ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES

RLF Subgrant – Arnolt Corporation
2525 Durbin Street
Warsaw, Kosciusko County, Indiana
Brownfield Site #4211002
Revolving Loan Fund RLF BF-00E48101-D

March 2022

Prepared for:

City of Warsaw
102 South Buffalo Street
Warsaw, Indiana 46580

Indiana Brownfields Program
Indiana Finance Authority
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1.0 INTRODUCTION

This *Analysis of Brownfield Cleanup Alternatives* (ABCA) outlines environmental cleanup alternatives that were evaluated for federally funded remediation work to be conducted at the former Arnolt Corporation property located at 2525 Durbin Street, Warsaw, Kosciusko County, Indiana (project area/site). This will help mitigate blight and facilitate redevelopment.

The ABCA, required by the U.S. Environmental Protection Agency (U.S. EPA), was prepared in cooperation among the Indiana Finance Authority (IFA)/Indiana Brownfields Program (IBP), the City of Warsaw (City), and SES Environmental (SES) contracted by IBP. The City will utilize U.S. EPA brownfield funding – Revolving Loan Fund (RLF) subgrant from the IFA through the IBP – to conduct remediation of hazardous substances (trichloroethene (TCE) and tetrachloroethene (PCE) in groundwater) at a portion of the project area. Cleanup will help revitalize approximately two acres of blighted property east of downtown Warsaw, Indiana. The City intends to redevelop the project area/site for residential use.

The ABCA is prepared in accordance with the public notice requirements of the IFA Brownfield Cooperative Agreement with the U.S. EPA (RLF #BF-00E48101-D).

2.0 GENERAL PROJECT SITE INFORMATION

The 2.26-acre site is located along Durbin Street east of downtown Warsaw in a commercial and industrial area. The site contains a vacant approximately 60,000-square foot interconnected building on the western portion. Durbin Street is located to the south, Adams Street to the east, Hendricks Street to the North, and a convenience store and fueling marketing facility adjoins the site to the west. The site is further located on the U.S.G.S. 7.5-Minute Series Topographic map of Warsaw, Indiana (see Figure 1) in the southeast quarter of Section 9, Township 32 North, Range 6 East.

Reportedly, the site operated as Arnolt Corporation (Arnolt) from circa 1942 (or 1938 depending on the source) as a manufacturer of metal parts (steel arresting hooks, parachute retainer clips, small motors, steel yokes, shock mounts and potentially asbestos brake pads, tubular frames, etc.) for the Department of Defense and others. Prior to Arnolt, site operations are unknown. Operations ceased on the site in 1990 and the building was used as a storage warehouse until 2019. The site is currently vacant and in disrepair.

Environmental investigations in 2020 and 2021 identified chlorinated volatile organic compounds (cVOCs) and metals in soil, vapor and/or groundwater across the north and west portions of the site. While soil at the site exhibited contaminants of concern; contaminant concentrations did not exceed *residential direct contact screening levels,* with only one exception being metal (arsenic and thallium) in soil at one area. Groundwater occurring at a depth of approximately 20 feet exhibited chlorinated volatile organic compounds (trichloroethene (TCE) and tetrachloroethene (PCE)) concentrations that exceeded *tap water screening* and *vapor exposure screening levels.* Soil gas TCE and PCE contamination was identified, along with asbestos, lead paint, and containerized solid wastes.

The overall objective of the project is to complete pre-demolition removal/abatement and post-demolition remediation activities on the subject property for its intended future residential use. Remediation will include contaminant source removals, along with chemical amendments to reduce contaminant concentrations, if necessary. Potential vapor intrusion will be addressed by active depressurization/soil vapor extraction. Monitoring will be initiated to assess temporal changes in groundwater quality following the removals and

amendments.

Contact information for involved parties are as follows:

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3.0 RECENT ENVIRONMENTAL INVESTIGATIONS

Roberts Environmental Services, LLC, (Roberts) in a *Phase I Environmental Site Assessment* dated June 16, 2020 identified four (4) recognized environmental conditions (RECs) in connection with the subject site. The four cited RECs are as follows.

REC #1 – Documented cVOC Impacts: Previous soil and ground water sampling activities conducted at the Site have revealed chlorinated volatile organic compound ("cVOC") impacts at the subject Site and at nearby off-Site locations. A 1991 Screening Site Inspection ("SSI") by the United States Environmental Protection Agency ("USEPA") identified trichloroethylene ("TCE") in soil along the northeast exterior of the building (former dumpster area) at a concentration of 8,600 micrograms per kilogram ("ug/kg"), which exceeds present day Indiana Department of Environmental Management ("IDEM") screening levels ("SLs"). TCE was also detected in soil samples collected at off-Site locations north and south of the Site. Additionally, ground water sampling conducted in 1993 by Envirocorp identified 1,100 micrograms per liter ("ug/l") TCE (greater than its SL of 5.0 ug/l) in the ground water on the eastern portion of the Site and 90 ug/l directly north of the building. TCE was also detected at a concentration of 130 ug/l in a ground water collected at an off-Site location north of the subject Site across Hendricks Street. During a 1994 ground water sampling event by Envirocorp, TCE was detected at a concentration of 160 ug/l directly north of the building and ethylbenzene was detected at a concentration of 840 ug/l (greater than its SL of 700ug/l) east of the building. Further, as part of leaking underground storage tank ("LUST") monitoring activities at the western adjacent Freedom Express gasoline station, tetrachloroethylene ("PERC") and TCE were detected in 2019 from a monitoring well ground water sample located near the subject Site's western property boundary at concentrations of 121 ug/l and 39.7 ug/l, respectively. It appears that none of the documented on-Site impacts have been properly delineated via further investigation. Other compounds or parameters that were identified at the Site historically include certain metals, total petroleum hydrocarbons, petroleumrelated VOCs, and semi-volatile organic compounds ("SVOCs"). Also note that the 1990s investigations did not include any sampling/analysis from the former Gast Fuel & Service property (southeast portion of the Site - Delta Investments lots).

REC #2 – Historical Hazardous Material & Petroleum Use/Storage: Coal and fuel storage activities occurred on the southeastern portion of the Site (Delta Investments lots) as part of the former Gast Fuel & Service company operations. Aerial photographs depict what appear to be cylindrical aboveground storage tanks ("ASTs") on the far east-central portion of the Site in the 1960s through portions of the 1990s. A large AST is also visible on the southeastern portion of the Site in photographs taken by EPA as part of their SSI in 1991. Envirocorp also noted two (2) "tanks" and "areas of 55-gal. drums" on the southeast portion of the Site during their 1993 and 1994 investigations. A representative of Delta Investments LLC stated that two (2) ASTs were historically used on the southeastern portion of the Site when it was owned by Gast Fuel & Service. The ASTs reportedly had capacities of 18,000-gallons (horizontal AST) and 100,000-gallons (vertical AST). Coal storage is evident across this same area of the Site in aerial photographs dated 1957 and 1961 as well as a Sanborn Map® dated 1964. Local fire department officials reported that petroleum tankers were also previously parked on the southeastern portion of the Site. The 1964 Sanborn Map identifies a Paint Dip Tank at the northern portion of the far northeastern Site building. Further, an aerial photograph dated 1948 shows a large area of darker coloration, which appears to be some type of liquid

discharge emanating from the northern portion of the original building and flowing to the east and then southerly across the Site. Various USEPA and Envirocorp reports from the early to mid-1990s indicate possible buried drums and/or dumping of drums associated with the "Arnolt Barrel Pit" site, which was reportedly located north of the Site across Hendricks Street, south of the Site across Durbin Street, and/or northeast of the Site at a former gravel pit pond/lake. Historical documents state that the Arnolt Corporation used and stored significant quantities of chemicals and petroleum products throughout their Site usage from circa 1946 to the early 1990s, including TCE. Suspect underground storage tank ("UST") piping was observed in the far northern portion of the building and also in the northeastern portion of the building near the same location that in 1993 Envirocorp surmised that an underground storage tank ("UST") may be located. A 10,000-gallon 24:1 outboard motor gasoline/#1 fuel oil UST was reported to have previously been located on the southeastern portion of the Site (former Gast Fuel & Service), according to a representative of Delta Investments LLC. This UST was reportedly removed circa 1985, however, no closure documentations was identified in the regulatory records review or provided by stakeholders.

REC #3 – Chemicals and Petroleum Products Observed On-Site: Two (2) dilapidated drums were observed inside the western portion of the building during the Site visit. The contents of the drums are unknown. Several bins full of a white powder were also observed inside the eastern portion of the building. Recent analytical testing during EPA 2019 Emergency Response Activities at the Site (transformer oil spill and asbestos sampling/disposal) indicate that the white powder contains TCE, arsenic, barium, cadmium, chromium, and selenium via Toxicity Characteristic Leaching Procedure ("TCLP"). Analytical testing for total constituent concentrations was not performed. No asbestos fibers were reportedly identified in the white powder through laboratory analysis. Additionally, several containers (10-gallons or less) were observed in a partial basement area underneath a concrete loading platform along the western exterior of the building. Some of the containers appeared to be leaking onto the surface of the concrete floor near floor drains. Further, an air compressor with a large oil reservoir was observed in the central portion of the building. Some of the oil appeared to be leaking out of the compressor. Characterization and proper disposal of these oils and chemicals would be necessary in order to prevent future leaks/spills at the Site. Oils in older manufacturing equipment can contain polychlorinated biphenyls ("PCBs"). It should be noted that the 1990s investigations and more recent 2019 response activities did not include any surface wipe sampling at the Site for PCBs.

REC #4 – Observed Building Features (Piping, Trenches, Catch Basins, etc.): Suspect hazardous material, petroleum, and/or process wastewater piping was observed in several areas of the building, including within a network of grated trenches inside the western and central portions of the building. A grated trench and two (2) or three (3) pit type features were also observed within the eastern portion of the building. Manholes were observed near a transformer room and a trench in the central portion of the building, while a catch basin was observed in the bottom of a trench located in the eastern portion of the building. The grated nature of the trenches may indicate that some type of wet process was utilized during manufacturing activities at the Site. Additionally, exhaust features in the ceiling of the eastern portion of the building where suspect piping was observed along with peeling paint on the walls may indicate some type of painting, coating, or plating process that produced fumes previously occurred in this area. Note that what appeared to be a large metal subsurface scale was observed in the far southwestern portion of the building. The area below the surface plate for the apparent scale could not be accessed.

Roberts in a *Limited Soil and Groundwater Screening Investigation* dated November 19, 2020 advanced 16 soil borings, identified as B1 through B16. The sampling/borings were completed in August 2020. Twenty-one (21) soil samples and eleven (11) ground water samples were collected and submitted for laboratory analysis. Roberts reported that the screening investigation was designed to assess potential widespread impacts related to specific RECs described in a previously completed Phase I ESA. Roberts presented the following findings and conclusions.

cVOCs in Soil and Ground Water. Concentrations of the chlorinated VOC ("cVOC") constituents PERC and/or TCE in soil samples collected at seven (7) boring locations (B-1 through B-5, B-12, and B-14) exceed MTG SLs. As shown on Figure 3, all of the PERC/TCE exceedances in soil were from borings installed inside the building or very near the on-Site building. PERC and/or TCE were detected at multiple depths within the soil column at all five (5) interior borings, B-1 through B-5. The highest PERC detection in soils was from soil sample B-1 (15-17) at a concentration of 0.30 mg/kg and the highest TCE detection in soils was from soil sample B-12 (3-5) at a concentration of 1.1 mg/kg. Multiple

soil samples exceed the MTG SL for PERC of 0.045 mg/kg and/or the MTG SL for TCE of 0.036 mg/kg by orders of magnitude. However, none of the PERC or TCE detections exceed RDC SLs. PERC and/or TCE was detected in ground water at various concentrations (0.48 ug/l to 500 ug/l) at nine (9) of the eleven (11) locations. Concentrations of PERC and/or TCE in ground water exceed their Tap GWSL of 5.0 ug/l at borings B-1, B-2, B-4, B-5, B-12, and B-14 and the C/I VE SL for TCE of 38 ug/l at each of these same locations. As shown on Figure 4, the data indicate that TCE in ground water may be migrating off-Site to the west. Additional soil and ground water sampling as well as a determination of ground water flow characteristics via permanent monitoring wells would be necessary to better define the extent of TCE impacts at the Site and at off-Site locations. Since PERC/TCE are dense non-aqueous phase liquids ("DNAPLs"), vertical delineation of the cVOC impacts in ground water would also be necessary. Note that no other cVOC SL exceedances were identified in ground water for the analyzed constituents.

Metals in Soils. Arsenic in soils at four (4) soil sample locations, B-1 (15-17), B-7A (1-3), B-8 (1-3), and B-11 (0-1), was detected at concentrations greater than its MTG SL of 5.9 mg/kg. However, the average arsenic concentration from all twenty-one (21) soil samples collected at the Site and analyzed for arsenic during this investigation is 4.94 mg/kg, below the MTG SL. Additionally, no elevated arsenic concentrations were detected in ground water samples collected at the Site during this investigation. As such, it appears that arsenic in the soil is not leaching into the ground water at the Site and may be related to naturally occurring background arsenic in soils. Elevated concentrations of nickel and thallium (greater than SLs) were also identified in soil sample B-11 (0-1), which was collected from an area of orangish stained soils/residues located at the northeastern exterior of the building. This soil sample also contained the greatest concentration of arsenic, 11 mg/kg, which exceeds the RDC SL for arsenic of 9.5 mg/kg. Remediation of the orangish material and impacted soil via excavation and disposal at an approved landfill may be a viable remedial option to help mitigate the risk of future residential exposures in this area.

Petroleum-Related VOCs and PAHs in Soils. Petroleum-related VOC and PAH impacts were identified in soils at borings B-6, B-7A, B-7B, and B-9, which were all advanced on the southeastern portion of the Site (former Gast Fuel Services property). Concentrations from shallow soil samples (0-1 feet or 1-3 feet bsg) exceed MTG SLs for naphthalene at each of these locations, while MTG SL exceedances for 1-methylnaphthalene, 2-methylnaphthalene, naphthalene, 1,2,4-TMB, benzene, and m,p-xylenes were also identified at B-7A. However, no exceedances of RDC SLs were identified. Further investigation would be necessary to adequately delineate these impacted soils.

Other Areas/Features Requiring Further Evaluation. Other areas and/or features that would require further evaluation during potential FSI activities would include the suspected UST or other underground feature identified inside the far northeastern portion of the building and the extensive trench drain systems inside the building. Also note that excessive vegetation on the southeastern portion of the Site significantly limited GPR screening in this area and could have prevented adequate evaluation of a reported potential UST in this same area. Various containers/bins of chemicals and/or petroleum products and an unknown white powder identified at the Site during the Phase I ESA still remain on-Site. Additionally, a suspected water well and three (3) previously installed monitoring wells located east of the building were not evaluated or abandoned as part of this investigation.

Roberts in a *Further Site Investigation* dated October 1, 2021 advanced 17 soil borings, identified as B17 through B28, B-7C, and B-11A. The sampling/borings were completed in July 2021. A total of five (5) PCB wipe samples, twenty-seven (27) soil samples, eight (8) ground water samples, and fifteen (15) soil gas samples were collected and submitted for laboratory analysis. The data tables are included as Appendix B. This screening investigation was reportedly performed to provide a better understanding of potential sources as well as the extent and magnitude of the previously identified TCE impacts at the Site. The FSI sampling was also designed to provide a general screening for PFAS and hex chrome in ground water, as well as PCBs on concrete flooring inside the building. Roberts presented the following findings and conclusions.

cVOCs in Soil and Ground Water. As shown on Figure 4, all of the PERC/TCE exceedances in soil are from borings installed inside the building or very near the on-Site building. The impacted area of TCE in ground water (Figure 5) remains similar to the impacts delineated during the ISI activities. The greatest concentration of TCE in ground water (500 ug/l) occurs at the boring B-2 location within the northern portion of the building. As shown on Figure 5, the data indicate that TCE in ground water may be migrating off-Site to the west. Based on the data collected from the

ISI and FSI, cVOCs are the primary contaminants of concern.

Soil "hot spots" (defined as PERC or TCE in soil at concentrations 10x their MTG SL) shown on Figure 6 indicate a relatively large area of elevated TCE concentrations in soils underneath/near the central, north-central, and eastern portions of the building. Elevated PERC concentrations in soils are primarily located underneath/near the west-central portion of the building.

The cVOC impacts at the Site have been generally defined. Additional soil and ground water sampling as well as a determination of ground water flow characteristics via permanent monitoring wells would be necessary to better define the extent of PERC/TCE impacts at the Site and at off-Site locations. Since PERC/TCE are dense non-aqueous phase liquids ("DNAPLs"), vertical delineation of the cVOC impacts in ground water would also be necessary. Note that no other cVOC SL exceedances were identified in ground water for the analyzed constituents.

PCB Wipes. Sample PCBW-1 collected from the concrete surface inside the eastern portion of the building contained 11 ug/100cm2 of PCBs, which is greater than the EPA PCB wipe standard of 10 ug/100cm2 . The concrete in this area should be considered "PCB Contaminated". No PCBs were detected at concentrations greater than the EPA standard at any of the other four (4) wipe sample locations.

PFAS and Hex Chrome Analysis. The PFAS constituent PFOA was detected at two (2) of the three (3) PFAS sampling locations. The concentrations of PFOA identified in ground water at B-2 of 4.98 ng/l and at B-28 of 2.40 ng/l are below the EPA Health Advisory Level of 70 ng/l. As such, PFAS ground water screening at the Site has not identified any widespread PFAS impacts. Hex chrome was not detected above laboratory reporting limits in the ground water samples collected from B-1, B-2, or B-28. Hex chrome was also less than reporting limits in soil sample B-11A (0-1), which was collected next to ISI soil sample B-11 (0-1) that previously contained elevated metals concentrations in soils. As such, the data suggests that hex chrome is not a contaminant of concern (COC) at the Site.

Petroleum-Related VOCs at Borings B-7 Area (*SES notes that the B-7 Area is not part of the site*). Elevated petroleum-related VOCs in soils (greater than MTG SLs) were previously identified at depths of 1.0 to 3.0-feet bsg at borings B-7A and B-7B during the ISI activities. Deeper soil samples (5-7 and 9-11 feet bsg) collected from boring B-7C during the FSI activities did not contain detectable concentrations of VOCs. Similarly, the ground water sample collected from boring B-7C exhibited no detections of VOCs. Therefore, it appears that the petroleum-related VOC impacts in soil near the surface in the borings B-7 area on the far southeastern portion of the Site have not negatively impacted the ground water.

Soil Gas. Elevated concentrations of PERC and/or TCE were identified in the soil gas samples collected at SG-1s, SG-1d, SG-3s, SG-3d, SG-4d, and SG-SS. The concentrations of PERC and/or TCE in these soil gas samples exceed C/I soil gas SLs by orders of magnitude at locations north of the northeastern portion of the building (SG-1 location), along the western property boundary (SG-3 and SG-4 locations), and underneath the northern portion of the building's concrete floor (SG-SS location). However, soil gas samples (SG-6 and SG-7 locations) collected east and southeast of the building on the Delta Lots did not exhibit any soil gas SL exceedances. Similarly, no SL exceedances were identified in the shallow soil gas sample SG-5s collected near a storm sewer lateral at the southwestern exterior of the building. Soil gas sample SG-8s, collected directly above a sanitary sewer lateral within the southeastern portion of the building exceeds the residential soil gas SL for TCE of 70 ug/m3 , but does not exceed the C/I soil gas SL of 293 ug/m3 for TCE. Note that elevated concentrations (greater than the C/I soil gas SL) of naphthalene were detected in soil gas samples SG-4s and SG-4d. Naphthalene has not been detected at concentrations greater than SLs in soil or ground water samples on the western portion of the Site. As such, the elevated naphthalene concentrations at SG-4 may be related to the nearby active gasoline filling station located directly west of the Site in close proximity to the SG-4 sample location.

Other Areas/Features Requiring Further Evaluation. Various metals impact at ISI boring B-11 were not further delineated, but are presumed to be related to stained soils/residues at the northeastern exterior of the building. A suspect UST is potentially located in the far northeastern portion of the building, which would likely require closure through removal. Various containers/bins of chemicals and/or petroleum products and an unknown white powder identified at the Site during the Phase I ESA still remain on-Site. Additionally, a suspected water well and three (3)

previously installed monitoring wells located east of the building were not evaluated or abandoned as part of this investigation. Business environmental risks ("BERs") such as asbestos and lead paint have been evaluated separately by Metric Environmental, LLC. It is also important to note that the Site-specific ground water flow direction has not been verified via the installation of permanent monitoring wells and it is possible that the Site is situated on a local ground water divide (i.e., westerly direction on central and western portions of the Site and an easterly flow direction on the eastern portion of the Site).

Metric Environmental (Metric) in an *Asbestos and LBP Survey Report* dated September 14, 2020 performed an asbestos and lead-based paint (LBP) survey of the site building. Metric identified the following assumed asbestos containing materials (ACMs): 12 fire doors, and 23,000 square feet of asphalt roofing in the north wing. Regulated ACM was identified as thermal system insulation on boiler pipe elbows and fittings (approximately 25 fittings/elbows). Non-friable ACM included 12"x 12" floor tile – cream with gray speckles on first floor, and on the second floor, 12" x 12" floor tile – dark-gray with flecks, and 12" x 12" floor tile – green/blue with flecks. Metric also indicated that the white transformers, salmon orange piping, and yellow shelfing, stair railing, piping, and sheeting are coated with lead-based paint.

4.0 PROJECT CONCEPTUAL MODEL

The project site is approximately 2.26 acre and identified by State identification number 43-11-15-400-020.000-032.

4.1 Topography and Drainage

Local topography surrounding the site is gently rolling with nearby lakes and wetlands accounting for changes in relief. Elevations range between 810 feet near the lakes, to more than 900 feet north-northeast of the site. The site elevation is approximately 850 feet. Site surfaces slope down to the south and east.

The closest body of water to the site is Winona Lake located approximately 1,000 feet to the south. An intermittent stream is located approximately 1,500 feet to the east. The intermittent stream extends to a wetland area, which is located approximately ½ mile southeast of the site.

Surface water drainage percolates into the local soils or drains across the ground surface towards low elevations to the south and east.

4.2 Soils

According to the Soil Survey of Kosciusko County, Indiana (Natural Resource Conservation Service ("NRCS"), 2019 – via Web Soil Survey), surficial soils on the site primarily consist of Ormas loamy sand (OrA) soils. Ormas soils are described as loamy sand soils with sands and gravels at depth that formed from outwash plains. These nearly level soils are well drained with a low available water capacity. Surficial geology in the area consists of thick glacial outwash deposits. The unconsolidated layers of clays, silts, sand and gravels are approximately 250-feet thick. The bedrock below the unconsolidated deposits is comprised of Devonian-age Muscatatuck Group limestone and dolomite.

Per the Roberts FSI Report, sandy soils extended from the near surface to a depth of at least 26 feet.

4.3 Groundwater

The Warsaw area is located within the Steuben Morainal Lake physiographic unit. Unconsolidated sediments

consisting of clay, silt, sand, gravel and occasional boulder characterize this glacial physiographic unit. This sediment is expected to be 250 feet thick in the area. Bedrock beneath the local area is expected to be Devonian-age limestone, or dolomite (Gray, 1987).

Groundwater occurs in buried discontinuous sand and gravel formations that are generally fluvial in nature, and associated with pre-glacial braided streams. Once deposited, the sand and gravel were dissected by glacial scouring causing them to be discontinuous (Fenelon, 1994). The sand and gravel deposits often exhibit confined conditions due to overlying fine textured glacial deposits. Bedrock is not typically used for groundwater supply in the area.

According to Roberts Phase I ESA, the regional ground water flow direction is westerly. However, ground water flow calculated as part of Envirocorp's investigations indicate an east to northeast ground water flow direction across the east half of the Site. Conversely, ground water flow directions presented as part of the nearby Warsaw Chemical cleanup activities (October 2019 Progress Report VFC ID 82906240), located west of the Site, show a westerly ground water flow direction near the subject Site then a southwesterly flow towards Winona Lake, located approximately 1,000-feet southwest of the subject Site. The Warsaw Chemical ground water flow maps include ground water elevations from an extensive monitoring well network that stretches from the Freedom Express filling station, located directly west of the Site, all the way to Winona Lake. The Freedom Express leaking UST facility also presents a westerly ground water flow direction (August 2019 Progress Report VFC ID 82828119). Ground water flow in the area could be affected by any nearby high capacity production wells. It appears that the Site could be on a ground water divide, with ground water flow on the eastern portion of the Site flowing to the east and ground water flow on the western portion of the Site flowing west.

4.4 Current and Future Land Use

The site contains a vacant approximately 60,000-square foot interconnected building on the western portion and scrub vegetation and debris piles on the east portion.

The redevelopment plan for the property includes multi-tenant building, community building, parking, playground, dog park, and sports courts. The draft plans are shown on Figure 7, along with the existing Arnolt Corporation building layout and remediation area. Proposed building #2 (southeast adjacent) is outside the scope of this project.

4.5 Surrounding Land Use

The immediate project area is characterized as commercial/industrial. Durbin Street borders the site to the south, with a parking lot and commercial buildings beyond. Adams Street borders the site to the east, with Cold Storage Units and restaurant property beyond. Hendricks Street borders the site to the north, with vacant lots and storage/warehouse structures to the north. A convenience store and fueling marketing facility adjoins the site to the west, with Argonne Road beyond.

4.6 Soil Impacts

Environmental investigation in 2020 identified arsenic and thallium soil contamination. A soil sample identified as B-11 (0-1') obtained near molten metal adjacent to the northeast corner of the site building exhibited arsenic and thallium concentrations exceeding *residential direct contact screening levels*.

4.7 Groundwater Impacts

Environmental investigations in 2020 and 2021 identified chlorinated volatile organic compounds (cVOCs) in groundwater across the north and west portions of the site. Groundwater occurring at a depth of approximately 20 feet exhibits TCE and PCE concentrations exceeding *tap water screening* and *residential vapor exposure screening levels.* Soil gas impacts generally with the groundwater impacts.

4.8 Potential Receptors

Ecological receptors including plants and wildlife that may inhabit or forage at this vacated commercial property are not expected. The closest ecological receptors may occur along or at marsh and lake areas approximately 1,000-1,500 feet to the south and southeast.

The site and surrounding area are reportedly provided with water by the Indiana American Water Company. However, a suspected private water well was observed east of the building. The approximately 4.0-inch diameter water well was located in an area of dense vegetation and appeared to be connected to a faucet. The electronic database maintained by the Indiana Department of Natural Resources, Water Resources Division showed no water well record for the site. However, water well record (#257105) was shown approximately 200 feet to the north. There were several other water wells within the area, but none located within 450 feet of the site and there was no significant withdrawal well areas within one mile of the site. In addition, according to IDEM's *Source Water Proximity Determination Tool*, the site is not located within a Wellhead Protection Area or Source Water Area.

As the project area will be used for residential development, the following human receptor groups have been identified as potential receptors:

- Potential Future Residents
- Future Excavation (Construction) Workers

4.9 Potential Exposure

Given the environmental conditions, the proposed future redevelopment presents a potential risk for the following human exposure pathways:

- Soil: residential direct contact
- Groundwater: residential tap water ingestion, and residential vapor exposure
- Soil Gas: residential vapor exposure

4.10 Remediation Objectives

The overall objective of the project is to complete pre-demolition removal/abatement and post-demolition remediation activities on the subject property for its intended future residential use. The remediation goal is to prevent human exposure to COCs in media through:

- Preventing direct contact of contaminated soil and groundwater;
- Preventing the ingestion of groundwater; and
- Preventing vapor exposure from groundwater.

5.0 SUMMARY OF CORRECTIVE ACTION ALTERNATIVES

5.1 Corrective Action Objective and Proposed Remedial Approach

The impacted soil and groundwater beneath the north and west portions of the site represents a potential exposure risk to human health and remediation is necessary. Remediation will include contaminant source removals, along with chemical amendments to reduce contaminant concentrations, if necessary. Potential vapor intrusion will be addressed by active depressurization/soil vapor extraction.

- Given the planned redevelopment of the subject project area for residential use, residential direct contact screening levels and residential vapor exposure screening levels published in IDEM's Remediation Closure Guide (RCG) would represent appropriate cleanup standards and sufficiently protective of human health. While this conclusion is subject to review by IDEM and U.S. EPA, SES recommends proceeding under the premise that contamination concentrations will only need to be reduced to these residential criteria in order to obtain site closure status from IDEM.

- Cleanup will help revitalize approximately two acres of blighted property east of downtown Warsaw, Indiana. The City intends to redevelop the site for residential use.

Site work will also include the removal/disposal of asbestos by a licensed abatement contractor, and the removal/disposal of chemical containers under the supervision of a CHMM. In addition, monitoring will be initiated to assess temporal changes in groundwater quality following the removals and amendments.

Remediation alternatives for the impacted soil and groundwater include three options. Each alternative is summarized below, along with conceptual application of isolation and extraction at the site.

1. No Action
2. Isolation
3. Extraction

5.2 Analysis of Corrective Action Alternatives

Corrective action alternatives were evaluated based on the following criteria.

1. Effectiveness
    a. The degree in which toxicity, mobility, and contaminant volume is expected to be reduced.
    b. The degree in which a corrective action will protect human health and the environment over time.
    c. Consideration for any adverse impact to human health and the environmental during corrective action implementation.

2. Implementation
    a. Technical feasibility of corrective action at the site.
    b. Availability of materials, equipment, and services needed to carry out corrective action.
    c. Administrative feasibility of corrective action (access agreements, permits, approvals from municipal, state, and/or federal agencies).

3. Cost
    a. Initial costs – planning and implementation (contractors, laboratory, etc.)
    b. Annual operation and maintenance costs

5.3 Corrective Action Alternatives - Soils

5.3.1 Alternative 1 – No Action

If no corrective action is conducted at the site, impacted soil will remain in-place hindering redevelopment of the site. The direct contact exposure issue will remain a potential liability for the City of Warsaw. This alternative is the least protective of human health and the environment and will continue to be an issue until addressed.

1. Effectiveness: None. This alternative does not reduce the impact or exposure issues.
2. Implementation: Easy. No actions are required to implement this alternative.
3. Cost: None $0. This alternative does not require initial costs or annual costs.

5.3.2 Alternative 2 - Isolation

Isolation involves establishing engineering controls (physical barriers) to prevent direct contact with contaminated media and to prevent further migration. Following establishment of the barrier, an administrative or institutional control (IC) consisting of an enforceable legal mechanism for restricting land use and maintaining the barrier would be required.

As conceptually applied at this site, a surface barrier (pavement, membrane, clean soil layer) could be applied over the currently known affected area to address the concern of direct human contact and exposure to contaminants. Implementation would consist of applying soil as a barrier at the affected area to prevent direct contact. Coordination with property developers would be required to ensure the affected area is properly addressed.

This scenario also requires a legitimate reuse determination/approval, an ERC, with the ERC prohibiting the use of the affected area for residential purposes, requiring that any excavated contaminated soils be managed in accordance with all applicable federal and state laws, and requiring the barrier to be maintained.

1. Effectiveness: Moderate. Isolation is an effective alternative as long as the barrier is properly maintained. Redevelopment plans would need to incorporate barriers to ensure exposure risk is addressed.
2. Implementation: Significant. While the site is currently vacant and barrier installation is feasible, attaining a legitimate reuse determination for an existing waste (melt area) would be problematic. Presently, the waste has no function, and would not serve as a replacement for a function that was otherwise needed.
3. Cost: Low $10,000 (referencing unit pricing from the RLF – Butler project). The estimated cost includes construction ($8,000) and monitoring ($2,000). Other associated costs, not tabulated here, include RWP preparations, the abatement, implementation, and closure reporting, as well as groundwater monitoring.

5.3.3 Alternative 3 – Extraction/Removal

Extraction is a process that consists of removing contaminated soil, followed by treatment or disposal. Typically, off-site disposal at a landfill facility is selected following extraction. As applied to this site, extraction would be a suitable alternative given the nature of contaminants and contaminant occurrence.

As conceptually applied at this site, contaminated soils would be removed to address the concern of direct human contact and exposure to contaminants. The contaminated soil would be extracted and transported offsite to a local landfill. The surface of the site would be vegetated to prevent erosion and the topsoil/grass surface.

Given that this scenario only addresses the surface contaminated soil removal and not the underlying impacted soils and/or groundwater, an Environmental Restrictive Covenant (ERC) may still be required.

1. Effectiveness: Moderate. Extraction would eliminate the residential direct contact exposure issue of the impacted

soil.

2. Implementation: Easy. The site is currently vacant and complete removal of the identified impacted surface soil could be completed.
3. Cost: Low $12,026 (referencing unit pricing of this RLF project). This cost includes removal and disposal by a licensed contractor/disposal firm ($8,026) and monitoring ($4,000). Other associated costs, not tabulated here, could include possible change orders/increased costs because of project complexities, RWP preparations, the abatement, implementation, and closure reporting, as well as groundwater monitoring.

5.4 Corrective Action Alternatives - Groundwater

5.4.1 Alternative 1 – No Action

If no corrective action is conducted at the site, impacted groundwater will remain in-place hindering redevelopment of the site. Groundwater contamination off-gassing and vapor exposure will remain a potential liability for the City of Warsaw. This alternative is the least protective of human health and the environment and will continue to be an issue until addressed.

1. Effectiveness: None. This alternative does not reduce the impact or exposure issues.
2. Implementation: Easy. No actions are required to implement this alternative.
3. Cost: None $0. This alternative does not require initial costs or annual costs.

5.4.2 Alternative 2 - Isolation

Isolation involves establishing engineering controls (physical barriers or active soil depressurization (ASD)) to prevent groundwater contamination off-gassing and vapor intrusion. Following establishment of a barrier or depressurization system, an administrative or institutional control (IC) consisting of an enforceable legal mechanism for restricting land use and maintaining the barrier/system would be required.

As conceptually applied at this site, the objective of ASD is to provide sub-slab depressurization to reduce, to the extent practicable, vapor intrusion into the planned residential buildings. The proposed ASD would utilize a regenerative blower to draw a vacuum from multiple extraction points adjacent or near to the planned building foundations. Using vacuum trend analysis for Incident 2003-04-506 near the site, four extraction wells, a 2.5 Hp blower, knock-out tank, and mini-enclosure are anticipated. Coordination with property developers would be required to ensure the affected area is properly addressed.

This scenario also requires an ERC, with the ERC requiring ASD operation, monitoring, and maintenance.

1. Effectiveness: Moderate. Isolation is an effective alternative as long as the ASD is properly maintained. Redevelopment plans would need to incorporate the ASD to ensure exposure risk is addressed.
2. Implementation: Moderate. While ASD is feasible, the groundwater contamination will persist and continue to be a long term liability.
3. Cost: Moderate $48,000 (referencing unit pricing of this RLF project). The estimated cost includes mechanical equipment and installation ($44,000), and monitoring ($4,000). Other associated costs, not tabulated here, could include possible change orders/increased costs because of project complexities, RWP preparations, the abatement, implementation, and closure reporting, as well as groundwater monitoring and O&M.

5.4.3 Alternative 3 – Extraction/Reduction

Extraction is a process that consists of removing contaminated groundwater, followed by treatment or disposal. Typically, this approach is primarily used for controlling the movement of contaminants at sites that exhibit significant groundwater accumulations. It is also used at sites where the nature of contamination prevents the

use of other, more effective technologies. The technology typically utilizes one or more recovery wells, underground conveyance lines, and an aboveground treatment system. However, extraction alone would not be a suitable alternative to address the groundwater vapor exposure risks. Reduction of the identified groundwater TCE and PCE concentrations is however feasible. As conceptually applied, Regenesis' 3-D Microemulsion®, S-MZVI®, BDI® Plus would be applied at the identified source area (in the base of an excavation) to promote degradation of the groundwater contaminants.

1. Effectiveness: Moderate. The chemical application/amendments, per Regenesis design, would reduce TCE and PCE concentrations. Redevelopment plans would also need to incorporate the ASD, to ensure the vapor exposure risk is addressed.
2. Implementation: Moderate. Chemical application/amendments are feasible and could be implemented following building demolition.
3. Cost: Moderate $70,353 (referencing unit pricing of this RLF project). The estimated cost includes contractor excavation/application and the product supplier cost ($65,353) and monitoring ($5,000). Other associated costs, not tabulated here, could include possible change orders/increased costs because of project complexities, RWP preparations, the abatement, implementation, and closure reporting, as well as groundwater monitoring.

5.5 Corrective Action Alternatives with Respect to Climate Change

A review of potential climate change scenarios was evaluated including increased flooding and increase in extreme weather events (tornados, blizzards, etc.). Results indicate the site is not likely to be influenced by the scenarios.

6.0 RECOMMENDATION FOR SITE REMEDY

This ABCA determined that while there may be alternatives for addressing the soil and groundwater contamination at this particular site, given the known conditions and proposed residential redevelopment, an integrated approach of soil extraction, chemical application/amendments to groundwater, and ASD would be the most effective corrective action alternative to achieve conditional closure.

Corrective Alternative	*Effective*	*Estimated Cost*
No Action	Impractical – Does Not Address Soil and Groundwater Contamination and Exposure Risks	
Soil Isolation	Impractical – Does Not Address Groundwater Contamination or Vapor Exposure Risks	
Groundwater Extraction	Impractical – Does Not Address Groundwater Vapor Exposure Risks	
Integrated Approach *Removal/Disposal, Chemical Amendments, and Active Soil Depressurization (ASD)*	Yes – *Includes Restrictions on Property Deed*	$130,379[1]

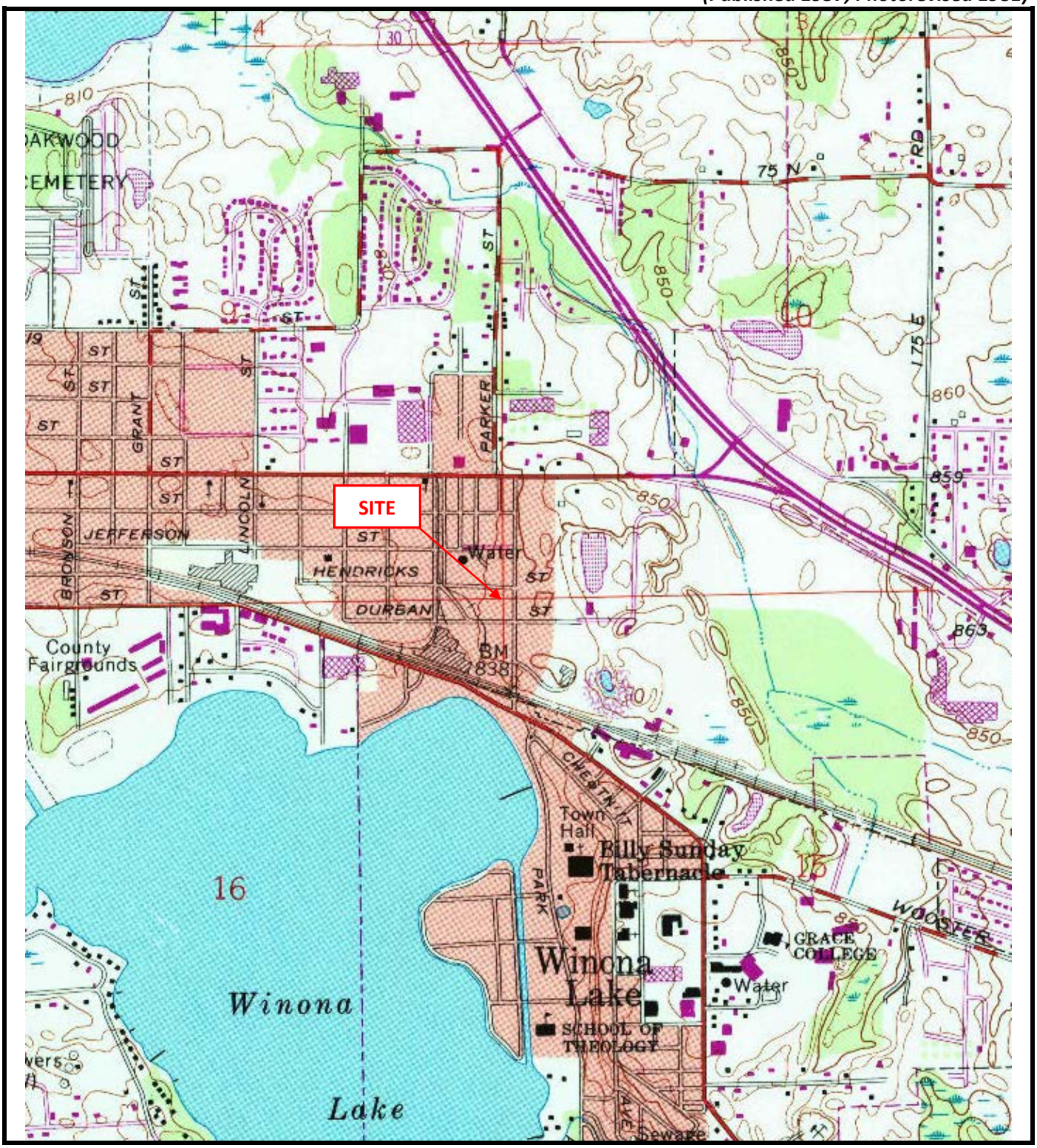
[1] Estimate cost does not include federal documentation, completion reporting, groundwater monitoring, operation and maintenance of active soil depressurization system, asbestos abatement, containerized solid waste disposal or ERC filings, which total an estimated $137,518 (per the RLF agreement with IFA).

A Decision Document will be provided at the end of the public comment period. It will provide additional details on the selected corrective action alternative. The document will serve as a notice to proceed with federally funded corrective action and will be provided to the public via the Information Repository indicated in the Community Relations Plan (CRP), along with this ABCA and other site documents.

APPENDIX A

FIGURES

Warsaw, Indiana 7.5 Minute Quadrangle Map
(Published 1957, Photorevised 1981)

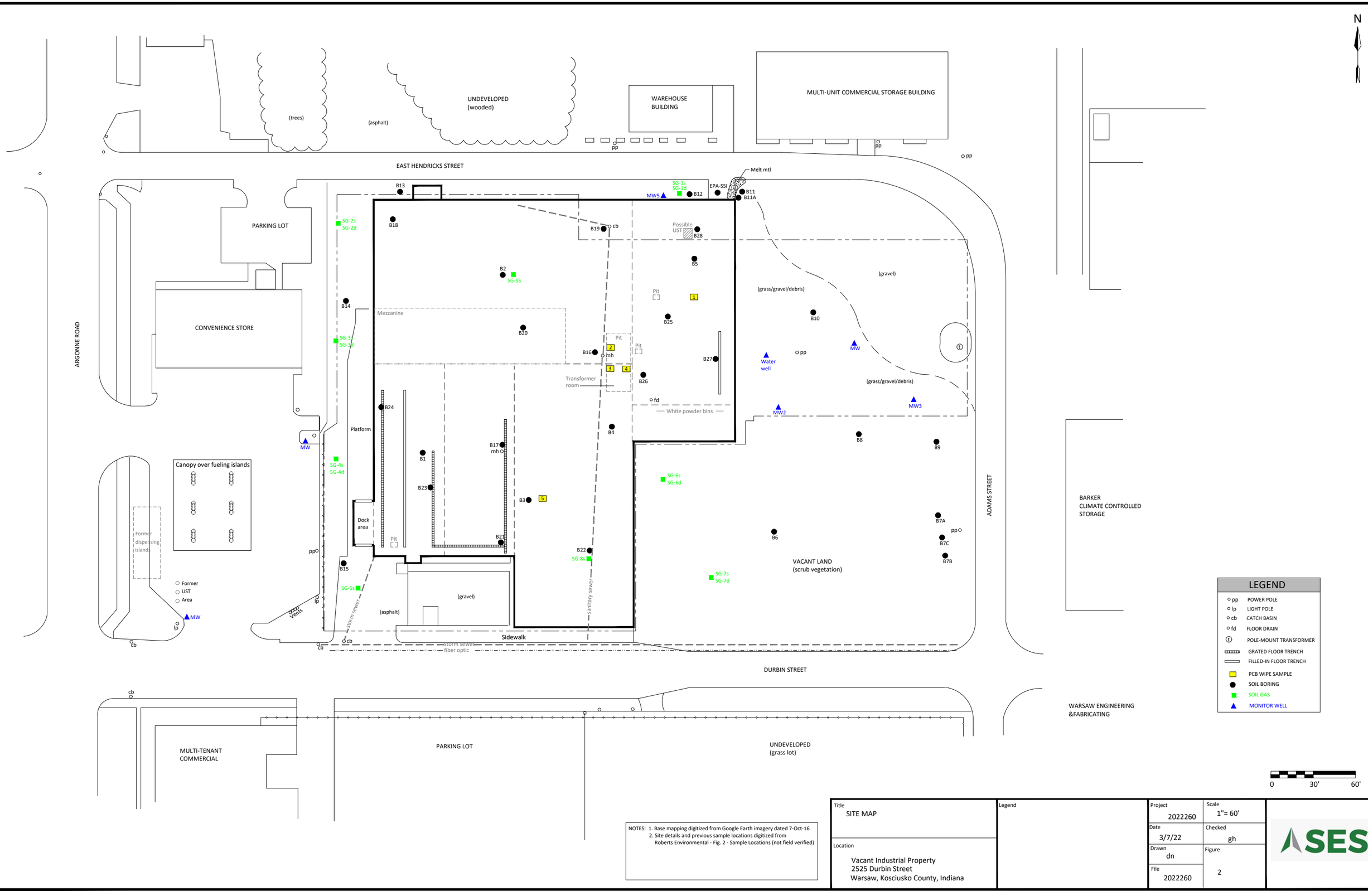


CONTOUR INTERVAL 10 FEET
Site Boundaries Shown are Approximate

Topographic Map **Figure 1**

Former Arnolt Corporation
2525 Durbin Street
Warsaw, Kosciusko County, Indiana
SES Project No.: 2022-200

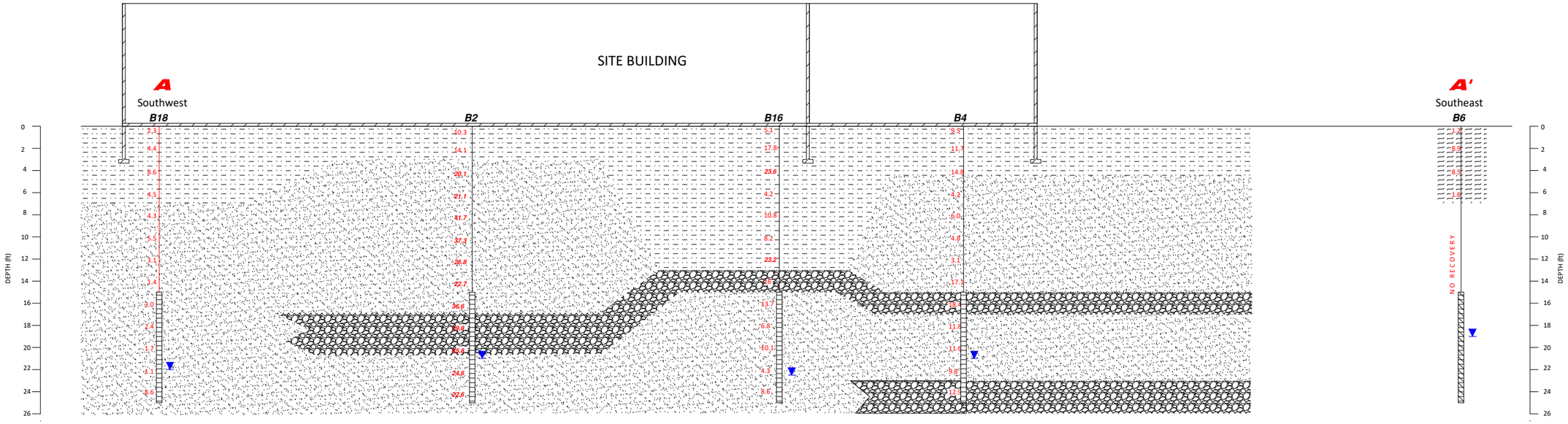
SES

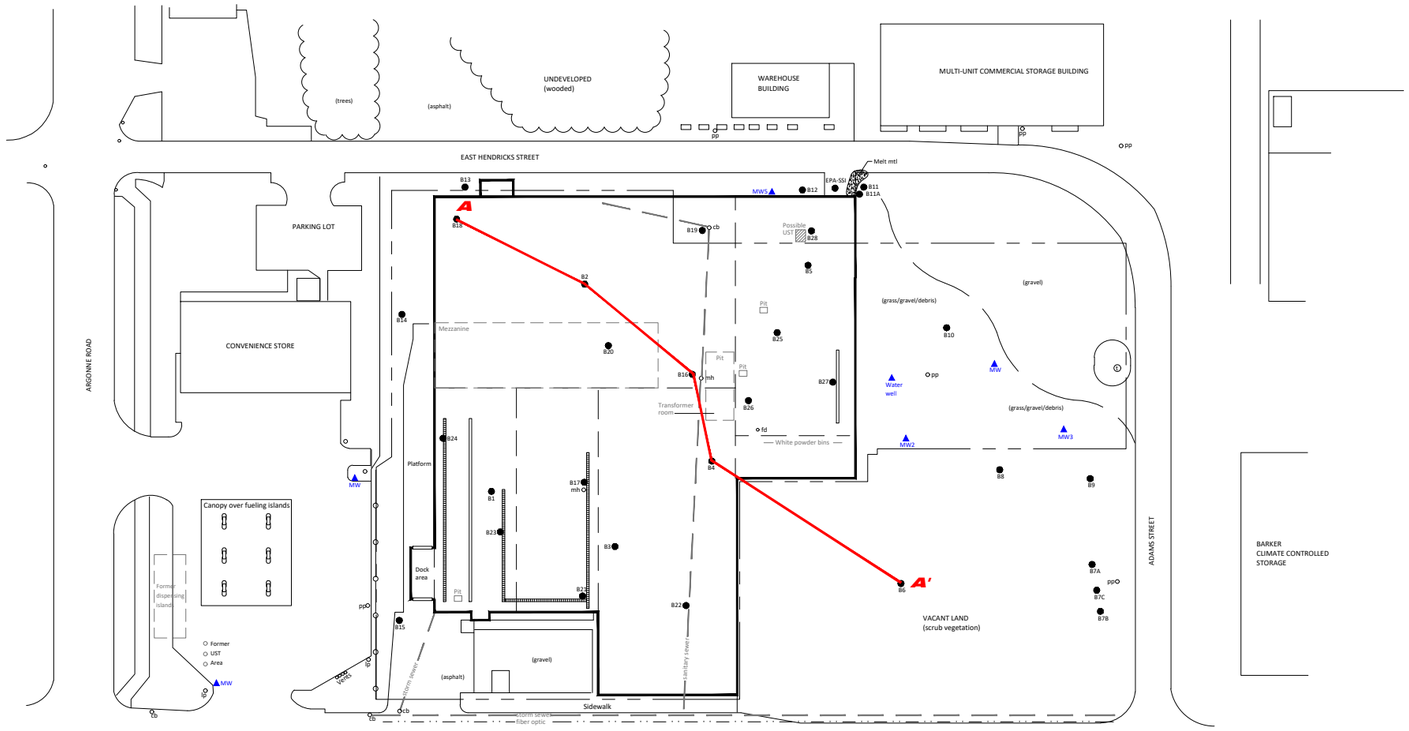


NOTES: 1. Base mapping digitized from Google Earth imagery dated 7-Oct-16
2. Site details and previous sample locations digitized from Roberts Environmental - Fig. 2 - Sample Locations (not field verified)

Title: SITE MAP	Legend	Project: 2022260	Scale: 1"= 60'
Location: Vacant Industrial Property 2525 Durbin Street Warsaw, Kosciusko County, Indiana		Date: 3/7/22	Checked: gh
		Drawn: dn	Figure: 2
		File: 2022260	

SES





LEGEND

- GRAVEL/FILL/COAL FRAGMENTS
- SILTY SAND
- FINE SAND
- COARSE SAND
- 8.6 PID INSTRUMENT RESPONSE (bold <20 ppmv)
- RECORDED DEPTH TO WATER

HORIZONTAL SCALE 1" = 30'

HORIZONTAL SCALE 1" = 30'

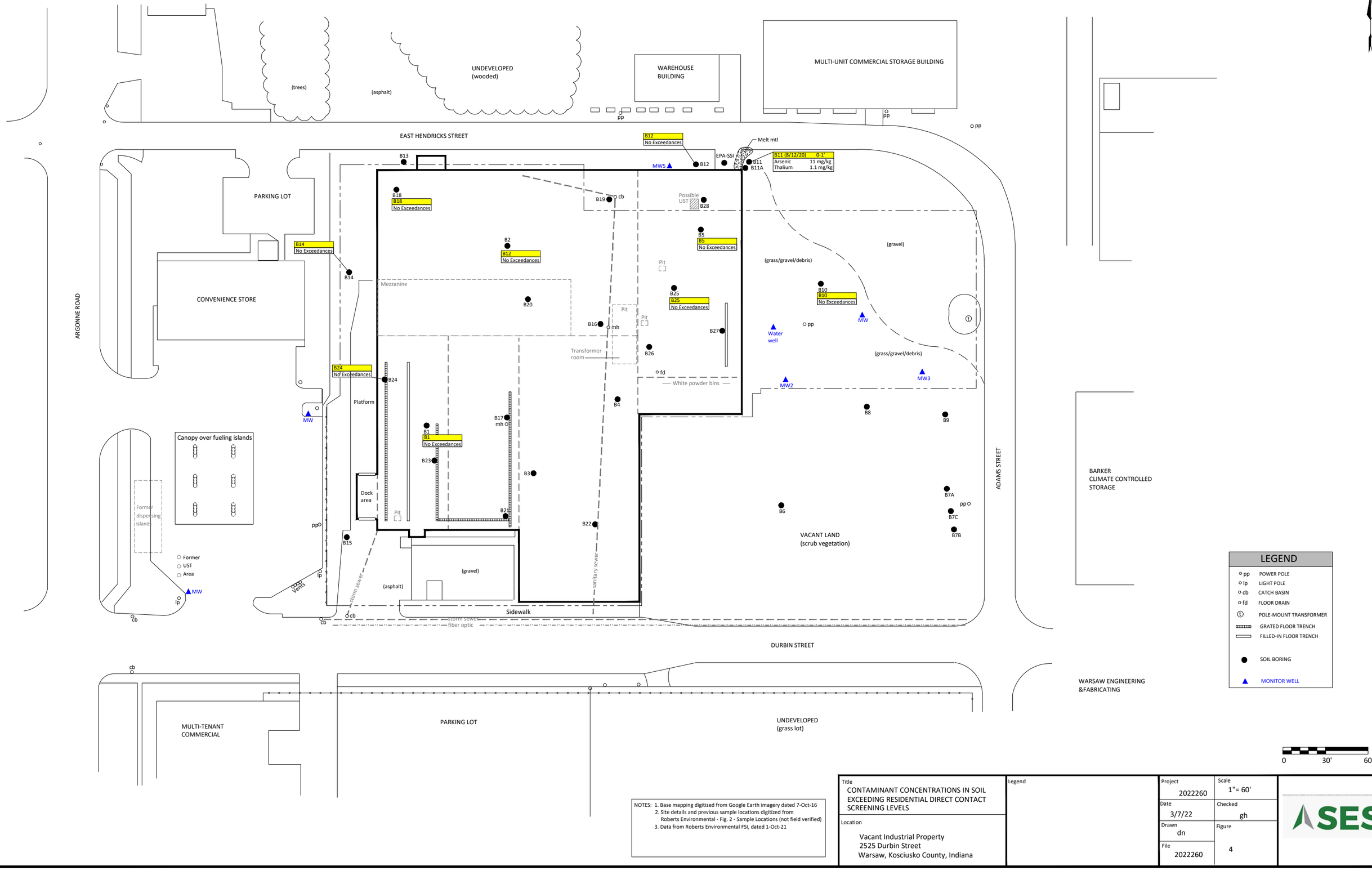
VERTICAL SCALE 1" = 10'

VERT. EXAG x3

NOTE: Log data from Roberts Environmental - FSI Reporting

Title: LINE OF SECTION	Legend	Project: 2022260	Scale: Noted
Location: Vacant Industrial Property, 2525 Durbin Street, Warsaw, Kosciusko County, Indiana		Date: 3/7/22	Checked: gh
		Drawn: dn	Figure: 3
		File: 2022260	

SES



NOTES:
1. Base mapping digitized from Google Earth imagery dated 7-Oct-16
2. Site details and previous sample locations digitized from Roberts Environmental - Fig. 2 - Sample Locations (not field verified)
3. Data from Roberts Environmental FSI, dated 1-Oct-21

Title
CONTAMINANT CONCENTRATIONS IN SOIL EXCEEDING RESIDENTIAL DIRECT CONTACT SCREENING LEVELS

Location
Vacant Industrial Property
2525 Durbin Street
Warsaw, Kosciusko County, Indiana

Legend

Project	2022260
Scale	1"= 60'
Date	3/7/22
Checked	gh
Drawn	dn
Figure	4
File	2022260

SES

N

(trees)

(asphalt)

UNDEVELOPED
(wooded)

WAREHOUSE
BUILDING

MULTI-UNIT COMMERCIAL STORAGE BUILDING

pp

EAST HENDRICKS STREET

B28
TCE 120 mg/L

Melt mtl

EPA-SSI

B11
B11A

B13

MW5

B12

PARKING LOT

B18
B18
TCE 270 mg/L

B19
cb
B16
TCE 290 mg/L

Possible
UST

B28
B28
TCE 50 mg/L

B14
TCE 250 mg/L

B14

B2
B2
TCE 500 mg/L

B5
B5
TCE 140 mg/L

(gravel)

(grass/gravel/debris)

Pit

Mezzanine

B25

B10
B10
No Exceedances

MW

CONVENIENCE STORE

B20

Pit

Pit

B16
mh
B16
TCE 290 mg/L

B27

Water
well

pp

ARGONNE ROAD

Transformer
room

B26

(grass/gravel/debris)

fd

MW3

MW2

White powder bins

B24

Platform

B4
B4
TCE 200 mg/L

B8

B9
B9
No Exceedances

B17
mh
B17
TCE 120 mg/L

B1
B1
TCE 270 mg/L

INFERRED TCE
EXCEEDANCE (9.1 mg/L)

B23

B3
B3
No Exceedances

ADAMS STREET

B7A

pp

B6
B6
No Exceedances

B7C
No Exceedances

B7C

B7B

Dock
area

Pit

B21

B22

VACANT LAND
(scrub vegetation)

BARKER
CLIMATE CONTROLLED
STORAGE

Canopy over fueling islands

Former
dispensing
islands

Former
UST
Area

MW

lp

pp

B15
B15
No Exceedances

Vent

storm sewer

(asphalt)

(gravel)

sanitary sewer

Sidewalk

cb

storm sewer
fiber optic

DURBIN STREET

WARSAW ENGINEERING
&FABRICATING

MULTI-TENANT
COMMERCIAL

PARKING LOT

UNDEVELOPED
(grass lot)

LEGEND

- pp POWER POLE
- lp LIGHT POLE
- cb CATCH BASIN
- fd FLOOR DRAIN
- POLE-MOUNT TRANSFORMER
- GRATED FLOOR TRENCH
- FILLED-IN FLOOR TRENCH
- SOIL BORING
- MONITOR WELL

0 30' 60'

NOTES:
1. Base mapping digitized from Google Earth imagery dated 7-Oct-16
2. Site details and previous sample locations digitized from Roberts Environmental - Fig. 2 - Sample Locations (not field verified)
3. Data from Roberts Environmental FSI, dated 1-Oct-21

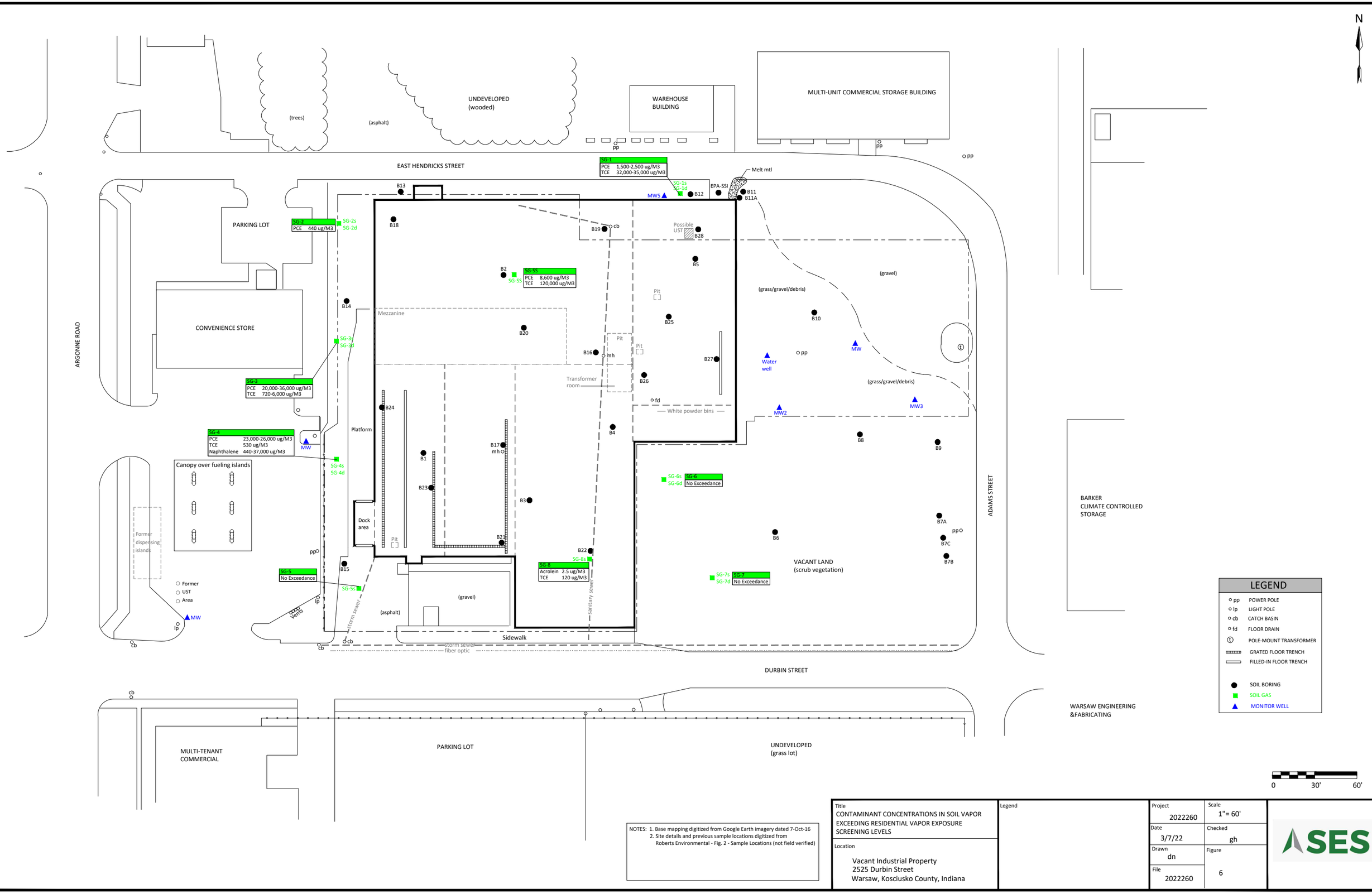
Title
CONTAMINANT CONCENTRATIONS IN GROUNDWATER EXCEEDING RESIDENTIAL VAPOR EXPOSURE SCREENING LEVELS

Location
Vacant Industrial Property
2525 Durbin Street
Warsaw, Kosciusko County, Indiana

Legend

Project 2022260	Scale 1"= 60'
Date 3/7/22	Checked gh
Drawn dn	Figure 5
File 2022260	

SES



NOTES: 1. Base mapping digitized from Google Earth imagery dated 7-Oct-16
2. Site details and previous sample locations digitized from Roberts Environmental - Fig. 2 - Sample Locations (not field verified)

Title
CONTAMINANT CONCENTRATIONS IN SOIL VAPOR EXCEEDING RESIDENTIAL VAPOR EXPOSURE SCREENING LEVELS

Location
Vacant Industrial Property
2525 Durbin Street
Warsaw, Kosciusko County, Indiana

Legend

Project	2022260
Scale	1"= 60'
Date	3/7/22
Checked	gh
Drawn	dn
Figure	6
File	2022260

SES

N

(trees)

(asphalt)

UNDEVELOPED
(wooded)

WAREHOUSE
BUILDING

MULTI-UNIT COMMERCIAL STORAGE BUILDING

pp

EAST HENDRICKS STREET

Melt mtl

PARKING LOT

CONVENIENCE STORE

ARGONNE ROAD

cb

Possible
UST

Pit

Mezzanine

Pit

Pit

hh

Transformer
room

fd

White powder bins

Platform

mh

(grass/gravel/debris)

(gravel)

(grass/gravel/debris)

INFERRED TCE
EXCEEDANCE (0.1 mg/L)

Canopy over fueling islands

Former
dispensing
islands

Former
UST
Area

lp

Dock

Pit

(gravel)

(asphalt)

storm sewer

sanitary sewer

Vents

Sidewalk

storm sewer
fiber optic

ADAMS STREET

VACANT LAND
(scrub vegetation)

BARKER
CLIMATE CONTROLLED
STORAGE

DURBIN STREET

WARSAW ENGINEERING
&FABRICATING

MULTI-TENANT
COMMERCIAL

PARKING LOT

UNDEVELOPED
(grass lot)

pp POWER POLE
lp LIGHT POLE
cb CATCH BASIN
fd FLOOR DRAIN
POLE-MOUNT TRANSFORMER
GRATED FLOOR TRENCH
FILLED-IN FLOOR TRENCH

0 30' 60'

NOTES: 1. Base mapping digitized from Google Earth imagery dated 7-Oct-16
2. Site details and previous sample locations digitized from Roberts Environmental - Fig. 2 - Sample Locations (not field verified)
3. Proposed redevelop is shown as dashed lines and digitized from The 2525 Real America draft submittal

Title
REMEDIATION/REDEVELPMENT AREA

Location
Vacant Industrial Property
2525 Durbin Street
Warsaw, Kosciusko County, Indiana

Legend

Project 2022260	Scale 1"= 60'
Date 3/7/22	Checked gh
Drawn dn	Figure 7
File 2022260	

ASES

APPENDIX B

DATA TABLES

TABLE 1 - PCB Wipe Sampling Results Summary
Fmr. Arnolt/Delta Properties - 2525 E. Durbin St. - Warsaw, Indiana

U.S. EPA BROWNFIELDS COALITION GRANT
Michiana Area Council of Governments, Indiana
GRANT NUMBER: BF-00E02717-0

SAMPLE I.D.	Sample Date	Interior Location	Polychlorinated Biphenyls (PCBs)									
			Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268	Total PCBs
UNITS			micrograms per 100 square centimeters of surface area (ug/100cm^2)									
PCBW-1	7/21/21	Far East Area	ND	ND	ND	ND	ND	**11**	ND	ND	ND	**11**
PCBW-2	7/21/21	Transformer Room	<-----All ND----->									
PCBW-3	7/21/21	Electrical Switches	<-----All ND----->									
PCBW-4	7/21/21	Old Air Compressor	ND	ND	ND	ND	ND	**2.1**	ND	ND	ND	**2.1**
PCBW-5	7/21/21	Floor Cuts Area	<-----All ND----->									
***EPA PCB Surface Wipe Standard**			**<10 ug/100cm^2**									

See laboratory reports for complete analytical results.
Bold = Concentration of analyte or parameter greater than or equal to laboratory reporting limit ("RL").
*PCB Wipe Standard per various EPA Guidance (EPA, 2005 & PCB Q&A 2014).
ND = Not Detected at or above reporting limit ("RL").

ROBERTS ENVIRONMENTAL SERVICES, LLC

TABLE 2 - Soil Sampling Results Summary (VOCs)
Fmr. Arnolt/Delta Properties - 2525 E. Durbin St. - Warsaw, Indiana

U.S. EPA BROWNFIELDS COALITION GRANT
Michiana Area Council of Governments, Indiana
GRANT NUMBER: BF-00E02717-0

		Volatile Organic Compounds ("VOCs")															
SAMPLE I.D. (depth interval)	**Sample Date**	Tetrachloroethylene ("PERC")	Trichloroethylene ("TCE")	cis-1,2-Dichloroethylene ("cis-DCE")	Bromomethane	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	2-Butanone (MEK)	4-Methyl-2pentanone (MIK)	Benzene	Ethylbenzene	m,p-Xylene	o-Xylene	Total Xylenes
UNITS		milligrams per kilogram ("mg/kg")															
B-1 (5-7)	8/13/20	0.16	0.039	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-1 (15-17)	8/13/20	0.30	0.16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-2 (7-9)	8/13/20	0.036	0.84	0.004	0.0018	ND	0.0018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-2 (15-17)	8/13/20	0.029	0.53	0.0046	0.0016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-3 (5-7)	8/13/20	ND	0.016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-3 (9-11)	8/13/20	0.0017	0.041	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-4 (3-5)	8/13/20	0.0067	0.32	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-4 (15-17)	8/13/20	0.02 (0.024)	0.52 (0.49)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-5 (9-11)	8/13/20	0.026	0.57	ND	ND	0.058	0.049	ND	0.015	0.021	ND	ND	ND	ND	0.0022	0.0021	0.0043
B-5 (15-17)	8/13/20	0.021	0.80	ND	ND	ND	0.0046	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-6 (1-3)	8/12/20	ND	ND	ND	ND	ND	0.0012	ND	0.0055	ND	ND	ND	0.0034	0.0022	0.013	0.0065	0.02
B-7A (1-3)	8/12/20	ND	ND	ND	ND	2.2	4.0	3.1	1.6	0.55	0.43	0.55	0.41	0.60	4.1	2.2	6.3
B-7B (1-3)	8/12/20	ND	ND	ND	ND	ND	ND	ND	0.0038	0.0027	0.008	ND	0.0021	0.0019	0.0052	0.0022	0.0074
B-7C (5-7)	7/28/21	<-----All VOCs ND----->															
B-7C (9-11)	7/28/21	<-----All VOCs ND----->															
B-8 (1-3)	8/12/20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0015	ND	0.0024	0.0015	0.0039
B-9 (0-1)	8/12/20	ND	ND	ND	ND	ND	ND	ND	0.0014	ND	ND	ND	0.0023	ND	0.0039	0.0018	0.0057
B-10 (5-7)	8/14/20	<-----All VOCs ND*----->															
B-11 (0-1)	8/12/20	ND	0.0015	ND	ND	ND	ND	ND	ND	ND	0.0041	ND	0.0013	ND	ND	ND	ND
B-12 (3-5)	8/14/20	0.17	1.1	0.0046	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-13 (1-3)	8/12/20	0.0061	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-14 (11-13)	8/14/20	0.14	0.010	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-15 (5-7)	8/12/20	0.0026	ND	ND	ND	ND	0.00099	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-16 (3-5)	7/27/21	0.017	4.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-16 (13-15)	7/27/21	0.016	1.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-17 (3-5)	7/27/21	0.045	0.70	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 2 - Soil Sampling Results Summary (VOCs)
Fmr. Arnolt/Delta Properties - 2525 E. Durbin St. - Warsaw, Indiana

U.S. EPA BROWNFIELDS COALITION GRANT
Michiana Area Council of Governments, Indiana
GRANT NUMBER: BF-00E02717-0

SAMPLE I.D. (depth interval)	Sample Date	Volatile Organic Compounds ("VOCs")															
		Tetrachloroethylene ("PERC")	Trichloroethylene ("TCE")	cis-1,2-Dichloroethylene ("cis-DCE")	Bromomethane	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	2-Butanone (MEK)	4-Methyl-2pentanone (MIK)	Benzene	Ethylbenzene	m,p-Xylene	o-Xylene	Total Xylenes
UNITS		milligrams per kilogram ("mg/kg")															
B-17 (13-15)	7/27/21	0.0069 (0.010)	0.079 (0.13)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-18 (3-5)	7/27/21	0.0085	0.010	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-18 (9-11)	7/27/21	0.010	0.020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-19 (1-3)	7/27/21	ND	0.050	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-19 (15-17)	7/27/21	0.012	0.77	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-20 (3-5)	7/28/21	0.013	1.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-20 (7-9)	7/28/21	0.015	2.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-21 (3-5)	7/28/21	<-----All VOCs ND----->															
B-22 (3-5)	7/28/21	<-----All VOCs ND----->															
B-23 (3-5)	7/28/21	0.073	0.0045	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-23 (7-9)	7/28/21	0.036	0.0071	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-24 (5-7)	7/28/21	0.70	0.045	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-24 (7-9)	7/28/21	0.75	0.082	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-25 (0-1)	7/28/21	0.032	3.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-25 (3-5)	7/28/21	0.0066	0.046	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-26 (3-5)	7/28/21	0.021	1.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-26 (7-9)	7/28/21	0.017	0.65	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-27 (3-5)	7/28/21	0.0058	0.16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-27 (5-7)	7/28/21	ND	0.12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-28 (9-11)	7/30/21	0.0054	0.078	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-28 (15-17)	7/30/21	0.0082	0.10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	MTG	0.045	0.036	0.41	0.038	1.2	3.7	0.11	1.6	1.7	23	28	0.051	16	3.7	3.7	200
IDEM	**RDC**	110	5.7	220	9.5	250	340	53	220	180	28,000	3,400	17	81	390	390	260
	C/I DC	170	19	2,300	30	390	3,000	170	220	180	28,000	3,400	51	250	390	390	260
	EXC	170	95	2,400	160	390	6,800	3,100	220	180	28,000	3,400	1,800	480	390	390	260

See laboratory reports for complete analytical results (not all analytes listed).
*Acetone, methylene chloride, and toluene were detected at trace concentrations (below SLs) in several soil samples, which are likely laboratory artifacts.
Bold = Concentration of analyte or parameter greater than or equal to laboratory reporting limit ("RL").
SL = Screening Level per IDEM 2021 Remediation Closure Guide update (March 1, 2021). MEK = Methyl Ethyl Ketone. MIK = Methyl Isobutyl Ketone.
DNE = IDEM SL for this analyte does not currently exist. Field Duplicate ("FD") results shown in parentheses (XX).
MTG = Migration to Ground Water (exceedances highlighted in light blue). RDC = Residential Direct Contact.
C/I DC = Commercial/Industrial Direct Contact. EXC = Excavation Direct Contact.
ND = Not Detected at or above reporting limit ("RL"). Underlined results are greater than or equal to 10X the MTG SL.

ROBERTS ENVIRONMENTAL SERVICES, LLC

TABLE 3 - Ground Water Sampling Results Summary (VOCs)
Fmr. Arnolt/Delta Properties - 2525 E. Durbin St. - Warsaw, Indiana

U.S. EPA BROWNFIELDS COALITION GRANT
Michiana Area Council of Governments, Indiana
GRANT NUMBER: BF-00E02717-0

SAMPLE I.D.	Sample Date	Volatile Organic Compounds ("VOCs")														
		Tetrachloroethylene ("PERC")	Trichloroethylene ("TCE")	cis-1,2-Dichloroethylene ("cis-DCE")	trans-1,2-Dichloroethylene ("trans-DCE")	Vinyl Chloride ("VC")	1,1-Dichloroethylene	1-Methylnaphthalene	2-Methylnaphthalene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Ethylbenzene	Toluene	m,p-Xylene	Total Xylenes	Acetone
UNITS		micrograms per liter ("ug/l")														
B-1 (GW)	8/13/20	9.6	270	0.40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-2 (GW)	8/13/20	2.4	500	3.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.7
B-3 (GW)	8/13/20	ND	3.2	ND	ND	ND	ND	0.36	0.27	1.2	0.28	39	0.51	25	25	ND
B-4 (GW)	8/13/20	2.8	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.37	ND	ND	7.2
B-5 (GW)	8/14/20	1.9	140	0.92	ND	ND	ND	0.46	ND	ND	ND	ND	ND	ND	ND	ND
B-6 (GW)	8/12/20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.36	ND	ND	ND
B-7C (GW)	7/28/21	<-----All VOCs ND----->														
B-9 (GW)	8/12/20	<-----All VOCs ND-----> (FD All ND)														
B-10 (GW)	8/14/20	ND	0.48	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.32	ND	ND	2.3
B-12 (GW)	8/14/20	1.8	120	0.77	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.1
B-14 (GW)	8/14/20	18	250	23	0.53	ND	0.25	ND	ND	ND	ND	ND	ND	ND	ND	1.9
B-15 (GW)	8/12/20	0.71	ND	6.3	0.66	ND	ND	ND	ND	ND	ND	ND	0.37	ND	ND	1.9
B-16 (GW)	7/27/21	9.1	290	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-17 (GW)	7/27/21	ND	120 (110)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-18 (GW)	7/27/21	7.3	270	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-19 (GW)	7/27/21	5.7	290	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B-28 (GW)	7/30/21	ND	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	TAP	5.0	5.0	70	100	2.0	7.0	11	36	56	60	700	1,000	190	10,000	14,000
IDEM	VE Res	110	9.1	DNE	DNE	2.1	300	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
	VE C/I	470	38	DNE	DNE	35	1,300	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE

See laboratory reports for complete analytical results (not all analytes listed). (xx) = Field Duplicate ("FD") results.
IDEM RCG = Indiana Department of Environmental Management - Remediation Closure Guide (March 2021 Screening Levels - "SLs").
Bold results = Concentration of analyte or parameter greater than or equal to laboratory reporting limit ("RL").
ND = Not Detected at or above reporting limit. DNE = Not applicable, IDEM SL does not currently exist.
TAP = IDEM RCG Ground Water Screening Level (exceedances highlighted with light blue shading).
VE Res = IDEM RCG Residential Vapor Exposure Ground Water Screening Level (exceedances highlighted in yellow).
VE C/I = Commercial/Industrial Vapor Exposure Ground Water Screening Level (magenta highlighted exceedances)..

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TABLE 4 - Ground Water Sampling Results Summary (VOCs)
Fmr. Arnolt/Delta Properties - 2525 E. Durbin St. - Warsaw, Indiana

U.S. EPA BROWNFIELDS COALITION GRANT
Michiana Area Council of Governments, Indiana
GRANT NUMBER: BF-00E02717-0

SAMPLE I.D.	Sample Date	Hex Chrome	PFAS/PFOA																	
			Perfluorooctanoic acid (PFOA)	Perfluorooctane sulfonate (PFOS)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUdA)	Perfluorododecanoic acid (PFDoA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorobutane sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	N-methylperfluorooctane sulfonamidoacetic acid	N-ethylperfluorooctane sulfonamidoacetic acid	9-chlorohexadecafluoro -3-oxanone-1-sulfonic acid	11Cl-PF3OUdS	Hexafluoropropylene oxide dimer acid (HFPO-DA)	4,8-dioxa-3H-perfluoro nonanoic acid (NaDONA)
UNITS		ug/l	nanograms per liter ("ng/l")																	
B-1 (GW)	7/30/21	ND (<0.30)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.8	<1.8	<20	<20	<2.0	<2.0	<12.5	<2.0
			<-----All PFAS Substances ND (FD All ND)----->																	
B-2 (GW)	7/30/21	ND (<0.30)	**4.98**	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.8	<1.8	<20	<20	<2.0	<2.0	<12.5	<2.0
B-28 (GW)	7/30/21	ND (<0.30)	**2.40**	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.8	<1.8	<20	<20	<2.0	<2.0	<12.5	<2.0
	TAP	0.35	U.S. EPA Health Advisory Level = 70 ng/l (individual or total)																	
	VE Res	DNE																		
	VE C/I	DNE																		

See laboratory reports for complete analytical results. (xx) = Field Duplicate ("FD") results.
IDEM RCG = Indiana Department of Environmental Management - Remediation Closure Guide (March 2021 Screening Levels - "SLs").
Bold results = Concentration of analyte or parameter greater than or equal to laboratory reporting limit ("RL").
ND = Not Detected at or above reporting limit. DNE = Not applicable, IDEM SL does not currently exist. ug/l=micrograms per liter.
TAP = IDEM RCG Ground Water Screening Level.
VE Res = IDEM RCG Residential Vapor Exposure Ground Water Screening Level.
VE C/I = Commercial/Industrial Vapor Exposure Ground Water Screening Level.

TABLE 5 - Soil Gas Sampling Results Summary
Fmr. Arnolt/Delta Properties - 2525 E. Durbin St. - Warsaw, Indiana

U.S. EPA BROWNFIELDS COALITION GRANT
Michiana Area Council of Governments, Indiana
GRANT No.: BF-00E02717-0

	RESULTS (micrograms per cubic meter - "ug/m^3") - Samples collected August 25, 2021																Commercial SLs		Residential SLs	
ANALYTE	**SG-1s**	**SG-1d**	**SG-2s**	**SG-2d***	**SG-3s**	**SG-3d**	**SG-4s**	**SG-4d**	**SG-5s**	**SG-6s**	**SG-6d**	**SG-7s**	**SG-7d**	**SG-8s**	**SG-SS**	**BG**	**Sub-Slab**	**Indoor Air**	**Sub-Slab**	**Indoor Air**
LOCATION	Northeast Exterior		Northwest Exterior		West Exterior		West Exterior		Southwest Sewer Line	Southeast Exterior (Delta Lots)		Southeast Exterior (Delta Lots)		Interior SE Sewer Line	North Interior	South Exterior				
1,1,1-Trichloroethane	15	8.6	40	ND	56	43	100	75	ND	ND	ND	ND	ND	6.1	44	ND	733,333	22,000	173,333	5,200
1,2,4-Trimethylbenzene	21	7.7	8.8	ND	35	6.6	12	21	4.2	8.3	4.9	5.6	2.8	18	2.6	**6.6**	8,667	260	2,100	63
1,3,5-Trimethylbenzene	6.1	2.7	ND	ND	11	ND	6.0	12	ND	ND	ND	ND	ND	5.2	ND	ND	8,667	260	2,100	63
2-Butanone (MEK)	9.6	ND	ND	ND	ND	ND	32	ND	ND	47	ND	ND	ND	50	ND	11	733,333	22,000	173,333	5,200
4-Ethyltoluene	5.3	ND	ND	ND	9.1	ND	2.8	3.9	ND	ND	ND	ND	ND	4.4	ND	ND	NA	NA	NA	NA
Acetone	150	34	16	340	510	ND	87	38	16	220	33	37	8.1	370	16	380	4,666,667	140,000	1,066,667	32,000
Acrolein	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**2.5**	ND	ND	2.93	0.088	0.70	0.021
Benzene	11	7.7	3.0	ND	27	4.9	2.1	3.2	2.4	7.7	9.7	1.9	2.0	5.7	ND	**13**	533	16	120	3.6
Carbon disulfide	12	3.2	3.4	ND	58	4.0	ND	3.1	ND	ND	ND	ND	ND	ND	ND	ND	103,333	3,100	24,333	730
Chloroform	6.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	35	ND	177	5.3	40	1.2
Cyclohexane	4.8	6.8	ND	22	34	8.5	ND	2.4	ND	12	7.4	ND	ND	ND	ND	14	866,667	26,000	210,000	6,300
Dichlorodifluoromethane	4.0	5.3	11	ND	13	20	18	22	13	58	110	4.2	8.7	840	54	ND	14,667	440	3,333	100
Ethylbenzene	17	10	4.3	ND	32	5.6	4.3	6.3	2.7	5.0	4.7	2.4	2.2	8.8	ND	6.5	1,633	49	367	11
Heptane	9.3	11	2.5	26	66	14	ND	8.4	2.4	4.3	7.7	ND	2.5	ND	ND	13	60,000	1,800	14,000	420
Hexane	130	110	89	780	220	130	100	130	110	190	93	ND	87	140	97	82	103,333	3,100	24,333	730
m,p-Xylene	62	20	15	ND	90	13	12	18	7.3	22	20	9.1	6.5	36	4.7	23	14,667	440	3,333	100
o-Xylene	24	7.5	5.7	ND	29	4.8	5.0	6.6	2.7	12	13	3.7	2.9	12	ND	8.4	14,667	440	3,333	100
Methylene chloride	54	53	39	270	55	52	57	53	140	60	50	48	52	67	54	ND	86,667	2,600	21,000	630
Propylene	9.9	ND	ND	160	560	43	ND	5.4	2.5	2.9	3.7	ND	ND	ND	3.0	2.6	433,333	13,000	103,333	3,100
Styrene	2.2	ND	ND	ND	2.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.8	146,667	4,400	33,333	1,000
Tetrachloroethene	**2,800**	**1,500**	**4,400**	260	**20,000**	**38,000**	**26,000**	**23,000**	1,000	84	9.0	29	36	51	**8,600**	ND	6,000	180	1,400	42
Trichloroethene	**32,000**	**38,000**	43	ND	**720**	**6,000**	37	**330**	ND	21	9.9	ND	1.8	**120**	**120,000**	ND	293	8.8	70	2.1
cis-1,2-Dichloroethene	120	71	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	84	ND	NA	NA	NA	NA
trans-1,2-Dichloroethene	7.2	3.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	78	ND	6,000	180	1,400	42
Tetrahydrofuran	6.0	ND	4.2	ND	12	ND	2.4	ND	ND	7.3	ND	ND	ND	28	ND	3.7	293,333	8,800	70,000	2,100
Toluene	51	30	18	35	150	20	9.4	21	9.6	35	49	9.5	9.3	40	4.6	72	733,333	22,000	173,333	5,200
Trichlorofluoromethane	5.3	3.4	11	ND	19	13	8.5	8.9	3.4	ND	ND	ND	ND	ND	9.7	ND	NA	NA	NA	NA
Isopropylbenzene (cumene)	ND	ND	ND	ND	5.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	60,000	1800	14,000	420
Naphthalene	5.8	2.6	3.4	ND	7.3	ND	**440**	**3,700**	3.4	12	2.7	3.8	ND	ND	3.6	ND	120	3.6	28	0.83
2-Propanol ("IPA") - Soil Gas	<4.9	12	8.7	<44	<4.9	<4.9	5.4	1,000	<4.9	800	19	3,600	<4.9	1,200	750	29				
2-Propanol ("IPA") - Shroud	43,000		41,000		44,000		29,000		25,000	33,000		32,000		40,000	50,000	---				
†Leakage Rate (%)	0.01%	0.03%	0.02%	0.05%	0.01%	0.01%	0.02%	3.4%	0.01%	2.4%	0.06%	11.3%	0.01%	3.0%	1.5%	---				

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See laboratory report for complete analytical results and reporting limits.

BG = Background ambient air sample. Shroud IPA concentrations are estimated (the concentration reported exceeds instrument calibration).

NA = No IDEM Remediation Closure Guide ("RCG") Screening Level ("SL") Available. SG = Soil Gas. SS = Sub-Slab. "s"=shallow (5.5 to 6.0-feet depths). "d"=deeper (17-feet depths)

IDEM RCG Residential and Commercial Sub-Slab soil gas Screening Level ("SL" - March 2021) calculated with an attenuation factor of 0.03.

Yellow highlighted and Bold results exceed the IDEM RCG commercial sub-slab SL. Orange highlighted and bold results exceed the IDEM RCG residential sub-slab SL.

ND = not detected at or above the laboratory reporting limit, which is below SLs. IPA = Isopropyl Alcohol. MEK = Methyl Ethyl Ketone. MIBK = Methyl Isobutyl Ketone.

† = Leakage rates of approximately 10% or less are generally considered acceptable. Quantified by dividing sub-slab IPA concentration by shroud air IPA concentration (at 1/2 detection limit when ND).

* Water observed in sample tubing. As such, sample may not be an accurate representation of the subsurface vapors above the water table.