42. *Please provide a plot of the estimated groundwater level superimposed on the base of liner level (top of liner less liner thickness). This is required to demonstrate separation of groundwater to the base of liner, and the need or not for a subsoil drainage system in the new lined extension. Elevated groundwater could impact liner construction and potentially damage the liner system if the groundwater level is above base of the liner.*

    Response:

    WSP proposes to take an adaptative management approach; following completion of the excavation for the proposed landfill extension, groundwater levels will be reviewed (drawing on a longer record of water level recordings) and a decision made as to what, if any, measures need to be undertaken to ensure groundwater levels are kept below the liner.

43. *The groundwater report uses an assumed maximum leachate leakage rate of 0.1 mm/year. This equates to an estimated leak rate of 2.7 l/ha/day, with the site being 3.23 ha, a total leak rate of 8.8 l/day. In terms of expected leak rate, this does not appear to take account of the impact of liner wrinkles and measured leak rates from operational facilities described in the research literature. Please provide technical justification for this. Additionally, what construction quality assurance and control is proposed for the landfill liner material and installation, as this can have a significant impact on the expected leak rates?*

    Response:

    WSP has recalculated a leakage loss due to liner wrinkles. Using the equation set from Giroud and Wallace (2016) for liner defect leakage estimates, a hole diameter of 3.57 mm, 5 holes per hectare and wrinkle width vs height ratio, leachate leakage is recalculated to 119 l/ha/day, giving an estimated total leachate leakage due to wrinkles of 310 l/day or 113 m^3/year.

    When the liner design and source of soil material is confirmed, a site-specific construction quality assurance and control plan will be prepared as part of the construction documentation. This will be consistent with current practice for similar landfill liners in New Zealand. It is expected that the CQA Plan will be subject to the landfill peer review process, as is anticipated for the consent. In our view there is no need to provide detail on the CQA at this stage as it is not definitive of whether the landfill extension can proceed.