



RCRA CORRECTIVE ACTION PROGRAM/REMOVAL ACTION

G M P O W E R T R A I N B E D F O R D P L A N T B E D F O R D , I N D I A N A

Proposed RCRA East Plant Area Cleanup

Public Meeting
March 31, 2005



- CREEK CLEANUP UPDATE
- PROPOSED RCRA EAST PLANT AREA CLEANUP
(INTERIM MEASURE)

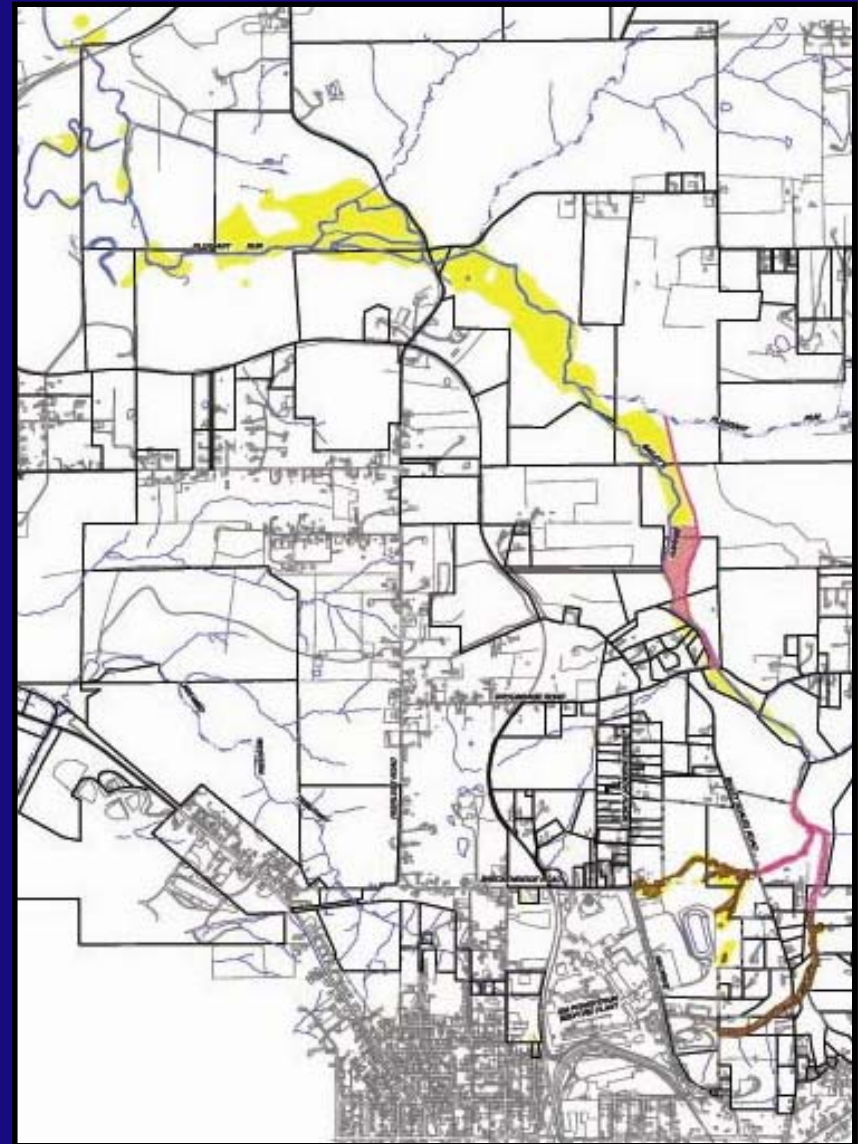


CREEK CLEANUP UPDATE

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GM POWERTRAIN BEDFORD PLANT BEDFORD, INDIANA

156,401 tons of
soil/sediment removed to
date





CREEK CLEANUP UPDATE

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EAST PLANT AREA

RCRA CORRECTIVE ACTION PROGRAM/REMOVAL ACTION

GM POWERTRAIN BEDFORD PLANT BEDFORD, INDIANA

2001





PROPOSED RCRA EAST PLANT AREA CLEANUP

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- East Plant Area used for waste management activities & infrastructure. Now only used for infrastructure
- Noted AOIs include:
 - AOI 4/15 Fill areas
 - AOI 5/6 Fill/sludge disposal areas
 - AOI 8 Former water treatment lagoon
- East Plant Area extensively studied as part of the RCRA Facility Investigation (RFI)
 - Soil borings
 - Test trenches/pits
 - Bedrock corings
 - Monitoring wells
 - Dye trace studies
 - Geophysical surveys
 - Chemical analysis





PROPOSED RCRA EAST PLANT AREA CLEANUP

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EAST PLANT AREA
PCB SOIL DISTRIBUTION
VISUALIZATION

CONCEPTUAL SITE MODEL (CSM)
VISUALIZATION



PROPOSED RCRA EAST PLANT AREA CLEANUP

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- To determine need for cleanup, took following steps:
 - Evaluated human health risk using EPA precautionary assumptions
 - Assumed continued industrial use
 - Evaluated worker contact with soil, groundwater, sediment, surface water, and spring water assuming no institutional/engineering controls
- Findings:
 - Determined that cleanup should be conducted in the East Plant Area as a precautionary measure



PROPOSED RCRA EAST PLANT AREA CLEANUP

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Objectives of the Cleanup Project

- Primary Objectives
 - Prevent people from routinely touching soil with PCBs at concentrations that could pose a long-term hazard
 - Contain groundwater and oil with PCBs within East Plant Area
- Additional Objectives
 - Minimize disruption to community and plant during cleanup
 - Isolate waste materials from rain/snowmelt
 - Allow for continued plant operations
 - Reduce the amount of PCBs in the ground
 - Balance maintenance and monitoring
 - Find the right balance between these objectives and cost



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Evaluation of Broad Range of Cleanup Options

- Conducted study to evaluate cleanup alternatives that would meet objectives of the project
 1. Monitor environmental conditions
 2. #1 + Institutional controls
 3. #2 + Cover system and perimeter groundwater collection system
 4. #3 + Soil removal with off-site disposal
 5. #3 + Soil removal and placement in landfill vault
 6. #3 + In-ground soil solidification
 7. #3 + Some in-ground soil solidification & some soil removal with off-site disposal
 8. Same as #7, except placement in landfill vault



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EPA Factors for Evaluating Cleanup Options

- Protect human health and environment
- Achieve cleanup objectives
- Remediate source
- Ensure long-term effectiveness
- Reduce toxicity, mobility and volume
- Ensure short-term effectiveness
- Ability to implement
- Consider cost
- Allow for community and state input



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- Met with U.S. EPA and IDEM to determine what we wanted to accomplish (end result) and potential remedies.
- Conversations have been underway for several months.
- Together have outlined objective for project, evaluated cleanup options and have narrowed down to a preliminary cleanup plan.



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Elements of the Cleanup Plan

- Institutional Controls
- Soil removal and placement into on-Facility Landfill Vault
- Soil Cover System over the East Plant Area
- Re-use of soil from the creek cleanup as grading layer below the Cover System
- Perimeter Trench System to collect/treat groundwater
- AOI 8 Groundwater Source Removal System
- Operation, maintenance, and monitoring



INSTITUTIONAL CONTROLS

- Institutional controls ensure future land use at East Plant Area remains compatible with cleanup
 - For example, deed restrictions prevent digging in area without proper health and safety precautions and would require any damaged component to be repaired

SOIL REMOVAL AND PLACEMENT INTO ON-FACILITY LANDFILL VAULT

- Areas of ≥ 50 mg/kg PCB soil removal
- Two areas where it is impractical for soil removal
 - Water treatment plant utility corridor
 - Stormwater pond side slopes





On-Facility Landfill Vault (Conceptual)





SOIL REMOVAL AND PLACEMENT INTO ON-FACILITY LANDFILL VAULT

Potential Location





SOIL COVER SYSTEM

- Install low permeability Cover System over East Plant Area
 - Control erosion
 - Prevent direct contact with contaminated soil
 - Reduce groundwater recharge by reducing infiltration of rain/snowmelt
 - Based on modeling, Geosynthetic Clay Liner/ Flexible Membrane Liner cover system alternatives can result in a 99 % reduction in precipitation infiltration rates
- Some areas (e.g. two employee parking lots) will be covered with an asphalt or concrete cap
- Cover System design will include:
 - Vegetated/frost protection/drainage layer
 - Barrier layer
 - Grading layer



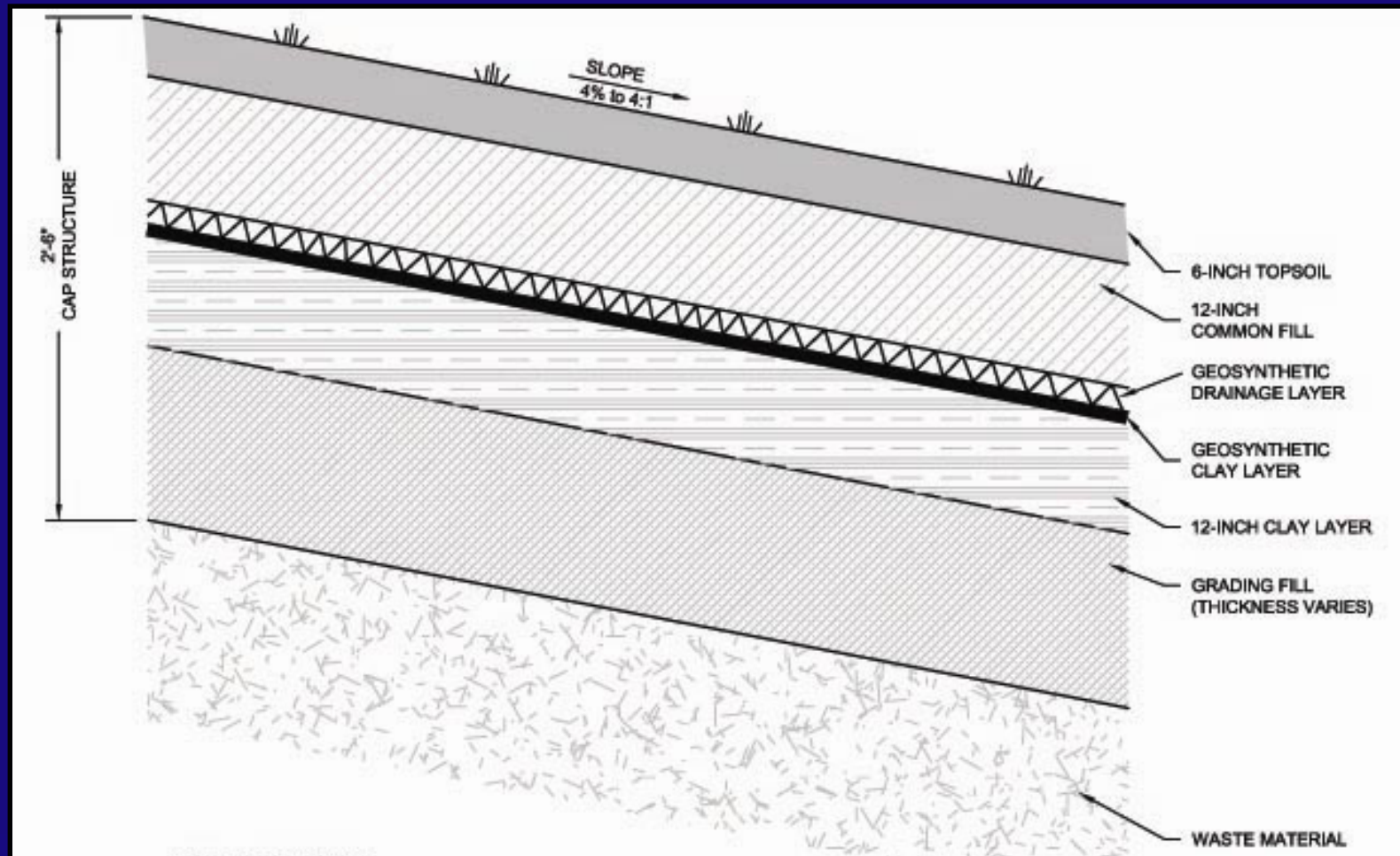
CLEANUP PLAN ELEMENTS

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SOIL COVER SYSTEM

Cover System (Conceptual)





RE-USE OF SOIL FROM CREEK CLEANUP FOR GRADING FILL

- Significant quantities of backfill material required for East Plant Area to:
 - Backfill soil excavation areas
 - Optimize sub-grade to contour ground surface below Cover System
 - Reduced maintenance
 - Reduced infiltration of rain/snowmelt
- Approximately 400,000 cubic yards of low concentration PCB soil (<50 mg/kg, average ~8.7 mg/kg) from Removal Action can be utilized for these purposes
- Benefits include:
 - Reduce impact to local community by minimizing traffic and damage to roads
 - Speed up completion of Removal Action
 - Reduce fuel consumption
 - Promote re-use/recycling and save backfill material from other sources



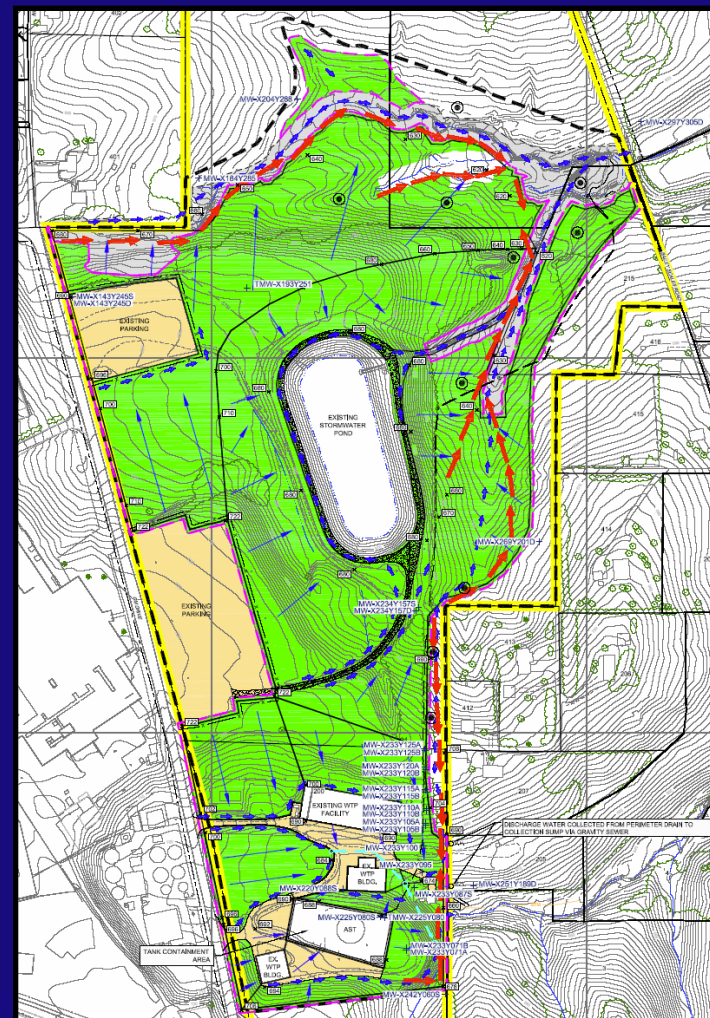
CLEANUP PLAN ELEMENTS

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PERIMETER GROUNDWATER COLLECTION SYSTEM

- Groundwater collection system will be constructed to collect and control potentially impacted groundwater at downstream side of East Plant Area
 - Excavate trench into competent bedrock (below upper fractured karst rock)
 - Line with impermeable heavy duty plastic (i.e., Flexible Membrane Liner) along the bottom and downstream side to keep water from going past the trench
 - Install perforated pipe and gravel in trench to capture and convey water to wet well
 - Pump collected water to water treatment facility



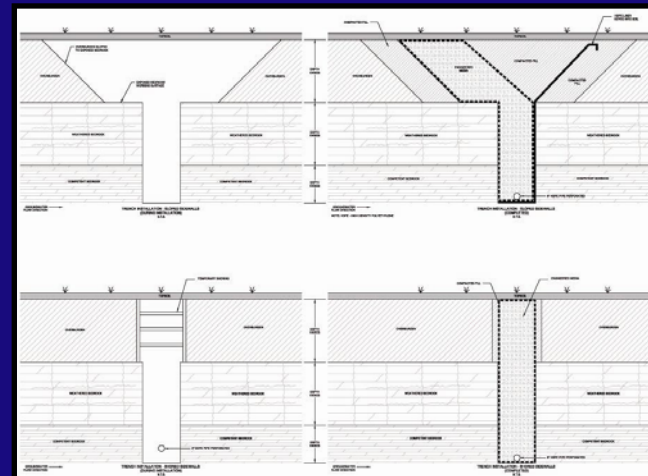
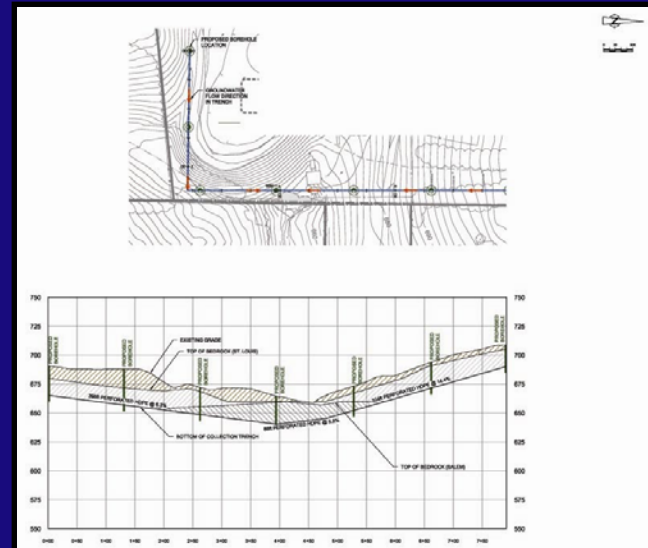
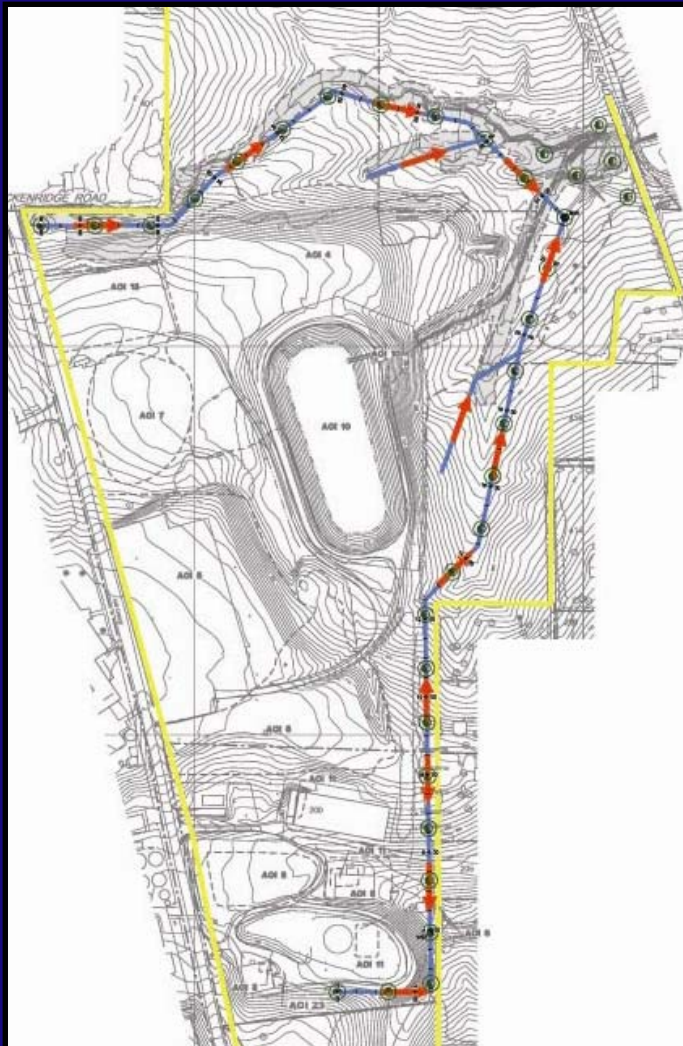


CLEANUP PLAN ELEMENTS

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PERIMETER GROUNDWATER COLLECTION SYSTEM





CLEANUP PLAN ELEMENTS

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TRENCHING MACHINE



03/17/2005



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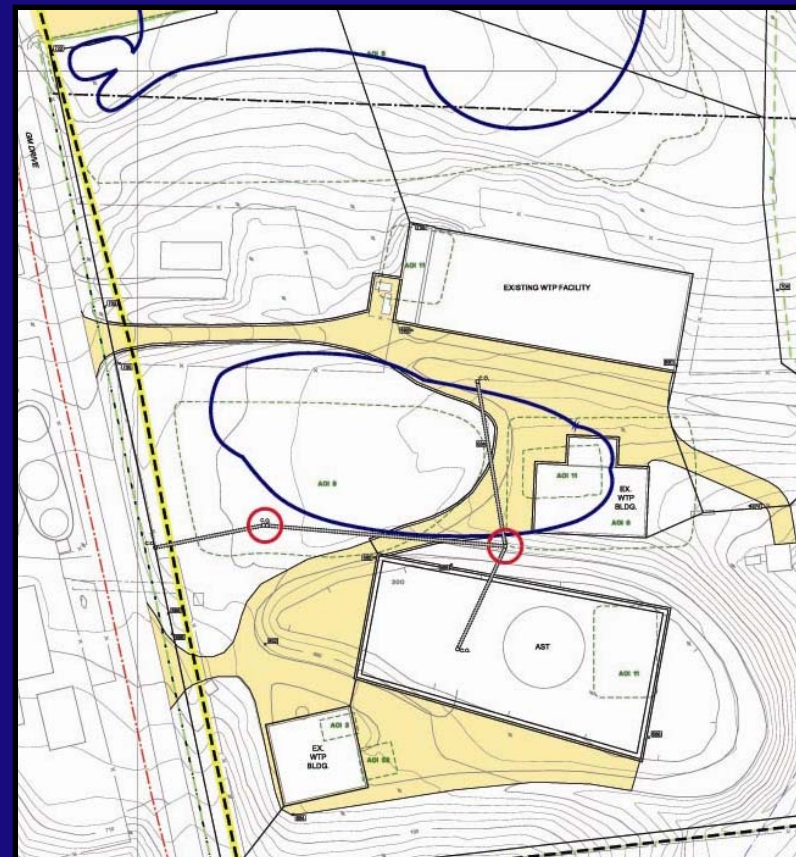
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HOE RAM EXCAVATORS



AOI 8 GROUNDWATER SOURCE REMOVAL SYSTEM

- Collect impacted groundwater and oil in area of old ponds
- Treat collected water
- Separate any oil and dispose of off-Facility



Example: Collection Trench



OPERATION, MAINTENANCE AND MONITORING

- Inspect landfill Cover System to prevent erosion
- Maintain and monitor Perimeter Groundwater Collection System
- Maintain and monitor groundwater/stormwater collection treatment system



PRE-DESIGN STUDIES

- Geophysical survey of East Plant Area to better define topography/condition of upper bedrock
- Perimeter surface PCB sampling to finalize limit of Cover System
- East Plant Area investigative coreholes to further define geology within East Plant Area
- Proposed Perimeter Groundwater Collection System alignment investigative coreholes
- Dye tracer studies in AOI 4
- Detailed topographic survey of East Plant Area



CLEANUP PLAN ELEMENTS

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Conceptual Schedule

Pre-design investigations	Spring – Summer 2005
Landfill Vault liner construction	Spring – Summer 2005
Excavation of > 50 mg/kg PCBs	Spring – Winter 2005
Backfill excavations/grading fill	Spring 2005 – Summer 2006
Landfill Vault cover system construction	Fall 2005 – Summer 2006
Cover System construction	Summer 2005 – late 2006
Perimeter Groundwater Collection Trench	TBD
AOI 8 Collection System	TBD

Removal Action

Delineation Sampling

- 3,000+ delineation samples collected over 5 miles of creek
- Creek sediments and floodplain soils sampled
- Clearing of trees in work area

Site Setup

- Mobilization, site security, site trailers
- Erosion controls
- Access roads and parking areas

Water Control

- Soil berms and swales to route clean water around work areas
- Water within work areas contained and collected
- Potentially impacted water treated prior to discharge
- Constructed temporary on-site wastewater treatment facility to treat water prior to discharge

Excavation

- Dust and erosion control measures in place prior to excavation
- Creek sediments and soil above cleanup criteria excavated
- Controls maintained until restoration complete

Soil Pile

- Excavated material managed in a contained area pending shipment for off-site disposal

Verification Sampling

- Creek and floodplain sampled to ensure cleanup criteria are met
- Additional excavation completed, if necessary, and additional verification samples collected

Restoration

- Areas backfilled to generally match pre-existing conditions
- Vegetation re-established
- Habitat features added to creek and floodplain

**Delineation
Sampling**



Site Setup



Soil Pile



Water Control



Restoration



**Verification
Sampling**



Excavation

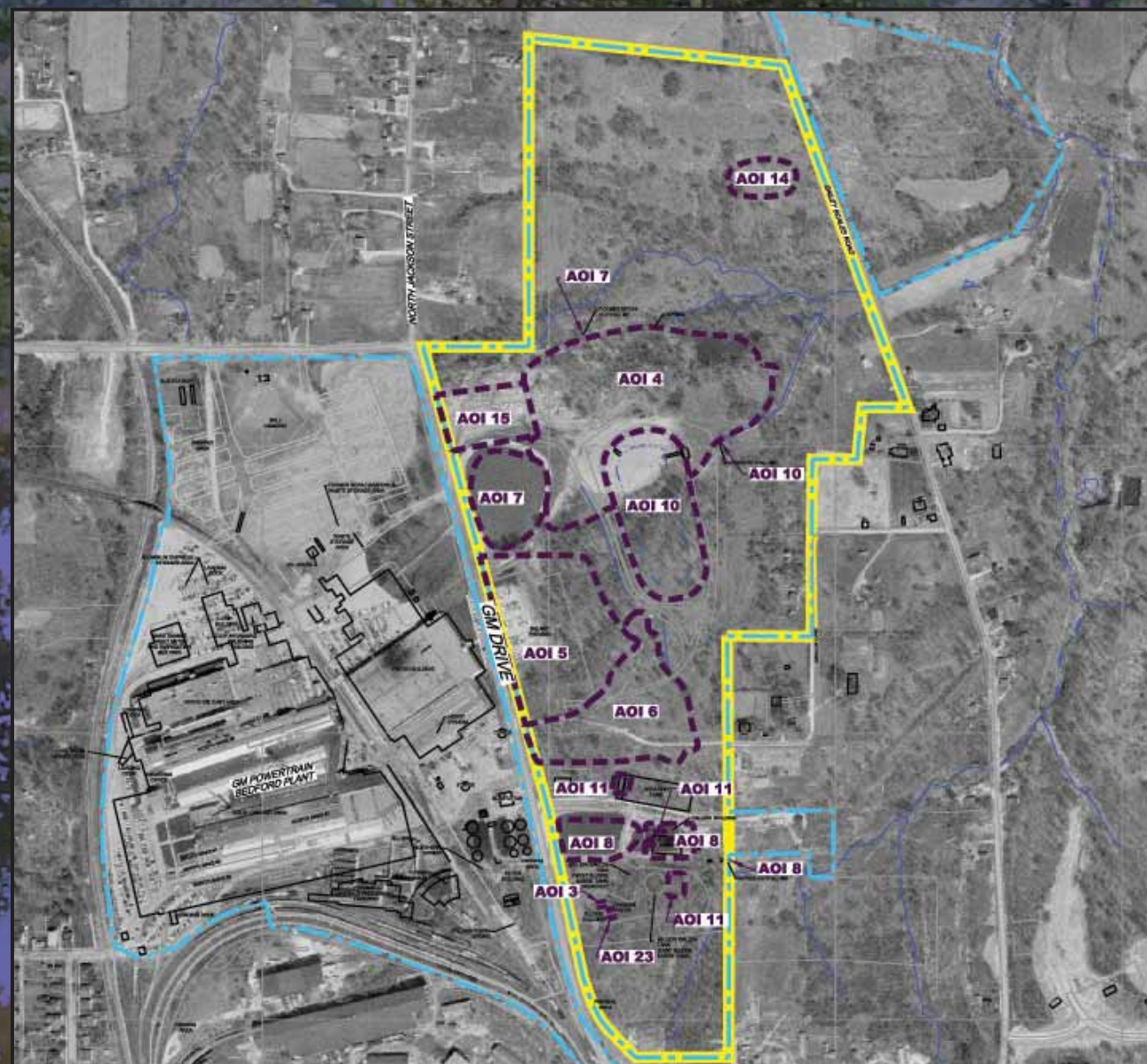




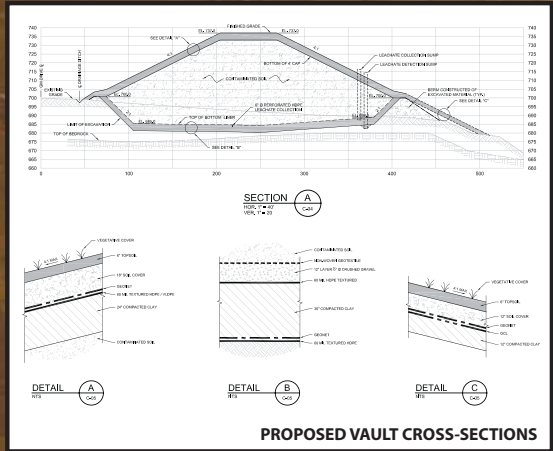
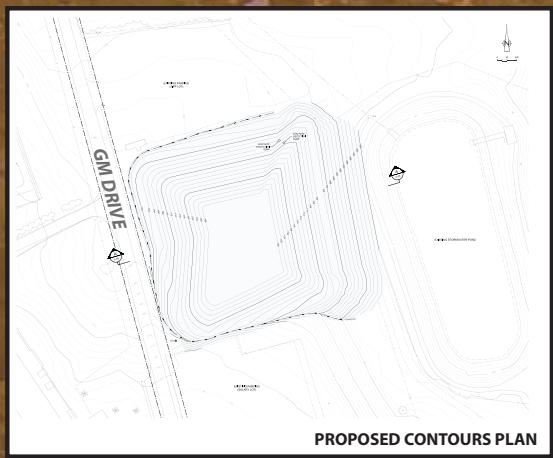
EAST PLANT AREA Historical Aerial Photograph - 1956

AREAS OF INTEREST

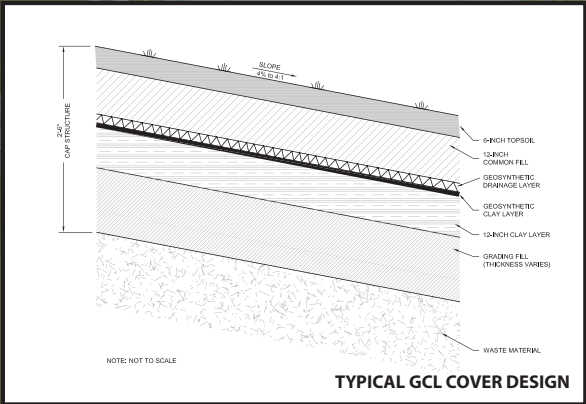
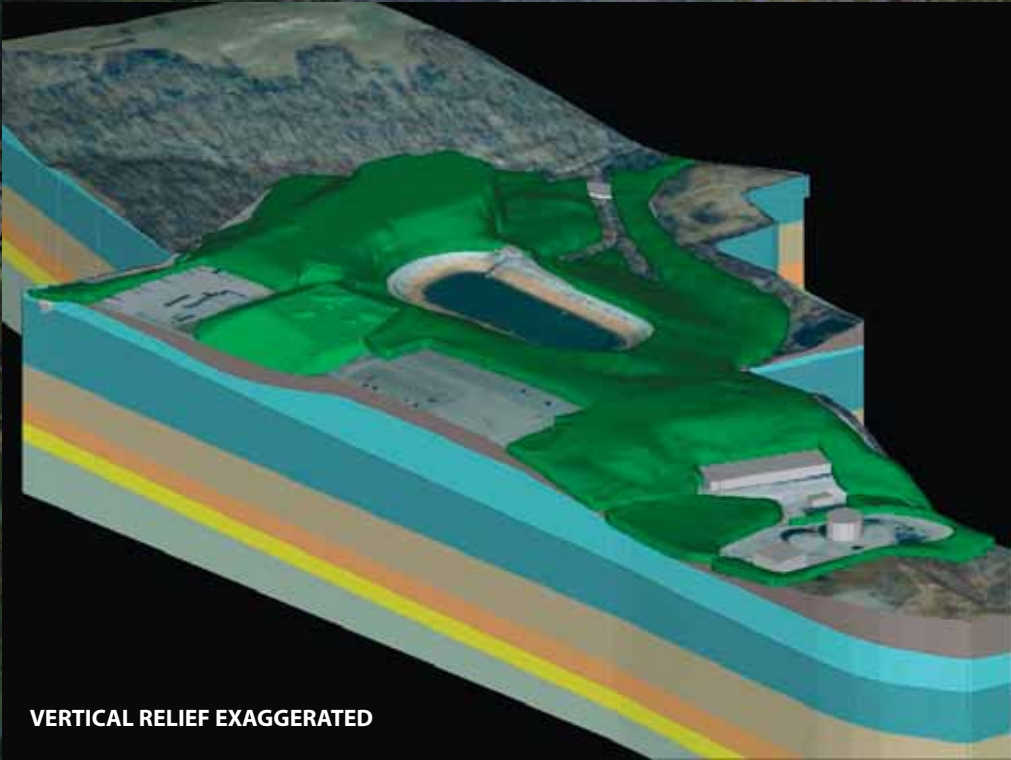
- AOI 3 PCB Storage Areas
- AOI 4 Former North Disposal Area
- AREA North of AOI 4
- AOI 5 Former East Sand Disposal Area
- AOI 6 Former Sludge Disposal and Fire Training Area
- AOI 7 Former North Lagoon and Outfall 001
- AOI 8 Former South Lagoons and Outfall 002
- AOI 10 Existing Stormwater Lagoon and Outfall 003
- AOI 11 Aboveground Storage Tanks
- AOI 14 McBride Cows Disposal Area
- AOI 15 Former Equipment Storage Area
- AOI 23 Area Affected by the 1996 Wastewater Treatment Filter Cake Release



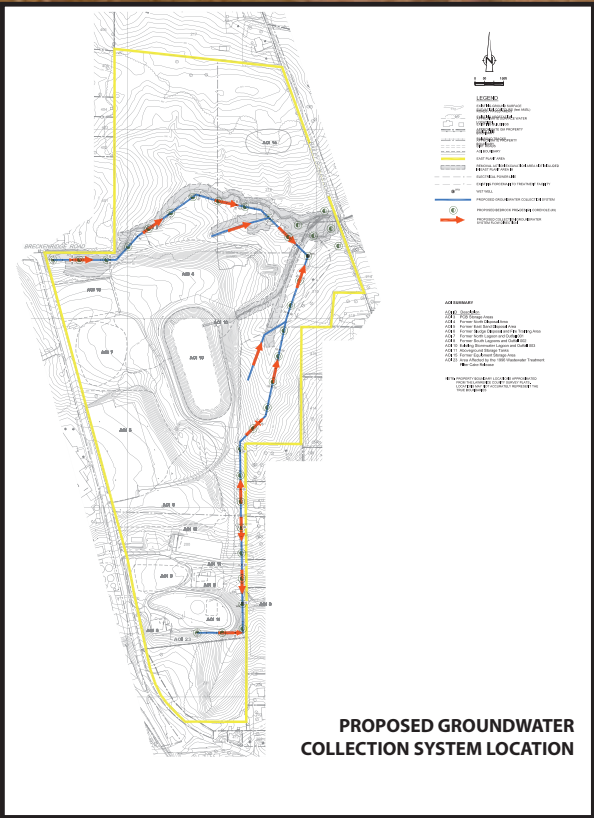
**INTERIM MEASURE COMPONENTS
EAST PLANT AREA**



LANDFILL VAULT DETAILS

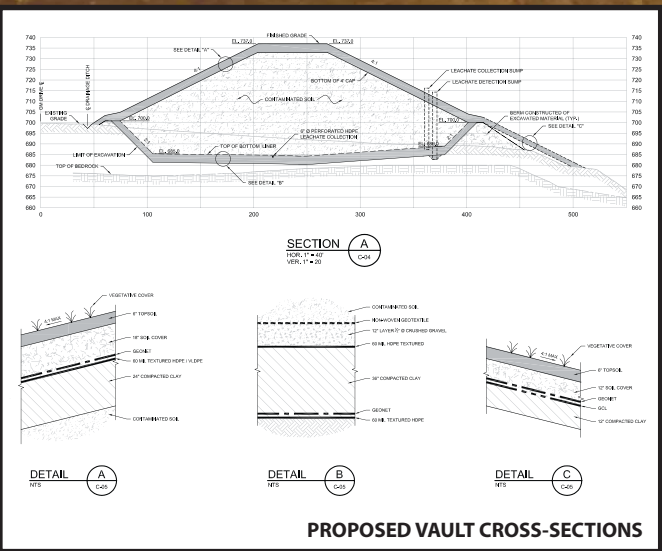
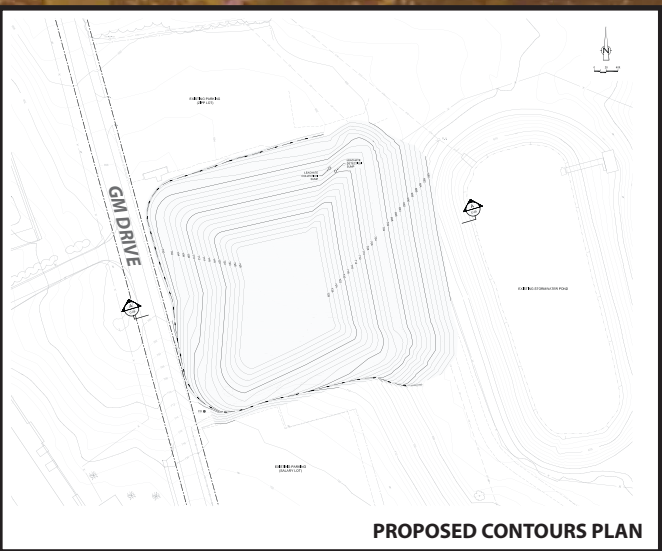


COVER SYSTEM DETAILS



GROUNDWATER COLLECTION
SYSTEM DETAILS

LANDFILL VAULT EAST PLANT AREA



LANDFILL VAULT DETAILS



Vault Excavation



Vault Excavation



High Density Polyethylene (HDPE) Liner Placement



High Density Polyethylene (HDPE) Liner Seaming



Placement of HDPE Liner as Part of Vault Cap



Placement of Drainage Layer over HDPE Liner



Placement of Clay Layer of Vault Cap



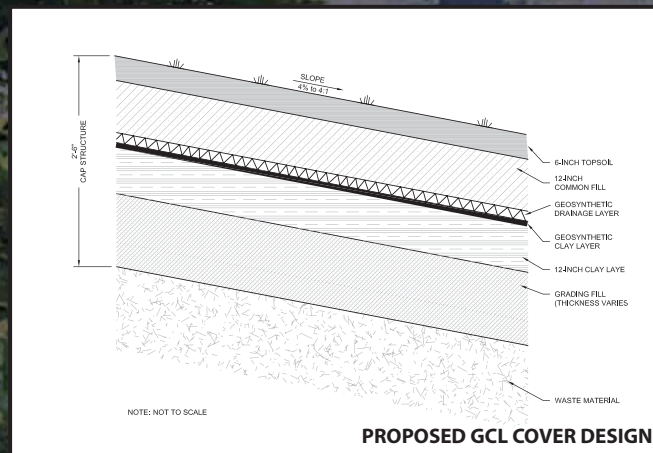
Placement of Clay Layer of Vault Cap



COVER SYSTEM EAST PLANT AREA



PROPOSED GRADING PLAN



PROPOSED GCL COVER DESIGN



GCL CROSS-SECTION

A Geosynthetic Clay Liner (GCL) consists of a layer of bentonite clay between two layers of geotextile. Water causes the bentonite clay to swell forming a continuous clay barrier layer. The geotextile fabric layers hold the bentonite clay in place and provide a separation between the bentonite clay and adjacent cover layers



GCL CLOSE UP



GCL PLACEMENT



PLACEMENT OF
DRAINAGE LAYER
OVER GCL



GCL ANCHOR
TRENCH



GCL ANCHOR
TRENCH



PLACEMENT OF
DRAINAGE LAYER
OVER GCL



FINISHED TOPSOIL
LAYER BEING SEED



PLACEMENT OF
DRAINAGE LAYER
OVER GCL



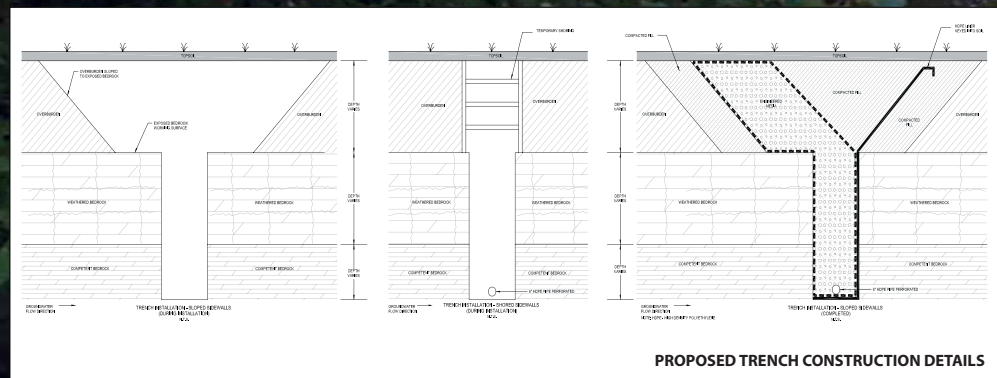
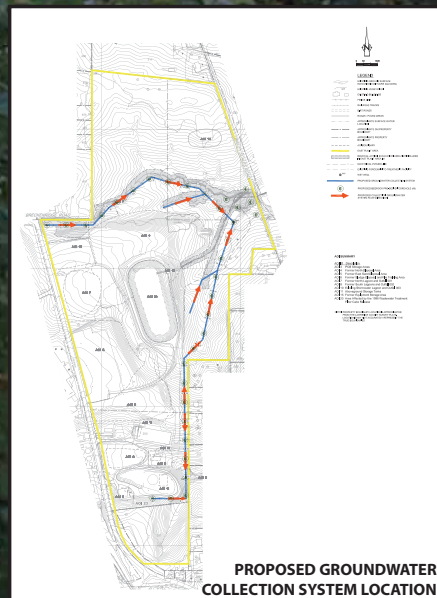
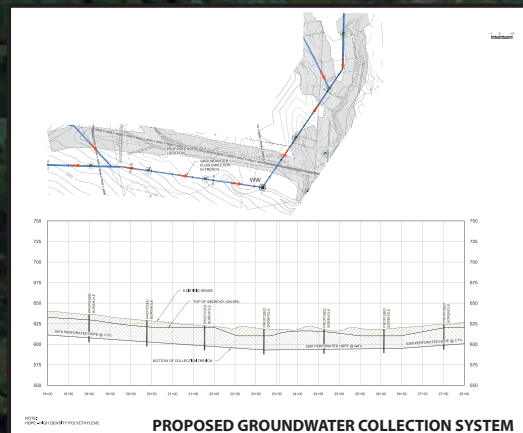
PLACEMENT OF
DRAINAGE LAYER
OVER GCL



PLACEMENT OF GRADING FILL

PERIMETER GROUNDWATER COLLECTION SYSTEM EAST PLANT AREA

Exact depth and alignment of perimeter trench to be determined by results of ongoing pre-design studies



PROPOSED TRENCH EXCAVATION METHODS

TRENCHING MACHINE



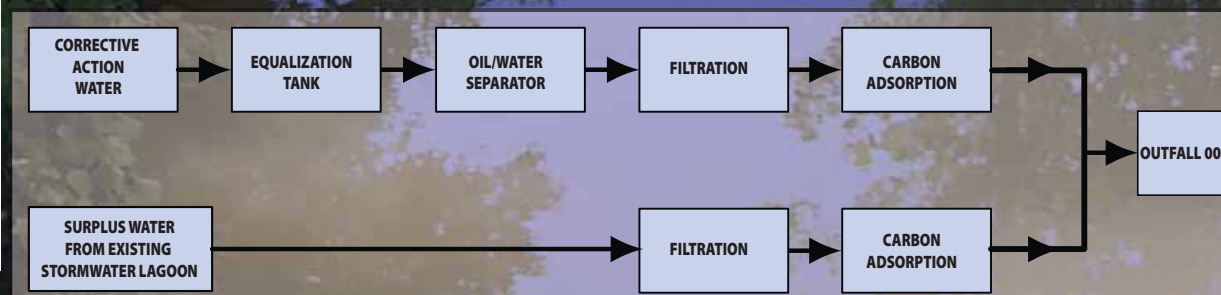
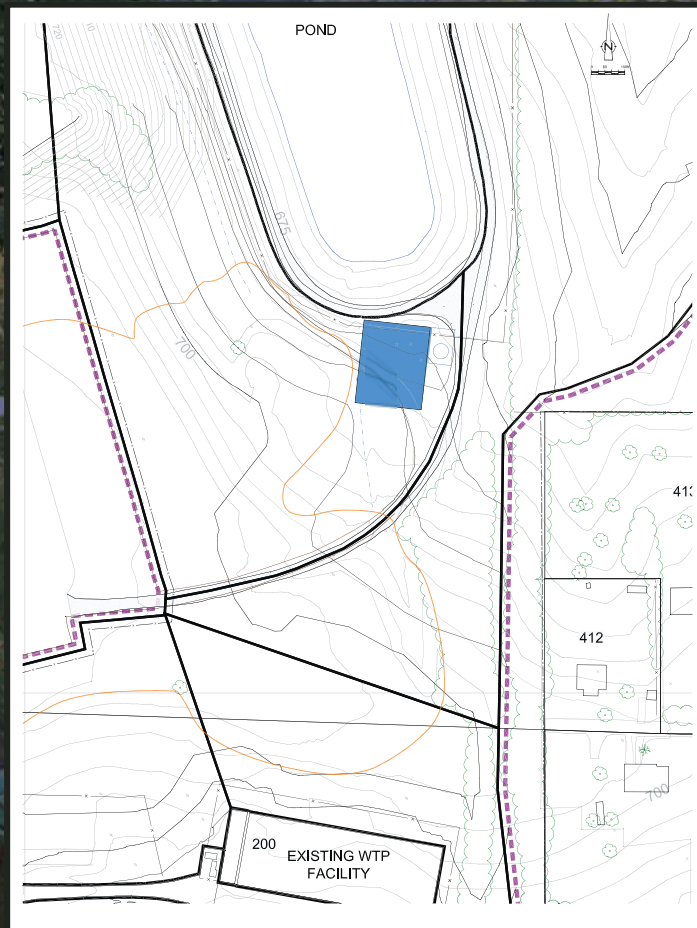
HYDRAULIC EXCAVATOR/HOE RAM



WATER TREATMENT FACILITY EAST PLANT AREA

EXPLANATION

- Designed to treat water from two sources:
- Site Source Control system and proposed groundwater collection trench.
- Treatment of the water will be completed using two processes:
 - Sand filtration to remove sediment particles suspended in the water;
 - Activated Carbon filters to remove remaining sediment particles and dissolved contaminants.
- The treatment system will normally operate between 300 gallons per minute up to 2,300 gallons per minute during storm events.
- Treated water will be tested before discharge to ensure the water quality criteria are met.



EXAMPLES OF SIMILAR WATER TREATMENT EQUIPMENT



SAND FILTER INSTALLATION



STORAGE TANK OUTSIDE OF
WATER TREATMENT FACILITY



GRANULAR ACTIVATED CARBON VESSELS
BEING DELIVERED TO A SITE



INSTALLED GRANULAR ACTIVATED CARBON VESSELS