

THE SIGMA GROUP, INC.

Introduction



- David Scherzer, President
- Kristin Kurzka, P.E., Senior Engineer
- Incorporated in 1991, operating since early 1980s
- Staff with decades of experience working with the WDNR on landfill development

THE SIGMA GROUP, INC.

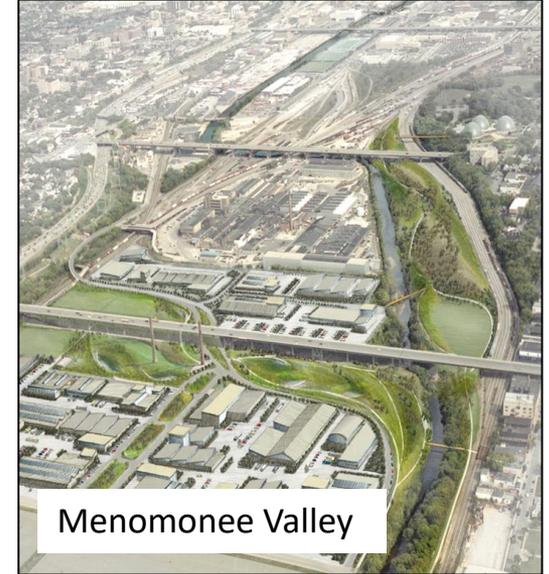
Relevant Project Experience



Miller Park



Froedtert Hospital



Menomonee Valley



Journal Sentinel Distribution Facility



Presidio Square Apartment Complex

➤ Additional Relevant Projects

- Harley-Davidson Museum
- Whitefish Bay Landfill
- Sigma Headquarters

MILWAUKEE COUNTY FRANKLIN LANDFILL HISTORY

- Prior to quarries, the property consisted of undeveloped farm fields.
- Quarrying visible in the 1937 aerial (earliest available). Excavation appears to have ceased in the early to mid 1950's,
- Filling began in mid 1950s - Milwaukee County Highway Department landfill.
- Fill composition in mid-1960's noted to be freeway demolition debris and trees.
- Filling ceased in 1981.
- Landfill currently closed by WDNR with on-going maintenance of cap, methane control system, groundwater/leachate collection system, and groundwater monitoring.



**1951 AERIAL
PHOTO**



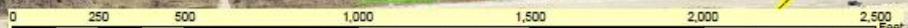
**1967 AERIAL
PHOTO**

CURRENT LANDFILL STATUS

- Geology and Hydrogeology
- Cap
- Methane Monitoring Network and Control system
- Groundwater/Leachate Collection System
- Groundwater Monitoring Program

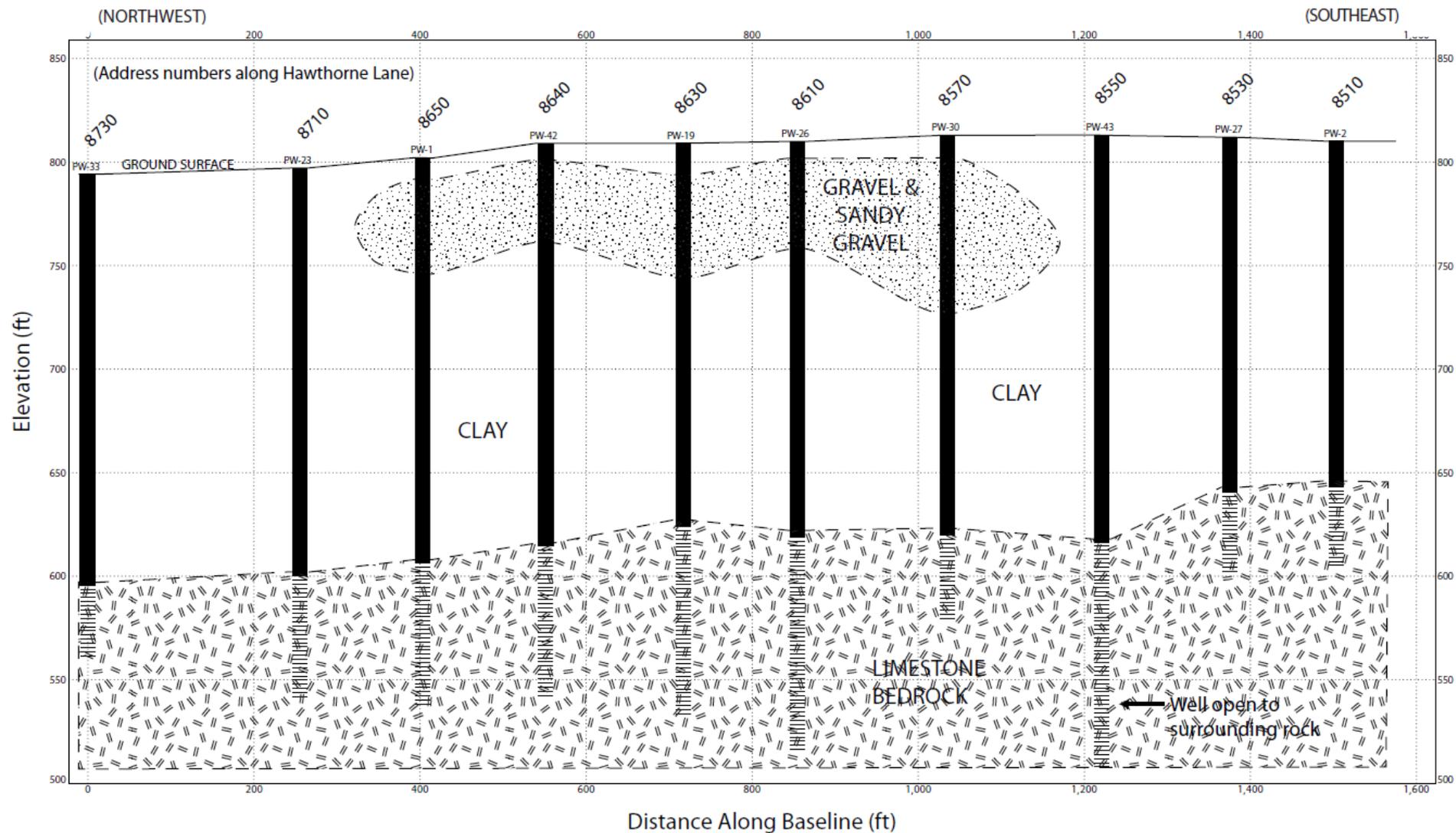
MILWAUKEE COUNTY HIGHWAY /
CRYSTAL RIDGE LANDFILL
FRANKLIN, WI
1"=200'

- Legend
-  LPL/OverRidge
 -  Leachate Blank Drain
 -  Limits of Mass
 -  Header Piping
 -  Leachate Retention & Leachate Pile



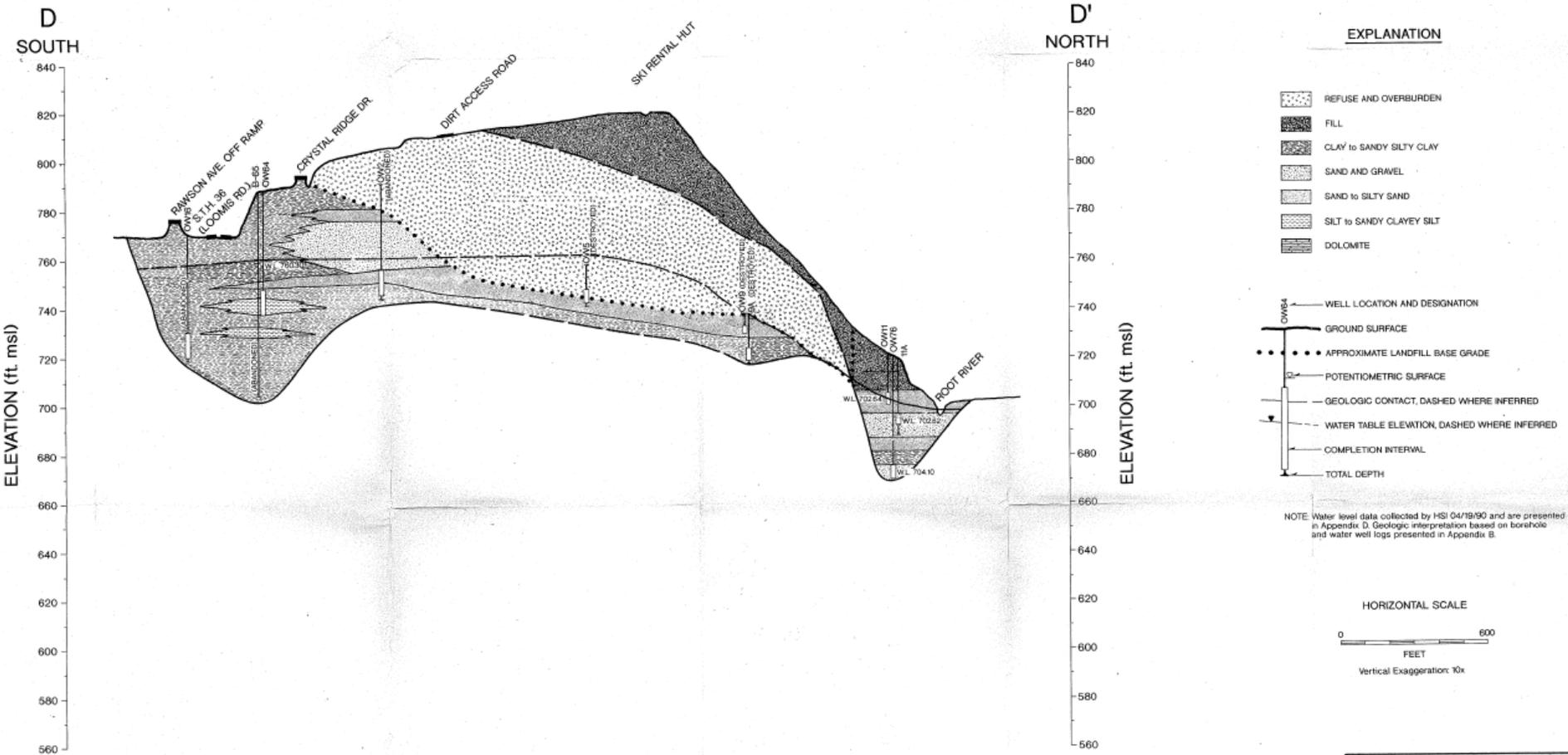
GEOLOGIC CROSS-SECTION

Potable Wells Along Hawthorn



GEOLOGIC CROSS-SECTION D-D'

Landfill Waste Elevation



MILWAUKEE COUNTY LANDFILL

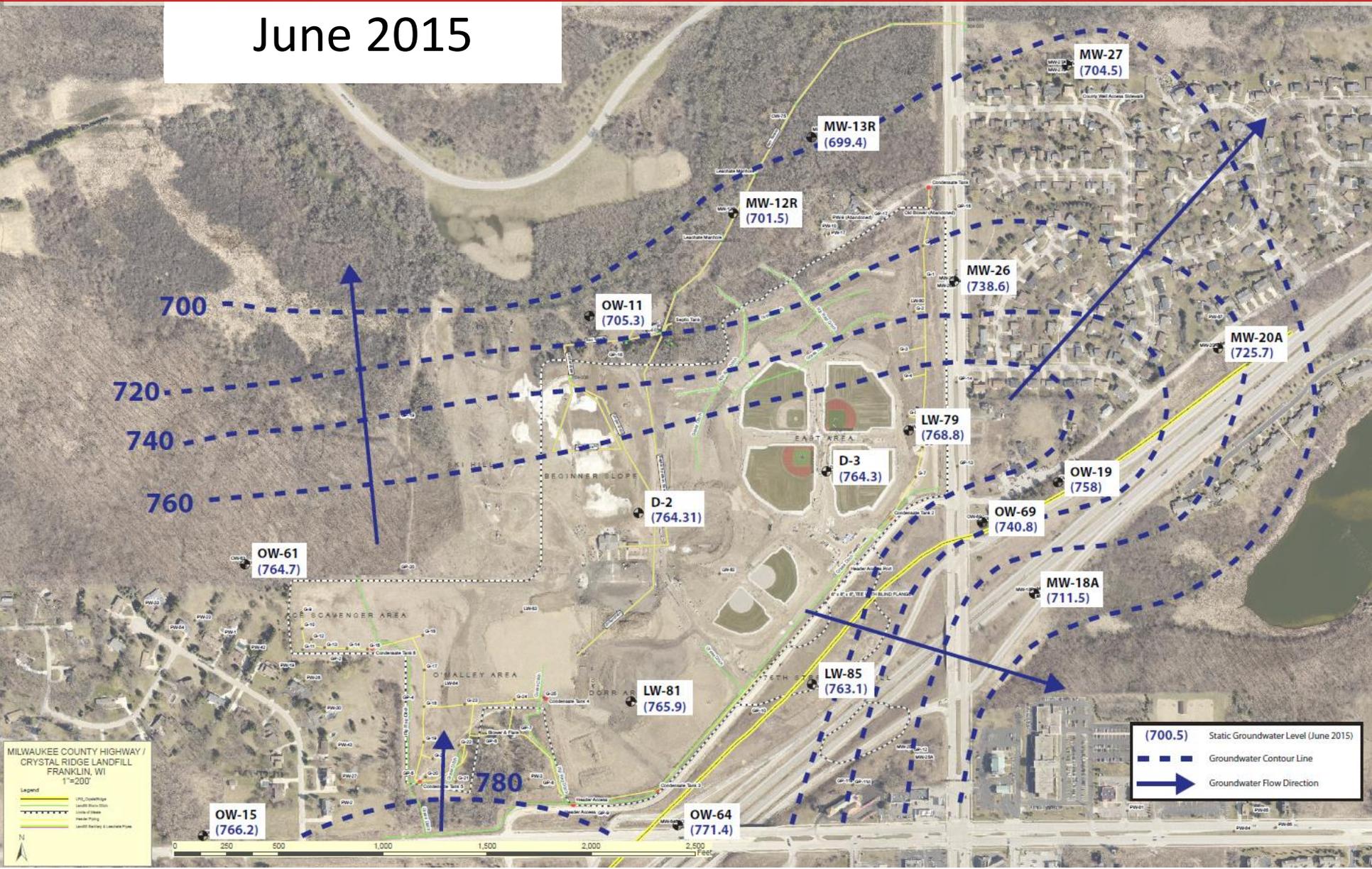
GEOLOGIC CROSS SECTION D - D'

PROJECT: 255E08613 DATE: 08/01/90

Hydro-Search, Inc.
HYDROLOGISTS-GEOLOGISTS-ENGINEERS
RENO DENVER MILWAUKEE

GROUNDWATER CONTOUR MAP

June 2015



MILWAUKEE COUNTY HIGHWAY / CRYSTAL RIDGE LANDFILL FRANKLIN, WI 1"=200'

Legend

- LPI, Overlay
- Landfill Site
- Landfill Area
- Water Piling
- Landfill Material & Landfill Pile

N

0 250 500 1,000 1,500 2,000 2,500 Feet

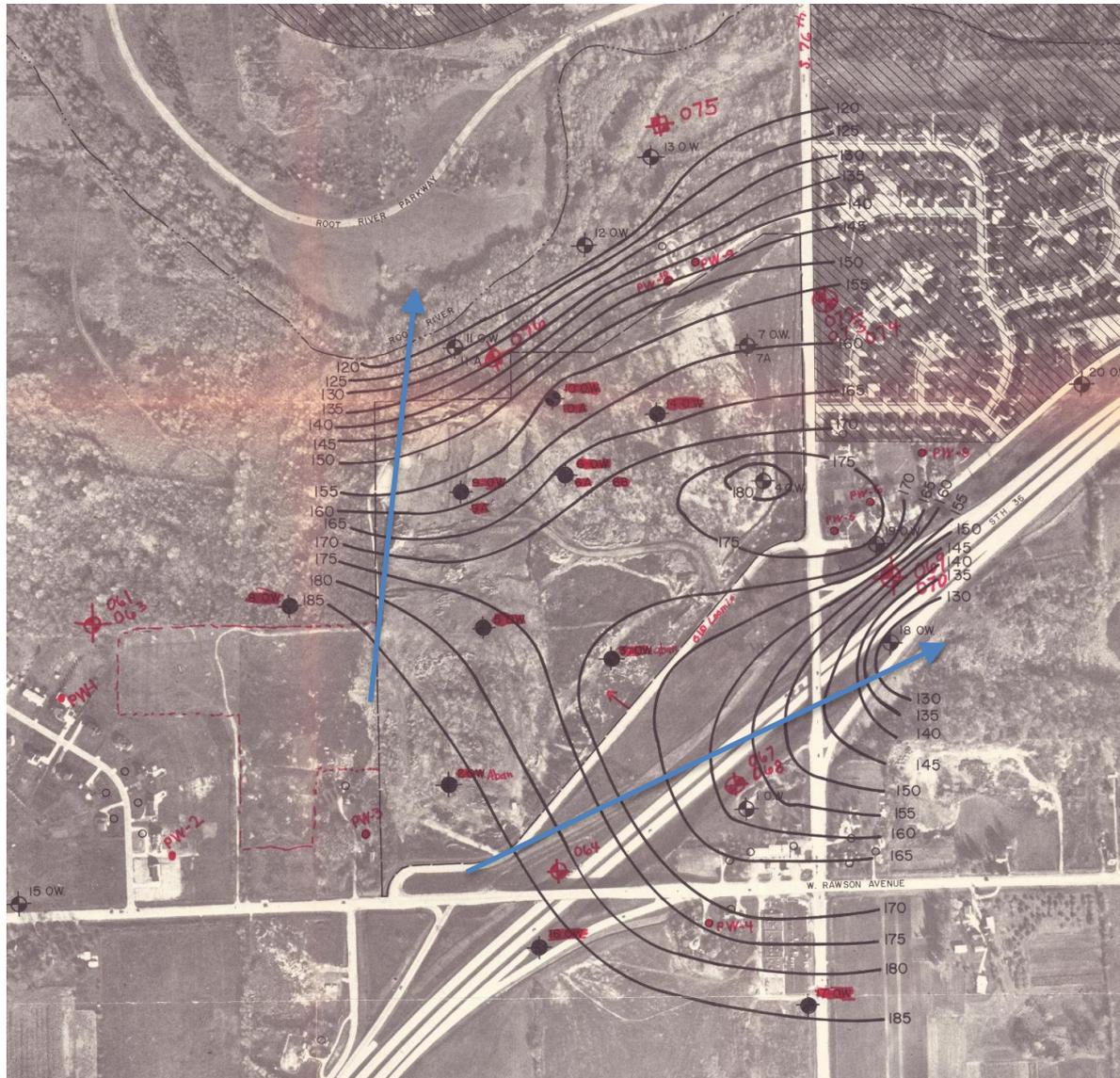
(700.5) Static Groundwater Level (June 2015)

--- Groundwater Contour Line

→ Groundwater Flow Direction

GROUNDWATER CONTOUR MAP

December 1979



GROUNDWATER QUALITY

Vinyl Chloride Concentration Map June 2015

All other lab samples reported Vinyl Chloride below Enformet Standards or Detection Limits

All concentrations in units of ug/L

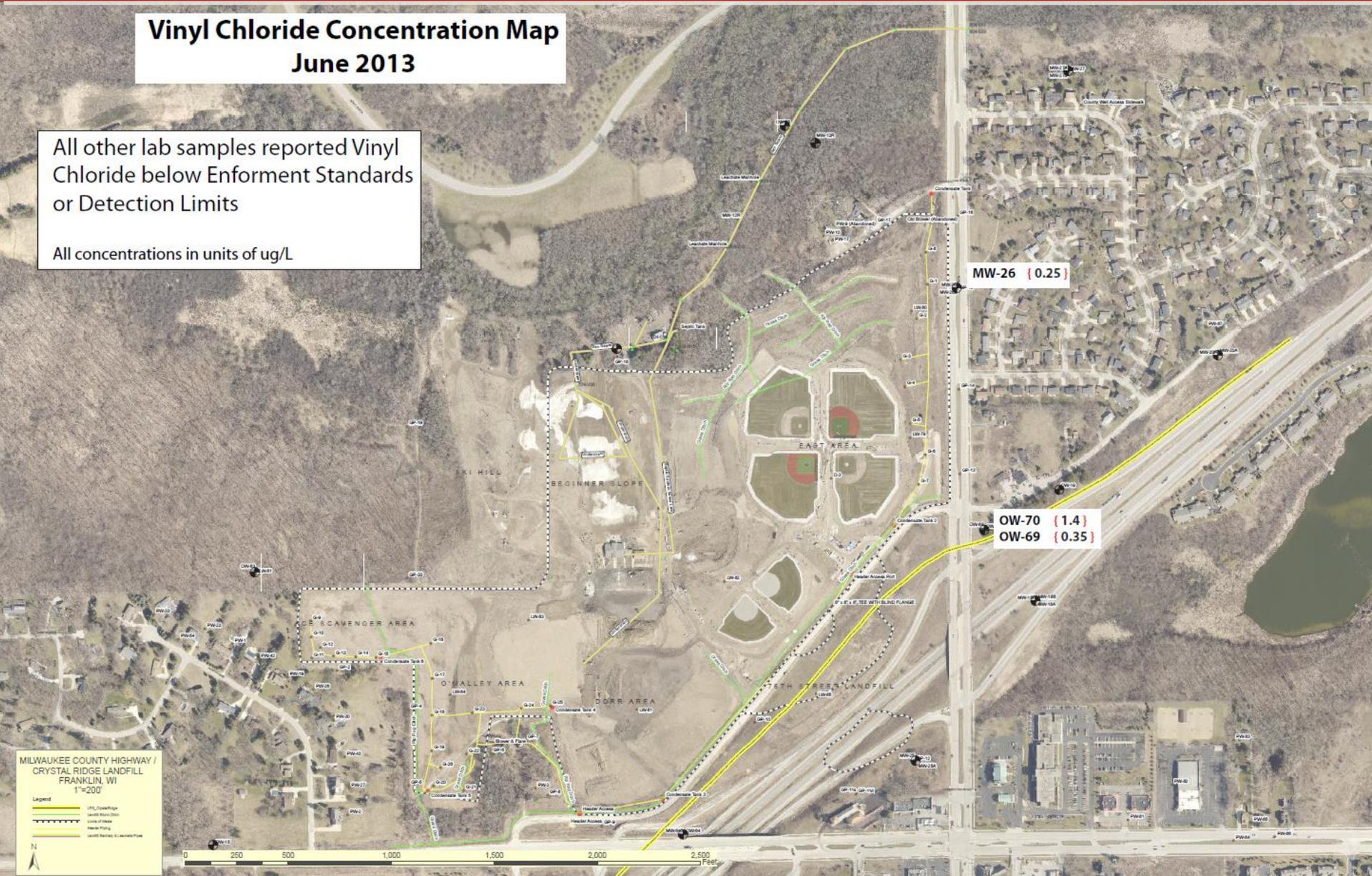


GROUNDWATER QUALITY

Vinyl Chloride Concentration Map June 2013

All other lab samples reported Vinyl Chloride below Enforment Standards or Detection Limits

All concentrations in units of ug/L



PROPOSED DEVELOPMENT

Environmental Requirements

- WDNR required Exemption to s. NR 506.085 Wis. Adm. Code for development on a landfill
- This process is intended to gather information necessary to evaluate the potential risk to human health and the environment as a result of the proposed development.
- The data collected are used to integrate remedial actions to specifically address identified risks into the proposed site development.

PROPOSED DEVELOPMENT SCOPE OF WORK

- Methane monitoring within the limits of the proposed structures.
 - Closed cap monitoring (5 days)
 - Open cap monitoring (5 days)
- Leachate monitoring at perimeter of stadium – wells to remain post-construction.
- Cap thickness verification.
- Information collected will be used to properly design control systems to address methane migration and potential accumulation within site structures.
- On-going leachate monitoring will be conducted to assess the potential affects of the stadium berm.
- Cap thickness observations will be used to properly design changes to the existing cap.

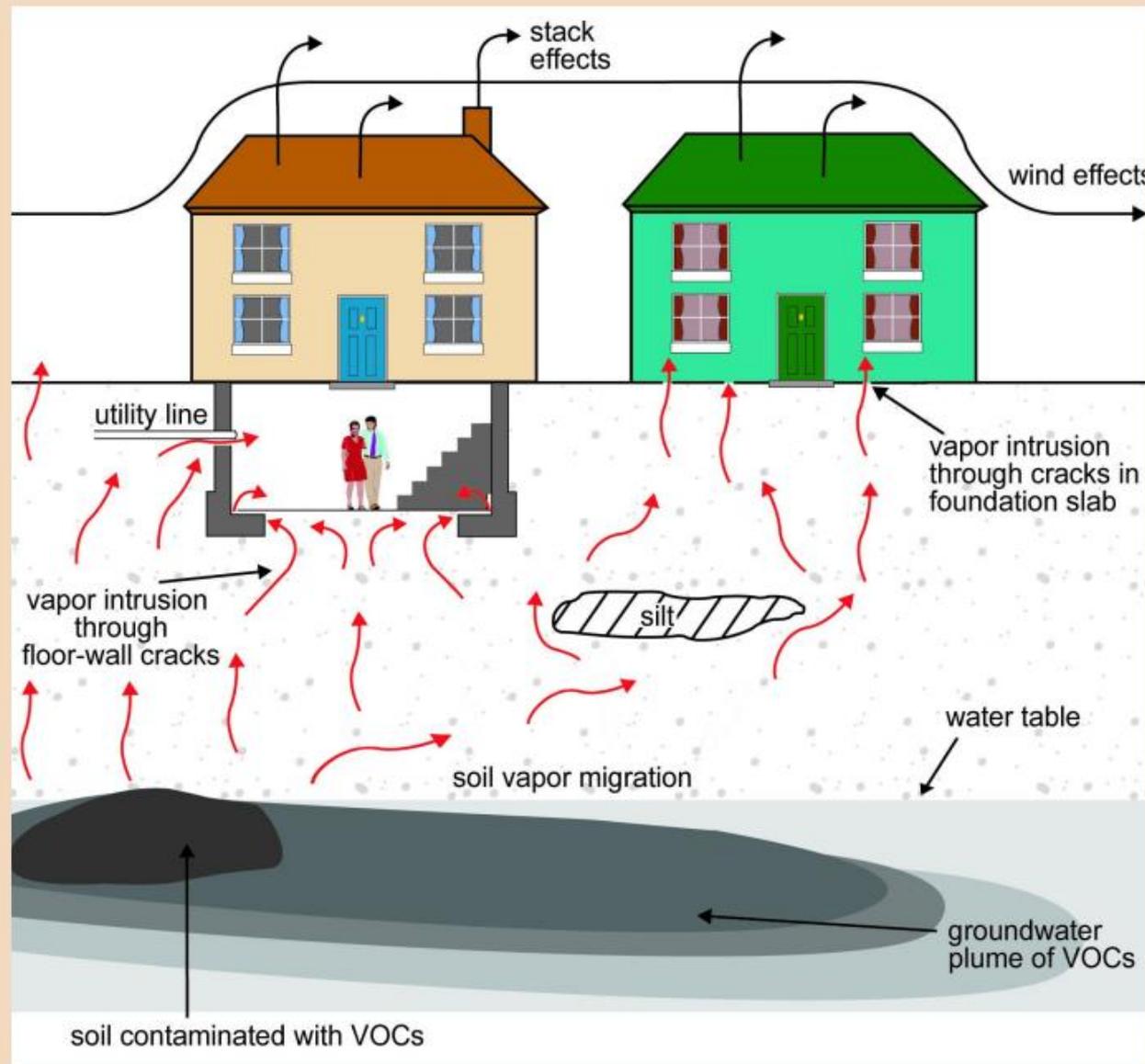
HEALTH AND SAFETY MEASURES

On-site assessment activities will be conducted in compliance with a site-specific health and safety plan. The safety plan will include:

- Location of underground utilities through Diggers Hotline markings, Milwaukee County consultant currently overseeing the operation of the methane collection system, and a private utility locator.
- Establishment of Exclusion Zones, Contamination Reduction Zones and Support Zones within the areas of active work.
- Notification of local officials (City of Franklin, Franklin Fire Department, WDNR, and Milwaukee County personnel) regarding the proposed work schedule and activities.
- Continuous methane and volatile vapor monitoring at well/vapor point locations during active work.
- Continuous ambient air monitoring for methane and volatile vapors a distance of 20 feet from the monitoring well/vapor point installation locations during active work.
- Contingencies for excessive methane generation/pressure during drilling activities including notification of the Franklin Fire Department as appropriate.

How Vapors Enter a Building

If you live near a commercial or industrial facility or landfill where VOCs have entered either the soil or groundwater, there may be a potential for those chemicals to travel as vapors into your home or business. Vapors can enter buildings in various ways, including through cracks in the foundation and openings for utility lines. Building ventilation and weather can influence the extent of vapor intrusion.



Adapted from U.S. Environmental Protection Agency (EPA) graphic.
www.epa.gov/oswer/vaporintrusion/basic.html

VAPOR AND GAS MONITORING



← Open cap well

Micromanometer used to measure pressure in well relative to ambient air



VAPOR AND GAS MONITORING



Multi-gas meter used to measure concentrations of Methane, CO₂, and other gases in well



Photoionization Detector (PID) used to measure concentration of volatile compounds in well



DEVELOPMENT RISK MANAGEMENT

- Reconfigure the existing methane control system(s).
- Install and operate active sub-slab venting systems for the proposed structures with vapor barriers and alarmed indoor air monitoring devices.
- Cap replacement and/or modifications that direct storm water away from the waste mass. Preliminary plans direct storm water to the north toward the Root River.
- Leachate monitoring to evaluate potential migration associated with Stadium structures/earthen berm.
- Continued groundwater monitoring for indicator parameters – intended to proactively detect potential contaminant migration.
- Design and construction specific details will be prepared upon completion of the proposed additional data collection.

FORMER WISDOT PROPERTY

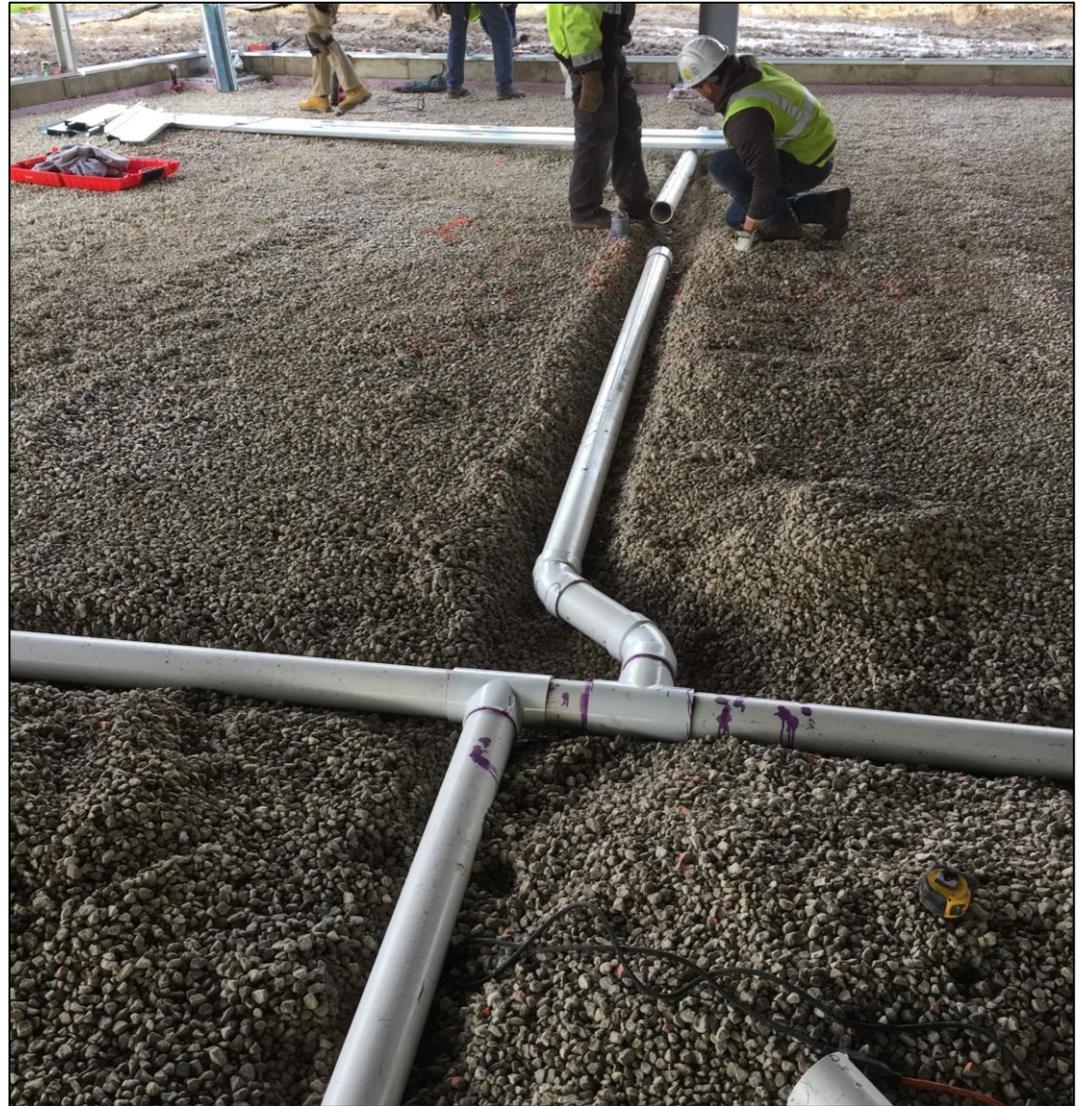
MMSD Methane Gas Conveyance Line

- The methane gas conveyance line was installed in 2011 to connect Waste Management landfill in Muskego to the MMSD Jones Island facility.
- Engineered and designed changes to the gas line require compliance with:
 - US Department of Transportation regulations - 49 CFR Part 192 Transportation of Natural and Other Gas by Pipeline;
 - Public Service Commission review and approval; and
 - MMSD review and approval.
- Construction activities must be completed by a US DOT certified contractor.
- The relocation plan will consider at a minimum: future access to the gas line for routine maintenance – current proposed location beneath rerouted Crystal Ridge Drive, design considerations relative to potential settlement if located within the fill mass, and proper management of materials excavated for the new section construction.

- Soil imported for cap, stadium construction, and screening berm will be vetted through the ch. NR 718 process. At a minimum, the following specific information regarding the soil prior to its import will be reviewed and evaluated:
 - The specific source of the soil – plans showing where the soil will be generated;
 - A copy of all Phase I environmental site assessments completed for the import soil project area; and
 - Laboratory analytical results for soil proposed for import. The specific number of soil samples analyzed and parameters analyzed for will be dependent on the quantity of soil proposed for import and results of the Phase I ESA.
- The Phase I and soil sampling data will be compared to draft WDNR guidance defining “clean” soil.

SUB-SLAB VENTING PIPE INSTALLATION

- A network of perforated vent pipe is installed within a layer of stone beneath floor grade in a grid pattern.



VAPOR BARRIER INSTALLATION

- A composite of vapor barrier and geotextile membrane is placed above the regraded base course stone.
- The vapor barrier is sealed to walls, columns, floor, and any utility penetrations to prevent vapor migration from the subsurface.



A clay seal is installed at utility building entrance points to prevent preferential migration.



ROOF VENTING SYSTEM

- Sub-slab system is plumbed through the ceiling and vented through an extraction pipe equipped with a fan to draw subsurface vapors from below the building and exhaust at the roof.



MANOMETER INSTALLED ON VENT SYSTEM

- A manometer is installed on the vapor extraction system for visual confirmation that the system is functioning as designed.



VENTING ALARM SYSTEM

- Venting system is connected to interior alarm system for notification of system malfunction.
- In event of power loss or system failure, audible alarm and flashing lights will activate.

