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| Minnesota Pollution Control Agency (MPCA), 520 Lafayette Road North, St. Paul, MN 55155-4194 | Investigation report  Petroleum Remediation Program  Guidance document 4-06  Doc Type: Limited Investigation or Remedial Investigation Report |

Instructions:Complete this report to document a site investigation, including a limited site investigation (LSI) or aremedial investigation (RI). Do not revise or delete any text or questions from this report. Include any additional information that is important for making a site management decision. If only an LSIis necessary, some questions do not need to be answered as identified in the form. If an RI is necessary, submit the report after completing a minimum of two quarterly sampling events unless instructed otherwise. Quarterly groundwater sampling should continue until a response from the Minnesota Pollution Control Agency (MPCA) is received.

**Note:** All documents with hyperlinks in this form are available on the MPCA’s Cleanup guidance website at <https://www.pca.state.mn.us/waste/cleanup-guidance>.

|  |  |  |  |
| --- | --- | --- | --- |
| **MPCA Site ID:** | LS00 | **Date (mm/dd/yyyy):** |  |

Responsible party information

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Individual or corporate name: | | | |  | | | | | |
| Mailing address: | | |  | | | | | | |
| City: |  | | | | | State: |  | Zip code: |  |
| Email: | |  | | | | | | Phone: |  |
| Alternative contact name (if any): | | | | |  | | | Phone: |  |

Leak site information

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name: | |  | | | | | Phone: |  | |
| Leak site address: | | | |  | | | | | |
| City: |  | | | | State: |  | Zip code: | |  |
| County: | | |  | |  | | |  | |

Confirmation of report content

Reports are insufficient if unsigned, altered, not on most recent format, or components are missing. Below are the most commonly missed components in the [Investigation report](https://www.pca.state.mn.us/sites/default/files/c-prp4-06.doc). If applicable items are missing, the report will not be accepted for review unless the MPCA project manager has been notified prior to report submittal.

|  |  |
| --- | --- |
|  | Underground storage tank(s) (USTs), aboveground storage tank(s) (ASTs), transfer areas, piping, dispensers, and remote fill pipe locations are depicted on a site map (Section 4: Figure 3) |
|  | Provide explanation if contact was not made in person for the well receptor survey, if applicable (Section 2.1) |
|  | Properties located within 500 feet of the release source identified in Table 15 correspond to labeled properties on the receptor map (Section 4: Figure 11) |
|  | Location of end points for all geologic cross sections are on site map (Section 4: Figure 11) |
|  | Two geologic cross-sections are included (Section 4: Figure 9) |
|  | Utilities identified in Table 18 are located on the receptor map (Section 4: Figure 11) and geologic cross-sections (Section 4: Figure 9) |
|  | Chromatograms provided at a reasonable scale for positive analytical results of gasoline range organics (GRO) and/or diesel range organics (DRO) (Section 6: Appendix F) |
|  | Pre and post cleanup analytical results if DRO silica gel cleanup was performed (Section 6: Appendix F) |
|  | Documentation of field activities, collection of field data, sampling information forms, and equipment calibration sheets (Section 6: Appendix H) |
|  | Soil disposal documentation such as landfill receipts, if not included in [General excavation report worksheet](https://www.pca.state.mn.us/sites/default/files/c-prp3-02.doc) (Section 6: Appendix N) |
|  | Record the amount of time borings left open for attempting groundwater collection in both the water level measurement and depth table (Section 5: Table 6) and on boring logs (Section 6: Appendix E) |
|  | [Field work notification](https://www.pca.state.mn.us/waste/field-work-notifications) copy of record(s) from MPCA’s [e-Services](https://www.pca.state.mn.us/data/e-services) (Section 6: Appendix O) |
|  | Submission of EQuIS electronic data deliverables (EDDs), and include email confirmation (Section 6: Appendix P) |

Environmental professional information

*By signing this document, I/we acknowledge that we are submitting this document on behalf of and as agents of the responsible person or volunteer for this leak site. I/we acknowledge that if information in this document is inaccurate or incomplete, it will delay the completion of remediation and may harm the environment and may result in a reduction in Petrofund reimbursement. In addition, I/we acknowledge on behalf of the responsible person or volunteer for this leak site that if this document is determined to contain a false material statement, representation, or certification, or if it omits material information, the responsible person or volunteer may be found to be in violation of Minn. Stat. § 115.075 or Minn. R. 7000.0300 (Duty of Candor), and that the responsible person or volunteer may be liable for civil penalties.*

***By typing/signing my name below,*** *I certify the above statements to be true and correct, to the best of my knowledge, and that this information can be used for the purpose of processing this form.*

### Signatures

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Report author(s)** | | | |  | **Report reviewer(s)** | | | |
| Signature: | |  | |  | Signature | |  | |
|  | | *(This document has been electronically signed.)* | |  |  | | *(This document has been electronically signed.)* | |
| Title: |  | | |  | Title: |  | | |
| Date (mm/dd/yyyy): | | |  |  | Date (mm/dd/yyyy): | | |  |
| Signature: | |  | |  | Signature: | |  | |
|  | | *(This document has been electronically signed.)* | |  |  | | *(This document has been electronically signed.)* | |
| Title: |  | | |  | Title: |  | | |
| Date (mm/dd/yyyy): | | |  |  | Date (mm/dd/yyyy): | | |  |

|  |  |
| --- | --- |
| Name(s) of field technician(s): |  |

### Company information:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name: | |  | | | | | Phone: | |  |
| Mailing address: | | |  | | | | | | |
| City: |  | | | State: |  | Zip code: | |  | |

### Project manager information:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name: |  | | | | |
| Phone: |  |  | Email: |  |

Emergency and high priority sites

|  |  |  |
| --- | --- | --- |
|  | **Yes** | **No** |
| 1. Is an existing drinking water supply well impacted or does an impact appear imminent? |  |  |
| 1. Is there an existing drinking water impact due to permeation of a water distribution line? |  |  |
| 1. Is there an existing surface water impact as indicated by 1) a petroleum sheen on the surface water or 2) a petroleum sheen or volatile organic compounds in the part per million range observed in a groundwater sample collected close to the surface water? |  |  |
| 1. Has mobile light non-aqueous phase liquid (LNAPL) been detected at the site? **If *Yes,*** attach the [Light non-aqueous phase liquid recovery report](https://www.pca.state.mn.us/sites/default/files/c-prp2-03.doc) in Section 6. |  |  |
| 1. Are there any existing field-detectable vapor impacts (photoionization detector, explosimeter, odors, etc.) to a receptor? |  |  |
| 1. Did the vapor intrusion assessment detect contaminants in excess of 33 times an expedited intrusion screening value? |  |  |
| 1. Was contamination caused by a recent release (discovered within 90 days of the release)? |  |  |
| If you answered ***Yes*** to any of questions A through G above, describe below the actions taken to date to reduce or eliminate the risk posed by the release. | | |

Section 1: Subsurface investigation

### Site and release information

Complete a [Release information worksheet](https://www.pca.state.mn.us/sites/default/files/c-prp2-05.doc) if one was not completed for a [General excavation report worksheet](https://www.pca.state.mn.us/sites/default/files/c-prp3-02.doc), and include in Section 6.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **1.1** | Describe the land use and pertinent geographic features (e.g., topographic changes, surface waters, etc.) within 1,000 feet of the site. Illustrate these features in Section 4 using a site location map, aerial photographs, and Sanborn Fire Insurance Maps™ for the various time periods they are available. | | | |
| **1.2** | Briefly describe the history of the site and any past site investigation work that may have been completed, including previous MPCA Site IDs. If documentation from other reports such as a Phase I or Phase II will be used as part of the site recommendation or site conceptual model, include the specific applicable pages of the report(s) in Appendix D. If entire report is required, the MPCA project manager will request that separately. | | | |
| **1.3** | List other potential petroleum sources within 500 feet of the site and identify them on the receptor map in Section 4. | | | |
| **1.4** | Describe the status of the tank system(s), including current and former tanks, piping, and dispensers. Identify all known and suspected product types that have been stored at the site, including leaded gas and E85. Summarize the status and characteristics of all past and present tanks in Table 1 and identify all components on in Section 4. | | | |
| **1.5** | Briefly describe the known or suspected source(s) of the release and how it was discovered. | | | |
| **1.6** | When did the release occur (if known)? | |  | |
| **1.7** | What was the volume and type(s) of petroleum product released (if known)? | | | |
|  | Gallons: |  | Released product type(s): |  |

When a tank has been excavated, refer to [Excavation of petroleum-contaminated soil and tank removal sampling](https://www.pca.state.mn.us/sites/default/files/c-prp3-01.pdf) and the [General excavation report worksheet](https://www.pca.state.mn.us/sites/default/files/c-prp3-02.doc) for reporting requirements. If a tank has been excavated or if contaminated soil was removed for off-site treatment/disposal prior to this investigation, include the [General excavation report worksheet](https://www.pca.state.mn.us/sites/default/files/c-prp3-02.doc) in Section 6 and identify the extent of soil excavation on in Section 4.

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| --- | --- | --- | --- | --- | --- | --- |
| **1.8** | Was soil excavated for off-site treatment/disposal?  *Yes*  *No* If yes, answer: | | | | | |
|  | Date(s) soil was excavated (mm/dd/yyyy): |  | | | Total volume removed in cubic yards: |  |
|  | Soil treatment/disposal method:  Land treatment  Landfilling  Composting/Biopiling | | | | | |
|  | Other: | |  | | | |
|  | Name and location of treatment/disposal facility: | | |  | | |
|  | Include documentation of off-site treatment or disposal in Section 6 if not included in the [General excavation report worksheet](https://www.pca.state.mn.us/sites/default/files/c-prp3-02.doc).  If you checked ***Other***, describe how the soil was treated and attach applicable documentation in Section 6. | | | | | |
| **1.9** | Were [field work notifications](https://www.pca.state.mn.us/waste/field-work-notifications) submitted prior to completing field work? Include [e-Services](https://www.pca.state.mn.us/data/e-services) copy of record(s) in Section 6, Appendix O.  *Yes  No* **If *No***, explain why. | | | | | |

### Site-specific geology and hydrogeology

|  |  |
| --- | --- |
| **1.10** | Discuss the soil borings drilled and provide rationale for their locations. Include boring logs in Section 6. Boring logs must include all the information required in [Soil and groundwater assessments performed during site investigations](https://www.pca.state.mn.us/sites/default/files/c-prp4-01.pdf). |
| **1.11** | Discuss in detail the site geology based on soil boring data, grain-size analyses, cross sections, geologic logs of nearby water supply wells, and available published information. Include detailed descriptions of more permeable soil lenses or beds within less permeable soil units. |
| **1.12** | Discuss the measured or estimated depth to bedrock, how the bedrock depth was determined, the uppermost bedrock formation, and the degree of weathering, fracture, and karstification encountered at the bedrock interface. |
| **1.13** | Discuss in detail the local and regional hydrogeology based on geologic logs of nearby water supply wells and available published information. |
| **1.14** | Discuss site groundwater flow direction using soil boring data, monitoring well data if collected, plume geometry, and available published information. |
| **1.15** | Describe any evidence of a fluctuating water table or a seasonal high water table (e.g., mottling, saturated soil color or gleyed soils, monitoring well observations). Also discuss current groundwater levels with respect to long-term water table fluctuations in the area from other sources of information found on the Minnesota Department of Natural Resources website at <http://www.dnr.state.mn.us/waters/cgm/index.html>, and the U.S. Geological Survey website at <https://waterdata.usgs.gov/mn/nwis/gw>. |

### Extent and magnitude of soil contamination

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| **1.16** | Were soil borings completed in or adjacent to each of the following features? |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Dispensers | *Yes*  *No*  *not present* | Piping | *Yes*  *No*  *not present* | | |
| Transfer areas | *Yes*  *No*  *not present* | Remote fill pipes | *Yes*  *No*  *not present* | | |
| UST basins | *Yes*  *No*  *not present* | Valves | *Yes*  *No*  *not present* | | |
| AST basins | *Yes*  *No*  *not present* | Known spill areas | *Yes*  *No*  *not present* | | |
| **1.17** | Based on the requirements described in [Soil and groundwater assessments performed during site investigations](https://www.pca.state.mn.us/sites/default/files/c-prp4-01.pdf), were the following conditions met?  **a.** **Horizontal Definition:** were a sufficient number of soil borings completed to define the horizontal extent of soil contamination in all directions?  *Yes  No*  **b. Vertical Definition:** were all soil borings completed to the required depth? *Yes  No*  **c. Site Stratigraphy:** was the stratigraphy boring completed to the required depth?  *Yes  No* | | | | | | | |
|  | If you answered ***No*** in either 1.15 or 1.16, explain why borings were not completed in the required locations or to the required depths. | | | | | | | |
| **1.18** | Describe the vertical and horizontal extent and magnitude of soil contamination based on field observations, soil headspace measurements (Table 2), and soil analytical results (Tables 3 and 4). If non-petroleum contaminants are present, discuss the possible sources of these compounds. Provide a map and two cross sections in Section 4 that illustrate both soil headspace and laboratory analytical results. Include laboratory analytical reports and soil sampling methodology in Section 6. | | | | | | | |
| **1.19** | Is contaminated soil in contact with groundwater?  *Yes  No* | | | | | | | |
|  | **If *Yes***, or if groundwater contamination appears likely, complete the **Aquifer determination** section below.  **If *No,*** complete question 1.20. | | | | | | | |
| **1.20** | 1. What is the distance separating the deepest soil contamination from the surface of the water table? | | | | | | feet | |
|  | 1. Was this distance measured during site activities, referenced from geologic information, or estimated based on professional opinion during a site visit? | | | | |  | | |
|  | 1. In your judgment, is there a sufficient distance separating the petroleum-contaminated soil from the underlying groundwater to prevent contamination of the groundwater?  *Yes  No*   Explain in detail. In your explanation, consider the site-specific geology, the data in this section, and the nature of the petroleum release (i.e., volume, age, released product type).    **If** ***Yes****,* the **Aquifer determination** is not necessary as part of the LSI.  **If *No***, complete the **Aquifer determination** section below. | | | | | | | |
| **1.21** | Is contaminated surface soil present at the site?  *Yes  No*  **If *Yes***, tabulate the surface soil assessment results in Table 5 include extent of contamination in Section 4 and describe the vertical and horizontal extent and magnitude of surface soil contamination below. | | | | | | | |

### Aquifer determination

Complete this section if groundwater has been contaminated or may become contaminated based on questions 1.19 and 1.20 to determine, in part, the need for an RI. Refer to [Soil and groundwater assessments performed during site investigations](https://www.pca.state.mn.us/sites/default/files/c-prp4-01.pdf) for methods and requirements. Provide in Section 6 the results of grain-size analyses, calculations, and other information used to determine the hydraulic conductivity.

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| **1.22** | Provide the hydraulic conductivity value (K) for each soil sample collected within the saturated zone. Include the name of the empirical formula in the Method field, or indicate whether a referenced value from Table 4 in [Soil and groundwater assessments performed during site investigations](https://www.pca.state.mn.us/sites/default/files/c-prp4-01.pdf) was used. Add additional rows as needed. | | | | | | |
|  | | Sample ID1: | Sample depth:       ft | | | K1:       ft/day | Method: |
|  | | Sample ID­2: | Sample depth:       ft | | | K2:       ft/day | Method: |
|  | | Sample ID3: | Sample depth:       ft | | | K3:       ft/day | Method: |
| **1.23** | Calculate the transmissivity (T) for each sample using the equation T = Kb, where K is the hydraulic conductivity value from question 1.21 and b is the saturated thickness of the hydrogeologic unit. | | | | | | |
|  | | K1 =       ft/day | | b1 =       ft | T1 =       ft2/day | | |
|  | | K2 =       ft/day | | b2 =       ft | T2 =       ft2/day | | |
|  | | K3 =       ft/day | | b3 =       ft | T3 =       ft2/day | | |
| **1.24** | Is the impacted hydrogeologic unit(s) considered an aquifer? Justify your determination by explaining the rationale for the selected hydraulic conductivity and unit thickness values used to calculate transmissivity, and considering whether the unit produces water to a well or spring. | | | | | | |

### Aquifer characterization

Complete this section if monitoring wells were installed as part of an RI. Refer to [Soil and groundwater assessments performed during site investigations](https://www.pca.state.mn.us/sites/default/files/c-prp4-01.pdf) for a list of conditions when monitoring wells are required.

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| **1.25** | Discuss the drilling and installation of monitoring wells, including the rationale for their locations. Summarize their construction and location information in Table 9. Attach boring logs, well construction diagrams, and well logs in Section 6. | | | | | | |
| **1.26** | Is there a clean or nearly clean (below Health Risk Limits [HRLs]) downgradient monitoring well located along the longitudinal axis of the contaminant plume (approximately 20degrees plus or minus the axis)?  *Yes  No* | | | | | | |
| **1.27** | Is there a worst-case well completed through the source area(s) of the release?  *Yes  No* | | | | | | |
|  | If you answered ***No*** to any of the above two questions, explain why a well was not completed in the required location. | | | | | | |
| **1.28** | Provide an estimate of the longitudinal length of the groundwater contaminant plume: | | | | |  | feet |
| **1.29** | Calculate groundwater velocity (v) using the hydraulic conductivity (K) from question 1.21, the average horizontal hydraulic gradient (dh/dl), and the effective porosity (n). If there are multiple hydraulic conductivity values, select a single value that represents the contamination’s primary flow path. Provide documentation and show calculations in Section 6. | | | | | | |
|  | | K =       ft/day | n =       method/reference | | dh/dl =       (unitless) | | v =       ft/day |
|  | | Using the calculated groundwater velocity, is there a receptor(s) located within a five-year travel time from the edge of the groundwater plume?  *Yes  No*  **If** ***Yes***, describe the location and type of receptor(s). | | | | | |
| **1.30** | Were any deep monitoring wells installed at the site?  *Yes  No*  **If** ***Yes***, list them and indicate their depths.    Provide the following information if deep wells were installed: | | | | | | |
|  | | Vertical hydraulic gradient (dv/dl): | |  | | | |
|  | | Inferred groundwater flow direction: | |  | | | |
|  | | K =       ft/day | n =       method/reference | | dh/dl =       (unitless) | | v =       ft/day |
|  | | Using the calculated groundwater velocity, is there a receptor(s) located within a five-year travel time from the edge of the groundwater plume?  *Yes  No*  **If** ***Yes***, describe the location and type of receptor(s). | | | | | |

### Sensitive groundwater conditions

Include in Section 6 applicable documentation such as Minnesota Department of Health (MDH) public well sampling results and wellhead protection plans, when available. For sites within a wellhead protection area, provide a copy of the MDH Source Water Assessment and a map from the MPCA [Petroleum Remediation Program maps online](http://pca-gis02.pca.state.mn.us/prp/index.html) website. Refer to [Assessment of sensitive groundwater conditions](https://www.pca.state.mn.us/sites/default/files/c-prp4-18.pdf) for more information. If making recommendations to further assess a sensitive condition in Section 3, contact the MPCA before submitting this report.

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| **1.31** | Has a sensitive groundwater condition(s) been identified?  *Yes*  *No*  Identifyall sensitive conditions present at the site and complete questions 1.32 and 1.33.  Wellhead protection area  Shallow bedrock  Sole-source aquifer  Shallow sand and gravel aquifer |
| **1.32** | Discuss the data used to identify the sensitive condition, including subsurface investigation and published data sources. Attach relevant documentation in Section 6, including the results of the supplemental karst RI investigation if applicable. |
| **1.33** | If water supply wells were identified within the applicable sampling radius defined in [Assessment of sensitive groundwater conditions](https://www.pca.state.mn.us/sites/default/files/c-prp4-18.pdf), were all wells sampled?  *Yes*  *No*  *Not present*  If ***Yes***, discuss the results of water supply well sampling in question 2.4.  If ***No***, discuss why any identified wells were not sampled. |

### Extent and magnitude of groundwater contamination

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| **1.34** | Describe the extent and magnitude of groundwater contamination based on the analytical results of samples collected as part of an LSI (Tables 6, 7, and 8) and, if applicable, monitoring well samples collected as part of an RI (Tables 10, 11, and 12). Provide maps that illustrate both the laboratory analytical results, and if applicable, groundwater gradients in Section 4. | |
| **1.35** | Were recalcitrant petroleum compounds (e.g., 1,2-dibromoethane [EDB], 1,2-dichloroethane [DCA], or methyl *tertiary*-butyl ether [MTBE] detected in groundwater samples?  *Yes*  *No*  If ***Yes***, describe the extent and magnitude of each recalcitrant compound. | |
| **1.36** | If non-petroleum compounds are present, discuss the possible sources of these compounds. | |
| **1.37** | Provide a discussion on QA/QC, including information on the samples collected and laboratory analyses performed. Include laboratory analytical reports and groundwater sampling methodology in Section 6. | |
| **1.38** | Laboratory certification number: |  |

Evaluation of natural biodegradation

Refer to [Assessment of natural biodegradation at petroleum release sites](https://www.pca.state.mn.us/sites/default/files/c-prp4-03.pdf). Note: Evaluation of natural biodegradation is not required unless requested by the MPCA.

|  |  |
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| **1.39** | Discuss the results of the natural biodegradation assessment (Table 13). Specifically, compare the concentrations of the inorganic parameters inside and outside the plume and whether the data indicate natural biodegradation is occurring at the site. |
| **1.40** | If remediation is anticipated, discuss reasons why natural attenuation (including biodegradation) cannot adequately remediate the contaminants to acceptable risk levels. |

Extent and recovery of mobile light non-aqueous phase liquid (LNAPL)

If mobile LNAPL is encountered during the investigation, include the [Light non-aqueous phase liquid recovery report](https://www.pca.state.mn.us/sites/default/files/c-prp2-03.doc)in Section 6. See [Light non-aqueous phase liquid management strategy](https://www.pca.state.mn.us/sites/default/files/c-prp2-02.pdf) for additional information.

|  |  |
| --- | --- |
| **1.41** | If mobile LNAPL was encountered during the site investigation, describe the work completed to delineate the extent of the mobile LNAPL and what efforts were or are being completed to recover it. Tabulate the LNAPL volume recovered in Table 14. Illustrate the estimated horizontal extent of the mobile LNAPL on a map in Section 4. |

Section 2: Receptor survey and risk evaluation

Well receptors

List all properties located within 500 feet of the site in Table 15. Identify all properties listed in Table 15 on the receptor map in Section 4.

List all wells located within 500 feet of the site and any municipal or industrial wells within one-half mile in Table 16. All water supply wells within 500 feet of the release source must be listed even if construction information was not obtained or available. Include all available water supply well logs obtained from the Minnesota Geological Survey, MDH, drillers, or county well management authorities, and any other well construction documentation in Section 6. Identify all wells listed in Table 16 on the Well receptor survey map in Section 4.

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| **2.1** | Were all property owners within 500 feet of the site successfully contacted to determine if water supply wells are present?  *Yes  No* **If *No***, explain.    Was the first attempt at contact with the property owners in person?  *Yes  No* **If *No***, explain. |
| **2.2** | Discuss any physical limitation to the inspection of properties within the 500-foot survey radius. |
| **2.3** | Discuss the results of the well receptor survey. Comment on the risks to water supply wells identified within 500 feet of the site as well as the risk posed by or to any municipal or industrial wells found within one-half mile. Specifically indicate whether identified water supply wells use an impacted aquifer. (Note: an impacted aquifer separated from another aquifer by a clay lens may not be considered a separate aquifer.) |
| **2.4** | If water samples were collected from nearby water supply wells, discuss the analytical results below and tabulate them in Tables 11 and 12. |
| **2.5** | Is municipal water available in the area?  *Yes  No* |
| **2.6** | Are there any plans for groundwater development in an impacted aquifer within one-half mile of the site or one mile downgradient of the site if the aquifer is fractured?  *Yes  No* |
|  | Provide the name, title, and telephone number of the person that was contacted for this information. |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name: |  | Title: |  | Phone: |  |

### Surface water receptors

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| --- | --- |
| **2.7** | Are there any surface water receptors located within one-quarter mile of the site?  *Yes  No*  **If** ***Yes****,* list them along with their distance and direction from the site in Table 17 and show on surface water map in Section 4.  Also, list below any potential pathways such as ditches, drain tiles, storm sewers, etc., that may lead to an identified surface water receptor. |
| **2.8** | If a surface water receptor is present downgradient of the site, is there a clean downgradient soil boring or monitoring well located between the site and the receptor?  *Yes  No*  *NA*  **If *Yes***,identify the clean downgradient boring or well, distance to the receptor, and discuss the risk to the receptor. |
|  | **If *No****,* and groundwater from a downgradient boring or well is contaminated, we assume that contamination discharges to the surface water receptor. Therefore, provide the following information. |

|  |  |  |  |
| --- | --- | --- | --- |
| Name of receiving water: |  | |  |
| Plume width, (W): | |  | feet |
| Plume thickness, (H): | |  | feet |
| Hydraulic conductivity, (K): | |  | gal/day/ft2 |
| Horizontal gradient, (dh/dl): | |  | (unitless) |
| Discharge, (Q) = H\*W\*K\*(dh/dl)/1440 | |  | gal/min |

### Utilities and subsurface structures

|  |  |
| --- | --- |
| **2.9** | Compare the relationship between the distribution of contaminant phases (soil, groundwater, vapor, and LNAPL) to the location of all underground utility lines, utility service lines, and nearby basements and sumps. Include all identified utilities in Table 18. Show all utilities, utility service lines, and other subsurface structures on applicable cross sections in Section 4. |
| **2.10** | Is there any evidence that mobile LNAPL or contaminated groundwater may be traveling off site within utility corridors?  *Yes  No*  **If *Yes*,** a utility backfill investigation is required. Refer to [Risk evaluation and site management decision at petroleum release sites](https://www.pca.state.mn.us/sites/default/files/c-prp4-02.pdf). Discuss the investigation rationale and results. |
| **2.11** | Are there water distribution lines intersecting a contaminated area?  *Yes  No*  **If *Yes*,** discuss the magnitude of the adjacent soil and groundwater contamination. Also describe construction details for all water distribution line components that intersect the contaminated area and the potential for permeation to occur*.* |
|  | If a sample was collected from a water line, describe the sampling location, procedures, and results. Tabulate sampling results in Tables 11 and 12. |
| **2.12** | Is there a history of field-detectable vapor impacts in the vicinity of the site?  *Yes  No*  **If *Yes*,** describe. |

If a vapor survey was completed, identify all vapor monitoring locations on the vapor survey map in Section 4 by labeling each monitoring location with a number that corresponds to vapor monitoring locations listed in Table 19. Discuss vapor monitoring methods, including instruments used, in Section 6.

|  |  |
| --- | --- |
| **2.13** | Provide a detailed description of each vapor monitoring location and indicate if vapors were detected. |

### Vapor intrusion receptors

If a preliminary soil gas assessment was completed, include the Vapor intrusion assessment map in Section 4 and the results in Table 20.

|  |  | **Yes** | **No** |
| --- | --- | --- | --- |
| **2.14** | Was a preliminary soil gas assessment completed?  **If *No***, explain why. |  |  |
| **2.15** | Do any of the soil gas samples from locations near inhabited buildings exceed the ISVs by thirty-three times (33X) for petroleum-related compounds?  If you answered ***Yes***, is additional characterization of the vapor intrusion pathway needed for these buildings (e.g. sub-slab soil gas, an indoor building survey, or indoor air sampling)? **If *Yes***, complete question 3.5.  **If *No***, explain why. |  |  |
| **2.16** | Have sufficient data been collected to propose a [Conceptualcorrective action design](https://www.pca.state.mn.us/sites/default/files/c-prp7-02.dot) for buildings that are likely to be impacted by petroleum vapors?  **If *Yes***, describe your justification for corrective action. |  |  |
| **2.17** | Based on the horizontal extent of impacted groundwater or mobile LNAPL from the release, is additional soil gas sampling required beyond the 100-foot preliminary assessment area near inhabited buildings?  **If *Yes***, describe your proposal for additional vapor intrusion sampling.    **If *No***, explain why. |  |  |
| **2.18** | Were recommended field sampling procedures and laboratory QA/QC followed?  **If *No***, explain why and discuss implications on data quality. |  |  |

### Conceptual site model discussion

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| --- | --- |
| **2.19** | Provide a detailed conceptual site model (CSM). For additional information on CSM development, see [Soil and groundwater assessments performed during site investigations](https://www.pca.state.mn.us/sites/default/files/c-prp4-01.pdf)*.* If closure is being recommended in Section 3 based on previous petroleum leak site closure(s), the CSM must include a comprehensive comparison of historical data and current site data for all sampled media. Please make sure to include information related to changes to land use, as well as information related to nearby receptors, as part of the development of the CSM. |
| **2.20** | Discuss any other site concerns not included in the above discussion. |

Section 3: Site management decision

Base the site management decision on the Petroleum Remediation Program’s policies described in [Risk evaluation and site management decision at petroleum release sites](https://www.pca.state.mn.us/sites/default/files/c-prp4-02.pdf).

|  |  |
| --- | --- |
| **3.1** | Recommendation for site:  Site closure  Additional groundwater monitoring  Additional field-detectable vapor monitoring  Additional soil or groundwater investigation  Additional soil gas/vapor intrusion investigation  Corrective action  If corrective action is recommended, contact the MPCA prior to submitting this report to determine whether a [Conceptual corrective action design (CCAD) report](https://www.pca.state.mn.us/sites/default/files/c-prp7-02.dot) should be prepared and included in Section 6. See [Corrective action design and implementation](https://www.pca.state.mn.us/sites/default/files/c-prp7-01.pdf) for more information on the corrective action design approval process. |
| **3.2** | If closure is recommended, summarize significant investigative events and describe how site-specific exposure pathways identified in question 2.19 have been adequately addressed. If closure is being recommend based on previous closed petroleum leak site(s), include all historical data and information that supports this recommendation. |
| **3.3** | If additional groundwater or field-detectable vapor monitoring is recommended, indicate the proposed monitoring locations, sampling frequency, and target analytes. Conduct quarterly groundwater monitoring and sampling until the MPCA responds to this report*.* |
| **3.4** | If additional soil or groundwater investigation is recommended, provide details of proposed activities such as locations for additional soil borings and monitoring wells, proposed monitoring well construction, or targeted sampling media and analytes. |
| **3.5** | If additional vapor intrusion investigation is recommended, provide details of proposed activities such as completing an indoor building survey, sub-slab vapor sampling, indoor air sampling, or locations for additional soil gas sampling. |

Section 4: Figures

All figures must include a north arrow, scale, and legend. Approximate scales are not acceptable. Distinguish sequential elements of investigations by dates, symbols, etc. in the legend, if applicable. Utilize aerial photographs as the basis of site figures with caution since the height of buildings and structures may skew and misrepresent the apparent location due to camera angle. Attach all required figures in the following order. Indicate figures included in this report by marking the check box.

|  |  |
| --- | --- |
|  | Figure 1: Site location map using a U.S. Geological Survey 7.5 minute quadrangle map. |
|  | Figure 2: Aerial photos and Sanborn Fire Insurance Maps™ (if available) of the immediate area. |
|  | Figure 3: Site map showing structures, location of utilities, all past and present petroleum storage tanks, piping, dispensers and transfer areas, boring and monitoring well locations, any water supply wells on site and location of end-points for all geological cross sections. |
|  | Figure 4: Extent of soil excavation using site map (Figure 3) as base map (if applicable). |
|  | Figure 5: Extent of contaminated surface soil using site map (Figure 3) as base map (if applicable). |
|  | Figure 6: Horizontal extent of LNAPL using site map (Figure 3) as base map (if applicable). |
|  | Figure 7: Horizontal extent of soil contamination using site map (Figure 3) as base map. |
|  | Figure 8: Horizontal extent of groundwater contamination using site map (Figure 3) as base map. |
|  | Figure 9: At least two (2) geologic cross sections depicting stratigraphy, soil headspace results, petroleum sheen test results, laboratory analytical results, water table elevation, and underground utilities. |
|  | Figure 10: Groundwater gradient contour maps (for sites with monitoring wells) for each gauging event. |
|  | Figure 11: Receptor map (scale 1 inch = 50 to 100 feet), centered on the release area, showing property boundaries and roads, and receptors such as buildings, water supply wells, underground utilities (distinguish between water, storm sewer, and sanitary sewer), surface water, ditches, and any other pertinent items within 500 feet of the release source. |
|  | Figure 12: Well receptor survey map showing one-half mile radius, 500-foot radius, water supply wells, and other potential sources of contamination on a U.S. Geological Survey 7.5 minute quadrangle map or aerial photograph. |
|  | Figure 13: Surface water map showing potential pathways that lead to surface water receptors within one-quarter mile of site. |
|  | Figure 14: Vapor survey map showing utilities and buildings with basements and monitoring locations within 500 feet (if a survey was required). If the survey area has been expanded beyond 500 feet, adjust the map to encompass the entire surveyed area. |
|  | Figure 15: Vapor intrusion assessment map showing all vapor intrusion samples and receptors at and within the 100-foot preliminary assessment area. If the assessment area has been expanded beyond 100 feet, adjust the map to encompass the entire assessment area. |

Section 5: Tables (Add additional rows as needed by placing cursor in last row in the last column and clicking Tab key. Copy an entire table if more columns are needed.)

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| Table 1  Tank information | | | | | | | | |
| Tank # | Tank material | UST or AST | Capacity (gallons) | Contents (product type) | Year installed | Tank status1 | Tank removal/ abandoned date | Tank condition |
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1 Indicate: removed, abandoned in place, or currently in use.

**Notes:**

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| Table 2  Results of soil headspace screening | | | | | | | | | | | | | | | |
| **Depth (ft)** | **Soil boring ID** | | | | | | | | | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
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List in Section 6 the instruments used and discuss field methods and procedures.

**Notes:**

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| Table 3  Analytical results of soil samples1 | | | | | | | | | | | | | |
| **Boring ID** | **Sample depth (ft)** | **Sample date** | **Benzene** | **Toluene** | **Ethyl-benzene** | **Xylenes** | **MTBE** | **1,2,4-Trimethyl-benzene** | **1,3,5-Trimethyl-benzene** | **Naph-thalene** | **GRO** | **DRO** | **Lab Type2** |
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1 Report results in mg/kg. Use less than symbols to show the report level.

2 Indicate “mobile” or “fixed” in the lab type column.

**Notes:**

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| Table 4  Other contaminants detected in soil samples (petroleum or non-petroleum derived)1 | | | | | | | | | | | | | |
| **Boring ID** | **Sample depth (ft)** | **Sample date** |  |  |  |  |  |  |  |  |  |  | **Lab Type2** |
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1 Report results in mg/kg. Use less than symbols to show the report level.

2 Indicate “mobile” or “fixed” in the lab type column.

**Notes:**

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| Table 5  Surface soil assessment results | | | | | | |
| **Sample ID** | **Sample depth (ft)** | **Soil headspace 10 ppmv or greater1 (Y/N)** | **Petroleum saturated (Y/N)** | **Stained**  **(Y/N)** | **GRO**  **(mg/kg)2** | **DRO**  **(mg/kg)2** |
|  |  |  |  |  |  |  |
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1 As measured with a photoionization detector (PID).

2 Use less than symbols to show the report level.

**Notes:**

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| Table 6  Water level measurements and depths of water samples collected from borings | | | | | | | | | | | | | | | |
|  | **Soil boring** | | | | | | | | | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| **Static water level depth1 (ft)** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Measurement duration2 (hh:mm)** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Sample depth3 (ft)** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Sampling method4** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

1 Describe in Section 6 the methods used to measure water levels in borings.

2 Indicate the elapsed time between soil boring completion and measurement of the static water level.

3 Indicate the screened interval depth.

4 Refer to [Groundwater sample collection and analysis procedures](https://www.pca.state.mn.us/sites/default/files/c-prp4-05.pdf) for acceptable groundwater sampling methods.

**Notes:**

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| Table 7  Analytical results of water samples collected from borings1 | | | | | | | | | | | | | |
| **Boring ID** | **Sample date** | **Sample depth (ft)** | **Benzene** | **Toluene** | **Ethyl- benzene** | **Xylenes** | **MTBE** | **1,2,4-Trimethyl-benzene** | **1,3,5-Trimethyl-benzene** | **Naph-thalene** | **GRO** | **DRO** | **Lab Type2** |
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| HRL3 |  |  |  |  |  |  |  |  |  |  |  |  |  |

1 Report results in µg/L. Use less than symbols to show the report level.

2 Indicate “mobile” or “fixed” in the lab type column.

3 See the Minnesota Department of Health (MDH) website at <http://www.health.state.mn.us/divs/eh/risk/guidance/gw/table.html> for a list of current HRLs.

**Notes:**

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| Table 8  Other contaminants detected in water samples collected from borings (petroleum or non-petroleum derived)1 | | | | | | | | | | | | | |
| **Boring ID** | **Sample date** | **Sample depth (ft)** | **1,2-Dichloro-ethane** | **1,2-Dibromo-ethane** |  |  |  |  |  |  |  |  | **Lab Type2** |
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| HRL3 |  |  |  |  |  |  |  |  |  |  |  |  |  |

1 Report results in µg/L. Use less than symbols to show the report level.

2 Indicate “mobile” or “fixed” in the lab type column.

3 See the MDH website at <http://www.health.state.mn.us/divs/eh/risk/guidance/gw/table.html> for a list of current HRLs.

**Notes:**

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| Table 9  Monitoring well completion and location information1 | | | | | | | | | | | |
| **Well number** | **MDH unique well number** | **Well location2** | | **Date installed** | **Surface elevation  (ft amsl)4** | **Top of riser**  **elevation  (ft amsl)4** | **Bottom**  **of well**  **elevation  (ft amsl)4** | **Depth to top of screen from surface (ft)** | **Depth to bottom of screen from surface (ft)** | **Screen slot size (inches)** | **Well stickup (ft)5** |
| **X Coordinate3** | **Y Coordinate3** |
| *Ex 1* | *123456* | *123456* | *1234567* | *1/1/17* | *1023.6* | *1025.6* | *1003.6* | *10* | *20* | *0.01* | *2* |
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1 Include well construction diagrams and MDH well logs in Section 6.

2 Well locations should preferably be provided in Universal Transverse Mercator (UTM) coordinates (meters) to the nearest meter, but geographic coordinates (Lat-Long) are acceptable using decimal degrees with precision to six decimal places.Refer to [Spatial data collection at petroleum remediation sites](https://www.pca.state.mn.us/sites/default/files/c-prp1-03.pdf) for more information.

3 X Coordinate is the easting coordinate and the Y Coordinate is the northing coordinate. The method of obtaining the coordinates must be indicated in the table footnotes; for example: classical surveying, GPS, map interpolation, photo interpolation, or other interpolation.

4 The method of obtaining the elevation must be indicated in the table footnotes; for example: classical surveying, GPS (indicate equipment type). AMSL stands for above mean sea level.

5 If the top of riser is below grade (at-grade well), indicate the well stickup as a negative value.

**Notes:** (location and elevation of benchmark, coordinate collection method, elevation collection method)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Table 10  Water level measurements in wells1 | | | | | | |
| **Well number** | **Sample date** | **Depth to water from top of riser** | **LNAPL thickness (ft)** | **Depth to water below grade** | **Relative groundwater elevation** | **Water level above screen (Y/N)** |
| MW-1 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| MW-2 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| MW-3 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

1 Describe in Section 6 the methods used to measure water levels.

**Notes:**

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| Table 11  Analytical results of water samples collected from wells1 | | | | | | | | | | | | |
| **Well number** | **Sample date** | **Benzene** | **Toluene** | **Ethyl-benzene** | **Xylenes** | **MTBE** | **1,2,4-Trimethyl-benzene** | **1,3,5-Trimethyl-benzene** | **Naph-thalene** | **GRO** | **DRO** | **Lab Type2** |
| MW-1 |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| MW-2 |  |  |  |  |  |  |  |  |  |  |  |  |
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| MW-3 |  |  |  |  |  |  |  |  |  |  |  |  |
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| MW-4 |  |  |  |  |  |  |  |  |  |  |  |  |
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| Lab Blank |  |  |  |  |  |  |  |  |  |  |  |  |
| HRL3 |  |  |  |  |  |  |  |  |  |  |  |  |

1 Report results in µg/L. Use less than symbols to show the report level.

2 Indicate “mobile” or “fixed” in the lab type column.

3 See the MDH website at <http://www.health.state.mn.us/divs/eh/risk/guidance/gw/table.html> for a list of current HRLs.

**Notes:**

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| Table 12  Other contaminants detected in water samples collected from wells (petroleum or non-petroleum derived)1 | | | | | | | | | | | | |
| **Well number** | **Sample date** | **1,2-Dichloro-ethane** | **1,2-Dibromo-ethane** |  |  |  |  |  |  |  |  | **Lab Type2** |
| MW-1 |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| MW-2 |  |  |  |  |  |  |  |  |  |  |  |  |
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| MW-3 |  |  |  |  |  |  |  |  |  |  |  |  |
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| MW-4 |  |  |  |  |  |  |  |  |  |  |  |  |
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| HRL3 |  |  |  |  |  |  |  |  |  |  |  |  |

1 Report results in µg/L. Use less than symbols to show the report level.

2 Indicate “mobile” or “fixed” in the lab type column.

3 See the MDH website at <http://www.health.state.mn.us/divs/eh/risk/guidance/gw/table.html> for a list of current HRLs.

**Notes:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table 13  Field parameters and natural biodegradationparameters | | | | | | | | | |
| **Well number** | **Sample date** | **Specific conductance** | **Temp. °C** | **pH** | **Dissolved oxygen (mg/L)** | **Redox potential** | **Nitrate (mg/L)** | **(Fe II) (mg/L)** | **(H2S, HS-) (mg/L)** |
| MW-1 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| MW-2 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| MW-3 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| MW-4 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

Describe in Section 6 the methods and procedures used.

**Notes:**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table 14  Light non-aqueous phase liquid (LNAPL) recovery | | | | | | | | | | | |
| **Recovery location**  **ID** | **Recovery date** | **Pre-recovery measurements** | | | | **Recovery method** | **Event recovery2** | | **Cumulative recovery3** | | **Comments** |
| **Depth to LNAPL**  **(ft)** | **Depth to GW1**  **(ft)** | **LNAPL thickness**  **(ft)** | **LNAPL volume**  **(gal)** | **LNAPL**  **(gal)** | **GW**  **(gal)** | **LNAPL**  **(gal)** | **GW**  **(gal)** |
| MW-1 |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| MW-2 |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| MW-3 |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| MW-4 |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |

1 GW = Groundwater

2 Volume recovered during individual recovery event for that location.

3 Cumulative volume recovered at each recovery location (i.e., keep a running total for each recovery point).

Describe in Section 6 the methods and procedures used.

**Notes:**

| Table 15  Properties located within 500 feet of the release source | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Distance from release source**  **(ft)** | **Water supply well** | | | **Public water supply** | | **Base-ment (Y/N)** | **Sump**  **(Y/N)** | **Possible petroleum sources (Y/N)** | **Comments (including property use)** |
| **Prop ID1** | **Property address** | **Well present (Y/N)** | **How determined2** | **Well use3** | **Utilized (Y/N)** | **Confirmed**  **by city**  **(Y/N)** |
| 1 |  |  |  |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |  |  |  |  |  |
| 9 |  |  |  |  |  |  |  |  |  |  |  |
| 10 |  |  |  |  |  |  |  |  |  |  |  |
| 11 |  |  |  |  |  |  |  |  |  |  |  |
| 12 |  |  |  |  |  |  |  |  |  |  |  |
| 13 |  |  |  |  |  |  |  |  |  |  |  |
| 14 |  |  |  |  |  |  |  |  |  |  |  |
| 15 |  |  |  |  |  |  |  |  |  |  |  |
| 16 |  |  |  |  |  |  |  |  |  |  |  |
| 17 |  |  |  |  |  |  |  |  |  |  |  |
| 18 |  |  |  |  |  |  |  |  |  |  |  |
| 19 |  |  |  |  |  |  |  |  |  |  |  |
| 20 |  |  |  |  |  |  |  |  |  |  |  |

1 Property IDs should correspond to labeled properties on the receptor map in Section 4.

2 The first attempt at contact should be in person. If personal contact is unsuccessful, follow up with visual observation, telephone, returned postcard, no returned postcard.

3 For example, domestic, industrial, municipal, livestock, lawn/gardening, irrigation.

**Notes:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table 16  Water supply wells located within 500 feet of the release source and municipal or industrial wells within one-half mile | | | | | | | | | |
| **Property ID1** | **MDH unique well number** | **Surface elevation** | **Total depth (ft)** | **Base of casing (ft)** | **Static elevation** | **Aquifer** | **Use** | **Owner** | **Distance and direction from source**  **(ft)** |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
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1 Property IDs should correspond to properties listed in Table 15 and labeled properties on the receptor map in Section 4 if known or applicable.

**Notes:**

|  |  |  |  |
| --- | --- | --- | --- |
| Table 17  Surface water receptor information | | | |
| **Map ID1** | **Name and type2** | **Distance and direction from plume edge**  **(ft)** | **Clean boring/well between?3**  **(Y or N)** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
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1 Map ID should correspond to a surface water receptor ID on the surface water map (Figure 13).

2 Type includes, but is not limited to, lake, retention pond, infiltration pond, ditch, intermittent stream, river, creek, rain garden, etc.

3 If the surface water receptor is upgradient or cross-gradient from the site, indicate so with “NA” for not applicable.

**Notes:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table 18  Utility receptor information | | | | | | | | |
| **Utility ID1** | **Description** | **Construction material** | **Depth to top of structure** | **Diameter** | **Flow direction (for liquids)** | **Year installed** | **Backfill material** | **Distance to water table** |
| *Ex 1* | *Sanitary sewer main between Main St and 1st Ave* | *PVC* | *7 ft* | *2 ft* | *West* | *1984* | *Sand* | *Top of structure at water table* |
| *Ex 2* | *Water main between Main St and 1st Ave* | *Polyethylene* | *8 ft* | *4 in* | *West* | *1996* | *Sand* | *1 ft below water table* |
| *Ex 3* | *On-site water service line* | *Copper* | *6 ft* | *2 in* | *South* | *1980* | *Native soils* | *1 ft above water table* |
| 1 |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |  |  |
| 9 |  |  |  |  |  |  |  |  |
| 10 |  |  |  |  |  |  |  |  |

1 ID should correspond to an identified utility line on the receptor map (Figure 11).

**Notes:**

|  |  |
| --- | --- |
| **Utility ID1** | **Name, title, and telephone number for public entity contacted to obtain information or other source of information** |
| *Ex 1, 2* | *Mary Smith, City Engineer, XXX-XXX-XXXX* |
| *Ex 3* | *Site owner* |
|  |  |
|  |  |

1 IDs should correspond to the same IDs in the above table.

**Notes:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Table 19  Vapor survey results | | | | |
| **Location ID1** | **Description2** | **Monitoring date** | **PID reading**  **(ppmv)** | **Percent of the LEL3** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
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1 Location IDs must match labeled locations on the vapor survey map (Figure 14).

2 Provide a brief description of the monitoring point (e.g., sump, basement corner, sanitary sewer manhole, storm sewer basin, etc.). If sampling at multiple depths at the same location, indicate the sampling depth in the Description field.

3 LEL = Lower Explosive Limit.

**Notes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table 20  Results of soil gas sampling for vapor intrusion screening1 | | | | | | | | | | | | | |
| **Sample ID2** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Sample date** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Sample depth (feet)** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **PID reading (ppmv)** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Compounds** |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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1 Report results in µg/m3. Use less than symbols to show report level. Bold or highlight results that exceed a vapor intrusion screening value. The intrusion screening values can be found on the MPCA’s [Cleanup guidance](https://www.pca.state.mn.us/waste/cleanup-guidance) webpage.

2 Sample IDs should correspond to labeled locations on the vapor intrusion assessment map (Figure 15).

**Notes:**

Section 6: Appendices

Attach all required or applicable appendices in the following order. Indicate appendices included in this report by marking the check box. All reproduced data must be legible.

|  |  |  |
| --- | --- | --- |
|  | *Appendix A* | [Light non-aqueous phase liquid recovery report](https://www.pca.state.mn.us/sites/default/files/c-prp2-03.doc) |
|  | *Appendix B* | [Release information worksheet](https://www.pca.state.mn.us/sites/default/files/c-prp2-05.doc) is required if the [General excavation report worksheet](https://www.pca.state.mn.us/sites/default/files/c-prp3-02.doc) is not included in Appendix C. |
|  | *Appendix C* | [General excavation report worksheet](https://www.pca.state.mn.us/sites/default/files/c-prp3-02.doc) |
|  | *Appendix D* | If documentation from other reports such as a Phase I or Phase II will be used as part of the site recommendation or site conceptual model, include the specific applicable pages of the report(s) in Appendix D. If entire report is required, the MPCA project manager will request that separately. |
|  | *Appendix E* | Geologic logs of soil borings, including construction diagrams of temporary and permanent wells and copies of the Minnesota Department of Health well record. Record on the boring log the amount of time the boring was left open to allow measurement of the water level. |
|  | *Appendix F* | Laboratory analytical reports for soil, soil gas/sub-slab vapor/indoor air/ambient air, and groundwater. Include laboratory QA/QC data, chromatograms, and laboratory certification number. Include pre and post analytical results if DRO silica cleanup was performed. |
|  | *Appendix G* | Methodologies and procedures, including field screening of soil, other field analyses, soil boring, soil sampling, soil gas/sub-slab/indoor air/ambient air sampling, vapor monitoring, well installation, and water sampling. |
|  | *Appendix H* | Field or sampling data forms (sampling forms, field crew notes, etc.), and equipment calibration sheets |
|  | *Appendix I* | Grain-size analysis, hydraulic conductivity measurements, and other calculations. |
|  | *Appendix J* | Documentation of the sensitive groundwater conditions assessment, including the supplemental karst RI investigation if applicable. |
|  | *Appendix K* | Copies of water supply well logs with legible unique numbers. |
|  | *Appendix L* | [Conceptual corrective action design (CCAD) report](https://www.pca.state.mn.us/sites/default/files/c-prp7-02.dot) |
|  | *Appendix M* | Copies of site photographs, if available. |
|  | *Appendix N* | Documentation of soil disposal if not included in [General excavation report worksheet](https://www.pca.state.mn.us/sites/default/files/c-prp3-02.doc). |
|  | *Appendix O* | [Field work notification](https://www.pca.state.mn.us/waste/field-work-notifications) copy of record(s) from MPCA’s [e-Services](https://www.pca.state.mn.us/data/e-services). |
|  | *Appendix P* | Documentation of EQuIS electronic data deliverables (EDDs) submission to the MPCA. See the MPCA’s [EQuIS](https://www.pca.state.mn.us/data/environmental-quality-information-system-equis) website for more details. |