EXPLOSIVE GAS MONITORING PLAN
ST. BERNARD LANDFILL

Presented To:

Village of St. Bernard

110 Washington Avenue
St. Bernard, Ohio 45217
(513) 242-7770

Presented By:

SCS Engineers
2060 Reading Road, Suite 200
Cincinnati, OH 45202
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File No. 23212007.02

Part 1 of 2

EXPLOSIVE GAS MIGRATION MONITORING PLAN APPLICATION FORM
FACILITY DATA SHEET

Owner X
Name of Applicant Village of St. Bernard, Ohio Operator X

Name of Sanitary Landfill Facility Former City of St. Bernard Landfill (known as Ludlow Grove Park)

Address of Facility 0 Ludlow Avenue, St. Bernard, Ohio 45177

(number, street or route, city, zip code)

County Hamilton Township N/A

Exact Location South of Bank Avenue Subdivision and East of I-75

Status of Facility: ___ Proposed No. of Occupied Structures: 9 within 200 ft.
___ Operating 232 within 1000 ft.
X Closed

Facility Operator or Licensee: (Person legally responsible for the operation)

Name Village of St. Bernard Street, R.D. # or Box# 110 Washington Avenue

City St. Bernard State Ohio Zip 45217

Telephone (513) 242-7770

Any prior landfill experience? ___ Yes X No If yes, explain. ____

Landowner/Lessee/or Person who has control of the land:

Name: Village of St. Bernard Street, R.D. # or Box# 110 Washington Avenue

City: St. Bernard State: Ohio Zip 45217

Telephone (513) 242-7770

Designer:

Name SCS Engineers

Street, R.D. # or Box # 2060 Reading Road, Suite 200

City Cincinnati State Ohio Zip 45202

Reg. Engineer James Walsh Reg. Surveyor N/A

Reg. No. E-44053 Reg. No. N/A

Any prior explosive gas monitoring system design experience?

X Yes ___ No

If yes, explain. Many landfill PTI applications and explosive gas plans in Ohio.

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Appendix

1.0 EXPLOSIVE GAS MONITORING SYSTEM DESIGN

1.1 COMPLETED APPLICATION FORM AND NAME CLARIFICATION.

OAC 3745-27-12 (D)(1)

The completed application form is provided at the front of this document. It is noted throughout this document that the Village of St. Bernard was formally classified as a City prior to April 2011. Therefore, past references in this document remain attributed to the City of St. Bernard, while present day references will refer to the Village of St. Bernard.

1.2 PREVIOUSLY PREPARED EXPLOSIVE GAS PLANS

Previously prepared and approved explosive gas monitoring plans and system design reports are extensively referenced throughout this revised Plan. These plans and reports are identified as follows:

- Explosive Gas Monitoring, Sampling, and Reporting Procedures, St. Bernard Landfill, October 4, 1991.
- Explosive Gas Monitoring System Design, St. Bernard Landfill, October 4, 1991.
- Explosive Gas Monitoring Plan, Former City of St. Bernard Landfill, CEC, November 18, 2011.

It is noted that various items of information presented in these documents with respect to landfill history, disposal practices, waste composition, and waste streams accepted cannot be presently verified, nor do they appear to be supported by documentation or historical data. However, these documents as a whole are nonetheless useful for the purposes of overall evaluation of explosive gas migration at the site. Various report figures, site maps, drawings, and illustrations from these previously prepared plans are also utilized throughout this updated Plan where applicable and appropriate.

1.3 SUMMARY OF SITE ENVIRONS

OAC 3745-27-12 (D)(2)

This updated Explosive Gas Monitoring Plan (Plan) was prepared for the former City of St. Bernard (City) Landfill, now known as Ludlow Grove Park. The landfill is located at the end of Phillips Avenue in the Village of St. Bernard. The former landfill lies immediately east of Interstate I-75, and is adjacent to the Bank Avenue residential subdivision. The portion of the subdivision closest to the landfill is commonly referred to as "Phase II". The primary use of the facility currently is as a Village park including soccer fields and associated green space. An area map depicting the site location is provided as Figure 1.

The landfill is located within an area of the Village with a significant history of industrial use. Accounts of development reflect industrial use as early as the late 1800s and continuing through the late 1970s. Industrial facilities within the immediate vicinity included those used for the production of animal hides, starch, glues, fertilizers, electrical equipment, and greenhouse products. These are documented within historical accounts of the area maintained and published by the Village.[1]

In the late 1970s and early 1980s, the City (now Village) began the process of acquiring various industrial properties with the intent of converting the area outside of the solid waste landfill to a residential area. Prior to residential development, the area adjacent to the landfill was used as a soccer and baseball field. Anecdotal information suggests that the industrial structures were demolished with demolition materials used to fill what is now land occupied by residential structures. Observations within the area, both surficial and subsurface, support this account. An aerial photo of the landfill in relation to the former industrial complex is provided as Figure 2.

The precise use and history of the landfill is not well known. However, anecdotal information suggests that it was used as an ash and "by-pass" disposal facility for the former City of St. Bernard municipal solid waste incinerator, as well as disposal of construction and demolition debris

1. Referenced from the document titled: *St. Bernard, Ohio, 1878-1978*. This document is a historical account of the area formerly known as Ludlow Grove.

generated within the City. Aerial photographic records indicate that the landfill was generally maintained as an open disposal area with limited waste volumes disposed throughout its operating history. Although the volume of waste material in-place and predominant waste composition is not known, positive detection of methane gas along the northern perimeter of the facility does suggest that at least some portion was organic and capable of generating explosive levels of methane gas.

By letter dated May 5, 1977, Ohio EPA confirmed that the landfill was closed. Capping of the landfill was conducted during the period of 1981 through 1985. Photographic records indicate the cap was placed as early as 1981. Information obtained from the Village of St. Bernard indicates that approximately five to six feet of cover material was applied over the fill area, which was then seeded and landscaped for use as a public park. This information was supported by observations recorded in November 2010 during installation of two power poles within the footprint of the landfill cover. At least six feet of clean cohesive cover material was observed and photographed in boreholes, thereby supporting reported cover operations.

Currently, the cap is maintained in excellent condition. No settlement, leachate seeps, gas seeps, or other common problems associated with closed landfills have been observed on-site since routine gas monitoring was resumed in July 2000.

At the request of the Ohio EPA, efforts to monitor landfill gas were initiated in the early 1990s by the Village, including installation of six gas-monitoring probes along the northern margin of the landfill. These probes were originally designated MP-1 through MP-6. A figure showing the locations of probes and monitoring points no longer included in the compliance network is included in Appendix C. The monitoring probes were proposed to be installed between the assumed limit of waste and adjacent residential structures. MP-1 appears to be located outside of previous fill limits. Former probes MP-2 (now designated SP-2) through MP-6 (now designated SP-6R) were of limited use in assessing off-site migration as they appear to be in direct contact with (or very near) waste fill.

Initial sampling of these six monitoring probes was conducted by Foppe Thelen Group, Inc. during selected periods from 1991 through 1994. Sampling indicated elevated concentrations of combustible gas, and in some instances, concentrations at or in excess of the lower explosive limit (LEL) for methane. Although total combustible gas percentages were not recorded, concentrations of at least 5% by volume were measured in several probes and the potential for off-site migration of landfill gas was identified at that time.

In July 2000, the City retained Civil & Environmental Consultants, Inc. (CEC) for engineering services associated with assessment of potential risk associated with off-site gas migration. The scope of these services was initially limited to sampling of the original six monitoring probes (MP-1 through MP-6) to validate previous sampling results. Sampling results indicated combustible gas concentrations in excess of 5% in several probes. Additional work resulting from the initial sampling effort included installation of numerous additional gas probes, analytical sampling of landfill gas within the monitoring network (including analysis of toxic organic vapors), and installation of a gas extraction system.

Installation of additional probes (MP-7 through MP-13) was completed in April 2001. In addition, installation of a vacuum line that was attached to original gas probes MP-2 through MP-6 was completed in April 2001, effectively converting these probes to vacuum extraction wells. At that time, these probes were changed from compliance monitoring probes and subsequently identified as extraction wells (with an applicable "EW" designation) within subsequent monitoring reports.

Following activation of this original extraction system, gas levels continued to decline in the compliance monitoring network with the exception of probe MP-7 which continued to indicate elevated levels of combustible gas. In all other compliance probes, compliance was routinely reported after December 2001 with the exception of sporadic exceedances in probes MP-11, MP-12, and MP-13 which were corrected following extraction system adjustments (it is noted that these sporadic exceedances were ultimately traced to accumulation of groundwater in former extraction well EW-3 (now designated SP-3R)). In July 2002, two supplemental probes were installed adjacent to MP-7 (MP-7A and MP-7B) in an effort to better define gas concentrations within this area. Gas levels fluctuated in compliance probes MP-7, MP-7A and MP-7B for a period

of several months. In November 2002, two additional probes, MP-7C and MP-7D were installed to further refine gas concentration data. Data from the probes was then studied for a period of several months. After the initial period of study, monitoring continued, with the data through April 2004 submitted to Ohio EPA.

In April 2004, a temporary gas probe network (T-1 through T-16) was installed on the landfill side of the MP-7 series of probes in an effort to better define gas concentrations as well as possible migration patterns in this area. The network was monitored bi-weekly for two months following installation. Analysis of data compiled during this monitoring period indicated a rather well defined area of elevated gas concentrations within approximately 10 feet of the MP-7 series of probes (note probes MP-7C and MP-7A were used in this evaluation and have subsequently been removed along with T-1 through T-16). Therefore, the former landfill remains as a potential source of gas generation, and data collected suggested that isolated sources of gas generation may have been present outside of what is identified as the landfill footprint.

As a variety of mechanical and operational adjustments to the existing gas extraction system did not satisfactorily reduce gas concentrations in this area, installation of a gas cutoff trench was selected as the next step in the mitigation effort. The intent of this installation was threefold:

- To excavate and remove organic materials that may be contributing to gas generation immediately adjacent to the affected monitoring probes;
- To excavate and remove large inert demolition debris which may promote migration of explosive gas; and
- To install a low-permeability barrier such that migration pathways from the landfill to the affected probes would be disrupted to the extent practical.

The trench was excavated to a depth of 10 to 12 feet and 3 to 5 feet wide. The total length of the trench was approximately 48 feet (see Figure 4). Trench alignment was configured such that the series of temporary monitoring probes on the landfill side of the trench (T-7 through T-15) was preserved to the extent practical. Compliance probes MP-7C and MP-7D located on the residential side of the trench were replaced with probes MP-7E and MP-7F, which were installed on

September 14, 2004, and have been supplemented with a third probe designated MP-7G installed in 2010.

Following installation of the trench, several important observations were noted. First, explosive gas concentrations on the residential side of the trench increased rapidly (in excess of 40% combustible gas by volume), with those on the landfill side remaining at or near 0%. This suggested that a potential source of combustible gas (i.e., putrescible material) existed outside of both the current property limits and footprint of the landfill. The presence of these materials was confirmed in December 2010 following excavation of four exploratory trenches within the rear yard of 429 Bank Avenue. Although limited in volume, these putrescible materials, which consisted principally of wood debris unrelated to waste fill, were present in sufficient volume to release limited volumes of methane. This methane was then released to, and detected within, the property line monitoring probes.

In December 2004, a temporary vacuum line was extended to MP-7E, which immediately reduced gas concentration in MP-7E and MP-7F to below the 5% compliance threshold with the exception of one isolated excursion (August 17, 2009 at 11% methane by volume). It is noted that vacuum was removed prior to any compliance sampling activity (24 hours prior) per the request of Ohio EPA.

In June 2007, elevated levels of combustible gas were observed in MP-8. These levels fluctuated through the remainder of 2007 and a supplemental probe (MP-8A) was installed in October 2007. Observed gas levels in each probe fluctuated considerably through December 2008 when a second supplemental probe (MP-8B) was installed. Over various time periods, vacuum was applied to MP-8A and MP-8B in an effort to reduce observed concentrations. These efforts proved ineffective and this series of probes continued to exhibit gas concentrations above 5% on a routine basis. The impact of the cut-off wall installation adjacent to the MP-7 series probes on the MP-8 series of probes was thoroughly considered and may have contributed to the observed gas levels. Furthermore, boring data obtained immediately adjacent to MP-8A and MP-8B indicated the presence of minor quantities of organic (wood) debris which may have represented a localized and limited source of gas generation directly impacting these probes. The Delineation Investigation

performed in 2013 showed that the two layers of soil fill placed to raise the ground level to the current elevation in the Bank Avenue development adjacent to the landfill contain small amounts of non-soil debris, including wood.

In November 2010, installation of a new perimeter gas extraction system was initiated. This system was completed and activated in April 2011. This system, as well as the current network of compliance probes may be referenced on Figure 4. For the past three years (2012-2014), this extraction system has resulted in maintenance of compliant gas levels within the majority of the monitoring network with the exception of probes MP-7E, MP-8D, MP-8F, MP-9, MP-10, and MP-16 which have exhibited seasonal elevated gas levels.

In June 2012, in order to address a number of threshold limit exceedances in the 8-series probes an approximately 5-foot wide and 50-foot long trench (as shown on Figure 4) was excavated. This excavation resulted in the removal of probes MP-8, MP-8A, MP-8B, and MP-8C. The excavation was backfilled with clean granular soil fill and replacement probes MP-8D, MP-8E, MP-8F, and MP-8G were installed in the backfilled trench. The excavation removed the organic materials contained in the original soil fill that were immediately adjacent to the initial MP-8 series probes.

On August 23, 2013, the two half-horsepower blowers that supplied vacuum to the extraction system were replaced by a single one-horsepower blower. The objective of the installation of the higher capacity blower was to apply additional vacuum on the horizontal collector system.

1.3.1 Detailed Topographical Information
OAC 3745-27-12 (D)(2)(a)

Site topography is provided on Figure 3. The information required by OAC 3745-27-12 (D)(2)(a)(i) through (vi) is presented in the following sections and/or shown on the figures described in the following sections.

1.3.2 Property Boundary and Facility Boundary, Horizontal Limits of Waste Placement
OAC 3745-27-12 (D)(2)(a)(i)

The landfill property is situated on several property parcels acquired by the City of St. Bernard since the early 1940s. Major revision to property boundaries occurred in the early 1940s with construction of the Mill Creek Expressway (Interstate-75), and again in the late 1970s and early 1980s with development of the Bank Avenue Subdivision. A legal description of the current landfill property parcels is presented in Appendix E. Landfill parcel boundaries and the property boundaries, property owners, and parcel identification numbers of properties within 1,000 feet of the limits of waste are provided on Figure 5.

The basis for assignment of the horizontal extent of the landfill is based upon review of historical site photos, topographic maps, and similar available documentation and the test pits performed for the Delineation Investigation. An Aerial Photographic Analysis Report dated November 1, 2012 was prepared by Environmental Research, Inc. (ERI) and detailed the development of the Landfill and surrounding areas from 1946 to 2009. There is general agreement on the extent of the landfill along its eastern, southern, and western boundaries. The eastern boundary is approximately the intersection of the flat surface of the closed landfill and the hillside slope parallel with the access road along the former canal right of way. The southern boundary is roughly parallel to the tree line on the hillside south of the landfill. The western boundary is approximately the base of the slope between the flat surface of the closed landfill and the I-75 shoulder. The Village of St. Bernard has determined that the northern boundary of the landfill is located within the limits of the Village owned property parcel(s) which contain the landfill, with the exception of a localized extension into the backyard of the property located at 441 Bank Avenue. With the completion of the remediation of the backyard of 441 Bank Avenue, the landfill limits of waste have been moved to the south and revert to within the landfill property.

The landfill property parcel boundaries, facility boundary, and limits of waste placement are shown on Figures 3 and 5.

1.3.3 Two Hundred and One-Thousand Foot Offsets
OAC 3745-27-12 (D)(2)(a)(ii)

A vicinity plan depicting the 200 and 1,000 foot offsets from the landfill limits of waste is provided on Figure 5. The property parcels boundaries, the facility boundary, and limits of waste placement are shown on Figure 5.

1.3.4 Property Boundaries, Property Ownership, Political Subdivisions and Zoning
OAC 3745-27-12 (D)(2)(a)(iii) & (iv)

Property boundaries within 1,000 feet of the landfill are illustrated on Figure 5. Properties within 1,000 feet of the landfill are generally bounded by Ross Avenue to the North, Andalus Avenue to the East, and Vine Street to the South. Detailed information of property owners immediately adjacent to the landfill along Bank Avenue is provided on Figure 3.

The properties located within 1,000 feet of the landfill property are primarily within the Village of St. Bernard, with some properties to the west located in the City of Cincinnati. Political boundaries, zoning and related boundary information may be referenced on Figure 5. Zoning for the landfill parcel and adjacent areas is primarily residential (R-1 and R-2). The zoning of the parcels listed in the table on Figure 5 are shown by the color of the text within the table.

1.3.5 On-Site and Off-Site Structures Within 1,000 Feet
OAC 3745-27-12 (D)(2)(a)(iv)

On-site and off-site structures within 1,000 feet of the landfill are depicted on Figure 5. The single on-site structure is a passively ventilated restroom facility which services the soccer fields.

Verification of on-site and off-site structures was conducted through review of Hamilton County CAGIS and property tax data following a graphical offset of limits of waste placement.

Other sources of explosive gas are described in Section 1.6 below.

1.3.6 Potential Manmade Explosive Gas Migration Pathways
OAC 3745-27-12 (D)(2)(a)(v)

Potential manmade pathways include various storm sewers, sanitary sewers, and drainage tiles. The approximate position and alignment of the storm sewers is based on a visual investigation of manholes and inlets, and is therefore an estimation of actual alignment. Other pathways include underground service utilities (water, electric, natural gas, etc.) servicing the park restroom, as well as adjoining properties. The known locations of potential manmade explosive gas migration pathways are illustrated on Figure 6. Mapping for all the pathways listed above is not available from the utilities directly or Hamilton County GIS records.

The 6-inch corrugated drain tile identified on Figure 6 was not located by survey, but was encountered during installation of vacuum piping in the vicinity of one of the 7-series wells. No record for installation of this tile was recorded by the City. The alignment of the exposed portion of the tile suggested that it roughly parallels the toe of the landfill slope. This tile discharges into the storm sewer inlet behind 441 Bank Avenue; however, no inlet structure was found. Further discussion of the tile as a migration pathway is presented in Section 1.4.4.1.

A 12-inch corrugated metal culvert was located adjacent to monitoring probe MP-7H during installation of the perimeter extraction system. The purpose or extent of this culvert is not known and initial sampling during construction activities did not indicate the presence of combustible gas.

1.4. GEOLOGICAL INFORMATION

OAC 3745-27-12 (D)(2)(c)

1.4.1 Groundwater Table and Depth

Considerable variation in groundwater levels along the northern boundary of the landfill has been recorded through measurement of static water levels in gas monitoring probes and extraction wells. Although approximate water table elevations identified in the 1991 Design Report suggested

groundwater elevations are approximately 10 to 15 feet below ground surface, measurement in the monitoring probes indicate that the groundwater table is responsive to precipitation, and varies based on location and climatic (barometric pressure, etc.) conditions. Water levels are shown for the probes depicted on the geologic cross section along the northern perimeter of the landfill presented as Figure 7.

Generally, this area of the site collects stormwater runoff from the park soccer fields, as well as hillside runoff upslope from Phillips Avenue. Anecdotal information from local residents and City (now Village) officials indicates that the area in which monitoring probes MP-7H through MP-11 are currently located was formerly a very wet "swampy" area prior to the construction of the Bank Avenue subdivision. The addition of stormwater drainage utilities has apparently eased this condition; however, probe data suggest that groundwater elevations along this margin of the landfill are quite responsive to wet weather.

In general, wet weather and subsequent groundwater table response is anticipated to affect landfill gas movement as well as gas extraction efficiency.

1.4.2 Site and Surrounding Area Topography, Geology
OAC 3745-27-12 (D)(2)(c)(ii)

The topography of the landfill and surrounding area generally consists of a series of hillside terraces transitioning to a lower flatland now developed for residential housing (Bank Avenue Subdivision). The landfill itself has been converted to a large flat terrace which is used as an athletic field. Area topography is depicted on Figure 3.

With respect to regional geology, the site is situated on the southeast edge of the Mill Creek Valley. The regional geology reflects multiple glacial advances and is consistent with a glacial outwash valley. Generally, regional geologic sequences consist of glacial valleys incised within Ordovician bedrock formations. These valley fills consist of highly variable interbedded sands, gravels, clays, silts, boulders, and cobbles.

With respect to site specific geology, the most significant feature includes a glacial till/outwash sequence which appears to form the base of the site. This unit is predominated by low permeability clays and or silts interbedded with silty sands within the areas investigated. Both oxidized and non-oxidized native materials have been found at depth, suggesting deposition in multiple sequences.

Although interbedded sands represent a potential zone of migration, those materials examined via borings were saturated and included a high percentage of silt (estimated at 40 percent or higher). As such, although classified as granular material, the potential for large scale gas transmission is seen as limited.

1.4.3 Natural Barrier to Gas Migration
OAC 3745-27-12 (D)(2)(c)(iii)

The native soil underlying the fill acts as a natural barrier to gas migration. No consistent geologic trend or formation has been identified along the perimeter of the site other than this soft, saturated silty sand/sandy clay formation into which the majority of monitoring probes were advanced and terminated. The elevation of this formation varies, and may be referenced on the geologic section provided on Figure 7. Fill material and a variety of clayey soils predominate in the interval above this unit.

Generally, considering the silt content and degree of saturation observed within this unit, it represents a likely barrier to downward gas migration. The overlying fill material is likely the predominant transmissive zone, and is believed to be the primary unit of interest with respect to gas migration and control. In addition, the presence of the wood and similar organic debris recorded in monitoring probe installation logs and the Delineation Investigation test pit logs indicates that said organic content may support limited generation of methane gas.

1.4.4 Potential Explosive Gas Migration Pathways
OAC 3745-27-12 (D)(2)(c)(iv)

Several potential explosive gas pathways have been identified at the former landfill. However, it is noted that the analysis of pathway risk includes consideration of the nature of the landfill, its relatively small size, and limited gas production observed to date. The gas generation potential of the landfill is further discussed in Section 1.8. Several pathways, while present, represent low or minimal risk to structures due to these factors. The analysis also considers the unique topography associated with the immediate area, and physical barriers or likely points of atmospheric discharge for accumulated gas that this topography provides. The focus of monitoring and data evaluation should be focused on the northern perimeter of the site where the former landfill property limits are contiguous with several Bank Avenue residential properties. There are some pathways that exist within the landfill and potentially connect to pathways at the perimeter of the landfill (Figures 4 and 6). These pathways include the storm sewer along the western edge of the landfill that drains the landfill surface, and the water and sanitary sewer lines that serve the restroom building. The line connecting the high water alarm in the condensate tank to the control unit mounted on the restroom building could also be considered a potential pathway. A brief discussion of pathways identified along the perimeter of the landfill is presented in the following narrative.

1.4.4.1 Primary Pathways of Concern - North

The primary pathways of concern lie along the northern perimeter of the site, where the former landfill property lines are contiguous with several residential properties along Bank Avenue. Essentially, this area consists of a flat terrace, projecting out from the toe of the landfill slope and transitioning into the back yards of the Bank Avenue residences. This terrace was raised to its current elevation by the placement of two generations of fill. The fill soils, in particular the lower fill, contain hard fill and miscellaneous debris. As a result, the near surface geologic profile of this terrace is quite varied. This fill is assumed to be the primary route for any potential gas migration along this boundary of the site. While the exact extent of fill placement beyond site property boundaries is not known, reports, City Council meeting minutes, etc. suggest that fill material was placed through the Bank Avenue development adjacent to the landfill to raise the

grade for the soccer and baseball field, prior to the second fill layer to raise the grade for the later Bank Avenue development.

The fill is underlain by undisturbed geologic formations consisting of saturated silty sand and/or sandy clays. This underlying formation appears to serve as a lower bound for any gas migration. Borehole logs indicate that this underlying formation is typically very moist to wet. Blow counts suggest a normally consolidated formation, possibly indicating backwater or floodplain deposits that may have been associated with the Mill Creek Valley.

In addition to the fill, stormwater utilities are also located along this northern property boundary, and represent potential gas migration pathways. The location and description of these utilities may be referenced on Figures 4 and 6. In addition to these mapped utilities, a previously unidentified corrugated polyethylene drain tile was also located during installation of vacuum lines in the vicinity of extraction well EW-7. This 6-inch tile roughly parallels the toe of the landfill slope and also represents a potential gas migration pathway. No record of installation for the tile is known to exist. The outlet of the drain tile is located at the stormwater inlet (labeled as INV. 496.68-8”E) located between abandoned probes MP-10 and MP-11. No defined surface inlet structure related to this drain tile has been observed or is known to exist. The tile appears to have been installed as an infiltration device to assist in removal of ponding water which accumulates along the toe of the landfill slope. Since discovery of this drain tile, explosive gas readings have been monitored at the outlet during periodic gas monitoring. To date, no explosive gas has been measured above detection limits.

In addition to stormwater utilities located on-site along this site perimeter, off-site storm drains along Bank Avenue have previously been monitored for evidence of gas accumulations. No methane has been detected in storm drains located on Bank Avenue from June 2000 through June 2017, therefore these locations are no longer being monitored. Other underground utilities are present along Bank Avenue, including sanitary sewer, electric, phone, cable, water, and natural gas, that could represent potential pathways. The locations of the sanitary and storm sewers are shown on Figure 6. Mapping for the other utilities along Bank Avenue are not readily available.

To address the identified potential for migration through subsurface utilities, the addition and/or maintenance of existing combustible gas indicators (CGIs) within structures located within 200 feet of the landfill property boundary is recommended as a component of this Plan, contingent on approval for the installation by the building owners and/or occupants.

1.4.4.2 Primary Pathways of Concern - Southeast

Along the southern margin of the site, a hillside spring is present, indicating a zone of increased transmissivity within the hillside geologic formation. However, the outlet of the spring is located several tens of feet above the surface of the landfill cap, thus it is not considered as a potential gas migration pathway. The presence of the spring suggests that a natural geological barrier is present, which acts as a lower barrier to movement of groundwater. This barrier would also serve as a barrier to upward migration of landfill gas. Thus the potential for movement of landfill gas upward from the landfill through this barrier is considered limited.

Based on the nature of pathways identified in this direction and topographic conditions, no additional monitoring is recommended along this perimeter of the site.

1.4.4.3 Primary Pathways of Concern -West

The elevation of the landfill and Interstate-75 do not preclude the potential for gas migration assuming appropriate geology and adequate gas pressure is present. While geologic conditions under Interstate-75 were not evaluated for the purposes of this Plan, it is assumed that the geology immediately under Interstate-75 has undergone significant modification during roadway construction. Thus any presumption of continuity for geologic formations that exist adjacent to the landfill may not accurately reflect the nature and extent of potential pathways under Interstate-75. While examination of geologic conditions under Interstate-75 was not undertaken as a component of this Plan, it is conservatively assumed that potential gas pathways may exist.

Assuming the presence of migration pathways, topography must then be considered in the evaluation of migration potential. Examining topography west of the landfill, it is seen that the

Mill Creek channel forms a potential barrier to gas migration. Assuming prevailing groundwater table is at or near streambed elevation within the Creek and Creek banks provide sufficient area for discharge of gas to the atmosphere, the Creek represents a limit for gas migration west toward the Vine Street industrial corridor. Also, considering the low level of gas generation and pressure observed within the landfill, the potential for migration under Interstate-75 and across the Mill Creek channel is considered limited.

For structures located east of the Mill Creek but west of Interstate-75, potential migration pathways were also evaluated. A series of commercial structures are located southwest of the landfill. Assuming appropriate geologic conditions exist, potential subsurface migration cannot be discounted. However, structures in this area are constructed slab-on-grade, and the ground surface profile approaches the estimated base elevation of the landfill, thus offering significant opportunities for atmospheric discharge of migrating gas. Combined with the low level of gas pressure observed at the landfill and distance to the structures, migration potential and risk to these structures is also considered low.

Based on these observations and current conditions at the landfill, no need for additional subsurface monitoring west of the landfill is currently recommended. Should additional pathways be installed (e.g. subsurface pipelines or utilities) or significant changes in gas generation be observed, re-evaluation of subsurface monitoring requirements should be performed.

1.4.5 Geologic Cross Sections
OAC 3745-27-12 (D)(2)(c)(vi)

A geologic cross section of the northern perimeter of the site is provided on Figure 7. This cross section depicts borehole information gathered during installation of various gas monitoring probes and other subsurface investigations. It is noted that information provided on this cross-section was developed through extrapolation of borehole information obtained at approximate 50-foot spacing. Based on the heterogeneity of the subsurface within potential transmissive zones, appropriate caution is recommended regarding strict interpretation of geology between borehole locations.

1.5 OTHER SOURCES OF EXPLOSIVE GAS

OAC 3745-27-12 (D)(2)(c)(v)

As previously indicated, organic materials within debris fill, mainly buried wood, may be of sufficient volume to produce measurable quantities of methane gas. As part of the Delineation Investigation, an estimate of the methane potentially generated by the organic material in the soil fill was calculated using a USEPA LandGEM Model. The results of this modeling indicated that the quantity of gas generated did not represent a threat to the residential properties adjacent to the northern boundary of the landfill property. Accumulations of organic material, previously described as peat, are present in the native glacial deposits and decomposition of these materials may generate methane. Test borings have indicated that this material is not horizontally continuous in the site vicinity and, where present, its thickness is less than six inches. In addition, anecdotal reports indicate a significant portion of the site was seasonally inundated or "swampy" prior to development. Swamp deposits that were accumulated then buried during development of the residential subdivision may also represent a potential source of gas generation.

Other non-landfill related sources of explosive gas include yard waste deposits placed by the City along the northeast portion of the site (approximate area of reported disposal area is indicated on Figure 3). While it is reported by City (now Village) personnel that yard waste was accumulated along the surface of this slope and not buried (thus promoting surface discharge of accumulated gases), limited potential exists for contribution to subsurface gas migration. Prior investigation of this area including installation of a monitoring probe at the base of this hillside indicated no significant combustible gas concentrations are present. Based on the location of this area and prior investigation results, no further monitoring of this area is deemed necessary.

With respect to public utilities, natural gas supply and sanitary sewer lines serving residences are identified as a potential off-site source of explosive gas. These utilities are located in the Bank Avenue right-of-way and are not considered significant with respect to assessment of gas migration from the landfill. No other potential off-site sources of explosive gas have been identified at this time.

1.6 LANDFILL CHARACTERISTICS

OAC 3745-27-12 (D)(3)

1.6.1 Depth of Waste and Excavation

OAC 3745-27-12 (D)(3)(a) & (b)

No recorded information is known to exist with respect to the depth of waste or excavations associated with the former landfill. Anecdotal information from various parties contained in the 1991 Design Report suggests that the landfill was developed principally as an area fill with limited excavation, if any. Previous research regarding landfill depth and methods of disposal was described in Section 3.0 of the 1991 Foppe Thelen Design Report and is summarized below. The present top surface of the landfill varies from 516 to 520 feet in elevation. Topographic maps of the area prior to commencement of landfill activities were obtained (Hamilton County, 1914, 1959).· Both the 1914 and 1959 maps indicate that the surface of the landfill area, prior to filling, was at an elevation of less than 495 feet but greater than 490 feet. This is consistent with the boreholes and test pits mentioned previously which indicate an elevation of 491 to 493 feet (±). Therefore; the depth of the landfill is estimated to vary between 23 and 29 feet.

1.6.2 Historical Operations

OAC 3745-27-12 (D)(3)(c)

As previously indicated, historical operating information is related primarily to anecdotal information from City (now Village) officials or residents of the area. This information was described in Section 3.3 of the 1991 Foppe Thelen Design Report and is summarized below. The land occupied by the landfill has been owned by the City of St. Bernard since 1945. The City acquired the land from E. I. DuPont Company. The City began controlled waste disposal sometime prior to 1958 as indicated by 1958 aerial photographs acquired from Hamilton County. No permits or other authorization were obtained prior to 1958. A summary of regulatory authorizations is presented below.

Date	Document
May 5, 1977	Acknowledgement of Closure
April 14, 2003	Director's Final Finding and Orders
May 18, 2004	OAC 3745-27-13 Authorization
September 16, 2009	Director's Final Finding and Orders
September 9, 2010	Remedial Action Plan & Response to Comments
June 8, 2011	OAC 3745-27-13 Authorization for ODOT
December 12, 2011	Alteration to Approved EGMP
November 6, 2012	Alteration to Approved EGMP
November 6, 2012	Revised Compliance Probe Monitoring Form
November 6, 2012	Alteration to 1st Remediation Plan
December 17, 2012	Delineation Plan
May 16, 2012	Clarification of MP-8 Series Replacement Probes
May 16, 2012	Approval of 2nd Revision to Explosive Gas Remediation
January 17, 2013	Alteration to Approved EGMP
December 5, 2014	Alteration to Approved EGMP (approved February 2, 2015)
February 13, 2018	Approval to abandon MP-10
December 16, 2019	Ohio EPA terminates September 2009 Director's Final Findings and Orders

For several years, the disposed material was not graded or covered but during the later years of operation the material was graded and covered weekly with several feet of soil. Final grade was achieved by covering the landfill area with 3 to 5 feet of clay in 1981, with additional soil added later for the development of the soccer field.

The area occupied by the landfill was for years a vegetable farm and orchard. The landfill began by disposal over the outslope of the Miami and Erie Canal bench. A 1958 aerial photograph and the 1959 topographic map compiled from the photo show a small area of disposal near the southern corner of the area. The canal bench was the disposal point and the disposed material fanned out onto the flat area below. Total area covered was approximately 150 feet wide by 200 feet long. The remainder of the area was orchard and gardens. I-75 had already been constructed. The

subdivision area northeast of the landfill was at this time also gardens except for the eastern 1/3 which was occupied by small warehouses and factories.

A 1973 aerial photograph shows that the landfill was actively receiving disposed material. An access road had been constructed from the canal bench down to the flat along the southwest side. Disposal was apparently still taking place over an approximately 250 foot length extending from the access road northeast along the canal bench. The remainder of this slope between the bench and the flat area is tree covered. Disposed material is seen in a band approximately 200 feet wide parallel to I-75 and running along the western side of the landfill property. This band is approximately 500 feet long, with the end near the present northern boundary of the landfill at the approximate center of the curve in the face. The warehouses and factories are still present.

By letter dated May 5, 1977, the Ohio EPA confirmed that the landfill had been closed.

A pre-1978 aerial photograph shows that the landfill had nearly assumed its present shape. The surface was apparently still receiving material for disposal, but the northern face had already been graded. The disposal area between the canal bench and the flat has already been graded over a length of approximately 350 feet and is grass covered. The undeveloped portion of the subdivision area had been graded and is occupied by a baseball/soccer field. Several of the southernmost factories/warehouses have been demolished.

By 1981, the final grading of the landfill had been completed. The slope area between the canal bench and landfill had been graded and was grass covered. The landfill surface had also been graded to its present configuration. The baseball/soccer field is still present but several more of the factories/warehouses have been demolished.

By 1986, the pine trees along the north face of the landfill were in place, as were the restrooms, storm sewers, and sanitary sewer. The subdivision had already been developed to its present configuration.

1.6.3 Types of Waste

OAC 3745-27-12 (D)(3)(d)

No detailed records or similar documentation regarding types of waste received at the facility are known to exist. Information pertaining to waste type was primarily obtained from interviews held with individuals familiar with landfill operations. Information gathered from these interviews is useful in terms of providing a general characterization of materials that may have been disposed. This information is summarized in Section 3.4 of the 1991 Design Report. No physical records of the material placed in the landfill were kept. However, several people fami1iar with the operation of the landfill were interviewed to determine waste characteristics. The following summarizes what is known about waste disposal at the landfill, based on these interviews.

The City began disposal from the canal bench soon after acquiring the property. Materials disposed included cans, glass, burned refuse from the City's incinerator, construction debris, stoves, refrigerators, tires, empty oil drums, soap manufacturing by-products, grass clippings, tree limbs and kitchen wastes. The oil drums were picked up by the City at local gasoline stations. They were empty and reportedly never contained anything but new oil. The empty drums were crushed with a bulldozer when they were placed in the landfill. The soap manufacturing by-products were materials from Procter & Gamble. These reportedly included soap powder, soap "sludge", and bottles of shampoo and liquid soap. The kitchen wastes also came from Procter & Gamble. These were wastes from Procter & Gamble's in-house cafeterias. There is no evidence that hazardous materials were placed in the landfill.

1.6.4 Landfill Construction

OAC 3745-27-12 (D)(3)(e)

Section 1.6.2 above relates what is known about the landfill's construction. No specific details of landfill construction means or methods are available other than historical information gathered from aerial photos and anecdotal information. An Aerial Photographic Analysis Report dated November 1, 2012 was prepared by Environmental Research, Inc. (ERI) and detailed the development of the Landfill and surrounding areas from 1946 to 2009.

1.6.5 Gas Extraction System
OAC 3745-27-12 (D)(3)(f)

As previously indicated, various gas migration control systems have been installed and operated since October 2000. The current system utilizes a series of six extraction "pods" which effectively offer six independently controlled zones where subsurface vacuum may be applied. The combined system provides for continuous vacuum extraction along the perimeter of the landfill that lies adjacent to occupied residential properties.

From October 2000 until April 24, 2013, a pair of explosion proof half-horsepower blowers provided vacuum to the system and were operated individually. After April 24, 2013 and until August 23, 2013, the two blowers were operated simultaneously to apply more vacuum to the horizontal collector system. On August 23, 2013, the two half-horsepower blowers were replaced by a single one-horsepower blower. Vacuum is applied on a continuous basis. The blower assembly is equipped with a flow meter and vacuum gauge to assist in adjustment of operating flow rate and vacuum. The migration control system layout is illustrated on Figure 4. Each pod is equipped with sampling ports facilitating measurement of applied vacuum and gas composition.

Condensate within extraction piping is fed via gravity to a 1,500-gallon receiving tank. Condensate collected within the tank is disposed off–site. A high level alarm, which notifies the Village police department of a high water condition in the tank, was installed on January 28 and 29, 2013.

Ambient air intrusion is anticipated during system operation. Overall, the current system is anticipated to be effective in reducing subsurface gas concentrations in the vicinity of the northern property boundary. However, it is expected to have little influence beyond current landfill property limits.

1.6.6 Existing Explosive Gas Monitoring System

OAC 3745-27-12 (D)(3)(g)

The gas monitoring system is depicted on Figure 4 and summarized in Table 1. The screened interval depths for the probes are also presented in Table 1.

Table 1.
Monitoring Network
St. Bernard Landfill

Probe	Adjacent Structure	Top of Screen Depth (feet below ground surface)	Bottom of Screen Depth (feet below ground surface)
MP-1	448 Bank	Not known	Not known
MP-7E	429 Bank	3	14
MP-7H	425 Bank (and 421 Bank)	2	15
MP-8F	433 Bank	4	14
MP-9	437 Bank	2	12
MP-16	441 Bank	2	12
MP-17	441 Bank	3	13

1.7 EXPLOSIVE GAS GENERATION POTENTIAL

OAC 3745-27-12 (D)(4)

The gas generation potential for a municipal solid waste landfill typically peaks at closure and declines over time. The St. Bernard landfill was used primarily to dispose of ash from the City's municipal solid waste incinerator and as a result likely generated less gas during any period of its history compared to a typical solid waste landfill. Further, because the landfill has not accepted waste for over 30 years, the gas generation has decreased considerably from its peak rate.

Based on current monitoring probe sampling data, the potential for explosive gas generation is confirmed. While data compiled through operation of the gas monitoring and extraction system does suggest that gas production is minimal, concentrations sufficient to exceed applicable regulatory thresholds have been present on occasion.

No incidents of odor or snow melt have been reported. No damage to the final cover has been observed. Some distressed/dying trees have been noted, including pine trees planted on the northern side slope of the landfill and trees within the back yards of some of the residences immediately north of the landfill. The impact to the pine trees on the side slopes is likely due to the shallow soil cover being unable to support large mature trees and is not due to landfill gas. Impacted pine trees are located in areas where methane has been detected in the monitoring probes and in areas where methane has not been detected in the monitoring probes. The impact on the trees in the back yards are likely due to the impact of the drought conditions that occurred two or three years ago and is not due to landfill gas.

1.8 EXPLOSIVE GAS MONITORING PLAN

OAC 3745-27-12 (D)(5)

1.8.1 Permanent Monitoring Network

OAC 3745-27-12 (D)(5)(a)

A summary of the monitoring locations is provided in Table 1 and the monitoring probes are shown on Figure 4. Each residence within 200 feet of the limits of waste placement (421 through 448

Bank Avenue, excluding 444 Bank Avenue where the owner declined the installation of a CGI and 429 Bank where the owner requested that the CGI be removed) has been equipped with an in-building combustible gas indicator (CGI). These monitoring locations have been established to provide a redundant level of detection. The location of monitoring probes and in-building CGIs is illustrated on Figure 4. All of the CGIs are set to alarm at 12,500 ppm methane (1.25 percent methane by volume) or less. The regulatory threshold concentration is 1.25 percent methane by volume in occupied structures.

Each monitoring probe is constructed with a bolt-down cover (flush mount) or locking well casing. Existing probes are fitted with quick-connect couplings to facilitate monitoring. Future monitoring probes (if necessary) will be equipped in a similar fashion.

Installation details for the probes may be referenced on borehole logs provided in Appendix C.

The monitoring network described above will become the network of record when this Explosive Gas Monitoring Plan (EGMP) is approved.

1.8.2 Methods of Construction
OAC 3745-27-12 (D)(5)(b)

Typical installation details for monitoring probe MP-1 through MP-6 may be referenced on Figure 11, which is presented in Appendix C. No individual installation logs were provided for this original series of probes.

More recent probes were installed using hollow stem rotary augers or direct push methods, with boreholes continuously sampled. Installation details for existing compliance monitoring probes may be referenced in Appendix C. The screened intervals of the existing probes are presented in Table 1 above.

Future probes will typically be constructed using hollow stem augers with continuous (2-ft interval) split spoon sampling. The auger will be clean and free of foreign materials, solvents, and

other substances, which may contaminate groundwater or cause an incorrect explosive gas measurement.

Permanent monitors will typically be screened from two to three feet below grade to the target depth of the permanent monitor, typically the top of the native soil beneath the soil fill. The target depths will be adjusted in the field depending on the conditions encountered. For example, if the water table is encountered within the target depth, the bottom of the screened zone will be raised so that the permanent monitor will not extend into the seasonal low water table.

A person knowledgeable in drilling, installation of permanent monitors, and geology will observe the installation and keep accurate, detailed records on materials encountered and permanent monitor construction. These logs will contain the information listed on an appropriate form. Solvent welded joints will not be used.

The pipe will be capped when backfilling the annular space. The quantities of the various backfill materials will be recorded on the form. The probes will be designated, as MP-xx and the designation will be placed on the interior and exterior of the protective casing for each probe.

A locking protective casing or bolt down flush mount protective casing will be installed for each permanent monitor as soon as possible after the pipe is installed and backfilled. The protective casing is required to minimize the possibility of accidental damage and vandalism. In order to minimize air infiltration during monitoring and also to obtain accurate pressure readings, the top end of the probe riser will be fitted with a PVC end cap with a sample port. The sample port will provide positive closure when not being sampled. The fitting will facilitate a simple connection to the combustible gas indicator's sampling hose.

1.8.3 Proposed Installation and Implementation Schedule
OAC 3745-27-12 (D)(5)(c)

The monitoring locations referenced in this Plan are currently installed.

1.8.4 Procedure for Abandonment of Permanent Monitors

OAC 3745-27-12 (D)(5)(d)

In the event that permanent monitoring probes require removal, replacement, or abandonment, the following general procedures will be utilized:

- Open the protective casing and confirm the probe number.
- Carefully fill the casing with bentonite chips, adding water to the casing to hydrate the bentonite as the casing is filled. The bentonite chips will be added so as to avoid introducing fines that could potentially cause bridging at the water surface.
- Using a small excavator, remove the concrete pad (if present) and the protective casing, severing the probe casing below the ground surface in the process.
- If the removal of the concrete pad and protective casing inadvertently removes the probe casing and screen, fill the remaining hole with bentonite, adding water to the hole to hydrate the bentonite as the hole is filled.
- If the top of the probe casing is less than 3 feet below the ground surface, excavate and cut off the probe casing a minimum of 3 feet below the ground surface.
- Place a slip cap on the top of the filled casing. The cap will be glued in place or secured with a screw.
- If the excavation of the protective casing has removed the annular seal, place a minimum of 1 foot of hydrated bentonite chips as a seal above the capped probe casing. If the excavation of the protective casing does not remove the annular seal, a replacement seal does not need to be added.
- Backfill the remaining hole made when the protective casing was removed with any soil excavated with the concrete pad/protective casing, adding clean fill soil as required to return the surface to grade. The areas of disturbed soil would be seeded and mulched with straw to reestablish grass in those areas.

The process of abandonment will be documented by an experienced observer. Photographs will be taken as part of the documentation. A certification report will be prepared and will be inserted to Appendix D in the EGMP. Abandonment will be undertaken only with prior approval of the Ohio EPA. Replacement permanent monitoring probes, if required, will be positioned to provide similar detection capacity to those removed. Any replacement probes will be installed and constructed in accordance with the approved EGMP.

1.9 PURPOSE AND RATIONALE BEHIND THE EXPLOSIVE GAS MONITORING SYSTEM

The purpose of the explosive gas monitoring is the detection of methane gas emanating from the former City landfill. Occupied residences north of the landfill are the primary focus of the monitoring system. Continued implementation of this plan will facilitate detection of potentially explosive gases migrating toward these residences.

2.0 EXPLOSIVE GAS MONITORING, SAMPLING AND REPORTING

2.1 MONITORING, SAMPLING, AND REPORTING PROCEDURES

OAC 3745-27-12 (E)

2.1.1 Monitoring Frequency

OAC 3745-27-12 (E)(1)

Monitoring of the compliance probes listed in Table 1 will be conducted semi-annually as specified in OAC 3745-27-12(E)(1)(c).

Maintenance and calibration checks of in-building combustible gas indicators (CGIs) will be performed as needed. Re-calibration of in-building CGIs will be performed annually. The maximum alarm set point is 12,500 ppm (1.25 percent by volume) which is the Explosive Gas Threshold Limit (EGTL of 1.25 percent required by regulation).

2.1.2 Monitoring Parameters

OAC 3745-27-12 (E)(2)

Each compliance probe will be monitored for the following parameters, in the order indicated:

- Pressure/vacuum.
- Initial percent combustible gas by volume.

- Sustained percent combustible gas by volume.
- Water level.

Atmospheric data will also be recorded for each monitoring event. These data may be obtained from a local or nearby National Oceanic and Atmospheric Administration (NOAA) registered climate data station if on-site climate data is not available. Parameters to be recorded include:

- Ambient barometric pressure.
- Ambient air temperature.
- Observed weather conditions.
- Relative humidity.

Pursuant to OAC Rule 3745-27-12(F)(1-4), installation of new or replacement permanent monitors will require that a certification report will be submitted with the initial reporting of the monitoring results in accordance with the approved explosive gas monitoring plan. The certification report will include the following:

1. Record drawing showing the locations of the new punch bar stations and/or the new permanent monitors with their associated identification designations.
2. Geologic logs from the installation of each permanent monitor.
3. Depth and length of screened intervals for each permanent monitor.
4. A new geologic cross section of the perimeter of the side of the landfill property will be prepared if a new occupied structure is built within 1,000 feet of solid waste placement and there is no existing cross section for that side of the landfill in the approved Explosive Gas Monitoring Plan.

2.1.3 Monitoring Equipment

2.1.3.1 Equipment Type

The following equipment, or equivalent alternates, will be utilized at the individual compliance probes and extraction wells.

1. A meter capable of measuring methane and pressure/vacuum. The meter will be calibrated using the concentration of methane recommended by the manufacturer for this type of application (and the recommended concentrations of carbon dioxide and oxygen if the instrument measures these gases in addition to methane).
2. An electronic Water Level Indicator graduated to 1/100th of a foot.

2.1.3.2 Equipment Maintenance and Calibration

Equipment maintenance and calibration will be performed per the manufacturer's recommendations. Prior to proceeding to the landfill, each instrument to be used will be calibrated or have its calibration checked per the manufacturer's specifications. The results of these calibrations will be recorded on the monitoring log sheets. Calibration procedures are described in respective equipment manuals.

2.1.4 Monitoring Procedures
OAC 3745-27-12 (E)(2)

The following information is required by regulation and will be recorded on monitoring logs for each monitoring event:

- Site name or identification number
- Date and time of sampling for each station
- Weather conditions (general)
- Ambient air temperature
- Barometric pressure
- Relative humidity
- Gas pressure (inches H_2O)
- Combustible gas as percent by volume methane (each station)
- Depth to water below the reference point

Monitoring probes are equipped with quick connect fittings or valves to facilitate monitoring. The instrument will be connected to the fittings only as long as required to obtain sampling data.

Sample extraction will be conducted in a manner that limits contact or inhalation of gases. Smoking will be strictly prohibited. Sources of spark or combustion will be removed from the area prior to sampling.

The step-wise instructions for sampling of the monitoring network are listed as follows. Sampling must occur in the order listed below:

1. Health and safety precautions. During sampling, there shall be no smoking, open flames, sparking, or use of non-explosion proof motors within 10 feet of compliance probes. If possible, sample from a position upwind of the probe being measured. Avoid inhalation of vapors or gasses emitted from the probes. Thoroughly wash hands following completion of sampling.
2. Unbolt cover to flush mount casing, or unlock protective casing for each probe to be sampled. Each compliance probe is fitted with a quick connect coupling. Do not remove or damage this coupling.
3. For flush mount casings, remove water that may have accumulated within the probe protective casing. Do not connect sampling devices under water.
4. Connect the landfill gas analyzer to the probe.
5. Record probe pressure reading. Record reading in inches of water column. Maintain reading for at least 10 seconds to determine if a variation in pressure is present. Make sure the sample line is observed for signs of water or accumulation of condensation.
6. Record time at the start of sampling.
7. Start sampling pump. Allow pump to run for 60 seconds.
8. Record explosive gas concentration. Record methane concentration in percent by volume. Do not allow probe to vent. (Note: the methane meter used will have a maximum accuracy and sensitivity in the range of +/- 1% methane by volume. The calibration standard used will be methane. For methane meters with variable calibration ranges, calibration will be set to no more than 15% methane by volume. A detection limit of at least 1.25% methane is required). Record initial and sustained gas concentrations over one minute.
9. Record water level measurements. Remove sampling port or cap as required to access the probe casing. Measure depth to water in the probe from the reference point (the top of the cap if the quick connect is removed or the top of the casing if the cap is removed) to the top of the water surface.
10. Record ambient barometric pressure, ambient temperature, weather conditions and relative humidity. If portable or site-specific weather stations are not available, utilize time stamped data from the nearest NOAA registered climate data recording station.

With respect to monitoring equipment calibration and maintenance, the following schedule will be employed:

1. Gas Detection Equipment: Maintenance no less than annually or more frequently if recommended by the manufacturer. For detection equipment utilized to determine compliance, calibration checks will be performed prior to sampling either via "bumping" of the meter with calibration gas or completing a standard instrument calibration. Calibration gas for compliance sampling will be 15% methane by volume. If the unit is bumped, an allowable deviation of not more than 0.2% methane (by volume) relative to the calibration standard will be considered acceptable.
2. Pressure Detection Equipment: No less than annually or more frequently if recommended by the manufacturer. Pressure detection equipment will be capable of calibration to existing atmospheric pressure (zeroing) and will be calibrated to atmospheric pressure prior to each use.
3. Water Level Measurement: The unit will be tested to confirm detection of liquids either through use of test buttons or immersion into a clean water source.

2.1.5 Validation of Data

OAC 3745-27-12 (E)(3)

Data obtained from monitoring probes will be compared to the applicable compliance threshold levels established by regulation. Currently, an explosive gas concentration equal to or greater than 5% in a compliance probe is the regulatory threshold.

Step by step instructions for validation of sampling data for gas monitoring probes by taking another measurement are listed as follows:

1. For gas compliance probes, compare peak explosive gas concentrations to the threshold limit concentration of 5% by volume.
2. For a probe that equals or exceeds 5%, immediately resample to confirm initial readings.
3. If repeat sampling of an affected probe results in gas concentration in excess of 5% by volume, implement the contingency plan. The contingency plan is presented in Section 2.3 below.

2.1.6 Data Reporting

OAC 3745-27-12 (E)(4)

Data collected during system monitoring will be compiled and reported to the Ohio EPA no later than 15 days following the date of sampling (note that non-compliant data must be reported as outlined in the contingency plan). Data will be reported on forms provided in Appendix A. Completed data forms will be mailed or submitted electronically to:

Ohio EPA
Southwest District Office
401 East Fifth Street
Dayton, Ohio 45402
Attn: Designated OEPA Contact

Hamilton County Public Health
250 William Howard Taft, 2nd Floor
Cincinnati, Ohio 45219
Attn: Designated Health Dept. Contact

Village of St. Bernard
Office of the Mayor
110 Washington Street
St. Bernard, Ohio 45217
Attn: Mayor

Data collected for the site will be retained by the Village, or their designee, for a minimum of five years.

2.2 EVALUATION OF MONITORING RESULTS

OAC 3745-27-12 (E)(3)

The monitoring results from each compliance probe will be compared to applicable compliance thresholds. Resampling procedures are described in detail in Section 2.1.5 above. If compliance threshold levels are exceeded during re-sampling, then the contingency plan will be enacted and listed authorities will be notified within 24 hours.

2.3 CONTINGENCY PLAN

OAC 3745-27-12 (E)(5)

In accordance with the requirements of OAC 3745-27-12(E)(5), contingency measures will be implemented following confirmed exceedance of applicable gas threshold limits. These limits are currently 5% combustible gas (by volume) in a compliance probe or 1.25% combustible gas (by volume) in an on-site structure or occupied structure within 200 ft of the landfill. Contingency measures to be implemented for probe exceedances include, but are not limited to:

1. Verify explosive gas concentrations in a compliance probe by immediate re-sampling. If gas levels are less than 5% during re-sampling, no further action is necessary. If re-sampling indicates gas concentration above the threshold limit, the contingency plan will be implemented.
2. Upon verification of readings above the explosive gas threshold limits, provide notification within 24 hours to the following public safety authorities and regulatory agencies. Notification will be via email, or via telephone to be followed by a hard copy sent by mail:

    - St. Bernard Fire Dept.
      5116 Vine Street
      St. Bernard, OH 45217
      513-242-8474
      513-242-0305 (fax)
      Attn: Fire Chief

    - St. Bernard Police Dept.
      4700 Vine Street
      St Bernard, OH 45216
      (513) 242-7770
      (513) 482-7234 (fax)
      Attn: Police Chief

    - Hamilton County Public Health
      250 William Howard Taft
      2nd Floor
      Cincinnati, OH 45219
      Attn: Designated Health Dept. Contact

- Ohio EPA
  Southwest District Office
  401 East Fifth Street
  Dayton, Ohio 45402
  (937) 285-6357
  Attn: Designated OEPA contact

- Village of St. Bernard
  Office of the Mayor
  110 Washington Street
  St. Bernard, Ohio 45217
  (513) 242-7770
  Attn: Mayor

3. Increase the monitoring frequency at the impacted probe to weekly, until the criteria for the discontinuation of contingency monitoring are met.
4. Because the homes adjacent to the northern boundary of the landfill property already have CGIs installed and because of the limited distance between the compliance probes, no additional monitoring points are needed for an exceedance at one of the compliance probes.
5. Continue weekly monitoring until sustained concentrations of less than 5% methane by volume in the impacted compliance probe(s) are recorded for a minimum of four sequential monitoring events, over a minimum period of two weeks. Upon completion of the contingency monitoring of compliance probes, where an exceedance has been recorded, monitoring will return to the monitoring schedule in place before the exceedance occurred.
6. In the event of an exceedance of the threshold concentration in a compliance probe, the following steps will be taken to protect human health and the environment:
   a. The gas extraction system will be checked to determine it is operating properly.
   b. The migration control system will be adjusted to attempt to provide additional vacuum to the horizontal collector segment nearest the probe that has experienced the exceedance.

The contingency plan for CGI alarm activation includes, but is not necessarily limited to the following:

1. When a resident experiences a continuous sounding CGI alarm, he or she will contact the St. Bernard Fire Department. The Fire Department will respond to determine if an explosive gas concentration is present in the home. If an explosive concentration of methane is present, the Fire Department will evacuate the home and ventilate it to reduce the methane concentration below the LEL. The Fire Department will notify the Village's monitoring subcontractor.
2. Upon verification of readings above the explosive gas threshold limits, notification within 24 hours will be provided to the following public safety authorities and regulatory agencies

not already notified. Notification will be via email, or via telephone to be followed by a hard copy sent by mail:

- St. Bernard Police Dept.
  4700 Vine Street
  St Bernard, OH 45216
  (513) 242-7770
  (513) 482-7234 (fax)
  Attn: Police Chief

- Hamilton County Public Health
  250 William Howard Taft
  2nd Floor
  Cincinnati, OH 45219
  Attn: Designated Health Dept. Contact

- Ohio EPA
  Southwest District Office
  401 East Fifth Street
  Dayton, Ohio 45402
  (937) 285-6357
  Attn: Designated OEPA Contact

3. Attempt to reconfirm the presence of methane and to locate the entry point into the structure.
4. It methane is accumulating in the home, steps to protect human health and the environment may include:
   a. Installation of a sub-slab ventilation system.
   b. Installation of an extension of the migration control system adjacent to the side of the residence facing the landfill.

The contingency plan includes the following reporting:

1. Within seven days of the initial detection above threshold limits, submit to the Ohio EPA and Hamilton County Public Health the monitoring results and the description of the steps taken or to be taken to protect human health and the environment.
2. Every 30 days from the date of initial detection above threshold limits, until contingency plan discontinuation criteria are met, submit a report to the Ohio EPA and Hamilton County Public Health containing:
   a. Analysis and summary of the results from the contingency monitoring including the lateral extent of explosive gas concentrations above the threshold limit and a characterization of explosive gas pathways. Characterization, based on visual inspection, of the pathways will include the degree of saturation and porosity (textural

classification or fracturing) within the pathways and the possible causes of the increase in gas concentrations such as landfill operational procedures, gas control system failure or upset, climatic conditions, or other activities being conducted on or near the site.

b. A summary of the steps taken to protect human health and the environment and an analysis of their effectiveness.

During implementation of the contingency plan, monitoring of non-affected probes as well as other components of the gas extraction system will continue per the requirements of this Plan. In addition, if another probe is in contingency monitoring , it will continue to be monitored and the required reports will be submitted on its existing schedule in accordance with the contingency monitoring requirements.

2.4 DISCONTINUATION OF CONTINGENCY PLAN

OAC 3745-27-12 (E)(5)(e)

The following criteria are provided as general guidelines that may be used to determine if actions implemented under the contingency plan may be discontinued. The provisions of OAC 3745-27-12(E)(5) will govern with respect to discontinuation of contingency monitoring.

The following criteria, in addition to those set forth in OAC 3745-27-12(E)(5) are to be considered in evaluating discontinuation:

1. Weekly monitoring will continue until sustained concentrations of less than 5% methane by volume in the impacted compliance probe(s) are recorded for a minimum of four sequential monitoring events, over a minimum period of two weeks.

A report summarizing this information will be compiled and submitted to the Ohio EPA and Hamilton County Public Health, and will also include the following information:

1. Analysis and summary of the results from contingency monitoring, including the lateral extent of explosive gas concentrations above the threshold limit and a characterization of the explosive gas pathways. Characterization of the pathway will include degree of saturation and porosity (textural classification or fracturing).

2. Consideration of the possible causes of the increased concentrations, such as landfill operational procedures, gas control system failure or upset, climatic conditions, or other activities being conducted on or near the site.

2.6 CERTIFICATION REPORT

OAC 3745-27-12 (F)

Should modification of the gas extraction system or installation of additional gas monitoring probes be required, a certification report will be prepared and submitted to the Ohio EPA. The certification report will include a description of modification or installations, survey and sampling data (as applicable), updated site plans and information relevant to continued operation or maintenance of the system and/or monitoring probes. A copy of the certification will be placed in Appendix D.

2.7 MODIFICATION OF THE MONITORING SYSTEM

OAC 3745-27-12 (H)

Modification of the explosive gas monitoring system may be required under circumstances including, but not limited to:

- Construction of new occupied structures adjacent to or on the landfill property within 1,000 feet of the landfill.
- Installation of subsurface utilities within 1,000 feet of the limit of the landfill.
- Capping or other modification of the landfill surface that may promote lateral migration of gas.
- Identification of trends suggesting increased gas production or migration potential.

A report detailing system modifications will be submitted prior to implementation to the Ohio EPA and the Hamilton County Public Health. Requirements per OAC 3745-27-12(H) will be reflected in this report, including details regarding modifications (added, abandoned, or replaced probes), why it was necessary (new structure, demolished structure, etc.), and amendment of monitoring and/or sampling procedures, if required. The results of initial monitoring of new probes will also be included.

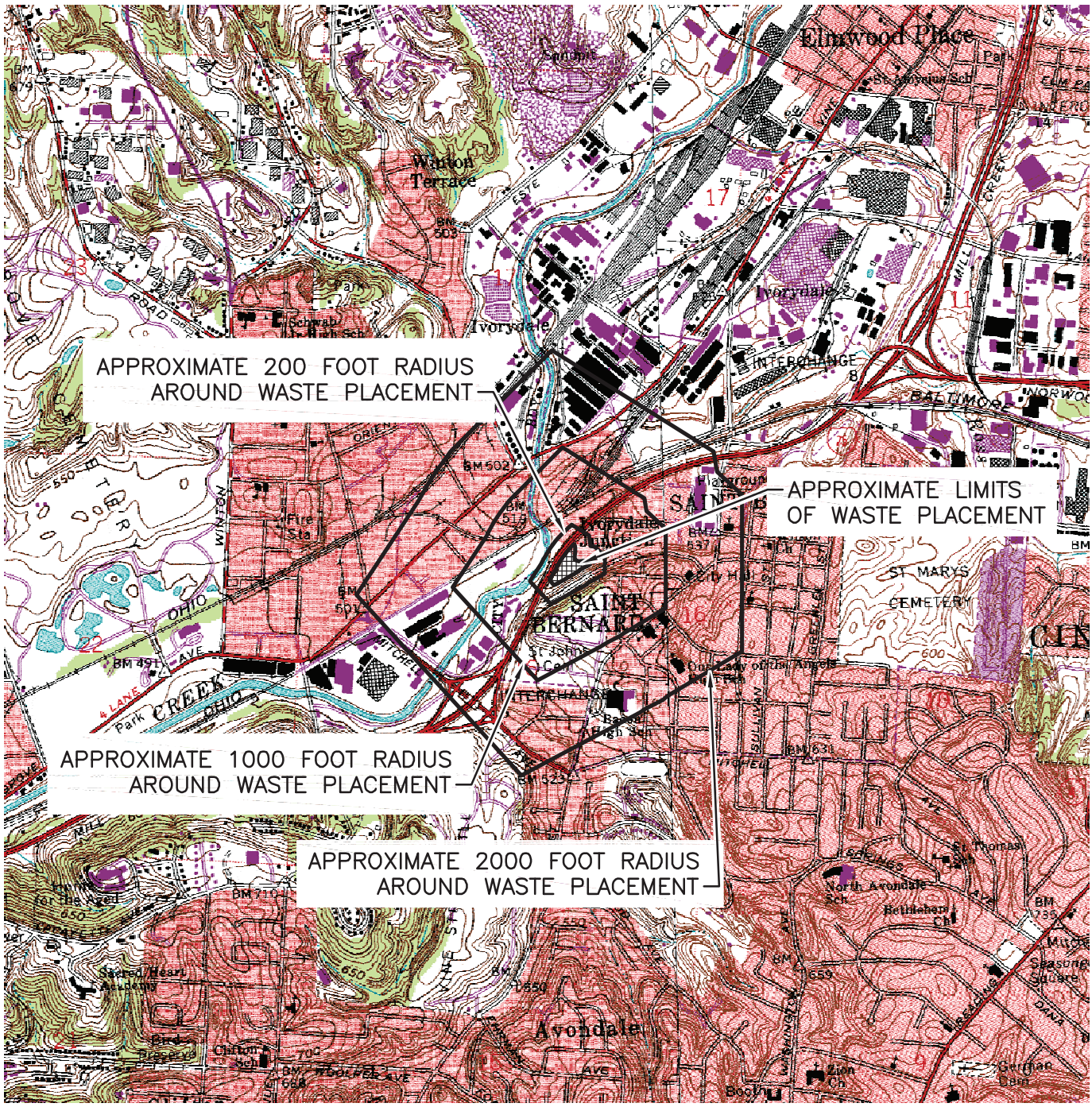
2.8 ABANDONMENT OF EXPLOSIVE GAS MONITORING SYSTEM

OAC 3745-27-12 (G)

A request may be submitted to the Ohio EPA requesting termination of explosive gas monitoring. The request will include:

- Identification of the Landfill Site.
- Documentation showing that there is no significant likelihood of future explosive gas formation and migration sufficient to require contingency procedures.
- A proposed schedule for the implementation of the abandonment activities.

FIGURES



SOURCE: USGS 7.5 MINUTE QUADRANGLES CINCINNATI EAST, OHIO, 1961 PHOTOREVISED 1981 AND CINCINNATI WEST, OHIO, 1961, PHOTOREVISED 1981, PHOTOINSPECTED 1986.

Civil & Environmental Consultants, Inc.
Cincinnati, OH
(513) 985-0226 (800) 759-5614
Pittsburgh, PA Columbus, OH Indianapolis, IN
Nashville, TN Chicago, IL St. Louis, MO

SITE VICINITY MAP
FORMER BANK AVENUE LANDFILL
ST. BERNARD, OHIO
HAMILTON COUNTY

DWN. BY: MTM	SCALE: AS NOTED	DATE: MAY 2003	PROJECT NO.: 210158	FIGURE NO.: 1
CHKD. BY: RH				

G:\PROJECTS\2001\210158\DWG\210158 SITE LOC.dwg DSNOOK – JANUARY 29, 2004 – 07:51:41 XREFS:

June 18, 2014. SCS incorporates this figure in full and unedited from the original source: CEC EGMP, November 2011.

SOURCE: PORTION OF AN OHIO DEPARTMENT OF TRANSPORTATION (ODOT) AERIAL PHOTOGRAPH - APRIL 1974.

- CAGIS - Parcel Boundary
- CAGIS - Edge of Pavement
- CAGIS - 2001 Topographic Contours
- CAGIS - Building Footprints

June 18, 2014. SCS incorporates this figure in full and unedited from the original source: CEC EGMP, November 2011.

Civil & Environmental Consultants, Inc.
4274 Glendale-Milford Road - Cincinnati, OH 45242
513-985-0226 - 800-759-5614
www.cecinc.com

BANK AVENUE LANDFILL - ST. BERNARD, OHIO
BASE - APRIL 1974 ODOT AERIAL PHOTOGRAPH
OVERLAY - CURRENT CAGIS PROPERTY AND TOPOGRAPHIC DATA

SITE AND VICINITY AERIAL MAP

DRAWN BY:	MJB	CHECKED BY:		APPROVED BY:	RH	FIGURE NO:	2
DATE:	MARCH 31, 2011	DWG SCALE:	1 " = 150 '	PROJECT NO:	100-194		

Signature on File *

LANDFILL PARCEL PROPERTY LINE/FACILITY BOUNDARY

LANDFILL PARCEL PROPERTY LINE/FACILITY BOUNDARY

REVISED WASTE LIMITS

REPORTED YARD WASTE DISPOSAL AREA.

LANDFILL PARCEL PROPERTY LINE/FACILITY BOUNDARY

BY GOVERNERS DEED TO CITY OF ST BERNARD

LUDLOW GROVE PARK
SOCCER FIELD

MILL CREEK EXPWY I-75

WEST LINE I-75

440 Bank Ave.
Parcel ID 582-0007-0259-00
Gas Monitoring Alarm Installed

444 Bank Ave.
Parcel ID 582-0007-0260-00

448 Bank Ave.
Parcel ID 582-0007-0261-00
Gas Monitoring Alarm Installed

City of St. Bernard
Parcel ID 582-0007-0262-00

436 Bank Ave.
Parcel ID 582-0007-0271-00
Gas Monitoring Alarm Installed

441 Bank Ave.
Parcel ID 582-0007-0263-00
Gas Monitoring Alarm Installed

437 Bank Ave.
Parcel ID 582-0007-0264-00
Gas Monitoring Alarm Installed

433 Bank Ave.
Parcel ID 582-0007-0265-00
Gas Monitoring Alarm Installed

429 Bank Ave.
Parcel ID 582-0007-0266-00

425 Bank Ave.
Parcel ID 582-0007-0267-00
Gas Monitoring Alarm Installed

421 Bank Ave.
Parcel ID 582-0007-0268-00
Gas Monitoring Alarm Installed

MART

NORTH
SCALE IN FEET
0 50 100

REV.	DATE	DESCRIPTION	CK. BY

SHEET TITLE: **SITE MAP**

PROJECT TITLE: **ST. BERNARD LANDFILL**
VILLAGE OF ST. BERNARD, OHIO

CLIENT: **VILLAGE OF ST. BERNARD**
110 WASHINGTON AVENUE
ST. BERNARD, OHIO 45217

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
CINCINNATI, OHIO 45202
PH. (513) 421-5353 FAX. (513) 421-2847

PROJ. NO. 23212007.02
DSK. BY: CES
DWN. BY: FDB
CHK. BY: FDB
Q/A RVW BY: JJW
APP. BY:

CADD FILE: Figure 3

DATE: SEPTEMBER 2014

SCALE: AS SHOWN

DRAWING NO.

FIG 3

I:\PROJECT\2012 Projects\23212007.00 St Bernard LF\Deliverables\EQMP\Draft Revised EQMP\2018 revision\Fig 3.dwg Apr 06, 2018 - 4:36pm Layout Name: Fig 3 By: 4078jcb

SAN MH
RIM=509.33
INV=489.23-8" E/NW
501.93-8" SW

INV 6"CPP=506.79

448 Bank Ave.
Parcel ID 582-0007-0261-00
Gas Monitoring Alarm Installed

426 Bank Ave.
Gas Monitoring Alarm Installed

City of St. Bernard
Parcel ID 582-0007-0262-00

EX. SAN C.O.
RIM=504.78
INV=497.25
N: 431802.5182
E: 1400321.6611

SUPPLEMENTAL VACUUM LATERAL FOR FUTURE USE IF NEEDED (BURIED AND SEALED).

1,500 GALLON CONDENSATE COLLECTION TANK (BURIED). CONDENSATE IS REMOVED VIA VACUUM TANKER.

MP-1

2" PVC

4" PVC

24"

EX. SAN C.O.
RIM=507.94
INV=497.39
N: 431781.5612
E: 1400293.2903

MP-16

441 Bank Ave.
Parcel ID 582-0007-0263-00
Gas Monitoring Alarm Installed

437 Bank Ave.
Parcel ID 582-0007-0264-00
Gas Monitoring Alarm Installed

433 Bank Ave.
Parcel ID 582-0007-0265-00
Gas Monitoring Alarm Installed

429 Bank Ave.
Parcel ID 582-0007-0266-00

425 Bank Ave.
Parcel ID 582-0007-0267-00
Gas Monitoring Alarm Installed

421 Bank Ave.
Parcel ID 582-0007-0268-00
Gas Monitoring Alarm Installed

EW-1S

4" PVC

PARK RESTROOM FACILITY

EX. SAN C.O.
RIM=508.38
INV=497.87
N: 431713.1779
E: 1400288.4885

CONDENSATE FLOW TO COLLECTION TANK

EW-2S

2" SCH. 40 PVC SLOTTED VACUUM EXTRACTION LATERAL. EACH LATERAL MAY BE ISOLATED AND OPERATED INDEPENDENTLY VIA VALVE ADJUSTMENTS.

MP-17

CONDENSATE FLOW TO VACUUM BREAK

STORM MH
RIM=517.27
INV=492.69

2" SCH. 40 PVC CONDENSATE GRAVITY DRAIN FLOWS WEST TO EAST, DISCHARGING TO THE NDENSATE TANK. CLEANOUTS LOCATED AS SHOWN. EANOUTS ARE BURIED APPROXIMATELY 12" BELOW RADE AND ARE MARKED WITH A STEEL/CAST IRON CAP FOR LOCATING PURPOSES.

EX. SAN C.O.
RIM=508.63
INV=497.95
N: 431669.2468
E: 1400330.0247

EW-3S &
SP-3R (FORMER EW-3R)

2" SCH. 40 PVC LATERAL (SOLID) FROM VALVE VAULT TO PERFORATED VACUUM LATERAL. (TYPICAL OF SIX).

VACUUM HEADER VALVE VAULT (FLUSH MOUNT). INCLUDES VACUUM VALVING AS WELL AS SAMPLING PORTS (TYPICAL OF SIX).

EX. SAN C.O.
RIM=505.67
INV=498.12
N: 431656.2388
E: 1400356.4814

3" SCH. 80 PVC VACUUM HEADER SLOPED TO VACUUM BREAK. HEADER PIPING IS CENTERED UNDER VALVE VAULTS FOR LOCATION AND ACCESS.

MP-9

MP-8F

MP-7E

EX. CONDENSATE VACUUM BREAK
RIM=502.48
INV=498.84
N: 431649.6338
E: 1400506.0296

ISOLATES VACUUM FROM CONDENSATE GRAVITY DRAIN. MAINTAIN CHAMBER IN FLOODED CONDITION AT ALL TIMES

CUT OFF TRENCH

EX. SAN C.O.
RIM=504.34
INV=499.42
N: 431652.5277
E: 1400611.8807

MP-7H

EXISTING SOIL/BENTONITE CUT-OFF WALL (APPROXIMATE LIMITS SHOWN)

2" PVC

EX. 12" CMP
INV=502.89

EX. 12" CMP
INV=503.34

EW-4S

EW-5S

EW-6S &
SP-6R (FORMER EW-6R)

6" CPE DRAIN TILE (APPROXIMATE LOCATION)

COLLECTED CONDENSATE FLOWS THROUGH TO VACUUM BREAK TO SANITARY SEWER.

ABANDONED CONDENSATE TANK

VACUUM BREAK ISOLATION VALVE

COLLECTED GAS FLOWS TO VACUUM BLOWER

STORM MH RIM=518.19
INV=509.21 - 12"
514.19 - 6"

PLAY SET

3" HDPE GAS EXTRACTION VACUUM HEADER

MATCH LINE

12" EXTENSION TO SPRING HEADWALL (ASSUMED - DIRECT CONNECTION COULD NOT BE CONFIRMED IN FIELD)

SPRING (APPROXIMATE LOCATION)

VACUUM EXTRACTION BLOWER ASSEMBLY AND DISCHARGE (FENCE-LOCKED NO. 204-REQUEST ACCESS VIA VILLAGE OF ST. BERNARD). SHUTOFF VALVES, POWER DISCONNECT AND PRESSURE GAUGES LOCATED IN ENCLOSURE.

MATCH LINE

LEGEND

- 500 — EXISTING CONTOUR
- PROPERTY/LOT LINES
- EXISTING SANITARY SEWER
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY CLEANOUT
- 24" — EXISTING STORM SEWER
- EXISTING STORM MANHOLE
- EXISTING STORM CATCH BASIN
- EXISTING DRAINAGE TILE
- MP-11 — EXISTING MONITORING PROBE
- EW-4S — EXISTING EXTRACTION WELL
- EXISTING FENCE
- 4" PVC — EXISTING 4" SANITARY SEWER
- 2" PVC — EXISTING 2" SLOTTED EXTRACTION PIPING
- VACUUM HEADER

NOTES:
1. BASE MAP SOURCE CEC DRAWING 2B, DATED MARCH 31, 2011
2. FIGURE REVISED TO REMOVED STORM SEWER DROP INLETS SS-6 AND SS-8 FROM SAMPLING PROGRAM.

NORTH
SCALE IN FEET
0 20 40

REV.	DATE	DESCRIPTION	CK. BY

SHEET TITLE
EXISTING MONITORING NETWORK

PROJECT TITLE
ST. BERNARD LANDFILL
VILLAGE OF ST. BERNARD, OHIO

CLIENT
VILLAGE OF ST. BERNARD
110 WASHINGTON AVENUE
ST. BERNARD, OHIO 45217

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
246 E. SIXTH STREET, CINCINNATI, OHIO 45202
PH: (513) 421-5353 FAX: (513) 421-2847

PROJ. NO. 23212007.02
DSN. BY: CES
DWN. BY: FDB
CHK. BY: RCM
QA/A RVW BY: JJW
APP. BY:

CADD FILE: FIG 4
DATE: SEPTEMBER 2014
SCALE: AS SHOWN
DRAWING NO.
FIG 4

I:\PROJECT\2012 Projects\23212007.00 St Bernard LF\Deliverables\EGMP\Draft Revised EGMP\2018 revision\Fig 5.dwg Apr 12, 2018 - 4:53pm Layout Name: Fig 6 By: 4078jcb

PARCELID	BOOK	PAGE	PARCEL	OWNNM1	OWNAD1	OWNAD2
022300020001	223	0002	0001	M J R INVESTMENTS 2 LLC	10340 EVENDALE DR	CINCINNATI OH 45241
022300020003	223	0002	0003	WILSON WILLIAM H	138 EAST COURT ST	CINCINNATI OH 45202
022300020008	223	0002	0008	MILLCREEK VALLEY	P O BOX 5057	CINCINNATI OH 45205
022300020021	223	0002	0021	REV REALTY PARTNERSHIP	4100 REV DR	CINCINNATI OH 45232
022300020026	223	0002	0026	REV REALTY PARTNERSHIP	4100 REV DR	CINCINNATI OH 45232
022300020032	223	0002	0032	MILLCREEK VALLEY	P O BOX 5057	CINCINNATI OH 45205
022300020035	223	0002	0035	MILLCREEK VALLEY	P O BOX 5057	CINCINNATI OH 45205
022300030001	223	0003	0001	M J R INVESTMENTS 1 LLC	10340 EVENDALE DR	CINCINNATI OH 45241
022300030100	223	0003	0100	FINE TAMARA L @6	3145 FAIRHAVEN LN	CINCINNATI OH 45237
022300030101	223	0003	0101	SPECIALTY ENVELOPE INC	4890 SPRING GROVE AVE	CINCINNATI OH 45232
022300030102	223	0003	0102	BALTIMORE & OHIO RAILROAD	500 WATER ST	JACKSONVILLE FL 32202 US
022300030103	223	0003	0103	SUN CHEMICAL CORP	110 PLEASANT AVE	SADDLE RIVER NJ 07458 US
022300030104	223	0003	0104	BALTIMORE & OHIO RAILROAD	500 WATER ST	JACKSONVILLE FL 32202 US
022300030106	223	0003	0106	BALTIMORE & OHIO RAILROAD	500 WATER ST	JACKSONVILLE FL 32202 US
022300030107	223	0003	0107	BALTIMORE & OHIO RAILROAD	500 WATER ST	JACKSONVILLE FL 32202 US
022300030108	223	0003	0108	SUN CHEMICAL CORP	110 PLEASANT AVE	SADDLE RIVER NJ 07458 US
022300030109	223	0003	0109	SUN CHEMICAL CORP	110 PLEASANT AVE	SADDLE RIVER NJ 07458 US
022300030110	223	0003	0110	SUN CHEMICAL CORP	110 PLEASANT AVE	SADDLE RIVER NJ 07458 US
022300030111	223	0003	0111	SUN CHEMICAL CORP	110 PLEASANT AVE	SADDLE RIVER NJ 07458 US
022300030112	223	0003	0112	J M SMUCKER LLC	STRAWBERRY LN	ORRVILLE OH 44667-0280 U
022300030113	223	0003	0113	SUN CHEMICAL CORP	110 PLEASANT AVE	SADDLE RIVER NJ 07458 US
022300030131	223	0003	0131	SUN CHEMICAL CORP	110 PLEASANT AVE	SADDLE RIVER NJ 07458 US
022300030132	223	0003	0132	SUN CHEMICAL CORP	110 PLEASANT AVE	SADDLE RIVER NJ 07458 US
022300030135	223	0003	0135	SUN CHEMICAL CORP	110 PLEASANT AVE	SADDLE RIVER NJ 07458 US
022300030142	223	0003	0142	BALTIMORE & OHIO RAILROAD	500 WATER ST	JACKSONVILLE FL 32202 US
022300030151	223	0003	0151	SUN CHEMICAL CORP	110 PLEASANT AVE	SADDLE RIVER NJ 07458 US
022300030154	223	0003	0154	SUN CHEMICAL CORP	110 PLEASANT AVE	SADDLE RIVER NJ 07458 US
022300030155	223	0003	0155	SUN CHEMICAL CORP	110 PLEASANT AVE	SADDLE RIVER NJ 07458 US
022300030162	223	0003	0162	J M SMUCKER LLC	STRAWBERRY LN	ORRVILLE OH 44667-0280 U
022300030163	223	0003	0163	MILLCREEK VALLEY	P O BOX 5057	CINCINNATI OH 45205
022300030166	223	0003	0166	MILLCREEK VALLEY	P O BOX 5057	CINCINNATI OH 45205
022300030167	223	0003	0167	MILLCREEK VALLEY	P O BOX 5057	CINCINNATI OH 45205
022300030169	223	0003	0169	M J R INVESTMENTS 12 LLC	2953 WOLD AVE	CINCINNATI OH 45206
022300030170	223	0003	0170	SUN CHEMICAL CORP	110 PLEASANT AVE	SADDLE RIVER NJ 07458 US
022300030171	223	0003	0171	MILLCREEK VALLEY	P O BOX 5057	CINCINNATI OH 45205
022300030172	223	0003	0172	SUN CHEMICAL CORPORATION	35 WATERVIEW BLVD	PARSIPPANY NJ 07054
022300030178	223	0003	0178	M J R INVESTMENTS 12 LLC	2953 WOLD AVE	CINCINNATI OH 45206
058200060001	582	0006	0001	TRILLIUM PROPERTIES LLC	5177 SPRING GROVE AVE	CINCINNATI OH 45217
058200060018	582	0006	0018	BALTIMORE & OHIO RAILROAD	500 WATER ST	JACKSONVILLE FL 32202 US
058200060104	582	0006	0104	HELLER ELMER	311 W ROSS AVE	CINCINNATI OH 45217
058200060105	582	0006	0105	LOHFELD RUDOLPH H	309 W ROSS AVE	CINCINNATI OH 45217
058200060106	582	0006	0106	RUSSELL MARY V	307 W ROSS AVE	CINCINNATI OH 45217
058200060107	582	0006	0107	SCHERPENBERG HERMAN JR	110 ALBERT ST	CINCINNATI OH 45217-1516
058200060108	582	0006	0108	SIEGEL WILLIAM R JR &	221 W ROSS AVE	CINCINNATI OH 45217
058200060109	582	0006	0109	SIEGEL WILLIAM R JR &	221 W ROSS AVE	CINCINNATI OH 45217
058200060110	582	0006	0110	SIEGEL WILLIAM R JR &	221 W ROSS AVE	CINCINNATI OH 45217
058200060159	582	0006	0159	KOCH WILLIAM	4753 CRAWFORD AVE	CINCINNATI OH 45223
058200060160	582	0006	0160	STEPHENSON DEBORAH M	308 MCCLELLAND AVE	CINCINNATI OH 45217-1208
058200060161	582	0006	0161	CARTER KENNETH L &	214 BANK ST	CINCINNATI OH 45217
058200060162	582	0006	0162	LUNDY AMBER N &	216 BANK AVE	CINCINNATI OH 45217
058200060163	582	0006	0163	FARRELL EARL	218 BANK ST	CINCINNATI OH 45217
058200060164	582	0006	0164	TORBECK BARBARA A &	220 BANK AVE	CINCINNATI OH 45217-1208
058200060165	582	0006	0165	BAKER STACEY G & ROBIN	222 BANK AVE	CINCINNATI OH 45217-1208
058200060166	582	0006	0166	S & G INVESTORS LLC	9557 DELRAY DR	CINCINNATI OH 45242
058200060167	582	0006	0167	WHALEY TEREA R	226 BANK AVE	CINCINNATI OH 45217-1208
058200060168	582	0006	0168	BERTER MICHAEL H	302 BANK AVE	CINCINNATI OH 45217-1264
058200060169	582	0006	0169	WINTERS MICHELLE L	1014 S VINE ST	URBANA IL 61801
058200060170	582	0006	0170	WILSON LARRY K	318 BANK AVE	CINCINNATI OH 45217-1264
058200060177	582	0006	0177	PENNSYLVANIA LINES LLC	110 FRANKLIN SE	ROANOKE VA 24042-0028 US
058200060178	582	0006	0178	PENNSYLVANIA LINES LLC	110 FRANKLIN SE	ROANOKE VA 24042-0028 US
058200060180	582	0006	0180	BALTIMORE & OHIO RAILROAD	500 WATER ST	JACKSONVILLE FL 32202 US
058200060181	582	0006	0181	BALTIMORE & OHIO RAILROAD	500 WATER ST	JACKSONVILLE FL 32202 US
058200060182	582	0006	0182	B&O SW RR CO THE	500 WATER ST	JACKSONVILLE FL 32202 US
058200060193	582	0006	0193	MORRIS JOHN	315 W ROSS AVE	CINCINNATI OH 45217
058200060195	582	0006	0195	BOLDEN GROUP LLC THE	306 BANK AVE	CINCINNATI OH 45217-1264
058200060203	582	0006	0203	RUBENDUNST ROBERT F TR	5506 EVERGREEN RIDGE DR	CINCINNATI OH 45215
058200060207	582	0006	0207	ST BERNARD VILLAGE		
058200060208	582	0006	0208	RECKMAN HELEN C	306 BANK ST	CINCINNATI OH 45217
058200060229	582	0006	0229	REYNOLDS JAMI & PATRICIA	400 BANK AVE	CINCINNATI OH 45217
058200060230	582	0006	0230	NIESEN JARED R	326 BANK AVE	CINCINNATI OH 45217
058200060231	582	0006	0231	MILLER DAPHNE C	322 BANK AVE	CINCINNATI OH 45217
058200060232	582	0006	0232	ST BERNARD CITY OF	110 WASHINGTON AVE	CINCINNATI OH 45217
058200060236	582	0006	0236	J M SMUCKER LLC	STRAWBERRY LN	ORRVILLE OH 44667-0280 U
058200070001	582	0007	0001	CINCINNATI CITY OF	801 PLUM ST	CINCINNATI OH 45202-5704
058200070002	582	0007	0002	ST BERNARD CITY OF THE	110 WASHINGTON AVE	CINCINNATI OH 45217
058200070003	582	0007	0003	ST JOHNS GERMAN CATHOLIC	3819 W EIGHTH ST	CINCINNATI OH 45205
058200070004	582	0007	0004	FRASURE LEDFORD T	307 BANK AVE	CINCINNATI OH 45217-1265
058200070005	582	0007	0005	LEWIS LINDA M & STEPHEN R	4529 LAWRENCE ST	CINCINNATI OH 45217-1635
058200070007	582	0007	0007	PFISTER SANDRA M	201 BANK AVE	CINCINNATI OH 45217-1246
058200070033	582	0007	0033	CINCINNATI HOUSING	7001 VINE ST	CINCINNATI OH 45216
058200070034	582	0007	0034	LEADBEATER LESLIE L	33 PHILLIPS AVE	CINCINNATI OH 45217
058200070035	582	0007	0035	BRANNEN STEPHEN A &	35 PHILLIPS AVE	CINCINNATI OH 45217-1231
058200070036	582	0007	0036	RALSTON GWENDOLYN E	39 PHILLIPS AVE	CINCINNATI OH 45217-1231
058200070037	582	0007	0037	DURBIN BARBARA J	36 BAKER AVE	CINCINNATI OH 45217-1224
058200070038	582	0007	0038	MEECE SANDY	47 PHILLIPS AVE	CINCINNATI OH 45217
058200070039	582	0007	0039	MEECE SANDY	47 PHILLIPS AVE	CINCINNATI OH 45217
058200070040	582	0007	0040	ENNIS SHEILA E &	49 PHILLIPS AVE	CINCINNATI OH 45217-1231
058200070041	582	0007	0041	SHRADER JACKIE HENKE	433 BANK AVE	CINCINNATI OH 45217
058200070042	582	0007	0042	ST BERNARD CITY OF	110 WASHINGTON AVE	CINCINNATI OH 45217
058200070043	582	0007	0043	VOLZ JACQUELYN F	106 BAKER AVE	CINCINNATI OH 45217-1245
058200070044	582	0007	0044	SCHULTE ALEX T &	108 BAKER AVE	CINCINNATI OH 45217
058200070045	582	0007	0045	DENNIS JULIA	110 BAKER AVE	CINCINNATI OH 45217
058200070046	582	0007	0046	CLARK WILLIAM M & TRACY A	114 BAKER AVE	CINCINNATI OH 45217
058200070047	582	0007	0047	HAWLEY TERRACE L	118 BAKER AVE	CINCINNATI OH 45217-1245
058200070048	582	0007	0048	FREDERICK ERIC &	122 BAKER AVE	CINCINNATI OH 45217
058200070049	582	0007	0049	ST CLAIR LARRY L	4717 VINE ST	CINCINNATI OH 45217
058200070050	582	0007	0050	SHORES MONICA E	1109 GRINDSTONE	UNION KY 41091
058200070051	582	0007	0051	RHODEBACK JEAN C TR	133 BAKER AVE	CINCINNATI OH 45217
058200070052	582	0007	0052	RHODEBACK JEAN C TR	133 BAKER AVE	CINCINNATI OH 45217
058200070053	582	0007	0053	STUCHELL JONATHAN L	129 BAKER AVE	CINCINNATI OH 45217-1244
058200070054	582	0007	0054	QUEALE SHAWN M & ANDREA D	123 BAKER AVE	CINCINNATI OH 45217
058200070055	582	0007	0055	SAYLOR MORGAN B	121 BAKER AVE	CINCINNATI OH 45217-1244
058200070056	582	0007	0056	ST BERNARD VILLAGE		
058200070057	582	0007	0057	HAMPEL PATRICIA K	115 BAKER AVE	CINCINNATI OH 45217-1225
058200070058	582	0007	0058	HAMPEL PATRICIA K	115 BAKER AVE	CINCINNATI OH 45217
058200070059	582	0007	0059	SHORES MONICA	710 CHAMBERS RD	WALTON KY 41094
058200070060	582	0007	0060	SHORES MONICA	710 CHAMBERS RD	WALTON KY 41094
058200070061	582	0007	0061	WESCHLER CHRISTOPHER	109 BAKER AVE	CINCINNATI OH 45217
058200070062	582	0007	0062	ST BERNARD CITY OF	110 WASHINGTON AVE	CINCINNATI OH 45217
058200070063	582	0007	0063	ST BERNARD CITY OF	110 WASHINGTON AVE	CINCINNATI OH 45217
058200070064	582	0007	0064	ST BERNARD VILLAGE		
058200070065	582	0007	0065	LEE DANIEL D	51 BAKER AVE	CINCINNATI OH 45217
058200070066	582	0007	0066	REIST PATRICK	49 BAKER AVE	CINCINNATI OH 45217
058200070067	582	0007	0067	COOMER LAURA V	43 BAKER AVE	CINCINNATI OH 45217-1223
058200070068	582	0007	0068	MACKZUM MICHAEL T	41 BAKER AVE	CINCINNATI OH 45217-1223
058200070069	582	0007	0069	WILSON DEBBIE S	37 BAKER AVE	CINCINNATI OH 45217-1223
058200070070	582	0007	0070	JOHNSTON ANN MARIE	33 BAKER AVE	CINCINNATI OH 45217-1223
058200070071	582	0007	0071	MOORE MORGAN E & ANN M	29 BAKER AVE	CINCINNATI OH 45217-1223
058200070072	582	0007	0072	BRICKLER JOSEPH T	4617 VINE ST	CINCINNATI OH 45217
058200070074	582	0007	0074	KUHLMAN PAUL K	46 BAKER AVE	CINCINNATI OH 45217-1224
058200070075	582	0007	0075	PFEIFFER URSULA M	44 BAKER AVE	CINCINNATI OH 45217-1224
058200070076	582	0007	0076	STERN JOHN C	42 BAKER AVE	CINCINNATI OH 45217
058200070077	582	0007	0077	BYRD DENNIS D & THERESE	40 BAKER AVE	CINCINNATI OH 45217-1224
058200070078	582	0007	0078	DURBIN BARBARA J	36 BAKER AVE	CINCINNATI OH 45217-1224
058200070079	582	0007	0079	SCHUDEL ERICH	34 BAKER AVE	CINCINNATI OH 45217-1224
058200070080	582	0007	0080	STALLSWORTH THERESA	32 BAKER AVE	CINCINNATI OH 45217
058200070081	582	0007	0081	STEINMETZ VALANCHE L	26 BAKER AVE	CINCINNATI OH 45217-1224
058200070082	582	0007	0082	CHIN TERENCE	18 BAKER AVE	CINCINNATI OH 45217
058200070091	582	0007	0091	BRICKLER JOSEPH T	4617 VINE ST	CINCINNATI OH 45217
058200070092	582	0007	0092	W & D REALTY	5736 CHILDS	CINCINNATI OH 45248
058200070093	582	0007	0093	W & D REALTY	5736 CHILDS	CINCINNATI OH 45248
058200070094	582	0007	0094	W & D REALTY	5736 CHILDS	CINCINNATI OH 45248
058200070095	582	0007	0095	TOBERGTE DONALD E &	4227 GREENLEE AVE	CINCINNATI OH 45217
058200070096	582	0007	0096	TOBERGTE DONALD E &	4227 GREENLEE AVE	CINCINNATI OH 45217
058200070097	582	0007	0097	BRANNEN ESTELLA M	98 MARTIN ST	CINCINNATI OH 45217-1612
058200070098	582	0007	0098	SIEGEL JOHN G & BARBARA C	563 ROSEHILL AVE	CINCINNATI OH 45217
058200070099	582	0007	0099	BERGER KATHRYN E	102 MARTIN ST	CINCINNATI OH 45217-1613
058200070100	582	0007	0100	PAPIA MICHAEL F &	104 MARTIN ST	CINCINNATI OH 45217-1613
058200070101	582	0007	0101	HORN JANET C	106 MARTIN ST	CINCINNATI OH 45217-1613
058200070102	582	0007	0102	SMITH BETTY L	108 MARTIN ST	CINCINNATI OH 45217-1613
058200070103	582	0007	0103	SAYLOR KAREN L	110 MARTIN ST	CINCINNATI OH 45217-1613
058200070104	582	0007	0104	MARTIN RICHARD KIPP &	5555 S KIMBARK	CHICAGO IL 60637
058200070105	582	0007	0105	WILLIAMS WILLIAM E	4608 LAWRENCE ST	CINCINNATI OH 45217-1230
058200070106	582	0007	0106	BARLOW PATRICIA KAY &	118 MARTIN ST	CINCINNATI OH 45217-1613
058200070107	582	0007	0107	HORN DEBRA	4607 LAWRENCE ST	CINCINNATI OH 45217-1229
058200070108	582	0007	0108	HORN DEBRA	4607 LAWRENCE ST	CINCINNATI OH 45217-1229
058200070109	582	0007	0109	KALLMEYER EDWARD DANIEL	4601 LAWRENCE ST	CINCINNATI OH 45217
058200070110	582	0007	0110	PAUL PATRICIA M	4543 LAWRENCE ST	CINCINNATI OH 45217-1635
058200070111	582	0007	0111	VAUGHT MARVIN C	4541 LAWRENCE ST	CINCINNATI OH 45217-1635

PARCELID	BOOK	PAGE	PARCEL	OWNNM1	OWNAD1	OWNAD2
058200070112	582	0007	0112	HUENING JOHN C	4535 LAWRENCE ST	CINCINNATI OH 45217
058200070113	582	0007	0113	AHR ROBERT & MARY C	4531 LAWRENCE ST	CINCINNATI OH 45217-1635
058200070114	582	0007	0114	FANT TERESSA	4527 LAWRENCE ST	CINCINNATI OH 45217
058200070115	582	0007	0115	BRIGGS EUGENE D	4525 LAWRENCE ST	CINCINNATI OH 45217
058200070116	582	0007	0116	BRIGGS STEPHANIE	3400 STATE ROUTE 133	WILLIAMSBURG OH 45179 US
058200070117	582	0007	0117	SIMOS CHASSIDY N	4517 LAWRENCE ST	CINCINNATI OH 45217-1608
058200070118	582	0007	0118	BRUNNER LORRAINE M TR	4515 LAWRENCE ST	CINCINNATI OH 45217-1608
058200070119	582	0007	0119	ST BERNARD COMMUNITY	110 WASHINGTON AVE	CINCINNATI OH 45217
058200070120	582	0007	0120	NEW HORIZON PROPERTIES LL	3000 READING RD	CINCINNATI OH 45206
058200070121	582	0007	0121	NEW HORIZON PROPERTIES LL	3000 READING RD	CINCINNATI OH 45206
058200070122	582	0007	0122	NEW HORIZON PROPERTIES LL	3000 READING RD	CINCINNATI OH 45206
058200070123	582	0007	0123	KUERZE EDWARD TR	5774 LUCLARE DR	CINCINNATI OH 45233
058200070124	582	0007	0124	KUERZE EDWARD TR	5774 LUCLARE DR	CINCINNATI OH 45233
058200070125	582	0007	0125	BELCHER DARREN W	4514 LAWRENCE ST	CINCINNATI OH 45217
058200070126	582	0007	0126	NEUMANN JOHN R	4516 LAWRENCE ST	CINCINNATI OH 45217-1609
058200070127	582	0007	0127	BECK DENNIS EDWARD	4518 LAWRENCE ST	CINCINNATI OH 45217-1609
058200070128	582	0007	0128	HACKNEY TIMOTHY R	218 JEFFERSON AVE	CINCINNATI OH 45217
058200070129	582	0007	0129	GRIGSBY MATHREM	4536 LEO ST	CINCINNATI OH 45217
058200070130	582	0007	0130	WACHTELL LYNN M	4542 LEO ST	CINCINNATI OH 45217
058200070131	582	0007	0131	SAINT CLAIR WALTER T	4542 LAWRENCE ST	CINCINNATI OH 45217-1634
058200070132	582	0007	0132	ESTEP STEEN P	4546 LAWRENCE ST	CINCINNATI OH 45217-1634
058200070133	582	0007	0133	LEIGH DAVID J	9378 MASON MONTGOMERY RD	MASON OH 45040
058200070134	582	0007	0134	GROH LEROY F JR &	7663 PINEGLEN DR	CINCINNATI OH 45224
058200070135	582	0007	0135	SPEED JENNIFER A	13 MARTIN ST	CINCINNATI OH 45217
058200070136	582	0007	0136	SPEED JENNIFER A	13 MARTIN ST	CINCINNATI OH 45217
058200070137	582	0007	0137	HAARMAN MICHAEL W	11 MARTIN ST	CINCINNATI OH 45217-1611
058200070138	582	0007	0138	STEELE ANGELA	1878 ATLANTIC AVE	LAWRENCEBURG IN 47025 US
058200070139	582	0007	0139	STEELE ANGELA	1878 ATLANTIC AVE	LAWRENCEBURG IN 47025 US
058200070140	582	0007	0140	ST CLAIR DAVID J	4533 VINE ST	CINCINNATI OH 45217
058200070141	582	0007	0141	VAN ZANDT JOSEPH B	4529 VINE ST	CINCINNATI OH 45217
058200070142	582	0007	0142	VAN ZANDT JOSEPH B	4529 VINE ST	CINCINNATI OH 45217
058200070143	582	0007	0143	MERSCH VENTURES LLC	8461 HIGHTON CT	CINCINNATI OH 45236
058200070144	582	0007	0144	ST BERNARD PROGRESSIVE	4517 VINE ST	CINCINNATI OH 45217
058200070145	582	0007	0145	ST BERNARD PROGRESSIVE	4517 VINE ST	CINCINNATI OH 45217
058200070146	582	0007	0146	ST BERNARD CITY OF THE	110 WASHINGTON AVE	CINCINNATI OH 45217
058200070147	582	0007	0147	ST BERNARD CITY OF THE	110 WASHINGTON AVE	CINCINNATI OH 45217
058200070148	582	0007	0148	ELLERBUSCH INSTRUMENT CO	4509 VINE ST	CINCINNATI OH 45217
058200070149	582	0007	0149	ELLERBUSCH PROPERTIES LCC	4509 VINE ST	CINCINNATI OH 45217
058200070150	582	0007	0150	ROLL WILLIAM N	5860 DAY RD	CINCINNATI OH 45252
058200070152	582	0007	0152	BALTIMORE & OHIO SW RR CO	500 WATER ST	JACKSONVILLE FL 32202 US
058200070153	582	0007	0153	PAPIA MICHAEL F &	104 MARTIN ST	CINCINNATI OH 45217-1613
058200070154	582	0007	0154	STUCHELL JONATHAN L	129 BAKER AVE	CINCINNATI OH 45217-1244
058200070155	582	0007	0155	BALTIMORE & OHIO SW RR CO	500 WATER ST	JACKSONVILLE FL 32202 US
058200070167	582	0007	0167	MEIER KEVIN EUGENE	4811 ANDALUS AVE	CINCINNATI OH 45217
058200070168	582	0007	0168	MEIER KEVIN EUGENE	4811 ANDALUS AVE	CINCINNATI OH 45217

PARCELID	BOOK	PAGE	PARCEL	OWNNM1	OWNAD1	OWNAD2
058200070173	582	0007	0173	BERINGHAUS CRAIG K	45 PHILLIPS AVE	CINCINNATI OH 45217-1231
058200070174	582	0007	0174	MEIER KEVIN EUGENE	4811 ANDALUS AVE	CINCINNATI OH 45217
058200070175	582	0007	0175	DIXON CYNTHIA M	203 BANK AVE	CINCINNATI OH 45217-1246
058200070176	582	0007	0176	REIGELSPERGER AMANDA	4544 LEO ST	CINCINNATI OH 45217
058200070177	582	0007	0177	PFSTER TERRY L	28 BAKER AVE	CINCINNATI OH 45217-1224
058200070178	582	0007	0178	HENDERER THERESE E	215 BANK AVE	CINCINNATI OH 45217-1207
058200070179	582	0007	0179	SCHMIDT LINDA S TR	5425 COUTIQUE CT	CINCINNATI OH 45238
058200070180	582	0007	0180	HACKNEY TIMOTHY R	218 JEFFERSON AVE	CINCINNATI OH 45217
058200070181	582	0007	0181	BRUNNER AMY	209 BANK AVE	CINCINNATI OH 45217-1246
058200070182	582	0007	0182	STUCHELL JONATHAN L	129 BAKER AVE	CINCINNATI OH 45217-1244
058200070183	582	0007	0183	SAUER THOMAS R	10040 POND WOODS LN	CINCINNATI OH 45241
058200070184	582	0007	0184	RHODEBACK JEAN C TR	133 BAKER AVE	CINCINNATI OH 45217
058200070185	582	0007	0185	CAIN CLIFFORD J II &	193 HARVEY CT	CINCINNATI OH 45217-1209
058200070186	582	0007	0186	COLSON KIM TERESE &	197 HARVEY CT	CINCINNATI OH 45217-1209
058200070187	582	0007	0187	PHILPOT RAYMOND	201 HARVEY CT	CINCINNATI OH 45217-1211
058200070188	582	0007	0188	RADTKE TOM	205 HARVEY CT	CINCINNATI OH 45217-1211
058200070189	582	0007	0189	WRIGHT LEE E	209 HARVEY CT	CINCINNATI OH 45217
058200070190	582	0007	0190	WARRICK LENNA M	213 HARVEY CT	CINCINNATI OH 45217
058200070191	582	0007	0191	PAPUCCI JOSEPH ANGELO &	217 HARVEY CT	CINCINNATI OH 45217-1211
058200070192	582	0007	0192	WILLIAMS ROBERT R &	221 HARVEY CT	CINCINNATI OH 45217-1211
058200070193	582	0007	0193	STACY LARRY D &	225 HARVEY CT	CINCINNATI OH 45217-1211
058200070194	582	0007	0194	RUTEMUELLER STEVEN	227 HARVEY CT	CINCINNATI OH 45217
058200070195	582	0007	0195	SLUSHER JASON M	229 HARVEY CR	CINCINNATI OH 45217
058200070196	582	0007	0196	RAPIEN DAVID J	231 HARVEY CT	CINCINNATI OH 45217-1211
058200070197	582	0007	0197	HACKNEY TIMOTHY R &	218 JEFFERSON AVE	CINCINNATI OH 45217
058200070198	582	0007	0198	WILLIAMS ROBERT R &	221 HARVEY CT	CINCINNATI OH 45217
058200070200	582	0007	0200	HOLBROOK PAMELA S	234 HARVEY CT	CINCINNATI OH 45217-1212
058200070201	582	0007	0201	JENNINGS ERIC J	232 HARVEY CT	CINCINNATI OH 45217-1212
058200070202	582	0007	0202	MILLER WILLIAM G	228 HARVEY CT	CINCINNATI OH 45217-1212
058200070203	582	0007	0203	RICHARDS DOROTHY	224 HARVEY CT	CINCINNATI OH 45217-1212
058200070204	582	0007	0204	RUTEMUELLER JAMES TR &	220 HARVEY CT	CINCINNATI OH 45217-1212
058200070205	582	0007	0205	HOPKINS JEFFREY R	216 HARVEY CT	CINCINNATI OH 45217-1212
058200070206	582	0007	0206	ALBRIGHT BRET C	212 HARVEY CT	CINCINNATI OH 45217-1212
058200070207	582	0007	0207	ST BERNARD CITY OF THE	110 WASHINGTON AVE	CINCINNATI OH 45217
058200070209	582	0007	0209	SIEGEL JOHN G & BARBARA C	563 ROSEHILL AVE	CINCINNATI OH 45217
058200070210	582	0007	0210	HACKNEY TIMOTHY R	218 JEFFERSON AVE	CINCINNATI OH 45217
058200070212	582	0007	0212	HACKNEY TIMOTHY R	218 JEFFERSON AVE	CINCINNATI OH 45217
058200070213	582	0007	0213	5007 GREENLEE LLC	218 JEFFERSON AVE	CINCINNATI OH 45217
058200070214	582	0007	0214	SCHUEHLER KATHLEEN F	5584 SILVERPOINT	CINCINNATI OH 45247
058200070215	582	0007	0215	TOBERGTE DONALD E &	4227 GREENLEE AVE	CINCINNATI OH 45217
058200070216	582	0007	0216	4601 VINE LLC	3808 LINCOLN RD	CINCINNATI OH 45247
058200070217	582	0007	0217	ST BERNARD CITY OF THE	110 WASHINGTON ST	CINCINNATI OH 45217
058200070218	582	0007	0218	DONALDSON ERIC M	219 BANK AVE	CINCINNATI OH 45217
058200070220	582	0007	0220	VAN ZANDT JOSEPH B	4529 VINE ST	CINCINNATI OH 45217
058200070221	582	0007	0221	HORN JAMES WESLEY	305 BANK AVE	CINCINNATI OH 45217-1265

PARCELID	BOOK	PAGE	PARCEL	OWNNM1	OWNAD1	OWNAD2
058200070222	582	0007	0222	SAUER THOMAS R	10040 POND WOODS LN	CINCINNATI OH 45241
058200070226	582	0007	0226	BETTERTON RUSEL	43 PHILLIPS AVE	CINCINNATI OH 45217
058200070231	582	0007	0231	PFEIFFER URSULA M	44 BAKER AVE	CINCINNATI OH 45217-1224
058200070232	582	0007	0232	TOBERGTE DONALD E &	4227 GREENLEE AVE	CINCINNATI OH 45217
058200070234	582	0007	0234	ST BERNARD CITY OF THE	110 WASHINGTON AVE	CINCINNATI OH 45217
058200070238	582	0007	0238	ST BERNARD PROGRESSIVE	4517 VINE ST	CINCINNATI OH 45217
058200070239	582	0007	0239	WACHTELL LYNN M	4542 LEO ST	CINCINNATI OH 45217
058200070240	582	0007	0240	WINKLE ALICIA A	233 HARVEY CT	CINCINNATI OH 45217
058200070243	582	0007	0243	REV REALTY PTNSHP	4100 REV DR	CINCINNATI OH 45232-1957
058200070250	582	0007	0250	PHILPOT RAYMOND	8914 YORKSHIRE DR	WEST CHESTER OH 45069 US
058200070252	582	0007	0252	MILLCREEK VALLEY	P O BOX 5057	CINCINNATI OH 45205
058200070253	582	0007	0253	REV REALTY PARTNERSHIP	4100 REV DR	CINCINNATI OH 45232
058200070254	582	0007	0254	MILLCREEK VALLEY	P O BOX 5057	CINCINNATI OH 45205
058200070255	582	0007	0255	VAN ZANDT JOSEPH B	4529 VINE ST	CINCINNATI OH 45217
058200070256	582	0007	0256	MACHA STEPHEN	428 BANK AVE	CINCINNATI OH 45217-1214
058200070257	582	0007	0257	LO-MAC LTD TRUST	432 BANK AVE	CINCINNATI OH 45217-1214
058200070258	582	0007	0258	BARNETT DONNA R	436 BANK ST	CINCINNATI OH 45217-1213
058200070259	582	0007	0259	BARGE RICK THOMAS	440 BANK AVE	CINCINNATI OH 45217-1213
058200070260	582	0007	0260	MCBRIDE BRAD	444 BANK AVE	CINCINNATI OH 45217-1213
058200070261	582	0007	0261	KENNEDY NORMA LEE TR	448 BANK AVE	CINCINNATI OH 45217
058200070262	582	0007	0262	ST BERNARD CITY OF THE	110 WASHINGTON AVE	CINCINNATI OH 45217
058200070263	582	0007	0263	ZIEGLER GREGG M & MOLLY E	441 BANK ST	CINCINNATI OH 45217-1213
058200070264	582	0007	0264	KISTNER MARIAN L	437 BANK AVE	CINCINNATI OH 45217-1213
058200070265	582	0007	0265	SHRADER JAN	433 BANK AVE	CINCINNATI OH 45217-1214
058200070266	582	0007	0266	SCHRENK ROBERT W	429 BANK AVE	CINCINNATI OH 45217-1214
058200070267	582	0007	0267	RICKENBAUGH JAMES	425 BANK AVE	CINCINNATI OH 45217-1214
058200070268	582	0007	0268	RAMSEY MICHAEL	421 BANK AVE	CINCINNATI OH 45217-1214
058200070269	582	0007	0269	ST BERNARD CITY OF THE	110 WASHINGTON AVE	CINCINNATI OH 45217
058200070270	582	0007	0270	WONG VICKY L	434 BANK AVE	CINCINNATI OH 45217-1214
058200070271	582	0007	0271	CRADDOCK ROBERT L	426 BANK AVE	CINCINNATI OH 45217-1214
058200070272	582	0007	0272	BARGE THOMAS A TR	415 BANK AVE	CINCINNATI OH 45217-1214
058200070273	582	0007	0273	DURBIN PEGGY A	411 BANK AVE	CINCINNATI OH 45217-1214
058200070274	582	0007	0274	ST BERNARD CITY OF THE	110 WASHINGTON AVE	CINCINNATI OH 45217
058200070275	582	0007	0275	ST BERNARD CITY OF	110 WASHINGTON AVE	CINCINNATI OH 45217
058200070276	582	0007	0276	PHTHALCHEM INC	266 W MITCHELL AVE	CINCINNATI OH 45232
58200070277	582	0007	0277	4601 VINE LLC	3808 LINCOLN RD	CINCINNATI OH 45247
058200070278	582	0007	0278	CARROLL THOMAS V II &	424 BANK AVE	CINCINNATI OH 45217
058200070279	582	0007	0279	CHAMBERS JOHN E	408 BANK AVE	CINCINNATI OH 45217
058200070280	582	0007	0280	SHRIVER DUWAYNE &	404 BANK AVE	CINCINNATI OH 45217-1264
058200070281	582	0007	0281	GREGORY JONATHAN D &	311 BANK AVE	CINCINNATI OH 45217
058200070282	582	0007	0282	ST CLAIR TERRY W &	315 BANK AVE	CINCINNATI OH 45217
058200070283	582	0007	0283	ECKES MARTHA A	401 BANK AVE	CINCINNATI OH 45217
058200070284	582	0007	0284	VAN VALKENBURG-WALDEN VAL	405 BANK AVE	CINCINNATI OH 45217
058200070286	582	0007	0286	SCHMIDT RICHARD W	4723 BAKER PL	CINCINNATI OH 45217-1262
058200070287	582	0007	0287	ST BERNARD CITY OF	110 WASHINGTON AVE	CINCINNATI OH 45217

Legend

- Cincinnati Area GIS (CAGIS) Parcel Boundary (April 2011)
- Approximate Limits of Waste
- Limits of Waste 200-foot Offset
- Limits of Waste 1000-foot Offset
- Cincinnati Area GIS (CAGIS) Building Footprints

0032 PARCEL ZONED MG (MANUFACTURING, GENERAL) OR PARCEL ZONED CC-A (COMMERCIAL, COMMUNITY, AUTO)
0107 PARCEL ZONED MG (MANUFACTURING, GENERAL)
0207 PARCEL ZONED R-2 (RESIDENTIAL, ONE AND TWO FAMILY)
0196 PARCEL ZONED R-1 (RESIDENTIAL, ONE FAMILY)

SCS NOTES:

1. 200 AND 1000 FOOT RADII LOCATIONS ARE APPROXIMATE.
2. THE ADDRESS INFORMATION CONTAINED IN THE TABLE ARE VALID, BUT THE PROPERTY OWNERS MAY HAVE CHANGED SINCE THE DATE OF THIS MAP.

SOURCE: CEC EGMP, APPENDIX H, DATED NOVEMBER 2011 (INCORPORATED IN FULL)

NORTH
SCALE IN FEET
0 200 400

REV | DATE | DESCRIPTION | CK. BY

SHEET TITLE: 200 FT AND 1000 FT OFFSETS

PROJECT TITLE: ST. BERNARD LANDFILL, VILLAGE OF ST. BERNARD, OHIO

CLIENT: VILLAGE OF ST. BERNARD, 110 WASHINGTON AVENUE, ST. BERNARD, OHIO 45217

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC.
2060 READING ROAD, CINCINNATI, OH 45202
PH. (513) 421-5353 FAX. (513) 421-2847

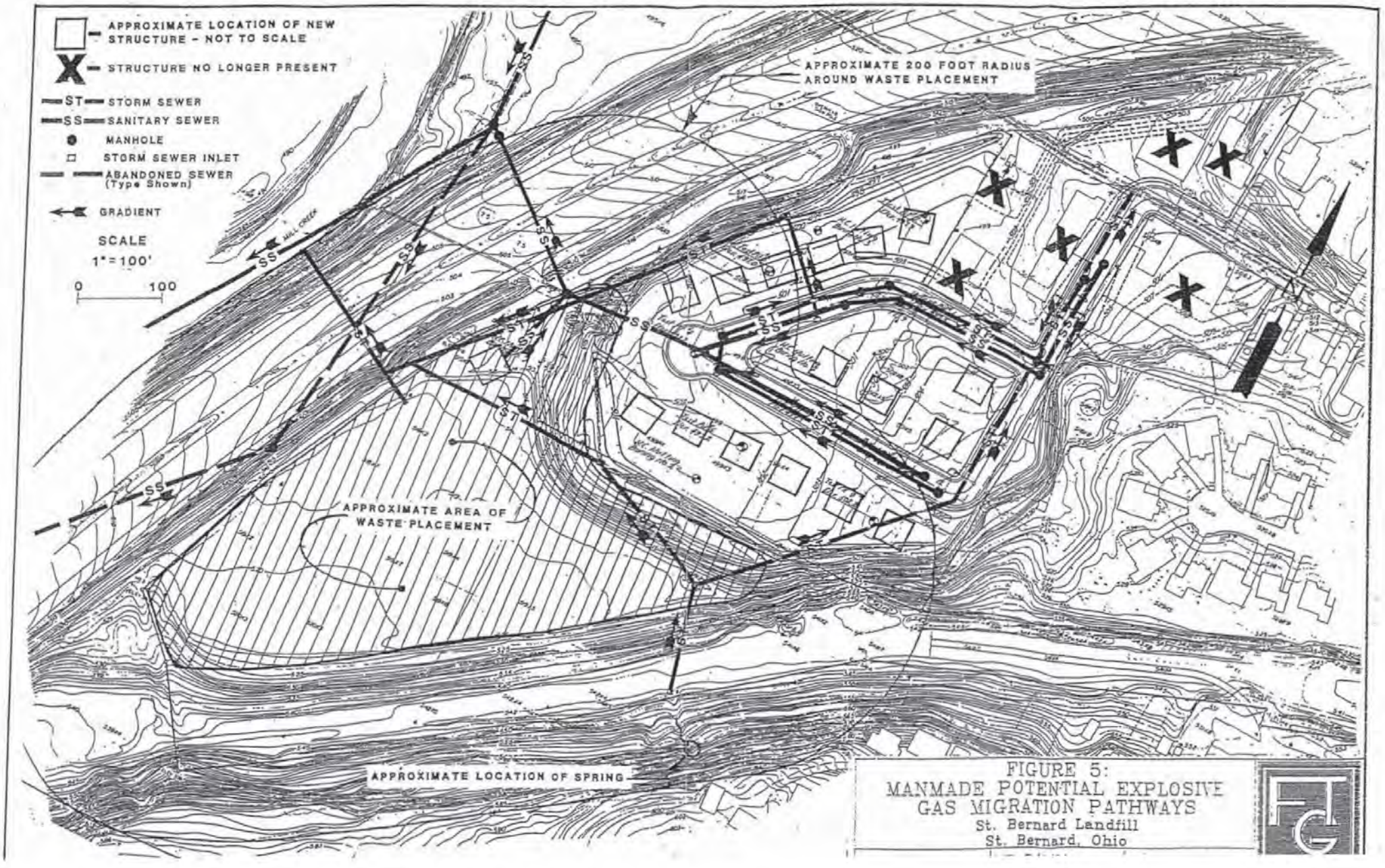
PROJ. NO. 23212007.02 | DSN. BY: CES | DWN. BY: FDB | CHK. BY: FDB | APP. BY: | Q/A RVW BY: JJW

CADD FILE: Fig 6

DATE: SEPTEMBER 2014

SCALE: AS SHOWN

DRAWING NO. **FIG 5**



June 18, 2014. SCS incorporates this figure in full and unedited from the original source: Foppe Thelen, Explosive Gas Monitoring System Design, October 1991.

FIGURE 6. MAN MADE MIGRATION PATHWAS

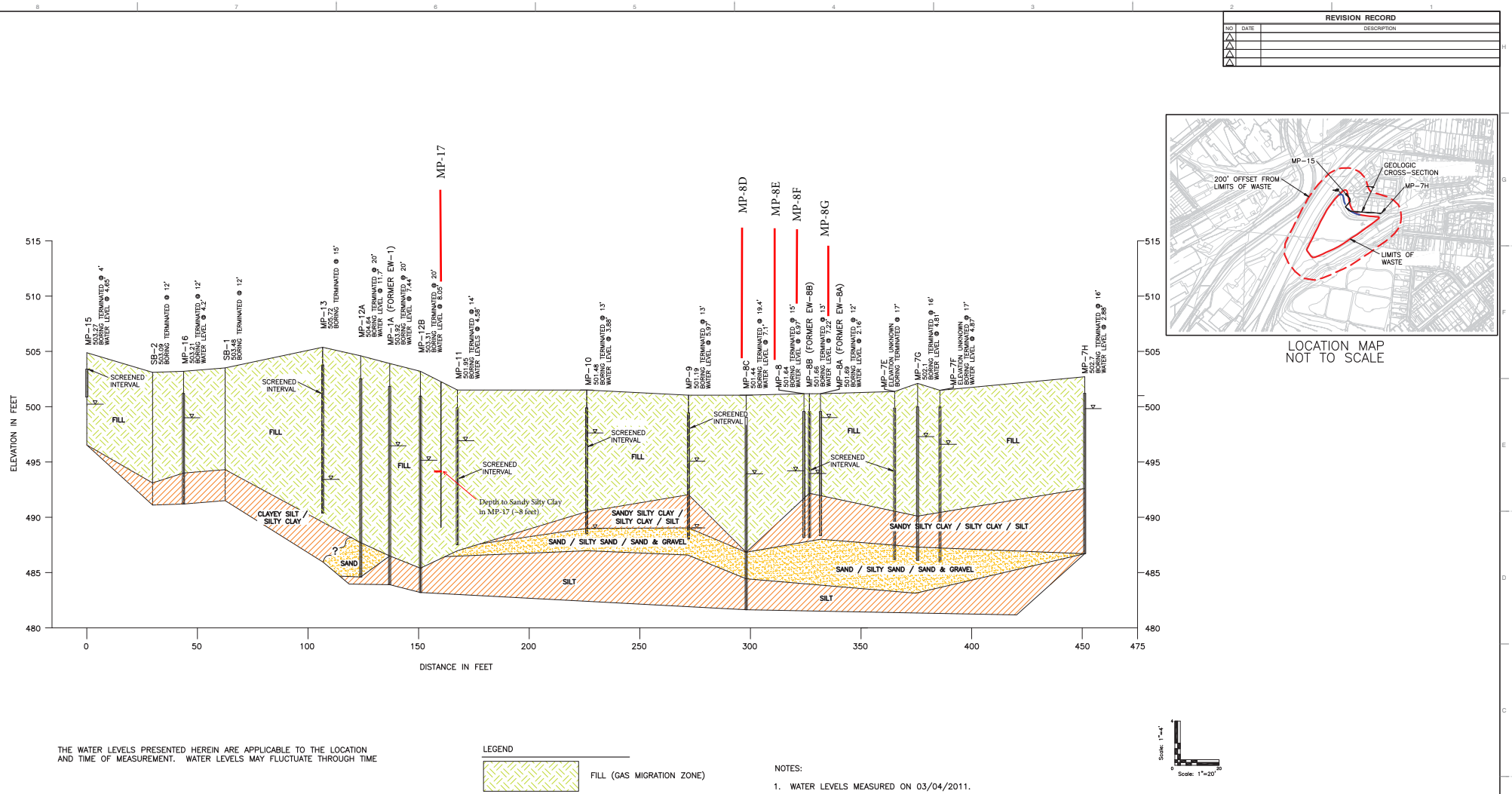


FIGURE 7. CEC 2011 Northern Geologic Cross Section

APPENDIX A

REPORTING FORMS