Annual Inspection Report
Tecumseh Energy Center
Industrial Landfill #0322

Prepared for:

Westar Energy

Tecumseh Energy Center

Tecumseh, Kansas

Prepared by:

CB&I Environmental & Infrastructure, Inc.

Janurary 2017

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§257.84(b)(1)(ii) stipulates: *"(b) Annual inspections by a qualified professional engineer. (1) Existing and new CCR landfills and any lateral expansion of a CCR landfill must be inspected on a periodic basis by a qualified professional engineer 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:* *(ii) A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit."*	Section 4.0

USEPA CCR Rule Criteria 40 CFR §257.84	Tecumseh Energy Center (TEC) Annual Inspection Report
§257.84(b)(2)(i) stipulates: *"(2) Inspection report. The qualified professional engineer must prepare a report following each inspection that addresses the following:* *(i) Any changes in geometry of the structure since the previous annual inspection;"*	Section 5.1
§257.84(b)(2)(ii) stipulates: *"(ii) The approximate volume of CCR contained in the unit at the time of the inspection;"*	Section 5.2
§257.84(b)(2)(iii) stipulates: *"(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;"*	Section 5.3
§257.84(b)(2)(iv) stipulates: *"(iv) Any other change(s) which may have affected the stability or operation of the CCR unit since the previous annual inspection."*	Section 5.4

USEPA CCR Rule Criteria 40 CFR §257.84	Tecumseh Energy Center (TEC) Annual Inspection Report
§257.84(b)(4) stipulates: *(4) Frequency of inspections. The owner or operator of the CCR unit must conduct the inspection required by paragraphs (b)(1) and (2) of this section on an annual basis. The date of completing the initial inspection report is the basis for establishing the deadline to complete the first subsequent inspection. Any required inspection may be conducted prior to the required deadline provided the owner or operator places the completed inspection report into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing subsequent inspection reports is based on the date of completing the previous inspection report. For purposes of this section, the owner or operator has completed an inspection when the inspection report has been placed in the facility's operating record as required by §257.105(g)(9).*	Section 1.0
§257.84(b)(5) stipulates: *"(5) If a deficiency or release is identified during an inspection, the owner or operator must remedy the deficiency or release as soon as feasible and prepare documentation detailing the corrective measures taken."*	Section 6.0
§257.84(c) stipulates: *"(c) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in §257.105(g), the notification requirements specified in §257.106(g), and the internet requirements specified in §257.107(g)."*	Sections 7.0

1.0 INTRODUCTION

CB&I Environmental and Infrastructure, Inc. (CB&I) has prepared the following Annual Landfill Inspection Report (Report) at the request of Westar Energy (Westar) for the Industrial Landfill No. 0322 (Landfill) located at the Tecumseh Energy Center (TEC) in Tecumseh, Kansas. TEC is a coal-fired power plant that has been in operation since 1925. The Landfill has been deemed to be a regulated coal combustion residual (CCR) unit by the United States Environmental Protection Agency (USEPA), through the Disposal of Coal Combustion Residuals from Electric Utilities Final Rule (CCR Rule) Title 40 Code of Federal Regulations (CFR) Part §257 and §261.

In support of compliance to the CCR Rule, Mr. Richard Southorn (a qualified professional engineer with CB&I) conducted an annual site inspection of the Landfill on November 28th 2016. Prior to inspection, Mr. Southorn reviewed the relevant portions of the facility's operating record and 2015 annual inspection report in relation to this Report.

This Report meets the requirements set forth within 40 CFR §257.84(b)(1) and (b)(2) based the review of available information and visual observation, to evaluate if the design, construction, operation, and maintenance of the Landfill is consistent with good engineering standards. The annual landfill inspection has been conducted and completed in compliance with the frequency of inspection timeframe set forth in §257.84(b)(4).

2.0 TEC LANDFILL OVERVIEW

Westar owns and operates an industrial landfill at TEC near Tecumseh, Kansas in Shawnee County. TEC is located approximately 6.5 miles east of Topeka, Kansas and approximately 2 miles north of Highway 70 and resides in Sections 31, Township 11 South, and Range 17 East. The location of the Landfill is depicted in **Figure 1.**

The Landfill is located due southeast of the TEC power plant, on the south side of 2nd Street. The Landfill footprint is approximately 56 acres total with approximately 32 acres used for CCR material disposal and management. The Landfill is being filled in three separate phases: Phase 1 (the northern phase, 7.4 acres), Phase 2 (the southern phase, 15.4 acres), and Phase 3 (the center phase, 9.2 acres) which is located between Phases 1 and 2. Phase 1 has a temporary clay cap with established vegetation. Phase 2 is operational for current CCR material disposal. Approximately 9.2 acres of the Phase 2 has a final clay cover with established vegetation which meets the CCR Rule requirements. Phase 3 was previously operational, however, has not received waste in several years. Existing site topography is depicted in **Figure 2.**

CCR material is transported from the generation station, fly ash silos, economizer hopper, and/or the bottom ash pond for disposal in the Landfill. CCR material is placed, graded by dozers, and compacted. Periodic dozing of the CCR material will occur as needed within the active area to maintain a relatively uniform grade. The CCR material will be wetted prior to the final cover placement and will form a hardened surface as it dries.

3.0 REVIEW OF AVAILABLE INFORMATION

Prior to the on-site inspection, Mr. Southorn reviewed the available information for the Landfill as provided by Westar:

- Kansas Department of Health and Environment – Bureau of Waste Management (KDHE-BWM) Industrial Landfill Permit No. 0322, October 15, 2015.
- Tecumseh Energy Center Weekly Inspection Reports, October 2015 through November 2016.
- Tecumseh Energy Center Annual Landfill Inspection – 2015, Blackstone Environmental, January 15, 2016.
- Seep Investigation Report for Tecumseh Energy Center Industrial Landfill, SCS Engineers, September 2016.

Mr. Southorn verified the available information during the annual site inspection on November 28th 2016.

3.1 Summary of Weekly Inspection Reports

Based on a review of the weekly inspection reports, it was determined that all stormwater conveyance systems are operating as designed. Native grasses along the landfill side slopes have been properly maintained throughout the year. It was noted that seeps have been observed along the east side of the landfill. There were no other deficiencies or malfunctions noted throughout the year.

3.2 Summary of Previous Annual Inspection Report

Based on a review of the annual inspection report, it was determined that all landfilling operations and environmental control features are in good working condition and functioning as designed. The 2015 Annual Inspection Report verified the seeps along the eastern side slopes. Westar launched an investigation into the cause of the seeps in order to appropriately resolve the issue. According to the *Seep Investigation Report* completed by SCS Engineers, the seeps were caused by contact water ponding on top of the Landfill and groundwater flowing through the Landfill subsurface from the southwest. Proposed remedial actions include draining the contact water basin, regrading the Landfill plateau to promote positive drainage away from the Landfill, and groundwater and surface water monitoring. This investigation report has been sent to the KDHE for review and approval. The implementation of proposed remedial activities will not commence without approval of KDHE.

4.0 INSPECTION SUMMARY

During the on-site inspection, Mr. Southorn focused on geotechnical signs of distress or malfunction such as slumping at the toe of slopes, tensile cracking, abnormal or excessive erosion on the side slopes or stormwater management facilities slope bulging, and groundwater/surface water seepage or ponding. These visual signs are potential indicators of structural weakness of the CCR Landfill.

4.1 Visual Signs of Distress or Malfunction

Based on observations noted during the on-site inspection, seeps that have been documented and investigated by Westar were verified. No other seeps were observed. Westar completed the clearing and grubbing of woody vegetation on the landfill cap in 2016 based on the recommendation of the 2015 Annual Inspection Report. It is noted that woody vegetation remains in the seep locations. Discussion with Westar indicate that this vegetation will be removed upon agreement of remedial activities by KDHE regarding the seeps. Vegetation along the landfill side slopes in all other areas are well established and properly maintained. Stormwater drainage features, contact water management systems, and overall site conditions were assessed and have been determined to operate as designed.

4.2 Review of Environmental Control Systems

With no evidence to the contrary, the environmental control systems at the Landfill are believed to be in good operating condition and functioning as intended. At the time of inspection, stormwater conveyance systems such as the perimeter drainage ditches and outfall pipe were operating as designed. The contact management system is operating as designed and appears to be in good working condition.

5.0 CONCLUSIONS

Based on a review of the available facility information and on-site inspection, the following conclusions were developed:

5.1 Changes in Geometry

As of the date of this inspection, the Landfill is actively accepting CCR material. Changes in geometry were evaluated by comparing topographic information from the 2015 Annual Landfill Inspection Report and the latest survey conducted in June 2016. Changes in geometry of the Landfill since the previous annual inspection consist of CCR placement within Phase 2 and Phase 3 of the Landfill. Minor grading has occurred in this area to promote positive drainage of non-contact stormwater into the stormwater conveyance system.

5.2 CCR Volume

The total permitted disposal capacity for the Landfill is 934,000 cubic yards (cy), as stated in the 2015 Annual Landfill Inspection Report. Based on the most recent survey, the remaining capacity was estimated at approximately 749,944 cy. The volume of CCR material contained within the Landfill is approximately 184,056 cy. As detailed in the 2015 Annual Report, the average fill rate for the Landfill is approximately 15,425 tons per year (tons/yr) of CCR material (8,846 tons fly ash and 6,579 tons bottom ash). Based on the fill rate, it is estimated that the Landfill has a remaining operational life of approximately 49 years.

5.3 Structural Weakness and Disrupting Conditions

At the time of this inspection, remedial actions that have been initiated as a result of the *Seep Investigation Report* have addressed the minor signs of distress at the Landfill. No

other signs of distress or malfunction that would indicate actual or potential structural weakness at the Landfill.

5.4 Changes Affecting Stability and Operations

There have been no changes to the Landfill that pose a threat or concern to the stability of the landform. Landfill operations and maintenance have not deviated from the original designed plan.

6.0 RECOMMENDATIONS

Based on the on-site inspection performed on November 28th 2016, CB&I recommend the following actions:

- ❑ Implement remedial activities for seeps upon approval by KDHE.
- ❑ Continue the current maintenance procedures initiated to address seeps.
- ❑ Continue to monitor erosion controls and vegetative cover in line with the weekly inspections.
- ❑ Continue to monitor stormwater conveyance features for signs of erosion or malfunction in line with the weekly inspections

There were no deficiencies or releases identified during the 2016 Annual Landfill Inspection that required the owner or operator to perform corrective actions as required under §257.84(b)(5).

7.0 RECORDS RETENTION AND MAINTENANCE

7.1 Incorporation of Plan into Operating Record

§257.105(g) of 40 CFR Part §257 provides record keeping requirements to ensure that this Plan will be placed in the facility's operating record. Specifically, §257.105(g) stipulates:

> §257.105(g)*: "(g) Operating criteria. The owner or operator of a CCR unit subject to this subpart must place the following information, as it becomes available, in the facility's operating record: (9) The periodic inspection report as required by §257.84(b)(2)."*

This Report will be placed within the Facility Operating Record upon Westar's review and approval.

7.2 Notification Requirements

§257.106(g) of 40 CFR Part §257 provides guidelines for the notification of the availability of the initial and periodic plan. Specifically, §257.106(g) stipulates:

> §257.106(g): *(g) Operating criteria. The owner or operator of a CCR unit subject to this subpart must notify the State Director and/or appropriate Tribal authority when information has been placed in the operating record and on the owner or operator's publicly accessible internet site. The owner or operator must: (7) Provide notification of the availability of the periodic inspection reports specified under §257.105(g)(9)."*

The State Director and appropriate Tribal Authority will be notified upon placement of this Plan in the Facility Operating Record.

§257.107(g) of 40 CFR Part §257 provides publicly accessible Internet site requirements to ensure that this Plan is accessible through the Westar Energy webpage. Specifically, §257.107(g) stipulates:

> §257.107(g): *(g) Operating criteria. The owner or operator of a CCR unit subject to this subpart must place the following information on the owner or operator's CCR Web site: (7) The periodic inspection reports specified under §257.105(g)(9)."*

This Plan will be uploaded to Westar Energy's CCR Compliance reporting Website upon Westar's review and approval.

8.0 PROFESSIONAL ENGINEER CERTIFICATION

The undersigned registered professional engineer is familiar with the requirements of the CCR Rule and has visited and examined the Tecumseh Energy Center or has supervised examination of the Tecumseh Energy Center by appropriately qualified personnel. I hereby certify based on a review of available information within the facility's operating records and observations from my personal on-site inspection (including the photographs contained in **Appendix A**), that the Tecumseh Landfill Disposal Site does not exhibit any appearances of actual/potential structural weakness that would be disruptive to the normal operations of the Tecumseh Energy Center CCR Unit. The unit is being operated and maintained consistent with recognized and generally accepted good engineering standards and practices. This certification was prepared as required by 40 CFR Part §257.84(b).

Name of Professional Engineer: Richard Southorn

Company: CB&I

Signature:

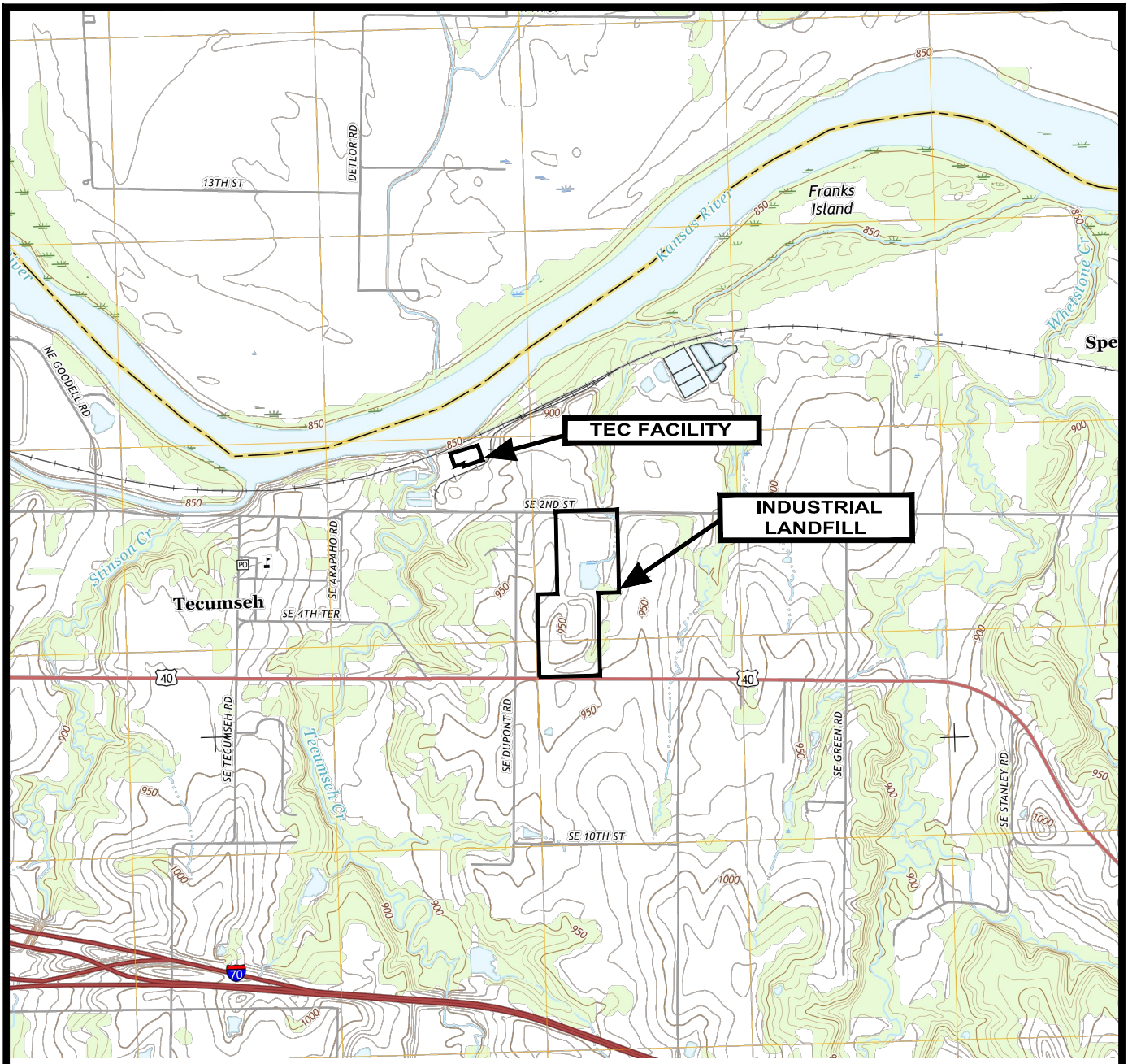
Date: Jan 12, 2017

PE Registration State: Kansas

PE Registration Number: PE25201

Professional Engineer Seal:

FIGURES



LEGEND

CCR UNIT BOUNDARY

N

0 2500'

GRAPHIC SCALE

NOTES

1. AERIAL TOPO OBTAINED FROM USGS 7.5-MINUTE SERIES, GRANTVILLE QUADRANGLE, KANSAS, 2014.
2. ALL BOUNDARIES ARE APPROXIMATE

CB&I Environmental & Infrastructure, Inc.

TECUMSEH ENERGY CENTER
5636 SE 2nd ST., TECUMSEH, KS

FIGURE 1
TECUMSEH LANDFILL
SITE LOCATION PLAN

APPROVED BY: RDS	PROJ. NO.: 631214397	DATE: JANUARY 2017

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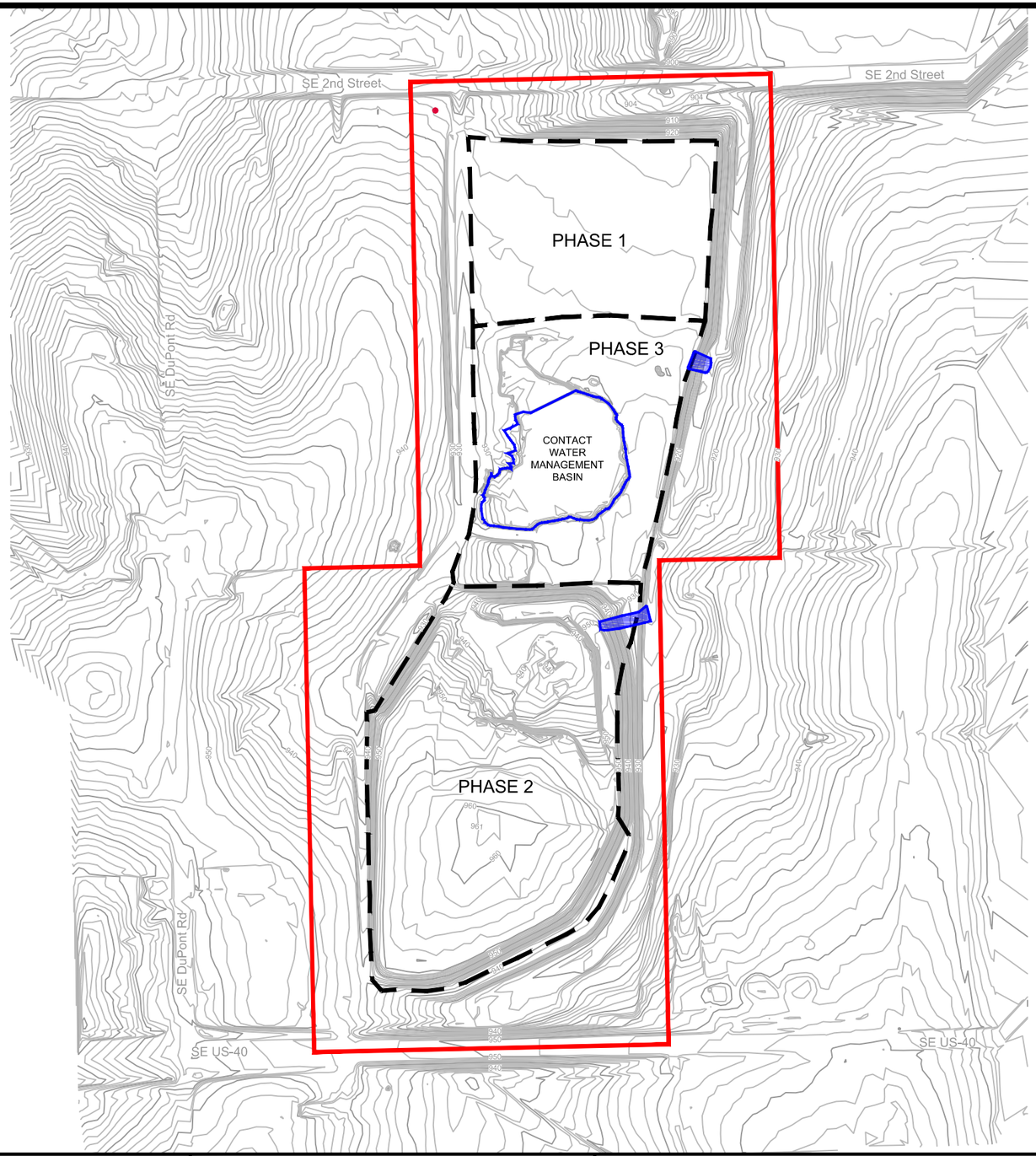
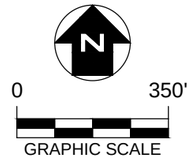




LEGEND

- CCR UNIT BOUNDARY
- LANDFILL CELL BOUNDARY
- BERM STRUCTURE
- APPROXIMATE SEEPAGE EROSION LOCATION

NOTES

1. EXISTING CONTOURS DEVELOPED BY PROFESSIONAL ENGINEERING CONSULTANTS IN JUNE 2016.
2. FOR CLARITY, NOT ALL SITE FEATURES MAY BE SHOWN.
3. CCR UNIT BOUNDARY IS APPROX. 57.3 ACRES.
4. ALL BOUNDARIES SHOWN ARE APPROXIMATE.

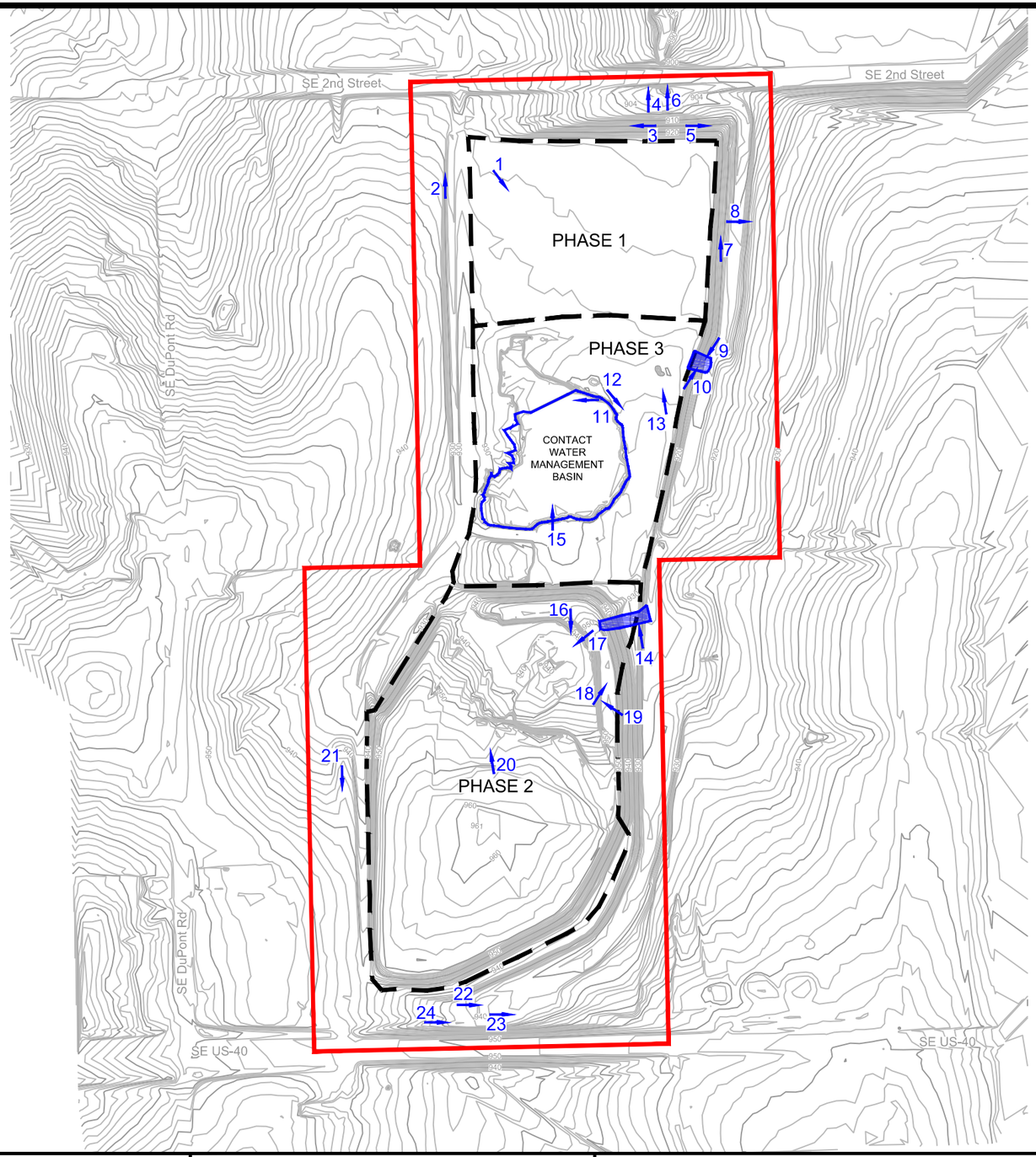
REV. NO.	DATE	DESCRIPTION

CB&I Environmental & Infrastructure, Inc.

TECUMSEH ENERGY CENTER
5636 SE 2nd ST., TECUMSEH, KANSAS

FIGURE 2
TECUMSEH LANDFILL
EXISTING SITE TOPOGRAPHY

DRAWN BY:	APPROVED BY:	PROJ. NO.:	DATE:
NV	RDS	631214397	JANUARY 2017



N

0 350'

GRAPHIC SCALE

LEGEND

- CCR UNIT BOUNDARY
- LANDFILL CELL BOUNDARY
- BERM STRUCTURE
- APPROXIMATE SEEPAGE EROSION LOCATION

NOTES

1. EXISTING CONTOURS DEVELOPED BY PROFESSIONAL ENGINEERING CONSULTANTS IN JUNE 2016.
2. FOR CLARITY, NOT ALL SITE FEATURES MAY BE SHOWN.
3. ALL BOUNDARIES SHOWN ARE APPROXIMATE.
4. REFER TO APPENDIX A FOR PHOTOGRAPHIC DOCUMENTATION.

REV. NO.	DATE	DESCRIPTION

CB&I Environmental & Infrastructure, Inc.

TECUMSEH ENERGY CENTER
5636 SE 2nd ST., TECUMSEH, KANSAS

FIGURE 3
TECUMSEH LANDFILL
PHOTO LOG PLAN VIEW

DRAWN BY:	NV	APPROVED BY:	RDS	PROJ. NO.:	631214397	DATE:	JANUARY 2017

APPENDIX A

Annual Inspection Photo Log

Photograph No. 1 **Date:** November 28, 2016 **Direction:** Southeast	
Description: Observing the final cover system at Phase I. Vegetation is well-established and maintained. No evidence of sloughing or ponding.	

Photograph No. 2 **Date:** November 28, 2016 **Direction:** North	
Description: Stormwater drainage ditch on west side of landfill. No evidence of obstructions or erosion.	

Photograph No. 3 **Date:** November 28, 2016 **Direction:** West	
Description: North slope of Phase 1. Vegetation is well-established and maintained. No evidence of sloughing or tensile cracking.	

Photograph No. 4 **Date:** November 28, 2016 **Direction:** North	
Description: Observing Monitoring Well-1 along the northern border.	

Photograph No. 5 **Date:** November 28, 2016 **Direction:** East	
Description: North slope of Phase 1 with Monitoring Well-6 in background. Vegetation is well-established and maintained. No evidence of sloughing or tensile cracking.	

Photograph No. 6 **Date:** November 28, 2016 **Direction:** North	
Description: Observing stormwater Outfall 014. Appeared free draining and free of obstructions.	

Photograph No. 7 **Date:** November 28, 2016 **Direction:** North	
Description: East slope of Phase I. Vegetation is well-established and maintained. No evidence of sloughing or tensile cracking.	

Photograph No. 8 **Date:** November 28, 2016 **Direction:** East	
Description: Observing Monitoring Well-5 along eastern border.	

Photograph No. 9 **Date:** November 28, 2016 **Direction:** South	
Description: Observing seep area at Phase 3. Water can be seen seeping out of side slope in general area of cattails. Remedial actions pending KDHE approval.	

Photograph No. 10 **Date:** November 28, 2016 **Direction:** North	
Description: Observing seep area at Phase 3. Water can be seen seeping out of side slope in general area of cattails. Evidence of gully erosion was found. Remedial actions pending KDHE approval.	

Photograph No. 11 **Date:** November 28, 2016 **Direction:** West	
Description: Observing the Phase 3 contact water basin. No evidence of instability.	

Photograph No. 12 **Date:** November 28, 2016 **Direction:** Southeast	
Description: Observing the contact water basin perimeter berm. Vegetation is well-established and maintained. No evidence of sloughing or tensile cracking.	

Photograph No. 13 **Date:** November 28, 2016 **Direction:** Northwest	
Description: Observing Piezometer-1 used to gauge water levels in CCR unit as part of seep evaluation.	

Photograph No. 14 **Date:** November 28, 2016 **Direction:** Northwest	
Description: Observing seep area at Phase 2. Water seeping out of side slope in general area of cattails. Remedial actions pending KDHE approval.	

Photograph No. 15 **Date:** November 28, 2016 **Direction:** North	
Description: Observing the Phase 3 contact water basin. No evidence of instability.	

Photograph No. 16 **Date:** November 28, 2016 **Direction:** South	
Description: Observing the active area within Phase 2. No evidence of ponding or airborne dust particles.	

Photograph No. 17 **Date:** November 28, 2016 **Direction:** West	
Description: Observing the active area within Phase 2. No evidence of ponding or airborne dust particles.	

Photograph No. 18 **Date:** November 28, 2016 **Direction:** Northeast	
Description: Observing the seep at Phase 2 seep from top of landfill berm. Eastern drainage channel is also shown.	

Photograph No. 19 **Date:** November 28, 2016 **Direction:** Northwest	
Description: Observing the active area within Phase 2. No evidence of ponding or airborne dust particles.	

Photograph No. 20 **Date:** November 28, 2016 **Direction:** North	
Description: Observing the smooth grading and compaction at the active area within Phase 2. No evidence of ponding or airborne dust particles.	

Photograph No. 21 **Date:** November 28, 2016 **Direction:** South	
Description: Observing the west slope and perimeter drainage channel of Phase 2. Appeared free draining and free of obstructions. Vegetation is well-established and maintained.	

Photograph No. 22 **Date:** November 28, 2016 **Direction:** East	
Description: Observing local creek entering the landfill property. Nominal flow.	

Photograph No. 23 **Date:** November 28, 2016 **Direction:** East	
Description: Observing local creek entering the landfill property. Very nominal flow.	

Photograph No. 24 **Date:** November 28, 2016 **Direction:** East	
Description: Observing Monitoring Well-4 along southern border.	