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EA Engineering, P.C.
EA Science and Technology

10 September 2019

Ms. Brianna Scharf
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233-7011

RE: Operable Unit 5 Remedial Investigation Work Plan Addendum
Contract/Work Assignment No: D007624-33
Site/Spill No./Pin: Dzus Fastener Company, Inc., West Islip, New York (152033)

Dear Ms. Scharf:

This Work Plan Addendum supplements the *Operable Unit 5 Remedial Investigation/Feasibility Study Work Plan*[1] and describes the additional activities proposed to support the Remedial Investigation (RI) and Feasibility Study (FS) for Operable Unit 5 (OU5) of the Dzus Fastener Company, Inc. site (152033). OU5 encompasses the tidal portion of Willetts Creek and the surrounding floodplain.

The tidal area was formerly part of OU4, and sediment samples were collected during the OU4 RI in December 2017 and May 2018 (**Figure 1)**. Nine sediment cores (0–2 feet) were collected in December 2017. In May 2018, in the northern half of the tidal area, 39 additional sediment cores (0–4 feet) were collected. The initial phase of the OU5 RI sediment sampling was performed in April and May 2019 and 90 sediment cores were collected from 0 to 6 feet (**Figure 2**). Four background sediment cores were also collected from reference area creeks (**Figure 3**). The 2019 results of the laboratory analysis for cadmium and chromium confirm past observations of contamination in the tidal area sediment and expand the horizontal and vertical delineation. Since cadmium was identified as the primary contaminant of concern,[2] the following discussion focuses on cadmium observations.

Analytical results of all tidal area sediment sampling conducted to date were compared to New York State Department of Environmental Conservation (NYSDEC) saltwater sediment guidance values (SGV) for cadmium[3] (NYSDEC 2014), which consists of Class A (<1.2 milligrams per kilogram [mg/kg]), Class B (1.2 to 9.6 mg/kg), and Class C (>9.6 mg/kg) values (**Figures 4a,b,c**). The primary goal of the supplemental sampling and analysis presented herein is to eliminate samples that fall within the Class B range and reclassify them as either acceptable (Class A) or

[1] EA Engineering, P.C. and its affiliate EA Science and Technology (EA). 2019. *Operable Unit 5 Remedial Investigation/Feasibility Study Work Plan*. April.
[2] EA. 2018. *Remedial Investigation Report, Dzus Fastener Company, Inc. (152033), Operable Unit 4 – Lake Capri*. September.
[3] NYSDEC. 2014. *Screening and Assessment of Contaminated Sediment.* June.

toxic (Class C). Locations for supplemental sampling and evaluation were selected based on observations of cadmium concentrations in the top 6 inches that are considered Class B. Although sediments in some deeper locations may be considered Class B, it is the bioavailable fraction of cadmium in sediment to which an organism is exposed that is available for uptake and causes toxicity. The bioactive zone of the sediments is generally considered the top 6 inches (EPA 2015).[4]

The following sections provide information on the supplemental data collection needed to evaluate potential ecological risks in the tidal portion of Willetts Creek. The field sampling procedures and protocols, number of samples, as well as the quality assurance (QA)/quality control (QC) procedures, are provided in the Site-Specific Quality Assurance Project Plan (QAPP) Addendum provided as **Attachment A** to this Letter Work Plan. In addition, field investigation activities will be conducted in a manner consistent with the EA Generic Health and Safety Plan developed for work assignments conducted under Standby Contract No. D007624 (EA 2011).[5] Copies of sampling forms used during the field activities will be submitted to NYSDEC as part of the final report. Field and sampling procedures will be photographically documented.

1. SEDIMENT SAMPLE COLLECTION AND ANALYSIS

Sediment samples will be collected from a total of 45 locations in the tidal area (**Figures 4a,b,c**) and 4 reference area locations (**Figure 3**). Reference locations are the same as previously sampled during the 2019 coring event. EA will contact Dig Safely New York prior to the start of sampling work. Surface sediment samples will be collected using EA's 28-foot aluminum workboat. Sample locations will be identified in the field using a Trimble/RTK Marine GPS with an accuracy of approximately 1 meter. Full details on navigation and positioning methods were presented in the *Operable Unit 5 Remedial Investigation/Feasibility Study Work Plan*.

At each sampling location, water depth will be recorded in feet (to the nearest tenth of a foot) using the vessel's fathometer. Water depths will be converted to bed elevations referenced to the North American Vertical Datum of 1988 (NAVD88). In situ water quality data (temperature, dissolved oxygen (DO), pH, salinity, turbidity) will be recorded at each sampling location prior to sediment collection using a YSI ProDSS-2016 meter, or similar.

A medium Ponar or modified Van Veen grab sampler will be used to obtain sediment at each location and will be decontaminated between locations to prevent cross-contamination. After the boat is positioned on location and anchored, the sampler will be lowered to the bottom, triggered, and brought back onboard. To confirm sediments are anoxic, oxidation reduction potential (ORP) will be measured at each location with a redox probe. Undisturbed samples of surficial sediment (to a depth of 6 inches) will be removed from the grab sampler using stainless steel spoons and transferred to an aluminum pan for homogenization. Chemical analyses include cadmium and chromium, total organic carbon (TOC), grain size, and acid volatile sulfide (AVS)/simultaneously extracted metals (SEM).

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[4] EPA. 2015. *Determination of the Biologically Relevant Sampling Depth for Terrestrial and Aquatic Ecological Risk Assessments.* EPA/600/R-15/176 ERASC-015F October.

[5] EA. 2011. *Generic Health and Safety Plan for Work Assignments under NYSDEC Contract D007624.* October.

It is important that sediments submitted AVS/SEM analysis are not excessively exposed to oxygen. Therefore, sediment for AVS/SEM will be gathered prior to any other analyses and prior to homogenizing multiple grabs. The sediment container for AVS/SEM will be filled to the top and immediately capped. More than one grab sample will be required to obtain enough sediment for toxicity and will be homogenized on board. Each grab will be homogenized by mixing in a stainless-steel bowl (or similar container) until the sample appears consistent throughout. Sub-samples collected for bulk sediment chemistry analyses will be placed into the laboratory provided containers and sub-samples for ecotoxicology testing will be placed into 1-gallon plastic buckets. All samples will be stored in a refrigerated trailer prior to transport to the appropriate laboratory for testing. Non-disposable sampling equipment will be decontaminated prior to moving to the next location, with the protocols outlined in the Site-Specific QAPP Addendum.

At 21 sampling locations, 2-ft cores will be collected for toxicity characteristic leachate procedure (TCLP) for cadmium and chromium to characterize the sediments for disposal. The locations for TCLP testing were chosen based on observations of cadmium that exceeded 20 mg/kg and/or chromium concentrations that exceeded 100 mg/kg. The 2-ft cores will be collected with a piston corer fitted with cellulose acetate butyrate core liners.

Sediment samples will be placed in appropriate sample containers, sealed, and submitted under standard chain-of-custody procedures. The samples will be labeled, handled, and packaged following the procedures described in the EA Generic QAPP (EA 2011)[6] and Site-Specific QAPP Addendum (**Attachment A**). QA/QC samples will be collected at the frequency detailed in Table 1 of the Site-Specific QAPP Addendum.

Sediment samples for chemistry analysis[7] will be submitted to Con-Test Analytical Laboratory located in East Longmeadow, Massachusetts. Sediment for toxicity testing will be submitted to EA's toxicology laboratory in Hunt Valley, Maryland, for a 28-day toxicity study with *Leptocheirus plumulosus* for survival, growth, and reproduction.

Samples will be analyzed for cadmium and total chromium by U.S. Environmental Protection Agency (EPA) Method 6020 and in accordance with the NYSDEC Analytical Services Protocol. Sediment samples will also be analyzed for TOC by Llyod Kahn, grain size by American Society for Testing and Materials (ASTM) D422, AVS/SEM using EPA Method EPA-821-R-100 and moisture content by ASTM D2216-98.

2. TISSUE SAMPLE COLLECTION AND ANALYSIS

Hard shell clam (*Macoma nasuta*) tissue samples (10 grams/sample) will be collected from site and reference locations and analyzed for cadmium and chromium following EPA Method 6020, and percent moisture. Co-located tissue and sediment samples will be attempted. However, clams were not abundant at the site during previous tissue collection events, and the level of effort to

[6] EA. 2011. *Generic QAPP for Work Assignments under NYSDEC Contract D007624.* October.
[7] Cadmium, chromium, AVS/SEM, TOC, grain size, TCLP.

obtain one clam was approximately 1 hour or up to 30 ponar drops. Therefore, clams will be collected from wherever they are found. If clams are small, they will be composited from multiple locations to obtain enough tissue. Clams will be composited from locations near each other (e.g., from the north end, mid-section, and/or lower end of the tidal creek). The goal is to collect at least 5 samples from the site and one sample from each of the reference creeks (2 reference tissue samples).

Clam tissue samples will be measured and weighed, shucked and submitted frozen to Alpha Analytical, in Mansfield, Massachusetts for chemistry analysis. Tissue samples will be placed in appropriate sample containers, sealed, and submitted under standard chain-of-custody procedures. The samples will be labeled, handled, and packaged following the procedures described in the EA Generic QAPP (EA 2011)[8] and Site-Specific QAPP Addendum (**Attachment A**). QA/QC samples will be collected at the frequency detailed in the EA Generic QAPP, Site-Specific QAPP Addendum, and Table 1 of the Site-Specific QAPP Addendum.

3. TOXICITY TESTING

Whole sediment toxicity testing will be conducted with the estuarine amphipod *L. plumulosus* using the sediment collected at the 45 site locations (**Figures 4a, b, c**), 4 reference locations (**Figure 3**), and one laboratory control per batch (collected from Prettyboy Reservoir, Maryland, a historically non-toxic location that is routinely used as a control in EA's sediment toxicity tests).

Upon receipt at the EA's Ecotoxicology laboratory, the sediment samples will be logged in and assigned EA laboratory accession numbers. The sediments will be stored in the dark in a secured walk-in cooler at 4 degrees Celsius (°C) until testing. Prior to use in testing, each sediment sample will be visually inspected, homogenized, and large rocks and debris will be manually removed and discarded from the sample. Sediment samples will be sieved through a 500-micrometer mesh to remove any predatory organisms that may have been in the samples.

Sediment toxicity testing will be conducted according to EA's Ecotoxicology Laboratory's Standard Operating Procedures[9], which are in accordance with EPA guidance[10]. The whole sediment toxicity tests will be conducted as static, renewal tests with 28 days of exposure to the whole sediments and overlying water. The tests occur in 1-liter beakers as the exposure chambers, with each beaker containing 200 milliliters (mL) of sediment and 700 mL of overlying artificial seawater. There will be 5 replicate chambers for each sediment sample and control. Gentle aeration (approximately 100 bubbles/minute) is provided to each test chamber throughout the test duration. Test organisms are randomly assigned to the test chambers, 20 organisms per replicate chamber for a total of 100 organisms per sample/station.

[8] EA. 2011. *Generic QAPP for Work Assignments under NYSDEC Contract D007624.* October.
[9] EA. 2018. *EA Ecotoxicology Laboratory Quality Assurance and Standard Operating Procedures Manual.*
[10] EPA. 1994. *Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods*. June.

Prior to initiation of the toxicity tests, the sediments and overlying water will be added to the test chambers, and the suspended sediments allowed to settle overnight. The addition of the test organisms to the exposure chambers on the following day marks the initiation of the toxicity tests. The amphipods used in the toxicity testing will be obtained from Aquatic Research Organisms (Hampton, New Hampshire).

The tests are maintained at 20 ±1°C with a 24-hour light photoperiod. The test chambers are visually inspected daily for abnormal organism behavior/lack of burrowing. Water quality measurements of temperature, pH, DO, and salinity are recorded daily on one replicate of each sample and control. An overlying water ammonia sample is collected from each sample on Day 0 prior to the introduction of the test organisms, and on Day 28 prior to test termination. Renewal of overlying water and feeding will occur three times per week.

The endpoint measures are survival, calculated as the percentage of neonates at test initiation that survive as adults at test termination; growth rate, calculated as the mean dry weight gain per day per adult amphipod surviving at test termination; and reproduction, calculated as number of offspring per surviving adult.

Test acceptability requires mean minimum control survival of 80 percent and growth and reproduction measurable in all control replicates.

4. DATA EVALUATION

Multiple-lines-of-evidence will be used to evaluate the data. At each location, cadmium and chromium sediment data will be pooled with previous data. Both pooled and unpooled data will be included in the report. Sediment concentrations will be compared to NYSDEC guidelines and to reference area sediment concentrations. Grain size, AVS/SEM, and TOC data will be used to evaluate the potential bioavailability of the metals.

Clam tissue chemistry data will be pooled with previous data and compared to reference area tissue concentrations and with literature-based body burden concentrations observed to cause adverse impacts. Both pooled and unpooled data will be included in the report. Sources for the literature body burden data will include the Environmental Residue Effects Database and other NYSDEC sources. If co-located clam and sediment chemistry data are obtained, biota-sediment accumulation factors will be calculated.

Results of the site toxicity tests will be compared with reference toxicity test results. Site toxicity results will also be considered in light of the sediment chemistry data to evaluate potential correlation.

Sediment and tissue concentrations can also be used to evaluate potential risks to upper-trophic level wildlife (e.g., birds and mammals) that may feed upon them using a food web dose model. Models can be conducted for great blue heron (*Ardea herodias*) which is representative of wading bird populations; herring gull (*Larus argentatus*) which is representative of piscivorous bird populations; and harbor seal (*Phoca vitulina*) which is representative of marine mammal

populations. The concentrations can also be used to evaluate potential risks to human health, assuming people will ingest tidal area clams and contact the OU5 sediments directly.

5. LABORATORY DATA VALIDATION

It is anticipated that preliminary analytical results will be available within 2 weeks of sample receipt at the laboratory, and final results will be provided within the standard turnaround time (i.e., 30 days). Analytical data will be validated by Environmental Data Services, Ltd. (EDS) of Pittsburgh, Pennsylvania. EDS will conduct a data usability analysis, and will provide a Data Validation/Usability Report, which will be appended to the RI Report for OU5.

6. PROJECT SCHEDULE

Field activities are scheduled to begin the week of 16 September 2019. Receipt of laboratory data is anticipated in October 2019, with the results of the toxicity testing anticipated in November 2019. An updated project schedule is provided as **Figure 5**. Please feel free to contact me at (315) 565-6564 if you have any questions.

Sincerely yours,

EA SCIENCE AND TECHNOLOGY

Adam Etringer
Project Manager

EA ENGINEERING, P.C.

Donald Conan, P.E., P.G.
Vice-President

Figures

1	Cadmium Concentration Summary 2017/2018
2	Cadmium Concentration Summary 2019
3	Background Sediment Locations
4a,b,c	Cadmium Concentration Summary and Proposed Ecological Sampling Locations
5	Project Schedule

Attachment A Site-Specific Quality Assurance Project Plan Addendum

Figures

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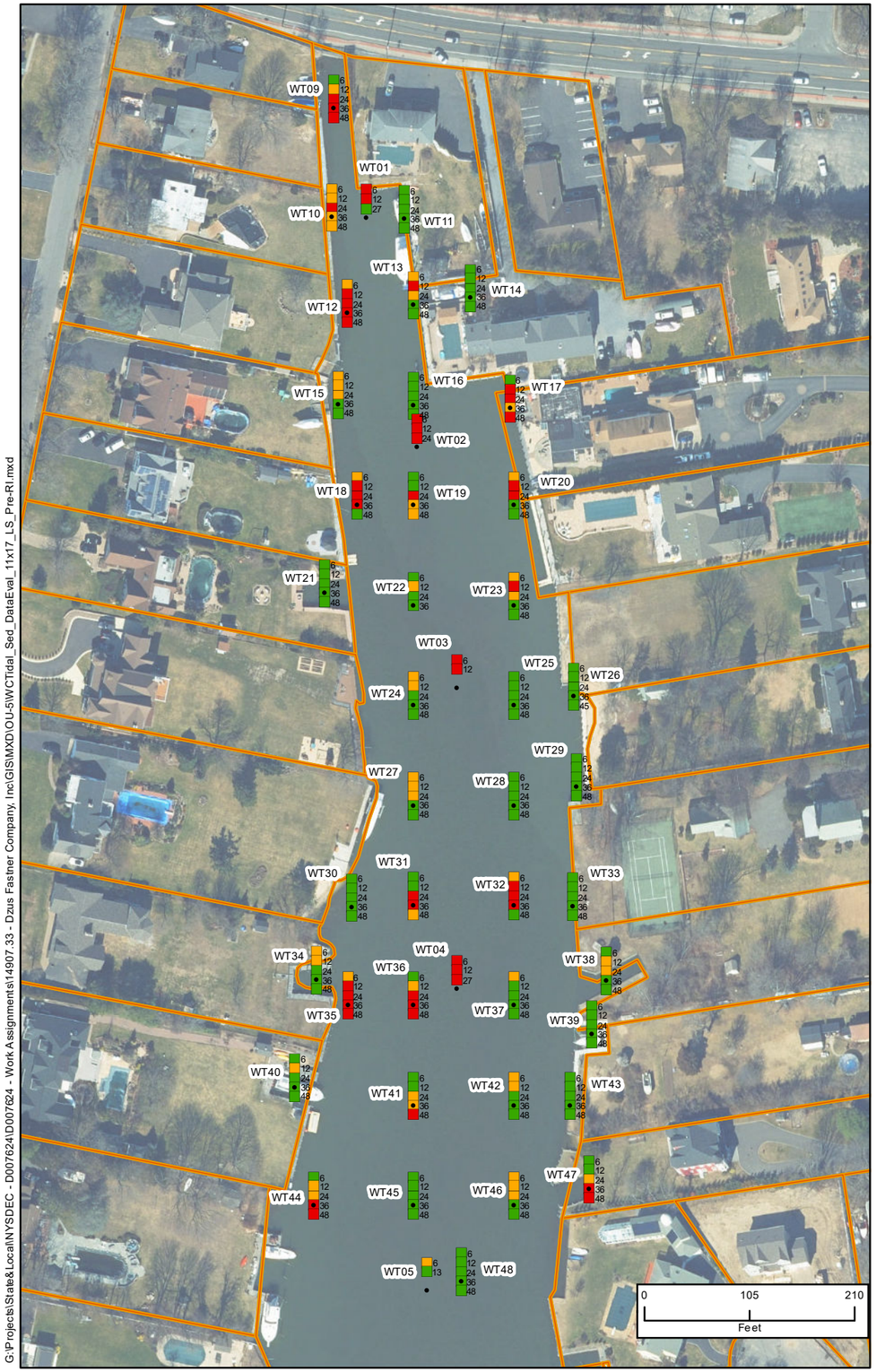
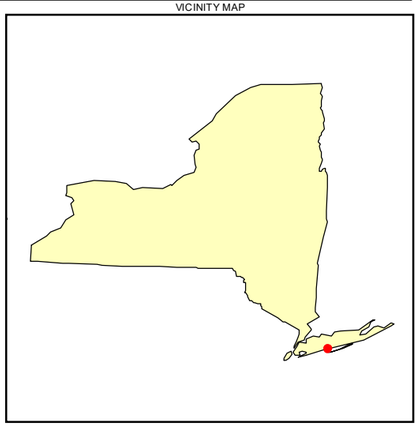


VICINITY MAP



Legend

- Approximate Tax Parcel Boundary
- Sediment Core Location

Cadmium Sediment Results

- Class A Sediments (< 1.2 mg/kg)
- Class B Sediments (1.2 - 9.6 mg/kg)
- Class C Sediments (> 9.6 mg/kg)

Notes:
1 Pre-Remedial Investigation (RI) sediment samples collected in 2017/2018.
2 Value adjacent to sediment class symbol indicates end depth of sample interval (inches).

Map Date: 7/29/2019
Projection: NAD83 State Plane New York Long Island

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Figure 1
Cadmium Concentration Summary 2017/2018
Dzus Fastener Company, Inc.
OU5 Remedial Investigation/Feasibility Study
West Islip, NY

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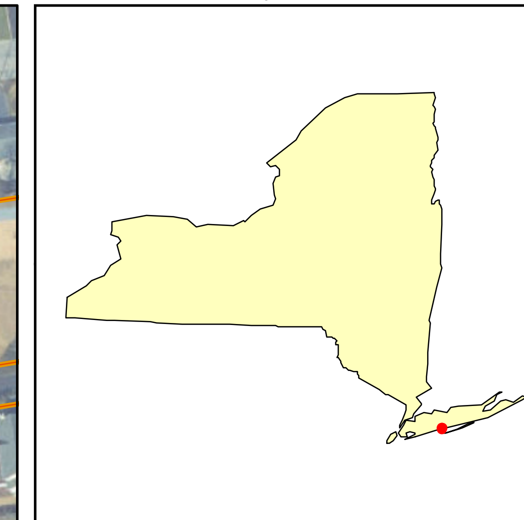
VICINITY MAP



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- Approximate Tax Parcel Boundary
- • Sediment Core Location

Cadmium Sediment Results

- Class A Sediments (< 1.2 mg/kg)
- Class B Sediments (1.2 - 9.6 mg/kg)
- Class C Sediments (> 9.6 mg/kg)

Notes:

1 Remedial Investigation (RI) sediment samples collected in 2019.

2 RI sediment sampling data are preliminary and unvalidated.

3 Value adjacent to sediment class symbol indicates end depth of sample interval (inches).

Map Date: 7/29/2019

Projection: NAD83 State Plane New York Long Island

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Figure 2

Cadmium Concentration Summary 2019

Dzus Fastener Company, Inc.

OU5 Remedial Investigation/Feasibility Study

West Islip, NY

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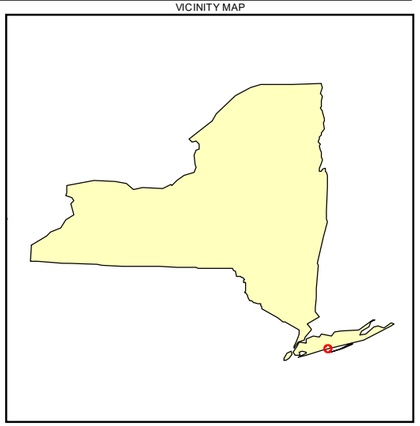

Legend

Approximate Operable Unit Boundary

- Operable Unit 5
- Sediment Core Location

Cadmium Sediment Results

- Class A Sediments (< 1.2 mg/kg)
- Class B Sediments (1.2 - 9.6 mg/kg)
- Class C Sediments (> 9.6 mg/kg)

Notes:
1 Value adjacent to sediment class symbol indicates end depth of sample interval (inches).
2 RI sediment sampling data are preliminary and unvalidated.

Map Date: 6/20/2019
Projection: NAD83 State Plane New York Long Island

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Figure 3
Background Sediment Locations

Dzus Fastener Company, Inc.
OU5 Remedial Investigation/Feasibility Study West Islip, NY

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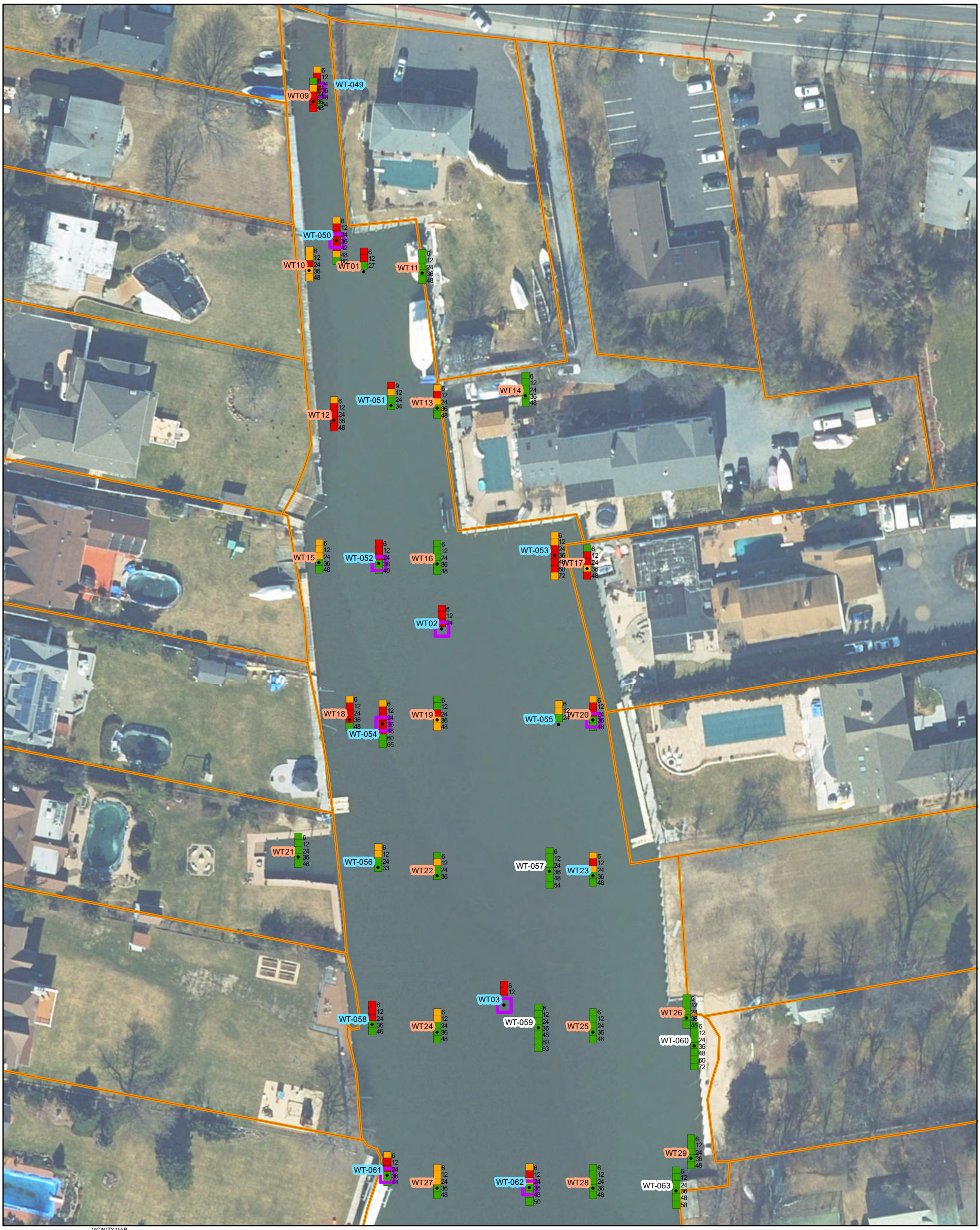

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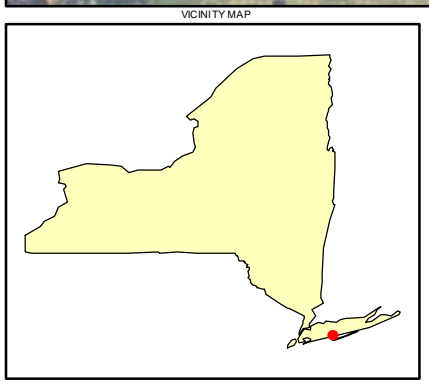

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Approximate Tax Parcel Boundary

TCLP Sample Location

Cadmium Sediment Results

- Class A Sediments (< 1.2 mg/kg)
- Class B Sediments (1.2 - 9.6 mg/kg)
- Class C Sediments (> 9.6 mg/kg)

Notes:
1 Core ID highlighted in blue indicates sample locations where eco-risk sampling will be performed in the 0- to 6-inch depth interval.
2 Core IDs WT01 through WT048 are samples collected and analyzed in 2017/2018; those not flagged for eco-risk sampling are highlighted orange.
3 Value adjacent to sediment class symbol indicates end depth of sample interval (inches).
4 RI sediment sampling data are preliminary and unvalidated.

Figure 4a
Sediment Cadmium Concentration Summary and Proposed Ecological Sampling Locations

Dzus Fastener Company, Inc.
OU5 Remedial Investigation/Feasibility Study
West Islip, NY

Map Date: 9/9/2019
Projection: NAD83 State Plane New York Long Island

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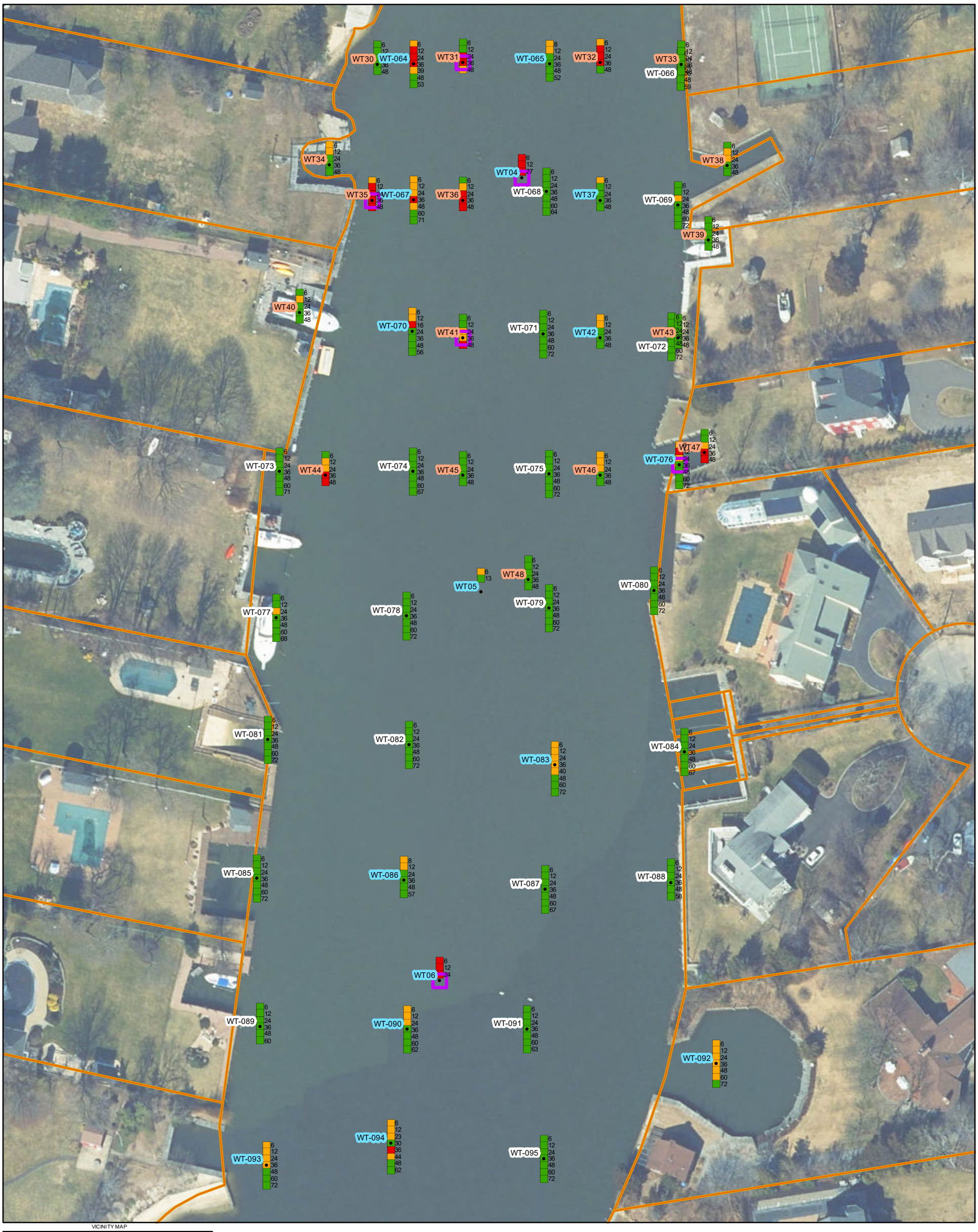

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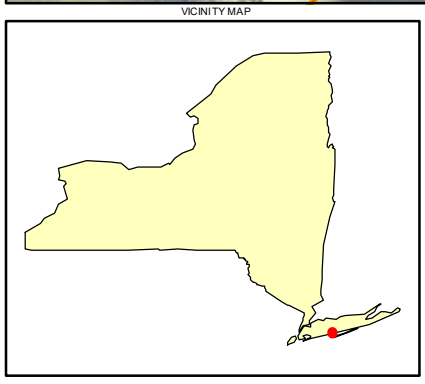

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Approximate Tax Parcel Boundary

TCLP Sample Location

Cadmium Sediment Results

- Class A Sediments (< 1.2 mg/kg)
- Class B Sediments (1.2 - 9.6 mg/kg)
- Class C Sediments (> 9.6 mg/kg)

Notes:

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Figure 4b
Sediment Cadmium Concentration Summary and Proposed Ecological Sampling Locations

Dzus Fastener Company, Inc.
OU5 Remedial Investigation/Feasibility Study
West Islip, NY

Map Date: 9/9/2019
Projection: NAD83 State Plane New York Long Island

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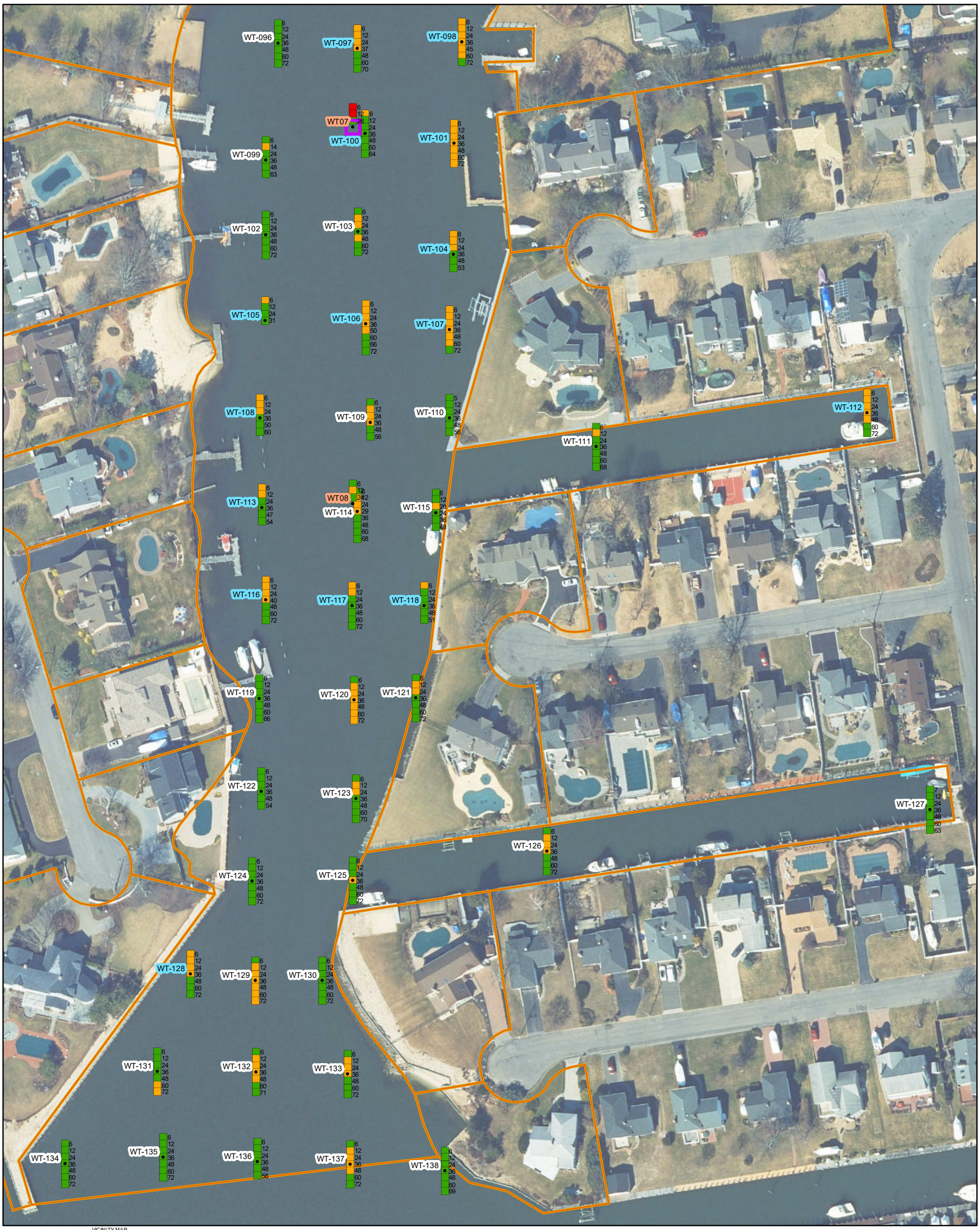

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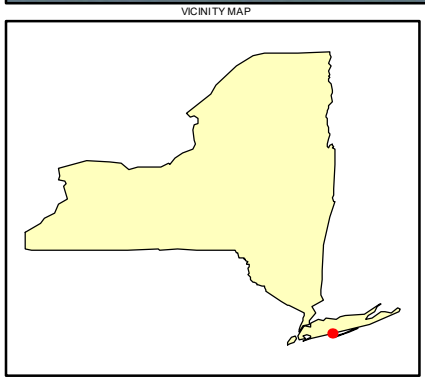

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- Approximate Tax Parcel Boundary
- TCLP Sample Location

Cadmium Sediment Results

- Class A Sediments (< 1.2 mg/kg)
- Class B Sediments (1.2 - 9.6 mg/kg)
- Class C Sediments (> 9.6 mg/kg)

Notes:
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Figure 4c
Sediment Cadmium Concentration Summary and Proposed Ecological Sampling Locations

Dzus Fastener Company, Inc.
OU5 Remedial Investigation/Feasibility Study
West Islip, NY

Map Date: 9/9/2019
Projection: NAD83 State Plane New York Long Island

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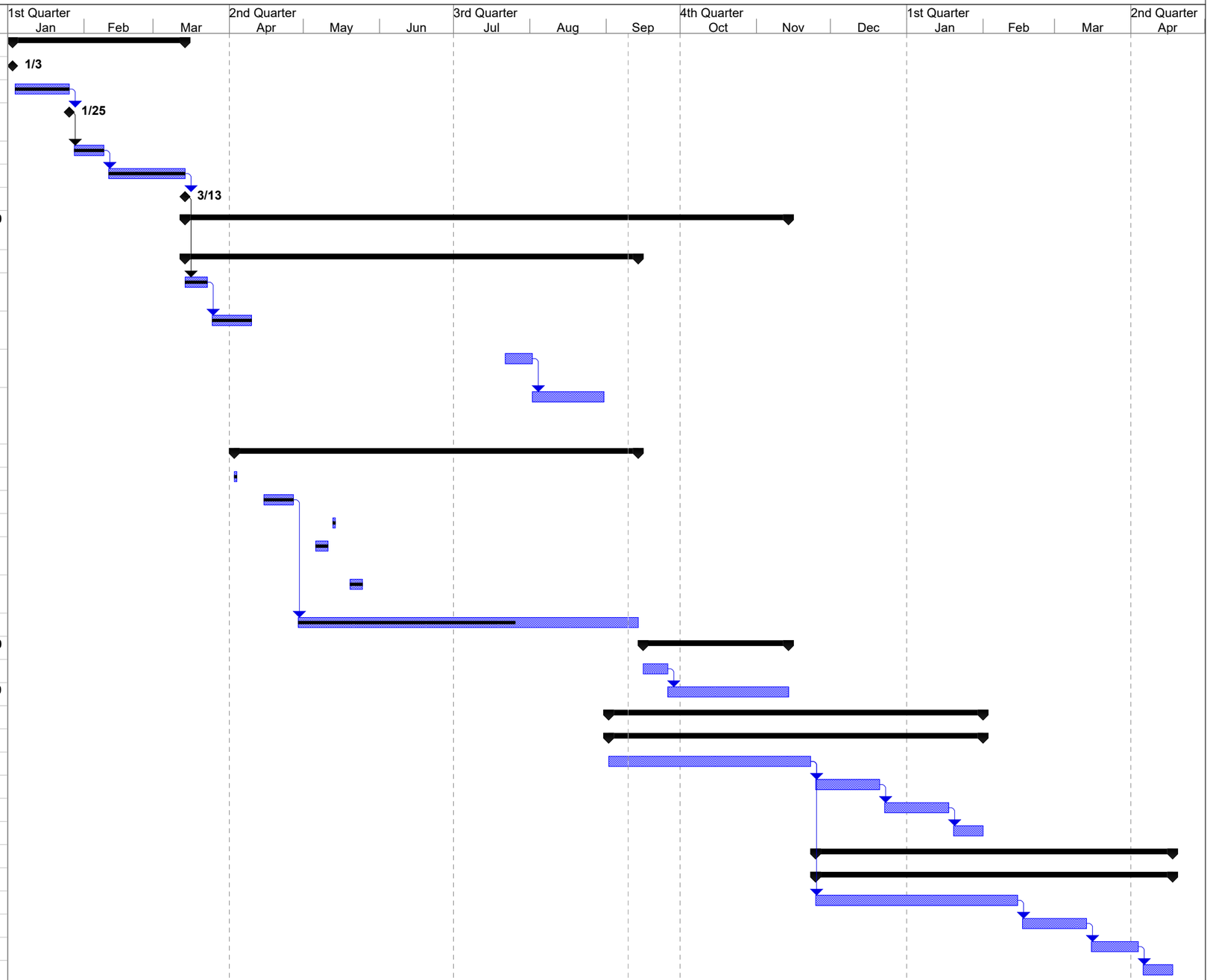
Figure 5
NYSDEC - Dzus Fastener Company, Inc. OU5
EA Project No.: 14907.33
(January 2019 - April 2020)

ID	Task Name	Duration	Start	Finish
1	**Task 1 - Scoping and Records Search**	**50 days**	**Thu 1/3/19**	**Wed 3/13/19**
2	WA Issuance	0 days	Thu 1/3/19	Thu 1/3/19
3	Prepare WA Package Amendment 2 (OU4)	16 days	Fri 1/4/19	Fri 1/25/19
4	Submit WA Package Amendment 2 (OU4) to NYSDEC	0 days	Fri 1/25/19	Fri 1/25/19
5	NYSDEC Review	10 days	Mon 1/28/19	Fri 2/8/19
6	Final NYSDEC Review and Approvals	23 days	Mon 2/11/19	Wed 3/13/19
7	NYSDEC Issuance of Approvals	0 days	Wed 3/13/19	Wed 3/13/19
8	**Task 2 - Phase 1 Remedial Investigation**	**175 days?**	**Thu 3/14/19**	**Wed 11/13/19**
9	**OU5 Remedial Investigation**	**132 days?**	**Thu 3/14/19**	**Fri 9/13/19**
10	Prepare and Submit OU5 Sampling Plan	7 days	Thu 3/14/19	Fri 3/22/19
11	NYSDEC Review & Approval of OU5 Sampling Plan	12 days	Mon 3/25/19	Tue 4/9/19
12	Prepare and Submit OU5 Work Plan Addendum	9 days?	Mon 7/22/19	Thu 8/1/19
13	NYSDEC and NYSDOH Review and Approval of Work Plan Addendum	21 days	Fri 8/2/19	Fri 8/30/19
14	**Conduct OU5 Sampling**	**118 days?**	**Wed 4/3/19**	**Fri 9/13/19**
15	Hydrographic Survey	1 day?	Wed 4/3/19	Wed 4/3/19
16	Sediment and Surface Water	10 days	Mon 4/15/19	Fri 4/26/19
17	Culvert and Outfall Inspection	1 day?	Mon 5/13/19	Mon 5/13/19
18	Residential Soil Sampling (first week)	5 days	Mon 5/6/19	Fri 5/10/19
19	Residential Soil Sampling (second week)	5 days	Mon 5/20/19	Fri 5/24/19
20	Lab Analysis and Validation	100 days	Mon 4/29/19	Fri 9/13/19
21	**Eco-Risk Investigation**	**43 days**	**Mon 9/16/19**	**Wed 11/13/19**
22	Sediment sample collection	8 days	Mon 9/16/19	Wed 9/25/19
23	Lab analysis and Validation	35 days	Thu 9/26/19	Wed 11/13/19
24	**Task 3 - Phase 2 Remedial Investigation**	**110 days**	**Mon 9/2/19**	**Fri 1/31/20**
25	**RI Report - OU5**	**110 days**	**Mon 9/2/19**	**Fri 1/31/20**
26	Prepare and Submit Draft RI Report	60 days	Mon 9/2/19	Fri 11/22/19
27	NYSDEC Review & Approval of Draft RI Report	20 days	Mon 11/25/19	Fri 12/20/19
28	Prepare and Submit Final RI Report	20 days	Mon 12/23/19	Fri 1/17/20
29	NYSDEC Review & Approval of Final RI Report	10 days	Mon 1/20/20	Fri 1/31/20
30	**Task 4 - Detailed Analysis of Alternatives**	**105 days**	**Mon 11/25/19**	**Fri 4/17/20**
31	**Feasibility Study - OU5**	**105 days**	**Mon 11/25/19**	**Fri 4/17/20**
32	Prepare and Submit Draft FS	60 days	Mon 11/25/19	Fri 2/14/20
33	NYSDEC Review & Approval of Draft FS	20 days	Mon 2/17/20	Fri 3/13/20
34	Prepare and Submit Final FS	15 days	Mon 3/16/20	Fri 4/3/20
35	NYSDEC Review & Approval of Final FS	10 days	Mon 4/6/20	Fri 4/17/20



Project: Dzus Fastener Company, Inc.
Date: August 2019

Task Milestone Summary Progress

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Attachment A

Site-Specific Quality Assurance Project Plan Addendum

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Site-Specific Quality Assurance Project Plan Addendum
Dzus Fastener Company, Inc. (152033)
West Islip, New York

Prepared for

New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233

Prepared by

EA Engineering, P.C. and its affiliate
EA Science and Technology
269 W. Jefferson Street
Syracuse, New York
(315) 431-4610

September 2019
Version: FINAL
EA Project 14907.33

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West Islip, New York

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September 10, 2019

Donald Conan, P.E., P.G., Vice-President
EA Engineering, P.C.

Date

September 10, 2019

Adam Etringer, Project Manager
EA Science and Technology

Date

September 2019
Version: FINAL
EA Project No.14907.33

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LIST OF ACRONYMS AND ABBREVIATIONS

°C	Degrees Celsius
AVS	Acid volatile sulfide
ASTM	American Society for Testing and Materials
Cd	Cadmium
Cr	Chromium
DER	Division of Environmental Remediation
EA	EA Engineering, P.C. and its affiliate EA Science and Technology
EDD	Electronic data deliverable
EDS	Environmental Data Services, Ltd.
EPA	U.S. Environmental Protection Agency
in.	Inch(es)
No.	Number
NYSDEC	New York State Department of Environmental Conservation
OU	Operable unit
POC	Point-of-contact
QA	Quality assurance
QC	Quality control
QAPP	Quality assurance project plan
RI	Remedial investigation
SEM	Simultaneously extracted metals
SOP	Standard operating procedures
TCLP	Toxicity characteristic leaching procedure
TOC	Total organic compound
TOX	Toxicity test

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1. PURPOSE AND OBJECTIVES

1.1 PURPOSE

A Generic Quality Assurance Project Plan (QAPP) (EA Engineering, P.C. and its affiliate EA Science and Technology [EA] 2011)[1] was developed for field activities performed under the New York State Department of Environmental Conservation (NYSDEC) Standby Contract Number (No.) D007624-33. This Site-Specific QAPP Addendum is for the remedial investigation (RI)/feasibility study Work Assignment for the Dzus Fastener Company, Inc. site in the Town of West Islip, Suffolk County, New York (NYSDEC Site No. 152033). This Site-Specific QAPP Addendum supplements the Generic QAPP with site-specific procedures for the collection, analysis, and evaluation of data that will be legally and scientifically defensible.

1.2 SITE-SPECIFIC QUALITY ASSURANCE PROJECT PLAN ADDENDUM OBJECTIVES

This Site-Specific QAPP Addendum provides site-specific information and standard operating procedures (SOPs) applicable to work performed for the Operable Unit 5 (OU5) RI that is not included in the Generic QAPP. The information includes definitions and goals for data quality and required types and quantities of quality assurance (QA)/quality control (QC) samples. The procedures address sample handling, sample custody, and shipping; instrument calibration and maintenance; auditing; data reduction, validation, and reporting; corrective action requirements; and QA reporting specific to the analyses performed by the analytical laboratories. The Letter Work Plan (EA 2019)[2] and Letter Work Plan Addendum (EA 2019)[3] details the procedures for sampling and decontamination protocols, as well as field documentation and specific project data quality objectives.

[1]EA. 2011. *Generic Quality Assurance Project Plan for Work Assignments under NYSDEC Contract No. D007624.* April.
[2] EA. 2019. *Operable Unit 5 Remedial Investigation/Feasibility Study Work Plan. Dzus Fastener Company, Inc. (152033).* April.
[3] EA. 2019. *Operable Unit 5 Remedial Investigation Work Plan Addendum.* September.

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2. PROJECT ORGANIZATION AND RESPONSIBILITIES

Although all personnel involved in the investigation and generation of data are implicitly a part of the overall project management and QA/QC program, certain members of the Project Team have specifically designated responsibilities. Project personnel responsibilities are summarized below.

2.1 EA ENGINEERING, P.C. AND ITS AFFILIATE EA SCIENCE AND TECHNOLOGY

EA will provide oversight, coordination, health and safety, field support, and evaluation of analytical data. EA will also be responsible for evaluation of analytical test results, which will be submitted to NYSDEC. The EA staff involved in this project are as follows:

- ***Robert Casey, Project QA/QC Officer***—The QA/QC Officer will provide guidance on technical matters and review technical documents relating to the project. He will assess the effectiveness of the QA/QC program and recommend modifications, when applicable. Additionally, the QA/QC Officer may delegate technical guidance to specially trained individuals under his direction.

- ***Adam Etringer, EA Project Manager***—The Project Manager provides overall coordination and preparation of the project within EA. This includes coordination with NYSDEC and New York State Department of Health, budget control, subcontractor performance, implementation of the Site-Specific QAPP Addendum, and allocation of resources and staffing to implement both the QA/QC program and the site Health and Safety Plan.

- ***Hilary Williams, EA Project QA/QC Coordinator***—The Project QA/QC Coordinator is responsible for project-specific supervision and monitoring of the QA/QC program. She will ensure that field personnel are familiar with and adhere to proper sampling procedures, field measurement techniques, sample identification, and chain-of-custody procedures. She will coordinate with the analytical laboratory for the receipt of samples and reporting of analytical results and will recommend actions to correct deficiencies in the analytical protocol or sampling. Additionally, she will prepare QA/QC reports for management review.

- ***Justin Marra, EA Site Manager***—The Site Manager will serve as the onsite contact person for field investigations and tests. He will be responsible for coordinating the field activities including inspecting and replacing equipment, preparing daily and interim reports, scheduling sampling, and coordinating shipment and receipt of samples and containers.

The Program Health and Safety Officer is also an integral part of the project implementation team.

- ***Peter Garger, Certified Industrial Hygienist, Certified Safety Professional, EA Program Health and Safety Officer***—The Program Health and Safety Officer will be responsible for the development, final technical review, and approval of the Health and Safety Plan. In

addition, he will provide authorization, if warranted, to modify personal protective equipment requirements based on field conditions. He will also provide final review of all safety and health monitoring records and personal protective equipment changes to ensure compliance with the provisions of the Health and Safety Plan.

2.2 LABORATORY

Laboratory analyses for chemical contaminants on this project will be performed by Con-Test Analytical Laboratory in East Longmeadow, Massachusetts, under subcontract with EA. Con-Test is NELAP certified in New York State. Toxicity testing will be performed by EA's Ecotoxicology Laboratory. Clam tissue analysis will be performed by Alpha Analytical in Mansfield, Massachusetts.

Adam Etringer (EA Project Manager) and Hilary Williams (EA Project QA/QC Coordinator) will have review responsibilities for sample results on this project. The laboratory will have their own provisions for conducting an internal QA/QC review of the data before they are released to EA. The laboratories' contract supervisors will contact EA's Project Manager with any sample discrepancies or data concerns.

Hard copy and electronic data deliverable formatted QA/QC reports will be filed by the analytical laboratories when data are submitted to EA. Corrective actions will be reported to the EA Project Manager along with the QA/QC report (Section 9 of the Generic QAPP). The laboratories may be contacted directly by EA or NYSDEC personnel to discuss QA concerns. EA will act as laboratory coordinator on this project, and all correspondence from the laboratories will be coordinated with EA's Project Manager.

3. SAMPLING RATIONALE, DESIGNATION, AND CONTAINERS

3.1 SAMPLING RATIONALE

The sampling rationale is presented for each planned field activity and is detailed in the Letter Work Plan (EA 2019)[2] and Letter Work Plan Addendum (EA 2019)[3] The rationale and frequency of the QC samples collected is discussed in the Generic QAPP (EA 2011).[1] The RI laboratory program includes the number of samples for each sample location, as well as QA/QC samples (**Table 1**). The frequency of QA/QC samples is expressed as a percentage of the total number of samples collected for that matrix. The Generic QAPP also includes analytical methods and reporting limits.

3.2 SAMPLE DESIGNATION

Field samples collected from the site will be assigned a unique sample tracking number. Naming scheme varies by matrix type, as discussed below.

Sediment Samples

Sample ID numbers for sediment samples will be assigned using the following naming convention:

- 152033-OU5-SD-WT01-0006-TOX = (NYSDEC SITE ID-OU5-Media/Type-Sample Area-Sample Depth Interval-Test Type)

Media/Type	Sample Area	Depth Interval	Test Type
SD – Sediment	WT – Willetts Tidal	0006: 0–6 in.	TOX AVS/SEM
		0612: 6–12 in.	
		1218: 12–18 in.	
		1224: 12–24 in.	
		2436: 24–36 in.	
		3648: 36–48 in.	
		4860: 48–60 in.	
		6072: 60–72 in.	

NOTES:
AVS = Acid volatile sulfide
in. = Inch(es)
SEM = Simultaneously extracted metals
TOX = Toxicity test

- If one or more components of the sample naming convention are not necessary, they will not appear in the Sample ID number (e.g., 152033-OU5-SD-WT01-0006).

- Duplicate samples will be labeled 152033-OU5-SD-FD-MMDDYY. If multiple duplicate samples are taken on same day from same sample area, "-01," "-02," etc. will be appended to the end of the sample name.

- Samples to be used for matrix spike/matrix spike duplicates will be indicated in the "notes" column of the chain-of-custody form.

- Rinse blanks will be labeled 152033-OU5-SD-RB-MMDDYY and will only be collected when non-dedicated equipment is used.

Clam Tissue Samples

Sample ID numbers for the clam tissue samples will be assigned using the following naming convention:

- 152033-OU5-HSC-REP1 = (NYSDEC SITE ID-OU5-Media/Type-Replicate Number).

3.3 SAMPLE CONTAINERS

Table 2 outlines the types of sample containers, sample volume, preservatives, and holding times required for sample collection. The laboratories will provide all required sample containers.

Table 1 Remedial Investigation Analytical Program

Samples	Sample Matrix	Cadmium and Chromium	AVS/SEM	TOC	Grain Size	TCLP (Cd and Cr); cadmium and chromium
SEDIMENT SAMPLING						
Number of Parent Samples	Sediment from 0 to 6 in. grab sample; 0 to 2 foot core (TCLP only)	50	50	50	50	21
Field Duplicate		3	3	3	Not applicable	Not applicable
Rinse Blank		3	Not applicable	Not applicable	Not applicable	Not applicable
Matrix Spike/Matrix Spike Duplicate		3/3	Not applicable	Not applicable	Not applicable	Not applicable
Total Number of Analyses		**62**	**53**	**53**	**50**	**21**
SEDIMENT TOXICITY SAMPLING						
Number of Parent Samples	Sediment from 0–6 in. grab sample	50	0	0	0	0
Field Duplicate		Not applicable	0	0	0	0
Rinse Blank		Not applicable	0	0	0	0
Matrix Spike/Matrix Spike Duplicate		Not applicable	0	0	0	0
Total Number of Analyses		**50**	**0**	**0**	**0**	**0**
CLAM TISSUE SAMPLING						
Number of clam composite samples	Clam tissue	10	0	0	0	0
Total Number of Analyses		**10**	**0**	**0**	**0**	**0**

1. Laboratory quality control samples will be collected at a rate of 1 per 20 samples, per matrix (unless otherwise noted).
2. Rinse blanks are collected at a rate of 1 per 20 samples, for cadmium and chromium, and only when non-dedicated equipment is used.
3. Sediment toxicity testing procedures include internal quality assurance/quality control replicates. The collection of additional sediment for duplicates is not required in the field.
4. Duplicates and applicable laboratory control tests for tissue analysis are performed at the lab using tissues from the parent samples. The collection of additional tissue for duplicates is not required in the field.

NOTES:
Cd = Cadmium
Cr = Chromium
TCLP = Toxicity characteristic leaching procedure
TOC = Total organic compound

Table 2 Sample Containers, Preservation, and Holding Times

Parameter	Matrix	Container Type/Size	Sample Volume	Preservation	Maximum Holding Time from Verifiable Time of Sample Receipt
Sediment and Soil					
Cd and total Cr by EPA Method 6020	Sediment	(2) 4-ounce wide mouth glass jars	8 ounces	Cool 4°C	6 months from collection
	Sediment for toxicity testing	(1) Pre-cleaned 1-gallon polypropylene bucket with lid	1 gallon	Cool 4°C	Not applicable
AVS/SEM by EPA Method EPA-821-R-100	Sediment	(1) 4-ounce wide mouth glass jar	4 ounces	Cool 4°C	14 days
Grain Size by ASTM D422	Sediment	(1) 1-gallon plastic Ziploc bag, double-bagged, filled halfway	500 grams	Ambient	6 months from collection
TCLP (cadmium and total chromium)	Sediment	(1) 8-ounce amber jar	100 grams minimum	Cool 4°C	6 months from collection
Total organic carbon by Lloyd Kahn and Moisture Content by ASTM D2216-98	Sediment	(1) 4-ounce amber glass jar	4 ounces	Cool ≤ 6°C	14 days from collection
Tissue					
Cd and total Cr by EPA Method 6020	Tissue	(1) Glass 120ml/4oz unpreserved	10 grams	Frozen	180 days

NOTES:
°C = Degrees Celsius
ASTM = American Society for Testing and Materials
EPA = U.S. Environmental Protection Agency

4. ANALYTICAL LABORATORIES

The data collected during this investigation will be used to determine the presence and concentration of Cd and Cr in sediment and clam tissue samples. Samples collected during execution of the Generic QAPP (EA 2011)[1] and this Site Specific QAPP Addendum will be submitted to Con-Test Analytical Laboratory in East Longmeadow, Massachusetts, and Alpha Analytical in Mansfield, Massachusetts. Both Con-Test and Alpha Analytical are New York State Department of Health Environmental Laboratory Analytical Program-certified laboratories, meeting specifications for documentation, data reduction, and reporting. Preliminary analytical results will be provided within 10 days of sample receipt, and full NYSDEC Analytical Services Protocol Category B deliverables and associated electronic data deliverables will be provided to EA within 30 days of sample receipt.

Sediment toxicity testing will be performed by the EA Ecotoxicology Laboratory. EA will review the sediment toxicity data and report for test acceptability. While not all elements of the Category B validation process necessarily apply to these data, those that do will be reviewed and the data checked for completeness, accuracy, precision, and relevance.

4.1 ANALYTICAL TEST PARAMETERS

This Site-Specific QAPP Addendum covers the analysis of non-aqueous (sediment and tissue) samples to be collected during the OU5 RI. The specific methods are listed in **Table 2**. Compound lists for each analytical method are included in the Generic QAPP (EA 2011).[1] A summary of the reporting limits for the analytical methods is provided as **Appendix A**.

4.2 SAMPLE SHIPPING PROCEDURES

Samples will be shipped to each laboratory by United Parcel Service, or laboratory courier if available. All samples will be checked into the laboratory's Laboratory Information Management System via chain-of-custody. Addresses for shipping and additional points-of-contact (POC) for each laboratory are included below:

- **Con-Test Analytical Laboratory**
  39 Spruce Street
  East Longmeadow, Massachusetts 01028
  POC: Aaron Benoit, Project Manager
  Direct: 413-525-2332 x47
  Email: aaron.benoit@contestlabs.com

- **Alpha Analytical**
  320 Forbes Boulevard
  Mansfield, Massachusetts 02048
  POC: Elizabeth Porta, Project Manager
  Direct: 508-844-4124
  Email: eporta@alphalab.com

- EA Ecotoxicology Laboratory
  231 Schilling Circle
  Hunt Valley, Maryland 21031
  POC: Mike Chanov
  Direct: 410-584-7000 extension 5120
  Cell: 443-845-9107
  Email: mchanov@eaest.com.

4.3 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

The QA/QC samples to be collected in the field throughout the duration of this project include field duplicates, matrix spikes, matrix spike duplicates, rinse blanks, and temperature blanks. Temperature blanks will be provided by the individual laboratories and will be placed in coolers with samples prior to sample shipment.

In addition to these field samples, the laboratories will run internal QA/QC samples including laboratory control samples and surrogate analyses. QA/QC samples are discussed in greater depth in Section 7 of the Generic QAPP (EA 2011).[1]

4.4 INSTRUMENT CALIBRATION AND MAINTENANCE

Each laboratory will provide EA with their QA Manuals prior to project initiation. The QA Manuals provide the instrument calibration and maintenance information for the equipment that the laboratories will use to analyze samples for metals, as well as total organic carbon and grain size, where appropriate.

4.5 DATA DELIVERY AND SAMPLE STORAGE

Full NYSDEC Analytical Services Protocol Category B deliverables with analytical results and associated NYSDEC EQuIS v3 electronic data deliverables (EDDs) will be provided to EA within 21 business days of sample receipt. Final Category B Data Deliverable PDFs (Adobe Acrobat file) will be fully bookmarked and searchable. Per the Generic QAPP (EA 2011)[1], the laboratories will store analyzed samples for 60 days after the submittal of the final data report to EA. After the 60-day period, the laboratories will dispose of the samples.

5. ANALYTICAL DATA VALIDATION

The laboratory will review data prior to release to EA. Objectives for review are in accordance with the QA/QC objectives stated in the Generic QAPP (EA 2011)[1] and NYSDEC Division of Environmental Remediation (DER)-10 Technical Guidance for Site Investigation and Remediation (2010).[4] The laboratories are required to evaluate their ability to meet these objectives. Outlying data will be flagged in accordance with laboratory SOPs and corrective action will be taken to rectify the problem.

To ensure the validity of analytical data generated by a project, the data will be validated by an independent data validator, Environmental Data Services, Ltd. (EDS). The Generic QAPP (EA 2011)[1] addresses implementation of independent validation, in accordance with NYSDEC DER-10. Data will be submitted to EDS for 100 percent Category B data validation. EDS will prepare data validation reports and update the EQuIS EDDs with any new or revised results and qualifiers for each sample delivery group. Validation for data usability will be accomplished by comparing the contents of the analytical data packages and QA/QC results to the requirements contained in the Site-Specific QAPP Addendum, the respective methods, and the laboratory SOPs.

Contact information for EDS is as follows:

- Diane Waldschmidt
  Principal Consulting Chemist
  5 Brilliant Avenue
  Pittsburgh, Pennsylvania 15215
  Direct: 412-408-3288
  E-mail: dwaldschmidt@eds-us.com.

[4] NYSDEC. 2010. *DER-10 Technical Guidance for Site Investigation and Remediation*. May.

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Appendix A

Reporting Limits

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Table 1 Analytical Reporting Limits
U.S. Environmental Protection Agency Method 6020

Constituent	Reporting Limit	
	Tissue (mg/kg)	Soil/Sediment (mg/kg)
Cadmium	0.04	0.095
Chromium	0.4	1.2

NOTES:
mg/kg = Milligram(s) per kilogram

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