

949526



Allied Paper, Inc./Portage Creek/Kalamazoo River River Update Community Advisory Group

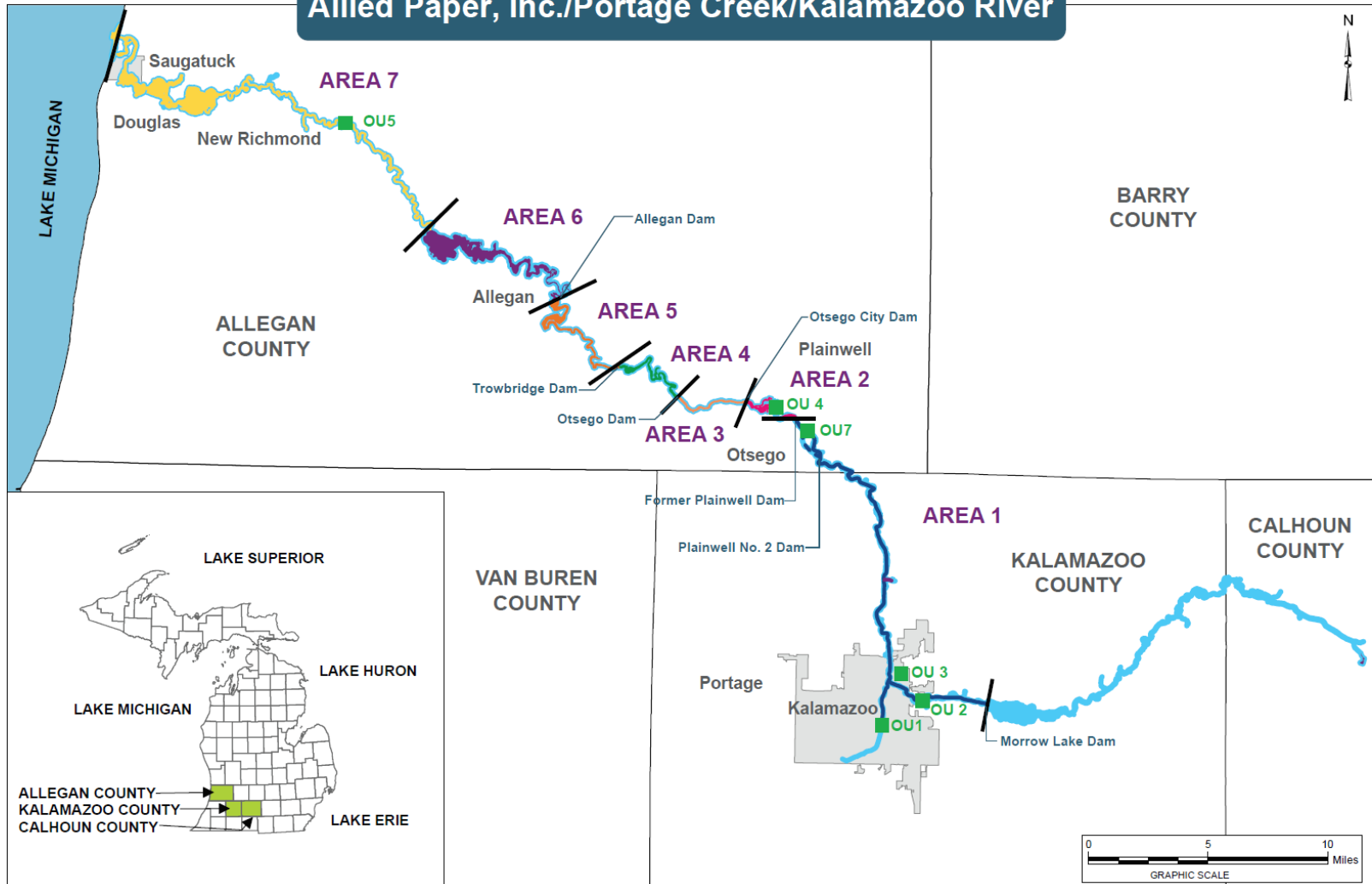
August 8, 2019



Allied Paper, Inc./Portage Creek/Kalamazoo River Site



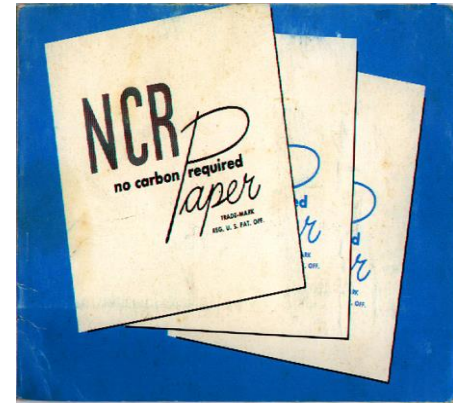
Allied Paper, Inc./Portage Creek/Kalamazoo River



Kalamazoo Site History



- PCBs from recycling of carbonless copy paper 1950s-1970s
- Primary human health exposure pathway through fish consumption
- Ecological exposure pathway to exposed floodplain soils
- The ongoing, uncontrolled erosion of contaminated paper wastes and soils from the river banks is the most significant source of PCB loading to the Kalamazoo River.



Sources of PCBs



paper waste on river banks

Residuals eroding into river



Photos by MDEQ

Kalamazoo Site History



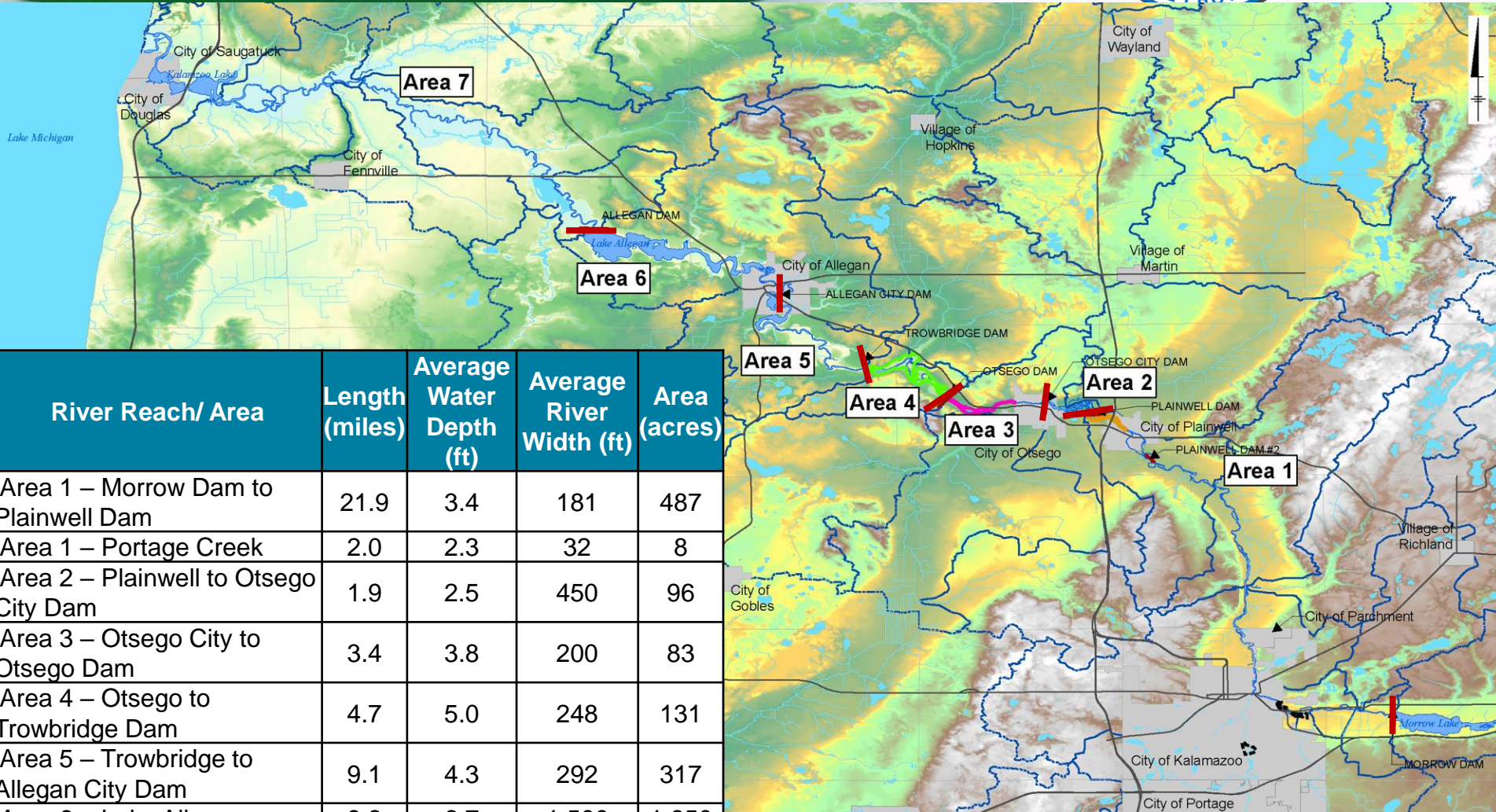
- August 1990: Site placed on NPL
- Michigan lead Agency
- October 2000: Draft RI/FS submitted by PRPs (Kalamazoo River Study Group: Georgia-Pacific/Millennium Holdings LLC)
- 2005: Mediated negotiations between EPA, MDEQ and KRSG
- April 2007: EPA took over lead Agency role for the Kalamazoo River. AOC for Supplemental RI/FS for Kalamazoo River and Portage Creek

Allied Paper, Inc./Portage Creek/Kalamazoo River Site



- Operable Unit 1: Allied Paper Landfill
- Operable Unit 2: Willow Boulevard and A-Site Landfill
- Operable Unit 3: King Highway Landfill
- Operable Unit 4: 12th Street Landfill
- Operable Unit 5: Portage Creek and 80 miles of Kalamazoo River
- Georgia Pacific/Hawthorn Mill Properties
- Operable Unit 7: Plainwell Mill Property

The Seven Areas of Operable Unit 5 (The Kalamazoo River and Portage Creek)



River Reach/ Area	Length (miles)	Average Water Depth (ft)	Average River Width (ft)	Area (acres)
Area 1 – Morrow Dam to Plainwell Dam	21.9	3.4	181	487
Area 1 – Portage Creek	2.0	2.3	32	8
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Area 3 – Otsego City to Otsego Dam	3.4	3.8	200	83
Area 4 – Otsego to Trowbridge Dam	4.7	5.0	248	131
Area 5 – Trowbridge to Allegan City Dam	9.1	4.3	292	317
Area 6 – Lake Allegan	9.8	6.7	1,500	1,650
Area 7 – Allegan Dam to Lake Michigan	26	5.5	212	670

Pre- and Post-Dam Water Levels

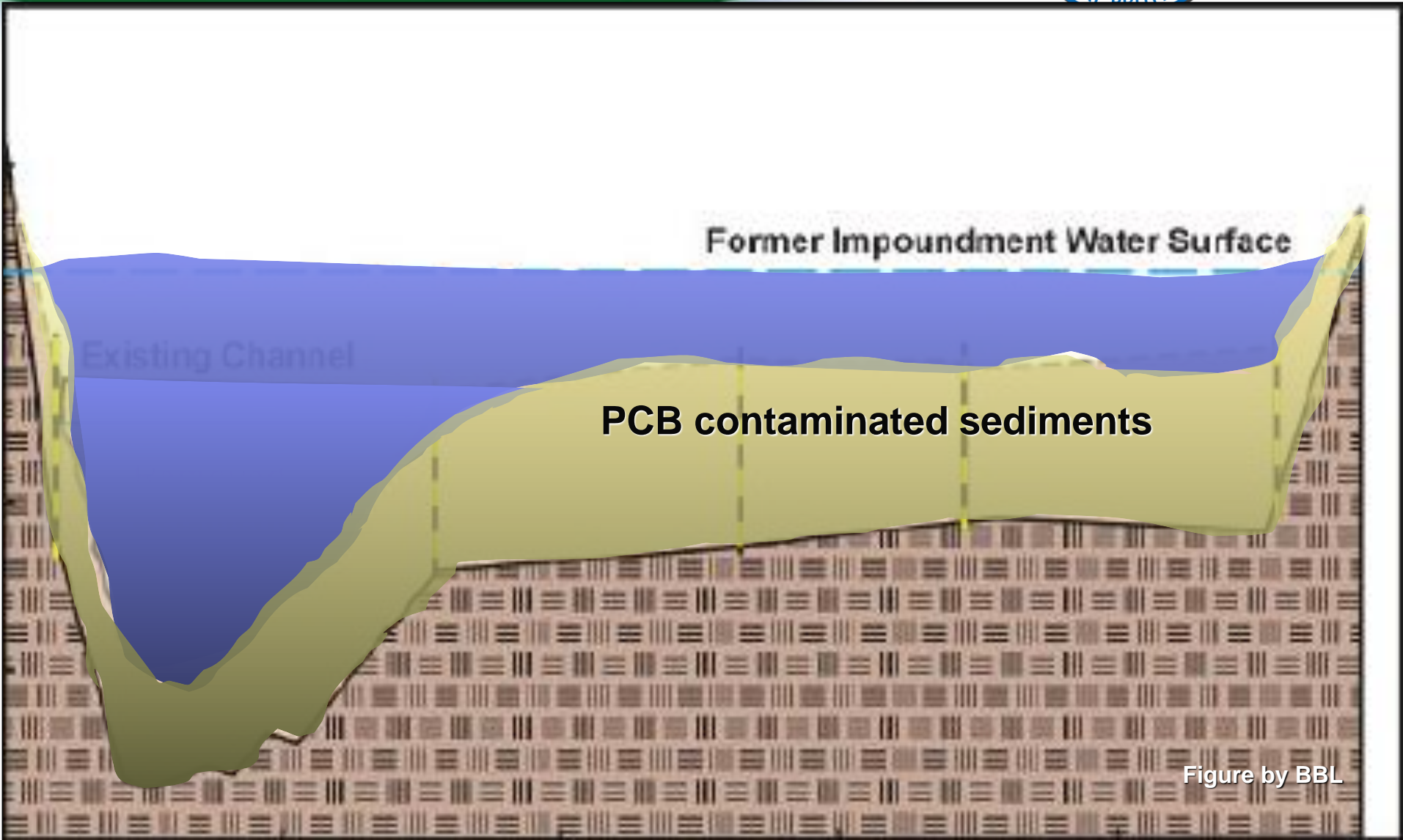


Figure by BBL



Remedial Action Objectives



- **RAO 1: Protect people who consume Kalamazoo River fish from exposure to PCBs that exceed protective levels. The RAO is expected to be progressively achieved over time by meeting the following targets for fish tissue and sediment.**
 - **Fish Tissue Targets**
 - A reduction in fish tissue to the Michigan fish advisory level for smallmouth bass to two meals per month (0.11 mg/kg total PCBs) within 30 years.
 - Achieve a non-cancer hazard index (HI) of 1.0 and a 10^{-5} cancer risk within 30 years for the high-end sport angler (100% bass diet; 125 meals/year)
 - **Sediment Target**
 - A SWAC of 0.33 mg/kg or less in the Kalamazoo River following completion of the remedial action

Remedial Action Objectives



- **RAO 2: Protect aquatic ecological receptors from exposure to concentrations of PCBs in sediments that exceed protective levels for local populations.**
- **RAO 3: Protect terrestrial ecological receptors from exposure to concentrations of PCBs in soils that exceed protective levels.**
- **RAO 4: Reduce the transport of PCBs from to downstream areas of the Kalamazoo and Lake Michigan.**
- **RAO 5: Protect people that reside from exposure to PCBs that exceed protective levels.**

Fish/Sediment/Soil PRGs



PRGs for Area 1 of OU5	
Media	PRG for Total PCBs
Fish Tissue	0.042 mg/kg (RAO 1, cancer risk of 1×10^{-5}) 0.072 mg/kg (RAO 1, non-cancer HI of 1) 0.6 mg/kg (RAO 2, ecological receptors)
Sediment	0.33 mg/kg (SWAC in each river section)
Floodplain Soil	11 mg/kg (all areas except residential) 2.5 mg/kg (residential areas)

Risk Based PCB Concentrations for Fish Tissue (mg/kg)

Receptor	Fish tissue concentration protective at target Cancer Risk of 1E-05	Fish tissue concentration protective at target Hazard Index of 1 (Immunotoxicity)
Sport Angler – CTE Assumes 24 meals/year 15 g/day; bass only	0.109	0.187
Sport Angler-RME Assumes 125 meals/year 78 g/day; 50% site; bass only	0.042	0.072
Subsistence Angler Assumes 179 meals/year 110 g/day; bass only	0.015	0.025

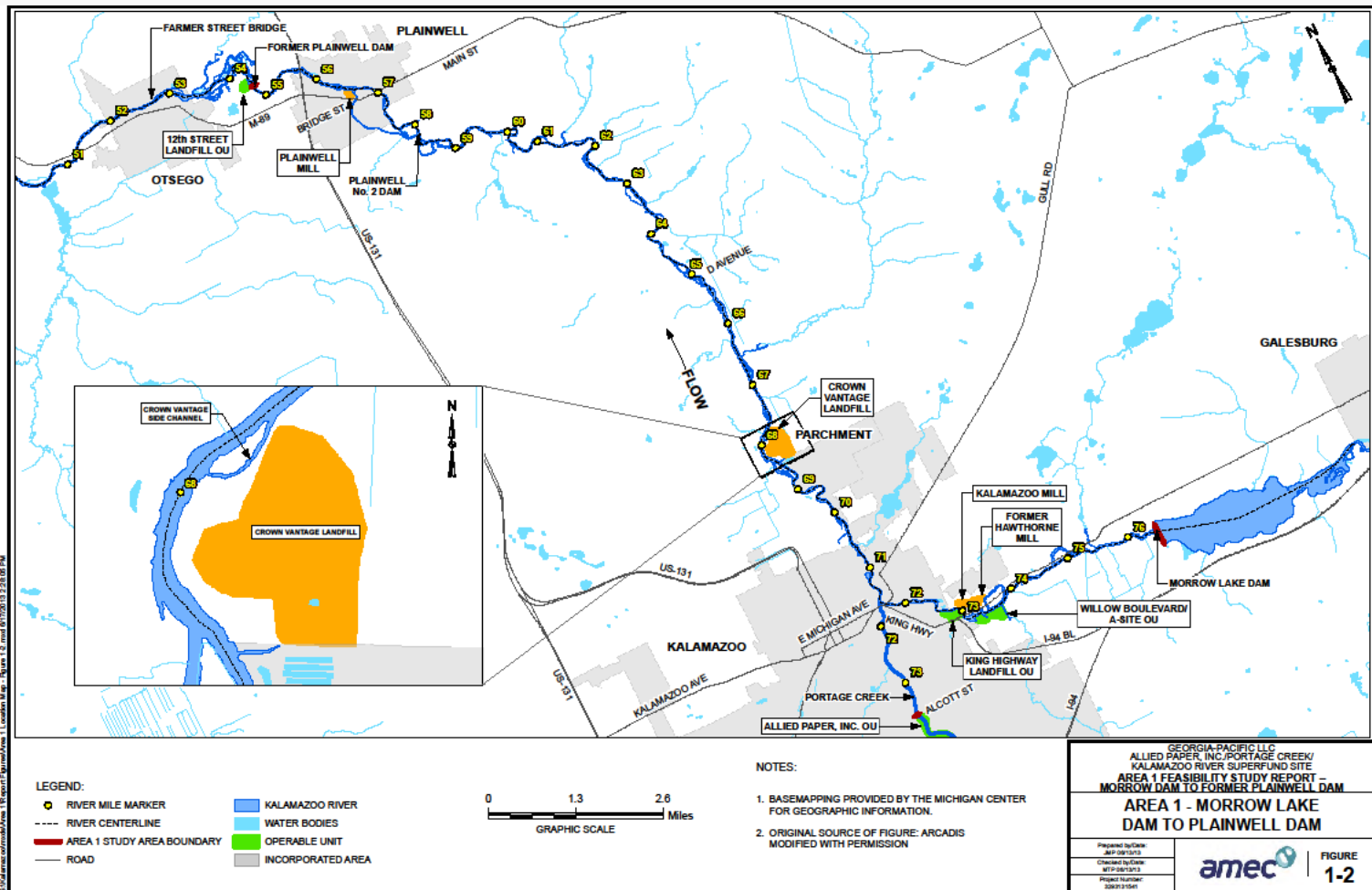
Reference Area (Background) Fish Concentrations (Average)

Species	Ceresco mg/kg PCB	Morrow Lake mg/kg PCB
Bass	0.03 <small>Below PRG for Sport Angler – RME, Bass Only</small>	0.14
Carp	0.24	0.50

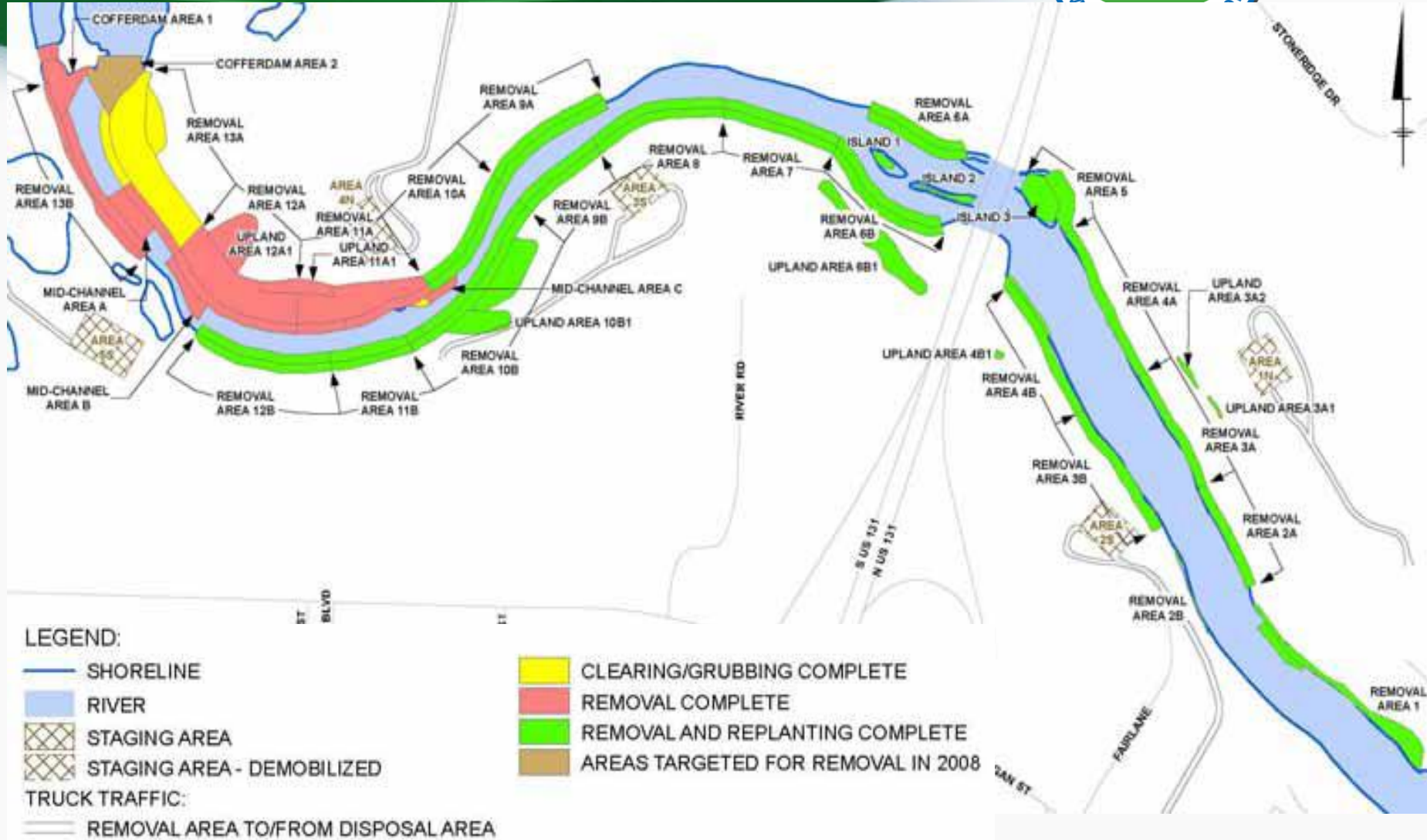
Area 1 of Operable Unit 5 (The Kalamazoo River and Portage Creek)



- Record of Decision: September 2015



Plainwell Time Critical Removal Action (TCRA)



Plainwell Dam Removal



- Conducted April 2007 to December 2009
- Removed 128,000 cy bank and in-stream PCB contaminated sediment
- Addressed 2 miles of the Kalamazoo River from Plainwell to the Plainwell Dam
- Removed the existing Plainwell dam and restored river to historical free-flowing channel



Plainwell TCRA



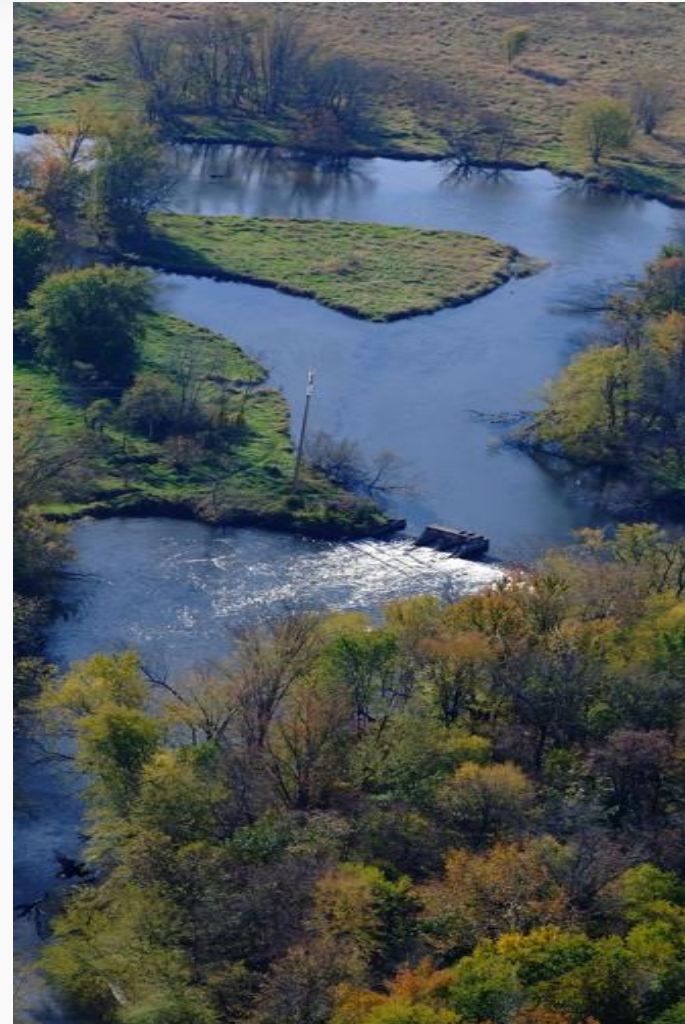
River Flowing Through New Western Channel



Plainwell No. 2 Dam TCRA



- August 2009 to December 2011
- 1.9 miles of river bank
- Removal of 14,200 cy PCB contaminated bank and floodplain material
- 12,000 cubic yards of soil removed from banks and floodplain
- 2,200 cubic yards from oxbow/river area





09.25.2009 14:58



09.23.2009 08:54



10.13.2009 14:48



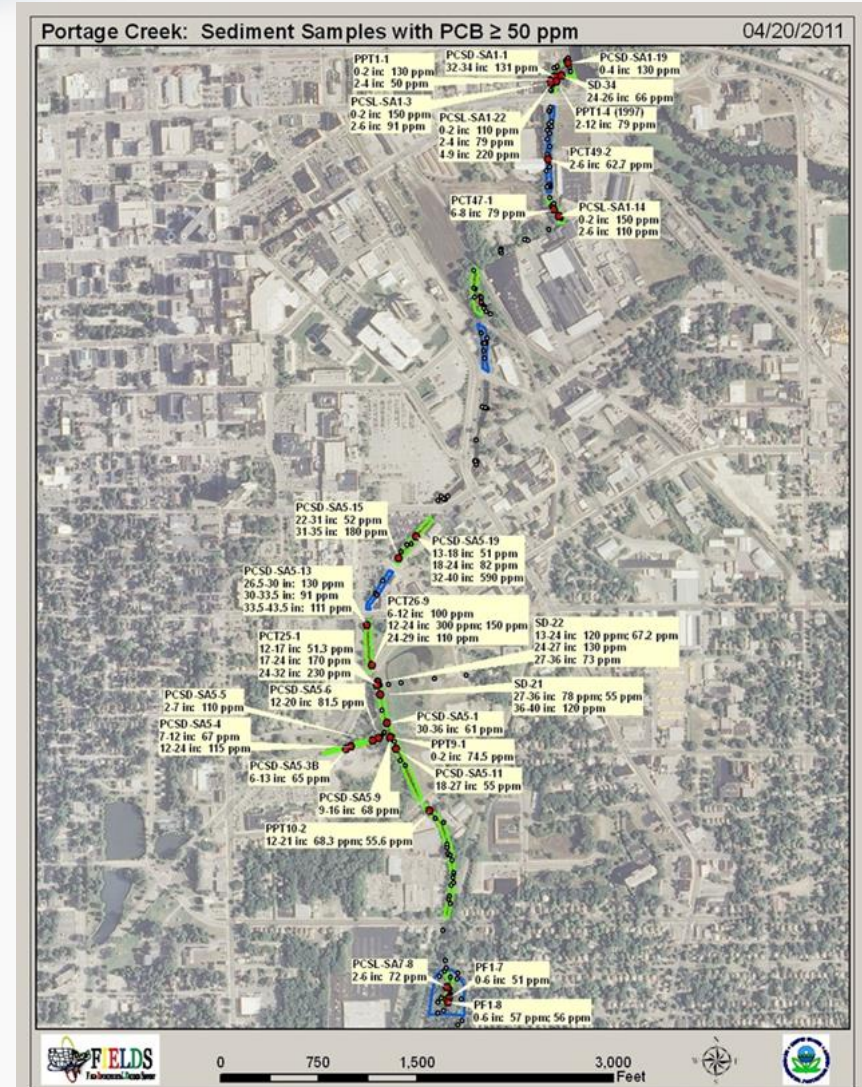
10.21.2009 09:13



Portage Creek TCRA



- EPA lead: 2011-2014
- Significant PCB source
- \$16M

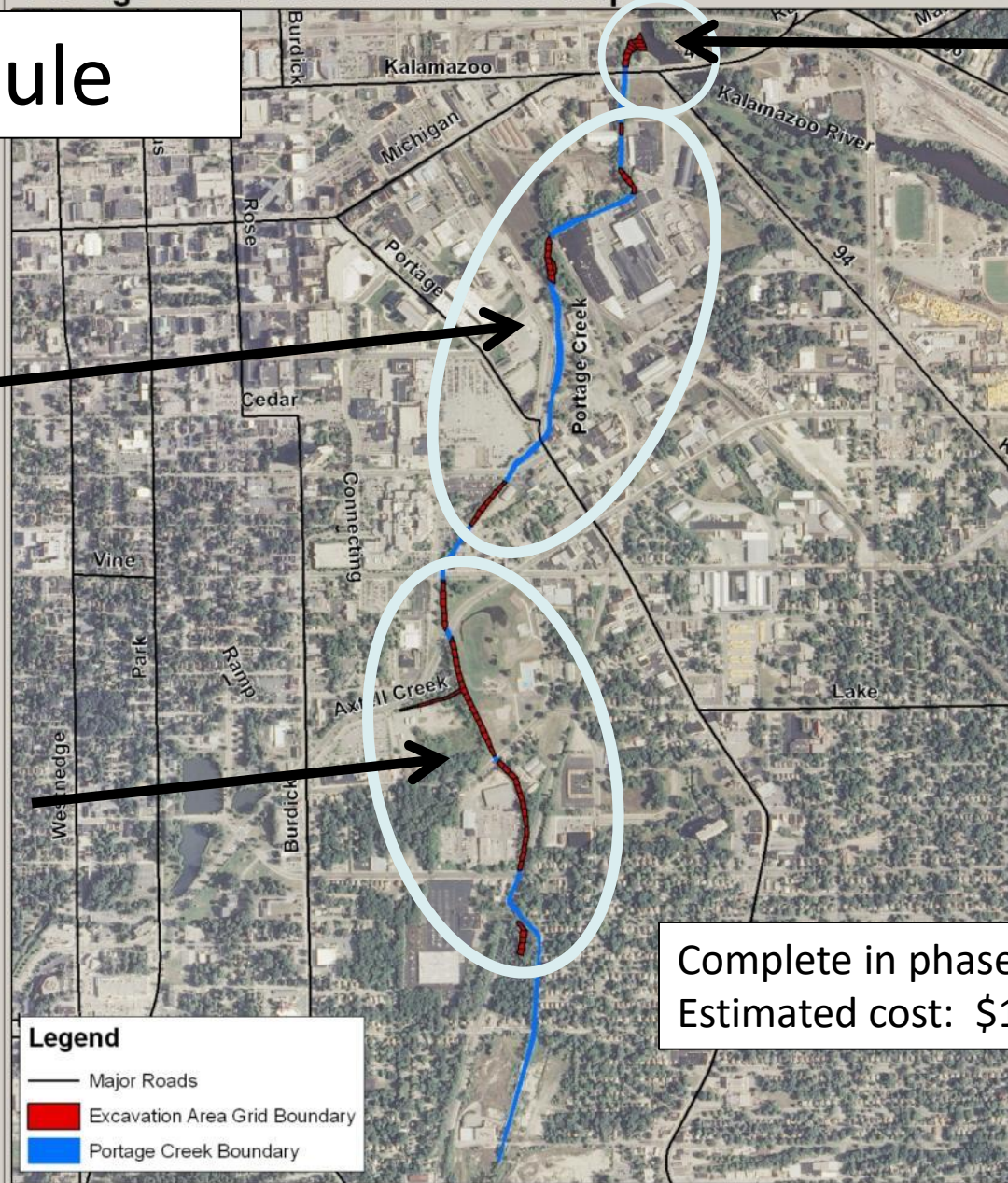


Schedule

2014
SA1-A

SA5-A
SA3-A
SA1-B&C

2012
SA7
SA6
Axtell Creek
SA5D&C
- completed -



Complete in phases in 2-4 yrs
Estimated cost: \$15.8m

Legend

- Major Roads
- █ Excavation Area Grid Boundary
- █ Portage Creek Boundary



Work Area Preparation



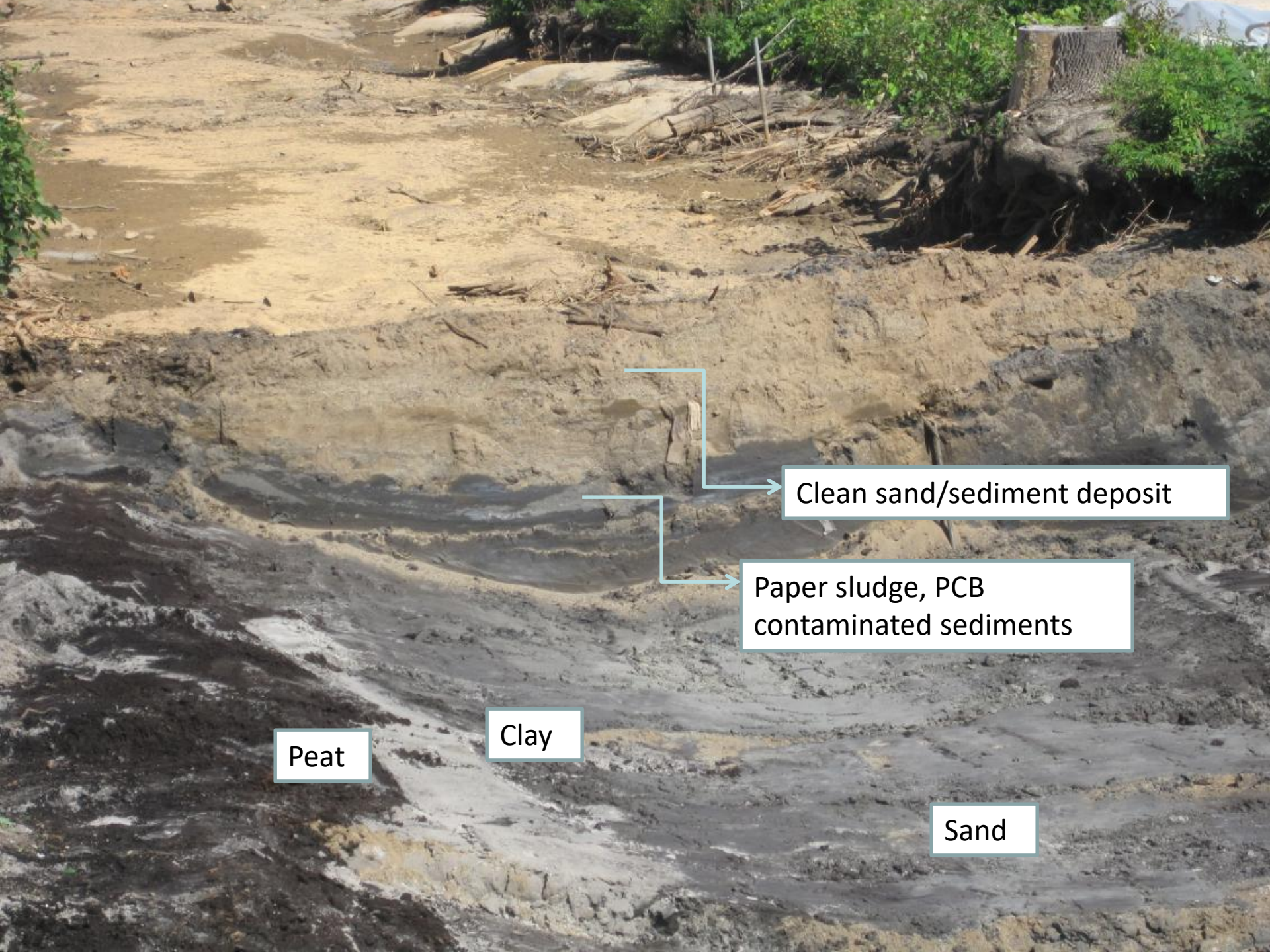
Clearing & Mat Placement

04/30/2012 13:33



Creek Bypass Pump System





Clean sand/sediment deposit

Paper sludge, PCB contaminated sediments

Peat

Clay

Sand



09/07/2012 17:58



SA5A Redevelop



Area 1 Work



- Three Removals
 - 2007-2014
 - \$75M
- ROD
 - 2015
 - Sediment hot spot remediation in a 3-mile upstream reach
 - Floodplain soil excavation beyond scope of Plainwell TCRA
 - \$23M

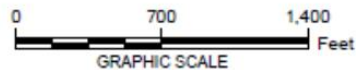
Floodplain Remediation Area




G:\GRC\2008\K02a_PDF\Area_1\Working\Remedial_Design\Work_Plan\ContiguousAreaConcentrations_Hilltop_NN_gisdoc.mxd 7/17/2017 2:52 PM



LEGEND:
○ RIVER MILE MARKER
▨ APPROXIMATE FLOODPLAIN SOIL EXCAVATION AREA

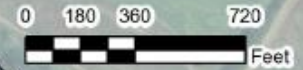


ALLIED PAPER, INC./PORTAGE CREEK/ KALAMAZOO RIVER SUPERFUND SITE AREA 1 REMEDIAL DESIGN WORK PLAN	
FORMER PLAINWELL IMPOUNDMENT FLOODPLAIN SOIL AREAS EXCEEDING AN RAL OF 20 MG/KG PCB AND GREATER THAN 0.25 ACRE	
Prepared by/Date: JRM 7/17/2017 Checked by/Date: HEP 7/17/2017 Project Number: 5093170001	amec foster wheeler  FIGURE 5-1

Floodplain Sample Results



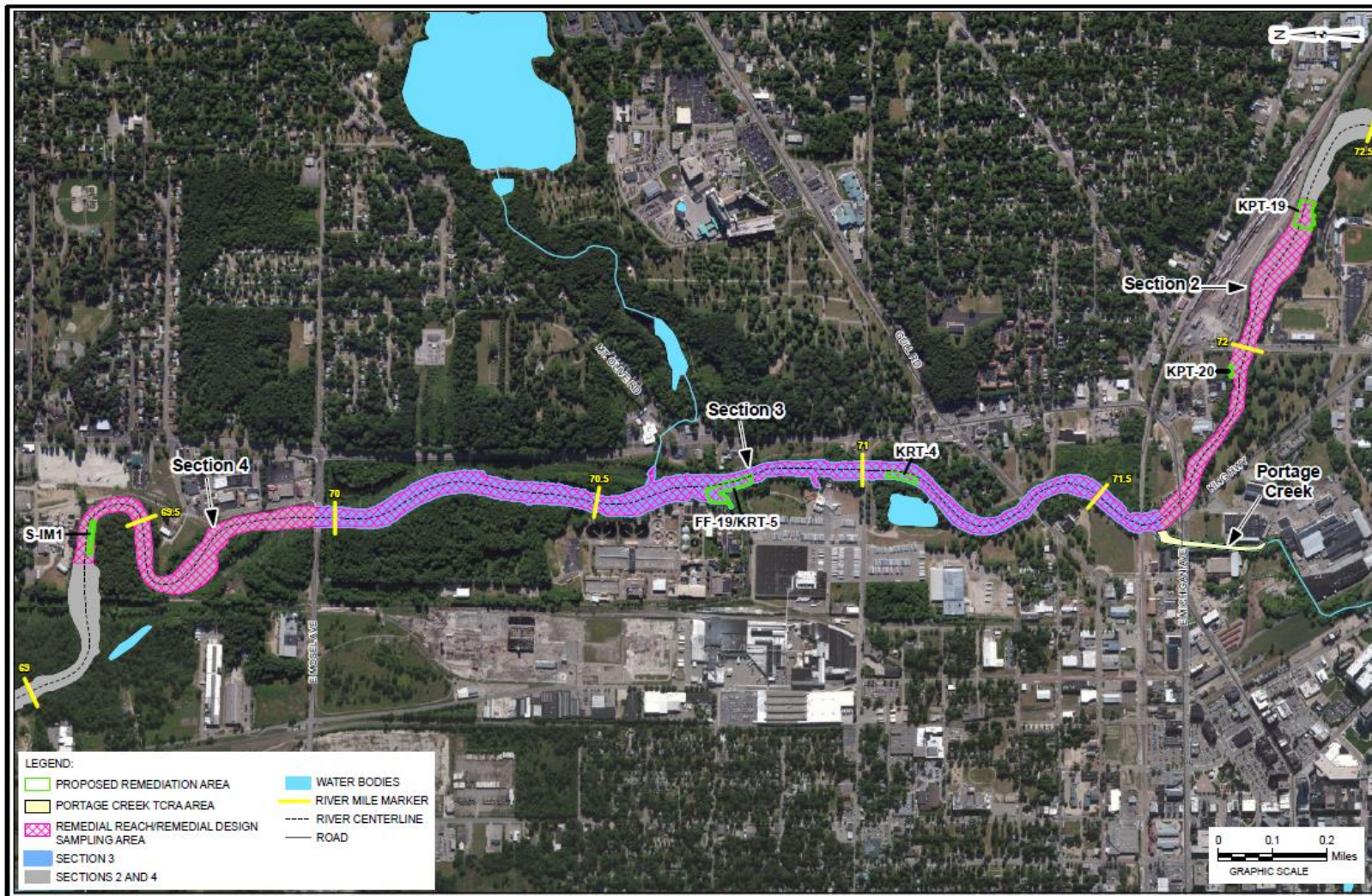
Max Concentration in Core



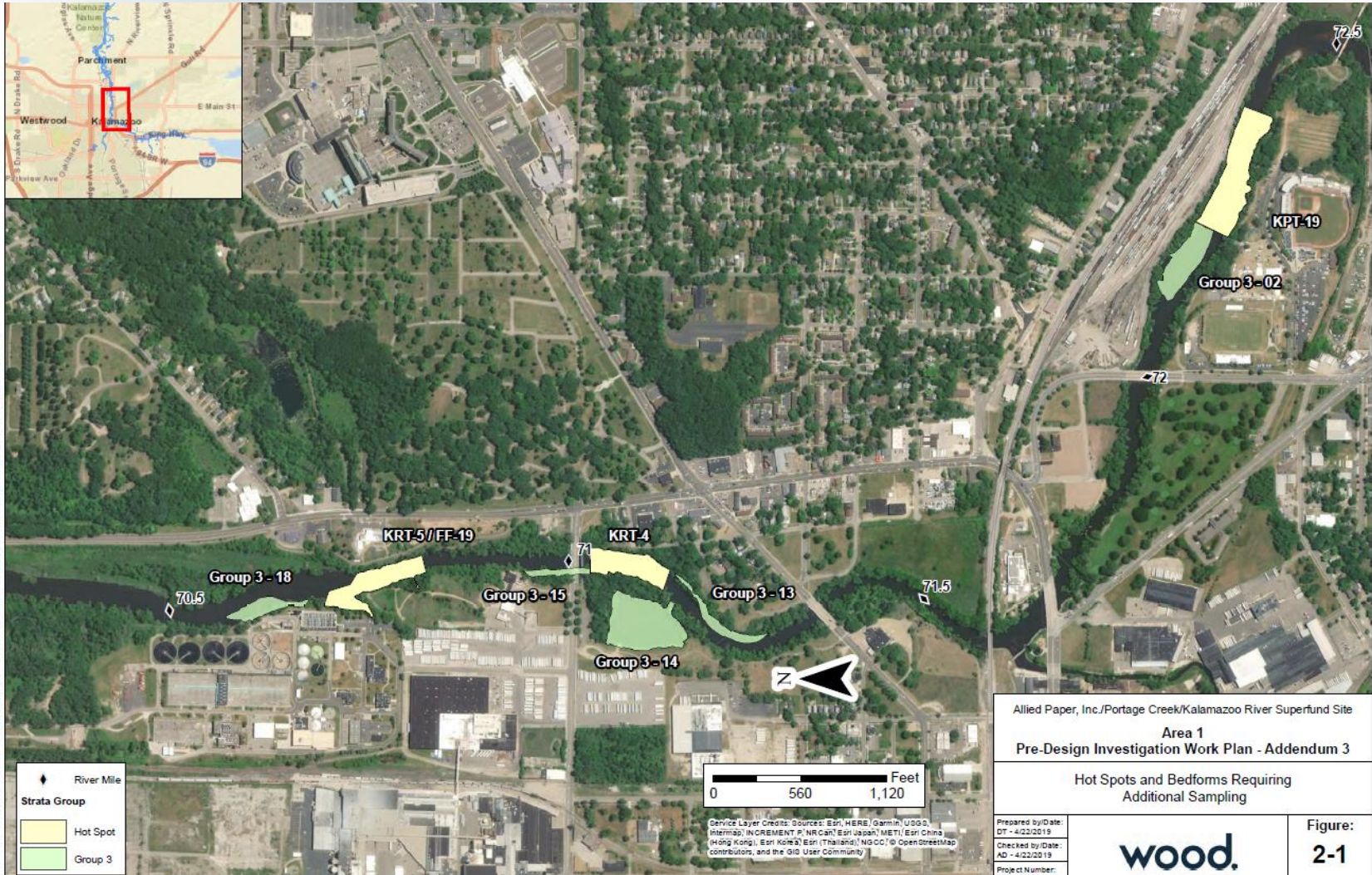
Remedial Reach



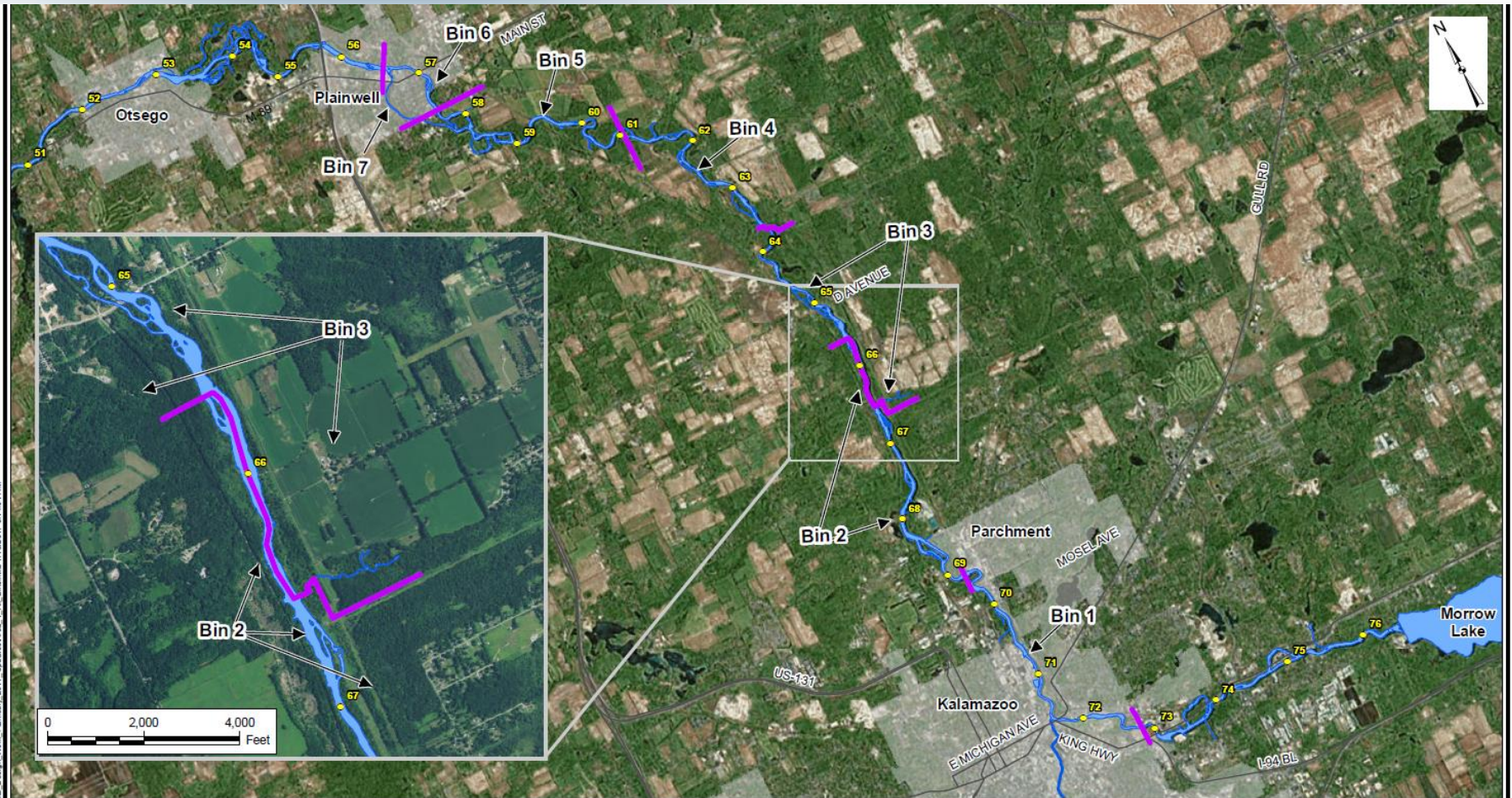
DRAFT



Remedial Reach Sample Results



Residential Floodplain Sampling Areas



LEGEND:
 ● RIVER MILE MARKER
 ■ BIN DIVIDING LINES

0 1 2 Miles
 GRAPHIC SCALE

NOTES:
 1. BASEMAPMING PROVIDED BY THE MICHIGAN CENTER FOR GEOGRAPHIC INFORMATION.

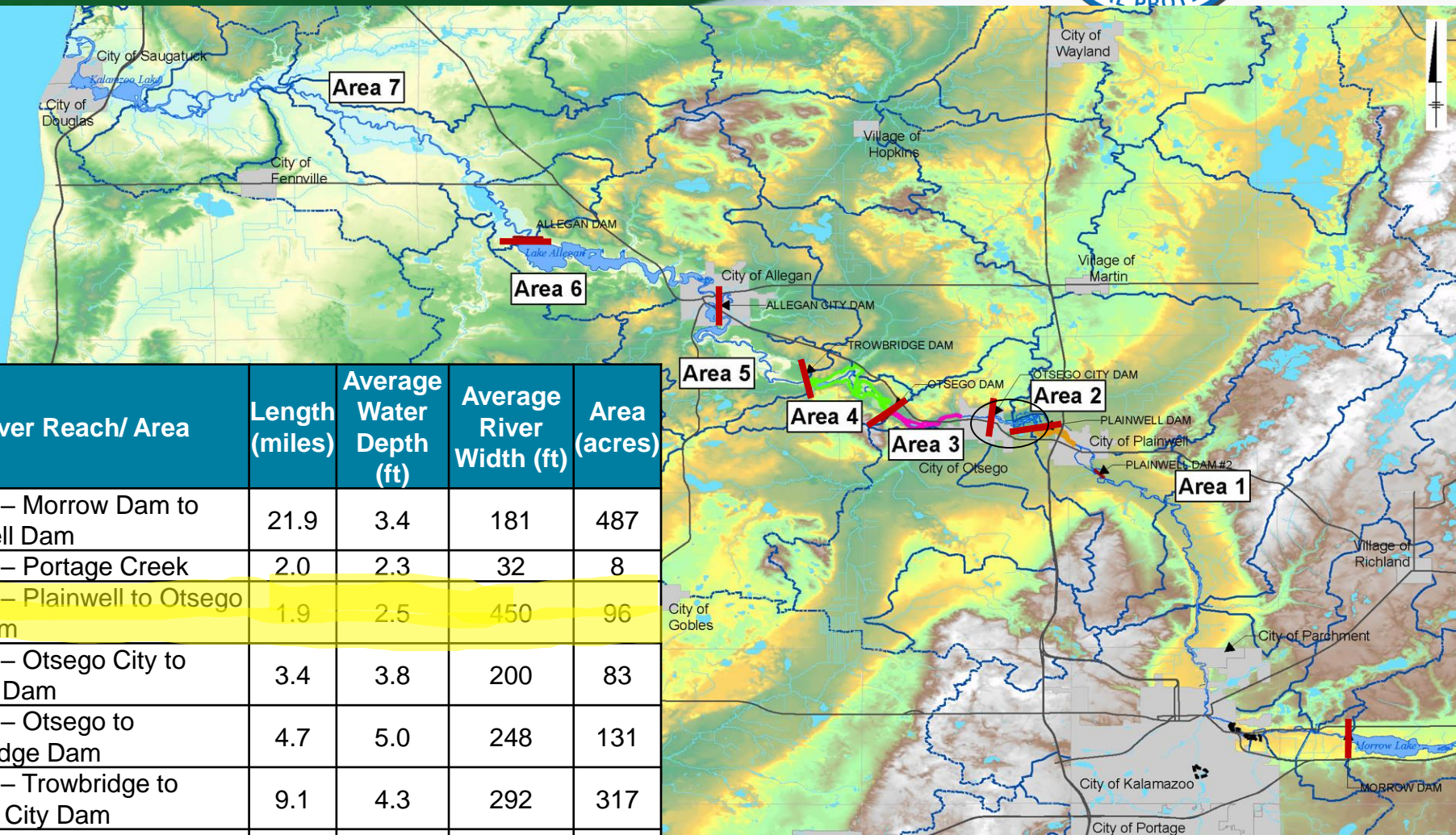
ALLIED PAPER, INC./PORTAGE CREEK/
 KALAMAZOO RIVER SUPERFUND SITE
 AREA 1 REMEDIAL DESIGN WORK PLAN
 AREA 1
 RESIDENTIAL FLOODPLAIN SOIL SAMPLING BINS

Area 1 Remedial Action



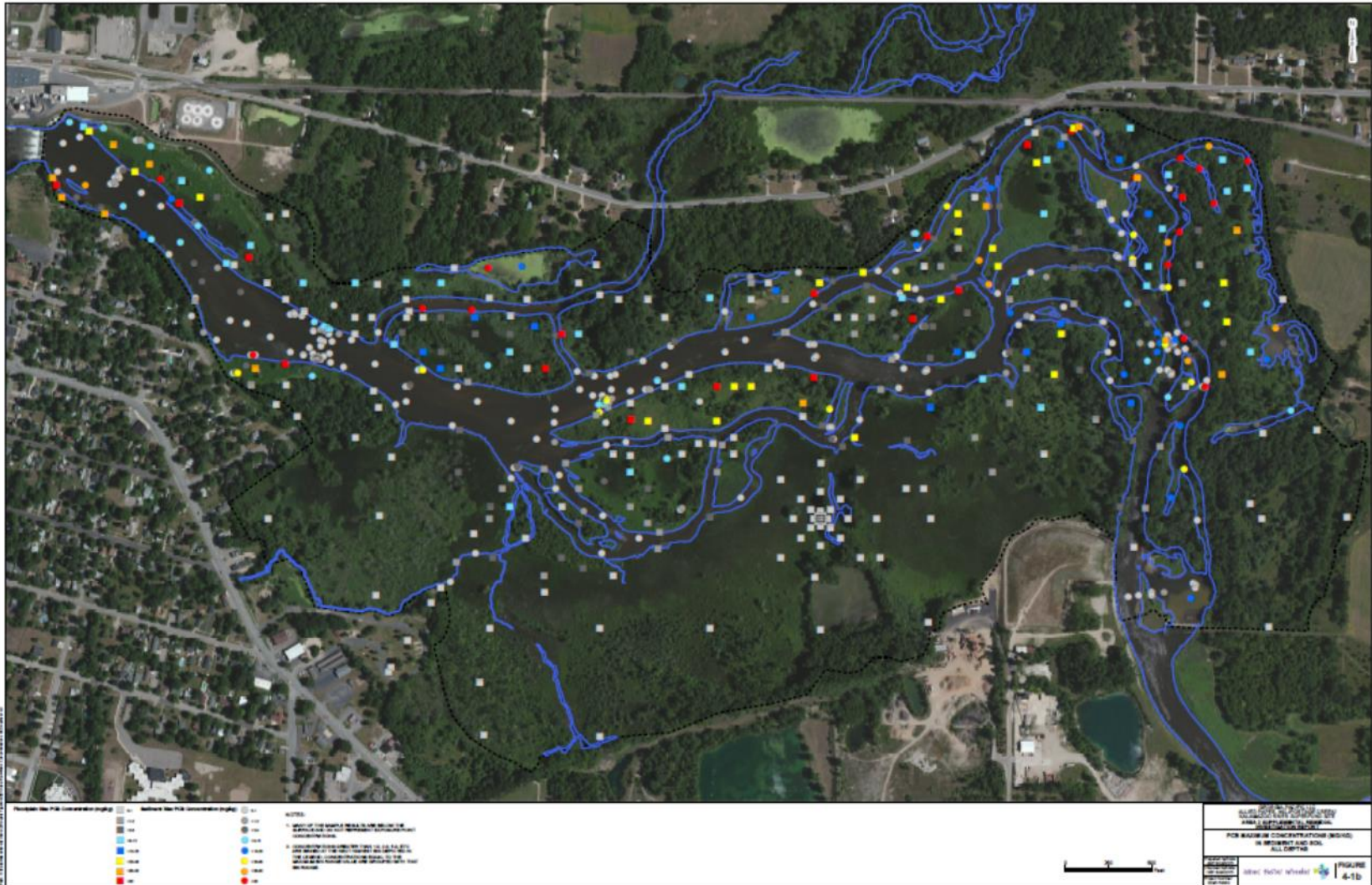
- Clean-up to be conducted in 2020-2023

Area 2

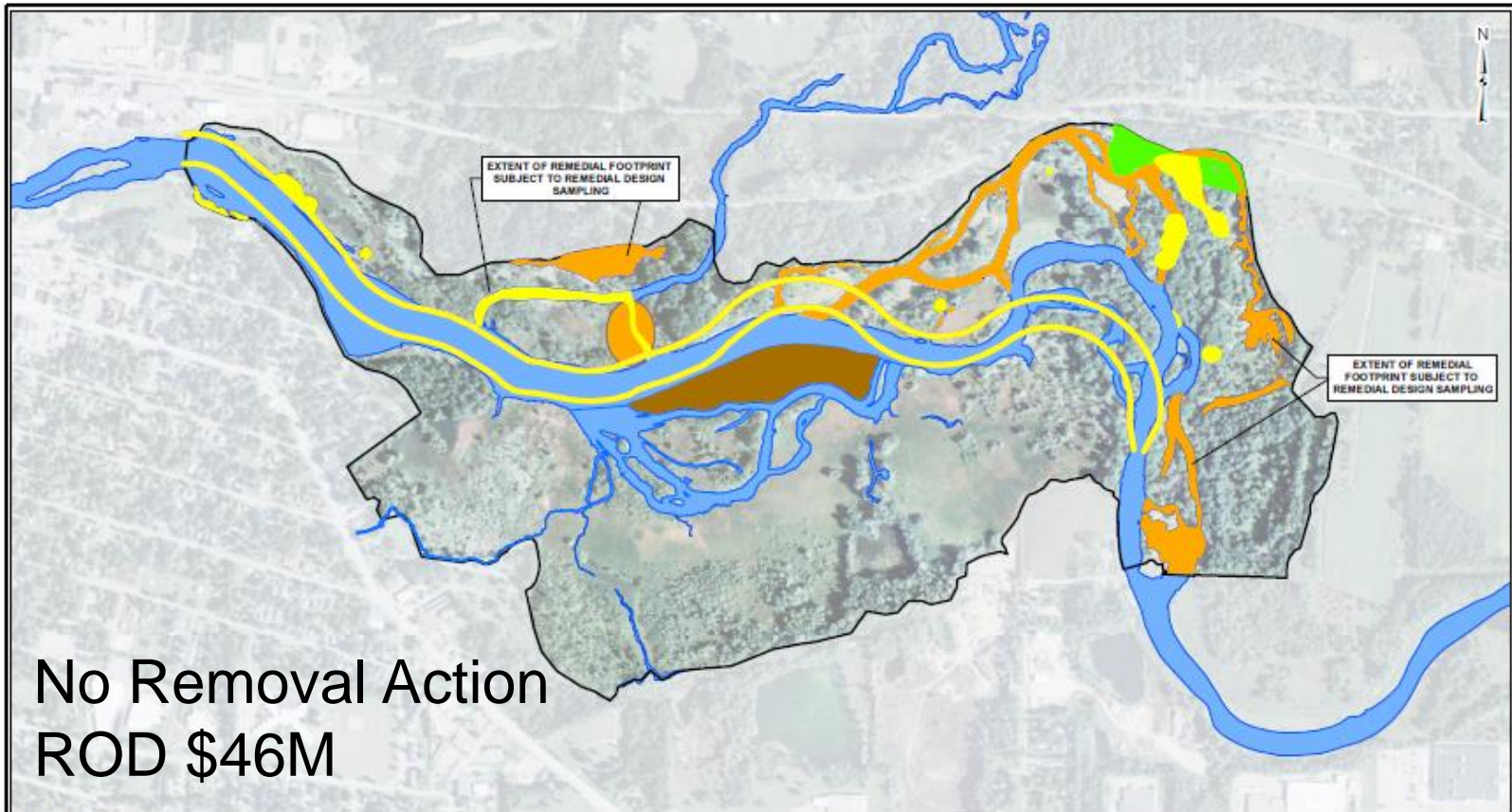


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Area 2 Maximum PCB Concentrations



Area 2: EPA Selected Remedy September 2017



No Removal Action
ROD \$46M

LEGEND

- MNR
- CAPPING
- EXCAVATE
- ICS
- BRUFS BOUNDARY (CH2M HILL 2003)



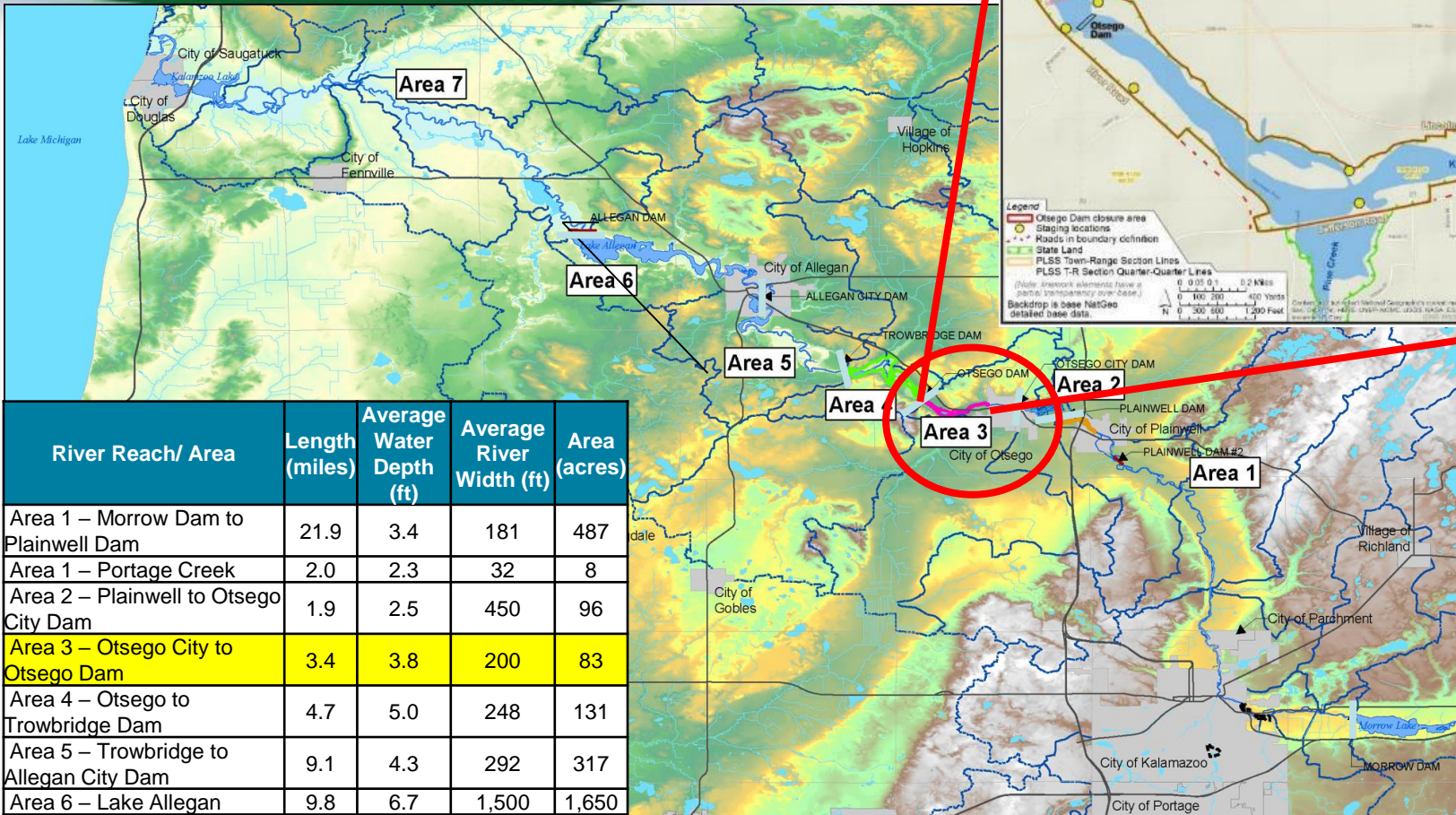
GEORGIA-PACIFIC LLC
ALLIED CORP. INC. PORTLAND CEMENT
VALMORADO RIVER SUPERFUND SITE
AREA 2 FEASIBILITY STUDY

ALTERNATIVE E:
CAPPING, BANK RAL EXCAVATION, FLOODPLAIN
SOIL EXCAVATION, CHANNEL REALIGNMENT, ICS,
AND LTM

Prepared by: amec foster wheeler
Created by: amec foster wheeler
Project Number: 3004000001

FIGURE 3-24

Area 3 of Operable Unit 5

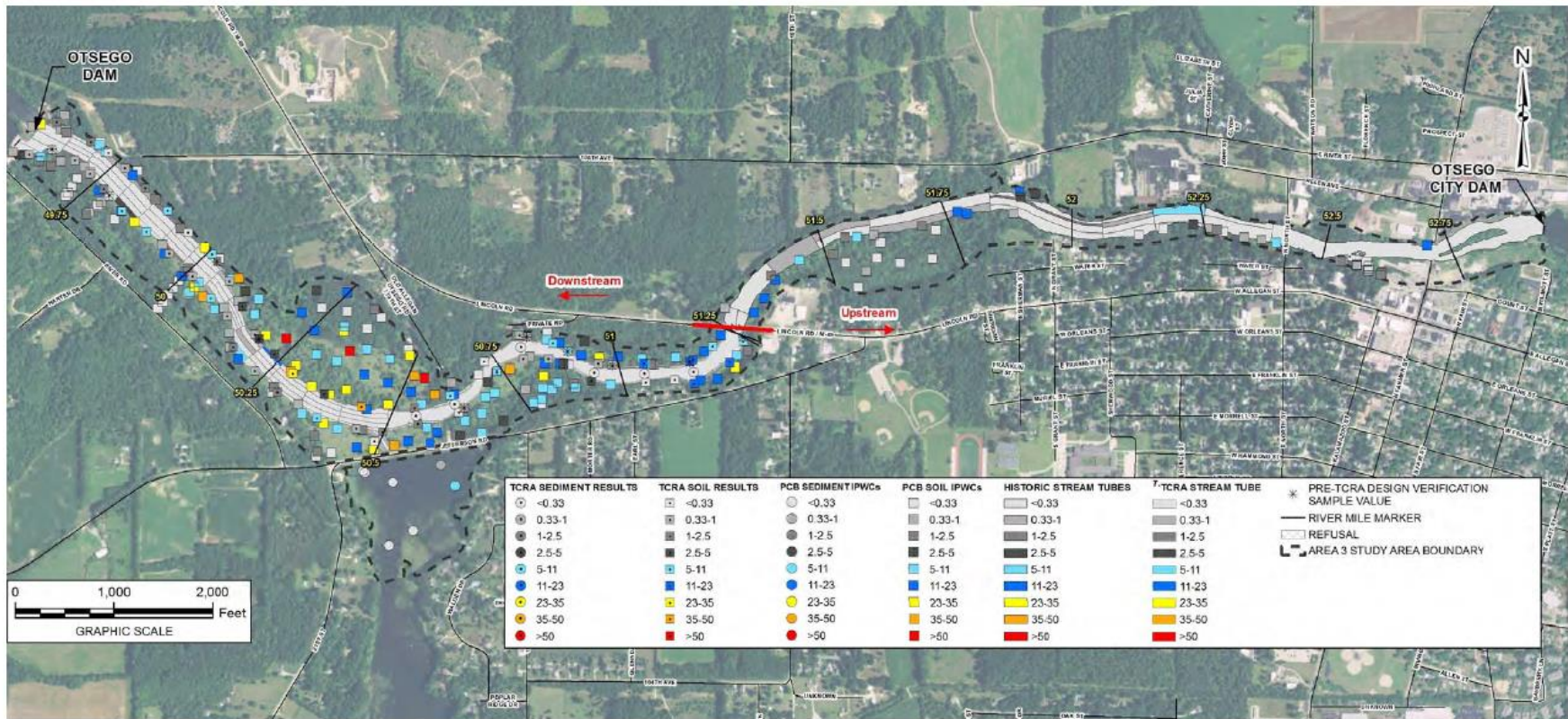


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Area 3 Surface PCBs



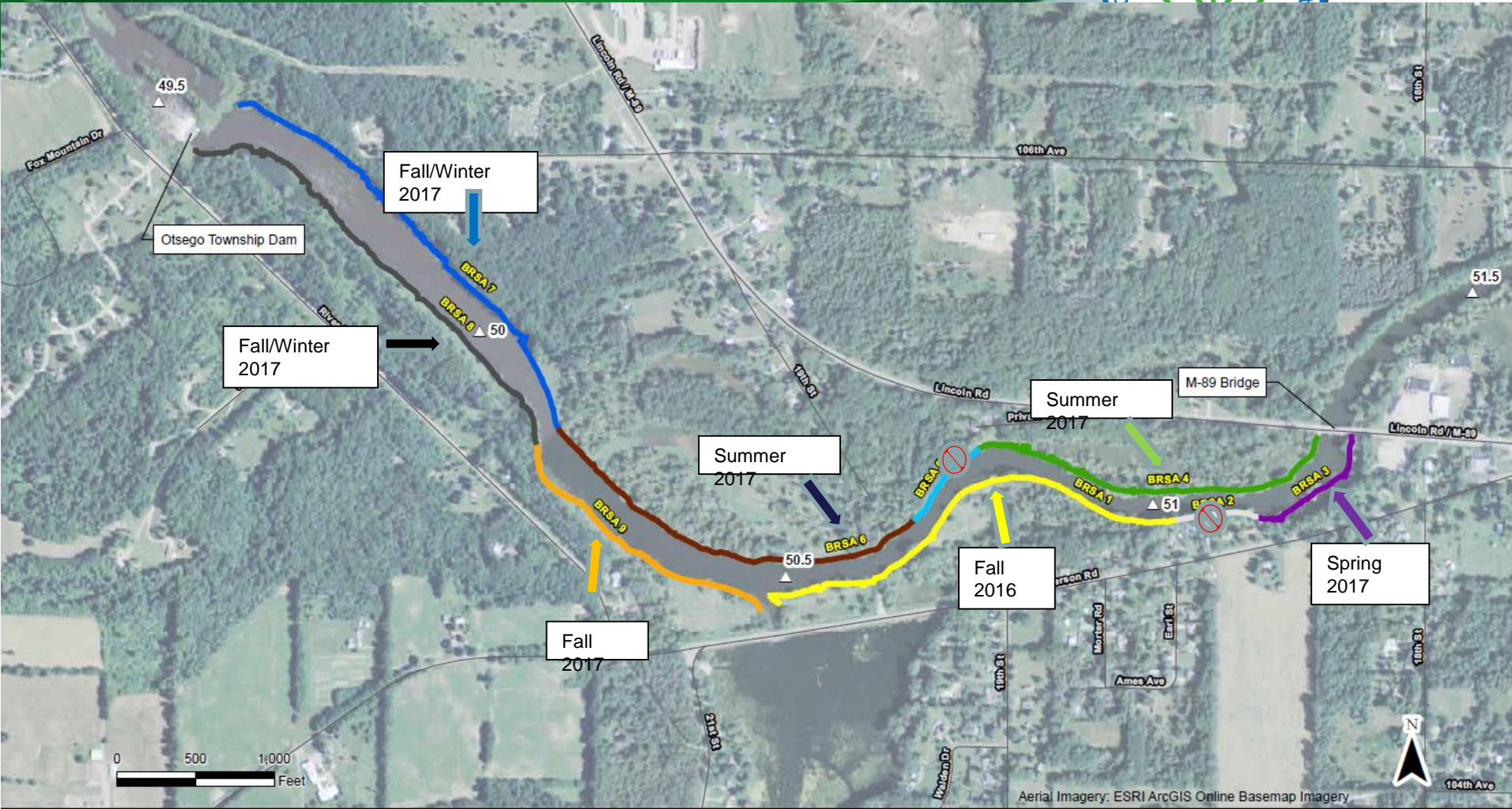
Area 3 Floodplain Soil and Sediment (0-6")



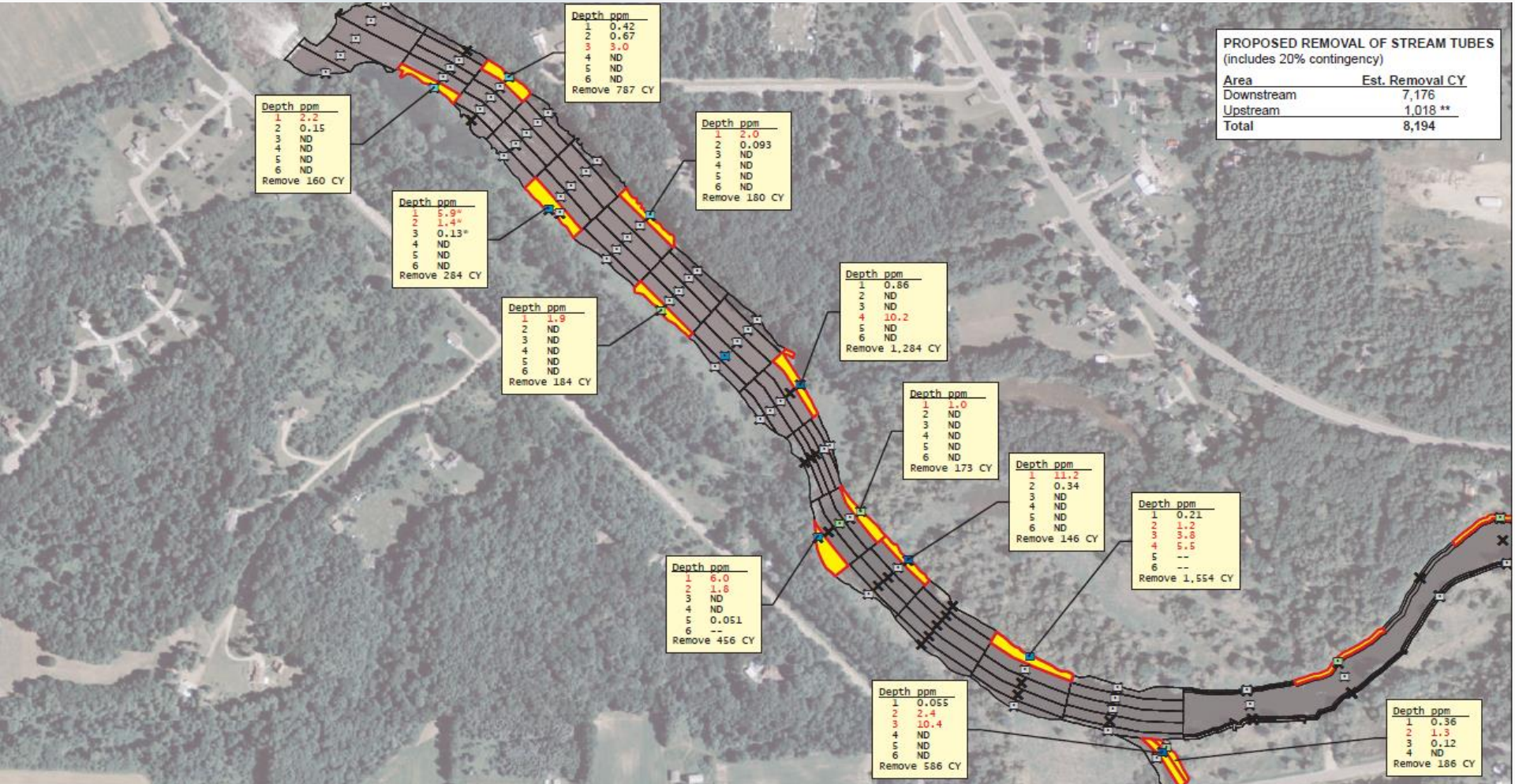
Otsego Township Dam



Bank Soil Removal Approach



Sediment Removal Approach



PROPOSED REMOVAL OF STREAM TUBES
(includes 20% contingency)

Area	Est. Removal CY
Downstream	7,176
Upstream	1,018 **
Total	8,194

BRSA 1 - Staging



BRSA 1 Removal work



Threatened
Mussel
relocation
before work



In-stream,
real time
turbidity
monitoring

Restoration



Root Wad Placement



Restoration



Water Control Structure



Free-Flowing Channel Restored



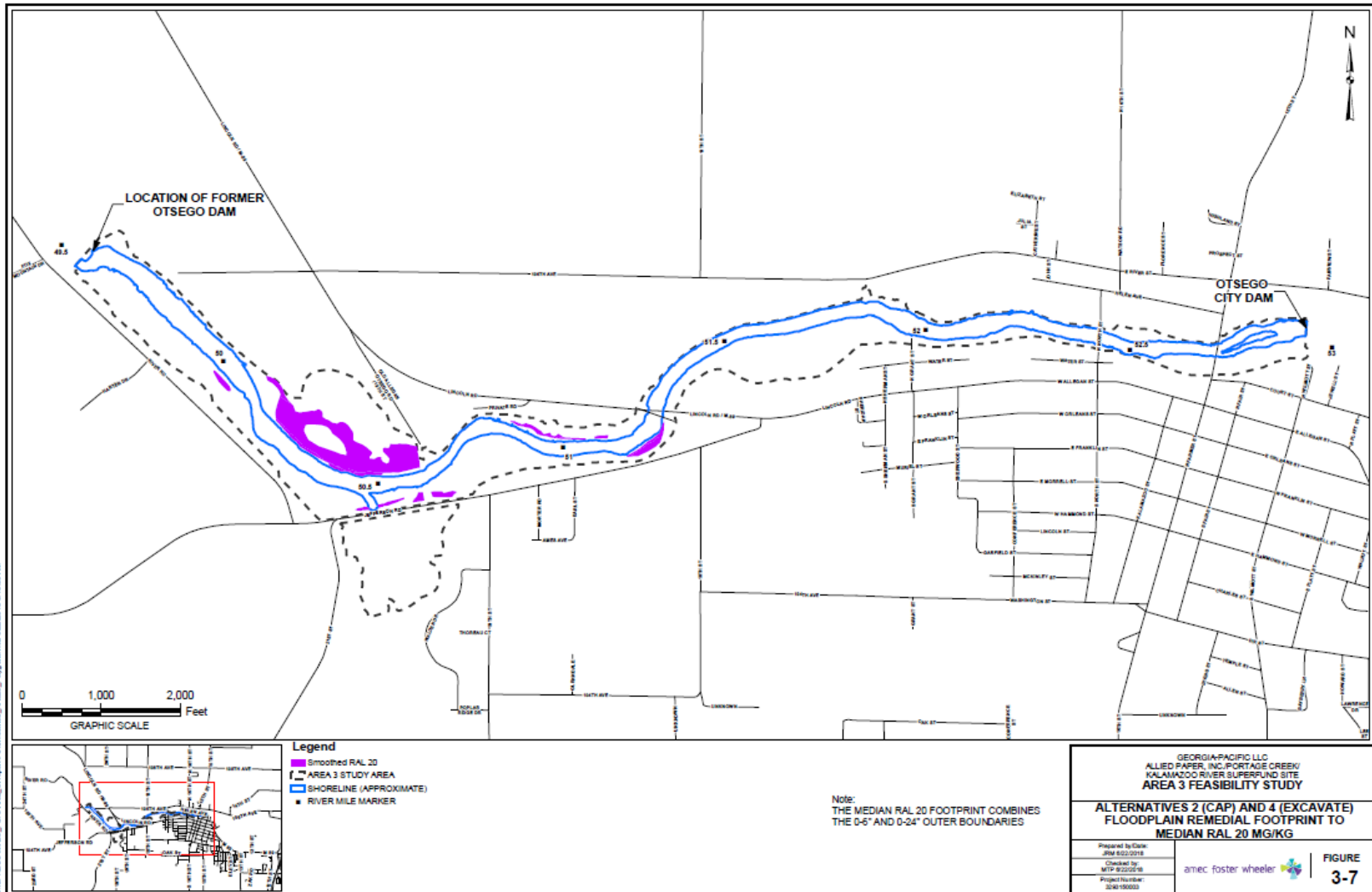
Area 3 TCRA



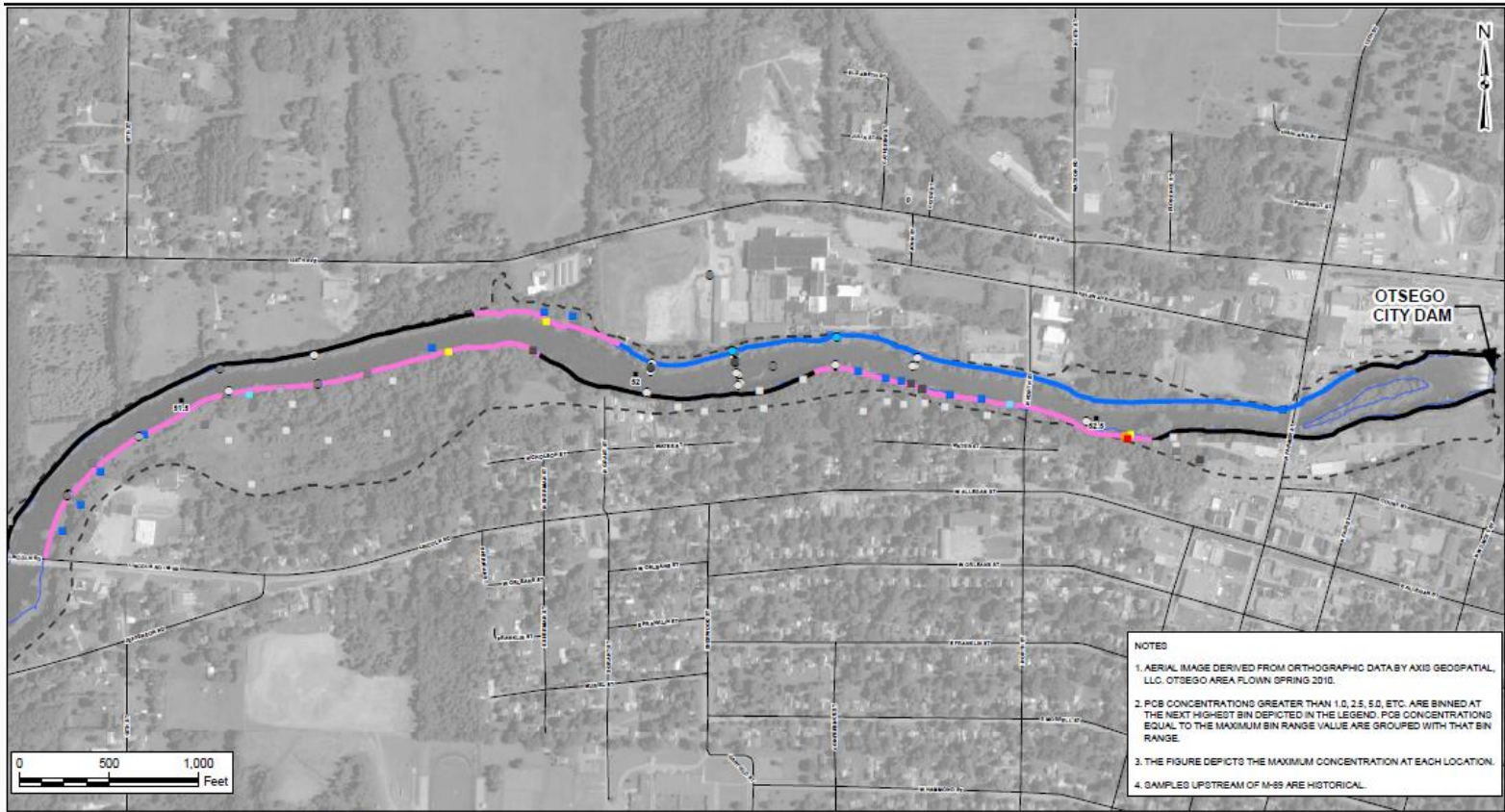
- 2016-2018
- 35,000 cubic yards
- \$32M



Area 3 Remedial Work Beyond Time-Critical Removal Action



Area 3 Remedial Work Beyond Time-Critical Removal Action



Legend		SOIL SAMPLE LOCATION		SEDIMENT SAMPLE LOCATION	
		MAX. PCB CONC. (MG/KG)	MAX. PCB CONC. (MG/KG)	MAX. PCB CONC. (MG/KG)	MAX. PCB CONC. (MG/KG)
○	<0.33	□	<0.33	○	0.33-1
○	0.33-1	□	0.33-1	○	1-2.5
○	1-2.5	□	1-2.5	○	2.5-5
○	2.5-5	□	2.5-5	○	5-11
○	5-11	□	5-11	○	11-23
○	11-23	□	11-23	○	23-35
○	23-35	□	23-35	○	35-50
○	35-50	□	35-50	○	>50
○	>50	□	>50		

—	BANKEDGE SEDIMENT REMOVAL AND RESTORATION
—	REMEDIAL DESIGN SAMPLING BETWEEN RIVER EDGE AND BLUFFS/STUDY BOUNDARY, SOIL BANK / EDGE SEDIMENT REMOVAL, BANK TOE STABILIZATION
—	NO ACTION ANTICIPATED, SUBJECT TO CONFIRMATION SAMPLING DURING REMEDIAL DESIGN
—	PRE-TORA DESIGN VERIFICATION SAMPLE VALUE
■	RIVER MILE MARKER
—	AREA 3 STUDY AREA BOUNDARY
—	SHORELINE (APPROXIMATE)

GEORGIA-PACIFIC LLC
ALLIED PAPER, INC. PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
AREA 3 FEASIBILITY STUDY

UPSTREAM BANK REMEDIATION AREAS

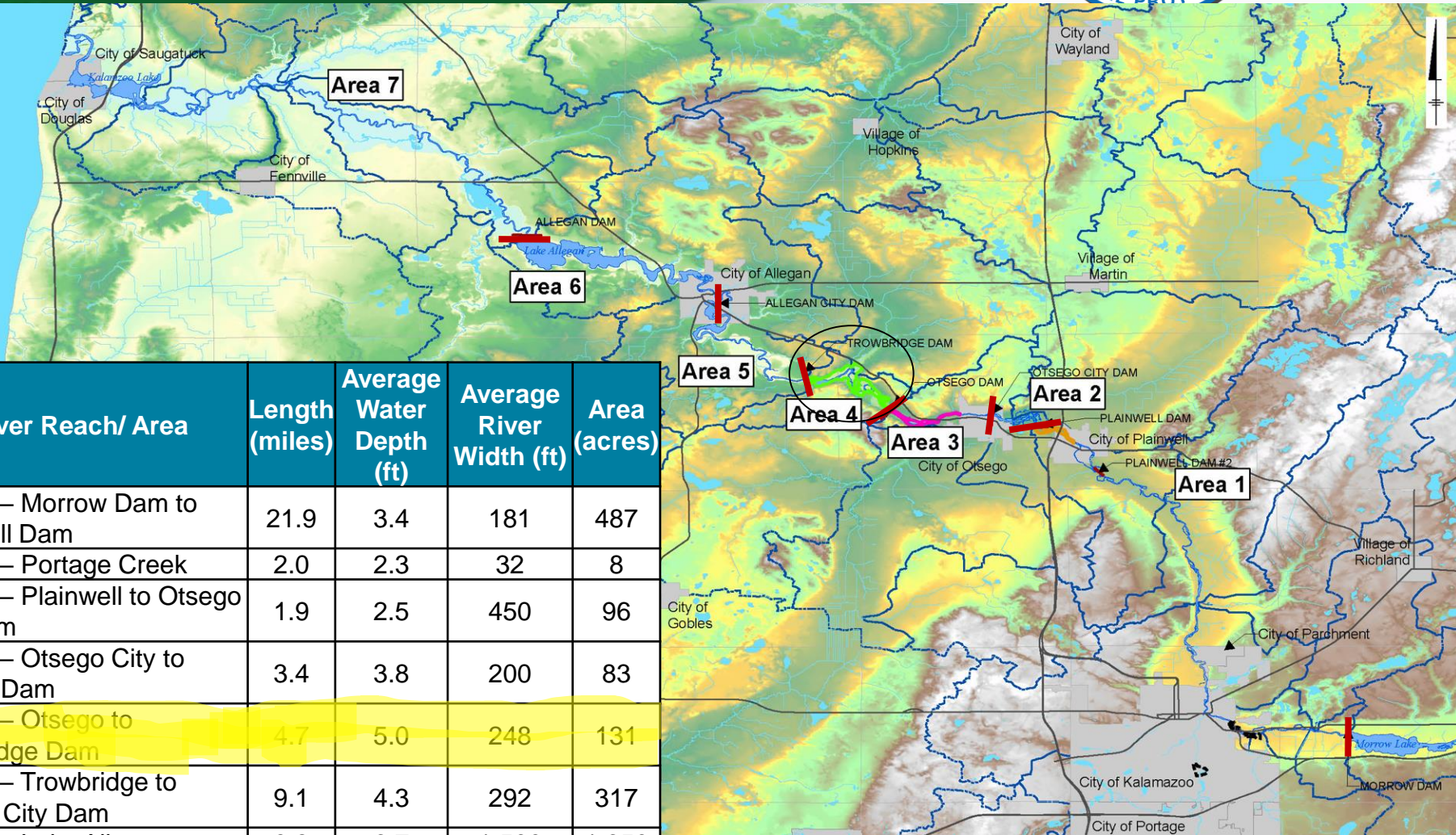
Prepared by: CWR	amc foster wheeler	FIGURE 3-9a
Year: 04/2018		
Checked by: HEP 01/05/2018		
Project Number: 04010002		

Area 3 Path Forward



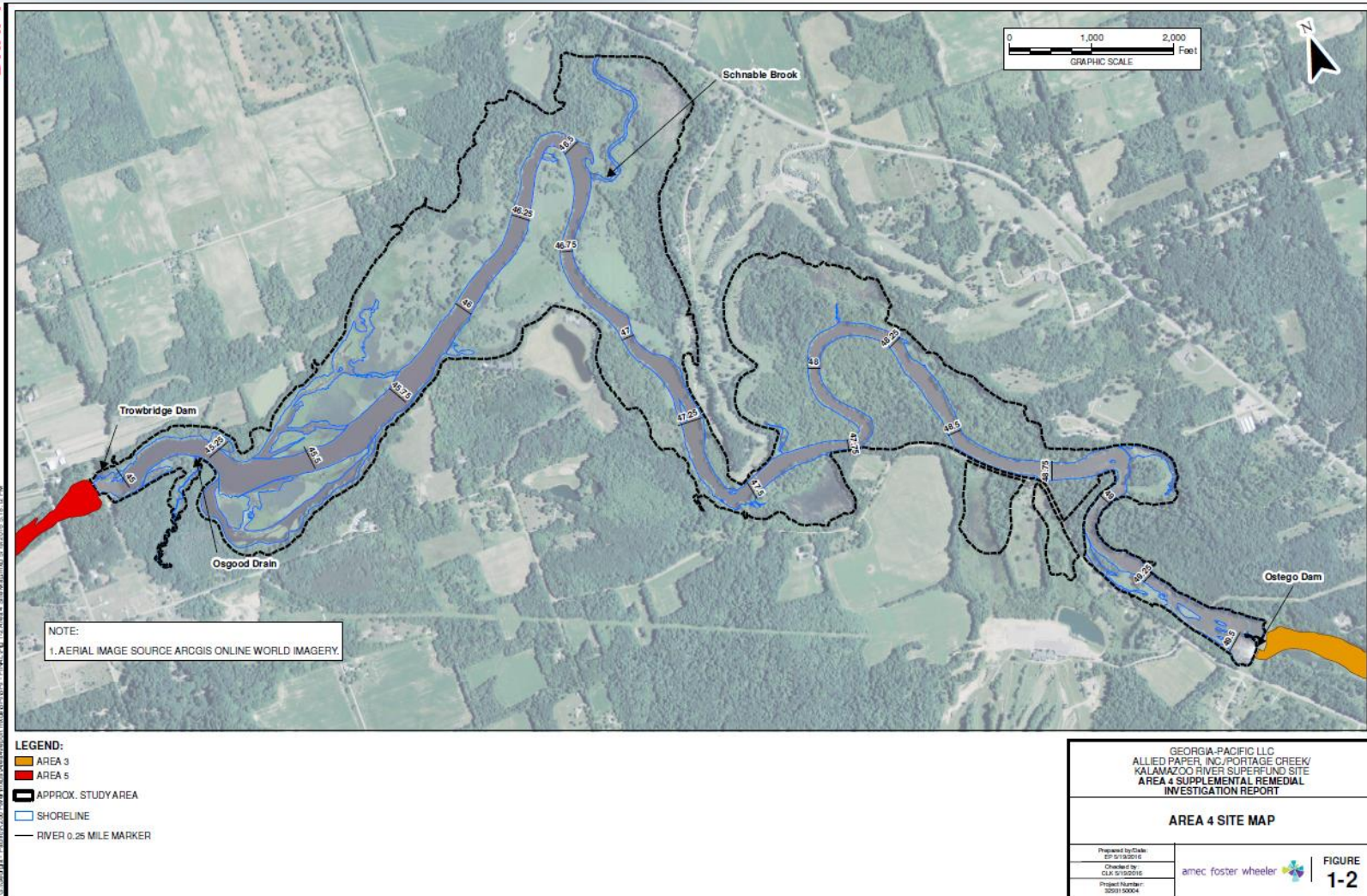
- **Feasibility Study (FS) report under review**
- **Early 2020: Proposed Plan released**
- **Spring 2020: Record of Decision**

Operable Unit 5: Kalamazoo River Area 4

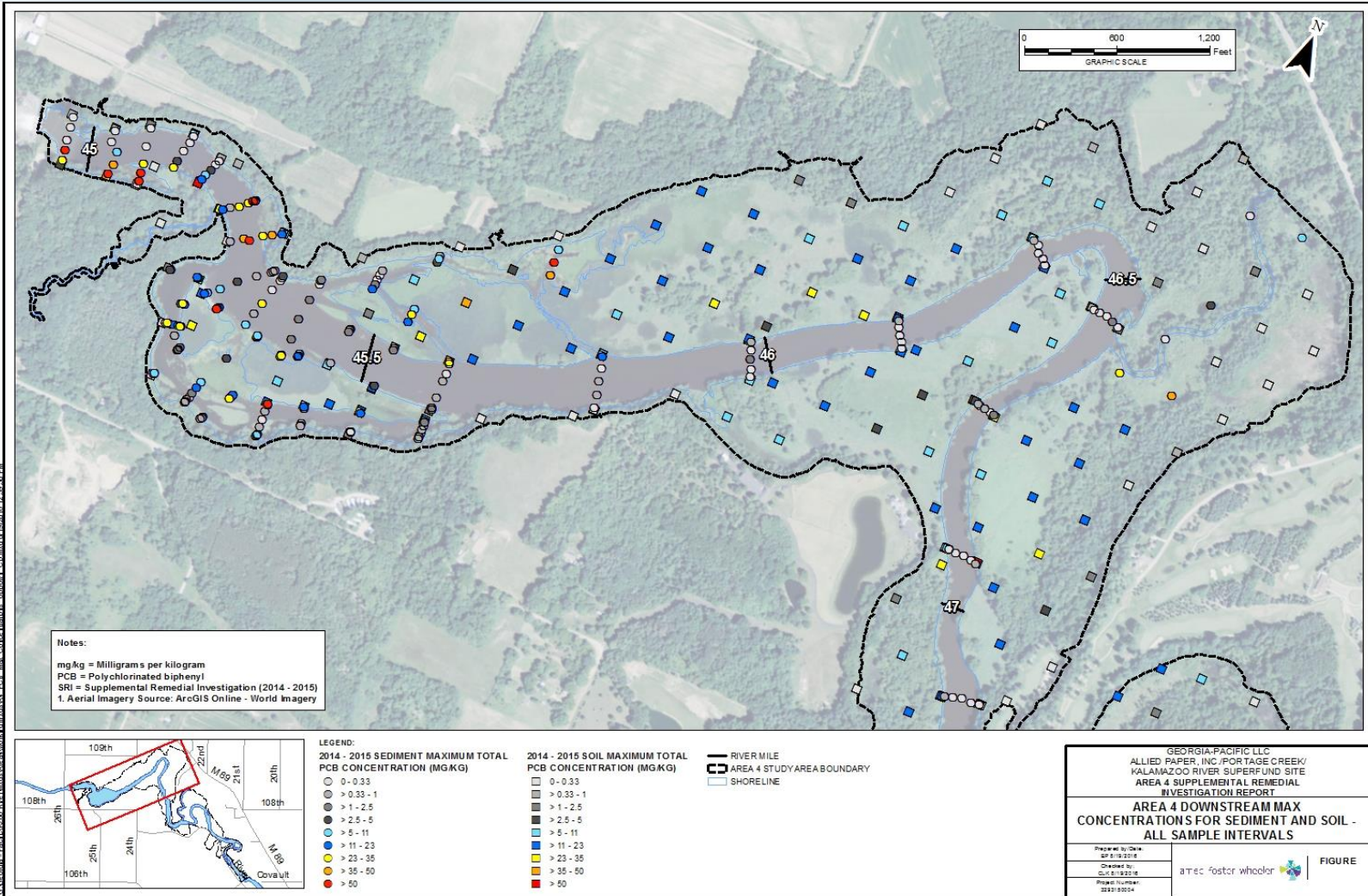


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Operable Unit 5: Kalamazoo River Area 4



Area 4 Otsego Township Dam to Trowbridge Dam



GEORGIA-PACIFIC LLC
 ALLIED PAPER, INC. FORT TATE CREEK/
 KALANIAZOO RIVER SUPERFUND SITE
 AREA 4 SUPPLEMENTAL REMEDIAL
 INVESTIGATION REPORT
**AREA 4 DOWNSTREAM MAX
 CONCENTRATIONS FOR SEDIMENT AND SOIL -
 ALL SAMPLE INTERVALS**

Prepared by: Dale
 02/16/2016
 Created by:
 02/16/2016
 Project Number:
 328118004

aTec foster wheeler **FIGURE**

C:\CS\BLL\Project\2016\Area 4\Map\Area 4 Downstream Max Concentrations for Sediment and Soil.mxd 12/29/2016 12:29:20 PM

Trowbridge Dam

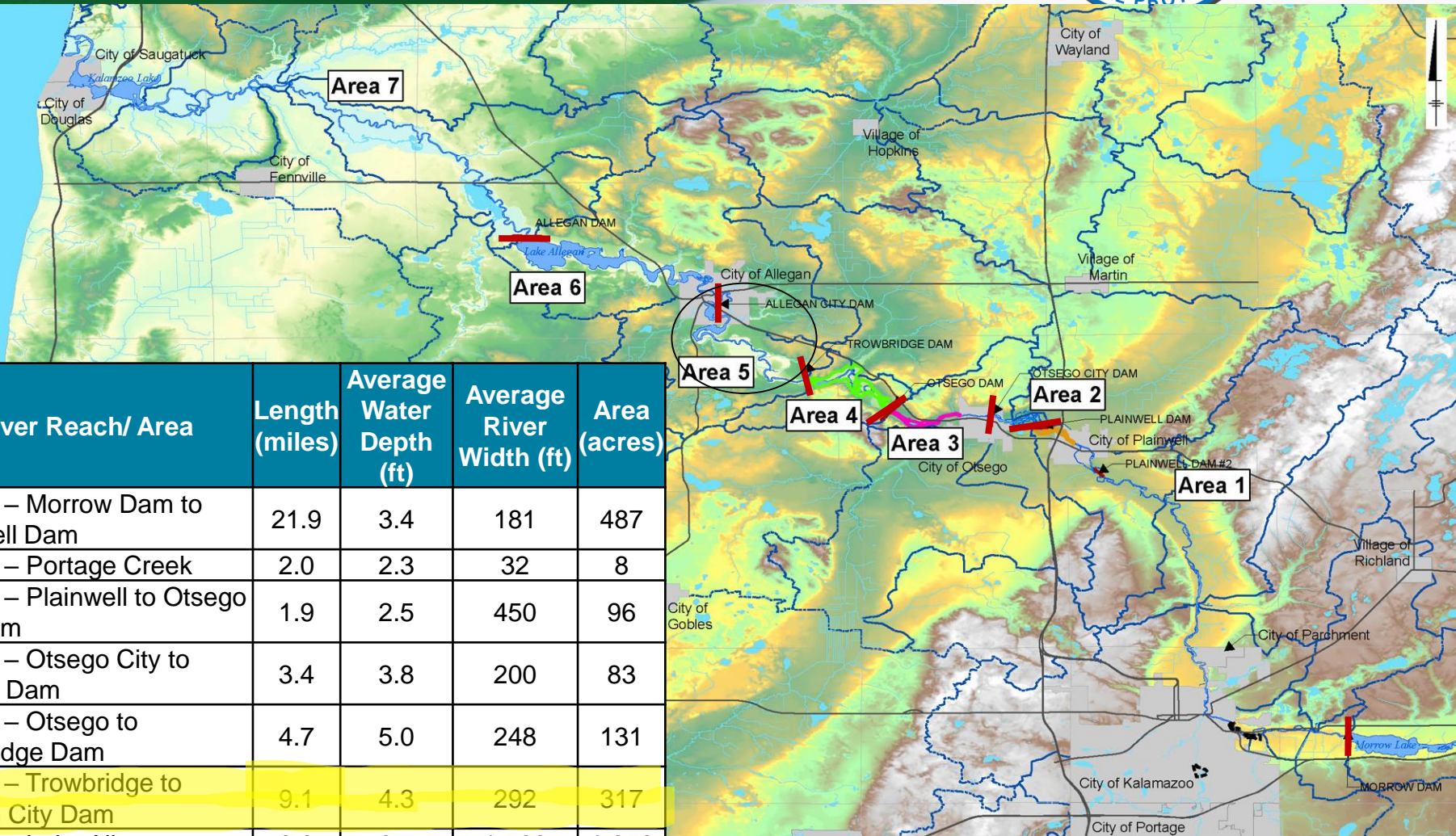


Area 4



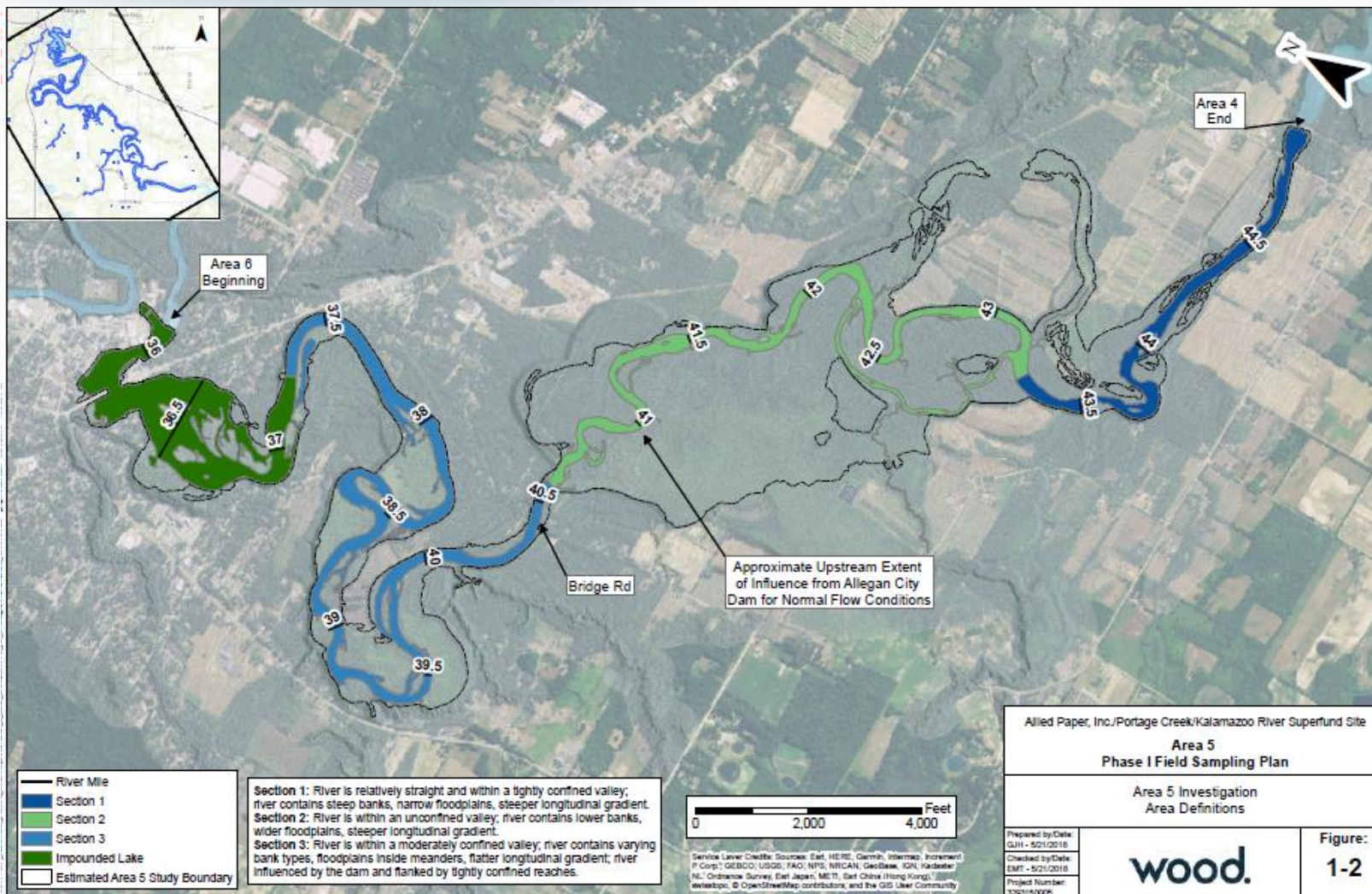
- Alternative Screening document September 2019
- Feasibility Study Summer 2020

AREA 5

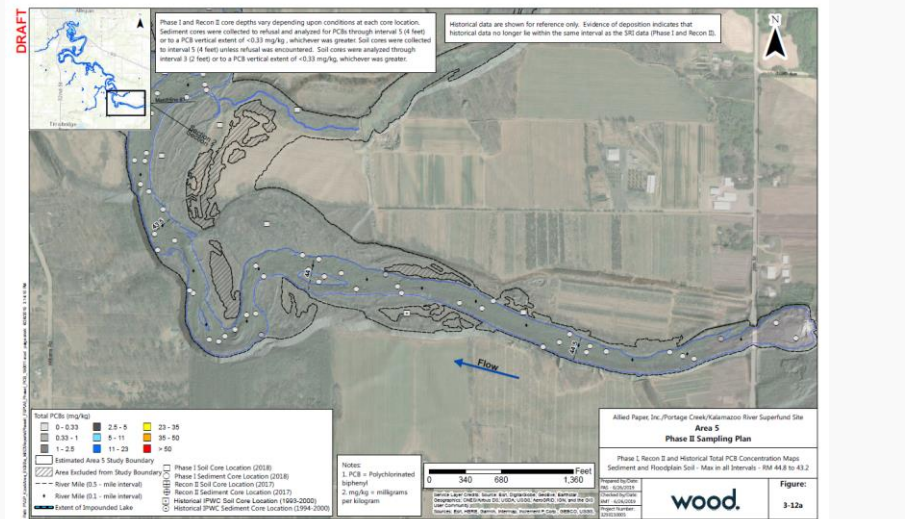
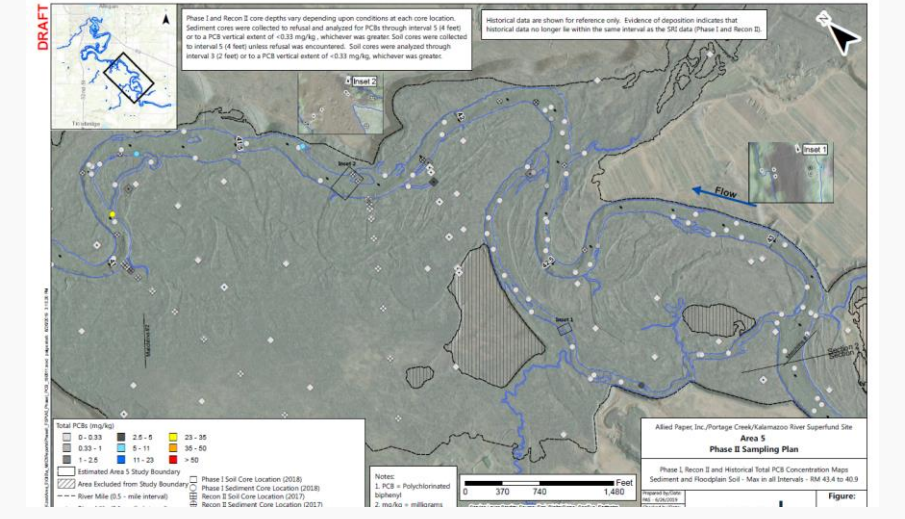
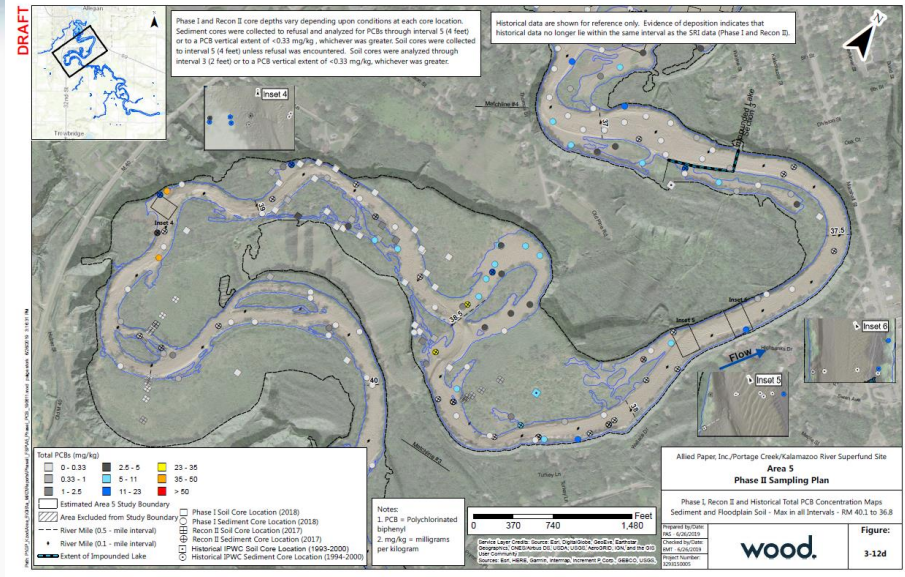
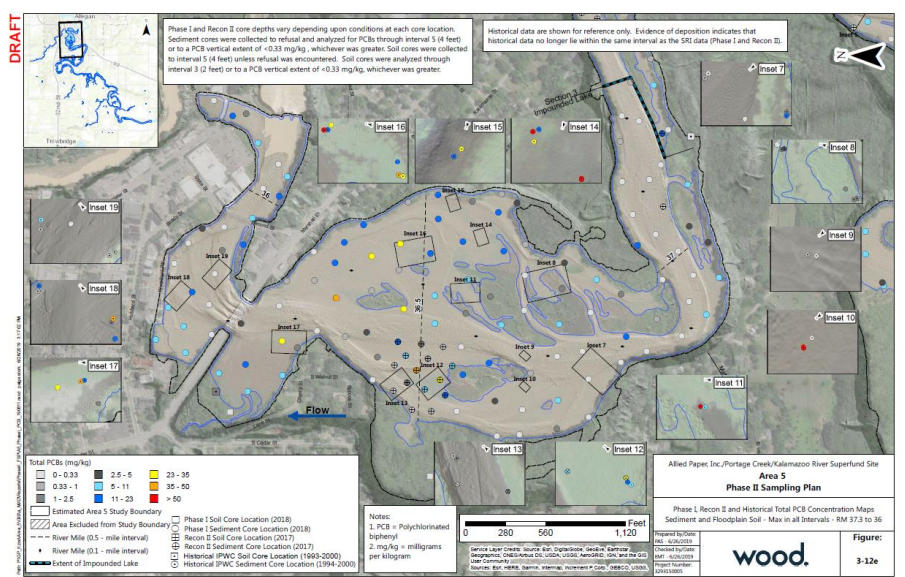


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Area 5 Trowbridge Dam to Allegan City Dam



Area 5 Trowbridge Dam to Alleghan City Dam

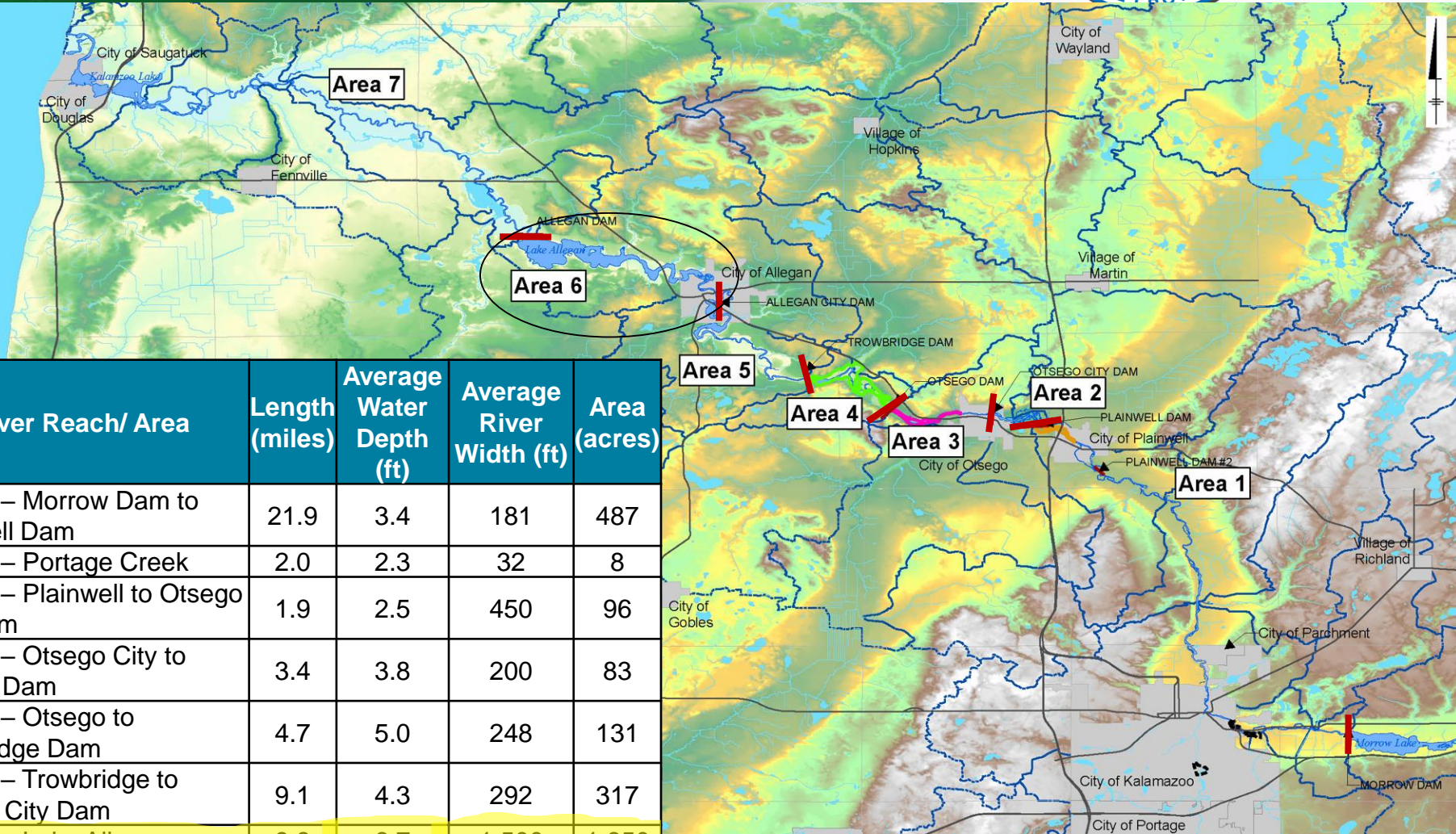


Area 5 Trowbridge Dam to Allegan City Dam



- Remedial Investigation Report due Spring 2020

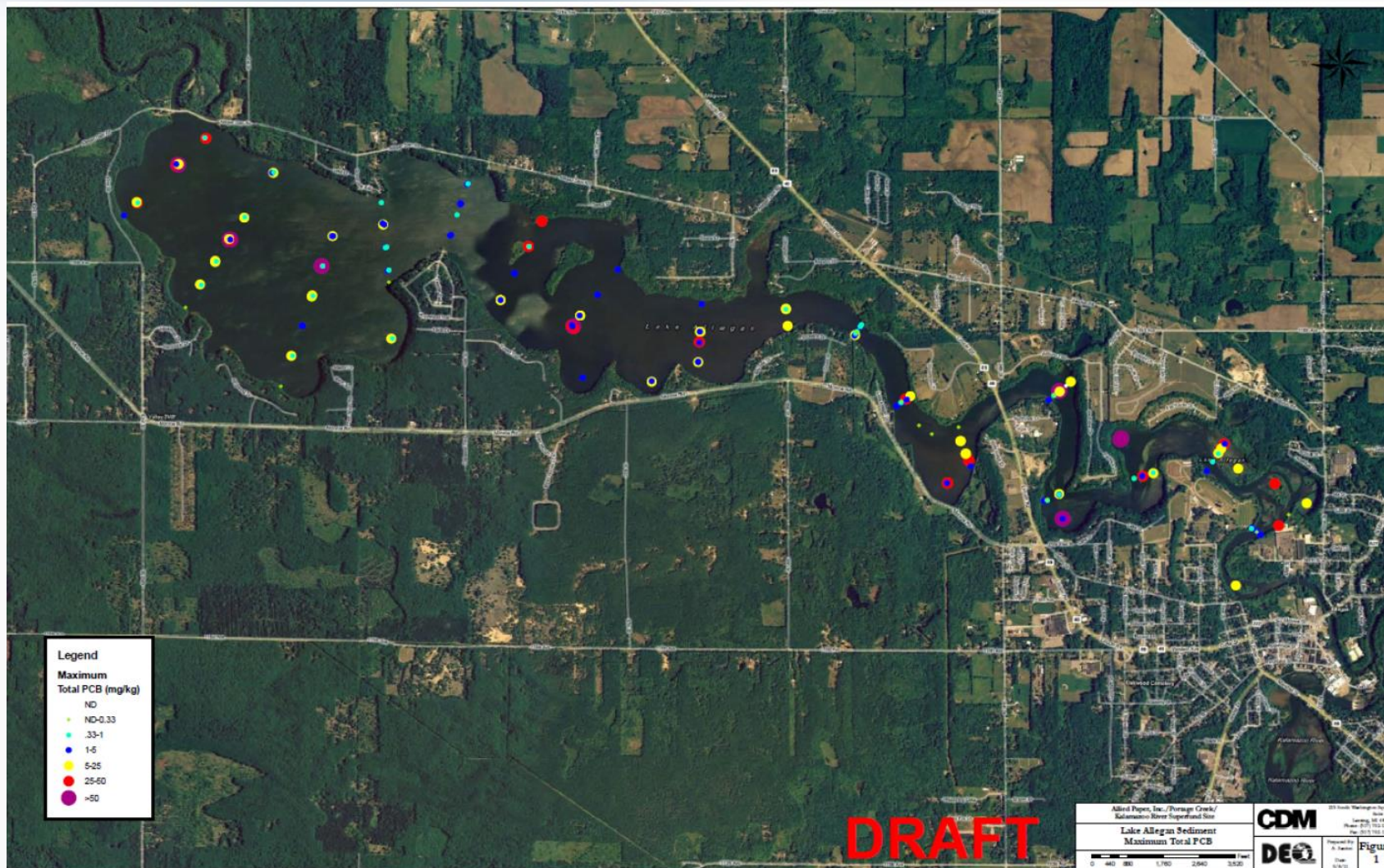
Area 6



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Area 6

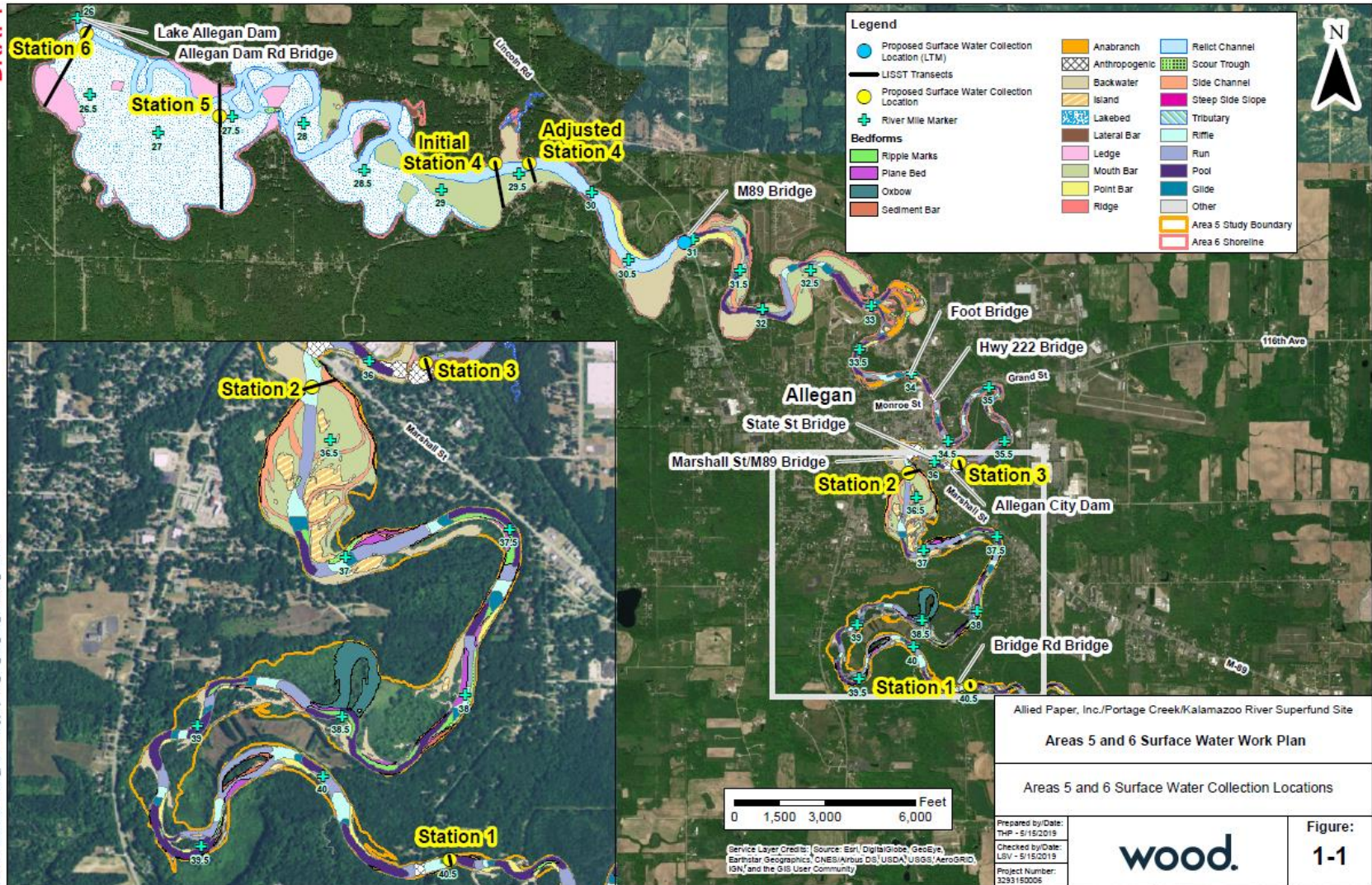
Allegan City Dam to Lake Allegan Dam (Lake Allegan)



Lake Allegan Surface Water Sampling



DRAFT



Document Path: K:\mead\mads_gis\working\proposed_3V_loc_wm_bedforms_11417.mxd

Lake Allegan Carp Removal



- Carp disturb sediment
- 70,000-90,000 carp in Lake Allegan
- Carp Box nets removed ~10,000 carp in 8 days in 2018 (14% of population)
- Additional carp removal by GP in 2019
- Promote sediment stability and lake recovery



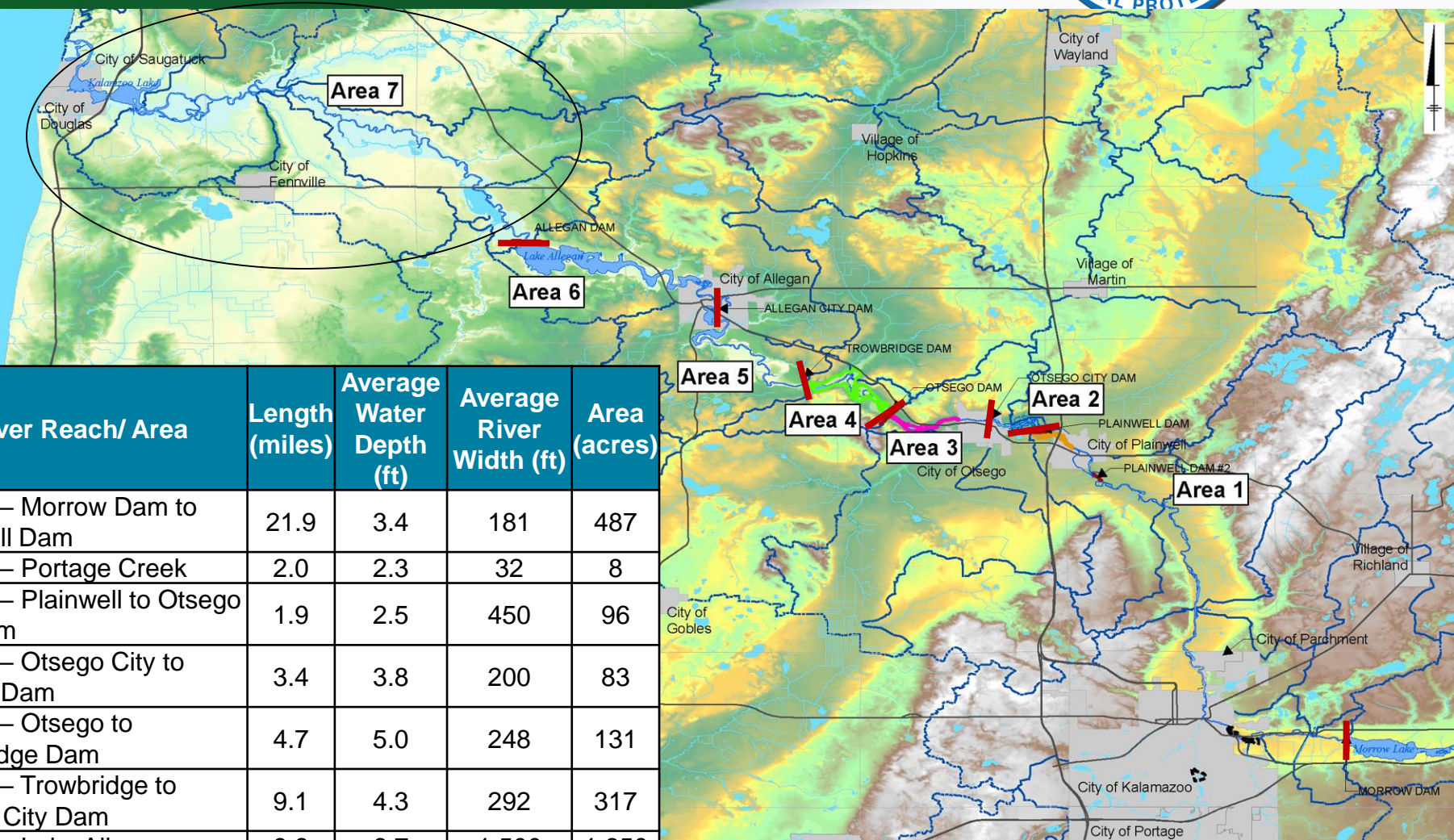
Area 6

Allegan City Dam to Lake Allegan Dam (Lake Allegan)



- November 2021: Remedial Investigation

Area 7



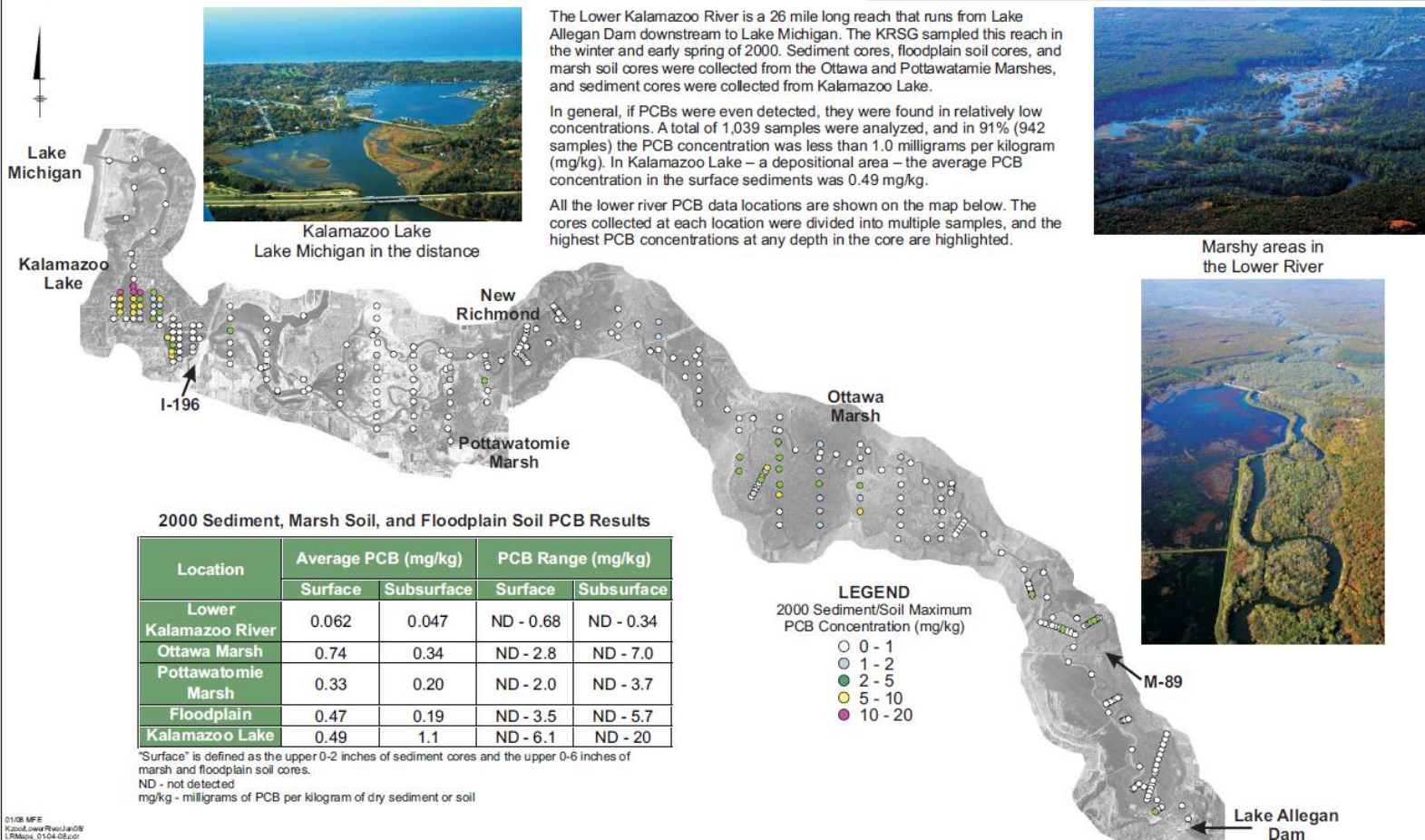
River Reach/ Area	Length (miles)	Average Water Depth (ft)	Average River Width (ft)	Area (acres)
Area 1 – Morrow Dam to Plainwell Dam	21.9	3.4	181	487
Area 1 – Portage Creek	2.0	2.3	32	8
Area 2 – Plainwell to Otsego City Dam	1.9	2.5	450	96
Area 3 – Otsego City to Otsego Dam	3.4	3.8	200	83
Area 4 – Otsego to Trowbridge Dam	4.7	5.0	248	131
Area 5 – Trowbridge to Allegan City Dam	9.1	4.3	292	317
Area 6 – Lake Allegan	9.8	6.7	1,500	1,650
Area 7 – Allegan Dam to Lake Michigan	26	5.5	212	670

Area 7

Lake Allegan Dam to Lake Michigan



Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site PCBs in the Lower River Sediments and Soils



Area 7

Lake Allegan Dam to Lake Michigan



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Questions?

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