

Discussion Topics
Crossroads Landfill, Phase 14 – Hydrogeology Related Comments
April 30, 2020:

Topic 1: Concerns related to desiccation features in the Presumpscot Clay

Primary Related Comments:

- **Volume I: Comments 12d, 12e, 26b, 26d**
- **Volume III: Comment 9, Comment 16, Comment 17b, Comment 25**

MEDEP refers to potential “fractures”, “undetected fractures” and “through-going fractures” in the “clay” in the comments listed above. In some cases, MEDEP’s comments appear focused on the upper stiff clay (e.g., Volume III, Comment 17b). In other cases (e.g., Volume III, Comment 16), MEDEP’s comments appear to be more generally focused on the clay as a single unit (i.e., both the upper stiff clay and lower soft clay).

Please clarify whether MEDEP’s comments relate solely to the upper stiff clay or whether MEDEP is also of the opinion that desiccation features are potentially present in the lower soft clay.

Please clarify whether MEDEP’s comments are limited to areas where the soft lower clay is absent beneath Phase 14 footprint or do the comments also apply to areas underlain by both the stiff upper clay and soft lower clay.

Topic 2: Restrictive Siting Criteria, SWMR 401.1.C(3)(b) states that *“The area within the solid waste boundary must be located on soils that contain sufficient fines and clay-size particles to minimize infiltration of leachate. The in-situ soils must have an undisturbed hydraulic conductivity less than or equal 1×10^{-5} cm/sec”.*

Primary Related Comment:

- **Volume I: Comment 26d**

MEDEP identifies the results of two slug tests conducted at piezometer PZ-16M with hydraulic conductivity values (1.56×10^{-5} cm/sec and 1.87×10^{-5} cm/sec) just slightly above the restrictive siting criterion of 1.0×10^{-5} cm/sec and suggests that the restrictive criterion of SWMR 401.1.C(3)(b) is not met. PZ-16M is screened in the upper stiff clay, which is underlain by 5.5 feet of the lower soft clay. It is WMDSM’s opinion that there is ample evidence to support the conclusion that the hydraulic conductivity of the lower soft clay far exceeds the restrictive criterion of 1.0×10^{-5} cm/sec. Therefore, it is WMDSM’s opinion that the restrictive criterion of SWMR 401.1.C(3)(b) is met at the location of PZ-16M, irrespective of the representativeness of the PZ-16M slug testing results (WMDSM has previously questioned the representativeness of the PZ-16M slug test results). Does MEDEP concur with this interpretation?

Can MEDEP clarify how they evaluate measurement of “undisturbed hydraulic conductivity”? At the PIR stage, MEDEP indicated that this should be measured using slug tests, which measure horizontal hydraulic conductivity. Doesn’t the restrictive criteria focus on the need to limit infiltration of leachate, which would be controlled by vertical hydraulic conductivity? Shelby tube sampling and permeameter is the industry standard for evaluating the hydraulic conductivity of liner systems and have been used at the Crossroads facility for confirming undisturbed hydraulic conductivity during construction per MEDEP requirements (Appendix A, Chapter 401).

In any event, can this concern be resolved by “improving” the existing soils (e.g., scarification and re-compaction of the brown clay following sand removal) and/or placement of 1.0E-5 cm/sec material in the areas where the lower soft clay is absent to meet the restrictive criterion SWMR 401.1.C(3)(b)?

Topic 3: Time of Travel Analysis

Primary Related Comments:

Volume III: Comments 22, 23, 25, and 26

MEDEP has multiple comments on the time of travel calculations presented in Section 6.0. WMDSM would like to confirm MEDEP’s understanding of how the time of travel calculations were conducted and seeks MEDEP’s concurrence of the basis of the calculations before addressing specific MEDEP comments.

- Sensitive Receptors: MEDEP requests that “fractured bedrock aquifers” be identified as a sensitive receptor (Comment 21). WMDSM identifies the New Office Well (a bedrock water supply well) as the closest potentially downgradient water supply well and as potential sensitive receptor for the purpose of the time-of-travel calculations. WMDSM considers the “New Office Well” to be the “fractured bedrock aquifer” sensitive receptor in the assessment of whether Phase 14 poses an unreasonable threat to sensitive receptors. Does MEDEP concur with this approach?
- MEDEP indicates that it does not agree with the use of mean values of hydraulic conductivity (K) for assessing time of travel and indicates that use of the highest K values is more appropriate. In addition, MEDEP suggests that “transport through the clay may be reduced to years in the presence of through-going fractures”. WMDSM believes that it is reasonable to use average values, which more accurately reflect values along an extended pathway. However, if WMDSM performed a sensitivity analysis of the time-of-travel input parameters to further quantify a range of potential travel times, including more rapid flow through the clay units, would this be acceptable to MEDEP?
- WMDSM identified the sumps on the western/southwestern side of the five landfill cells as theoretical release points for time-of-travel calculations. The sumps represent locations where leachate could theoretically accumulate and create a hydraulic head on the liner for a leachate release and are located on the downgradient side of the landfill cells, and therefore conservatively represent the shortest pathway to downgradient potential sensitive receptors. Does MEDEP concur that is appropriate to use the location of the sumps as the theoretical release points for the time-of-travel calculations, notwithstanding other MEDEP concerns regarding the travel time calculations?