
5.0 Site Conceptual Model

This section summarizes the features of the Site including waste extent, geology and hydrogeology, and an initial assessment of the potential receptors that are at risk from the deposited waste material.

5.1 Waste Extent

The approximate extent of waste is depicted on Figures 9 and 10. The following paragraphs detail the information that was utilized in making the determinations. As noted below, the extent of waste has not been fully delineated.

Freeway Dump

The extent of waste material at the Dump appears to extend beyond the property boundaries in all directions. Test excavations were completed along the edges of the property during the most recent investigation, however, waste material and/or ash were encountered at each of these locations extending to the property line.

Along the north and east edges of the property, the presence of waste material beyond the property boundary was anticipated as the elevated ground surface of the Dump above the adjacent wetland can be observed. The elevated ground surface extends approximately 100 feet north of the property boundary. There are three monitoring wells (installed during the 1997 MPCA investigation) located just to the north of the toe of the slope. Boring logs from these wells indicate no waste present, therefore the northern extent of the waste can be assumed to be located somewhere between the toe of the slope and these wells. Along the east edge of the elevated Dump surface, the slope is more gradual and where it contacts the wetland less easily identified. At one test excavation (FD-TT-06), completed along the east edge of the property near what appeared to be the bottom of the slope, waste material was observed extending below the groundwater elevation. Additionally, the boring log for OFMW-1, located farther to the east, indicate ash was encountered in the boring.

Neighboring the property to the south and southeast is a storage unit facility. Test excavations along the south property boundary encountered waste material. Additionally, the boring log from monitoring well MW97-6, located just south of the property boundary indicated the presence of waste material. A review of historical aerial photographs also give some insight into the extent of waste material in this area. Photographs from 1966 and 1967 indicate that operations were occurring as far south as where the storage facility is now located. The area to the southeast of the property corner also appears disturbed in the 1969 photograph. In addition, a representative of the storage facility mentioned that they had encountered waste material during previous construction activities. It can be assumed that the waste material and possibly ash extend beyond the Dump property boundary to the south and southeast.

Interstate 35W is located west of the Dump property. Three test excavations were placed along the west edge of the property and although no MSW/CD was present, ash was observed at all three locations. The Minnesota Department of Transportation (MnDOT) conducted a Phase II investigation in 2014 ([MnDOT, 2015](#)) and a supplemental investigation in 2018 ([MnDOT, 2018](#)) along the right-of-way corridor adjacent to the property. The logs from borings conducted between the Dump and the Interstate indicated the

presence of a greyish silt with fine-grained sand, which is similar to the description of the ash encountered during this investigation. Additionally, historical aerial photographs from 1964 and 1967 indicate that operations were occurring close to the edge of the highway. Although MSW/CD do not seem to extend beyond the Dump property boundary, it is assumed that ash may extend into the right-of-way of Interstate 35W.

Freeway Landfill

An assumed waste footprint was presented in the Investigation & Sampling Plan (MPCA, 2017) based on data from previous investigations. Along the west edge of the Landfill, the 2005 soil boring investigation delineated the extent of waste material with a transect of borings (No. 1 – 8) where no waste was observed. Along the south edge of the Landfill, the extent of waste material is defined by the bottom of the slope running along the property boundary. The extent of waste is also defined by the bottom of the slope along the east edge of the Landfill. This is supported in historical aerial imagery, where there does not appear to be disturbance beyond landfill slopes as they exist today.

During the 2018 investigation, test excavations were conducted along the north edge of the Landfill and in the southeast corner to gain a better understanding of the extent of waste in these areas (Figure 10). In the southeast corner, waste material was observed in FL-TT-08, which was located on the slope due to soft ground conditions beyond the toe of the slope. No waste material was identified in borings WT-7 or DP-8, located beyond the toe of the slope. Historical aerial photos do not show any disturbance in this corner of the Landfill, with the exception of an access road in the 1990s. It is likely that the waste material extends no further than the bottom of the slope, but the exact location of the extent has yet to be identified.

Along the north edge of the property, waste material was observed in test excavations FL-TT-01 to FL-TT-05. Historical aerial photos show ground disturbance in the area of the US Salt property. During utility locate activities for the 2018 investigation, personnel from US Salt mentioned waste material had been encountered during past construction activities. Extent of waste material is not known, but likely extends north of the Landfill property boundary. There is also debris visible on the southern bank of the Minnesota River, but it has not been determined if this is related to the waste in the Landfill or a separate placement of debris to stabilize the river bank.

Waste material was not observed at locations FL-TT-06 and FL-TT-07. These test excavations were completed beyond the slope of the elevated landfill (Figure 10). Historical aerial photos also do not show evidence of ground disturbance beyond the toe of the slope as is located currently. This also is additional confirmation that the extent of waste material along the east edge of the landfill is likely defined by the base of the slope.

Freeway Transfer Station

No waste material was observed at locations TS-SB-02 and TS-SB-07, which were completed inside the operations building. Waste material was observed at every other boring location surrounding the operations building that was completed during the 2018 investigation. Therefore, it appears likely that

waste material extends throughout the Transfer Station area, with the exception of directly under the buildings and, possibly, the weighing stations.

5.2 Geology

Subsurface conditions at the Dump, Landfill, and Transfer Station generally consist of a thin layer of top soil overlaying non-native fill material overlaying waste, overlaying native sediments and/or bedrock. A description of these layers and detailed investigation observations are included in [Section 4.0](#).

5.2.1 Freeway Dump

Waste material at the Dump, which includes MSW/CD and ash, was observed to be between 10 and 30 feet thick. The waste material was identified to contain concentrations of various constituents that exceed criteria as discussed in [Section 4.0](#). Fill materials at the Dump were observed on top of waste material. The waste material overlays native sediment and/or bedrock. Bedrock generally slopes downward to the north edge of the property towards the Minnesota River. Available information indicates no liner is present under the waste material.

Previous investigations describe the unconfined water table at the Dump as existing above and below the interface of the unconsolidated material and bedrock ([MPCA, 1992](#)). In some areas the groundwater is in contact with waste material. Groundwater samples collected during the 2018 investigation exhibited concentrations of various constituents that exceed drinking water and surface criteria as discussed in [Section 4.0](#).

5.2.2 Freeway Landfill

Waste material encountered at the Landfill consisted of MSW/CD, with a slightly higher percentage of construction debris compared to the Dump and Transfer Station. Waste material encountered during this investigation had an average thickness of 8.5 feet. Data from a 2005 investigation indicate that waste material was commonly observed between 15 and 25 feet thick in the center portion of the landfill, and was observed to be as much as 49 feet thick ([FES, 2005](#)). Fill materials were observed on top of waste material. The waste material overlays native sediment and/or bedrock. The uppermost bedrock beneath the Landfill is a sandy dolostone of the Prairie du Chien Group. The bedrock elevation is generally higher in the south, and slopes to the north towards the Minnesota River.

Similar to the Dump, concentrations of various constituents in soil, waste material, and groundwater samples collected at the Landfill exceeded criteria as discussed in [Section 4.0](#).

5.2.3 Freeway Transfer Station

Waste material at the Transfer Station consisted of MSW/CD and was present beneath cover fill soil at all locations with the exception of borings completed within the operations building, where fill material was observed from the ground surface to bedrock at approximately 25 feet bgs ([Figure 6E](#)). At boring locations outside of the building the waste material overlays native sediment and/or bedrock and was observed to be between 6 and 25 feet thick.

Similar to the Dump and Landfill, concentrations of various constituents in soil, waste material, and groundwater samples collected at the Transfer Station exceeded criteria as discussed in Section 4.0.

5.3 Hydrogeology

The Site is located in close proximity to the Minnesota River channel. The Minnesota River is a regional groundwater discharge zone. Wetlands are adjacent to the north and east sides of the Dump. The Black Dog Preserve Calcareous Fen is to the east of the Dump. The water table in the vicinity of the Site is generally present in unconsolidated materials above the bedrock or in the uppermost bedrock. The waste in the dump is in contact with the bedrock and water table in some areas.

The uppermost bedrock beneath the site is the Prairie du Chien Group. Immediately below the Prairie du Chien is the Jordan Sandstone. The Prairie du Chien and Jordan are hydraulically interconnected and are the two most utilized and productive aquifers in the Twin Cities metropolitan area. Under natural conditions, groundwater in the Prairie du Chien and Jordan would discharge to the Minnesota River.

The Kraemer Mining and Materials quarry is located approximately 1,000 feet west of the Dump and immediately south and southwest of the Landfill. The resource being mined in the quarry is the Prairie du Chien. Dewatering in the quarry likely captures groundwater in the Prairie du Chien beneath the site, depressing the water table from what it would be under natural conditions.

Neither the Dump nor the Landfill operated as lined facilities. Waste is directly in contact with groundwater in portions of the Dump site. Except for near the edges, waste is generally not in contact with groundwater at the Landfill, but models predict that condition will change when Kraemer Quarry operations end and the pumping is eliminated (Barr, 2015). Water was encountered within the waste materials on the Transfer Station property.

5.4 Potential Receptors

The presence of waste in unlined facilities has the potential for negative impacts on human health and the environment. The following paragraphs provide a preliminary summary of some of the receptors and pathways that may be affected by the presence of the waste materials, both under current and expected future scenarios.

Direct Contact Receptors

Freeway Dump currently operates as a recreational facility (golf driving range). On the south end is a gravel parking lot. The majority of the land surface is vegetated by grass. Along the east, north and west edges the vegetation includes scrubs and the south edge is wooded. Cover soil is present over the waste material, but was observed in some locations at thicknesses of less than one foot. A metal chain link fence runs along Interstate 35W and between the Dump and the storage facilities to the south. The site is accessible to pedestrian and vehicular traffic.

Freeway Landfill is similarly vegetated with grasses over the majority of the land surface and the edges of the property having scrubs or wooded vegetative cover. The Landfill is no longer operational, however

the Transfer Station is operational and access roads through the Landfill are utilized as well as lay-down areas in the northern portion of the Landfill. Cover soil is present over the waste material and was observed at thickness of 2 feet or greater. The site is also accessible to pedestrian and vehicular traffic.

Drinking Water Supply

The City of Burnsville utilizes a surface water feature within the Kraemer Quarry as a drinking water supply. The City also operates water supply wells that are open to the Jordan Sandstone and are located approximately one-third mile to the southeast of the Dump. Based on past investigations and modeling, the current flow of groundwater beneath the Dump is generally towards Kraemer Quarry. However, when pumping at the quarry stops, the City's pumping wells could draw groundwater from the Dump to the south in the direction of Burnsville's drinking water supply wells (MPCA, 1992).

Surface Water Receptors

Freeway Dump is bounded both to the north and east by a wetland which lies between the Dump and the Minnesota River. The Minnesota River is directly north of the Landfill. An intermittent water course that flows to the river runs along the east side of the Landfill. A majority of the Dump is elevated above the 100-year flood plain of the Minnesota River. The same is true of the Landfill with the exception of the northern area where test excavations were conducted during the 2018 investigation. When Kraemer Quarry stops pumping, the resulting lake may be an additional potential surface water receptor.

Vapor Receptors

Elevated methane concentrations were detected throughout all portions of the Site. Any current buildings, including the Transfer Station and the driving range office, may be exposed to methane or other landfill gases. Similarly, future buildings located near the Dump or Landfill may be potentially be exposed to elevated concentrations of landfill gases.