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May 8, 2012

VIA ELECTRONIC DELIVERY AND FEDERAL EXPRESS

Mr. Chris Sanders
Chief, Environmental Compliance and Enforcement Division
Mississippi Department of Environmental Quality
515 Amite Street
Jackson, Mississippi 39201

Mr. Richard Sumrall, P.E.
Chief, Chemical Branch
Mississippi Department of Environmental Quality
515 Amite Street
Jackson, Mississippi 39201

SUBJECT: Impoundment Basin Decommissioning Work Plan
Hercules Inc. Hattiesburg Facility
Hattiesburg, Forrest County, Mississippi

Dear Messrs. Sanders and Sumrall:

As requested by the Mississippi Department of Environmental Quality (MDEQ), Hercules Incorporated (Hercules) is pleased to submit to you this copy of a consolidated Impoundment Basin Decommissioning Work Plan (Work Plan). The Work Plan was revised to address MDEQ comments raised in discussions and meetings regarding the removal of sludges from the Impoundment Basin. Upon selection of the decommissioning contractor, this Work Plan will be supplemented with an Odor Mitigation Plan that will contain procedures to address odor issues that may arise during the performance of the work.

If you have any questions about the Work Plan, please feel free to contact the undersigned at (302) 995-3456.

Sincerely,

Timothy D. Hassett
Remediation Project Manager

cc: Willie McKercher, P.E. (with electronic copy)
Melissa McGee-Collier (with electronic copy)

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Impoundment Basin Decommissioning Work Plan

Hattiesburg, Mississippi

8 May 2012

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Impoundment Basin
Decommissioning Work Plan

Hattiesburg, Mississippi

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Our Ref.:
LA002999.0007

Date:
8 May 2012

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1. Introduction

This Impoundment Basin (IB) Decommissioning Work Plan (work plan) has been prepared by ARCADIS U.S., Inc. (ARCADIS), on behalf of Hercules Incorporated, (Hercules), for the decommissioning of the IB at the Hercules Facility in Hattiesburg, Mississippi (Figure 1). The work plan incorporates revisions from several comments in multiple correspondences between Hercules and the Mississippi Department of Environmental Quality (MDEQ). The decommissioning procedures and technical drawings in Appendix A are based on the results presented in the *Sludge Characterization and Bench Scale Treatability Report* dated August 20, 2010, and the *Impoundment Basin Odor Characterization Results Report* dated March 2, 2012. The activities leading up to the submission of this document include:

- ARCADIS completed field activities to characterize and evaluate appropriate treatment methods for the sludge contained within the IB in April 2010;
- ARCADIS on behalf of Hercules submitted a *Sludge Characterization and Bench Scale Treatability Report* on August 20, 2010. The report included an *IB Decommissioning Work Plan*;
- MDEQ provided comments on the *Sludge Characterization and Bench Scale Treatability Report* on November 10, 2010;
- ARCADIS on behalf of Hercules submitted a response to the November 2010 comments on January 7, 2011. This response included a revised *Impoundment Basin Decommissioning Work Plan* and the associated technical specifications;
- MDEQ provided comments on the revised work plan in a letter dated August 2, 2011. Comment 1 of this letter required that a pilot test(s) for odor mitigation be performed;
- Hercules provided a response to these comments in a letter dated December 22, 2011. The response included a brief *Odor Characterization Work Plan*;
- MDEQ approved the Odor Characterization Work Plan in a letter dated January 23, 2012; and

- On February 13, 2012, ARCADIS completed the odor characterization effort and submitted the results on March 2, 2012 in a report titled *Impoundment Basin Odor Characterization Results Report.*

The IB contains approximately 4,700 cubic yards of untreated sludge which will be mechanically dewatered. The dewatered sludge would then be tested for volatile organic compounds (VOCs) by the toxicity characteristic leaching procedure (TCLP), total solids, and the point filter liquids test (PFLT) to determine the appropriate off-site disposal location. Upon the removal of the IB sludge, the open excavation will be backfilled to the surrounding grade with "clean" backfill.

This work plan is subject to modifications based on findings in the field. However, in the event that unforeseen circumstances occur and a significant change to this plan is required, MDEQ will be notified and have an opportunity to comment on the impacts prior to revisions of the plan and implementation.

2. Decommissioning Method

2.1 Pre-Decommissioning Activities

The current MDEQ Water Pollution Control permit (Permit No. MSP091286) allows for the discharge of water that originates from the IB to the City of Hattiesburg Publicly Owned Treatment Works (POTW). Upon selecting a contractor and prior to implementation of this decommissioning plan, supplemental information consisting of a description of the mechanical dewatering process will be submitted to MDEQ for inclusion in the permit. No other aspects of the permit will be requested to be revised. Once MDEQ approves the inclusion of the supplemental information, Hercules will communicate with the POTW so they are aware of the decommissioning activities.

Free-standing liquids in the IB may be drawn down, sampled, and discharged in accordance with the facility's pretreatment permit until a minimum of 6 inches of water remains over the sludge. Prior to implementation of the decommissioning, an approved waste disposal profile will be obtained from the Pine Belt Regional Landfill (PBRL) in Ovett, Mississippi, using the current sludge data. Dewatered sludge that is non-hazardous as determined by the procedures contained in Section 2.4 of this work plan will be disposed of at PBRL. Hazardous waste will be profiled and disposed of at a facility permitted to receive hazardous waste.

2.2 Mechanical Dewatering

2.2.1 Dewatering Equipment Staging

The selected contractor's equipment will be mobilized to the site. The staging areas shown in the plans (Appendix A) will be utilized for the primary dewatering equipment and containers holding the dewatered sludge prior to off-site shipment. Mechanical dewatering units will be powered by facility power or a portable generator, if the current configuration of facility power is insufficient.

2.2.2 Dewatering Methodology

Raw sludge will be pumped either directly to the dewatering unit or placed into a closed feedstock equalization container prior to introduction into the dewatering equipment. Any reagent additions, if required to enhance dewatering and/or reduce odors, will be added to the sludge prior to introduction into the equipment. Mechanical dewatering operations may be conducted 24 hours per day until all of the IB sludge has been dewatered. The sludge will be dewatered until it passes the PFLT. At this time, it is not expected that any solidification reagents will be required to pass the PFLT.

The dewatered sludge will be directly placed into roll-off containers (or equivalent), covered, and staged for disposal pending the results of the analyses described in Section 2.4. The dewatered sludge will be loaded for off-site transport to an appropriate landfill. Prior to disposal at a landfill facility, an approved profile will be obtained from that landfill.

The generated liquid effluent will be pumped to an on-site storage container. On-site storage will consist of available empty facility tanks and/or rented frac tanks. Samples of the stored water will be collected and submitted to an analytical laboratory. The samples will be analyzed for the parameters contained in the facility's permit. The analytical results will be used to calculate a discharge flow rate to the facility's permitted industrial sewer outfall that will not exceed the pounds per day limits contained in the permit. The industrial sewer system is currently covered by the permit.

2.3 Odor Monitoring

Odor monitoring will be conducted for the duration of sludge handling and dewatering activities. The odor monitoring has been developed based on the findings in the *Impoundment Basin Odor Characterization Results Report.* The results of the

characterization indicated that there is a reasonable off-site odor potential for the proposed IB decommissioning activities. Based on the odor characterization analytical data, nearly all the odor is a result of hydrogen sulfide (H_2S). Other constituents that were detected in the laboratory-analyzed sample (i.e., toluene, mercaptans) present low relative odor or health risk potential. Benzene, the primary constituent of concern in the IB sludge, was detected with a Draeger Tube during odor characterization. Because benzene has relatively low exposure limits, it will be monitored. The objective of the monitoring is to ensure the protection of the public from potentially harmful chemicals and offensive odors.

In addition to the details presented in this section, the selected contractor to implement the work plan will prepare a Health and Safety Plan (HASP) and Odor Mitigation Plan. These plans will be submitted to MDEQ as an addendum to this work plan prior to mobilizing to the site.

2.3.1 Relevant Standards

Of paramount importance is to protect the public from potentially harmful chemicals. The Occupational Safety and Health Administration (OSHA) permissible exposure limit for H_2S is 20 parts per million (ppm). The National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit (REL) for H_2S is 10 ppm by volume as a 10-minute ceiling. According to the online NIOSH Pocket Guide to Chemical Hazards, H_2S is a colorless gas with a strong odor of rotten eggs. The sense of smell becomes quickly fatigued to H_2S.

The OSHA time-weighted average limit (TWA) for benzene is 1 ppm indicating that a site worker shall not be exposed to an airborne concentration of benzene in excess of 1 ppm as an 8-hour TWA. The short-term exposure limit (STEL) for benzene is 5 ppm indicating that a site worker shall not be exposed to an airborne concentration of benzene in excess of 5 ppm averaged over any 15-minute period. The NIOSH REL as a 10-hour TWA is 0.1 ppm and as a 15-minute STEL is 1 ppm.

In accordance with the State of Mississippi's regulations, the public should be protected from unreasonable odors in ambient air. Hercules proposes the following as objective and measurable standards to address odor.

- Field olfactometer readings collected from odors at the property boundary emitted by and downwind of the IB do not exceed a ratio of 2 dilutions to threshold (D/T).

- H_2S concentrations emitted by the IB and collected at the property boundary do not exceed 0.02 ppm.

The D/T ratio is a measure of the number of dilutions needed to make the odorous ambient air "non-detectable". The D/T ratio is equal to the volume of carbon-filtered air divided by the volume of odorous air. The use of subjective standards will be permitted only by MDEQ staff or the site Health and Safety officer.

2.3.2 Monitoring Equipment

Monitors will be used both in the work area and areas downwind to protect the public from exposure.

H_2S will be monitored immediately downwind of the dewatering area using an OdaLog DiCom system (from Detection Instruments Corporation). This system has an H_2S measurement range of 0.005 ppm to 2 ppm. The meter will monitor H_2S on a continuous basis and will be programmed to record a measurement at a frequency of every 10 minutes. Using the system's ability to transmit a 4 to 20 milliampere signal, an alarm will be transmitted to a central monitoring location when a measured concentration exceeds a predetermined level.

H_2S will also be monitored in the work area and areas downwind as needed with a RAEGuard EC (by RAE Systems Inc.) equipped with an H_2S sensor. The monitor will be equipped with an alarm which will be initiated if an H_2S concentration of 10 ppm is reached. In the event that this criterion is exceeded, the procedures detailed in the contractor's HASP will be implemented.

Odors will be monitored with a Nasal Ranger® (developed by St. Croix Sensory) consistent with the odor characterization effort.

Because truck traffic will be required during the removal of the dewatered sludge from the site, a dust monitoring instrument will be used to monitor dust.

Benzene will be monitored in the work area and downwind areas with an UltraRae 3000 (by RAE Systems) photoionization detector (PID), or equivalent, set in the benzene specific mode. The UltraRae 3000 meter can detect benzene concentrations between 0.05 ppm and 200 ppm. If a PID reading exceeds the equivalent of 0.1 ppm, an alarm will be initiated and procedures detailed in the contractor's HASP will be implemented.

H_2S is flammable with a lower explosive limit (LEL) of 4 percent. Other compounds such as methane can also be present. Therefore, potentially explosive conditions will be monitored in the work area using an LEL meter. If a reading greater than 10 percent LEL is observed, then sludge removal and dewatering activities will cease until a remedy is determined to address the potentially explosive conditions.

2.3.3 Monitoring Locations, Frequency, and Threshold Concentrations

Monitoring for benzene, odors, and H_2S will be conducted when the sludge is being removed from the IB and dewatered. One stationary and continuous monitoring location will be installed immediately downwind of the dewatering building/area for benzene and H_2S. To supplement this, a weather station including an anemometer will be installed to track the direction and speed of the wind. Extra caution will be employed when the wind is in the direction of the neighbors.

The detection concentration for H_2S in the ambient environment ranges from 0.01 ppm to 0.02 ppm, depending on the environmental conditions and the sensitivity of the individual. An initial alarm level of 0.02 ppm has been selected for H_2S. Because the potential exists for an alarm to occur at this level as a result of motor vehicle operation, rather than the sludge, and the proximity of this project to city streets, this alarm level may be adjusted in coordination with MDEQ to avoid false positive alarms.

If a detection of H_2S above 0.02 ppm or an alternate MDEQ-approved threshold is detected immediately downwind of the dewatering building/area, a portable instrument will be used to monitor the midpoint location between the building/area and the property boundary. An exceedance of the established threshold at this midpoint location will require measurement at the property boundary. An exceedance of 0.02 ppm of H_2S or the MDEQ-established threshold at the property boundary will require work to stop. The cause of the exceedances will be investigated and corrective measures implemented to rectify the issue (provided that the investigation indicates that the cause is a result of the sludge and not a false alarm).

In addition, if a detection of benzene above the 0.1 ppm, or MDEQ-established threshold, is detected immediately downwind of the dewatering building/area, a portable instrument will be used to monitor the midpoint between the building/area and the property boundary. Exceedances of 0.1 ppm at the midpoint due to the dewatering effort will require work to stop, the cause investigated, and corrective measures implemented to rectify the issue.

Periodic odor quality checks will be completed with Nasal Ranger® at the midpoint between the dewatering building/area and the property boundary as well as at the property boundary including around the IB. Two monitoring events will be completed per morning and two monitoring events will be completed per afternoon while work is being completed on site. More frequent monitoring may result in nasal fatigue and will not accurately represent odor quantification.

The selected contractor will be required to install one stationary and continuous monitoring location immediately downwind of the highest area of truck traffic for dust. The selected contractor will also be required to continuously monitor benzene, LEL, and H_2S in any worker areas for worker safety.

The monitoring will only be conducted during sludge removal and dewatering because there should not be elevated emissions when the sludge is in a quiescent condition. The following table summarizes the monitoring parameters, threshold concentration, location, measuring device, and frequency. The threshold is the concentration at which an action will be required as specified by the HASP and/or Odor Mitigation Plan developed by the contractor.

Compound/ Parameter	Threshold Concentration	Monitor Locations	Monitoring Device	Monitoring Frequency
Benzene	0.1 ppm	Worker Area	UltraRae 3000 benzene specific PID or EQ	Continuous
		Downwind of Dewatering Area		Continuous
		Midpoint (Dewatering Area & Property Boundary)		As Needed (see above)
Hydrogen Sulfide	10 ppm	Worker Area	RAEGuard EC	Continuous
	0.02 ppm	Downwind of Dewatering Area	OdaLog DiCom	Continuous
	0.02 ppm	Midpoint (Dewatering Area & Property Boundary)	RAEGuard EC or EQ	As Needed (see above)
	0.02 ppm	Property Boundary	RAEGuard EC or EQ	As Needed (see above)
Odor	2 D/T	Property Boundary Midpoint (Dewatering Area & Property Boundary) and IB area	Nasal Ranger®	2 morning, 2 afternoon
Explosive Conditions	10% LEL	Worker Area	TBD	Continuous

Compound/ Parameter	Threshold Concentration	Monitor Locations	Monitoring Device	Monitoring Frequency
Dust	>100 mg/m^3 above background	Highest Traffic Area	TBD	As needed during sludge hauling activities

D/T Dilution to threshold.
EQ Equivalent.
LEL Lower explosive limit.
mg/m^3 milligrams per cubic meter.
PID Photoionization detector.
ppm Parts per million.
TBD To be determined.

2.3.4 Odor Mitigation

The selected IB sludge removal and dewatering contractor will be required to select a mitigation approach and prepare an Odor Mitigation Plan prior to mobilization to the site. The subcontractor will also be required to prove its effectiveness on site prior to full-scale implementation of sludge removal and dewatering. MDEQ will be notified when this demonstration has been completed.

One or a combination of the following mitigation approaches, or other appropriate technologies, will be utilized by the contractor to avoid the migration of offensive odors off site during the removal and dewatering of sludge from the IB.

- **Water Barrier**: By maintaining a water barrier on the IB and removing (i.e., pumping) sludge from beneath this barrier, odors emitted directly from the IB can be significantly reduced. In addition, removal of the sludge using hoses or piping would minimize the exposure of the sludge to ambient air.

- **Containment structures:** The most effective approach to controlling emissions from a source is to contain, capture, and treat them. When dealing with an area source such as the IB, a temporary structure could be installed over it such as a sprung structure. The need for such a structure would be greatest if the sludge were to be exposed to ambient air, such as by dredging equipment. The air within the structure would be conveyed to a treatment system. A sprung structure consists of an aluminum frame and a membrane that is attached to the frame. The membrane is made of a polyester fabric with either a polyurethane or Tedlar coating. Sprung structures are available in widths ranging from 50 feet to

200 feet and of varying lengths. They have been used in a wide range of applications such as enclosing remediation/excavation sites, municipal salt storage facilities, and to enclose vehicle maintenance operations.

The sludge dewatering operation may be conducted in an enclosed space such as a building or a temporary structure. The air supply portion of the system would be designed to provide fresh air to the breathing zone of the workers. The exhaust air from the enclosed space would be discharged to a treatment system before being exhausted to the ambient air. Treatment of the air would need to be sufficient enough to avoid exceedances to the threshold values stated previously.

- **Chemical Addition:** Given the high H_2S concentrations measured in the *Impoundment Basin Odor Characterization Results Report*, the addition of chemicals to sludge before dewatering could be implemented. The chemicals are intended to react with the H_2S contained in the sludge to minimize emissions during and after dewatering. The chemicals to be considered should include an alkali such as lime, which would raise the pH of the sludge and convert H_2S to a non-volatile ion; iron salts, which would convert dissolved sulfide to a non-volatile precipitate; and oxidants, which would convert sulfide to sulfate, a non-volatile ion. Proprietary chemicals may also be used, if appropriate.

- **Hydraulic Removal of Sludge:** As stated previously, the sludge will likely be removed from the IB hydraulically. Pumps will be used to remove the sludge from under the water surface. It will be pumped to the sludge dewatering equipment. This approach will produce minimal emissions and has been proven to be effective at similar projects.

- **Foaming Agents:** Aqueous foam formulations have been used successfully to control emissions from landfills, open excavations, and ponds. The foam forms a flexible membrane and minimize emissions. The effectiveness of foaming agents controlling emissions varies with compounds and their effective life also varies. Therefore, the evaluation of foam should consider the compounds that are to be controlled and their required service life. Foaming agents may prove to be most beneficial once nearly all the sludge is removed and the overlying water is pumped out in order to access the residual sludge at the bottom of the IB.

- **Counteractants/Masking Agents:** There are liquid products that are applied in as a mist which are reported to react with various odors/volatile compounds and serve to neutralize odors. The actual effectiveness of these materials is difficult

to quantify. Other vapor phase products are intended to simply replace an offensive odor with a more acceptable one. This approach is challenging because what is acceptable to one individual may be offensive to another. The use of counteractants and masking agents is a last resort and is typically used for large area sources where the option of containing, capturing, and treating an emission source is deemed too difficult and expensive.

The Odor Mitigation Plan will be deemed effective if:

- Nasal Ranger readings collected from odors at the property boundary emitted by and downwind of the IB do not exceed 2 D/T.

- H_2S concentrations emitted by the IB and collected at the property boundary do not exceed 0.02 ppm.

The contractor will be required to prepare a contingency plan as part of the Odor Mitigation Plan submittal (prior to mobilization to the site) in the event that the selected approach does not perform to the standards presented above. In the event that unforeseen circumstances occur and a significant change to the Odor Mitigation Plan is required, MDEQ will be notified.

2.4 Sludge Characterization for Off-Site Disposal

Per the approval of MDEQ, characterization of the sludge will be determined based on the analysis of a composite sample from each shipment container (i.e., likely roll-off boxes) which will be comprised of six grab 1-liter aliquots of sludge. The grab samples will be collected from each corner and two middle locations within the container. Once the total sample volume is collected, the composited sludge will be thoroughly mixed in a clean 5-gallon plastic bucket. The sample will be containerized and submitted to an analytical laboratory for TCLP-VOCs.

If the TCLP sample results are less than or equal to the Resource Conservation and Recovery Act (RCRA) toxicity characteristic (TC) levels, indicating that the waste is nonhazardous, no additional analytical testing will be conducted for the sludge within the sampled container and the sludge will be transported to the PBRL for disposal.

If the TCLP results exceed the TC criteria, land disposal restrictions will apply to this sludge. The dewatered sludge will be disposed of at a permitted facility. A flow chart

showing the proposed sludge sampling/waste management decision process is included in Appendix B.

2.5 Soil Excavation and Confirmatory Sampling

Following the removal of the sludge from the IB, approximately 6 inches of soil at the bottom of the IB will be excavated, staged in shipping containers (or on and under plastic), and properly characterization. Characterization will involve the collection of three samples during the removal of the soil, one at each end and one in the middle of the IB. The samples will be submitted to a laboratory for the TCLP-VOCs, TCLP RCRA eight metals, and any additional analysis required by the landfill.

Once the soil has been removed from the IB, eight evenly spaced confirmatory samples from the floor of the IB will be collected. In addition, two confirmatory samples will be collected along each side of the IB and one at each end just beyond the sidewalls to assess whether constituents associated with the IB are present behind the walls of the IB. These sidewall samples will be collected by advancing borings using a direct push drilling rig. The sidewall borings will be continuously sampled (every 2 feet) and screened with a PID to a depth consistent with the bottom of the IB (approximately 12 feet below land surface). The interval exhibiting the highest PID reading at each sidewall boring will be selected for laboratory analysis. In the event that elevated PID readings are not measured during the advancement of the sidewall borings, the sample interval from the midpoint of the boring depth will be selected for laboratory analysis. The floor and sidewall confirmatory samples will be submitted to an analytical laboratory and analyzed for VOCs by U.S.Environmental Protection Agency (USEPA) Method 8260B and RCRA eight metals by USEPA Method 6010/7470.

If the confirmatory samples are collected in native soil within the first encountered groundwater zone, no additional soil sampling or excavation will be conducted. This is because the soil samples will be representative of impacted groundwater, which would bias the results. The excavation will be backfilled and the groundwater in the vicinity of the filled IB will continue to be managed as an impacted groundwater zone.

2.6 Lateral Pipe Installation

Three lateral pipes with screened sections will be installed within a porous material at the bottom of the IB. These laterals may be used in the event that a post-decommissioning remedy is warranted that may involve an injection or extraction technology. Figures A6 and A7 in Appendix A present details of the lateral design. The laterals will be 40 feet

long, 2 inches in diameter, 304 or 316 stainless steel screens (Johnson Free-Flow Vee Wire Screen or approved equivalent). The laterals will be backfilled with a minimum of 6 inches of pea gravel above, below, and on the sides of the pipe. The ends of the laterals will be capped and have a minimum of 1 foot of pea gravel that extends beyond the capped ends. In the center of the 40-foot run of pipe will be a tee that leads to a 2-inch diameter riser pipe made of Schedule 80 polyvinyl chloride pipe. The top of the riser pipe will be extended 2 feet above the ground surface, painted orange, capped, and locked. The laterals will be spaced 80 feet apart within the former IB, with the first lateral being 50 feet from the end of the basin wall.

2.7 Backfill Activities

Once the sludge and 6 inches of soil has been removed from the IB, soil from an existing stockpile west of the IB will be used to backfill the IB. Once this source has been depleted, additional fill will be imported and placed in the IB. Representative samples of the fill material from on site and off site will be collected for laboratory analysis to confirm that the material is a clean source. Dewatering of the IB will be conducted concurrently with backfilling, if necessary. In the event of excessive water infiltration, gravel may be placed in the bottom of the IB to bridge the groundwater and allow for the proper compaction of overburden fill soil. Compaction will be completed in 6- to 8-inch lifts using track equipment and will be sufficient to minimize significant post-construction settling.

2.8 Site Restoration

The filled IB and any other disturbed areas (soil stockpile) will be graded to promote positive drainage to existing surface water conveyances. The disturbed areas will be seeded with a native grass species and fertilized. After fertilization, all project equipment will be demobilized from the site.

3. Reporting

Upon completion of decommissioning activities, a Decommissioning Certification Report will be submitted to MDEQ. The report will document the activities undertaken to decommission the IB and request no further action status for the IB sludge.

4. Post-Decommissioning

Post-decommissioning activities related to the IB sludge are not anticipated because of the removal action. The on-site groundwater monitor wells currently surrounding the IB will be left in place to facilitate future groundwater monitoring activities conducted under the Restrictive Use Agreed Order in place for this property.

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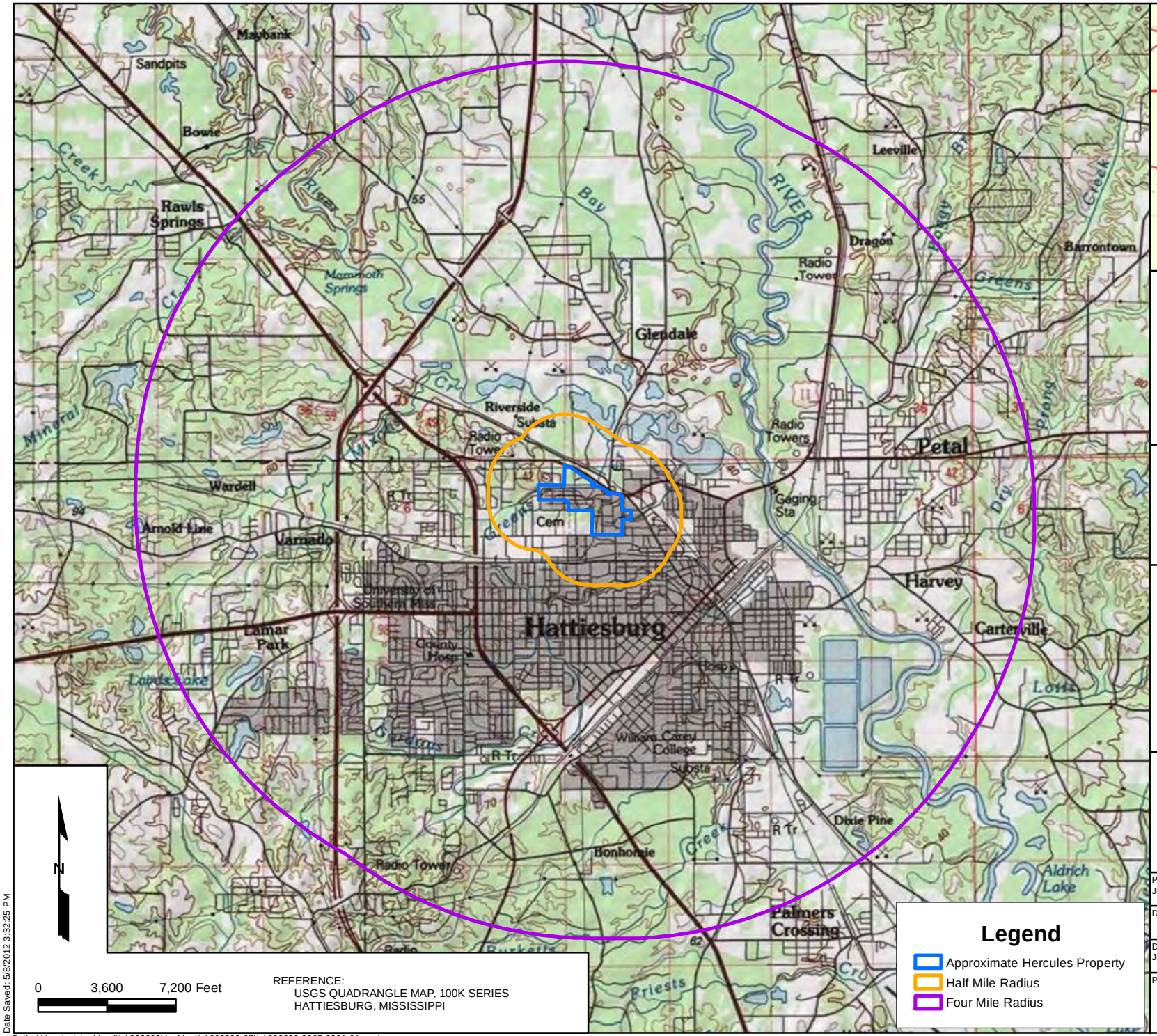
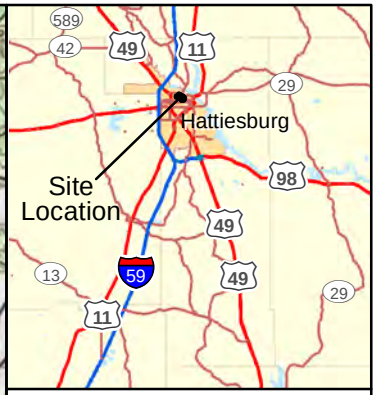
Figure





SITE LOCATION MAP

Impoundment and Basin Decommissioning Work Plan

HERCULES INCORPORATED
Hattiesburg, Mississippi

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PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 05/08/2012
PROJECT NUMBER: LA002999.0007	FIGURE NUMBER: 1

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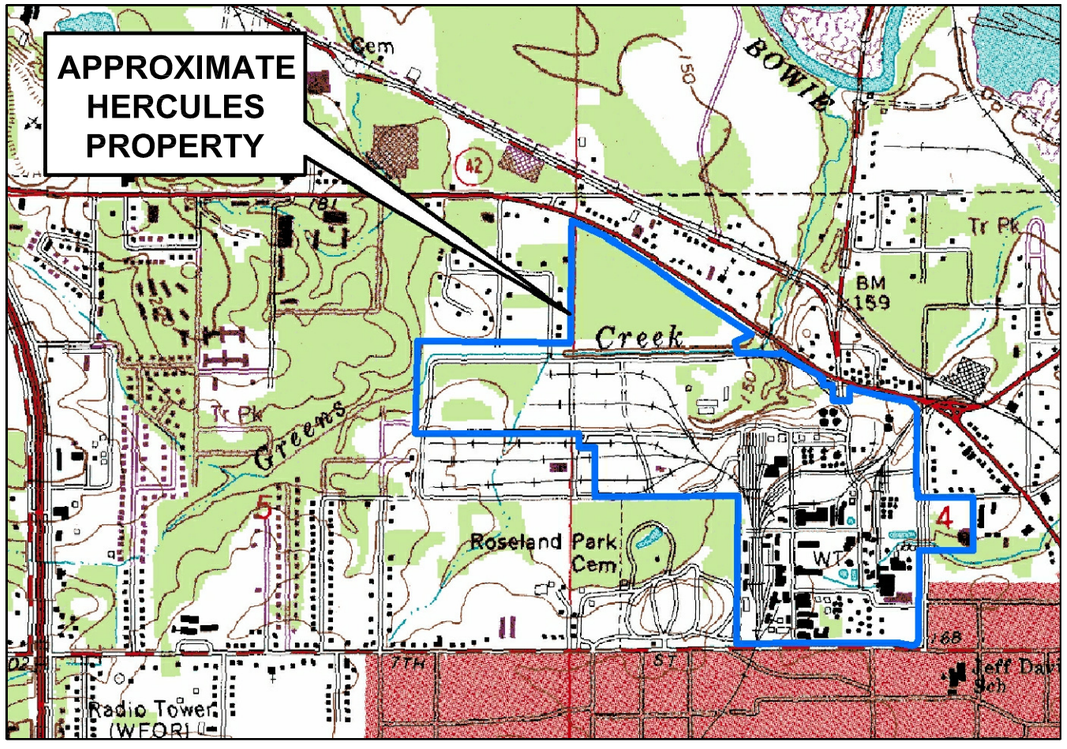
Appendix A

Technical Drawings

CONSTRUCTION DRAWINGS
IMPOUNDMENT BASIN AND TANK DECOMMISSIONING



SITE LOCATION MAP

HERCULES INCORPORATED
613 WEST 7TH STREET
HATTIESBURG, MISSISSIPPI

INDEX OF DRAWINGS

Hercules Incorporated
Impoundment Basin Decommissioning
Hattiesburg, Mississippi

TITLE SHEET

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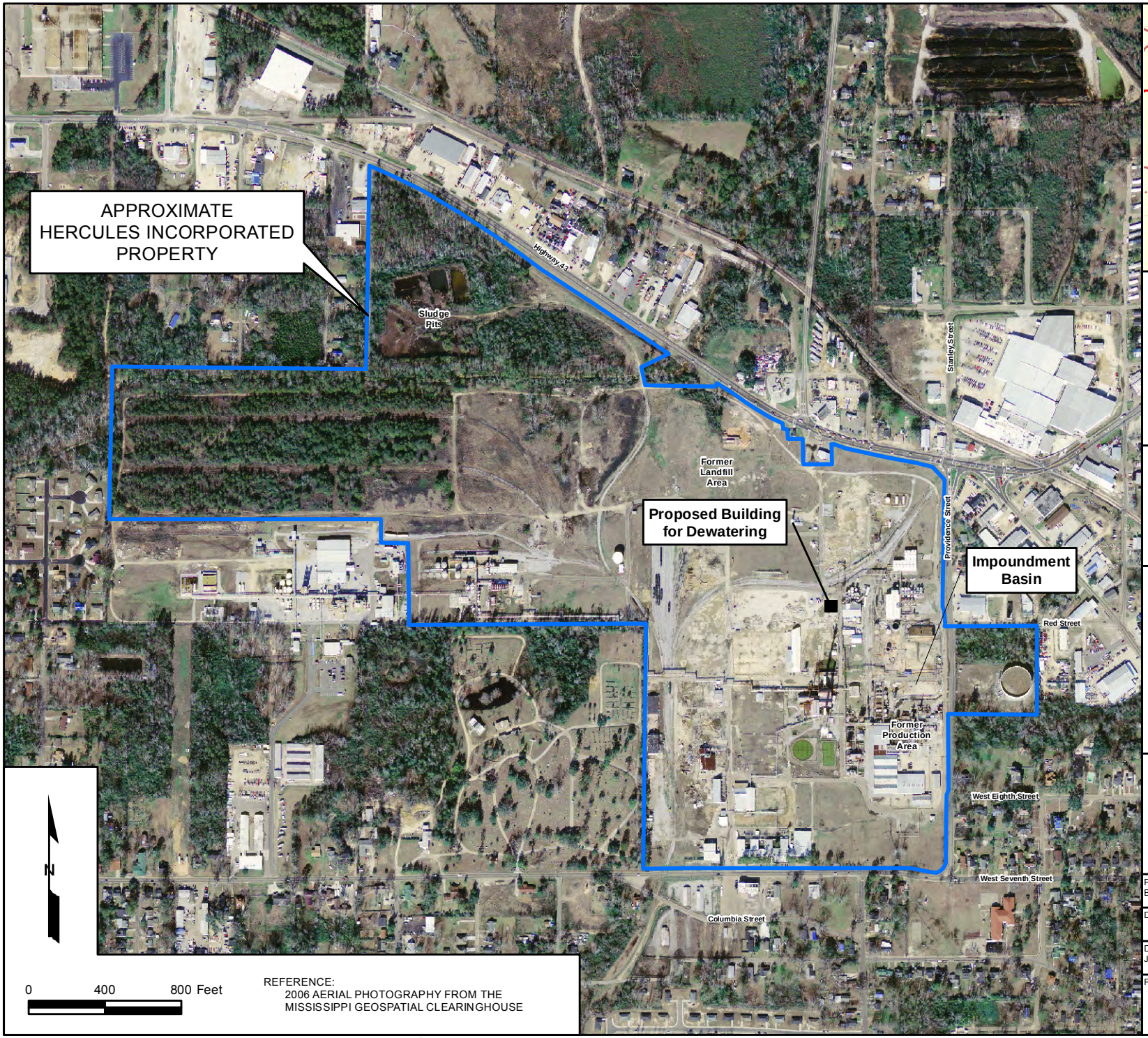
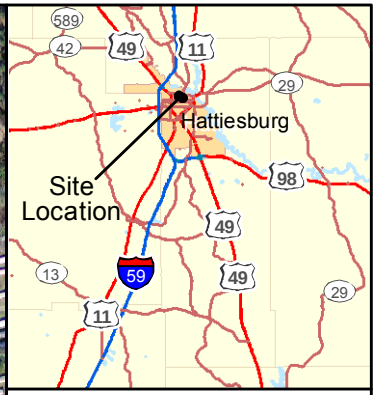
FIGURE
A-1





REFERENCE:
2006 AERIAL PHOTOGRAPHY FROM THE MISSISSIPPI GEOSPATIAL CLEARINGHOUSE

SITE LAYOUT MAP

AERIAL

IMPOUNDMENT BASIN DECOMMISSIONING

HERCULES INCORPORATED
613 W. 7th Street
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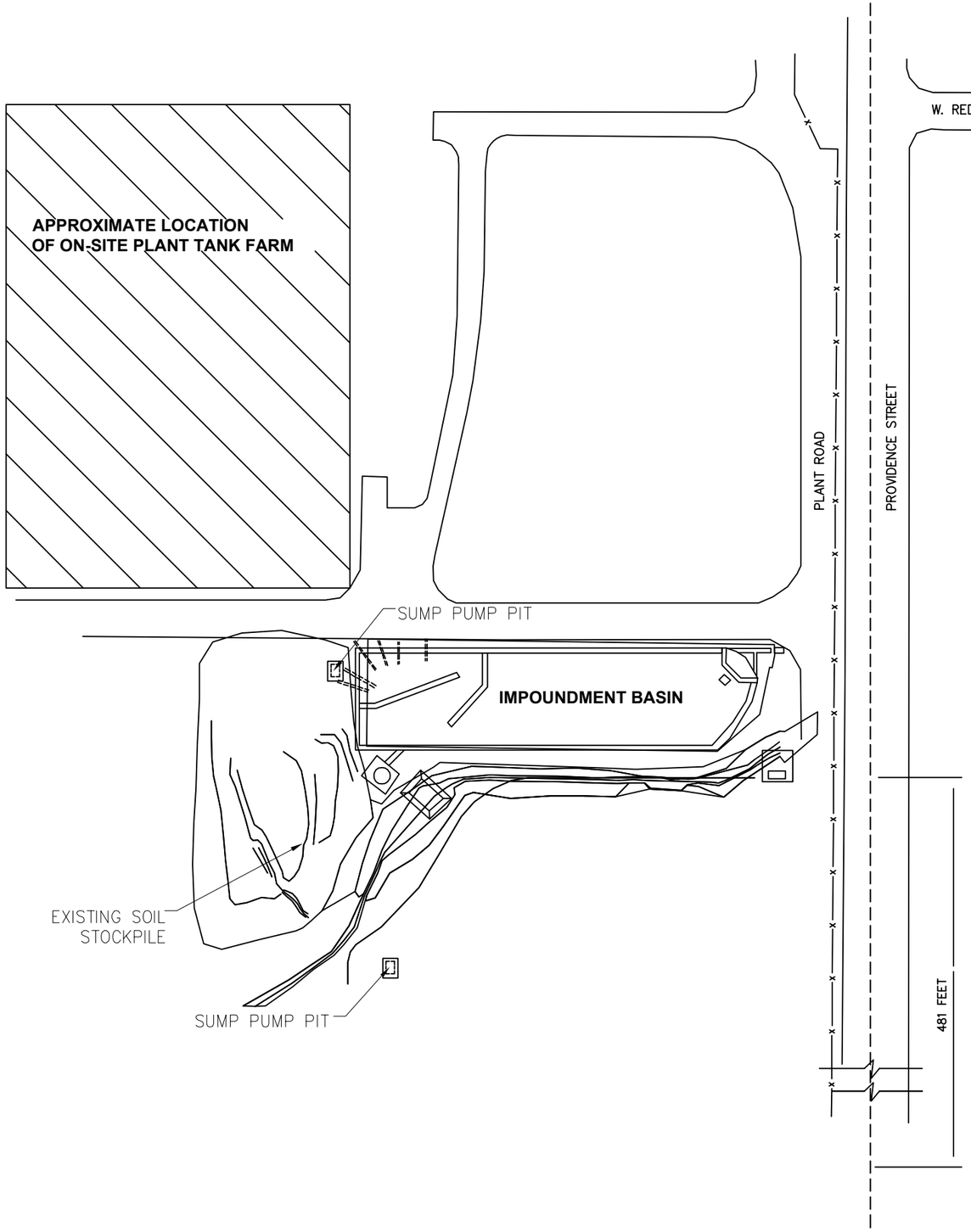
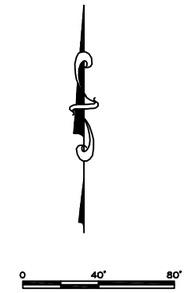
PROJECT MANAGER: BG	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 02/29/2012
PROJECT NUMBER: LA002999.0007	FIGURE NUMBER: A-2





EXPLANATION

- – – – – APPROXIMATE LOCATION OF CITY OF HATTIESBURG SEWER PIPE (NOT SURVEYED)
- = = = = = APPROXIMATE LOCATION OF PIPES TO BE DECOMMISSIONED (NOT SURVEYED)

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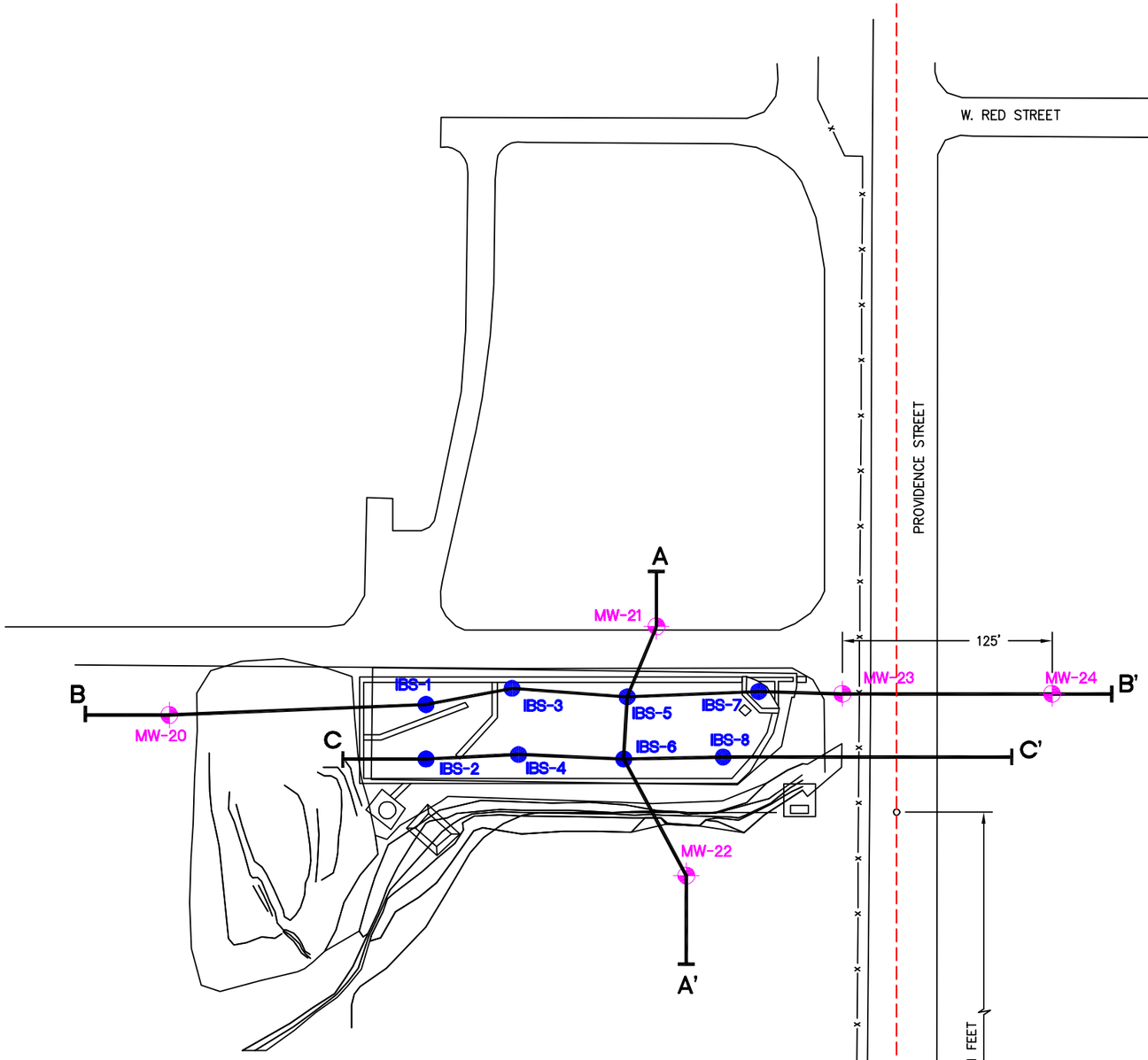
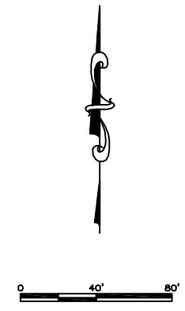
Hattiesburg, Mississippi

DEWATERING SITE PLAN (IB)

ARCADIS

FIGURE
A-3





EXPLANATION

MW-22 — MONITOR WELL LOCATION AND DESIGNATION

IBS-1 — CHARACTERIZATION/TREATABILITY SAMPLE LOCATION

APPROXIMATE LOCATION OF CITY OF HATTIESBURG SEWER PIPE (NOT SURVEYED)

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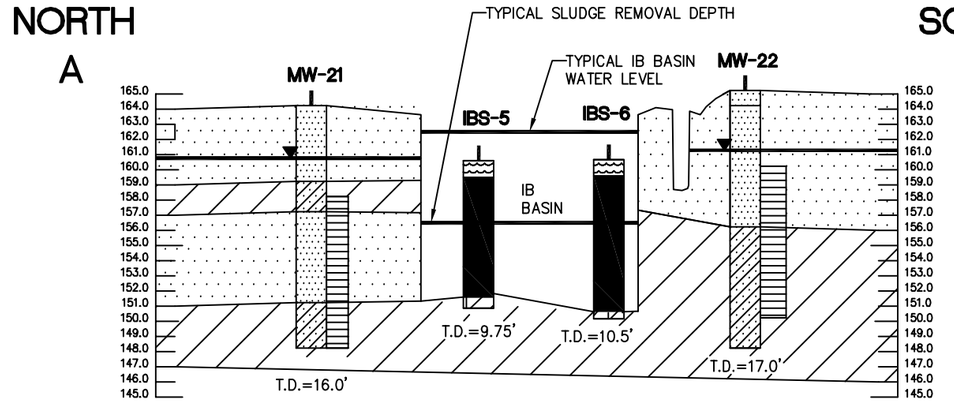
Hattiesburg, Mississippi

IMPOUNDMENT BASIN CROSS-SECTION LOCATION MAP

ARCADIS

FIGURE
A-4

DB:(S..MEN) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\PUBLIC\Ashland\Hattiesburg\IB Closure\Tech Specs\Tech Specs - IB_ET-10\Exhibit A - Drawings\LA002999-01-03.dwg PLOTTED: 4/12/2012 8:56 AM BY: SMITH, BOB

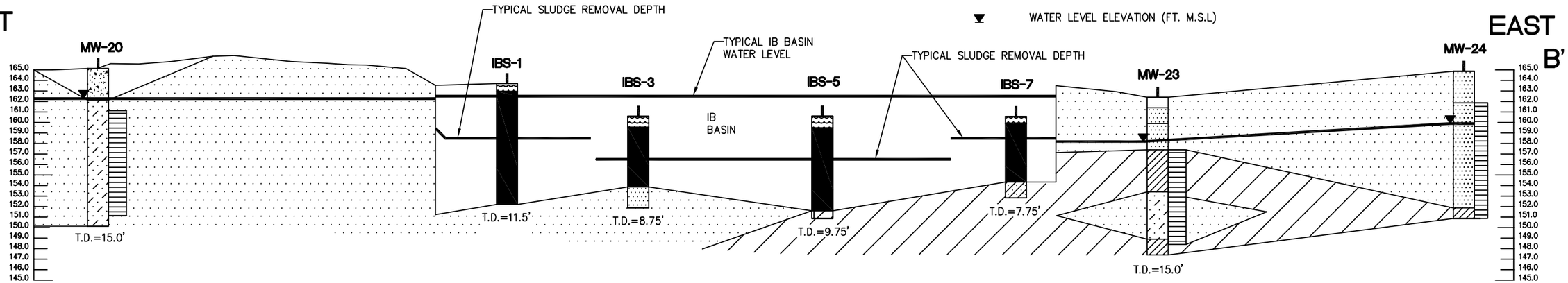


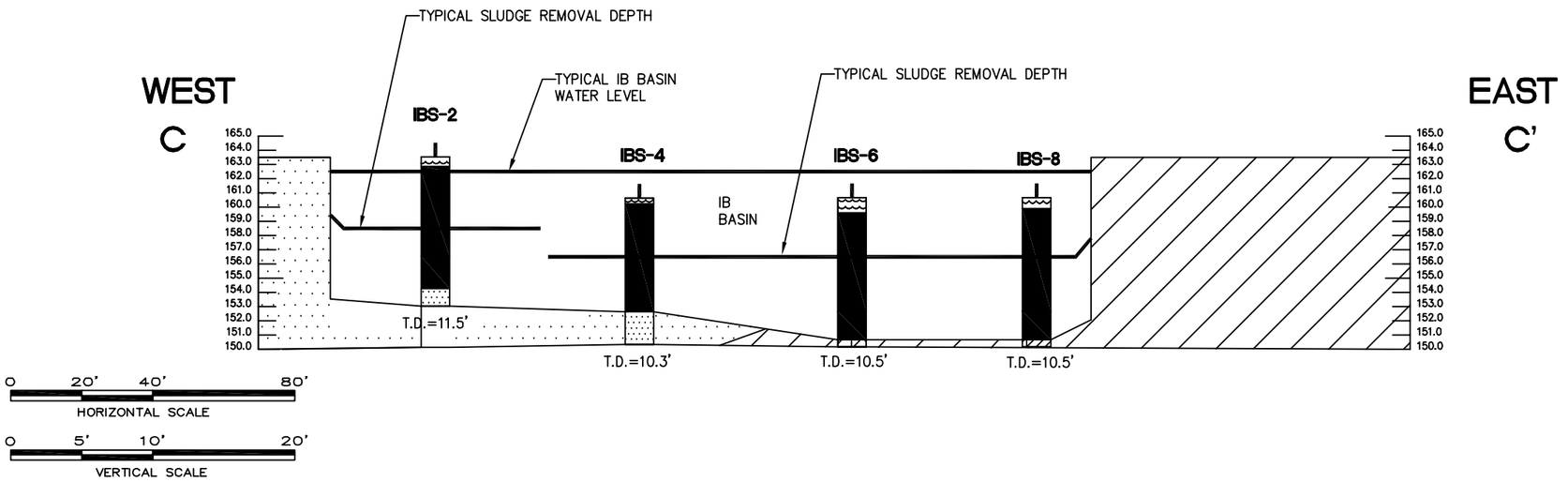
EXPLANATION

- SAND
- SANDY CLAY
- UPPER SLUDGE
- LOWER SLUDGE
- SILTY CLAY
- WATER
- GRAVEL
- CLAYEY SAND
- CLAY
- WATER LEVEL ELEVATION (FT. M.S.L)
- SCREEN INTERVAL
- MW-22 — MONITOR WELL/BORING LOCATION & DESIGNATION
- T.D.=17.0' — TOTAL DEPTH

NOTE:

THE ELEVATIONS AT THE IBS LOCATIONS WERE DETERMINED IN APRIL 2010 DUE TO IB BASIN DEWATERING THAT OCCURED DURING THE IMPLEMENTATION OF THE TREATABILITY WORK PLAN, THE WATER ELEVATIONS AT EACH IBS LOCATION VARIES. THE GROUNDWATER ELEVATIONS IN THE WELLS WERE DETERMINED IN MAY 2010.





0 20' 40' 80'
HORIZONTAL SCALE

0 5' 10' 20'
VERTICAL SCALE

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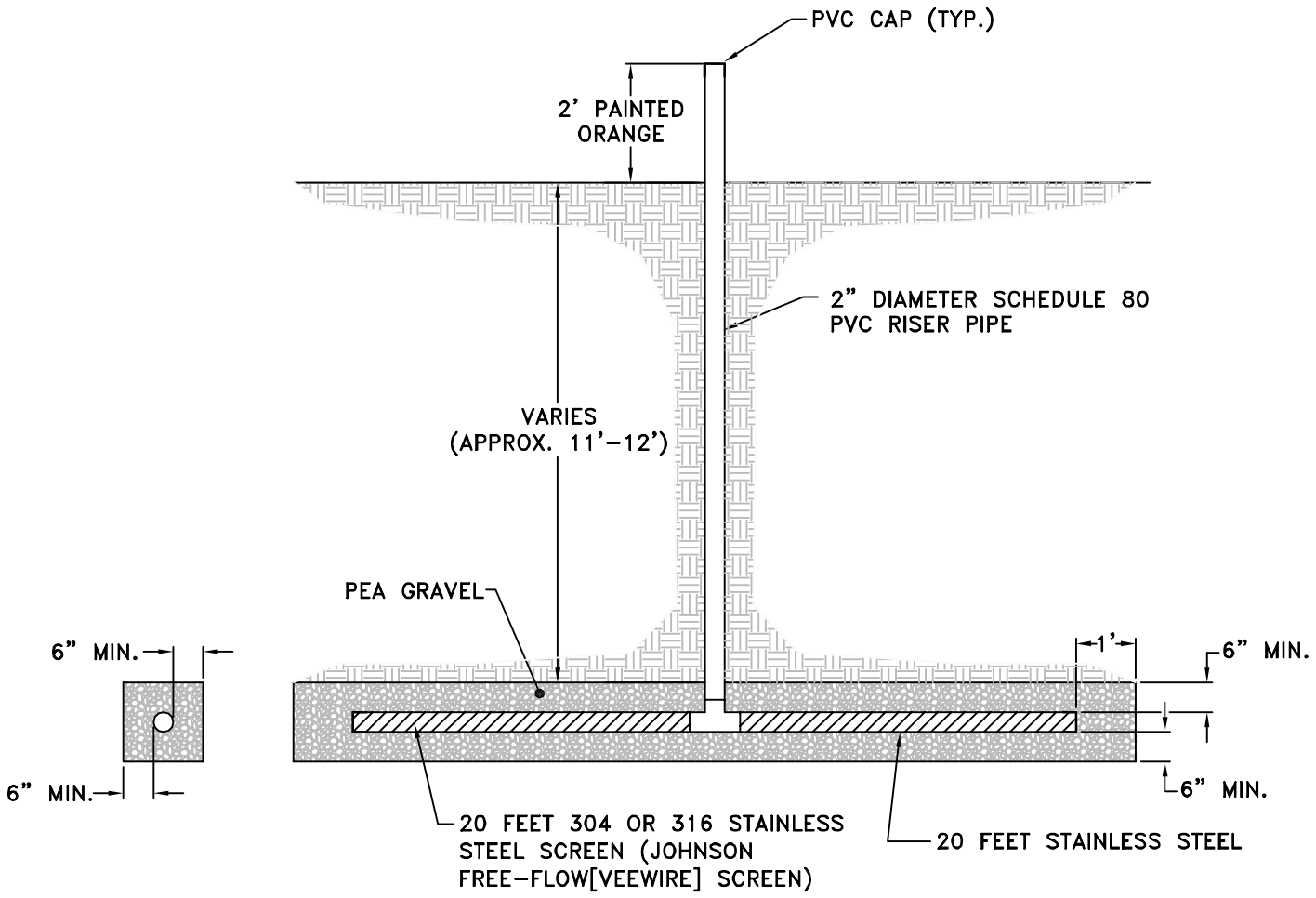
CROSS-SECTIONS A-A', B-B', AND C-C'

ARCADIS

FIGURE
A-5



NOT TO SCALE

IB DECOMMISSIONING

LA002999.0007

WELL CROSS SECTION DETAIL

ARCADIS

FIGURE

A-6

8.7'

40.0'

8.7'

0 10' 20'

EXPLANATION

LOCATION OF LATERAL LINES

LOCATION OF RISER PIPE

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Hattiesburg, Mississippi

WELL LAYOUT

ARCADIS

FIGURE
A-7

DB:(S. MEN) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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ARCADIS

Appendix B

Proposed Sludge Sampling/Waste Management Decision Flowchart

MECHANICAL DEWATERING