

Tennessee Valley Authority
welcomes you to the

**ALLEN FOSSIL PLANT
COMMUNITY INFORMATION
SESSION**

Environmental Impact Statement

+

Environmental Investigation

+

Remedial Investigation

+

Interim Response Actions



TODAY'S TOPICS

Closure + Development

Environmental Impact Statement

- TVA is seeking input on the scope of its evaluation for the closure of the East Ash Pond Complex, the West Ash Pond, and the Metal Cleaning Pond
- TVA is analyzing options for disposal of ash in a beneficial re-use process and in an offsite landfill
- One project purpose and need is to make land available for future economic development projects in the greater Memphis area
- Public comment period is until November 25, 2019

Investigation + Evaluation

Environmental Investigation

- Details on how TVA is investigating and assessing the extent of impacts on soil and groundwater from management and disposal of Coal Combustion Residuals (CCR) at the Allen Fossil Plant
- Outlines the activities that will be underway at the site to better evaluate what must be done to safely manage the storage and disposal of CCR

Current Groundwater Conditions

Remedial Investigation

- TDEC is directing an ongoing groundwater remedial investigation (RI) at the Allen Fossil Plant focused on the East Ash Disposal Area
- The RI at the Allen Fossil Plant was started following the detection of elevated arsenic in groundwater near the East Ash Disposal Area
- Information on the remedial investigation and interim action for addressing the arsenic issue

Current Environmental Activities

Interim Response Actions

- Information on the Groundwater Remediation system which will control and treat arsenic in groundwater found in two areas north and south of the East Ash Disposal Area
- Details on how pond dewatering is being performed to remove standing water and ash pore water prior to removal of the CCR

OVERVIEW



Facility Overview

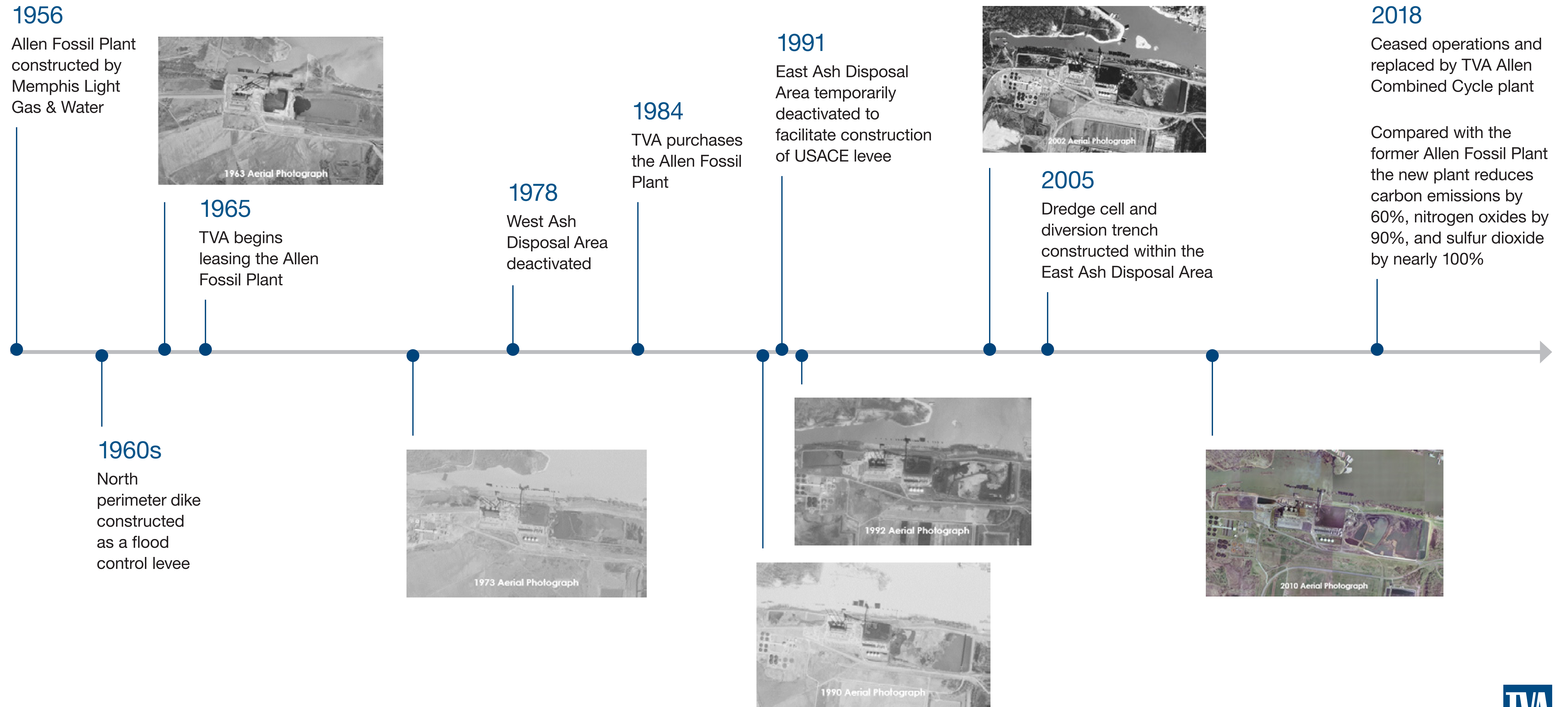
- 1956** Allen Fossil Plant constructed by Memphis Light Gas & Water
- 1965** TVA began leasing the plant and purchased it in 1984
- 741** megawatts net capacity
- 3** Coal-fired units (closed)
- 2018** Ceased operations and replaced by TVA Allen Combined Cycle plant
- 2019** Begin dewatering East Ash Disposal Area



TDEC Order CCR Units:

- West Ash Pond
- East Ash Pond

HISTORIC TIMELINE



TVA'S COMMITMENT AND STRATEGY

TVA's commitment

- TVA is committed to protecting human health and the environment and doing the right thing for the people of Memphis
- TVA is committed to the remediation of arsenic impacts at the Allen Fossil Plant
- TVA is committed to economic development in Memphis
- TVA has suspended use of the groundwater production wells at the Allen Combined Cycle Natural Gas Plant and has contracted with MLGW to obtain cooling water for the plant

TVA's strategy

Short-term Allen Fossil Plant CCR strategy:

- Implement groundwater Interim Response Action
- Dewater East Ash Disposal Area
- Perform supplemental Investigations

Long-term ALF CCR strategy:

- Conduct National Environmental Policy Act evaluation to determine closure alternative
- Perform groundwater remediation
- Restore site for industrial use



Conceptual Future Redevelopment

COAL COMBUSTION RESIDUALS COMPLIANCE ORDER

What is the TDEC Order and why was it put in place?

On August 6, 2015, the Tennessee Department of Environment and Conservation (TDEC) issued Commissioner's Order No. OGC15-0177 to the Tennessee Valley Authority (TVA) for Coal Combustion Residuals (CCR) Compliance pursuant to the provisions of Tennessee's solid waste management and disposal laws.

This order establishes a transparent, comprehensive process to investigate, assess, and remedy unacceptable risks resulting from the management and disposal of CCR at TVA coal-fired power plants within the state.

What is the EIP?

What it is and why we do it

TDEC has requested certain information about Allen's CCR management.

What TVA has already done

TVA has ongoing programs and monitoring that can help answer TDEC's questions.

Proposed EIP Activities

The Environmental Investigation Plan (EIP) lays out the proposed investigation TVA is conducting to provide additional information that TDEC has requested.

What are coal combustion residuals?

Coal combustion residuals, commonly known as coal ash, are created when power plants burn coal to produce electricity.

These residuals include fly ash and bottom ash/slag and are collected separately from different areas of the facility.

Fly ash originates from the flue gas electrostatic precipitators and bottom ash from the boilers.

Did you know...

In 2018, Allen's three coal-fired units were retired and replaced with natural gas generators that will help ensure low-cost and reliable electricity for the greater Memphis area.



Slag



Fly Ash

ENVIRONMENTAL IMPACT STATEMENT ASH IMPOUNDMENT CLOSURE

Why it is being done

- Support TVA's commitment to eliminate wet CCR storage at its coal plants by closing CCR surface impoundments
- Meet federal and state requirements including the U.S. Environmental Protection Agency's CCR Rule and National Environmental Policy Act
- Make land available for future economic development projects in the greater Memphis area

Projects studied

- Closure of the East Ash Pond Complex
- Re-evaluation of the West Ash Pond for Closure-by-Removal
- Closure of the Metal Cleaning Pond
- Possible Use of CCR in a Beneficial Re-use Process
- Evaluation of Existing Off-Site Permitted Landfills that will Accept CCR Materials from ALF
- Evaluation of Existing Offsite Backfill Sources

How it might get done

Alternatives Considered in the EIS

Alternative A

- No Action

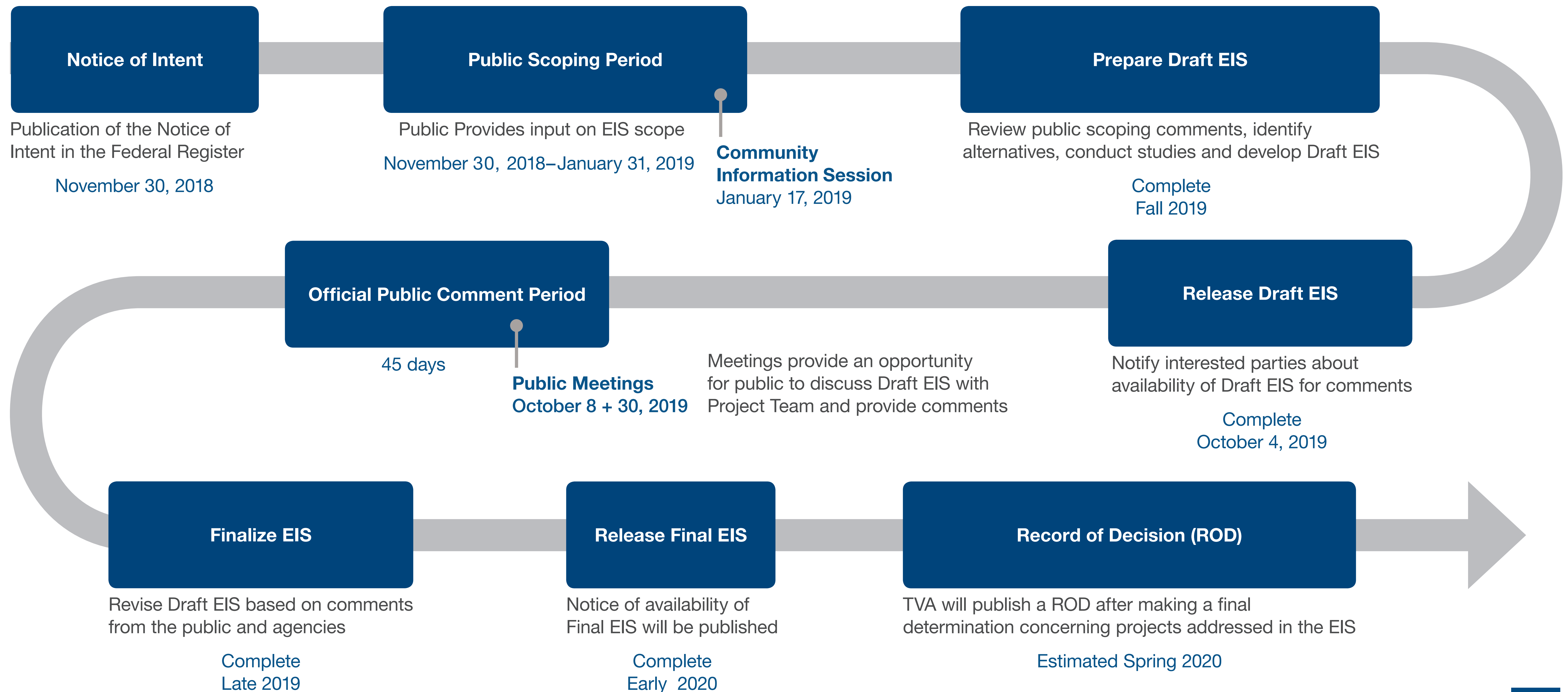
Alternative B (Preferred)

- Closure-by-Removal of the East Ash Pond Complex, West Ash Pond and Metal Cleaning Pond
- Disposal of CCR to an Offsite Landfill Location

Alternative C

- Closure-by-Removal of the East Ash Pond Complex, West Ash Pond and Metal Cleaning Pond
- Disposal of CCR in a Beneficial Re-Use Process and Offsite Landfill Location

ENVIRONMENTAL IMPACT STATEMENT—PROCESS/SCHEDULE



ENVIRONMENTAL IMPACT STATEMENT— COMMENTS

How to Provide Comments on the EIS

Written comments can be left here or mailed to the address on the Comment Form.

You can also provide comments by:

Email: wdwhite0@tva.gov

Web: www.tva.gov/nepa

Mail: Attn: W. Douglas White
NEPA Specialist
Environmental Compliance & Operations

Tennessee Valley Authority
400 W. Summit Hill Drive
Knoxville, TN 37902

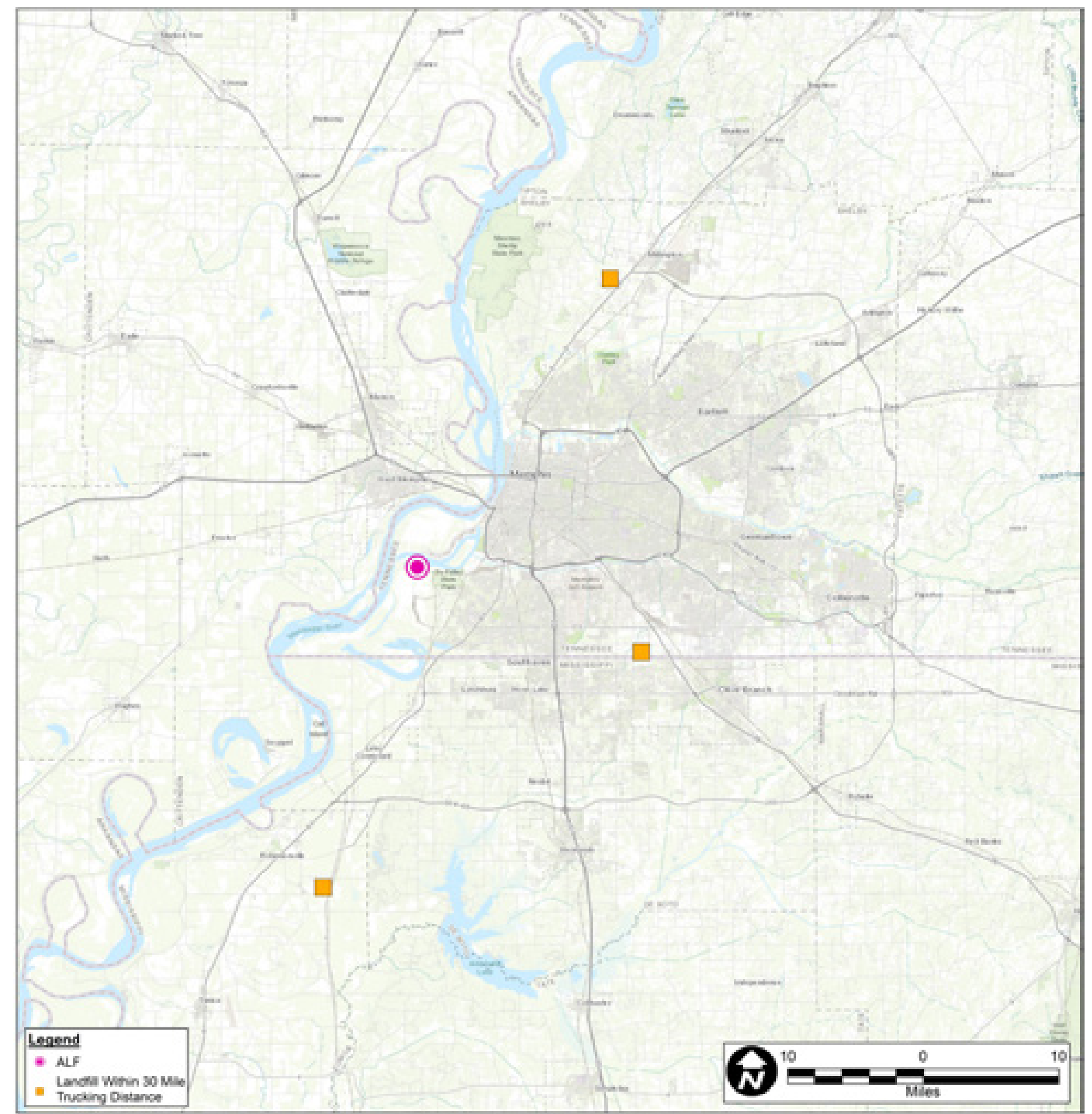
All comments received by November 25, 2019 will become part of the EIS record



ENVIRONMENTAL IMPACT STATEMENT— POTENTIAL LANDFILL SITES

Landfills were screened based on the following criteria:

- Located within 600 miles for Rail
- or -
- Located within 30 miles for Truck
- Existing permitted landfill
- Large commercial operator
- Ability to accept CCR
- Ability to dedicate a portion of the landfill to this project
- Serviced by an existing rail spur or port (if located more than 30 miles from Allen Fossil Plant)
- Sufficient capacity
- No geographic restrictions on waste origin that exclude Allen Fossil Plant



Potential Landfill Locations

Facility	Commercial Carrier	City, State	Distance to Allen Fossil Plant	Transport Method
South Shelby Landfill	Republic Services	Memphis, Tennessee	14 miles	Truck
Tunica Landfill	Waste Management	Robinsonville, Mississippi	20 miles	Truck
North Shelby Landfill	Republic Services	Millington, Tennessee	21 miles	Truck
Arrowhead Landfill	Green Group Holdings	Uniontown, Alabama	240 miles	Rail
Taylor County Disposal Landfill	Waste Industries	Mauk, Georgia	380 miles	Rail
Lee County Landfill	Republic Services	Bishopville, South Carolina	565 miles	Rail

ENVIRONMENTAL IMPACT STATEMENT— TRUCK VS RAIL TRANSPORT OF CCR

Criteria	Truck Transport	Rail Transport
Safety	Minor impact due to Increased risk of accidents and road damage due to increased vehicles on roadways	Minor impact due to Increased risk of accidents and derailments Risk would be greater than transport by truck due to increased distance traveled
Distance	30-mile radius	600-mile radius
Closure Period	8-years Average 240 truck trips per day during closure period	15 years 100 rail cars (1 train) every 9 days during closure period
Environmental Impacts	Minor, localized air, greenhouse gas and noise emissions	Minor, localized air and noise emissions (yet less than transport by truck) Marginally greater emissions of greenhouse gases due to longer travel distance
Transportation Impact	Moderate and localized impact to existing transportation system Minimized with the development and implementation of a Traffic Management Plan	Minor impact to existing regional railway system
Infrastructure Improvements	Sufficient roads already exist	Require upgrades to local rail system to support railcar storage and staging

ENVIRONMENTAL IMPACT STATEMENT— POTENTIAL BACKFILL (BORROW) SOURCES

Potential Backfill Source Locations and Haul Routes

TVA will use clean soil to backfill the East Pond after the CCR has been removed.

TVA will implement the following measures to minimize impacts associated with the transport of backfill material (i.e., clean soil or borrow material) to Allen Fossil Plant and the offsite transport of CCR from the plant:

Measures to minimize fugitive dust and exhaust emissions

- Require all contractors to keep construction equipment properly maintained
- Require the use of Best Management Practices such as covered loads and watering unpaved haul roads

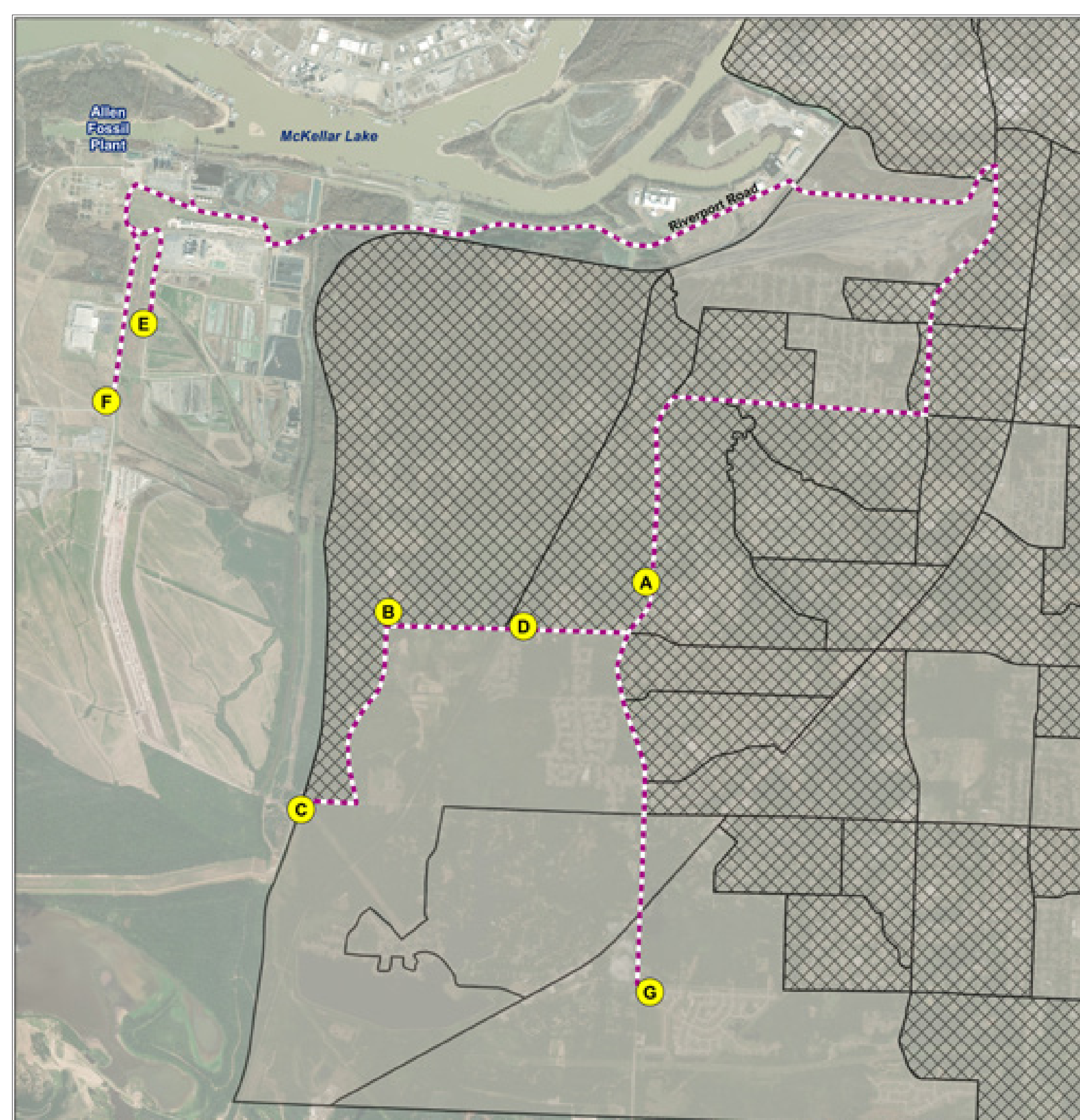
Measure to minimize noise impacts

- Minimize the use of backfill source locations that require access from lower volume roadways

Measures to minimize traffic impacts

- Develop a traffic management plan that considers
 - Alternate access locations to/from Allen Fossil Plant (i.e., Plant Road vs. Riverport Road to the west)
 - Staging and management of trucks entering/exiting
 - Select backfill source locations that do not require use of local, low volume roads
 - Potential alternate routing during train operations on Rivergate Road, and installation of temporary signals at key intersections

Potential Haul Routes



Legend

- Potential Backfill Source Locations
- ⋯ Haul Route
- ▨ Low Income Population
- Minority Population

TDEC ORDER ENVIRONMENTAL INVESTIGATION PLAN

This event is to provide information about the Environmental Investigation Plan (EIP) for the decommissioned Allen Fossil Plant.

The following acronyms appear frequently on the boards:

- Environmental Investigation Plan (EIP)
- Environmental Assessment Report (EAR)
- Coal Combustion Residuals (CCR)
- Tennessee Department of Environment and Conservation (TDEC)
- Tennessee Valley Authority (TVA)
- Sampling and Analysis Plan (SAP)
- Environmental Protection Agency (EPA)
- Remedial Investigation (RI)

The information boards are color-coded according to the technical focus area they cover in the EIP. For instance, if they contain general information regarding the EIP process, the information board will be color-coded in blue.

General Information

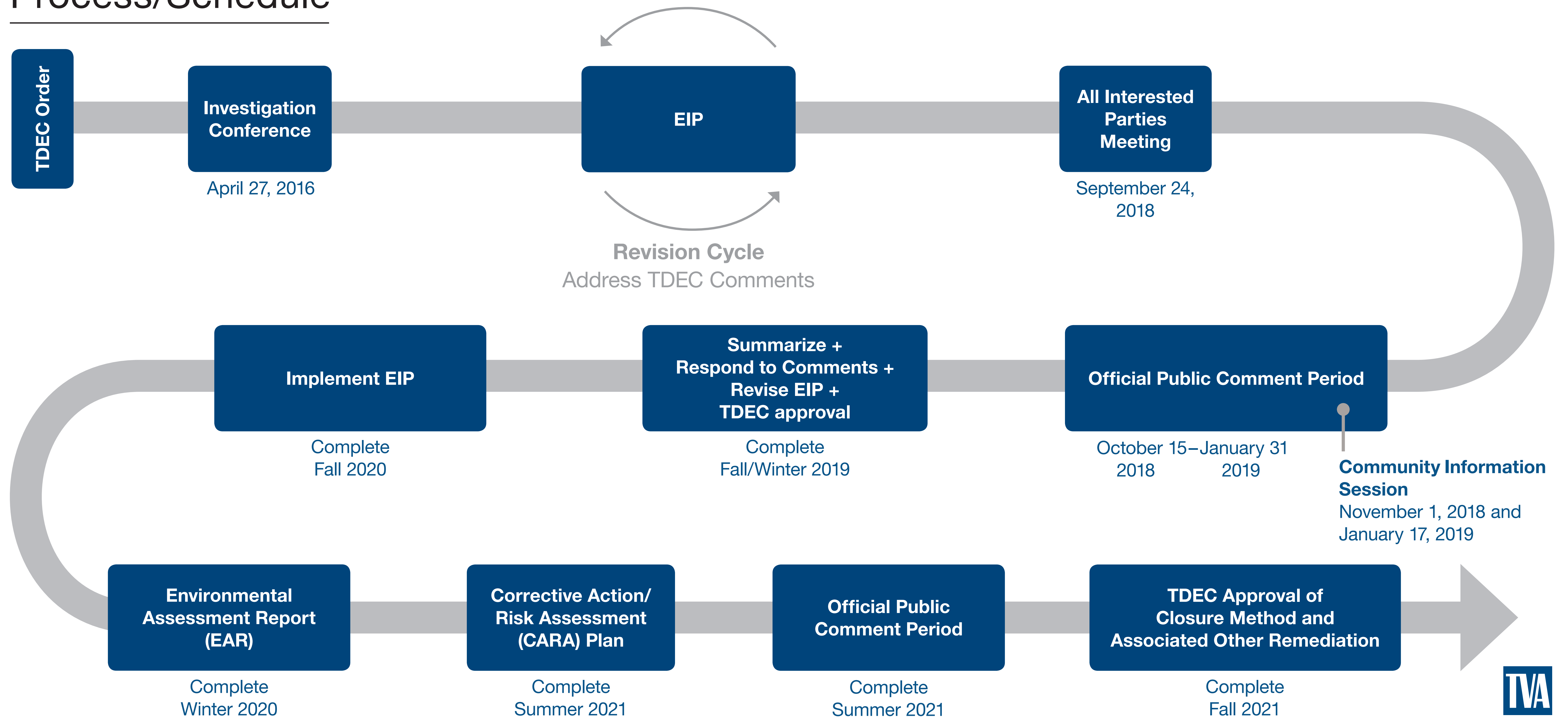
Below are the main areas of technical focus in the EIP, divided by study area. More information on the activities within each area has been provided at the stations around the room.

The evaluation of existing site data serves as the foundation to support the additional studies planned for each focus area.

Geotechnical	Civil/Mapping Activities	Hydrogeologic	Environmental
<ul style="list-style-type: none">• Exploratory Drilling	<ul style="list-style-type: none">• Coal Combustion Residuals Material Quantity	<ul style="list-style-type: none">• Hydrogeologic Investigation	<ul style="list-style-type: none">• CCR Material Characteristics
<ul style="list-style-type: none">• Slope Stability		<ul style="list-style-type: none">• Groundwater Investigation	<ul style="list-style-type: none">• Seepage Investigation
		<ul style="list-style-type: none">• Background Soil Investigation	

ENVIRONMENTAL INVESTIGATION PLAN

Process/Schedule



EXPLORATORY DRILLING

(1 of 3)

What it is and why we do it

Exploratory drilling helps us better understand what is in and under each CCR unit.

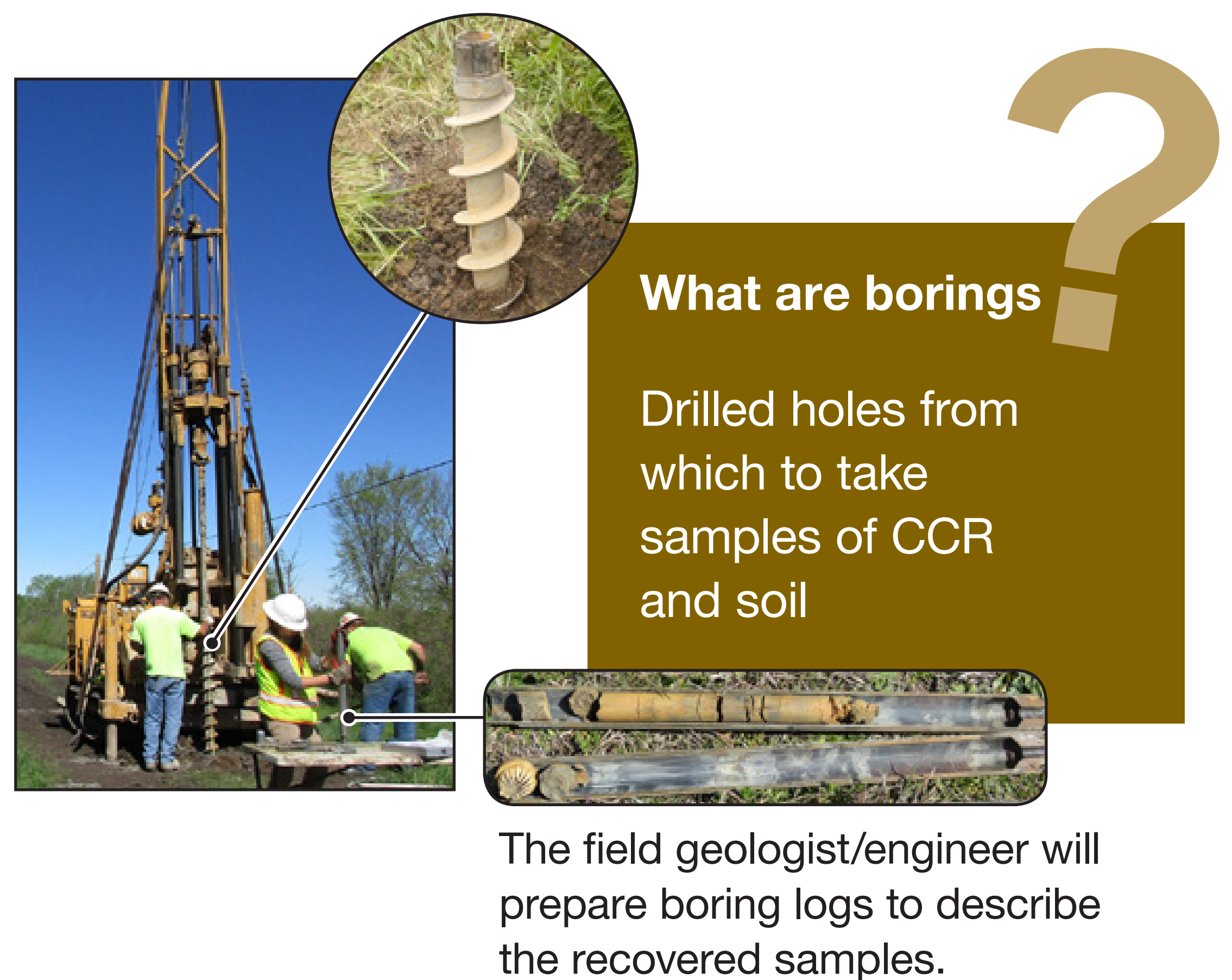
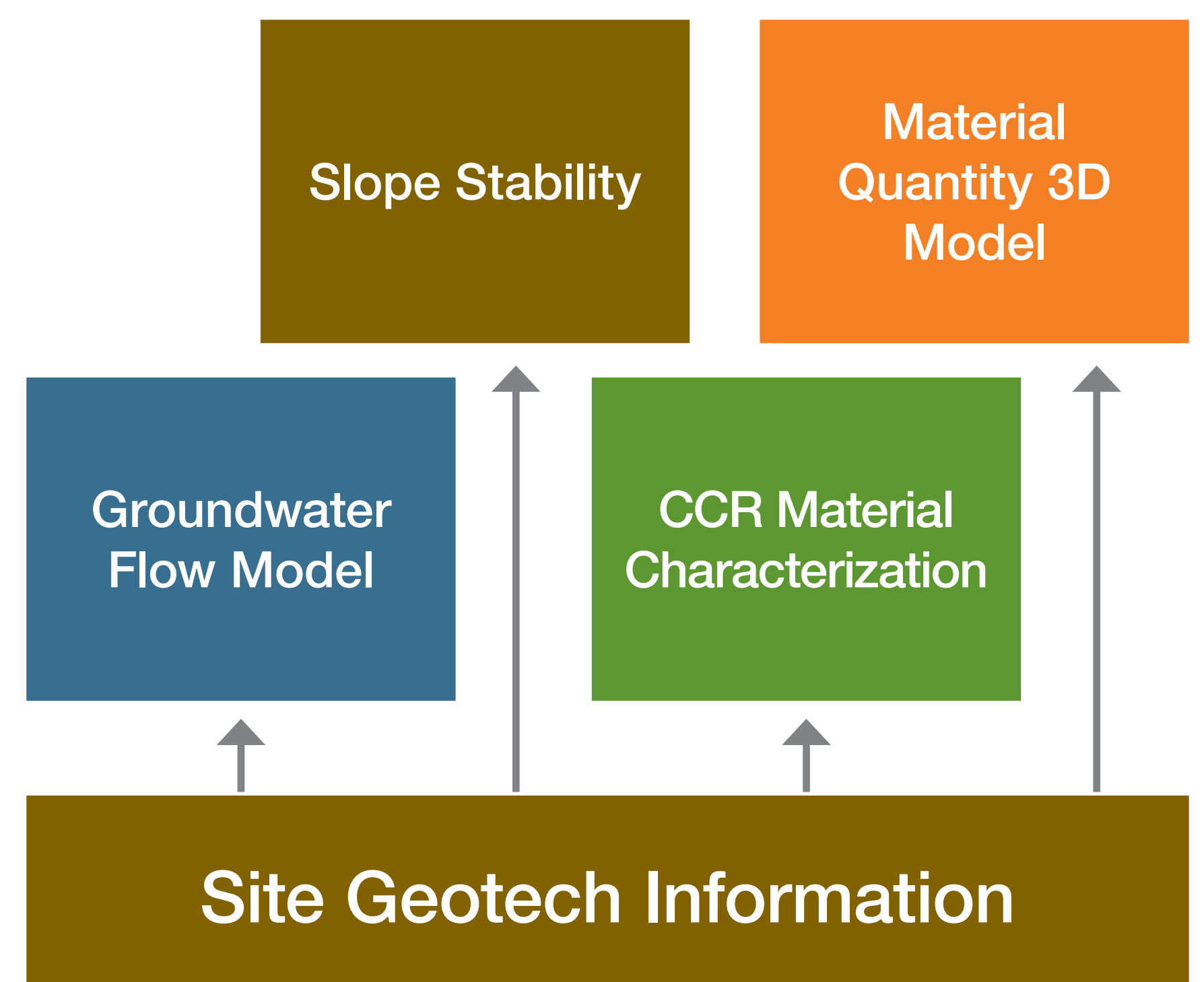
It tells us:

- What is there: material types (CCR, soil) and properties (strength, permeability, etc.)
- Where it is (material locations)
- Where the water level(s) are (material saturation)

What TVA has already done

The EIP includes an evaluation of existing geotechnical data. This includes a review of design and construction records, inspection records, field data (including 150+ borings and 70+ water level instruments), laboratory data, and engineering analyses.

Each piece of information has been evaluated to confirm that it was collected and analyzed properly in the past. This existing data are very valuable to understand the CCR unit conditions.



EIP Activities

- Additional borings within the interior of the CCR units
- Install temporary wells in CCR material
- Targeted borings in specific areas along unit borders
- Laboratory testing
- Share data with hydrogeological, environmental, and civil/mapping discipline teams

EXPLORATORY DRILLING

(2 of 3)

Where will the drilling be done?

East Ash Disposal Area

19 Borings

3 Borings with Temporary Wells and No Rock Coring

16 Borings with No Rock Coring



Legend

- Proposed Boring
- ★ Proposed Temporary Well (Screened Interval)

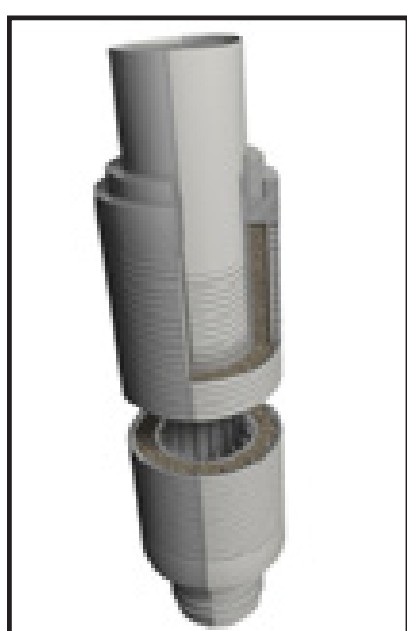
Foundation Soil [at the base of Perimeter Dikes and CCR]

- Clay
 - Boring ID
 - Lab Hydraulic Conductivity (cm/s) [if completed]
- Silt
 - Boring ID
 - Lab Hydraulic Conductivity (cm/s) [if completed]
- Silty Sand to Sand
 - Boring ID
 - Lab Hydraulic Conductivity (cm/s) [if completed]

- Current Impoundment (Approximate)
- Former Disposal Area (Approximate)

What are Water Level Instruments/Piezometers?

Sensors that measure water pressures in CCR and soil



Slotted well screen

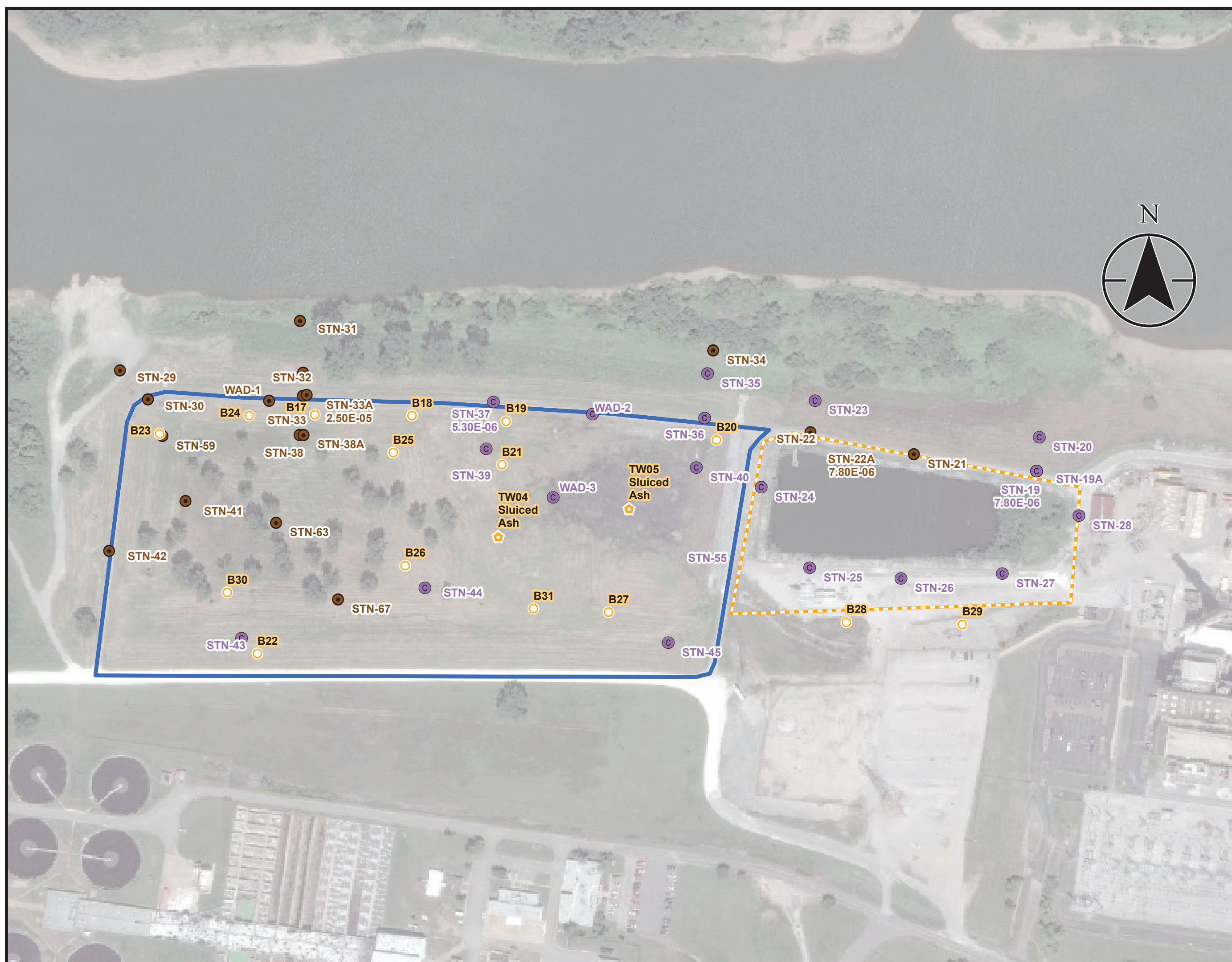


Surface protection for top of well

Slotted PVC well pipe that allows water to enter at a selected depth in the boring

EXPLORATORY DRILLING

(3 of 3)



West Ash Disposal Area

17 Borings

2 Borings with Temporary Wells and No Rock Coring

15 Borings with No Rock Coring

Legend

○ Proposed Boring

☆ Proposed Temporary Well (Screened Interval)

Foundation Soil [at the base of Perimeter Dikes and CCR]

Clay or Silt

● Boring ID
Lab Hydraulic Conductivity (cm/s) [if completed]

Silty Sand to Sand

● Boring ID
Lab Hydraulic Conductivity (cm/s) [if completed]

▭ Current Impoundment (Approximate)

▭ Former Disposal Area (Approximate)



SLOPE STABILITY

What it is and why we do it

These analyses tell us if the slopes of the CCR units are stable. Multiple locations around each CCR unit are checked for stability.

Normal (long-term) conditions and earthquake conditions are evaluated.

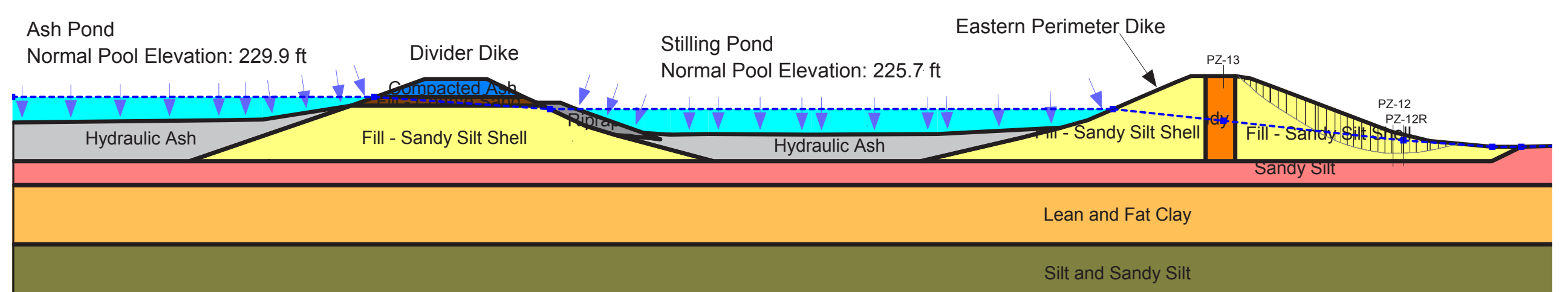
What TVA has already done

Slope stability has been analyzed many times over the years, for various conditions and at multiple units.

The existing analyses were reviewed as part of the evaluation of existing geotechnical data.

Each analysis was reviewed for adequate documentation, appropriate methods, and representative conditions.

Example of existing slope stability analysis



Inputs: Surface and subsurface geometry/zones, engineering properties, water levels/pressures, external loads

Outputs: Factor of safety against sliding

Existing and proposed analyses satisfy EIP requirements

CCR Unit	Normal	Earthquake
East Ash Disposal Area	E	E/P
West Ash Disposal Area	E	P

E = Existing analysis **P** = Proposed analysis

EIP Activities

- Compare existing models to new data from the Exploratory Drilling Sampling and Analysis Plan
 - If models are representative, no changes
 - If not, update models and reanalyze
- New analyses (for some units) for normal and earthquake conditions
- Compare slope stability results to acceptance criteria

SLOPE STABILITY

(2 of 3)

What it is and why we do it

Slope stability is influenced by water levels and pressures (among other factors).

Monitoring water levels also supports the hydrogeologic investigation and the CCR material quantity estimate (saturated vs. unsaturated material).

Water level instrumentation

- New instruments are added
 - due to Exploratory Drilling Sampling and Analysis Plan
 - due to Hydrogeological Investigation Sampling and Analysis Plan (monitoring wells)

What TVA has already done

TVA has multiple types of water level instruments on site, as well as a number of monitoring wells, to track water levels in many areas. These instruments have been installed over many years, for various purposes. About 70 water level instruments are currently installed.

Existing instrumentation East Ash Disposal Area



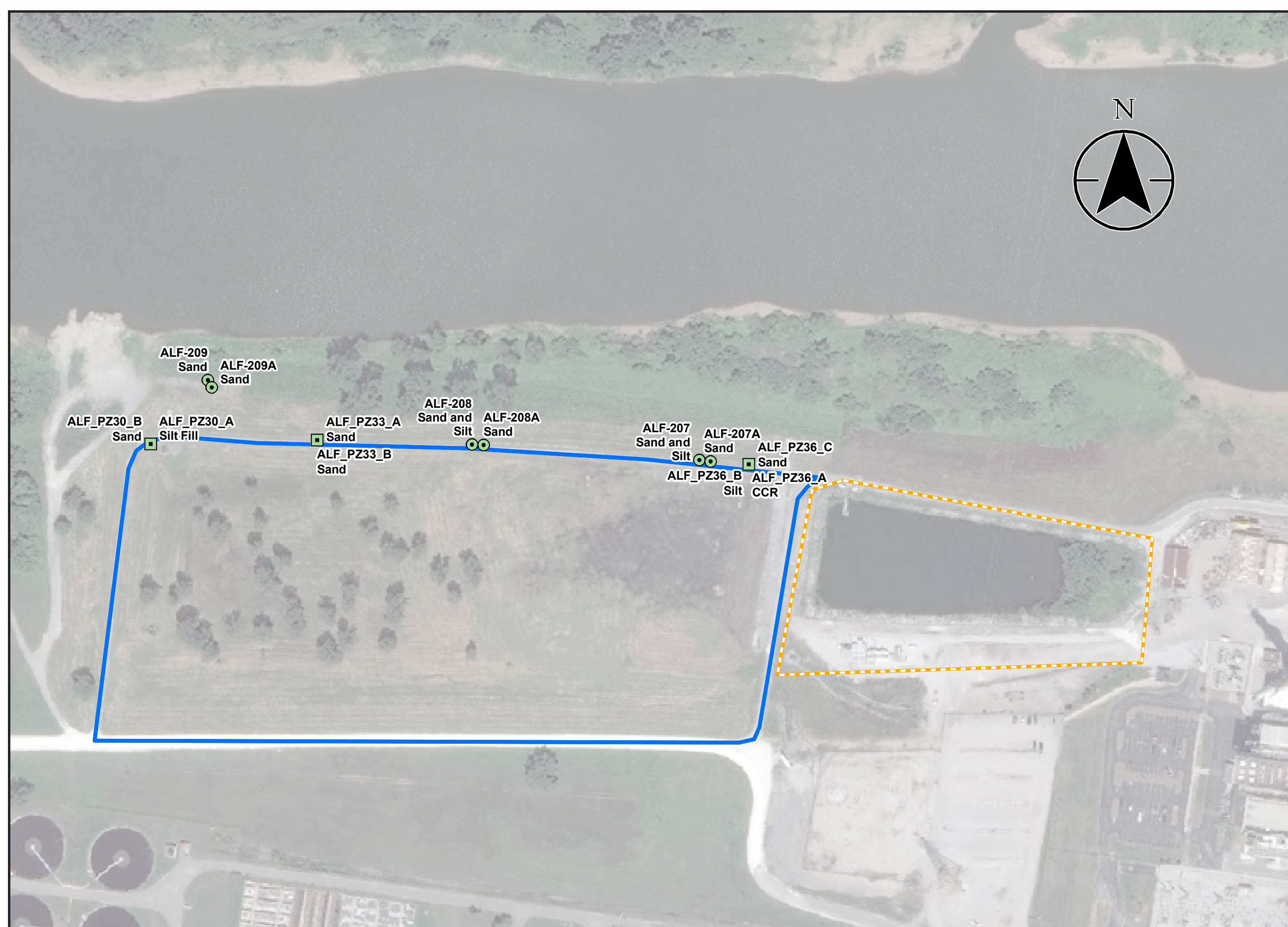
Legend

- Existing Piezometer Open Standpipe (Screened Interval)
- Existing Piezometer Vibrating Wire (Tip Interval)
- Current Impoundment (Approximate)
- Former Disposal Area (Approximate)

SLOPE STABILITY

(3 of 3)

Existing instrumentation West Ash Disposal Area



Legend

- Existing Piezometer Open Standpipe (Screened Interval)
- Existing Piezometer Vibrating Wire (Tip Interval)
- Current Impoundment (Approximate)
- Former Disposal Area (Approximate); Dashed

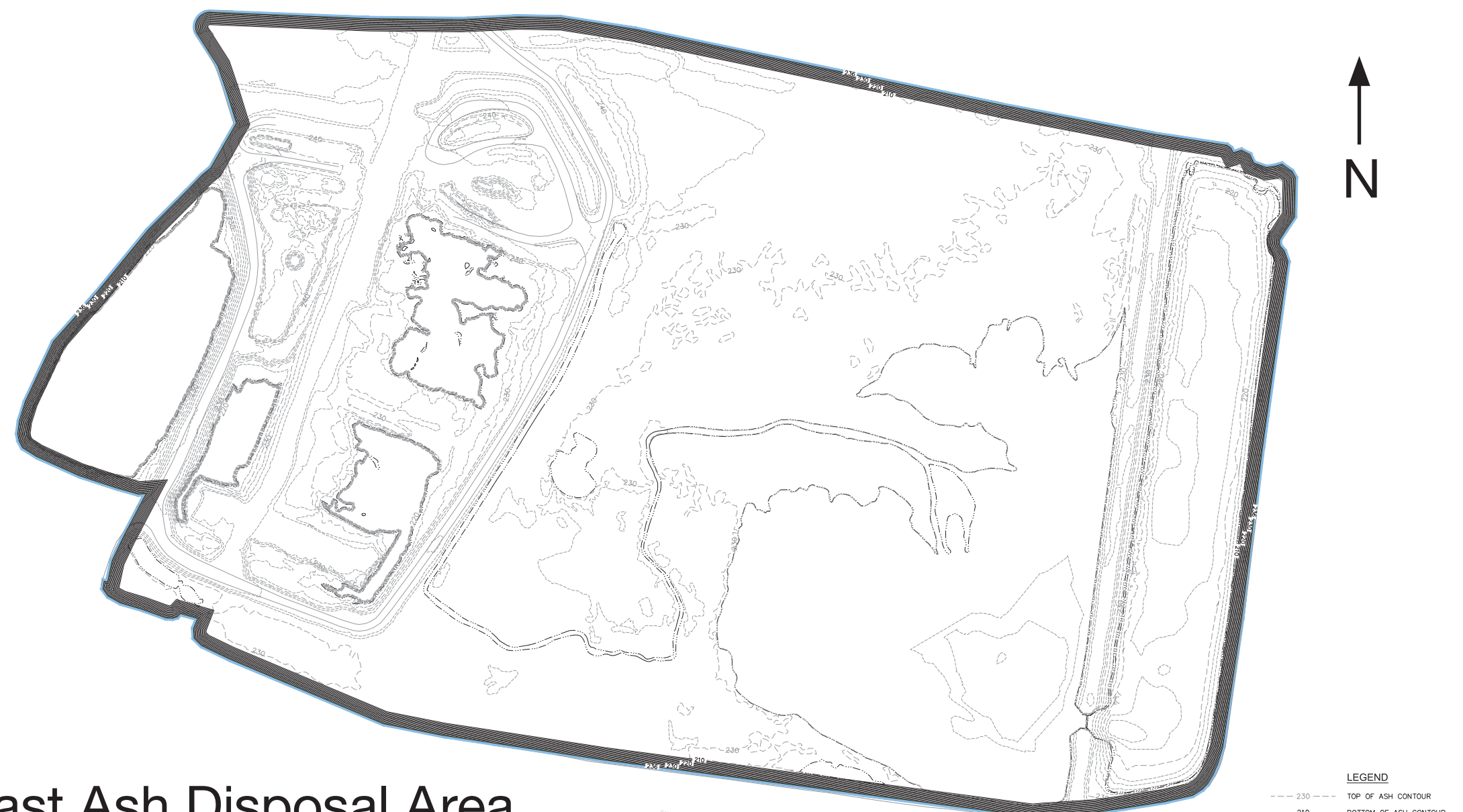
COAL COMBUSTION RESIDUALS MATERIAL QUANTITY

What it is and why we do it

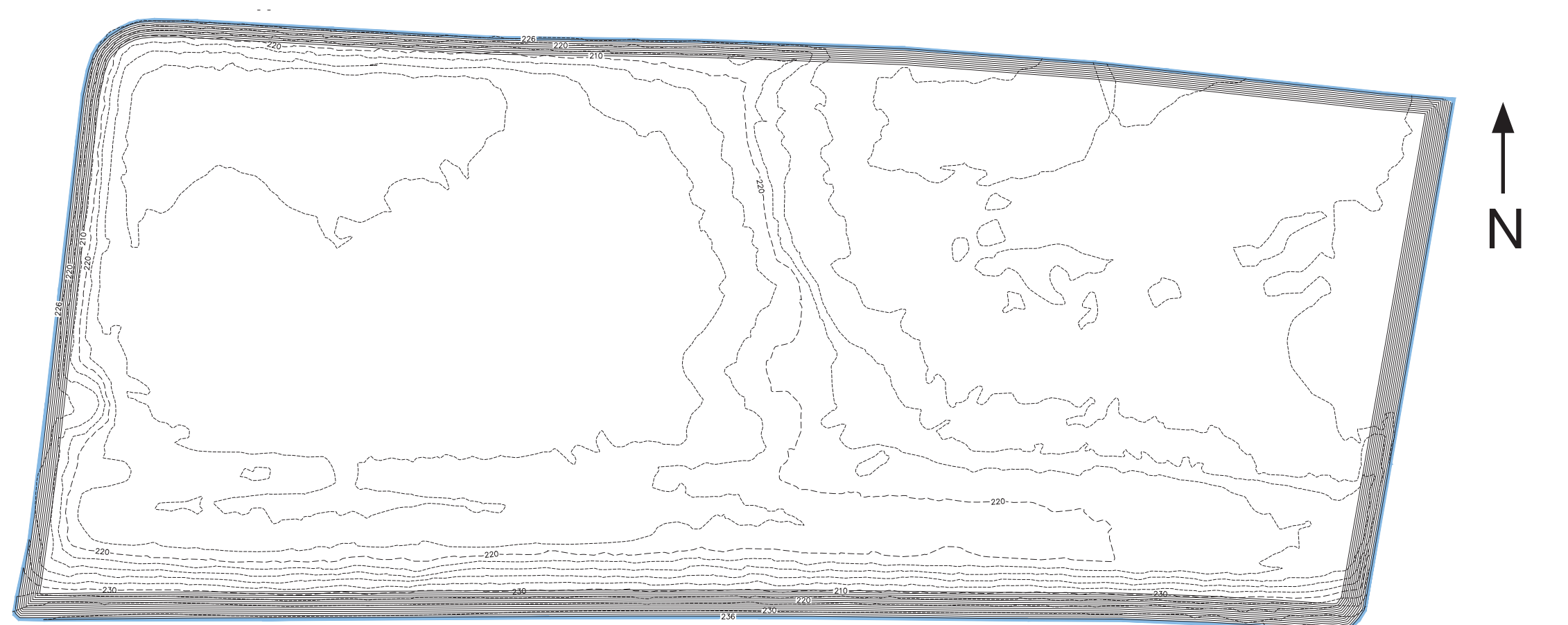
Recent surveys of the site tracked the location and quantity of coal combustion residuals (CCR) to aid overall site management.

What TVA has already done

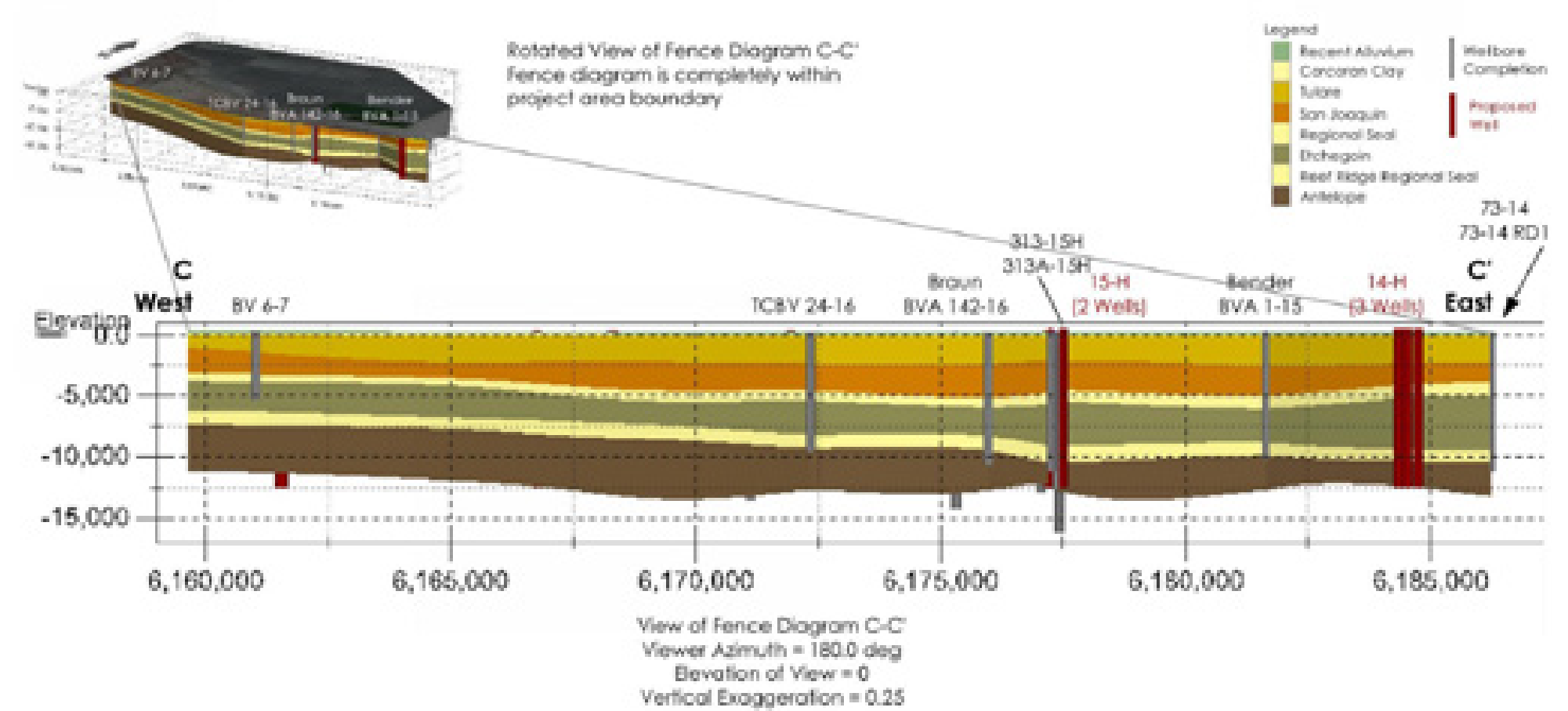
- As built drawings and records
- Aerial surveys performed for specific projects
- Historical boring logs beginning in 1958
- In 2015 TVA completed 26 soil test borings, 14 cone penetration test soundings, and 5 test pits for the East and West Ash Disposal Areas



East Ash Disposal Area topographic map



West Ash Disposal Area topographic map



Example of a 3-dimensional model developed and used to calculate volumes

EIP Activities

- Review existing surveys, drawing, and borings
- Develop 3-dimensional models of CCR units
- Update 3-dimensional models with new boring data and water levels
- Confirm CCR volumes

HYDROGEOLOGIC INVESTIGATION

What it is and why we do it

Hydrogeologic investigations help us better understand how groundwater moves in a particular area, as well as its interaction with the surrounding soils and rocks.

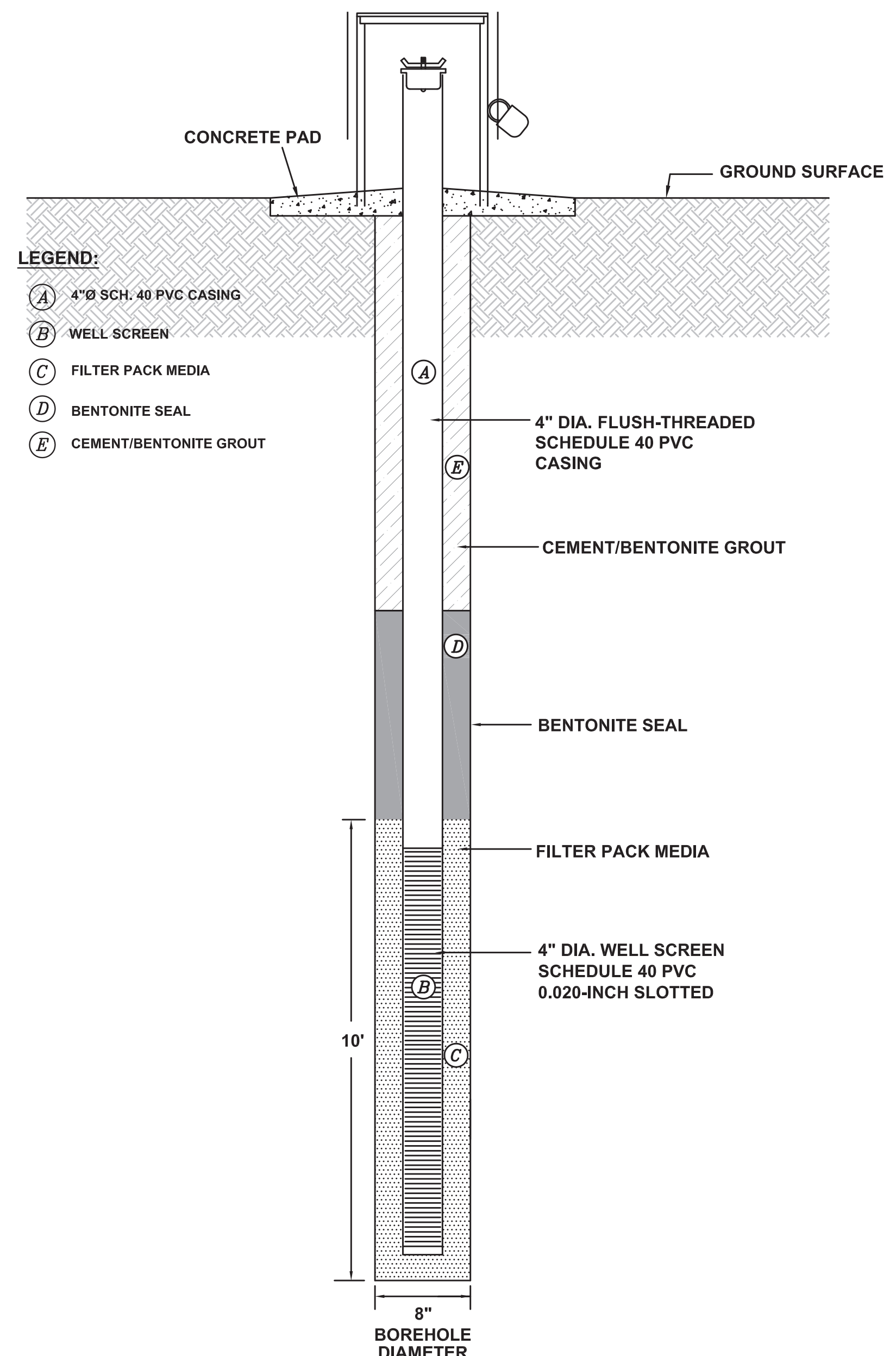
These investigations consist of installing groundwater monitoring wells to collect information about groundwater.

Background and downgradient wells are used to study water quality changes.

What TVA has already done

- Existing network of 66 groundwater monitoring wells
- Wells are screened at shallow, intermediate and deep intervals
- In 2019, installed 8 new groundwater monitoring wells near West Ash Disposal Area and 1 new background monitoring well

Groundwater monitoring well



What is a groundwater monitoring well?

A well specially designed and installed to obtain representative groundwater quality samples and hydrogeologic information.

GROUNDWATER INVESTIGATION

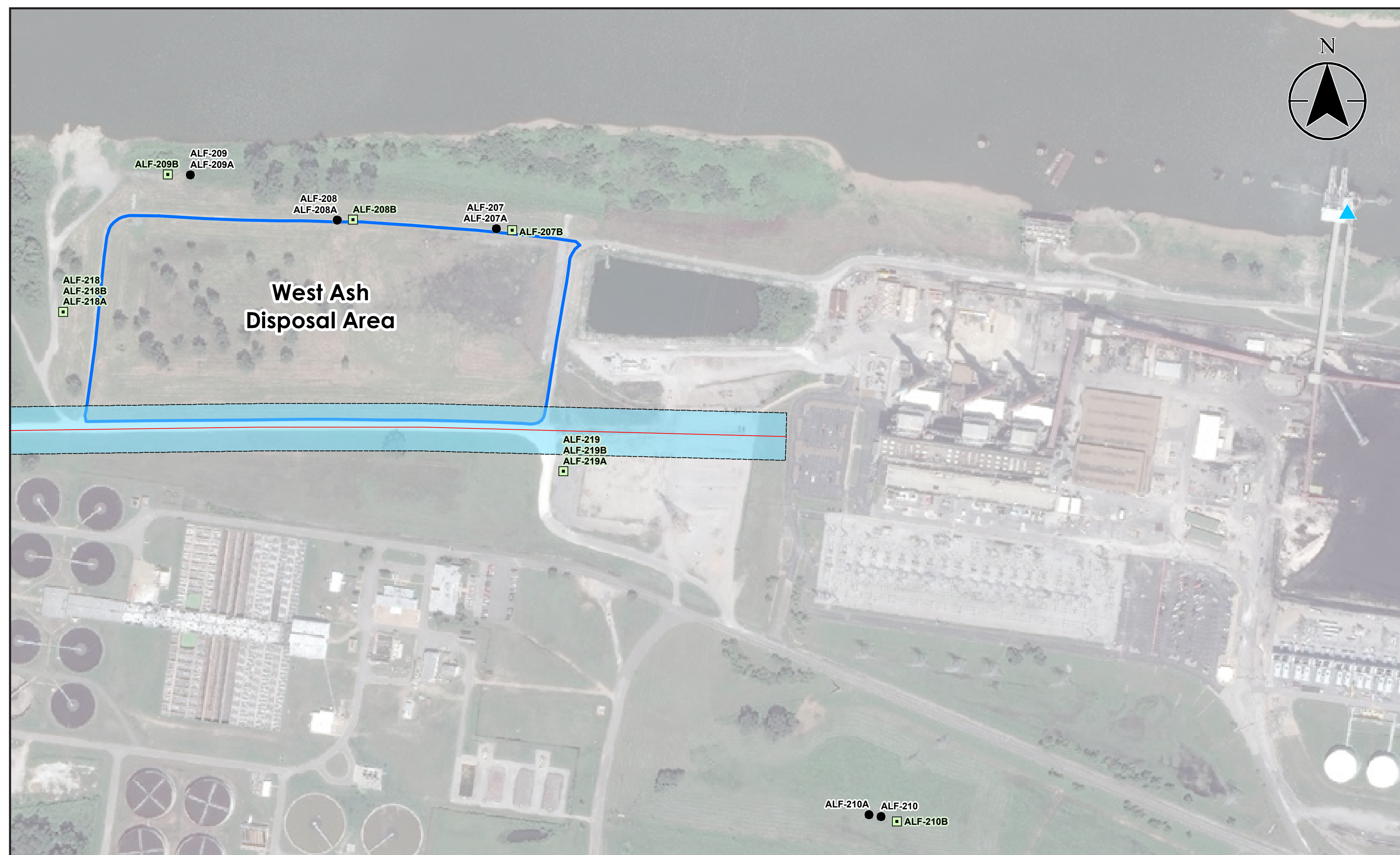
What it is and why we do it

Groundwater samples are collected frequently to test for a number of quality measures. By testing groundwater regularly, TVA can track compliance with regulatory permits and requirements.

What TVA has already done

- Groundwater monitoring has been performed routinely since 1988
- Samples are analyzed for CCR related constituents

Groundwater well locations West Ash Disposal Area



Legend

- | | |
|--|--------------------------------|
| ● Existing Groundwater Monitoring Well | — Approximate Levee Centerline |
| ■ Groundwater Monitoring Well – 2019 | ■ Approximate Extent of Levee |
| ▲ Gauging Station | □ West Ash Disposal Area |

EIP Activities

- Bimonthly groundwater sampling for 1 year (6 events)
- Collect groundwater samples from 16 groundwater monitoring wells

BACKGROUND SOIL INVESTIGATION

What it is and why we do it

The constituents found in CCR are also found in nature. This investigation would detect CCR constituent levels in background soils.

These levels can be compared to other soils to determine if they are higher than natural levels and used to determine if CCR constituents are naturally occurring in native soils.

What TVA has already done

- Background soil samples were collected from 4 locations during the Remedial Investigation in 2017
- Background soil samples were collected from 10 locations for analysis of CCR constituents in 2019

Proposed soil sampling locations



Legend

- | | | | |
|---|---|---|------------------------------------|
| ● | Background Soil Sampling Location - Offsite | ● | Background Monitoring Well |
| ● | Background Soil Sampling Location - TVA Property | + | TVA Property Boundary |
| + | 2017 Remedial Investigation Background Soil Sampling Location | □ | Current Impoundment (Approximate) |
| □ | Existing Background Groundwater Monitoring Well | □ | Former Disposal Area (Approximate) |
| □ | Existing Downgradient Monitoring Well | | |

SEEPAGE INVESTIGATION

What it is and why we do it

Dikes on the property are checked frequently to identify active seeps.

The soils and water at active seep areas are tested for CCR constituent levels.

What TVA has already done

- TVA has conducted annual dike inspections at ALF since 1970

Historic seep locations



Legend

- Historical Seeps (Approximate Location)
- Inactive Seep (Approximate Location)
- Current Impoundment (Approximate)
- Former Disposal Area (Approximate)

EIP Activities

- Conduct seepage investigation to identify active seeps
- Collect soil and water samples at identified seeps
- Analyze samples for CCR constituents
- Comparative analysis against background soils
- Report the analytical results in the Environmental Assessment Report (EAR)

COAL COMBUSTION RESIDUALS MATERIAL CHARACTERISTICS

(1 of 2)

What it is and why we do it

The different CCR materials on site are tested for levels and types of chemical constituents. This helps us understand whether they leach from (or leave) the ash and enter the water in the CCR units.

Proposed temporary wells East Ash Disposal Area

What TVA has already done

- 1995 — Slag fines analyzed for leachability and trace metals
- 2002 — Slag fines and fly ash analyzed for leachability and total metals; slag analyzed for leachability
- 2013 — Slag, slag fines and fly ash analyzed for leachability and total metals
- 2017 — Ash and pore water samples collected from 21 locations within the East Ash Disposal Area



Legend

- ★ Proposed Temporary Well (Screened Interval)
- Current Impoundment (Approximate)
- Former Disposal Area (Approximate)

EIP Activities

- Collect CCR material samples from borings in units
- Collect pore water samples from temporary wells in units
- Analyze samples for CCR constituents
- Comparative analysis against existing data
- Report the analytical results in the Environmental Assessment Report (EAR)




COAL COMBUSTION RESIDUALS MATERIAL CHARACTERISTICS

(2 of 2)

Proposed temporary wells West Ash Disposal Area



Legend

-  Proposed Temporary Well (Screened Interval)
-  Current Impoundment (Approximate)
-  Former Disposal Area (Approximate)

TVA'S ADVANCED TECHNOLOGY FOR IMPOUNDMENT MONITORING CENTER



Automated Instrumentation

TVA's Advanced Technology for Impoundment Monitoring (ATIM) Center

\$2 million to develop the ATIM center



helps to **identify** and **respond** to any coal ash issues **before** they become an **emergency**



More than **11,000 real-time sensors** to monitor ash impoundments send data (24/7/365) to a centralized computer monitoring system



Only facility of its kind in the utility industry in the U.S.

LED wall displays Geographic Information System (GIS) maps, weather, earthquakes, sensor data



ATIM Center

Operations has **real-time data** or can **watch** what's happening at TVA impoundments via **live video**

System sends **alerts** on any irregularities

REMEDIAL INVESTIGATION

What is Remedial Investigation?

A Remedial Investigation (RI) is a scientific study intended to:

- 1** Gather the data necessary to evaluate the nature and extent of environmental impacts at a property
- 2** Establish cleanup goals
- 3** Identify preliminary corrective actions

A RI is performed to collect data to characterize environmental conditions that may have been affected by site operations. The RI at the Allen Fossil Plant was performed following the detection of elevated arsenic in groundwater near the East Ash Disposal Area. The RI is being performed in coordination with the TDEC Division of Remediation, and concurrently with the TDEC Order, but is focused on the groundwater near the East Ash Disposal Area.

Remedial investigation objectives:

- Evaluate sources
- Delineate CCR constituents in groundwater, focusing on arsenic, fluoride, and lead
- Evaluate Alluvial aquifer
- Evaluate connections between aquifers



East Ash Disposal Area

Remedial investigation work performed:

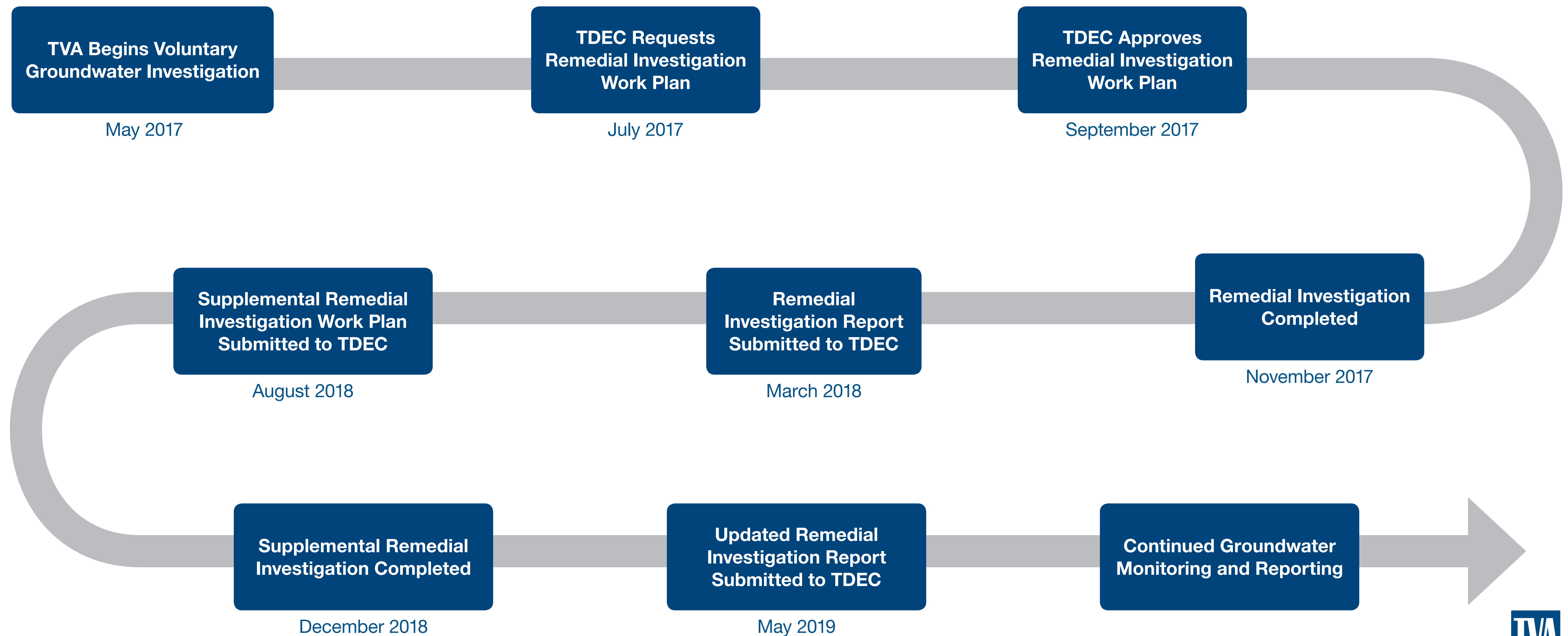
- 46 wells added during the RI (for a total of 66 wells)
- 7 groundwater events
- 315 samples analyzed
- Deep stratigraphic borings were drilled to characterize the upper Claiborne confining unit (clay)
- Pumping test by United States Geological Survey (USGS)



Groundwater monitoring well

REMEDIAL INVESTIGATION TIMELINE

Process/Schedule

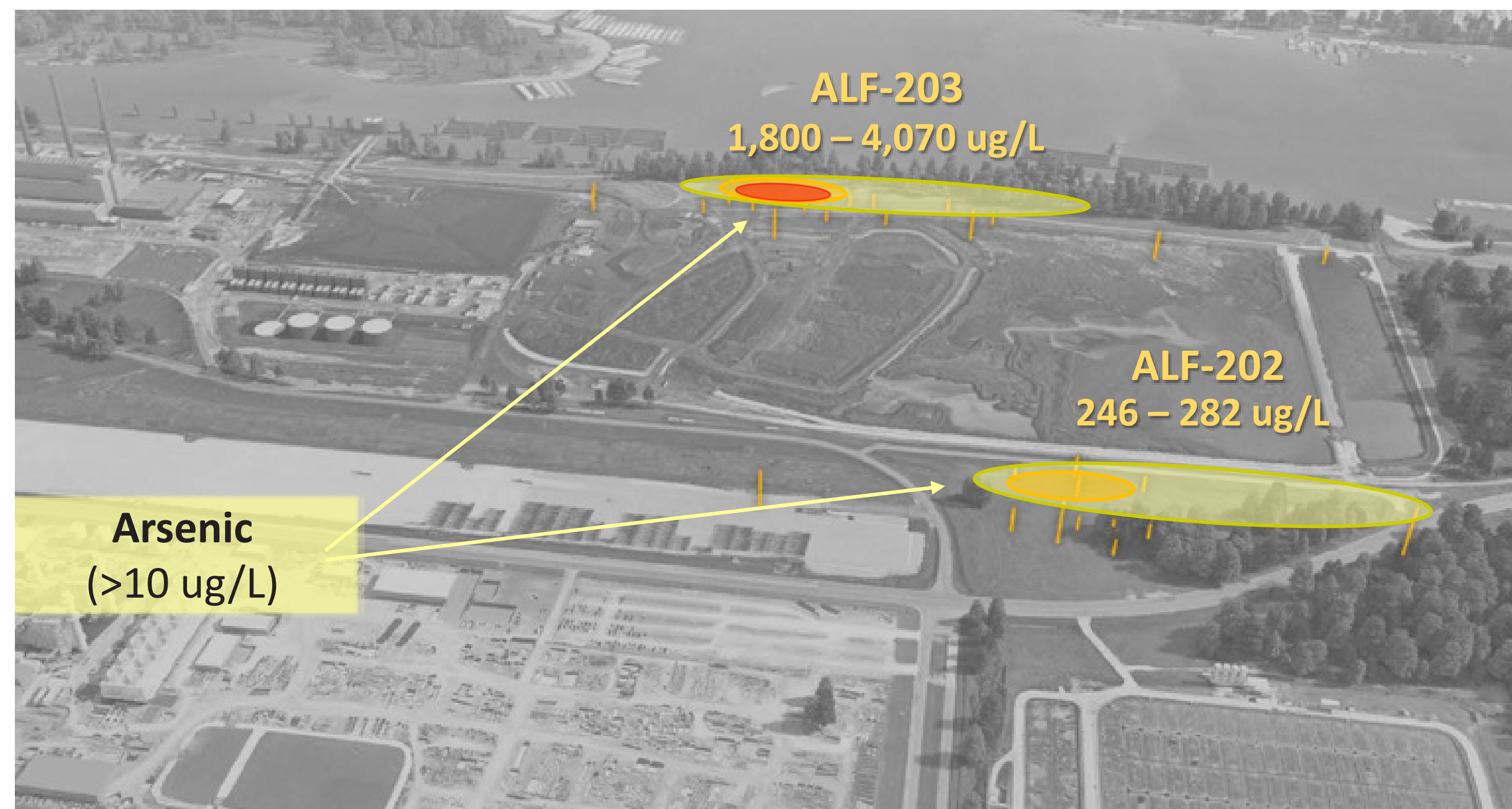


REMEDIAL INVESTIGATION— DELINEATE CCR CONSTITUENTS

(1 of 2)

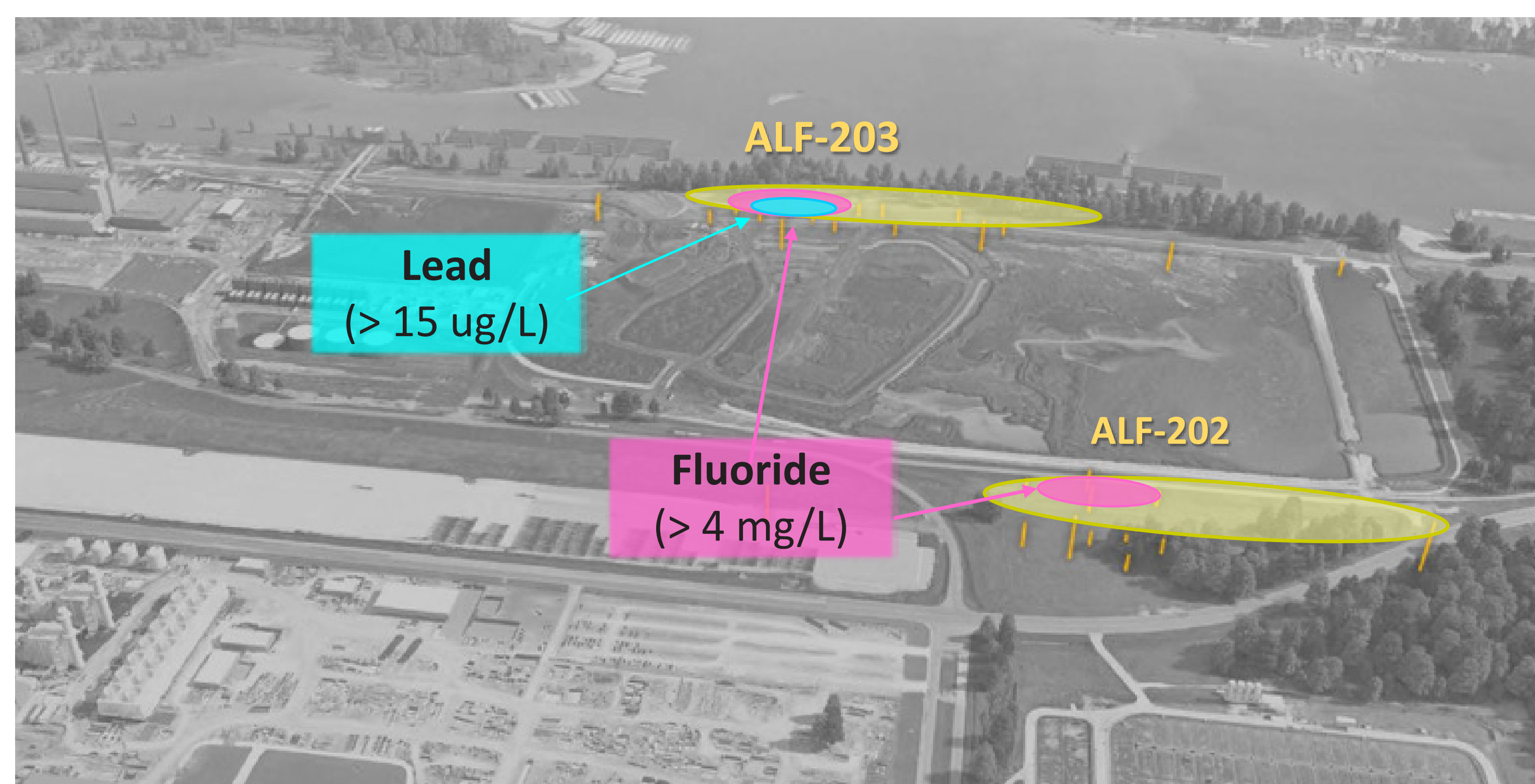
The horizontal extent of arsenic, fluoride, and lead in groundwater is limited to two primary areas: north and south of East Ash Disposal Area.

Horizontal delineation (arsenic) north and south areas



- Arsenic above the USEPA drinking water standard was found north and south of the East Ash Disposal Area in the shallow Alluvial aquifer
- The highest concentrations were found within the upper 40 feet

Horizontal delineation (fluoride and lead) north and south areas



- Fluoride and Lead above the USEPA drinking water standards are located within the arsenic areas

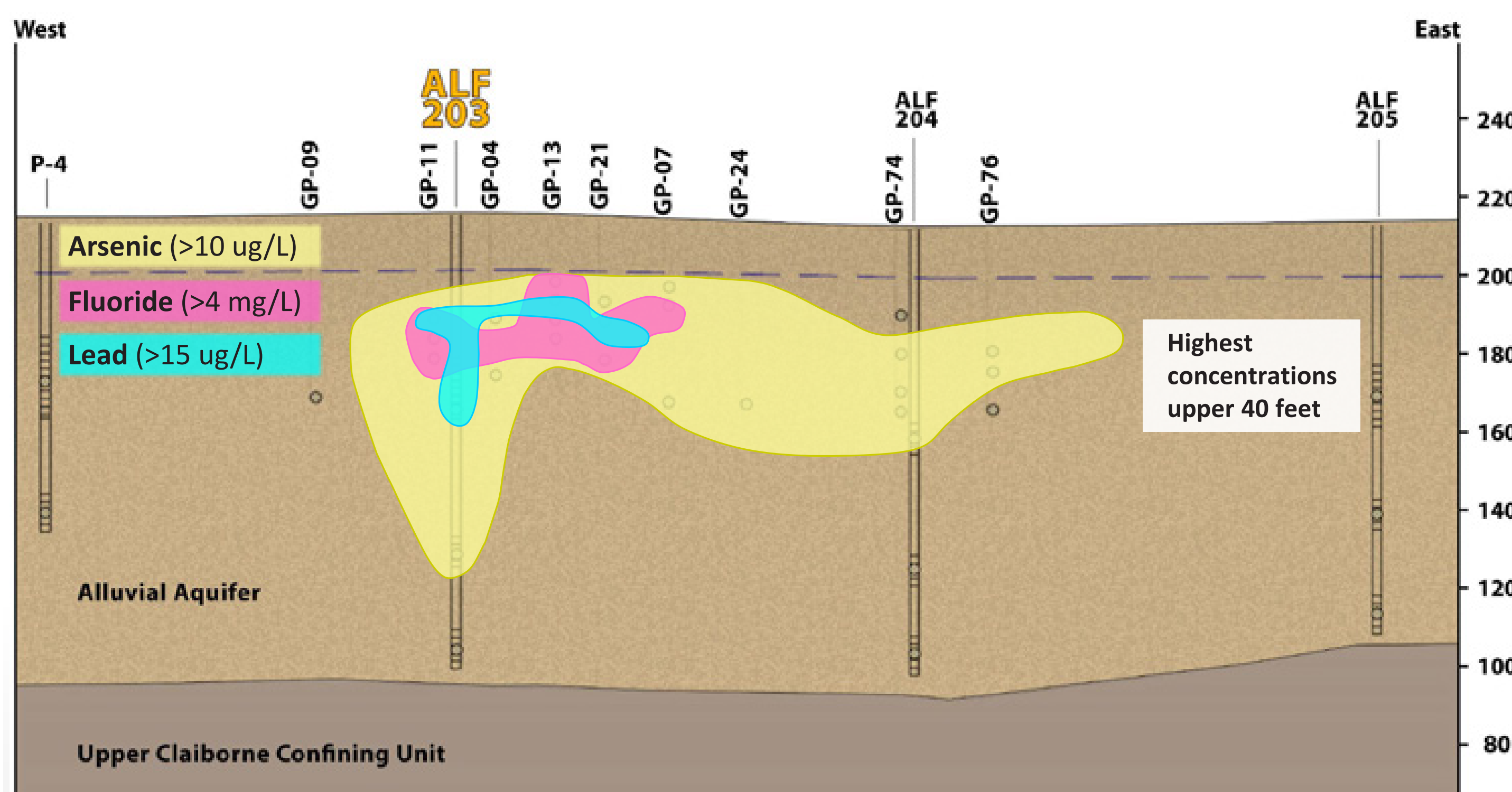
REMEDIAL INVESTIGATION— DELINEATE CCR CONSTITUENTS

(2 of 2)

Vertical distribution of arsenic, fluoride, and lead in groundwater

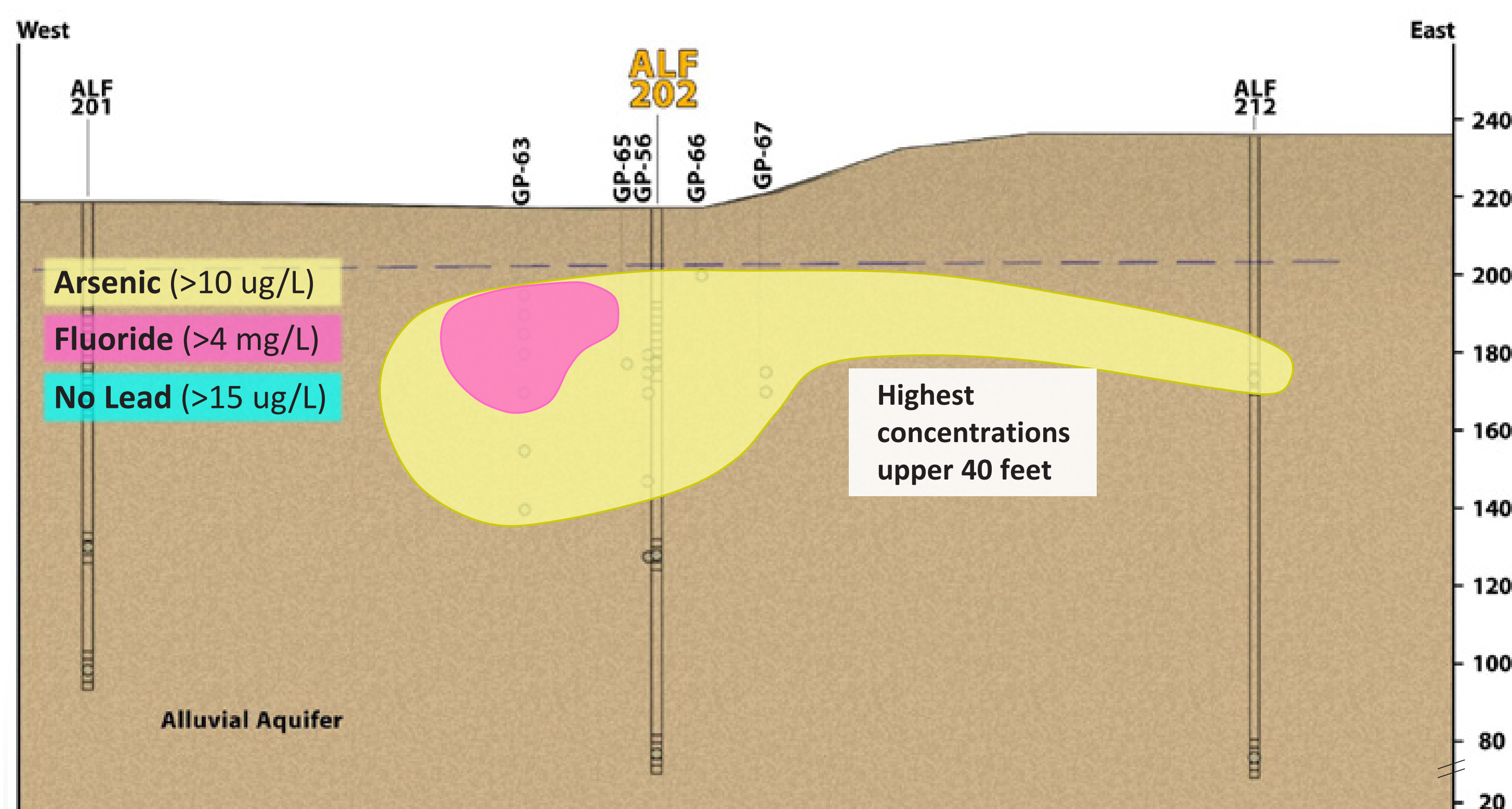
- The highest concentrations were detected within the upper 40 feet of the Alluvial aquifer
- Arsenic, fluoride and lead were not detected above USEPA drinking water standards in any deep wells
- The Memphis aquifer (sand) has not been affected and sample results meet USEPA drinking water standards

Cross section—north of East Ash Disposal Area



Conceptual Cross Section—geological formation thicknesses are approximate

Cross section—south of East Ash Disposal Area



Conceptual Cross Section—geological formation thicknesses are approximate

PLANT DECONSTRUCTION

The Former Allen Fossil Plant will be Deconstructed.

The Allen Fossil Plant was constructed in the 1950s by the Memphis Light, Gas and Water Company (MLGW). TVA purchased the plant and property in 1984. Allen's three coal-fired units were retired on March 31, 2018.

On October 4, 2019, TVA issued a Final Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for decontamination and deconstruction of its Allen Fossil Plant.

The EA evaluated the potential environmental effects of the future disposition of the physical structures associated with the retired coal-fired plant units, including the powerhouse, coal handling facilities, and surrounding support buildings.

- ▶ **TVA's preferred alternative is Full Demolition of the Allen Plant resulting in a usable property.**
- ▶ **This is a key step in the process to make the Allen site available for future redevelopment.**
- ▶ **Decommissioning is already underway and deconstruction will start in 2022.**



DECONSTRUCTION OF FORMER ALLEN FOSSIL PLANT

A change is underway at TVA as energy efficiency has reduced demand and the company shifts away from coal and toward cleaner sources of generation such as nuclear, renewables, and natural gas.

Old facilities are being turned into new opportunities in the most environmentally sustainable way. D4 is how most everything is reused and/or recycled, and sites are returned to grassy fields.



Decommissioning → Prepare Site

- Drain oils, fuels, and solvents
- Salvage usable equipment
- Remove residual ash & coal dust from boilers and plant structures, ducts, hoppers, & bunkers

Deactivation → Remove Energy Sources

- Reroute power and services
- Make the plant “cold, dark and dry” by de-energizing, isolating, and air-gapping equipment so that it is safe to decontaminate and demolish

Decontamination → Remove Regulated Materials

- Universal waste disposal
- Asbestos abatement of all structures to be demolished

Demolition → Remove Plant and Structures

- Carefully deconstruct buildings and structures
- Dispose, reuse, and recycle building components and materials
- Restore the disturbed area to provide conditions suitable for redevelopment

D4—SCOPE AND TIMELINE



TVA begins
Decontamination
and Demolition

TVA begins
Decommissioning

2018 2022

1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020 2025



PLANT UPDATE



Allen Fossil Plant Update

October 8, 2019

Allen Fossil Plant

Commissioning Date:
1959

Retirement Date:
March 2018

Size of facility:
Approx. 500 acres

Former Output:
741 megawatts

Amount of CCR material:
Approx. 3.5 million cubic yards

CCR Units to be Closed:
East Ash Pond ~100 acres
West Ash Pond ~20 acres



PLANT UPDATE

Allen Environmental Stewardship



1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020 2025

ALLEN FOSSIL PLANT UPDATE - 10-08-19 | 3



Allen Environmental Stewardship



McKellar Lake
created by City of
Memphis

McKellar Lake

1948-1950

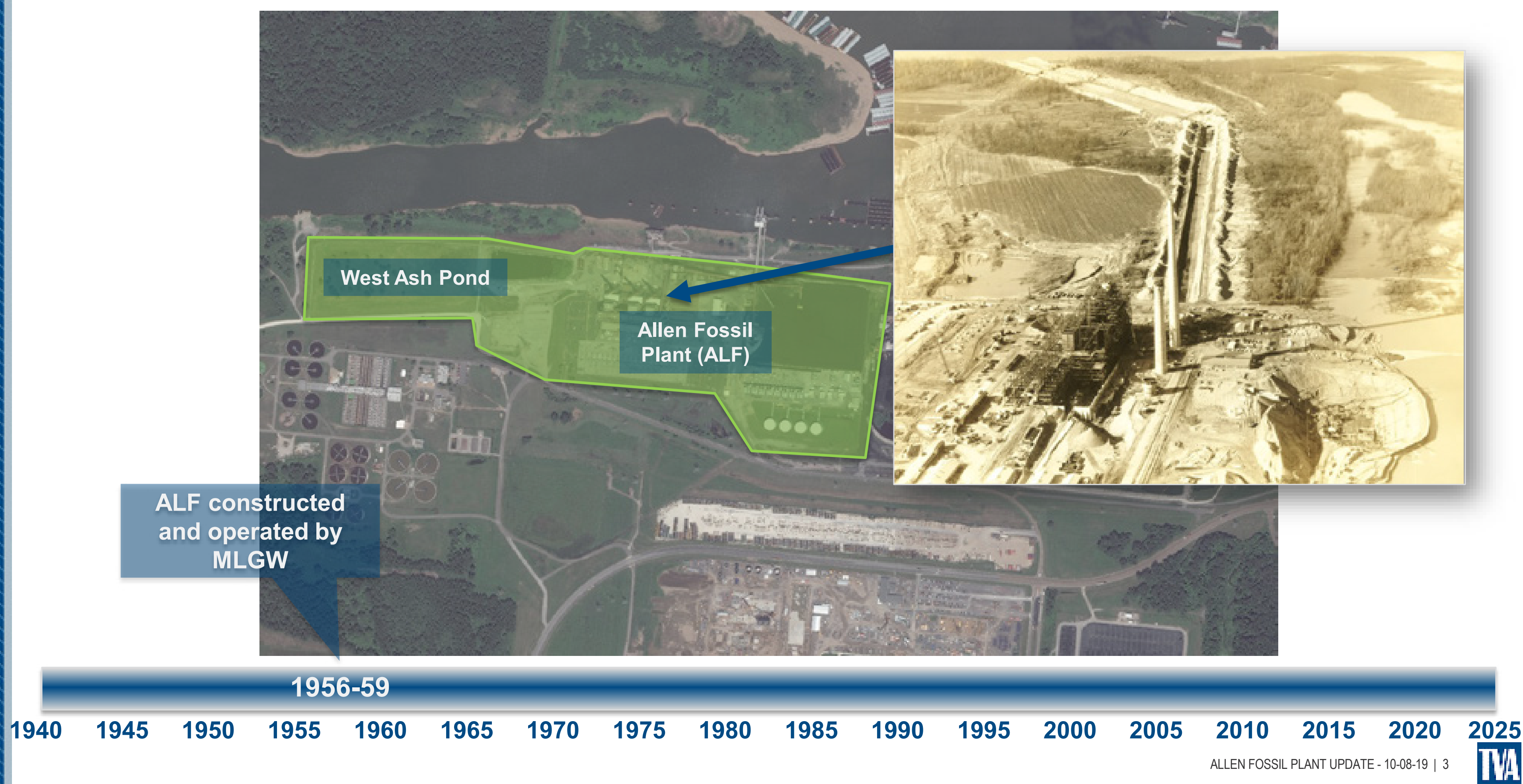
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ALLEN FOSSIL PLANT UPDATE - 10-08-19 | 3

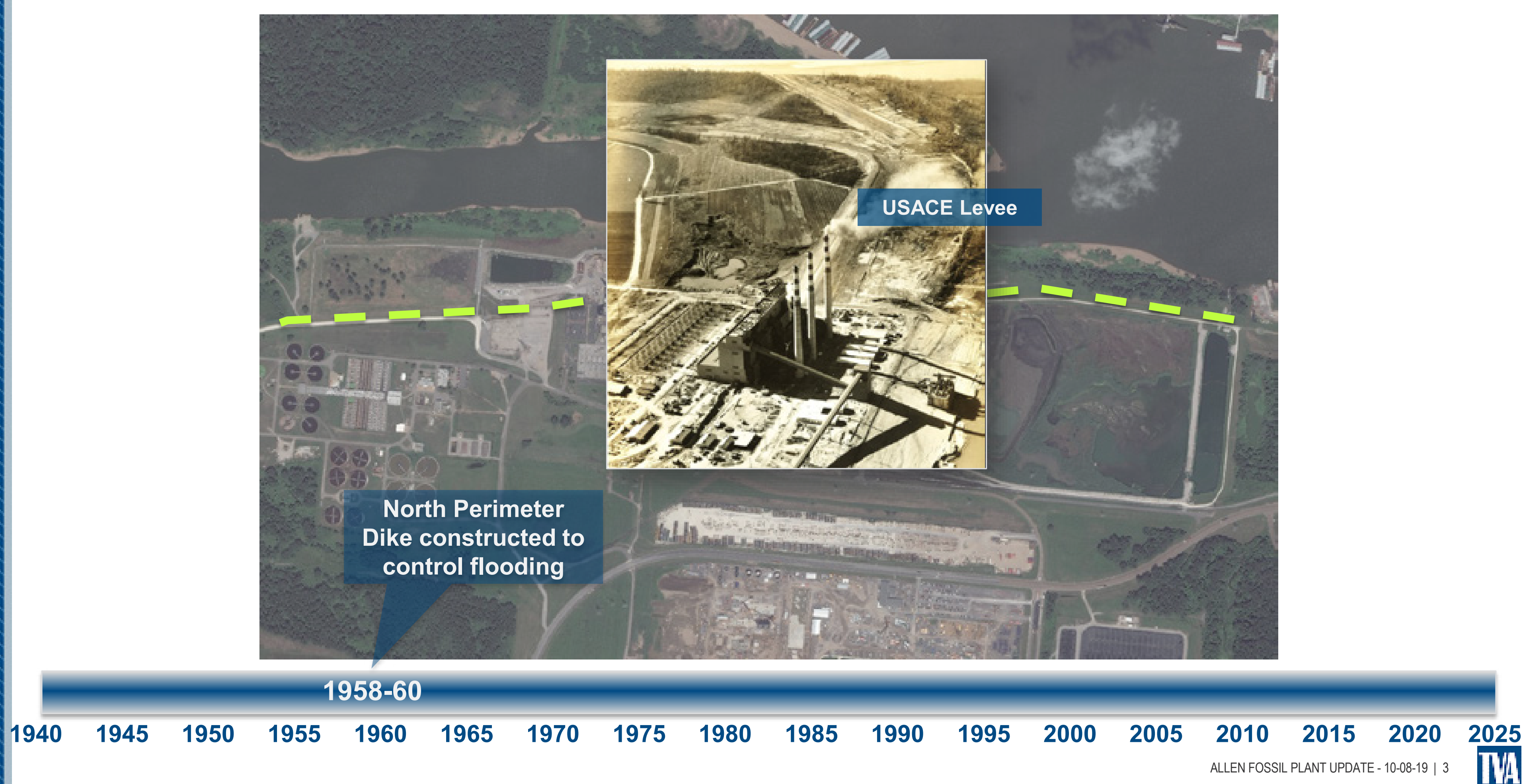


PLANT UPDATE

Allen Environmental Stewardship



Allen Environmental Stewardship



PLANT UPDATE

Allen Environmental Stewardship



ALLEN FOSSIL PLANT UPDATE - 10-08-19 | 3



Allen Environmental Stewardship



ALLEN FOSSIL PLANT UPDATE - 10-08-19 | 3



PLANT UPDATE

Allen Environmental Stewardship



1978

1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020 2025

ALLEN FOSSIL PLANT UPDATE - 10-08-19 | 3



Allen Environmental Stewardship



1984

1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020 2025

ALLEN FOSSIL PLANT UPDATE - 10-08-19 | 3



PLANT UPDATE

Allen Environmental Stewardship



Allen Environmental Stewardship



PLANT UPDATE

Allen Environmental Stewardship



TVA entered into an agreement with the City of Memphis, Shelby County, Port Authority and MLG&W

2015

1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020 2025

ALLEN FOSSIL PLANT UPDATE - 10-08-19 | 3



Allen Environmental Stewardship



TVA begins TDEC Order Activities

2017

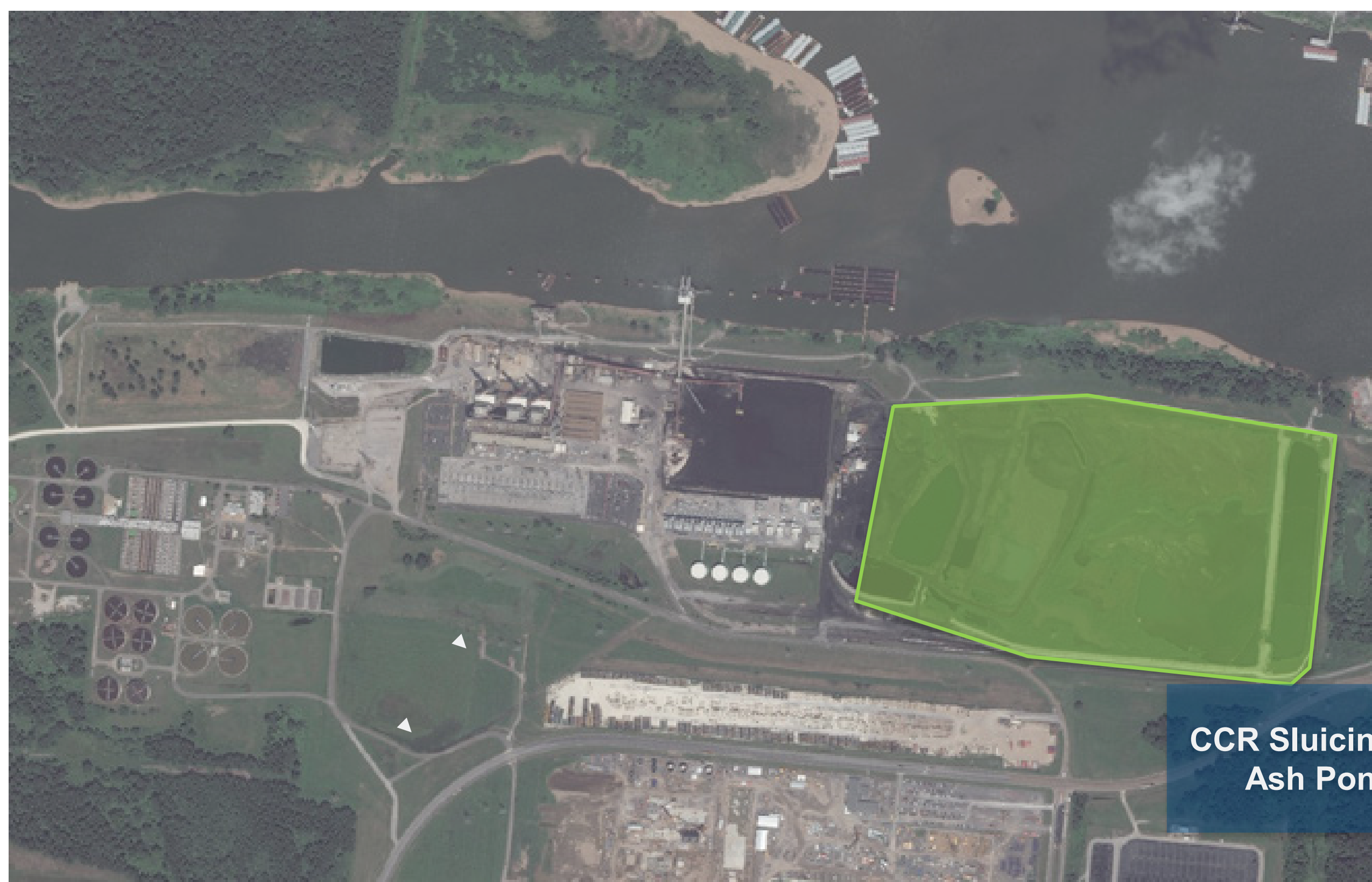
1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020 2025

ALLEN FOSSIL PLANT UPDATE - 10-08-19 | 3



PLANT UPDATE

Allen Environmental Stewardship



CCR Sluicing to the East Ash Pond ceases

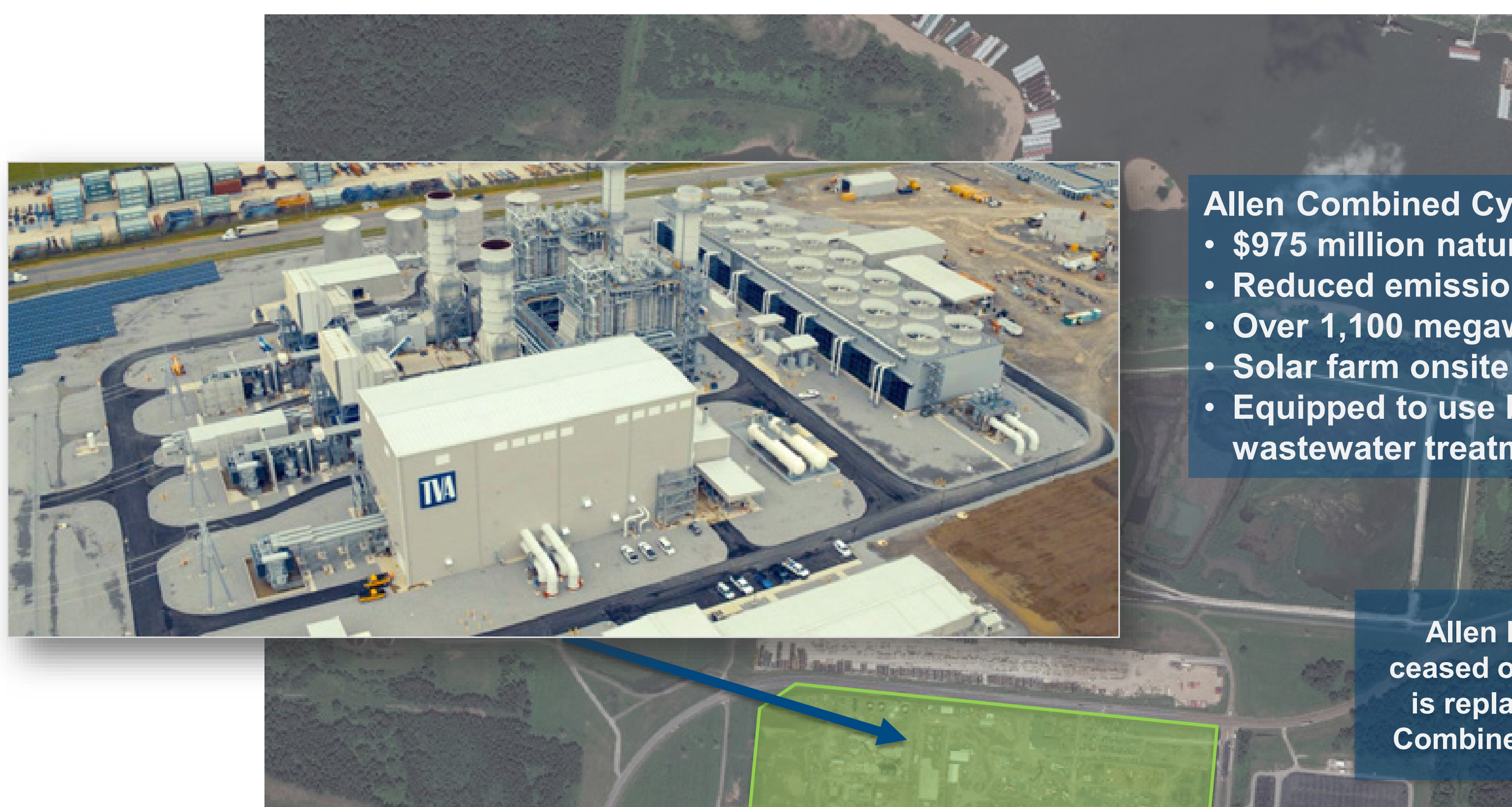
2018

1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020 2025

ALLEN FOSSIL PLANT UPDATE - 10-08-19 | 3



Allen Environmental Stewardship



Allen Combined Cycle Plant

- \$975 million natural gas plant
- Reduced emissions
- Over 1,100 megawatts
- Solar farm onsite
- Equipped to use biogas from wastewater treatment

Allen Fossil Plant ceased operations and is replaced by Allen Combined Cycle Plant

2018

1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020 2025

ALLEN FOSSIL PLANT UPDATE - 10-08-19 | 3



PLANT UPDATE

Allen Environmental Stewardship



1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020 2025

ALLEN FOSSIL PLANT UPDATE - 10-08-19 | 3



Conceptual Future Condition



ALLEN FOSSIL PLANT UPDATE - 10-08-19 | 9



PLANT UPDATE

For More Information

Allen Fossil Plant

<https://www.tva.gov/Energy/Our-Power-System/Coal/Allen-Fossil-Plant>

Air Quality – Water Quality – Ash Storage

<https://www.tva.com/Environment/Environmental-Stewardship>

TDEC Order

<https://www.tva.com/tdec>

Groundwater Monitoring

www.tva.com/ccr

TDEC Order Environmental Investigation

West Ash Pond

- Groundwater Study
 - 18 Monitoring Wells
 - One year of sampling planned
- Background Soil Study



PLANT UPDATE

Remedial Investigation

East Ash Pond

- 27 new wells
- 22 soil borings with 60 groundwater samples collected
- 59 pore water samples collected
- Deep soil borings
- USGS pumping test



ALLEN FOSSIL PLANT UPDATE - 10-08-19 | 5



Remedial Investigation

East Ash Pond

- Two areas of groundwater identified with elevated Arsenic
- Impacts are limited to upper 40 feet of the Alluvial aquifer
- No impacts to the Memphis Sand Aquifer

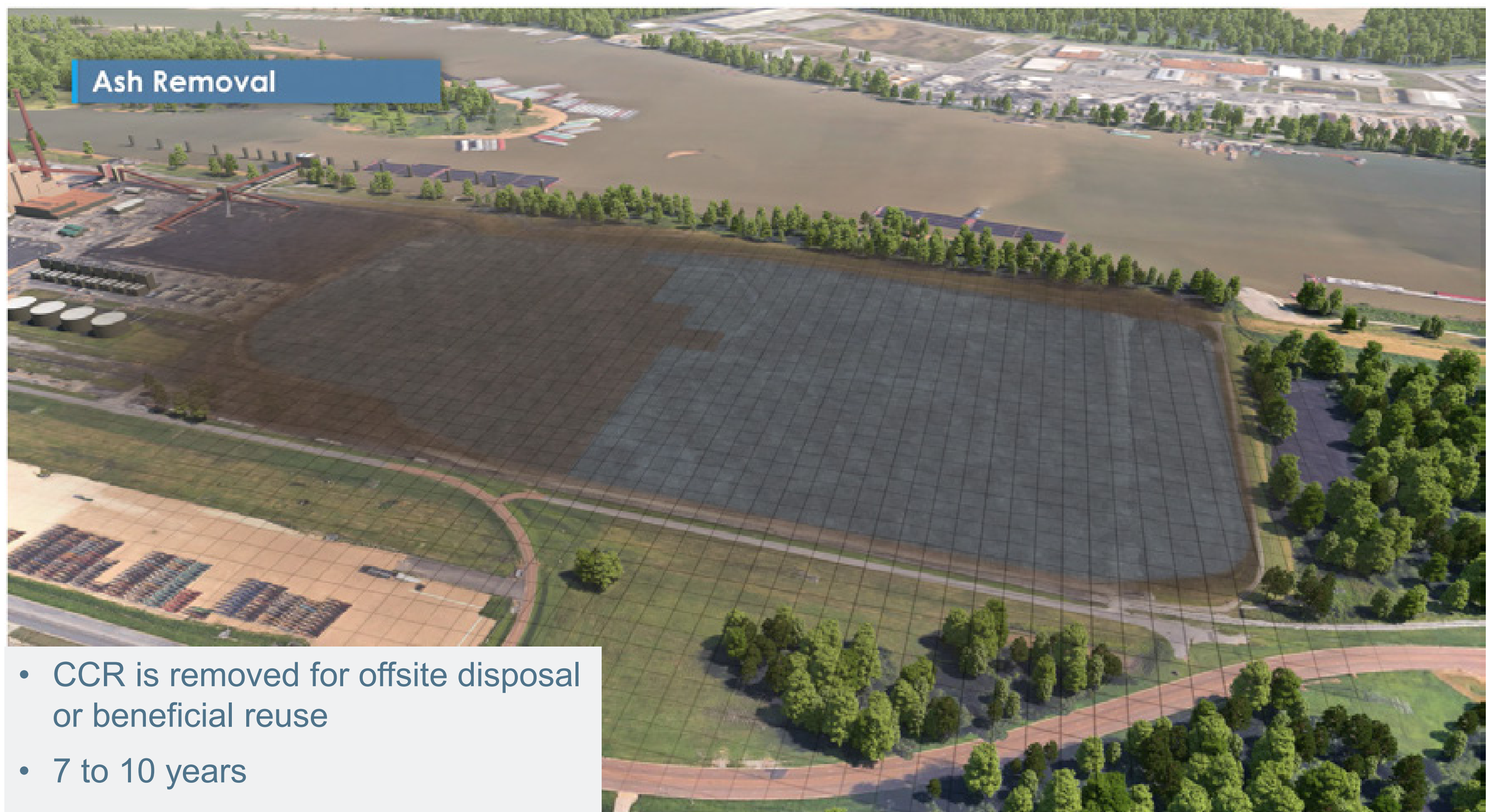


ALLEN FOSSIL PLANT UPDATE - 10-08-19 | 5



PLANT UPDATE

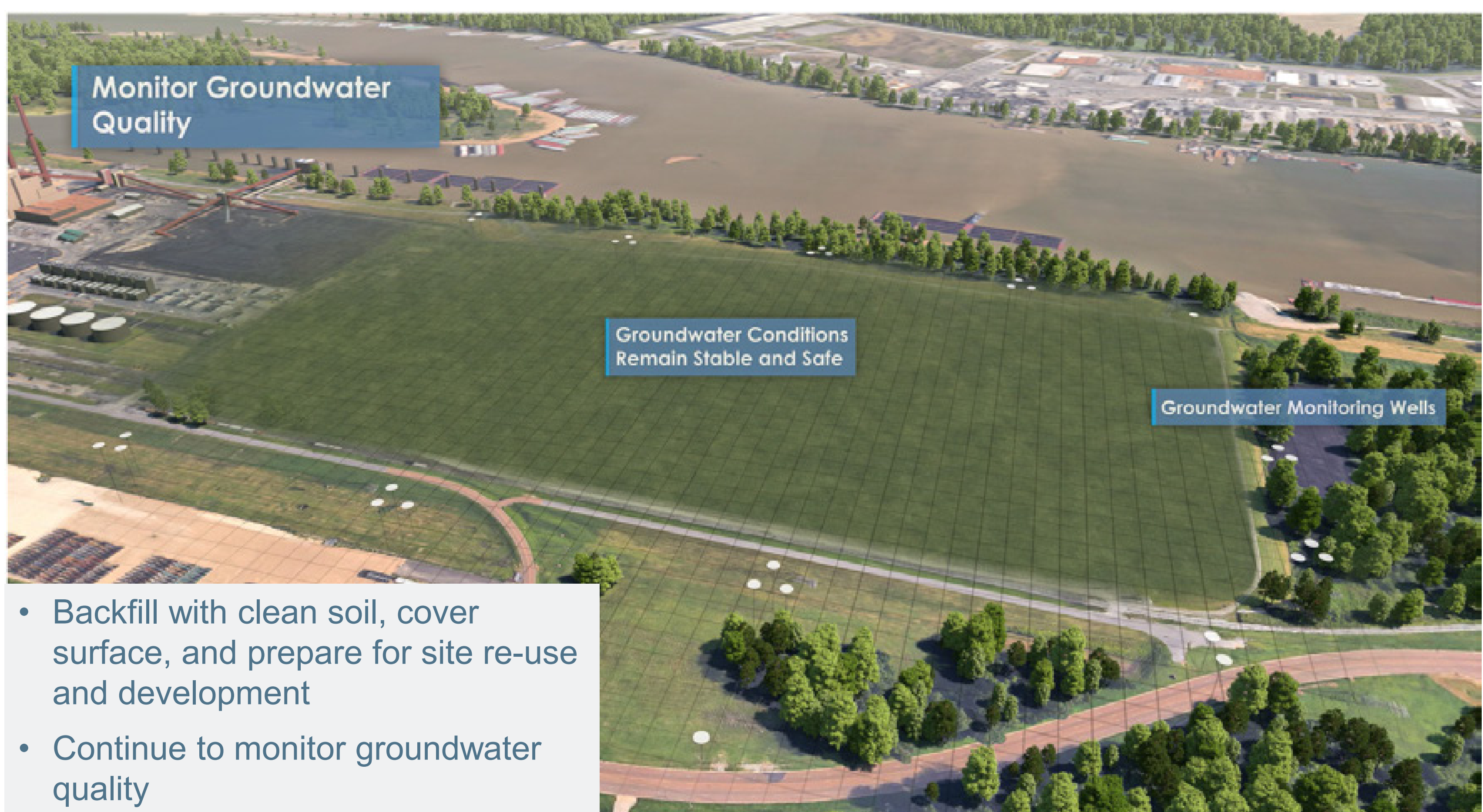
Pond Closure: CCR Removal



ALLEN FOSSIL PLANT UPDATE - 10-08-19 | 5



Pond Closure: Site Restoration

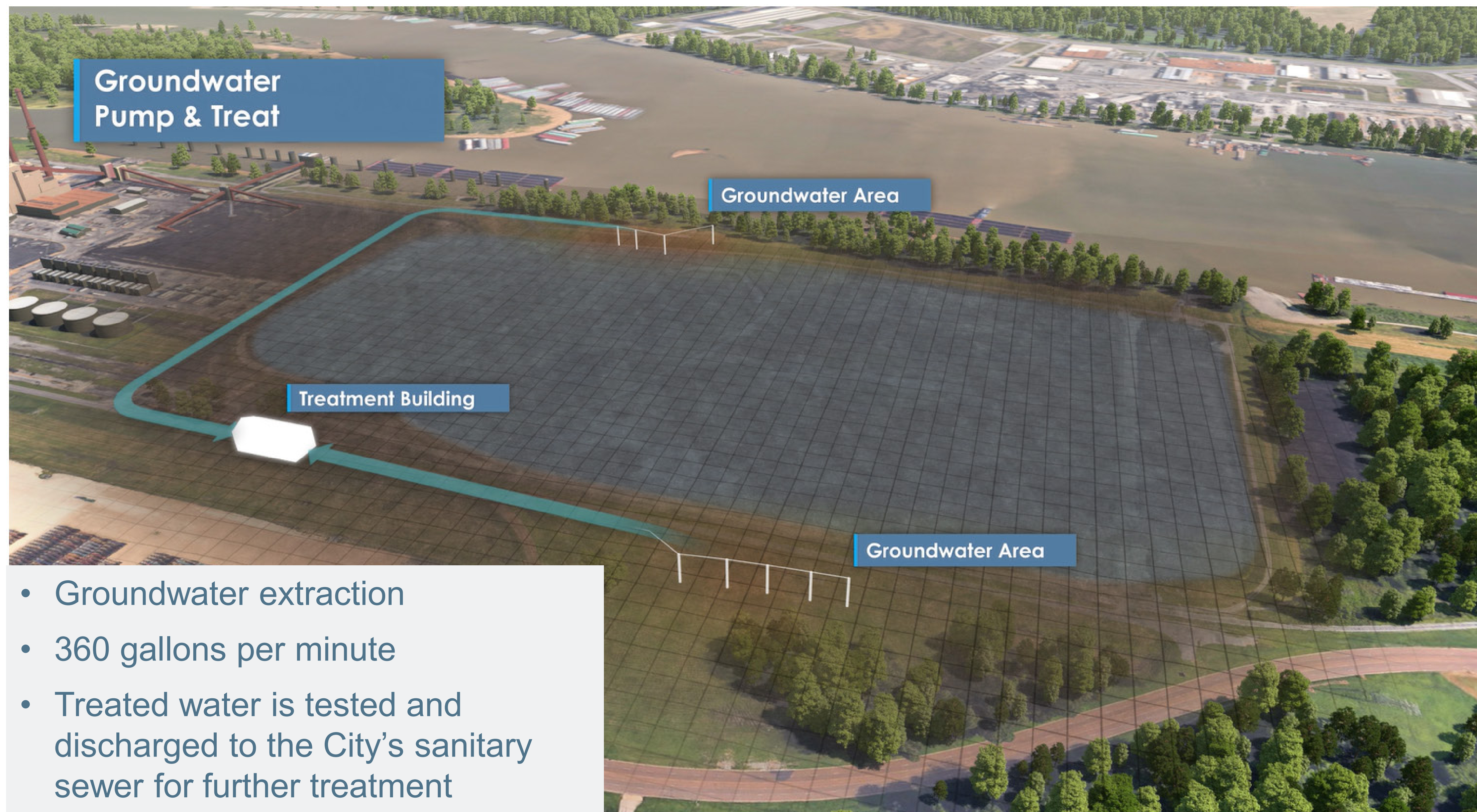


ALLEN FOSSIL PLANT UPDATE - 10-08-19 | 5

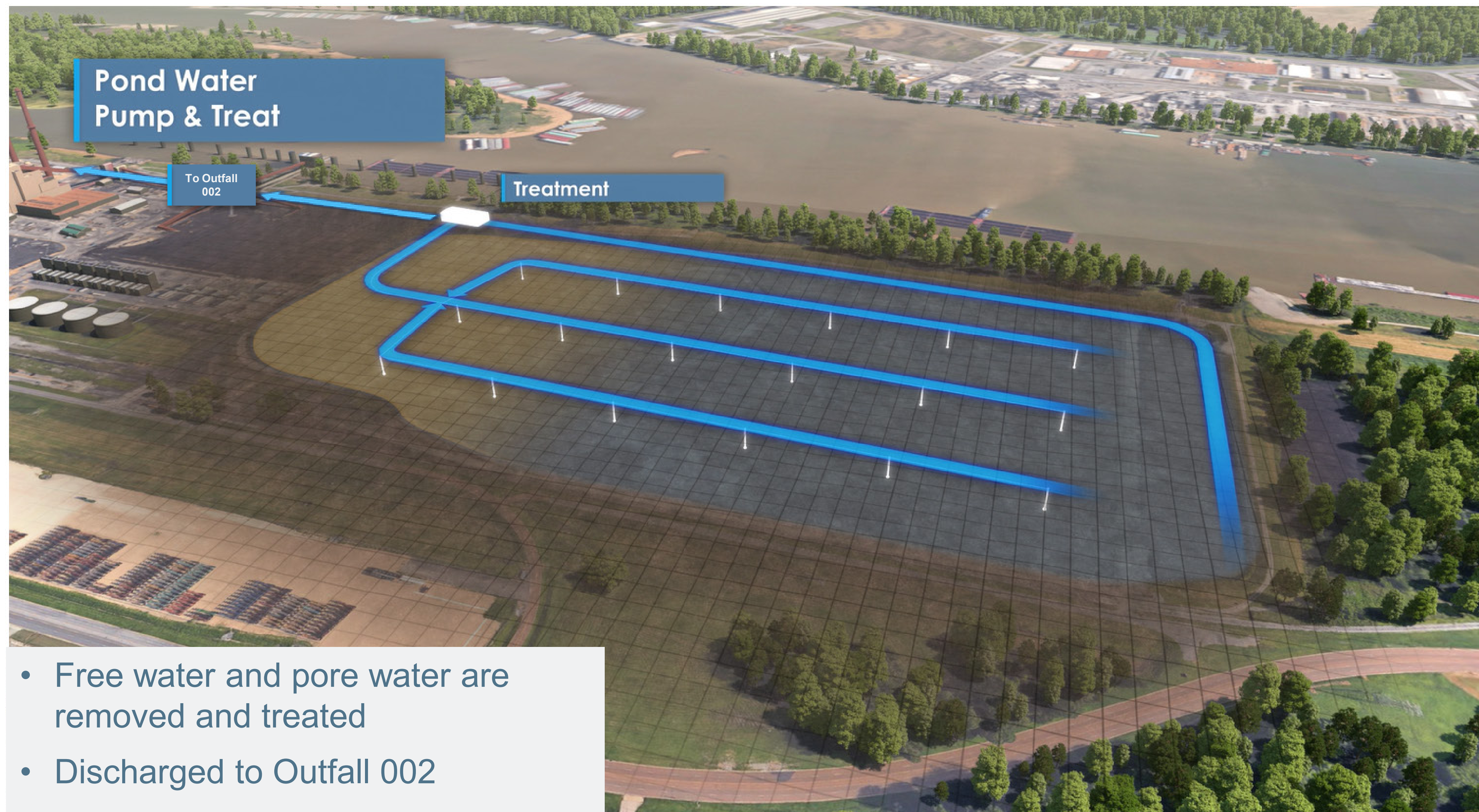


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Interim Response Action: Groundwater



Pond Closure: Dewatering



- Free water and pore water are removed and treated
- Discharged to Outfall 002

Serving the people of Memphis to make life better



Memphis is important to TVA. We have been honored to partner with Memphis and MLGW for more than 85 years. We invest over **\$70 Million** each year in the Memphis community, including **\$17 Million** in tax equivalent payments. We also own and operate our **\$1 Billion** Allen Combined Cycle plant, one of the most advanced and efficient gas generating facilities in the U.S. The plant ensures high reliability, low cost and cleaner air.



TVA ECONOMIC DEVELOPMENT
HELPED CREATE

28,000 JOBS
\$3.6 BILLION
IN MEMPHIS SINCE 2012

MORE THAN
**60% CARBON
REDUCTION**

* since 2005 levels

ALLEN COMBINED CYCLE PLANT
HOME TO

**LARGEST TVA OWNED
SOLAR FACILITY**

99.999%
RELIABILITY
18 YEARS IN A ROW

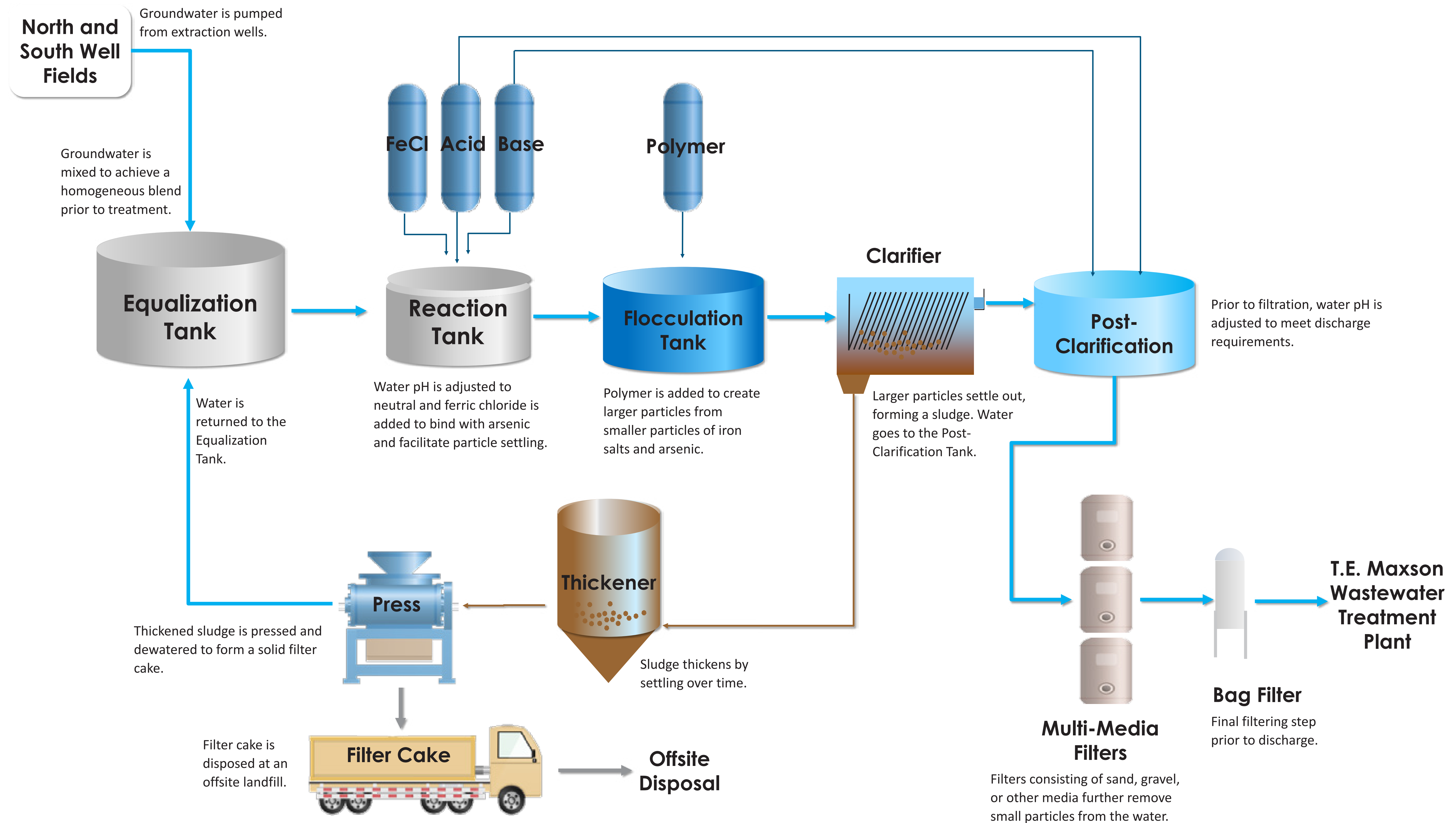
ADDED
41 MEGAWATTS
OF NEW LOAD AND
22 MEGAWATTS
OF PROJECTED LOAD GROWTH
IN PARTNERSHIP WITH MLGW

\$1 BILLION
ANNUAL FUEL
COST REDUCTION

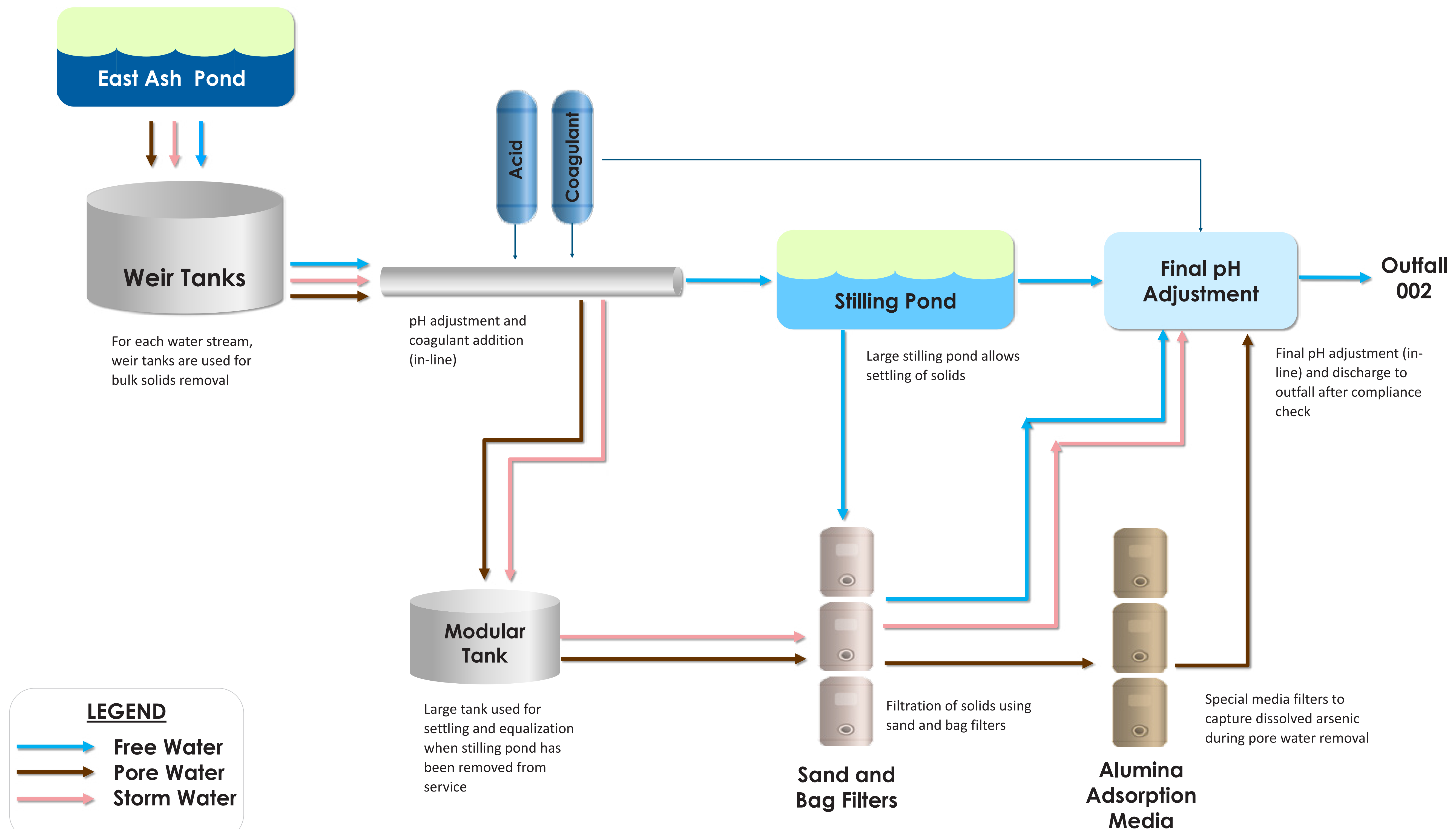
\$800 MILLION
ANNUAL OPERATING
COST REDUCTION

As a customer of TVA, MLGW receives the full benefits of a low-cost public power system with 99.999% reliability. TVA's public power model allows us to partner with the customers we serve and make investments into their communities. To learn more, visit tva.com/Memphis.

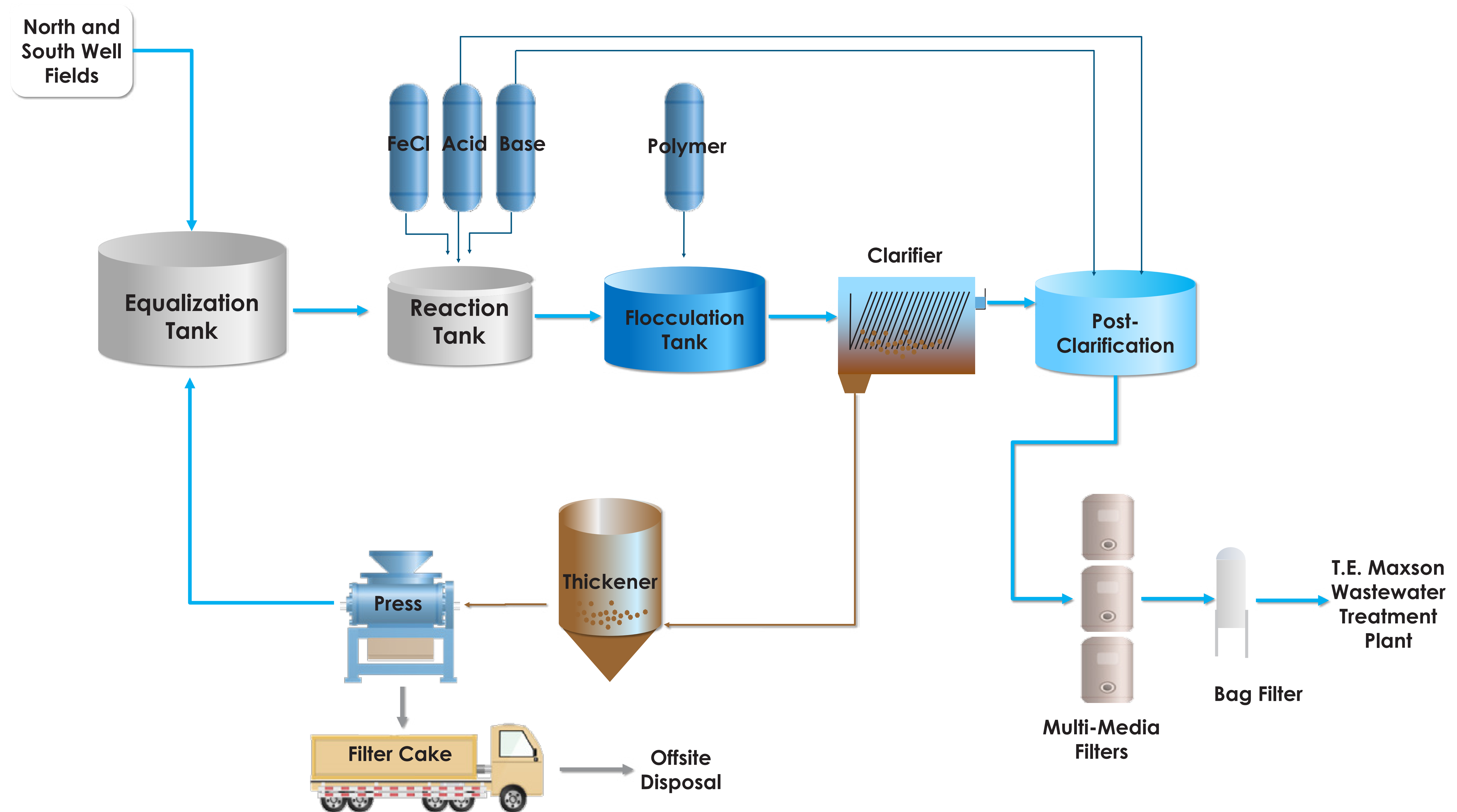
INTERIM RESPONSE ACTION: GROUNDWATER TREATMENT PROCESS



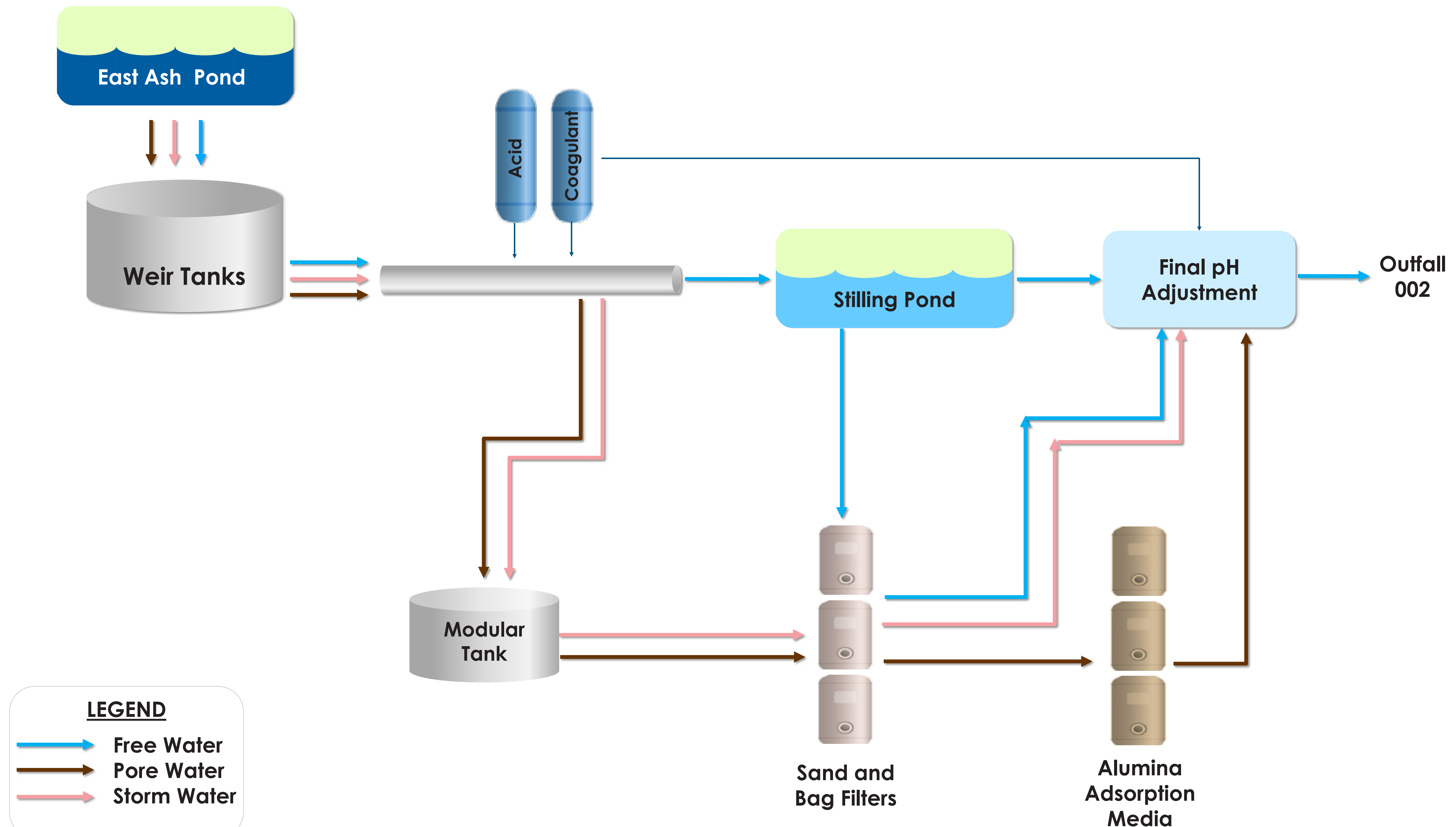
POND CLOSURE: DEWATERING EAST ASH POND—WATER TREATMENT PROCESS



INTERIM RESPONSE ACTION: GROUNDWATER TREATMENT PROCESS



POND CLOSURE: DEWATERING EAST ASH POND—WATER TREATMENT PROCESS



ENVIRONMENTAL IMPACT STATEMENT—PROJECT AREA



Legend

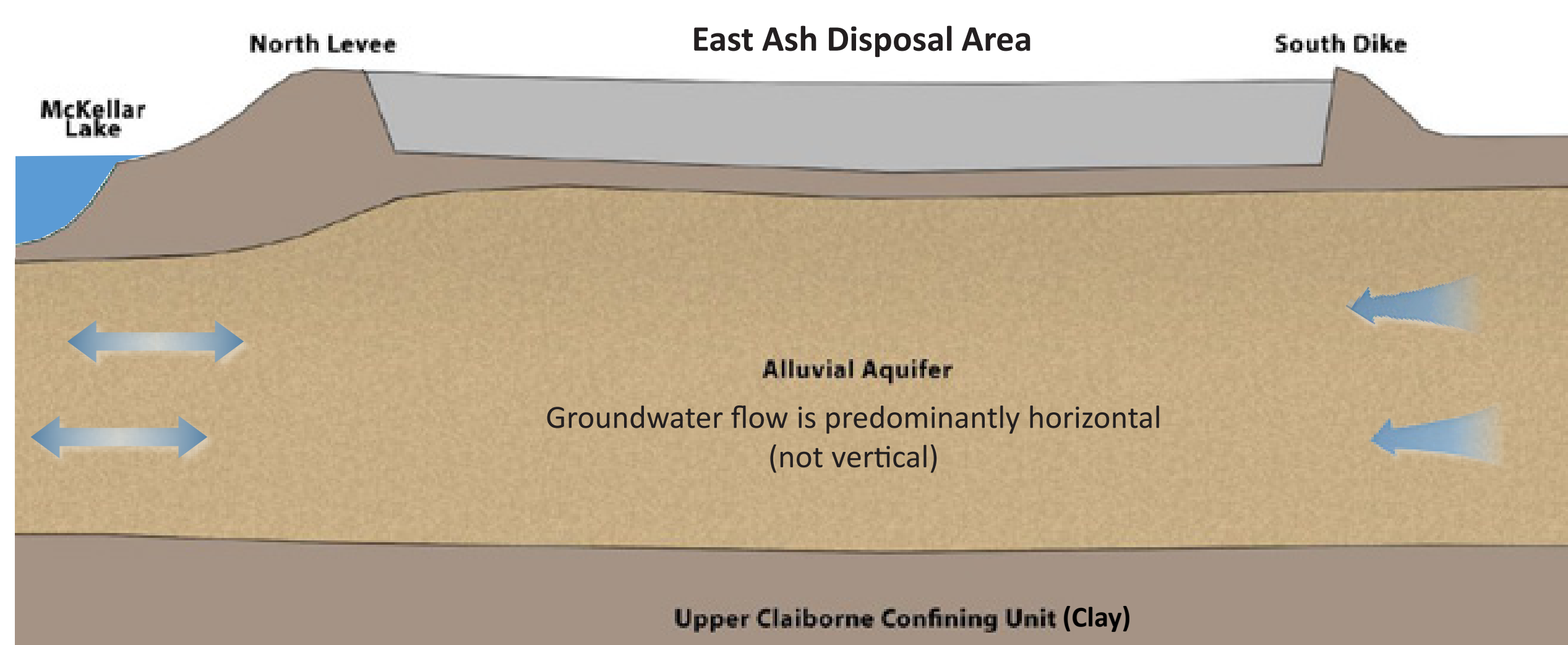
 Environmental Study Area

REMEDIAL INVESTIGATION—EVALUATE ALLUVIAL AQUIFER + CONNECTIONS

Evaluate Alluvial aquifer

Evaluating the groundwater flow directions helps to understand and predict migration of CCR constituents.

- To evaluate groundwater flow directions near the East Ash Disposal Area, 22 shallow, intermediate, and deep wells were installed and monitored (46 total)
- The outcome was that groundwater flows horizontally and is affected by McKellar Lake

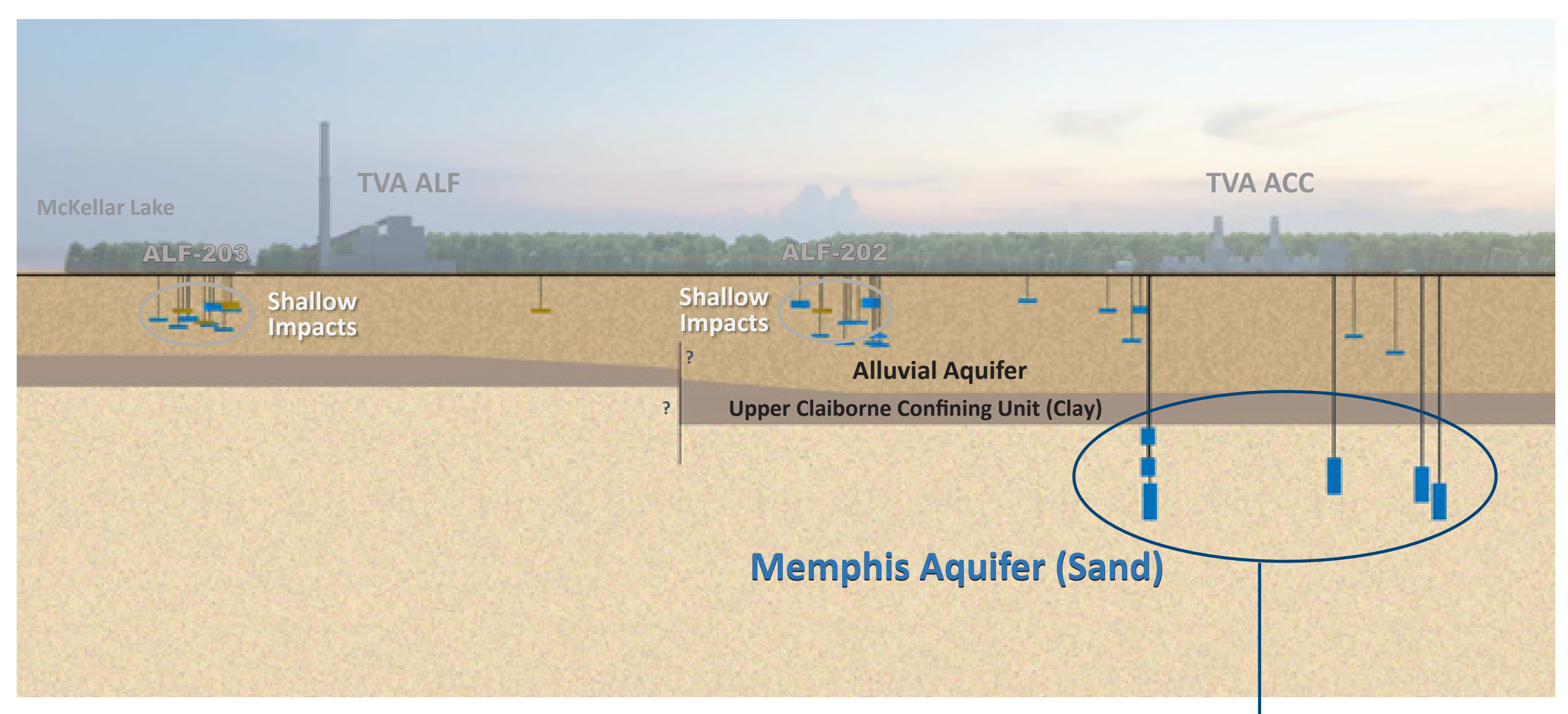


Conceptual Cross Section—geological formation thicknesses are approximate

Evaluate connections between aquifer

The Memphis aquifer (sand) is a source for regional drinking water. This deep aquifer is located beneath the shallow Alluvial aquifer, but these aquifers are separated by a clay layer, the upper Claiborne confining unit. TVA, with help from United States Geological Survey, evaluated the connection between these two aquifers and concluded:

- The upper Claiborne confining unit (clay), where present, is low-hydraulic conductivity clay up to 69 feet thick and lies between the Alluvial and Memphis (sand) aquifers
- The stratigraphy of the upper Claiborne confining unit (clay) is offset in the southeast corner of the East Ash Disposal Area. Further evaluation was conducted
- A hydraulic connection between the Alluvial aquifer and Memphis aquifer (sand) was observed under pumping conditions



Conceptual Cross Section—geological formation thicknesses are approximate

Concentrations below USEPA drinking water standards

REMEDIAL INVESTIGATION—NEXT STEPS














What are the next steps?

Proposed groundwater interim response action

- Design, construct and operate Groundwater Extraction/Treatment Systems
- Purpose is to control groundwater during pond closure



Legend

- | | |
|--|--|
|  McKellar Lake Gauging Station |  Monitoring Well (Intermediate) |
|  Deep Stratigraphic Boring |  Monitoring Well (Deep) |
|  Performance Monitoring Well (PMW) (Shallow) |  Production Well (Memphis Sand) |
|  Performance Monitoring Well (PMW) (Intermediate) |  Sewer Manhole Location of Force Main Transition to Gravity |
|  Performance Monitoring Well (PMW) (Deep) |  Sanitary Sewer Pipes |
|  IRA Extraction Well (EW) |  East Ash Pond Boundary |
|  Monitoring Well (Shallow) | |