UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C 20460

March 31, 2020

OFFICE OF
LAND AND EMERGENCY
MANAGEMENT

MEMORANDUM

SUBJECT: Approval for a Time-Critical Removal Action at the Trowbridge Dam Area of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site, Allegan County, Michigan (EPA ID MID006007306)

FROM: Douglas Ballotti, Director
Superfund and Emergency Management Division, Region 5

THRU: Reggie Cheatham, Director 4/1/2020
Office of Emergency Management

TO: Peter Wright, Assistant Administrator
Office of Land and Emergency Management

I. PURPOSE

The purpose of this Action Memorandum is to request and document approval of the time-critical removal action (TCRA) described herein for the "Trowbridge Dam Area," an area of contamination within Area 4 of Operable Unit #5 (OU5) of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site (the Site). OU5, which is located in Kalamazoo and Allegan Counties, Michigan, is primarily and pervasively contaminated with polychlorinated biphenyls (PCBs).

The response action described in this Action Memorandum will mitigate threats to public health, welfare, and the environment upstream of the Trowbridge Dam[1] posed by the ongoing uncontrolled releases of PCBs and potential for further uncontrolled release of high levels of PCBs into the food chain from instream sediments and riverbank/floodplain soils of the Kalamazoo River at the Trowbridge Dam Area. For the purposes of this Action Memorandum, the "Trowbridge Dam Area" is PCB-contaminated material in and along an approximate 2.4 mile stretch of the Kalamazoo River between River Mile 47.25 and the Trowbridge Dam (see Figure 2) and includes targeted instream sediments and riverbank/floodplain soils (see Figures 3 & 4).

The Trowbridge Dam Area contains contaminated sediment and soil with very high levels of

[1] The Trowbridge Dam is located in Allegan County at River Mile (RM) 44.9 of the Kalamazoo River (see Figure 1).

PCBs. Riverbank erosion and instability cause continued release of PCBs into the Kalamazoo River. The Trowbridge Dam is in very poor condition and on the brink of failing. The dam creates an impoundment area of approximately 59 acres. Failure of the dam prior to the implementation of the removal action described in this Action Memorandum would lead to highly concentrated PCB-contaminated sediments being released to the riverbanks, floodplains, and instream sediments where contamination does not currently exist or exists at lower levels.

The response action set forth in this Action Memorandum is time-critical and includes dredging and/or excavation of sediment and soil; containment of PCB-contaminated material; water treatment; shoreline and riverbank stabilization; off-site disposal of removed PCB-contaminated materials managed in accordance with EPA's Toxic Substances Control Act (TSCA) (40 C.F.R. Part 761) and the off-site rule (40 C.F.R. § 300.440); and monitoring. EPA estimates that this time-critical removal action (TCRA) will address approximately 189,000 yd^3 of PCB-contaminated material.

II. SITE CONDITIONS AND BACKGROUND

As stated in Section I above, the Trowbridge Dam Area is an area of contamination within Area 4 of OU5 of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site (SEMS ID # MID006007306).

A. Site Description

1. Removal Site Evaluation

The Administrative Record (found in Attachment 2) contains numerous reports which summarize investigations at the Site. The three investigations and two risk assessments described below provide the basis for this TCRA:

a) State-lead Remedial Investigation/Feasibility Study (RI/FS)

Between 1990 and 2003, the State of Michigan (the State) and various potentially responsible parties (PRPs) conducted Site-wide remedial investigation (RI) and feasibility study (FS) work. The RI field work included an assessment of the physical characteristics of the riverbanks across OU5, including what is now referred to as Area 4. Based on the State's early field work, EPA has concluded that the riverbanks are an ongoing source of loading of PCB-contaminated soils and sediments to the Kalamazoo River.

EPA bases its determination of an imminent and substantial endangerment in this Action Memorandum in part on the risk analysis set forth in the State's RI. The risk analysis associated with the RI identified some ways PCBs are released into the Kalamazoo River from the riverbanks. In particular, the RI report concludes that the cohesive nature of the exposed sediments allows significant portions of the riverbanks to remain in vertical-to-near-vertical repose. The fine-grained exposed sediments, however, generally overlie non-cohesive sandy sediments and soils. As a result, the faces of the banks are susceptible to erosion by river flow during higher water stages and to undercutting by erosion of the underlying non-cohesive

sediments and soils. Undercutting progresses until the overlying sediments fall into the river, typically in blocks. These blocks, or portions thereof, remain along the toe of the river at the Trowbridge Dam Area (see photographs in Attachment 3).

b) United States Geological Survey (USGS) Study

In 2005, USGS, in cooperation with EPA and the State, conducted an additional study of the channel characteristics of the Kalamazoo River. This study concluded that the erosion of the "toe" of the riverbank widens the river, resulting in steeper bank angles. Once the bank undercut exceeds its critical bank angle, the inability of the sediments to support themselves results in bank failure. EPA and State field personnel observed both significant erosion and failure of riverbanks into the river channel in April 2018 (see photographs in Attachment 3).

c) Supplemental Remedial Investigation/Feasibility Study

Beginning in 2013, and continuing today, additional investigations in Area 4, which includes the Trowbridge Dam Area, were conducted as part of the Supplemental Remedial Investigation (SRI). The data gathered as part of the SRI found levels of PCBs in the Trowbridge Dam Area as high as 83 milligrams per kilogram (mg/kg) PCBs in riverbank/floodplain soils and 120 mg/kg PCBs in instream sediments. Further, the report indicated that PCB levels were > 50 mg/kg in 18 riverbank soil samples. The SRI investigations also indicate riverbank erosion and sloughing are contributing PCB-contaminated sediments to the Kalamazoo River. Erosion pin survey results indicate that bank erosion and/or bank sloughing occurred at 70% (7 of 10) of the locations in the former Trowbridge impoundment (BBL, 2003).

d) Baseline Human Health Risk Assessments

In 1977, the State issued a public health advisory related to the PCB contamination in the Kalamazoo River. This advisory remains in place today and warns against eating a variety of fish species from the river because of PCB contamination. In December 1991, the federal Agency for Toxic Substances and Disease Registry (ATSDR) and the State prepared a Public Health Assessment (PHA) for the Site (ATSDR, 1991). The PHA indicated that the Site was a public health hazard because of the probable exposure to hazardous substances at concentrations that might result in adverse health effects. Potential human exposure pathways of concern include incidental ingestion and inhalation of contaminated soils and ingestion of contaminated biota, primarily fish.

In April 2003, the State completed a Baseline Human Health Risk Assessment (HHRA) for the Site that is relevant to EPA's determination of imminent and substantial endangerment in this Action Memorandum. The HHRA identified the following primary human health risk:

> Cancer risks and non-carcinogenic Hazard Quotients (HQ) exceed EPA and/or State acceptable risk limits for both sport and subsistence fishermen. Carcinogenic risk from the consumption of fish ranges from 1.8×10^{-4} to 1.8×10^{-3} for the river segment (designated in the assessment as 'ABSA8') encompassing the Trowbridge Dam Area. Non-carcinogenic HQs for the consumption of fish range from 3.0 to 29 for reproductive effects and 10 to 100 for immunological effects.

Subsequent updates to the HHRA in 2012 and 2015, as well as the 2017 SRI concluded that unacceptable risks and hazards to human health continue to be associated with the fish ingestion pathway (ARCADIS, 2012, AMEC Foster Wheeler, 2015, AMEC Foster Wheeler, 2017).

e) Ecological Risk Assessment

The State finalized its Ecological Risk Assessment (ERA) for the Kalamazoo River in April 2003. The State's ERA findings are also relevant to EPA's determination of imminent and substantial endangerment at the Trowbridge Dam Area. The ERA focused primarily on assessing population-level risks associated with PCB contamination in abiotic media and biota. Because of the potential for PCBs to accumulate in biological tissues and exert adverse effects in upper trophic level biota, the ERA specifically considered bioaccumulation, food chain effects, and adverse effects in upper trophic level organisms. The ERA also focused on assessing the risks from PCB exposures via direct contact with contaminated surface water, streambed sediment, floodplain (exposed) sediment, and surface soil, as well as ingestion of PCB-contaminated food items.

The ERA concluded that PCB contamination at the Site presents a high to moderate ecological risk for eight animal species. Table 5.3 of the ERA identifies the estimated risks for all representative species of concern, based on estimated PCB dose (birds and mammals) or on the Site-wide average PCB concentration (aquatic receptors). The ERA also found that PCB contamination of surface water and streambed sediment (and floodplain soils that are frequently inundated or have the potential to erode into the river) is likely to adversely affect sensitive piscivorous predators, such as mink, through consumption of PCB-contaminated prey, especially fish. Other piscivorous predators, such as bald eagles, also appear to be at high risk based on the exposure assumptions presented in the assessment.

More recently, the Terrestrial Baseline Ecological Risk Assessment, updated as part of the SRI, concluded that there continues to be a potential risk to moderate to low-sensitivity insectivorous and vermivorous birds (AMEC Foster Wheeler, 2017). Terrestrial and semi-aquatic biota may also be at risk from PCB-contaminated riverbank/floodplain soils, depending on life history (e.g. foraging behavior, diet and mobility) and sensitivity to PCBs. Omnivorous birds (represented by the robin) that consume substantial numbers of soil invertebrates, such as earthworms, appear to be at moderate but still significant risk.

The Trowbridge Dam Area may also be home to endangered species. The United States Fish and Wildlife Service has identified two federally-endangered species, three federally-threatened species, and one federal candidate species that can be present in Allegan County. The Karner Blue Butterfly and the Indiana Bat both are endangered. The Bald Eagle, Northern Long-Eared Bat, and Pitcher's Thistle (a plant) are threatened in this region. The Eastern Massasauga Rattlesnake is the lone candidate species. The State lists seven species as endangered or threatened (not including the federally-listed species) in or near the Site, including the Zigzag Bladderwort, wild American Ginseng, the Log Fern (plants), the Creek Chubsucker (fish), Prairie Warbler (bird), Ottoe Skipper (insect), and the Spotted Turtle (reptile).

2. Physical Location

The "Trowbridge Dam Area" is the aerial extent of PCB-contaminated instream sediments and riverbank/floodplain soils along the 2.4 mile stretch of the Kalamazoo River between River Mile 47.25 and the Trowbridge Dam (see Figure 2). The geographical coordinates of the Trowbridge Dam are 42° 28' 58.21" north latitude and 85° 47' 47.50" west longitude. The dam is in a sparsely populated, rural area consisting primarily of evergreen tree farms.

An Environmental Justice (EJ) analysis for the Trowbridge Dam Area is contained in Attachment 1. The analysis was done for the surrounding area using EPA's EJ Screen Tool. EPA has reviewed environmental and demographic data for a one-mile radius surrounding the Trowbridge Dam Area and determined there is a potential for EJ concerns at this location.

3. Site and Trowbridge Dam Area Characteristics

As stated above, the Trowbridge Dam Area is an area of contamination within Area 4 of OU5 of the Site. The Site lies within the Great Lakes Basin in the Kalamazoo River watershed of Michigan's Lower Peninsula. The watershed drains 2,020 square miles of southwest Michigan. It reaches 162 miles into south-central Michigan, and ranges in width from 11 to 29 miles. The main channel of the Kalamazoo River flows northwest for 123 miles before ultimately emptying into Lake Michigan near Saugatuck, Michigan. EPA studies have estimated that the Kalamazoo River contributes approximately 42 pounds of PCBs to Lake Michigan per year (EPA, 2004).

The Trowbridge Dam was built in 1898 to generate hydroelectric power. Consumers Energy operated it from 1902 to 1967, when it gifted the dam to the State. Over the past 50 years, the State has demolished the dam's powerhouses, removed its superstructure, spillway and concrete piers, raised its gates to lower the impoundment level, and lowered its abutment walls. The dam, as it exists today, consists of a 150-foot left earthen embankment, 80-foot wide concrete spillway, and 110-foot right earthen embankment (see Figure 5).

In 2010, the State began semi-annual safety inspections of Trowbridge Dam. The State has determined that the Trowbridge Dam is in 'very poor' condition and exhibits several active or incipient failure mechanisms (SME, 2018). The latest inspection report defines 'very poor' to mean that it is expected that the dam will fail unless action is taken to remove or reconstruct the dam (SME, 2018). Most pertinent to this Action Memorandum is the active erosion of the left upstream embankment into the reservoir with progressive sloughing of the slope into the embankment (see photograph #5 in Attachment 3), and the potential for an uncontrolled release of the reservoir as well as the impounded sediment should there be a catastrophic failure of the dam. Because of the critical dam safety issues set forth in the State's report, EPA plans to complete the work described herein within the next two years so that PCB-contaminated soils and sediments impounded by the dam and within the reservoir do not further contaminate the river due to dam failure.

4. Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant

A release to the environment of a hazardous substance, pollutant, and/or contaminant has occurred and continues to occur at the Trowbridge Dam Area due to ongoing riverbank erosion (see photographs in Attachment 3). EPA documented the presence of elevated levels of PCBs, a hazardous substance, as defined by Section 101(14) of CERCLA, 42 U.S.C. § 9601(14), within instream sediments and riverbank/floodplain soils at the Trowbridge Dam Area. The human health impacts from elevated PCB levels are described in Section III below. Possible exposure routes for wildlife contact with hazardous substances includes direct contact with contaminated riverbank/floodplain soils, and consumption of fish and earthworms that accumulate PCBs. Historical samples taken at the Trowbridge Dam Area show PCB concentrations in riverbank/floodplain soils up to 83 mg/kg and instream sediments up to 120 mg/kg. These levels are orders of magnitude higher than the clean-up goals established for other response actions at OU5.

EPA has not yet selected remediation goals for Area 4, but at this time believes that the remediation goals will be consistent with the final remediation goals selected for other areas of the Site, which are 0.33 mg/kg surface-weighted average concentration[2] for instream sediments, 2.5 mg/kg for residential floodplain soils, and 11 mg/kg for non-residential floodplain soils.

5. NPL Status

The Site was listed on the NPL on August 30, 1990. In 2002, EPA assumed the enforcement lead from the State for most operable units of the Site, including OU5. Based on the RI/FS and SRI documents completed to date, a Record of Decision (ROD) is currently under development for the Site.

6. Maps and Pictures

The following figures can be found attached to this Action Memorandum:

Figure 1. Site Location Map
Figure 2. Area 4 - Designated Subareas
Figure 3. Approximate Site Excavation Areas – Riverbank Soils
Figure 4. Approximate Site Excavation Areas – In-Stream Sediments
Figure 5. Trowbridge Dam – Projected Extent of Removal

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[2] A surface-weighted average concentration (SWAC), is a method of spatially calculating the mean (average) concentration of a constituent (i.e., total PCBs) in the sediment surface. Samples are collected throughout the area of concern, representative sub-areas are generated for each sample location, and a subarea-weighted concentration is calculated to produce the SWAC. The subareas may be generated using several different methods, such as grids or stream tubes.

The following photographs depicting site conditions can be found in Attachment 3 of this Action Memorandum:

Photograph 1. Riverbank erosion of contaminated soils on north bank (April 2018)
Photograph 2. Riverbank erosion of contaminated soils on south bank (April 2018)
Photograph 3. Riverbank erosion of contaminated soils on north bank (April 2018)
Photograph 4. Riverbank erosion of contaminated soils on south bank (April 2018)
Photograph 5. Deterioration of left descending bank at Trowbridge Dam (March 2018)

B. Other Actions to Date

1. Previous actions

Previous actions for the Trowbridge Dam Area have been documented in Section II.A.1.

2. Current Actions

The Site continues to be addressed through the Superfund remedial process. Subsequent to completion of the TCRA and through the Superfund remedial process, EPA will complete its evaluation of the risks to human health and the environment presented by the presence of PCBs within Area 4 of OU5. This evaluation will consider data collected and analyses performed as part of the TCRA described in this Action Memorandum. EPA will then issue a Record of Decision (ROD) for Area 4 of OU5.

C. State and Local Authorities' Roles

1. State and local actions to date

Previous actions by the State for the Trowbridge Dam Area have been documented in Section II.A.1.

2. Potential for continued state/local response

EPA is the lead agency for CERCLA response actions and will continue working in consultation with the State during the proposed removal and remedial activities associated with the Site.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

Conditions present at the Trowbridge Dam Area constitute a threat to public health, welfare or the environment and meet the criteria for a time-critical removal action as provided for in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. § 300.415(b)(1), based on the factors in 40 C.F.R. § 300.415(b)(2). These factors include the following:

- **Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants;**

PCBs are a hazardous substance, as defined by Section 101(14) of CERCLA. PCBs are listed as a hazardous substance under Section 311(b)(2) of the Clean Water Act, as set forth in 40 C.F.R. Part 116.4, Table A. EPA has determined that PCBs are a probable human carcinogen. In addition, exposure to PCBs is widely associated with measurable adverse immunological and developmental effects in humans, particularly developing fetuses (MDPH, 2012). These chemicals have the potential to bio-magnify, which means that they have the potential to increase in concentration as they are transferred from one link in the food chain to another.

The Trowbridge Dam Area has PCB levels up to 120 mg/kg for instream sediments and 83 mg/kg for riverbank/floodplain soils. The ongoing, uncontrolled erosion of soils from the riverbanks is a significant source of PCB loading to the Kalamazoo River. The 2017 SRI report documented PCB-containing wastepaper residuals and soils sloughing off the riverbanks into the Kalamazoo River and transported downstream. Erosion pins installed in 2000 along transects at 10 different locations were utilized to establish riverbank/floodplain soils and PCB erosion rates, which are reported in the Area 3 SRI document. The Area 3 SRI document described the erosion along the riverbanks to be greater than previously understood (see photographs in Attachment 3). Instream sediments and riverbank/floodplain soils are primary sources of an ongoing release of PCBs into the Kalamazoo River.

Although the 1977 State fish consumption advisory is still in effect, it is not legally binding. State personnel and local officials have reported that anglers fishing at the Site are taking home fish in amounts that may be inconsistent with consumption advisories issued by the State (MDPH, 2015). It has also been reported that turtles have been taken from the river for human consumption, which would provide for another potential human exposure pathway.

The most significant outcome of the ecological and human health risk assessments is the conclusion that fish consumption is the primary exposure pathway for ecological and human receptors that may be at risk from PCB within media of the Kalamazoo River. Therefore, the key to reducing exposure and potential risks to important receptors (e.g. fish-eating birds, fish-eating wildlife, and humans) is to reduce PCB concentrations in the fish tissue consumed by these receptors. The SRI concluded the greatest factor controlling PCB levels in fish is bioavailability of PCB in surface sediments and the water column where fish and their prey come in contact with or ingest PCBs.

- **High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate;**

The Trowbridge Dam Area has PCB levels up to 120 mg/kg for instream sediments and 83 mg/kg in riverbank/floodplain soils. As explained above, sediments and riverbank/floodplain soils located instream or near the river's edge are susceptible to erosion and scouring (see photographs in Attachment 3). During high water events, increases in river velocity create conditions which cause additional releases of PCB to the Kalamazoo River, and ultimately, Lake

Michigan (EPA, 2004).

Further, if the dam were to fail, contaminated instream sediments would be transported downriver. These contaminated sediments would spread PCB-contaminated sediments onto riverbanks and floodplains previously characterized as not having PCB contamination above risk-based levels or cleanup standards. This may also require EPA to conduct response actions to address either human health threats related to direct exposure of residents or recreational users to riverbank/floodplain soils or exacerbated ecological threats at areas where responses may not otherwise be necessary.

- **Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released;**

The Kalamazoo River is often subjected to extreme weather conditions in the winter and spring which increase the threat of a release of PCBs. The highest flood-stage water level ever recorded was measured by the National Weather Service in February 2018. The breakup of ice in the late winter, and the movement of ice floes downstream, causes scouring of the banks and river bottom and may adversely impact the temporary water control structure. Likewise, heavy spring rains and/or summer storms increase stream volume and flow velocity, which lead to increased scouring of the river bottom and riverbanks. All of these forces cause an increase in the volume and extent of PCB contamination in the Kalamazoo River and Lake Michigan.

IV. ENDANGERMENT DETERMINATION

EPA concludes that unless addressed by implementing the response action detailed in this Action Memorandum, the conditions at the Trowbridge Dam Area, the nature of the hazardous substances found there, the potential exposure pathways described in Sections II and III above, and the actual or threatened release of PCBs from the Trowbridge Dam Area, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. PROPOSED ACTIONS

A. Description of the Proposed Action

The proposed response action to mitigate threats associated with PCB-contaminated sediments and soils in the Trowbridge Dam Area consists of removing contaminated instream sediments and riverbank/floodplain soils. The TCRA will include, but may not be limited to, the following tasks:

1) Dredging and/or excavation of PCB-contaminated instream sediments and riverbank/floodplain soils with elevated PCB concentrations (see estimated excavation area maps in Figures 3 & 4) to meet cleanup standards below;

2) Removal of the Trowbridge Dam including the 150-foot left earthen embankment, 80-foot wide concrete spillway, and 110-foot right earthen embankment (see Figure 5), and

any water control structure within the Trowbridge Dam Area as needed to reduce the risk of PCB mobilization from floodplains and banks due to failure of the Trowbridge Dam or water control structure;

3) Cut-back and stabilization of riverbanks to mitigate exposures to PCB-contaminated riverbank/floodplain soils and future erosion;

4) Dewatering, as necessary, and disposal off-site of all PCB-contaminated instream sediments and riverbank/floodplain soils removed pursuant to proposed actions 1, 2 & 3 above. PCB-contaminated material with PCB concentrations $\geq$ 50 mg/kg shall be transported off-site to a TSCA waste landfill compliant with all state and federal regulatory requirements. PCB-contaminated material with PCB concentrations < 50 mg/kg shall be transported off-site and disposed in an appropriately licensed and permitted commercial landfill in compliance with all state and local laws, including EPA's Off-Site Rule (40 CFR § 300.440);

5) Ensuring that a stable river channel exists post-removal, including backfilling as appropriate and re-vegetation with native plant species; and

6) Conducting appropriate monitoring and maintenance both during and for a defined time period, to be determined in coordination with the State, after completion of the work described above.

The TCRA will be conducted in a manner not inconsistent with the NCP. The On-Scene Coordinator (OSC) has initiated planning for provision of post-removal site controls consistent with the provisions of Section 300.415(l) of the NCP.

The actions described in this Action Memorandum directly address actual or threatened releases of hazardous substances, pollutants, or contaminants at the Trowbridge Dam Area which pose an imminent and substantial endangerment to public health, welfare and the environment. The activities related to the TCRA will require an estimated 600 days (2-3 construction seasons) on-site to complete, with continued post-removal monitoring and maintenance for a defined time period to be determined in coordination with the State.

B. Cleanup Standards

EPA has established the following cleanup standards for PCBs at the Trowbridge Dam Area:

- Instream sediments: $\leq$ 1.0 mg/kg.
- Riverbank/floodplain soils: $\leq$ 5.0 mg/kg.

The standards are based on preliminary remediation goals (PRGs) expected to be sufficiently protective of human (anglers, recreationists and residents) as well as ecological (wildlife) receptors set forth in the updated Human Health Risk Assessment (HHRA) (CDM, 2003) and are consistent with prior TCRAs conducted in Area 1 of OU5 of the Site. The PRGs were established based on risk-based concentration (RBC) values for fish tissue, soil and sediment

defined in the human health and ecological risk assessments conducted at this Site and referenced in Section II.A of this Action Memorandum. RBCs are calculated, chemical-specific concentrations below which no significant health risks are anticipated for a receptor. The PRGs are also based on the State's screening and target level for PCBs.

EPA anticipates that the cleanup standards for PCBs in Area 4 will be consistent with the cleanup standards set forth in the RODs for Area 1 and Area 2 of OU5. EPA expects to achieve a surface weighted average concentration of 0.33 mg/kg total PCBs (set forth in the HHRA) for instream sediments by removing contaminated riverbank/floodplain soil with PCBs greater than 5 mg/kg (see Figure 2), and instream sediments with PCBs at levels greater than or equal to 1 mg/kg (see Figure 3). Additionally, past work with PCB-contaminated soils has found a "neat line" exists in subsurface riverbank/floodplain soils above which contamination is present and below which it is not. Sampling data along this "neat line" has been found to be at the 5.0 mg/kg cleanup goal, making 5.0 mg/kg a practicable cleanup goal.

C. Orderly Transition to Remedial Response

The NCP requires that, if EPA determines that a removal action will not fully address a release, and that subsequent remedial action may be necessary, then the Agency must ensure an orderly transition from removal to remedial response activities (40 C.F.R. Part 300.415(g)). As noted above, subsequent to the TCRA described in this Action Memorandum, EPA will complete its evaluation, through the Superfund remedial process, of risks to human health and the environment within Area 4. Residual risks to human health and the environment remaining within Trowbridge Dam Area after completion of the removal action will be evaluated as part of the feasibility study that will be used by EPA to select a final remedy for Area 4 of OU5.

D. Applicable or Relevant and Appropriate Requirements

Pursuant to 40 C.F.R. Part 300.415, removal actions shall, to the extent practicable considering the exigencies of the situation, attain applicable or relevant and appropriate requirements (ARARs) of federal and state law. Federal ARARs for this TCRA may include:

- Clean Air Act requirements related to emission of air contaminants in quantities that can cause harmful effects to human health, animal life, plant life, and/or property found at 40 C.F.R. Part 50.
- Clean Water Act (CWA) requirements at 40 C.F.R. Part 231 and 33 C.F.R. Parts 320 - 330 apply to all existing, proposed, or potential areas for discharges of dredged or fill materials into the Kalamazoo River.
- If water is treated during removal action and discharged to a publicly owned treatment works (POTW), the influent requirements of these facilities must be met prior to discharging to the POTW, as prescribed 40 C.F.R. Parts 136 and 403. These regulations also provide guidelines establishing test procedures for the analysis of pollutants.
- If water is treated during the removal action and discharged back into the river, on-site discharges from the Site must meet the substantive National Pollutant Discharge

Requirements (NPDES) requirements related to ambient water quality standards and effluent standards, both of which are set by the State in relation to the Kalamazoo River.

- TSCA requirements for the dewatering of PCB-contaminated sediment and for the storage and transport of PCBs found at 40 C.F.R. Part 761.61(b) (specifies cleanup and disposal options for PCB remediation waste including sediment and dredged materials), 40 C.F.R. Part 761.65 (establishes technical requirements for temporary storage of PCB wastes prior to treatment or disposal), and 40 C.F.R. Part 761.79 (provides decontamination standards and procedures for removing PCBs that are regulated for disposal from water, organic liquids, and other materials).

By letter dated June 20, 2019, EPA requested that the State identify potential state ARARs for this TCRA. Any state ARARs identified in a timely manner for this TCRA will be complied with to the extent practicable. To date, the State has not provided EPA with a list of ARARs.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Continued risk to public health and the environment will result if the TCRA is delayed or not taken. Delayed action increases the risk of failure of the Trowbridge Dam before the completion of the TCRA, which would spread the contamination and increase the likelihood for wildlife populations to come into direct contact with PCB-contaminated sediments and riverbank/floodplain soils. In addition to the risks associated with failure of the Trowbridge Dam, delay or non-action would likely result in erosion of high levels of PCB-contaminated riverbank/floodplain soils and instream sediment to both the water column and surface, allowing for easy uptake of PCBs by fish, worms, plants and other organisms of the food chain in this area and downstream.

VII. OUTSTANDING POLICY ISSUES

No outstanding policy issues have been identified in relation to the Trowbridge Dam Area of the Site.

VIII. RECOMMENDATION

This decision document represents the selected response action for the Trowbridge Dam Area of the Site. It was developed in accordance with CERCLA and is not inconsistent with the NCP. This decision is based upon the Administrative Record for the TCRA, an index of which is attached to this Action Memorandum (Attachment 2).

Conditions at the Trowbridge Dam Area meet the criteria of Section 300.415(b)(2) of the NCP for a TCRA, and I recommend your approval of the TCRA described herein. EPA expects that a PRP will perform all removal actions under the oversight of the OSC. You may indicate your decision by signing below.

APPROVE: PETER WRIGHT Digitally signed by PETER WRIGHT Date: 2020.04.01 21:19:34 -04'00' DATE: _____

Peter Wright
Assistant Administrator
Office of Land and Emergency Management

DISAPPROVE: _____ DATE: _____

Peter Wright
Assistant Administrator
Office of Land and Emergency Management

Figures:

1. Site Location Map
2. Area 4 - Designated Subareas
3. Approximate Site Excavation Areas – Riverbank Soils
4. Approximate Site Excavation Areas – In-Stream Sediments
5. Trowbridge Dam – Projected Extent of Removal

Attachments:

1. Environmental Justice Analysis
2. Administrative Record Index
3. Site Photographs

cc: S. Ridenour, U.S. EPA, 5104A/B517F (Ridenour.Steve@epa.gov)
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Liesl Eichler Clark, Director, Michigan EGLE, w/o Enf. Addendum
Polly Synk, Michigan AG, w/o Enf. Addendum

FIGURE 1

SITE LOCATION MAP

Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site –
Trowbridge Dam Area

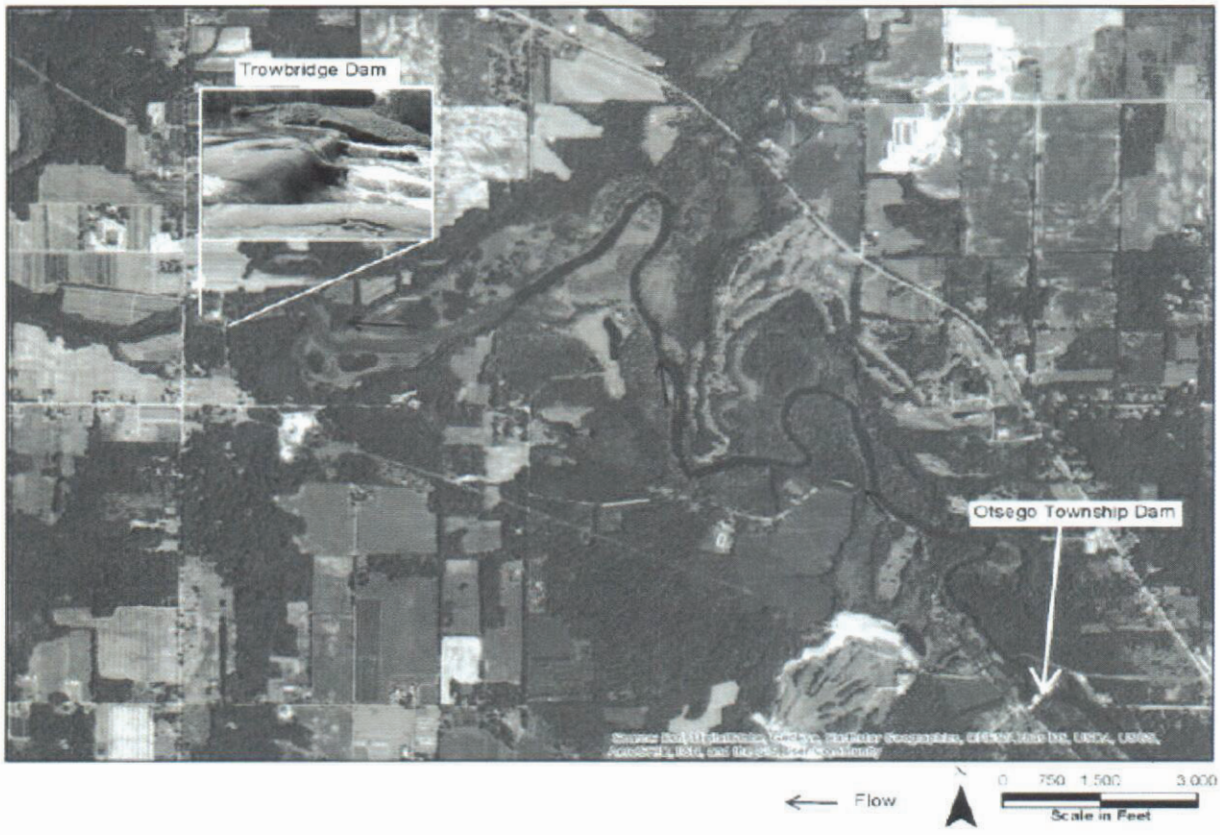


FIGURE 2

AREA 4 - DESIGNATED SUBAREAS
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site –
Trowbridge Dam Impoundment

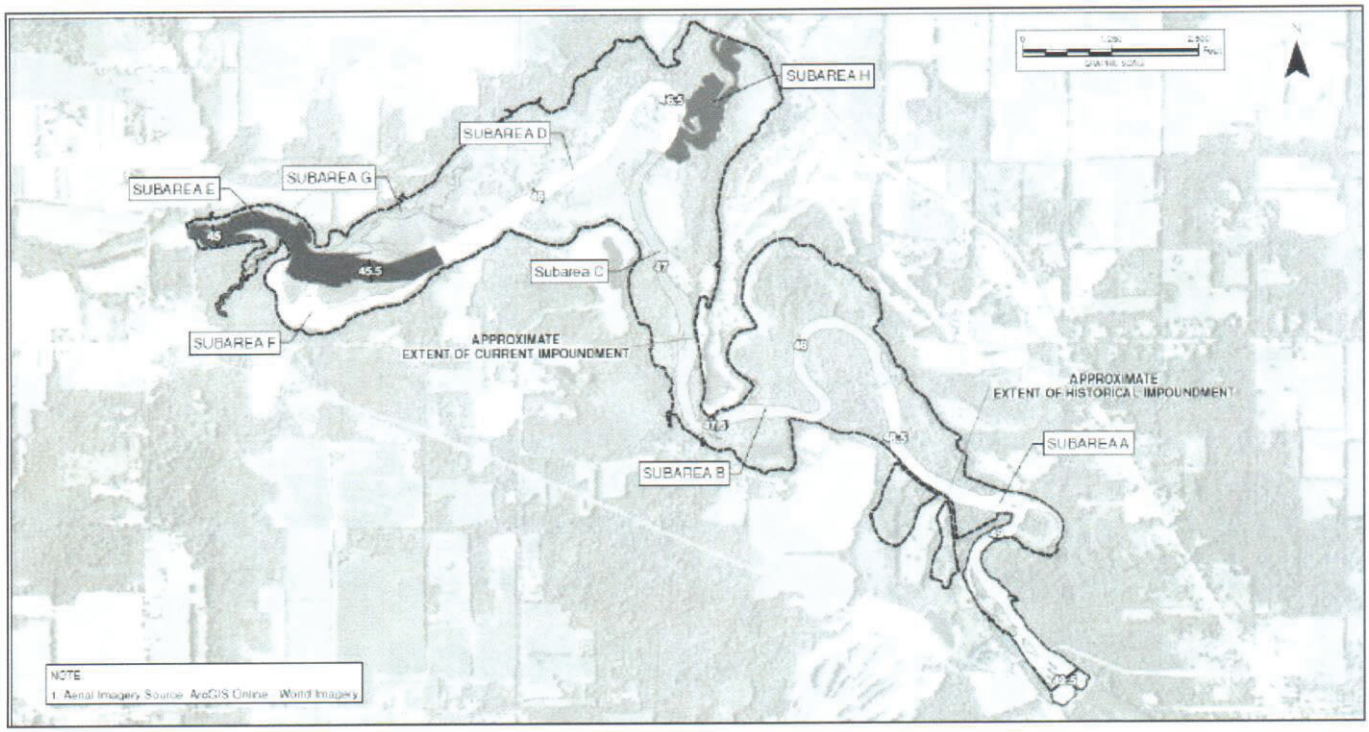
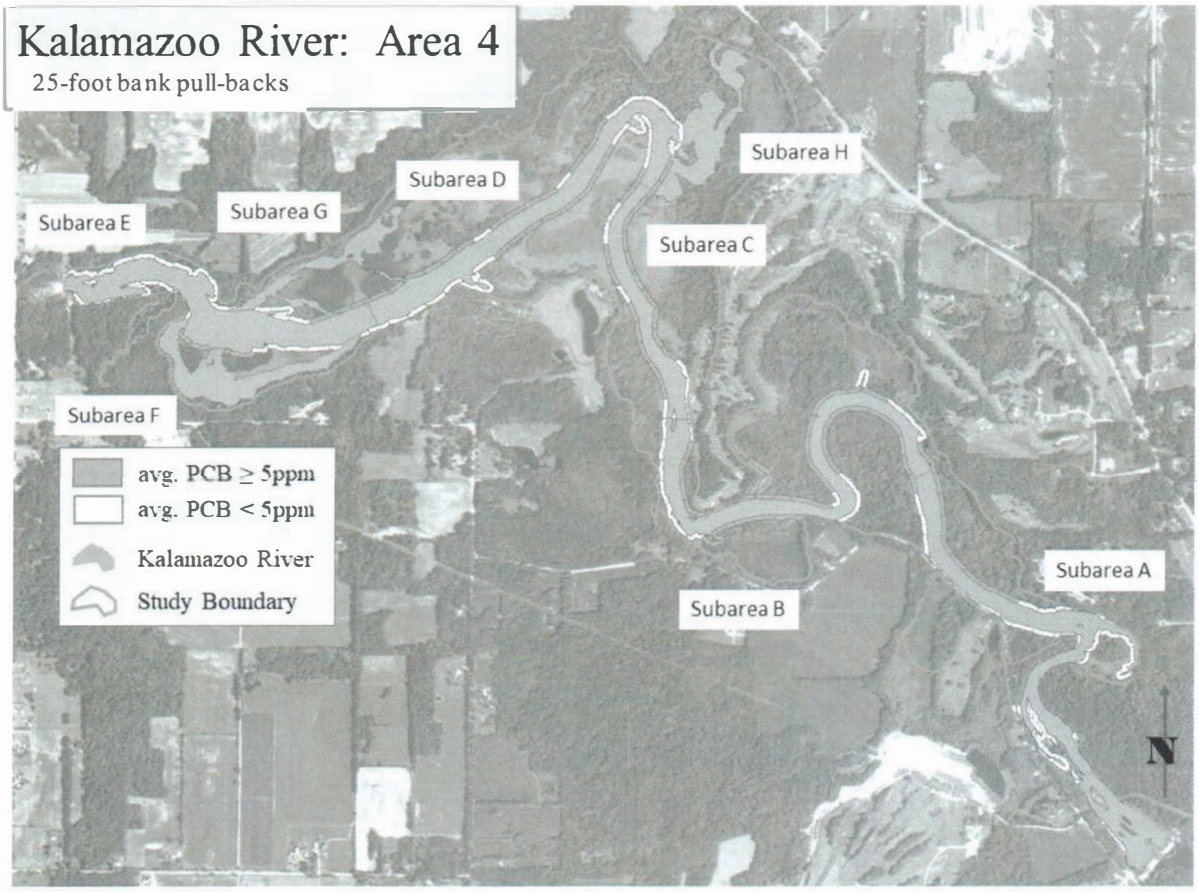


FIGURE 3

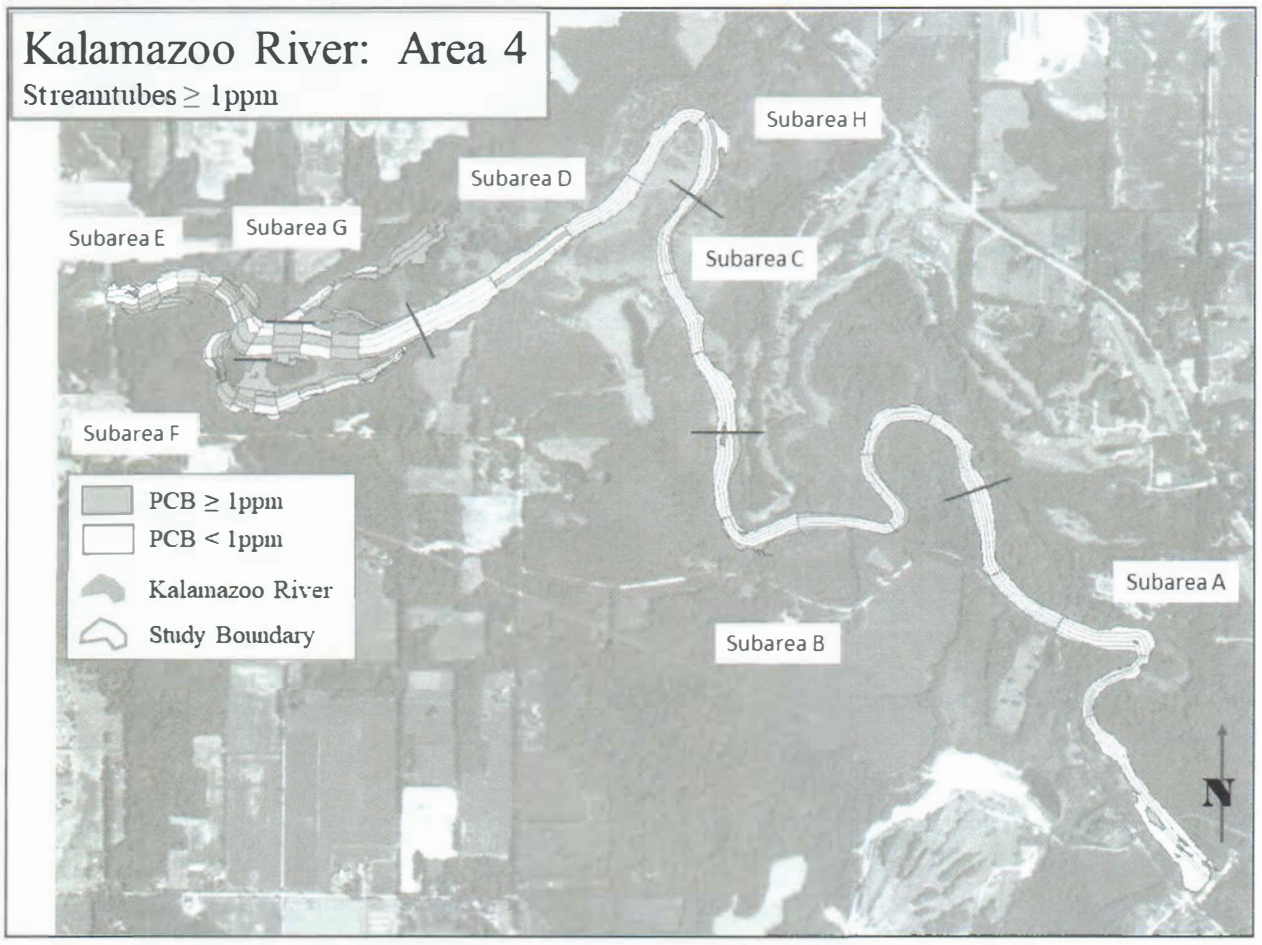
APPROXIMATE SITE EXCAVATION AREAS – RIVERBANK SOILS
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Trowbridge Dam Area



River bank soil removal is anticipated in Subareas C, D & E.

FIGURE 4

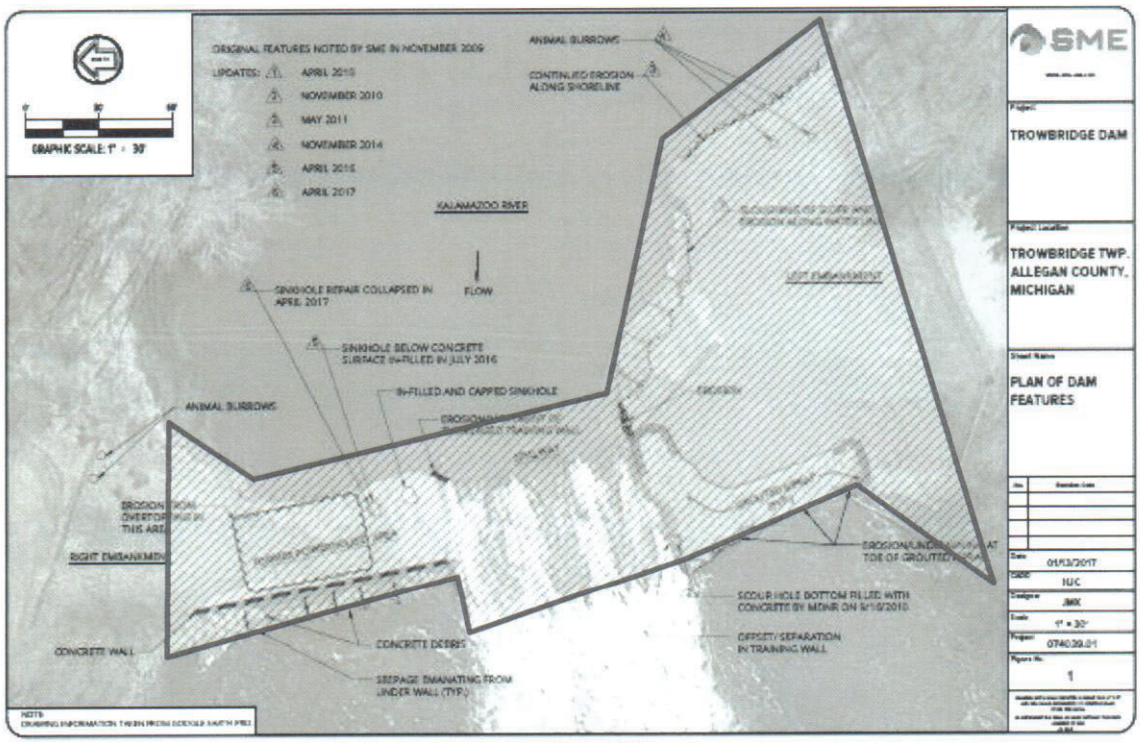
APPROXIMATE SITE EXCAVATION AREAS – IN-STREAM SEDIMENTS
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Trowbridge Dam Area



In-Stream sediment removal is anticipated in Subareas E, F & G.

FIGURE 5

Trowbridge Dam – Projected Extent of Removal
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Trowbridge Dam Area



Anticipated extent of existing dam removal.

Attachment 1

EJ Analysis

(3 pages)

EPA United States Environmental Protection Agency

EJSCREEN Report (Version 2019)

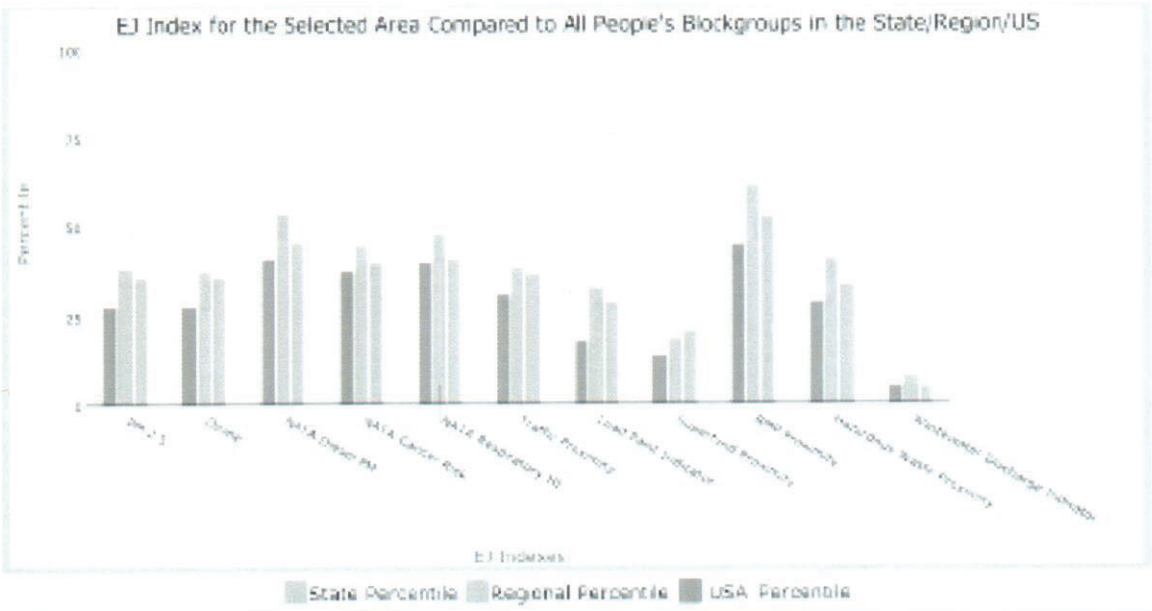
2 miles Ring Centered at 42.481973,-85.784122, MICHIGAN, EPA Region 5

Approximate Population: 906

Input Area (sq. miles): 12.56

Trowbridge Dam Area

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	36	39	28
EJ Index for Ozone	36	38	28
EJ Index for NATA* Diesel PM	46	54	41
EJ Index for NATA* Air Toxics Cancer Risk	40	46	38
EJ Index for NATA* Respiratory Hazard Index	41	48	40
EJ Index for Traffic Proximity and Volume	37	39	31
EJ Index for Lead Paint Indicator	29	33	18
EJ Index for Superfund Proximity	21	19	14
EJ Index for RMP Proximity	53	62	45
EJ Index for Hazardous Waste Proximity	34	41	29
EJ Index for Wastewater Discharge Indicator	5	8	5



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EPA United States Environmental Protection Agency

EJSCREEN Report (Version 2019)

2 miles Ring Centered at 42.481873,-85.784122, MICHIGAN, EPA Region 5

Approximate Population: 906
Input Area (sq. miles): 12.56
Trowbridge Dam Area

Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EPA United States Environmental Protection Agency

EJSCREEN Report (Version 2019)

2 miles Ring Centered at 42.481873,-86.784122, MICHIGAN, EPA Region 5

Approximate Population: 906

Input Area (sq. miles): 12.56

Trowbridge Dam Area

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m³)	8.49	8.56	37	8.63	31	8.3	55
Ozone (ppb)	45	44	70	43.4	63	43	63
NATA* Diesel PM (µg/m³)	0.168	0.338	19	0.446	<50th	0.479	<50th
NATA* Cancer Risk (lifetime risk per million)	20	24	23	26	<50th	32	<50th
NATA* Respiratory Hazard Index	0.24	0.29	22	0.34	<50th	0.44	<50th
Traffic Proximity and Volume (daily traffic count/distance to road)	98	660	38	530	38	750	34
Lead Paint Indicator (% Pre-1960 Housing)	0.31	0.38	51	0.38	49	0.28	62
Superfund Proximity (site count/km distance)	0.15	0.15	78	0.13	81	0.13	79
RMP Proximity (facility count/km distance)	0.084	0.53	16	0.82	8	0.74	12
Hazardous Waste Proximity (facility count/km distance)	0.33	1	45	1.5	39	4	46
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	0.093	0.23	91	0.82	86	14	89
Demographic Indicators							
Demographic Index	12%	29%	19	28%	22	36%	12
Minority Population	4%	25%	18	29%	20	39%	10
Low Income Population	20%	33%	32	31%	36	33%	33
Linguistically Isolated Population	1%	2%	69	2%	64	4%	49
Population With Less Than High School Education	9%	10%	57	10%	58	13%	49
Population Under 5 years of age	4%	6%	34	6%	30	6%	30
Population over 64 years of age	19%	16%	72	15%	74	15%	75

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations or appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJSCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

December 10, 20[illegible] 3/3

Attachment 2

Administrative Record

(5 pages)

ATTACHMENT 2

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMEDIAL ACTION

ADMINISTRATIVE RECORD
FOR THE
ALLIED PAPER/PORTAGE CREEK/KALAMAZOO RIVER SITE
TROWBRIDGE TOWNSHIP DAM AREA
OPERABLE UNIT 5
TROWBRIDGE, ALLEGAN COUNTY, MICHIGAN

ORIGINAL
JULY, 2019
SEMS ID:

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	923493	Undated	MI Dept. Of Community Health	Public	Fact Sheet - Eat Safe Fish in Michigan	2
2	167821	12/23/1991	ATSDR	U.S. EPA	Preliminary Health Assessment	42
3	249488	10/1/2000	Blasland, Bouck & Lee, Inc.	U.S. EPA	Feasibility Study Report - Phase I	407
4	249490	10/1/2000	Blasland, Bouck & Lee, Inc.	U.S. EPA	Remedial Investigation Report -Phase I	653
5	205878	2/1/2002	Weston, Inc.	U.S. EPA	Removal Assessment Report	777
6	249487	4/1/2003	Camp, Dresser, & McKee	U.S. EPA	Final Baseline Ecological Risk Assessment (Revised)	270
7	249495	4/1/2003	CH2M Hill	U.S. EPA	Remedial Investigation Report (Draft)	122

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
8	249486	5/1/2003	Camp, Dresser, & McKee	U.S. EPA	Final Human Health Risk Assessment (Revised)	109
9	921852	1/1/2005	USGS	File	Historical and Simulated Changes in Channel Characteristics of the Kalamazoo River, Plainwell to Otsego, Michigan	67
10	923490	3/1/2005	Kalamazoo River Natural Resource Trustees	Public	Fact Sheet - 2005 Kalamazoo River Natural Resource Damage Assessment - Summary of the Stage I Assessment	2
11	923488	3/15/2005	Stratus Consulting	MDEQ	Stage I Assessment Report - Volume 1 - Injury Assessment: Kalamazoo River Environment	284
12	923489	3/15/2005	Stratus Consulting	MDEQ	Stage I Assessment Report - Volume 2 - Economic Assessment: Kalamazoo River Environment	200
13	23486	9/1/2005	Wesley, J., MDNR	File	Kalamazoo River Assessment -Special Report 35	377
14	249492	7/25/2006	ATSDR	U.S. EPA	Health Consultation: ATSDR Response to Public Advisory Council for Kalamazoo River Area of Concern Rap Comments on Public Health Assessment	18
15	940548	6/4/2010	SME, Inc.	MDNR	Report on Existing Conditions Trowbridge Dam	20

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
16	924225	2/1/2012	ARCADIS	Georgia-Pacific, LLC	Area 1 Supplemental Remedial Investigation Report - Final	303
17	918185	8/1/2012	ARCADIS	Georgia-Pacific, LLC	Supplemental Remedial Investigation Report - OU-5, Area 1	4740
18	923491	11/1/2012	MI Dept. of Community Health	File	Health Consultation - Technical Support Document for a Polychlorinated Biphenyl Reference Dose (RFD) as a Basis for Fish Consumption Screening Values (FCSVS)	107
19	940550	6/19/2013	SME, Inc.	MDNR	Dam Safety Inspection Report	18
20	940544	2/18/2014	SME, Inc.	MDNR	Report on Existing Conditions Trowbridge Dam	24
21	923492	1/1/2015	MI Dept. of Community Health	Public	2015 Eat Safe Fish Guide for Southwest Michigan	88
22	940545	4/3/2015	SME, Inc.	MDNR	Report on Existing Conditions Trowbridge Dam	24
23	923466	7/29/2015	Moritz, W., MDNR	Saric, J., U.S. EPA	Letter re: Amendment to Notification Letter Regarding Off-Site Disposal of Contaminated Sediments	1

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
24	920817	7/6/2015	AMEC Foster Wheeler	Saric, J., U.S. EPA	OU5 Kalamazoo River Superfund Site Area 3 Draft Supplemental Remedial Investigation Report (Redacted Version)	27
25	940551	5/2/2016	Trumble, L., MDEQ	MDNR	Dam Safety Inspection Report Trowbridge Dam	21
26	940546	5/30/2017	SME, Inc.	MDNR. MDEQ, MDTMB	Memo re: Observations During Inspection of Trowbridge Dam	6
27	940552	10/18/2017	AECOM	MDNR	Trowbridge Dam: Dam Removaland Channel Restoration - Conceptual Design Report	34
28	940547	12/29/2017	SME, Inc.	MDNR	2017 Report on Existing Conditions Trowbridge Dam	28
29	940549	6/6/2018	U.S. EPA	File	Environmental Justice (EJ) Report	3
30	947136	10/26/2018	Saric, J. U.S. EPA	Johnson, S., Georgia Pacific	EPA Letter Re: Supplemental Remedial Investigation Report Area 4 Revision 2 Conditional Approval	2
31	947135	11/16/2018	AMEC Foster Wheeler	Kirchner, K. U.S. EPA	AMEC Foster - Final Supplemental Remedial Investigation Report - Operable Unit 5 Area 4 (Cover Letter, Text, Tables and Figures)	302

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
32	947109	4/6/2019	SME, Inc.	MDNR	2018 Report on Existing Conditions Trowbridge Dam	28
33	947092	6/20/2019	Ruesch, P. U.S. EPA,	Peabody, D., MDEQ	U. S. EPA Letter - Request for State Applicable Relevant & Appropriate Requirements (ARARs)	3
34	-	-	Ballotti, D., U.S. EPA	Wright, P., U.S. EPA	Enforcement Action Memorandum re: Determination of an Imminent & Substantial Threat to Public Health & the Environment at the Trowbridge Dam Area of the Allied Paper/Portage Creek/Kalamazoo River Site (***PENDING)***	-

Attachment 3

Site Photographs

(3 pages)

Site: Trowbridge Dam Area
Photograph No.: 1 **Date:** 04/03/2018
Direction: North **Photographer:** Paul Ruesch
Subject: Riverbank erosion of contaminated soils into Kalamazoo River on north bank.

Site: Trowbridge Dam Area
Photograph No.: 2 **Date:** 04/03/2018
Direction: South **Photographer:** Paul Ruesch
Subject: Riverbank erosion of contaminated soils into Kalamazoo River on south bank.

Site: Trowbridge Dam Area
Photograph No.: 3 **Date:** 04/03/2018
Direction: North **Photographer:** Paul Ruesch
Subject: Riverbank erosion of contaminated soils into Kalamazoo River on north bank.

Site: Trowbridge Dam Area
Photograph No.: 4 **Date:** 04/03/2018
Direction: south **Photographer:** Paul Ruesch
Subject: Riverbank erosion of contaminated soils into Kalamazoo River on south bank.

Site: Trowbridge Dam Area
Photograph No.: 5 **Date:** 03/08/2018
Direction: East **Photographer:** Paul Ruesch
Subject: Erosion on south bank at Trowbridge Dam.

CONCURRENCES

SYMBOL <	OEM/PRAD	[illegible]	[illegible]	OGC/SWRLD	OSRTI/SMRDB	DANA STALC UP Digitally signed by DANA STALCUP Date: 2020.03.30 15:05:24 -04'00'	OEM/PRAD	OEM
SURNAME<	RJOENOVIC	[illegible]	[illegible]	Michaud	[signature]		GR	CHEATHAM
DATE <	3/3/2020	3/4/20	3/5/20	3/11/20	3/26/2020		4/1/2020	4/1/2020