

Hillcrest Soil Contamination

It is widely known that soil contamination is a challenge at the Hillcrest redevelopment site. Standard golf course maintenance and operating procedures, between the 1950s and 1990s, left behind considerable amounts of mercury contamination. Most stem from fertilizers and fungicides that have since been prohibited. The table below shows the significance of current contamination levels.

Acceptable Mercury Levels

Current Levels at the Hillcrest Site	Acceptable Levels for Residential Areas	Acceptable Levels for Light Industrial Areas
Between 5.1 and 144 milligrams/kilogram	0.5 milligrams/kilogram	1.5 milligrams/kilogram

Additional Contamination

In addition to mercury, there are also isolated areas of petroleum contamination and physical debris that will need to be included in the cleanup. These areas are currently under investigation, in an effort to determine extent and magnitude.

Regulatory Parameters

The Saint Paul Port Authority voluntarily enrolled in both investigation and cleanup programs, through the Minnesota Department of Agriculture (MDA) and Minnesota Pollution Control Agency (MPCA). In turn, these agencies will oversee the remediation process and provide regulatory approvals.



Once the investigation is complete, and remediation activities drafted, we will reengage with the community for further feedback. For a more detailed account of this process, provided by Braun Intertec, go to

www.sppa.com/hillcrestsoil.

**FORMER HILLCREST GOLF COURSE
 ENVIRONMENTAL CONTAMINATION & REMEDIATION CONSIDERATIONS
 SAINT PAUL PORT AUTHORITY
 APRIL 24, 2020**

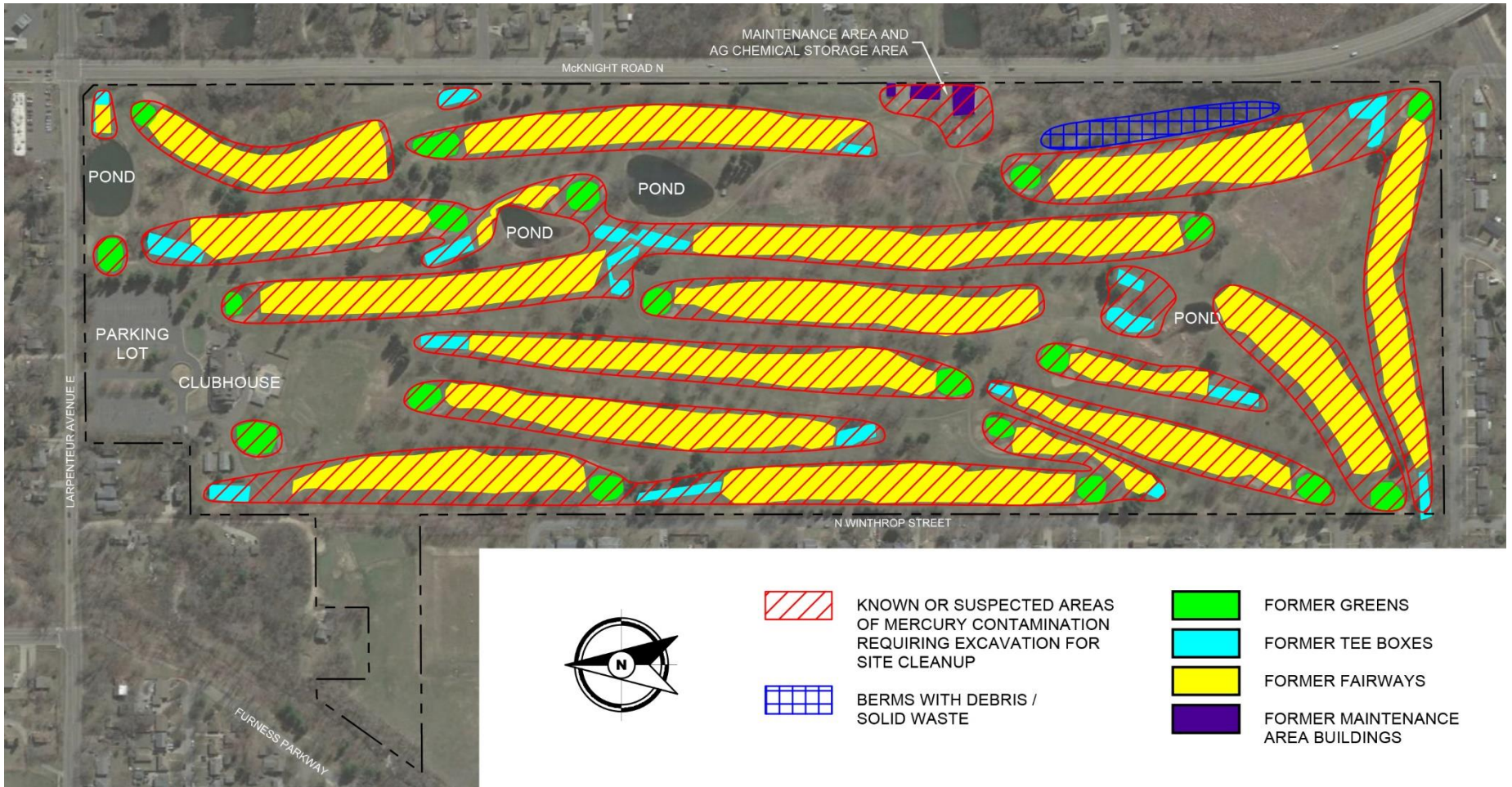


FIGURE 1
 KNOWN OR SUSPECTED AREAS OF IMPACTED SOIL REQUIRING EXCAVATION FOR SITE CLEANUP

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Site History

- The Hillcrest Site was first developed in the 1920's as a golf course that became a private golf club, which included a clubhouse, related amenities and maintenance facilities. The golf course ceased operations in 2017, and the Site was acquired by the Saint Paul Port Authority in 2019.

Contamination Sources and Locations

- Contamination Caused by Golf Course Operations: Golf course operations resulted in soil contamination caused by the storage and use of petroleum products, other hazardous substances related to golf course management, and agricultural fertilizers and fungicides for turf management.
- Mercury is Biggest Contamination Issue: The biggest contamination issue at the Site is mercury in soil from the historic application of specialty fungicides, which are estimated to have started in 1950's and continued until 1997 when the fungicides with mercury were banned.
- Widespread Contamination: The mercury contamination at the Site is widespread, with mercury concentrations exceeding applicable regulatory standards in all soil samples collected to date from former tee boxes, fairways, and greens across much of the Site. Mercury contamination has also been detected in soil samples collected near former agricultural chemical storage and equipment maintenance areas. Roughly one-half of the former golf course areas (excluding clubhouse, parking lots and ponds) are affected by mercury-impacted soil that will require excavation and cleanup for redevelopment (see attached map).
- Contamination is Mostly Shallow: The mercury contaminated soil extends in depth to approximately 1-foot in former fairways, up to 1.5 feet in former tees boxes, and up to 2.5 feet in former green/fringe areas. Mercury contaminated soils identified near former agricultural chemical storage and equipment maintenance require further investigation but are estimated based on current data to extend to a depth of approximate 1-foot to 1.5 feet.

Contamination Levels, Cleanup Standards and Regulatory Oversight

- Mercury Concentrations: Mercury has been detected in soil samples collected from areas near the former golf course greens/fringes at concentrations up to **144 milligrams per kilogram (mg/kg)**, in former tee boxes at concentrations up to **7.0 mg/kg**, and in former fairways at concentrations **5.1 mg/kg**.
- Future Soil Cleanup Standards: The current health risk-based residential and industrial use regulatory criteria for mercury in soil are **0.5 mg/kg** and **1.5 mg/kg**, respectively. These criteria are commonly used to establish cleanup standards for redevelopment projects.
- Hazardous Waste Criteria: Soil samples with the highest mercury concentrations at the Hillcrest Site were also analyzed using a specialty leach test if the soil would be classified by environmental regulations as a hazardous waste if excavated. The highest mercury concentration detected using this leach test was **0.0885 micrograms per liter (ug/L)**, which was below the hazardous waste limit of **0.2 ug/L**.
- Regulatory Agency Involvement: The Hillcrest Site is enrolled in voluntary investigation and cleanup programs through both the Minnesota Department of Agriculture (MDA) and Minnesota Pollution Control Agency (MPCA) to secure required regulatory agency approvals, including approval of investigations, cleanup plans and documentation of completed cleanup activities. It will also be necessary to obtain liability protection letters needed to support redevelopment. MDA involvement on this project is triggered by the historic use of agricultural fertilizers and fungicides at the Site. MPCA involvement will address other non-agricultural contaminants at the Site including petroleum.

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Site Cleanup Approach

- Regulatory Agency Must Approve Cleanup Plan: The site cleanup approach will be outlined in a cleanup plan that will be submitted to the respective MDA and MPCA for review and approval. The requirements of the cleanup plan must be tailored to the site development plan and future uses.
- Future Soil Cleanup Standards: Mercury-contaminated soil above the residential SRV of **0.5 mg/kg** (future residential or recreational use areas) and industrial SRV of **1.5 mg/kg** (future commercial or industrial use areas) will need to be excavated and managed in accordance with the agency-approved cleanup plan.
- On-Site and Off-Site Soil Management: Site soils with the highest levels of mercury contamination (i.e., former greens/fringes) will likely require off-site disposal at a permitted landfill. Soils with lower levels of mercury contamination will likely be consolidated and placed placement at pre-approved locations determined by the regulatory agency to be safe for human health and the environment.
- Cover Considerations for Placed Contaminated Soil: Soils placed on-site will be subject to other requirements such as installation of a 4-foot thick clean fill cap on top of the placed soil (in green space areas) or installation of a clean 2-foot cover (in future asphalt paved roadway areas).
- Future Restrictions: The MDA will require that the mercury-impacted soil placed on-site be documented in an Environmental Covenant filed with the deed for the property, which will identify the located of placed impacted soil and impose restrictions on disturbance of the soils.

Site Cleanup Considerations

- Important to Coordinate Site Cleanup with Development Plan: Site cleanup will need to be coordinated with the mass grading for Site development for efficiency, cost effectiveness, and technical reasons. Thus, the cleanup plan will need to consider future grades, cut and fill areas, future parcel boundaries for future developments, future property uses by development area, and site geotechnical requirements.
- Big Cost Implications if Site Cleanup is Planned Separately: If site cleanup is planned and implemented independent of the mass grading for site development, the site cleanup costs will increase substantially since on-site consolidation will likely become impractical.
- Final Excavation Extent Determined During Site Cleanup: Site cleanup will be documented through post excavation sampling and testing program to demonstrate that the mercury concentrations in the remaining soil meet the relevant cleanup standards for safe future use. In our experience, it is likely that the final excavation extent for site cleanup will be substantially greater in some locations compared to the planned excavation limits estimated through the site investigation process.
- Saving Large Areas of Trees May Not Practical: Because the excavation extent will be determined during site cleanup, it may not be practical to ensure specific trees or areas of trees can be saved.
- On-Site Soil Placement Considerations: Specific placement locations **must be** identified in approved cleanup plan and will be subject to clean fill separation distances specified in the plan, **must be** structurally suitable for intended use, **must not be** placed within future development parcels for liability reasons, **must not be** placed beneath areas targeted for storm water infiltration, **must not be** placed at locations or depths close to natural groundwater, **must be** placed below depth of future utilities if placed within future roadway right of way property.