# MEMO

**To:** **BJ Leroy, Wisconsin Department of Natural Resources (WDNR)**

**From:** **Joe Renier; Deborah Barsotti**
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**Project No.:** **7311150004**

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**Date:** **07-30-19**

**Subject:** **Memo – Risk Analysis – Ashview Terrace Apartments Site, Ashwaubenon, Brown County, Wisconsin**

## 1.0 INTRODUCTION

This memo summarizes a risk analysis performed for the Ashview Terrace Apartments Site (the Site or ATA Site) at 988 – 1020 Willard Drive, Ashwaubenon, Brown County, Wisconsin. A Site map is provided as Figure 1. The Site encompasses approximately 3.4 acres, located north of Willard Drive and the Ashwaubenon High School (Figure 2). The Site is being investigated under the Wisconsin Department of Natural Resources (WDNR) Site # 02-05-564043.

The Site was historically used as a borrow pit that was filled in with paper sludge at some locations and may also have received municipal waste from a town dump formerly located on property to the south. Polychlorinated biphenyls (PCBs) and two metals (mercury and lead), possibly associated with the referenced fill materials and/or other sources, have been detected at levels above residential soil screening criteria at the Site.

The purpose of this risk analysis is to briefly summarize the site background and contaminant nature and extent (PCBs and metals), discuss potential release mechanisms for the compounds of potential concern (COPCs), identify potential contaminant exposure routes and receptors (human and ecological) associated with the Site, and characterize potential site risk relevant to human and ecological receptors.

Twelve areas, in green spaces between apartment buildings, were identified as containing or potentially containing fill with elevated PCB and/or metals concentrations in near surface soils. These areas are considered characteristic of the shallow fill areas at the Site that may be accessed by human and ecological receptors and thus are subject of this risk analysis. The risk analysis, particularly the risk characterization will be used to determine if remedial action is

necessary, and if so, what remedial actions would be protective of human health and the environment. Currently, these areas are being considered for capping using a river rock cap/cover based on PCB concentrations and/or the presence of paper sludge in near surface soil.

While not risk based, TSCA PCB self implementation cleanup for high occupancy areas provides for unrestricted closure at =<1 mg/kg PCBs. To comply with NR 720, DNR rather than developing PCB non-industrial site-specific residual cleanup level (RCL) the existing shallow soil PCB impacts were compared to individual Aroclor direct contact RCLs and EPA Regional Screening Levels (RSLs) to estimate risk to address NR 700 rules series unrestricted closure. This is in addition to evaluation of the performance standard, i.e., the TSCA PCB high occupancy self implementation requirements including that for =<1 mg/kg and >1 to =<10 ppm.

A brief description of Site background and previous investigations are presented below.

## 2.0 BACKGROUND

During the 1930's a portion of the Site and land to the south (currently owned by the Ashwaubenon School District and the Village of Ashwaubenon), was used as a borrow pit (OMNNI, 2015). Aerial photos dating back to 1938 illustrate the apparent borrow pit surrounded by agricultural fields. The borrow pit or outline of the pit was evident until at least 1960 but was no longer apparent on a 1967 aerial photo (Figure 3). The borrow pit area on the ATA Site and School District/Village property was filled in with paper sludge in some locations. In addition, the pit area on the School District/Village property was used as a town dump. PCBs, possibly associated with the referenced fill materials and/or other sources have been detected at levels above soil criteria at the ATA Site and School District/Village property. The School/Village property was remediated under WDNR Site #02-05-559562 (Ashwaubenon School District/Klipstine Park Site).

### Site Description and Features

As discussed by OMNNI (2015), the Site is located at 988 – 1020 Willard Drive, in the city of Ashwaubenon, Wisconsin in the southeast quarter of the southeast quarter of Section 4, Township 23 North and Range 20 East. The Site is specifically identified as Brown County tax parcel VA-120-5. The Site is relatively flat with a slight slope to the southeast and is occupied by the ATA complex including apartment buildings, paved driveway, parking areas and green space. The surrounding area is a mix of light commercial and residential development. No surface water bodies exist on-Site and the nearest surface water to the Site is Dutchman Creek and the Fox River located at approximately 0.8 miles and 1.4 miles southeast of the Site, respectively.

**Previous Investigations**

A number of environmental investigations by OMNI and Wood Environment and Infrastructure Solutions (Wood) (formerly Amec Foster Wheeler), have been conducted at the Site, which mapped contaminant nature and extent. These include a Phase II Subsurface Investigation (Phase II) (OMNNI, 2015), a Site Investigation (SI) (Amec Foster Wheeler, 2017), a Supplemental Site Investigation (SSI) (Amec Foster Wheeler, 2018a), and a Supplemental Site Investigation Addendum (SSI Addendum) (Amec Foster Wheeler, 2018b).

The first Site investigation (Phase II) was conducted to determine whether PCBs are present in near surface soils beneath the Site. This included the installation and sampling of three push probe borings to 5.5 ft bgs in the west, east, and southeastern portions of the Site. PCBs were detected at levels of concern in soil at two of the borings completed and this set the stage for further investigation.

The second Site investigation (SI) was conducted to determine the former borrow pit boundaries as they relate to the Site, and to install and sample a series of soil borings within the confines of the former pit to document the horizontal and vertical extent of fill materials and define the distribution of PCBs and metals in soils across the Site. The pit boundaries were mapped off historical aerial photo coverage. A total of 12 soil borings were completed to depths between 8 to 24 ft bgs in a rough grid pattern throughout the area, and a temporary well was installed at the southeast downgradient corner of the Site to document whether groundwater associated with the Site has been impacted. This investigation effectively documented the fill and nature and extent of PCBs and metals across the Site, except at some locations along the northern Site boundary.

The third investigation (SSI) was conducted to better define the fill extent/thickness and PCB and metals concentrations in soil along the northern Site boundary, investigate the nature of a high photo-ionization detector (PID) detection obtained during the SI in an interval from one boring on the west side of a garage (test soil for VOCs and PAHs), and confirm groundwater results from the SI by installing and sampling a second temporary well at the southeast downgradient corner of the Site. Three soil borings along the northern Site border were installed to 8 ft bgs and the boring on the west side of the garage was installed to a depth of 19.7 ft bgs. This investigation effectively documented the fill and nature and extent of PCBs and metals along the northern border except at one location. Testing for VOCs and PAHs at the garage boring showed no detections of these parameters above soil criteria.

The SSI Addendum involved installation of two borings to depths of 2.9 ft bgs and 3.7 ft bgs, to further document the extent of PCBs and metals at the remaining one location along the northern Site border. Results of this investigation showed that PCBs at levels of concern at the remaining referenced location did not extend off-Site north of the Site boundary.

In addition to the above investigations, Amec Foster Wheeler installed a total of 21 hand probe borings (Hand Probe Investigation) completed to 2.5 ft bgs, without soil sampling for analytical parameters. These were installed to determine the depth to paper sludge (where present) in near surface soils in areas where borings were not previously advanced. This effectively increased the boring density across the Site. The previous investigations showed that those intervals containing paper sludge generally contained PCB and metals concentrations at levels of concern, so the presence of paper sludge was qualitatively associated with potential PCB and metal impacts.

Figure 4 shows the locations of all borings and temporary wells completed at the Site. A summary of the borings completed for each investigation are as follows:

| Investigation | Borings | Boring Numbers | Temporary Wells | Installation Method | Boring Depth (ft) | Analytical Collected |
|---|---|---|---|---|---|---|
| OMNI - 2015: Phase II Site Investigation | 3 | B1 thru B3 | | Push Probe | 5.5 | PCBs |
| AMEC-FW - 2016: Site Investigation | 12 | SB16-01 thru SB16-12 | TW16-01 | Push Probe | 8 to 24 | PCBs and Metals |
| AMEC-FW -2017: Supplemental Site Investigation | 4 | SB17-01 thru SB17-04 | TW17-01 | Push Probe | 8 - 19.7 | * PCBs and Metals |
| AMEC-FW -2017: Supplemental Site Investigation Addendum | 1 | SB17-06 | | Hand Auger | 2.9 | PCBs |
| AMEC-FW - 2017: Hand Probe Investigation | 21 | SS17-01 thru SS17-21 | | Hand Probe | 2.5 | None - Visual for Paper Sludge |

* One sample at SB17-04 collected for VOCs and PAHs

Site geologic cross sections are included in the Site Investigation and Supplemental Site Investigation Reports (Amec, 2017 and Amec 2018a). Analytical results are provided in Figures 8 and 9 in the SI Report, Figures 7 and 8 in the SSI Report, and in Figure 4 of the SSI Addendum.

## 3.0 CONTAMINANT NATURE AND EXTENT

Soil borings conducted during the Site Investigation (Amec, 2017) identified that the Site is underlain by top soil, and sandy clay and/or silty sand where native materials were encountered (on the western portion of the Site). Over the remainder of the Site, within the confines of the former borrow pit, fill was encountered below 1 to 2 ft of topsoil or asphalt and road base. The fill variably consists of sandy clay and/or silty sand, gravel and paper sludge. The fill (where present) extends to depths ranging from 2.5 ft bgs on the eastern side of the Site to as much as 16 ft bgs in the central portion of the Site. The paper sludge is generally grey in color and has soil like physical properties similar to a medium plasticity silty clay. Paper sludge was identified in 7 out of the 12 borings conducted during the Site investigation (Amec, 2017), and ranged in thickness from 0.9 ft at the southeast corner of the Site to 13.5 ft in the central portion of the Site. Paper sludge was also identified in 1 out of 4 borings during the SSI (Amec 2018a), and in an additional 18 out of 21 shallow borings completed in the Hand Probe Investigation at depths starting from at the surface to 1.5 ft bgs.

Soil analytical results for both PCBs and RCRA Metals were compared to WDNR Non-Industrial Residual Contaminant Levels (RCLs), Industrial RCLs, Soil to Groundwater RCLs (as specified in NR 720) and the USEPA "high occupancy use cleanup level" of 1 milligram per kilogram (mg/kg) for total PCBs in the top 4 ft of soil. As specified in 40 CFR 761.61 (a)(4)(i)(A), and referenced in WDNR Remediation and Redevelopment Document RR-786, for PCBs concentrations between 1 mg/kg and 10 mg/kg, the site must have a cover and deed notice per EPA requirements (40 CFR 761.61(a)(7) and (a)(8)). The required cap thickness is 18-inches of clean soil or fill above soils impacted at levels of concern.

Collectively, the soil analytical data indicate that shallow soils, primarily in fill within the confines of the former borrow pit, are impacted with PCBs and metals at levels above soil screening criteria in some locations. This includes PCBs above RCLs (Aroclors 1248, 1254 and 1260) and above 1 mg/kg (total PCBs) in the top 4 ft bgs.

Metals detected at levels above the Non-Industrial and Industrial RCLs include arsenic, lead and mercury. Other metals including barium, cadmium, selenium and silver were detected at low levels above Soil to Groundwater RCL. The source of the metals is unknown. The metals could be related to other materials/waste deposited at the Site or transferred to the Site from the borrow pit area to the south and/or related to naturally occurring background concentrations. The arsenic detections appear to be background concentrations leaving mercury and lead to be the two metals of concern.

Groundwater was encountered at a depth of approximately 19.5 ft bgs in the temporary monitoring wells (TW16-01, and TW17-01) completed at the southeast corner of the Site. Groundwater analytical results were compared to WDNR NR 140 Enforcement Standard (ES), NR140 Preventative Action Limit (PAL) and the US Environmental Protection Agency (USEPA) Maximum Contaminant Levels (MCLs). PCBs and metals were not detected at levels above groundwater criteria in the groundwater samples collected from the temporary wells completed during the SI or SSI at the southeast corner of the Site. This indicates that groundwater adjacent and downgradient of the Site has not been impacted by contaminants at levels of potential concern as well as the other metals including barium, cadmium, selenium and silver that were detected at low levels above the Soil to Groundwater RCL.

## 4.0 CONCEPTUAL SITE MODEL

Based on the investigations to date, a conceptual site model (CSM) was developed providing for the primary source, the release mechanisms, environmental media impacted and the exposure routes to the relevant human and ecological receptors (Figure 5). This was conducted to comply with NR 720.13 which requires that "responsible parties shall consider human food chain, surface water quality, and terrestrial eco-system pathways of exposure, when those pathways of exposure are of concern at a site or facility." For a pathway to a receptor to be complete, five elements need to be present including:

- Source of contamination;
- Mechanism for transport of a substance from the source to the air, surface water, groundwater and/or soil;
- Exposure point concentration where people come in contact sufficiently to pose a risk or hazard;
- Route of entry into the body; and
- An exposed population must be present.

If one of more elements are not present and information is insufficient to eliminate the pathway, then the pathway is potentially complete. When one or more of the elements is absent, the pathway is incomplete.

As stated above the primary source is historical placement of fill containing paper sludge and municipal waste through the majority of the Site. The potential mechanisms of release from the fill include leaching to groundwater, surface water runoff and wind erosion. However, since much of the fill is covered by top soil or asphalt and road base, the surface water runoff and

wind erosion are considered incomplete. While the leaching from soil to groundwater pathway may occur – particularly for metals, the downgradient groundwater has not been impacted by contaminants at levels of potential concern, thus the pathway is incomplete. Since PCBs have limited water solubility and tend to bind to carbon in soil, the leaching pathway is also considered incomplete and that is consistent with the lack of finding PCBs in groundwater at a level of concern.

A summary of CSM Pathways and Receptors is as follows:

| **Media** | **Pathway** | **Human** | **Ecological** |
|---|---|---|---|
| Soil | Direct Contact | Potentially Complete | Potentially Complete |
| Groundwater | Direct Contact | Incomplete | Incomplete |
| Surface Water | Direct Contact | Incomplete | Incomplete |
| Air | Direct Contact | Incomplete | Incomplete |

As can be seen from the above, the only complete or potentially complete pathway is direct contact with soil (ingestion, dermal absorption and inhalation) by human and soil contacting terrestrial receptors, e.g., shrews and birds. Given the limited terrestrial habitat available including presence of the buildings and paved drive and parking areas, the most sensitive receptor would be humans, particularly a residential child. This pathway therefore needs to be evaluated as to the potential cancer risks and noncancer hazards associated with PCBs, lead and mercury.

## 5.0 RISK CHARACTERIZATION

To determine if PCBs, and the mercury and lead detections in shallow soils are a risk to human health, analytical results for the 0 ft to 4 ft bgs interval (n = 34 samples for PCBs and 29 samples for mercury and lead) were assessed through exposure point concentration (EPC) analysis using EPA's ProUCL software version 5.1. For PCBs and mercury, the 95% upper confidence level of the arithmetic mean (95UCL) was estimated for the EPCs of the individual Aroclor mixtures. Consistent with EPA Technical Risk Workgroup (TRW) recommended guidance, the arithmetic mean was used as the EPC for lead when comparing to Integrated Exposure Uptake Biokinetic (IUEBK) model direct contact lead RCL and RSL.

To determine the cancer risk (PCBs) and noncancer hazards (lead and mercury) associated with the direct contact of soil by residents including children and adults, the EPCs were compared to the screening residential soil criteria (EPA RSL and WDNR RCL) that were developed in accordance with NR 720.12 for carcinogenic and non-carcinogenic chemicals. For a carcinogen (PCBs), the lifetime excess carcinogenic risk from exposure to PCBs in soil is estimated by:

***PCB Lifetime Excess Cancer Risk = (EPC/RSL or RCL ($10^{-6}$ risk) soil screening criteria) x 1 x $10^{-6}$***

For the non-carcinogens (lead and mercury), the noncancer hazard quotient (HQ) is calculated by:

***Lead or Mercury = EPC/(RSL or RCL)***

The results of the above risk and hazard calculations are summarized in the table below:

## Exposure Point Concentrations Summary

PCBs

| Aroclor | Exposure Point Concentration (mg/kg) | EPA Residential RSL 10-6 (mg/kg) | Risk | WI Non-Industrial RCL 10-6 (mg/kg) | Risk |
|---|---|---|---|---|---|
| 1248 | 0.941 | 0.23 | $4 \times 10^{-6}$ | 0.24 | $4 \times 10^{-6}$ |
| 1254 | 0.567 | 0.24 | $2 \times 10^{-6}$ | 0.24 | $2 \times 10^{-6}$ |
| 1260 | 0.37` | 0.24 | $2 \times 10^{-6}$ | 0.24 | $2 \times 10^{-6}$ |
| **TOTAL** | | | **$8 \times 10^{-6}$** | | **$8 \times 10^{-6}$** |

[a] **95%UCL/ProUCL**
[b] 0-4 feet below ground surface
[c] USEPA Resident Soil RSL
[d] WI - Non-Ind DC RCL
[e] Risk calculated using either the RSL or RCL

Metals

| Chemical | EPC (mg/kg) | EPA RSL Nonindustrial (mg/kg) | HQ | EPA RSL Industrial (mg/kg) | HQ | WI RCL Nonindustrial (mg/kg) | HQ | WI RCL Industrial (mg/kg) | HQ |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 220.7[a] | 400 | 0.55 | 800 | 0.28 | 400 | 0.55 | 800 | 0.25 |
| Mercury (methyl mercury)[b] | 5.377[c] | 7.8 | 0.69 | 120 | 0.04 | 7.82 | 0.69 | 118 | 0.05 |
| Mercury(elemental mercury)[d] | 5.377[c] | 10 | 0.54 | 46 | 0.12 | 3.13 | 1.72 | 3.13 | 1.72 |
| Mercury (mercuric chloride and other mercury salts)[e] | 5.377[c] | 23 | 0.23 | 350 | 0.02 | 23 | 0.23 | 350 | 0.02 |

[a] Based on mean per EPA guidance for use with lead models;
[b] Based on methyl mercury
[c] 95%UCL/ProUCL
[d] Based on inorganic (elemental) mercury
[e] Based on mercury chloride (mercuric chloride)
HQ = hazard quotient

While risks for individual Aroclors exceed the $10^{-6}$, results of this analysis indicate that the total cumulative excess cancer risk for all Aroclors does not exceed the $10^{-5}$ risk criteria for cumulative risk that applies to the Site based on NR-720.12(1). In addition, individual sample results for total PCBs exceed the TSCA unrestricted high occupancy TSCA self implementation PCB criterion of =<1 mg/kg.

While HQs for mercury assuming the presence of elementary mercury for nonindustrial and industrial land use exceed the threshold of 1 (1.72 for both), there is no history, laboratory or field observations indicating that elemental mercury is present. Furthermore, the toxicity criterion for elemental mercury is based on the inhalation exposure route which is rendered largely incomplete by soil cover, buildings and paved areas covering much of the suspected fill areas. The calculated EPCs for the more likely mercury species present - mercuric chloride and other mercury salts as well as lead are below a hazard quotient of one using the ratio of the EPCs to the WDNR and EPA soil criteria.

It has therefore been concluded that that PCBs, mercury and lead are not present at levels of concern from 0 to 4 ft bgs at the Site. Groundwater analytical results from the temporary wells were below WDNR and EPA groundwater criteria for the referenced compounds so the groundwater pathway is incomplete. It has also therefore been concluded that these compounds have not leached to groundwater at levels of concern beneath the Site.

## 6.0 SUMMARY AND CONCLUSIONS

The purpose of this risk analysis was to summarize the site background and contaminant nature and extent (PCBs and metals), discuss potential release mechanisms for the COPCs, identify potential contaminant exposure routes and receptors (human and ecological) associated with the Site, and characterize potential site risk relevant to human and ecological receptors.

While the risk analysis demonstrated that the near surface soil does not pose an unacceptable risk or hazard to residential receptors including adults and children, the EPC for total PCBs exceeded 1 mg/kg that is a requirement for unrestricted non-industrial closure according to the TSCA PCB Spill Policy self-implementation cleanup. Therefore, rendering the direct contact pathway with soil impacted by PCBs incomplete through an engineered barrier, e.g., soil or river rock cap/cover is being considered for selected areas, even though site soils do not pose an unacceptable risk to potential receptors.

**Risk Analysis Justification**

This risk analysis developed a site CSM and calculated EPCs for the identified, site specific COPCs in order to show that shallow Site soils do not pose an unacceptable risk to potential receptors using standard default exposure assumptions for direct contact of COPCs in soil by residents consistent with those in NR 720. It is standard risk assessment practice to consider that the standard default exposure assumption for soil ingestion, e.g., 200 mg/day for children is not received from one location but from various places such as across the residential yard, playground or indoor dust. To account for the variable exposures, the concentration in the exposure equation is the average concentration (typically the 95% UCL on the mean (95% UCL)) contacted by the receptor. This concentration should be representative of the average concentration over the exposure area and throughout the exposure period (time), e.g., 30 years. To that end and consistent with DNR and EPA guidance the 95% UCL was used for PCBs and mercury EPCs in risk and hazard estimates. Consistent with EPA's lead risk assessment guidance, the mean concentration was used for the EPC. These exposure estimates are considered to be representative of that encountered by direct contact with soil at the Site over a 30-year exposure period for PCBs and over a year for mercury and lead.

For the purpose of compliance with the Direct Contact (DC) RCLs, exposure point concentrations or averaging is approvable under NR 720.07(2)(b) according to DNR RR 991 using a minimum of 10 sampling points. As provided in DRN RR 991, compliance averaging using 95%UCL of soil concentration is suited where the "contaminant is widespread, relatively consistent in concentrations and at levels close to the applicable RCL for that compound." Based on the investigations of this Site, that is the case.

It is Wood's opinion that an adequate number of soil samples have been collected to perform this analysis and that based on analytical and visual observations that the paper sludge material is distributed across the Site and the analytical data is representative of the shallow soil impacts. Analytical samples from 20 sample locations (with multiple samples per boring) from across the Site were factored into the EPC analysis and an additional 21 locations were assessed qualitatively through visual observation of fill characteristics (primarily the presence or absence of paper sludge). Samples from these 41 locations were collected over a roughly 2.5 acre area (within the former pit confines) which is covered largely by apartment buildings and paved areas. Figure 4 shows that the green spaces between the apartment buildings have been adequately sampled.

This risk analysis is relevant to current Site conditions and assumes that Site soils will not be disturbed and remain covered by buildings, pavement and top soil and grass in green spaces. A deed notice should be applied as part of the accepted remedy.

## 7.0 REFERENCES

Amec Foster Wheeler, January 2018b. Supplemental Site Investigation Report Addendum, Ashview Terrace Apartments Site, Ashwaubenon, Brown County, WI.

Amec Foster Wheeler, January 2018a. Supplemental Site Investigation Report, Ashview Terrace Apartments Site, Ashwaubenon, Brown County, WI.

Amec Foster Wheeler, June 2017. Site Investigation Report, Ashview Terrace Apartments Site, Ashwaubenon, Brown County, WI.

Code of Federal Regulations, Title 40 (40 CFR) 761.61 (a)(4)(i)(A), and 761.61(a)(7) and (a)(8)

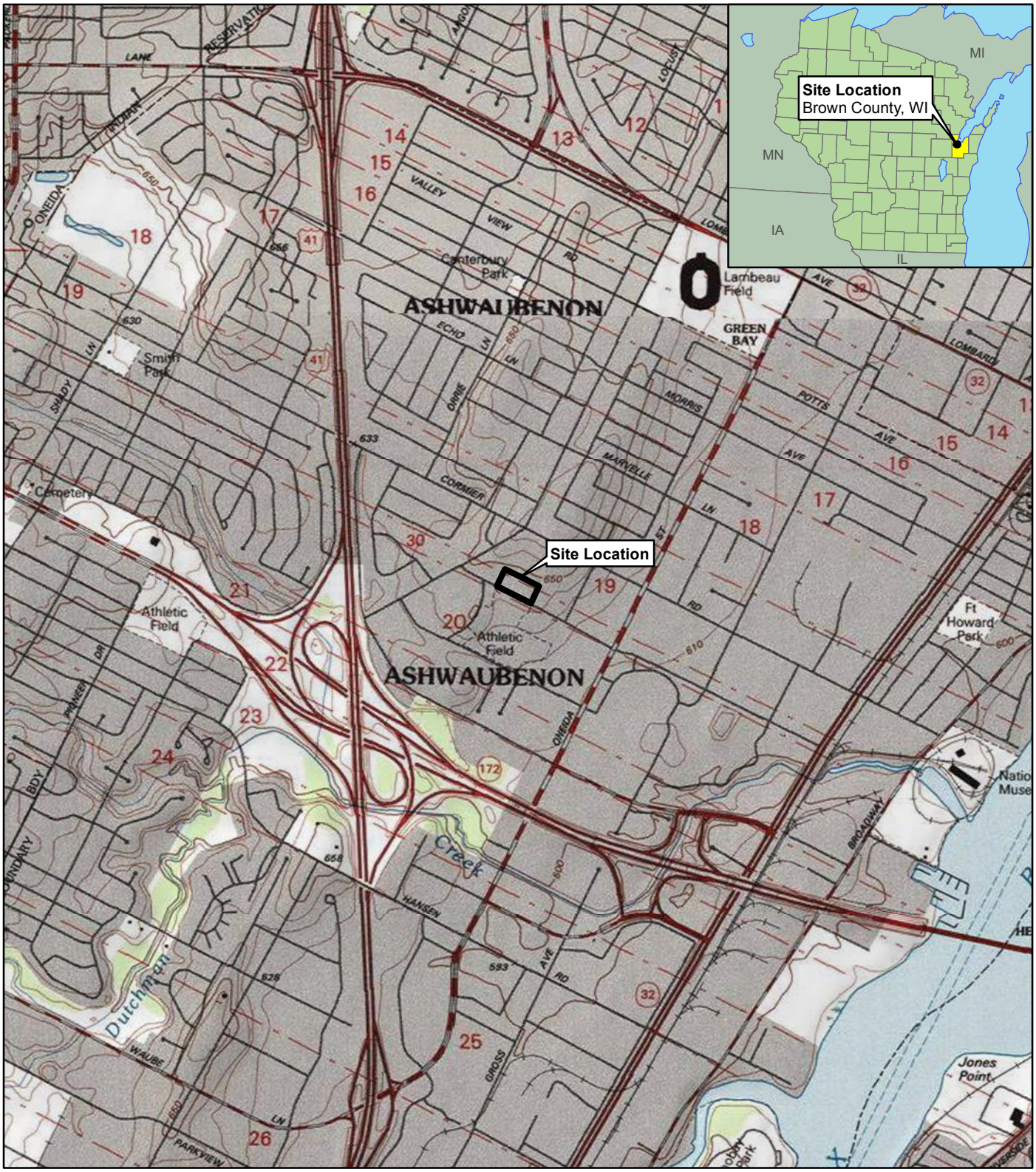
OMNNI, February 2015. Phase II Subsurface Investigation at the Perry Property, 988-1020 Willard Dr., Parcel VA-120-5, Ashwaubenon, Brown County, WI Report.

USEPA June 2016. ProUCL software version 5.1 – for Environmental Applications for Datasets with and without Nondetect Observations.

WDNR, October 2015. WDNR Remediation and Redevelopment document RR-991, Compliance Averaging of Soil Contaminant Concentration Data.

WDNR, November, 2014. WDNR Remediation and Redevelopment document RR-786, PCB Remediation in Wisconsin under the One Cleanup Program Memorandum Agreement.

WDNR, November, 2013. Chapter NR 720 Soil Cleanup Standards.




**Legend**

Approximate Site Boundary

1:24,000 — 1 inch equals 2,000 feet

Approximate Scale in Feet

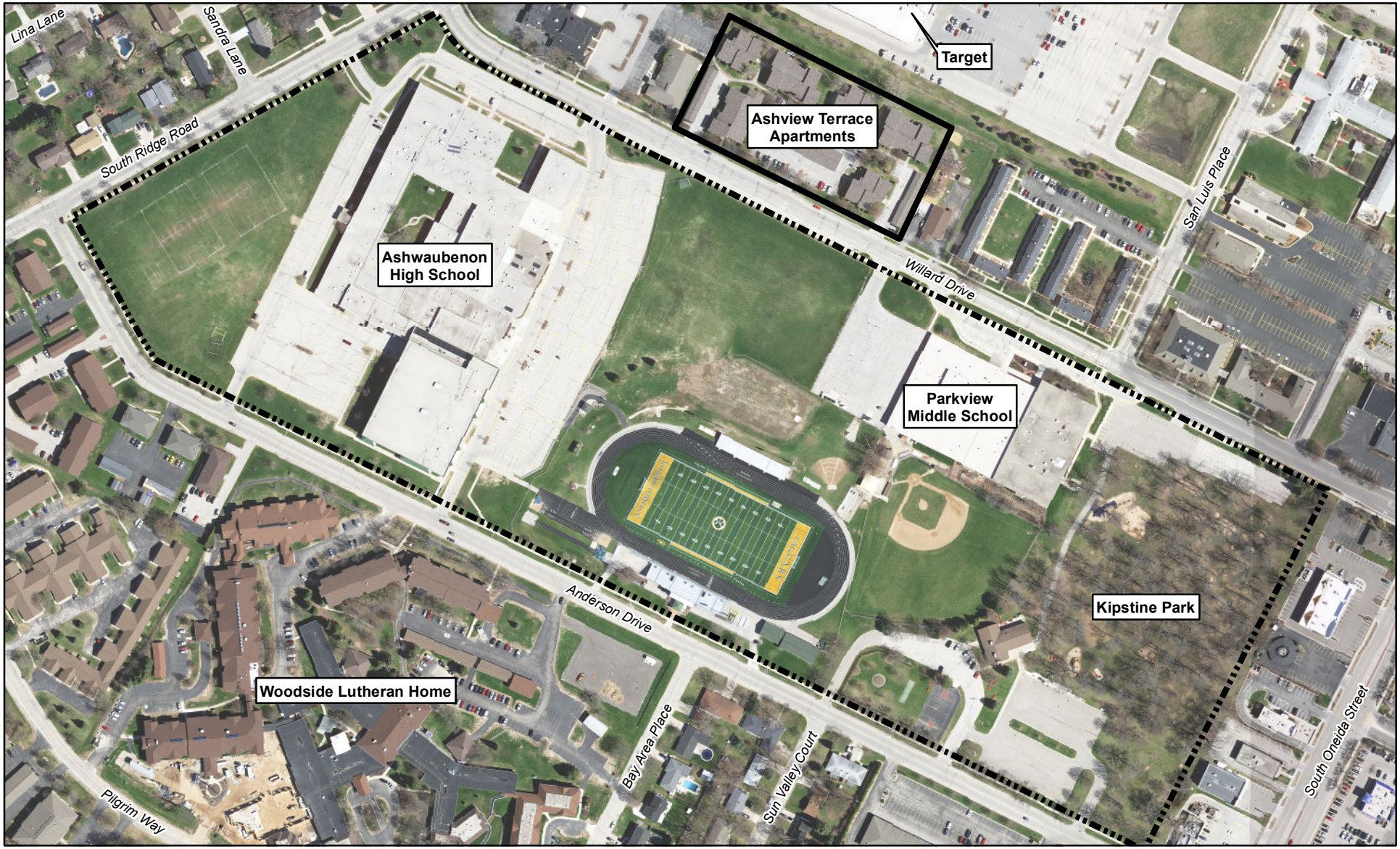
0 — 2,000 — 4,000 — 6,000

# SITE LOCATION MAP

Risk Analysis Memo
WDNR Site 02-05-564043
Ashview Terrace Apartments Site
Ashwaubenon, Wisconsin

Note: 1:24k Topos courtesy of ESRI (De Pere and Green Bay West Quads)

| | | | |
|---|---|---|---|
| Date: 07/17/2019 | Project No. 7311150004 | Figure: 1 |
| Drawn: MJV | wood. | |
| Checked: JMR | | |




**Legend**

- Ashview Terrace Apartments Site
- Ashwaubenon High School / Kipstine Park Sites

# SITE FEATURES MAP

Risk Analysis Memo
WDNR Site 02-05-564043
Ashview Terrace Apartments Site
Ashwaubenon, Wisconsin

Note: Imagery courtesy of Brown County Planning & Land Services (May 2014)

Figure: **2**

| | | | |
|---|---|---|---|
| Drawn: | MJV | Project No. | 7311150004 |
| Checked: | JMR | Date: | 07/17/2019 |

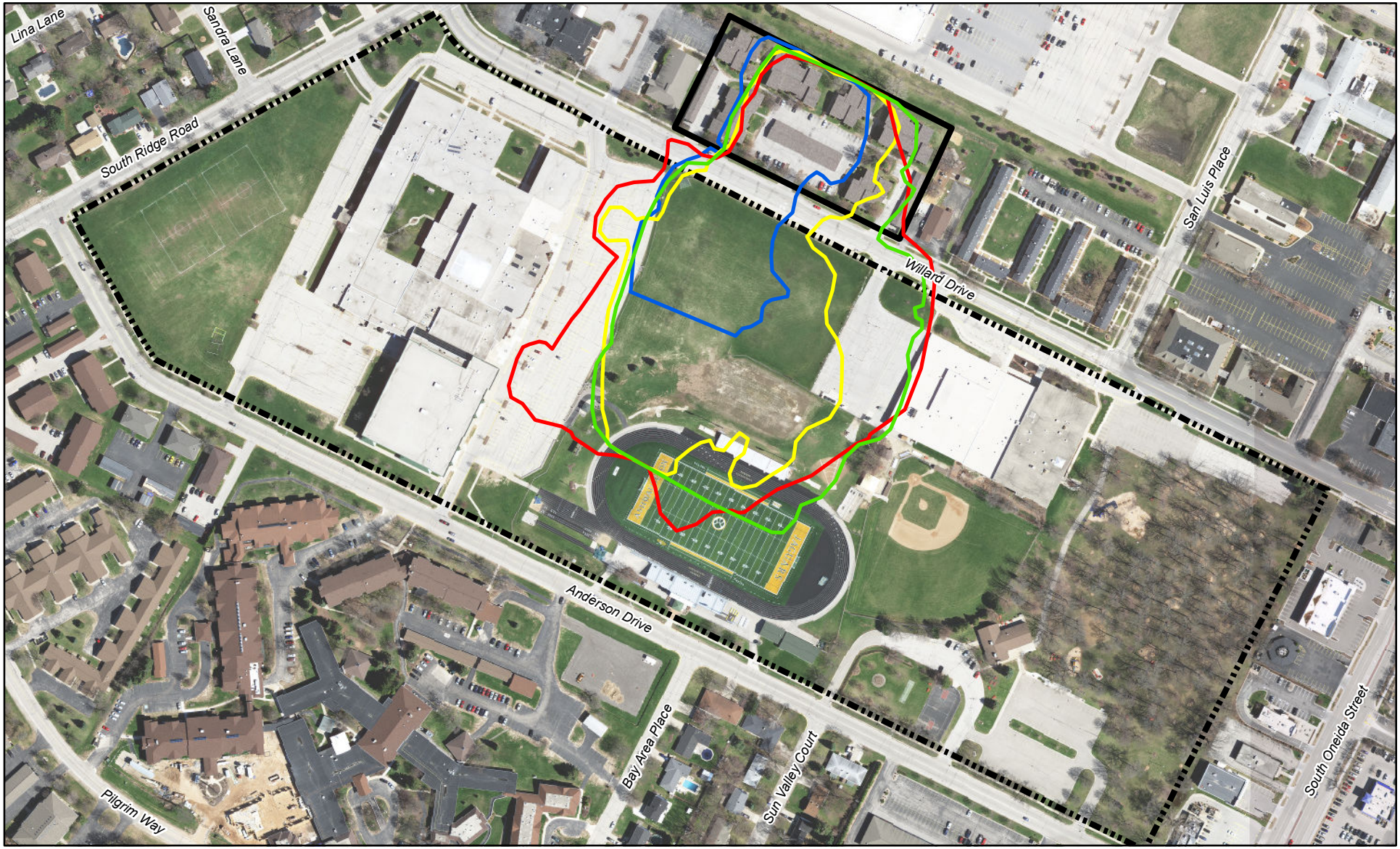
1:3,600

1 inch equals 300 feet

Approximate Scale in Feet

0 300 600

wood.




**Legend**

- Ashview Terrace Apartments Site
- Ashwaubenon High School / Kipstine Park Sites

**Approximate Extent of Historic Borrow Pit by Year**

- 1938
- 1954
- 1951
- 1960

# HISTORIC BORROW PIT DIMENSIONS

Risk Analysis Memo
WDNR Site 02-05-564043
Ashview Terrace Apartments Site
Ashwaubenon, Wisconsin

Note: Imagery courtesy of Brown County Planning & Land Services (May 2014)

Figure: 3

| | | | |
|---|---|---|---|
| Drawn: | MJV | Project No. | 7311150004 |
| Checked: | JMR | Date: | 07/17/2019 |

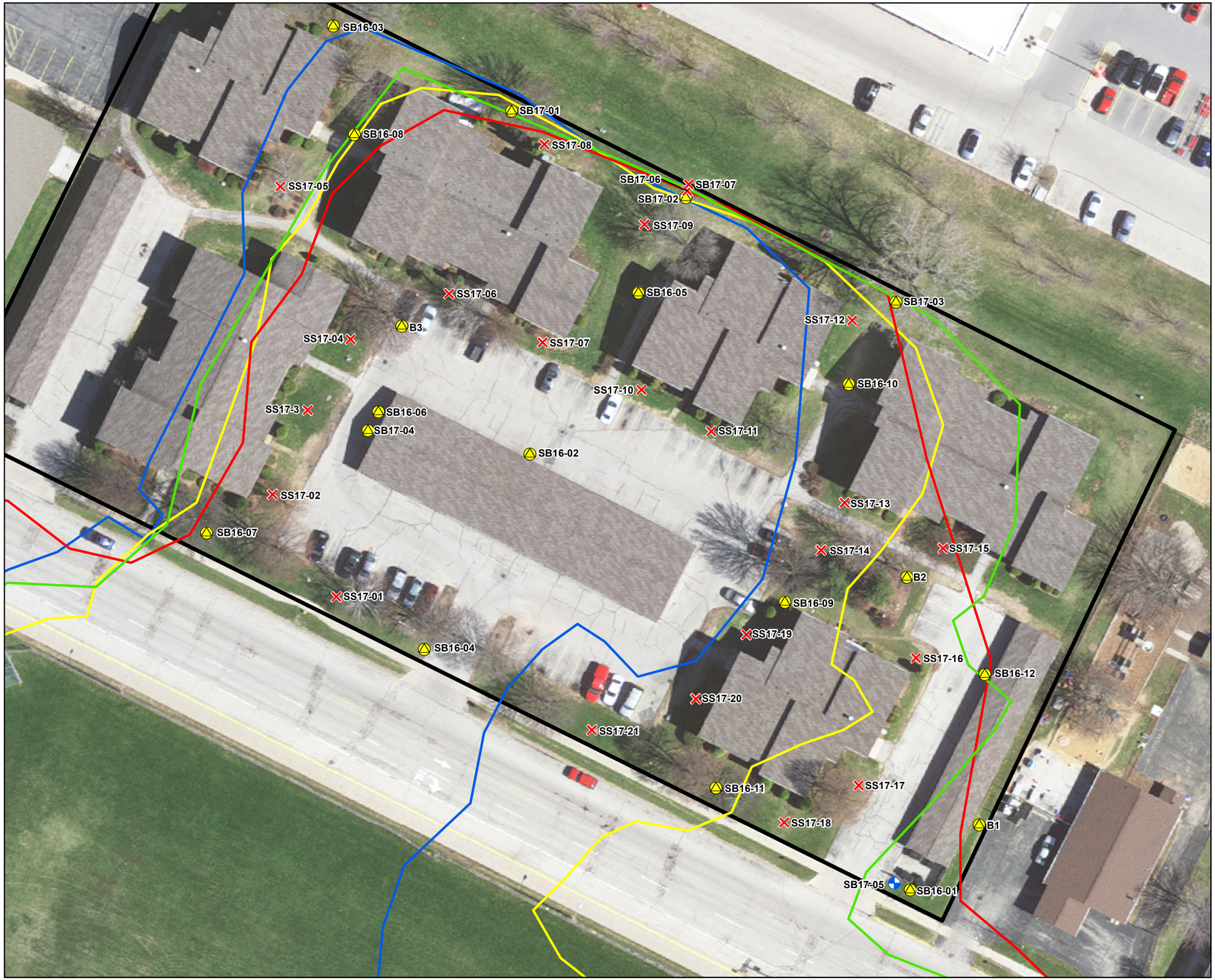
1:3,600

1 inch equals 300 feet

Approximate Scale in Feet

0 300 600

wood.




50 0 50

Feet

1:540 1 inch equals 45 feet

## Legend

- Geoprobe Borings
- Temporary Well / Geoprobe (to 24 ft bgs)
- Soil Probes
- Approximate Site Boundary

Approximate Extent of Historic Landfill by Year

- 1938
- 1951
- 1954
- 1960

# SOIL BORING AND TEMPORARY WELL LOCATION MAP

Risk Analysis Memo
WDNR Site 02-05-564043
Ashview Terrace Apartments Site
Ashwaubenon, Wisconsi

Note: Imagery courtesy of Brown County Planning & Land Services (May 2014)

| | | | |
|---|---|---|---|
| N W E S | Date: 07/18/2019 | Project No. 7311150004 | Figure: 4 |
| | Drawn: MJV | wood. | |
| | Checked: JMR | | |

# GP Ashwaubenon - CSM

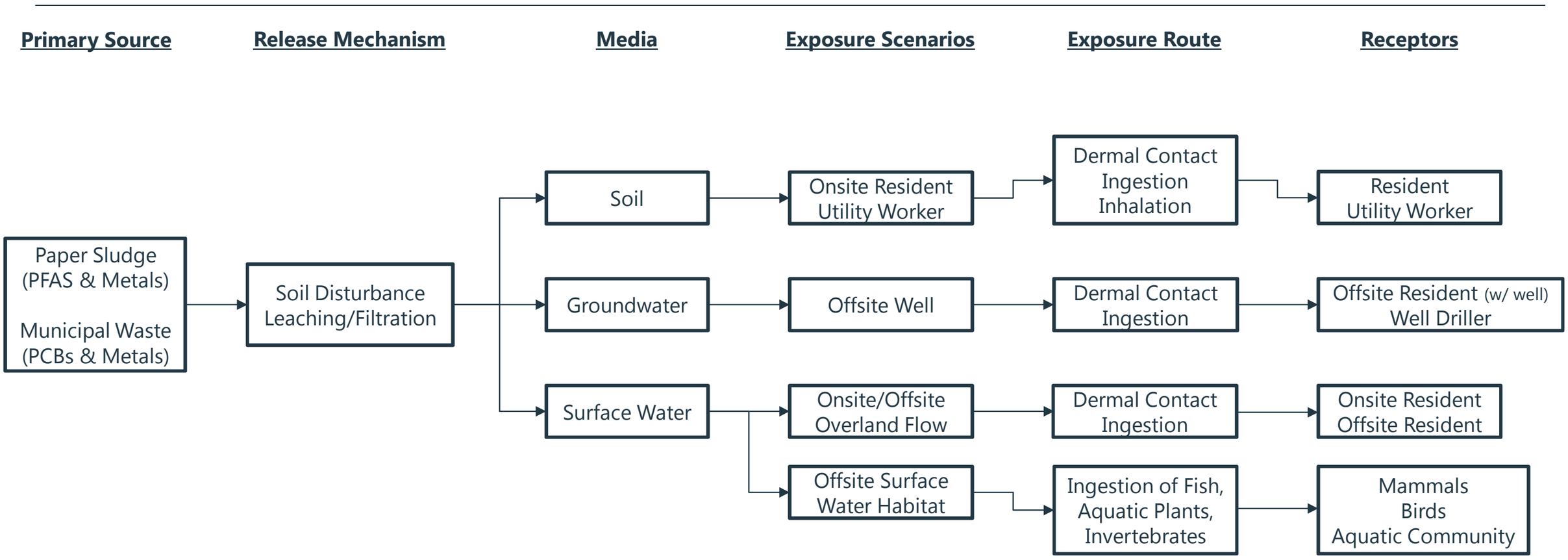



**Figure 5**
**Conceptual Site Model**
**WDNR Site 02-05-564043**
**Ashview Terrace Apartments Site**
**Ashwaubenon, Wisconsin**