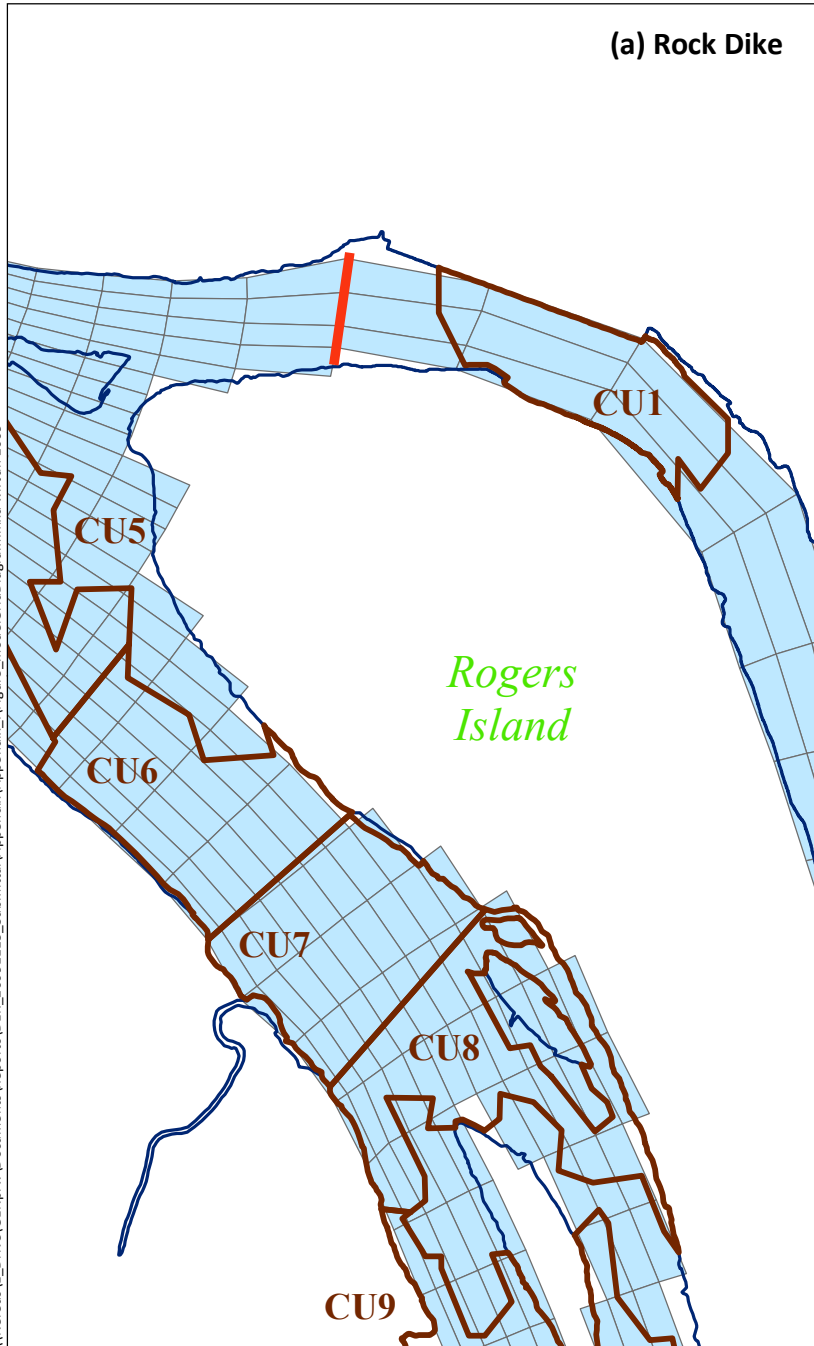
Notes:

1. River velocities were calculated by the Upper Hudson River hydrodynamic model.
2. Velocities shown in the table represent averaged daily velocities over daily bucket footprint (i.e., daily dredge area) by CU
3. Velocities at CU18 during 7/10-8/19 (sheetpiling period) represent velocities over dredge areas outside the sheetpiling

# FIGURES

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\\Nereus\E\_Drive\GENprw\Documents\Reports\DER\_2009\1115\_Submittal\Appendix\Appendix I\Figure\_modelGridDiagram.mxd wk Jan 2009



**Figure I-1**  
Locations of Rock Dike and Sheet Piling Areas in the Upper Hudson River Hydrodynamic Model Phase 1 Evaluation Report  
General Electric Company