From:	Sager, John E - DNR
To:	cieniawski.scott; Patarcity, Jane M (Pittsburgh) USA
Cc:	Klatt, David/CHC; Klinkhamer, Christopher; Isom, Kristen; Stuart Messur; Bessingpas, David; Seaman, Jennifer/CHC; Selcoe, Barrie/HOU; Pfeiffer, Danielle; Anderson, Paul; Graham, Joseph R - DNR; Saari, Christopher A - DNR; Endsley, Erin A - DNR; Fassbender, Judy L - DNR
Subject:	FW: Example Remediation Projects
Date:	Tuesday, August 24, 2021 11:48:00 AM
Attachments:	Delineation_Pres_21Aug15_final_reduced.pdf

Scott and Jane,

Based on our recent conversations, the WDNR thought it may be useful to share examples of sites in Wisconsin that have gone through a remedial investigation, remedial action selection process, and remedial action where large areas of contamination in sediment, flood plain soils, or both were present. Below are links to the WDNR's BRRTS database for the Cedar Creek Site in Cedarburg and the Howard's Bay site in Superior. We have also provided a link to the WDNR Office of Great Waters website for the Lincoln Park Site in Milwaukee. Arcadis, Anchor QEA, and Jacobs were involved with these projects. In these examples, the consultants provided detailed evaluation of multiple lines of evidence so that the project coordination team could evaluate remedial action options appropriate for the various areas of each site. All of these sites used clean up levels the DNR determined protective of human health and the environment.

Cedar Creek: BRRTS ID# 02-46-000107

See attached presentation, Cedar Creek Soil Removal Delineation, Anchor, 2015.

Lincoln Park: https://dnr.wisconsin.gov/topic/GreatLakes/LincolnPark.html

Feasibility Study, Lincoln Park/Milwaukee River Channel Sediments Site, Milwaukee Estuary Area of Concern, Milwaukee, Wisconsin, CH2M Hill, December, 2009.

Howards Bay: BRRTS ID# 02-16-563449

Howard's Bay Sediment Data Summary Report, Arcadis, August 2014.

Focused Feasibility Study for Sediment Cleanup in Howard's Bay, Arcadis, July 2015.

The WDNR believes a similar process will work at the Koppers Superior site.

We are committed to service excellence.
Visit our survey at http://dnr.wi.gov/customersurvey to evaluate how I did.

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Wisconsin Department of Natural Resources
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dnr.wi.gov


Cedar Creek
Soil Removal Delineation

Presented by

Anchor QEA

August 21, 2015

Agenda

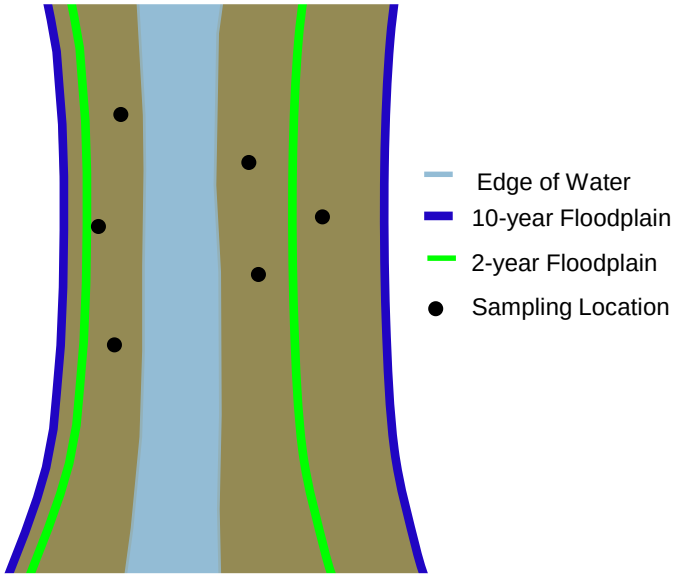
- Objective
- Review Pre-Design Sampling Plan
- Describe soil removal delineation approach
- Present soil removal boundary
- Next steps

Objective

- Develop the 1 mg/kg soil removal boundary
  - Horizontal and vertical extents

Basis of Pre-Design Investigation Sampling Plan

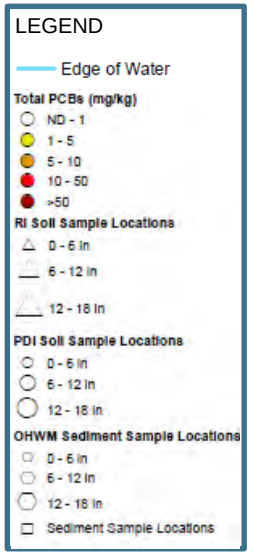
- Delineate soils greater than and equal to 1 mg/kg
- Based on RI data, focused sampling locations
  - Soil samples placed between edge of water[1] and 10-year floodplain
  - Higher density of samples near creek/pond
  - Fewer samples between 2-year and 10-year floodplain



[1]The edge of water was presented in the Remedial Investigation Report and is based on aerial photography flown on March 1, 1997.

Approach

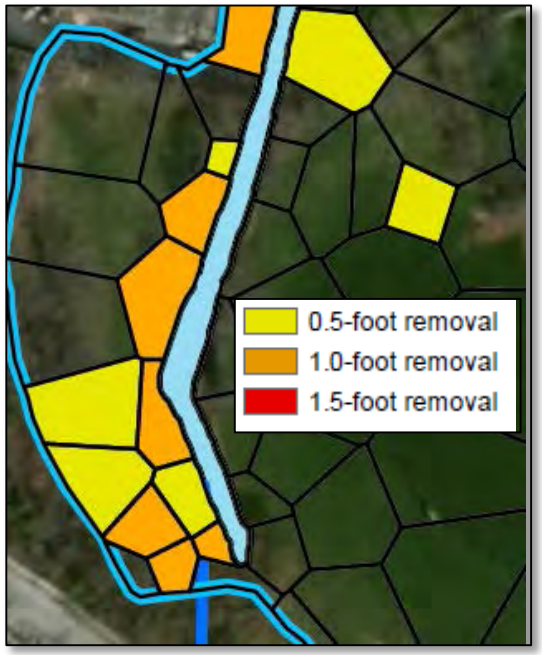
- Step 1 – Compiled PCB data from both RI and PDI



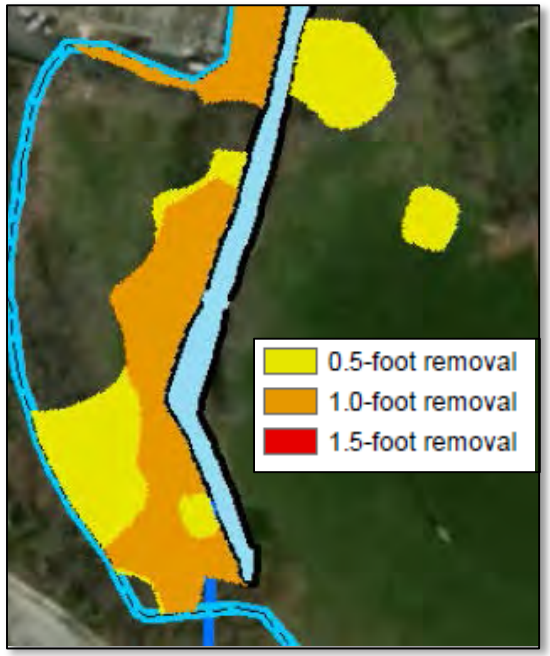
Approach (cont'd)

- Step 2 – Evaluated two interpolation techniques
  - Thiessen polygons
  - Inverse distance weighting (IDW)

Thiessen Polygons



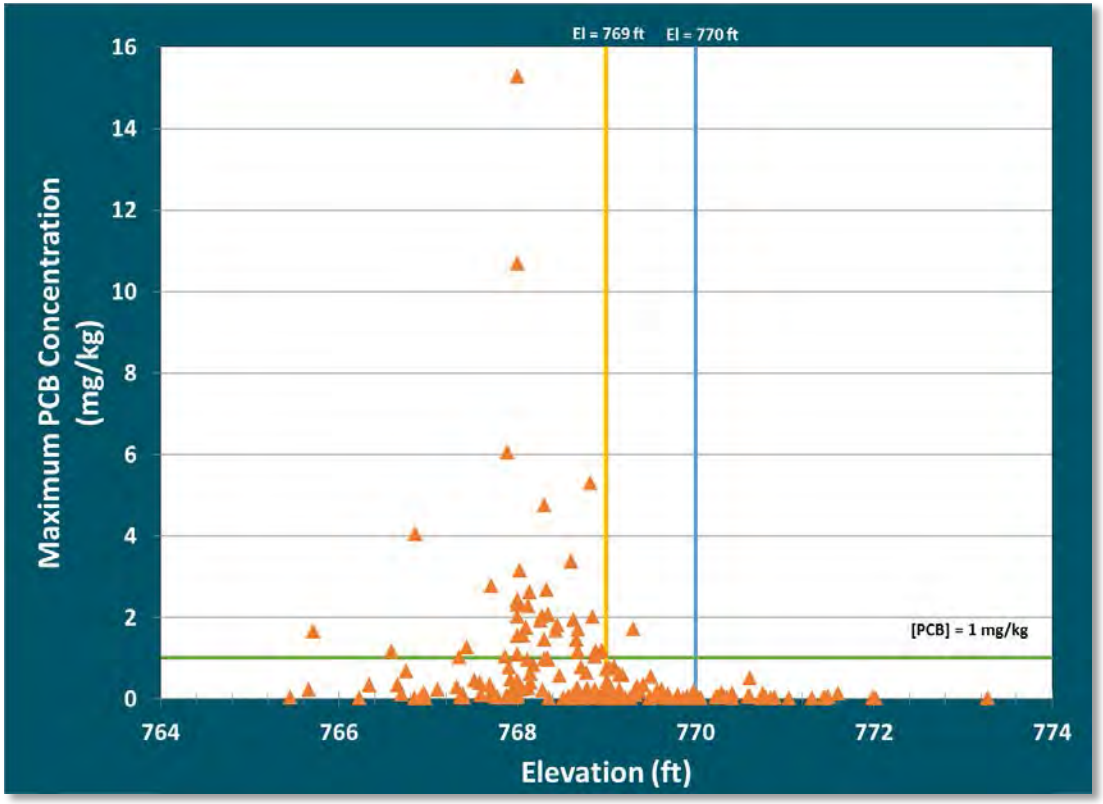
IDW



Approach (cont'd)

- Step 3 – Assessed correlation between PCB concentration and elevation

Columbia Pond PDI Results



[1]Results associated with the upstream, free-flowing portions of Cedar Creek are not included in dataset.

Summary of Approach

- Step 1 – Compiled PCB data from both RI and PDI
- Step 2 – Evaluated two interpolation techniques
  - Thiessen polygons
  - Inverse distance weighting (IDW)
- Step 3 – Assessed correlation between PCB concentration and elevation

No "one-size-fits-all" approach

- Step 4 – Used lines of evidence for soil removal delineation for every area where greater than or equal to 1 mg/kg were observed

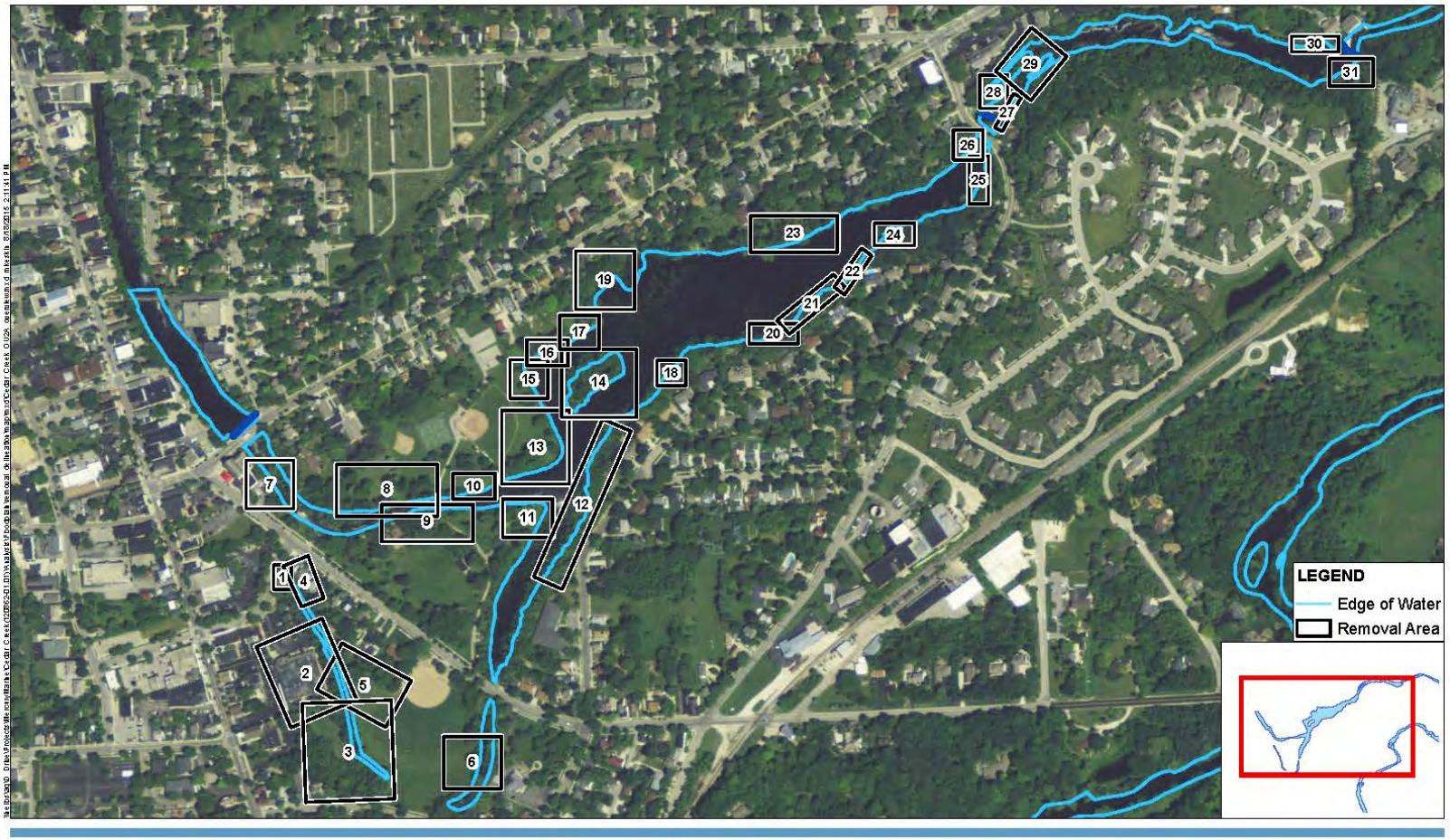
Approach – Step 4

- Step 4 – Used lines of evidence for delineation
  - PCB concentration results from RI and PDI
  - Elevation
    - Relative elevation where samples with PCB concentrations <1 mg/kg are observed
    - Ordinary high water mark (OHWM)[1]
    - 2-yr floodplain boundary
    - 10-yr floodplain boundary
  - Interpolation techniques
    - IDW
    - Thiessen polygons
  - Impervious surfaces and structures

[1]The OHWM is used to define the boundary between soil and sediment.

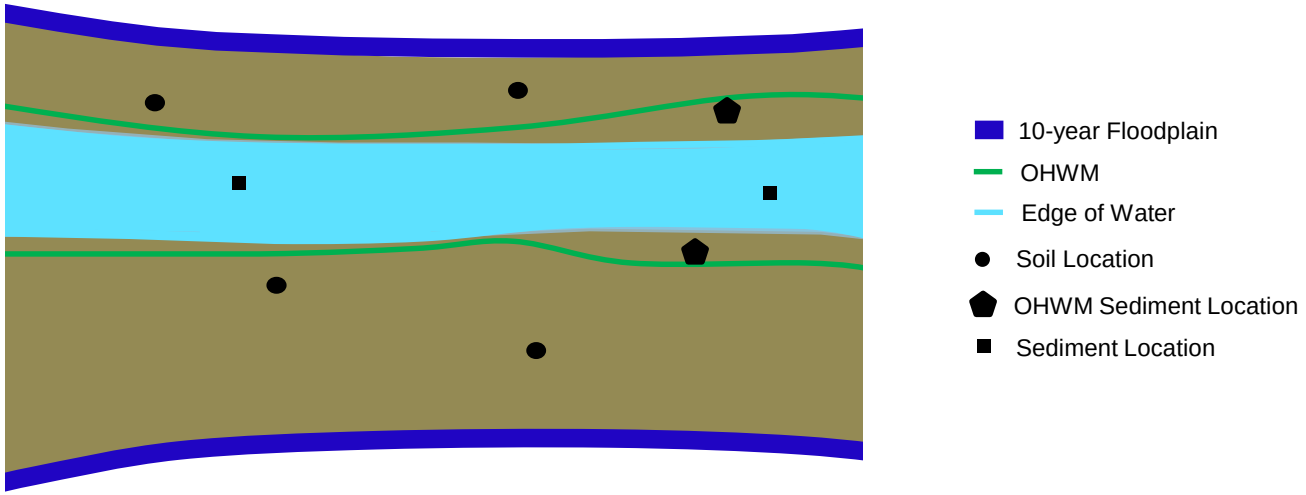
Lines of Evidence Delineation Process

- Divided OU-2A into 31 discrete removal areas with PCB concentration ≥1 mg/kg



Lines of Evidence Delineation Process (cont'd)

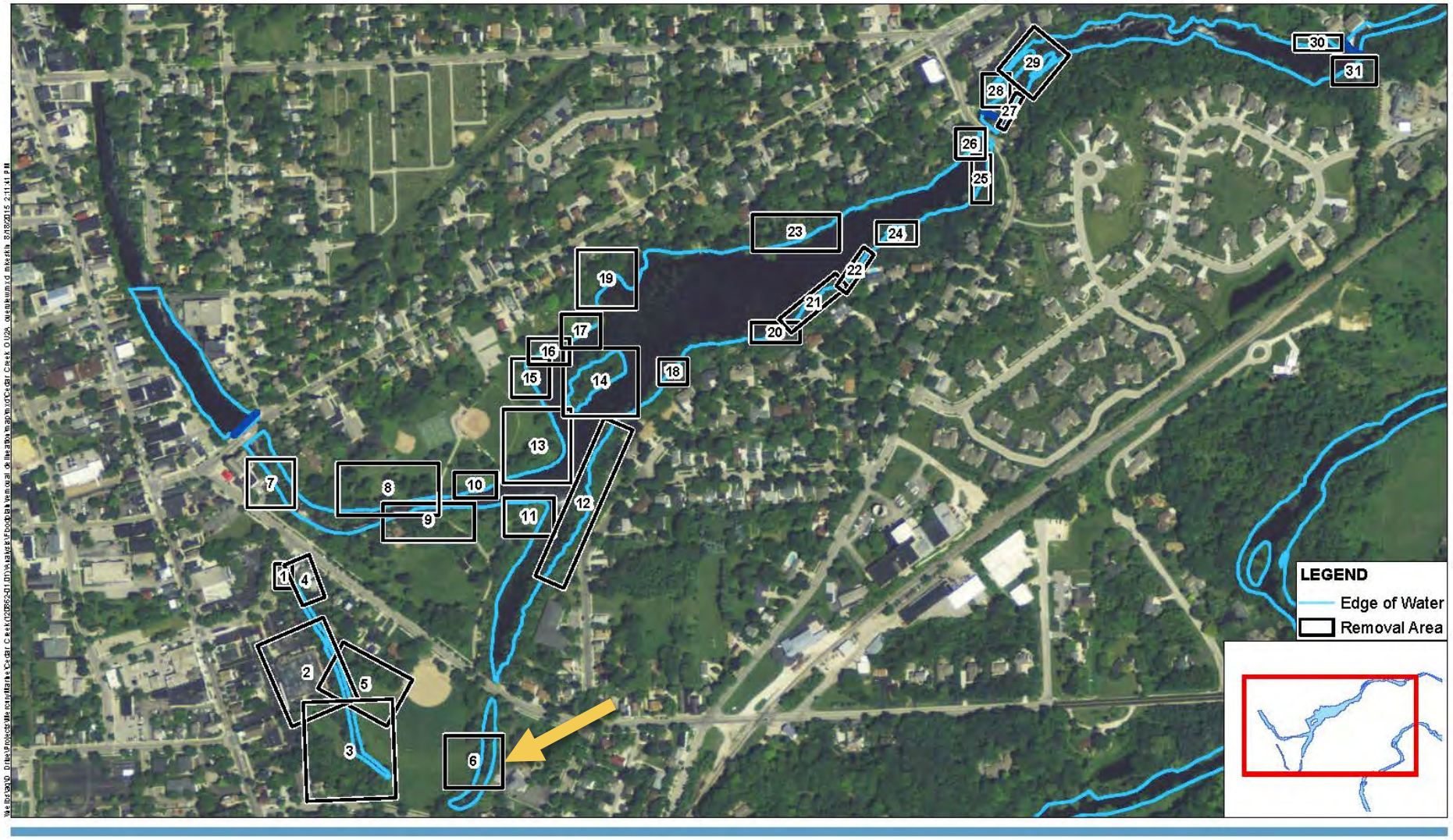
- Identify whether removal is considered OHWM sediment or soil
  - OHWM Sediment: removal associated with core location below OHWM
  - Soil: removal associated with core location above OHWM



Lines of Evidence Delineation Process (cont'd)

- OHWM Sediment Removal Boundaries
  - Lower bound is edge of water (EOW)[1]
  - Upper bound is OHWM
  - Lateral bound is Thiessen polygons where multiple samples occur between EOW and OHWM
- Soil Removal Boundaries
  - Lower bound is OHWM
  - Upper bound is elevation or IDW
  - Lateral bound using professional judgment based on lines of evidence
- Additional sampling may be warranted in some locations

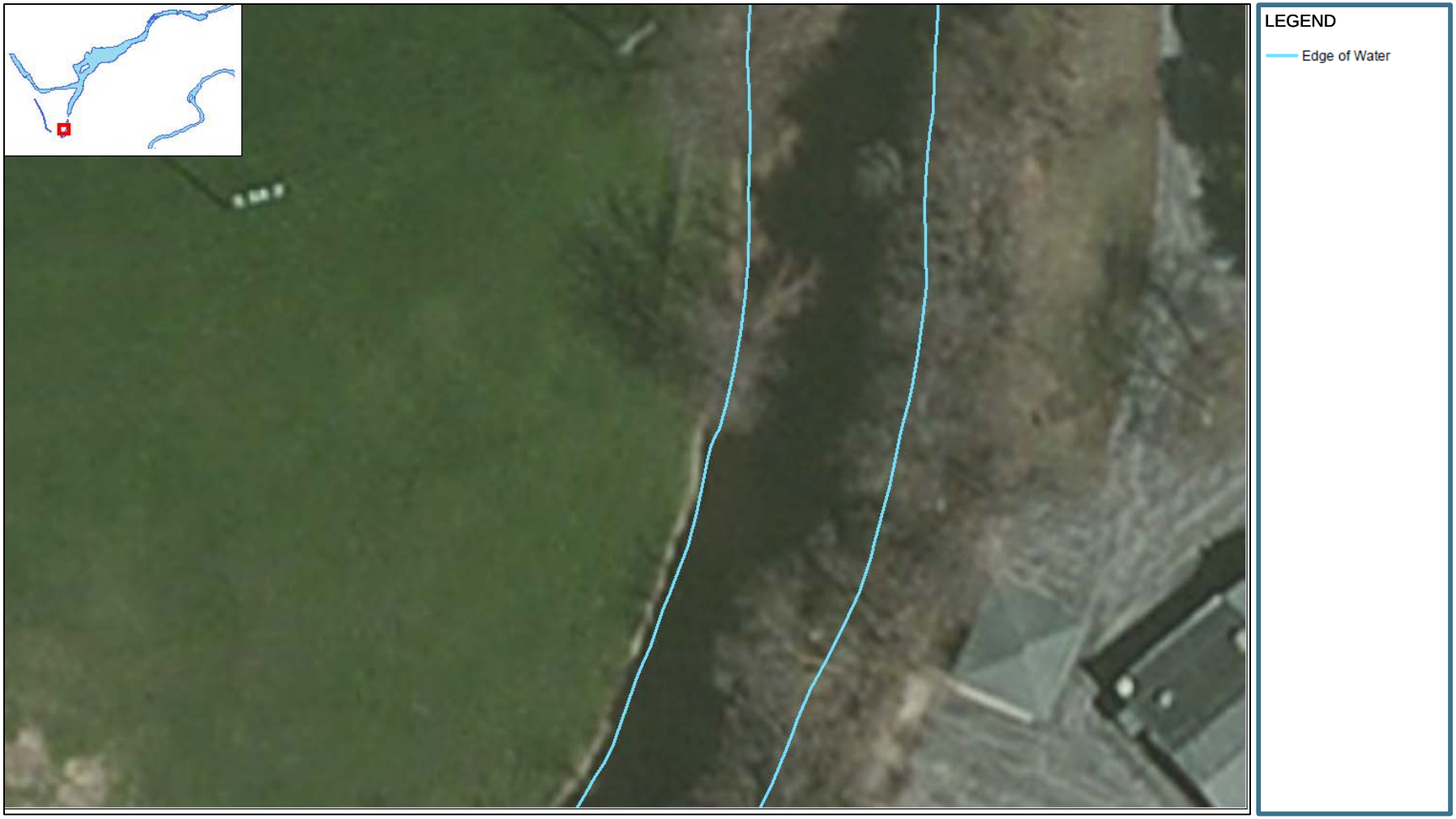
[1]The edge of water was presented in the Remedial Investigation Report and is based on aerial photography flown on March 1, 1997.



Removal Area 6

Removal Area 6

Removal Area 6



Removal Area 6

Removal Area 6

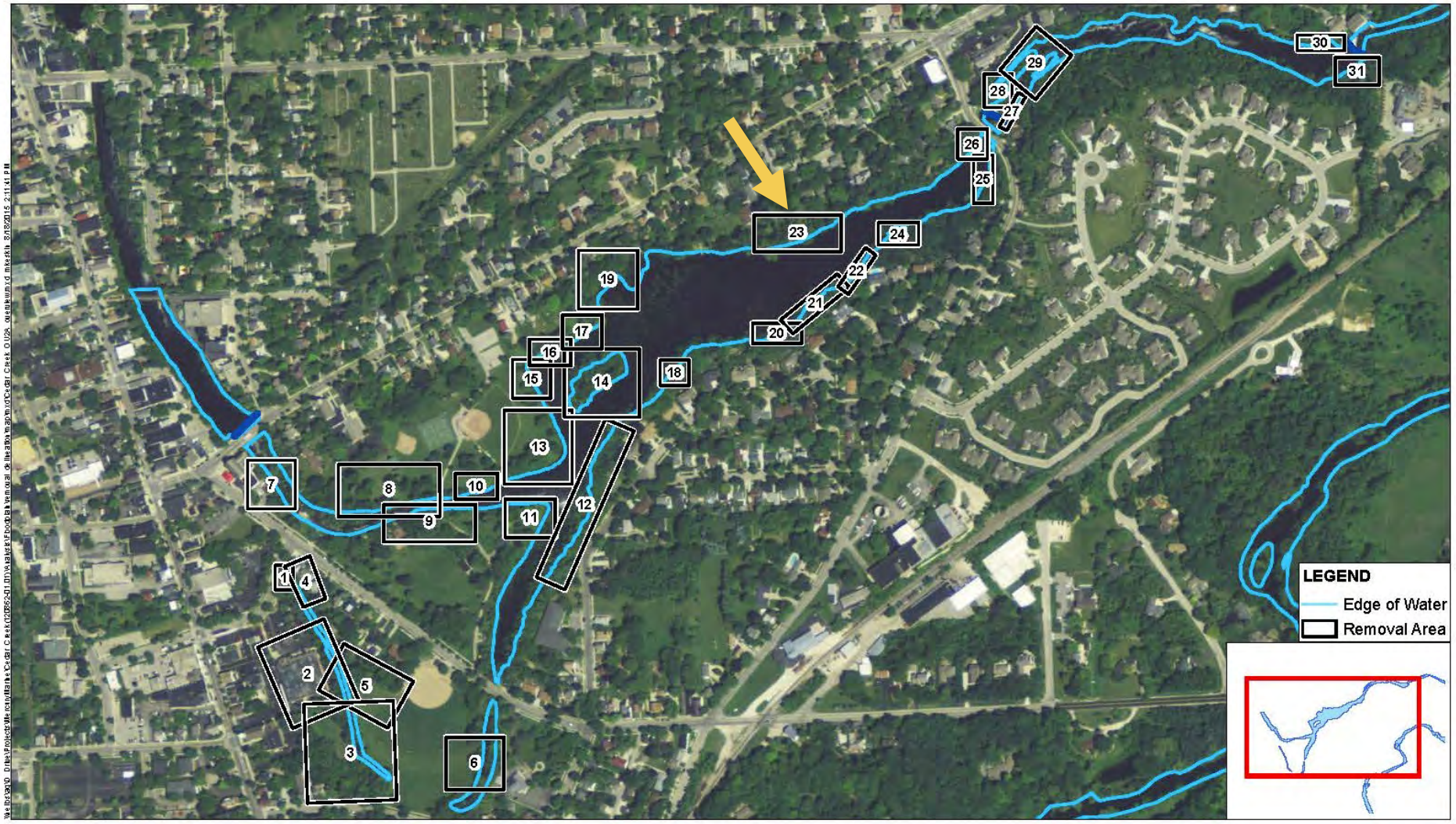
Removal Area 6

Removal Area 6

Removal Area 6

Removal Area 6

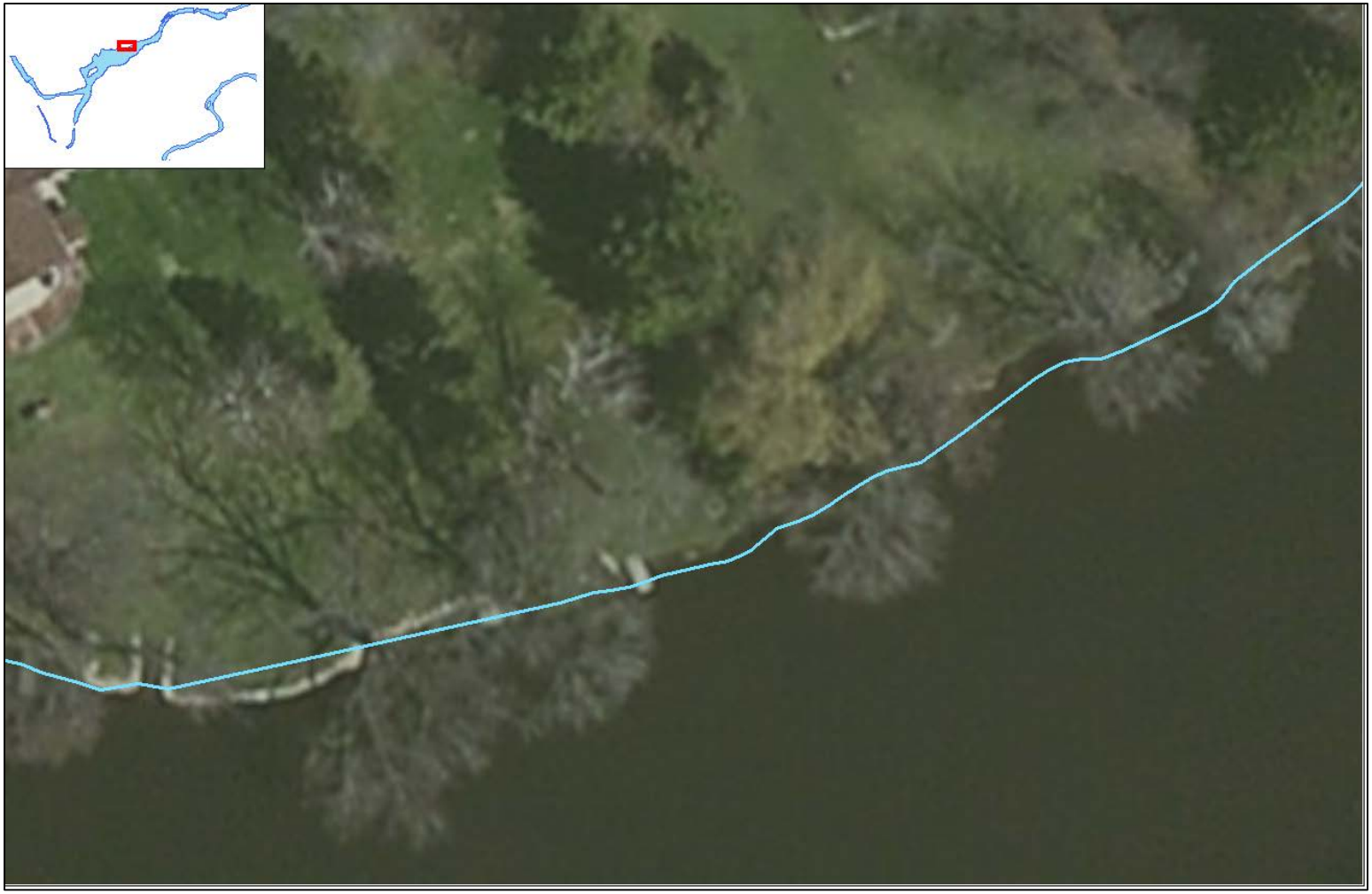
Removal Area 6



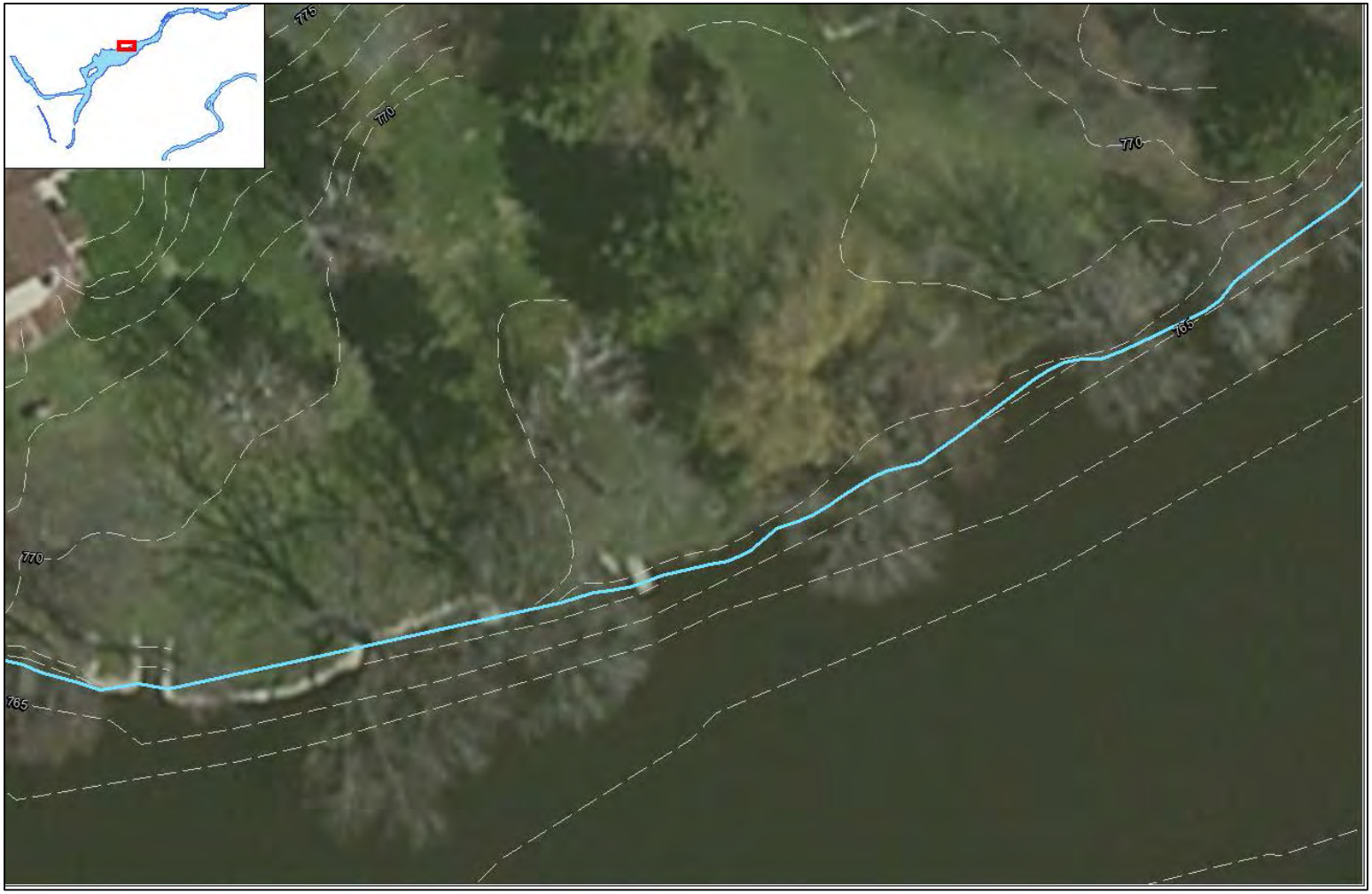
Removal Area 23

Removal Area 23

Removal Area 23



Removal Area 23



Removal Area 23

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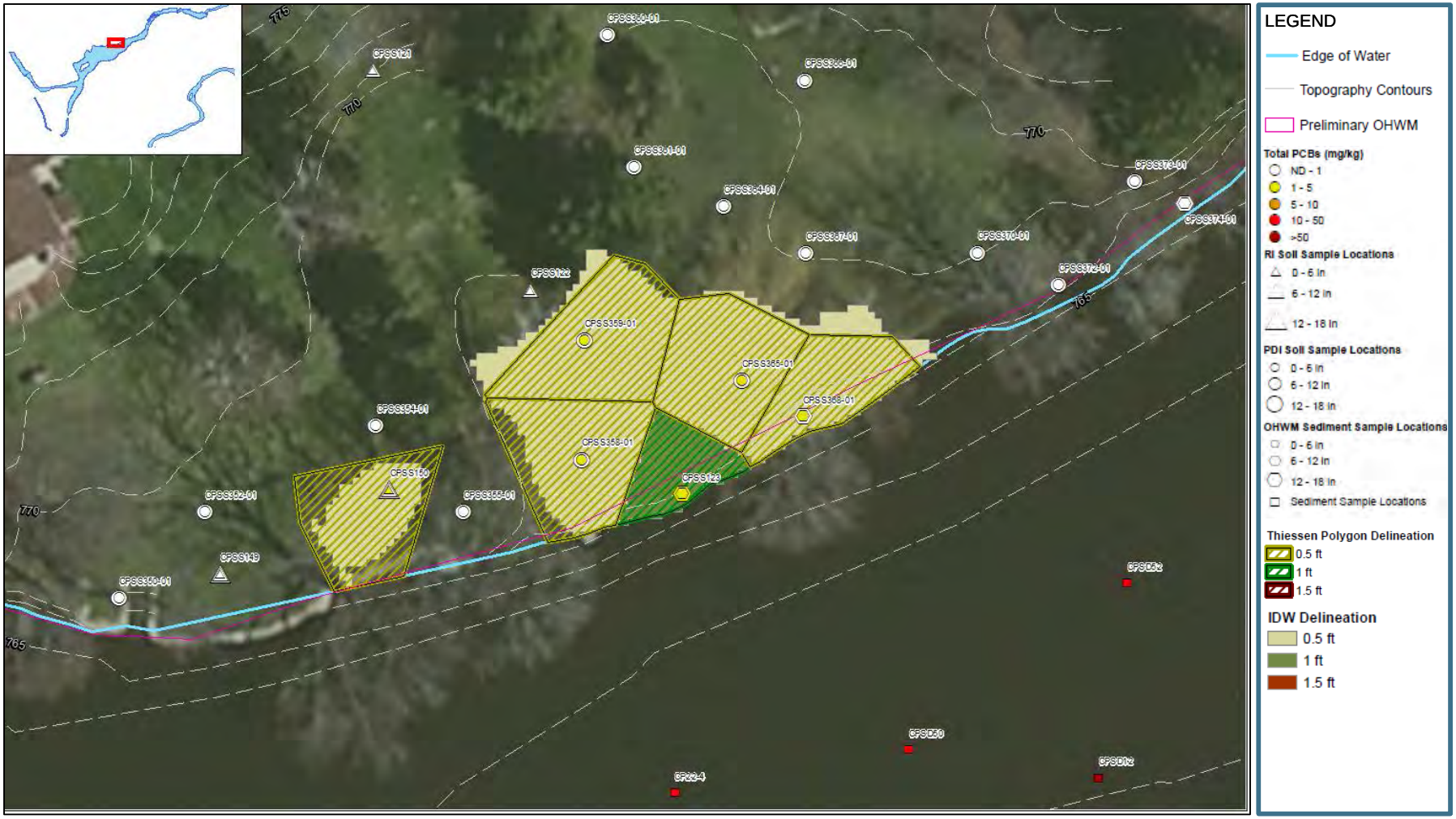
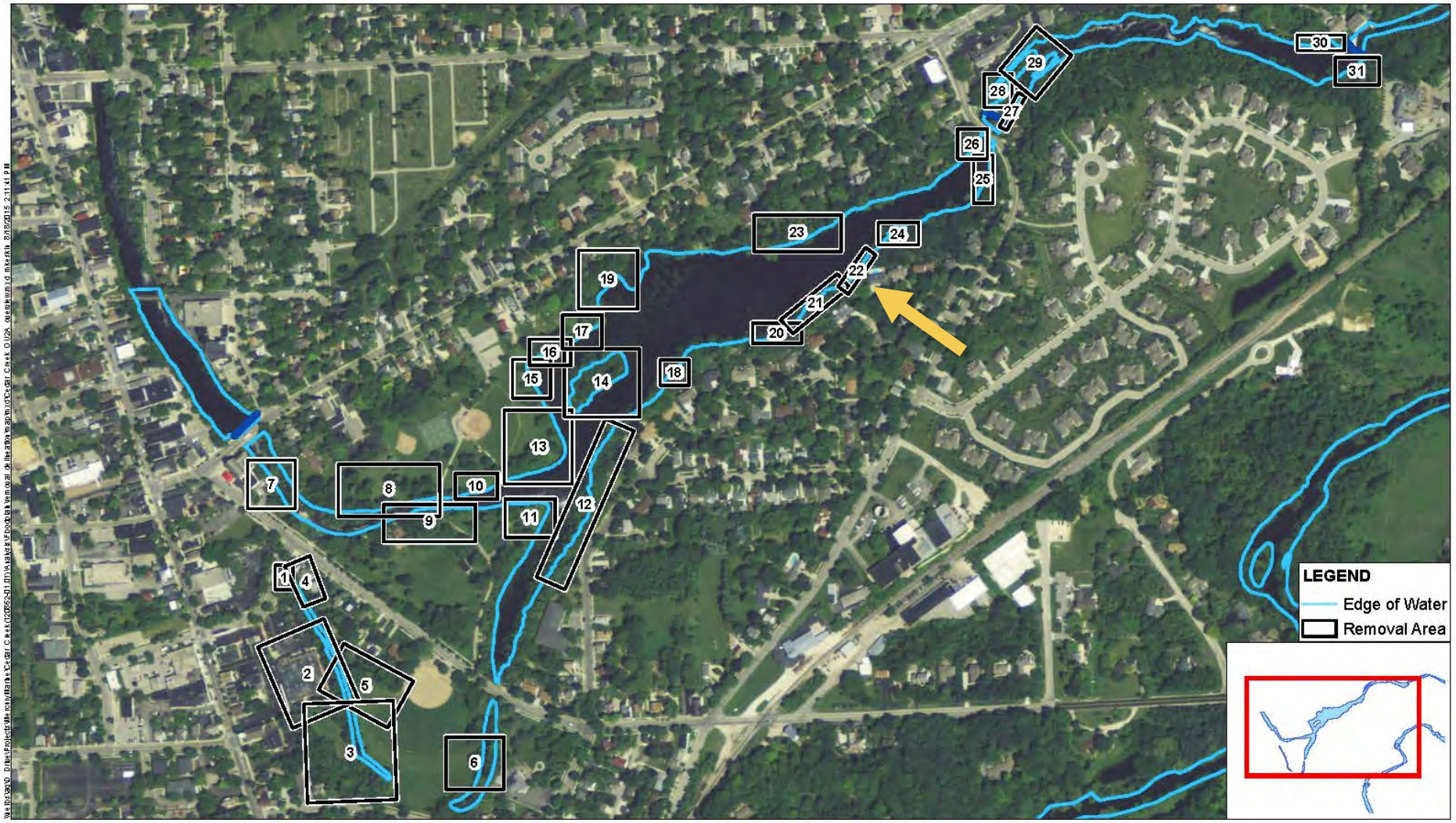


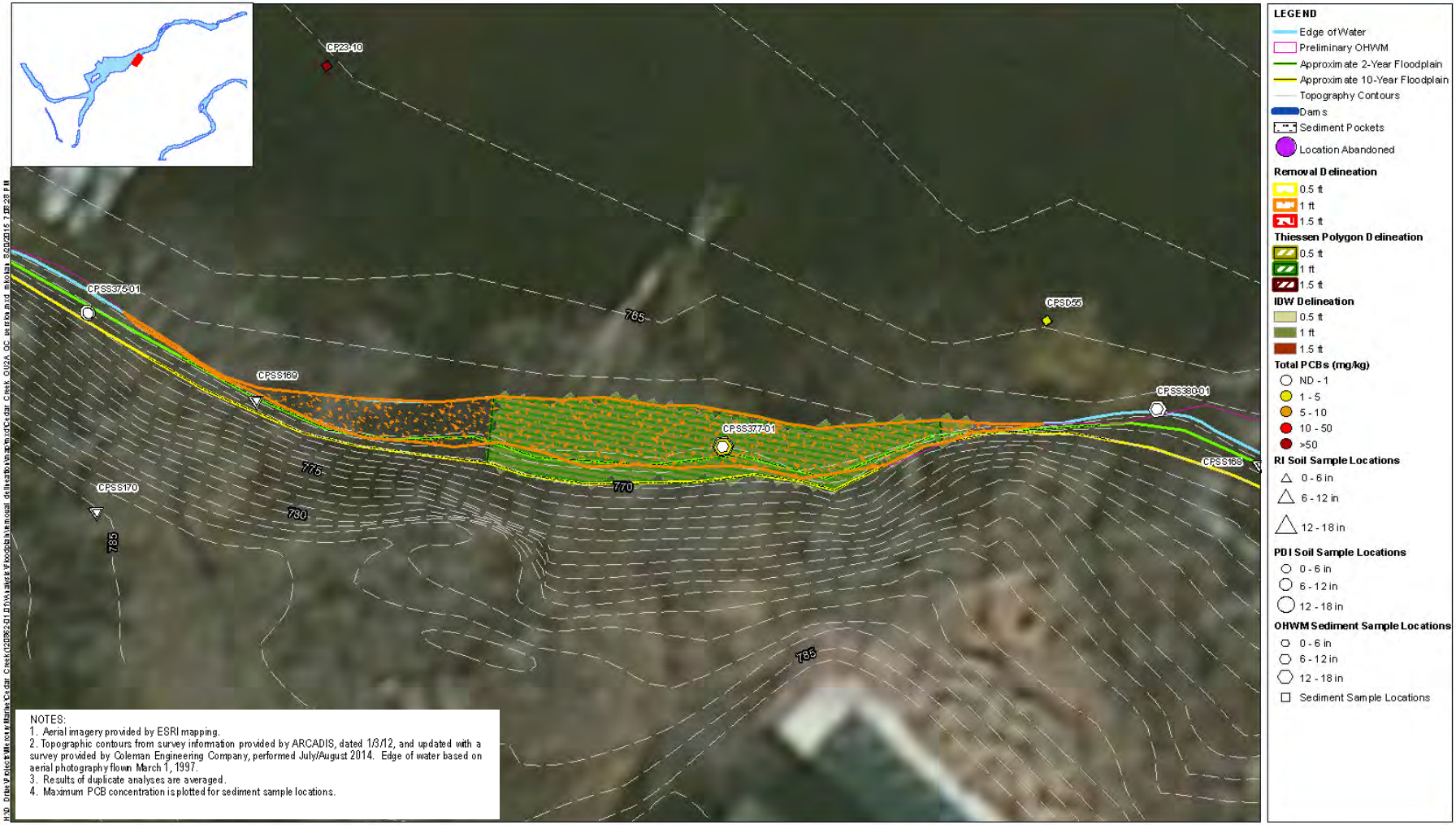
Removal Area 23

Removal Area 23

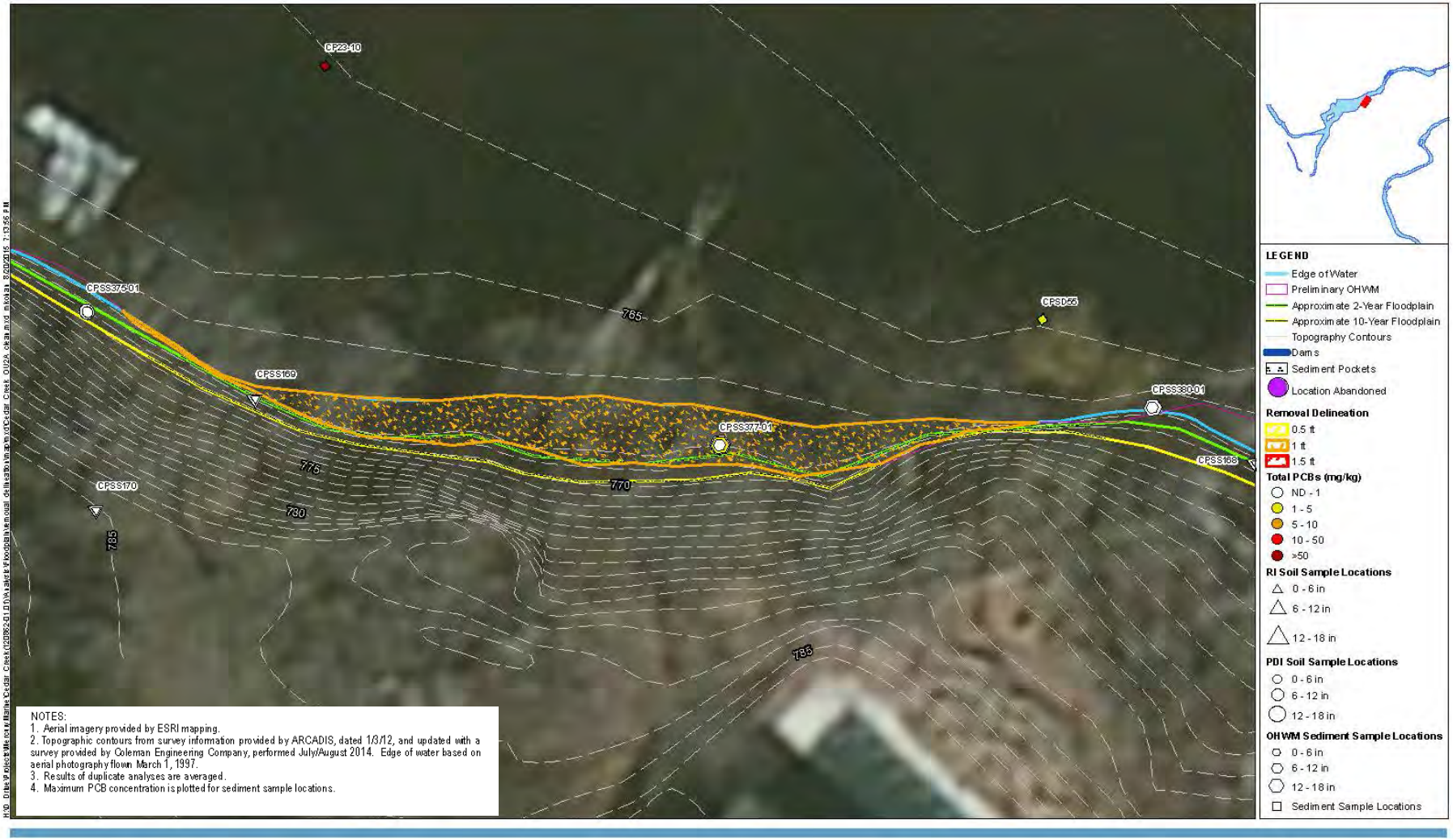


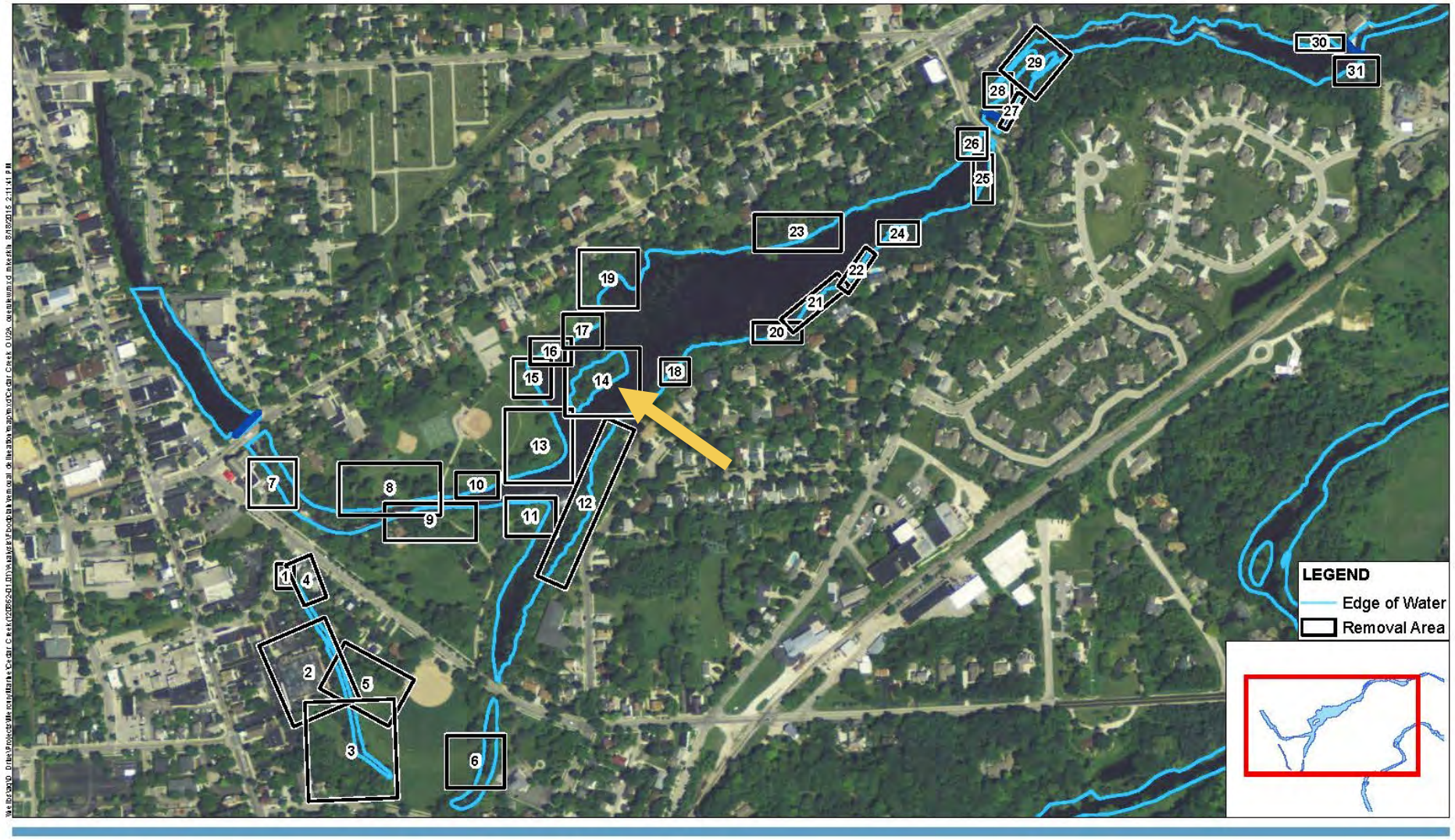
Removal Area 22

Removal Area 22



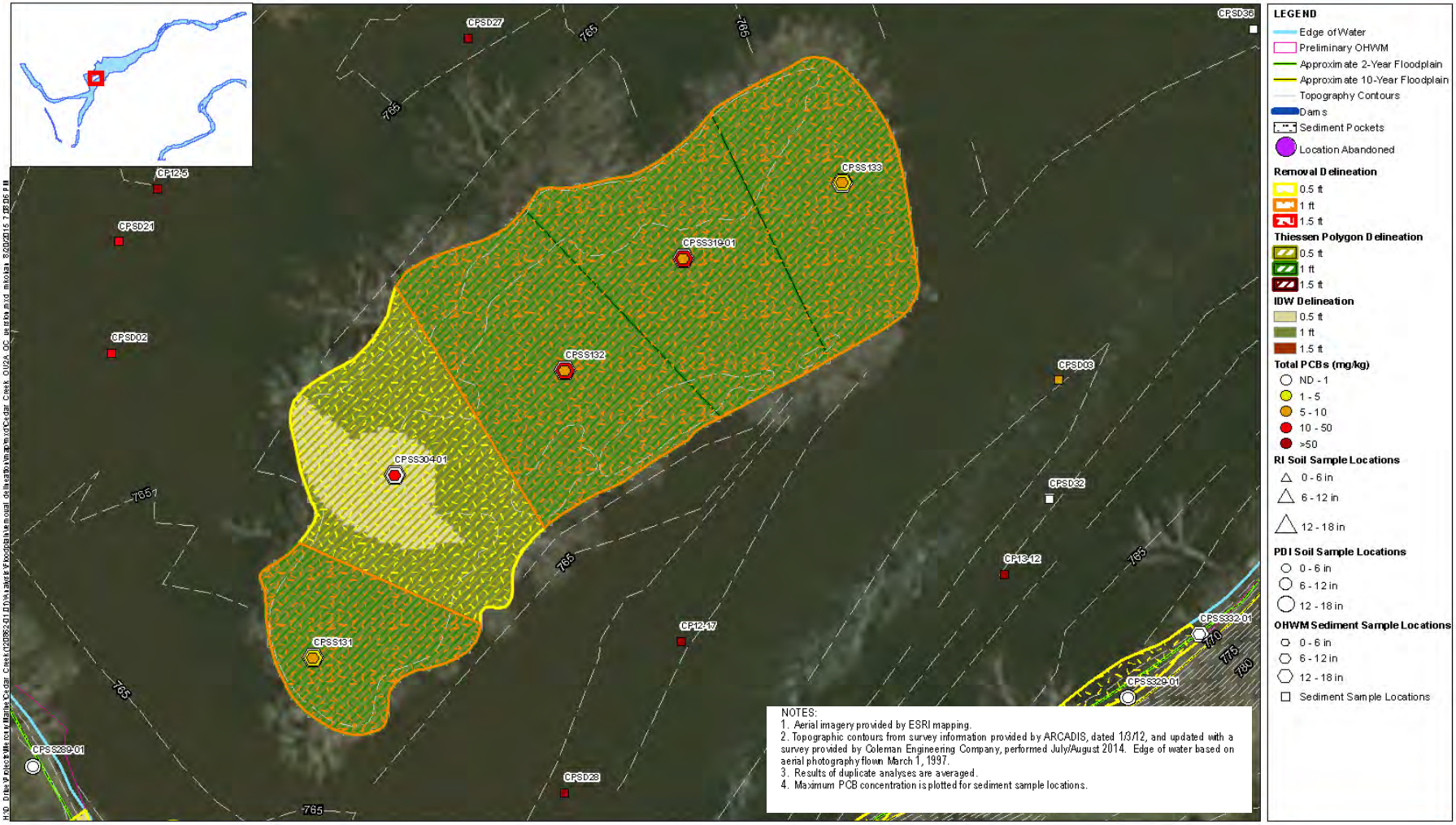
Removal Area 22



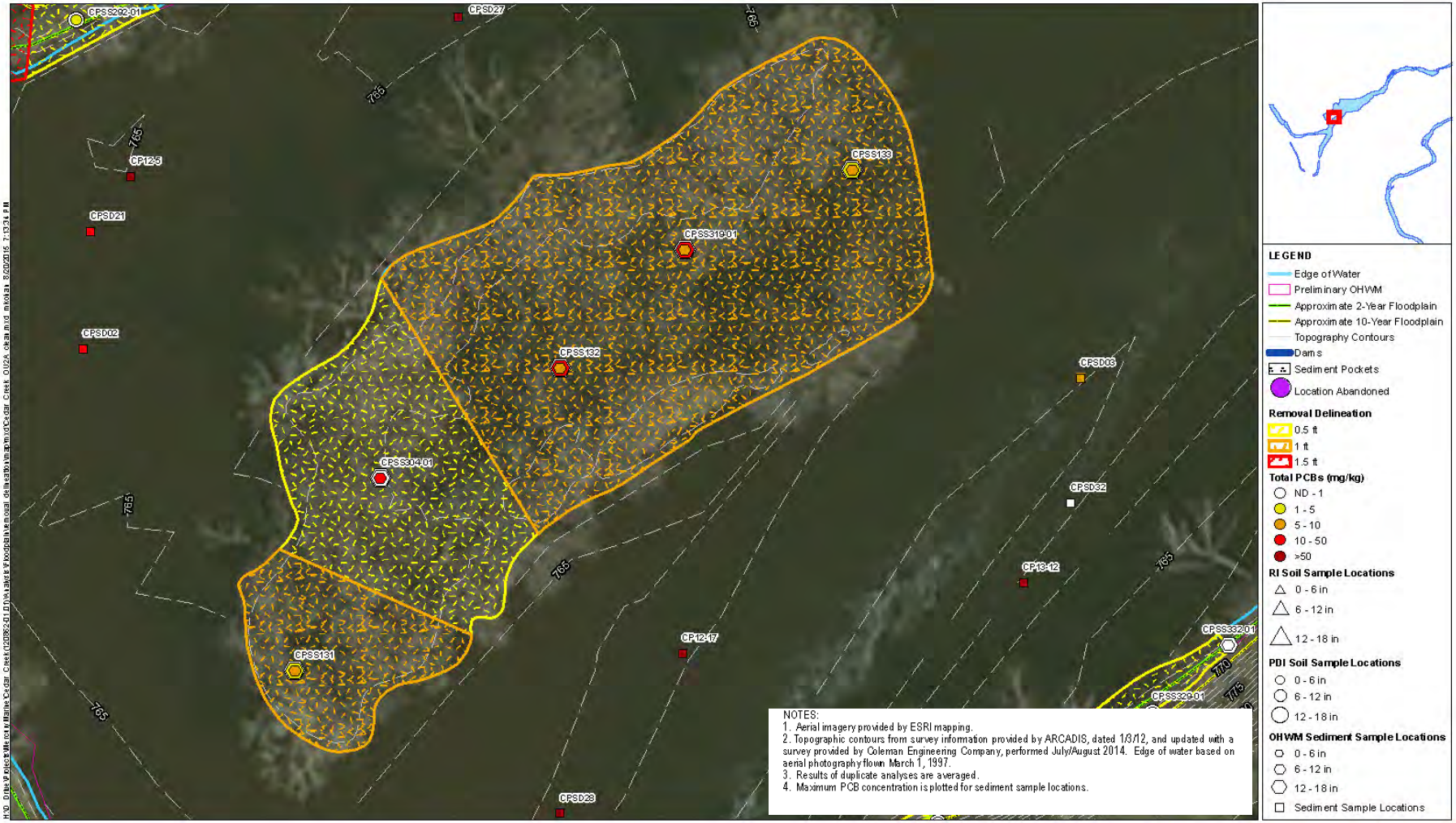


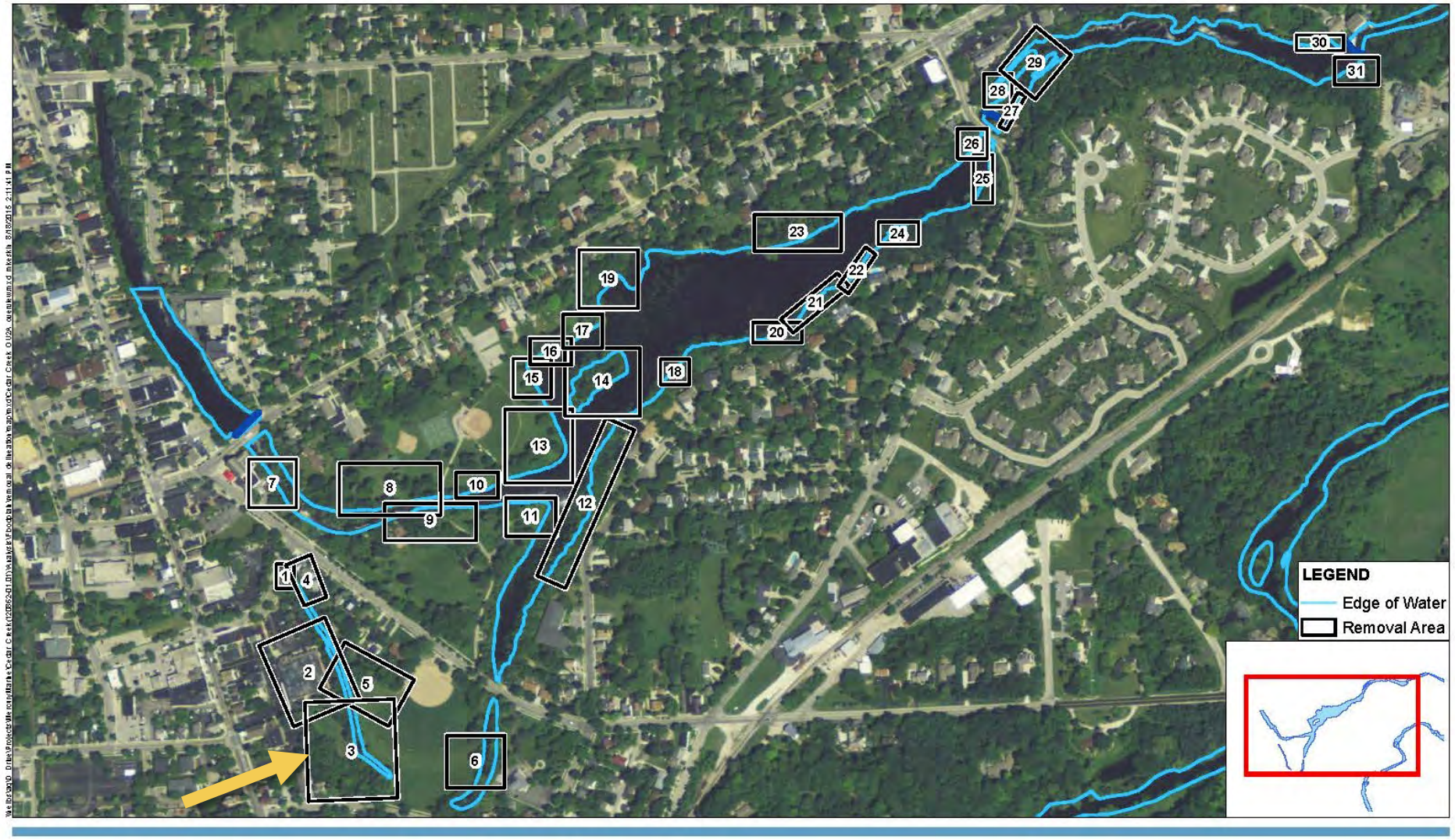
Removal Area 14

Removal Area 14



Removal Area 14

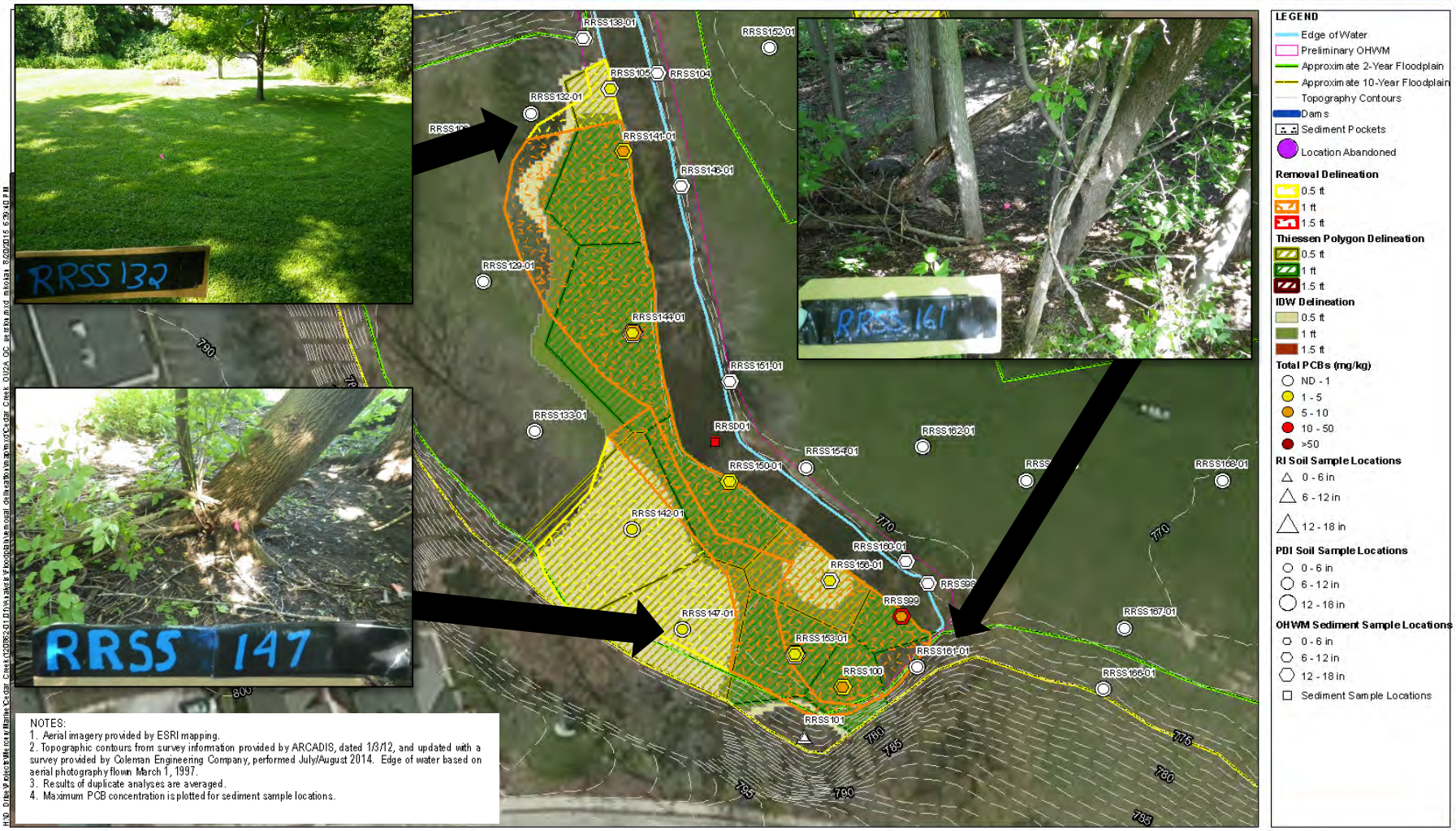




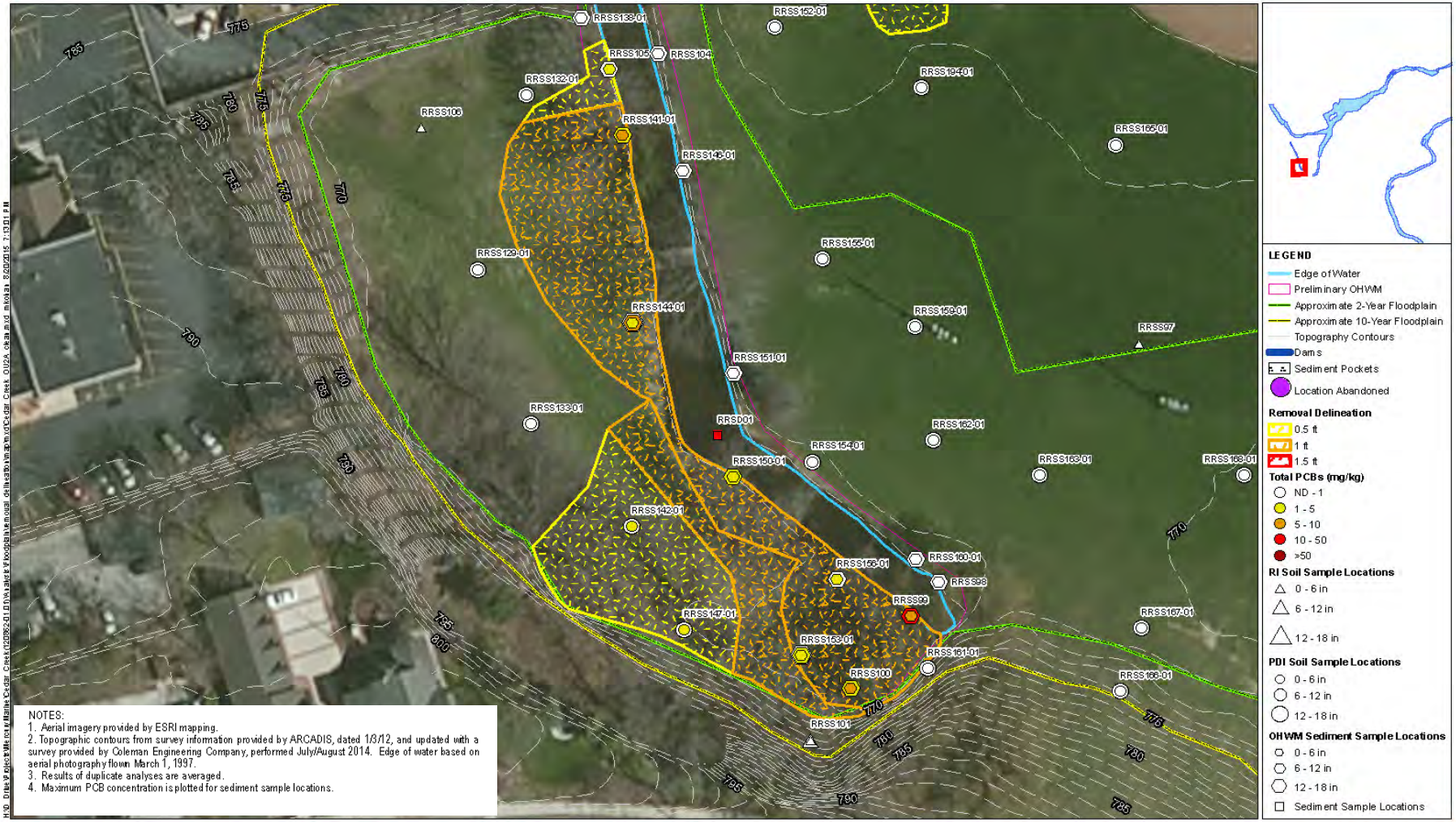
Removal Area 3

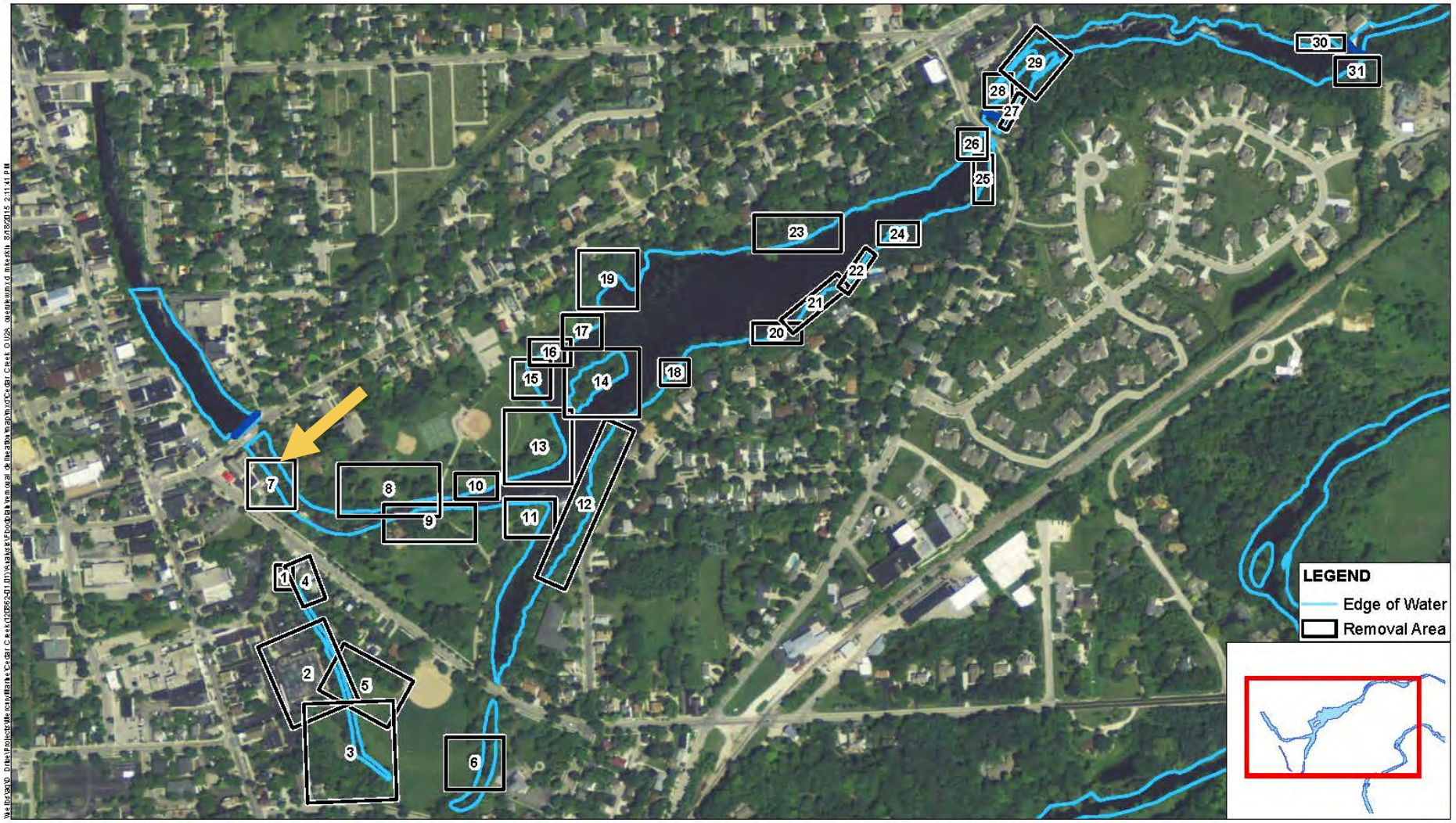
Removal Area 3

Removal Area 3



Removal Area 3



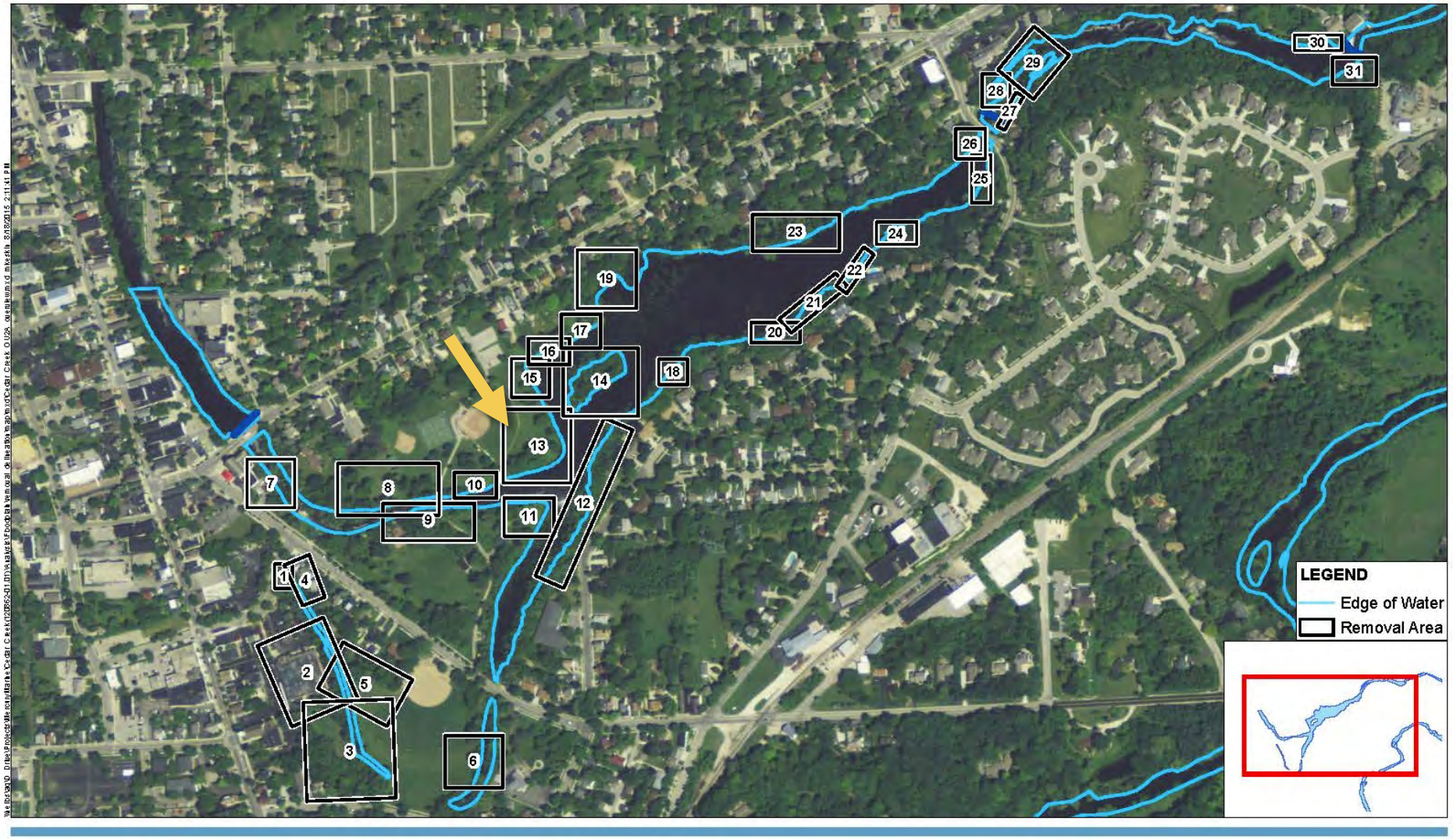


Removal Area 7

Removal Area 7

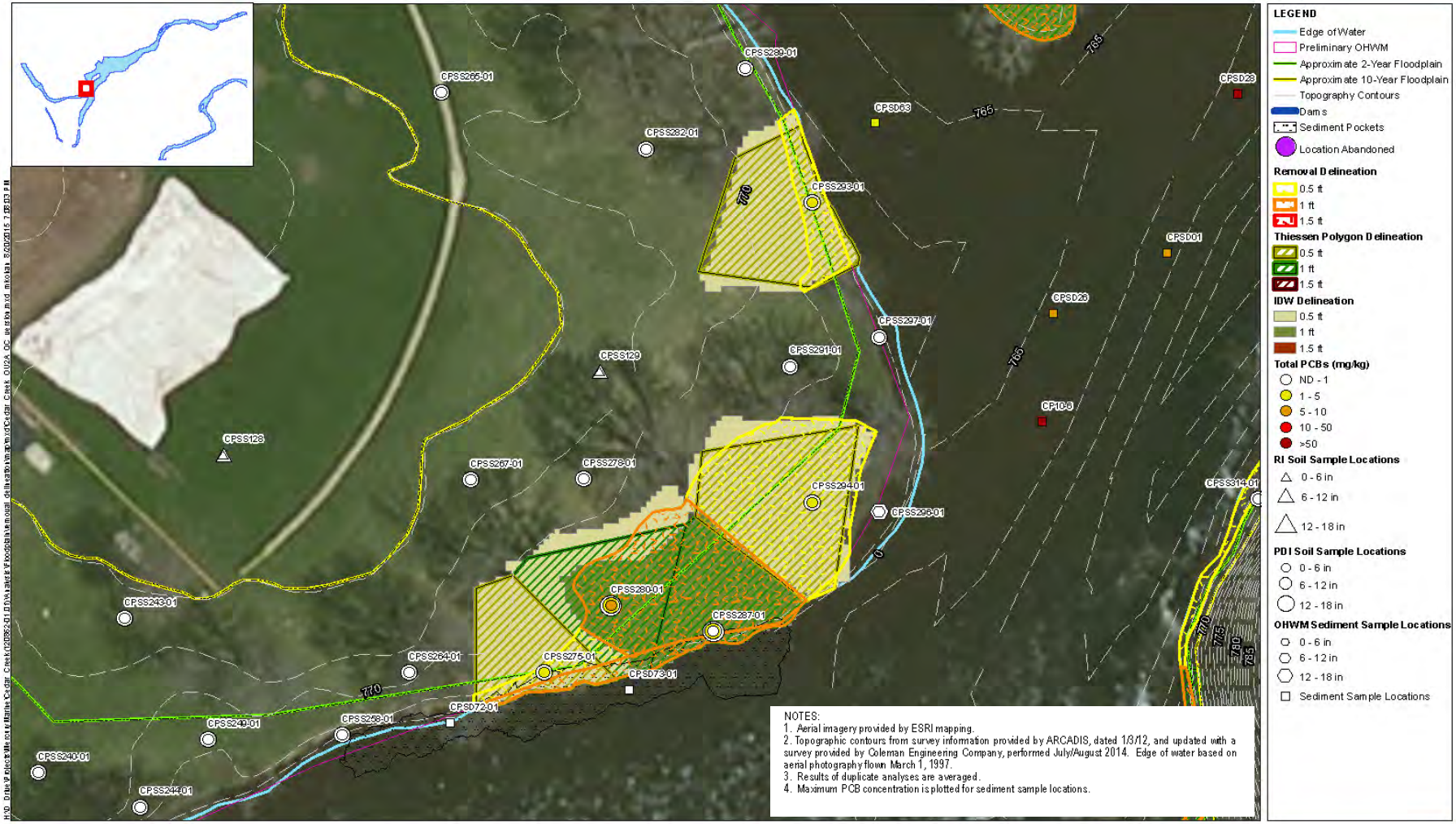
Removal Area 7

Removal Area 7

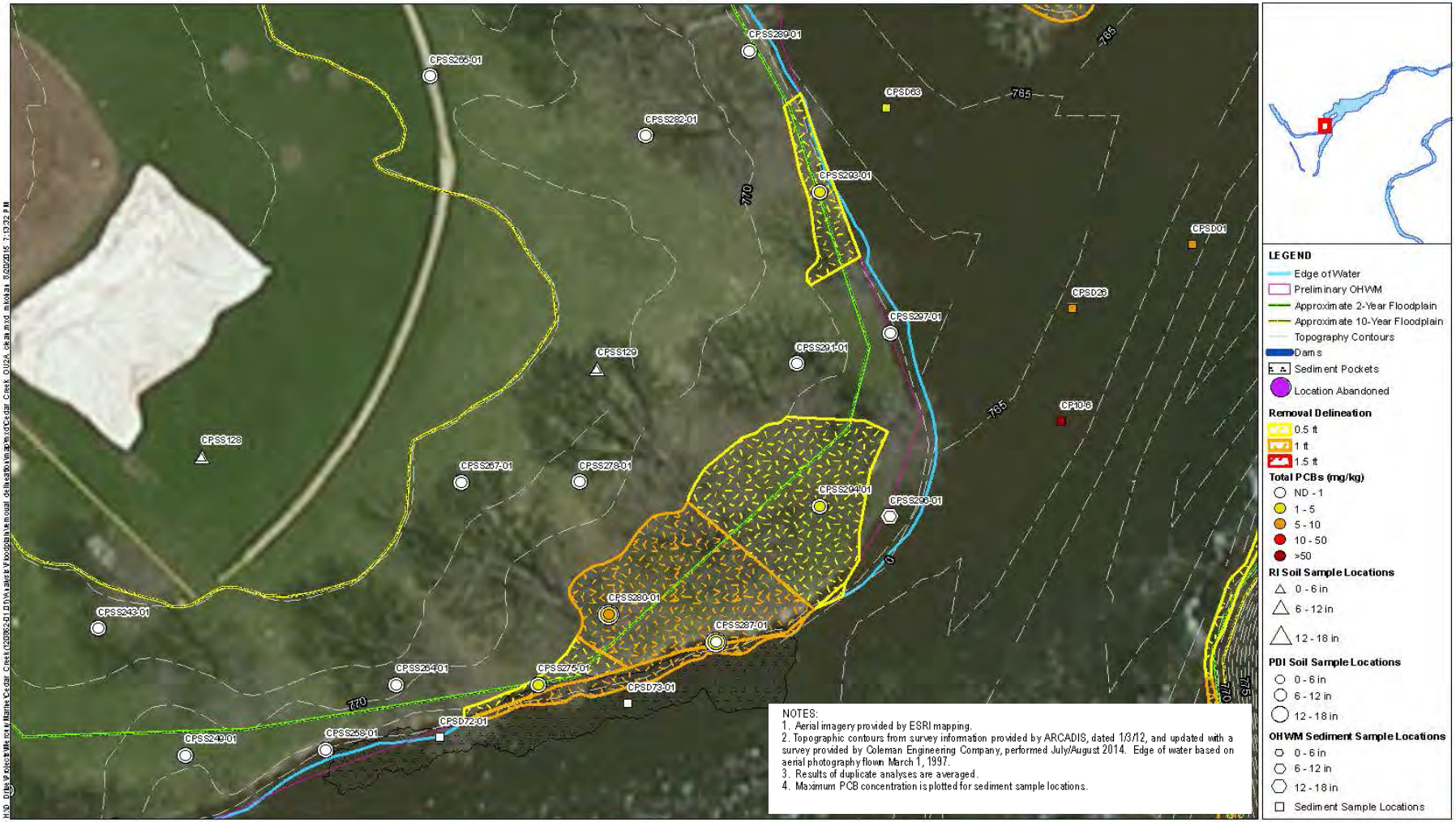


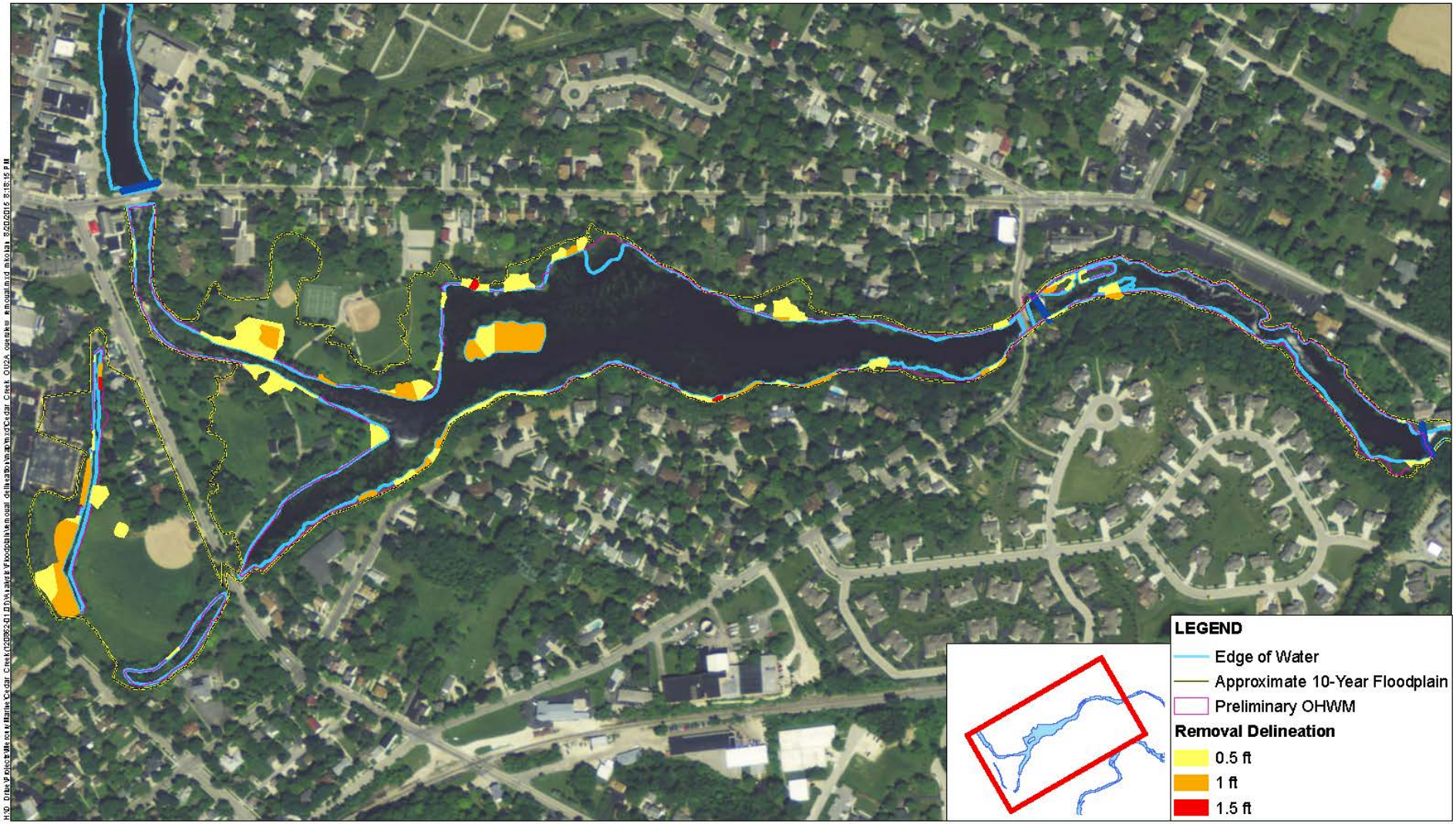
Removal Area 13

Removal Area 13



Removal Area 13





Mercury Marine
Cedar Creek Soil Removal Delineation

ANCHOR QEA

Next Steps

- Team reviews detailed removal area mapping
- Meet for face-to-face meeting week of August 31

Questions/Discussion