
SITE CONCEPTUAL MODEL

Good site assessment reports serve as a site conceptual model (SCM). However, many reports submitted to GPP staff are simply data dumps that do not update our understanding of the extent, stability, and impact of the contamination on public health and the environment. In this case, GPP staff may require submittal of a stand alone SCM.

A SCM integrates and interprets all data obtained to date to increase our understanding of the extent, stability, and impact of the contamination on public health and the environment. The SCM will contain the following sections: 1) introduction, 2) summary of previous work, 3) evaluation of the extent (lateral and vertical) and stability of the contamination, 4) assessment of the impact of the residual contamination on public health and the environment, and 5) recommended cleanup concentrations.

Section 1 of the SCM should contain introductory material describing the site and surrounding area, geologic setting, and hydrologic setting. The site and area description subsection should describe site location and elevation; indicate the San Mateo County Assessor's Parcel Number; summarize the existing, former, and surrounding land use; and identify the former and existing contaminant storage and dispensing facilities, including their use and release history. Geologic setting should discuss soil texture and stratigraphy based on boring logs and geological maps and discuss structures that may influence contaminant extent (e.g. dipping beds). The hydrologic setting should identify the nearest surface water bodies; identify groundwater basin, beneficial uses (RWQCB Basin Plan), occurrence (e.g. confined versus unconfined), and flow (gradient direction and vertical component to flow); discuss the potential interconnectedness of aquifers; and summarize the results of any groundwater quality testing (e.g. total dissolved solids).

Section 2 of the SCM should summarize contaminant release history and all environmental work performed to date to assess and remediate the contamination, evaluate risk to public health and environment, and evaluate the feasibility of using various cleanup technologies. The goal of this section is to provide a road map of major actions, identify the major conclusions of each phase of work, and reference the reports containing the details. This section should not restate the minutia of each past report, restate laboratory results for each sample, or be a cut-and-paste assemblage of past report text. The text of this section should be concise and focused.

Section 3 of the SCM should discuss the lateral and vertical extent and stability of the contamination. This section should discuss the following: 1) the lateral and vertical extent of non-aqueous phase liquid (NAPL), 2) the lateral and vertical extent of the chemicals of concern in unsaturated zone soil; 3) the lateral and vertical extent of contaminants in saturated zone soil (smear zone); 4) the lateral and vertical extent of the chemicals of concern in groundwater; 5) the lateral and vertical extent of the chemicals of concern in subsurface vapor; and 6) the stability of the chemicals of concern in unsaturated zone soil, groundwater, and subsurface vapor. All conclusions regarding the adequacy of assessment and the stability of the contaminants must be justified.

Section 4 of the SCM should discuss potential contaminant sources, transport, and exposure pathways and identify which pathways pose a potential risk to public health and the environment. This section of the SCM should also identify which areas of the site and which media contain contaminants in concentrations exceeding residential use RWQCB Environmental Screening Levels. It is not acceptable to simply provide an ASTM figure with closed pathways crossed out. This section must also evaluate the potential of the contamination to migrate to identified receptors (justify a minimum time to impact the receptor if the contaminants are not stable). All conclusions regarding source areas, the transport and exposure pathways (including those deemed incomplete), and risk to public health and environment must be justified.

Please note, GPP staff require RPs to protect to a 10^{-6} residential use risk level, even in commercial areas, because the County cannot control the land use decisions made by municipalities (cities can rezone commercial areas to residential use). GPP staff will allow the RP to protect to 10^{-6} commercial risk if the RP agrees to execute a County approved deed restriction limiting the site's land use to commercial and non-sensitive purposes.

Section 5 of the SCM should propose and justify soil and groundwater cleanup concentrations and identify the target zone of remediation based on the extent and stability of the contamination and its potential impact to public health and the environment. Generally, it will not be possible to prepare this portion of the SCM until a significant amount of data has been collected and evaluated. However, appropriate remedial technology and testing cannot be cost-effectively selected until this information is established.

The SCM should include the following figures to support the text: 1) a scaled site vicinity map on a topographic map base; 2) a base 10 scaled area map showing surrounding land use within the limits of the dissolved-phase plume (minimum of 200 feet from the site); 3) a base 10 scaled site plan identifying the former and existing contaminant storage and dispensing facilities, property lines, streets, buildings, and the location of grab samples, borings, wells (including former wells), limits of previous excavation, and any other information necessary to evaluate site conditions; 4) a base 10 scaled plan identifying the location, type, and depth of subsurface conduits which may influence contaminant migration; 5) a base 10 scaled plan identifying the lateral extent of contaminants in unsaturated zone soil; 6) a base 10 scaled plan identifying the lateral extent of contaminants in saturated zone soil (smear zone); 7) a base 10 scaled plan identifying the lateral extent of NAPL; 8) a base 10 scaled plan identifying the lateral extent of dissolved-phase contaminants in each impacted zone; 9) a base 10 scaled map identifying the limits of the previous receptor survey and all receptors identified; and 10) cross-sections showing stratigraphy, borings, wells, soil sample locations, soil sample contaminant concentrations, depth to groundwater, lateral and vertical extent of any NAPL, and the lateral and vertical extent of contaminated soil, groundwater, and soil vapor. All plan figures must include a north arrow and all plan figures showing the extent of dissolved-phase contaminants must include a rose diagram showing the groundwater gradient direction measured over the last five years.

The SCM should also contain graphs plotting the following information: 1) depth to groundwater and the logarithm of the dissolved-phase contaminant concentration versus time for the more impacted wells and those along the direction of contaminant transport, 2) the logarithm of the

recent average dissolved-phase contaminant concentrations of the chemicals of concern versus distance along the axis of contaminant migration (refer to ASTM E-1943); 3) NAPL thickness and depth to groundwater in wells versus time; 4) cumulative recovery of contaminants from prior remediation (e.g. vapor extraction).

The SCM should also contain the following tables to support the text: 1) well gauging data collected to date, 2) laboratory results of soil sample analyses performed to date, 3) laboratory results of groundwater sample analyses performed to date, 4) laboratory results of vapor sampling analyses performed to date, and 5) remediation data collected to date (e.g. system operation and tracking data, manual recovery of NAPL). The gauging data table should identify the well, casing elevation, date of gauging measurement, depth to groundwater, depth to NAPL, NAPL thickness, and units of measurement. The laboratory results tables should identify the sample locality, depth (if a soil sample), date of collection, analyte concentrations, and units of measurement.