



Prepared for

DTE Electric Company
One Energy Plaza
Detroit, Michigan 48226

2024 ANNUAL INSPECTION REPORT SIBLEY QUARRY LANDFILL

TRENTON CHANNEL POWER PLANT

Trenton, Michigan

Prepared by

Geosyntec 
consultants

Geosyntec Consultants of Michigan

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CHE8242V

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1. INTRODUCTION

1.1 Overview

This 2024 Annual Inspection Report (AIR) was prepared by Geosyntec Consultants of Michigan, Inc. (Geosyntec) for DTE Electric Company's (DTE's) Sibley Quarry Landfill (Landfill). The inspection was performed to comply with the United States Environmental Protection Agency (USEPA) Coal Combustion Residual (CCR) Rule published on April 17, 2015, as amended July 30, 2018 (40 CFR Parts 257 and 261), August 28, 2020 (Part A Rule), and November 12, 2020 (Part B Rule). Under the CCR Rule, the Landfill is an "existing CCR landfill" per 40 CFR 257.53 and must be inspected by a qualified professional engineer on a periodic basis, not to exceed one year.

The Landfill is located in Trenton, Michigan. The Landfill is an inactive limestone quarry that was operated since the mid-nineteenth century and mined to more than 300 feet below ground surface (bgs) in some areas. The Landfill is currently licensed as a coal ash landfill under the provisions of Michigan Part 115, Solid Waste Management, of the Natural Resource and Environmental Protection Act (NREPA), 1994 Public Act (PA) 451, as amended. License Number 9602 effective May 15, 2020, was issued to DTE by EGLE.

1.2 Purpose

The objective of the inspection is to detect indications of instability in time to allow planning, design, and implementation of appropriate mitigation measures. The purpose of the inspection under the CCR Rule [40 CFR 257.84(b)(1)] is:

"...to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards."

The inspection must, at a minimum, include:

- (i) A review of the available information regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record (e.g., the results of an inspection by a qualified person, and results of previous annual inspections); and
- (ii) A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit.

The purpose is accomplished through periodic visual inspections (and photo-documentation) of the Landfill, review of the previous inspection, and discussions with site personnel about the history of the site and general operations at the Landfill. Observations from the visual inspection,

document review, and discussions are summarized in an inspection report. The inspection report addresses the following under the CCR Rule [40 CFR 257.84(b)(2)]:

- (i) Any changes in geometry of the structure since the previous annual inspection;
- (ii) The approximate volume of CCR contained in the unit at the time of the inspection;
- (iii) Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit; and
- (iv) Any other change(s) which may have affected the stability or operation of the CCR unit since the previous annual inspection.

1.3 Report Organization

The remainder of this report is organized as follows:

- Section 2 - The Site History and Current Operations: provides information on the history of the Landfill and DTE's current operations.
- Section 3 - Observations from Annual Inspection: summarizes visual observations recorded during the 2024 inspection of the Landfill.
- Section 4 - Evaluation of Observations: based on the inspection results, evaluates if the design, construction, operation, and maintenance of the Landfill are consistent with recognized and generally accepted good engineering standards.
- Section 5 - Conclusions: provides the overall conclusions of the annual inspection and certification of the AIR.

1.4 Terms of Reference

The annual visual inspection was performed on May 28, 2024, by Dr. Clinton Carlson, Ph.D., P.E.¹ and Dr. Jorge Romaña Giraldo, Ph.D. of Geosyntec, with assistance from DTE Staff.

¹ Clinton Carlson, Ph.D., P.E. is the qualified professional engineer per the requirements of §257.53 of the CCR Rule. He has ten years of experience with coal ash related projects. His resume is provided in Appendix A.

This report was prepared by Dr. Carlson and Dr. Romaña Giraldo and reviewed by Mr. John Seymour, P.E. of Geosyntec.

2. THE SITE HISTORY AND CURRENT OPERATIONS

The site originally operated as a limestone quarry beginning in the 1800s. The site was acquired by DTE in 1951 and has operated as a landfill since. Over the life of the Landfill, it received CCR from various DTE power plants, and other local approved power plants, including Wyandotte Power Plant (mainly fly ash with some bottom ash). At the time of inspection, the Landfill was receiving CCR from DTE's Monroe Power Plant, along with inert material generated from DTE projects in Michigan. In addition, CCR and inert material from the top of the northern slopes are being excavated and hauled to the bottom of the Landfill. The Trenton Channel Power Plant retired in June 2022 and no longer sends CCR to the Landfill. Currently, the Landfill accepts materials generated only by DTE.

The approximate disposal rate is approximately 400,000 cubic yards (cy) of CCR and 50,000 cy of inert material per year; however, this rate can vary significantly based on market conditions for the beneficial use of CCR. Additionally, DTE is closing the Monroe Power Plant Bottom Ash Impoundment by removal; approximately 1,200,000 tons of excavated CCR was disposed of at the Landfill between 2021 and 2024.

There are no construction or design documents available for the original quarry. Based on a review of current and historical maps, and correspondence with DTE personnel, limestone and dolomite were mined from the site to a depth of approximately 300 feet bgs, with multiple setbacks/benches.

The current site plan is provided in Figure 1. The site is approximately 207 acres, of which approximately:

- (i) 98 acres is currently licensed as an active landfill area;
- (ii) 90 acres have received final cover approved by the Michigan Department of Environment, Great Lakes, and Energy (EGLE); and
- (iii) the remaining 19 acres are not used for disposal.

The operations at the site consist of three main activities:

- (i) placement of CCR;
- (ii) continuous pumping of groundwater and stormwater; and
- (iii) treatment of pumped water before discharging into the Detroit River through a National Pollutant Discharge Elimination System (NPDES) permit.

The amount of CCR disposed of in the Landfill is currently estimated to be approximately 14,140,000 cy. CCR and inert material are hauled by trucks and placed at the bottom of the Landfill in progressive lifts over the drainage collection layer.

Groundwater is continuously pumped from the lowest point of the Landfill to maintain a consistent groundwater level below the CCR. Therefore, the steady-state groundwater level is maintained below the lowermost area of the Landfill. The pumping rate of the chimney sump at the bottom of the Landfill is approximately 1.6 million gallons per day (mgd) based on discussions with DTE personnel. Groundwater is pumped into two ponds located at the top of the Landfill (referred to as “upper ponds”) and treated. Treated water from the upper ponds discharges into a conveyance channel. The conveyance channel is approximately a half mile long and conveys water to settling ponds. A pump house at the southern end of the settling ponds pumps the water to the Detroit River. The water is discharged to the Detroit River, consistent with NPDES permit requirements. Water samples are collected weekly from the pump house. The water samples are tested, and analytical results are compared to the limits provided in the NPDES permit.

Dust at the site is controlled in accordance with the site-specific Fugitive Dust Plan. Per the plan: (i) vehicular speed is limited to a maximum of 15 mph; (ii) paved surfaces are frequently swept with wet broom equipment; and (iii) unpaved roads are wetted during landfill operations, as necessary. Unpaved roads are also treated with an acrylic cement emulsion two times per year. In the Annual Fugitive Dust Report dated November 19, 2024, DTE reported that there were no citizen complaints about fugitive dust between November 2023 and October 2024.

3. OBSERVATIONS FROM ANNUAL INSPECTION

Inspection results and photographs from the annual inspection are provided in Appendix A. The key observations from the inspection are summarized below.

- 1) The following changes to the site that are part of the closure design have occurred since the 2023 inspection.
 - a. The northern slopes have been regraded to a four horizontal-to-one vertical slope (4H:1V) in preparation of the closure of the Landfill (Photographs #1, #2, #17).
 - b. A stormwater diversion berm, stormwater channel, and concrete culvert have been added to the top of the northern CCR slopes to convey stormwater from the top of the northern slopes over the western sidewalls (Photographs #1, #3, #4).
 - c. CCR excavated from the northern slopes (Photographs #2, #16) and from DTE's Monroe Power Plant has been hauled and placed at the bottom of the Landfill (Photographs #7 through #11, #13). CCR is disposed of in the Landfill by dumping, spreading, and compacting the CCR in lifts. The top elevation of the CCR placed within the active CCR filling area has increased by approximately 50 feet since the 2023 inspection.
 - d. The chimney sump (Photograph #5) was raised in height by approximately 40 feet since the 2023 inspection. This increase is consistent with the progression of the CCR placement within the active filling area of the Landfill. Additional raises are expected in the future to keep the top of the chimney sump above the top of CCR as more CCR is placed.
- 2) Trucks haul CCR to the active filling area at the bottom of the Landfill using the main haul road, Switchback Two (Photographs #3, #14, #16, #17). Switchback Two was in use and observed to be in good condition during the inspection.
- 3) The groundwater and stormwater flow by gravity and collect in the chimney sump at the bottom of the Landfill through the leachate collection and filter layers (Photograph #5). Along the haul road, stormwater channels, check dams, diversion berms, and coir logs are present to convey stormwater toward the bottom of the Landfill and sump (Photographs #10, #14, #15). Stormwater features (i.e., diversion berm, stormwater channel, and concrete culvert) are also present along the top of the northern CCR slopes (Photographs #1, #3, #4). The stormwater features were observed to be in generally good condition during the inspection and limiting the formation of erosion rills on the side slopes.

- 4) Eroded sediments have collected behind the check dams in the stormwater channel at the bottom of the Switchback Two haul road (Photographs #10, #12). However, the functionality of the check dams to slow the flow of contact water and limit erosion at the toe of the Switchback Two haul road slopes did not appear to be impacted in the current condition.
- 5) One erosion rill was observed on the lower slope of the Switchback Two haul road (Photograph #12). Due to the incised nature of the Landfill, this feature does not represent an existing concern to the safety and operation of the Landfill.
- 6) The side slopes of the CCR placed within the active filling area are relatively steep (approximately 1.5-horizontal-to-1-vertical, 1.5H:1V) (Photographs #7, #10, #11). However, no indications of slope instabilities (e.g., cracks) were observed during the inspection and this configuration is temporary during filling operations.
- 7) Natural fractures in the bedrock sidewalls lead to groundwater inflow at multiple locations (Photographs #8, #9, #11); however, this inflow flows to the bottom of the Landfill where it is collected within the leachate collection layer and directed to the chimney sump.
- 8) The natural fractures in the sidewalls pose a potential safety risk for rock falls. DTE has taken measures to address this safety concern by keeping a minimum of 20 feet between the sidewalls and the active filling operations (Photograph #11).
- 9) The chimney sump and pumps appeared to be in good condition and were operational during the inspection (Photographs #5, #6).
- 10) The upper ponds (Photographs #18, #19, #20), conveyance channel (Photographs #21, #22), and Settling Ponds #3 and #4 (Photographs #23 through #26) appeared to be in generally good condition during the inspection. These features are used to store, convey, and treat leachate collected at the bottom of the Landfill before discharging to the Detroit River. Minimal erosion and some vegetation was observed on the side slopes of the ponds and channel. Water was flowing from the upper ponds through the conveyance channel to Settling Ponds #3 and #4 during the inspection. Water discharging from the conveyance channel to Settling Pond #4 had a light, grey-blue color (Photograph #23). The instrument panel and pumps for the pump house at the south end of Settling Pond #4 were in good condition (Photograph #27).
- 11) Some erosion was observed in the riprap and side slopes below the outfalls of the pipes from the upper ponds to the conveyance channel (Photograph #21) and from Settling Pond #4 to Settling Pond #3 (Photograph #25). However, no signs of slope instabilities (e.g., cracks) were observed in these locations.

- 12) Heavier vegetation was observed along the conveyance channel west of the settling ponds (Photograph #22) and within the settling ponds below the outfalls from the pipes into the ponds (Photographs #23, #25). However, no erosion was observed on the side slopes of the channel or pond and the vegetation did not appear to impact the flow of leachate.
- 13) A boundary ridge surrounds the area and prevents run-on for events up to and exceeding a 25-year, 24-hour storm in accordance with the Run-on Run-off Control Plan for the Landfill.
- 14) The ash conveyor system on the southeast edge of the quarry, constructed in 2022 (Photograph #28), has not been used between the 2023 and 2024 inspections.

4. EVALUATION OF OBSERVATIONS

The Landfill includes a former quarry where any eroded material, groundwater, and stormwater flow to the bottom and are either contained or collected in the chimney sump and pumped to the upper ponds to be treated and discharged. The sidewalls and the groundwater pumping system act as a containment system for the Landfill, preventing release of CCR into areas beyond the footprint of the Landfill. The design, construction, maintenance, and current operations of the Landfill are consistent with recognized and generally accepted good engineering standards, based on available information. The Landfill was not observed to have any existing structural weaknesses or conditions disrupting the operation and safety during the annual inspection.

The Landfill slopes, stormwater features, Switchback Two haul road, placement of CCR at the bottom of the quarry, chimney sump and pumps, and leachate collection, treatment, and conveyance system appeared generally well-maintained. However, the following conditions were identified during the annual inspection that should be addressed to improve the overall efficiency of the Landfill.

- 1) The side slopes of the CCR placed within the active CCR filling area are relatively steep, but no erosion or signs of slope instabilities were observed during the inspection. Any erosion or movement of the slopes will be confined within the Landfill.
- 2) Eroded sediments have accumulated behind the check dams in the stormwater channel at the bottom of the Switchback Two haul road. The check dams appear to be able to properly slow the stormwater flow velocity for the current conditions.
- 3) One erosion rill was observed on the lower slope of the Switchback Two haul road. The rill had not significantly changed in size or geometry since the 2023 inspection. Although any eroded material will be contained within the Landfill footprint, continued erosion could begin to impact the stability of these slopes.
- 4) Heavier vegetation was observed along the conveyance channel west of Settling Pond #4 and near the outfall from the pipes into the settling ponds. The current conditions did not appear to impact flow through the channel and settling ponds and no erosion of the side slopes were observed.
- 5) Some erosion was observed in the riprap and side slopes below the outfalls of the pipes from the upper ponds to the conveyance channel and into Settling Pond #3. However, the erosion has not clearly increased since the 2023 inspection and no signs of slope instabilities (e.g., cracks) were observed along the embankments these pipes penetrate during the 2024 inspection.

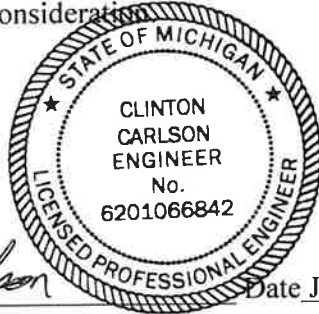
Geosyntec provides the following recommendations to address observed conditions.

- 1) DTE should continue monitoring the active CCR filling area near the side slopes for early signs of distress like cracks or subsidence and erosion rills to identify potential safety concerns early. This should continue to be implemented during active filling operations.
- 2) Some sediments behind the check dams in the stormwater channel at the bottom of the Switchback Two haul road should be removed. This will increase the hydraulic capacity within the stormwater channel. The sediments do not need to be completely removed because of the incised nature of the Landfill. This recommendation should be implemented within two years.
- 3) DTE should continue to monitor the side slopes of the Switchback Two haul road for the expansion of existing erosion features or the formation of new erosion features to identify potential safety concerns early. This should continue to be implemented during active filling operations.
- 4) Vegetation along the conveyance channel and within the settling ponds should be removed to maintain the hydraulic capacity of these features and prevent erosion. DTE mows vegetation around these and other features of the Landfill as part of routine maintenance. This recommendation should be implemented within two years.
- 5) Additional riprap, gravel, and sand should be placed below the pipe outfalls from the upper ponds to the conveyance channel and from Settling Pond #4 to Settling Pond #3 to replace eroded material and maintain the stability of the embankments between these features. Because the erosion has not clearly progressed since the 2023 inspection and no signs of instabilities were observed, this recommendation should be implemented within five years.

5. CONCLUSIONS AND CERTIFICATION

The design, construction, operation, and maintenance of the Landfill is generally consistent with recognized and generally accepted good engineering standards in accordance with the CCR Rule [40 CFR 257.84(b)(1)]. The 2024 annual visual inspection did not identify any structural instabilities that would cause CCR to release into the areas outside the footprint of the Landfill. Geosyntec identified five conditions detailed in Section 4 requiring continued monitoring and maintenance. Recommendations and timelines to address these conditions are provided in Section 4 for DTE's consideration.

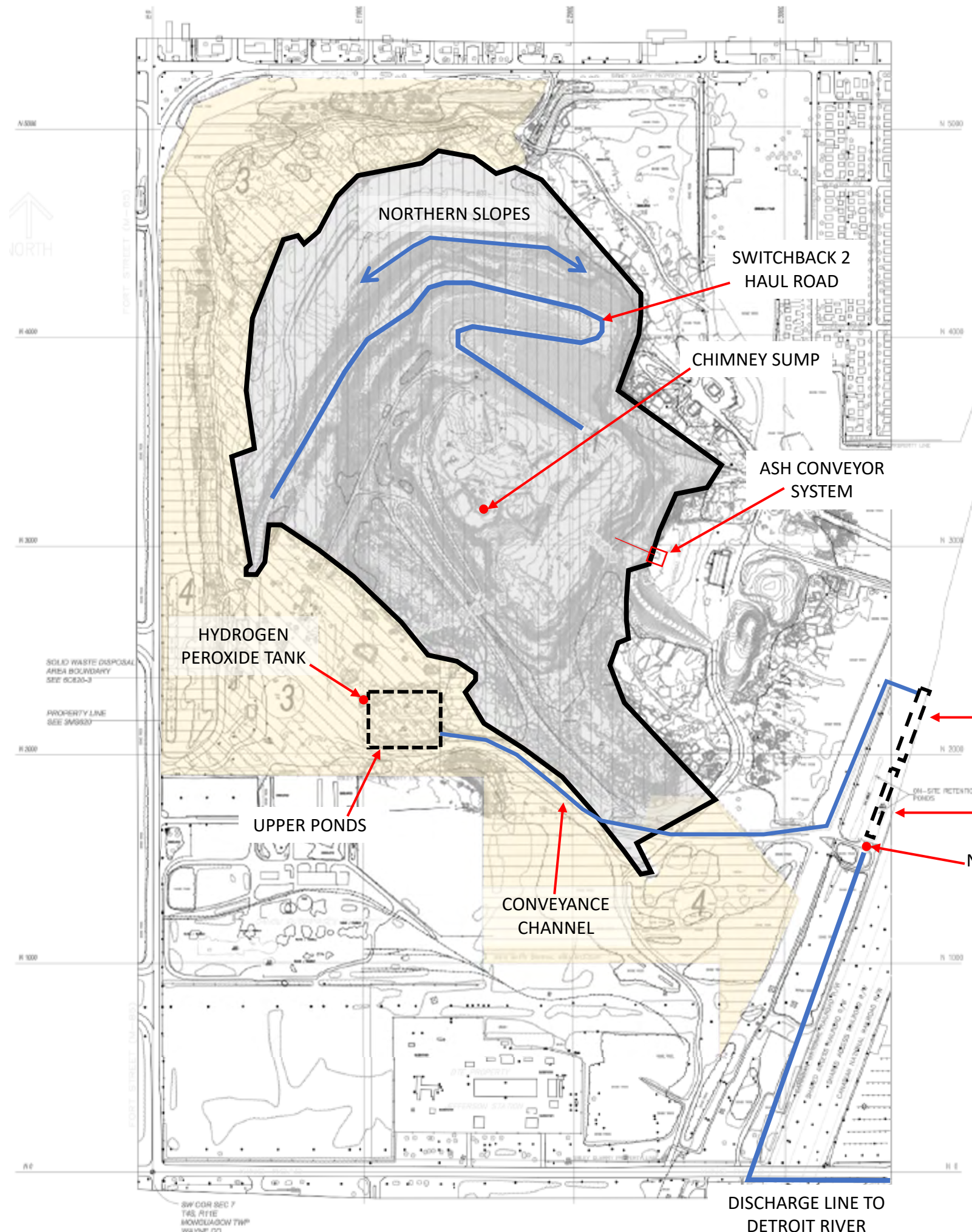
Certified by:



Clinton Carlson

Date January 9, 2025

Clinton Carlson, Ph.D., P.E.
Michigan P.E. License Number 6201066842
Project Engineer



NOTE:
 TOPOGRAPHIC INFORMATION
 GENERATED FROM AERIAL PHOTOGRAPHY
 DATED MAY 16, 2023, BY PEA GROUP

- PERMITTED FILL AREA
- APPROXIMATE LANDFILL AREA THAT RECEIVED CLAY COVER



SIBLEY QUARRY LANDFILL SITE PLAN		FIGURE 1
Geosyntec consultants <small>Geosyntec Consultants of Michigan</small> DETROIT, MICHIGAN		
PROJECT: CHE8242V	JANUARY 2025	

SW COR SEC 7
 T4S, R11E
 MONROVIA TWP
 WAYNE CO
 MICHIGAN

APPENDIX A

Resume of Clinton Carlson, Ph.D., P.E.
(Qualified Professional Engineer)



Clinton P. Carlson, PhD, PE

Qualifications

Dr. Carlson is a geotechnical engineer with ten years of experience on projects related to design and remediation of landfills and coal combustion residual impoundments, dam safety, and geotechnical instrumentation. He is a Project Engineer with Geosyntec and part of the firm's dams and levees practice area. His work has included managerial responsibilities for project budgets and schedules and has primarily supported federal and power clients for both small and large projects. Clinton has managed and supported projects for risk assessments, slope stability analyses, and instrumentation for landfills and dams.

Specialties

Landfill and CCR Design and Remediation
Dam Safety
Geotechnical Instrumentation

Education

PhD, Civil Engineering, University of Michigan, Ann Arbor, MI, 2014
MSE, Civil Engineering, University of Michigan, Ann Arbor, MI, 2010
BSE, Civil & Environmental Engineering, University of Michigan, Ann Arbor, MI, 2009

Licenses/Certifications

Professional Engineer: IN, MI

Relevant Project Experience

Annual Inspections of CCR Units, Confidential Client, Southeast Michigan | Inspections of CCR units are conducted annually as part of the CCR Rule to identify any site conditions that pose a concern to the safe operation and stability of the CCR units. Project manager in charge of financials and engineer in charge of performing annual inspections for three CCR units for a client in Southeast Michigan. Prepared inspection reports to summarize observed conditions at the three CCR units. Interacted with client representatives to discuss necessary actions to address potential concerns. (Mar. 2022–Present)

Monitoring and Maintenance for CCR Units, Confidential Client, Southeast Michigan | Project manager in charge of financials and engineer in charge of overseeing inspections, monitoring, and maintenance of geotechnical instrumentation system of two CCR units for a client in Southeast Michigan. The geotechnical instrumentation system included multiple monitoring wells, settlement plates, vibrating wire piezometers, manual inclinometers, and ShapeArray inclinometers. Instrumentation data were evaluated to identify near real-time concerns

for the safe operation and stability of the CCR units. Provided monthly summary reports to the client representatives and met with them to discuss the monitoring data on a bi-monthly basis. Conducted site inspections of observed conditions posing concerns for the safe operation and stability of the CCR units on at the request of the client. (Mar. 2022–Present)

FERC Part 12D External Audits of Owner's Dam Safety Programs, Multiple Clients, MI and OH | The FERC regulations require dam owners periodically have an external consultant audit the Owner's Dam Safety Program (ODSP), which includes dam safety documents like the Dam Safety Surveillance and Monitoring Plan (DSSMP) and Emergency Action Plan (EAP). The City of Ann Arbor and American Municipal Power, Inc. contracted Geosyntec to perform the audits of the ODSP for their portfolio of dams (two and four, respectively) in 2024. Performed reviews of the dam safety documents, conducted interviews with dam safety personnel to evaluate their understanding of the dam safety program, observed site inspections conducted by personnel as part of the dam safety program, and prepared a report with the findings and conclusions on the content and implementation of the ODSP. Project manager in charge of the project financials and schedule and the point-of-contact with the owners. (Jan. 2024-Dec. 2024)

FERC Part 12D Periodic Inspections for Barton and Superior Dams, City of Ann Arbor, Ann Arbor, MI | The City of Ann Arbor owns and operates the Barton and Superior Hydroelectric Projects (Barton and Superior Dams) in Ann Arbor, Michigan. Barton and Superior Dams are used by the City of Ann Arbor for power generation and thus, are under regulation by the Federal Energy Regulatory Commission (FERC). FERC regulations require dam safety inspections are performed every five years by Independent Consultant (IC) Teams. Geosyntec served as the IC Team for the City of Ann Arbor for the Ninth FERC

Part 12D Periodic Inspections of Barton and Superior Dams performed in 2023. Served as the project manager and point-of-contact with the City of Ann Arbor on behalf of the IC Team. Member of the IC Team (geotechnical engineering support and field inspection team) that performed the document review, developed the Inspection Plans, prepared the Pre-Inspection Preparation Reports, performed the field inspections, and prepared the Periodic Inspection Reports. The Periodic Inspection Reports were completed and submitted to FERC before the December 2023 deadline. (Jan. 2023–Dec. 2023)

Landfill Stability Evaluation, Confidential Client, Southeast US | Contacted by the client to evaluate an instability at an existing landfill including the implementation of instruments to measure and evaluate progression of instability. Project manager in charge of financials and engineer in charge of developing instrumentation plan and evaluating measurements of instrumentation. Conventional surveying stakes and an automated monitoring total station were implemented to measure progression of instability. Evaluation of measurements was used to inform the client on progression of instability and provide recommendations for implementation of mitigation measures. Weekly summary reports of instrumentation measurements were provided to the client while implementing mitigation measures. Additional support was provided to the client in discussions with the state regulator. The monitoring systems were also utilized to provide additional safety measures during the staged temporary removal of a buttress berm in order to tie-in liner systems for new landfill cells to the existing liner system. Monitoring data are currently summarized in monthly reports and provided to the client. (Aug. 2019–Present)

Landfill Design Projects for Power Company, Confidential Client, Southeast US | Engineer in charge of coordinating and performing the geotechnical analyses for the permitting and closure of multiple sites for a power company. Geotechnical analyses performed for the sites included subsurface investigation and geotechnical material properties interpretation, slope stability analyses (including veneer and liner stability), settlement calculations for liner and cover systems, and hydrologic evaluations for liner and cover systems. The computer programs Slide and HELP were used to perform the slope stability analyses and hydrologic evaluations, respectively. (June 2015–Present)

Portsmouth Gaseous Diffusion Plant On-Site Waste Disposal Facility, Fluor-BWXT Portsmouth, Piketon, OH | The Department of Energy's Portsmouth On-Site Waste Disposal Facility is being constructed for the disposal of on-site hazardous waste materials. Engineer that aided geotechnical analyses for the design and construction of the facility. Geotechnical analyses performed during the design phase included slope stability analyses (including veneer and liner stability), settlement calculations for liner and cover systems under variable loads, and foundation design for leachate conveyance systems. During construction, performed slope stability analyses for excavation conditions and geo-structural calculations and reinforcement detailing for reinforced concrete valve houses constructed as part of a leachate transmission system and a footing for an interim transfer ramp. The computer program Slide was used to perform the slope stability analyses. (Apr. 2015–Present)

Inspections and Mitigation for CCR Landfill, Confidential Client, Southeast Michigan | Probabilistic slope stability analyses for a CCR landfill in Southeast Michigan identified unsatisfactory conditions for existing slopes that required mitigation measures. Project manager in charge of project financials and schedule and engineer in charge of developing inspection and construction plans to mitigate unsatisfactory conditions. Developed an inspection plan to identify indicators of slope instabilities and allow for safe operation conditions. The inspection plan was carried out by site personnel prior to and during construction and supported by Geosyntec. Developed a construction plan to regrade the slopes and mitigate the unsatisfactory conditions. Performed site inspections and met with client representatives and contractors during construction to verify safe working conditions and satisfactory slope conditions were achieved. (Feb. 2022–May 2022).

Probabilistic Slope Stability Assessment for CCR Landfill, Confidential Client, Southeast Michigan | Previous site inspections identified potentially unstable slopes at a CCR landfill in Southeast Michigan, so probabilistic slope stability analyses were performed to evaluate the reliability of the slope conditions given limited site information. Engineer that aided in review of probabilistic slope stability analyses and slope stability assessment report. Recommendations were developed and provided to the client to

address unsatisfactory conditions for existing slopes identified in the probabilistic site response analyses. (Nov. 2021–May 2022).

Quantitative Risk Assessment for Dam in Southeast US, Confidential Client, Southeast US | The project further refines estimates of risk developed from previous potential failure mode analyses and semi-quantitative risk analyses performed for an embankment dam and its primary and auxiliary spillways located in the Southeastern U.S. Project manager in charge of financials and schedule for the Quantitative Risk Assessment (QRA) of the dam. The main objectives of the QRA are to estimate the risk, in terms of annual failure probabilities and downstream consequences, for seismic, internal erosion, and spillway hydrologic failure modes and the uncertainties associated with the risks. Actively participated in the expert elicitation process to develop risk models and meetings with the client to present the models and results of the QRA. Prepared calculation packages and reports summarizing the methods used in the QRA and the results for the client. Aided in the ground motion selection, internal erosion evaluation, and evaluation of the erodibility of the embankment soils. (May 2018–Apr. 2022)

Field Investigation of Primary Spillway for Dam in Southeast US, Confidential Client, Southeast US | Field engineer for oversight of a visual inspection and investigation of the foundation of the primary spillway slabs and control structure for a dam in the Southeast U.S. Observations from the field investigation were used to inform a QRA performed for the dam and its spillways. The visual inspection was performed to identify vertical offsets and gaps in the joints between the slabs of the primary spillway. A field investigation consisting of shallow cores through the concrete slabs of the spillway and deep borings into competent rock below the control structure was performed to evaluate the foundation materials of the primary spillway and the presence of voids. (Jan. 2021–May 2021)

Landfill Stability Evaluation, Confidential Client, Southeast US | Contacted by the client to evaluate an instability at an existing landfill including the root cause of the instability. Project manager in charge of financials and engineer in charge of coordinating and performing slope stability analyses. Slope stability analyses were performed to evaluate the root cause of the instability and mitigation measures required to stabilize the landfill. Results of the analyses were used to support the client in discussions with the state regulator and advise the client on a path forward for stabilizing the landfill. A facility-wide stability plan was also developed based on the stability of the landfill for the existing conditions and the final planned conditions. Analyses were also performed for a staged temporary removal of a buttress berm in order to tie-in liner systems for new landfill cells to the existing liner system. Aiding in ongoing annual landfill stability assessments. (Aug. 2019–Dec. 2020)

Onondaga Lake Geotechnical Monitoring, Honeywell, Syracuse, NY | Contaminated sediments were dredged from Onondaga Lake and consolidated within geotextile tubes at an off-site landfill as part of a Superfund project. Geotechnical instrumentation systems were implemented to monitor (i) a sheetpile wall around a portion of the Lake dredged for remediation and (ii) a landfill closure comprised of geotextile tubes filled with sediments dredged from the Lake. Manager in charge of financials and engineer in charge of monitoring the instrumentation data. The monitoring systems included manual and automated inclinometers, settlement cells, vibrating wire piezometers, and surface monitoring points. (Feb. 2015–Oct. 2018)

Stability and Internal Erosion Assessment of Clear Creek Dam and Beaver Creek Dam, Tennessee Valley Authority, Bristol, TN and VA | Static and seismic stability of two earthen embankment dams in the twin cities of Bristol, TN and VA, Clear Creek Dam (BTC) and Beaver Creek Dam (BTB), were assessed along with the internal erosion for potential failure modes identified in the Potential Failure Mode Analyses (PFMA). Engineer in charge of seismic site response analyses and internal erosion evaluations for two earthen embankment dams. Performed seismic response analyses and used the results to perform the liquefaction potential evaluation. The seismic response analysis was performed using the computer program Strata. Internal erosion evaluations were performed for the critical potential failure modes identified by the project team for each dam. (Mar. 2017–Sept. 2017)

APPENDIX B
2024 Annual Inspection Forms and Photos

**Sibley Quarry - CCR Landfill
2024 Annual Inspection Report**

Name of CCR Landfill: <u>Sibley Quarry Landfill</u>	Qualified Professional Engineer: <u>Clinton Carlson, PhD, PE</u>
Owner: <u>DTE Electric Company</u>	Date: <u>5/28/2024</u> Time: <u>1 pm to 3:30 pm</u>
Weather: <u>Sunny with scattered clouds, 70s</u>	Precipitation (past week): <u>1.1</u> in.
Site Conditions: <u>Dry</u>	

I. Landfill Perimeter, Side Walls and Access Ramps

1. How would you describe the vegetation at the Site? (Check all that apply)
- | | |
|--|---|
| <input type="checkbox"/> Recently Mowed | Other (describe): _____ |
| <input checked="" type="checkbox"/> Overgrown | <u>The perimeter around the permitted fill area had a good cover of grass and trees. The recently regraded CCR slopes at the top of the northern slopes were clear of vegetation. Trees were also located on the southern, western, and eastern sidewalls. Asphalt roads were used around the trailers and truck wash on the southwest corner of the site. Gravel was used for access roads around the rest of the site, including the main haul road (i.e., Switchback Two).</u> |
| <input checked="" type="checkbox"/> Good Cover | |
| <input type="checkbox"/> Sparse | |
| <input checked="" type="checkbox"/> Paved | |
| <input checked="" type="checkbox"/> Gravel | |
2. Are there any areas of hydrophilic (lush, water-loving) vegetation? Yes No
If 'Yes', describe (size, location, severity, etc.)
Phragmites populate areas where water typically flows. This vegetation is not found on CCR slopes but around the upper ponds, settlement ponds, and especially along the conveyance channel (Photographs #21 through #26).
3. Are there any trees or other undesired vegetation? Yes No
If 'Yes', describe (type of vegetation, size, location, etc.)
Trees of varying sizes are present around the perimeter of the site (Photographs #1, #2) and above and on the sidewalls (Photographs #7, #8, #9, #13). However, these trees do not affect the operation of the Landfill.
4. Is there an access ramp in the landfill? Yes No
If 'Yes', describe (good condition, numerous cracks, newly paved, stone uniformly distributed, etc.)
The main haul road, Switchback Two, was in use and in good condition (Photographs #14, #16, #28). The emergency route along the south sidewall was not traveled but appeared to be in good condition (Photographs #7, #28).
5. Are there any depressions, ruts, or holes on the access ramp or road? Yes No
If 'Yes', describe (size, location, etc.)
-
6. Are there any fractures on side walls? Yes No
If 'Yes', describe (length and width, location and direction of cracking, slough, or distress, etc.)
The sidewalls are limestone rock. Safety measures are in place to keep a 20-foot buffer between the sidewalls and active CCR filling at the bottom of the Landfill (Photographs #7, #11).
7. Are there wet areas that indicate seepage through the side walls? Yes No
If 'Yes', describe (size, location, etc.)
Multiple wet areas were observed on the sidewalls from natural groundwater seepage (Photographs #8, #9, #11). The seepage flows to the bottom of the Landfill where it is collected by the drainage collection layer then pumped from the chimney sump (Photographs #5, #6) to the upper ponds (Photograph #18).
8. Other observations, changes since last inspection:
Road signs indicating "Falling Rocks" were installed along Switchback Two haul road.
-

**Sibley Quarry - CCR Landfill
2024 Annual Inspection Report**

Name of CCR Landfill: Sibley Quarry Landfill Qualified Professional Engineer: Clinton Carlson, PhD, PE
Owner: DTE Electric Company Date: 5/28/2024 Time: 1 pm to 3:30 pm

II. Stormwater Conveyance Structures

1. Describe what types of stormwater conveyance structures there are at the site (e.g. drop inlets, downchutes, benches, ponds, outlet structures, etc.).

Stormwater drains by gravity to the chimney sump at the bottom of the quarry (Photograph #5). Stormwater diversion berms were on the northern slopes, where CCR excavation was ongoing, to divert water over the quarry sidewalls (Photographs #3, #4). Drainage channels, check dams, and diversion berms were present along the Switchback Two haul road to direct water to the bottom of the quarry and chimney sump (Photographs #10, #12, #14, #15).

2. Describe the condition of stormwater structures mentioned above. (Are they in working condition? Is there any erosion in or around the structures, signs of leakage or movement, etc.?)

The stormwater diversion berm, concrete culvert, and channels along the top of the northern CCR slopes were in good condition (Photographs #3, #4). The chimney sump and pumps were operational (Photographs #5, #6). The lower stormwater channel and check dams below the Switchback Two haul road appeared to be in fair condition as eroded material had collected behind the check dams (Photographs #10, #12). The diversion berms and stormwater channel along the Switchback Two haul road appeared to be in good condition, limiting erosion rills on the CCR slopes (Photographs #14, #15).

III. Landfill Conditions

1. Describe operations in the landfill (disposal, reclamation, general operational activities):

CCR and inert materials from DTE projects are hauled to and placed at the bottom of the Landfill on the prepared drainage collection and filter layer (Photographs #7 through #11, #13). CCR and inert material is being excavated from the top of the northern slopes and hauled to the bottom of the Landfill (Photographs #1, #2, #16).

2. Are any stormwater controls obstructed? Yes No

If 'Yes', describe (type of debris, reason for obstruction, etc.)

Eroded sediments from the CCR slopes have accumulated behind the check dams within the stormwater channel at the bottom of the Switchback Two haul road (Photographs #10, #12). However, the functionality of the check dams to slow the flow of contact water and limit erosion does not appear to be impacted in the current condition.

3. Are there indications of erosion on the landfill slopes? Yes No

If 'Yes', describe what type and its condition (rill, gully, dimensions, etc.)

One erosion rill was observed on the lower slope of the Switchback Two haul road (Photograph #12). Diversion berms and coir logs are present along the Switchback Two haul road (Photograph #15) to limit flows over the slopes. The observed erosion rill does not currently disrupt the operation and safety of the Landfill because it is the only erosion feature observed and eroded material is transported to the bottom of the Landfill.

4. Is the leachate collection system functioning (describe discharge color, quantity)?

The drainage collection and filter layers at the bottom of the Landfill serve as the leachate collection system (Photograph #5). The upper ponds function as the leachate treatment ponds (Photographs #18, #19, #20). Groundwater and CCR contact water that accumulates at the bottom of the Landfill is pumped to the upper ponds for treatment. The leachate collection system and treatment ponds were functioning properly during the inspection.

**Sibley Quarry - CCR Landfill
2024 Annual Inspection Report**

Name of CCR Landfill: Sibley Quarry Landfill Qualified Professional Engineer: Clinton Carlson, PhD, PE
Owner: DTE Electric Company Date: 5/28/2024 Time: 1 pm to 3:30 pm

5. How is the leachate stored? Comment on the condition of the structure.

See Item 4.

6. Other observations around the landfill (changes since last inspection, etc.):

DTE personnel indicated the CCR surface at the bottom of the Landfill had increased in height by more than 50 ft over the entire footprint since the 2023 annual inspection (April 2023) (Photographs #7 through #11, #13). The chimney sump and leachate collection and filter layer around the sump had been raised 40 ft (Photograph #5).

IV. Leachate Pond Spillways

1. What types of spillways does the leachate pond have (concrete, earth, riprap, etc.)?

Principal Spillway: See description below Emergency Spillway: _____

Other: Leachate is pumped (Photograph #6) from the bottom of the Landfill to the upper ponds (Photographs #18 through #20). After being treated, leachate is discharged to the conveyance channel and settling ponds before being discharged into the Detroit River (Photographs #20 through #26).

V. Repairs, Maintenance, Action Items

1. Has any routine maintenance been conducted since the last inspection? Yes No

If 'Yes', describe.

Routine maintenance related to fugitive dust control (e.g., wetting roads and treating slopes) and mowing of the upper ponds, conveyance channel, settling ponds, and discharge have been conducted since the last inspection.

2. Have any repairs been made since the last inspection? Yes No

If 'Yes', describe.

3. Are there any areas of potential concern? Yes No

If 'Yes', describe.

The side slopes of the active CCR filling area are relatively steep (slope of approximately 1.5 horizontal-to-1 vertical, 1.5H:1V) (Photographs #7, #11). However, no signs of instabilities (e.g., cracks) were observed during the inspection. These slopes should continue to be monitored as filling operations continue to identify potential slope instabilities. Safety measures, such as maintaining a minimum of 20 feet between the quarry sidewalls during filling operations, should continue, as there is still a risk of rock falls (Photograph #11). Personnel should be aware of these potential risks and implement the appropriate safety measures.

**Sibley Quarry - CCR Landfill
2024 Annual Inspection Report**

Name of CCR Landfill: Sibley Quarry Landfill Qualified Professional Engineer: Clinton Carlson, PhD, PE
 Owner: DTE Electric Company Date: 5/28/2024 Time: 1 pm to 3:30 pm

4. Has this inspection identified any need for repair or maintenance? Yes No

If 'Yes', describe and state the urgency of maintenance. "Urgent" for maintenance that should be conducted as soon as possible, "Moderate" for maintenance that should be conducted within two years, and "Not Urgent" for maintenance that should be conducted within five years.

Moderate - Monitor the side slopes of the CCR within the active filling area at the bottom of the Landfill to observe signs of instabilities (e.g., cracks) within the active filling area.

Moderate - Clear sediment accumulated behind the check dams in the stormwater channel at the bottom of the Switchback Two haul road.

Moderate - Monitor CCR slopes for the formation of additional or expansion of existing erosion rills.

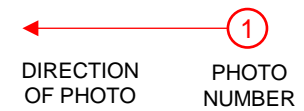
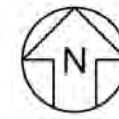
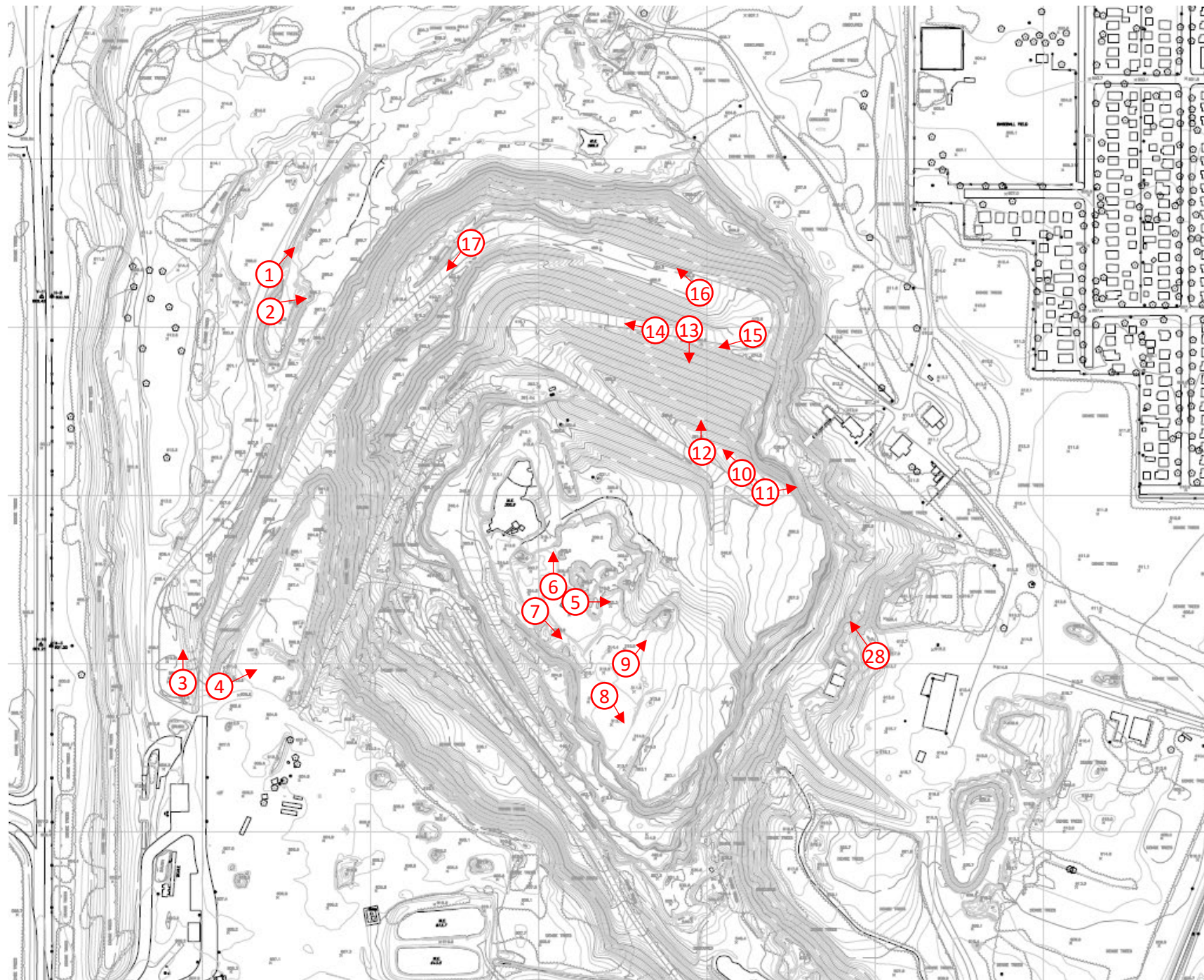
Moderate - Clear vegetation along the conveyance channel that connects the upper pond to the settling ponds and within Settling Pond #3 near the inlet to the pond.

Not Urgent - Place additional riprap, gravel, and sand below the pipe outfalls from the upper pond to the conveyance channel.

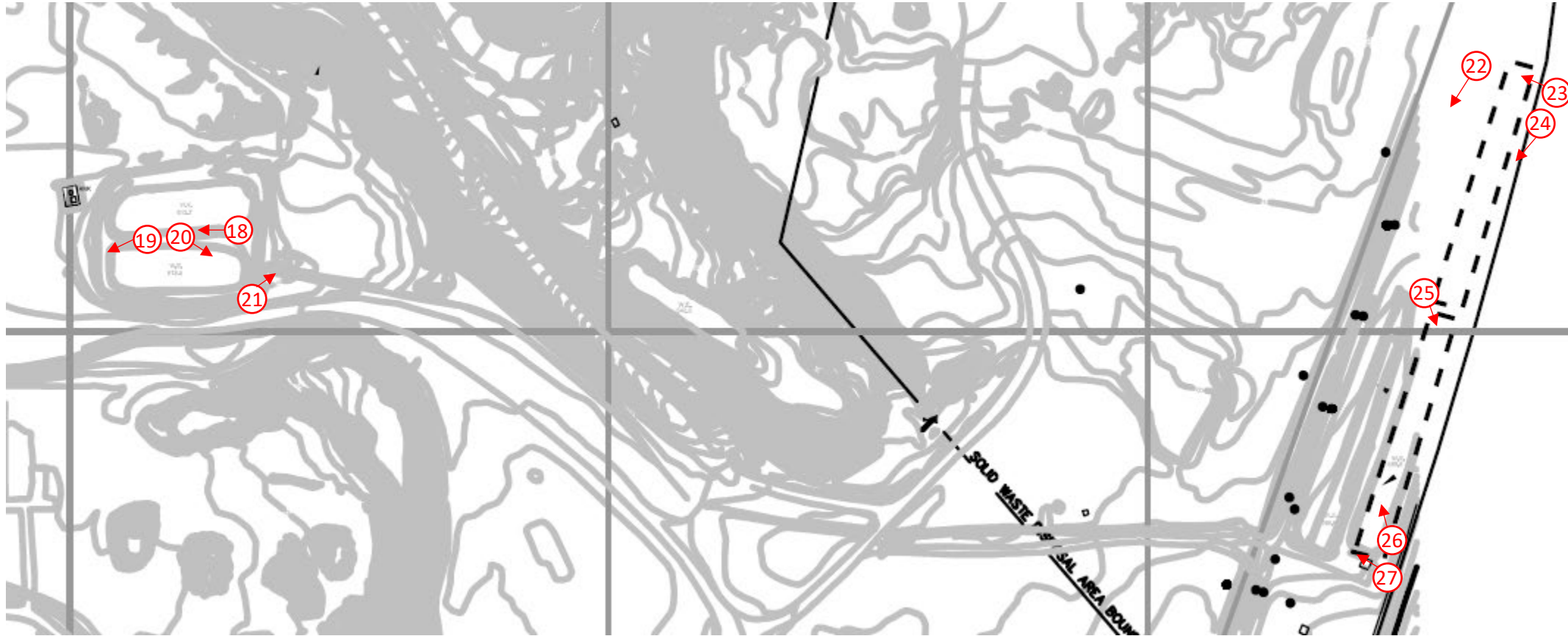
VI. Photographs

Photographs can be taken of notable features. List of photographs:

	<u>Location</u>	<u>Direction of Photo</u>	<u>Description</u>
i.	<u>SEE THE ATTACHED PHOTO LOG.</u>		
ii.			
iii.			
iv.			
v.			
vi.			
vii.			



<p>SIBLEY QUARRY PHOTO LOG 1</p>		<p>FIGURE B1</p>
<p>Geosyntec consultants <small>Geosyntec Consultants of Michigan</small> DETROIT, MICHIGAN</p>		
PROJECT: CHE8242V	JANUARY 2025	



SIBLEY QUARRY PHOTO LOG 2	
Geosyntec [®] consultants <small>Geosyntec Consultants of Michigan</small> DETROIT, MICHIGAN	
PROJECT: CHE8242V	JANUARY 2025
FIGURE B2	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company

Project Number: CHE8242V

Site Name: Sibley Quarry Landfill

Site Location: Trenton, MI

Photograph 1

Date: 5/28/2024

Direction: Northeast

Comments: View of the northern CCR slopes after regrading to a 4H:1V slope. The excavated material was being hauled to the bottom of the quarry. There is a stormwater diversion berm at the top of the slopes (approximately 1 to 2 feet high) to reduce stormwater flow over the regraded slopes.



Photograph 2

Date: 5/28/2024

Direction: East

Comments: Active excavation area on the northern CCR slopes. Equipment was loading and hauling CCR in line with generally accepted engineering practices. The equipment appeared to be operating safely and at speeds to minimize fugitive dust.



DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company

Project Number: CHE8242V

Site Name: Sibley Quarry Landfill

Site Location: Trenton, MI

Photograph 3

Date: 5/28/2024

Direction: North

Comments: Diversion berm, stormwater collection point, and concrete culvert conveying stormwater from the top of the northern slopes to the bottom of the Landfill. The system is adjacent to the Switchback Two haul road. The culvert appeared to be in good condition and free of obstructions.



Photograph 4

Date: 5/28/2024

Direction: Northeast

Comments: Stormwater channel conveying stormwater from the culvert in Photograph #3 over the western sidewalls of the Landfill. The system is adjacent to the Switchback Two haul road. Side slopes and bottom of the ditch appeared to be in good condition with no erosion observed.



DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company

Project Number: CHE8242V

Site Name: Sibley Quarry Landfill

Site Location: Trenton, MI

Photograph 5

Date: 5/28/2024

Direction: East

Comments: Chimney sump at the bottom of the quarry and drainage collection and filter layer surrounding the sump. The drainage collection and filter layer are also present below the CCR.



Photograph 6

Date: 5/28/2024

Direction: North

Comments: Sump pumps installed at the bottom of the Landfill to convey water to the upper ponds. The two sump pumps were operating during the inspection.



DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company

Project Number: CHE8242V

Site Name: Sibley Quarry Landfill

Site Location: Trenton, MI

Photograph 7

Date: 5/28/2024

Direction: South

Comments: Western side slopes of the active CCR filling area at the bottom of the Landfill. The edge of the filling area is offset from the sidewall. The side slopes are relatively steep (~1.5H:1V) but did not show any indications of instabilities (e.g., cracks). Emergency road along south sidewall appeared to be in good condition.



Photograph 8

Date: 5/28/2024

Direction: Southeast

Comments: Active CCR filling area at the bottom of the Landfill and the south sidewalls. Groundwater inflow from the sidewall was observed during the inspection. Placement of CCR appeared to be in line with generally accepted engineering practices.



DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company

Project Number: CHE8242V

Site Name: Sibley Quarry Landfill

Site Location: Trenton, MI

Photograph 9

Date: 5/28/2024

Direction: Northeast

Comments: Active filling area at the bottom of the Landfill and east sidewall. Construction equipment was observed compacting the hauled material. Placement of CCR appeared to be in line with generally accepted engineering practices.



Photograph 10

Date: 5/28/2024

Direction: Northwest

Comments: Side slopes of the Switchback Two haul road near the bottom of the Landfill. Stormwater channel and check dams at the bottom of the Switchback Two haul road leading to the bottom of the Landfill. Sediments were observed behind the check dams.



DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company

Project Number: CHE8242V

Site Name: Sibley Quarry Landfill

Site Location: Trenton, MI

Photograph 11

Date: 5/28/2024

Direction: East

Comments: Eastern side slopes of the active CCR filling area at the bottom of the Landfill. The edge of the filling area is offset from the sidewall (note rock fall debris within buffer). The side slopes are relatively steep (~1.5H:1V) but did not show any indications of instabilities (e.g., cracks).



Photograph 12

Date: 5/28/2024

Direction: North

Comments: Erosion rill on the lower slope of the Switchback Two haul road. Eroded material was retained by the check dams within the stormwater channel adjacent to the road. The rill did not appear to have changed in size or geometry from previous inspections. Erosion features should continue to be monitored.



DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company

Project Number: CHE8242V

Site Name: Sibley Quarry Landfill

Site Location: Trenton, MI

Photograph 13

Date: 5/28/2024

Direction: South

Comments: Overview of the landfill operations and active CCR filling areas. Construction operations appeared to be in line with generally accepted engineering practices. Fugitive dust was not observed during the inspection.



Photograph 14

Date: 5/28/2024

Direction: West

Comments: Switchback Two haul road, sideslopes, and adjacent diversion berm. Haul road and diversion berm appeared to be in good condition.



DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company

Project Number: CHE8242V

Site Name: Sibley Quarry Landfill

Site Location: Trenton, MI

Photograph 15

Date: 5/28/2024

Direction: Southwest

Comments: Diversion berm on Switchback Two haul road to mitigate stormwater flow over the bottom slopes. The diversion berm appeared to be in good condition.



Photograph 16

Date: 5/28/2024

Direction: Northwest

Comments: Active excavation area on the northern CCR slopes. Excavated material was transported to the bottom of the Landfill. The equipment appeared to be operating safely and at speeds to minimize fugitive dust.



DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company

Project Number: CHE8242V

Site Name: Sibley Quarry Landfill

Site Location: Trenton, MI

Photograph 17

Date: 5/28/2024

Direction: Southwest

Comments: Toe of northern CCR slopes after regrading to a 4H:1V slope. Slopes appeared uniform with no signs of instability or erosion.



Photograph 18

Date: 5/28/2024

Direction: West

Comments: Upper ponds during the inspection. North pond (right side of the photograph) is used as water supply for fugitive dust control. South pond (left side of the photograph) is used to treat water collected at the bottom of the Landfill.



DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company

Project Number: CHE8242V

Site Name: Sibley Quarry Landfill

Site Location: Trenton, MI

Photograph 19

Date: 5/28/2024

Direction: Southwest

Comments: Discharge from chimney sump into the south upper pond. No erosion or instabilities along the upper ponds were observed.



Photograph 20

Date: 5/28/2024

Direction: Southeast

Comments: South upper pond and silt curtains. No damage or obstructions were observed along the silt curtains.



**DTE ELECTRIC COMPANY
Photographic Record**

Client: DTE Electric Company

Project Number: CHE8242V

Site Name: Sibley Quarry Landfill

Site Location: Trenton, MI

Photograph 21

Date: 5/28/2024

Direction: Northeast

Comments: Discharge from upper south pond into conveyance channel to the settling ponds. Some erosion was observed beneath the pipe and sides of the conveyance channel.



Photograph 22

Date: 5/28/2024

Direction: Southwest

Comments: Conveyance channel west of the settling ponds. Heavy vegetation (phragmites) was observed on the sides of the channel, but did not appear to impact the conveyance of water to the settling ponds. No erosion or instabilities were observed along the side slopes of the conveyance channel.



DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company

Project Number: CHE8242V

Site Name: Sibley Quarry Landfill

Site Location: Trenton, MI

Photograph 23

Date: 5/28/2024

Direction: Northwest

Comments: Discharge from conveyance channel into Settling Pond #4. Some vegetation was observed near the outlet but did not appear to impact the conveyance of water into the settling ponds. No erosion of the riprap below the outlet was observed.



Photograph 24

Date: 5/28/2024

Direction: Southwest

Comments: Settling Pond #4. Side slopes of the pond appeared to be in good condition (i.e., no erosion, no instabilities, minimal vegetation).



DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company

Project Number: CHE8242V

Site Name: Sibley Quarry Landfill

Site Location: Trenton, MI

Photograph 25

Date: 5/28/2024

Direction: Southeast

Comments: Culvert pipes between Settling Pond #4 and Settling Pond #3. No obstructions were observed in the culvert pipes. Some erosion and vegetation were observed beneath the outlets of the pipes. The vegetation did not appear to impact the conveyance of water. The area appears to have been filled in somewhat since the last annual inspection.



Photograph 26

Date: 5/28/2024

Direction: North

Comments: Aerators in Settling Pond #3. Side slopes of the pond were observed to be in good condition (i.e., no erosion, no instabilities).



**DTE ELECTRIC COMPANY
Photographic Record**

Client: DTE Electric Company

Project Number: CHE8242V

Site Name: Sibley Quarry Landfill

Site Location: Trenton, MI

Photograph 27

Date: 5/28/2024

Direction: Northwest

Comments: The instrument panel and pumps for the pump house at the south end of Settling Pond #4 were in good condition.



Photograph 28

Date: 5/28/2024

Direction: North

Comments: Ash conveyor system at top of Landfill on the southeast side. The ash conveyor has not been used since the previous annual inspection.

