Long-Term Stewardship Assessment Report

Union Carbide Corporation, Technology Park

EPA ID #: WVD060682291

South Charleston, WV 25303

RCRIS CODE: CA88 (P2)

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Assessment Visit Date: October 29, 2025 Assessment Report Date**:** February 20, 2026

Introduction: In EPA Region 3 and its RCRA-authorized states, a Long-Term Stewardship (LTS) or "LTS Assessment Visit" is a site inspection that combines a review of historical records with an on-site evaluation to confirm that selected remedies remain in place and functioning as intended. These visits assess whether a remediated facility continues to meet environmental protection standards by verifying that engineering controls (ECs) are properly maintained and that institutional controls (ICs) remain in effect. The LTS program periodically evaluates the long-term performance of these remedies and ensures that any required controls continue to protect human health and the environment. It also serves as a mechanism for keeping the community informed about the status of facilities addressed under the RCRA Hazardous Waste Cleanup (Corrective Action) Program.

Facility Background and Environmental History: The Union Carbide Corporation (UCC) Technology Park in South Charleston, West Virginia encompasses approximately 574 acres situated within a mixed industrial, commercial, and residential setting (Figure 1). UCC, a wholly owned subsidiary of The Dow Chemical Company, assembled the property between 1947 and 1974 through the acquisition of multiple parcels from industrial owners, private landholders, and a former dairy farm. Prior to UCC ownership, the land was largely undeveloped except for several brine wells historically operated by Westvaco Chemical Company for chlorine bleach production.

Over the decades, UCC divested 267 acres, retaining roughly 307 acres that include former landfill areas and surrounding buffer lands. Approximately 110 acres remain developed with laboratories, pilot-scale manufacturing units, waste management areas, and administrative buildings. The property is subdivided into six tracts (A–D), with Tracts A and B donated to the State of West Virginia. A portion of Tract D, designated Tract D-1, was sold in 2010 for future church development, while another portion of it, designated Tract D-2, was subdivided for implementation of vapor intrusion restrictions

Environmental investigation and cleanup activities began under a Facility Lead agreement with EPA in 1999. A comprehensive Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) was conducted between 2000 and 2006, supported by extensive groundwater monitoring in Ward Hallow and the Greenhouse Area. Interim Measures were implemented at the Ward B Landfill and Building 707 Area,

including landfill cover improvements, drainage modifications, and targeted soil removals. Human health and ecological risk assessments were completed between 2005 and 2010.

These investigations identified several volatile organic compounds as primary constituents of concern, including benzene, ethylbenzene, toluene, chlorobenzene, dichlorobenzene, dichloropropane, trichloroethene, and vinyl chloride. Over time, these constituents of concern were refined to focus on contaminants relevant to the site's Remedial Action Objectives: preventing unacceptable groundwater discharges to the Kanawha River and mitigating potential human health risks associated with vapor intrusion and direct contact. Based on current information, no imminent threats to human health or the environment have been identified.

EPA issued its Final Remedy in December 2010, consisting of landfill capping or excavation, continued groundwater monitoring, operation and management of leachate and central drain systems, and facility-wide institutional controls. These requirements are implemented through a revised RCRA Corrective Action Permit issued and enforced by the West Virginia Department of Environmental Protection (WVDEP), along with multiple Uniform Environmental Covenants. The RCRA Permit is in force through July 8, 2029.

Current Site Status: UCC currently manages approximately 307 acres of the Technology Park in South Charleston, West Virginia, consisting largely of former landfills and surrounding buffer areas. About 110 acres remain developed with laboratory buildings, pilot plant areas, waste packaging and storage facilities, and office buildings. For development and management purposes, the Facility is subdivided into four tracts, Tract A through D (Figure 2), with Tracts A and B previously donated to the State of West Virginia and a portion of Tract D, labeled as Area D-1, sold in 2010 for future church development.
The Facility currently operates under a RCRA Corrective Action Permit issued by WVDEP on July 8, 2019, which serves as the primary regulatory mechanism for implementing and enforcing the Final Remedy selected by EPA in December 2010. This permit incorporates all components of the Final Remedy, including the soils remedy, focused on capping or excavating former landfills, and the groundwater remedy, which requires long-term groundwater monitoring, continued operation of the leachate collection system, and pumping of the Ward B central drain sump. The permit also integrates the facility-wide institutional controls (ICs) required to ensure long-term protectiveness.

Implementation of ICs and engineering controls (ECs) at the property (**Figure 3**) is achieved through a total of eight (8) Environmental Covenants recorded on individual tracts, including covenants for Tract D (recorded June 11, 2019) and the Tract C/OODA Inc. parcel (recorded October 4, 2019). EPA's May 30, 2018 Long-Term Stewardship assessment concluded that the remedy's institutional and engineering controls were fully implemented and protective.

Since 2018, UCC has continued active stewardship of the remedy, including submission of annual Operations and Maintenance (O&M) Technical Memorandums and Annual Groundwater Monitoring Reports to WVDEP and EPA. Updated Materials Management and Groundwater Monitoring Plans were submitted in 2025 and reviewed and commented on by the agencies. Site-related updates are routinely discussed during bi-monthly UCC–agency coordination calls, supporting ongoing agency oversight.

Long-Term Stewardship Site Visit: On October 28, 2025, WVDEP conducted a long-term stewardship assessment visit with Union Carbide representatives and Jacobs, UCC's long-time consultants, to discuss and assess the status of the implemented remedies at the site.

The attendees included:

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Paul Weber	The Dow Chemical Company	Pwever6@dow.com
Patrick Kish	Jacobs Solutions, Inc.	patrick.kish@jacobs.com

Institutional Controls (ICs) Status:

UECA Environmental Covenants: Covenants are the method for implementing institutional controls required as a condition of the Final Decision. Currently, eight Environmental Covenants (ECs), including covenants for Tract D (recorded June 11, 2019) and the Tract C/OODA Inc. parcel (recorded October 4, 2019), are in place The following ICs apply to one or more of the six (6) Facility tracts (see Figure 3):

Land Use Restriction: The Property shall not be used as "residential" property (as defined in W.Va. Code §22-22-2(bb)). There were no residential structures or uses of the site at the time of the visit, and UCC is in compliance with the land use restrictions.

Groundwater Use Restriction: Extraction of groundwater for groundwater monitoring and/or remediation approved by WVDEP is permitted. Any other use of groundwater is prohibited. All parties at the Facility are connected to a public water supply, and there were no observed uses of groundwater at the time of the visit.

Vapor Intrusion (VI) Building Restrictions: All occupied structures in the area of property designated as the vapor intrusion restriction area (as specified in EC exhibits) shall have a vapor control system approved by a West Virginia registered professional engineer and installed by properly trained and appropriately licensed personnel in full compliance with all applicable federal, state and local laws, rules and regulations, and ordinances.

Materials Management Plan: Any construction activities such as excavation, drilling, penetration or any other type of disturbance must be conducted by a contractor who is informed and trained about the releases and exposure to contaminants known to exist at the site. The contractor is required to perform the work in accordance with a site-specific Health and Safety Plan. An updated Materials Management Plan (MMP) covering the entire Technology Park site and tracts has recently been reviewed and commented on by WVDEP and EPA and is anticipated to be finalized in the first half of 2026. Also, existing surface covers shall be maintained over impacted areas to minimize surface water infiltration and prevent direct contact with soils.

During the Facility walk, earth-moving activities and contractors were observed. It was confirmed that contractors work was reviewed and approved by UCC's team with regular guidance about site related matters. Most asphalt or concrete paved surfaces were observed to be intact during the site walk as well.

UCC consultants Jacobs inspect the IC on a quarterly basis. According to the 2024 Operations and Maintenance Memorandum submitted to WVDEP, the inspections had not identified any nonconforming land use or new structures within the VI restriction areas. Furthermore, Kanawha County Health Department (KCHD) had not identified the presence of any potable wells at the facility or on the offsite affected properties.

Engineering Controls (ICs) Status:

Landfills: The Facility includes three inactive landfills, the Lower Ward Landfill, Ward A Landfill, and Ward B Landfill. These landfills were constructed primarily to receive fly ash slurry from the Facility. The landfills also received oxide tails from the UCC South Charleston facility's propylene oxide production unit, and municipal sludge from the South Charleston publicly owned treatment works. The landfills were created by constructing upper and lower dikes across a hollow, designated as Ward Hollow. The Lower Ward Landfill is located between the upper and lower dikes, and the Ward A and B Landfills are located south of the upper dike. Use of the landfills was discontinued in 1973, after which the Lower Ward and Ward B Landfills were covered and the Ward A Landfill was turned into a scenic pond. The parking lot cover at Lower Ward Landfill and the clay-soil mix cover at Ward Landfill B were observed to have been properly maintained at the time of the site visit.

Lower Ward Leachate Collection System: The leachate collection system collects leachate from the Lower Ward Landfill and transfers it to the South Charleston wastewater treatment plant via the Holz Impoundment decant line. The system is inspected weekly for overflow conditions, operation of the sump, testing of the telemetry system, and evidence of damaged or ineffective parts. According to the 2024 Operation and Maintenance technical memorandum dated March 28, 2025 (O&M Report), solids accumulating in the various sections of the system were vacuumed, and a variable-frequency drive on the southern pump was replaced. One overflow event, which was recorded for April 11, 2025, occurred due to excessive rainfall and runoff impacting the sump. Vacuum trucks called to prevent overflow could not get to the site in time due to severe flooding in the Charleston area. The event was reported to WVDEP.

Ward B Central Drain Sump Pumping System: The sump pumping collection system collects leachate from the central drain line in Ward B Landfill during normal soil saturated conditions and transfers it to Holz Impoundment. During rain events, the sump allows stormwater to overflow to Ward A pond. The system was inspected weekly to determine if the system was operational and for possible damages. Inspections were also completed during some of the rain events to verify water flowing to Ward A pond through the overflow pipe. The Ward B Sump was requested to be permanently shut down and decommissioned in the new RCRA Permit application after a recharge study in 2018 that demonstrated that the sump and the central drainage line can be removed from service without adversely affecting landfill cover drainage and drainage to the Ward A landfill. The new Permit was issued in July 2019. Currently, Ward B Landfill is inspected quarterly for signs of damage to the landfill cover. No signs of erosion, furrows, ruts or animal burrows were observed during the 2024 inspections.

Groundwater Monitoring*:* Two areas of groundwater contamination are currently monitored; the Ward Hollow area and Greenhouse area.

The Lower Ward Landfill, the Ward A/B Landfills, and the former brine wells are affecting groundwater in Ward Hollow. Contaminated groundwater migrates from these source areas to the underlying weathered bedrock and then downgradient into Ward Hollow. Through many years of monitoring, groundwater flow is consistent with topography, flowing northwest towards the Kanawha River.

Monitoring wells in this area were sampled quarterly through 2018, and on a reduced quarterly monitoring schedule from 2019 through the end of 2025. Agencies recently have approved a further reduction to annual monitoring (once per calendar year), beginning in the second quarter of 2026.

The most prominent constituents present within the Ward Hollow groundwater plume are1,4-dioxane, benzene, bis(2-chloroisopropyl)ether, and barium. The 2024 analytical data showed the following for the prominent constituents: 1,4-Dioxane has the largest lateral extent in groundwater; it is delineated by the monitoring well MW-31, which also delineates bis(2-chloroisopropyl)ether and barium plumes. Benzene appears to have the smallest areal footprint and is delineated by MW-28.

The Greenhouse area monitoring network includes two monitoring wells, WVU-MW04 and MW-104A, which are currently sampled annually for volatile organic compounds (VOCs). Agencies recently have approved a reduced monitoring at a biennial rate (once every other calendar year). Historically, groundwater in this area flows to the northwest, toward the Kanawha River. During the 2024 sampling event, 1,4-dioxane exceeded its screening level in groundwater at MW-104A in September 2024 but was not detected at WVU-MW04. PCE and TCE were detected at WVU-MW04 during the September 2024 event, but concentrations were below the MCLs.

Reporting Requirements/Compliance: UCC is required to submit annual groundwater monitoring reports. There have been no issues of noncompliance regarding reporting requirements, as UCC has submitted a report each year, the last of which was received March 31, 2025. Copies of voluntary inspection reports, as well as maintenance, transport and disposal records are kept onsite. No transfer of property, change in use of the property, or work that will affect contamination at the property has been reported.

Financial Assurance (FA): UCC has been compliant with permit FA requirements for the site over the many years. WVDEP has approved the latest FA cost estimate update and the financial instrument documentation on January 26, 2026.

Mapping: The EPA facility website map is accurate and includes an interactive map of the 574-acre Property. The map was previously field verified and no issues were noted. A downloadable geospatial PDF map is available on EPA's corrective action facility webpage under the "Reports, Documents and Photographs" section, found here.

Conclusions and Recommendations: WVDEP has determined that the ICs/ECs established for the site by the Final Remedy Decision (FDRTC) are in place and that all of the remedy elements are being fully implemented.

Attachments:

Figure 1: Aerial Map of Union Carbide Corporation Technology Park site.

Figure 2: Site Locations Map.

Figure 3: Land use restrictions map

Figure 4: Lower Ward Landfill. A large portion of the landfill cover serves as a parking lot. IMG 2942

Figure 5: Lower Ward Landfill. Looking west. An empty portion of the parking lot/landfill cover.

Figure 6: Monitoring wells MW-34 and MW01 (in the back).

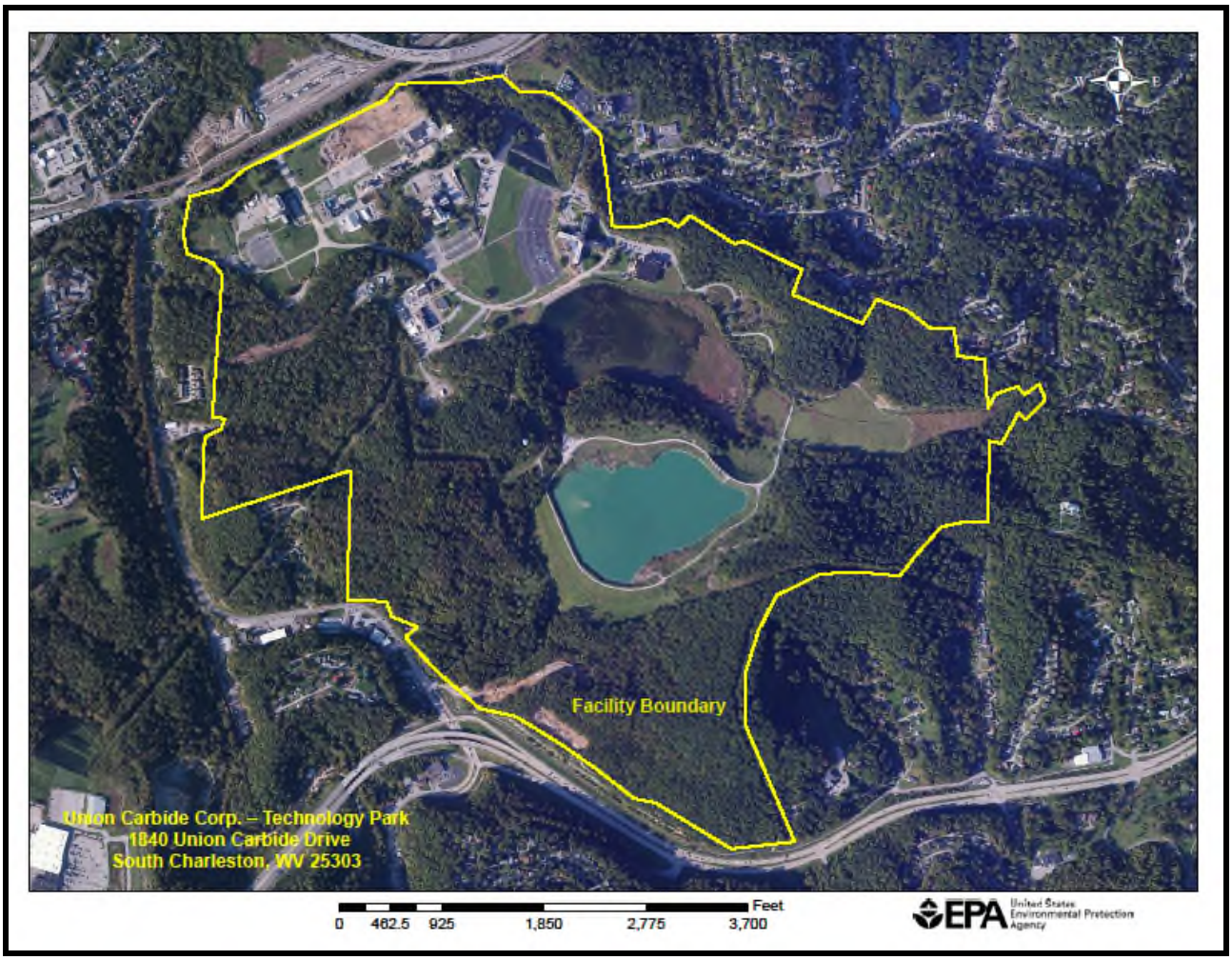
Figure 7: Leachate collection tank and pump housing for the Lower Ward Landfill.

Figure 8: Wetland vegetation along the eastern edge of Ward A Landfill.

Figure 9: Looking north from the northeast edge of Holz impoundment to the boundary area between Ward A Landfill and Ward B Landfill.

Figure 10: Looking west southwest from the northeastern corner of the Holz Impoundment.

Figure 11: A cluster of monitoring wells (MW-05, MW-06, and MW-29) along the border of Tracts B and C.



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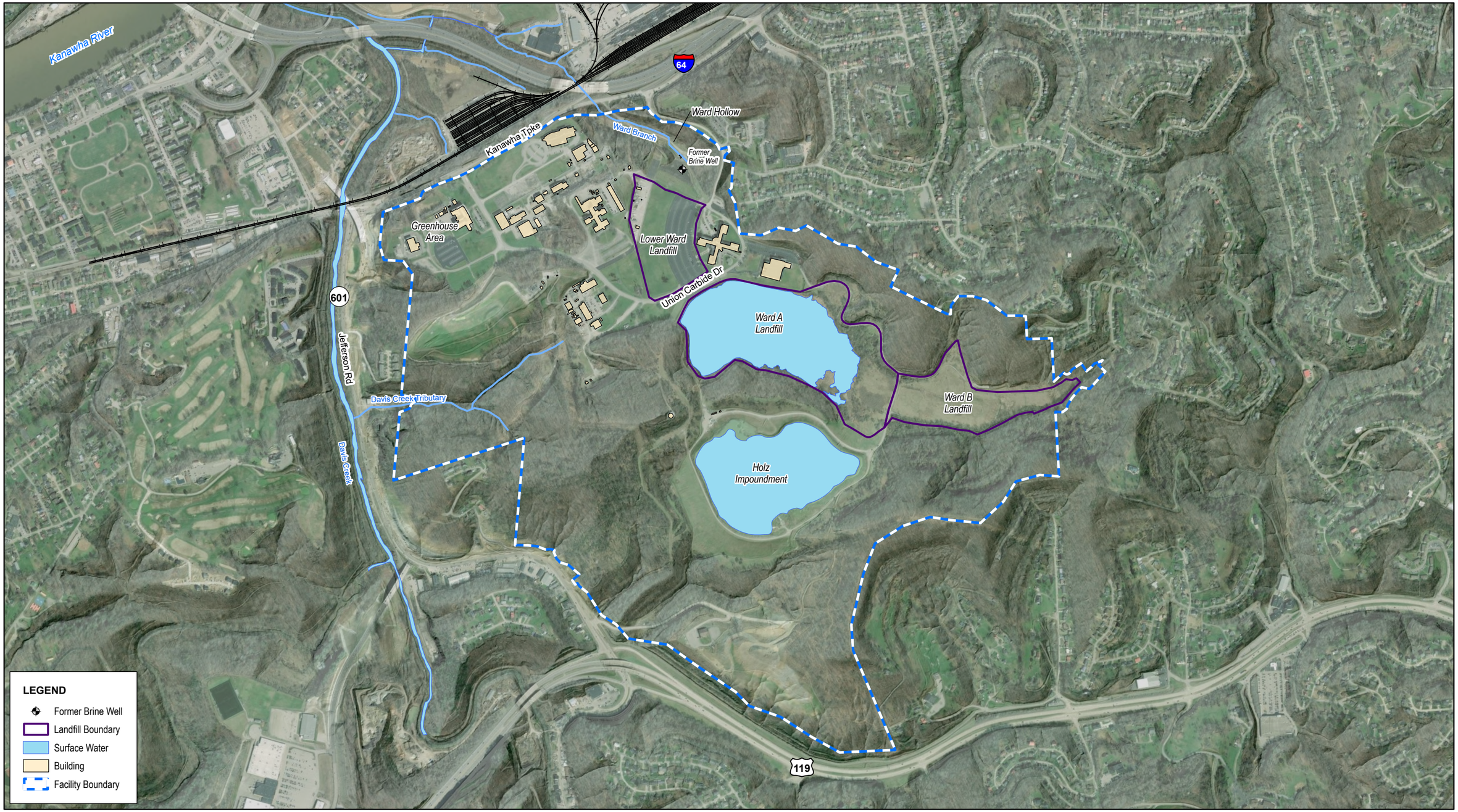
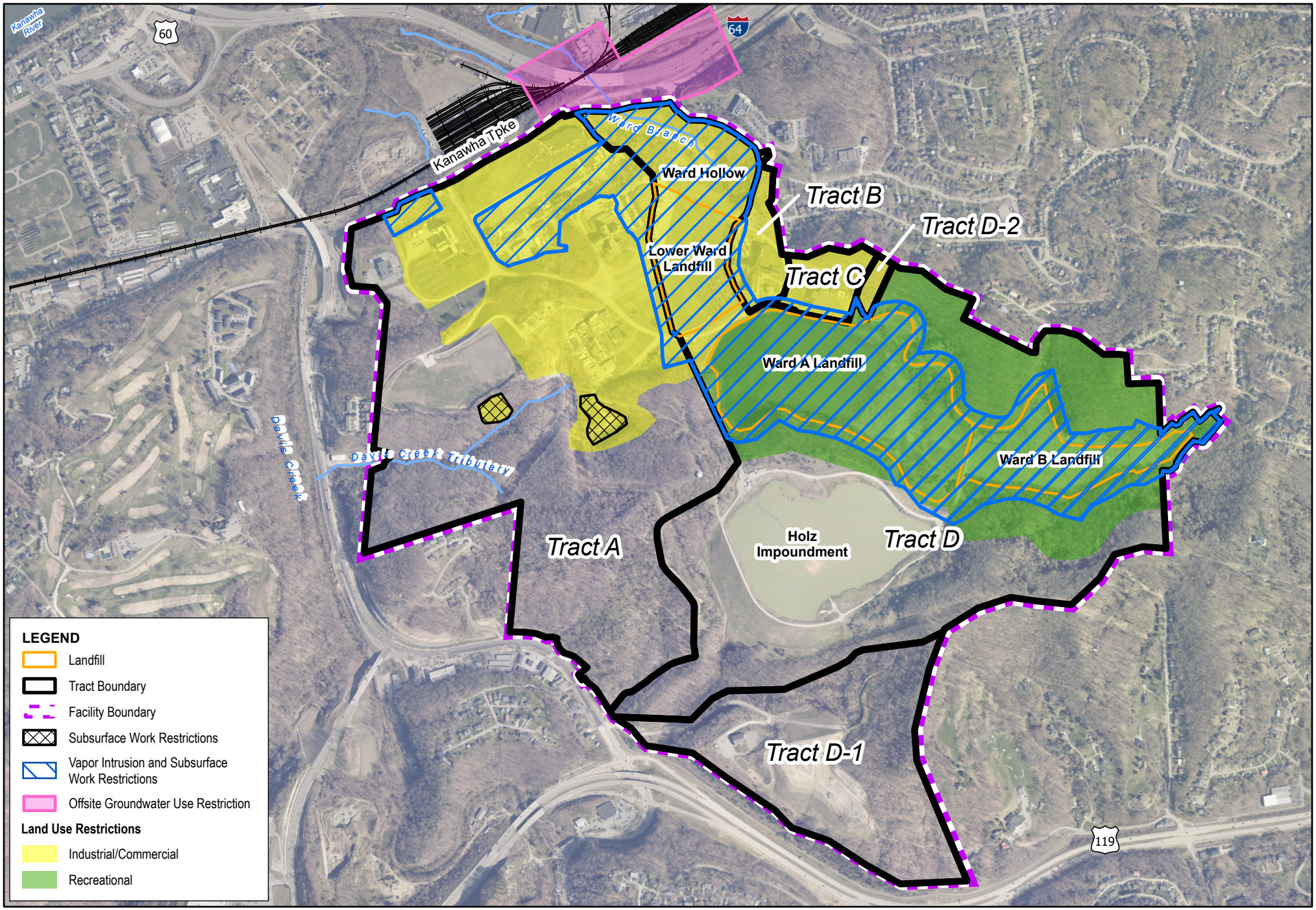


Notes:
1. 2023 Aerial Photography provided by Esri ArcGIS Online World Imagery.

Figure 2.
2024 Site Location Map
(2024 Groundwater Monitoring Report)
UCC Technology Park, South Charleston, West Virginia

Jacobs



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0 550 1,100
Feet

Note:
1. 2025 Aerial Photography web service provided by the West Virginia GIS Technical Center.
2. There is a groundwater use restriction for all tracts at the facility.

Figure 3.
Land Use Restrictions
UCC Technology Park, South Charleston, West Virginia

Jacobs

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