Appendix C

LANDFILL REVIEW
SKB Lansing Landfill (SW-514)
SKB Austin Landfill (SW-542)

Prepared For:

Mower County Board of Commissioners
Mower County, Minnesota

I certify that this report was prepared by me or under my direct supervision and that I am a duly licensed Professional Geologist under the Laws of the State of Minnesota.

Signature of Preparer

Timothy L. Kenyon, PG #30512
Senior Consultant

October 30, 2016

PROFESSIONAL GEOLOGIST
I hereby certify that this plan, document, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Geologist under the laws of the State of Minnesota

Print Name: Timothy L. Kenyon
Signature:
Date: 30 OCT 16 License # 30512

LEGGETTE, BRASHEARS AND GRAHAM, INC.
Professional Groundwater and Environmental Services
140 East Hinks Lane, Suite 126
Sioux Falls, South Dakota 57104

TABLE OF CONTENTS

Page

FIGURES
(at end of report)

Figures

EXECUTIVE SUMMARY

The geology of Mower County consists of up to 275 feet of unconsolidated glacial sediments overlying bedrock. The glacial sediments were deposited by continental glaciers that receded from the area approximately 20,000 years ago. Although the glacial sediments are typically of very low permeability, some sand and gravel zones are present within the glacial sediments, and, where sufficiently thick, are utilized as aquifers. The glacial sediments, where thick and clayey, serves to protect underlying aquifers from surface pollution. Bedrock beneath the county consists largely of carbonate rocks, and a karst system is relatively well-developed. The carbonate bedrock serves as an aquifer in many areas.

The Lansing and Austin landfills are located next to each other approximately 2 miles northwest of the City of Austin. The landfills are operated by SKB Environmental, which is owned by Waste Connections.

The Austin Facility is an unlined Class II demolition and debris land disposal facility that occupies approximately 76 acres. The facility has been in operation since about 1998, and appears to have been most recently re-permitted in 2006. Even though this design is compliant with state rules, the unlined design is inadequate for the protection of local groundwater resources. The groundwater monitoring system (wells, parameters and sampling frequency) appears to be adequate for the purpose of detecting releases of leachate from the landfill into the adjacent groundwater.

The groundwater beneath the facility is moderately oxidized. Changes in the geochemical character of the groundwater towards a reducing environment are often a signal that a release has occurred. Comparison of the redox conditions between the downgradient wells (MW-2, MW-3 and MW4R) with the background well (MW-1) shows that the downgradient wells are slightly less oxidized and may be trending toward a more reduced state. The departure of the groundwater from the fully oxidized state in the downgradient areas (compared with the upgradient areas near MW-1) does not appear to be sufficient to indicate that a leachate release has occurred.

In 2014, a leachate seep drain trench was installed and began collecting leachate. In 2015, 48,050 gallons of leachate were collected and discharged to the City of Austin wastewater treatment plant. The presence of the leachate seep drain trench mitigates the hazard of leachate migration to some extent; however, it is not an adequate substitution for a properly designed and installed liner and leachate collection system.

We recommend that future phase development and expansion of the Austin Facility include provisions incorporating liner and leachate collection systems. Consideration should be given to the performance of a more robust statistical analysis of the groundwater data to provide a more complete and rigorous understanding of changes in the geochemistry of the groundwater at the site.

The Lansing Facility is a Class III demolition landfill and occupies approximately 40 acres. A 50-acre expansion to the west is planned. The design of the landfill appears to be appropriate to the permitted status of the landfill as a Class III demolition landfill. The groundwater beneath the Lansing Facility is slightly reduced, but to the extent that a leachate release is indicated. The groundwater monitoring system for the original facility (wells, parameters and sampling frequency) appears to be adequate for the purpose of detecting releases of leachate from the landfill into the adjacent groundwater. The groundwater monitoring system for the expansion also appears adequate for the purpose of detecting releases of leachate from the landfill into the adjacent groundwater.

We recommend that future phase development and expansion of the Lansing Facility follow the design practices of the current facility incorporating liner and leachate collection systems. Consideration should be given to the performance of a more robust statistical analysis of the groundwater data to provide a more complete and rigorous understanding of changes in the geochemistry of the groundwater at the site.

1.0 INTRODUCTION

The purpose of this report is to provide a review of the SKB Lansing landfill (SW-514, hereinafter "Lansing Facility") and the SKB Austin landfill (SW-542, hereinafter "Austin Facility") with a focus on potential groundwater impacts from the landfills.

The information presented in this report is a distillation of the documents provided by the County. A listing of the documents is presented below. In addition to the documents listed below, information from various on-line resources, principally from the Minnesota Pollution Control Agency (MPCA), the Minnesota Department of Health (MDH), and the Minnesota Geological Survey (MGS), was utilized. Because much of the information is contained in multiple documents, comprehensive attribution is not practical.

Reviewed Documents

- SKB Lansing Landfill (SW-514) MPCA Permit
- SKB Lansing Monitoring System Work Plan, July 2001
- SKB Lansing Hydrogeologic Evaluation Form for Demolition Landfills, March 2007
- SKB Lansing Well Relocation of MW-2 and MW-3, April 2011
- SKB Lansing Phase I Hydrogeologic Evaluation and Phase II Work Plan for a Hydrogeologic Investigation, December 2013
- SKB Lansing Phase II and Phase III Hydrogeologic Investigation Report, October 2014
- SKB Lansing Landfill (SW-514) Annual Report for 2014
- SKB Lansing Landfill (SW-514) Annual Report for 2015
- Vonco IV Austin Landfill (SW-542) MPCA Permit
- SKB Austin Landfill Phase II Hydrogeologic Evaluation, May 2004
- SKB Austin Landfill (SW-542) Annual Report for 2014
- SKB Austin Landfill (SW-542) Annual Report for 2015
- SKB Austin Landfill Annual Leachate Report for 2015
- SKB Austin Leachate Seep Drain Trench, July 2015
- Contributions to the Geology of Mower County, MGS, 2000
- Mower County Geologic Atlas, MGS, 1998

2.0 GEOLOGY OF MOWER COUNTY

The geology of Mower County consists largely of up to 275 feet of unconsolidated glacial sediments overlying bedrock. The unconsolidated glacial sediments are associated with the Des Moines lobe glaciers which retreated from the area approximately 20,000 years ago. The glacial sediments consist of unsorted deposits called till, which is clay- to boulder-size material laid down directly from glacial ice. The till, where thick and clayey, serves to protect underlying aquifers from surface pollution. The till is overlain and interbedded in places with glacial meltwater deposits of sorted sand, gravel, and silt (outwash), which may serve as aquifers or as sources of construction aggregate.

The glacial deposits rest on an erosional surface cut into flat-lying Paleozoic carbonate rocks (limestone and dolostone) that are 374–440 million years old. These soluble carbonate rocks underlie the entire county and a karst system is evident in many areas. Karst forms in carbonate bedrock when water moving through the soil picks up carbon dioxide, creating a weak solution of carbonic acid. This acidic solution moves through the rock and enlarges and integrates the cracks and fractures as the solutions dissolve the bedrock. The network of cracks and fissures initially transmits groundwater slowly, but as the solution-enlarged cracks and fractures grow, they are integrated into subsurface conduit systems that drain the landscape.

The uppermost bedrock encountered beneath the Lansing Facility and Austin Facility is typically greater than 100 feet deep. Depth to bedrock generally increases to the northwest where a bedrock valley has been documented.

Where present, the glacial outwash sediments serve as aquifers. County-side, the bedrock is utilized as an aquifer, typically where the quality and quantity of groundwater from the glacial aquifers is not sufficient.

An assessment of the sensitivity of groundwater to pollution was performed by the MDH and is presented on Figure 1. The location of known landfills is superimposed on the sensitivity shading, with the Lansing Facility and Austin Facility identified. Note that the Lansing Facility and Austin Facility are located in an area of low sensitivity to surficial pollution.

3.0 SKB LANSING LANDFILL (SW-541)

3.1 Key Understandings

The Lansing Facility was first permitted as a Class II demolition landfill in 1996, includes five phases and occupies approximately 40 acres (Figures 2 and 3). Phase 2 of the Lansing Facility is equipped with a composite liner system that includes a 60-mil HDPE layer and leachate collection system. In 2005, the designation of the Lansing Facility was changed to a Class III demolition landfill, to allow limited acceptance of industrial wastes.

We understand that an expansion of the Lansing Facility to the west is contemplated, but that the remaining life of the existing landfill is such that the expansion may not occur for some time.

The Lansing Facility is underlain by clay-rich glacial till with water-bearing sandy or gravelly zones at approximately 20-25 feet below grade (FBG) and at approximately 40-45 FBG. These water-bearing zones are contained within the low-permeability clay-rich glacial till and are perched above the underlying limestone bedrock, which occurs at depths generally below 100 FBG.

Groundwater flow within the water-bearing zones in the glacial till is generally to the south with minor variances to the southeast and southwest (Figures 4 and 5). Both water-bearing zones are monitored: there are five monitor wells in the shallow zone and three monitor wells in the deeper zone. In the expansion area to the west, there are 12 monitor wells and piezometers split among the two zones.

The eight monitor wells (four in each zone) are monitored for volatile organic compounds (VOCs), total metals, redox parameters and field stabilization parameters. Leachate samples are also monitored for the same parameters, plus parameters required by the wastewater treatment plant (BOD and COD).

Total metals and redox parameters are detected in all wells. No VOCs have been consistently detected in any wells. Note that it is expected that VOCS will be sporadically detected in monitor wells and that these detections are false positive detections and, unless they become statistically significant, are not indicative of a release. The leachate contains a variety of VOCs as wells as the other parameters.

Exceedances of Intervention Limits (ILs) are present in nearly all the wells and consist of Arsenic, Barium and Manganese. One IL exceedance for Tetrahydrofuran is reported and ascribed to well construction solvents.

In December 2013, a work plan for the evaluation of the 50 acres west-adjacent to the Lansing Facility was submitted to the MPCA. The investigation included in excess of 30 soil borings, monitor wells, piezometers and test pits, as well as testing of soil properties and groundwater analysis. The results of the investigation indicate that the subsurface geology of the expansion area is quite similar to that of the original Lansing Facility in that low-permeability, clay-rich glacial till with entrained outwash (sand) lenses are predominant. The outwash lenses in the shallow subsurface are not laterally continuous. The deeper sand unit that is present on the original Lansing Facility appears to be present on the expansion area with a thickness of 3 to 6 feet. The low-gradient generally southward groundwater flow across the expansion area is consistent with that of the original Lansing Facility. A qualitative comparison of groundwater chemistry results to historical data indicates that the concentrations of parameters across the site varies within the expected range for similar geologic environments. Tetrahydrofuran was detected in the wells installed in 2011 and is attributed to the solvent used to fuse the PVC well casing in accordance with MDH regulations.

3.2 Interpretations

The design of the Lansing Facility appears to be appropriate to the permitted status of the landfill as a Class III demolition landfill and is accommodating of the hydrogeology of both the original site and the expansion.

The groundwater monitoring system for the original facility (wells, parameters and sampling frequency) appears to be adequate for the purpose of detecting releases of leachate from the landfill into the adjacent groundwater. The groundwater monitoring system for the expansion also appears adequate for the purpose of detecting releases of leachate from the landfill into the adjacent groundwater.

As is typical of Minnesota landfills, the only substantive evaluation of the groundwater monitoring results consists of a comparison to statutory limits such as Intervention Limits. While this method of evaluation is compliant with applicable rules and is required, it falls short of utilizing the monitoring results for the assessment of the geochemical character of the groundwater in an attempt to determine if a release has occurred prior to the exceedance of an Intervention Limit. The reported Intervention Limit exceedances are not a definitive indication that a leachate release has occurred.

Changes in the geochemical character of the groundwater towards a reducing environment are often a signal that a release has occurred. Review of the groundwater monitoring results shows that the shallow zone is relatively oxidized as indicated by the presence of relatively high concentrations of dissolved oxygen (between 1 and 5 mg/L), and positive Eh readings (a measurement of oxidation/reduction potential). When compared with the shallow zone background well (MW-1), the downgradient shallow zone wells (MW-2R, MW-3, MW-3R and MW-4) are generally more mineralized and at a somewhat less oxidized state. The presence of a somewhat less oxidized condition in downgradient monitor wells in a glacial till environment is not necessarily indicative of a leachate release, but is often a result of the interruption of the natural seasonal water recharge and discharge cycle of the till as a result of the construction of the landfill. When a leachate release has occurred, the groundwater proximal to, and downgradient of, the release typically becomes strongly reduced (non-detect dissolved oxygen with strongly negative Eh readings and very highly mineralized). At this site, the departure of the groundwater from the fully oxidized state in the downgradient areas (compared with MW-1) does not appear to be sufficient to indicate that a leachate release has occurred. Given the variety and concentrations of VOCs in the leachate, as well as the strongly reduced nature of the leachate, it is expected that a very strong reduced environment would be rather quickly evident in the groundwater in the downgradient areas should a release occur. The onset of a strongly reduced condition would be followed rather quickly by the detection of VOCs in the groundwater.

In the deeper zone, the groundwater is naturally somewhat reduced, as indicated by low dissolved oxygen concentrations and low or slightly negative Eh readings. This somewhat reduced condition is typical of groundwater located deeper within the glacial till because there is very little annual water recharge and discharge due to the largely impermeable nature of the clay-rich glacial till matrix. Review of the analytical results shows that there are no significant differences in the nature of the groundwater between MW-1RD, MW-2RD and MW-3RD that are indicative of a leachate release.

3.3 Recommendations

We recommend that future phase development and expansion of the Lansing Facility follow the design practices of the current facility incorporating liner and leachate collection systems. Consideration should be given to the performance of a more robust statistical analysis of the groundwater data to provide a more complete and rigorous understanding of changes in the geochemistry of the groundwater at the site.

4.0 SKB AUSTIN LANDFILL (SW-542)

4.1 Key Understandings

The Austin Facility was permitted as an unlined Class II Unlined Demolition Debris Land Disposal facility in 2006, includes eight phases and occupies approximately 76 acres (Figures 6 and 7). Groundwater level data has been collected at the Austin Facility since 1998, confirming activity at the site by Vonco, the previous owner, prior to the 2006 permit. In 2014, a leachate seep drain trench was installed and began collecting leachate.

The Austin Facility is underlain by clay-rich glacial till with water-bearing sandy or gravelly zones at approximately 15-20 FBG. These water-bearing zones are contained within the low-permeability clay-rich glacial till and are perched above the underlying limestone bedrock, which occurs at depths generally below 100 FBG.

Groundwater flow within the water-bearing zones in the glacial till is generally to the southwest on the west half of the Austin Facility and to the northeast on east half of the Austin Facility (Figure 8). The groundwater gradients are very flat, ranging from 0.08 to 0.0008.

The water-bearing zones are monitored by four monitor wells utilized for groundwater sampling and eight monitor wells utilized for groundwater level gauging.

The sampled monitor wells are monitored for VOCs, total metals, redox parameters and field stabilization parameters. Leachate is monitored for groundwater parameter and parameters required by the receiving facility, the Austin wastewater plant.

Total metals and redox parameters are detected in all wells. VOCs have not been consistently detected in any wells. Note that it is expected that VOCs will be sporadically detected in monitor wells and that these detections are false positive detections and, unless they become statistically significant, are not indicative of a release.

Exceedances of Intervention Limits (ILs) were indicated in 2014 for Boron and Nitrate+Nitrite and in 2015 for Boron, all in MW-2.

The leachate seep drain was placed across the southwest margin of the western portion of the Austin Facility, and is assumed to be in response to leachate migration issues (Figure 9). No documentation was available relative to the leachate migration issues. In 2015, 48,050 gallons of leachate were collected and discharged to the City of Austin wastewater treatment plant. Several VOCs have been chronically present in the leachate, up to the maximum concentration of 296 ug/L for 2- and 3-methylphenol. As expected, the leachate is strongly reduced.

4.2 Interpretations

The permit documents and the 2014 Annual Report indicate that the Austin Facility is not equipped with a liner or leachate detection system. Even though this design is compliant with state rules, and unless a focused evaluation was performed to qualify the existing in-situ soils as a liner, this design is inadequate for the protection of local groundwater resources. Even if a focused evaluation was performed to qualify the in-situ soils as a liner, the design is inadequate because of the lack of a leachate collection system. The leachate that inevitably collects in the landfill will accumulate and eventually migrate to the groundwater and cause groundwater impacts. The leachate that collects in demolition landfills can contain substances that are groundwater pollutants, such as the variety of VOCs detected in the leachate from the leachate seep drain. Additionally, the redox environment in the cells in demolition landfills can be very strongly reducing, resulting in the evolution of hydrogen sulfide gas, a highly toxic atmospheric and groundwater pollutant.

The presence of the leachate seep drain trench mitigates the hazard of leachate migration to some extent; however, it is not an adequate substitution for a properly designed and installed liner and leachate collection system.

The groundwater monitoring system (wells, parameters and sampling frequency) appears to be adequate for the purpose of detecting releases of leachate from the landfill into the adjacent groundwater.

As is typical of Minnesota landfills, the only substantive evaluation of the groundwater monitoring results consists of a comparison to statutory limits such as Intervention Limits. While this method of evaluation is compliant with applicable rules and is required, it falls short of utilizing the monitoring results for the assessment of the geochemical character of the groundwater in an attempt to determine if a release has occurred prior to the exceedance of an Intervention Limit. The reported Intervention Limit exceedances are not a definitive indication that a leachate release has occurred.

Changes in the geochemical character of the groundwater towards a reducing environment are often a signal that a release has occurred. Review of the groundwater monitoring results shows that the groundwater is moderately oxidized as indicated by the presence of concentrations of dissolved oxygen generally between 1 and 5 mg/L, and positive Eh readings (a measurement of oxidation/reduction potential). Comparison of the redox conditions between the downgradient wells (MW-2, MW-3 and MW4R) with the background well (MW-1) shows that the downgradient wells are slightly less oxidized and may be trending toward a more reduced state

A key indicator of this trend toward a more reduced state is the sharp drop in Nitrate+Nitrite concentrations in MW-3 and the absence of Nitrate+Nitrite in MW-2, in the face of reasonable steady concentrations of Nitrate+Nitrite in MW-1 (reductions in concentrations of Nitrate+Nitrite can be an indicator of the onset of reducing conditions). A drop in pH, accompanied by an increase in Alkalinity, can also be an indicator of the onset of reducing conditions, and this condition is evident in MW-2 and MW-3.

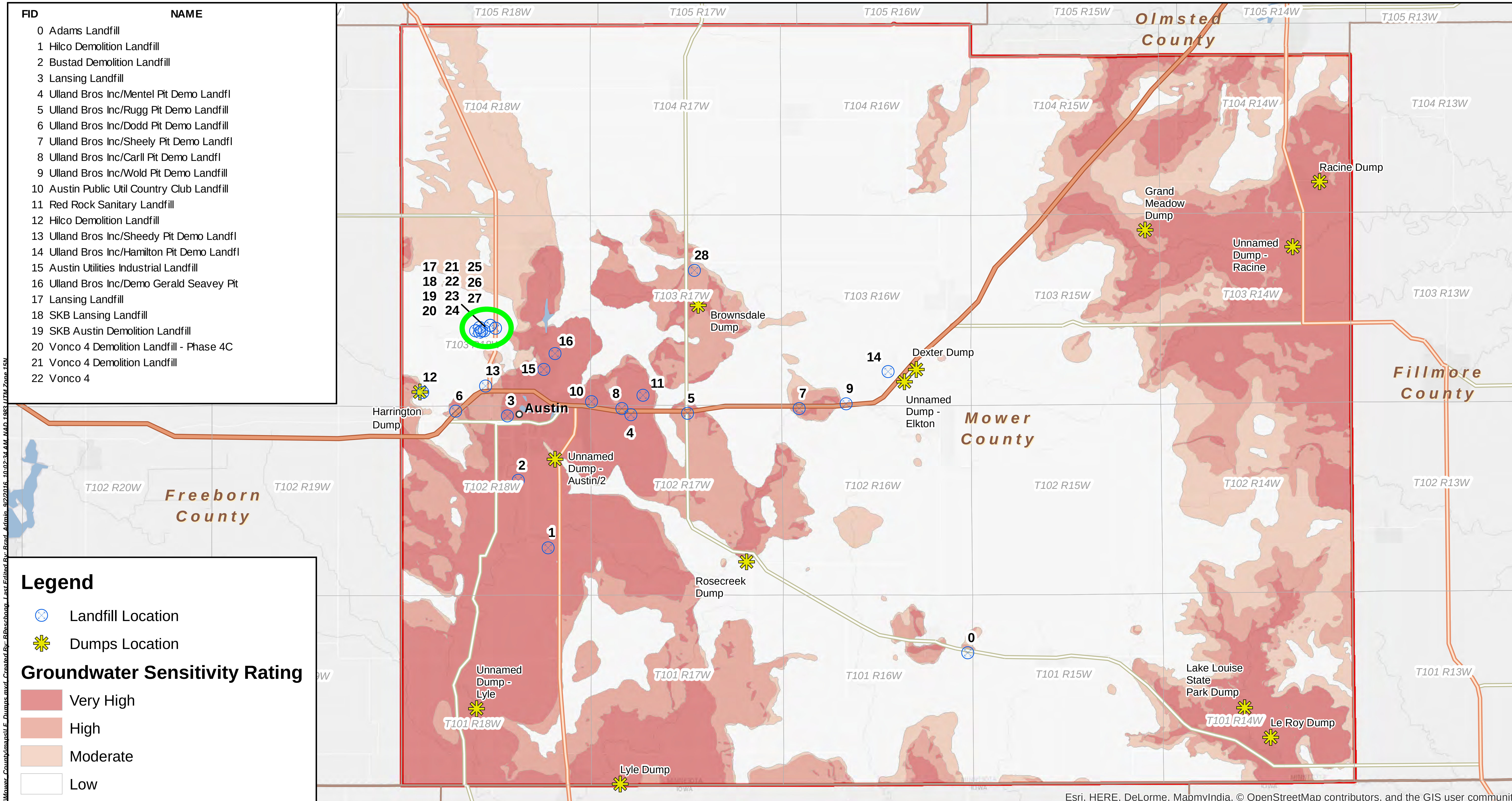
The presence of a somewhat less oxidized condition in downgradient monitor wells in a glacial till environment is not necessarily indicative of a leachate release, but is often a result of the interruption of the natural seasonal water recharge and discharge cycle of the till as a result of the construction of the landfill. When a leachate release has occurred, the groundwater proximal to, and downgradient of, the release typically becomes strongly reduced (non-detect dissolved oxygen with strongly negative Eh readings also becomes very highly mineralized).

At the Austin Facility, the departure of the groundwater from the fully oxidized state in the downgradient areas (compared with MW-1) does not appear to be sufficient to indicate that a leachate release has occurred. Given the variety and concentration of VOCs expected to be present in the leachate, as well as the expected strongly reduced nature of the leachate, it is expected that a very strong reduced environment would be rather quickly evident in the groundwater in the downgradient areas should a release occur. The onset of a strongly reduced condition would be followed rather quickly by the detection of VOCs in the groundwater.

4.3 Recommendations

We recommend that future phase development and expansion of the Austin Facility include provisions incorporating liner and leachate collection systems. Consideration should be given to the performance of a more robust statistical analysis of the groundwater data to provide a more complete and rigorous understanding of changes in the geochemistry of the groundwater at the site.

FIGURES



FID	NAME
0	Adams Landfill
1	Hilco Demolition Landfill
2	Bustad Demolition Landfill
3	Lansing Landfill
4	Ulland Bros Inc/Mentel Pit Demo Landfl
5	Ulland Bros Inc/Rugg Pit Demo Landfill
6	Ulland Bros Inc/Dodd Pit Demo Landfill
7	Ulland Bros Inc/Sheely Pit Demo Landfl
8	Ulland Bros Inc/Carll Pit Demo Landfl
9	Ulland Bros Inc/Wold Pit Demo Landfill
10	Austin Public Util Country Club Landfill
11	Red Rock Sanitary Landfill
12	Hilco Demolition Landfill
13	Ulland Bros Inc/Sheedy Pit Demo Landfl
14	Ulland Bros Inc/Hamilton Pit Demo Landfl
15	Austin Utilities Industrial Landfill
16	Ulland Bros Inc/Demo Gerald Seavey Pit
17	Lansing Landfill
18	SKB Lansing Landfill
19	SKB Austin Demolition Landfill
20	Vonco 4 Demolition Landfill - Phase 4C
21	Vonco 4 Demolition Landfill
22	Vonco 4

Legend

Landfill Location

Dumps Location

Groundwater Sensitivity Rating

Very High

High

Moderate

Low

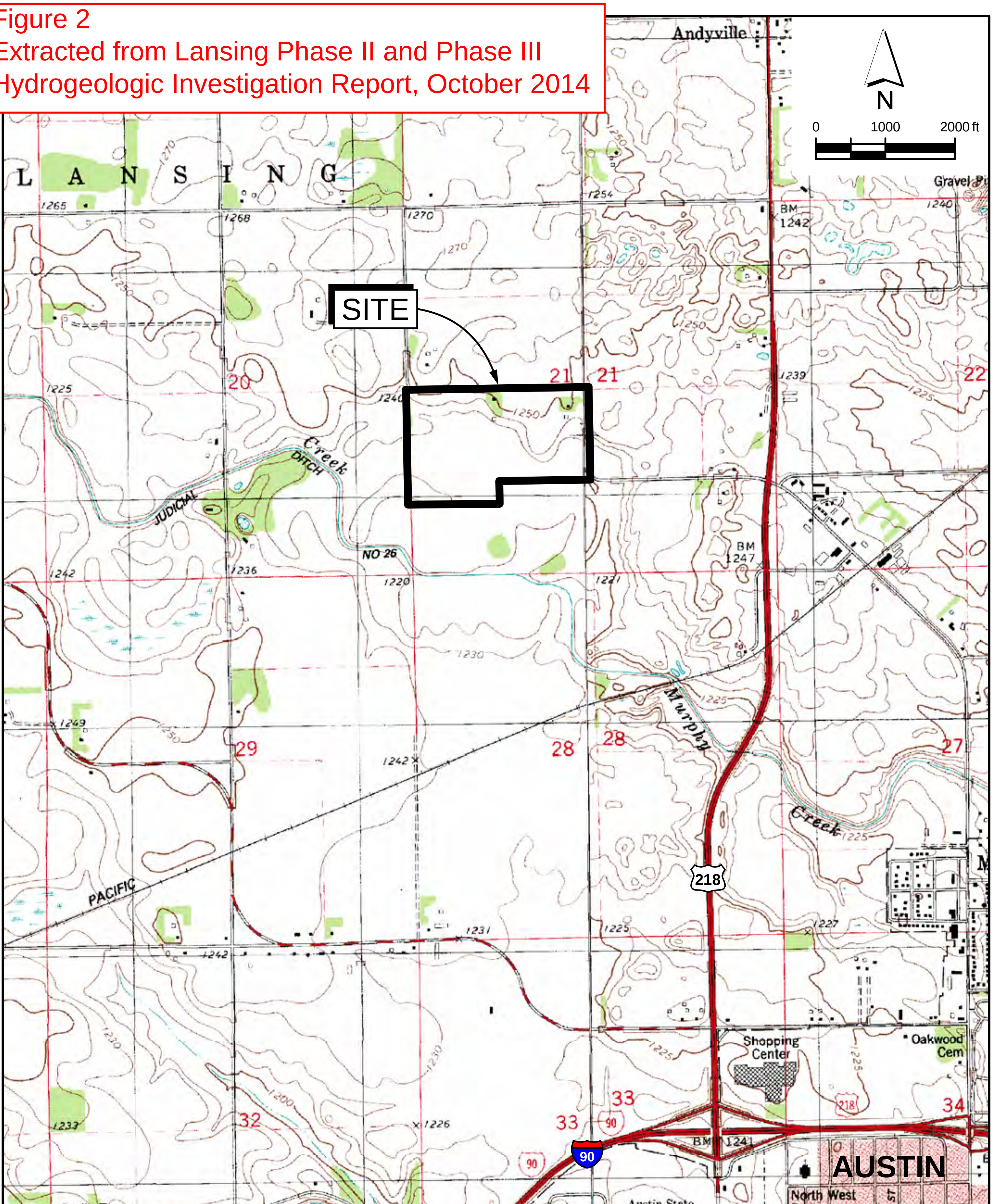
Prepared By:
LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Ground-Water and
Environmental Engineering Services
140 East Hinks Lane, Suite 126
Sioux Falls, SD 57104
(605) 334-6000

MOWER COUNTY
AUSTIN, MINNESOTA

GROUNDWATER SENSITIVITY TO POLLUTION
and KNOWN LANDFILLS / DUMPS

Document Path: O:\Mower_County\maps\LF_Dumps.mxd | Date Saved: 9/2/2016 10:00:40 AM | FIGURE: FIGURE 1

Figure 2
Extracted from Lansing Phase II and Phase III Hydrogeologic Investigation Report, October 2014

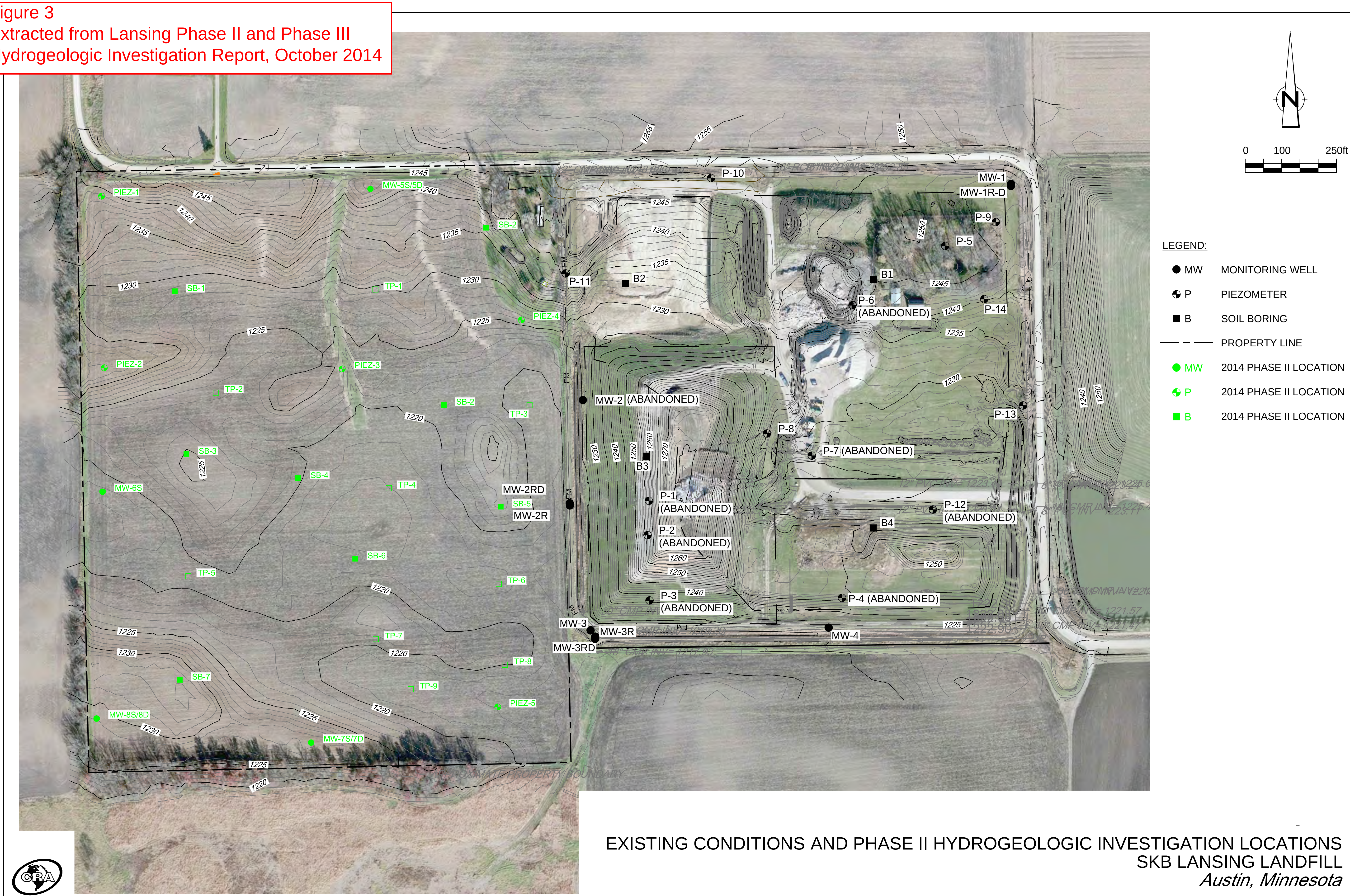


SOURCE: USGS 7.5 MINUTE QUADS - AUSTIN EAST; AUSTIN WEST (1982)

SITE LOCATION
SKB LANSING LANDFILL
Austin, Minnesota

075704-3064(037)GIS-SP003 JUN 27/2014

Figure 3
Extracted from Lansing Phase II and Phase III Hydrogeologic Investigation Report, October 2014

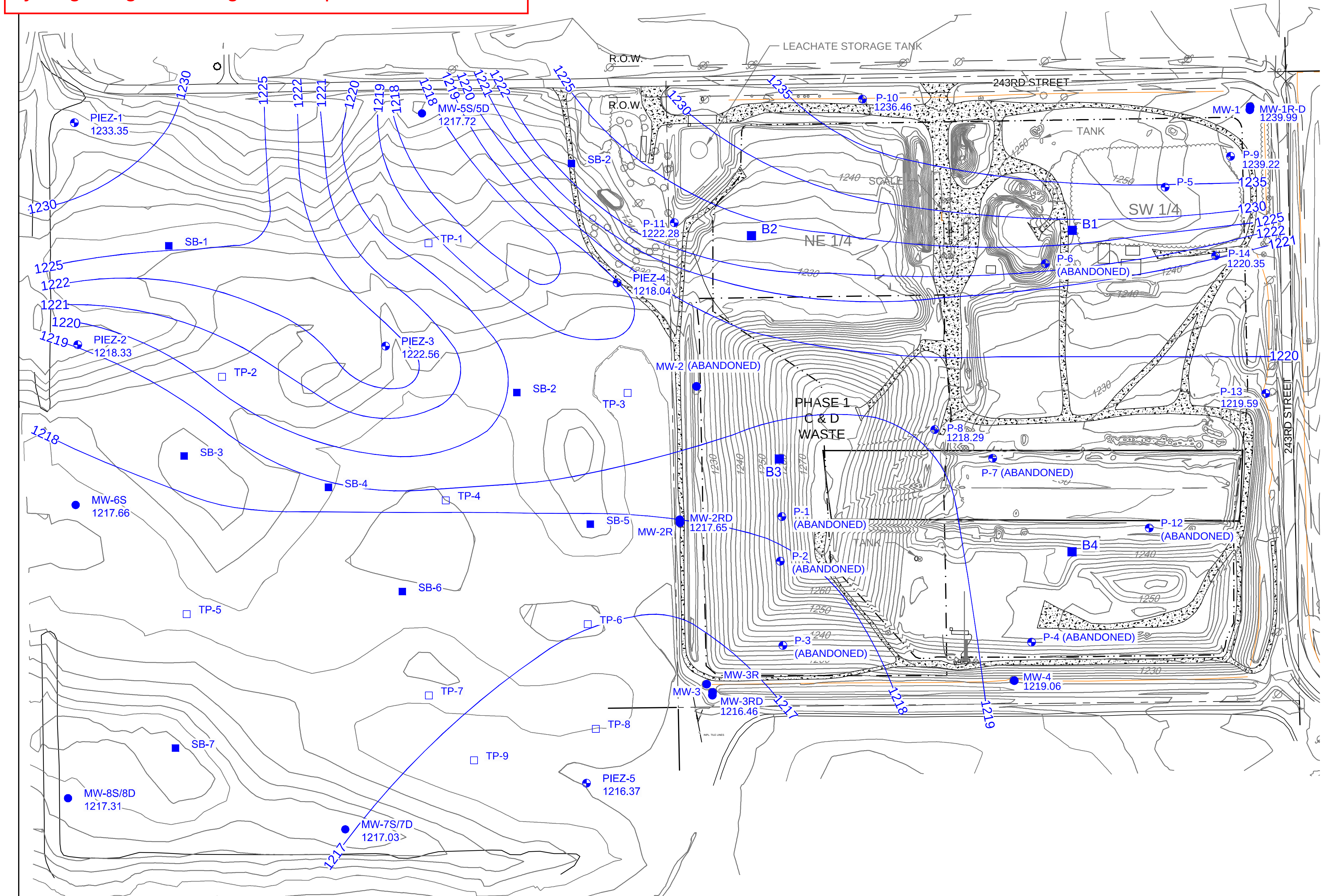


EXISTING CONDITIONS AND PHASE II HYDROGEOLOGIC INVESTIGATION LOCATIONS
SKB LANSING LANDFILL
Austin, Minnesota

CRA

75704-5000(037)GN-BU004 OCT 16/2014

Figure 4
Extracted from Lansing Phase II and Phase III Hydrogeologic Investigation Report, October 2014



LEGEND:

1245	EXISTING CONTOUR
x	FENCE LINE
	TREE OR BRUSH
	EXISTING BUILDING
MW-4	MONITORING WELL LOCATION
P-4	PIEZOMETER LOCATION
	EXISTING POWER POLE
	EXISTING OVERHEAD ELECTRIC
	EXISTING PRIVATE WELL
	EXISTING SECTION CORNER
	APPROXIMATE PROPERTY BOUNDARY
	APPROXIMATE LIMITS OF C & D WASTE
	APPROXIMATE LIMITS OF INDUSTRIAL WASTE
	RIGHT OF WAY
	CONTOUR LINES

N

0 100 250ft

NOTE:

1. CONTOURING PATTERN IN SOUTHWEST IS BASED ON HISTORICAL PATTERNS ESTABLISHED FROM PIEZOMETER DATA.
2. MW-1 ELEVATION IS ASSUMED BASED ON BOTTOM OF SCREEN ELEVATION OF 1220.8.

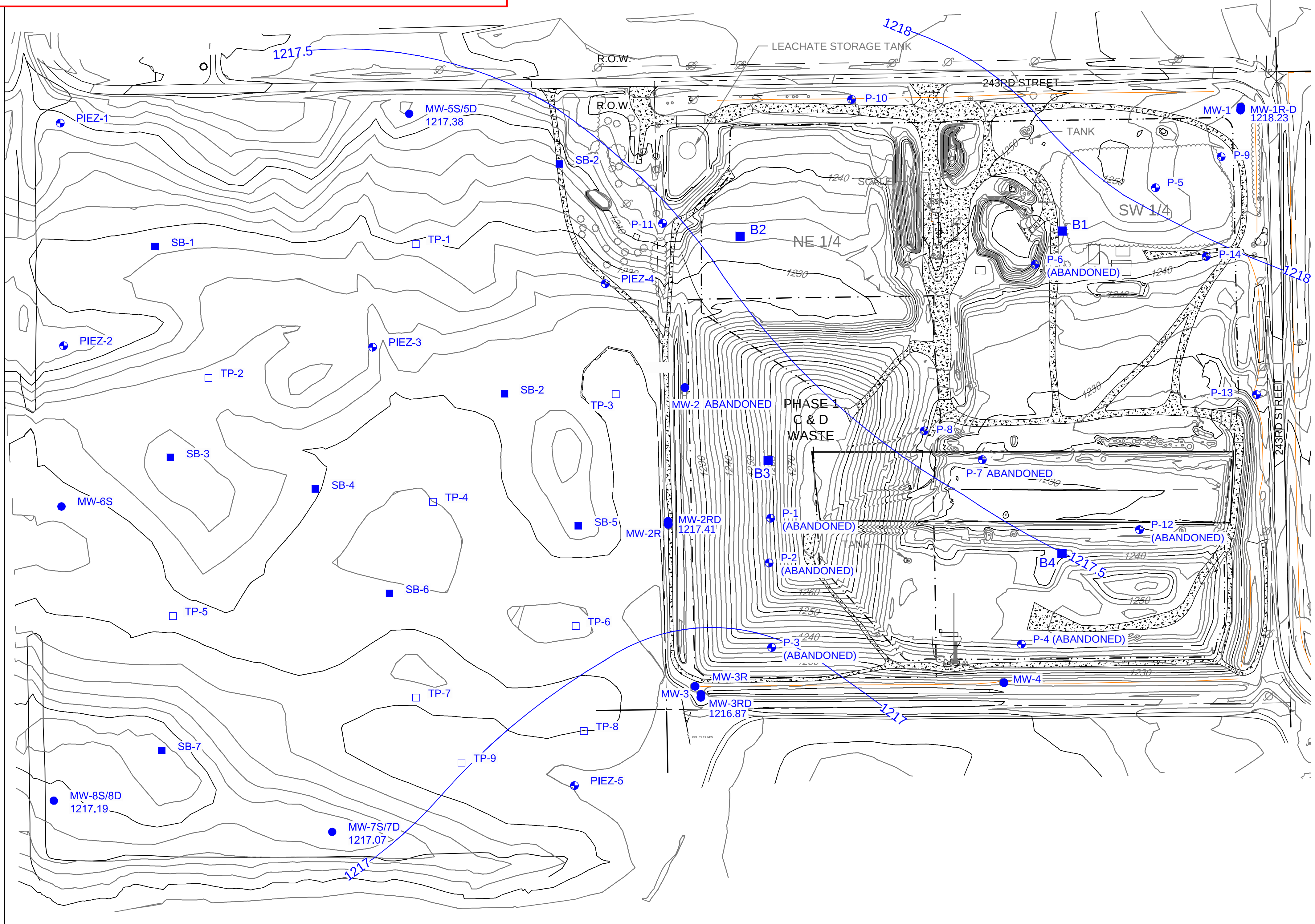
SOURCES:

1. SITE LOCATION: THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 21. T103 N, R18W, MOWER COUNTY.
2. EXISTING TOPOGRAPHY IS A COMPILATION OF FIELD SURVEYS DATED 1997-2008, BY JONES, HAUGH & SMITH CONSULTING ENGINEERS AND LAND SURVEYORS, OF ALBERT LEA, MINNESOTA.
3. ACTIVE WASTE AREA UPDATED JANUARY 2009 BY GORMAN SURVEYING OF BLOOMINGTON, MN.
4. GORMAN TOPOGRAPHIC SURVEY OF NOVEMBER 2011.
5. DRAWINGS PREPARED BY FOTH, LLC. 02/03/2009

SHALLOW POTENTIOMETRIC CONTOUR MAP MAY 28, 2014
SKB LANSING LANDFILL
Austin, Minnesota

75704-5000(037)GN-BU001 JUN 06/2014

Figure 5
Extracted from Lansing Phase II and Phase III Hydrogeologic Investigation Report, October 2014



LEGEND:

1245	EXISTING CONTOUR
x	FENCE LINE
	TREE OR BRUSH
	EXISTING BUILDING
MW-4	MONITORING WELL LOCATION
P-4	PIEZOMETER LOCATION
	EXISTING POWER POLE
	EXISTING OVERHEAD ELECTRIC
	EXISTING PRIVATE WELL
	EXISTING SECTION CORNER
	APPROXIMATE PROPERTY BOUNDARY
	APPROXIMATE LIMITS OF C & D WASTE
	APPROXIMATE LIMITS OF INDUSTRIAL WASTE
	RIGHT OF WAY
	CONTOUR LINES

N

0 100 250ft

NOTE:

1. CONTOURING PATTERN IN SOUTHWEST IS BASED ON HISTORICAL PATTERNS ESTABLISHED FROM PIEZOMETER DATA.
2. MW-1 ELEVATION IS ASSUMED BASED ON BOTTOM OF SCREEN ELEVATION OF 1220.8.

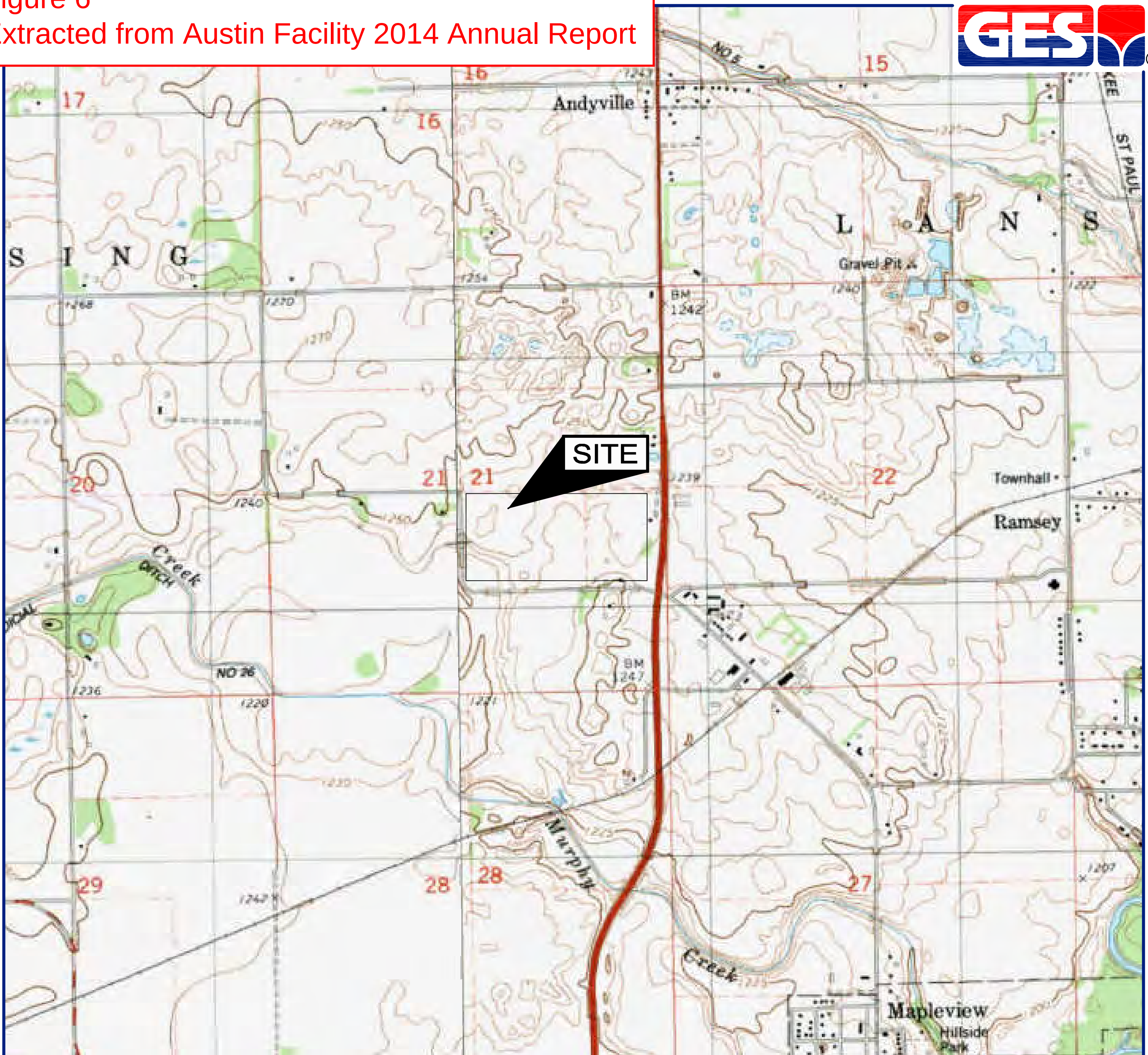
SOURCES:

1. SITE LOCATION: THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 21. T103 N, R18W, MOWER COUNTY.
2. EXISTING TOPOGRAPHY IS A COMPILATION OF FIELD SURVEYS DATED 1997-2008, BY JONES, HAUGH & SMITH CONSULTING ENGINEERS AND LAND SURVEYORS, OF ALBERT LEA, MINNESOTA.
3. ACTIVE WASTE AREA UPDATED JANUARY 2009 BY GORMAN SURVEYING OF BLOOMINGTON, MN.
4. GORMAN TOPOGRAPHIC SURVEY OF NOVEMBER 2011.
5. DRAWINGS PREPARED BY FOTH, LLC. 02/03/2009

DEEP GROUNDWATER CONTOUR MAP MAY 28, 2014
SKB LANSING LANDFILL
Austin, Minnesota

75704-5000(037)GN-BU002 JUN 06/2014

Figure 6
Extracted from Austin Facility 2014 Annual Report



SOURCE: USGS 7.5 MINUTE SERIES
TOPOGRAPHIC QUADRANGLE 1982
AUSTIN EAST, MINNESOTA
CONTOUR INTERVAL = 5'

QUADRANGLE LOCATION

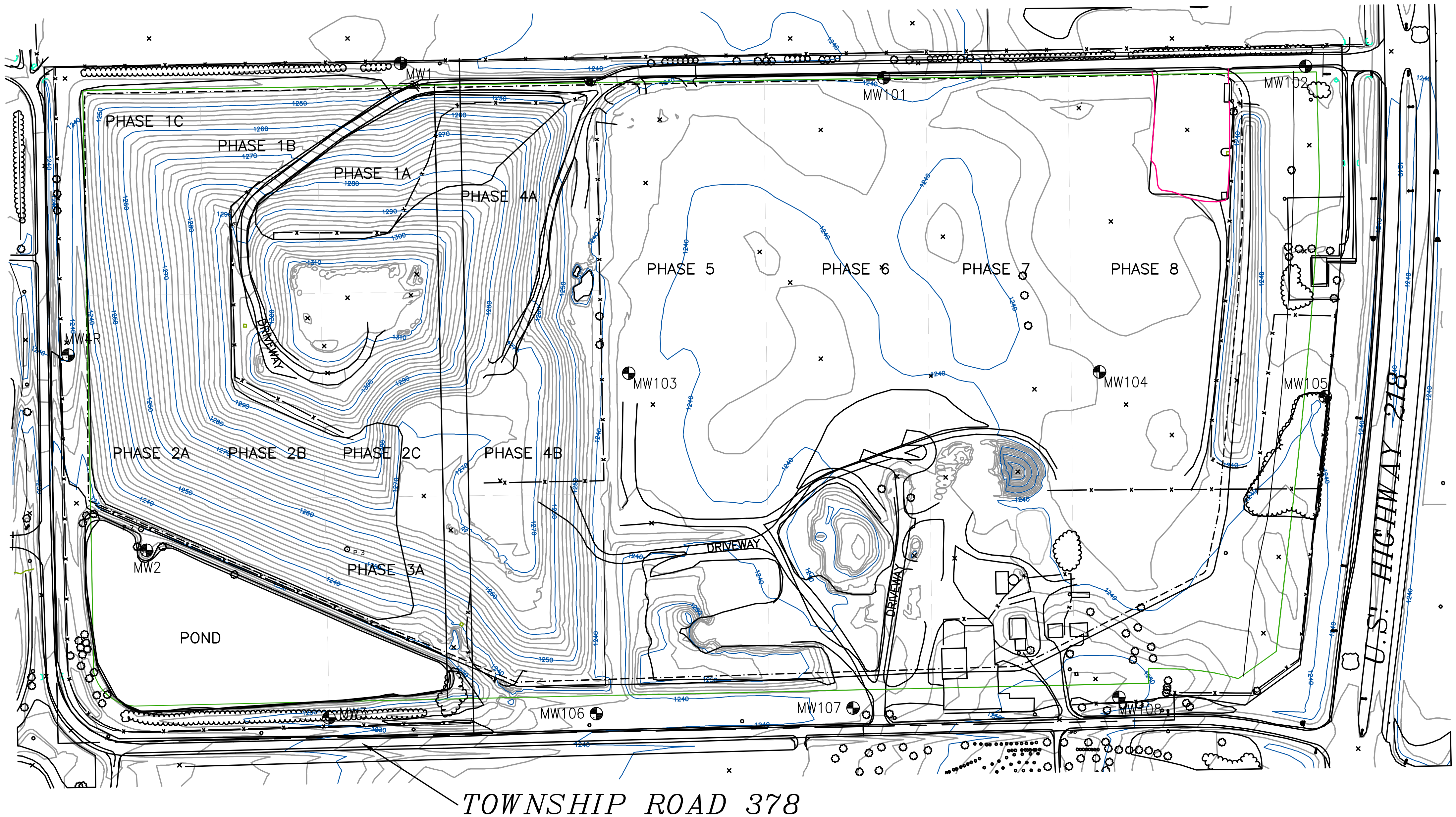
DRAFTED BY: W.G.S. (N.J.)	SITE LOCATION MAP
CHECKED BY:	SKB ENVIRONMENTAL SKB AUSTIN LANDFILL FACILITY 24477 US HIGHWAY 218 AUSTIN, MINNESOTA
REVIEWED BY:	
NORTH	Groundwater & Environmental Services, Inc. 1285 CORPORATE CENTER DRIVE, SUITE 120, EAGAN, MN 55121
	SCALE IN FEET 0 2000 — DATE 1-9-15

M:\Graphics\3500-Minnesota\SKB Environmental\Austin-Lansing facility(Hwy218)\Austin-Lansing facility(Hwy218) SLM.dwg, Layout1, 1/9/2015 9:26:43 AM, WShea

Figure 7
Extracted from Austin Facility 2014 Annual Report

LEGEND

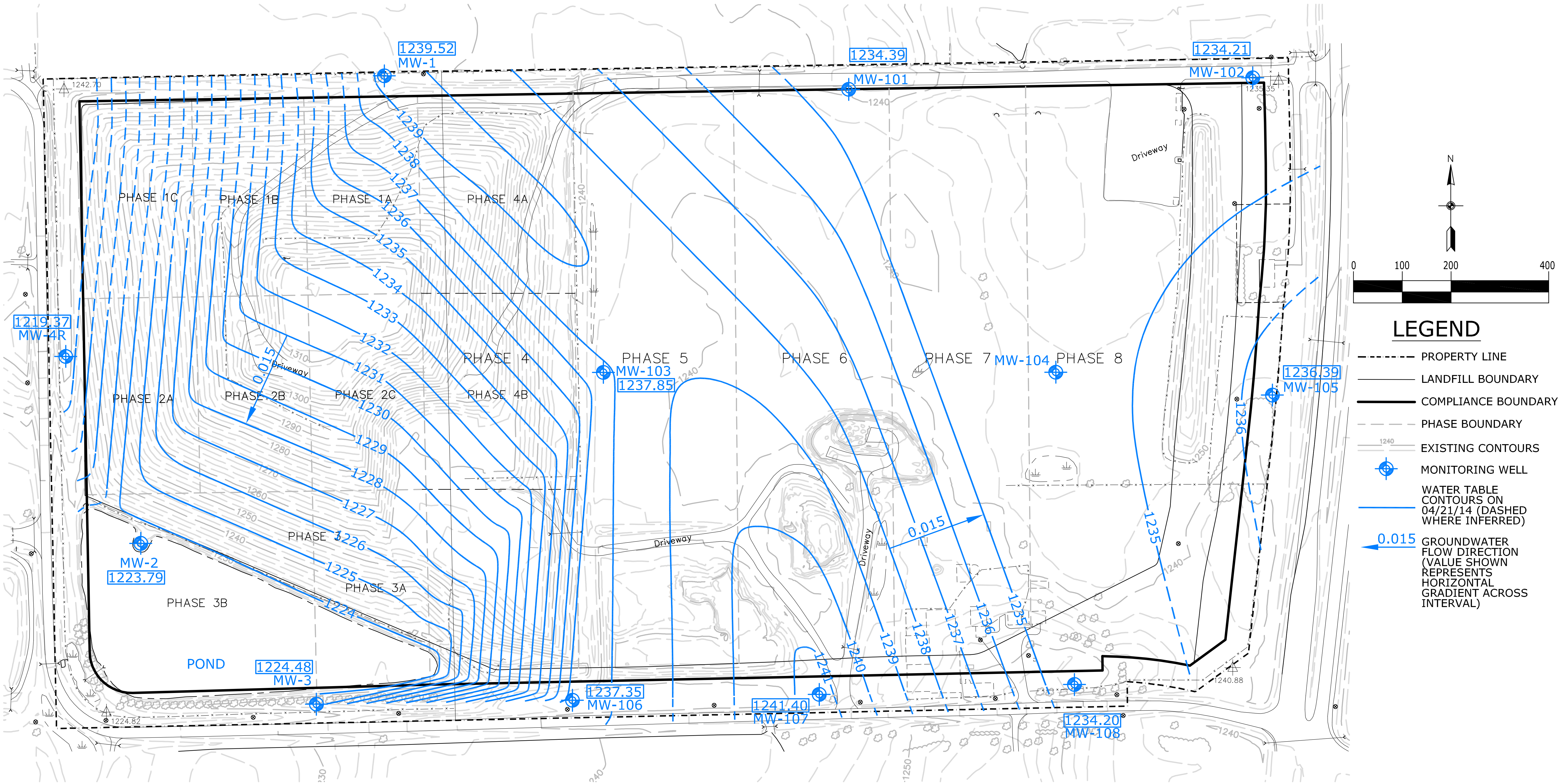
- PROPERTY BOUNDARY
- FENCE
- LANDFILL BOUNDARY
- COMPLIANCE BOUNDARY
- PHASE BOUNDARY
- MONITORING WELL



DRAFTED BY: W.G.S. (N.J.)	SITE MAP
CHECKED BY:	SKB ENVIRONMENTAL SKB AUSTIN LANDFILL FACILITY 24477 US HIGHWAY 218 AUSTIN, MINNESOTA
REVIEWED BY:	
NORTH	Groundwater & Environmental Services, Inc. 1285 CORPORATE CENTER DRIVE, SUITE 120, EAGAN, MN 55121
	SCALE IN FEET: 0 APPROXIMATE 250 — DATE: 1–19–15

M:\Graphics\3500-Minnesota\SKB Environmental\Austin-Lansing facility(Hwy218)\Austin-Lansing facility(Hwy218) SM.dwg, B-250, 1/19/2015 2:32:44 PM, WShea

Figure 8
Extracted from Austin Facility 2014 Annual Report



Carlson McCain
ENVIRONMENTAL • ENGINEERING • SURVEYING

TOPOGRAPHY FROM AERIAL PHOTOGRAPHS
TAKEN DEC., 2013 BY AERO-METRIC, INC.

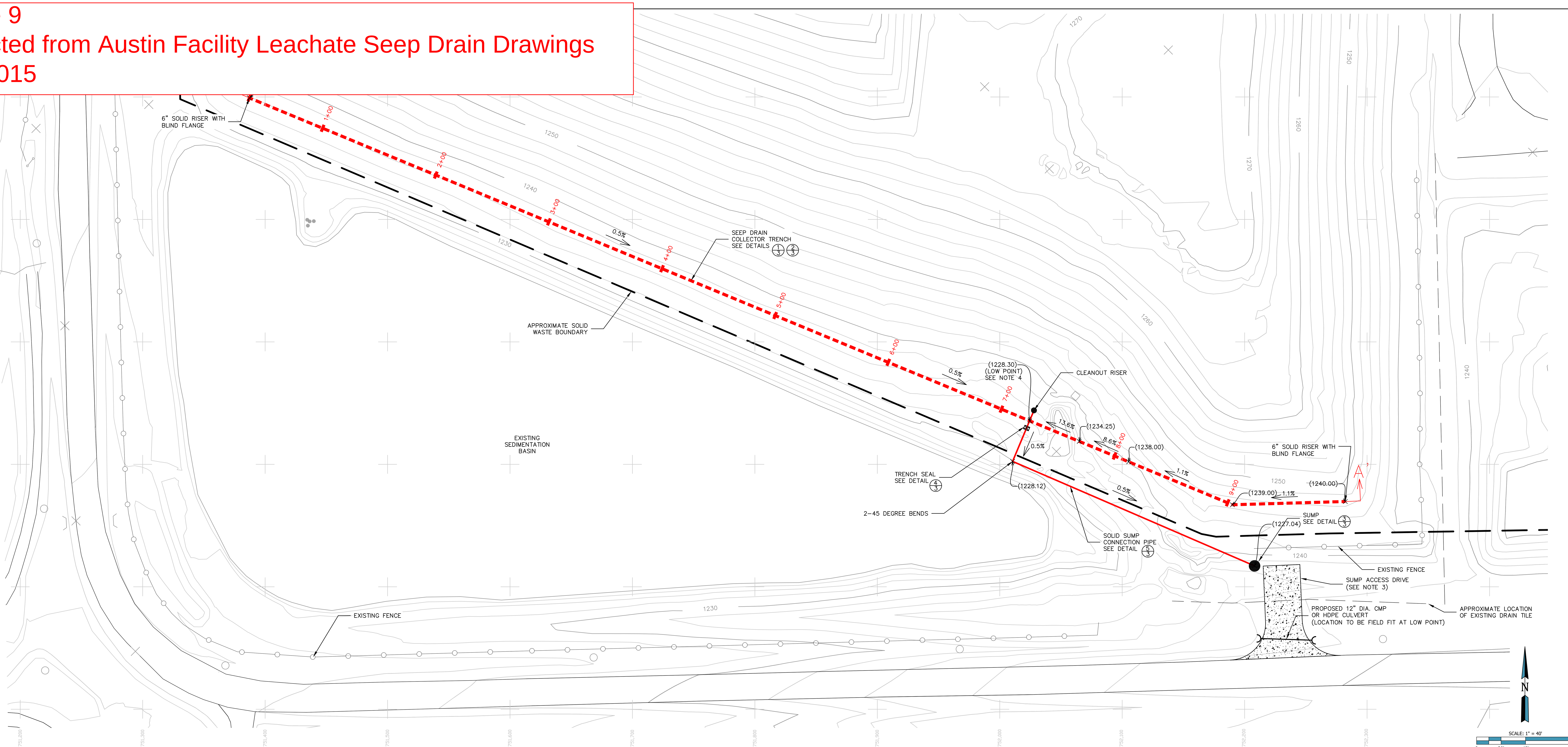
Vonco IV, LLC
24477 U.S. Highway 218
Austin, Minnesota

2014 SPRING WATER MONITORING REPORT
Vonco IV, LLC

WATER TABLE CONTOUR MAP

F:\Jobs\100-120\115-Mower_County\Reports\2014Acad\Spr2014\WT Spr2014.dwg

Figure 9
Extracted from Austin Facility Leachate Seep Drain Drawings
July 2015



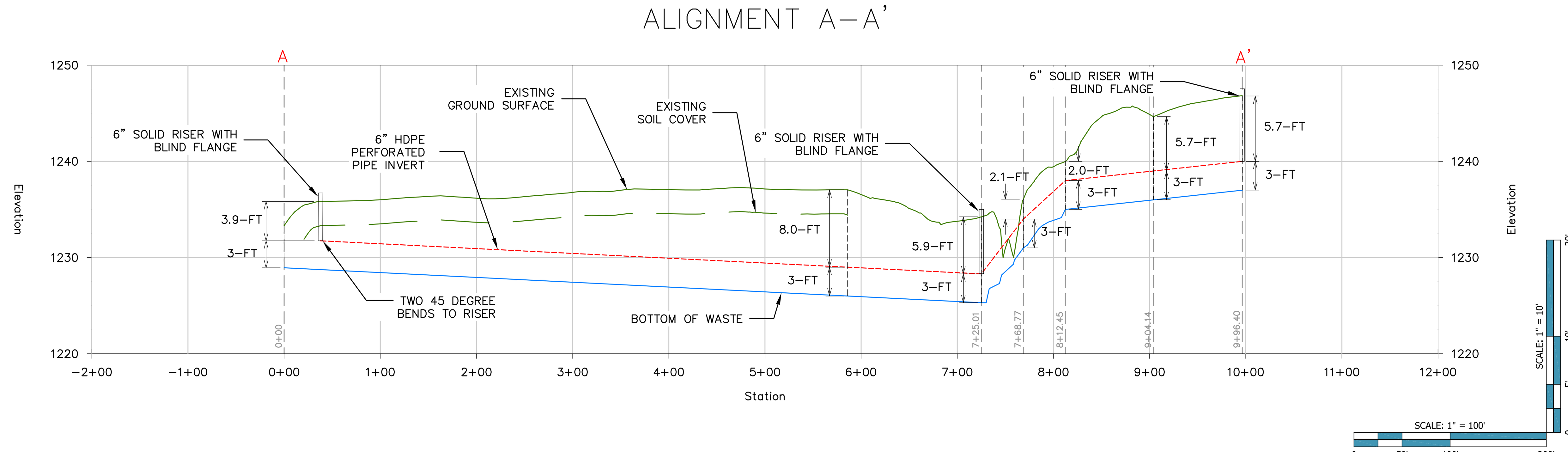
LEGEND

- SOLID WASTE BOUNDARY
- EXISTING CONTOUR 2–FT
- 1230 EXISTING CONTOUR 10–FT
- EXISTING DRAIN TILE
- PROPOSED PERFORATED DRAIN SEEP TRENCH ALIGNMENT
- PROPOSED SOLID SUMP CONNECTOR TRENCH ALIGNMENT
- PROPOSED STORMWATER CULVERT
- PROPOSED DRAIN SEEP SUMP
- × (1234.25) PROPOSED DRAIN SEEP PIPE INVERT POINT (ELEVATION)
- PROPOSED HYDRATED BENTONITE PLUG

NOTES

1. EXISTING TOPOGRAPHY CONTOURS ARE FROM AN AERIAL SURVEY FLOWN ON OCTOBER 25, 2014.
2. FOR CLARITY PURPOSES ALL SITE FEATURES MAY NOT BE SHOWN ON THIS DRAWING.
3. SUMP ACCESS DRIVE SHALL CONSIST OF COMPACTED SUBGRADE OVERLAIN BY 6OZ/SY GEOTEXTILE, OVERLAIN BY 8" MNDOT CLASS 5 OR 7 AGGREGATE.
4. LOW POINT SHALL HAVE A 6" CROSS WITH CLEANOUT RISER.

ALIGNMENT A–A'



DRAFT
RELEASED FOR BID
APPROVED FOR CONSTRUCTION
CLIENT APPROVAL BY:

PREPARED FOR:
WASTE CONNECTIONS, INC.

LEACHATE SEEP DRAIN PLAN VIEW
AUSTIN LANDFILL
24477 US HIGHWAY 218
AUSTIN, MINNESOTA

REVISION DESCRIPTION | DATE | No.

Weaver Consultants Group

WEAVER CONSULTANTS GROUP
1813 N. MILL ST. SUITE A
NAPERVILLE, ILLINOIS 60563
(630)-717-4848
www.wcgrp.com

DRAWN BY:	DJR
REVIEWED BY:	BED
DATE:	7/6/2015
FILE:	0601-009-10
CAD:	AU000002.dwg

SHEET 2 OF 3