Response Action Plan

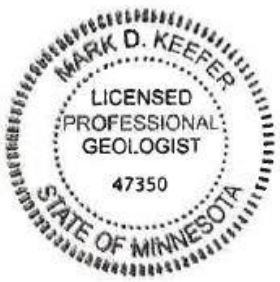
Hillcrest Redevelopment Site
Saint Paul, Minnesota
MPCA Brownfields Site ID: BF0001281
MDA Project No.: JAL101091523

Prepared for

Saint Paul Port Authority

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

Mark D. Keefer, PG
Group manager – Senior Scientist
License Number: 47350



Project B1903316.00
March 1, 2022

Braun Intertec Corporation

BRAUN INTERTEC
The Science You Build On.

Braun Intertec Corporation
1826 Buerkle Road
Saint Paul, MN 55110

Phone: 651.487.3245
Fax: 651.487.1812
Web: braunintertec.com

March 1, 2022

Project B1903316.00

Mr. Josh Leable
Project Manager, Incident Response Unit
Minnesota Department of Agriculture
625 Robert Street
St. Paul, MN 55155

Mr. Andrew Nichols
Project Manager
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155

Re: Response Action Plan
Hillcrest Redevelopment Site
St. Paul, Minnesota
MPCA Brownfields Site ID: BF0001281
MDA Project No.: JAL101091523

Dear Mr. Leable/Mr. Nichols:

On behalf of The Saint Paul Port Authority, Braun Intertec Corporation has prepared the attached Response Action Plan (RAP) for the Hillcrest Redevelopment Site located in St. Paul, Minnesota (the Site). The RAP describes response actions that will be implemented to manage contaminated soils, sediments and other media required to facilitate planned redevelopment at the Site and obtain environmental assurances and RAP and RAP implementation approvals from the Minnesota Department of Agriculture (MDA) and Minnesota Pollution Control Agency (MPCA). The RAP includes a Construction Contingency Plan (CCP) that provides procedures for managing unanticipated contaminated materials that may be encountered during project construction.

Per our previous discussions, review and approval of the enclosed RAP is requested from both the MDA and MPCA voluntary programs by no later than Friday, April 29, 2022 to facilitate the submittal of cleanup grant applications on Monday, May 2.

If you have any questions or comments regarding this report or the project in general, please contact Ken Larsen at 952-995-2455 or Mark Keefer at 952.995.2493.

Sincerely,

BRAUN INTERTEC CORPORATION

Kenneth A. Larsen, PE, PG
Vice President/Principal Scientist

Mark D. Keefer, PG
Business Unit Leader, Senior Scientist

cc: Monte Hilleman, Saint Paul Port Authority
Steve Heurung, Stoel Rives

Attachment:
Response Action Plan

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A. Introduction

Braun Intertec Corporation (Braun Intertec) was retained by the Saint Paul Port Authority (SPPA) to prepare this Response Action Plan (RAP) for the proposed Hillcrest Redevelopment Site located in St. Paul (the Site). The SPPA is planning to redevelop the Site into a mixed-use development. The location of the Site is shown on Figure 1.

This RAP describes environmental response actions necessary to secure a Certificate of Completion or No Further Action Determination for the Site and includes procedures for managing contaminated soil, sediment, soil vapor and groundwater impacts identified by Remedial Investigation of the Site. The RAP includes a Construction Contingency Plan (CCP) that describes requirements for responding to unanticipated contaminated materials that may be encountered during project construction. This RAP is being submitted to the Minnesota Department of Agriculture (MDA) Voluntary Investigation and Cleanup (AgVIC) Program, the Minnesota Pollution Control Agency (MPCA) Voluntary Investigation and Cleanup (VIC) Program, and the MPCA Petroleum Brownfields (PB) Program for review and approval. If any modifications or changes to the RAP are required, an addendum or amendment outlining such modifications or changes will be submitted to the MDA and MPCA. The Site has been enrolled into the respective voluntary programs and was assigned MDA Project No.: JAL101091523 and MPCA Brownfields Site ID: BF0001281.

This RAP generally follows MDA Guidance Document Agricultural Chemical Incident Remedial Investigation Report and Corrective Action Plan, Guidance Document 10 (September 2001) and MPCA Guidance Document *Brownfield Program Response Action Plans (October 2018)*, including the inclusion of a CCP for responding to unexpected environmental conditions on the Site. This RAP provides details on managing different types of soil contamination at the Site to ensure that the excavation, stockpiling and handling of soils at the Site are protective of human health and the environment, both in the short-term during construction and for the long-term during subsequent Site use.

Upon completion of the response actions addressed in this RAP, the SPPA anticipates requesting RAP Implementation Report Approval Letters and a Certificate of Completion or No Further Action Determination from the MDA and MPCA as appropriate. This RAP was prepared on behalf of and for use by the Saint Paul Port Authority in accordance with the contract between the Saint Paul Port Authority and Braun Intertec. No other party has a right to rely on the contents of this RAP without the written authorization of Braun Intertec.

A.1. Planned Redevelopment

The Planned Redevelopment of the Site will result in a new multi-use development. The Development will include areas of light industrial and commercial use, high, medium, and low-density residential use, associated parking/drive areas, new infrastructure, recreational use and passive greenspace areas. Added infrastructure included with the redevelopment includes installing electric, sewer and water utility lines and constructing several public streets and stormwater management systems. A map depicting the planned redevelopment configuration and future land uses is included as Appendix A.

A.2. Project Objectives

This RAP includes the environmental response actions required to address known contaminated media to facilitate planned site use and obtain appropriate environmental assurance and approvals from the MDA AgVIC Program, MPCA VIC Program and MPCA PB Program. Specifically, upon completion of the response actions addressed in this RAP, the SPPA anticipates requesting RAP Implementation Report Approval Letters and a Certificate of Completion of No Further Action Determination from the MDA and MPCA as appropriate.

B. Site Background

B.1. Site Location and Description

The Site is located at 2200 Larpenteur Avenue East in Saint Paul, Ramsey County, Minnesota (see Figure 1).

The Site is approximately 112 acres in size and includes all or parts of six separate parcels. At the time of the site assessments and investigations supporting this RAP, the Site consisted of a vacant 18-hole golf course that included club facilities, a driving range, practice putting greens, and support buildings. A vacant clubhouse with associated paved parking lot, swimming pool, vacant pool building, vacant golf cart sheds, and vacant garages were in the northwest corner of the Site. The former fairways extended south of the clubhouse. A vacant maintenance area is in the southeastern area of the Site that includes a former maintenance shop building, former maintenance storage building, and former agricultural chemical storage and mixing buildings (i.e., agricultural chemical buildings). Earthen berms were located along the southeastern Site boundary next to and south of the former maintenance area. Two unsealed water wells and two small petroleum above ground storage tanks (ASTs) were also identified at the Site. A site sketch is included as Figure 2.

According to the 2019 Former Hillcrest Golf Course Site Phase I Environmental Site Assessment (Phase I ESA), the Site had been operated as a golf course since the 1920s until it was closed in 2017. The former golf course layout is shown on Figure 3. The surrounding area land use has generally consisted of cultivated agricultural land progressively followed by residential and light commercial (retail) development.

B.2. Site Land Use History

Prior to the 1920s the Hillcrest Site was cultivated agricultural land or grazing land. The Hillcrest Golf Course was developed in the 1920s for and became a full size 18-hole private golf course/club that included clubhouse facilities, a swimming pool with pool building, driving range, practice putting greens, tennis courts, and various support buildings on the north side of the Hillcrest Site, and agricultural chemical storage buildings and maintenance shop on the southeastern side. Earthen berms, which contain contaminated soils and intermixed debris, are located along the southeastern boundary of the Site next to and south of the maintenance area and two unsealed water wells. The Golf course ceased operations in 2017 and the Site has remained vacant since that time.

During use as a golf course, various petroleum products were used and stored on the Hillcrest Redevelopment Site. Specifically, three past petroleum releases have been reported at the Site, Leak ID# 5050; Leak ID# 6222; and Leak ID# 18327. Based on the property use at the time of the releases, all three petroleum release leak sites were closed by the MPCA following review of the follow up site investigations, or in the case of Leak ID #6222, review of the limited soil cleanup actions taken following tank removal (i.e., excavation, hauling and treatment of an estimated 180 tons of petroleum-impacted soil).

B.3. Site Assessments/Investigations by SPPA

B.3.a. Overview

Previous environmental investigations performed at the Site have identified soil, sediment, soil vapor and groundwater impacts associated with the past use of the Site as a golf course. The SPPA performed a Phase II Environmental Site Assessment of the Site to investigate the Recognized Environmental Conditions (RECs), Historical RECs (HRECs), and Controlled RECs (CRECs) identified in the Phase I ESA. In addition, the SPPA recently performed a remedial investigation (RI) of the Site in support of the planned redevelopment. Results of previous environmental investigations are included in the document entitled: Remedial Investigation Report, Former Hillcrest Golf Course Site, St. Paul, Minnesota, dated March 1, 2022 (2022 RI Report). The following sections summarize the results of the previous environmental assessments and investigations completed by the SPPA.

B.3.b. Phase I Environmental Site Assessment

Prior to property acquisition in June 2019, the SPPA retained Braun Intertec Corporation (Braun Intertec) to complete a Phase I Environmental Site Assessment of the Hillcrest Site in accordance with ASTM Standard Practice E1527-13. The Phase I ESA results were documented in a report entitled: *Phase I Environmental Site Assessment, Former Hillcrest Golf Course, McKnight Road and Larpenteur Avenue East, St. Paul, Minnesota*, dated June 10, 2019 (2019 Phase I ESA).

In summary, the 2019 Phase I ESA identified the following recognized environmental conditions (RECs) related to the Hillcrest Redevelopment Site: 1) the presence of remaining contamination from past petroleum tank leaks, 2) the potential for agricultural chemical releases to the soil and groundwater, 3) the potential for the repeated historical application of fungicide to result in an accumulation of mercury in the soils over time, and 4) the potential presence of contaminated soils and buried regulated waste materials in berms present at various locations. No HRECs or CRECs were identified for the Site in the 2019 Phase I ESA.

Braun Intertec amended the 2019 Phase I ESA in response to the MDA's letter to the SPPA dated July 19, 2019. The amended Phase I ESA is presented in the letter entitled: *Phase I Environmental Site Assessment Addendum, Agricultural Chemical Incident Investigation, Former Hillcrest Golf Course, St. Paul, Minnesota*, prepared by Braun Intertec and dated August 15, 2109 (2019 Phase I Addendum).

The 2019 Phase I Addendum identified eight high risk areas (HRAs) at the Site consisting of the following:

- Agricultural chemical storage buildings loading areas.
- Damaged floors in the agricultural chemical storage buildings (3 buildings).
- Agricultural chemical mixing/washout area.
- Drainage area adjacent to mixing/wash area.
- Berms on eastern portion of Property.
- Golf greens and practice greens constructed before 1994.
- Tee boxes.
- Fairways.

As requested by the MDA during an October 29, 2019 Site walk, Braun Intertec added (a) the primary pesticide/fertilizer storage building, and (b) the associated loading area as standalone HRAs.

In addition, as part of the 2019 Phase I Addendum, Braun Intertec reviewed the historical agricultural pesticide and fertilizer use at the former golf course. The facility primarily used granular and soluble fertilizers consisting of various brands and formulations of nitrogen, potassium and phosphorus-based

fertilizers. The majority of these fertilizers were applied to greens, tee boxes, and fairways with occasional applications to roughs and around the clubhouse area.

The facility used a variety of pesticides including fungicides, herbicides, insecticides, and algicides for various applications across the golf course. Based upon available usage records it appears that these were used in smaller quantities primarily on the greens, but occasionally on the fairways, approaches, and tees, and sporadically around the clubhouse. Common pesticides used included 2, 4-D, imidacloprid, Dicamba, chlorothalonil, iprodione. Reportedly, the facility had discontinued use of mercury-based fungicides sometime prior to 1994.

B.3.c. Limited Phase II Environmental Site Assessment

In 2019, Braun Intertec conducted a Phase II Environmental Site Assessment, in support of the SPPA acquiring the Site, the results of which are presented in the report entitled: *Preliminary Phase II Environmental Site Assessment, Former Hillcrest Golf Course, St. Paul, Minnesota*, dated June 10, 2019 (2019 Phase II ESA).

The 2019 Phase II ESA consisted of twelve geotechnical soil borings, nine environmental soil borings, four temporary perched groundwater monitoring wells, two soil vapor probes, and one sub-slab vapor point. In addition, one soil sample was collected from the maintenance berm and 25 surficial soil samples were collected throughout the former golf course.

The following provides a summary of the conclusions of the 2019 Phase II ESA:

- Past and current Phase II ESAs detected both non-petroleum and petroleum compounds in soil at various locations and depths across the Site. The highest concentrations of mercury impacts were detected in soil samples collected from the former greens and related fringe/apron areas. Mercury concentrations were detected consistently on tee boxes, sampled fairways, and in soil near the “mixing area” where fungicides are known to have been mixed with water and loaded into the turf management equipment for use on the golf course. The mercury concentrations in the fairways and tee boxes varied with some soil sample results exceeding the Residential and Commercial/Industrial SRVs in-place at the time of the investigation.
- Additional non-petroleum impacts to soil from polycyclic aromatic hydrocarbons (PAHs) and arsenic were also detected at a few locations at the Hillcrest Site, but these impacts are relatively minor in extent and magnitude. Petroleum impacts were also detected at the Hillcrest Site and were limited to the area of the three “closed” petroleum leak sites that were discussed previously.

- Several soil berms with intermixed debris and solid waste are present in the wooded area south of the maintenance shop on the east side of the property and adjacent to McKnight Road. Debris types observed in the soil include brick, asphalt, concrete, carpet, drain tile, conduit, plastic, etc. A composite soil sample consisting of several discrete soil samples collected from different areas of the soil berms with observed debris detected mercury at a concentration exceeding the Commercial/Industrial SRV in-place at the time of the investigation.
- Groundwater samples collected during the Preliminary Phase II ESA did not detect evidence of significant or widespread contamination by petroleum compounds or hazardous substances. The only detection of a contaminant in groundwater above a drinking water standard was diesel range organics (DRO) in the sample collected near the previously investigated and closed petroleum leak sites.
- Low concentrations of volatile organic compounds (VOCs) were detected in soil vapor samples collected during this investigation. However, no VOCs in the soil vapor were detected at concentrations above the MPCA action levels requiring consideration or redevelopment.

The Limited Phase II ESA report concluded that additional environmental investigation(s) would be needed to further delineate and define the magnitude and extent of the identified impacts at the Hillcrest Site in consideration of future redevelopment.

B.3.d. Remedial Investigation

Braun Intertec Corporation conducted a remedial investigation (RI) to further define the impacts identified during the Limited Phase II ESA. The scope of the RI was detailed in the Remedial Investigation Work Plan dated March 27, 2020 (The RI Work Plan), with minor additional sampling addressed in a RI Work Plan Addendum dated June 12, 2020, and RI Work Plan Addendum #2 dated October 7, 2021.

The RI Work Plan was approved by the Minnesota Department of Agriculture (MDA) Incident Response Staff on May 5, 2020, and the RI Work Plan Addendum was approved by email on June 23, 2021. The investigation was partially funded from a U.S. Environmental Protection Agency (EPA) Assessment Grant Number BF00E02723. As such, all field work and sampling procedures were conducted in accordance with the Quality Assurance Project Plan (QAPP), dated September 26, 2019, that was previously submitted to and approved by EPA Region 5. As required under the QAPP, a Sampling and Analysis Plan (SAP) document containing the same elements of the RI Work Plan was prepared by Braun Intertec and dated May 11, 2020, the SAP was submitted to the U.S. EPA Region 5. RI Work Plan Addendum #2 was approved by MDA Incident Response Staff on November 2, 2021.

The Remedial Environmental Investigation was primarily performed between June and August 2020, with additional investigation also performed in November 2021.

The results of the RI are included in the 2022 RI Report dated March 1, 2022, which included a summary of the data presented in the 2019 Phase II ESA). The RI results are summarized further below.

The 2022 RI consisted of soil borings, hand auger soil borings, test pits, sediment samples, groundwater samples, and surface water samples. The RI investigation included the following:

- Ten test pits (TT-1, TT-2, TT-3, TT-4, TT-5, TT-6, TT-7, TT-8, TT-9, and TT-10) excavated in areas of potential buried debris.
- Thirteen soil borings completed in agricultural maintenance and washout areas,
- Four soil borings in former petroleum tank areas
- One soil boring in the north parking lot.
- Conversion of three of the soil borings into permanent monitoring wells.
- Twenty-one hand augers around the clubhouse
- Approximately 212 shallow hand auger borings throughout the golf course areas (i.e., fairways, green, tee boxes and roughs).
- 51 multipoint composite samples (comprised of 574 individual aliquots) throughout the fairways.
- 87 hand auger borings in potential wetlands or pond sediments.
- Groundwater samples collected from the three monitoring wells, the existing irrigation well, and maintenance area wells at the facility.

Soil samples were submitted to Pace Analytical Services of Minneapolis and analyzed for a combination of the following parameters:

Analyte*	**Analytical Method**
VOCs	EPA 8260
TKN	EPA 351.2
PAHs	EPA 8270C
Nitrate-Nitrite	EPA 353.2
Chlorothalonil	EPA 8270
GRO	WI MOD GRO
DRO	WI MOD DRO
Chlorothalonil	EPA 8270
Propiconazole	EPA 8321
Iprodione	EPA 8270
MDA list 2	EPA 8321
RCRA Metals/mercury	EPA 6020/7471

The following provides a summary of the conclusions of the 2022 RI:

- Investigations at the Site have detected both non-petroleum and petroleum compounds in soil at various locations and depths across the Site. The non-petroleum impacts included widespread mercury contamination from the historical use of specialty fungicides and other turf management agricultural products associated with golf courses dating back to the 1930's and into the 1990's.
- The highest concentrations of mercury were detected in soil samples collected from the former greens and related fringe/apron areas. Mercury concentrations were detected consistently on tee boxes, fairways, and in soil near the "mixing area" where fungicides are known to have been mixed with water and loaded into the turf management equipment for use on the golf course. The mercury concentrations in the fairways and tee boxes varied with many soil sample results exceeding the SRV.
- Mercury concentrations exceeding the SRV were detected in all of the greens, and the majority of tee boxes.
- Mercury concentrations in the fairways typically ranges from 0.3 to 20.2 mg/kg. About half of the fairways had detections of mercury at concentrations greater than the SRVs.

- Mercury concentrations in the golf course roughs were typically below the SRV and generally were in the range of naturally occurring mercury. There were some exceedances of the mercury SRV in localized areas near cart paths or operation areas.
- Non-petroleum impacts to soil from PAHs and arsenic have also been detected at a few locations at the Site. Petroleum impacts detected at the Site are primarily associated with the past use and storage of diesel fuel and gasoline products in the former maintenance shop area located on the east side of the Site adjacent to McKnight Road. Specifically, there were three separate petroleum leak site numbers opened by the MPCA for the releases reported in the vicinity of the former maintenance shop area at the property. The MPCA closed these leak site numbers following review of the previously completed petroleum release investigations and/or soil corrective actions.
- Several soil berms containing contaminated soils intermixed with debris are present in the wooded area south of the maintenance shop on the east side of the property and adjacent to McKnight Road. Debris types observed in the soil include brick, asphalt, concrete, carpet, drain tile, conduit, plastic, etc. A composite soil sample consisting of several discrete soil samples collected from different areas of the soil berms with observed debris detected mercury at concentrations exceeding the Residential and/or Commercial/Industrial SRV, and PAHs, however the detected concentrations of PAHs were below SRVs.
- Test pits encountered buried debris at the Site. The buried debris includes the area of the former pool house and tennis courts, which contained various fill soils intermixed with debris. The observed debris included paint cans, concrete, asphalt, plastic, pieces of tennis court and other solid garbage materials. The debris was present intermittently down to a depth of approximately 5 ft bgs. Trace debris (wood or concrete) was encountered in soils near the maintenance buildings to depth of 7 ft bgs. DRO was detected in the soil associated with the buried debris at concentrations exceeding the MPCA fill criteria. VOCs were detected in soil vapor samples collected from the buried debris area.
- Groundwater samples collected by Braun Intertec did not detect evidence of significant or widespread contamination by petroleum compounds or hazardous substances. Dissolved Barium was the only metal detected in the water samples; however, the detected concentrations were well below the drinking water standard for barium.
- DRO was detected at 540 micrograms per liter (ug/l) in perched groundwater at boring location ST-8, in the former washout/tank area of the Site. DRO was not detected above the laboratory reporting limits in the other groundwater samples analyzed during the investigations.

- The presence of residual petroleum-related perched groundwater contamination associated with the closed leak sites in the Maintenance area, that was previously investigated, is a known condition, and would only be a concern for redevelopment if dewatering for construction was required and/or if a storm water infiltration feature was planned for this specific area of the Site.
- Mercury (total or dissolved) was not detected above laboratory reporting limits in the surface water or groundwater samples analyzed during Site investigation.
- Low concentrations of VOCs were detected in soil vapor samples collected during this investigation. However, none of the detected concentrations of VOCs in soil vapor were above the MPCA's action level of 33X the residential ISVs in any of the sample locations.

Figure 4 shows the sampling locations for all of discreet samples collected at the Site; Figure 5 summarizes the soil analytical data collected at the Site by Braun Intertec during Site investigation. Summary figures and summary data tables with analytical data are provided in the 2022 RI Report.

B.4. Published Geologic Information

B.4.a. Topography

According to the United States Geological Survey (USGS) 7.5-minute topographic map series, St. Paul East, Minnesota quadrangle, the Site elevation ranges from approximately 1,000 feet to approximately 1,060 feet above mean sea level and the terrain is rolling (2019 Phase I ESA).

B.4.b. Geology

The unconsolidated sediments in the Site vicinity are Pleistocene age till deposits that consist of sandy loam, clay loam, and silty clay loam. The till deposit is generally reddish brown in color and is locally compact (2019 Phase I ESA).

The depth to bedrock in the Site vicinity is 100 to 150 feet below land surface (2019 Phase I ESA). The uppermost bedrock units in the Site vicinity include the Middle Ordovician, Decorah Shale on the western portions of the Site, the Platteville and Glenwood Formations on most of the central and northern portions of the Site, and the St. Peter Sandstone on the southern portions of the Site (2019 Phase I ESA).

Site-specific information regarding soils identified by the Site investigations is provided in the Site Conceptual Model provided in Section C.

B.4.c. Hydrogeology

The reported depth to groundwater in the Site vicinity is 100 to 200 feet below land surface. Perched groundwater may occur at shallower depths above clay layers. According to published geologic information, the regional groundwater flow direction in the Site vicinity is generally westerly (2019 Phase I ESA). However, the local direction of groundwater flow may be affected by nearby streams, lakes, wells, and/or wetlands and may vary seasonally.

Site-specific information regarding groundwater conditions identified by the Site investigations is provided in the Site Conceptual Model provided in Section C.

B.5. Exposure Risk

The impacted soils identified at the Site are readily accessible below the grass and thin topsoil layer at each green and fringe as well as in many of the tee boxes, fairways, the maintenance area, in localized areas of the clubhouse area soils, the buried debris areas, some of the wetland sediments and in small areas of some rough's areas. Currently, the former golf course is open green space and there are no dedicated uses for the area. The area is not open to public use and the Site is surrounded by a security fence. Shallow petroleum impacts were previously identified associated with the closed leak sites in the maintenance area.

The response actions presented in Section G below will address the removal of impacted soils. The cleanup goals for the RAP are presented in Section F below.

The investigations to date have not identified groundwater or surface water impacts at the Site above the relevant drinking water standards, except for the residual petroleum impacts to perched water associated with the closed leak sites.

C. Site Conceptual Model

The historic information summarized above and the RI results presented in the 2022 RI Report were used to prepare a site conceptual model that envisions future redevelopment of the Site.

The site conceptual model incorporates the current Site use and conditions, former Site uses and conditions, planned Site uses, physical setting, characterization of impacts to the Site from the contaminants of concern (COCs), and a discussion of potential receptors and exposure pathways.

C.1. Current Site Use and Conditions

The Site was developed and used as a golf course from the early 1920s until golf course operations ceased in 2017. The Site is currently occupied by the former golf course operations structures, including unmaintained greens, tee boxes, and fairways, a driving range, practice putting greens, and support buildings. A vacant clubhouse with associated paved parking lot, swimming pool, vacant pool building, vacant golf cart sheds, and vacant garages are in the northwest corner of the Site. There was an original clubhouse that was severely damaged by fire in 1962. The remains of the destroyed clubhouse were demolished and replaced with a new clubhouse that was subsequently demolished between 1994 and 2000 and replaced by the current existing vacant clubhouse in 2000. The former fairways extended south of the club house. A vacant maintenance area located in the southeastern portion of the Site includes a former maintenance shop building, former maintenance storage building, and former agricultural chemical storage and mixing buildings (agricultural chemical buildings). Earthen berms containing various fill soils with debris are located along the southeastern Site boundary next to and south of the former maintenance area. Two out of service (the pumps were removed in 2020) unsealed water wells are present at the site, including three shallow monitoring well installed during the 2020 RI and two deeper production wells, an out of service irrigation well located near the center of the site, and an out of service production well located in the maintenance area.

Golf operations included the storage and mixing of agricultural chemicals. The storage and mixing of chemicals was primarily performed in and around the agricultural chemical storage buildings and the fill/wash out area and wash pad (Figure 2)., The facility was using the mix load pad for washing and filling of pesticide equipment. The load pad and associated area drains to a low-lying area immediately south of the maintenance area. The golf course facility used a variety of pesticides, which included fungicides (including a mercury-based fungicide), herbicides, insecticides, and algicides for various applications across the golf course. Based upon available usage records it appears that these were used in small quantities, primarily on the greens, but occasionally on approaches and tee boxes.

The facility also used granular and soluble fertilizers consisting of various brands and formulations of nitrogen, potassium and phosphorus-based fertilizers. The available records indicate the fertilizers used at the largest quantities were granular fertilizers. According to Tom Schmidt, a former Hillcrest Golf Course Greens Keeper, these fertilizers were applied to greens, tee boxes, and fairways, with occasional applications to roughs and around the clubhouse area. Available usage records indicate that the soluble fertilizers were primarily used on the greens.

In addition, historically the site had several petroleum USTs and ASTs on the Site. Three gasoline USTs were previously located on the Site, including one 560-gallon tank and two 1,000-gallon tanks. Leaks

were reported for two of the former gasoline USTs and one former unregistered diesel above ground storage tank (AST). The USTs were located south of the former Maintenance Building (Leak #6222) and south of the Agricultural Chemical Storage Building (Leak #5050), the unregistered diesel AST was located west of the Maintenance Storage Building (Leak #18327). The leak locations are shown on Figure 2. The MPCA assigned a closed status to UST Leak ID# 5050 on June 1, 1992; to UST Leak ID# 6222 on September 26, 1994; and to AST Leak ID# 18327 on June 15, 2011. Leak ID # 6222 and Leak ID # 18327 were reportedly closed with remaining soil and groundwater contamination.

The Site topography varies across the site with rolling hills, berms, low areas, such that the Site elevation ranges from approximately 1,000 feet to approximately 1,060 feet above mean sea level and the terrain is rolling. The storm water from the Site appears to infiltrate in the green space areas or runs off by sheet flow to the existing storm water sewer system.

The Site is located in a fully developed residential/light commercial area that was originally developed for cultivated agricultural land, grazing land, and residential use. By the early 1980s a small retail strip mall was developed on adjoining property to the north and another small retail strip mall was developed on adjoining property to the northeast by the early 1990s. The retail development on the adjoining property to the northeast includes a gasoline filling station, which has operated since approximately 1990. The areas to the east, south and west of the Site are residential developments.

C.2. Stratigraphy

The Site stratigraphy consists of a surficial fill deposit underlain by native soil deposits. Specifically, soils at the site consist of the following:

- Variable fill soils/fill soils with debris
- Organic soils/peat
- Alluvium, fluvial and glacial tills

The Site is covered with topsoil or topsoil fill consisting of sandy clay/clayey sand, sandy silt or silt with various amounts of organics materials. The topsoil is underlain with various fill materials consisting of primarily clayey sands, sands, silty sands, clay or sands with silts to depth ranging from 1 to 10 feet below ground surface. The soils in the lower elevations in the eastern and northeastern portions of the site initially consist of a combination of existing fill, organic swamp deposits and soft alluvial soils that extend to depths of 4 to 9 feet below existing grades. Clayey sands or clayey sand with gravel were encountered below these surficial materials to depth of 25 feet below ground surface in the borings advanced at the Site.

C.2.a. Fill soils

C.2.a.1. Berms

There are two soil berms on the Site, one is located north of the Agricultural Chemical Storage Building, and a second larger berm located south of the maintenance area (Figure 2). The northern berm consisted of sandy lean clay fill over native sandy lean clay.

The southern berm consisted of intermixed poorly graded sand and silt, clayey sand, of sandy lean clay fill soils with varying amounts of debris. In portions of the southern berm, organic peat soils intermixed with debris was observed beneath the debris bearing clays and sandy clay fill soils The debris consisted of various materials including bricks, concrete, carpet, glass, golf balls, metal pipes, and areas that appeared to be ash and other burned trash. The debris was observed in depths ranging to 10 feet bgs.

C.2.a.2. Buried Debris-Containing Fill

The area of the former pool house and tennis courts contained various fill soils intermixed with debris including debris included paint cans, concrete, asphalt, plastic, pieces of tennis court and other solid garbage materials. The debris was present intermittently down to a depth of approximately 5 ft bgs.

Trace debris (wood or concrete) was encountered in soils near the maintenance buildings to depth of 7 ft bgs.

The buried debris areas are shown on Figures 6 and 7.

C.2.a.3. Other Fill

There are various other fill soils at the site including topsoil or topsoil fill consisting of sandy clay/clayey sand, sandy silt or silt with various amounts of organics materials, were underlain with various fill materials consisting of primarily clayey sands, sands, silty sands, clay or sands with silts to depth ranging from 1 to 10 feet below ground surface.

C.2.b. Native Soil

Native soils at the Site include the following:

- organic swamp deposits
- soft alluvial soils consisting of clayey sands or clayey sand with gravel

C.2.c. Groundwater Conditions

Groundwater, suspected to be perched, was encountered in some of the borings advanced during the 2019 Phase II ESA at depths ranging from approximately 5 to 13 feet bgs. During the 2020 RI, perched groundwater was encountered intermittently at several borings at depths ranging from 7.5 feet to 15 feet bgs.

Perched groundwater was measured in the three permanent monitoring wells installed as part of this investigation at depths ranging from approximately 4 ft bgs at MW-2 (located near the agricultural chemical storage/ maintenance buildings), to approximately 19 ft bgs at MW-1 in the northern parking lot, to approximately 22 feet bgs at monitoring well MW-3 located in the south end of the site.

Groundwater was measured at approximately 134 ft bgs in the facility well located next in the maintenance area (Maintenance Well), and at approximately 190 ft bgs in the well located near the Third Hole Tee Box (Irrigation Well).

Based upon the investigations performed by Braun Intertec, groundwater impacts have not been detected at the Site with the exception of trace detections of dissolved barium site wide, estimated trace concentrations of List 2 pesticides in a duplicate water sample collected from a well located in the former Maintenance Area (detected in duplicate sample only, but not in the original sample), both of which were at concentrations below relevant drinking water standards, and elevated residual concentrations of DRO in one sample taken near the former UST basins (also in the former Maintenance Area).

C.2.c.1. Surface Water Conditions

Surface water is present in several ponds across the Site, and in a drainage swale located southwest of the maintenance area. Based upon the data collected to date, the surface water at the Site does not appear to have been impacted by mercury from historic Site operations.

C.3. Contaminants of Concern

The contaminants of concern (COCs) detected during the Site investigations are listed in this Section. Additional information regarding the COCs, including their locations on the Site and concentrations, are provided in Section D.

C.3.a. Petroleum Compounds

Petroleum contamination at the Site will be addressed under the MPCA PB Program. Specific petroleum compounds detected at the Site include (by media type):

Soil

- Diesel range organics
- Xylenes

Groundwater

- Diesel range organics

Soil Vapor

- Benzene
- Ethylbenzene
- n-Heptane
- n-Hexane

C.3.b. Agricultural Chemicals

Contamination related to the storage, management, and use of agricultural chemicals at the Site will be addressed under the MDA AgVIC Program. Specific agricultural chemical-related compounds detected during the Site investigations include (by media type):

Soil

- Mercury (from past agricultural chemical use)
- Total Kjeldahl Nitrogen (TKN)
- Nitrate-Nitrogen

Groundwater

- 2,4-D
- 2,4-DB
- 2,4,5-T
- 2,4,5-TP (Silvex)
- Bentazon
- Dicamba
- MCPA
- Picloram
- Triclopyr

C.3.c. Non-Agricultural Chemicals

Contamination related to non-agricultural chemicals will be addressed under the MDA VIC Program. Specific non-agricultural chemical hazardous substances detected during the Site investigations include (by media type):

Soil

- Mercury (from non-agricultural chemical sources)
- Arsenic
- Lead
- Chromium
- Cadmium
- Acenaphthene
- Acenaphthylene
- Anthracene
- Benz(a)anthracene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Benzo(a)pyrene
- Benzo(g,h,i)perylene
- Chrysene
- Dibenz(a,h)anthracene
- Fluoranthene
- Fluorene
- Indeno(1,2,3-cd)pyrene
- Naphthalene
- Phenanthrene
- Pyrene

Groundwater

- Barium, Dissolved

Soil Vapor

- Acetone
- 2-Butanone (Methyl ethyl ketone, MEK)
- Carbon disulfide

- Chloromethane
- Cyclohexane
- 1,3-Dichlorobenzene
- Dichlorodifluoromethane
- Ethanol
- Ethyl acetate
- Methylene chloride (Dichloromethane)
- 2-Propanol (Isopropyl alcohol)
- Propylene
- Tetrahydrofuran

D. Contaminant of Concern Locations and Characteristics

D.1. Golf Course Areas

Golf Course Areas include those locations at the Site where active past golf course operations occurred; it is assumed that some level of active maintenance and chemical use occurred in and around these areas. Operations in the Golf Course Areas include the chemical storage and mixing area, the wash out and maintenance area, and greens, tee boxes, fairways, sand traps and associated roughs.

The following sections describe the various golf course areas and the types of contamination present in each area. Summary information pertaining to the need for response actions are also provided for each area.

D.1.a. Agricultural Chemical Storage/Maintenance Area

There are four buildings with associated paved loading areas that comprise the agricultural chemical Storage/Maintenance Area (Figure 2). These are the agricultural chemical storage building, the maintenance storage building, the agricultural chemical storage shed and the maintenance building. Shallow soils (0-0.5 ft bgs) in portions of the exterior paved loading area for the agricultural chemical storage building, and the exterior soils adjacent to the side loading door of the maintenance storage building (Figure 2) are intermittently impacted with mercury at concentrations that exceed the residential and commercial/industrial SRVs. Soil samples collected beneath the floors of the buildings in the Agricultural Chemical Storage/Maintenance Area and around the agricultural chemical storage shed and the maintenance building did not identify elevated concentrations of mercury above the established SRVs or screening SLV.

Summary Information

- Response Actions Required: Yes.
- COCs Triggering Response Action: Mercury in Soil.
- Relevant SRVs: Residential and Commercial/Industrial SRVs for Mercury in Soil = 3.1 mg/kg.
- Relevant Screening SLV: Screening SLV for Mercury in Soil = 3.3 mg/kg.
- Lead Program: MDA AgVIC Program.

D.1.b. Water Fill/Chemical Mixing Area

The former Water Fill/Chemical Mixing Aarea is located west of the maintenance buildings and near the wash pad (Figure 2). Soils in the water fill/chemical mixing area are impacted with elevated concentrations of mercury above the established SRVs and/or screening SLV to depths ranging up to 4 ft bgs. Borings and hand augers completed around the Water Fill/Chemical Mixing Area indicate that the deeper mercury impacts (>1 ft bgs) are limited to the area immediately around the water fill pipes.

Summary Information

- Response Actions Required: Yes.
- COCs Triggering Response Action: Mercury in Soil.
- Relevant SRVs: Residential and Commercial/Industrial SRVs for Mercury in Soil = 3.1 mg/kg.
- Relevant Screening SLV: Screening SLV for Mercury in Soil = 3.3 mg/kg.
- Lead Program: MDA AgVIC Program.

D.1.c. Greens and Tee boxes

Most of the shallow soils (0-0.5 ft bgs) in the greens and associated fringe areas and the tee boxes are impacted with mercury at concentrations that exceed the established SRVs. While some of the mercury concentrations detected in soil samples collected from the deeper soils (1-1.5 ft bgs) exceeded SRVs, most of the deeper soils (>1 ft bgs) were not impacted above SRVs. In addition, soils in the 8th hole green are impacted with arsenic above SRVs in the surface samples (0-0.5 ft bgs) and the deeper samples 1-1.5 ft bgs.

Summary Information

- Response Action Required: Yes.
- COCs Triggering Response Action: Mercury in Soil.
- Relevant SRVs:
    - Residential and Commercial/Industrial SRVs for Mercury in Soil = 3.1 mg/kg.
    - Residential and Commercial/Industrial SRVs Arsenic in Soil = 9 mg/kg.
    - Relevant Screening SLV: Screening SLV for Mercury in Soil = 3.3 mg/kg.

- Lead Programs:
    - MDA AgVIC Program – Mercury in soil.
    - MPCA VIC Program – Arsenic in soil.

D.1.d. Fairways

During the RI, the fairways were divided into several decision units (DU). These decision units (See Figure 8) were sampled as described in the RI Addendum #2 to characterize the fairways for mercury impacts in soil. Based upon the results of the DU sampling, shallow soils (<1 ft bgs) in the fairways contain varying concentrations of mercury. The concentrations of mercury in the fairways range from 0.32 to 20.2 mg/kg. Approximately ½ of the fairway area decision units described by RI Addendum #2 have mercury impacts in soil that exceed the established SRVs or screening SLV. The fairways with SRV or screening SLV exceedances are shown on Figure 9.

Summary Information

- Response Action Required: Yes (in approximately ½ of the fairway area decision units).
- COCs Triggering Response Action: Mercury in Soil.
- Relevant SRVs: Residential and Commercial/Industrial SRVs for Mercury in Soil = 3.1 mg/kg.
- Relevant Screening SLV: Screening SLV for Mercury in Soil = 3.3 mg/kg.
- Lead Program: MDA AgVIC Program

D.1.e. Rough Areas

The soils in the golf course Rough Areas generally have concentrations of mercury below the established SRVs and screening SLV, with most concentrations within the range of typical background concentrations for mercury. There are a few localized areas of the roughs where the Site investigations have detected elevated concentrations of mercury in soil that exceed the established SRVs and screening SLV. These impacted Rough Areas are located near cart paths, immediately adjacent to fairways, or adjacent to sand traps near an impacted green. The areas of the rough that require remediation are shown on Figure 9.

Summary Information

- Response Action Required: Yes (isolated locations).
- COCs Triggering Response Action: Mercury in Soil.
- Relevant SRVs: Residential and Commercial/Industrial SRVs for Mercury in Soil = 3.1 mg/kg.
- Relevant Screening SLV: Screening SLV for Mercury in Soil = 3.3 mg/kg.
- Lead Program: MDA AgVIC Program

D.2. Golf Course Support Areas

The Golf Course Support Areas include the vacant clubhouse and the area in the vicinity of the former clubhouse, the pool house and the former clubhouse/tennis courts and the golf cart and storage sheds located near the clubhouse.

The following sections describe the various Golf Course Support Areas and types of contamination present in each area. Summary information pertaining to the need for response actions are also provided for each area.

D.2.a. Clubhouse Area

Most of the soils in the Clubhouse Area are not impacted above cleanup standards. There are, however, isolated areas of shallow soils in the Clubhouse Area that are intermittently impacted with mercury above SRVs. The mercury impacts around the clubhouse were primarily in the 0-0.5 ft bgs depths, with the deeper 1-1.5 ft bgs typically having mercury concentrations below the established SRVs. As discussed in the 2022 RI, both agricultural chemical and non-agricultural chemical sources of mercury in soil are believed to be present in the Clubhouse Area.

Shallow soils (0-0.5 ft bgs) near the small storage shed northwest of the clubhouse (DSS-2, DSS-2W) are impacted with PAHs above residential SRVs. The PAH soil contamination in this area appears to be limited to the surface soils based upon data collected during the Site investigations. The area of impacts above SRVs in the Clubhouse Area are shown on Figure 5.

<u>Summary Information</u>

- Response Action Required: Yes.
- COCs Triggering Response Action: Mercury and PAHs in Soil.
- Relevant SRVs:
    - Residential and Commercial/Industrial SRVs for Mercury in Soil = 3.1 mg/kg.
    - Residential SRV for PAHs in Soil = 2 mg/kg.
    - Commercial/Industrial SRV for PAHs in Soil = 23 mg/kg.
- Relevant Screening SLV: Screening SLV for Mercury in Soil = 3.3 mg/kg.
- Lead Programs:
    - MDA AgVIC Program – Mercury in soil from agricultural chemicals.
    - MPCA VIC Program – PAHs in soil, Mercury in soil from non-agricultural chemical sources.

D.2.b. Former Pool house and Tennis Courts (Buried Debris Area)

The former pool house and tennis courts originally occupying the golf course were demolished between 1985 and 1991 and replaced with the current pool. Test trenches excavated in this area identified a Buried Debris Area, including buried concrete pads, intermixed with contaminated soils. No constituent of concern was detected in the Buried Debris Area above applicable SRVs and SLVs. However, DRO was detected in TT-1 at concentrations above the MPCA unregulated fill criteria of 100 mg/kg. The presence of buried debris and concentrations of DRO require management of the soils and buried debris in this area per MPCA requirements for regulated fill soils.

Summary Information

- Response Action Required: Yes.
- COCs Triggering Response Action: DRO in soil.
- Relevant Standard:
    - Unregulated fill Criterion for DRO in soil = 100 mg/kg.
- Lead Programs:
    - MPCA VIC & PB Programs

D.3. Existing Wetlands

There are several low areas of the Site where intermittent standing water or surface saturate conditions exist, but are not considered ponds or water features associated with the former golf course areas. These low areas are referred to as wetlands for the purpose of the Site investigations.

Shallow soils (0-0.5 ft bgs) in the wetlands are intermittently impacted with mercury at concentrations that exceed SLVs and/or SRVs. The impacts appear to be limited to surface soils (<1 ft bgs), primarily in the potential wetlands located downgradient of the maintenance area in the southeast portion of the Site, and in some isolated areas outside of the maintenance area. The locations of the wetlands that require remediation are shown on Figure 10.

Summary Information

- Response Actions Required: Yes.
- COCs Triggering Response Action: Mercury in Soil.
- Relevant SRVs: Residential and Commercial/Industrial SRVs for Mercury in Soil = 3.1 mg/kg.
- Relevant Screening SLV: Screening SLV for Mercury in Soil = 3.3 mg/kg.
- Lead Program: MDA AgVIC Program.

D.4. Ponds

Several ponds associated with the former golf course are located on the Site. Shallow sediments (0-0.5 ft bgs) in the ponds are not impacted above established SRVs or screening SLVs, except for the small pond located adjacent to the 4th fairway, which is impacted with mercury.

Summary Information

- Response Actions Required: Yes.
- COCs Triggering Response Action: Mercury in Soil.
- Relevant SRVs: Residential and Commercial/Industrial SRVs for Mercury in Soil = 3.1 mg/kg.
- Relevant Screening SLV: Screening SLV for Mercury in Soil = 3.3 mg/kg.
- Lead Program: MDA AgVIC Program.

D.5. Southern Berm

A fill soil berm area located south of the Agricultural Chemical Storage/Maintenance Area is impacted DRO, PAHs and mercury contaminants. Mercury concentrations identified in the fill soils exceed the SRVs. This Southern Berm Area also included contain varying amounts of debris intermixed with the fill soils.

Summary Information

- Response Actions Required: Yes.
- COCs Triggering Response Action: Mercury in Soil.
- Relevant SRVs: Residential and Commercial/Industrial SRVs for Mercury in Soil = 3.1 mg/kg.
- Relevant Screening SLV: Screening SLV for Mercury in Soil = 3.3 mg/kg.
- Lead Programs:
    - MDA AgVIC Program – Mercury in soil.
    - MPCA VIC Program – Intermixed debris with other measurable soil contamination.

D.6. Soil Vapor

Soil vapor samples collected at the Site to date have not identified soil vapor at concentrations greater than the 33X residential and commercial/industrial ISVs. In addition, VOCs contaminated media (i.e., sources of soil vapor) have not been identified at the Site. Water and soil samples collected by Braun Intertec at the Site have not identified VOCs except for a trace detection of xylene in one soil sample. Therefore, based upon the soil vapor, water and soil data collected to date, there does not appear to be a soil vapor area of concern at the Site. No response actions related to soil vapors are required to support redevelopment.

D.7. Groundwater/Surface Water

Constituents of concern have not been identified in groundwater or surface water samples collected at the Site at concentrations above relevant drinking water or surface water standards, with the exception of one elevated DRO detection in a groundwater sample collected in the former washout/UST area of the Site. The detection of elevated DRO in groundwater is shown on Figure 6B of the 2019 Phase II ESA, and is included as Appendix B.

Summary Information

Response Actions Required: Yes, as necessary to manage groundwater and surface water during RAP implementation. The lead regulatory programs for groundwater and surface water management will be both the MDA and MPCA since measurable concentrations of both agricultural and non-agricultural contamination have been detected in soil and groundwater at the Site during the previous and recent site investigations completed in support of this RAP and summarized in the 2022 RI Report.

E. Potential Receptors and Exposure Pathways

There is the potential for human health impacts from exposure to COC-impacted soil; such exposure may be via ingestion, inhalation, or dermal contact. Based on Site characterization data, direct exposure to soils impacted by COCs is the predominant exposure pathway at the Site.

E.1. Direct Soil Exposure Pathway

The potential receptors via direct soil exposure include current and future users of the Site and construction and utility workers (short term exposure). If impacted fill soils were removed from the Site and used as fill soils off-site, the potential receptors via direct soil exposure would include the users of those off-site properties, and construction workers, utility workers, and potentially the general public.

E.2. Leaching Pathway

Based on contaminant concentrations, there is a potential for the soil leaching to groundwater and/or surface water pathway to be completed from the elevated concentration of metals and PAHs in the soils at the Site. However, based upon the age of the releases at the Site and the recently completed groundwater and surface water investigation data collected by Braun Intertec, there are no indications that metals or PAHs in soils are leaching into surface water or and groundwater at the Site.

E.3. Water Ingestion Pathway

There is a potential risk of direct exposure to or ingestion of shallow perched contaminated groundwater in the maintenance area at the Site. However, groundwater at the Site is currently not used. There are two out of service groundwater wells and three shallow monitoring wells currently located at the Site. The Site is vacant with a security fence preventing access to the Site and the wells are secured with locking well covers. Perched groundwater is present at depths greater than 4 ft. bgs across the Site, further limiting the risk of direct contact with the perched groundwater.

F. Cleanup Standards and Definitions

The Site is currently vacant property. The planned redevelopment of the Site includes mixed use light industrial, commercial, recreational, passive greenspace and residential uses. The planned residential uses will include both high density and low-density housing (i.e., apartments and single-family homes). Response actions to be completed and the applicable cleanup standards for any given location at the Site will be determined by the planned future use that will occur at those locations.

Cleanup standards applicable to the Site and established in this RAP address the following potential exposure pathways: 1) direct human exposure to impacted soil, and 2) leaching from impacted soil that would result in impact to underlying groundwater.

The direct exposure pathway is addressed by the MPCA's Residential and/ or Commercial/Industrial SRVs. The Residentials SRV will apply in the portions of the site planned for future residential, recreational, and passive greenspace use (see Figure 11). The Commercial/Industrial SRVs will apply in the portions of the site planned for future commercial or industrial use and within the public road rights-of-way planned for the development. Meeting Site cleanup standards established in this RAP will protect construction and maintenance workers under a short-term worker scenario for residual impacted soil that may be encountered by construction workers during the redevelopment of the Site and further maintenance of utilities at the redeveloped Site. Additionally, construction and maintenance workers' exposure to soil will be managed with the implementation of a Site-specific health and safety plan.

Utility corridors will be constructed within unregulated fill soils at base of and surrounding the utility after response actions have been completed at the site. Residual contaminated soils or sediment and debris and/or regulated fill soils encountered during utility corridor excavations will be managed in accordance with the RAP or CCP as applicable.

Based on the identified COCs and the detected concentrations of COCs in Site soils, the nuisance dust standard of 2 milligrams per cubic meter (mg/m^3) will be enforced to provide protection for human health during construction activities anticipated for redevelopment at the Site.

Leaching from contaminated soil to groundwater is addressed by applying the MPCA Screening SLV to future passive greenspace areas, such as wetlands and other stormwater management features.

G. Proposed Response Actions

As described in Section E, direct human exposure to contaminated soils is the primary environmental risk impacting the planned redevelopment at the Site. The proposed response action activities presented herein will involve the excavation and management of impacted soils that were identified at the Site. The proposed response actions will address the identified soil contamination at the Site to protect human health and the environment at the Site and facilitate redevelopment. The response actions were selected based on Site conditions and appropriate cleanup standards for planned future land uses of the Site. A diagram depicting the future redevelopment and associated land uses is included as Figure 11.

The planned response actions include the following:

- Managing contaminated media during Site clearing and grubbing.
- Abandonment of the existing monitoring wells and abandoned groundwater wells at the Site.
- Building and existing structures demolition.
- Removal of subsurface utilities located within targeted soil remediation areas to provide access to impacted soils.
- Removal of subsurface irrigation infrastructure located within targeted soil remediation areas to provide access to impacted soils.
- Management of surface water and shallow groundwater at the Site to facilitate soil remediation.
- Additional soil sampling and analysis in the potential wetland south of the maintenance area.
- Excavation of mercury impacted soil/sediments exceeding established cleanup standards and disposal of the excavated material off-site.
- Management of residual mercury impacted soils with concentrations above naturally occurring background levels.

- Excavation of PAH and arsenic contaminated soil exceeding established cleanup standards and disposal of the excavated material off-site.
- Excavation and on- or off-site management of regulated fill soils.
- Backfilling remedial excavations as needed with clean soil from on Site and/or Imported fill material from off Site.
- Petroleum impacted soil excavation and disposal off-Site.
- Short term/temporary engineering controls (dust control, storm water control, Site access).

These actions are described in more detail in the following sections. Additional detail and specific requirements for implementing the work described below is provided in the Soil Management Plan included as Section H below.

G.1. Response Actions Related to Contaminated Media Excavation

The response actions related to the excavation of the identified areas of contaminated soil, sediment and debris-containing materials will be monitored and documented by Braun Intertec engineers and scientists with experience with Brownfield redevelopment projects including soil, environmental, and geotechnical corrective actions.

Oversight of the earthwork and field screening for the COCs during earthwork activities will include real-time analysis for organic vapors, soil sampling and analysis for COCs excavation verification, tracking of contaminated soil stockpiles and volumes, surveying excavation boundaries and placement locations, and documenting the work in a RAP Implementation Report to support MDA and MPCA RAP implementation approvals and final environmental assurances.

A general discussion of the response actions needed to complete the required contaminated media excavations, based on previous environmental investigations and planned redevelopment, is presented below.

G.1.a. Site Clearing, Grubbing and Tree Removal/Replanting

Trees, stumps surface vegetation and related subsurface root systems will be cleared and grubbed as necessary to facilitate completion of response actions and redevelopment. In addition, select existing mature trees at the Site may be considered for intact removal and replanting at either an on-site or off-site location subject to consideration of the tree's location related to known existing contaminated soil and the potential for residual contaminated soil being attached to the removed root system.

The following summarizes the response actions and considerations that will apply to the site clearing, grubbing and tree removal/replanting activities.

- Site clearing, grubbing and tree removal activities that disturb site soils will be observed and monitored by Braun Intertec staff. Site clearing and grubbing activities that occur and disturb soil within a known area of soil/sediment contamination will require management as a contaminated material under this RAP.
- At locations of known contaminated soil or sediment, the portions of the removed trees and vegetation with attached soil will be managed as contaminated material and will be disposed of off-site at a permitted landfill (subject to landfill approval). If practical, the soil attached to the trees and vegetation from known areas of contamination will be manually removed as a response action under this RAP to allow removal and/or recycling of the vegetation as clean material without restriction. On-site staging or stockpiling of trees and/or vegetation with attached soil will be completed as needed, subject to the same daily covering requirements utilized for contaminated soils (see Section H.6).
- At locations with no known contaminated soil or sediment, the portions of the removed trees and vegetation with attached soil will be managed as clean material. This clean material will either be processed (e.g., chipped) and reused on-site without restriction or hauled off-site for reuse or recycling as unregulated material as appropriate. On-site reuse locations will likely include future wetlands and greenspace areas subject to project need and material suitability. On-site stockpiling and staging of the removed clean trees and related vegetation will be subject to erosion control project requirements.
- Above grade portions of trees and site vegetation that can be removed without disturbing site soils will be managed as clean material. The material will either be processed (e.g., chipped) and reused on-site without restriction or hauled off-site for reuse or recycling as unregulated material as appropriate. On-site reuse locations will likely include future wetlands and greenspace areas subject to project need and material suitability. On-site stockpiling and staging of the removed clean trees and related vegetation will be subject to erosion control project requirements.
- Existing mature trees at the Site will only be considered for intact removal and replanting if the tree's original location is outside of an area of soil or sediment contamination addressed by response action under this RAP. Existing trees from other non-contaminated locations will be considered eligible for intact removal and replanting. If replanted on-site, the trees removed intact from uncontaminated areas will be replanted on-site without further sampling or testing of the attached soil for contamination. However, soils attached to trees removed intact for off-site

replanting will be sampled and tested for mercury to confirm that the remaining attached soils meet the MPCA criteria established for unregulated soils.

G.1.b. Abandonment of the Existing Wells

Currently there are three monitoring wells, an irrigation well, and a maintenance area production well at the Site.

The three monitoring wells were installed by Braun Intertec include the following:

- MW-1 (Unique number 849084), total depth is 25 ft bgs
- MW-2 (Unique number 849085), total depth is 20 ft bgs
- MW-3 (Unique number 849086), total depth is 30 ft bgs

An irrigation well and associated pump house are located approximately 600 feet north-northwest of the maintenance area. The location of the irrigation well and pump house corresponds to the location described for Unique Well Number 603061. The well depth is reportedly 486 feet.

An unregistered well was observed by Braun Intertec near the southwest corner of the Site in the vicinity of the maintenance buildings that did not appear to have a Unique Well Number. Based on previous reports and our interview with a previous employee of the former golf course, the well was apparently used for various washing and maintenance activities. The depth of the well and other information concerning the well is unknown.

The presence of unsealed wells can act as a conduit for impacts to migrate into groundwater. Therefore, response actions will be implemented by utilizing a licensed well contractor to seal the five wells described in this section in accordance with Minnesota Department of Health (MDH) regulations.

These five wells will be properly abandoned per the MDH well code during RAP implementation activities. The location of the five wells is shown on Figure 12.

G.1.c. Demolition of Existing Buildings and On Site Structures

Braun Intertec previously prepared and submitted to the MDA and MPCA, under separate cover, soil management plans for the planned demolition of the structures located in the Site's Maintenance Area and the Clubhouse Area. The specifics for soil management during building demolition in these areas can be found in the documents *Storm Sewer Rehabilitation & Building Demolition Soil Management Workplan Former Hillcrest Golf Course Site, Saint Paul, Minnesota*, dated July 26, 2021, and the *Building Demolition Soil Management Workplan, Former Hillcrest Golf Course Site – Clubhouse Area, Saint Paul, Minnesota* dated January 28, 2022 (2022 Clubhouse Demolition SMP).

The remaining buildings, including slabs and foundations, as wells as the water lines, sanitary/storm sewer lines and other buried utilities, will be demolished as part of the planned development work. The existing paved areas and concrete slab at the Site, where practical, will be reclaimed, crushed, and reused on site as aggregate base materials for future roadways or parking areas (MNDOT Class 5). The re-use of reclaimed concrete and asphalt pavement is now a common practice and saves on the use of virgin aggregate. During demolition and removal activities, environmental observations and field screening for the presence of wastes from the historic floor drains, sumps, and piping and unanticipated impacted material will be performed.

Most of the hazardous materials have already been properly removed/abated from the existing structures. However, some asbestos containing materials (ACM) and/or other regulated building materials remain. These materials will be properly abated and removed prior to demolition. The foundations and utilities for these structures may contain waterproofing. Waterproofing can contain asbestos, therefore as these structures are unearthed during demolition the waterproofing will be sampled to evaluate whether the waterproofing contains asbestos.

The contract for demolition will include specifications to ensure that City and State permit conditions and rules are followed, including site access control, utility abandonment, storm water control and fugitive dust monitoring and control.

The Site has some miscellaneous solid waste scattered around the Site. These items will be recycled or handled and disposed in accordance with appropriate regulations. Any remaining solid waste debris such as miscellaneous debris and wood will be segregated and disposed of off-site at appropriate permitted facilities in accordance with local, state and Federal requirements.

After demolition of the clubhouse, the below ground level will be backfilled with either on site clean soils from the designated Borrow Area (2022 Clubhouse Demolition SMP) or approved imported soils (see Section G.4.e for imported soil requirements). Braun Intertec collected composite samples through the proposed borrow area soils for laboratory analysis to characterize the soils. Based upon the results of the Borrow Area investigation, the borrow soils meet the definition of unregulated fills per MPCA guidance and can be reuse on site. A table summarizing the borrow soil analytical results is include as Table 1.

The above ground structures that will be demolished are shown on Figure 13.

G.1.d. Management of Surface Water and Shallow Groundwater at the Site to Facilitate Soil Remediation

Dewatering of surface water in existing ponds and potential wetlands and shallow groundwater will be required to complete soil response actions in areas of the Site where surface water and shallow groundwater intersect with contaminated soil and sediment areas. Surface water and shallow groundwater will need to be dewatered and properly managed to allow access to the underlying impacted soils/sediments.

Constituents of concern have not been detected in surface water samples or shallow groundwater samples collected during the Site investigations at concentrations above relevant drinking water or surface water standards, with the exception of an isolated shallow groundwater sample collected near the former UST adjacent to the maintenance aera of the Site. Discharge and/or treatment of stormwater, or any other dewatering action required for demolition or soil remediation, will be conducted in accordance with state, federal, and local regulations and rules. Water from within the ponds and potential wetlands, as well as stormwater catch basins/manholes and piping, may be pumped out using a vac truck or similar equipment. Dewatered surface water or shallow groundwater removed during response action implementation will be either pumped into existing drainage pond(s) on the Site, stored in a vac truck or portable tanks, used for on-site for dust suppression during site excavations, transported for disposal at an off-Site permitted facility, or discharged under proper permits to the existing sanitary sewer system. Best management practices, including filtration and/or sediment settling tanks will be used during the water pumping activities to minimize the potential for contaminated sediments and/or soils to become intermixed with the water being managed. A sanitary sewer discharge permit and Minnesota Department of Natural Resources DNR water appropriations permit will be obtained for the required dewatering and water pumping/management activities as required.

G.1.e. Additional Soil Sampling and Analysis - Wetland South of Maintenance Area

Due to the presence of standing water, several of the planned soil samples in the potential wetland south of the maintenance area (see the RI Addendum #2) could not be collected before winter/freezing conditions made sampling impractical. Planned samples SED-6 N, SED-6 E, SED-6 S, SED-6 W, PW-6C N, PW-6C W, PW-6D S, and PW-6D W will be collected once the standing water in this area is removed during RAP implementation. The soil samples will be collected and analyzed per RI Addendum #2, and any additional mercury impacts above the established SRVs or screening SLV will be addressed as discussed in Section G.1.f below.

G.1.f. Excavation of Mercury Impacted Soil/Sediment and Disposal Off-Site

A Braun Intertec environmental technician will be on-site during response action excavation activities associated with the removal of mercury contaminated soils know to exceed Site cleanup standards. Proposed excavation areas are shown on Figure 10. Excavation areas will be pre-staked using GPS

coordinates. The initial excavation depths identified on Figure 10, range from 1 to 5 ft bgs. The initial excavation depths are based upon the vertically stratified sampling data collected to date at the Site. Excavation boundaries (sidewalls and base) will meet the Residential/Commercial SRV for mercury of 3.1 mg/kg. If confirmation sampling (see Section G.4.b below) indicates that residual mercury remains in a base or sidewall sample at concentrations above the Residential/Commercial SRVs, that area will be further excavated.

Excavated mercury-impacted soils exceeding established Site cleanup standards will likely be direct-loaded into trucks and transported to a permitted industrial landfill in Minnesota. However, if the direct loading cannot be used, these soils will be stockpiled on-site until transportation and disposal arrangements can be made. Stockpiled soils will be placed on polyethylene sheeting or other impervious surface and covered with polyethylene sheeting at the end of each workday, which will be secured in place. The stockpile will be bermed to prevent storm water run-on and/or runoff.

During excavation of shallow impacted soils through the golf course, irrigation piping may be encountered. Shallow irrigation piping in areas requiring remedial excavation will be removed to provide access to impacted soils and handled in the following manner:

- The piping will be segregated from piping removed from non-impacted areas
- The soil adhered to the piping that was removed from within remedial excavation areas will be disposed of offsite at a permitted landfill.

G.1.g. Management of Mercury-Impacted Soils Above Background Concentrations, but Meeting Site Cleanup Standards

Based upon the sampling results to date, portions of the fairways, tee boxes, and potential wetland/ponds are impacted with mercury above the Residential/Commercial SRVs. However, there are several tee boxes, large portions of the fairways and most of the potential wetlands/ponds that contain residual mercury impacts below the Residential/Commercial SRVs. Most of these residual impacts are below the Residential/Commercial SRVs. However, the concentration of mercury in soil from these areas is mostly above typical background concentrations for mercury in soils, with some concentrations near cleanup standards.

Meeting the final grades at the Hillcrest Redevelopment Site will require a net soil export to balance the Site. If a suitable off-site use of the referenced soil exceeding background mercury concentrations cannot be found, the material will require off-site disposal at a permitted landfill if removed from the Site. Under this scenario, it will be more cost effective to manage the soil exceeding background mercury concentrations on site and export clean native soil to balance soils during redevelopment. Therefore, if off site reuse of the soils exceeding mercury background concentrations can be found, the soil exceeding

background mercury concentrations will be managed on-site as a response action to the degree that the material meets site use requirements. As such, the soils from the fairways, tee boxes, ponds and wetlands, that have mercury or other impacts at concentrations above background concentrations, will be managed on site as outlined in Section H of this RAP.

It is further noted that the MPCA's Best Management Practices for the Off-Site Reuse of Unregulated Fill Guidance Document[1] recommends the following Best Management Practices for the placement of unregulated fill in sensitive settings:

- Avoid placing unregulated fill at schools, playgrounds, daycares, and residential properties. Unregulated fill is most suitable for use at industrial or commercial properties.
- Avoid placing unregulated fill in gardens where food for human/animal ingestion will be grown.
- Observe a minimum ten-foot separation distance between unregulated fill and the water table.
- Avoid placing unregulated fill where contaminants may be transported by run-off to lakes, rivers, wetlands, or streams.

The combination of these future off-site use limitations and the stigma associated with exporting impacted soils as unregulated fill make it unlikely and impractical to export this soil for off-site reuse as unregulated fill. Furthermore, it is better environmentally and more cost effective for the project (and for site cleanup) to manage the material on-site as an environmental response action under this RAP to the degree possible and needed for redevelopment rather than to dispose of the material in a landfill.

G.1.h. Excavation of PAH Contaminated Soil and Soil with Intermixed Debris

There are isolated areas of soils at the Site that are impacted with PAHs at concentrations above Residential/Commercial SRVs (e.g., clubhouse area and buried debris in the southern berm). There are also isolated areas at the Site with debris fill soils, which are impacted with Constitutes of Concern. These contaminated soils and debris fill soils will be excavated to the depth required by the planned development and to meet established Site cleanup standards. These excavated soils will be field screened with a PID equipped with 10.6 eV lamp. Geotechnical suitable soils with no impacts above Residential/Commercial SRVs or screening SLVs, and up to 10% debris may be reused as engineered fill beneath paved areas. Unregulated fill[1] soils with no more than de minimis debris may be re-used beneath the future buildings. Contaminated soils and contaminated soils with mixed debris will be disposed of off-Site at a permitted landfill.

G.1.i. Petroleum Impacted Soil Excavation and Disposal Off-Site.

There is an area of shallow petroleum impacts associated with closed leak sites #5050 and #18327 located in the Maintenance Area of the Site.

The petroleum impacted soils will be managed in accordance with MPCA guidance as prescribed below.

In the areas where only petroleum contaminated soils are encountered the following applies:

- Petroleum-saturated or grossly contaminated soils shall be excavated and properly managed at an MPCA approved off-site treatment/disposal facility.
- Soils excavated for redevelopment with photoionization detector (PID) screening values at or greater than 10 parts per million (ppm), and/or with DRO concentrations exceeding 100 mg/kg, will be properly managed and disposed of at a permitted off-site treatment/disposal facility. If soils are transported off-site for disposal, the soils will be characterized and taken to a disposal facility permitted to accept those waste.
- For utility corridors, soils with PID screening values at or greater than 10 ppm encountered during the installation of underground utilities will be removed and property managed as part of the RAP. If contamination remains at or above 10 ppm a vapor barrier will be placed around the installed utility corridor.

G.2. Short Term Monitoring/Temporary Engineering Controls

There will be monitoring and controls on storm water occurring during response actions and dust generated from the soil response actions, mass grading, soil correction, demolition and related work.

G.2.a. Dust Control and Air Monitoring

Perimeter air monitoring will be performed during response action soil excavation and excavated soil handling and placement to document that the dust control activities are successful at keeping nuisance dust to levels below the nuisance dust standard. Dust monitoring will be accomplished with hand-held dust monitoring meters.

The dust monitoring will be defined in a Nuisance Dust Monitoring Plan/Specification that will require sampling and analysis and reporting daily while abatement, demolition, and soil earthwork is being performed.

G.2.b. Storm Water Pollution Prevention and Sediment Control Plan

An interim and phased Storm Water Management Plan will be developed to control erosion and sediment on-Site. This work will be detailed and approved in a Construction Site Storm Water Pollution Prevention Plan (SWPPP).

G.2.c. Site Access

Site security will include the existing security fences and signage to prevent unauthorized access during the work and in non-working hours.

G.3. Permits

A number of permits will be required by governmental agencies. A list of those permits potentially required is as follows.

- SWPPP/Erosion Control Plan: This plan is required by the MPCA, as well as the City of St Paul and the Ramsey-Washington Metro Watershed District. The plan will be prepared by the general contractor for the response action work. This contractor will also implement the plan during subsequent building and utility work. The plan and its implementation will ensure that storm water from the Site construction work, both during the RAP implementation and during subsequent Site building and utility construction, will not be unreasonably impacted and discharged off-Site. This will be accomplished through BMPs prescribed by the City of St Paul and the Watershed District.
- Land Alteration/Grading Permit: For the Site excavation, stockpiling and soil placement and compaction and final grading a grading permit may be required by the City of St. Paul and will be applied for by the general contractor for the response actions.

G.4. Methods and Procedures

G.4.a. Soil Screening

A Braun Intertec environmental technician with asbestos inspector credentials will be on Site during excavation activities when impacted soils are excavated at the Site. Soils will be observed for the presence of visual and olfactory indications of contamination. Direct olfactory evaluation of contaminated soil is not recommended for safety reasons, but incidental observations will be noted and acted on. The technician will follow MPCA-approved headspace methodology using a PID equipped with a 10.6-electron-volt lamp to monitor soil for the presence of organic vapors. A minimum of one sample

for headspace analysis will be collected for every 10 cubic yards of potentially impacted soil removed. Screening results will be documented.

The headspace procedure is used to field-screen organic vapor levels in soils. The procedure consists of half-filling a new quart-sized sealable bag with a soil sample. The bag is quickly closed and headspace development is allowed to proceed for at least 10 minutes. The bag is shaken vigorously for 15 seconds, both at the beginning and the end of headspace development. After headspace development, the PID probe is inserted into the bag to one-half the headspace depth. The highest reading observed on the PID is then recorded.

In the area of the known petroleum impacts, as excavation proceeds, the field technician will collect and field screen soil samples frequently, enough to verify the need for soil removal (at least one sample for each 10 cubic yards of soil removed). Removed samples will be labeled with the prefix "R", the sample ID, and the sample depth. The field technician will document successive PID readings vertically below the source of release, indicating the location and depth of each sample on a map of the excavation.

G.4.b. Confirmation Sampling

As part of RAP implementation, Braun Intertec will perform confirmation soil sampling to verify Site cleanup standards are met and assist with managing the exposure pathways.

This section outlines the plan for confirmation soil sample collection and analysis from soils excavated during implementation of the RAP.

Following excavation of each impacted area, confirmation samples will be collected from the base and sidewalls of the excavation. The following additional details are provided.

Greens/Fringes Excavations

For each green and associated fringe area, the excavation will be divided into quadrants and one base confirmation soil sample will be collected per quadrant. Each quadrant sample will be a composite sample comprised of four aliquots. See Figure 14 for an example of this approach.

For sidewall samples, one confirmation sample will be collected for every 45 lineal feet and the side wall composites form each quadrant will be used to create a composite sidewall sample for each quadrant. Sidewall samples will be collected from the 0- to 6-inch interval at the excavation boundary. The 0- to 6-inch interval is used to confirm clean boundary because the fungicide was applied topically, and this interval is most applicable to identify whether impacts remain. All samples collected form the greens and associated fringe areas will be analyzed for mercury using EPA method 7471. In addition, the confirmation samples for the 8th Hole Green will be sampled for total arsenic using EPA method 6020.

Tee boxes and Rough Hot Spots

Confirmation samples will be collected from the base of those tee boxes and the rough with mercury concentrations in soil Residential/Commercial SRVs (See Figure 10). Confirmation samples will be collected from these areas in the same manner as for the greens/fringes described above.

Wetlands and Ponds

Confirmation samples will be collected from the base of those Potential Wetlands and Ponds with mercury concentrations in soil Residential/Commercial SRVs (See Figure 10). Confirmation samples will be collected from these areas in the same manner as for the greens/fringes described above.

Fairways

Confirmation samples will be collected from the base of the decision units in the Fairways that had detected concentrations of mercury in soil exceeding the Residential/Commercial SRVs (See Figure 8). The confirmation base excavation samples from the Fairways with surficial mercury impacted above Residential/Commercial SRVs will be collect in the same manner as described in the RI Addendum #2, which is summarized below.

The fairways are sub-divided into various decision units.

- In each decision unit where the concentration of mercury in surface soils was above Residential/Commercial SRVs, one composite soil sample will be created from several aliquots collected from the 1-1.5-foot soil interval for mercury analysis.
- On aliquot will be collected for every 2,000 square feet.
- Composite samples will be created by combining all aliquots from a decision unit at a similar depth into one composite sample per the protocols in the 2020 RI Work plan/2020 SAP.
- If the results of the 1-1.5 ft confirmation samples are greater than the mercury SRV, then another 6 inches of soil will be removed for off-site disposal, and another composite sample will be collected from that decision unit from the 1.5 to 2 ft bgs depth for lab analysis of mercury. This process will continue deeper in the applicable decision units until the soil detections are less than the SRV for mercury.

The Fairway decision units and aliquot sample locations are shown on the attached Figure 9. All samples collected form the fairways will be analyzed for mercury using EPA method 7471.

Excavation of Soils with Intermixed Debris

Soils from these areas will be screened using a 10.6 eV PID at a rate of approximately one headspace measurement for every 100 cubic yards (CY) of soil.

Soil samples will be collected for laboratory analysis from excavation sidewalls and base. Soil samples will be collected from these fill soils at a rate of one five-point composite sample and one grab sample per 2,500 CY. Composite samples will be analyzed for PAHs and Resource Conservation and Recovery Act (RCRA) metals. Grab samples will be analyzed for VOCs.

Petroleum Excavation

Petroleum post excavation sampling will be in accordance with MPCA guidance document Excavation of petroleum-contaminated soil and tank removal sampling, C-prp3-01, dated March 2017.
The Braun Intertec technician will collect bottom samples from the bottom of the excavation basin at a rate shown in the chart below. Bottom samples will be labeled with the prefix "B", the sample ID, and the sample depth.

Sidewall samples will be collected at a rate shown in the chart below; with a minimum of four sidewall samples (i.e., one from each side). The collected side wall samples will be collected at a depth of the highest PID readings during excavation. Sidewall samples will be labeled with the prefix "S", the sample ID, and the sample depth.

Confirmation samples will be analyzed for volatile organic compounds (VOCs) and DRO.

The number of soil samples from the excavation areas from petroleum impacted areas will be collected based on the following:

Base of Excavation (ft^2)	**Number of Samples**	**Sidewalls (ft^2)**	**Number of Samples**
<500	1	<500	4
500-1000	2	500-1000	5
1000-1500	3	1000-1500	6
1500-2500	4	1500-2000	7
2500-4000	5	2000-3000	8
4000-6000	6	3000-4000	9
6000-8500	7	>4000	1 per 45 linear feet
8500-10890	8		

G.4.c. Areas with No Known Impacts or Debris Present

Protocols for characterizing fill and underlying native soil in these areas where no known impacts or debris is present are described below.

Soils excavated from these areas will be visually monitored by for obvious signs of potential impacts (visual, olfactory). Soils with no organic vapors detected will be re-used onsite as unrestricted fill. If soils are planned to be re-used off-site (not currently anticipated), then these soils will be stockpiled on-site and characterized for potential off-Site reuse. Soil samples of soils for potential off-site re-use will be collected from these stockpiles at a rate of one five-point composite sample and one grab sample per 5,000 CY. Composite samples will be analyzed for PAHs, eight RCRA metals, and DRO. Grab samples will be analyzed for VOCs and GRO. Soils reused off-Site will meet the MPCA's unregulated fill criteria.

Soils with organic vapors detected above background concentrations will be characterized for on-site reuse or off-Site disposal. For other areas with elevated PID readings, soil samples will be collected from these stockpiles at a rate of one grab sample per 2,500 CY. Samples will be analyzed for VOCs.

G.4.d. Sample Labeling and Handling

Sample bottle labels appropriate for the size and type of containers will be provided by the MDH certified laboratory analyzing the samples. All sample containers will be labeled prior to being filled. Each label will indicate at a minimum:

- Sample identification
- Date/time of sample collection
- Sampler's initials
- Required analyses
- Type of preservative

All labels will be completed in waterproof ink. Each sample collected will be given a unique sample identification code.

The field sampler will be responsible for the care and custody of the samples until they are transferred or properly dispatched to the laboratory. The samples will be shipped via courier or hand delivered to the laboratory. During transfer of custody, a properly completed chain-of-custody form will accompany samples.

G.4.e. Soil Import

Fill sources will be considered on a case-by-case basis and evaluated for the potential presence of contaminants in the material. If the fill source is from a site with no environmental concerns, such as native pit run material or from a residential development with no USTs or other environmental concerns, no analytical testing of the material will be conducted.

Acceptance of fill from other sources with potential environmental concerns will be made on a case-by-case basis. As part of the decision-making process, the land-use history of the source facility will be evaluated, existing environmental reports and analytical data will be reviewed, and the geotechnical suitability of the material will be assessed. If additional analytical testing of the material is deemed warranted after input from the MDA and MPCA, samples will be collected at a frequency of at least one sample per material type and a frequency no less than one sample per 2,000 CY of material. Analytical parameters will be determined based on historic use of the source facility and the Site contaminants of concern. Analytical results will be compared to the Residential SRVs and Screening SLVs. Environmental monitoring of fill soils as they are loaded into trucks from the source facilities will be conducted if warranted based on the nature of the fill source location.

All imported fills will meet the requirements of the criteria specified in the MPCA's 2012 Unregulated Fill Guidance.

H. Soil Management Plan

This Soil Management Plan describes the management of the various soils present at the Site in regard to the RAP. Detailed procedures for soil management and activities related to this RAP will be included in engineering specifications that will be prepared prior to response action plan implementation.

H.1. Existing Cover and General Plan for Site Soils

The surface cover at the Site currently includes primarily grass covered open areas, buildings, cart paths, a parking lot, water features, and potential wetlands.

The future surface cover at the Site will include the future building pads, residential driveways, commercial parking lots and drive areas and associated curbs and drainage features, and open greenspace areas

During RAP Implementation, the known areas of impacted soils and debris-bearing fill soils exceeding the established site cleanup standards will be excavated and managed to meet the Residential and Commercial/Industrial SRVs and/or screening SLVs and to reach geotechnically suitable soils for constructing new pavement areas and associated utilities, and excavated to environmentally suitable soils in the greenspace areas.

The impacted soils with concentrations of impact above Residential/Commercial SRVs, screening SLVs, unregulated fill criteria, and/or contain regulated materials such as debris, once excavated will be either temporarily stockpiled, and/or directly hauled off-site for disposal at a permitted landfill.

Soils impacted with residual contaminant concentration below site cleanup goals, but above background concentrations will be managed on site if the soils are suitable for the planned site development.

H.2. Site Soil Types

The primary soil types have been documented at the Site, including:

- Variable fill soils/fill soils with debris
- Organic soils/peat
- Alluvium, fluvial and glacial tills

Descriptions of these soil types are presented in Section C.2 and the nature of impacts are described in Sections C.3 and Section D of this document.

H.3. Site Earth Work Requirements for Existing Conditions

The Site response actions require earthwork for the proper management of mercury, PAHs, arsenic and petroleum impacted soils at the Site. The scope of earthwork has been determined based on the environmental requirements to ensure that the COCs do not pose a risk to human health or the environment during and after the Site redevelopment. This section presents the requirements for the site earthwork to ensure the geotechnical and environmental requirements are met in accordance with the RAP.

H.3.a. Environmental Soil Classifications

Based on previous environmental investigations the known COCs at the Site include mercury, arsenic, PAHs and petroleum. The presence and magnitude (concentrations) of the COCs are not evenly distributed across the entire Site.

Figure 10 illustrates the known areas of soils that would be considered as regulated fill soils per the MPCA's Off-Site Use of Regulated Fill Policy, March 2012, c-rem2-02.

The soils at the Site will be placed into three use categories to be followed during RAP implementation.

The three soils classification categories are provided in the following sections.

H.3.a.1. Type 1 Soils

These are either on site soils or imported soils that meet the requirements to be considered unregulated fill per MPCA guidance. These soils may be reused on site with no environmental restrictions. All geotechnically suitable Type 1 soils may be placed beneath buildings, pavements, and in utility corridors.

H.3.a.2. Type 2 Soils

Type 2 soils are soils from the tee boxes, fairways, ponds, and wetlands that contain residual mercury impacts below the Residential/Commercial SRVs, but are above typical background concentrations for mercury in soils in the area.

Type 2 soils will be restricted to placement in portions of the Site zoned for future commercial/industrial use, roads, wetlands, and within the planned park. Type 2 soils placed into the planned park will be placed beneath a 1-foot-thick buffer of Type 1 soils. Type 2 soils will not be placed in the portion of the Site zoned for residential use.

H.3.a.3. Type 3 Soils

Type 3 soil are those onsite soils that contain concentrations of contaminants, debris or petroleum and/or do not meet the requirements to be considered unrelated fill per MPCA guidance. The areas of contaminated soils have been described above and are shown on Figure 10. Type 3 soils will be excavated and transported off-Site for proper disposal at an approved permitted facility.

H.4. Future Soil Placement Considerations

H.4.a. Pavements and Building Pads

All geotechnical suitable Type 1 and Type 2 Soils (per the restrictions outlined above in Section H) may be placed beneath pavements and building pads if determined to be geotechnically suitable for that purpose.

H.4.b. Utility Corridors

Utility Corridors will be constructed to ensure future workers installing or maintaining buried utilities will not be exposed to known COCs. The utility corridors will be constructed within soils meeting the established site cleanup standards. In practice, this will require that the excavation of debris and/or impacted soils that are present within the utility corridors will be completed and documented in advance of utility excavation. And placement of approved soils. The soils approved for use in the utility corridors include Type 1 and Type 2 Soils to the degree the materials are geotechnically suitable for the intended use.

In accordance with the RAP, soils placed into utility corridors must meet the following requirements:

- Soils will meet Residential SRVs, including PAHs as expressed in BaP equivalent concentrations of 2 mg/kg, within the utility corridor.
- Screening SLVs will be met to the water table in areas where infiltration is allowed to occur.

H.4.c. Greenspace/Wetland Areas

In accordance with the RAP, greenspace areas will contain only approved on-Site soils or approved imported fill. Greenspace will contain only Type 1 soils and/or Type 2 soils (per the restrictions outlined above in Section H). Impacted fill soil exceeding site cleanup standards that currently exists in planned future greenspace areas will be excavated. These excavated soils will be transported off-site for proper disposal. Site soils reused on site and imported fill must meet the requirements of the RAP.

In accordance with the RAP, imported, impacted on site fill soils, and other onsite soils placed in the greenspace areas must meet the following requirements:

- Soils will meet Residential SRVs, including PAHs as expressed in BaP equivalent concentrations of 2 mg/kg.
- Screening SLVs will be met to the water table in areas where infiltration is allowed to occur.
- Contain no more than a de-minimis amount of debris.

H.5. Site Controls

The following controls will be necessary during the soil correction activities to ensure the work is conducted in a manner that is protective to the health and safety of onsite workers and the general public. A Site-specific HASP detailing personal health and safety measures will be prepared for the RAP Implementation. The earthwork contractor will also prepare a HASP that will address environmental concern, as well as those concerns normally associated with excavation and compaction.

Engineering controls will be implemented during the response actions to protect human health and the environment including Site-wide dust control (to ensure adherence with the nuisance dust standard), storm water control, and Site access. These controls will be designed, planned and documented throughout the RAP implementation to ensure thoroughness and as a technique to manage the construction. The specifications will provide details to the implementation of the temporary engineering controls.

H.5.a. Fugitive Dust

The primary COC exposure route of concern at the Site is inhalation of fugitive dust with elevated mercury, metals, or PAH concentrations. Currently, the Site is covered with grass/vegetation, which generally prevents the generation of dust. When earthwork occurs within the limits of soils with elevated metals or PAHs, controls must be in place to minimize the generation of dust during work and non-work hours.

The contractor will provide the defined and specified practices to control fugitive dust generation during Site activities. The purpose is to reduce the risk of exposure to airborne materials that may contain elevated COC concentrations and silica to workers at the Site and to the general public adjacent to the Site. These practices will be implemented when impacted soils are exposed at the ground surface. Records will be kept of the date, time, location, and method of dust suppression.

Dust from grading and soil consolidation actions will be controlled by applying water to the soils being worked. Visibly dry areas will be watered as they are observed. The amount of impacted soil that is exposed at the end of each work shift will be minimized, and those areas left exposed will be sprayed down to form a crust prior to the end of each work shift. The amount of water used for dust suppression will be carefully controlled so that runoff does not occur. Records will be kept of the date, time, location, and method of dust suppression.

H.5.b. Dust Control While Working

Dust from environmentally restricted soils must be kept to a minimum. Primary dust control measures include minimizing open soil areas, wetting soil with water, use of dust suppression agents, and using stockpile management practices. These options are discussed below.

H.5.b.1. Minimizing Open Soil Areas

In areas where soil correction work involves debris containing fill and/or PAH or RCRA metal-impacted soils, the disturbance of these soils will be limited to what will be corrected that each day to the degree feasible.

At the end of the day, all debris fill and/or PAH or RCRA metal-impacted soils may be covered with an interim cover. Acceptable interim covers, if deemed necessary at the time, include but are not limited to:

- A minimum of 2 inches native sand, sandy fill, clean organic soils, or imported soils;
- Spraying the exposed soils with water to form a crust;
- Cover sheeting that meets the minimum specification for stockpile materials; or
- An approved dust control agent.

H.5.b.2. Wetting Soils

Dust suppression via water spraying is considered an effective control method during working hours. The amount of water used for dust suppression will be carefully controlled so that runoff does not occur.

H.5.b.3. Alternative Controls

A number of alternative dust control measures exist. The engineering specifications and contract allows for the earthwork contractor to develop alternative means and methods to complete the job in accordance with the RAP. Braun Intertec will evaluate and approve or disapprove alternative dust suppression means and methods presented by the contractor.

H.5.b.4. Non-Work Hours

At the conclusion of each workday, excavated impacted soils will be covered with an approved interim cover.

H.6. Stockpile Management

During the course of the redevelopment, stockpiles may be created for impacted soils, asphalt, concrete, Site fill material, organic soils and native soils. The stockpiles will be maintained until the stockpiled material is transported off-site or reused as fill on Site. Such stockpiles, if chemically impacted, will be covered when not being added to or subtracted from.

Stockpiles will be protected from storm water run-on/run-off and shall have effective erosion and sedimentation control features in accordance with the SWPPP. All material placement shall be in accordance with the requirements of the SWPPP. This shall include, at a minimum, installing berms or silt fences around potentially impacted soil stockpiles.

Soil stockpiles will be located throughout the project site in areas adjacent to active work areas. These stockpiles will be created during the soil correction work as necessary. Stockpiles will be inspected daily to ensure cover materials are sufficient and material is not being lost to erosion/runoff.

H.7. Groundwater/Surface Water Management

During planned excavations and the installation of utilities and/or soil corrections, temporary groundwater dewatering may be necessary. Discharge and/or treatment of groundwater, storm water, or any other dewatering action will be managed in accordance with state, federal, and local agencies.

Contaminated groundwater and/or storm water will be managed by permit under the following approaches (as appropriate):

- A MCES temporary discharge permit may be obtained in order to facilitate the discharge of any contaminated groundwater or storm water accumulated in Site excavations to appropriate nearby sanitary sewer connections. Monitoring, testing, and reporting will be required by MCES. Pre-discharge treatment will be completed for storm water or groundwater collected during construction with contaminant concentrations or characteristics exceeding permit requirements. Anticipated pretreatment approaches (if required) could include product separation and/or carbon treatment.
- A NPDES discharge permit may also be obtained in order to facilitate the discharge of construction-related water to appropriate nearby storm sewer connections. Monthly monitoring, testing and/or treatment and quarterly reporting would be required by the permit.

The MDA and MPCA will be notified when a final groundwater/dewatering plan is decided (if necessary).

I. Construction Observation and Documentation Plan

The following sections describe the types of observations that will be made and the types of documentation that will be prepared during implementation of the response action elements.

I.1. Field Reports

Field reports will be prepared to document construction activities at the end of each day. These reports will include the following information as applicable:

- Contractor's activities including type and volumes of material excavated and/or replaced (as necessary);
- Weather conditions at the Site, including any precipitation and wind conditions;
- Contractor's efforts in reducing dusty conditions or activities to eliminate Site runoff during wet conditions;
- Details of completed testing or samples collected for laboratory testing;
- Any unforeseen Site conditions encountered during the Work;
- Contractor's equipment that is on-Site and being used; and
- Health and safety status and issues.

I.2. Forms

Appendix C contains the forms that will be used as warranted to document construction activities, including:

- Daily Field Report;
- Project Health and Safety Field Meeting Form;
- Incident Report Form;
- Chain-of-Custody Record;
- Sample Control Log;
- Boring Log Form;
- Test Trench Form; and
- Air Monitoring Log.

I.3. Problem/Deficiency Identification and Corrective Action

The General Contractor and/or Earthwork Contractor will be required to inform the Braun Intertec Project Manager and the Owner, in a timely manner, of any problems/deficiencies that arise during RAP Implementation.

I.4. Plan Modification

Any proposed modifications to the RAP will be communicated to the MPCA in a timely manner. The RAP shall be modified if appropriate with written approval of the MDA, MPCA, Owner, and the Project Manager. A plan for any RAP modifications will be prepared if required and provided for the MDA and MPCA Project Managers for approval.

I.5. Photographs

The Braun Intertec environmental technician will take photographs to document observations, problems, and/or deficiencies, or Work in progress. The photographs for this project will include, at a minimum, the following:

- Pre-construction conditions
- Excavation of soils
- Stockpiling of soils
- Any unforeseen Site conditions encountered during construction
- Any compaction and backfilling taking place in excavated areas
- Grading operations
- Dust and water control operations
- Soil and water sampling
- Air monitoring
- Well and/or process utility abandonment
- Temporary closure activities
- Erosion control and storm water control procedures

J. Work Controls

The following sections describe the horizontal and vertical controls, environmental monitoring, access, and erosion control.

J.1. Horizontal and Vertical Controls

The reporting of results will require accurate knowledge of the actual Site elevations and locations. The topographic survey of the Site performed and will be used to prepare maps of the Site and to document areas of excavations and volumes of materials excavated or filled on-Site.

J.2. Environmental Monitoring During the Work

Air monitoring of vapors and dust emanating from excavations will be performed in accordance with the specific Site HASP. Organic vapors will be monitored using a PID to monitor worker breathing zones. Dust may be monitored using portable dust monitors. Other monitoring equipment for measuring oxygen, carbon dioxide, methane, explosive vapors (LEL), and other hazards will be available, if needed.

J.3. Erosion Control

The earthwork contractor will be responsible for implementing appropriate erosion controls in accordance with general permit requirements for storm water control at construction sites. This typically includes installation of silt fences at the project boundaries and limits of excavations to control erosion during work on-Site. In addition, the Contractor will be responsible for providing rock construction entrances or performing street sweeping to prevent muddy or dusty conditions on city streets.

K. RAP Implementation Report

Following completion of response actions for the redevelopment, a RAP Implementation Report will be prepared and submitted to the MDA and MPCA for review and approval. The RAP Implementation Report will include the following at a minimum:

- Overview of the environmental response actions performed.
- Documentation of pre-demolition hazardous materials removal for demolished buildings.
- Documentation of water well and monitoring well sealing.

- Summary of environmental monitoring results during construction.
- Documentation of all contaminated soil excavations for materials targeted for off-site disposal (Type 3 Soils).
- Documentation of excavation and on-site placement of Type 2 soils meeting established geotechnical criteria.
- Disposal documentation including manifests and disposal facility approvals.
- Summary of off-site disposal material types and volumes.
- Documentation of imported fill sources and associated analytical testing results.
- All soil and groundwater analytical testing results completed for RAP implementation, including post-excavation verification sampling/testing results.
- Descriptions and documentation related to contingency actions (if any) completed during construction.
- Photographic documentation of response actions completed.

L. Construction Contingency Plan

The objective of this Construction Contingency Plan is to provide a protocol that will be followed if unanticipated environmental conditions are encountered during RAP Implementation and construction activities. These environmental conditions may include, but are not limited to:

- Buried drums or other containers.
- Underground storage tanks.
- Wells.
- Buried Debris.
- Asbestos-containing material.
- Buried foundations from historical structures.
- All other unknown contaminated media.

Specifically, based upon the Site history and the conditions observed during previous investigations, Braun Intertec has developed procedures related to the following unanticipated conditions could be encountered during construction and development activities at the Site:

- Petroleum impacted soils
- Buried demolition debris
- Unsealed wells

For the purposes of this CCP, indicators of potentially contaminated soil or groundwater include, but are not limited to the following:

- Odor, including gasoline, diesel, creosote (odor of railroad ties), mothballs, or other chemical-like odor.
- Soil stained green or black (not due to organic content), or with dark, oily appearance, or any unusual soil color or texture.
- A rainbow color (sheen) on contact water or soil.

Indicators of regulated wastes include, but are not limited to the following:

- Cans, bottles, glass, scrap metal, or wood (indicators of solid waste and a possible dump).
- Concrete or asphalt rubble (indicators of demolition waste).
- Roofing materials, shingles, siding, vermiculite, floor tiles, or any fibrous material (indicators of demolition waste that could contain asbestos, lead or other chemicals).
- Culverts or other pipes with tar-like coating, insulation or transite (indicators of asbestos).
- Ash (ash from burning or regulated materials may contain lead or other chemicals).
- Sandblast residue (could contain lead or other metals).
- Treated wood, including, but limited to, products referred to as green-treated, brown-treated or creosote (treated wood disposal is regulated).
- Chemical containers such as storage tanks, drums, filters or other containers (possible sources of chemical contaminants).
- Old basements with intact floor tiles or insulation (could contain asbestos), sumps (could contain chemical waste), waste traps (could contain oily waste) or cesspools (could contain chemical or oily wastes)

L.1. Notification Requirements

In the event that unanticipated contaminated materials or debris are encountered during construction when the environmental consultant is not on Site, work in the area shall cease immediately, and the work area shall be secured. Work outside of the vicinity of the discovery area can continue if conditions remain safe to do so for project personnel and the surrounding community. The contractor shall immediately notify the owner and/or the owner's representative. At the owner's and/or owner's representative's request, the environmental consultant will mobilize to the Site in the event that contamination is encountered. At this time, the soils will be assessed in-situ as part of a preliminary reconnaissance for the presence of contamination using both visual and olfactory indications of contamination, as well as laboratory analysis.

L.2. Communications

Communications include notifying the Braun Intertec Project Manager, who will notify the MDA and MPCA project managers of the unanticipated condition, the preliminary assessment of the hazard, and the expected response. The response may include collecting samples of wastes, soil, or water for chemical analysis or performing containerization or isolation activities prior to arranging for disposal.

Minnesota Department of Agriculture	
Josh Leable	651-201-6632
Stuart Orlowski	651-201-6148
Minnesota Pollution Control Agency	
Andrew Nichols (VIC Program)	651-757-2612
Mark Koplitz (PB Program)	651-757-2283

L.3. First Response

The Field Representative will perform field sampling and air monitoring. Field equipment to be kept available on short notice will include a PID or equivalent, a portable dust meter, a combustible gas indicator, and containers and equipment for various air, water, and soil sampling which may be required. In addition, equipment and supplies as required for implementing the site-specific HASP will be available for use as needed.

L.4. Preliminary Reconnaissance

If contamination or regulated waste is unexpectedly encountered, the environmental consultant will mobilize to the Site to conduct a preliminary reconnaissance. During the preliminary reconnaissance, the environmental consultant will begin assessing the situation and obtaining air monitoring data with a photoionization detector, oxygen detector, or combustible gas indicator in accordance with procedures in the site-specific HASP. If conditions are safe, samples will be collected for field screening by visual observation and for jar headspace screening with a PID. This field screening data will be used to assess the hazard and develop a plan for response.

Samples of the potentially impacted soil will be collected from any stockpiles or from the excavation base and sidewalls for headspace screening using a PID using MPCA recommended methodologies.
A minimum of 1 sample for headspace analysis will be collected for every 10 cubic yards of material removed. Visual and indirect olfactory indications of contamination will be noted. Screening results will be documented, and Site photographs will be taken, as appropriate.

As part of the preliminary reconnaissance, any potentially contaminated soil that is stockpiled will be placed on polyethylene sheeting or other impervious surfaces and covered with polyethylene sheeting that is secured in place. Staging areas for potentially impacted soil or material will be clearly marked. The results of the preliminary reconnaissance will be provided to the owner and/or the owner's representative. The contractor will not be allowed to continue to work in the area until the type(s) of contamination is identified and an appropriate response action is defined by the owner and/or the owner's environmental representative.

L.5. Isolation

Isolation includes placing small containers or small quantities of soils into 55-gallon drums for containment, or backfilling the excavation if larger containers or large quantities of impacted materials are present. The anticipated response for large quantities of hazardous materials is the notification of an emergency response contractor to develop a plan to isolate and contain the hazardous materials until treatment or disposal options can be determined. At least five new 55-gallon drums will be available on Site to containerize hazardous materials if necessary. If buried debris such as concrete or wood is encountered; the material will be excavated and stockpiled. It is anticipated that buried debris that cannot be re-used onsite can be disposed of in a landfill for demolition debris or municipal solid waste.

L.6. Emergency Response Contractors

Arrangements with various emergency response contractors will be made prior to starting work at the site in order to allow immediate response to unanticipated conditions. The Contractor and/or excavation subcontractor will most likely perform excavation and trucking of materials on Site or off Site. The following contractors may be utilized for response to emergencies or other situations at the Site:

Name of Contractor	**Type of Service**
Stevens Drilling and Environmental 6240 Highway 12 West Maple Plain, MN 55359 763.479.1797	Emergency Response
Minnesota Petroleum 682 39th Ave NE Columbia Heights, MN 55421 763.780.5191	Vacuum Truck Containerization of Liquid or Oily Wastes
Pace Analytical Services 1700 Elm Street, Suite 200 Minneapolis, MN 55414 612.607.6455, Dan Nguyen Or Legend Technical Services 88 Empire Drive St. Paul, MN 55103 651.642.1150, Cory Campbell	Analytical Services
Thein Well Service 11355 Highway 71 Northeast Spicer, MN 56288 320.847.3207	Well Abandonment and Replacement

Grainger Supply — Over-Pack Container Supplier
201 E 78th Street
Bloomington, MN 55420
(952) 888-2502

Consolidated Container — 55-gallon Drum Supplier
109 NE 27th Ave,
Minneapolis, MN 55418
(612) 781-0923

The Field Representative will perform field sampling and air monitoring. Field equipment to be kept available on short notice will include a PID or equivalent, a portable dust meter, a combustible gas indicator, detector tubes (Draeger or Sensidyne) for field sampling for individual compounds, and containers and equipment for various air, water, and soil sampling which may be required. In addition, equipment and supplies as required for implementing the site-specific HASP will be available for use as needed.

L.7. Potential Contingency Response Actions

In general, after conducting the preliminary reconnaissance and assessing the type of contamination, environmental monitoring will be conducted during excavation of potentially contaminated materials. The results of the environmental monitoring will be used to segregate and stockpile the potentially contaminated material.

If potential ACM is encountered that was not already identified, no excavation work will be conducted until the results of polarized light microscopy (PLM) testing are available. If ACM is detected, procedures established in Section H and L.7.b will be followed.

Response actions, listed by contaminant/waste type, to manage unidentified contamination that is encountered during construction are detailed below.

L.7.a. Petroleum-Contaminated Soils

If petroleum-contaminated soils are identified during construction, soils will be segregated and handled in accordance with MPCA Petroleum Remediation Guidance Document 3.01 “Excavation of Petroleum Contaminated soil and Tank Removal Sampling.”

L.7.b. Debris and Asbestos-Containing Materials

In the event that debris suspected of containing asbestos is encountered during earthwork activities, it will be evaluated in-situ for the presence of asbestos by bulk sampling and analysis by polarized light microscopy (PLM). If ACM is encountered, protocol outlined in the July 1999 MPCA *Asbestos Guidance on Excavation Projects* will be followed including implementation of an emissions control plan (ECP). An ECP will be prepared if needed, upon request. In addition, as the debris is excavated and removed, if encountered, it will be properly recycled or soil containing greater than 10% debris will be disposed. ACM will be properly disposed of off-Site; no soil containing ACM will be reused on Site.

L.7.c. Non-Petroleum-Impacted Soil

Soils that exhibit non-petroleum impacts will be segregated, stockpiled, and sampled. Field methods and procedures, analytical testing and decisions regarding soil disposition will be consistent with Braun Intertec Standard Operation Procedures (SOPs).

L.7.d. Storage Tanks or Drums

In the event that drums or other storage containers are encountered during earthwork activities, they will be removed and their condition evaluated by appropriately trained personnel. If the containers are determined to be in poor condition, the materials will be transferred to a new drum that is in good condition. The drums will be placed in a secure location. Containerized materials will be evaluated, tested, and properly disposed.

Soil from the area around the container will be screened for indications of contamination. Potentially impacted soil will be segregated and stockpiled. Soil samples will be collected from stockpiled materials for chemical analyses and confirmation soil samples will be collected from remaining in-place soil.

If a possible underground storage tank~~s~~ (UST~~s~~) is indicated by a metal or concrete surface, is encountered during excavation activities, the area around the possible underground structure will be carefully excavated. The underground structure will be tested to evaluate the depth to bottom or the presence of liquid. If liquid is present, further testing will be conducted to evaluate its contents. Liquid will be removed by pumping prior to removal and disposal of the structure. All UST contents will be handled in accordance with MPCA and Occupational Safety & Health Administration (OSHA) requirements. The UST will be removed by a licensed UST removal contractor and will be completed in accordance with MPCA requirements. Soil surrounding the tank or structure will be monitored for possible impacts and sampled for chemical analyses in accordance with MPCA, Petroleum Remediation Program, Guidance Document #3-01.

L.7.e. On-Site Wells and Septic Systems

All unused wells must be sealed by a licensed well contractor in accordance with Minnesota Department of Health (MDH) regulations. Septic systems also should be properly abandoned in accordance with local and state code.

Figures

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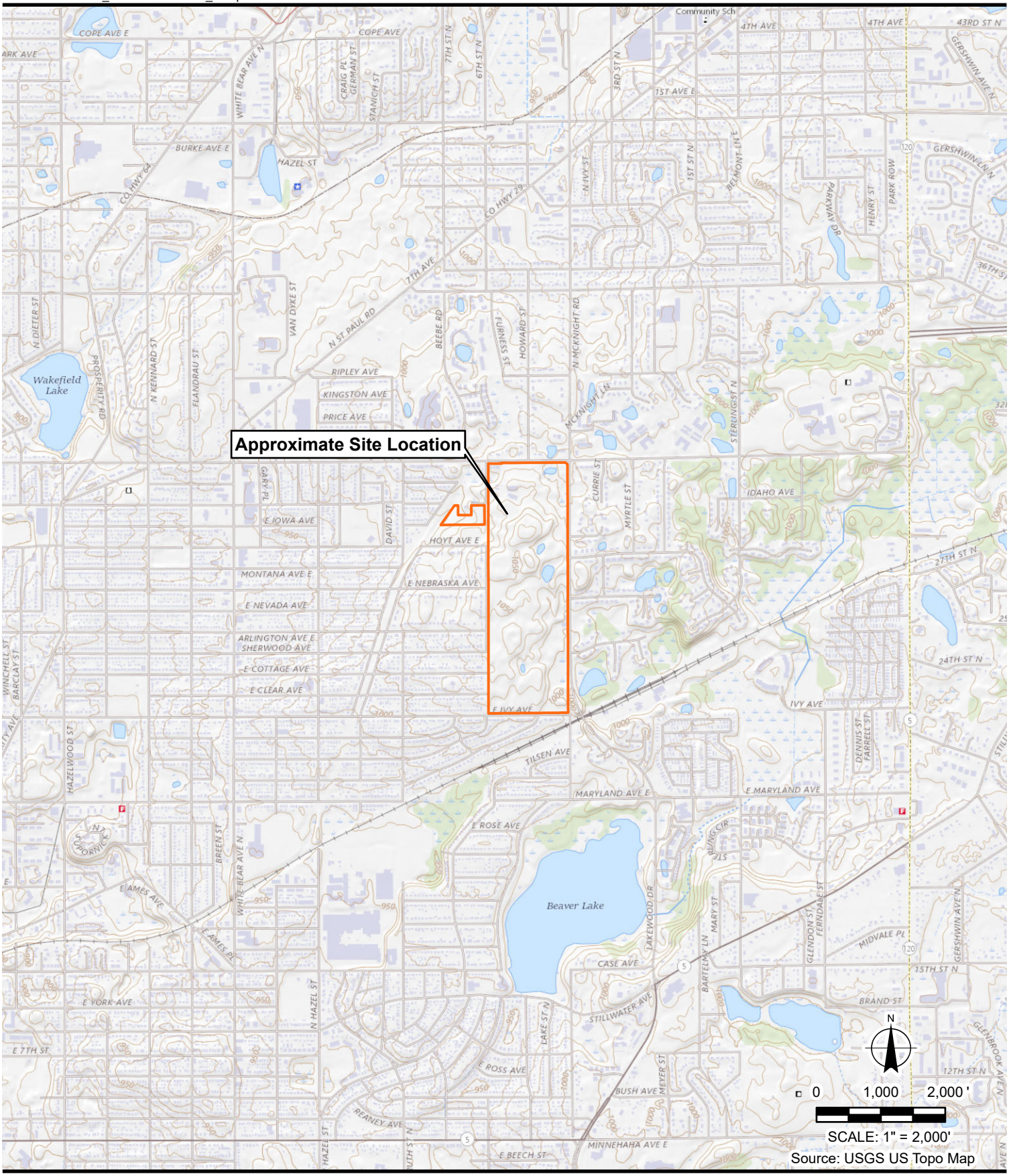

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Project No:	B1903316_00
Drawing No:	B1903316_00_Fig 1
Drawn By:	ZS
Date Drawn:	2/28/2022
Checked By:	MK
Last Modified:	6/4/2020

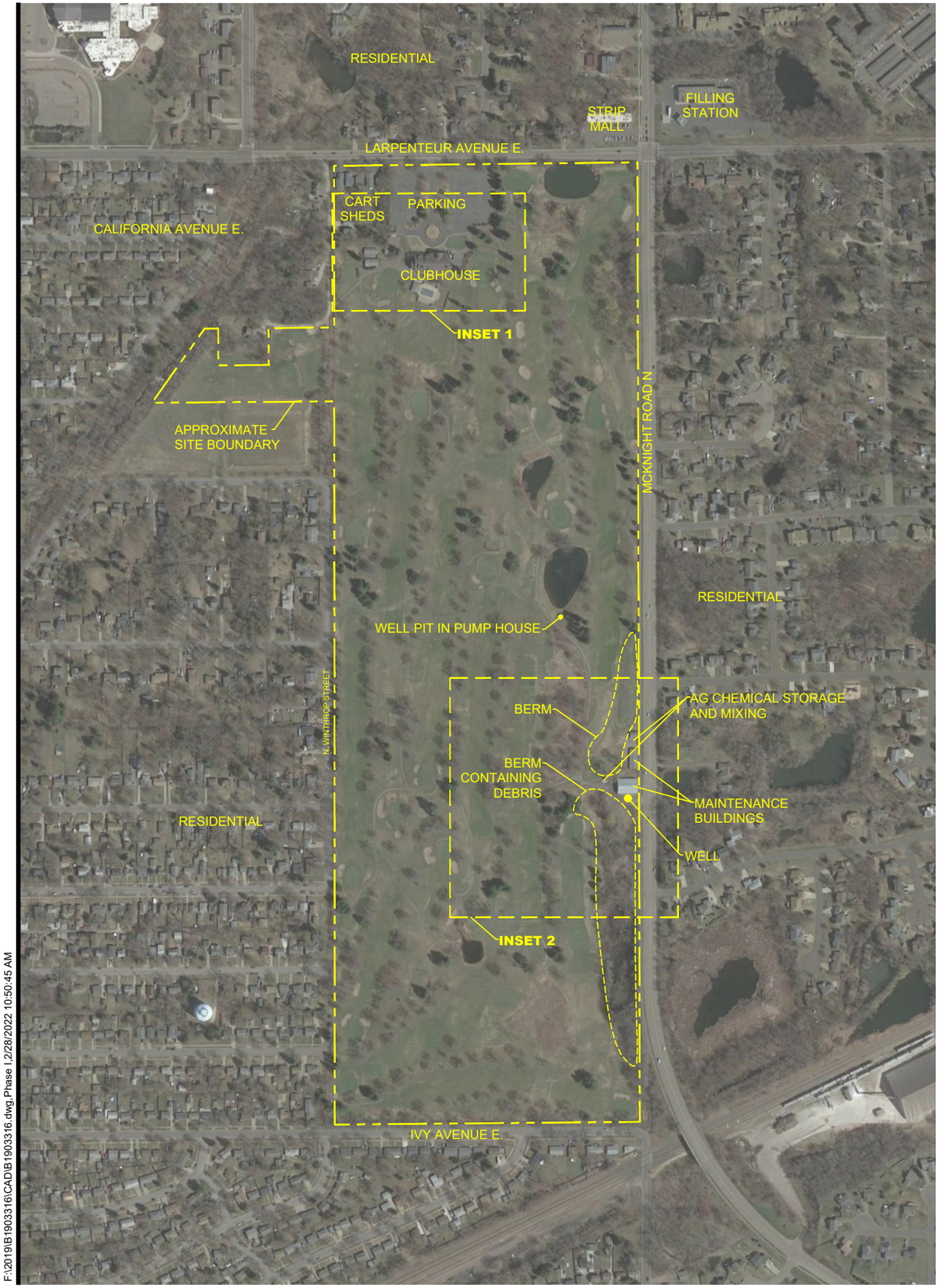
Hillcrest Redevelopment Site

McKnight Road N and Larpenteur Avenue E

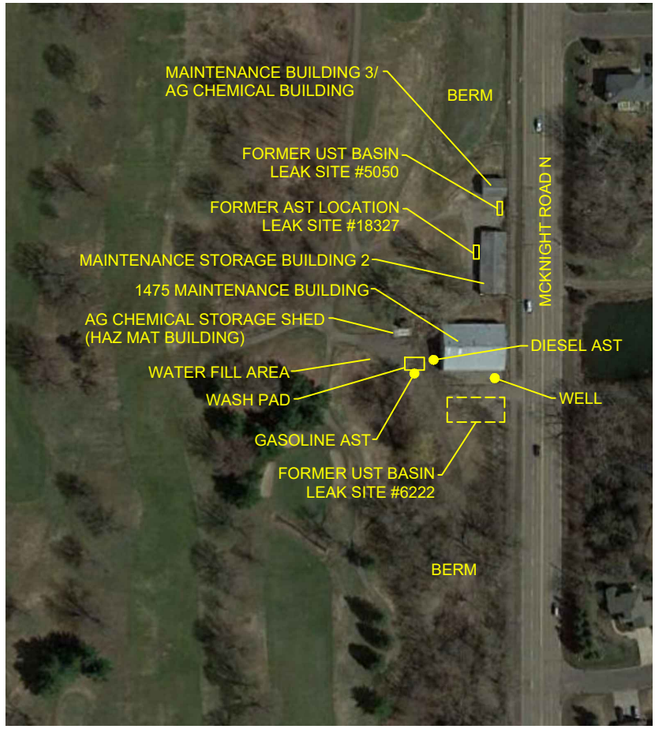
St. Paul, Minnesota

Site Location Map

Figure 1



INSET 1: CLUBHOUSE AREA
SCALE: 1" = 120'



INSET 2: MAINTENANCE FACILITY
SCALE: 1" = 200'

250' 0 500'
SCALE: 1"= 500'

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Date Drawn:	5/15/19
Checked By:	MPE
Last Modified:	2/28/22

Project Information

Hillcrest Redevelopment Site

McKnight Road N and Larpenteur Avenue E

St. Paul, Minnesota

Current Site Conditions

Figure 2

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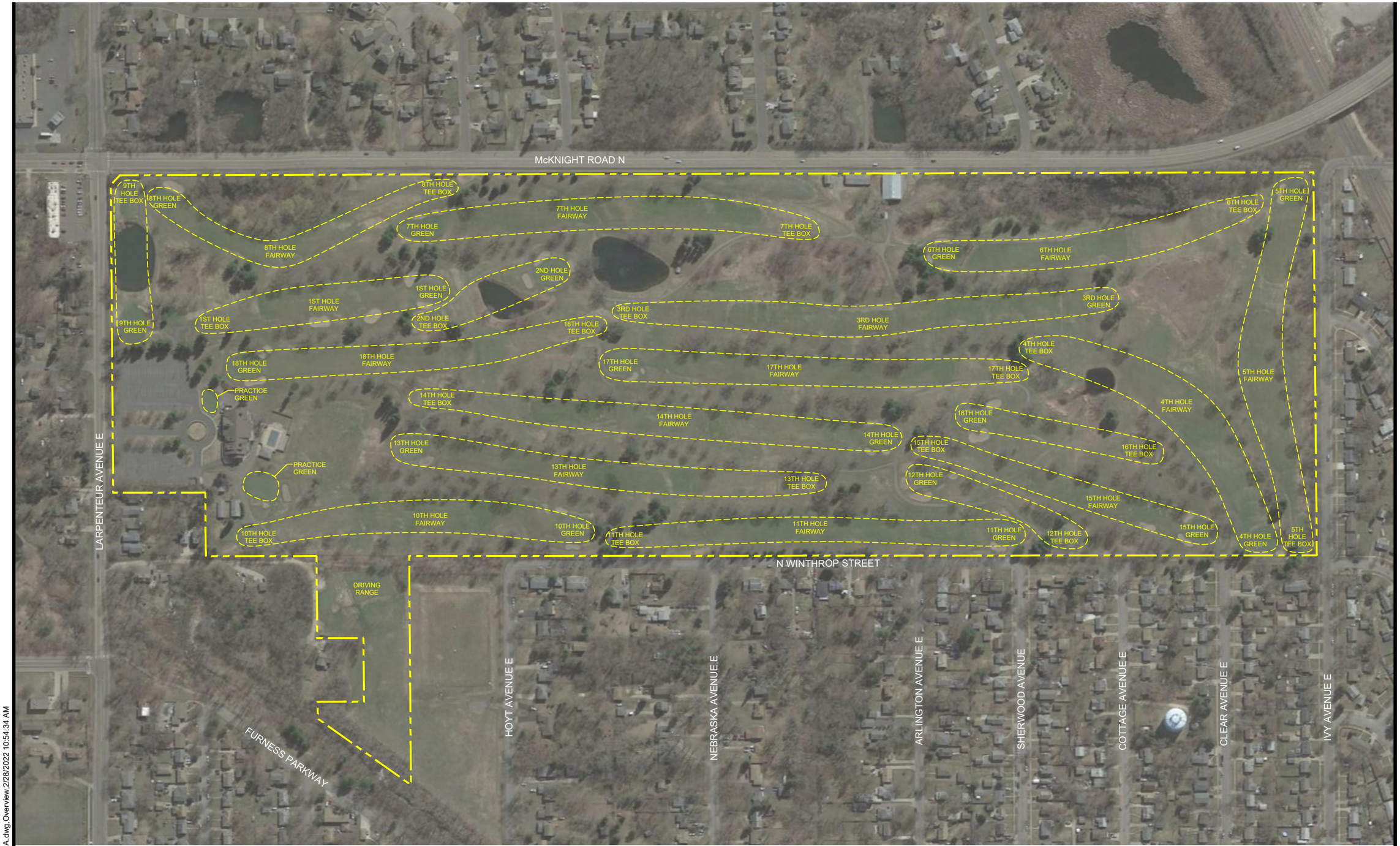

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150' 0 300'

SCALE: 1" = 300'

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Date Drawn:	5/23/19
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Last Modified:	2/28/22

Project Information

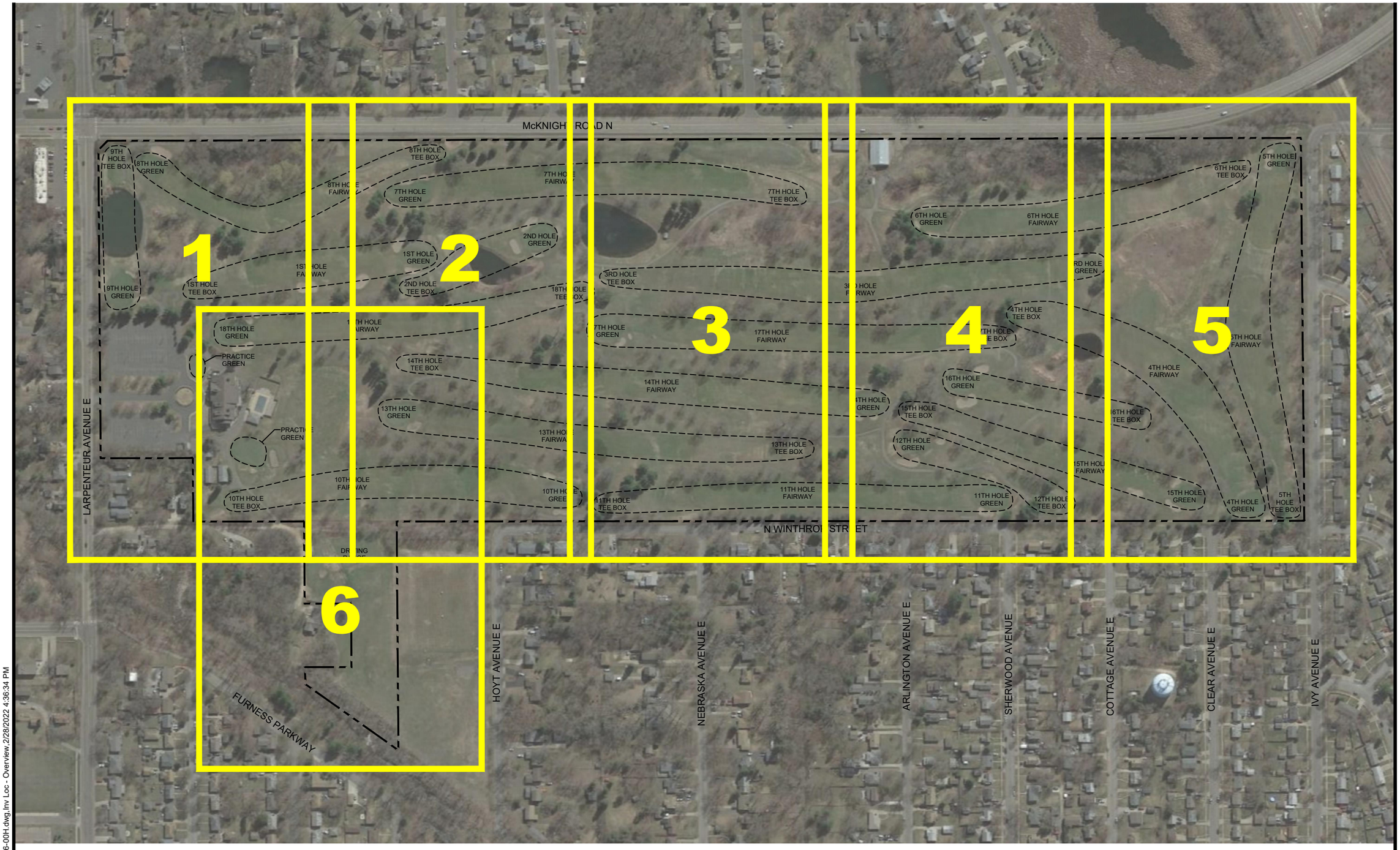
Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Former Golf Course Layout

Figure 3



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Drawing Information

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Drawing No:	B1903316-00H
Drawn By:	BJB
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Project Information

Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Investigation Locations Sheet Overview Map

Figure 4

150' 0 300'

SCALE: 1" = 300'

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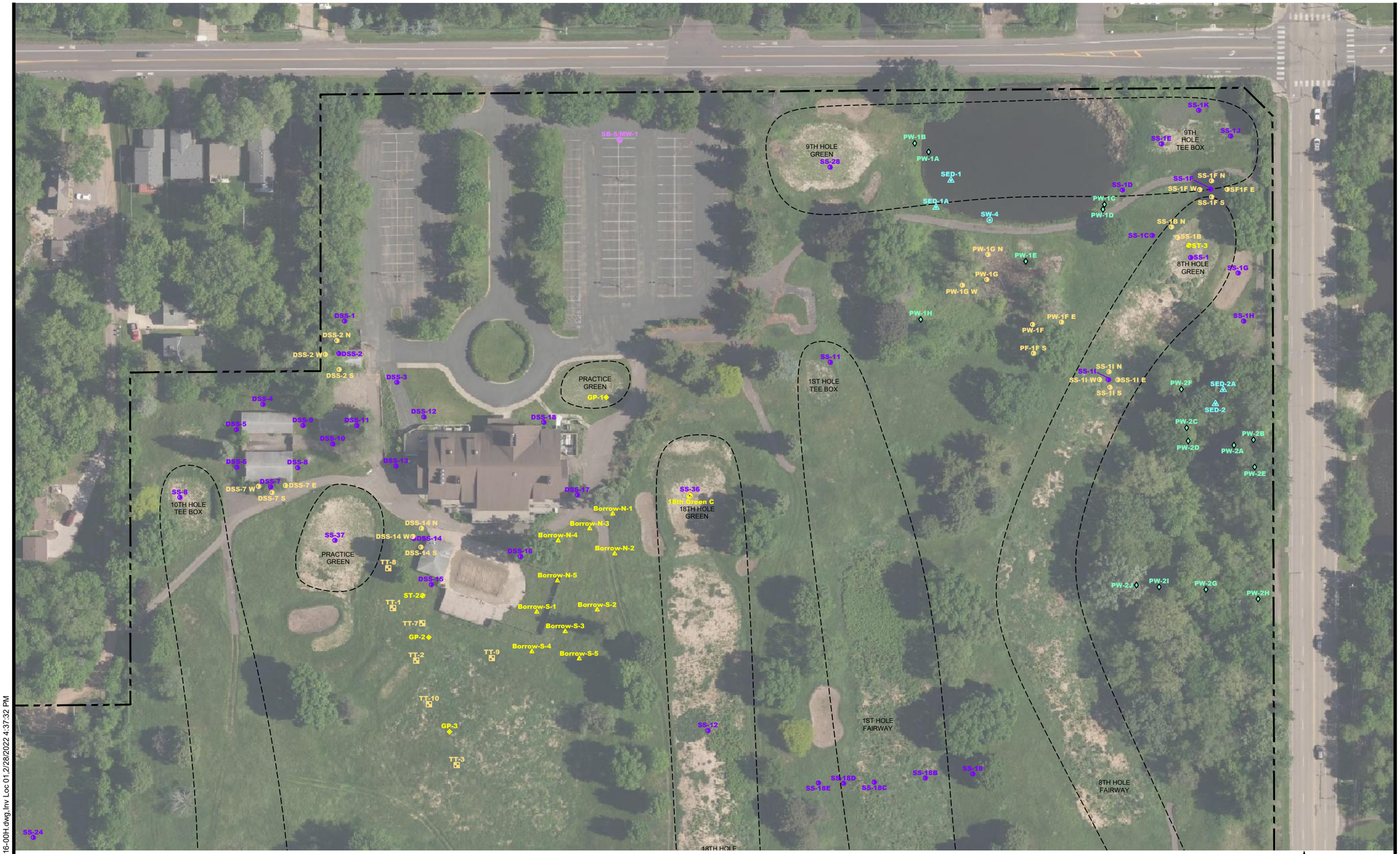

SOIL BORING LOCATION
SOIL BORING / TEMPORARY WELL LOCATION
SOIL BORING / PERMANENT WELL LOCATION
MONITORING WELL LOCATION
AGRICULTURAL CHEMICAL SOIL BORING LOCATION
TEST TRENCH LOCATION

SHALLOW HAND AUGER BORING LOCATION
WELL LOCATION
SURFACE WATER SAMPLE
SEDIMENT SAMPLE LOCATION
POTENTIAL WETLAND SAMPLE LOCATION
SURFACE WATER SAMPLE LOCATION

HOLLOW STEM AUGER BORING LOCATION
PUSH PROBE BORING LOCATION
COMPOSITE SOIL SAMPLE LOCATION
SHALLOW HAND AUGER BORING LOCATION (2021)
CONFIRMATION SAMPLE LOCATION

50' 0 100'

SCALE: 1" = 100'

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Project Information

Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Investigation Locations

Sheet: 01 of 06

Fig: 4

- SOIL BORING LOCATION
- SOIL BORING / TEMPORARY WELL LOCATION
- SOIL BORING / PERMANENT WELL LOCATION
- MONITORING WELL LOCATION
- AGRICULTURAL CHEMICAL SOIL BORING LOCATION
- TEST TRENCH LOCATION
- SHALLOW HAND AUGER BORING LOCATION
- WELL LOCATION
- SURFACE WATER SAMPLE
- SEDIMENT SAMPLE LOCATION
- POTENTIAL WETLAND SAMPLE LOCATION
- SURFACE WATER SAMPLE LOCATION
- HOLLOW STEM AUGER BORING LOCATION
- PUSH PROBE BORING LOCATION
- COMPOSITE SOIL SAMPLE LOCATION
- SHALLOW HAND AUGER BORING LOCATION (2021)
- CONFIRMATION SAMPLE LOCATION

50' 0 100'

SCALE: 1" = 100'

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Project Information

Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Investigation Locations

Sheet: 02 of 06

Fig: 4

- SOIL BORING LOCATION
- SOIL BORING / TEMPORARY WELL LOCATION
- SOIL BORING / PERMANENT WELL LOCATION
- MONITORING WELL LOCATION
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- PUSH PROBE BORING LOCATION
- COMPOSITE SOIL SAMPLE LOCATION
- SHALLOW HAND AUGER BORING LOCATION (2021)
- CONFIRMATION SAMPLE LOCATION

50' 0 100'

SCALE: 1" = 100'

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Project Information

Hillcrest Redevelopment Site

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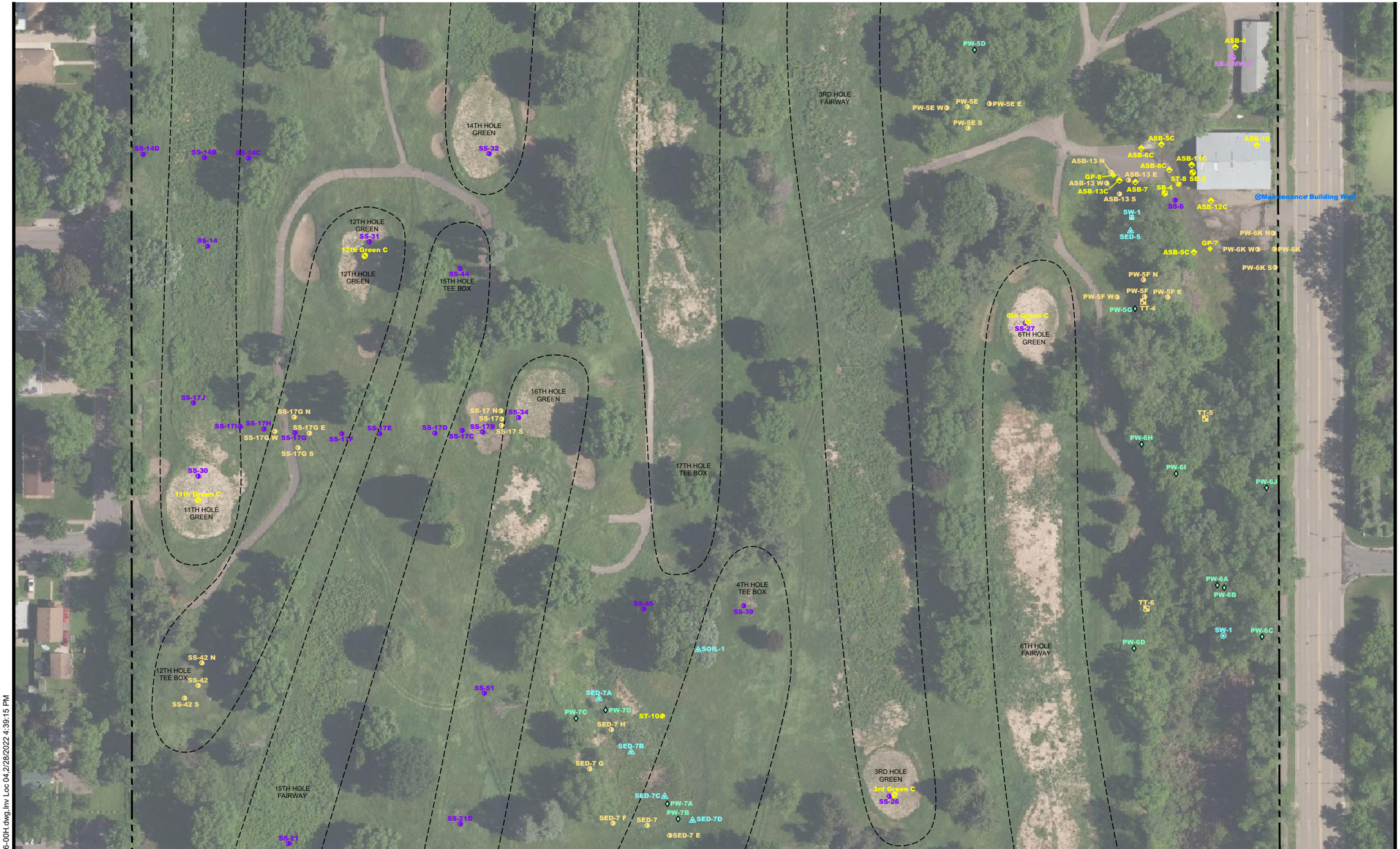
Investigation Locations

Sheet: 03 of 06

Fig: 4



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- PUSH PROBE BORING LOCATION
- COMPOSITE SOIL SAMPLE LOCATION
- SHALLOW HAND AUGER BORING LOCATION (2021)
- CONFIRMATION SAMPLE LOCATION

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50' 0 100'

SCALE: 1" = 100'

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Drawing Information

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Drawing No: B1903316-00H

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Date Drawn:	5/23/19
Checked By:	MK
Last Modified:	2/28/22

Project Information

Hillcrest Redevelopment Site

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Saint Paul, Minnesota

Investigation Locations

Sheet: 04 of 06

Fig: 4

- SOIL BORING LOCATION
- SOIL BORING / TEMPORARY WELL LOCATION
- SOIL BORING / PERMANENT WELL LOCATION
- MONITORING WELL LOCATION
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- PUSH PROBE BORING LOCATION
- COMPOSITE SOIL SAMPLE LOCATION
- SHALLOW HAND AUGER BORING LOCATION (2021)
- CONFIRMATION SAMPLE LOCATION

50' 0 100'

SCALE: 1" = 100'

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Drawing Information

Project No:	B1903316.00
Drawing No:	B1903316-00H
Drawn By:	BJB
Date Drawn:	5/23/19
Checked By:	MK
Last Modified:	2/28/22

Project Information

Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Investigation Locations

Sheet: 05 of 06

Fig: 4

- SOIL BORING LOCATION
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N

50' 0 100'

SCALE: 1" = 100'

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Project Information

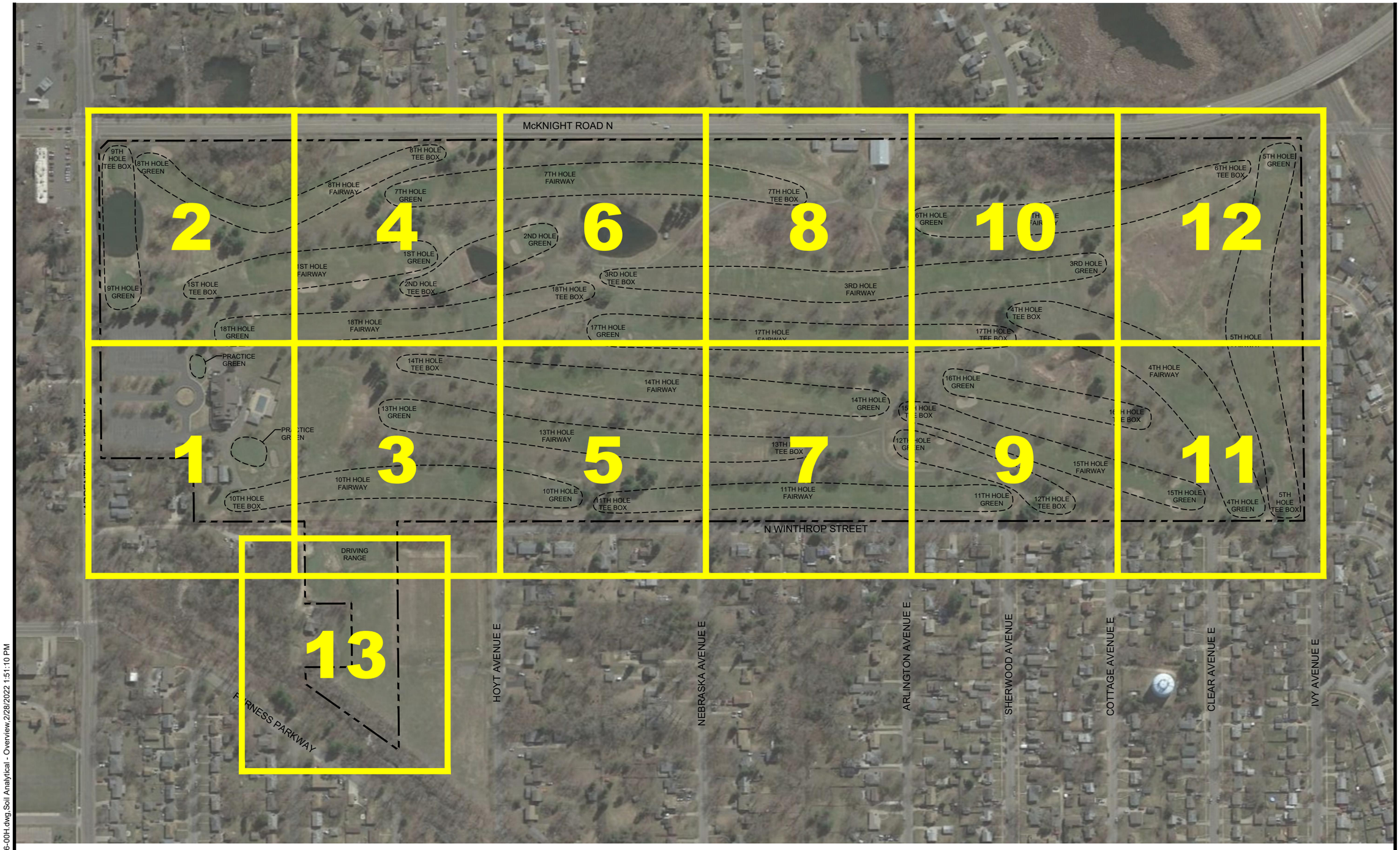
Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Investigation Locations

Sheet:	Fig:
06 of 06	4



150' 0 300'

SCALE: 1" = 300'

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Project Information

Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Soil Analytical Results Sheet Overview Map

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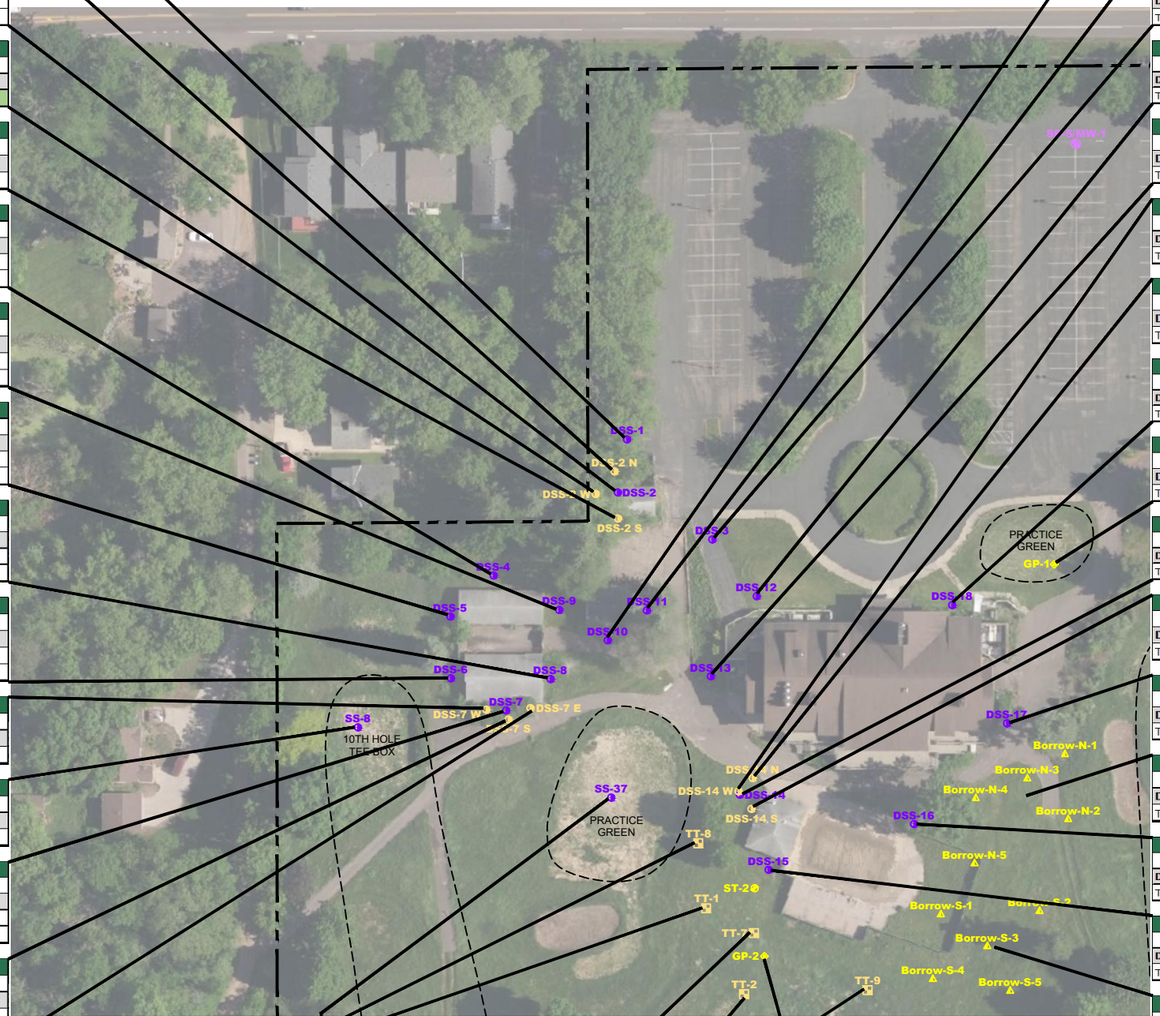

DSS-1
date

Depth	0-0.5	1-1.5
Total Mercury	0.37	0.38
No BAP Equivalent Exceedances		

DSS-2 N
11/15/2021

Depth	0-0.5
BaP Equivalent	1.1

DSS-2
7/2/2020

Depth		1-1.5
Total Mercury	0.38	0.31
BaP Equivalent	3.0	1.3

DSS-2 W
11/15/2021

Depth	0-0.5
BaP Equivalent	2.1

DSS-2 S
11/15/2021

Depth	0-0.5
BaP Equivalent	0.6

DSS-4
7/2/2020

Depth	0-0.5	1-1.5
Total Mercury	0.37	0.38
No BAP Equivalent Exceedances		

DSS-9
7/2/2020

Depth	0-0.5	1-1.5
Total Mercury	0.52	0.099
No BAP Equivalent Exceedances		

DSS-5
7/2/2020

Depth	0-0.5	1-1.5
Total Mercury	0.37	0.38
No BAP Equivalent Exceedances		

DSS-8
7/2/2020

Depth	0-0.5	1-1.5	(Dup)
Total Mercury	0.31	0.3	0.38
No BAP Equivalent Exceedances			

DSS-6
7/2/2020

Depth	0-0.5	1-1.5
Total Mercury	0.37	0.38
No BAP Equivalent Exceedances		

DSS-7 W
11/16/2021

Depth	0-0.5
Total Mercury	0.084

SS-8
6/11/2020

Depth	0-0.5	1-1.5
Total Mercury	6.5	0.03

DSS-7
7/2/2020

Depth	0-0.5	1-1.5
Total Mercury	3.3	0.3
No BAP Equivalent Exceedances		

DSS-7 S
11/16/2021

Depth	0-0.5
Total Mercury	0.095

DSS-7 E
11/16/2021

Depth	0-0.5
Total Mercury	0.62

SS-37
6/11/2020

Depth	0-0.5	1-1.5
Total Mercury	2.0	0.089

TT-8
6/25/2020

Depth	0-6
No soil impacts observed, no sample collected	

TT-1
6/24/2020

Depth	2-4	2-4 (Hotspot)	6-7
Total Mercury	<0.019	0.064	0.45
GRO	<10.6	199.0	<10.9

TT-7
6/24/2020

Depth	3-5
Total Mercury	0.059

TT-2
6/24/2020

Depth	2-3
Total Mercury	<0.022

TT-9
6/25/2020

Depth	3-5
Total Mercury	0.059

GP-2
5/7/2019

Depth	0-1	4-5
Total Mercury	0.13	0.12

DSS-10
7/2/2020

Depth	0-0.5
Total Mercury	0.16
No BAP Equivalent Exceedances	

DSS-11
7/2/2020

Depth	0-0.5	1-1.5
Total Mercury	0.29	0.089
No BAP Equivalent Exceedances		

DSS-3
7/2/2020

Depth	0-0.5
Total Mercury	0.11

DSS-12
7/2/2020

Depth	0-0.5
Total Mercury	0.042

DSS-13
7/2/2020

Depth	0-0.5	1-1.5
Total Mercury	2.0	1.7

DSS-14 W
11/16/2021

Depth	0-0.5
Total Mercury	0.71

DSS-14 N
11/16/2021

Depth	0-0.5
Total Mercury	0.19

DSS-18
7/2/2020

Depth	0-0.5	1-1.5
Total Mercury	0.62	0.89

GP-1
5/7/2019

Depth	0-1	1-2
Total Mercury	<0.020	<0.019

DSS-14
7/2/2020

Depth	0-0.5	1-1.5
Total Mercury	4.1	0.91

DSS-14 S
11/16/2021

Depth	0-0.5
Total Mercury	0.8

DSS-17
7/2/2020

Depth	0-0.5	1-1.5
Total Mercury	0.79	0.062

Borrow-N
11/15/2021

Depth	0-0.5	1-1.5
Total Mercury	1.2	1.0

DSS-16
7/2/2020

Depth	0-0.5	1-1.5	(Dup)
Total Mercury	1.6	0.11	1.1

DSS-15
7/2/2020

Depth	0-0.5	1-1.5
Total Mercury	0.31	0.24

Borrow-S
11/15/2021

Depth	0-0.5	1-1.5
Total Mercury	0.51	0.11

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Exceeds the MPCA unregulated fill criteria
Exceeds SRV

N

50' 0 100'

SCALE: 1" = 100'

F:\2019\B1903316\CAD\B1903316-00H.dwg,01.2/28/2022 1:52:27 PM

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braunintertec.com

Drawing Information

Project No: B1903316.00

Drawing No: B1903316-00H

Drawn By:	BJB
Date Drawn:	5/23/19
Checked By:	MK
Last Modified:	2/28/22

Project Information

Hillcrest Redevelopment Site

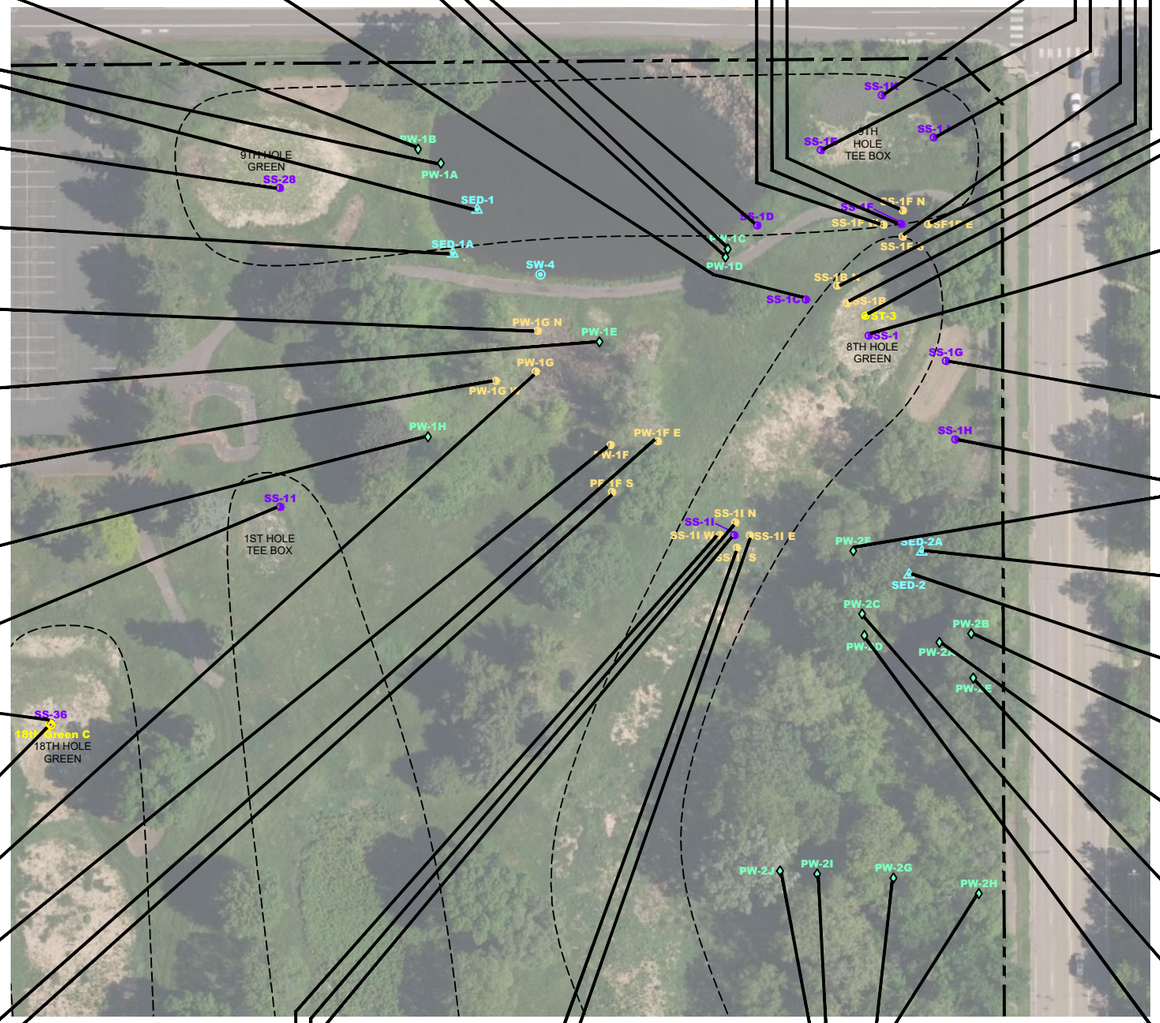
2200 Larpenteur Avenue E

Saint Paul, Minnesota

Soil Analytical Results

Sheet: 01 of 13

Fig:



SS-1D	
6/7/2020	
Depth	0-0.5 / 1-1.5
Total Mercury	0.039 / 0.028

SS-1C		
6/7/2020		
Depth	0-0.5	1-1.5
Total Arsenic	3.2	3.7
Total Mercury	0.08	0.057

PW-1C	
8/12/2020	
Depth	0-0.5
Total Mercury	0.31

PW-1D	
8/12/2020	
Depth	0-0.5
Total Mercury	0.54

SS-1F N	
11/16/2021	
Depth	0-0.5
Total Mercury	0.84

SS-1F		
6/7/2020		
Depth	0-0.5	1-1.5
Total Mercury	6.6	0.057

SS-1F W	
11/16/2021	
Depth	0-0.5
Total Mercury	16.1

SS-1J		
6/7/2020		
Depth	0-0.5	1-1.5
Total Mercury	5.1	0.087

SS-1E		
6/7/2020		
Depth	0-0.5	1-1.5
Total Mercury	3.9	0.11

SS-1K		
6/7/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.9	0.1

SS-1F S	
11/16/2021	
Depth	0-0.5
Total Mercury	0.026

SS-1F E	
11/16/2021	
Depth	0-0.5
Total Mercury	0.94

SS-1B N		
11/15/2021		
Depth	0-0.5	1-1.5
Total Mercury	4.7	3.6

SS-1B			
6/7/2020			
Depth	0-0.5	1-1.5	2-2.5
Total Arsenic	117.0	29.1	2.5
Total Mercury	38.2	11.6	13.0

SS-1B	
11/15/2021	
Depth	2-2.5
Total Mercury	13.0

ST-3	
4/12-13/19	
Depth	0-2
Total Arsenic	15.7
Total Mercury	6.3

SS-1	
4/19/2019	
Depth	0-0.5
Total Mercury	18.6

SS-1G		
6/7/2020		
Depth	0-0.5'	1-1.5'
Total Mercury	<0.022	0.028

SS-1H		
6/7/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.13	<0.021

PW-2F		
8/12/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.28	0.22

SED-2A	
7/15/2020	
Depth	0-0.5
Total Mercury	0.59

SED-2	
7/2/2020	
Total Mercury	0.21

PW-2B	
8/12/2020	
Depth	0-0.5
Total Mercury	0.16

PW-2A	
8/12/2020	
Depth	0-0.5
Total Mercury	0.73

PW-2E	
8/12/2020	
Depth	0-0.5
Total Mercury	0.028

PW-2C	
8/12/2020	
Depth	0-0.5
Total Mercury	0.94

PW-2D	
8/12/2020	
Depth	0-0.5
Total Mercury	1.9

PW-1B	
8/12/2020	
Depth	0-0.5
Total Mercury	2.8

PW-1A	
8/12/2020	
Depth	0-0.5
Total Mercury	0.41

SED-1	
7/2/2020	
Total Mercury	0.73

SS-28		
6/7/2020		
Depth	0-0.5	1-1.5
Total Mercury	110.0	0.22

SED-1A	
7/15/2020	
Depth	0-0.5
Total Mercury	0.23

PW-1G N	
11/16/2021	
Depth	0-0.5
Total Mercury	1.0

PW-1E	
8/12/2020	
Depth	0-0.5
Total Mercury	0.94

PW-1G W	
11/16/2021	
Depth	0-0.5
Total Mercury	8.8

PW-1H	
8/12/2020	
Depth	0-0.5
Total Mercury	0.83

SS-11	
5/10/2019	
Depth	0-0.5
Total Mercury	5.2

SS-36		
6/15/2020		
Depth	0-0.5	1-1.5
Total Mercury	2.0	0.1

18th Green C	
11/18/2021	
Depth	0-0.5
Total Mercury	66.5

PW-1G		
Date	8/12/2020	11/16/2021
Depth	0-0.5	1-1.5
Total Mercury	16.5	0.076

PW-1F		
Date	8/12/2020	11/16/2021
Depth	0-0.5	1-1.5
Total Mercury	26.3	0.063

PW-1F E	
11/16/2021	
Depth	0-0.5
Total Mercury	0.7

PW-1F S	
11/16/2021	
Depth	0-0.5
Total Mercury	1.2

SS-1I W	
11/16/2021	
Depth	0-0.5
Total Mercury	4.4

SS-1I N	
11/16/2021	
Depth	0-0.5
Total Mercury	2.4

SS-1I		
6/7/2020		
Depth	0-0.5	1-1.5
Total Mercury	6.7	0.2

SS-1I S	
11/16/2021	
Depth	0-0.5
Total Mercury	4.6

SS-1I E	
11/16/2021	
Depth	0-0.5
Total Mercury	7.1

PW-2J	
8/12/2020	
Depth	0-0.5
Total Mercury	0.063

PW-2I	
8/12/2020	
Depth	0-0.5
Total Mercury	0.18

PW-2H	
8/12/2020	
Depth	0-0.5
Total Mercury	0.2

PW-2G	
8/12/2020	
Depth	0-0.5
Total Mercury	0.13

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Exceeds the MPCA unregulated fill criteria

Exceeds SRV

50' 0 100'

SCALE: 1" = 100'

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Drawing Information

Project No: B1903316.00

Drawing No: B1903316-00H

Drawn By: BJB
Date Drawn: 5/23/19
Checked By: MK
Last Modified: 2/28/22

Project Information

Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Soil Analytical Results

Sheet: 02 of 13

Fig:

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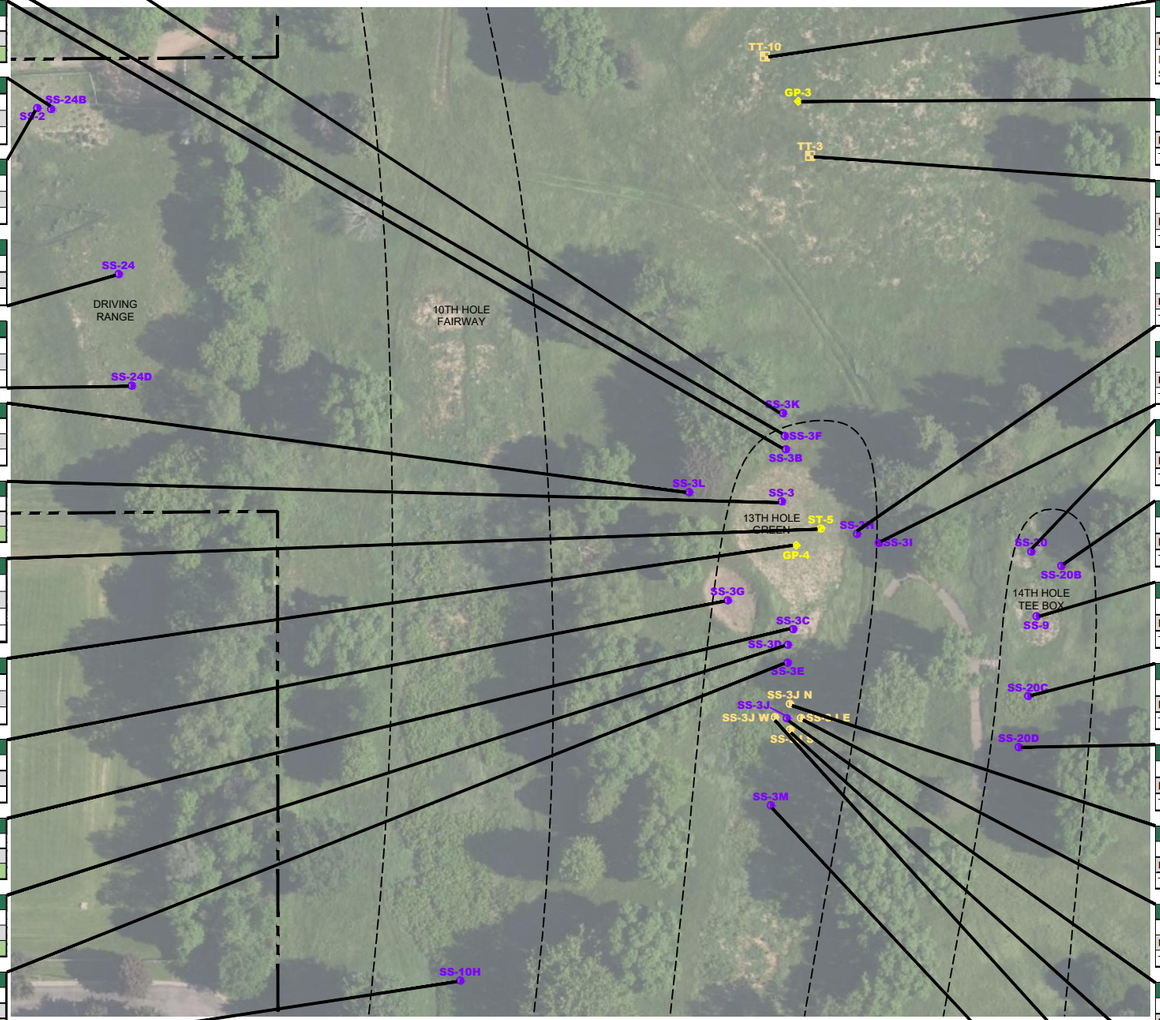

SS-3K
6/9/2020

Depth	0-0.5	1-1.5
Total Mercury	0.9	0.1

SS-3F
5/10/2019

Depth	0-0.5
Total Mercury	9.9

SS-3B
5/1/2019

Depth	0-0.5
Total Mercury	17.8

SS-24B
6/12/2020

Depth	0-0.5	1-1.5
Total Mercury	<0.021	<0.021

SS-2
4/19/2019

Depth	0-0.5
Total Mercury	0.089

SS-24
6/12/2020

Depth	0-0.5	1-1.5
Total Mercury	0.23	<0.022

SS-24D
6/12/2020

Depth	0-0.5	1-1.5
Total Mercury	<0.022	<0.020

SS-3L
6/9/2020

Depth	0-0.5	1-1.5
Total Mercury	1.4	0.054

SS-3
4/19/2019

Depth	0-0.5
Total Mercury	43.4

ST-5
4/12/2019

Depth	1-3
Total Arsenic	<5.3
Total Mercury	0.044

GP-4
5/7/2019

Depth	1-2	2-3
Total Mercury	1.4	0.047

SS-3G
6/9/2020

Depth	0-0.5	1-1.5
Total Mercury	0.15	<0.022

SS-3C
5/1/2019

Depth	0-0.5
Total Mercury	144.0

SS-3D
5/1/2019

Depth	0-0.5
Total Mercury	113.0

SS-3E
5/10/2019

Depth	0-0.5
Total Mercury	15.1

SS-10H
6/9/2020

Depth	0-0.5	1-1.5
Total Mercury	3.5	<0.023

TT-10
6/25/2020

Depth	0-6
No soil impacts observed, no sample collected	

GP-3
5/7/2019

Depth	0-1	1-2
Total Mercury	0.068	0.026

TT-3
6/24/2020

Depth	1-2
Total Mercury	0.041

SS-3H
6/9/2020

Depth	0-0.5	1-1.5
Total Mercury	130.0	1.8

SS-3I
6/9/2020

Depth	0-0.5	1-1.5
Total Mercury	0.92	0.051

SS-20
6/9/2020

Depth	0-0.5	1-1.5
Total Mercury	0.021	0.07

SS-20B
6/9/2020

Depth	0-0.5	(Dup)	1-1.5
Total Mercury	0.33	0.26	0.11

SS-9
5/1/2019

Depth	0-0.5
Total Mercury	0.45

SS-20C
6/9/2020

Depth	0-0.5	1-1.5
Total Mercury	6.8	0.023

SS-20D
6/9/2020

Depth	0-0.5	1-1.5
Total Mercury	2.8	0.068

SS-3J N
11/17/2021

Depth	0-0.5
Total Mercury	2.5

SS-3J E
11/17/2021

Depth	0-0.5
Total Mercury	3.8

SS-3J
6/9/2020

Depth	0-0.5	1-1.5
Total Mercury	4.0	0.14

SS-3J S
11/17/2021

Depth	0-0.5
Total Mercury	3.9

SS-3J W
11/17/2021

Depth	0-0.5
Total Mercury	3.7

SS-3M
date

Depth	0-0.5	(Dup)	1-1.5
Total Mercury	1.5	1.2	0.043

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N

50' 0 100'

SCALE: 1" = 100'

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Project Information

Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Soil Analytical Results

Sheet: 03 of 13

Fig:

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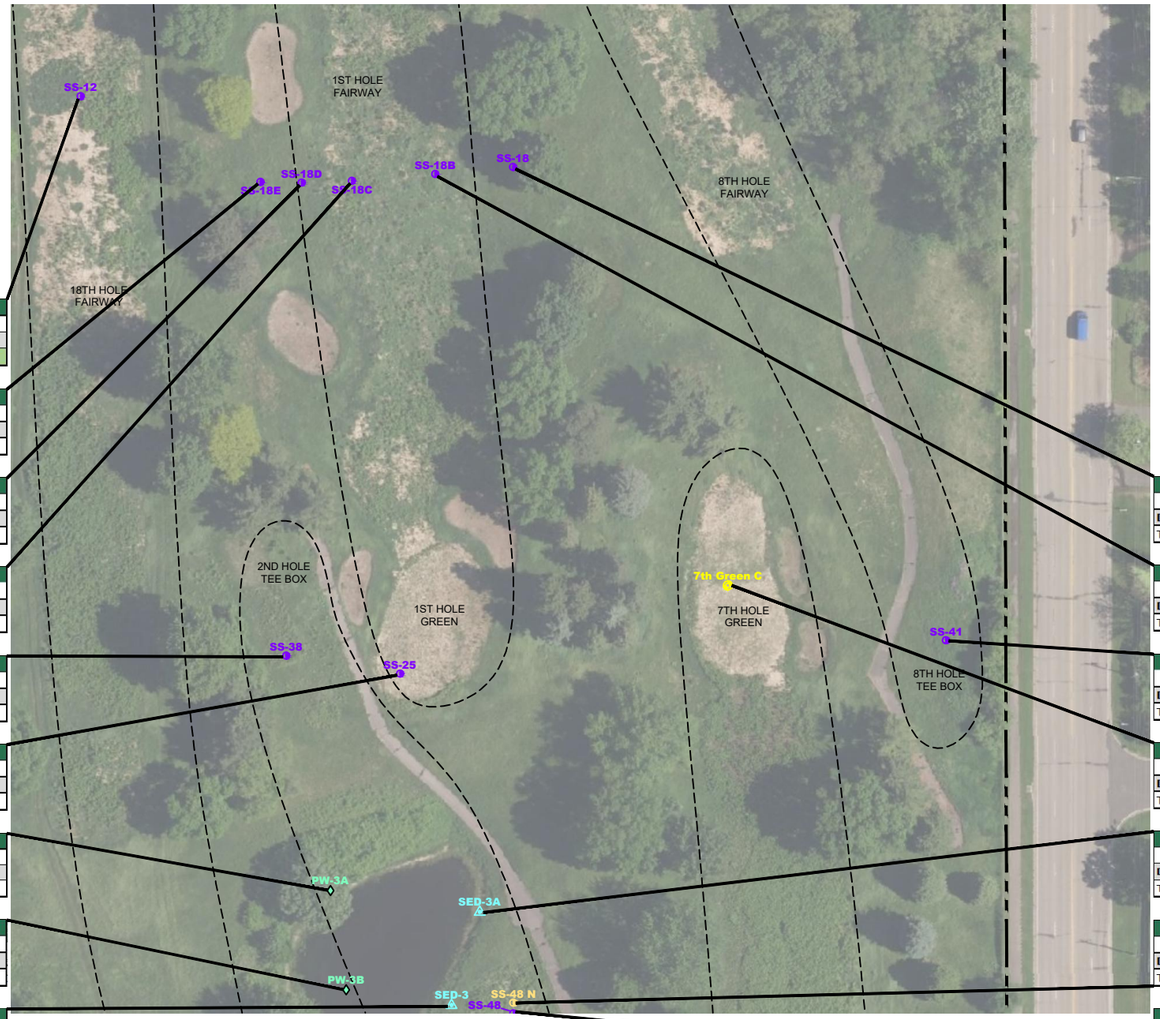

SS-12	
5/10/2019	
Depth	**0-0.5**
Total Mercury	**5.0**

SS-18E		
6/7/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**0.13**	<0.021

SS-18D		
6/7/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**0.8**	**0.042**

SS-18C			
6/7/2020			
Depth	**0-0.5**	**(Dup)**	**1-1.5**
Total Mercury	**4.1**	**0.85**	**0.11**

SS-38		
6/7/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**0.056**	**0.05**

SS-25		
6/7/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**63.9**	**1.6**

PW-3A	
8/12/2020	
Depth	**0-0.5**
Total Mercury	**0.075**

PW-3B	
8/12/2020	
Depth	**0-0.5**
Total Mercury	**0.47**

SED-3 / SED-101		
7/2/2020		
Total Mercury	**0.56**	**0.3**

SS-18		
6/7/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**0.48**	**0.054**

SS-18B		
6/7/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**3.1**	**2.7**

SS-41			
6/7/2020			
Depth	**0-0.5**	**(Dup)**	**1-1.5**
Total Mercury	**6.4**	**4.6**	**1.6**

7th Green C	
11/18/2021	
Depth	**0-0.5**
Total Mercury	**102.0**

SED-3A	
7/15/2020	
Depth	**0-0.5**
Total Mercury	**0.044**

SS-48 N	
11/16/2021	
Depth	**0-0.5**
Total Mercury	**4.7**

SS-48		
6/7/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**8.2**	**0.073**

- **SOIL BORING LOCATION**
- **SOIL BORING / TEMPORARY WELL LOCATION**
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- **CONFIRMATION SAMPLE LOCATION**

Exceeds the MPCA unregulated fill criteria
Exceeds SRV

50' 0 100'

SCALE: 1" = 100'

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11001 Hampshire Avenue S
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952.995.2000
braunintertec.com

Drawing Information

Project No: B1903316.00

Drawing No: B1903316-00H

Drawn By:	BJB
Date Drawn:	5/23/19
Checked By:	MK
Last Modified:	2/28/22

Project Information

Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Soil Analytical Results

Sheet: 04 of 13

Fig:

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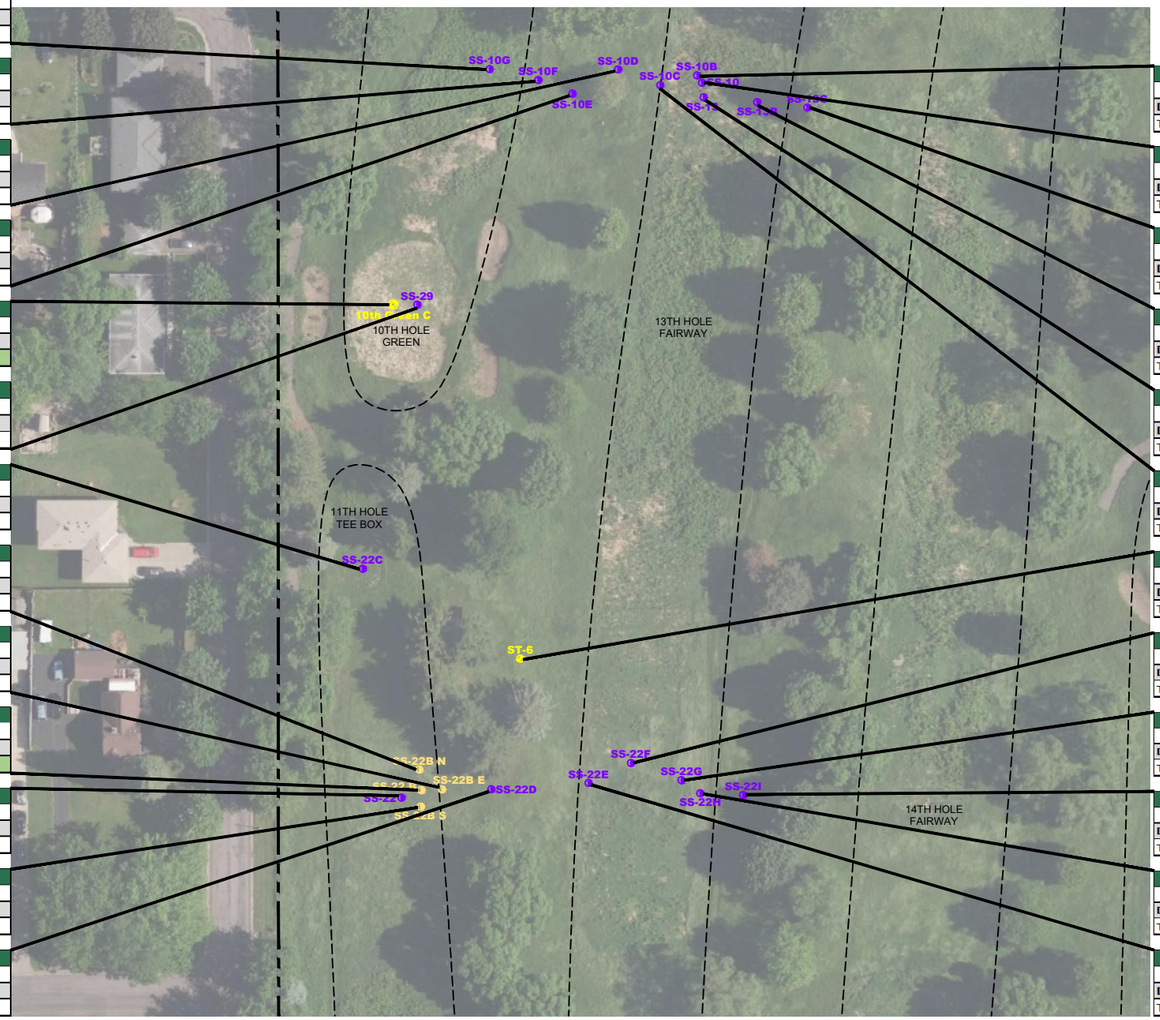

SS-10G		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	2.8	0.57

SS-10F			
6/9/2020			
Depth	0-0.5	1-1.5	(Dup)
Total Mercury	2.3	0.22	0.61

SS-10D		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.87	0.071

SS-10E		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.22	<0.022

10th Green C	
11/18/2021	
Depth	0-0.5
Total Mercury	79.0

SS-29		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	79.8	0.33

SS-22C		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	4.5	0.22

SS-22B N			
11/17/2021			
Depth	0-0.5	1-1.5	2-2.5
Total Mercury	0.19	0.028	0.028

SS-22B E	
11/17/2021	
Depth	0-0.5
Total Mercury	0.37

SS-22B			
6/9/2020			
Depth	0-0.5	(Dup)	1-1.5
Total Mercury	16.9	25.0	109.0

SS-22		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	1.4	0.038

SS-22B S	
11/17/2021	
Depth	0-0.5
Total Mercury	2.2

SS-22D		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.077	0.023

SS-10B		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	3.7	0.04

SS-10	
5/1/2019	
Depth	0-0.5
Total Mercury	4.7

SS-13C		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	<0.023	0.087

SS-13B		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	3.0	0.08

SS-13	
5/10/2019	
Depth	0-0.5
Total Mercury	5.1

SS-10C		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	1.7	<0.023

ST-6	
4/12/2019	
Depth	2-4
Total Mercury	<0.020

SS-22F		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	3.0	0.072

SS-22G		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	4.7	0.073

SS-22I		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.066	<0.023

SS-22H		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	1.8	0.08

SS-22E		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	2.2	0.15

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Exceeds the MPCA unregulated fill criteria

Exceeds SRV

SCALE: 1" = 100'

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Drawing Information

Project No: B1903316.00

Drawing No: B1903316-00H

Drawn By:	BJB
Date Drawn:	5/23/19
Checked By:	MK
Last Modified:	2/28/22

Project Information

Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Soil Analytical Results

Sheet: 05 of 13

Fig:

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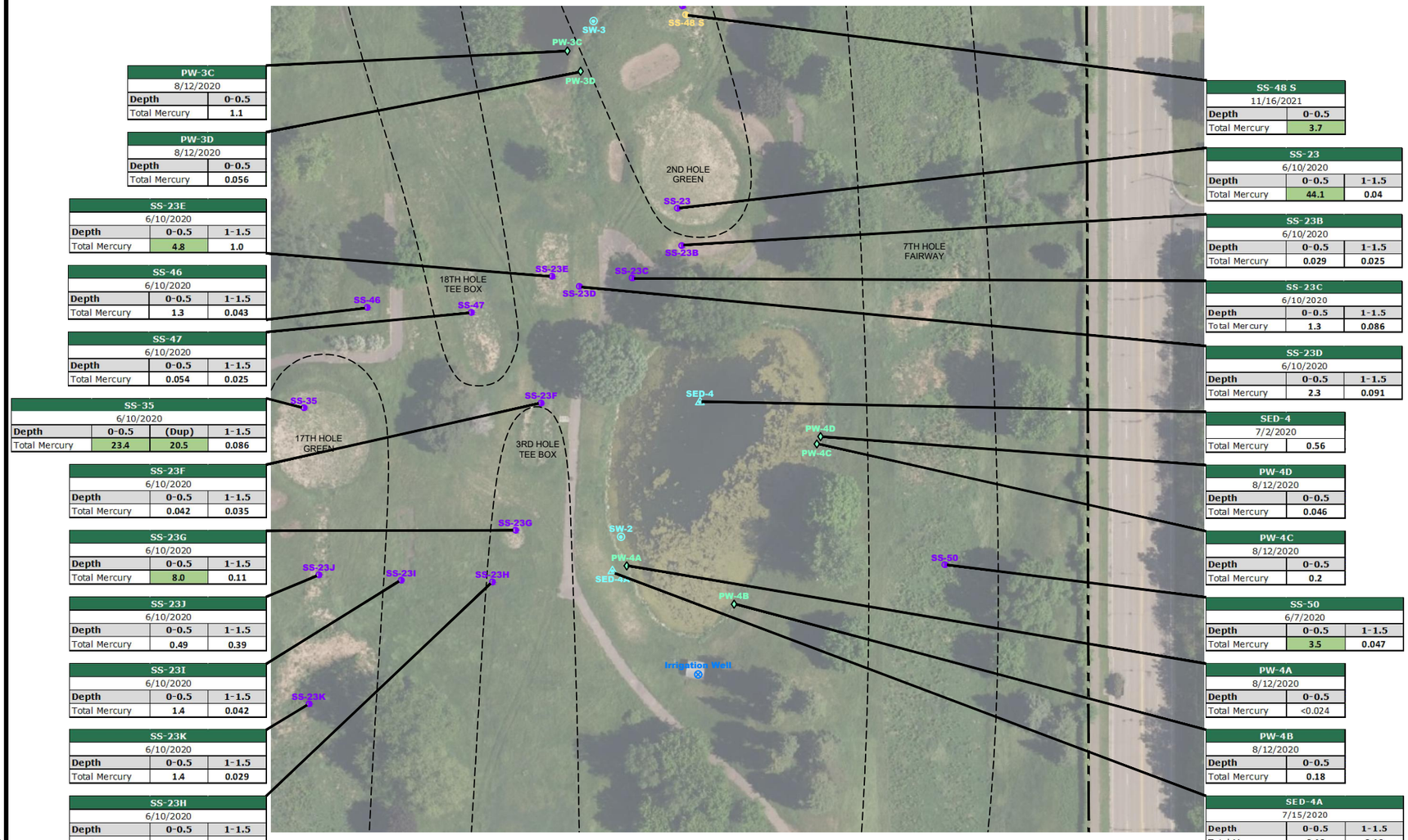

PW-3C	
8/12/2020	
Depth	**0-0.5**
Total Mercury	**1.1**

PW-3D	
8/12/2020	
Depth	**0-0.5**
Total Mercury	**0.056**

SS-23E		
6/10/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**4.8**	**1.0**

SS-46		
6/10/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**1.3**	**0.043**

SS-47		
6/10/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**0.054**	**0.025**

SS-35			
6/10/2020			
Depth	**0-0.5**	**(Dup)**	**1-1.5**
Total Mercury	**23.4**	**20.5**	**0.086**

SS-23F		
6/10/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**0.042**	**0.035**

SS-23G		
6/10/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**8.0**	**0.11**

SS-23J		
6/10/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**0.49**	**0.39**

SS-23I		
6/10/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**1.4**	**0.042**

SS-23K		
6/10/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**1.4**	**0.029**

SS-23H		
6/10/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**0.33**	<0.022

SS-48 S	
11/16/2021	
Depth	**0-0.5**
Total Mercury	**3.7**

SS-23		
6/10/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**44.1**	**0.04**

SS-23B		
6/10/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**0.029**	**0.025**

SS-23C		
6/10/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**1.3**	**0.086**

SS-23D		
6/10/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**2.3**	**0.091**

SED-4	
7/2/2020	
Total Mercury	**0.56**

PW-4D	
8/12/2020	
Depth	**0-0.5**
Total Mercury	**0.046**

PW-4C	
8/12/2020	
Depth	**0-0.5**
Total Mercury	**0.2**

SS-50		
6/7/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**3.5**	**0.047**

PW-4A	
8/12/2020	
Depth	**0-0.5**
Total Mercury	<0.024

PW-4B	
8/12/2020	
Depth	**0-0.5**
Total Mercury	**0.18**

SED-4A		
7/15/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**0.16**	**0.19**

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Exceeds the MPCA unregulated fill criteria
Exceeds SRV

50' 0 100'

SCALE: 1" = 100'

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Drawing Information

Project No: B1903316.00

Drawing No: B1903316-00H

Drawn By: BJB
Date Drawn: 5/23/19
Checked By: MK
Last Modified: 2/28/22

Project Information

Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Soil Analytical Results

Sheet: 06 of 13

Fig:

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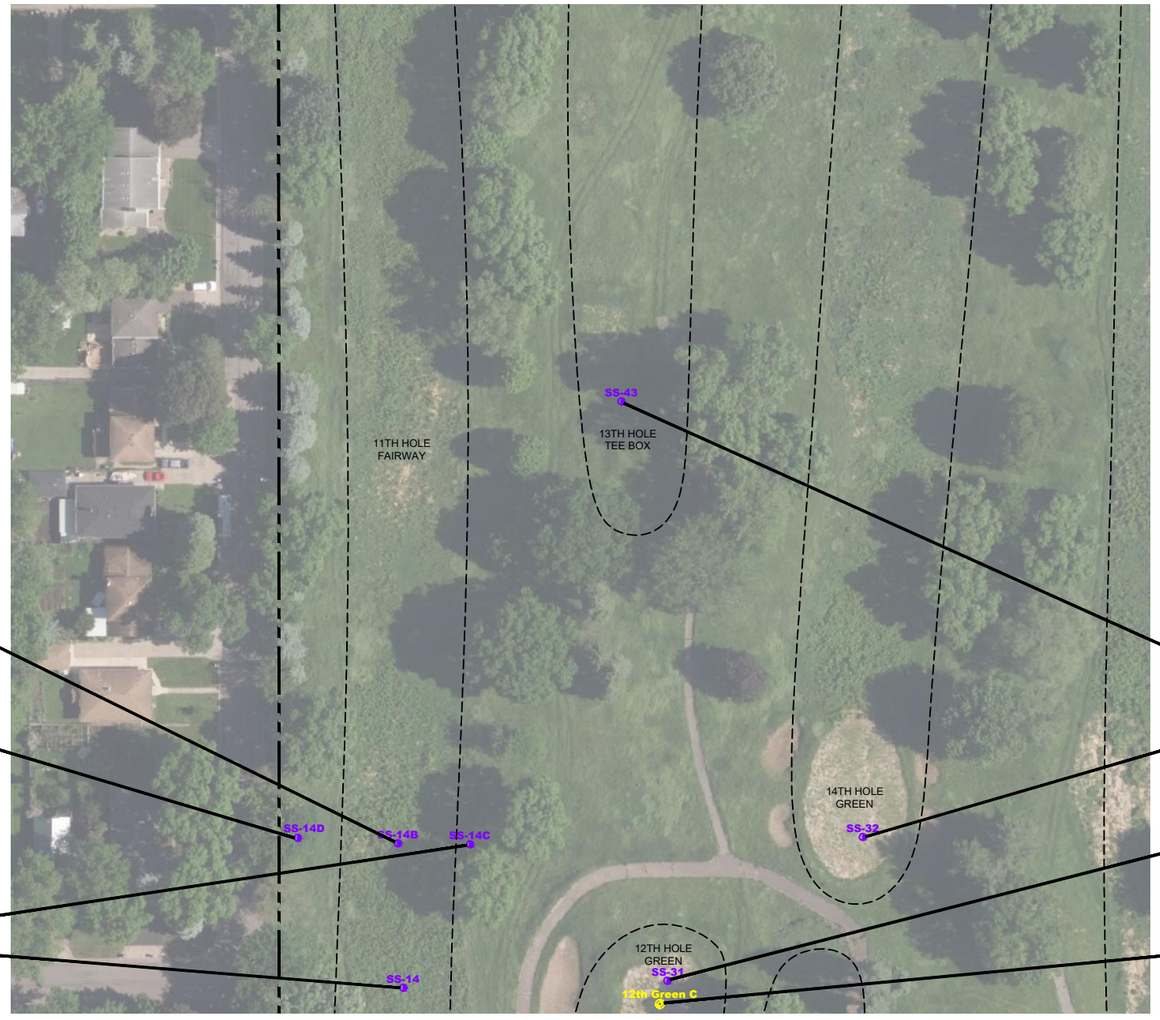

SS-14B		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	4.0	0.14

SS-14D		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.093	<0.024

SS-14C		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	1.7	0.2

SS-14	
5/10/2019	
Depth	0-0.5
Total Mercury	4.4

SS-43		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	2.7	0.16

SS-32		
6/9/2020		
Depth	0-0.5	1-1.5
Total Mercury	40.9	<0.022

SS-31		
6/10/2020		
Depth	0-0.5	1-1.5
Total Mercury	1.4	1.6

12th Green C	
11/18/2021	
Depth	0-0.5
Total Mercury	59.8

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Project Information

Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Soil Analytical Results

Sheet: 07 of 13

Fig:

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PW-5A	
8/12/2020	
Depth	0-0.5
Total Mercury	0.14

PW-5B	
8/12/2020	
Depth	0-0.5
Total Mercury	0.098

PW-5C	
8/12/2020	
Depth	0-0.5
Total Mercury	0.084

SS-40		
6/11/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.4	0.036

ASB-6C			
6/22/2020			
Depth	0-0.5	2-2.5	(Dup)
Total Mercury	0.21	<0.021	<0.024

ASB-5C		
6/23/2020		
Depth	0-0.5	2-2.5
Total Mercury	<0.023	<0.024

SS-19		
6/10/2020		
Depth	0-0.5	1-1.5
Total Mercury	1.1	0.12

SS-19B N	
11/16/2021	
Depth	0-0.5
Total Mercury	2.9

SS-19B E	
11/16/2021	
Depth	0-0.5
Total Mercury	2.3

SS-19B		
6/10/2020		
Depth	0-0.5	1-1.5
Total Mercury	3.1	0.65

SS-19C		
6/10/2020		
Depth	0-0.5	1-1.5
Total Mercury	3.0	0.3

SS-19B S	
11/16/2021	
Depth	0-0.5
Total Mercury	2.8

SS-19D		
6/10/2020		
Depth	0-0.5	1-1.5
Total Mercury	2.0	0.092

SS-19F			
6/10/2020			
Depth	0-0.5	(Dup)	1-1.5
Total Mercury	0.35	0.35	0.047

SS-19E		
6/10/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.67	<0.021

PW-5D	
8/12/2020	
Depth	0-0.5
Total Mercury	0.28

PW-5E E	
11/16/2021	
Depth	0-0.5
Total Mercury	2.9

PW-5E W	
11/16/2021	
Depth	0-0.5
Total Mercury	0.27

PW-5E		
Date	8/12/2020	11/16/2021
Depth	0-0.5	1-1.5
Total Mercury	8.0	0.071

PW-5E S	
11/16/2021	
Depth	0-0.5
Total Mercury	41.9

ASB-13 N		
11/18/2021		
Depth	0-0.5	1-1.5
Total Mercury	3.3	2.4

GP-8		
5/7/2019		
Depth	1-2	3-4
Total Mercury	2.3	0.74

ASB-13 W		
11/18/2021		
Depth	0-0.5	1-1.5
Total Mercury	3.3	3.6

ASB-13C				
6/22/2020				
Depth	0-0.5	2-2.5	2-2.5 DUP	4-4.5
Total Mercury	14.6	1.3	4.2	0.16

ASB-13 E		
11/18/2021		
Depth	0-0.5	1-1.5
Total Mercury	2.4	3.5

ASB-7		
6/22/2020		
Depth	0-0.5	2-2.5
Total Mercury	0.036	0.048

ASB-13 S		
11/18/2021		
Depth	0-0.5	1-1.5
Total Mercury	2.4	4.2

SED-5	
7/2/2020	
Total Mercury	0.1

GP-7	
5/7/2019	
Depth	3-4
Total Mercury	0.041

ASB-9C			
6/23/2020			
Depth	0-0.5	2-2.5	4-4.5
Total Mercury	0.61	0.78	--

GP-9		
date		
Depth	0-1	5-6
Total Mercury	0.23	0.033

ASB-8C				
6/22/2020				
Depth	0-0.5	2-2.5	(Dup)	4-4.5
Total Mercury	1.1	0.58	0.14	0.037

SS-7		
4/19/2019		
Depth	0-1	
Total Mercury	0.25	

ASB-1		
6/22/2020		
Depth	0-0.5	2-2.5
Total Mercury	0.042	<0.022

ASB-2		
6/22/2020		
Depth	0-0.5	2-2.5
Total Mercury	0.024	<0.022

ASB-3			
6/22/2020			
Depth	0-0.5	2-2.5	4-4.5
Total Mercury	0.15	0.048	--

ASB-4		
6/22/2020		
Depth	0-0.5	2-2.5
Total Mercury	<0.018	<0.022

ST-8	
4/13/2019	
Depth	5-7
Total Mercury	0.028

ASB-11C		
6/23/2020		
Depth	0-0.5	2-2.5
Total Mercury	--	--

ASB-10		
6/22/2020		
Depth	2-2.5	
Total Mercury	<0.022	

SB-3	
6/24/2020	
Depth	6.5-7
DRO	<9.5

SB-4	
6/24/2020	
Depth	4-10 in
DRO	605.0

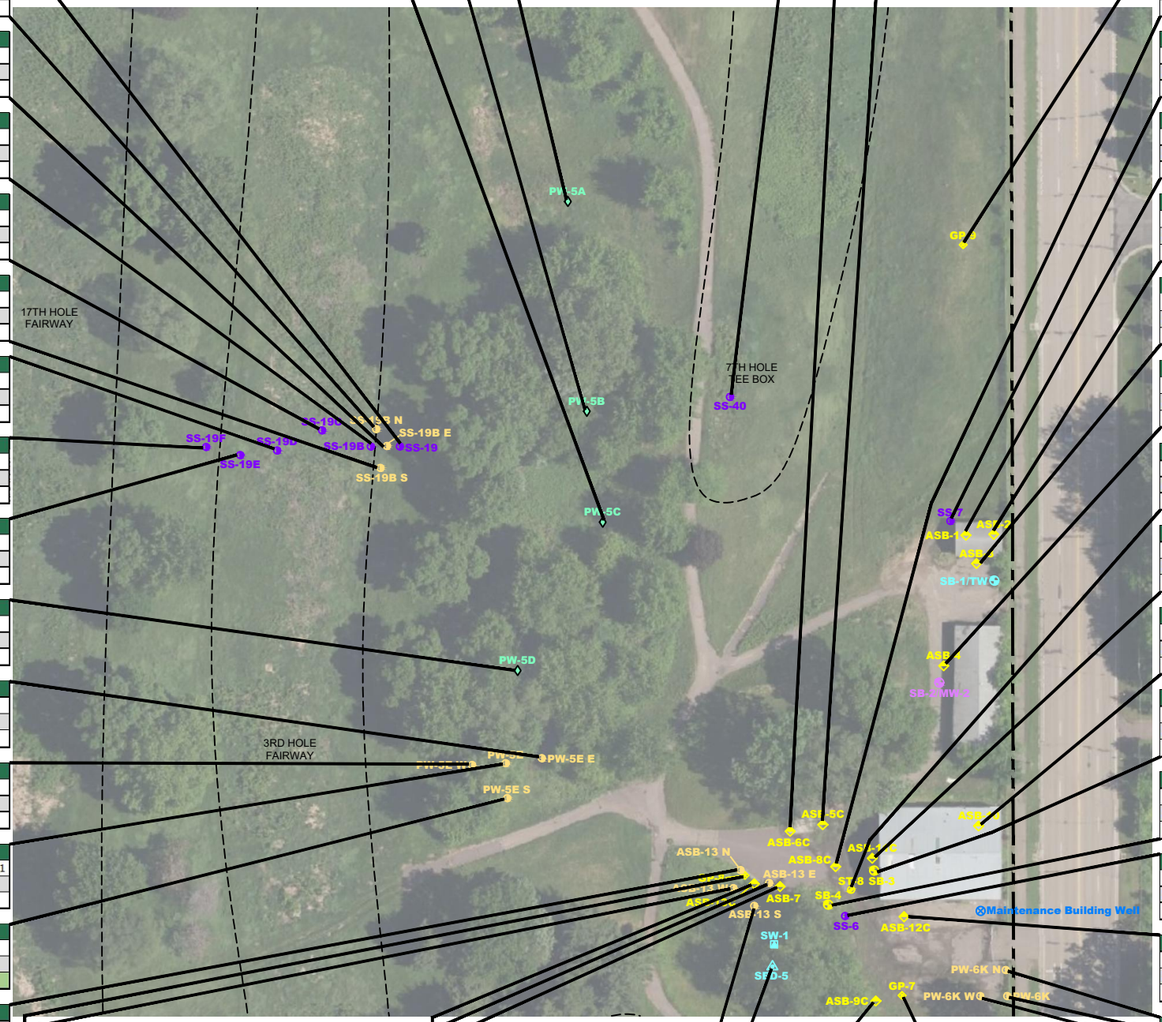
SS-6	
date	
Depth	1-2
Total Mercury	2.8

ASB-12C		
6/23/2020		
Depth	0-0.5	2-2.5
Total Mercury	--	--

PW-6K N	
11/18/2021	
Depth	0-0.5
Total Mercury	0.27

PW-6K		
Date	8/12/2020	11/18/2021
Depth	0-0.5	1-1.5
Total Mercury	3.4	2.3

PW-6K W	
11/18/2021	
Depth	0-0.5
Total Mercury	1.4



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Exceeds the MPCA unregulated fill criteria
Exceeds SRV

N

50' 0 100'

SCALE: 1" = 100'

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Checked By:	MK
Last Modified:	2/28/22

Project Information

Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Soil Analytical Results

Sheet: 08 of 13

Fig:

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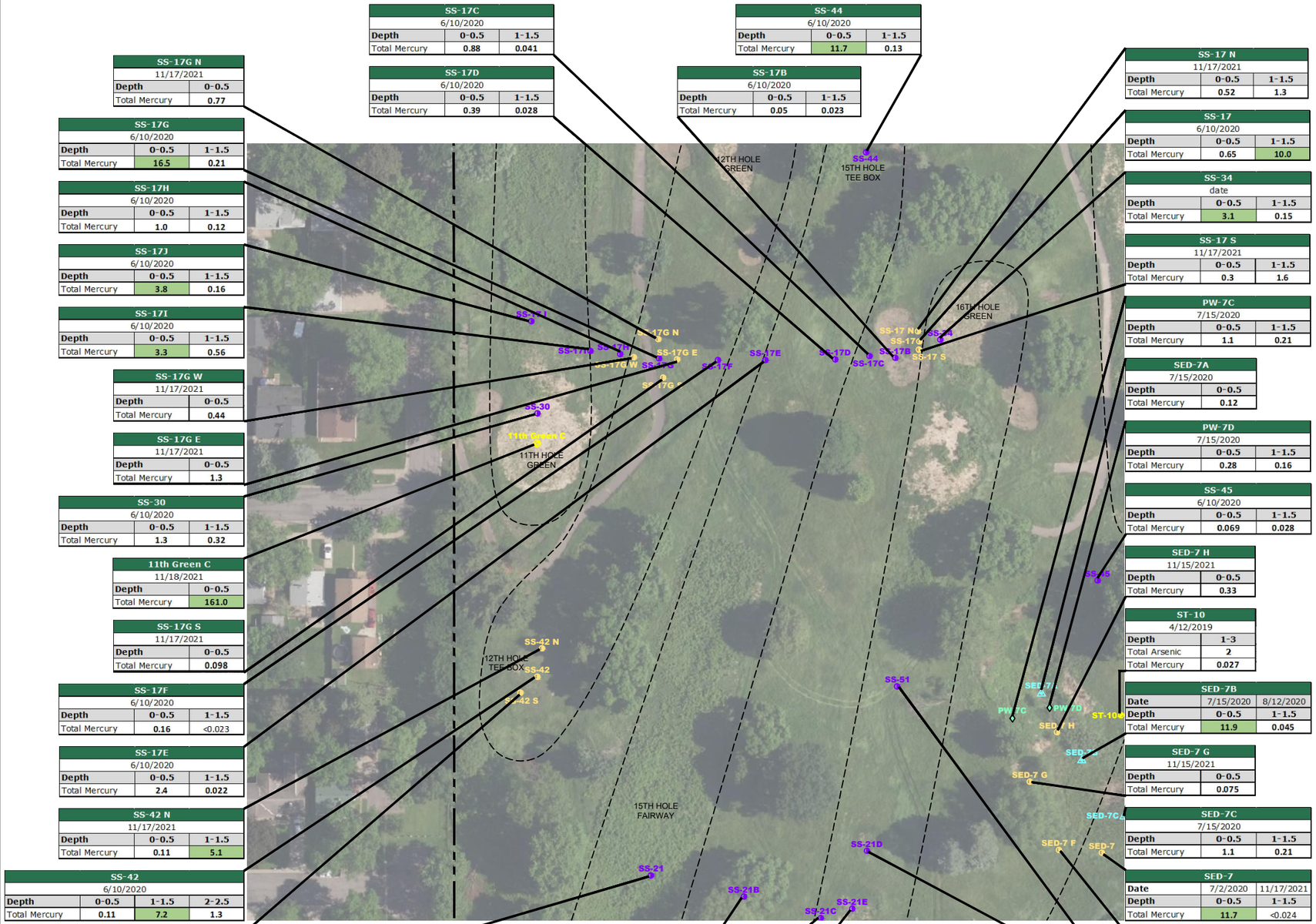

SS-17G N	
11/17/2021	
Depth	0-0.5
Total Mercury	0.77

SS-17G		
6/10/2020		
Depth	0-0.5	1-1.5
Total Mercury	16.5	0.21

SS-17H		
6/10/2020		
Depth	0-0.5	1-1.5
Total Mercury	1.0	0.12

SS-17J		
6/10/2020		
Depth	0-0.5	1-1.5
Total Mercury	3.8	0.16

SS-17I		
6/10/2020		
Depth	0-0.5	1-1.5
Total Mercury	3.3	0.56

SS-17G W	
11/17/2021	
Depth	0-0.5
Total Mercury	0.44

SS-17G E	
11/17/2021	
Depth	0-0.5
Total Mercury	1.3

SS-30		
6/10/2020		
Depth	0-0.5	1-1.5
Total Mercury	1.3	0.32

11th Green C	
11/18/2021	
Depth	0-0.5
Total Mercury	161.0

SS-17G S	
11/17/2021	
Depth	0-0.5
Total Mercury	0.098

SS-17F		
6/10/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.16	<0.023

SS-17E		
6/10/2020		
Depth	0-0.5	1-1.5
Total Mercury	2.4	0.022

SS-42 N		
11/17/2021		
Depth	0-0.5	1-1.5
Total Mercury	0.11	5.1

SS-42			
6/10/2020			
Depth	0-0.5	1-1.5	2-2.5
Total Mercury	0.11	7.2	1.3

SS-42 S		
date		
Depth	0-0.5	1-1.5
Total Mercury	0.37	0.66

SS-21		
6/11/2020		
Depth	0-0.5	1-1.5
Total Mercury	4.5	0.1

SS-17C		
6/10/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.88	0.041

SS-17D		
6/10/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.39	0.028

SS-44		
6/10/2020		
Depth	0-0.5	1-1.5
Total Mercury	11.7	0.13

SS-17B		
6/10/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.05	0.023

SS-21B		
6/11/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.1	<0.023

SS-21C		
6/11/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.6	0.062

SS-21E		
6/11/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.47	<0.022

SS-21D			
6/11/2020			
Depth	0-0.5	(Dup)	1-1.5
Total Mercury	0.53	0.54	0.19

SS-17 N		
11/17/2021		
Depth	0-0.5	1-1.5
Total Mercury	0.52	1.3

SS-17		
6/10/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.65	10.0

SS-34		
date		
Depth	0-0.5	1-1.5
Total Mercury	3.1	0.15

SS-17 S		
11/17/2021		
Depth	0-0.5	1-1.5
Total Mercury	0.3	1.6

PW-7C		
7/15/2020		
Depth	0-0.5	1-1.5
Total Mercury	1.1	0.21

SED-7A	
7/15/2020	
Depth	0-0.5
Total Mercury	0.12

PW-7D		
7/15/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.28	0.16

SS-45		
6/10/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.069	0.028

SED-7 H	
11/15/2021	
Depth	0-0.5
Total Mercury	0.33

ST-10	
4/12/2019	
Depth	1-3
Total Arsenic	2
Total Mercury	0.027

SED-7B		
Date	7/15/2020	8/12/2020
Depth	0-0.5	1-1.5
Total Mercury	11.9	0.045

SED-7 G	
11/15/2021	
Depth	0-0.5
Total Mercury	0.075

SED-7C		
7/15/2020		
Depth	0-0.5	1-1.5
Total Mercury	1.1	0.21

SED-7			
Date	7/2/2020	11/17/2021	
Depth	0-0.5	1-1.5	
Total Mercury	11.7	<0.024	

SED-7 F	
11/15/2021	
Depth	0-0.5
Total Mercury	0.24

SS-51		
6/10/2020		
Depth	0-0.5	1-1.5
Total Mercury	2.8	0.21

- SOIL BORING LOCATION
- SOIL BORING / TEMPORARY WELL LOCATION
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- PUSH PROBE BORING LOCATION
- COMPOSITE SOIL SAMPLE LOCATION
- SHALLOW HAND AUGER BORING LOCATION (2021)
- CONFIRMATION SAMPLE LOCATION

Exceeds the MPCA unregulated fill criteria
Exceeds SRV

N

50' 0 100'

SCALE: 1" = 100'

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Drawing Information

Project No: B1903316.00

Drawing No: B1903316-00H

Drawn By:	BJB
Date Drawn:	5/23/19
Checked By:	MK
Last Modified:	2/28/22

Project Information

Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

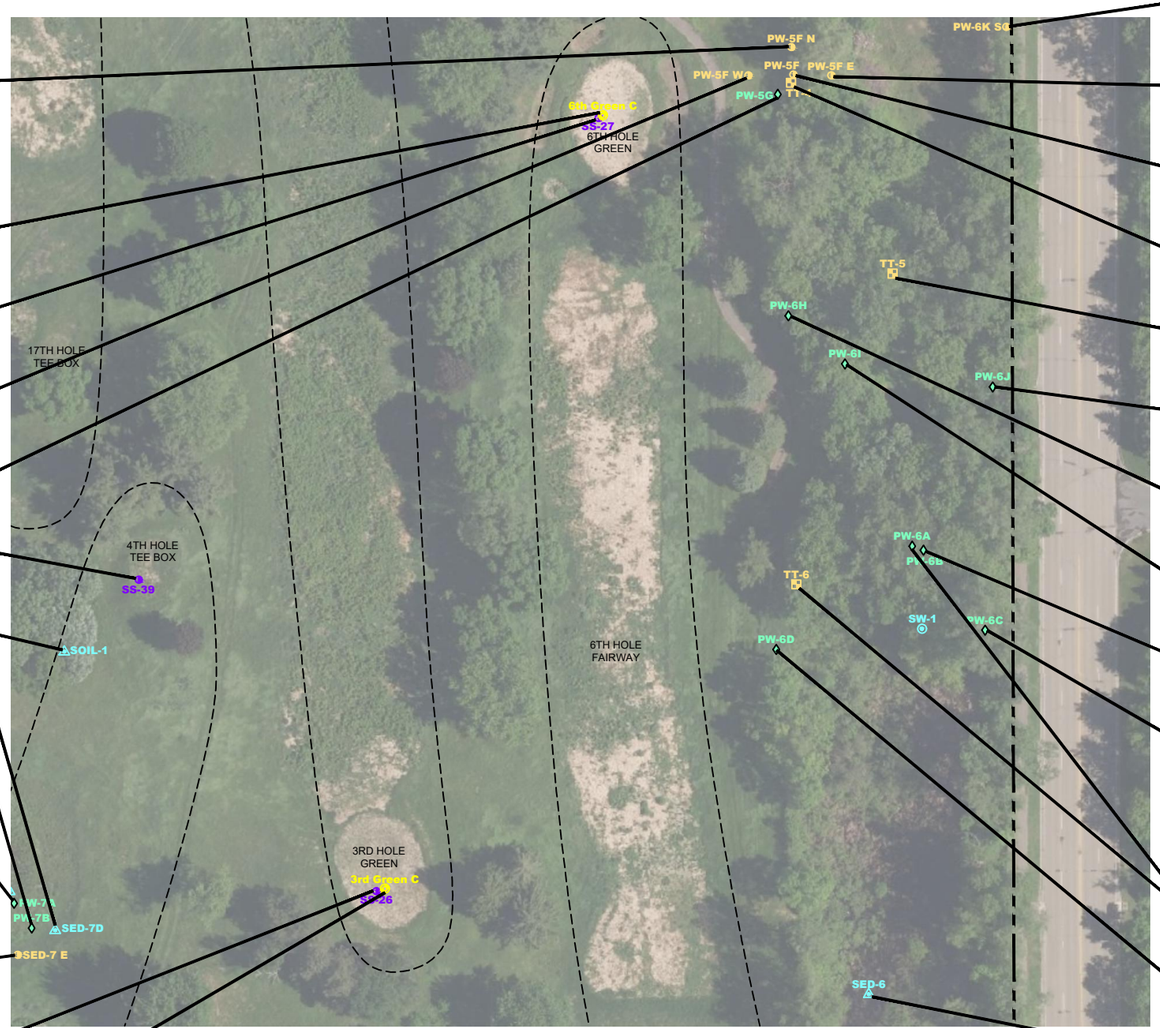
Saint Paul, Minnesota

Soil Analytical Results

Sheet: 09 of 13

Fig:

F:\2019\B1903316\CAD\B1903316-00H dwg,09,2/28/2022 2:12:25 PM



PW-5F N	
11/18/2021	
Depth	**0-0.5**
Total Mercury	**0.29**

6th Green C	
11/18/2021	
Depth	**0-0.5**
Total Mercury	**18.6**

SS-27		
6/11/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**3.0**	**1.8**

PW-5F W	
11/18/2021	
Depth	**0-0.5**
Total Mercury	**0.66**

PW-5G	
8/12/2020	
Depth	**0-0.5**
Total Mercury	**2.5**

SS-39		
6/10/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**4.4**	<0.023

SOIL-1		
7/15/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**0.1**	**0.034**

SED-7D		
7/15/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**0.28**	**0.16**

PW-7A	
7/15/2020	
Depth	**0-0.5**
Total Mercury	**0.12**

PW-7B		
7/15/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**11.9**	**0.045**

SED-7 E		
11/15/2021		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**0.13**	**0.055**

SS-26		
6/10/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**1.7**	**0.64**

3rd Green C	
11/18/2021	
Depth	**0-0.5**
Total Mercury	**89.2**

PW-6K S	
11/18/2021	
Depth	**0-0.5**
Total Mercury	**0.11**

PW-5F E	
11/18/2021	
Depth	**0-0.5**
Total Mercury	**2.2**

PW-5F		
11/18/2021		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**3.7**	**6.8**

TT-4	
6/23/2020	
Depth	**7-8**
Total Mercury	**1.2**

TT-5	
6/23/2020	
Depth	**2-3**
Total Mercury	**1.2**

PW-6J	
8/12/2020	
Depth	**0-0.5**
Total Mercury	**0.91**

PW-6H	
8/12/2020	
Depth	**0-0.5**
Total Mercury	**0.28**

PW-6I	
8/12/2020	
Depth	**0-0.5**
Total Mercury	**0.5**

PW-6B	
8/12/2020	
Depth	**0-0.5**
Total Mercury	**2.5**

PW-6C	
8/12/2020	
Depth	**0-0.5**
Total Mercury	**6.4**

PW-6A	
8/12/2020	
Depth	**0-0.5**
Total Mercury	**1.9**

TT-6		
6/23/2020		
Depth	**8-9**	**8-9 DUP**
Total Mercury	**4.6**	**7.2**

PW-6D	
8/12/2020	
Depth	**0-0.5**
Total Mercury	**9.3**

SED-6	
7/2/2020	
Total Mercury	**12.9**

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Exceeds the MPCA unregulated fill criteria
Exceeds SRV

N

50' 0 100'

SCALE: 1" = 100'

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Project No: B1903316.00

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Drawn By:	BJB
Date Drawn:	5/23/19
Checked By:	MK
Last Modified:	2/28/22

Project Information

Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Soil Analytical Results

Sheet: 10 of 13

Fig:

SS-21G		
6/11/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.56	0.051

SS-21F		
6/11/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.82	0.25

SS-33		
6/11/2020		
Depth	0-0.5	1-1.5
Total Mercury	73.0	0.085

SS-4F		
6/11/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.13	<0.023

SS-4E		
6/11/2020		
Depth	0-0.5	1-1.5
Total Mercury	3.4	0.12

SS-4D		
6/11/2020		
Depth	0-0.5	1-1.5
Total Mercury	3.6	0.046

SS-4C			
6/11/2020			
Depth	0-0.5	(Dup)	1-1.5
Total Mercury	2.5	2.1	0.24

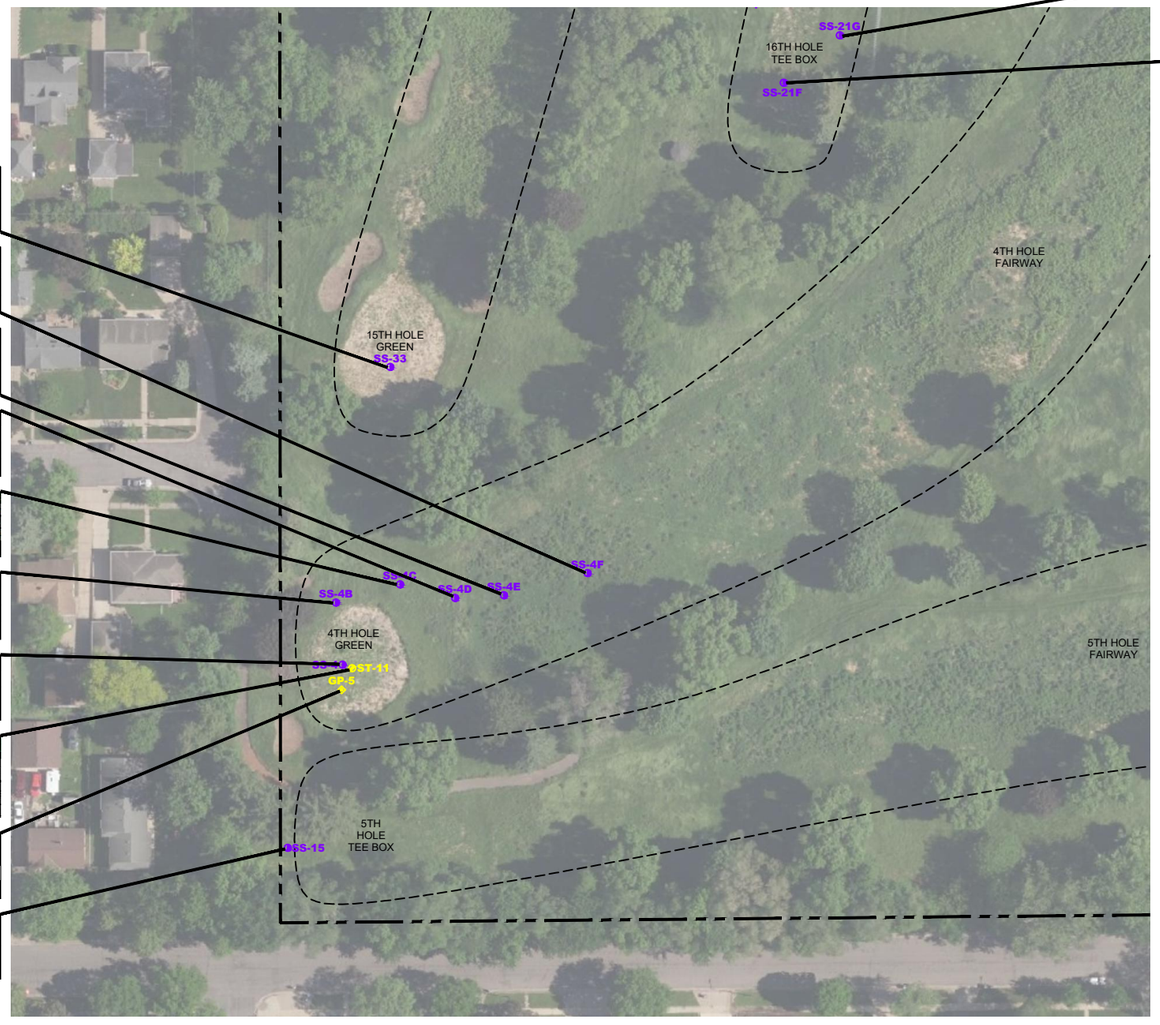
SS-4B		
6/11/2020		
Depth	0-0.5	1-1.5
Total Mercury	46.0	0.27

SS-4	
4/19/2019	
Depth	0-0.5
Total Mercury	21.1

ST-11	
4/13/2019	
Depth	4-6
Total Arsenic	1.7
Total Mercury	<0.020

GP-5		
5/7/2019		
Depth	1-2	2-3
Total Mercury	6.1	0.067

SS-15	
5/10/2019	
Depth	0-0.5
Total Mercury	7.0



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Exceeds the MPCA unregulated fill criteria
Exceeds SRV

50' 0 100'

SCALE: 1" = 100'

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Drawing Information

Project No: B1903316.00

Drawing No: B1903316-00H

Drawn By:	BJB
Date Drawn:	5/23/19
Checked By:	MK
Last Modified:	2/28/22

Project Information

Hillcrest Redevelopment Site

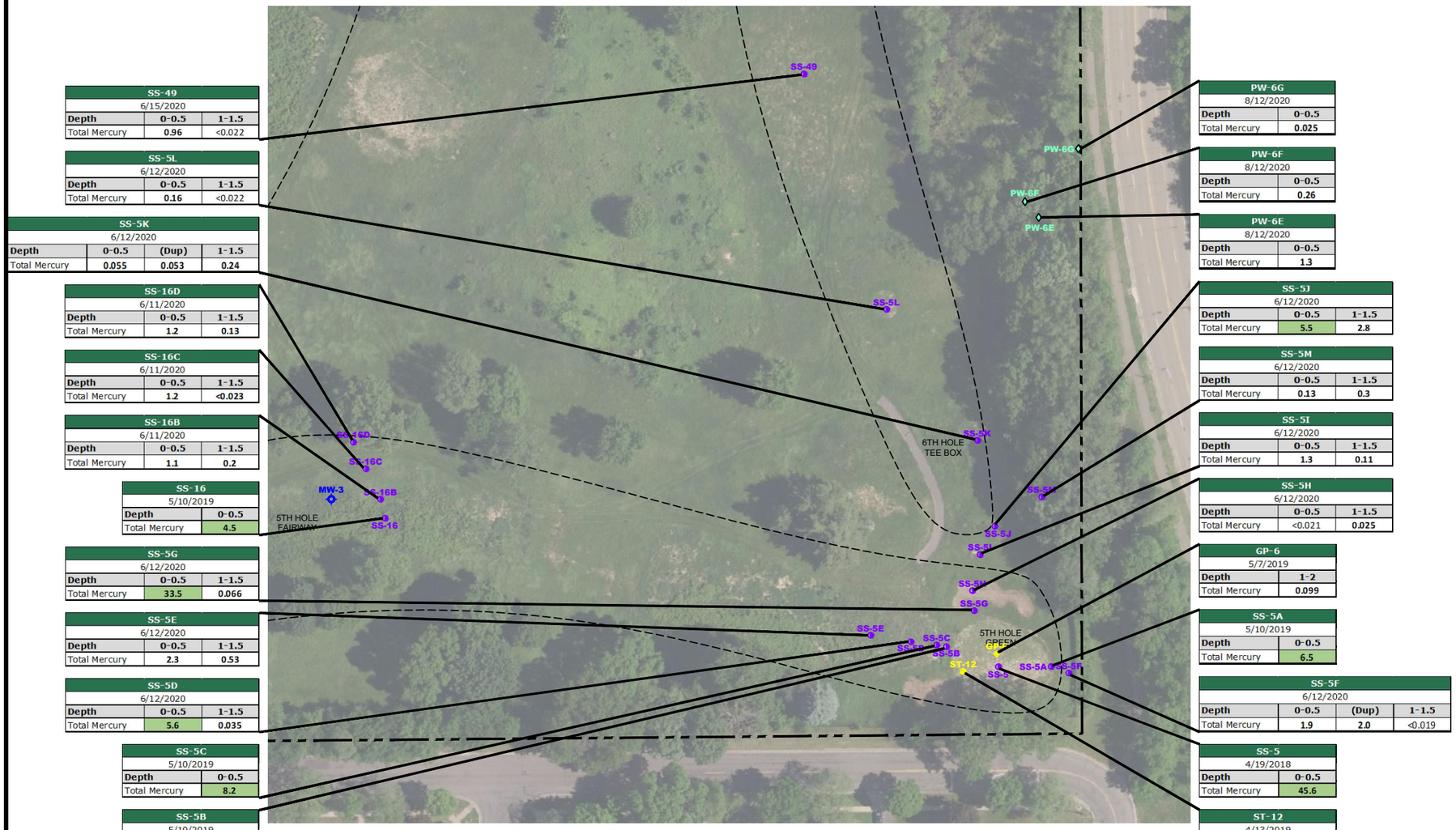
2200 Larpenteur Avenue E

Saint Paul, Minnesota

Soil Analytical Results

Sheet: 11 of 13

Fig:



SS-49		
6/15/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.96	<0.022

SS-5L		
6/12/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.16	<0.022

SS-5K			
6/12/2020			
Depth	0-0.5	(Dup)	1-1.5
Total Mercury	0.055	0.053	0.24

SS-16D		
6/11/2020		
Depth	0-0.5	1-1.5
Total Mercury	1.2	0.13

SS-16C		
6/11/2020		
Depth	0-0.5	1-1.5
Total Mercury	1.2	<0.023

SS-16B		
6/11/2020		
Depth	0-0.5	1-1.5
Total Mercury	1.1	0.2

SS-16	
5/10/2019	
Depth	0-0.5
Total Mercury	4.5

SS-5G		
6/12/2020		
Depth	0-0.5	1-1.5
Total Mercury	33.5	0.066

SS-5E		
6/12/2020		
Depth	0-0.5	1-1.5
Total Mercury	2.3	0.53

SS-5D		
6/12/2020		
Depth	0-0.5	1-1.5
Total Mercury	5.6	0.035

SS-5C	
5/10/2019	
Depth	0-0.5
Total Mercury	8.2

SS-5B	
5/10/2019	
Depth	0-0.5
Total Mercury	46.3

PW-6G	
8/12/2020	
Depth	0-0.5
Total Mercury	0.025

PW-6F	
8/12/2020	
Depth	0-0.5
Total Mercury	0.26

PW-6E	
8/12/2020	
Depth	0-0.5
Total Mercury	1.3

SS-5J		
6/12/2020		
Depth	0-0.5	1-1.5
Total Mercury	5.5	2.8

SS-5M		
6/12/2020		
Depth	0-0.5	1-1.5
Total Mercury	0.13	0.3

SS-5I		
6/12/2020		
Depth	0-0.5	1-1.5
Total Mercury	1.3	0.11

SS-5H		
6/12/2020		
Depth	0-0.5	1-1.5
Total Mercury	<0.021	0.025

GP-6	
5/7/2019	
Depth	1-2
Total Mercury	0.099

SS-5A	
5/10/2019	
Depth	0-0.5
Total Mercury	6.5

SS-5F			
6/12/2020			
Depth	0-0.5	(Dup)	1-1.5
Total Mercury	1.9	2.0	<0.019

SS-5	
4/19/2018	
Depth	0-0.5
Total Mercury	45.6

ST-12	
4/13/2019	
Depth	2-4
Total Arsenic	6.4

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- SHALLOW HAND AUGER BORING LOCATION (2021)
- CONFIRMATION SAMPLE LOCATION

Exceeds the MPCA unregulated fill criteria

Exceeds SRV

N

50' 0 100'

SCALE: 1" = 100'

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Drawing Information

Project No: B1903316.00

Drawing No: B1903316-00H

Drawn By: BJB
Date Drawn: 5/23/19
Checked By: MK
Last Modified: 2/28/22

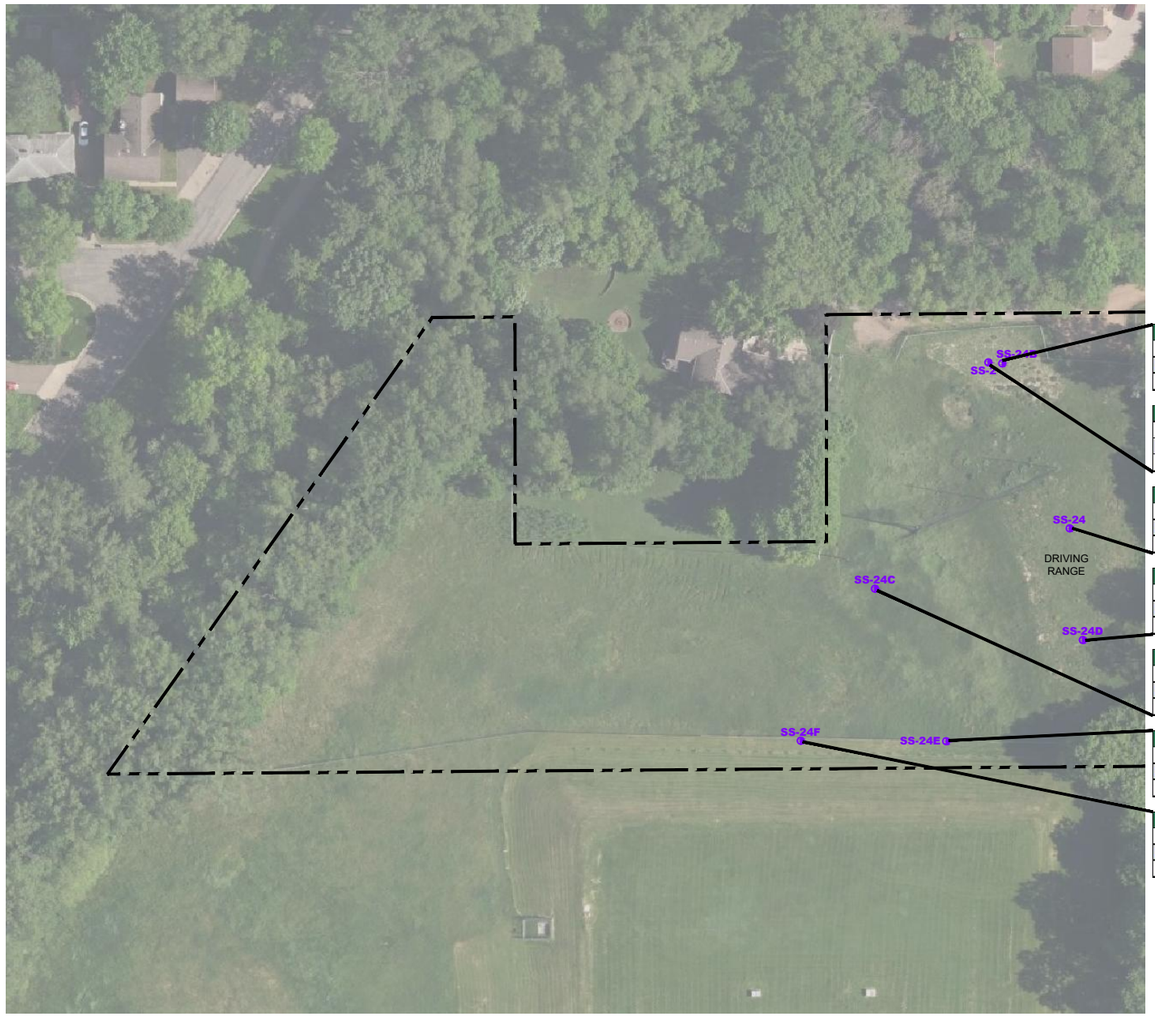
Project Information

Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Soil Analytical Results



SS-24B		
6/12/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	<0.021	<0.021

SS-2	
4/19/2019	
Depth	**0-0.5**
Total Mercury	**0.089**

SS-24		
6/12/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**0.23**	<0.022

SS-24D		
6/12/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	<0.022	<0.020

SS-24C		
6/12/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**0.033**	<0.020

SS-24E		
6/12/2020		
Depth	**0-0.5**	**1-1.5**
Total Mercury	**0.25**	<0.021

SS-24F			
6/12/2020			
Depth	**0-0.5**	**(Dup)**	**1-1.5**
Total Mercury	**0.025**	<0.023	<0.021

- **SOIL BORING LOCATION**
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- **PUSH PROBE BORING LOCATION**
- **COMPOSITE SOIL SAMPLE LOCATION**
- **SHALLOW HAND AUGER BORING LOCATION (2021)**
- **CONFIRMATION SAMPLE LOCATION**

Exceeds the MPCA unregulated fill criteria

Exceeds SRV

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Project Information

Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Soil Analytical Results

Sheet: 13 of 13

Fig:

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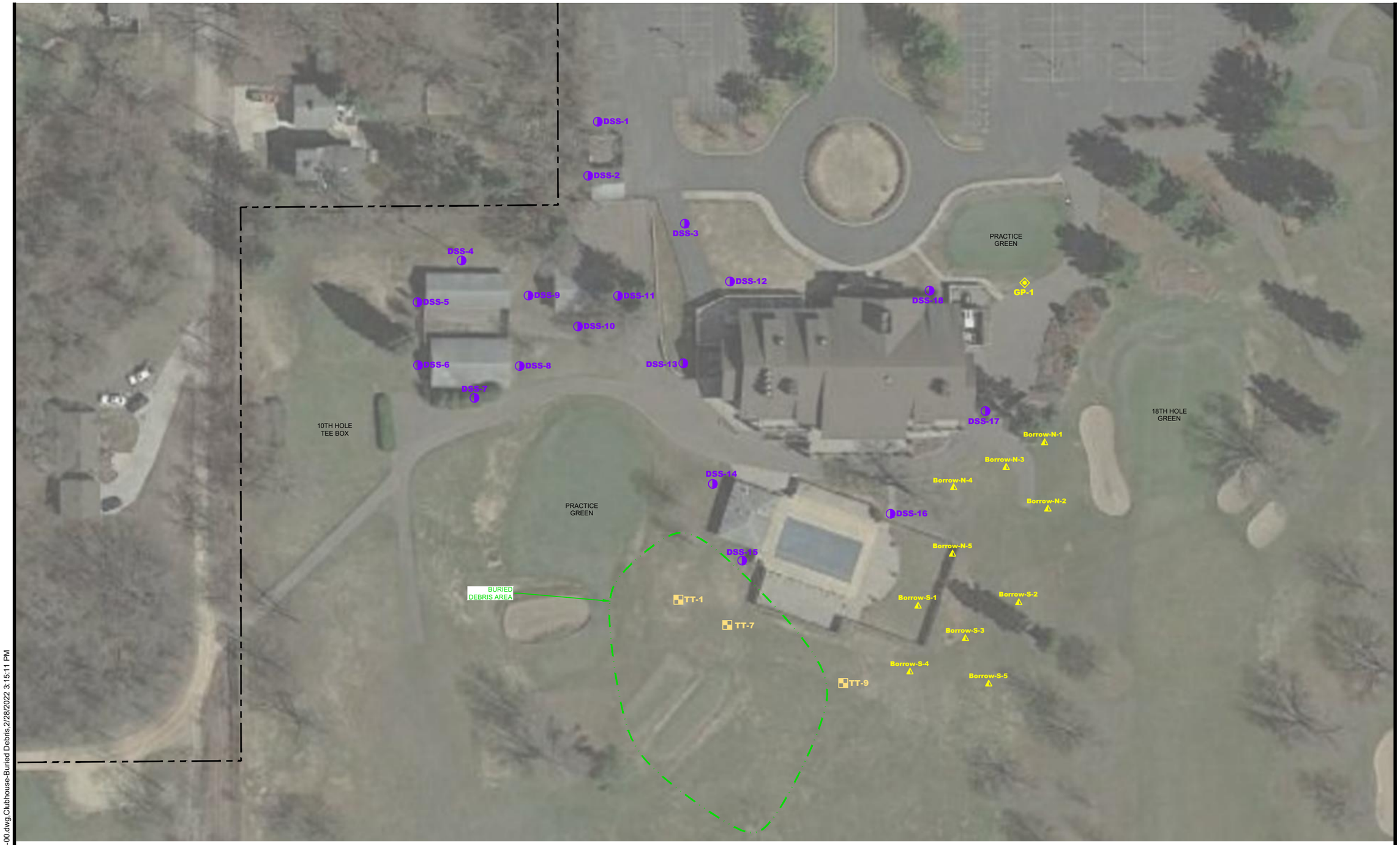

TEST TRENCH LOCATION

SHALLOW HAND AUGER BORING LOCATION

PUSH PROBE BORING LOCATION

CONFIRMATION SAMPLE LOCATION

30' 0 60'

SCALE: 1" = 60'

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Date Drawn:	2/6/20
Checked By:	MK
Last Modified:	2/28/22

Project Information

Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Clubhouse Buried Debris Area

Figure 6

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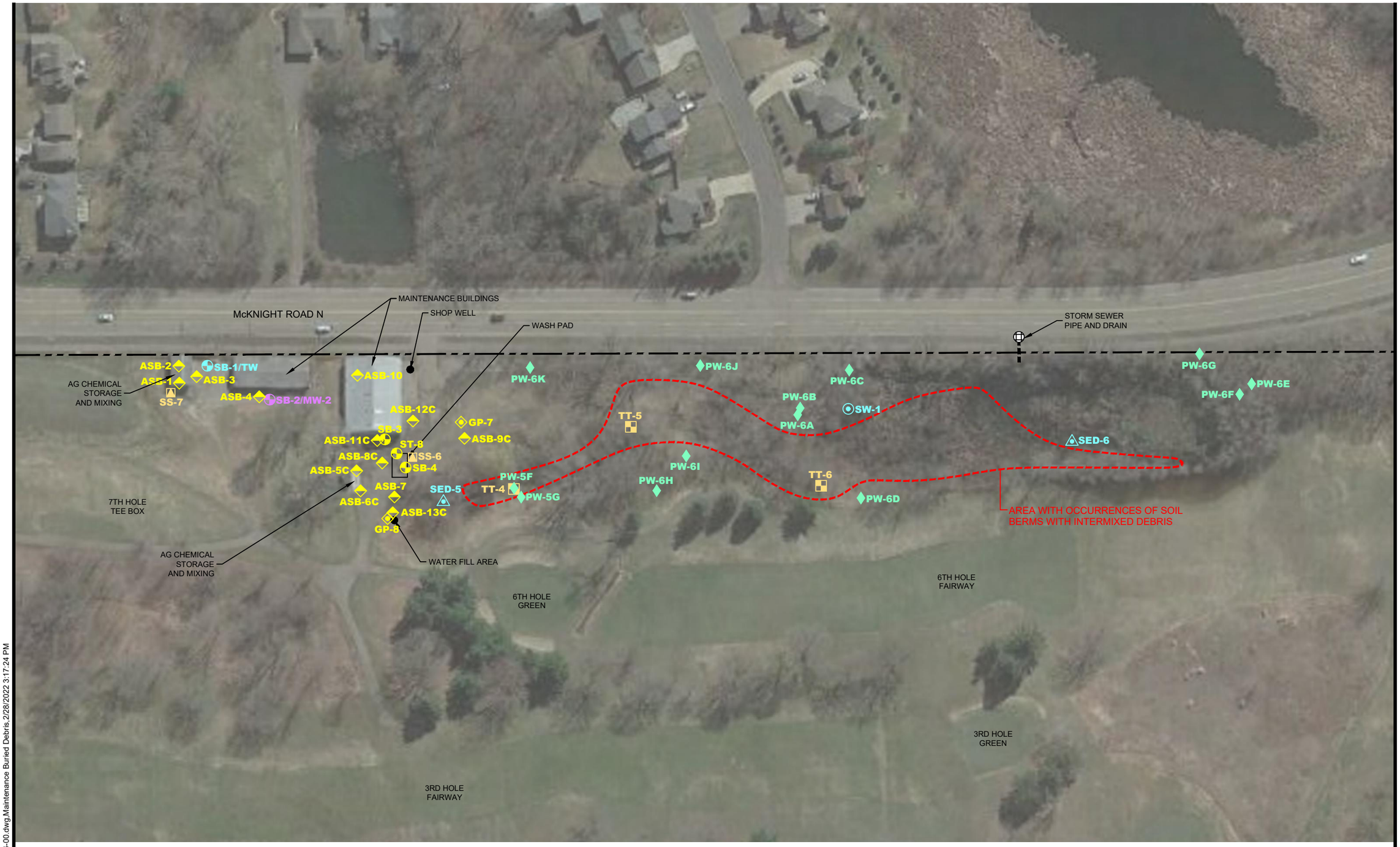

SOIL BORING LOCATION
SOIL BORING / TEMPORARY WELL LOCATION
SOIL BORING / PERMANENT WELL LOCATION
AGRICULTURAL CHEMICAL SOIL BORING LOCATION
TEST TRENCH LOCATION
SEDIMENT SAMPLE LOCATION
POTENTIAL WETLAND SAMPLE LOCATION
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SURFACE SOIL SAMPLE LOCATION

50' 0 100'
SCALE: 1" = 100'

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Drawing Information

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Drawing No:	B1903316-00
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Date Drawn:	2/6/20
Checked By:	MK
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Project Information

Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Maintenance Buildings Buried Debris Area

Figure 7

F:\2019\B1903316\CAD\B1903316-00.dwg,Maintenance Buried Debris,2/28/2022 3:17:24 PM

COMPOSITE SOIL SAMPLE LOCATION

MERCURY CONCENTRATIONS IN SOIL EXCEED SOIL REFERENCE VALUE FOR MECURY

MERCURY CONCENTRATIONS IN SOIL ARE BELOW THE SOIL REFERENCE VALUE FOR MERCURY

75' 0 150'

SCALE: 1" = 150'

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Drawing Information

Project No:	B1903316.00
Drawing No:	B1903316-00G
Drawn By:	BJB
Date Drawn:	8/25/21
Checked By:	MK
Last Modified:	1/25/22

Project Information

Former Hillcrest Golf Course

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Fairway Mercury Soil Cleanup Areas

Sheet: 1 of 2

Fig: 8

COMPOSITE SOIL SAMPLE LOCATION

MERCURY CONCENTRATIONS IN SOIL EXCEED SOIL REFERENCE VALUE FOR MECURY MERCURY

CONCENTRATIONS IN SOIL ARE BELOW THE SOIL REFERENCE VALUE FOR MERCURY

75' 0 150'

SCALE: 1" = 150'

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Drawing No:	B1903316-00G
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Project Information

Former Hillcrest Golf Course

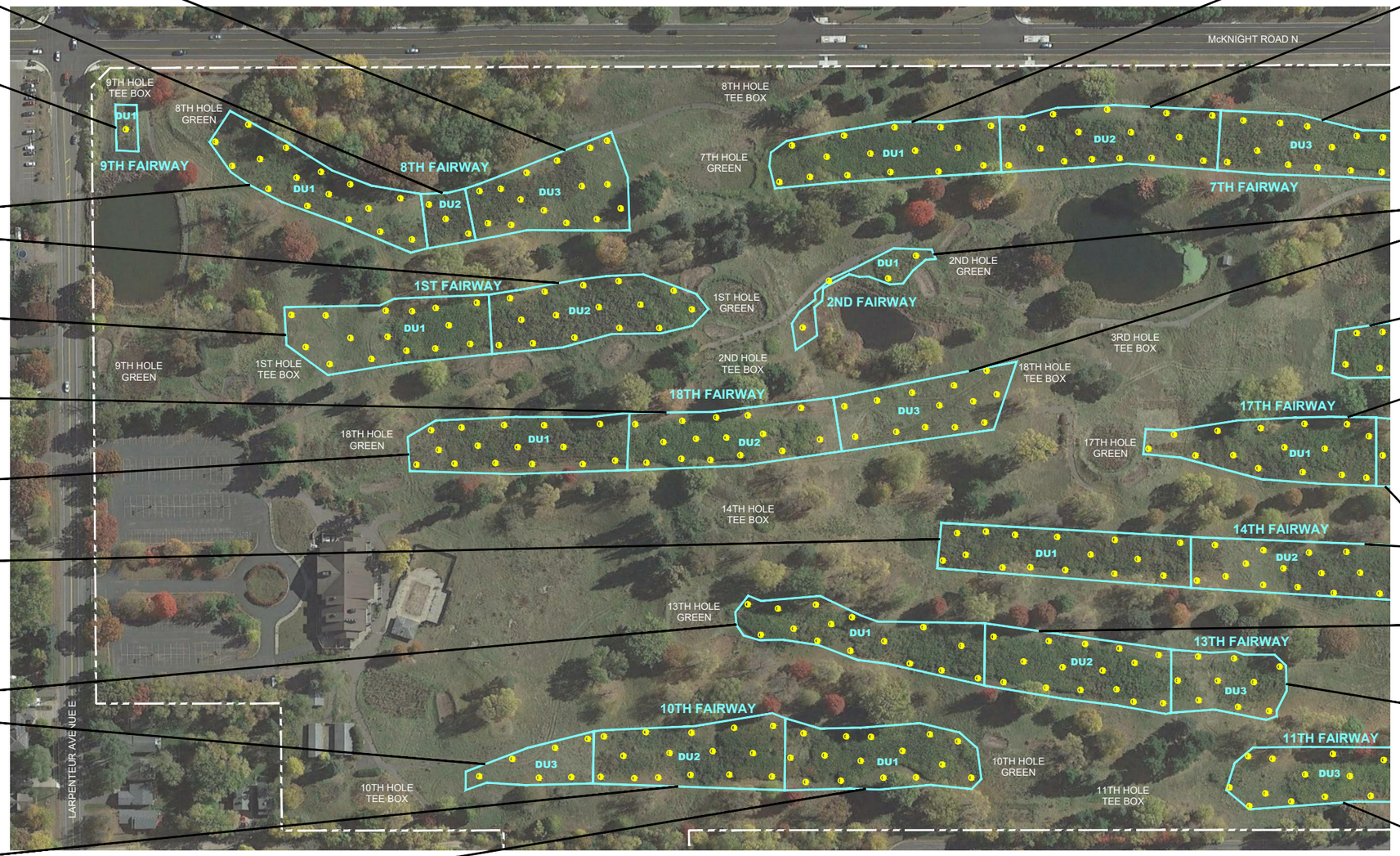
2200 Larpenteur Avenue E

Saint Paul, Minnesota

Fairway Mercury Soil Cleanup Areas

Sheet: 2 of 2

Fig: 8



FW-8-DU3	
Depth	0-0.5'
Mercury	1.8

FW-8-DU2	
Depth	0-0.5'
Mercury	5.4

FW-9-DU1	
Depth	0-0.5'
Mercury	0.31

FW-8-DU1	
Depth	0-0.5'
Mercury	5.2

FW-1-DU2	
Depth	0-0.5'
Mercury	4.1

FW-1-DU1	
Depth	0-0.5'
Mercury	3.1

FW-18-DU2	
Depth	0-0.5'
Mercury	3.6

FW-18-DU1	
Depth	0-0.5'
Mercury	7.6

FW-14-DU1	
Depth	0-0.5'
Mercury	3.5

FW-13-DU1	
Depth	0-0.5'
Mercury	15.1

FW-10-DU3	
Depth	0-0.5'
Mercury	2.8

FW-10-DU2	
Depth	0-0.5'
Mercury	3.4

FW-10-DU1	
Depth	0-0.5'
Mercury	11.9

FW-7-DU1	
Depth	0-0.5'
Mercury	2.8

FW-7-DU2	
Depth	0-0.5'
Mercury	3

FW-7-DU3	
Depth	0-0.5'
Mercury	2.9

FW-2-DU1	
Depth	0-0.5'
Mercury	2.6

FW-18-DU3	
Depth	0-0.5'
Mercury	1.7

FW-3-DU3	
Depth	0-0.5'
Mercury	3.1

FW-17-DU1	
Depth	0-0.5'
Mercury	1.4

FW-17-DU2	
Depth	0-0.5'
Mercury	2.7

FW-14-DU2	
Depth	0-0.5'
Mercury	3.1

FW-13-DU2	
Depth	0-0.5'
Mercury	2.9

FW-13-DU3	
Depth	0-0.5'
Mercury	2.9

FW-11-DU3	
Depth	0-0.5'
Mercury	2.7

Exceeds Residential/Recreational SRV

COMPOSITE SOIL SAMPLE LOCATION

100' 0 200'

SCALE: 1" = 200'

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Date Drawn: 8/25/21
Checked By: MK
Last Modified: 2/28/22

Project Information

Hillcrest Development Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Fairway Soil Analytical Results

Sheet: 1 of 2

Fig: 9

FW-6-DU1	
Depth	0-0.5'
Mercury	4.4

FW-7-DU3	
Depth	0-0.5'
Mercury	2.9

FW-7-DU2	
Depth	0-0.5'
Mercury	3

FW-3-DU2	
Depth	0-0.5'
Mercury	3.6

FW-3-DU3	
Depth	0-0.5'
Mercury	3.1

FW-17-DU2	
Depth	0-0.5'
Mercury	2.7

FW-17-DU1	
Depth	0-0.5'
Mercury	1.4

FW-14-DU3	
Depth	0-0.5'
Mercury	3.5

FW-14-DU1	
Depth	0-0.5'
Mercury	3.5

FW-14-DU2	
Depth	0-0.5'
Mercury	3.1

FW-13-DU3	
Depth	0-0.5'
Mercury	2.9

FW-11-DU3	
Depth	0-0.5'
Mercury	2.7

FW-11-DU2	
Depth	0-0.5'
Mercury	2.3

FW-11-DU1	
Depth	0-0.5'
Mercury	3.3

FW-12-DU1	
Depth	0-0.5'
Mercury	1.1

FW-6-DU2	
Depth	0-0.5'
Mercury	6.8

FW-6-DU3	
Depth	0-0.5'
Mercury	1.9

FW-5-DU3	
Depth	0-0.5'
Mercury	6.8

FW-3-DU1	
Depth	0-0.5'
Mercury	3.2

FW-5-DU2	
Depth	0-0.5'
Mercury	2.4

FW-17-DU3	
Depth	0-0.5'
Mercury	1.2

FW-4-DU3	
Depth	0-0.5'
Mercury	1.9

FW-16-DU1	
Depth	0-0.5'
Mercury	3.3

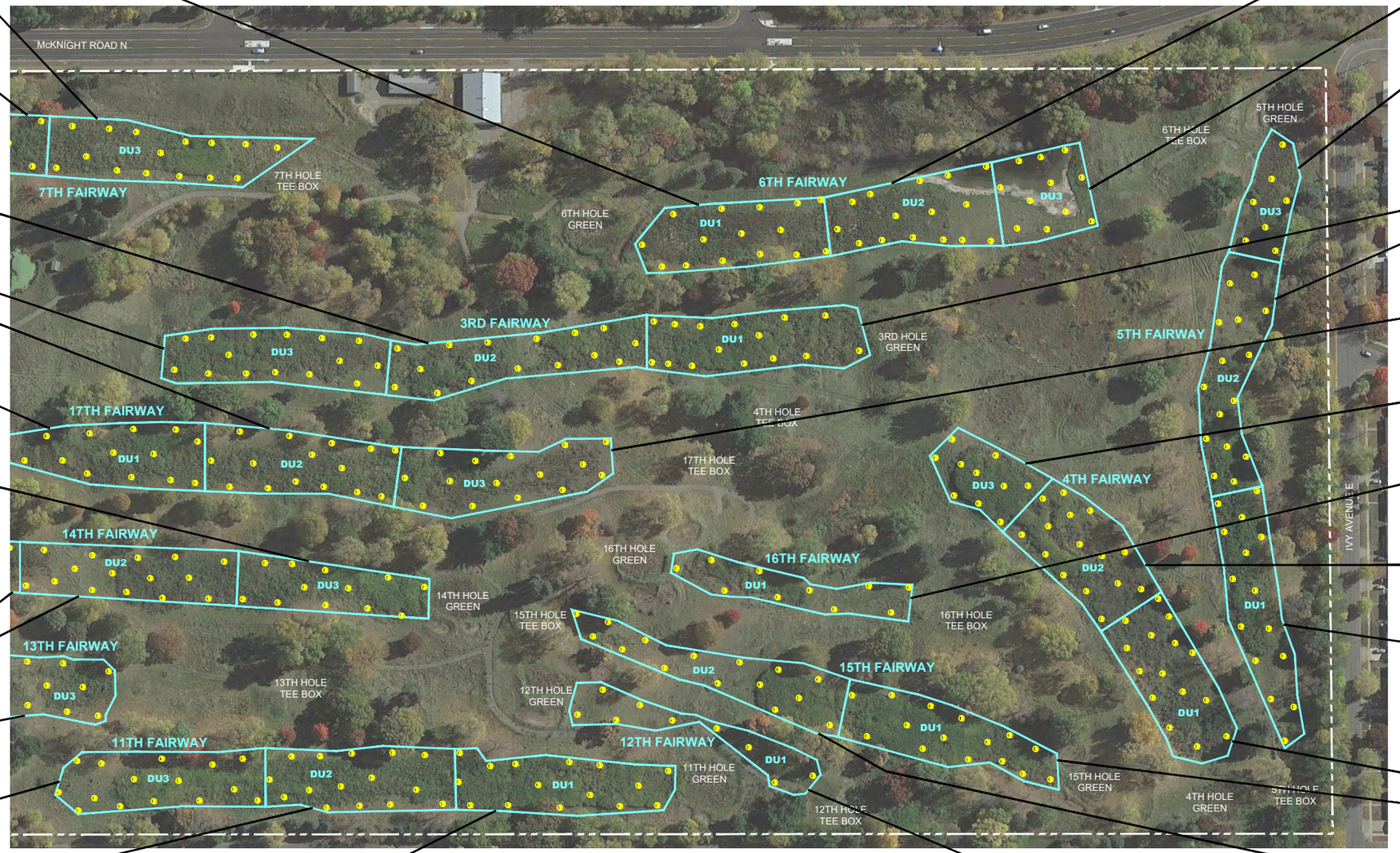
FW-4-DU2	
Depth	0-0.5'
Mercury	2.4

FW-5-DU1	
Depth	0-0.5'
Mercury	2.2

FW-4-DU1	
Depth	0-0.5'
Mercury	2.5

FW-15-DU1	
Depth	0-0.5'
Mercury	1.9

FW-15-DU2	
Depth	0-0.5'
Mercury	4.7



Exceeds Residential/Recreational SRV

● **COMPOSITE SOIL SAMPLE LOCATION**

100' 0 200'

SCALE: 1" = 200'

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Project Information

Hillcrest Redevelopment Site

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Fairway Soil Analytical Results

Sheet: 2 of 2

Fig: 9

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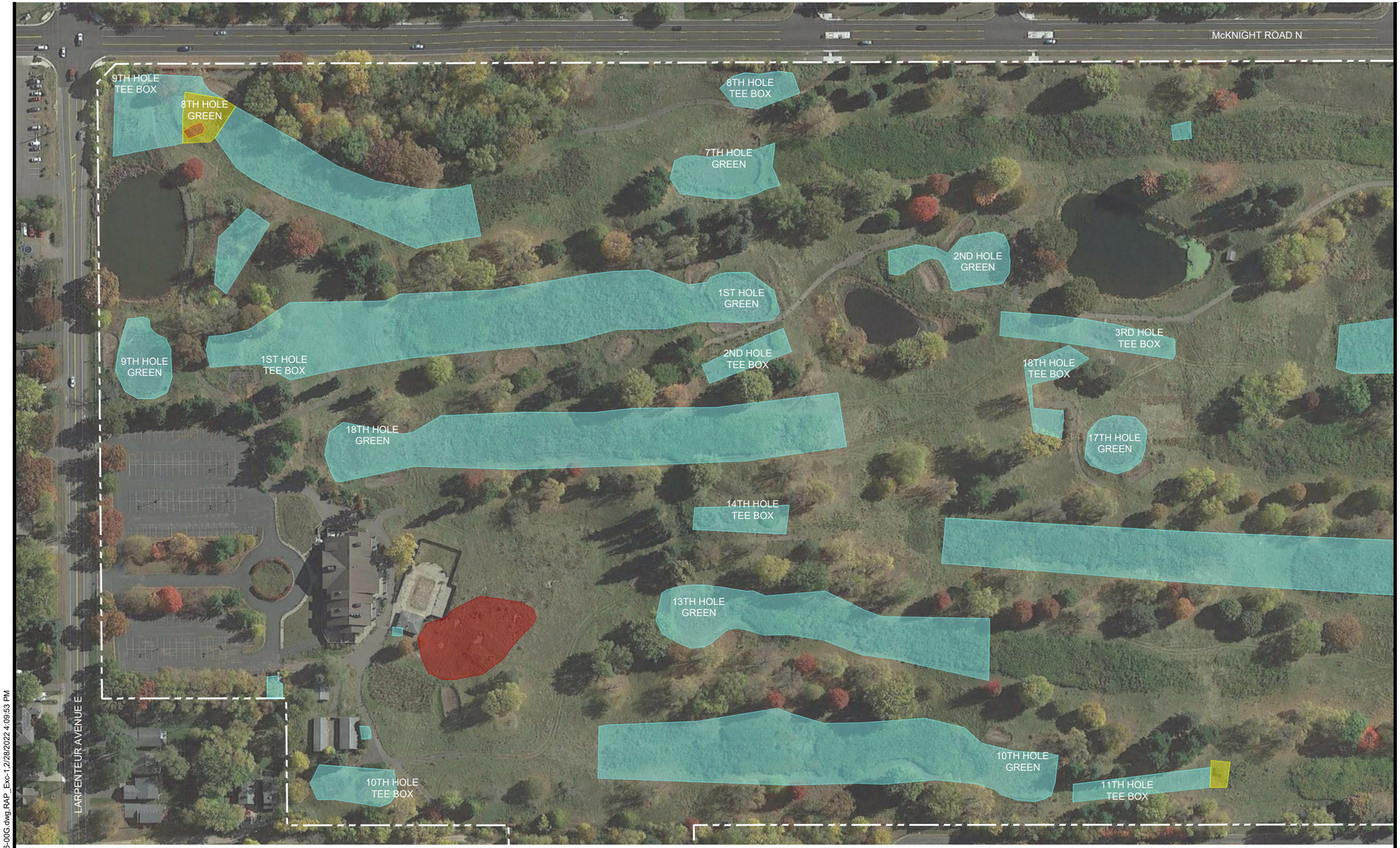

TYPE 3 SOIL EXCAVATION AREAS

- 0.5 to 1 FT. DEPTH
- 2 FT. DEPTH
- 3 FT. DEPTH
- 4 FT. DEPTH
- 5 FT. DEPTH

75' 0 150'

SCALE: 1" = 150'

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Hillcrest Redevelopment Site

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Contaminated Soil Excavation Areas

Sheet: 1 of 2

Fig: 10

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TYPE 3 SOIL EXCAVATION AREAS

- 0.5 to 1 FT. DEPTH
- 2 FT. DEPTH
- 3 FT. DEPTH
- 4 FT. DEPTH
- 5 FT. DEPTH

75' 0 150'

SCALE: 1" = 150'

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Project Information

Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

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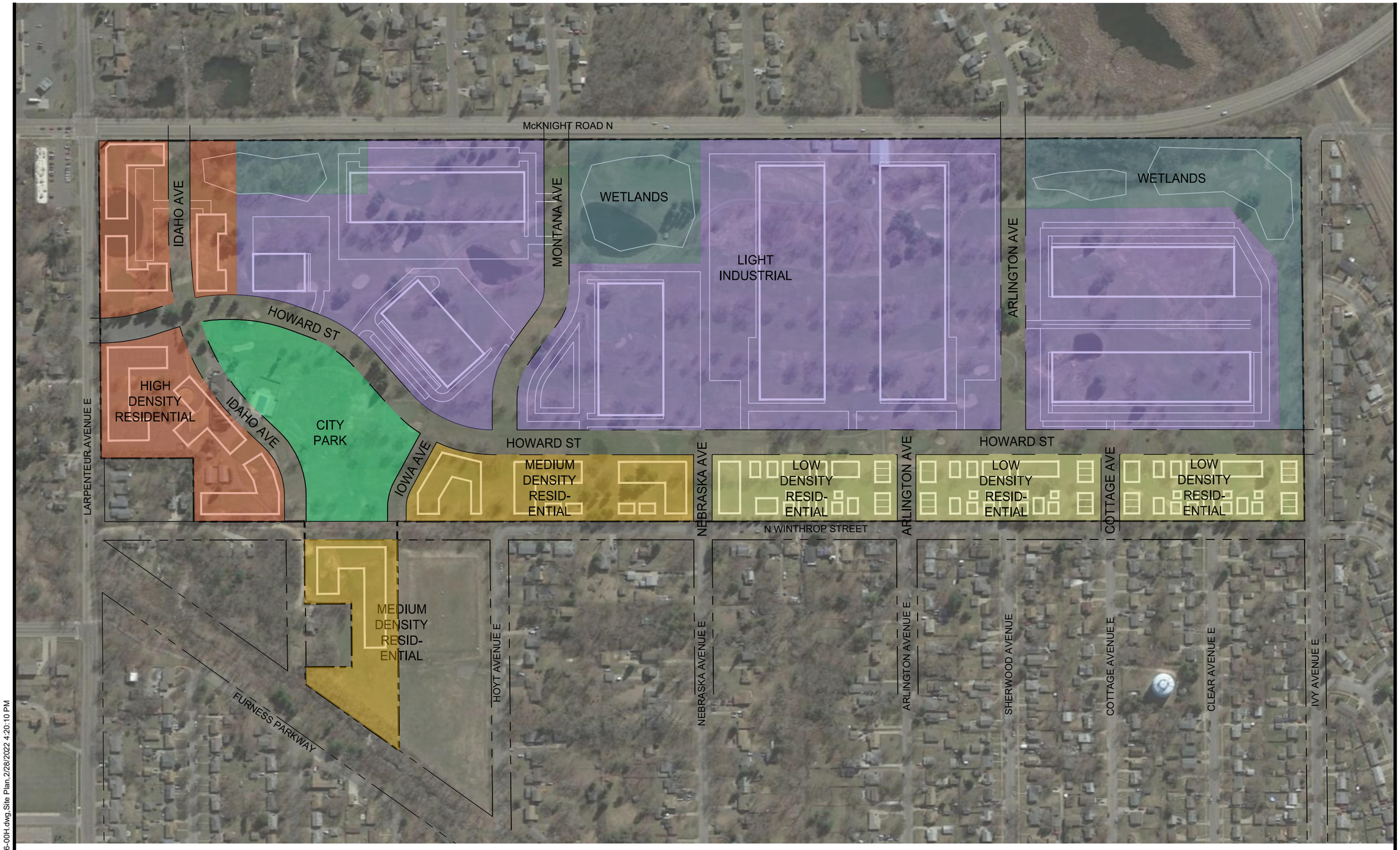
Contaminated Soil Excavation Areas

Sheet: 2 of 2

Fig: 10



TYPE 2 SOILS ARE RESTRICTED TO REUSE ONSITE ONLY WITHIN THE ROADS, IN THE AREAS ZONED AS WETLANDS, INDUSTRIAL, OR COMMERCIAL USE, AND IN THE AREA ZONED AS CITY PARK, WITH A 1 FOOT CLEAN SOIL BUFFER.

150' 0 300'

SCALE: 1" = 300'

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Project Information

Hillcrest Redevelopment Site

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Site Plan

Figure 11

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MONITORING WELL LOCATION

WELL LOCATION

150' 0 300'

SCALE: 1" = 300'

F:\2019\B1903316\CAD\B1903316-00A.dwg,Wells,2/28/2022 4:23:34 PM

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Project Information

Hillcrest Redevelopment Site

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Well Locations

Figure 12

DEMOLITION AREAS

150' 0 300'

SCALE: 1" = 300'

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Project Information

Hillcrest Redevelopment Site

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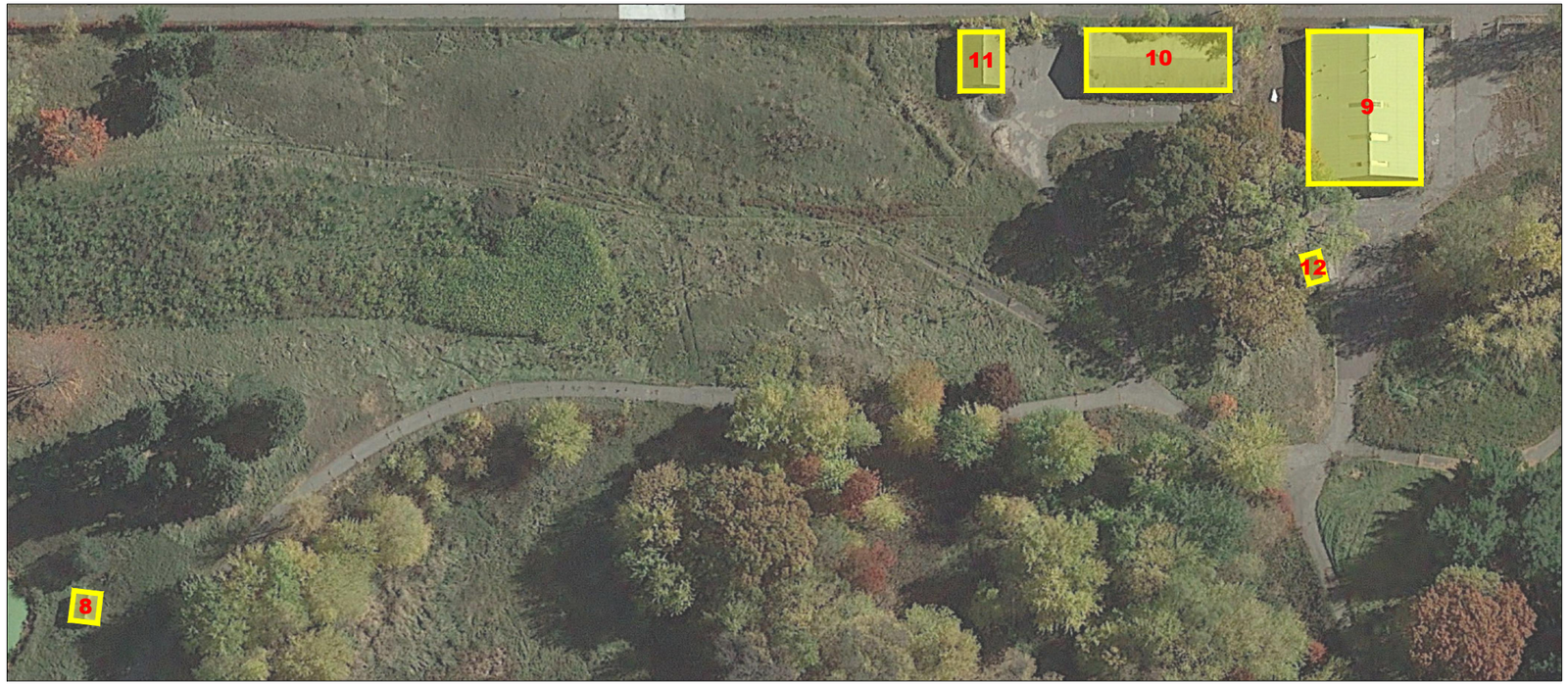
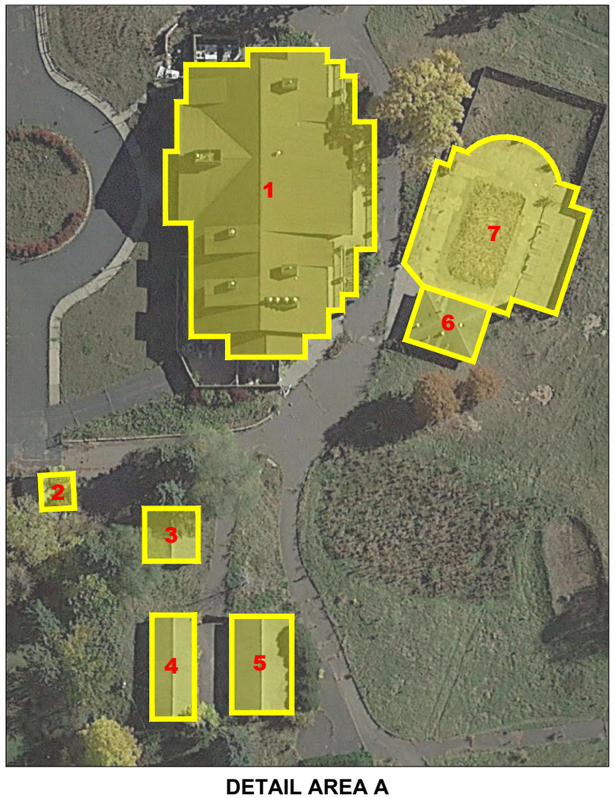
Demolition Project Extent - Overview

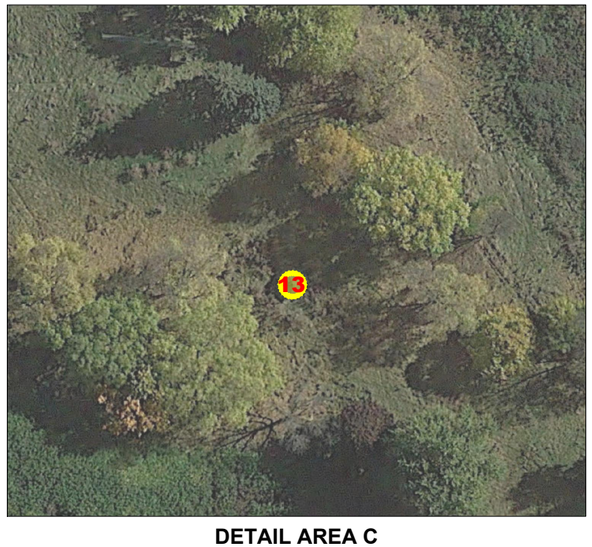
Sheet:	Fig:
1 of 2	13



DETAIL AREA B



DETAIL AREA A



DETAIL AREA C

HILLCREST BUILDINGS

NUMBER, SECRIPTION, SQ. FT.

1	1, CLUB HOUSE, 14353
2	2, CLUB HOUSE PARKING LOT GARAGE, 411
3	3, CADDY SHACK, 738
4	4, CADDY GARAGE A, 1232
5	5, CADDY GARAGE B, 1563
6	6, POOL PUMP ROOM / BAR, 1168
7	7, POOL, 6440
8	8, IRRIGATION PUMP SHACK, 190
9	9, MAIN MAINTENANCE SHED, 4770
10	10, MCKNIGHT GARAGE A, 2641
11	11, MCKNIGHT GARAGE B, 665
12	12, CHEMICAL SHED, 161
13	13, GAZEBO, 132

40' 0 80'

SCALE: 1" = 80'

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Project Information

Hillcrest Redevelopment Site

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Demolition Project Extent - Detail Areas

Sheet: 2 of 2

Fig: 13

REMEDIAL EXCAVATION AREAS

BASE SAMPLE LOCATION

SIDEWALL SAMPLE LOCATION

25' 0 50'

SCALE: 1" = 50'

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Project Information

Hillcrest Redevelopment Site

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Proposed Confirmation Sampling Plan, Typical Approach

Figure 14

Tables

Table 1
Soil Analytical Results - Soil Borrow Area
Former Hillcrest Golf Course
St Paul, Minnesota
Project B1903316.00

Compound/Parameter	CAS No.	Sample Identifier and Date Collected					Residential/ Recreational SRV (mg/kg)	Commercial/ Industrial SRV (mg/kg)	SLV (mg/kg)
		Borrow-N (0-0.5)	Borrow-N (1-1.5)	Borrow-S (0-0.5)	Borrow-S (1-1.5)	Trip Blank			
		11/15/2021	11/15/2021	11/15/2021	11/15/2021	11/15/2021			
Volatile Organic Compounds (VOCs) (mg/kg)									
All other reported VOCs	---	<RL	<RL	<RL	<RL	<RL	---	---	---
Polycyclic Aromatic Hydrocarbons (PAHs) (mg/kg)									
Acenaphthene	83-32-9	<0.0121	<0.0113	<0.0110	<0.0116	---	450	6,800	81
Acenaphthylene	208-96-8	<0.0121	<0.0113	<0.0110	<0.0116	---	NE	NE	NE
Anthracene	120-12-7	**0.0148**	**0.0118**	<0.0110	<0.0116	---	2,800	42,000	1,300
Benz(a)anthracene	56-55-3	**0.0754**	**0.0387**	<0.0110	<0.0116	---	cPAH	cPAH	cPAH
Benzo(b)fluoranthene	205-99-2	**0.125**	**0.0553**	<0.0110	<0.0116	---	cPAH	cPAH	cPAH
Benzo(k)fluoranthene	207-08-9	**0.0547**	**0.0238**	<0.0110	<0.0116	---	cPAH	cPAH	cPAH
Benzo(a)pyrene	50-32-8	**0.0894**	**0.0398**	<0.0110	<0.0116	---	cPAH	cPAH	cPAH
Benzo(g,h,i)perylene	191-24-2	**0.0687**	**0.0281**	<0.0110	<0.0116	---	NE	NE	NE
Chrysene	218-01-9	**0.0978**	**0.0459**	<0.0110	<0.0116	---	cPAH	cPAH	cPAH
Dibenz(a,h)anthracene	53-70-3	**0.0142**	<0.0113	<0.0110	<0.0116	---	cPAH	cPAH	cPAH
Fluoranthene	206-44-0	**0.178**	**0.101**	<0.0110	<0.0116	---	200	2,700	670
Fluorene	86-73-7	<0.0121	<0.0113	<0.0110	<0.0116	---	390	5,800	110
Indeno(1,2,3-cd)pyrene	193-39-5	**0.0721**	**0.0303**	<0.0110	<0.0116	---	cPAH	cPAH	cPAH
2-Methyl naphthalene	91-57-6	---	---	---	---	---	39	580	NE
Naphthalene	91-20-3	<0.0121	<0.0113	<0.0110	<0.0116	---	81	280	4.5
Phenanthrene	85-01-8	**0.0581**	**0.0488**	<0.0110	<0.0116	---	NE	NE	NE
Pyrene	129-00-0	**0.131**	**0.0731**	<0.0110	<0.0116	---	220	3,200	440
All other reported PAHs	---	<RL	<RL	<RL	<RL	<RL	---	---	---
BaP Equivalent[c]	---	**0.13**	**0.1**	**0.0**	**0.0**	**0.0**	2[BTV]	23	1.4
Metals (mg/kg)									
Arsenic, Total	7440-38-2	**4.1**	**3.5**	**3.3**	**3.3**	---	9[BTV]	9[BTV]	5.8
Barium, Total	7440-39-3	**68.6**	**57.7**	**64.6**	**59.0**	---	3,000	41,000	1,700
Cadmium, Total	7440-43-9	**0.49**	**0.34**	**0.17**	**0.18**	---	1.6	23	8.8
Chromium, Total[e]	7440-47-3	**29.6**	**20.9**	**19.9**	**18.4**	---	23,000/11[e]	100,000/62[e]	1,000,000,000/36[e]
Lead, Total	7439-92-1	**15.1**	**8.0**	**8.4**	**10.1**	---	300	700	2,700
Mercury, Total	7439-97-6	**1.2**	**1.0**	**0.51**	**0.11**	---	3.1	3.1	3.3
Selenium, Total	7782-49-2	<0.56	<0.52	<0.52	<0.53	---	77	1,200	2.6
Silver, Total	7440-22-4	**0.67**	<0.52	<0.52	<0.53	---	77	1,200	7.9
Organochlorine Pesticides (mg/kg)									
Aldrin	309-00-2	<0.0101	<0.0019	<0.0093	<0.0097	---	0.45	2.6	NE
alpha-BHC	319-84-6	<0.0101	<0.0019	<0.0093	<0.0097	---	0.69	3.8	NE
beta-BHC	319-85-7	<0.0101	<0.0019	<0.0093	<0.0097	---	2.5	14	NE
gamma-BHC (Lindane)	58-89-9	<0.0101	<0.0019	<0.0093	<0.0097	---	4.3	25	NE
delta-BHC	319-86-8	<0.0101	<0.0019	<0.0093	<0.0097	---	NE	NE	NE
Chlordane (Technical)	57-74-9	<0.101	<0.0188	<0.0927	<0.0970	---	NE	NE	NE
alpha-Chlordane	5103-71-9	<0.0101	<0.0019	<0.0093	<0.0097	---	NE	NE	NE
gamma-Chlordane	5103-74-2	<0.0101	<0.0019	<0.0093	<0.0097	---	NE	NE	NE
4,4'-DDD	72-54-8	<0.0201	<0.0037	<0.0185	<0.0193	---	19	100	NE
4,4'-DDE	72-55-9	**0.0809**	**0.0886**	**0.024**	<0.0193	---	22	130	NE
4,4'-DDT	50-29-3	<0.0201	**0.0128**	<0.0185	<0.0193	---	7.3	87	NE
Dieldrin	60-57-1	<0.0201	<0.0037	<0.0185	<0.0193	---	0.11	1.5	NE
Endosulfan I	959-98-8	<0.0101	<0.0019	<0.0093	<0.0097	---	NE	NE	NE
Endosulfan II	33213-65-9	<0.0201	<0.0037	<0.0185	<0.0193	---	NE	NE	NE
Endosulfan sulfate	1031-07-8	<0.0201	<0.0037	<0.0185	<0.0193	---	NE	NE	NE
Endrin	72-20-8	<0.0201	<0.0037	<0.0185	<0.0193	---	4	54	NE
Endrin aldehyde	7421-93-4	<0.0201	<0.0037	<0.0185	<0.0193	---	NE	NE	NE
Endrin ketone	53494-70-5	<0.0201	<0.0037	<0.0185	<0.0193	---	NE	NE	NE
Heptachlor	76-44-8	<0.0101	<0.0019	<0.0093	<0.0097	---	1.6	8.9	NE
Heptachlor epoxide	1024-57-3	<0.0101	<0.0019	<0.0093	<0.0097	---	0.28	4.2	NE
Methoxychlor	72-43-5	<0.101	<0.0188	<0.0927	<0.0970	---	NE	NE	NE
Toxaphene	8001-35-2	<0.302	<0.0563	<0.277	<0.290	---	4.1	23	NE
All other reported organochlorine	---	<RL	<RL	<RL	<RL	<RL	---	---	---
Petroleum Parameters (mg/kg)							**MPCA Unreg. Fill Criterion**		
DRO with Silica Gel Clean-up	---	<10.2	<8.9	<8.9	**37.2** [1]	---	100[f]		
Gasoline Range Organics (GRO)	---	<14.4	<12.7	<12.7	<13.4	<10.0	100[f]		

Notes

Minnesota Pollution Control Agency (MPCA) Soil Reference Values (SRVs) updated in May 2021 and Soil Leaching Values (SLVs) updated in June 2013.

mg/kg = Milligrams per kilogram.

< = Not detected at or above the laboratory reporting limit indicated.

--- = Not analyzed or calculated for this parameter or not applicable.

BTV = Background Threshold Value. BTVs are not calculated health based SRVs. The MPCA calculated SRVs were determined to be below background values (MPCA guidance document c-r1-05, April 2021).

cPAH = Individual regulatory limit not established for this carcinogenic PAH; included in BaP equivalent calculation.

NE = Regulatory limit not established for this parameter.

RL = Reporting limits for other parameters that are not listed individually in this table because their concentrations were below reporting limits provided in the laboratory report.

[c] = Benzo(a)pyrene (BaP) equivalent is calculated based on the concentration and weighted toxicity of cPAHs; MPCA; 2009. If no cPAHs were detected above reasonable laboratory reporting limits the BaP equivalent is reported as 0 mg/kg per MPCA Remediation Division Policy; June 2011.

[e] = Reported result is total chromium, regulatory limit for chromium III and chromium VI are provided.

[f] = DRO/GRO concentrations greater than 100 mg/kg are not suitable for reuse as unregulated fill per MPCA Guidance Document c-rem1-01 "Best Management Practices for the Off-Site Reuse of Unregulated Fill" (February 2012).

[1] [T6] High boiling point hydrocarbons are present in the sample.

Exceeds Residential/Recreational SRV
Exceeds Commercial/Industrial SRV
Exceeds SLV
Exceeds 100 mg/kg for DRO/GRO

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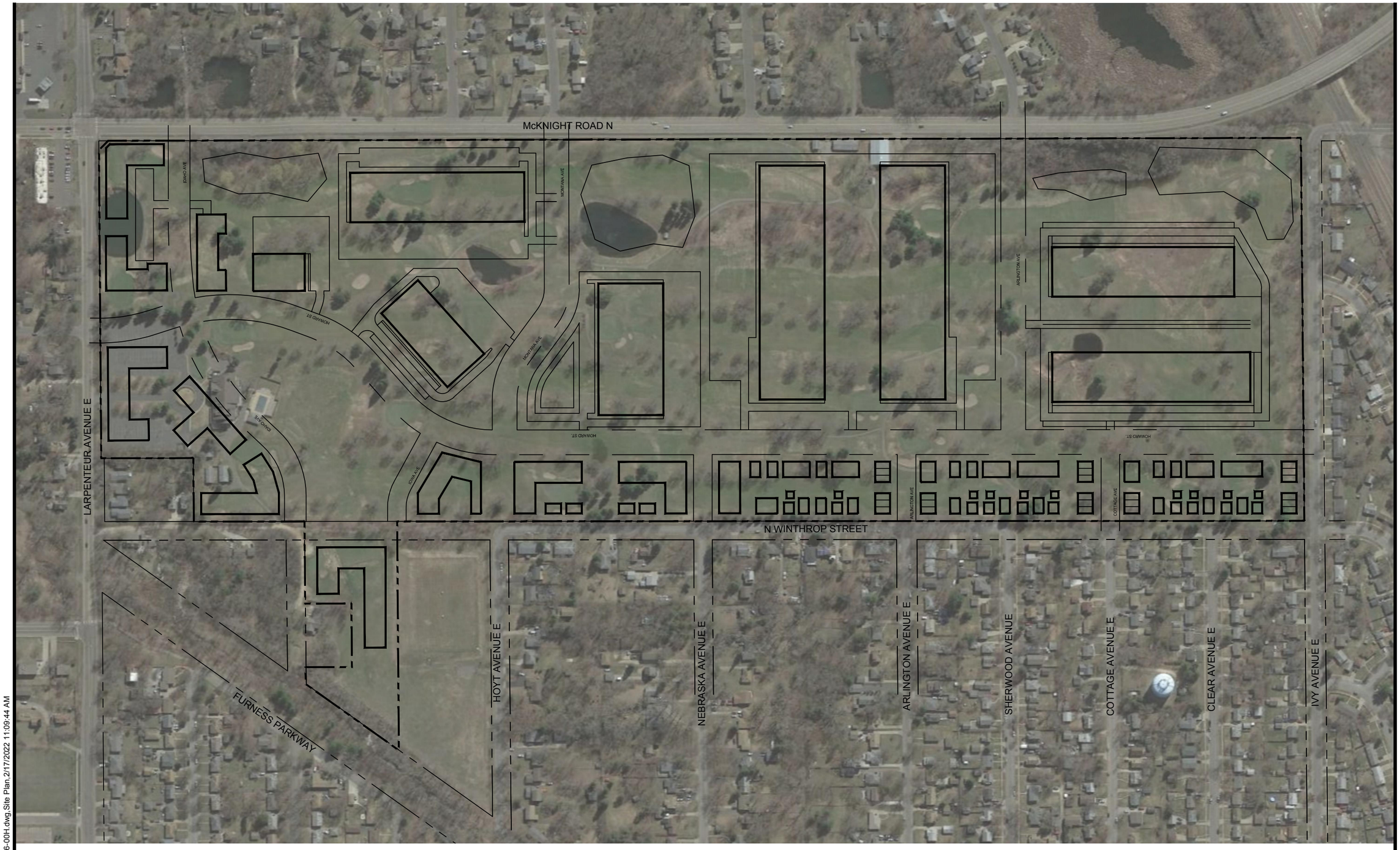
Appendix A

Development Plan



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SCALE: 1" = 300'

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Drawn By:	BJB
Date Drawn:	5/23/19
Checked By:	MK
Last Modified:	2/16/22

Project Information

Former Hillcrest Golf Course

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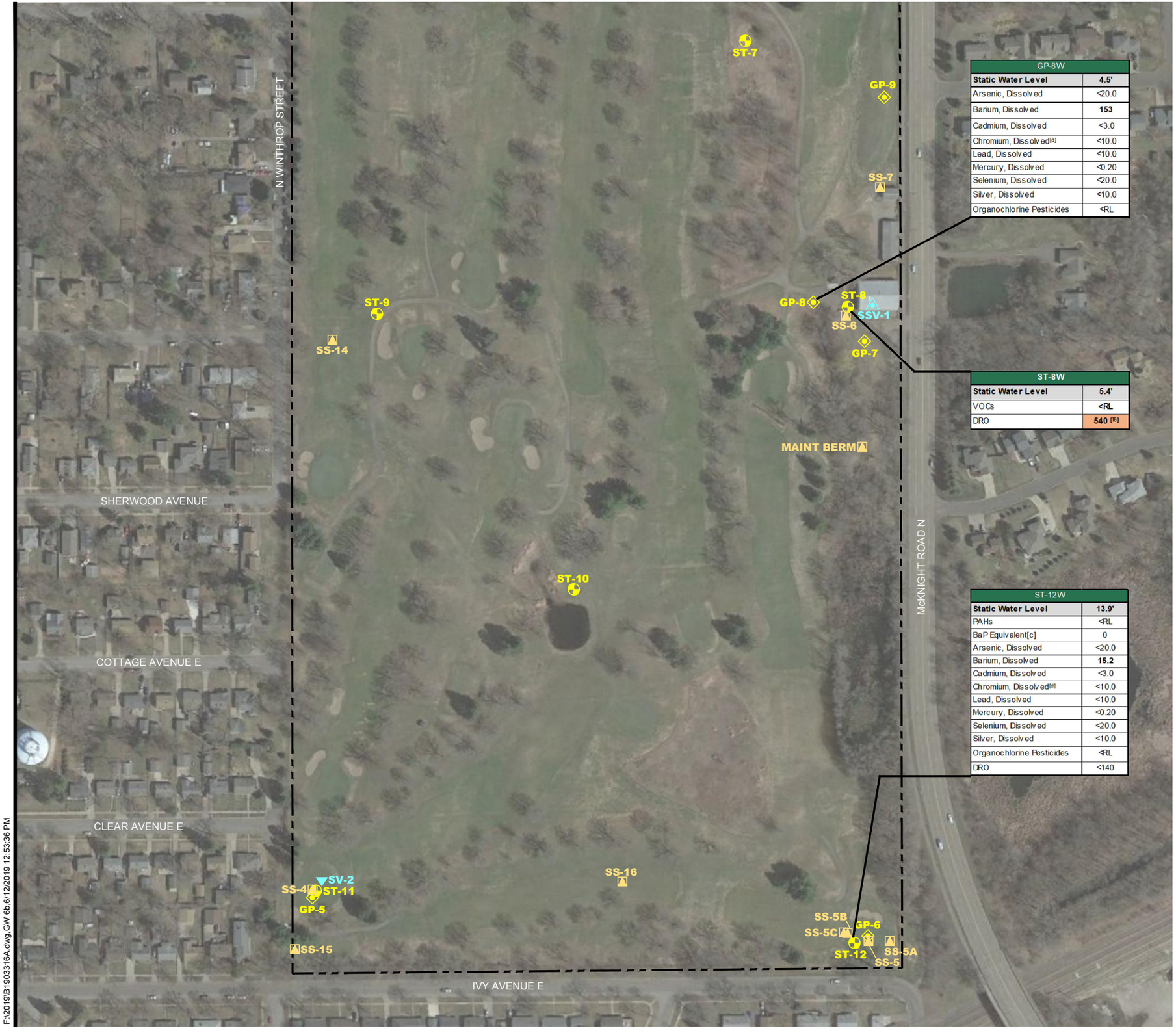
Development Plan

Appendix A

Appendix B

Figure 6B Groundwater Exceedances



GP-8W	
Static Water Level	**4.5'**
Arsenic, Dissolved	<20.0
Barium, Dissolved	**153**
Cadmium, Dissolved	<3.0
Chromium, Dissolved[d]	<10.0
Lead, Dissolved	<10.0
Mercury, Dissolved	<0.20
Selenium, Dissolved	<20.0
Silver, Dissolved	<10.0
Organochlorine Pesticides	<RL

ST-8W	
Static Water Level	**5.4'**
VOCs	**<RL**
DRO	**540** [T6]

ST-12W	
Static Water Level	**13.9'**
PAHs	<RL
BaP Equivalent[c]	0
Arsenic, Dissolved	<20.0
Barium, Dissolved	**15.2**
Cadmium, Dissolved	<3.0
Chromium, Dissolved[d]	<10.0
Lead, Dissolved	<10.0
Mercury, Dissolved	<0.20
Selenium, Dissolved	<20.0
Silver, Dissolved	<10.0
Organochlorine Pesticides	<RL
DRO	<140

Drinking Water Notes

Drinking Water Criteria = The most conservative value for chronic or cancer exposures provided from the following sources including the Minnesota Department of Health (MDH) Health Risk Limit (HRL), MDH Health Based Value (HBV), MDH Risk Assessment Advice (RAA) or Maximum Contaminant Level (MCL). The date of promulgation is provided, if available. Values updated 7/27/16.
µg/L = Micrograms per liter.
< = Not detected at or above the laboratory reporting limit indicated.
--- = Not analyzed or calculated for this parameter or not applicable.
RL = Reporting limits for other parameters that are not listed individually in this table because their concentrations were below reporting limits provided in the laboratory report.
NE = Regulatory limit not established for this parameter.
cPAH = Individual regulatory limit not established for this carcinogenic PAH; included in BaP equivalent calculation.
[c] = Benzo[a]pyrene (BaP) equivalent is calculated based on the concentration and weighted toxicity of cPAHs; Minnesota Pollution Control Agency; 2009. If no cPAHs were detected above reasonable laboratory reporting limits the BaP equivalent is reported as 0 mg/kg per MPCA Remediation Division Policy; June 2011.
[d] = Reported result is total chromium, criteria for chromium III and chromium VI are provided.
[e] = Provisional MDH Health Based Value for total petroleum hydrocarbons (sum of DRO and GRO).
[T6] = High boiling point hydrocarbons are present in the sample.

Drinking Water Criteria
BaP Equivalent[c] HBV-12 = 0.06
Arsenic, Dissolved MCL = 10 µg/L
Barium, Dissolved HRL-93 = 2,000 µg/L
Cadmium, Dissolved HRL-15 = 0.5 µg/L
Chromium, Dissolved[d] HRL-94 = 20,000/100[d] µg/L
Lead, Dissolved MCL = 15 µg/L
Mercury, Dissolved MCL = 2 µg/L
Selenium, Dissolved HRL-93 = 30 µg/L
Silver, Dissolved HRL-93 = 30 µg/L
Diesel Range Organics (DRO) HBV[e] = 200 µg/L
Gasoline Range Organics (GRO) HBV[e] = 200 µg/L
Exceeds Drinking Water Criteria

HOLLOW STEM AUGER BORING LOCATION
SOIL VAPOR PROBE LOCATION
SUB SLAB VAPOR PROBE LOCATION
PUSH PROBE BORING LOCATION
SURFACE SOIL SAMPLE LOCATION

SCALE: 1" = 200'

BRAUN INTERTEC
The Science You Build On.
11001 Hampshire Avenue S
Minneapolis, MN 55438
952.995.2000
braunintertec.com

Drawing Information

Project No: B1903316
Drawing No: B1903316A
Drawn By: BJB
Date Drawn: 5/23/19
Checked By: MK
Last Modified: 6/12/19

Project Information

Former Hillcrest Golf Course

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Groundwater Exceedances

Figure 6b

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Appendix C

RAP Implementation Forms

BRAUN INTERTEC

Field Report Form

Project No.:

Date:

Project Name:

Personnel:

Location:

Time On Site:

Time Off Site:

☐ Photos taken and documented.

Project Manager:

Other Braun Intertec Staff:

Weather (temperature, wind speed and direction, etc.):

Other Personnel (subcontractors, site superintendent, etc.; include time on site and time off site):

PPE and Field Equipment Used (e.g., PID; include ID numbers, calibration information, etc.):

Work Completed (include field scope, unexpected issues, action items, log of communication, and site sketch):

Signature:

BRAUN INTERTEC

Field Report Form

Project No.:		Date:	
Project Name:		Personnel:	
Location:		Project Manager:	

Work Completed (include field scope, unexpected issues, action items, log of communication, and site sketch):

Signature:

DUST MONITORING LOG

BRAUN INTERTEC

Project Name ____

Page ___ of ___

Project Number and Task No.: _________________________

Project Location:____

Date	Time	Wind Direction/Speed/Weather	Dust Meter Reading (mg/m^2)			Work Zone Location	Record By	Comments
			Upwind	Work Zone	Downwind			

BRAUN INTERTEC

Incident Report Form

Report Number: Report Date: Incident Date:
Project Title and Location:
Project Number:
Location of Incident:
Names of All Personnel Involved: _____

_____

_____

Describe the incident as it occurred (use additional sheets, if necessary):

_____

_____

_____

_____

_____

_____

_____

Names of Witnesses	Relationship to the Incident	Where They Can Be Reached
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Project Implications

What is the cost impact to the project (e.g., lost days, man-hours, equipment)?

_____

_____

What is the schedule impact to the project?

_____

_____

Does the incident impact the scope of the project in other ways? If so, how?

_____

_____

SAMPLE CONTROL LOG

Project Name: _____

Project Number and Activity Number: _____ Page ___ of ___

Sampling Date	Sampling Time	Sample Number (ID)	Analysis Required	Sample location, depth, description, purpose etc.	Date Sent to Lab

DOCUMENT ALL ACTIVITIES WITH PHOTOGRAPHS.

BRAUN INTERTEC

BRAUN INTERTEC

SITE HEALTH AND SAFETY PLAN

ESE PROJECT HEALTH AND SAFETY FIELD MEETING FORM

Date:_____ Time:_____ Project No.:_____

Project Name:_____

Location:_____

Meeting Conducted by:_____

Topics Discussed:

Physical Hazards:_____

Chemical Hazards:_____

Personal Protection:_____

Decontamination:_____

Special Site Considerations:_____

_____

_____

Emergency Information:_____

Hospital Location:_____

Attendees

Name/Company (printed)	Signature
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Meeting Conducted by:_____

Signature

Truck Manifest Log

Project Name: ____ Project #: __________________________

Excavator: ____ Date: _____________________________

Braun Personnel: ____

Purpose of Excavation: ____

____

Haul Start Time: ________________________ Haul End Time: __________________________

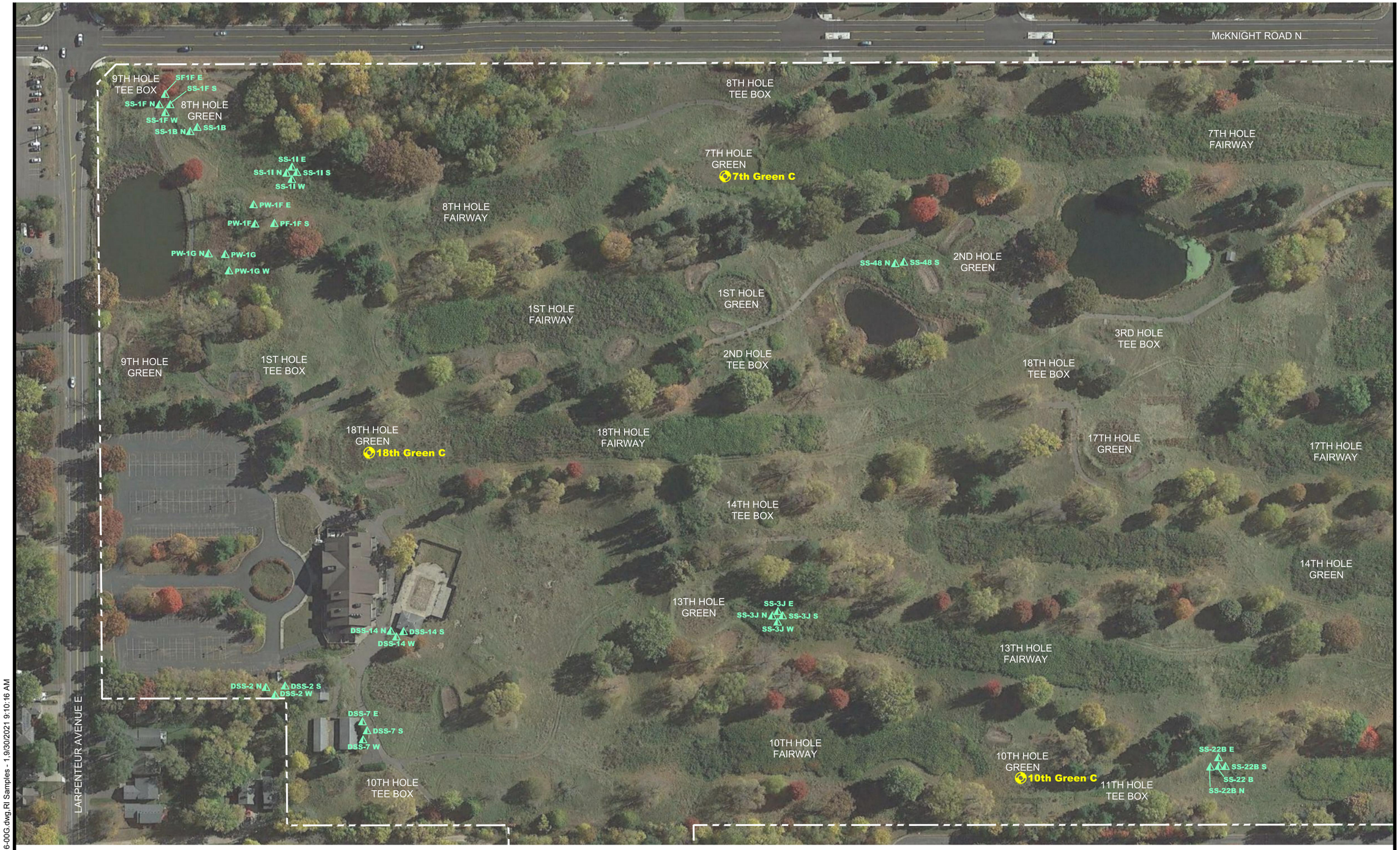
Load #	Time	Manifest #	Cab Description	License Plate	Truck Type*	Soil Location (STA, depth, etc.)	PID

Observations/Notes:

* Truck Type: SD=Side Dump, Q=Quad, BD=Belly Dump, ED=End Dump

BRAUN INTERTEC

Appendix D
Additional Sampling Locations – South Wetland Area



COMPOSITE SOIL SAMPLE LOCATION

DISCRETE SOIL SAMPLE LOCATION

150' 0 300'

SCALE: 1" = 300'

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The Science You Build On.

11001 Hampshire Avenue S
Minneapolis, MN 55438
952.995.2000
braunintertec.com

Drawing Information

Project No:	B1903316.00
Drawing No:	B1903316-00G
Drawn By:	BJB
Date Drawn:	8/25/21
Checked By:	MK
Last Modified:	9/30/21

Project Information

Former Hillcrest Golf Course

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Soil Sample Locations

Sheet: 1 of 2

Fig: 1

COMPOSITE SOIL SAMPLE LOCATION

DISCRETE SOIL SAMPLE LOCATION

SOIL SAMPLES TO BE COLLECTED DURING REMEDIAL ACTION IMPLEMENTATION

150' 0 300'

SCALE: 1" = 300'

F:\2019\B1903316\CAD\B1903316-00G.dwg,RI Samples - 2,9/30/2021 9:10:18 AM

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The Science You Build On.

11001 Hampshire Avenue S
Minneapolis, MN 55438
952.995.2000
braunintertec.com

Drawing Information

Project No:	B1903316.00
Drawing No:	B1903316-00G
Drawn By:	BJB
Date Drawn:	8/25/21
Checked By:	MK
Last Modified:	9/30/21

Project Information

Former Hillcrest Golf Course

2200 Larpenteur Avenue E

Saint Paul, Minnesota

Soil Sample Locations

Sheet: 2 of 2

Fig: 1