REPORT

Draft Time Critical Removal Action Work Plan for the Refuse Area at the Georgia-Pacific Corporation Kalamazoo Mill Property and the Oxbow Area at the Former Hawthorne Mill Property

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

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Table of Contents

Section 1. Introduction 1-1

1.1 General 1-1
1.2 Related Documentation 1-1
1.3 Report Organization 1-2

Section 2. Previous Activities 2-1

2.1 General 2-1
2.2 Kalamazoo Mill Property 2-1
2.2.1 RI Activities 2-1
2.2.2 Discovery of the Refuse Area 2-1
2.2.3 Kalamazoo Mill Property Divestiture Study 2-2
2.3 Former Hawthorne Mill Property 2-3
2.3.1 Sampling in 2000 and 2002 2-3
2.3.2 Supplemental Investigations 2-3

Section 3. Removal Action Activities 3-1

3.1 General 3-1
3.2 Pre-Mobilization Activities 3-1
3.2.1 Permits and Approvals 3-1
3.2.2 Pre-Mobilization Submittals 3-2
3.3 Mobilization/Site Preparation 3-2
3.3.1 Erosion and Sedimentation Controls 3-2
3.4 Removal Activities 3-3
3.4.1 Refuse Area 3-3
3.4.2 Transformer Pad Area 3-4
3.4.3 Wastewater Pipeline Area 3-4
3.4.4 Oxbow Area 3-4
3.5 Liquids Handling and Treatment 3-5
3.6 Refuse Area and Oxbow Area Restoration 3-5
3.6.1 Refuse Area Restoration Plan 3-5
3.6.2 Oxbow Area Restoration 3-6
3.7 Environmental Monitoring 3-6
3.7.1 Dust Monitoring 3-6
3.7.2 Air Monitoring 3-6
3.7.3 Turbidity Monitoring 3-7
3.8 Decontamination 3-7
3.9 Verification Sampling and Analysis 3-7
3.10 Consolidation of Materials at the A-Site 3-8
3.11 Documentation 3-8

Section 4. Post-Removal Action Activities 4-1

4.1 General 4-1
4.2 Post-Removal Site Control Plan 4-1

Section 5. References 5-1

Figures

1 Georgia-Pacific Kalamazoo Mill and Hawthorne Mill Site Plan
2 Location of A-Site Disposal Area
3 Project Schedule
4 Environmental Monitoring Locations
5 Route to Disposal Area

Appendices

A Anticipated Verification Sampling Grids and Calculations

1. Introduction

1.1 General

This document presents a Draft Time Critical Removal Action (TCRA) Work Plan (Work Plan) for the removal of paper-making residuals (residuals) and soils that contain, or may potentially contain, polychlorinated biphenyls (PCB) from the Refuse Area at the Georgia-Pacific Corporation (Georgia-Pacific) Kalamazoo Mill Property (Kalamazoo Mill Property) and the Oxbow Area at the former Hawthorne Mill Property (Oxbow Area). These properties are collectively referred to as the Mill Properties, (Figure 1) and are associated with the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site (Superfund Site). This TCRA Work Plan is being implemented in accordance with the Administrative Settlement Agreement and Order on Consent for a Removal Action (Settlement Agreement) 2006. Additional information on the Mill Properties is presented in the *Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site Description of the Current Situation* (Blasland & Bouck Engineers, P.C. [BBEPC], 1993a).

The goals of the TCRA are:

- removal, to the extent feasible, PCB-containing residuals and soil at the Refuse and Oxbow Areas;
- consolidation of these materials at the A-Site Landfill, a disposal area comprising part of Operable Unit #2 of the Superfund Site;
- performance of verification sampling to document cleanup criterion have been achieved; and
- restoration of the Refuse and Oxbow Areas.

Although not required by the United States Environmental Protection Agency (USEPA), Georgia-Pacific will also remove and dispose of residuals and soils that contain, or may potentially contain, PCB from a wastewater pipeline and an electrical transformer pad located on the Kalamazoo Mill Property.

1.2 Related Documentation

Several existing documents support the removal action activities discussed in this Work Plan, including:

- *Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site Remedial Investigation/Feasibility Study – Field Sampling Plan* (FSP) (BBEPC, 1993b);

- *Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site Remedial Investigation/Feasibility Study – Quality Assurance Project Plan* (QAPP) (BBEPC, 1993c);

- *Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site Remedial Action Turbidity Monitoring Plan* (TMP) (BBL, 1999); and

- *Final King Highway Landfill Operable Unit Closure Erosion and Sedimentation Control Plan* (ESCP) (BBL, 2002).

1.3 Report Organization

The remainder of this report addresses the following:

- Section 2 presents background information related to previous investigations at the Mill Properties;
- Section 3 describes the proposed removal action activities;
- Section 4 presents proposed post-removal site control activities; and
- Section 5 presents references cited in this Work Plan.

2. Previous Activities

2.1 General

This section presents a summary of information related to previous investigations conducted at the Mill Properties. These investigation efforts included:

- Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site – Remedial Investigation (RI) (1993);
- Refuse Area drum removal and sampling activities (1999);
- Focused Soil and Sediment Sampling Program (2000);
- Georgia-Pacific Corporation Kalamazoo Paper Mill Property Divestiture Study/Supporting Materials Report Property Divestiture Study (Property Divestiture Study) (2002); and
- Supplemental soil investigation activities at the Hawthorne Mill Property (2005).

Highlights of the historical investigations at each of the Mill Properties are provided below. More detailed discussions of the investigations, including rationale, sampling approach, and results are included in various investigation-specific reports, as indicated. Although historical information may be presented for several areas of the Mill Properties, as part of the TCRA, removal activities will be focused on the Refuse and Oxbow Areas, and contemporaneously the wastewater pipeline, and electrical transformer pad.

2.2 Kalamazoo Mill Property

2.2.1 RI Activities

The Kalamazoo Mill Property was initially investigated to assess the nature and extent of PCB impacts associated with the Mill's five former onsite lagoons (Mill Lagoons #1 through #5), a former wastewater treatment system clarifier, and storm water runoff as part of the Superfund Site RI activities conducted in 1993. Results were presented in *Technical Memorandum 15 – Mill Investigation* (BBL, 1996). Follow up sampling was conducted in June 1996, and the results were reported in *Final Document in Support of King Highway Landfill Operable Unit RI/FS* (BBL, 1997). These activities were conducted consistent with the requirements prescribed in the AOC (Final Order No. DFO-ERD-91-001) issued by the Michigan Department of Natural Resources (MDNR) in 1991.

2.2.2 Discovery of the Refuse Area

Based on the findings of the RI, remedial actions at the five former Mill Lagoons commenced in 1999 as part of the King Highway Landfill Operable Unit 3 (KHL-OU) response activities. During work at the KHL-OU, which was conducted consistent with the requirements prescribed in the 1991 AOC, deteriorating metal drums were observed in the heavily vegetated area adjacent to the river to the south and west of Mill Lagoons #4 and #5. This area has since been referred to as the Refuse Area (Figure 1). On June 11, 1999 seven solids samples collected from this area were analyzed for Toxicity Characteristic Leaching Procedure (TCLP) analytes and PCB. No PCB were detected in any of the samples. The only TCLP analyte detected was lead, which was identified in one sample at a concentration of 2.2 milligrams per liter (mg/L) (compared to the TCLP regulatory level of 5 mg/L). All other TCLP analysis results were non-detect. In the initial response at the Refuse Area in June 1999, one of the deteriorating drums was removed and disposed of at the EQ landfill in Detroit, Michigan. Additionally, approximately 10 cubic yards (cy) of material excavated from beneath and adjacent to the drums

(e.g., drum remnants, soil, white crystals) were disposed in a local Type II landfill. This information is reported in the Property Divestiture Study; BBL, 2003a.

2.2.3 Kalamazoo Mill Property Divestiture Study

In the fall of 2002, as part of the Kalamazoo Mill Property Divestiture Study, soil and groundwater samples were collected from areas at the Kalamazoo Mill Property where available information suggested the potential for PCB-containing materials to be present.

Sampling activities are described in the Property Divestiture Study (BBL, 2003a). PCB were detected in the Refuse Area, in a wastewater pipeline, and in soils beneath an electrical transformer pad. These results are summarized below.

Refuse Area

During removal and disposal of the drums found in the Refuse Area in June of 1999, a variety of construction debris and scrap metal was observed in a number of locations, some of which were visible at the surface. As part of the Kalamazoo Mill Property Divestiture Study, this area was identified as a potential PCB-containing area. In November and December 2002, two soil borings and seven test pits were installed in the Refuse Area (Figure 1), and more than 30 soil samples were collected for PCB analysis.

The seven exploratory test pits were excavated to the depth of the water table. In all cases, the interface between disturbed soils/fill materials and undisturbed native soils was encountered above the groundwater table. Soil sample collection from the Refuse Area test pits was biased toward apparent residuals, if present. In several test pit locations, isolated pockets of residuals were found and discretely sampled. PCB concentrations in the test pit samples ranged from non-detect to a maximum of 330 milligrams per kilogram (mg/kg). The maximum result of 330 mg/kg was for a sample collected from an isolated deposit of residuals located 2.5 to 3 feet below ground surface (bgs). This sample was the only sample with a PCB concentration that exceeding Michigan's Part 201 Natural Resources and Environmental Protection Act (Part 201) Industrial PCB Cleanup Criterion of 16 mg/kg. The next highest sample PCB concentration was 9.7 mg/kg. PCB results for four samples collected between the surface and a depth of approximately 2 feet in this same test pit ranged from non-detect to 2.4 mg/kg, while results for three samples collected between 3 and 9.5 feet bgs ranged from non-detect to 0.81 mg/kg.

Additionally, in December 2002 groundwater samples were collected from two monitoring wells located within the Refuse Area. Neither sample contained detectable levels of PCB at the reporting limit of 0.05 micrograms per liter (µg/L). Additional information is available in the Property Divestiture Study (BBL, 2003a).

Wastewater Pipeline Residuals

The Kalamazoo Mill Property Divestiture Study also included collection of seven soil samples from a wastewater pipeline and a wet well located between the former Mill Lagoons and Mill #1 (Figure 1). The wet well is located near the former Mill Lagoons at the end of the wastewater pipeline, which runs northwest from Mill #1.

PCB concentrations in the seven samples associated with the wastewater pipeline and the wet well – which were biased toward apparent residuals where present – ranged from not detected to a maximum of 31.1 mg/kg in a sample of residuals, scraped from the inside of the wastewater pipeline. The average and median concentrations

of these seven samples were 4.9 and 1.3 mg/kg, respectively. Additional information is provided in the Property Divestiture Study (BBL, 2003a).

Although not required by the USEPA, Georgia-Pacific will perform removal activities at the wastewater pipeline contemporaneously with the TCRA at the Refuse and Oxbow Areas.

Electrical Transformer Pad Soils

Soil samples were collected from a test pit excavated at the location of a former transformer pad at Mill #1 (Figure 1) where stained soils were observed. Four samples were collected between depths of 0 and 5 feet bgs. In the 0 to 1 foot bgs interval, PCB were detected at a concentration of 2.6 mg/kg. PCB were not detected in the other three samples. Additional information is provided in the Property Divestiture Study (BBL, 2003a).

Although not required by the USEPA, Georgia-Pacific will perform removal activities at the electrical transformer pad contemporaneously with the TCRA at the Refuse and Oxbow Areas.

2.3 Former Hawthorne Mill Property

2.3.1 Sampling in 2000 and 2002

During RI activities, residuals were observed in the Oxbow Area of the Hawthorne Mill Property. As a result, additional samples were collected from this area as part of the 2000 Focused Soil and Sediment Sampling Program conducted for the Superfund Site. PCB were detected in two samples in the 0.5- to 1-foot layers (220 mg/kg and 2.4 mg/kg). Based on this information, additional sampling was conducted as part of the Kalamazoo Mill Property Divestiture Study to further assess the nature and extent of PCB in the Oxbow Area. The PCB concentrations in the Oxbow Area ranged from non-detect to 490 mg/kg (BBL, 2003a).

2.3.2 Supplemental Investigations

Pursuant to discussions held among the USEPA, the MDEQ, and Georgia-Pacific, additional focused soil sampling was conducted at the Hawthorne Mill Property on April 7, 2005. A total of six test pits were excavated near the former Hawthorne Mill and clarifier located north of the oxbow, and three test pits were excavated within the Oxbow Area for waste characterization purposes. Three of the test pits were excavated to 6 feet bgs, with discrete samples collected at intervals of 2, 4, and 6 feet bgs. The three other test pits were excavated to a depth of 2.5 feet bgs. Test pits in the Oxbow Area were excavated to approximately 2 to 2.5 feet bgs, with samples collected from a layer of residuals at approximately 0.25 to 1 foot bgs. In addition, one sample was collected from an approximately 4-inch diameter steel pipe that was observed in the Oxbow Area.

Some samples were analyzed just for PCB, while others were analyzed for Target Compound List/Target Analyte List (TCL/TAL) pesticides, PCB, semi-volatile organic compounds (SVOCs), metals, and volatile organic compounds (VOCs). PCB concentrations in the Oxbow Area ranged from non-detect to 1.28 mg/kg. Additional information is provided in the *Former Hawthorne Mill Supplemental Soil Investigation Activities Summary* field memorandum (BBL, 2005).

3. Removal Action Activities

3.1 General

Removal action activities at the Mill Properties will consist of the excavation of materials from the Refuse Area, the Oxbow Area, and contemporaneously the electrical transformer pad area and wastewater pipeline, and the subsequent consolidation of these excavated materials at either the A-Site portion of the Willow Boulevard/A-Site Landfill Operable Unit #2 (WB/A-OU) (which is associated with the Allied Paper/Portage Creek/Kalamazoo River Superfund Site) or if appropriate a Type II landfill (excavation areas are shown on Figure 1 and the A-Site disposal area is shown on Figure 2). Georgia-Pacific will procure a removal action contractor (Contractor) to perform the removal action activities, and will provide an onsite representative throughout the removal action to observe and document the activities. Georgia-Pacific's onsite representative will also be present to coordinate and consult with the USEPA on-scene coordinator, as necessary. Information regarding the removal action activities is discussed below. A summary of activities associated with specific areas is provided in the following table:

Area	Removal Action Activities
Refuse Area	Construct erosion controls, excavate PCB-containing material, characterize/segregate material, consolidate at A-Site or Licensed Landfill, perform confirmation sampling, restore area
Transformer Pad Area	Excavate visibly-stained soil, dispose at Type II Landfill as appropriate, post-excavation sampling
Wastewater Pipeline Area	Excavate pipeline and wet well, consolidate material at A-Site, post-excavation sampling
Oxbow Area	Construct erosion controls, excavate PCB-containing material, dispose at A-Site, perform confirmation sampling, restore area
A-Site	Construct erosion controls, grade consolidated material, construct temporary soil cover

A project schedule for removal activities is presented on Figure 3.

3.2 Pre-Mobilization Activities

Given the nature of the proposed removal action, several pre-mobilization activities are anticipated to occur. These activities are briefly discussed below.

3.2.1 Permits and Approvals

Consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121(e)(1), since all removal activities will be conducted on-site and consistent with AOC, permits are not required. Substantive requirements will be achieved to the extent practicable, as determined necessary by the USEPA.

3.2.2 Pre-Mobilization Submittals

Prior to onsite mobilization, several documents will be prepared in support of this TCRA Work Plan including:

- Site Specific Health and Safety Plan (HASP);
- Sampling Analysis Plan (SAP) Addendum;
- Quality Management Plan; and
- Post-Removal Site Control Proposal.

These documents will be submitted to USEPA for its approval prior to initiating any on-site removal activity.

3.3 Mobilization/Site Preparation

Prior to initiating removal action construction, the Contractor will perform mobilization and site preparation activities. At a minimum, it is anticipated that the following site preparation activities will be performed:

- Verify existing site conditions;
- Identify the location of, and relocate as necessary, aboveground and underground utilities, equipment, and structures;
- Mobilize personnel, equipment, and materials to the site;
- Clear and grub areas as necessary to perform the removal action activities (e.g., tree removal in the Oxbow Area, removal of debris and miscellaneous aboveground appurtenances in the Refuse Area);
- Construct equipment and material staging/dewatering areas (as necessary);
- Prepare equipment and personnel decontamination areas;
- Establish erosion and sedimentation control measures (as discussed below);
- Construct temporary access roads (as needed) for ingress and egress of construction equipment as well as offsite transportation of excavated materials; and
- Install temporary fencing or barriers as necessary to protect and secure the work areas.

3.3.1 Erosion and Sedimentation Controls

This subsection describes structural controls to be installed before initiating earth-moving activities. In general, erosion and sedimentation controls will be implemented consistent with the ESCP (BBL, 2002), as applicable. The specific locations of erosion and sedimentation controls will be determined and/or modified in the field based on site-specific considerations related to drainage, topography, and work activities. The selection of specific erosion and sedimentation control measures (either land- or water-based) will be based on, but not limited to, the scope of removal activities, site topography, type of ground cover, anticipated run-off from the project area, and operational/maintenance considerations as determined by the USEPA On-Scene Coordinator, in consultation with the Contractor for Georgia-Pacific. Erosion control measures may be necessary at the A-Site Landfill to ensure that the removal activities required by this Work Plan do not result in a release of hazardous substances to the Kalamazoo River. Additionally, certain operational and best management practices (to be defined in the Contractor's site-specific plans) will be implemented throughout the project.

Throughout the duration of the project, erosion and sedimentation control devices will be inspected and maintained and/or modified, as necessary, based on site conditions and site activities. The erosion and

sedimentation control devices will be maintained for the duration of the project until site restoration activities have provided a final surface cover (as appropriate).

3.4 Removal Activities

Removal activities at the Refuse Area, Transformer Pad Area, Wastewater Pipeline Area, and Oxbow Area are discussed in the following sections.

3.4.1 Refuse Area

The initial extent of excavation in the Refuse Area will be determined based on visual criteria, and any additional removal will be completed as necessary to achieve a Performance Standard of 10 mg/kg, with a goal of 1 mg/kg. Based on the results of the test pit and soil boring activities conducted in the Refuse Area, it is anticipated that approximately 30,000 cy will be excavated from the Refuse Area and consolidated at the A-Site.

The depth of excavation will extend to the approximate interface with native soils. This interface was identified during test pit construction, and it occurred above the groundwater table at all locations. Excavated materials from the Refuse Area will be disposed of at the A-Site as identified on Figure 2. The disposal area in the A-Site was selected based on consideration of where additional material is needed to raise the site contours to grading design elevations.

In general, excavation activities will commence along the east side of the Refuse Area, directly west of former Mill Lagoon #5. The excavation operations will continue radially outward from the initial point. It is anticipated that excavation activities will be conducted in a staged approach to minimize sloughing and to provide a stable, clean excavation base from which to work. As the excavation activities approach the Kalamazoo River bank, a maximum 10-foot buffer will be left intact along the water's edge, assuming it consists of native material. If this buffer contains materials targeted for removal, a small temporary diversion berm, composed of certified clean fill, will be constructed in the river to isolate the excavation activities from river water prior to removing any buffer materials. Additional excavation in other areas beyond the initial limits may be performed based on visual observations during removal, as well as the results of post-excavation verification sampling.

Following post-excavation verification sampling and confirmation that the established Performance Standard has been achieved, the excavation areas will be backfilled and restored in accordance with the Refuse Area Restoration Plan described in Section 3.6.1.

Materials excavated from the Refuse Area will be segregated during excavation activities. Excavated materials that are deemed unsuitable for placement at the A-Site (i.e., drums, drum remnants, or other questionable materials) will be segregated, characterized, and disposed of appropriately at an offsite disposal facility. Characterization of these materials will include analysis for PCB; TCLP metals, VOCs, SVOCs; and Resource Conservation and Recovery Act (RCRA) hazardous waste characteristics to obtain approval for disposal. Concrete and scrap metals will be segregated and temporarily staged on the foundation floor of the former Mill #5 (Figure 1). Depending on the quantity of materials recovered from the Refuse Area, scrap metals and concrete may be transported offsite for recycling or disposal in a Type II landfill, as appropriate. Other excavated materials (i.e., residuals and soils) will be transported directly to the A-Site and consolidated with existing materials. Excavated materials that contain free liquids will be placed in a temporary lined staging area and gravity dewatered prior to transport to the A-Site. An imported aggregate may be used to solidify excavated

material, as necessary. The contractor will be responsible for conducting paint filter testing (USEPA Method 9095A) to evaluate the presence of free liquids in representative samples of material subject to transportation to the A-Site.

3.4.2 Transformer Pad Area

Based on the test pit results at the location of a former electrical transformer, the A-Site or pad adjacent to Mill #1, visibly-stained soils beneath the transformer pad will be removed and disposed of in a licensed Type II landfill, as appropriate. Samples of excavated soil will be analyzed for RCRA hazardous waste characteristics, PCB, TCLP metals, VOCs, and SVOCs to obtain approval for disposal. Following excavation, the area will be backfilled with certified clean backfill material and restored to match surrounding conditions. Although not required by the USEPA, Georgia-Pacific will perform removal activities at the transformer pad contemporaneously with the TCRA at the Refuse and Oxbow Areas.

3.4.3 Wastewater Pipeline Area

As discussed in Section 2, a mill wastewater pipeline exists that runs between Mill #1 and a wet well near the former lagoon area. To address the presence of PCB, the wastewater pipeline and the wet well will be excavated and disposed of at the A-Site. Following excavation, the area will be backfilled with certified clean backfill material and restored to match surrounding conditions. Although not required by the USEPA, Georgia-Pacific will perform removal activities at the wastewater pipeline contemporaneously with the TCRA at the Refuse and Oxbow Areas.

3.4.4 Oxbow Area

The initial extent of excavation in the Oxbow Area will be determined based on visual criteria and any additional removal will be completed to achieve, at a minimum, a PCB concentration Performance Standard of 10 mg/kg, with a goal of 1 mg/kg. This will include excavating soil at the location where PCB were detected at a concentration of 150 mg/kg. It should be noted that the excavation methods are expected to achieve substantially lower levels, which will be documented by verification sampling (see Section 3.9). Based on the results of the soil investigation activities conducted in the Oxbow Area, it is anticipated that approximately 5,000 cy of material will be excavated and consolidated at the A-Site (Figure 2). Additional excavation may be performed based on visual observations during excavation as well as the results of post-excavation verification sampling.

In general, the removal effort will consist of a 2-foot-deep excavation that will be bounded to the south at the Hawthorne Mill Property line, along King Highway. As the excavation activities approach King Highway, existing trees will be protected to the extent practicable, so as to create a visual buffer between King Highway and the excavation area. Excavated materials will be transported to the A-Site and consolidated with existing materials. Trees cleared during excavation activities will be processed with an onsite wood chipper, and the resultant wood chips will be stockpiled onsite for potential reuse. Tree stumps and root systems will be excavated and disposed of at the A-Site. It is anticipated that the excavation will not extend into the banks of the oxbow channel; this will be confirmed in the field by sampling.

Following post-excavation verification sampling and confirmation that the established cleanup criterion has been achieved, the excavation areas will be backfilled and restored as discussed in Section 3.6.2.

Materials excavated from the Oxbow Area will be transported to the A-Site and consolidated with existing materials. Excavated residuals observed to contain free liquids will be placed in a temporary lined staging area and gravity dewatered prior to transport to the A-Site. An imported aggregate may be used to solidify excavated material, as necessary. The contractor will be responsible for conducting paint filter testing (USEPA Method 9095A) to evaluate the presence of free liquids in representative samples of material subject to transportation to the A-Site.

3.5 Liquids Handling and Treatment

Water collected from temporary staging/dewatering areas, decontamination fluids, and other liquids generated during construction activities will be treated onsite at a temporary water treatment system (TWTS) located on the South side of the Area East of Davis Creek. The TWTS will consist of filtration and liquid-phase granular two-stage activated carbon. The two-stage activated carbon treatment system will be used so that rotation and replacement of the carbon tanks will occur immediately upon detection of PCB at the intermediate stage. Water will be collected, handled, treated, monitored, and discharged to Davis Creek (Figure 2). To monitor the TWTS, an influent, intermediate (i.e., between the carbon stages), and effluent wastewater sample will be collected and analyzed for PCBs and total suspended solids (TSS) from the TWTS prior to any discharge of the treated water. Treated wastewater will be stored in 20, 000 gallon frac tanks until sampling and analysis confirm that the discharge limitations (i.e., 2.6×10^{-5} µg/L for PCBs and 45 mg/L for TSS) have been achieved prior to discharging the water to Davis Creek. Sampling procedures, preservation and handling, and analytical protocol for monitoring for PCB will be consistent with USEPA Method 608 (the quantification level will not exceed 0.1 µg/L). Analytical methods and detection limits used to analyze the water collected during construction activities will be performed consistent with the QAPP.

3.6 Refuse Area and Oxbow Area Restoration

3.6.1 Refuse Area Restoration Plan

Based on the collective recommendation of the USFWS and the MDNR, the intent of the restoration plan in the Refuse Area is to restore the area as a floodplain. The benefits of restoring the area to a low lying terrace in the floodplain include improved habitat, and increase storage capacity and decrease river velocity during high flow events. Following excavation of the Refuse Area, an approximately 10-foot buffer zone, consisting of native material, is anticipated to remain along the river bank. For the purposes of this Work Plan, the buffer zone will be considered the area between the edge of the Refuse Area excavation and the river bank, at an elevation of 755 feet above mean sea level. Prior to disturbing this material, seven representative samples will be collected from the buffer zone and analyzed for PCB. If the analytical results confirm that PCB concentrations in the buffer zone meet the 1 mg/kg goal, then the existing material will be used as backfill for the Refuse Area.

If during excavation the materials in the buffer zone are observed to contain residuals or are not native material, the buffer materials will be removed after construction of a small temporary diversion berm, as discussed in Section 3.4.1. The berm material will be analyzed prior to its use to confirm that it does not contain PCB concentrations greater than 1 mg/kg.

Following the completion of excavation activities in the Refuse Area, the native material in the buffer zone (or the imported clean material used to create a temporary diversion berm, if necessary) will be used to backfill the

Refuse Area. The Contractor will provide certification that the imported clean material used as backfill martial is clean. Backfilling will be performed by creating a gradual inclining slope from the edge of the river back to the upland extent of the excavation. Once backfilling and grading activities are complete, the new floodplain will be vegetated and a 5-foot-wide, 6-inch-thick layer of riprap will be installed along the bank of the Kalamazoo River. To the extent practicable the riprap will be placed at the toe of the slope and at or below the waterline. Additionally the riprap will be inspected and maintained for one year as outlined in the post-removal site control proposal. For the purposes of establishing vegetation, material used to backfill the Refuse Area will be tested to confirm that the pH (between 5.5 and 7.5) and organic content (e.g., greater than 10%) are suitable for establishing vegetative growth. If, based on these criteria, the existing material is deemed unsuitable for establishing vegetative growth, the floodplain area will be covered with a minimum 6-inch layer of topsoil or equivalent and hydroseeded.

3.6.2 Oxbow Area Restoration

Following excavation of the upper 2 feet of material in the Oxbow Area (or more if necessary to achieve the Performance Standard), the excavated area will be backfilled with imported material. Similar to the Refuse Area restoration, backfill material will be tested to confirm that the pH (between 5.5 and 7.5) and organic content (e.g., greater than 10%) are suitable for establishing vegetative growth. The only restoration effort will take place along the bank of the Oxbow Channel, which will be vegetated with woody shrubs, as requested by U.S. Fish and Wildlife Service (USFWS) and MDNR.

3.7 Environmental Monitoring

Environmental monitoring will be conducted throughout the removal action construction activities. Environmental monitoring activities, described below, are anticipated to include dust monitoring, ambient air monitoring for PCB, and turbidity monitoring. Additional information regarding environmental monitoring activities is described below and in the HASP.

3.7.1 Dust Monitoring

Dust monitoring will be conducted periodically (i.e., at a minimum of every two hours) by walking the perimeter of active areas during removal action construction activities that may potentially generate dust. Monitoring will consist of both visible observations of airborne particulates as well as monitoring via a Mini-Ram particulate monitor along the perimeter of active areas. In accordance with National Ambient Air Quality Standards (NAAQS), if airborne particulate concentrations are measured at 150 micrograms per cubic meter ($\mu g/m^3$) or above, appropriate dust suppression/control measures will be implemented.

3.7.2 Air Monitoring

PCB will be monitored in ambient air at two locations (Figure 4), with an action level set at 0.02 $\mu g/m^3$. However, in accordance with Rule 225 (3) of Part 55, Act 451 as amended, a 10-fold increase in the secondary risk screening levels (SRSLs) is permitted if the ambient impact occurs on industrial property or public roadways. Given the nature of the physical settings of the removal activities, an action level of 0.2 $\mu g/m^3$ for the third location shown on Figure 4 will be used, which will be positioned near the work area. If an action level is exceeded, the USEPA will be notified and corrective actions will be taken to reduce emissions. It should be noted, as conditions change or removal activities move to new locations the air samplers may move to new location, as well. Any new air sampler location will be selected after consultation with USEPA OSC.

The air monitoring program will follow the procedures outlined by USEPA Method TO-4A from the *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air* (USEPA, 1999) for sample collection and analysis. Sampling will be conducted daily for 5 days during commencement of remediation activities at the Mill Properties. Samples will be collected during the entire work day. If the first week's data demonstrate that concentrations at the monitoring locations are below the action levels and similar activities are planned for subsequent weeks, the frequency of sampling may be reduced or terminated upon approval by the USEPA. Following a reduction in sampling frequency, if the nature of the work changes significantly, air monitoring may be resumed.

Meteorological data will be recorded during sampling days. Approximate wind direction, wind speed, and general weather conditions will be obtained from the Battle Creek/Kalamazoo International Airport.

Georgia-Pacific's onsite representative will perform and document the air monitoring activities. The ambient air PCB concentration data will be made available for USEPA review as soon as the data are received from the laboratory.

3.7.3 Turbidity Monitoring

Turbidity monitoring will be performed in the Kalamazoo River approximately 100 feet upstream and 100 feet downstream of excavation activities in the Refuse Area during periods of active work. Measurements of turbidity at the mid-depth point of the water column will be recorded daily (2 hours into the start of the work day). Turbidity monitoring will be conducted consistent with the TMP (BBL, 1999).

If excavation activities progress to within close proximity of the oxbow channel, turbidity monitoring may also be performed at appropriate upstream and downstream locations in the oxbow channel, if necessary.

3.8 Decontamination

Field personnel, vehicles, and equipment will be decontaminated before leaving the work area. All field staff will complete the following decontamination procedures prior to leaving the work area:

- Remove significant residual material from outer clothing and boots;
- Remove soiled outer garments and gloves, and deposit them in lined waste receptacles; and
- Decontaminate hard hats and boots with an aqueous solution of detergent or other appropriate cleaning solution, as necessary.

Vehicle or equipment decontamination will consist of cleaning tires and wheel wells. Significantly soiled equipment will be steam cleaned or pressure washed. Wash water will be collected, transported to the onsite TWTS, treated, and discharged to Davis Creek.

3.9 Verification Sampling and Analysis

Verification sampling will be conducted on the floor and walls of the Refuse Area and Oxbow Area excavations to confirm that residual PCB concentrations in the remaining soil are at or below the Performance Standard of 10 mg/kg, with a goal of 1 mg/kg. Twenty percent of the verification samples will also be analyzed for TCL/TAL constituents and compared against the established criteria.

Verification sampling frequency and sampling locations will be determined based on the steps described in *Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria* (MDEQ, 2002). It is anticipated that the sampling grid will be determined in the field for each excavation segment, and samples will be collected in consultation with the USEPA on-scene coordinator following excavation of visible residuals. However, based on the anticipated extent of excavation, proposed sampling grids have been developed as a reference. The anticipated sampling grids and associated calculations are included in Appendix A.

If the analytical results of post-excavation verification samples indicate that PCB are present in soil at concentrations greater than the established criteria, a 20-foot by 20-foot area around the sample location will be re-excavated. A verification sample will then be collected from the floor or wall of the new excavation area and compared to the appropriate criterion. This process will be repeated as necessary to achieve the appropriate cleanup criterion.

3.10 Consolidation of Materials at the A-Site

Prior to disposal of excavated residuals and soils, the area of the A-Site being used for consolidation of material will be cleared and grubbed. Existing access roads will be used, as appropriate. Figure 5 presents the anticipated route that trucks will travel between the Mill Properties and the A-Site disposal area.

An erosion control blanket will be placed on the consolidated residuals as a temporary erosion control measure until the cover material is placed. The beds of the trucks used to transport the materials from the Mill Properties to the A-Site will be lined and properly covered (e.g., tarp covers).

Once consolidation of materials at the A-Site is complete, a minimum of 12 inches of clean soil will be placed over the newly placed materials and graded to a slope of 4:1, followed by implementation of long-term erosion control measures. Consistent with the ESCP, long-term erosion control will consist of planting shallow-rooted grasses (e.g., a mixture of perennial rye, Kentucky blue, creeping red fescue, timothy, and orchard grass). This will serve as an interim cover until the WB/A-Site OU is closed.

3.11 Documentation

Actions undertaken as part of this Work Plan will be summarized on a monthly basis as part of the monthly reports prepared for this TCRA. Additionally, after completion of all construction activities prescribed in theSettlement Agreement, a Final Report will be prepared and submitted to USEPA for approval.

The Final Report will conform with the requirements set forth in Section 300.165 of the NCP and with guidance set forth in "Superfund Removal Procedures: Removal Response Reporting – POLREPS and OSC Reports". The Final Report will be prepared in accordance with Item 20 of the Settlement Agreement. The Final Report will include, but may not be limited to, the following:

- a summary of removal action activities (e.g., cost, material quantities and disposal destination);
- a summary of analytical results for of all sampling and analyses performed; and
- relevant documentation generated during the removal action (e.g., manifests, invoices, bills, contracts, and permits).

In addition, the Final Report shall also include the following certification signed by a person who supervised or directed the preparation of that report:

"Under penalty of law, I certify that to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of the report, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

4. Post-Removal Action Activities

4.1 General

Following completion of removal action construction activities at the Mill Properties, several post-removal action activities will be performed, as discussed below.

4.2 Post-Removal Site Control Plan

Georgia-Pacific will submit a Post-Removal Site Control Plan for USEPA approval, as required by the Settlement Agreement. The Post-Removal Site Control Plan will be prepared consistent with Section 300.415(1) of the NCP and USEPA's Office of Solid Waste and Emergency Response (OSWER) Directive No. 9360.2-02, and will identify procedures for post-removal operations, maintenance activities, and institutional controls (e.g., deed restrictions), as appropriate. Requirements related to post-removal site controls to be implemented at the Mill Properties are currently identified in Post Removal Site Control Proposal as prescribed in the Settlement Agreement.

5. References

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BBEPC. 1993b. *Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site Remedial Investigation/ Feasibility Study – Field Sampling Plan.* (Syracuse, NY: June 1993).

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BBL. 2003a. *Georgia Pacific Corporation Kalamazoo Paper Mill Property Divestiture Study/Supporting Materials.* (Syracuse, NY: March 4, 2003).

BBL. 2005. *Former Hawthorne Mill Supplemental Soil Investigation Activities Summary Memorandum* (Syracuse, NY: September 2005).

MDEQ. 2002. *Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria.* MDEQ – Environmental Response Division (Lansing, MI: 2002).

USEPA. 1999. *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition*, EPA/625/R-96/010b, January, 1999.

Figures

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Appendix A

Anticipated Verification Sampling Grids and Calculations

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INDEPENDENT VERIFICATION SAMPLING CALCULATIONS – REFUSE AREA AND OXBOW AREA

TIME CRITICAL REMOVAL ACTION WORK PLAN
ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE
GEORGIA-PACIFIC CORPORATION
KALAMAZOO, MICHIGAN

Introduction

Verification sampling is to be preformed at the Refuse and Oxbow Areas as part of the paper-making residuals (residuals) removal activities. Verification sampling frequency requirements were determined based on the *Sampling Strategies and Statistics Training Materials for Part 201Cleanup Criteria* (MDEQ Guidance Document; MDEQ 2004). Independent sampling frequency and location requirements were developed for both the Refuse and Oxbow Areas as these are regarded as separate "sites" in relation to the MDEQ Guidance Document. A sampling strategy that facilitated the selection of unbiased sampling locations using girding was used, pursuant to the MDEQ Guidance Document.

Size of "Site"

As described in the MDEQ Guidance Document, the verification sampling frequency and locations are based on the planimetric area to be remediated, or, as designated in the MDEQ Guidance Document, the size of the "site". Determination of the "site" size includes calculating the combined area of the excavation sidewalls and base. This calculation, and a discussion of the "site" size based on the MDEQ Guidance Document, is presented below.

Determining the Appropriate Grid Interval

In accordance with MDEQ Guidance Document, the grid interval to be established for verification sample collection is determined based on "site" size (i.e., small, medium or large), and the corresponding total "site" area (sidewall plus base areas). The grid interval for a medium and large-size "site" is calculated using the following equations:

Medium Site $$\frac{\sqrt{A/\pi}}{4} = G.I.$$

Large Site $$\sqrt{\frac{A/\pi}{SF}} = G.I.$$

where:

G.I. = Grid Interval
A = "Site" Area; and
π = Pi (3.14).

Calculation of the grid interval for both the Refuse and Oxbow Areas are presented below.

Refuse Area

The total area of the Refuse Area excavation, including excavation sidewalls and base, is approximately 103,179 square feet (ft^2), thus utilizing the medium site size equation above, the grid interval equals 45 ft. Utilizing a 45-foot grid spacing to establish the verification sample collection locations results in 11 grid stations located within and along the sidewalls of the removal area.

Oxbow Area

The total area of the Oxbow Area excavation, including excavation sidewalls and base, is approximately 173,400 ft^2, thus utilizing the large site size equation above, the grid interval equals 30 ft. Utilizing a 30-foot grid spacing to establish the verification sample collection locations results in 189 grid stations located within and along the sidewalls of the removal area.

Estimating the Number of Samples to be collected on the Established Grid

As recommended in the MDEQ Guidance Document, a minimum of 9 samples or 25 percent of the total number of grid stations, whichever is larger, should be collected and analyzed as part of the verification sampling program. Applying this guidance information to the Refuse and Oxbow removal areas, and assuming grid intervals of 45 feet (ft), and 30 ft, respectively, the appropriate number of verification samples is determined as described below.

The sample collection requirements for the Refuse and Oxbow excavations are calculated based on the respective areas of the sidewall and base, and the sampling frequency criteria presented in the MDEQ Guidance Document. The table below presents calculations for the Refuse and Oxbow excavations. These calculations are based on the excavation areas presented above, under the *size of the "site"* section.

Removal Area	**Grid Station Area** (ft^2)	**Total Sidewall Area** (ft^2)	**Total Base Area** (ft^2)	**Number of Grid Stations**	**25% of Grid Stations**	**Minimum Number of Samples**
Refuse Area	2,025	11,726	91,453	45	11.25	11
Oxbow Area	900	3,272	170,128	189	47.25	47
					Total Samples	**58**

Based on the above calculations, a minimum number of 11, and 47 samples should be taken from each of the Refuse Area and Oxbow Area excavations, respectively, for a total of 58 samples.

CLIENT: Georgia-Pacific Corporation **PROJECT:** Georgia-Pacific Corporation Kalamazoo Mill and Former Hawthorne Mill Properties
TITLE: Sample Calculations **Prepared By:** D.O.K. **Date:** June 2005
SUBJECT: Verification Sampling Calculations – Refuse Area and Oxbow Area **Checked By:** D.J.H **Date:** June 2005

OBJECTIVE:

Determine the frequency of post-excavation verification samples required for the Refuse Area Removal Area and the Oxbow Area Removal Area of the Georgia-Pacific Corporation (Georgia-Pacific) Kalamazoo Mill Property (Kalamazoo Mill Property) and the former Hawthorne Mill Property (Hawthorne Mill Property), respectively.

REFERENCES:

1. MDEQ. 2002. *Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria* (MDEQ. April 14, 2004) Remediation and Redevelopment Division (MDEQ Guidance Document; Lansing, MI: 2002).

ASSUMPTIONS:

1. The removal areas were determined from the approximate Refuse Area Removal Area and Oxbow Area Removal Area limits on Figure 1 of the A*ction Removal Area Work Plan* (Work Plan; BBL, 2005). The Refuse Area Removal Area equaled approximately 2 acres and the Oxbow Area Removal Area equaled approximately 4 acres.

2. The perimeter of the assumed excavation areas was determined from the approximate Refuse Area Removal Area and Oxbow Area Removal Area limits on Figure 1 of the Work Plan. The Refuse Area Removal Area perimeter equaled approximately 1,303 square feet (ft^2) and the Oxbow Area Removal Area perimeter equaled approximately 1,636 ft^2.

3. The Refuse Area and Oxbow Area excavation depths were assumed to be 9 feet (ft) and 2 ft, respectively, in accordance with the Work Plan.

4. The site factor (S.F.) for the Oxbow Area Removal Area was determined from the approximate Oxbow Area Removal Area limits on Figure 1 of the Work Plan.

CALCULATIONS:

Sampling Grid Interval Calculations

Consistent with the MDEQ Guidance Document the Refuse Area Removal Area is characterized as a medium site (i.e., an excavation area between 0.25 and 3.0 acres) and the Oxbow Area Removal Area is characterized as a large site (i.e., an excavation area greater than 3.0 acres), as such, the grid interval shall be calculated using the following equations:

Medium Site $$\frac{\sqrt{A/\pi}}{4} = G.I.$$

Large Site $$\sqrt{\frac{A * \pi}{SF}} = G.I.$$

where,

G.I. = Grid interval.
A = Area to be grid (ft^2. The area equals the sum of the excavation base and sidewalls areas).

S.F. = Site factor, length of area to be grid (unit less).

Refuse Area Removal Area

Consistent with the MDEQ Guidance Document, the grid interval for a medium site is given by Equation 1. The excavation base area equaled 91,453 ft^2. The sidewall area was calculated by multiplying the length of the perimeter of the assumed excavation area by the depth of the excavation, and is given by the following:

$$A_{sidewall} = 1{,}303\,\text{ft} * 9\,\text{ft} = 11{,}726\,\text{ft}^2$$

The total area was calculated as the sum of the excavation base and sidewalls, as follows:

$$A_{Total} \cong 103{,}179\,\text{ft}^2 \cong 2.37\,\text{acres}$$

$$\text{G.I.} = \frac{\sqrt{103{,}179\,\text{ft}^2 / \pi}}{4} = 45\,\text{ft}$$

Assume a 45 ft gird interval, as such, the number of nodes was determined by:

$$91{,}453\ ft^2 / (45\ ft * 45\ ft) = 45\,nodes$$

Consistent with the Guidance Document, the minimum number of samples was determined to be the greater of 9 samples or 25% of the number of nodes:

$$45\ \text{nodes} * 0.25 = 11.25$$

A minimum of 11 post-excavation samples will be taken within the Refuse Area.

Oxbow Area Removal Area

Consistent with the MDEQ Guidance Document, the grid interval for a large site is given by Equation 2. The excavation base area equaled 170,128 ft^2. The sidewall area was calculated by multiplying the length of the perimeter of the assumed excavation area by the assumed depth of the excavation, and is given by the following:

$$A_{sidewall} = 1{,}636\,\text{ft} * 2\,\text{ft} = 3{,}272\,\text{ft}^2$$

The total area was calculated as the sum of the excavation base and sidewalls, as follows:

$$A_{Total} \cong 173{,}400\,\text{ft}^2 \cong 3.98\,\text{acres}$$

$$\text{G.I.} = \sqrt{\frac{173{,}400\,\text{ft} * \pi}{635}} = 29.29\,\text{ft}$$

Assume a 30 ft gird interval, as such, the approximate number of nodes was determined by:

$$170{,}128\,\text{ft}^2 / (30\,\text{ft} * 30\,\text{ft}) = 189\,\text{nodes}$$

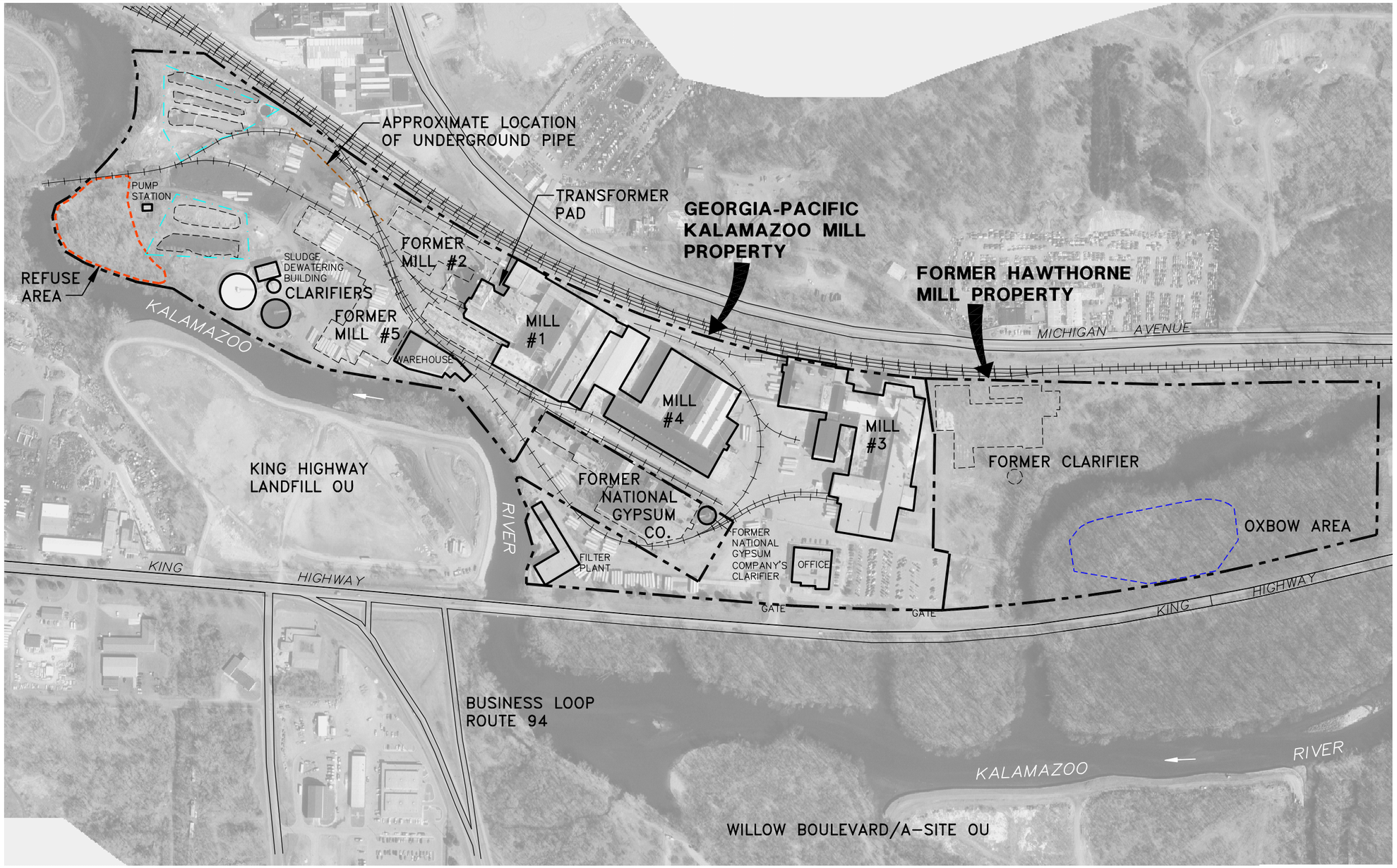
Consistent with the Guidance Document, the minimum number of samples was determined to be the greater of 9 samples or 25% of the number of nodes:

$$189\ \text{nodes} * 0.25 = 47.25 = 47$$

A minimum of 47 post-excavation samples will be taken within the Oxbow Area.

SUMMARY:

Based on the above calculations, a minimum number of 11 and 47 samples should have been taken from the Refuse Area and Oxbow Area excavations, respectively, for a total of 58 samples.



LEGEND:

- APPROXIMATE REFUSE AREA REMOVAL AREA
- APPROXIMATE OXBOW AREA REMOVAL AREA
- APPROXIMATE MILL LAGOON PROPERTY BOUNDARY
- APPROXIMATE BOUNDARY OF KALAMAZOO MILL AND HAWTHORNE MILL PROPERTIES
- APPROXIMATE BOUNDARY OF FORMER MILLS
- OUTLINE OF STANDING STRUCTURES

NOTES:

1. PLANIMETRIC MAPPING, INCLUDING PROPERTY BOUNDARIES, IS APPROXIMATE.
2. AERIAL IMAGE DERIVED FROM ORTHOPHOTOGRAPHIC DATA BY AIR LAND SURVEYS, INC., FLOWN 4/24/99.
3. FORMER MILL LAGOONS EXCAVATED PER KING HIGHWAY LANDFILL–OPERABLE UNIT AOC, 1999–2000.

0 400' 800'

GRAPHIC SCALE

DRAFT

GEORGIA–PACIFIC CORPORATION
KALAMAZOO MILL PROPERTY
REMOVAL ACTION WORK PLAN

GEORGIA-PACIFIC KALAMAZOO MILL AND HAWTHORNE MILL SITE PLAN

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FIGURE **1**

X: 64585X01, X00.DWG, 64585X02, X03.TIF
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P: PAGESET/PLT–BL
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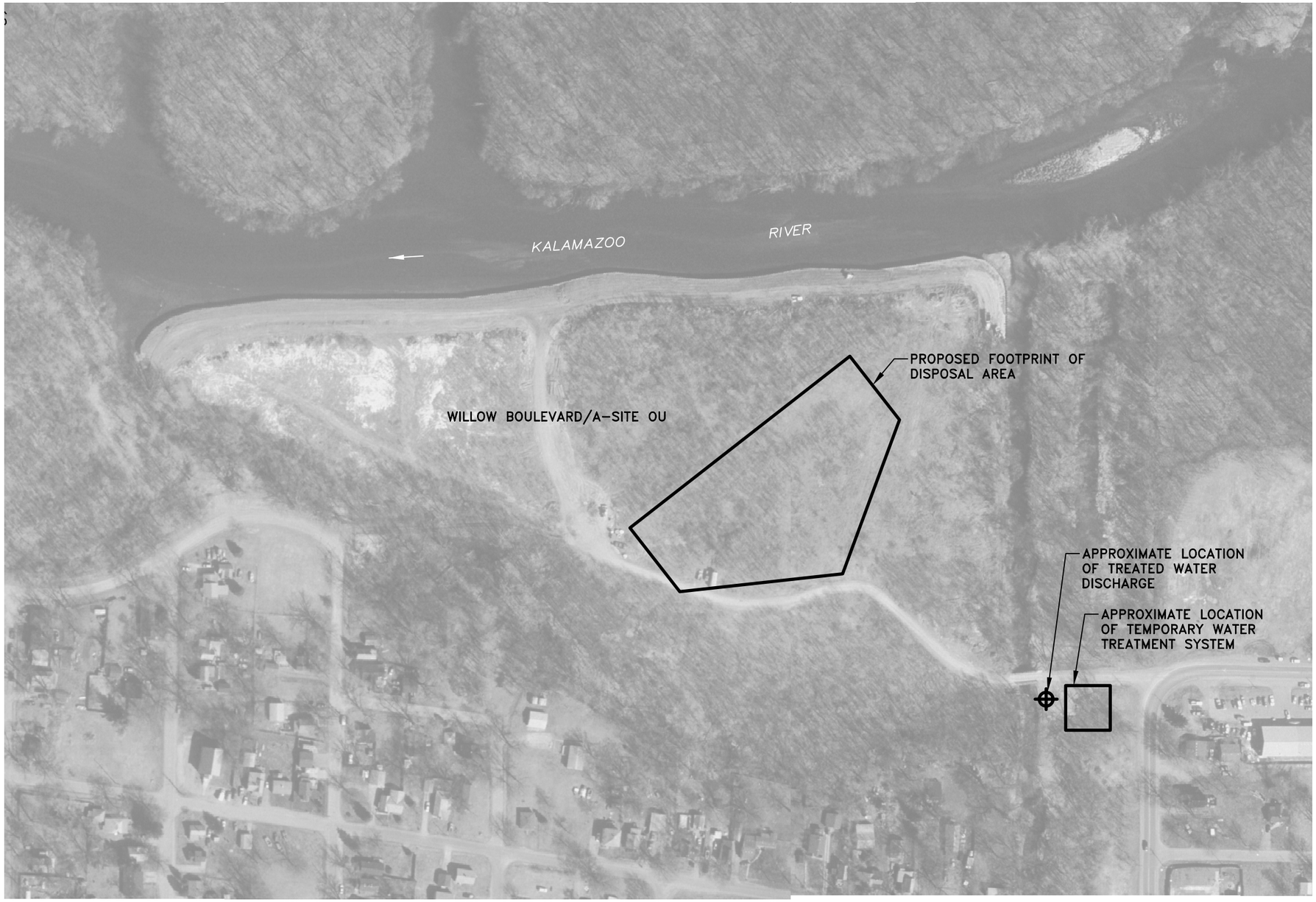
64585675/RWAP/64585G01.DWG



NOTES:

1. PLANIMETRIC MAPPING, INCLUDING PROPERTY BOUNDARIES, IS APPROXIMATE.
2. AERIAL IMAGE DERIVED FROM ORTHOPHOTOGRAPHIC DATA BY AIR LAND SURVEYS, INC., FLOWN 4/24/99.

0 200' 400'

GRAPHIC SCALE

DRAFT

GEORGIA–PACIFIC CORPORATION
KALAMAZOO MILL PROPERTY
REMOVAL ACTION WORK PLAN

LOCATION OF A-SITE DISPOSAL AREA AND TEMPORARY WATER TREATMENT UNIT

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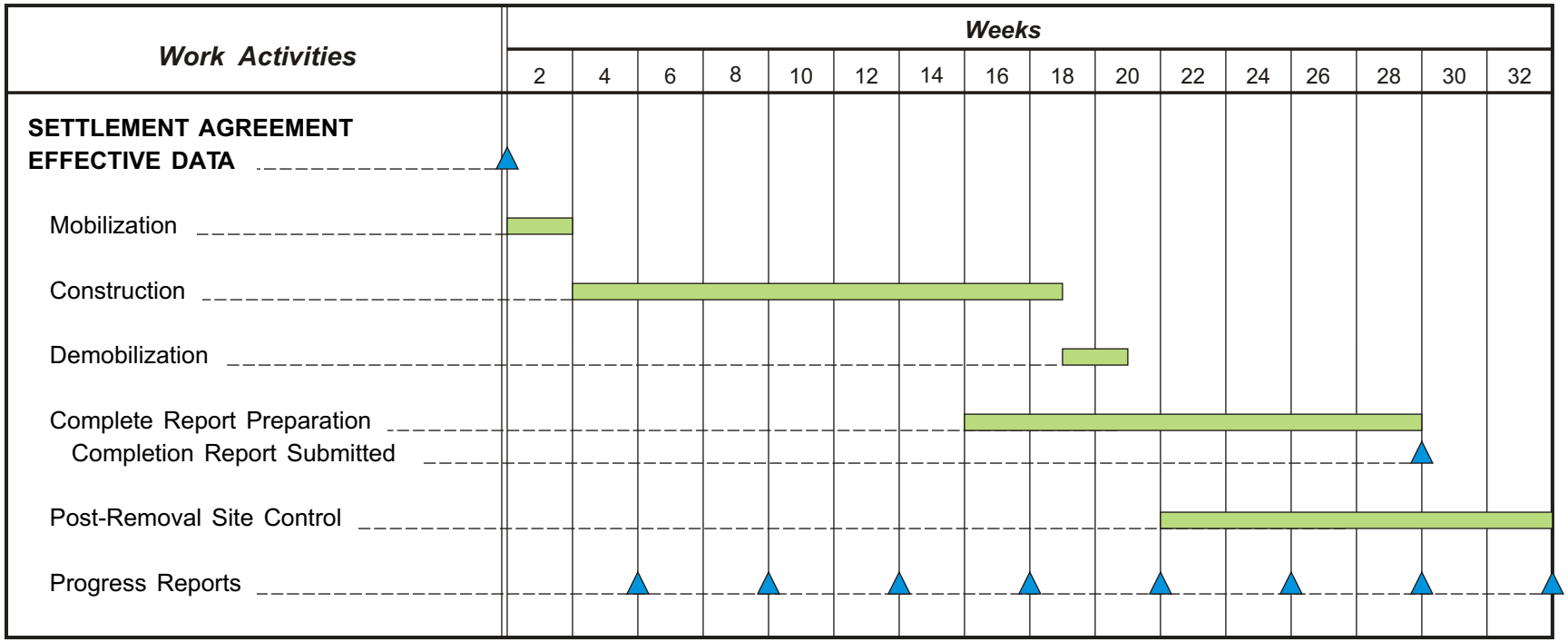
FIGURE
2

X: 64585X00, X01.DWG, 64585X02, X03.TIF
L: ON=*' OFF=REF*
P: PAGESET/PLT-BL
5/15/06 SYR-85-RLP KMD RCA
64585675/RAWP/64585B01.DWG

DRAFT



NOTES:

1. Approval to proceed includes approval of TCRA Workplan and associated documents

2. Construction includes removal of material from refuse and oxbow area, transformer pad, wastewater pipeline, and restoration of each area.

GEORGIA-PACIFIC CORPORATION
KALAMAZOO MILL AND FORMER HAWTHORNE MILL

TIME CRITICAL REMOVAL ACTION

PROJECT SCHEDULE

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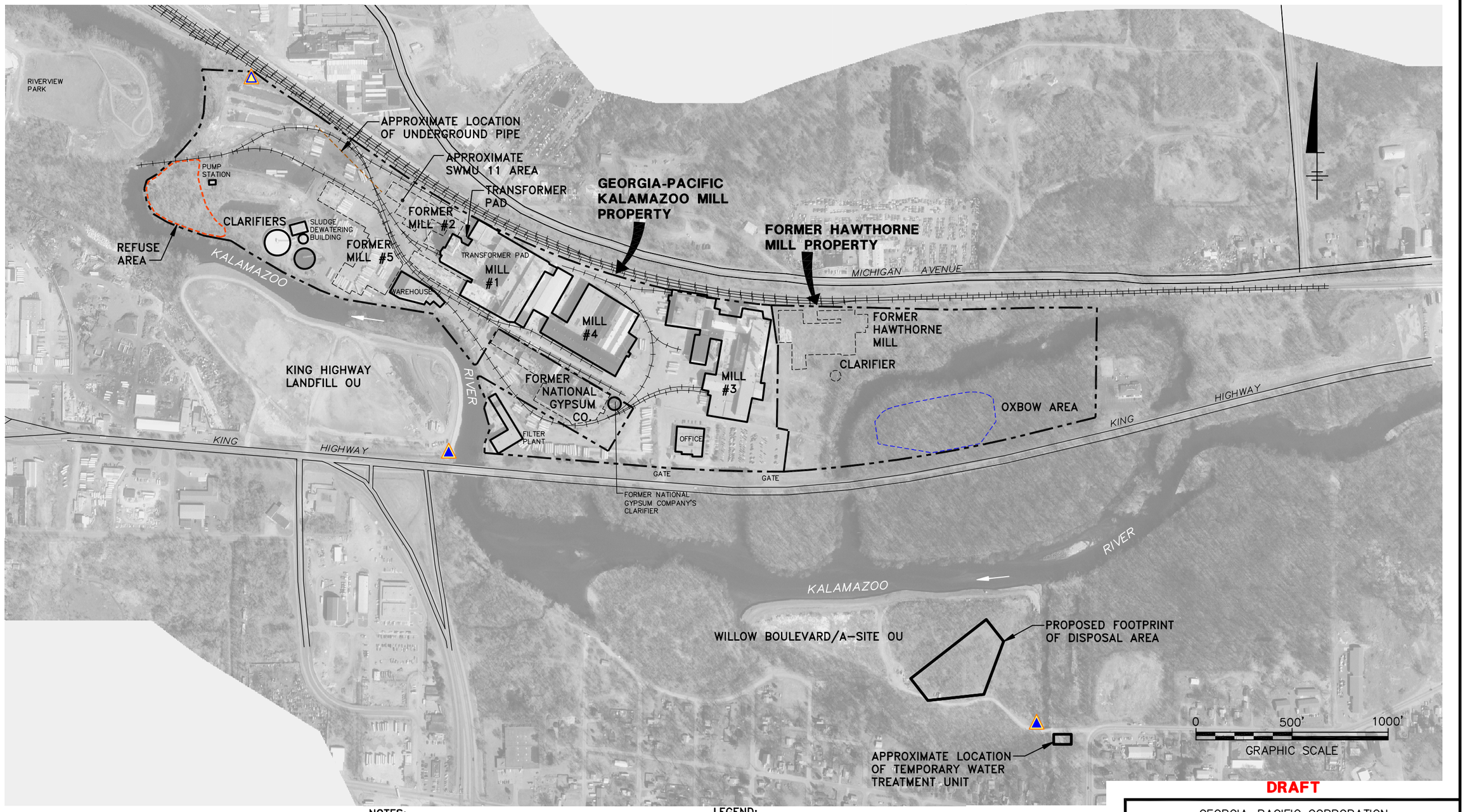
FIGURE
3

05/15/06 SYR-D85-DJH
64585675/64585j01.cdr



DRAFT

NOTES:

1. PLANIMETRIC MAPPING, INCLUDING PROPERTY BOUNDARIES, IS APPROXIMATE.
2. AERIAL IMAGE DERIVED FROM ORTHOPHOTOGRAPHIC DATA BY AIR LAND SURVEYS, INC., FLOWN 4/24/99.
3. PROPOSED MONITORING LOCATIONS ARE APPROXIMATE, LOCATIONS MAY VARY BASED ON FIELD CONDITIONS ENCOUNTERED DURING THE REMOVAL ACTION.

LEGEND:

- APPROXIMATE REFUSE AREA REMOVAL AREA
- APPROXIMATE BOUNDARY OF KALAMAZOO MILL AND HAWTHORNE MILL PROPERTIES
- APPROXIMATE BOUNDARY OF FORMER MILLS
- APPROXIMATE OXBOW AREA REMOVAL AREA
- PROPOSED AMBIENT AIR MONITORING LOCATION AND PCB ACTION LEVEL OF 0.2 ug/m3
- PROPOSED AMBIENT AIR MONITORING LOCATION AND PCB ACTION LEVEL OF 0.02 ug/m3

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P: PAGESET/PLT-BL
5/15/05 SYR-85-RLP KMD RCA
64585675/RAWP/64585G03.DWG

GEORGIA-PACIFIC CORPORATION
KALAMAZOO MILL PROPERTY
REMOVAL ACTION WORK PLAN

GEORGIA-PACIFIC KALAMAZOO MILL AND HAWTHORNE MILL ENVIRONMENTAL MONITORING LOCATIONS

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FIGURE **4**