Works Approval
IWLTSF Stage 4
Supporting Document

28 March 25

BELLEVUE GOLD

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1. PROJECT DESCRIPTION

The Bellevue Gold Project (BGP) is owned and operated by Golden Spur Resources Pty Ltd (a wholly owned subsidiary of Bellevue Gold Limited (BGL)). Bellevue is listed on the Australian Stock Exchange as ASX:BGL.

The BGP is a historic gold mining operation located within Mineral Field 36 in the North-eastern Goldfields Region of WA, approximately 430 km north of Kalgoorlie-Boulder and 40 km north of Leinster, in the Northern Goldfields region, within the Shire of Leonora (Figure 1). The Project is adjacent to the Goldfields Highway which passes through the tenements to the west of the historic Bellevue Mine. Processing of gold recommenced at the BGP in October 2023 at the newly constructed Processing Plant.

An overview of the BGP tenure and the infrastructure in relation to this Works Approval application is presented in Figure 2. The Prescribed Premise boundary for this Works Approval is the current prescribed premise boundary of M36/24, M36/25 and M36/299 all of which are held by Golden Spur Resources Pty Ltd.

All compliance and regulatory requirements regarding this assessment document should be forwarded by e-mail, post or courier to the following address:

Proponent: Bellevue Gold Limited

[redacted]

2. PURPOSE

This document constitutes "Attachment 3B" of the Works Approval application and provides additional information to support the Works Approval application dated 28 March 2025.

3. SCOPE OF WORKS APPROVAL AND EXISTING APPROVALS

The BGP was previously mined by open cut and underground methods from 1988 to 1997. Approval under the *Mining Act 1978* for the consolidation of previous Mining Proposals was approved through the Department of Mines, Industry Regulation and Safety (DMIRS) on the 28 May 2023, further iterations of this Mining Proposal have been approved with the latest version approved on 26 February 2025. An update to this version will be undertaken to include the latest tailings dam design.

BGP currently operates under Licence L9259/2020/1 for the following Prescribed Premises:

- Category 5: Processing or beneficiation of metallic or non-metallic ore: premises on which (a) metallic or non-metallic or is crushed, ground, milled or otherwise processed; or (b) tailings from metallic or non-metallic ore are reprocessed; or (c) tailings or residue from metallic or non-metallic ore are discharged into a containment cell or dam (50 000 tonnes or more per year).
- Category 6: Mine dewatering – premises on which water is extracted and discharged into the environment to allow mining of ore (50,000 tonnes or more per year).
- Category 52: Electric power generation.
- Category 54: Sewage Facility.
- Category 64: Class II or III putrescible landfill site.
- Category 70: Screening etc. of material.

This Works Approval application requests approval to construct the next stage of the Integrated Waste Landform TSF (IWLTSF), namely the IWLTSF Stage 4. The IWTLTSF Stage 4 in relation to the Prescribed Premise boundary is illustrated in Figure 2.

The proposed Prescribed Premises cateogry for this Works Approval is:

- Category 5: Processing or benefication of metallic or non-metallic ore; comprising crushing or grinding, or tailings storage or reprocessing (production or design capacity of 50,000 tonnes or more per year).

This Works Approval application support document describes the receiving environment and provides details on management of emissions and pollution control. Assessment of risks associated with this amendment demonstrates that emissions can be effectively managed to ensure there are no material impacts to sensitive receptors.

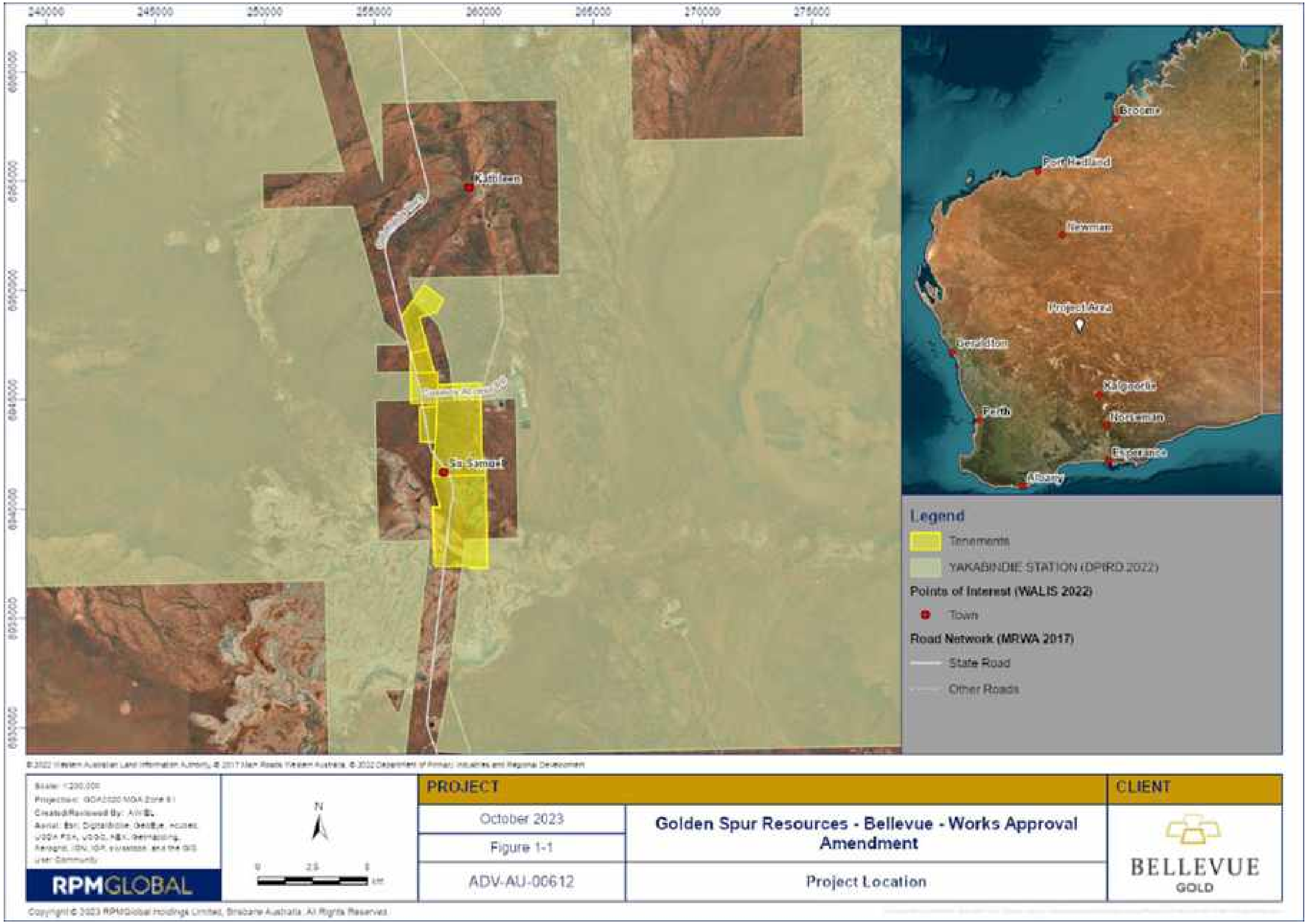


Figure 1: Project Location

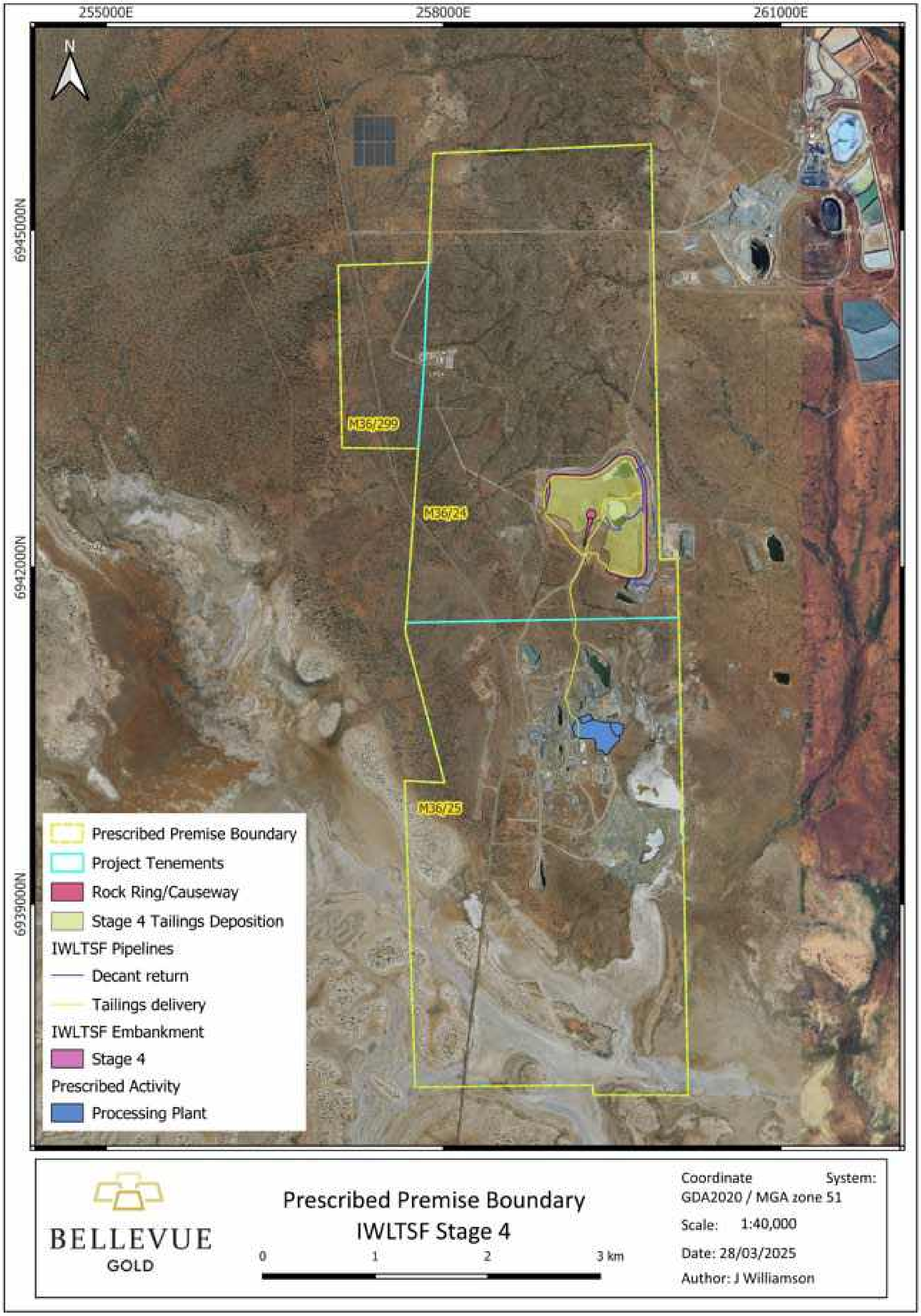


Figure 2: Prescribe Premises Boundary in Relation to the IWLTSF Stage 4

4. EXISTING ENVIRONMENT

4.1 Landscape

The Project is in the semi-arid North-Eastern Goldfields region of Western Australia, on the fringes of Lake Miranda. The Project lies within the East Murchison subregion of the Interim Biogeographic Regionalisation for Australia (IBRA) Murchison bioregion, defined by Cowan (2001):

"Internal drainage and extensive areas of elevated red desert sandplains with minimal dune development. Salt lake systems are associated with the occluded Paleodrainage system. Broad plains of red-brown soils and breakaway complexes as well as red sandplains are widespread. Vegetation is dominated by Mulga Woodlands often rich in ephemerals, hummock grasslands, saltbush shrublands and Halosarcia *shrublands."*

The Austin Botanical District in which the Project is located, is described by Beard (1990) as being typified by Mulga (*Acacia aneura*) woodlands on the plains, scrub and shrublands on hills and rises, Mulga and *Eremophila* shrublands on stony plains, and chenopod communities on duplex soils. Vegetation communities are strongly correlated with landforms and soils (Pringle et al., 1994; Beard 1990).

4.2 Climate

The Bellevue Gold Project is in an area characterised by a semi-arid climate, with warm to hot summers and cool to mild winters. The nearest Bureau of Meteorology (BOM) weather station to the Project is located 43 km south at Leinster Aero (Site Number 012314) (BOM, 2024). A summary of the climate data is provided in Figure 3.

The mean maximum temperature is 37.3°C in January and mean minimum temperature of 6.2°C in July (BOM, 2024). The average annual rainfall as recorded at Leinster Aero Station is approximately 245.2 mm with an average of 30.6 days of rain per year. Rainfall generally comes from locally generated thunderstorms (during winter) and dissipating tropical cyclones tracking southeast from the Pilbara coast (during summer). The highest average rainfall occurs in February with 39.9 mm and the lowest occurring in September with 4.1 mm (BOM, 2024).

Design storm events and the Probably Maximum Precipitation is discussed in the Resource Engineering Consultants (REC) Detailed Design Report (DDR) for the IWLTSF Stage 4 (Appendix A).

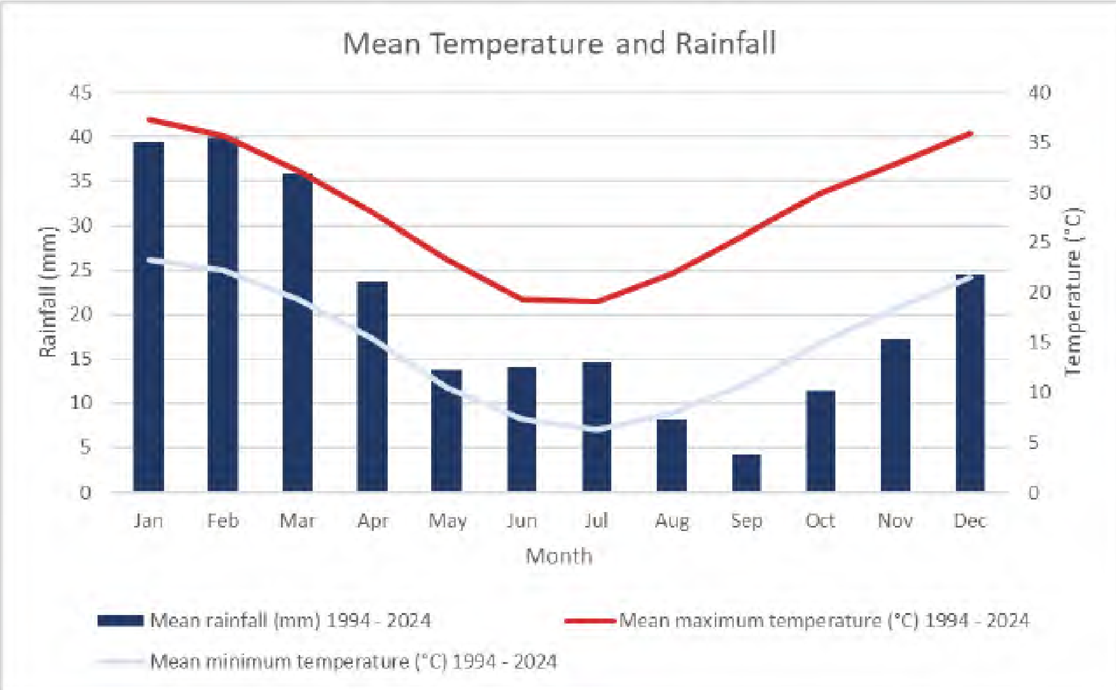


Figure 3: Leinster Aero (Site No. 012314) Climate Data BOM

4.3 Landforms and Soils

MBS Environmental (2021) identified several commonly occurring landforms across the greater Project area including:

- Greenstone Hills and ridges supporting *Acacia* and mixed chenopod shrublands;
- Undulating gravel plains with low stony rises and minor saline plains; supporting groved mulga, bowgada and chenopod shrublands;
- Salt lakes with fringing saline alluvial plains, kopi dunes and sandy banks; supporting halophytic shrublands and *Acacia* tall shrublands;
- Broad plains with mantle of ironstone gravel supporting mulga shrublands and grasses; and
- Sandplains supporting *Triodia* grasslands with mallees and *Acacia* shrubs.

The soil types identified within the Prescribed Premises area is described as a "Red Shallow Loam" which occurs commonly across the broader Project area. These loams occur over a shallow hardpan and are located over flat to gently sloping areas. Soils were typically covered with a dense cover of ferruginous and/or siliceous gravel and stony lag material.

4.4 Flora Species and Vegetation Communities

Two detailed flora surveys across the Project site covered 2,428.4 ha. RPS Australia West Pty Ltd (RPS) undertook five field surveys between August 2018 and October 2019. RPS Group (2020) identified a total of 345 vascular flora species across the Project area. There were no Threatened Flora species identified within the Project area; however Three Priority Flora species were identified:

- *Grevillea inconspicua* (Priority 4);
- *Hibiscus* sp. Perrinvale Station (Priority 3); and
- *Goodenia lyrata* (Priority 3).

A total of 19 vegetation communities were described across the Project area.

- H01 - Mulga spp. Isolated Trees to Low Open Woodland over *Acacia tetragonophylla*, *Eremophila galeata* and *Hakea preissii* Tall Sparse Shrubland over *Ptilotus obovatus* var. *obovatus* and mixed Chenopod Low Sparse Shrubland over *Aristida contorta* and *Enneapogon caerulescens* Sparse Tussock Grassland on stony plains and lower hill slopes
- H06: Mulga spp.and *Acacia doreta* (long phyllode form) Low Open Woodland with Isolated *Eremophila oldfieldii* subsp. *angustifolia* over *A. xanthocarpa* Tall Isolated Shrubs over *Eremophila exilifolia, E. forrestii* subsp. *forrestii* and *Senna artemesioides* Mid Sparse Shrubland over *Ptilotus obovatus* var. *obovatus* and *Maireana* spp. Low Sparse Shrubland over *Aristida contorta* Sparse Tussock Grassland on stony hill slopes, spurs and crests
- H07 - *Acacia doreta* (long phyllode form) Low Open Woodland over *A. xanthocarpa* Tall Sparse to Open Shrubland over *Senna* sp. *Meekatharra* and *S. artemisioides* subsp. *Helmsii* Mid Sparse Shrubland over *Ptilotus obovatus* var. *obovatus* Low Shrubland on stony hillslopes, spurs and crests
- H09 - Mulga spp. Low Open to Closed Forest over *Acacia xanthocarpa* Tall Sparse to Open Shrubland over *Eremophila exilifolia* and *Senna* spp. Mid to Low Open Shrubland over *Aristida contorta* Sparse to Open Tussock Grassland in drainage lines on stony hill slopes
- P02 - Mulga spp. Low Open Woodland to Isolated Trees over *Eremophila pantonii* and *E. galeata* Tall Open to Sparse Shrubland over *Senna* sp. Meekatharra Mid Open Shrubland over *Ptilotus obovatus* var. *obovatus* and mixed Chenopods Low Open to Sparse Shrubland over *Aristida contorta* Sparse Tussock Grassland in drainage lines on stony hardpan plains
- Cleared/Highly Modified: Highly modified and cleared areas devoid of native vegetation – includes roads, tracks, buildings, mining infrastructure, historical pits, processing areas and camps.

The Violet Range (Perseverence Greenstone) BIF Priority Ecological Community (PEC) occurs within the broader Project area. The majority of the PEC in the BGP is in a degraded state due to historical mining activities (NVS 2022). Activities related to the works approval amendment do not directly impact this area.

There are no Threatened Ecological Communities (TECs) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act), or the *Biodiversity Conservation Act 2016* (WA) (BC Act).

4.5 Fauna Species and Habitat

Bamford Consulting Ecologists Pty Ltd (Bamford) undertook a detailed terrestrial fauna and habitat assessment for the Project in 2018 and 2019. Bamford identified six Vegetation and Substrate Associations (VSAs) across the broader Project area to help describe the types of habitats available to local fauna species. The VSA’s recorded within the Prescribed Premises include:

- Long-leaf Mulga over shrubs and tussock grass on rocks and loam of undulating hills;
- Broad-leaf Mulga over shrubs and tussocks grass on sandy-loam plains;
- Isolated trees over open shrubland on gypsum soils close to Lake Miranda;
- Samphire marsh in loam clay on margins and across parts of Lake Miranda;
- Lake Miranda; and
- Degraded area.

A total of 110 vertebrate fauna species were observed within the broader Project area (Bamford Consulting Ecologists 2020) consisting of:

- 1 Amphibian;
- 32 Reptiles;
- 64 Birds; and
- 13 Mammals (9 native, 4 introduced).

Of these confirmed fauna species, five were identified as being species of conservation significance, including:

- Common Greenshank (*Tringa nebularia*) – Listed under the EPBC Act as Marine & Migratory
- Sharp-tailed Sandpiper (*Calidris acuminata*) – Listed under the EPBC Act as Marine & Migratory
- Sandplain worm-lizard (*Aprasia repens*) – Listed as a species of local significance
- Australian Bustard (*Ardeotis australis*) – Listed as a species of local significance
- Bush Stone-curlew (*Burhinus grallarius*) – Listed as a species of local significance

Several other species of conservation significance were identified as potentially occurring within the broader Project area (primarily migratory wetland birds); however, they were not identified during the survey program.

4.6 Subterranean Fauna

Invertebrate Solutions Pty Ltd (Invertebrate Solutions) undertook a preliminary subterranean fauna species and habitat assessment for the Project in 2021. The technical memorandum served as a preliminary assessment of records by the Western Australian Museum (WAM) and DBCA. Desktop results for stygofauna and troglofaunal records found in the vicinity of the BGP are limited to calcrete outcrops, including Miranda East and Miranda West calcretes. These habitats have not been identified in the Project area.

The absence of stygofauna records outside of calcrete geology in the Project area would suggest that stygofauna habitats are generally absent or present in low abundance. However, it is unknown what sampling intensity has previously been undertaken and the lack of records may be due to a scarcity of sampling. The groundwater within the BGP is almost saline to hypersaline with salinity ranging from 17,900 mg/L TDS up to 155,000 mg/L in Vanguard pit, further reducing the likelihood of stygofauna within local aquifers. Whilst stygofauna have occasionally been recorded in hypersaline groundwater, this has mostly been associated with aquifers at the edges of salt lakes. Most hypersaline waters have not been found to contain stygofauna. Core photos examined for the saturated zone confirm the general absence of suitable fracturing that provides interconnected void space in the rock strata that may provide a habitat for stygofauna (Invertebrate Solutions Pty Ltd, 2021).

Whilst overlaying colluvium, known as the Mesovoid Shallow Substratum, is virtually unsampled, it is increasingly known worldwide to contain troglobiont communities. However, the colluvium across the BGP is dominated by sand and soil, making it unlikely to contain troglofaunal in this area. Additionally, core photos examined for the unsaturated zone confirm the absence of suitable fracturing that provides interconnected void space in the rock strata that may provide a habitat for troglofauna (Invertebrate Solutions, 2021).

4.7 Hydrology

The broader Project area is situated on a gently undulating landscape which consists of minor ridges, undulating plains to the east and hills to the west and salt-lake features to the south (Lake Miranda). There are no wetlands or permanent surface water features on the site. All streams are ephemeral, driven by the erratic nature of rainfall in the region.

The existing open pits are aligned with the local topographical high of the greenstone belt, which also defines the top of the local surface water catchments in the area. Drainage near the site is generally to the south towards Lake Miranda (salt-lake with periodic inundation driven by seasonal rainfall events). East of the site lies a braided streambed with four major tributaries that converge at a point about 2 km east of the southernmost point of the site. Substantial surface run-off occurs following thunderstorms or cyclonic activity, resulting in intermittent and short duration surface water flows in the local drainage lines. Run-off rates during these large rainfall events are generally high.

2D food modelling determined that whilst the Project could be affected by a 1 in 100-year flood event, the predicted water velocities are typically non-destructive to earth structures and unlikely to impact the Project. Additional modelling was completed for a 1 in 500-year flood event to account for extreme rainfall events due to climate change. The assessment identified that flood extents would increase by up to 40 m laterally compared to the 1 in 100-year events. The Water Management Plan describes this type of flood event as very low and that the site topography naturally encourages water to flow away from the Project (RPS 2021).

The total catchment area for the proposed IWLTSF Stage 4 is estimated to be approximately 69.9 ha. This includes contributions from the upstream catchment area of 15.1 ha, which partially drains into the facility, and direct runoff from the tailings beach catchment area of 54.8 ha (REC, 2025). The combined rainfall runoff volume from these catchments is estimated to be approximately 0.64 Mm^3. The IWLTSF Stage 4 catchment area is illustrated in Figure 4.

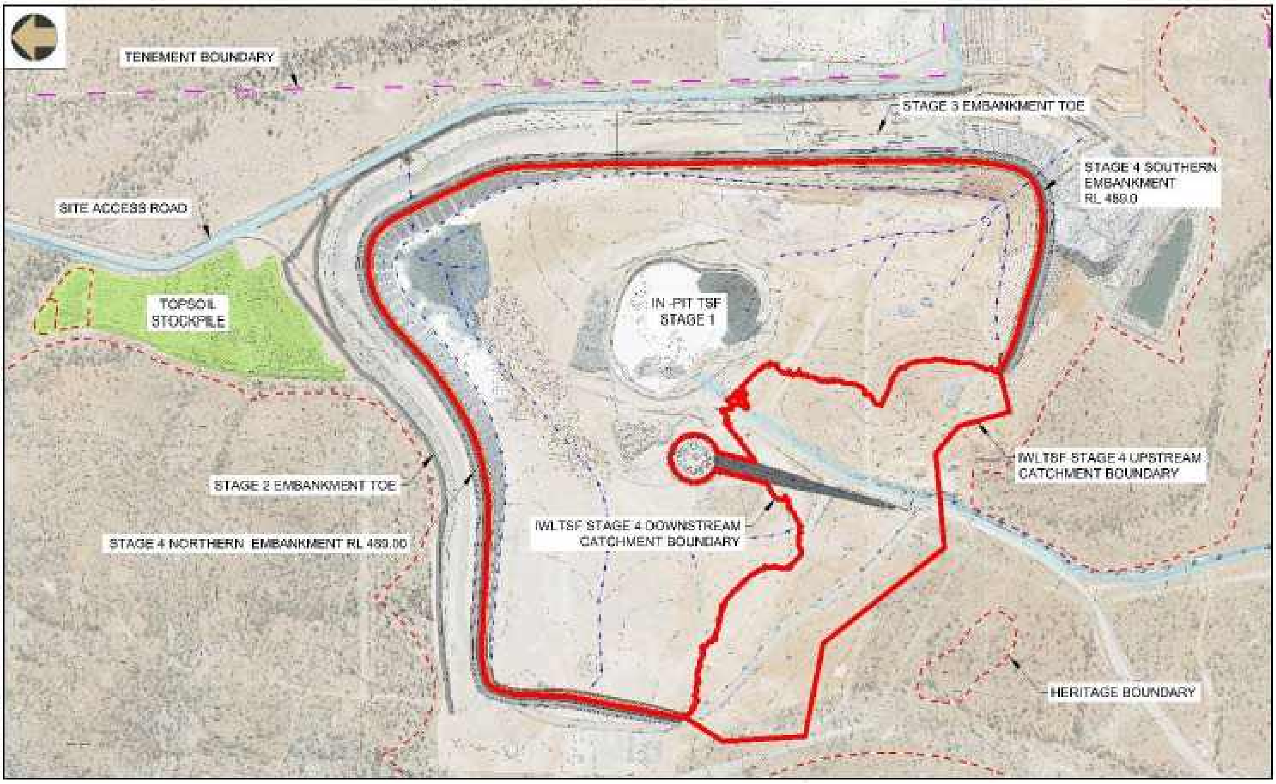


Figure 4: IWLTSF Stage 4 Total Catchment (REC, 2025)

4.8 Hydrogeology

The known paleochannel aquifer systems are to the south and east of the Project area. The main aquifer of relevance to mining and dewatering is the fractured-rock aquifer, which is comprised of greenstones, granitoids and minor intrusive rocks. The greenstone belt in the project area is aligned in a north to south orientation, with the associated faults and fracture sets also aligned in this direction. The fractured rock aquifer characterises the extents and degree of fracturing and the interconnectedness of such fractures along strike. Typically, such fractured rock aquifers are quite localised and low in groundwater storage. This preferred orientation for faulting also gives an asymmetry to the preferential flow paths for groundwater, with drawdown propagation expected to extend further along strike (north south), while being more limited across strike (east west).

The pre-mining groundwater levels at Bellevue range between 15 m to 30 m below ground level (mbgl), depending on topography, equivalent to about ~460 m above height datum (m AHD). The levels indicate arelatively flat groundwater gradient regionally towards the south, which is consistent with the regional groundwater flow direction following the major paleo-drainage lines. Groundwater is hypersaline with TDS in the range of 90,000 to 120,000 mg/L.

Groundwater within the Project area flows south from the mine area to the Lake. The lake acts as a groundwater sink where water is lost to the environment and salts concentrate. Water levels at the lake are typically far shallower than at the mine area at less than two meters below the surface (REC 2022).

Natural groundwater ingress to the current workings at Bellevue was originally believed to to be low, however following a hydrogeological investigation by the hydrogeology consultants SRK in 2023 underground water inflows were found to be much higher. The estimated seepage rate into the underground workings from the Henderson pit is between 23 and 24 L/s and for Westralia pit 2 to 3 L/s.

4.9 Social Setting and Cultural Heritage

4.9.1 Social Setting

A review of the environmental and social setting surrounding the greater BGP has guided the identification of potential sensitive receptors that have been considered when assessing this Project's risks and potential emissions. The relevant potential sensitive receptors identified include (Figure 5):

- Local flora, fauna and vegetation.
- Heritage sites outside the agreed development envelope.
- Yakabindie Pastoral Lease homestead approximately 10 km from the Project.
- Leinster townsite (located approximately 40 km to the south).
- Lake Miranda

Although not considered a sensitive receptor under the EP Act, BGL has also considered the potential for impacts at the Mining Administration Building and Accomodation Village.

4.9.2 Aboriginal Cultural Heritage

The BGP tenements are located within an area of high cultural heritage significance. Bellevue executed a Native Title Agreement (NTA) with Tjiwarl (Aboriginal Corporation) RNTBC (Tjiwarl AC) as the holder on trust for the Tjiwarl Native Title Holders, being the native title rights and interests' holders and traditional owners of the land, which hosts the BGP. The NTA ensures that important cultural and heritage considerations have been included in the surface design and layout of the Project, protecting sensitive areas and developing a co-designed Cultural Heritage Management Plan (CHMP) to manage future activities.

The Project area has been extensively and thoroughly surveyed for Aboriginal ethnographical and archaeological sites with registered sites shown in Table 1. In addition to the registered sites on the Aboriginal Heritage Inquiry System (AHIS) register, there are 13 sites which are lodged and are awaiting formal assessment before entry into the Register by the Registrar of Aboriginal Sites. Many of these sites have been mapped by the Department of Planning, Lands and Heritage (DPLH) with large extended boundaries and overlapping large polygons that do not reflect the actual location of the site and completely cover the Project area. As a result of consultation with the Aboriginal Consultation Group and additional heritage survey work, heritage sites' locations and cultural values within the Project area are well understood. BGL and TAC signed a Native Title Agreement in September 2022 of which a comprehensive CHMP formed a part. As a result of the consultation and cultural mapping that took place ahead of writing the CHMP all cultural heritage values were captured within the immediate project area and a process was defined that would lead to Bellevue and TAC agreeing to those areas where Bellevue would be permitted to expand its current extent.

Under the CHMP, Bellevue must provide Tjiwarl AC with copies of all approval applications sent to regulatory agencies. Accordingly, this application has been sent to Tjiwarl AC in parallel. Additionally, the CHMP requires Bellevue to obtain authorisation from Tjiwarl AC before it is permitted to complete any activities outside of activities already approved under the CHMP.

The Stage 4 IWLTSF as proposed in this document is within the scope of the CHMP, which states a specific total area of the IWLTSF of 92 ha and maximum heigh of approximately 23 m (~492 mRL) along the eastern embankment.

Table 1: AHIS Registered Aboriginal Sites

Tenement	Site ID	Legacy ID	Site Name	Site Type
M36/24	459	W02261	Sir Samuel Camp	Ceremonial, Camp
	38870	-	Wati Kutjarra Old Lore Ground	Ceremonial
	460	W02262	Mother's Camp	Historical
	22277	-	Violet Range 2	Mythological, Natural feature.
M36/25	464	W02262	Katatjuna	Ceremonial, Mythological
	819	W02164	Mitan	Ceremonial, Mythological, Water Source
	823	W02168	Ngunan	Artefact/Scatter, Ceremonial, Man-Made Structure, Mythological
	1200	W01966	Lake Miranda North	Artefacts/Scatter, Quarry
	1295	W01896	Matintjiti	Artefacts/Scatter, Ceremonial, Mythological
	1376	W01818	Yakabindie S./Pilkari Kutji	Mythological
	1377	W01819	Yakabindie S.E./Yulkapa	Mythological
M36/25 and M36/24	22183	-	Vanguard South Scatter 1	Artefacts/Scatter, Other: Grindstone
	1301	W01902	Lake Miranda (Katawill)	Ceremonial, Mythological, Plant Resource
	1304	W01905	Ingkatala	Artefacts/Scatter, Ceremonial, Man-Made Structure, Repository/Cache, Skeletal Material/Burial, Camp.

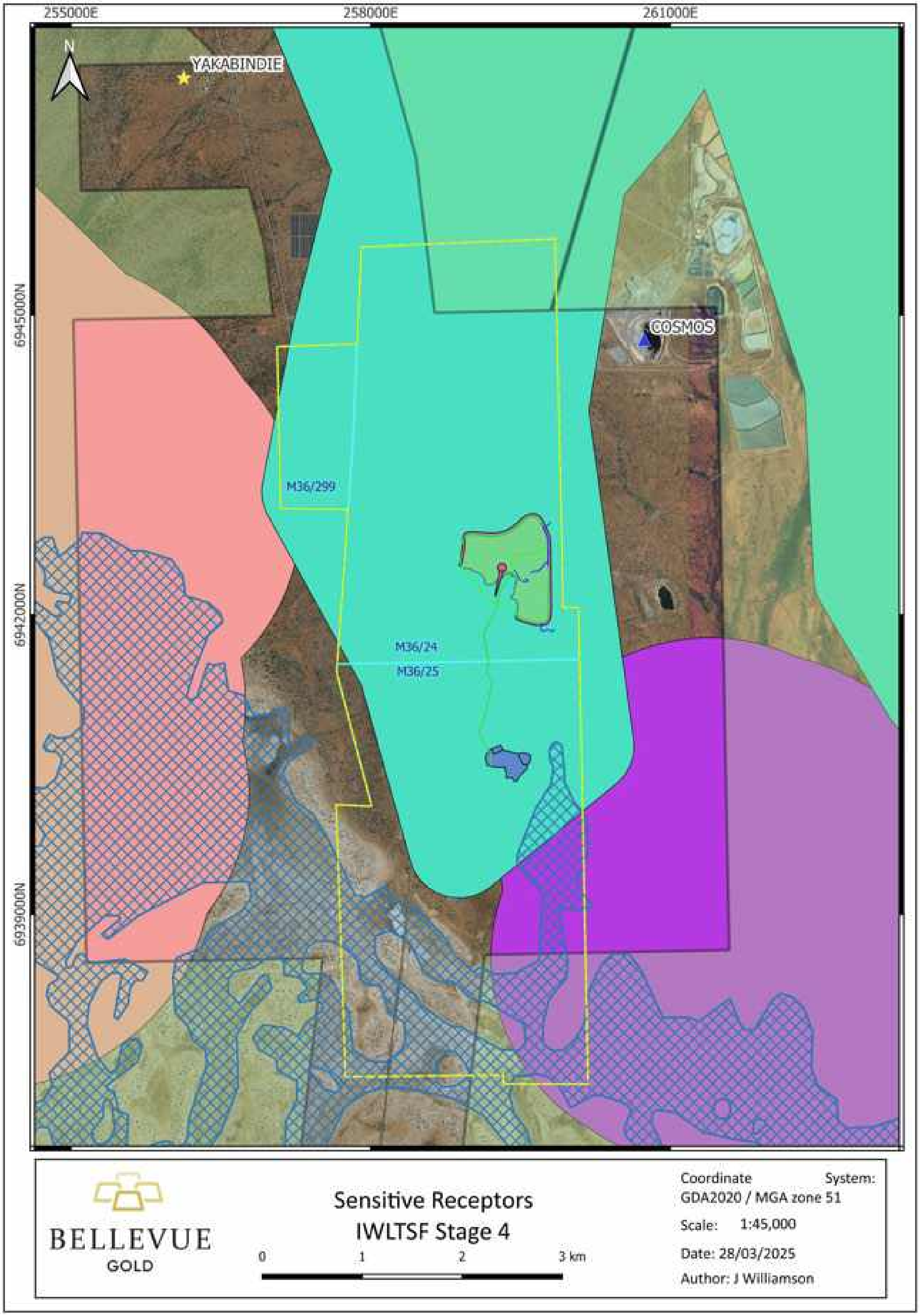
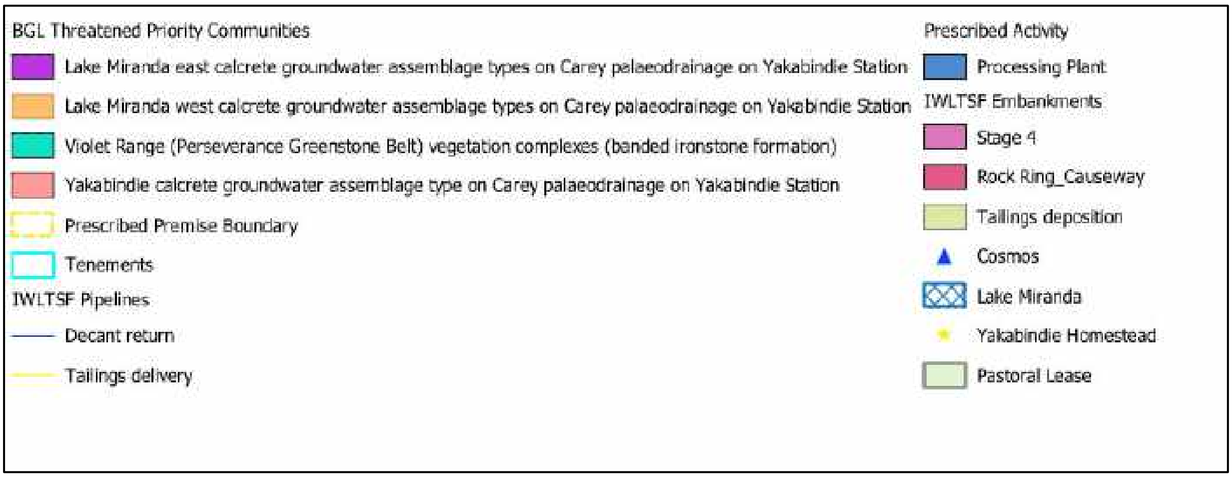


Figure 5: Sensitive Receptors in Relation to IWLTSF Stage 4


BGL Threatened Priority Communities
Lake Miranda east calcrete groundwater assemblage types on Carey palaeodrainage on Yakabindie Station
Lake Miranda west calcrete groundwater assemblage types on Carey palaeodrainage on Yakabindie Station
Violet Range (Perseverance Greenstone Belt) vegetation complexes (banded ironstone formation)
Yakabindie calcrete groundwater assemblage type on Carey palaeodrainage on Yakabindie Station
Prescribed Premise Boundary
Tenements
IWLTSF Pipelines
Decant return
Tailings delivery
Prescribed Activity
Processing Plant
IWLTSF Embankments
Stage 4
Rock Ring_Causeway
Tailings deposition
Cosmos
Lake Miranda
Yakabindie Homestead
Pastoral Lease

5. PROPOSED ACTIVITY – INTEGRATED WASTE LANDFORM TAILING STORAGE FACILITY STAGE 4

The following sections provide detail and design information for Stage 4 of the Integrated Waste Landform Tailings Storage Facilty (IWLTSF). The IWLTSF Stage 4 consists of two sections: Stage 4 North and Stage 4 South. Resource Engineering Consultants (REC) completed a Detailed Design Report (DDR) for the Stage 4 North and Stage 4 South IWLTSF, this is provided at Appendix A.

5.1 Background

Tailings is currently stored in the Vanguard in-pit Tailings Storage Facility (IPTSF) (Stage 1) and Stage 2 of the Integrated Waste Landform Tailings Storage Facility (IWLTSF). The IPTSF and the IWLTSF Stage 2 and Stage 3 were approved under Works Approval W6724/2022/1. The IPTSF has been transferred to the Prescribed Premise Licence L9259/2020/1 and the IWLTSF Stage 2 is currently in Time Limited Operations and in the process of being transferred to the site Prescribed Premise Licence. Construction of the IWLTSF Stage 3 was completed at the end of February with the Critical Containment Infrastructure Report submitted to the DWER on 12 March 2025, following approval of this report Stage 3 will also be in Time Limited Operations.

Stages 1 to 3 of the IWLTSF were designed to be constructed and operated sequentially. Stage 1 is the IPTSF which utilised the depleted Vanguard open pit. Stage 2 and 3 are starter embankments of the IWLTSF which encapsulate the IPTSF. Stage 2 provides containment to the north and northern portion of the eastern side of the storage basin, while Stage 3 forms the south and southern portion of the eastern side of the storage basin. The integrated Stage 2 and Stage 3 emankments provide a continous perimeter embankment around the north, east and south of the storage basin at an elevation RL 484.5 m.

To support continuous operation and tailings storage beyond 2026 (which is the current life of the IWLTSF Stage 3), the IWLTSF requires further expansion through the construction of proposed IWLTSF Stage 4 North and Stage 4 South raises (also described in this document as IWLTSF Stage 4).

5.2 TSF Design

To enable construction and continuation of tailings delivery, Stage 4 will be split into two sections; Stage 4 North (footprint in red outline - Figure 6) and Stage 4 South (footprint in green outline - Figure 6) embankment raise. The design of the IWLTSF Stage 4 North and Stage 4 South embankment raise has been developed to optimise storage capacity, maximise tailings densit, achieve water recovery in the range of 55% of the slurry water, reduce seepage and minimise the environmental and societal impact of the facility.

The Stage 4 North and Stage 4 South have been designed in a downstream embankment configuration with an embankment raise height of 4.5 m, increasing the IWLTSF elevation to RL 489 m.

The IWLTSF Stage 4 North and Stage 4 South embankments will be constructed using mine waste (Zone 3A and Zone 3B) sourced from underground mining waste, compacted in lifts through traffic compaction. Zone 3B will form the bulk of the downstream embankment and will be constructed in maximum 1.0m traffic-compacted lifts, followed by Zone 3A in maximum 0.5 m traffic compacted lifts. The upstream batter, Zone 3C will be constructed using transitional mine waste material sourced from the historic Vanguard waste dump and other suitable borrow pitstockpiles.

The embankment upstream face will incorporate a High Density Polyethylene (HDPE) liner, underlain by a suitable subgrade and Bidim A24 geotextile (or equivalent) to provide enhanced puncture protection. An anchor trench will be constructed at the crest and the HDPE liner will be keyed in for stability.

The Stage 4 embankment extension (Figure 6), extending across natural ground beyond the existing Stage 2 and Stage 3 embankments, will include a cutoff trench and toe drain that will integrate with the existing Stage 2 and Stage 3 cutoff trenches and underdrainage network. The HDPE liner in this section wiill be anchored at the bottom of the cutoff trench. The cutoff trench is proposed to be constructed with low permeability material from obtained from suitable laterite sources available across the site. The cutoff trench aims to intercept lateral seepage through and beneath the embankments (Figure 9).

The embankment geometrics are presented in Figure 7 to Figure 9 . The IWLTSF Stage 4 detailed deign drawings are included in the REC DDR in Appendix A.

ITWLTSF Stage 4 decant water recovery will be facilitated by the construction of a rock ring with access provided via a decant causeway extending from ridgeline to the south of the IWLTSF (Figure 6). The rock ring construction has been postponed from Stage 3 and repositioned from original design locations based on an updated understanding of the surrounding ground conditions and elevations identifed through removal of the nearby Vanguard pit waste dump.

Additionally, a buttress will be constructed at the downstream toe of the IWLTSF embankment located at the southeast corner of the facility, where the Stage 3 embankment has been built to a minimum 10.0 m crest width. This buttress is designed to reinforce the embankment. It will be constructed at an elevation of 468.0 m with a maximum height of 5.0 m.

Tailings deposition will be deposited using sub-aerial deposition techniques (as with Stage 2 and 3) from the perimeter embankments from multi spigot locations, the spigot intervals will be not less than 20 m and not more then 50 m.

IWLTSF Stage 4 North and Stage 4 South have been designed in accordance with the Australian National Committee on Large Dams (ANCOLD) Guidelines (ANCOLD, 2012), with a Dam Failure Consequence Category of ‘High C’ assigned to the facility. Similarly, an assessment based on the Department of Mines and Petroleum (DMP) Code of Practice (DMP 2013, Table 1) determined a ‘Medium’ hazard rating, while classification under Table 2 of the DMP Code of Practice (DMP 2013, Table 2) designates IWLTSF Stage 4 North and Stage 4 South as a ‘Category 1’ facility.

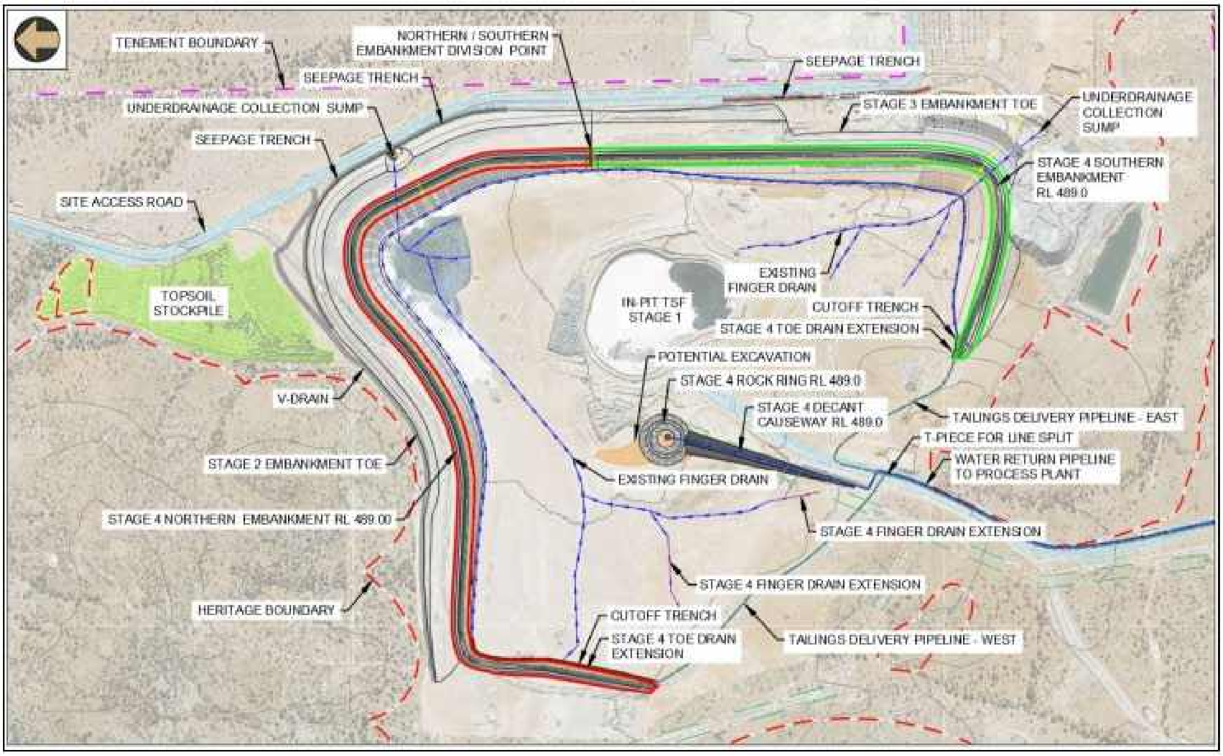


Figure 6: IWLTSF Stage 4 North and Stage 4 South General Arrangement (Plan) (REC, 2025)

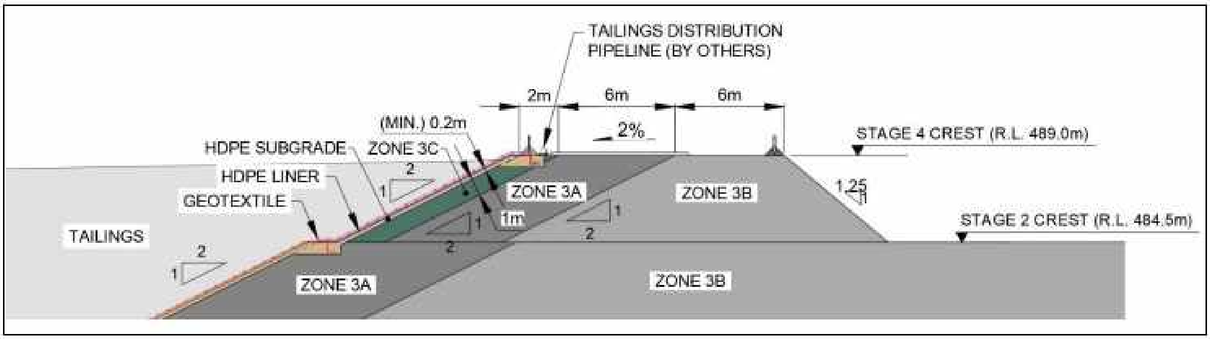


Figure 7:Typical Section IWLTSF Stage 4 North Embankment (REC, 2025)

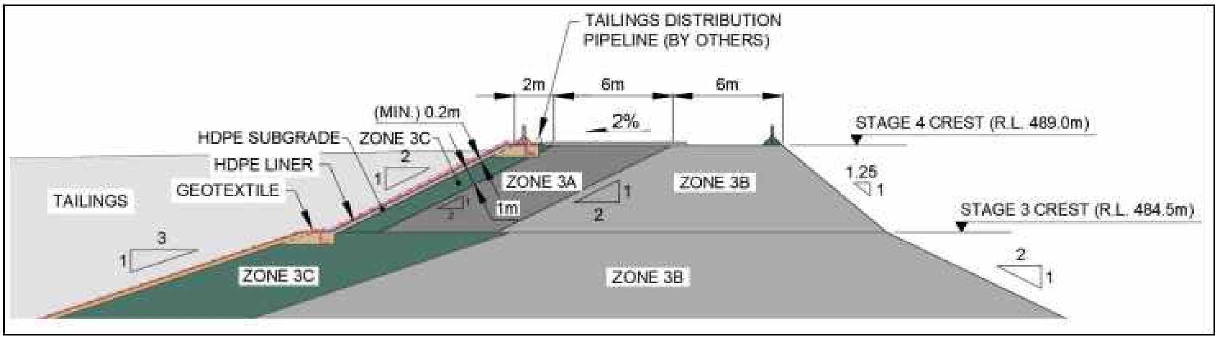


Figure 8: Typical Section IWLTSF Stage 4 South Embankment (REC, 2025)

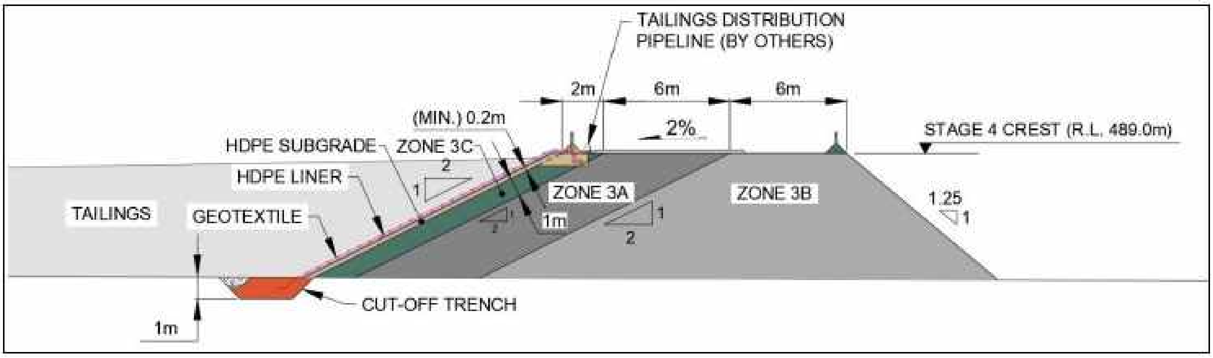


Figure 9: Typical Section IWLTSF Stage 4 Embankment Extension, including Cut-off Trench Configuration (REC, 2025)

5.3 Storage Capacity

The Stage 4 embankment is proposed to be constructed in two phases – Stage 4 North and Stage 4 South to ensure uninterrupted operations during construction. A deposition sequencing plan has been developed to facilitate the timely completion of Stage 4 construction while maintaining a centralized pond within the IWLTSF. The IWLTSF Stage 4, at an assumed dry density of 1.4 t/m^3, is projected to provide 2.11 Mm^3 of storage capacity for 2.95 Mt of tailings. The overall Stage 4 North and Stage 4 South storage capacities, along with their sequencing order, are summarised in Table 2.

Table 2: Design Storage Capacities and Sequencing Order Stage 4 (REC, 2025)

Parameter	Stage 4		
	North Intermediate	South Intermediate	Remaining North & South
Crest Elevation (m RL)	489.0	489.0	489.0
Crest Height (m)	27.0	27.0	27.0
Maximum Discharge Elevation (m RL)	486.2	486.2	488.7
Assumed Average Dry Density (t/m^3)	1.40	1.40	1.40
Storage Capacity (Mt)	0.64	0.55	1.76
Cumulative Tailings (Mt)	0.64	1.19	2.95
Storage Capacity (Mm^3)	0.46	0.39	1.26
Cumulative Capacity (Mm^3)	0.46	0.85	2.11
Stage Life (years)	0.4	0.3	1.1
TSF Cumulative Life (years)	0.4	0.7	1.8
Stage Average Rate of Rise (m/y)	12.7	10.3	3.4

5.4 Tailings Materials Characterisation

Tailings samples representing each of the four lodes and one ore sample (Tribune lode) were assessed by MBS (2021) and were classified as Potentially Acid Forming (PAF). These findings are consistent with the percent levels of pyrrhotite (iron sulfide) identified in ore and tailings.

All tailings samples were enriched in copper; molybdenum and tellurium, whilst individual ore and tailings samples were enriched in bismuth, rhenium, selenium, and tungsten. These enrichments reflect those of the waste rock and the BGP mineralisation.

Further kinetic testing was completed by Graeme Campbell (completed in 2024), the results from this test work showed when kept moist, acidificatoin of tailings occurred after approximately 80 weeks (i.e. roughly 18 months) during which solubility of minor elements (metals and metallloids) was tightly constrained. The design of the Stage 4 IWLTSF has given consideration to the lag time, ensuring that previously deposited tailings are not exposed longer than 18 months before being covered with fresh tailings.

5.5 Freeboard

To ensure no overtopping of the IWLTSF the IWLTSF Stage 4 freeboard was been calculated and assessed based on the requirements of both DEMIRS and ANCOLD guidelines for Tailings Storage Facilities (TSFs). For the purpose of the assessment, the IWLTSF Stage 4 was assumed to receive rainfall runoff from the upstream catchment (Section 4.7). The freeboard was evaluated for both the Stage 4 North intermediate tailings storage scenario and the Stage 4 full capacity tailings storage scenario.

Both the Stage 4 North intermediate and the final configuration of the IWLTSF Stage 4 provides capacity for the 1:100-year annual exceedance probability (AEP) 72- hour storm event, incorporating DEMIRS required freeboard and ANCOLD additional freeboard. A summary of the freeboard limits and requirements for Stage 4 North and Stage 4 South, along with their sequencing order, is presented Table 3.

During operational life of the TSF the risk of overtopping is significantly reduced as the incidental rainfall is contained on thetilings beach on a depression away from the perimeter embankments. Removal of stormwater is managed by designing the decant pumps to extract not only the volume of water required for the target dry density, but also the volume of water expected from the Probable Maximum Precipitation.

Table 3: Freeboard Limits and Requirements (REC, 2025)

Parameter	Stage 4 North Intermediate	Stage 4 South Intermediate	Stage 4 North & South (Remaining)
Facility Classification			
ANCOLD	High C	High C	High C
DEMIRS	Category 1	Category 1	Category 1
Embankment Elevations			
Embankment Elevation (RL m)	489.0	489.0	489.0
Contingency Storage Allowance			
Tailings Operational Freeboard (DEMIRS minimum)	0.3 m	0.3 m	0.3 m
Beach Freeboard (DEMIRS minimum)	0.2 m	0.2 m	0.2 m
Additional Freeboard (ANCOLD 2019)	0.5 m	0.5 m	0.5 m
Total Freeboard (Minimum to Max. Operating Pond)	1.0 m	1.0 m	1.0 m
Extreme Storage Allowance			
Design Storm Event (1:100-year AEP, 72-hour event)	0.26	0.26	0.26
Normal Operating Pond			
Minimum Normal Operating Pond Freeboard (m)	1.26	1.26	1.26
Maximum Normal Operating Pond (RL m)	483.24*	487.74	487.74
Note: * Calculated based on Stage 3 embankment elevation (RL 484.5 m), with Stage 4 South under construction and containment not yet provided to the full Stage 4 embankment elevation (RL 489.0) on south.			

5.6 Seepage

5.6.1 Seepage Assessment

A seepage assessment and modelling was conducted by REC and included in the DDR in Appendix A, the seepage assessment was conducted at two locations on the Northeast and Southeast sides of the proposed IWLTSF Stage 4 embankment, these locations were identified as critical sections where the embankment height is the greatest.

The estimated seepage flux and resulting seepage volumes for the modelled case are presented in Table 4. A conservative seepage volume estimate through the embankment, based on the resulting flux estimates, is approximately 5.5 m^3/day for the south eastern embankment (994 m length) and approximately 1.5 m^3/day for the north eastern embankment (1,516 m length). A localised groundwater mound can likely be anticipated beneath the facilities during their operating life.

The seepage water quality is hypersaline, which is the quality of the groundwater utilised in the Processing Plant, the TDS is in the range of 90,000 – 120,000 mg/L.

Table 4: Results of Seepage Analysis (REC, 2025)

Section	Facility	Embankment Height (m)	Estimated Flux Facility (m^3/day)/m	Total Embankment Length (m)	Seepage Estimate (m^3/day)
1	IWLTSF	27	0.005556	1,516	5.5
2	IWLTSF	12	0.000990	994	1.5

5.6.2 Seepage Control Measures

Design measures and operational controls aimed at minimising seepage include:

- Design measures
    - Underdrainage;
    - Low permeability floor;
    - Cut off trench.
- Operational controls
    - Sub-aerial deposition to promote air-drying (evaporation) whilst continually depositing in thin lifts to minimise dust generation;
    - Maintaining a small decant pond away from the embankment;
    - High rate of water recovery with a target of ~55% of the water from the tailings slurry being recovered;
    - Monitoring of pore pressure development within and downstream of the embankments; and
    - Monitoring of groundwater levels and groundwater quality downstream of the embankments.

The primary seepage management strategy for the TSF is to limit the amount of seepage by means of the underdrainage system. An underdrainage system currently exists within the Stage 2 and Stage 3 storage areas and will extend into the Stage 4 storage area. The IWLTSF stage 2, 3 and 4 underdrainage system layout is illustrated in Figure 10.

The extension of the underdrainage network system comprises of extension of toe drains and finger drains an integrated with existing underdrainage network system.

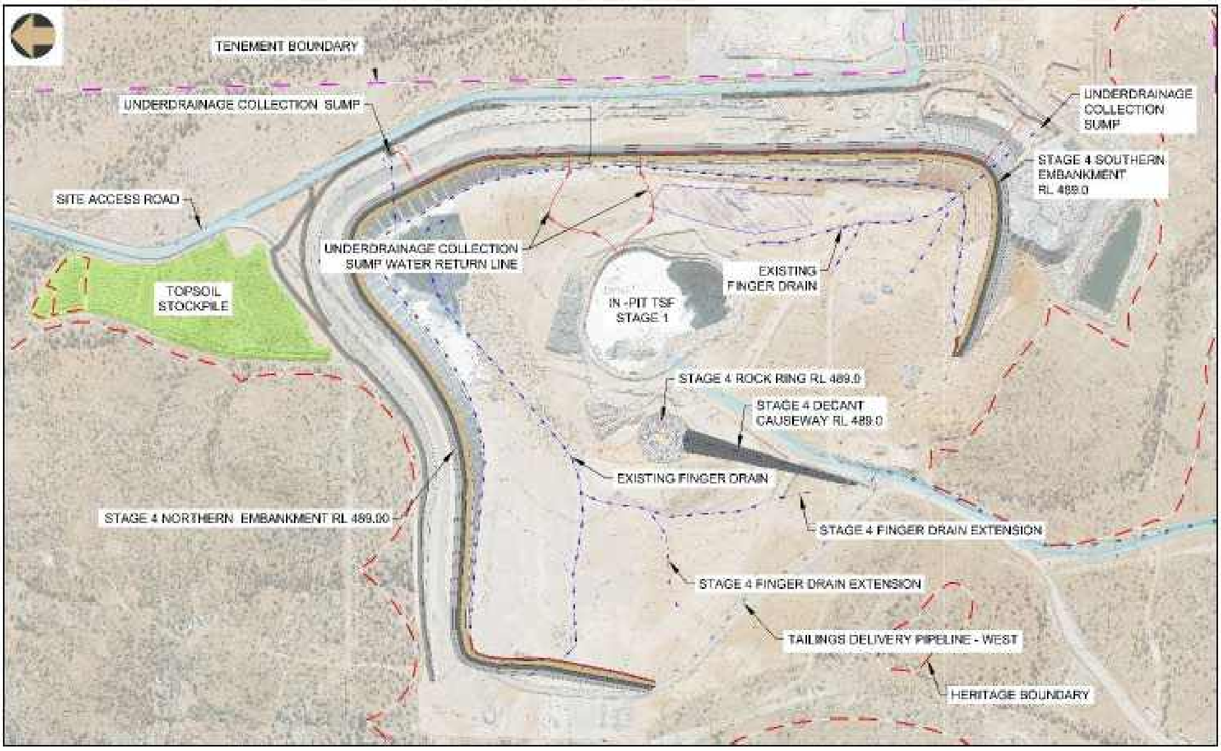


Figure 10: IWLTSF Stage 2, 3 and 4 Underdrainage System Layout (REC,2025)

5.6.3 Monitoring

The existing network of monitoring bores provides adequate coverage for the proposed Stage 4 embankment, allowing effective monitoring of groundwater levels and quality (against background groundwater quality) downstream of the facility. There are currently 9 monitoring bores installed around the IWLTSF (Figure 11). Sampling and analysis of these monitoring bores have been completed regularly as per licence conditions for the IWLTSF Stage 2 and 3. Analysis results have been provided in the Time Limited Operations report for Stage 2 and the Critical Containment Construction report for Stage 3.

The existing monitoring instrumentation provides adequate coverage for the proposed Stage 4 embankment. The instrumentation includes 12 vibrating wire piezometers (VWPs) at various depths in five locations on the embankment (Figure 12). No new instruments will be installed, only the existing VWP cables will need to be extended to the Stage 4 embankment level, and the logger setup will be repositioned on top of the new embankment.

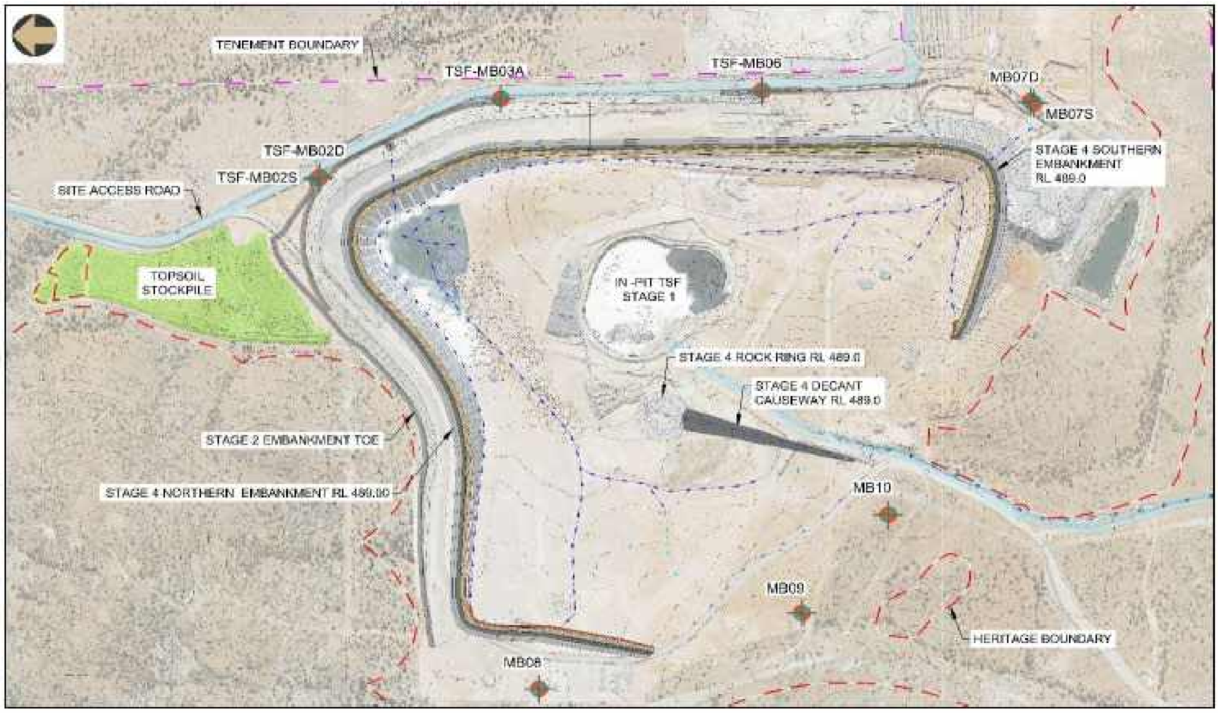


Figure 11: Existing Monitoring Bore Locations (REC, 2025)

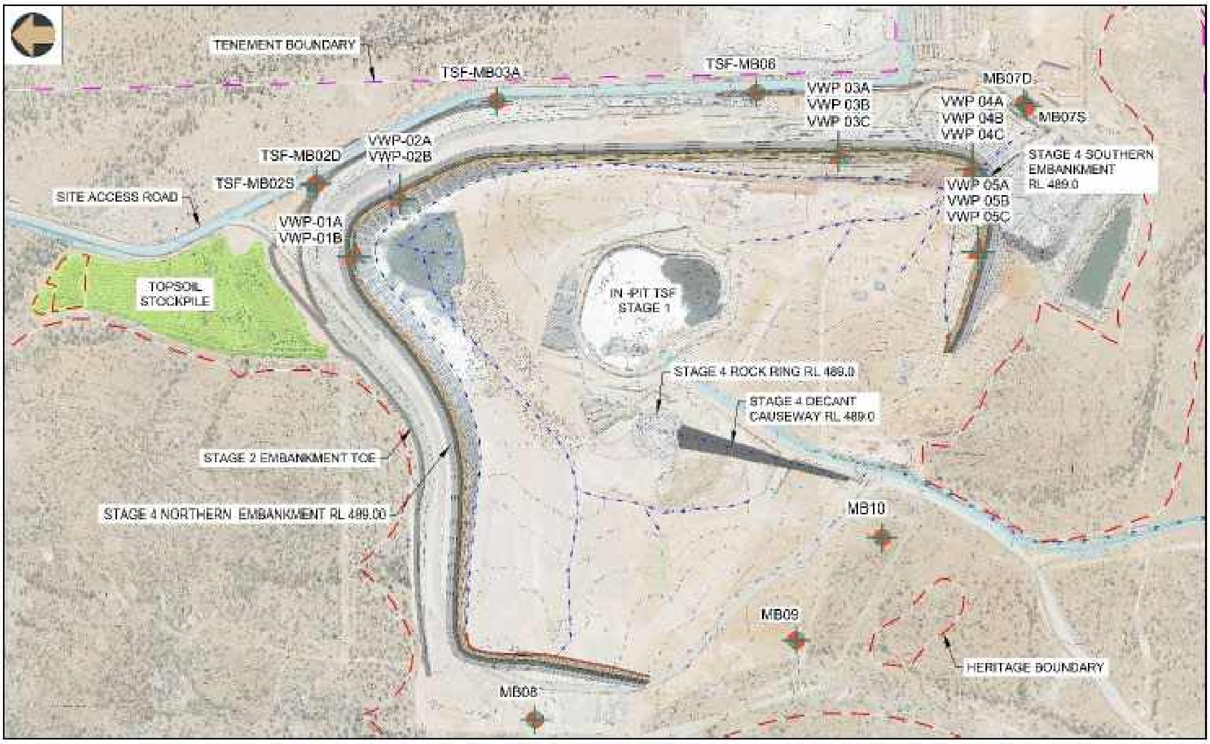


Figure 12: Existing Embankment Instrumentation (REC, 2025)

5.7 Water and Tailings Management

Tailings are to be deposited from the main embankment of the IWLTSF in a sub-aerial manner in thin lifts and beaching away from the perimter embankments. The decant pond shall be developed from the perimeter embankment of the IWL TSF. The spigotting sequence will be such that the supernatent water pond is always maintained away from the perimter embankments, initally near the IPTSF and later progressing towards the rock ring as the beach develops.

The position and extent of the supernatent pond is controlled by the water recovery which is to be maximised, the decant pumping system will be capacble of recovering additional water during the wet season.

A new turret pump will be installed within the rock ring to manage the pond formed by tailings deposition from the western and northern embankments. Later as the beach develops the decant pond will naturally drain into the rock ring.

5.7.1 Cyanide Management within the IWLTSF Decant

The processing plant has been designed to a standard that will allow Bellevue Gold to manage cyanide according to best practice standards.

Measures to ensure cyanide levels are managed within the decant pond include:

- Introduction of operating and management systems to minimise cyanide use during the processing phase, thereby limiting the concentration of cyanide in the tailings.
- Lime and sodium hydroxide is used as a pH inhibitor to control the generation of hydrogen cyanide (HCN) in leaching and elution process to an agreed safe working limit.
- Inclusion of a Weak Acid Dissociable (WAD) cyanide analyser in the process plant. Where levels exceed operating target WAD cyanide levels, hydrogen peroxide will be applied as the destruction technology, if and when required.
- Regular monitoring of WAD cyanide levels in the decant pond.

To ensure fauna are not attracted to ponding water and to reduce risk of cyanide poising to fauna, the decant pond will be as small as possible this will be achieved by:

- Use of thickeners during the processing of ore to increase tailings to 55% solids w/w prior to being pumped to the TSF and therefore minimise the amount of decant water on the IWLTSF.
- Deposition of tailings via spigot management is according to approved design to avoid ponding of water in areas other than decant area.

Continued use of hypersaline water in the Processing Plant acts as a natural deterrent to fauna species drinking and utilising decant water in the tailings facilities (Commonwealth of Australia, 2008). Bellevue wil continue to conduct regular monitoring for fauna at the IWLTSF.

5.8 Stability Assessment

A stability assessment was also completed by REC at two critical sections for the Stage 4 embankment. The predicted slope stability Factor of Safety (FoS) for each case analysed along with the recommended minimum FoS for both sections are summarised in Table 5 and Table 6. It can be concluded that the assessed cross sections exceed the minimum recommended FoS for the assessed soil stress condition.

Table 5: Slope Stability Results for Section 1 (REC, 2025)

Case	Recommended Minimum	Calculated Factor of Safety
Drained	1.50	1.54
Undrained	1.50	1.54
Seismic	1.20	1.33
Post Seismic (Tailings Liquified)	1.0* - 1.20	1.24
Note: * To be related to the confidence in selection of residual shear strength. 1.0 may be adequate for use with lower bound results.		

Table 6: Slope Stability Results for Section 2 (REC, 2025)

Case	Recommended Minimum	Calculated Factor of Safety
Drained	1.50	1.68
Undrained	1.50	1.55
Seismic	1.20	1.45
Post Seismic (Tailings Liquified)	1.0* - 1.20	1.31
Note: * To be related to the confidence in selection of residual shear strength. 1.0 may be adequate for use with lower bound results.		

5.9 Preliminary Dam Break Assessment

A preliminary dam break analysis was conducted under both ʻSunny Dayʼ and ʻRainy Dayʼ conditions to assess the potential impacts of an embankment breach of the IWLTSF Stage 4 at two critical sections. The 'Sunny Day' analyses assessed dam breaches where potential energy drives a tailings flow slide failure downstream of the facility, whereas the 'Rainy Day' analyses assessed dam breaches under worst conditions due to overtopping under extreme storm events over the facility and its catchment.

Based on the Linear Method, the IWLTSF Stage 4 (full) during Sunny Day conditions could potentially release tailings which runout between 760 m to 1,180 m and 510 m to 860 from the south-eastern and north-eastern embankment respectively.

Breach modelling for the IWLTSF Stage 4 embankment crest geometry indicated that under PMP Rainy Day conditions a potential peak run-out flow of 161 m^3/s could be expected from a failure on the southeast corner of the facility over a period of 4 hours. The Rainy Day breach could potentially result in tailings runout reaching the Plant Site approximately 1.25 km south of the facility.

5.10 Water Balance

A water balance for the IWLTSF inclusive of Stage 4 was completed, under average rainfall and evaporation, the preliminary water balance indicates an average daily water return to the plant of 1,715 m^3/day or 71.4 m^3/hr, equivalent to 48% of the total slurry water.

The site has a overall water balance, which takes into account water into and out of the Processing Plant. This water balance is updated monthly from readings taken from flow meters and other monitoring equipment.

5.11 Project Timing and Phases

The Stage 4 embankment is proposed to be constructed in two phases: Stage 4 North and Stage 4 South, following the same approach as Stages 2 and 3, to ensure the continuous operation of the IWLTSF during construction. The Stage 4 North will be constructed after the completion of Stage 2's intermediate operation, once Stage 3 is commissioned and during its operational period. During this time, tailings will be pushed from the Stage 3 south and eastern embankments towardthe IPTSF, keeping the pond positioned close to the IPTSF.

Upon the conclusion of Stage 3's operation, when the remaining storage in Stage 2 is resumed for operation, Stage 4 South will be constructed. During this period, tailings will be pushed from the Stage 4 North across the north and eastern embankmentstowards the IPTSF and rock ring, while the pond is ultimately navigated towards the rock ring.

5.12 Time Limited Operations

Time-limited operations is proposed as part of this Works Approval application to faciliate using the IWLTSF Stage 4 North and Stage 4 South after construction is complete until the amendment to Licence L9259/2020/1 is prepared, assessed and approved. During time-limited operations, the proposed IWLTSF Stage 4 North and Stage 4 South will commence operations sequentially under conditions specified in the granted Works Approval accepting tailings from the processing plant.

7. COMPLIANCE

7.1 Legislative Framework

A summary of the relevant environmental legislation applicable to this application is provided in Table 7.

Table 7: Environmental Legislative Framework

Relevant Legislation	Environmental Factor	Relevant Approval or Requirement
Aboriginal Heritage Act 1972 (WA) (AH Act)	Protection of Aboriginal heritage sites and matters.	BGL continues to work closely with Tjiwarl Aboriginal Corporation (TAC) under a Cultural Heritage Management Plan. Disturbance to Aboriginal cultural heritage will only be performed under consultation with Tjiwarl and where a permit issued under Section 18 of the AH Act has been approved.
Native Title Act 1993 (Cth)	Provides a national system for the recognition and protection of native title and for its co-existence with national land management system.	The BGP lies within the Tjiwarl and Tjiwarl #2 Native Title area (WCD 2017/001). A Native Title Agreement (NTA) was signed between BGL (and its subsidiaries) and Tjiwarl Aboriginal Corporation (TAC) Registered Native Tiitle Body Corporate (RNTBC) as the holder on trust for the Tjiwarl Native Title Holders on 3 October 2022. The NTA secures the protection and upholding of cultural values at the Project while maintaining the Project's development schedule and forecast industry-leading economic ouputs.
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (Cth)	Impacts to matters of national environmental significance.	It is considered unlikely that the BGP will have a significant impact on matters of national environmental significance. The BGP is not considered to trigger referral under the EPBC Act.
Environmental Protection Act 1986 (WA) (EP Act) - Part IV	Proposals that have the potential to result in significant environmental impacts.	The Project was referred to the Environmental Protection Authority (EPA) on 7 December 2021 where details of the environmental factors including flora and vegetation, terrestrial fauna, social surroundings and inland waters were presented. The EPA considered that the likely environmental effects of the proposal were not so significant to warrant formal assessment, due to the proposal being within a historically disturbed area. The decision was announced on 27 May 2022.

Relevant Legislation	Environmental Factor	Relevant Approval or Requirement
EP Act - Part V (Division 2): Clearing of native vegetation.	Assessment against the 10 clearing principles (biological diversity, significant fauna rare flora, threatened ecological community, remnant vegetation, association with watercourse or wetland, land degradation, impact on a conservation area; impact surface or underground water quality, cause or exacerbate flooding).	A Native Vegetation Clearing Permit (NVCP) has been assessed and approved under Part V of the EP Act for the BGP. CPS 9951/2 approves 338.38 ha's of clearing of native vegetation during 11 February 2023 and 10 February 2028.
EP Act - Part V (Division 3) – Prescribed premises, works approvals and licences.	Emissions and discharges to the environment from prescribed premises.	Works Approvals held by Golden Spur for the BGP include: **W6724/2022/1** (issued on 4 Nov 2022): ▪ Category 5: Processing or beneficiation of metallic or non-metallic ore up to 1,000,000 tonnes per annum. ▪ Category 6: Mine dewatering up to 1,000,000 tonnes per year. **W6865/2023/1** (issued on 12 June 2024): ▪ Category 5: Processing or beneficiation of metallic or non-metallic ore up to 400,000 m3 per annum. Golden Spur hold Licence: **(L9259/2020/1)** for: ▪ Category 6: Mine dewatering up to 1M tonnes per year. ▪ Category 5: Processing or beneficiation of metallic or non-metallic ore up to 1M tonnes per year. ▪ Category 52: Electric power generation of 30 MW. ▪ Category 54: Sewage facility up to 150 m^3 per day. ▪ Category 64: Class II or III putrescible landfill site up to 500 tonnes per annual period. ▪ Category 70: Screening of material <50,000

Relevant Legislation	Environmental Factor	Relevant Approval or Requirement
		tonnes per annual period
Biodiversity Conservation Act 2016 (WA) (BC Act)	Threatened Flora, Fauna and Ecological Communities.	No threatened flora or fauna species, or ecological communities protected under the BC Act will be impacted by the activities described in the Site Wide MP. Baseline studies have been completed across the Project area.
Mining Act 1978 (WA) (Mining Act)	Compliance with tenement conditions. Mining proposals and mine closure plan.	BGL are committed to continue complying with all tenement conditions from the BGP. The Project has an approved consolidated site wide Mining Proposal and Mine Closure Plan.
Rights in Water and Irrigation Act 1914 (WA) (RIWI Act)	Impacts to groundwater as a result of the abstraction of groundwater.	The Project holds two licences under the RIWI Act: **GWL202960** (expiry 30 March 2031) ▪ Approves annual abstraction of up to 150,000 kL from the Goldfields combined, fractured rock west, fractured rock aquifer from M36/25, M36/660, M36/328, M36/24 and M36/162. **GWL202924** (expiry 30 March 2031) ▪ Approves annual abstraction of up to 1,200,000 kL from the Goldfields combined, fractured rock west, fractured rock aquifer from M36/24 and M36/25.
Dangerous Goods Safety Act 2004 (WA)	The storage, transport and use of dangerous goods.	The Project currently has dangerous goods licencing for the explosives and detonators (ETS002841). The Project also has a dangerous goods site licence for diesel fuel storage (DGS022620) and the processing plant dangerous goods (DGS022620).
Health (Miscellaneous Provisions) Act 1911	Approval to treat and dispose of domestic sewage.	All existing treatment and disposal of domestic sewage is undertaken in accordance with provisions under the *Health (Miscellaneous Provisions) Act 1911* through the Shire of Leonora.

8. CONTROL OF EMISSIONS

8.1 Risk Assessment Overview

A risk assessment was completed in accordance with DWER Guidance Statement: Environmental Risk Assessments Framework (DWER, 2017) and the DWER Guidance Statement: Environmental Siting (DWER, 2016) . The risk assessment process identified the following:

- The sources of pollution and where available, quantification of emissions.
- The pathway which pollution follows from the source to the receptor.
- The environmental and health receptors.
- The potential impacts on the receptors from this source of pollution.
- The controls and mitigation measures applied to the Project.
- The likelihood, consequence and overall risk rating associated with this factor.
- The requirement for monitoring.

Likelihood and consequence categories (Table 8 and Table 9) were derived from these Guidance Statements and used to develop the associated risk matrix is presented in Table 10.

Table 8: Likelihood Categories

Likelihood of Occurrence	Probability
Almost Certain	The risk event is expected to occur in most circumstances.
Likely	The risk event will probably occur in most circumstances.
Possible	The risk event could occur at some time.
Unlikely	The risk event will probably not occur in most circumstances.
Rare	The risk event may only occur in exceptional circumstances.

Table 9: Consequence Categories

Consequence Category	Environmental Consequence	Public Health and Amenity Consequence
Severe	▪ **Onsite impacts:** catastrophic ▪ **Offsite impacts local scale:** high level or above ▪ **Offsite impacts wider scale:** mid-level or above ▪ Mid to long-term or permanent impact to an area of high conservation value or special significance ▪ Specific Consequence Criteria (for environment) are significantly exceeded	▪ Loss of life ▪ **Adverse health effects:** high level or ongoing medical treatment ▪ Specific Consequence Criteria (for public health) are significantly exceeded. ▪ **Local scale impacts:** permanent loss of amenity
Major	▪ Onsite impacts: high level ▪ Offsite impacts local scale: mid-level ▪ Offsite impacts wider scale: low-level ▪ Short-term impact to an area of high conservation value or special significance ▪ Specific Consequence Criteria (for environment) are exceeded	▪ **Adverse health effects:** mid-level or frequent medical treatment ▪ Specific Consequence Criteria (for public health) are exceeded. ▪ **Local scale impacts:** high-level impact to amenity
Moderate	▪ Onsite impacts: mid-level ▪ Offsite impacts local scale: low-level ▪ Offsite impacts wider scale: minimal ▪ Specific Consequence Criteria (for environment) are at risk of not being met	▪ **Adverse health effects:** low-level or occasional medical treatment ▪ Specific Consequence Criteria (for public health) are at risk of not being met ▪ **Local scale impacts:** mid-level impact to amenity
Minor	▪ Onsite impacts: low-level ▪ Offsite impacts local scale: minimal ▪ Offsite impacts wider scale: not detectable ▪ Specific Consequence Criteria (for environment) likely to be met	▪ Specific Consequence Criteria (for public health) are likely to be met. ▪ **Local scale impacts:** low-level impact to amenity
Slight	▪ Onsite impact: minimal ▪ Specific Consequence Criteria (for environment) met	▪ **Local scale:** minimal to amenity ▪ Specific Consequence Criteria (for public health) met

Table 10: Risk Matrix

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost Certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

8.2 Risk and Impact Assessment

Potential impacts, control measures and risk evaluation associated with the proposal is summarised in Table 11. This assessment also considered the sensitive receptors identified in Section 4.

Table 11 : Risk and Impact Assessment

Emission Source/Event	Pathway	Receptor	Event Impacts	Control Measures	Consequence on Receptor	Likelihood of Event Impact (After Controls)	Level of Risk
Emissions to Land and Water							
Spillage of tailings material – pipeline rupture	Spillage to land and water	▪ Flora and vegetation. ▪ Fauna ▪ Lake Miranda ▪ Groundwater ▪ Surrounding soils	▪ Degradation of vegetation. ▪ Contamination of soils.	▪ All tailings and associated return water pipelines (excluding pipelines which are situated on the IWLTSF embankments) are within an earthen bund which is sufficient to contain any spill for a period of time equal to the time between inspections. ▪ Scour pits are constructed and located at low points along the length of the pipeline corridor. ▪ Daily visual inspections of pipelines and regular monitoring of pipelines. ▪ Immediate reporting and cleanup of all tailing's spills. ▪ Flow meters installed on tailings pipelines.	Moderate	Possible	Medium

Emission Source/Event	Pathway	Receptor	Event Impacts	Control Measures	Consequence on Receptor	Likelihood of Event Impact (After Controls)	Level of Risk
Seepage of contaminated water from IWLTSF	Vertical seepage to groundwater Lateral seepage to Lake Miranda. Groundwater mounding, seepage expression.	▪ Flora and vegetation adjacent to TSF. ▪ Fauna ▪ Lake Miranda ▪ Groundwater ▪ Surrounding soils	▪ Degradation of vegetation. ▪ Contamination of groundwater.	▪ IWLTSF embankments have been constructed with compacted mine waste, low permeability materials and HDPE liner on the inner wall to minimize seepage. ▪ An underdrainage system (finger drains and toe drains) has been installed to lower the phreatic water table against the IWLTSF embankment. ▪ Groundwater levels and quality in the vicinity of the TSF will be monitored in accordance with a DWER Environmental Protection licence and works approvals. ▪ Cut-off trench (compacted clayey low permeability materials) constructed to restrict potential seepage under the perimeter embankment. ▪ Decant water recovery to maximise consolidation of tailings. ▪ Maintaining small decant pond away from main embankments. ▪ Use of pre-leach and tailings thickeners to minimize water to tailings. ▪ Sub-aerial deposition in think lifts to promote air-drying	Moderate	Unlikely	Medium

Emission Source/Event	Pathway	Receptor	Event Impacts	Control Measures	Consequence on Receptor	Likelihood of Event Impact (After Controls)	Level of Risk
Failure of TSF embankments (spillage of tailings material) Release of contaminated water during high rainfall events.	Vertical seepage to groundwater. Spillage to land and water.	▪ Flora and vegetation. ▪ Fauna ▪ Lake Miranda ▪ Groundwater ▪ Surrounding soils	▪ Degradation of vegetation. ▪ Contamination of groundwater. ▪ Contamination of soils.	▪ TSF design conforms to Australian National Committee on Large Dams (ANCOLD) and DMIRS Guidelines. ▪ TSF constructed as per design and documented in Critical Containment Infrastructure Report. ▪ Design freeboard is as a minimum for 1:100 Annual Exceedance Probability (AEP), 72 hour rainfall event. Maintenance of freeboard. ▪ Regular monitoring of VWPs. ▪ Regular monitoring of TSF freeboard. ▪ Regular geotechnical audit of TSF.	Moderate	Rare	Medium
Excessive levels of WAD CN in the decant water on the TSF/return water dams	Direct ingestion by fauna of surface water from the decant/return water dams	▪ Fauna	▪ Death of fauna species.	▪ Regular monitoring of CN in the tailing's material with a CN analyser in the plant. ▪ Addition of H^2O^2 as required for destruction of CN if CN levels above set internal limits. ▪ Daily inspections of tailings facilities and process water ponds. ▪ Regular monitoring of the usage of the TSF and TSF return water ponds by fauna. ▪ Groundwater levels and quality in the vicinity of the TSF will be monitored in accordance with a DWER Environmental Protection licence. ▪ Hypersaline water used in processing acts as a natural deterrent to fauna ingesting water on a regular basis. ▪ Decant water in the IWLTSF is minimized through the use of pre-leach and tailings thickeners during processing. ▪ Small decant pond	Moderate	Unlikely	Medium

Emission Source/Event	Pathway	Receptor	Event Impacts	Control Measures	Consequence on Receptor	Likelihood of Event Impact (After Controls)	Level of Risk
Noise Emissions							
Noise during construction and operations (mobile equipment)	Direct noise emissions (air/wind)	▪ Yakabindie Pastoral Lease holders. ▪ Fauna	Noise is anticipated to be a negligible addition to the operating mine site. Due to separation distances, impacts to receptors are not anticipated.	▪ Regular maintenance of vehicles and plant equipment. ▪ Where possible, noise attenuating equipment will be installed and maintained on vehicles and equipment. ▪ Adherence to the *Environmental Protection (Noise) Regulations 1997.*	Minor	Rare	Low
Air Emissions							
Dust generated during construction and operation.	Air/windborne	▪ Vegetation	Dust is anticipated to be a negligible addition to the operating mine site. Due to separation distances, impacts to receptors are not anticipated.	▪ Moisture content of the tailings will be maintained to minimize dust during operations. ▪ Water carts to be utilized during construction as required. ▪ Water carts to be utilized regularly on tracks during operation. ▪ All vehicles to remain on designated roads and access tracks.	Minor	Rare	Low

9. REFERENCES

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APPENDIX A: IWLTSF STAGE 4 NORTH AND STAGE 4 SOUTH DETAILED DESIGN REPORT BELLEVUE GOLD PROJECT (REC, 2025)

REPORT REF	P19-11-PR-29-R01	25 MARCH 2025

IWLTSF Stage 4 North and Stage 4 South Detailed Design Report
Bellevue Gold Project
Bellevue Gold Limited

CLIENT DETAILS

REC DETAILS

Bellevue Gold Limited

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Report

Title:	IWLTSF Stage 4 North and Stage 4 South Detailed Design Report
File:	P19-11-PR-29-R01
Author(s):	[redacted]
Client:	Bellevue Gold Limited
Contact:	[redacted]
[redacted]	This document presents the detailed design of Integrated Waste Landform Storage Facility (IWLTSF) Stage 4 North and Stage 4 South at the Bellevue Gold Limited Bellevue Gold Project.

Revision

Date	Revision	Purpose	[redacted]
08 MAR 2025	DRAFT	ISSUED FOR REVIEW AND COMMENT	[redacted]
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Executive Summary

Resource Engineering Consultants Pty Ltd (REC) has been engaged to prepare this Detailed Design Report (DDR) for Stage 4 North and Stage 4 South of the Integrated Waste Landform Tailings Storage Facility (IWLTSF) at the Bellevue Gold Limited (BGL) Bellevue Gold Project (BGP). The report follows the format outlined in the Government of Western Australia Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) Guide to the Preparation of a Design Report for Tailings Storage Facilities.

The BGP is located in the Sir Samuel region of Western Australia's North-Eastern Goldfields, approximately 430 km north of Kalgoorlie and 40 km north of Leinster, adjacent to the Goldfields Highway. The project is situated within the Agnew-Wiluna Greenstone Belt, a major gold and nickel sulphide-producing region, with a total project area covering 3,650 km^2 across mining, exploration, and prospecting leases.

Stages 1 to 3 of the Tailing Storage Facilities (TSFs) were designed to be constructed and operated sequentially. Stage 1 is an In-Pit Tailings Storage Facility (IPTSF) which utilised the depleted Vanguard open pit. Stage 2 and Stage 3 are starter embankments of the IWLTSF which encapsulate the IPTSF. Stage 2 provides containment to the north and northern portion of the eastern side of the storage basin, while Stage 3 forms the south and southern portion of the eastern side of the storage basin. The integrated Stage 2 and Stage 3 embankments provide a continuous perimeter embankment around the north, east and south of the storage basin at an elevation RL 484.5m.

IPTSF (Stage 1) was operated between late October 2023 and late October 2024. To maintain freeboard requirements, operations continued until the maximum pond elevation reached RL 473.0 m, at which point operations were terminated, despite additional storage capacity being available within the IPTSF. This freeboard is no longer relevant following the completion of the Stage 3 embankment containment. The remaining storage capacity will be utilised along with the IWLTSF Stage 2 and Stage 3 operations.

IWLTSF Stage 2 commenced operation in late October 2024 and is currently in operation. Stage 2 will be operated to an intermediate storage elevation of RL 482.5 m, expected to be reached by May 2025. This intermediate level prevents tailings from entering the IPTSF, with the decant pond managed within the IPTSF. Once the Stage 3 beach forms, reaching into the IPTSF from the south, the Stage 2 remaining storage will resume operation, pushing tailings into and around the IPTSF.

IWLTSF Stage 3 construction was completed at the end of February 2025 and is currently awaiting operational approval from the relevant government authorities. Once approved, Stage 3 will commence operation, aligning with the completion of the Stage 2 intermediate storage. During Stage 3 operation, the decant pond will be managed within IPTSF and the adjacent low laying area, eliminating the immediate need for the decant infrastructure originally planned for Stage 3. The combined operation of Stage 2 and Stage 3 at full capacity is expected to provide tailings storage up to August 2026 (16 months), supporting a throughput of 1.35 Mtpa to 1.60 Mtpa at an assumed dry density of 1.40 t/m^3.

This DDR has been prepared to support the proposed Stage 4 North and Stage 4 South embankment raises of the IWLTSF to provide ongoing tailings storage at the BGP. Stage 4 North and Stage 4 South have been designed in a downstream embankment configuration with an embankment raise height of 4.5 m, increasing the facility elevation to RL 489.0 m. The proposed IWLTSF Stage 4 raise provides approximately 2.1 Mm^3 or 2.95 Mt of tailings storage capacity, based on an assumed average tailings dry density of 1.40 t/m^3. At a maximum planned throughput of 1.6 Mtpa, this provides a minimum storage life of approximately 1.8 years.

The IWLTSF Stage 4 North and Stage 4 South embankments will be constructed using mine waste (Zone 3A and Zone 3B) derived from underground mine development works, compacted in lifts through traffic compaction. The upstream batter (Zone 3C) will be constructed using transitional material sourced from the historic Vanguard waste dump and other suitable borrow pit stockpiles. The embankment upstream face will incorporate a High-Density Polyethylene (HDPE) liner, underlain by a suitable subgrade and Bidim A24 geotextile (or equivalent) to provide enhanced puncture protection.

The construction of the decant infrastructure (rock ring and decant causeway), which was initially postponed from IWLTSF Stage 3 construction, is now planned to take place after the commissioning of Stage 3, with the current focus remaining on Stage 3 commissioning activities. The rock ring of this planned development will serve as the central decant for Stage 4 water recovery.

IWLTSF Stage 4 North and Stage 4 South have been designed in accordance with the Australian National Committee on Large Dams (ANCOLD) Guidelines (ANCOLD, 2012), with a Dam Failure Consequence Category of 'High C' assigned to the facility. Similarly, an assessment based on the Department of Mines and Petroleum (DMP) Code of Practice (DMP 2013, Table 1) determined a 'Medium' hazard rating, while classification under Table 2 of the DMP Code of Practice (DMP 2013, Table 2) designates IWLTSF Stage 4 North and Stage 4 South as a 'Category 1' facility. The IWLTSF Stage 4 North and Stage 4 South have capacity for the 1:100-year annual exceedance probability (AEP) 72-hour storm event, DMP required freeboard and ANCOLD additional freeboard.

Construction work for the IWLTSF Stage 4 North and Stage 4 South must be undertaken in accordance with drawings and an earthworks specification. Furthermore, the operation of these facilities must be executed in accordance with the intent of the design and Operating Manual (OM). Tailings are to be deposited from the perimeter embankment of the IWLTSF Stage 4 North and Stage 4 South in a sub-aerial manner in thin lifts and beaching towards the rock ring at the centre of the facility to form a decant pond away from the main embankments.

The proposed IWLTSF Stage 4 North and Stage 4 South design has been developed in consultation with the client. The design considers the existing landforms (both natural and those formed by previous mining activities) and drainage requirements. The proposed IWLTSF Stage 4 North and Stage 4 South marries waste from the proposed mining activities into existing natural landforms and encapsulates waste rock dump formed by previous mining activities and the IPTSF. These design objectives have been developed to ensure that premises are decommissioned and rehabilitated in an ecologically sustainable manner in accordance with the DEMIRS principal closure objectives for rehabilitated mines and the Environmental Protection Authority's (EPA) objective for Rehabilitation and Decommissioning.

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Terminology and Abbreviations

The following terminology and abbreviations have been used in this document:

AEP	Annual exceedance probability
ANCOLD	Australian National Committee on Large Dams
BGL	Bellevue Gold Limited
BGP	Bellevue Gold Project
BOM	Bureau of Meteorology
DEMIRS	Department of Energy, Mines, Industry Regulation and Safety
DDR	Detail Design Report
DWERS	Department of Water and Environmental Regulation
GPS	Global Positioning System
GSI	Geotechnical Site Investigation
LOM	Life of mine
IFD	Intensity frequency duration
IPTSF	In-Pit Tailings Storage Facility
IWLTSF	Integrated Waste Landform Tailings Storage Facility
m/a	Metres per annum
m^3/d	Cubic meters per day
Mm^3	Million cubic meters
Mt	Million tonnes
Mt/a	Million tons per annum
NAF	Non-acid forming
OM	Operating Manual
PAF	Potentially Acid Forming
RL	Reduced level
t/a	Tonnes per annum
t/d	Tonnes per day
t/m^3	Tonnes per cubic metre
SMDD	Standard maximum dry density
TSF	Tailings Storage Facility

1. TSF Proposal Summary

1.1 Introduction

REC was engaged by BGL to prepare the Detailed Design Report (DDR) for the integrated Waste Landform Tailings Storage Facility (IWLTSF) Stage 4 North and Stage 4 South at the Bellevue Gold Limited (BGL) Bellevue Gold Project (BGP). The BGP is located in the Sir Samuel region of Western Australia's, North-eastern Goldfields, approximately 430 km north of Kalgoorlie and 40 km north of the regional town of Leinster. The BGP is hosted in the Agnew-Wiluna Greenstone Belt, an area of significant metal endowment and a major gold and nickel sulphide producing belt. The project area covers a total of 3,650 km^2 with a combination of mining, exploration and prospecting leases.

The existing BGP Tailings Storage Facilities (TSFs), originally designed by REC as detailed in the WSD, IPTSF, TSF and IWLTSF Detailed Design Report (Ref: P19-11-PR-14 Rev 1, dated 10 November 2022), originally included an In-Pit Tailings Storage Facility (IPTSF) (Stage 1), a Water Storage Dam (WSD) planned for conversion into TSF (Stage 2) at RL 482.0 m, and IWLTSF (Stage 3) at RL 484.5 m. However, during construction, modifications were made due to construction challenges. As a result, the final TSF configuration consists of IPTSF (Stage 1) and Stages 2 and 3 of the IWLTSF as detailed in the IWLTSF Stage 2 and Stage 3 Critical Containment Infrastructure Report (CCIR) (Ref: P19-11-PR-25-R01 and P19-11-PR-28-R05 respectively).

IPTSF Stage 1 operated from late October 2023 to late October 2024. Following the IPTSF operation, IWLTSF Stage 2 was subsequently commissioned and is still currently in operation, with storage expected to reach an intermediate elevation of RL 482.5 m by April 2025.

IWLTSF Stage 3 construction was completed at the end of February 2025 and is currently awaiting operational approval from the relevant government authorities. Once approved, Stage 3 will commence operation, aligning with the completion of the Stage 2 intermediate storage. Once IWLTSF Stage 3 is operated to its full capacity (including the utilisation of the remaining Stage 2 storage up to RL 484.2 m), the tailings beach will extend into the IPTSF from the south and tailings will be directed into the IPTSF from the north and the western areas of the Stage 2 storage.

During Stage 3 operation, the decant pond will be managed within IPTSF and the adjacent low laying area, eliminating the immediate need for the decant infrastructure originally planned for Stage 3. The combined operation of Stage 2 and Stage 3 at full capacity is expected to provide tailings storage up to August 2026 (16 months), supporting a throughput of 1.35 Mtpa to 1.60 Mtpa at an assumed dry density of 1.40 t/m^3.

The Stage 2 embankment crest has been constructed to its full width of 75.0 m. In Stage 3, while part of the eastern embankment crest has been built to its full width of 75.0 m, the southern and remaining eastern sections were constructed to a 10.0 m minimum width due to limitations in available waste rock material at the time of construction. To support ongoing mine waste placement, and the construction of the future Stage 4 embankment, recently an additional 20.0 m width has been constructed at RL 484.5 m across the southern embankment to the east of the Prospero waste dump using waste rock placed through paddock dumping techniques. Ongoing waste rock placement is currently progressing using tip head techniques to increase the waste rock embankment width downstream of the southeast embankment adjacent to and within the downstream borrow pit.

The IWLTSF Stage 4 North and Stage 4 South embankments will be constructed using mine waste (Zone 3A and Zone 3B) derived from underground mine development works, compacted in lifts through traffic compaction. The upstream batter (Zone 3C) will be constructed using transitional material sourced from the historic Vanguard waste dump and other suitable borrow pit stockpiles. The embankment upstream face will incorporate a High Density Polyethylene (HDPE) liner, underlain by a suitable subgrade and Bidim A24 geotextile (or equivalent) to provide enhanced puncture protection.

The construction of the rock ring and decant causeway, which was originally postponed from IWLTSF Stage 3 construction, is now planned to take place after Stage 3 commissioning, with the current focus remaining on commissioning activities.

The decant trenches originally proposed to facilitate early water recovery during Stage 3 operations were found to be difficult to construct due to the presence of shallow surficial rock. To address these constraints, the alignment of the rock ring has been revised and shifted westward to coincide with a new topographic low point identified within the area of the historic Vanguard waste dump. This shift followed the partial removal of the dump material, exposing the natural ground surface. The remaining waste is scheduled for removal in future works.

The repositioned rock ring is now planned for construction under IWLTSF Stage 4 North, together with the associated decant causeway. Both structures will initially be constructed to RL 489.0 m and will be progressively raised in alignment with the staged development of the facility.

The revised area also contains low-permeability borrow material, which is intended to be excavated and stockpiled for future use during construction activities. This material is anticipated to enhance decant water drainage performance through the rock ring by increasing the available hydraulic head.

Currently, an internal training wall, with a maximum height of 2.5 m, has been constructed within Stage 2 storage area to prevent tailings from Stage 2 operation forming towards the planned rock ring location and decant water ponding in this area due to its topographic low point. Additionally, an open-end tailings discharge has recently been undertaken from the western side of the Stage 2 storage area to direct tailings towards the IPTSF and maintain the pond centrally within the IPTSF. This open-end discharge strategy will be intermittently used as needed in the future.

The current tailings management strategy is to continue operating IWLTSF Stage 2 until it reaches its intermediate storage capacity, after which operations will transition to IWLTSF Stage 3. Stage 3 will be operated to its maximum capacity with a strategic deposition plan aimed at keeping the decant pond in its current location at the southern part of the IPTSF and the adjacent low-lying area.

To support continuous operation and tailings storage beyond 2026, the current TSF will require further expansion through the construction of the proposed IWLTSF Stage 4 embankment raise. This is expected to provide additional tailings storage capacity until June 2028. The Stage 4 embankment is proposed to be constructed in two phases: Stage 4 North and Stage 4 South, following the same approach as Stages 2 and 3, to ensure uninterrupted operations during construction.

Stage 4 North will be constructed after the ongoing tailings operation in Stage 2 intermediate storage is completed and transitioned to Stage 3, with construction planned to be completed and CCIR approval obtained during the operational life of Stage 3.

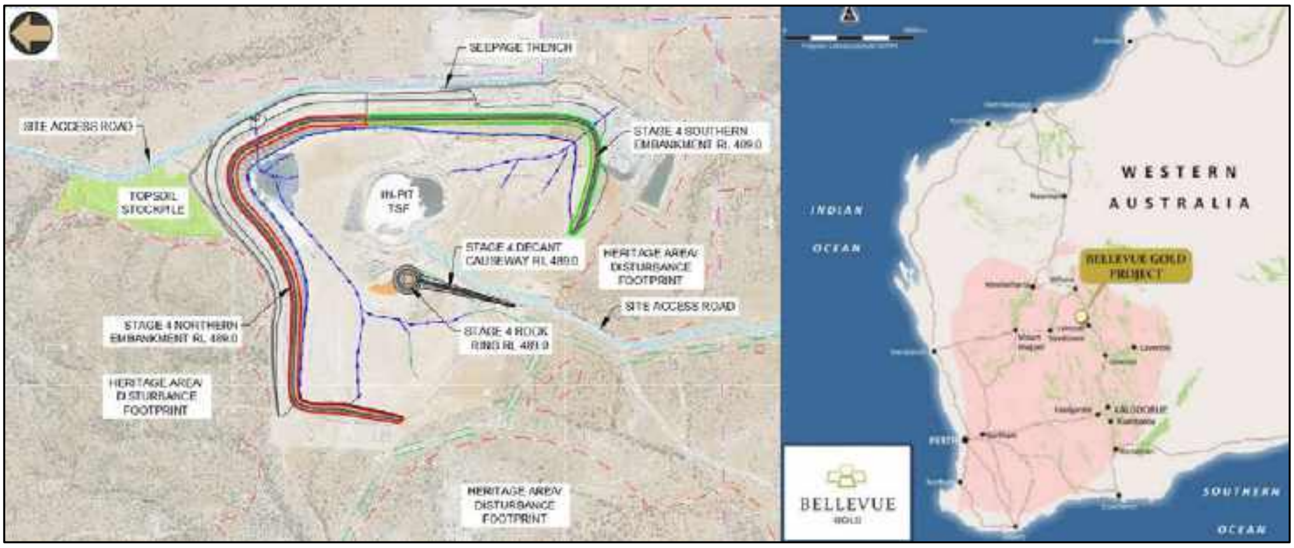
Similarly, Stage 4 South construction will commence once tailings deposition in Stage 3 is completed and transitions to the remaining storage in Stage 2. To allow sufficient time for Stage 4 South construction and its CCIR approval, Stage 4 North will be operated temporarily for an intermediate storage capacity following its own CCIR approval.

This planned sequencing of Stage 2 and Stage 3 operations, along with the phased construction of Stage 4, is designed to ensure sufficient time for construction completion and CCIR approval while maintaining uninterrupted operations.

This DDR outlines the engineering design for the IWLTSF Stage 4 North and Stage 4 South embankment raise at the BGP to a crest elevation of RL 489.0 m. The scope of the design documented in this report is limited to civil engineering/earthworks components and excludes other design elements.

The location of the project site along with the existing IPTSF and IWLTSF (Stage 2 and Stage 3), in addition to the proposed IWLTSF Stage 4 North and Stage 4 South raise configuration are presented in Figure 1.

Figure 1: Overall Site Layout



1.2 Purpose and Scope

This DDR outlines the basis of design for the BGP IWLTSF Stage 4 North and Stage 4 South raise, upon which the design assessments and operational requirements are based.

The purpose of this document is to present the overall objectives of the IWLTSF Stage 4 North and Stage 4 South raise and summarise the relevant guidelines and legislation, design criteria, overall design philosophy, and other relevant information related to the facilities design. All matters related to the design, construction and operation of the IWLTSF Stage 4 North and Stage 4 South raise at the BGP have been prepared in accordance with the most recent and applicable design codes and regulation.

As the scope of this document is to provide comprehensive design documentation, the contents within this document are to be considered as the definitive design document of the IWLTSF Stage 4 North and Stage 4 South raise. Preceding design documentation submitted to BGL, and their associated assessments and designs pertaining to the IWLTSF Stage 4 North and Stage 4 South, are superseded by the contents of this document.

2. Design Considerations

2.1 Introduction

The design of the IWLTSF Stage 4 North and Stage 4 South embankment raise has been developed to optimise storage capacity, operational efficiency, and embankment stability. The Stage 4 embankment geometry has been designed to enable safe, economical, and practical construction, considering available mine waste materials, construction limitations, and site-specific constraints. Locally sourced materials have been prioritised for embankment construction, while seepage control measures have been integrated into the design. These measures include the extension of existing finger drains and toe drains to intercept seepage water. The embankment design incorporates a HDPE liner across the embankment upstream face, underlain by a suitable subgrade and geotextile layer to further mitigate seepage risks.

The following sections detail the inputs and design considerations for the IWLTSF Stage 4 North and Stage 4 South DDR.

2.2 Storage Capacity

The WSD, IPTSF, TSF and IWLTSF Detailed Design Report (Ref: P19-11-PR-14 Rev 1, dated 10 November 2022) outlined the initial design for tailings storage across the BGP, which comprised the IPTSF (Stage 1), TSF (Stage 2), and IWLTSF (Stages 3 to 8). This design was based on a 9-year operational life with a processing throughput of 1.0 Mtpa and an assumed tailings dry density of between 1.4 and 1.45 t/m³ for above ground tailings storage. Stage 1 was designed to provide storage capacity for 1.0 year, while the combined Stage 2 and Stage 3 were designed to accommodate 3.0 years of storage. The remaining five stages of the IWLTSF (Stages 4 to 8) were proposed at a conceptual level to provide storage for the remaining 5.0 years of tailings deposition, with one embankment raise per year to a maximum elevation of RL 492.0 m.

However, during construction, modifications were made to the design due to construction challenges. As a result, the final TSF configuration consists of IPTSF (Stage 1) and Stages 2 and 3 of the IWLTSF as detailed in the IWLTSF Stage 2 and Stage 3 Critical Containment Infrastructure Report (CCIR) (Ref: P19-11-PR-25-R01 and P19-11-PR-28-R05 respectively).

Additionally, the original design throughput of 1.0 Mtpa was maintained throughout IPTSF (Stage 1) and IWLTSF (Stage 2) operation until the end of 2024. A planned throughput increase took effect in January 2025 with a planned gradual increase to 1.35 Mtpa by July 2025, followed by a further planned increase to 1.60 Mtpa from July 2026 onwards. The updated production schedule will generate approximately 13.3 Mt of tailings, exceeding the original 9.0 Mt storage capacity upon which the initial LoM IWLTSF design was based. The project updated mill throughput schedules are presented in Table 1.

Table 1: Updated Mill Throughput Schedule

Operation Life (Year)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Total
Calendar Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	
Throughput (Mt)	1.00	1.25	1.48	1.60	1.60	1.60	1.60	1.60	1.60	13.33
Cumulative Dry Tailings (Mt)	1.00	2.25	3.73	5.33	6.93	8.53	10.13	11.73	13.33	-

The proposed conceptual LoM design is currently under review in response to the recent changes in throughput projections and evolving tailings storage requirements at the BGP, including considerations for extending the life of the existing storage facility.

Based on the updated production schedule the current IWLTSF Stage 2 and Stage 3 combined is expected to provide 1.81 Mm³ of storage capacity for 2.54 Mt of tailings during their operation based on an assumed average in-situ dry density of 1.40 t/m3 and are projected to provide storage capacity until September 2026 for a throughput ranging between 1.35 Mtpa and 1.6 Mtpa.

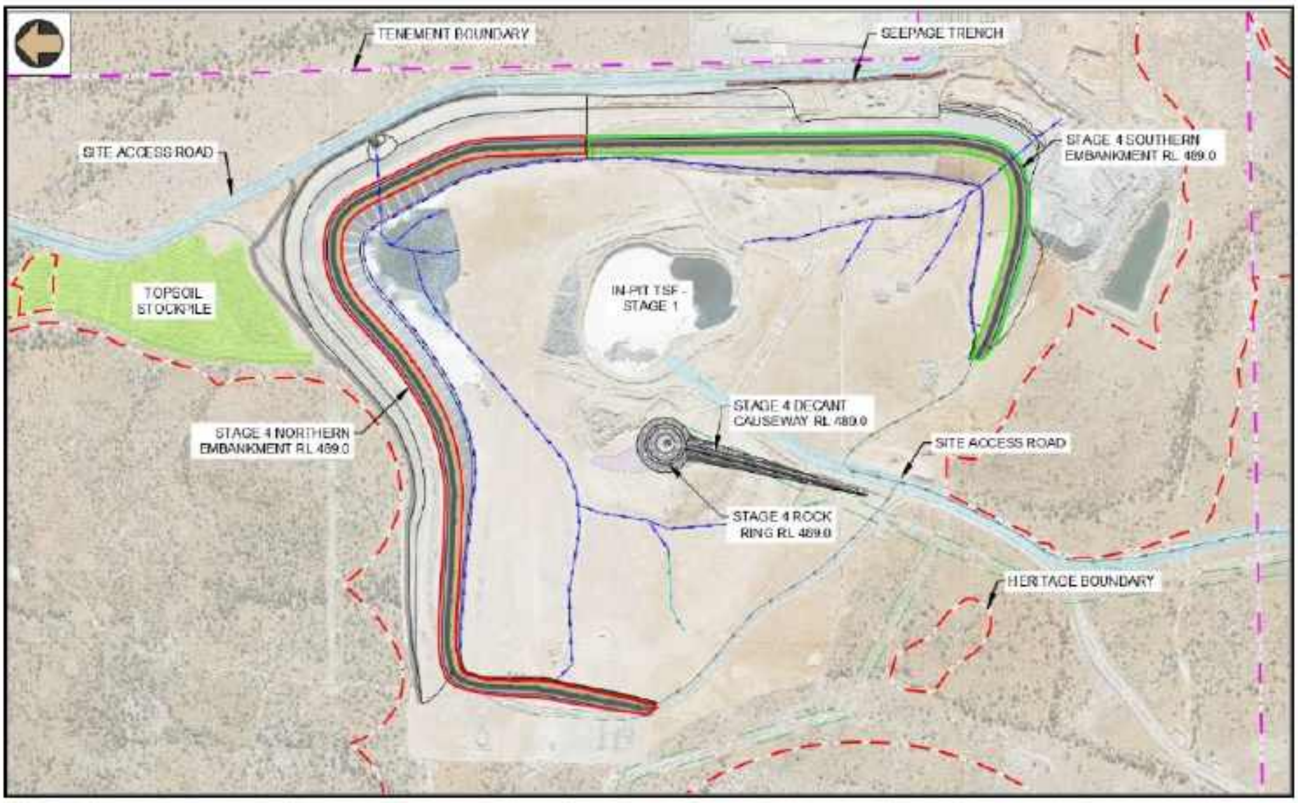
The current deposition sequence plan which was first implemented during the construction of Stage 3 to support its completion, has now been slightly adjusted to facilitate the phased construction of Stage 4. This adjustment in deposition sequence is made to ensure adequate time for Stage 4 construction completion and CCIR approval, while maintaining uninterrupted operations. The capacities for Stages 2 and 3, along with their stage sequencing order, is summarized in Table 2.

Table 2: Storage Capacities Stage 2 and 3

Parameter	Stage 2 Intermediate Storage (Ongoing)	Stage 3 (Future-Awaiting CCIR Approval)	Stage 2 Remaining Storage (Future)
Crest Elevation (m RL)	484.5	484.5	484.5
Crest Height (m)	10.7	22.5	10.7
Maximum Discharge Elevation (m RL)	483.2	484.2	484.2
Assumed Average Dry Density (t/m^3)	1.40	1.40	1.40
Storage Capacity (Mt)	0.76	1.57	0.21
Cumulative Tailings (Mt)	0.76	2.33	2.54
Storage Capacity (Mm^3)	0.54	1.12	0.15
Cumulative Capacity (Mm^3)	0.54	1.66	1.81
Stage Life (years)	0.6	1.2	0.1
TSF Cumulative Life (years)	0.6	1.8	1.9

The Stage 4 embankment is proposed to be constructed in two phases—Stage 4 North and Stage 4 South—adopting the same approach used for Stages 2 and 3 to ensure uninterrupted operations during construction. A deposition sequencing plan has been developed to facilitate the timely completion of Stage 4 construction while maintaining a centralized pond within the IWLTSF facility.

Figure 2: IWLTSF Stage 4 North and Stage 4 South Layout



Stage 4 North will be temporarily operated for an intermediate storage following its CCIR approval to support the completion and subsequent CCIR approval of Stage 4 South. Once CCIR approval for Stage 4 South is obtained, tailings deposition will continue in Stage 4 South for a period of time to allow the beach elevation to match that of Stage 4 North, ensuring the pond remains centralized within the facility. Thereafter, the remaining capacity of Stage 4 will be operated as a single storage facility, with tailings deposition cycled along the entire perimeter embankment.

IWLTSF Stage 4 has been designed with a 4.5 m downstream embankment raise to maximise stage storage life while ensuring mine waste material availability for timely construction. IWLTSF Stage 4, at an assumed average dry density of 1.40 t/m³, the facility is projected to provide 2.11 Mm³ of storage capacity for 2.95 Mt of tailings. The overall Stage 4 North and Stage 4 South storage capacities, along with their sequencing order, are summarised in Table 3.

Table 3: Design Storage Capacities Stage 4

Parameter	Stage 4		
	North Intermediate	South Intermediate	Remaining North & South
Crest Elevation (m RL)	489.0	489.0	489.0
Crest Height (m)	27.0	27.0	27.0
Maximum Discharge Elevation (m RL)	486.2	486.2	488.7
Assumed Average Dry Density (t/m³)	1.40	1.40	1.40
Storage Capacity (Mt)	0.64	0.55	1.76
Cumulative Tailings (Mt)	0.64	1.19	2.95
Storage Capacity (Mm³)	0.46	0.39	1.26
Cumulative Capacity (Mm³)	0.46	0.85	2.11
Stage Life (years)	0.4	0.3	1.1
TSF Cumulative Life (years)	0.4	0.7	1.8
Stage Average Rate of Rise (m/y)	12.7	10.3	3.4

2.3 Tenure and Site Conditions

2.3.1 Location

The BGP is situated approximately 40 km by road north of the town of Leinster and can be accessed from the Goldfields Highway. The project locality is presented in Figure 3. The proposed IWLTSF Stage 4 North (footprint in red outline) and Stage 4 South (footprint in green outline) configuration is presented in Figure 2.

Figure 3: Bellevue Gold Project Locality

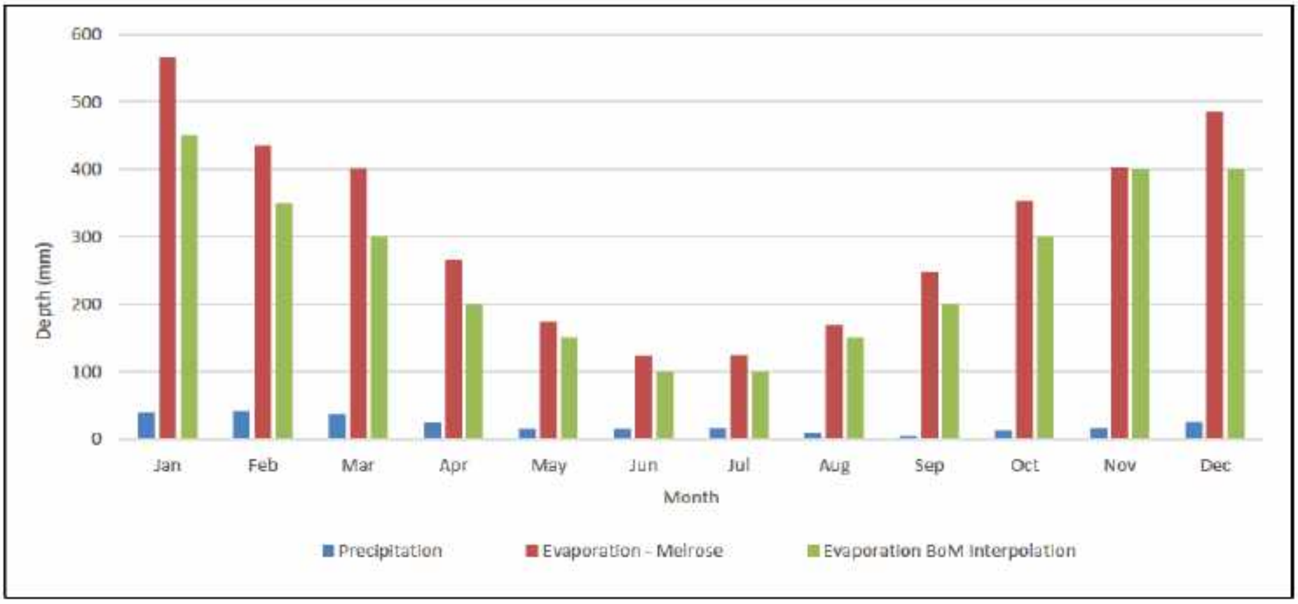
2.3.2 Climate

Data from the Bureau of Meteorology (BoM) weather station nearest to the site has been used to evaluate the climate of the project area. Presented in Table 4 are the long-term temperature and rainfall data (1994-2020) for Leinster (BoM Site 012314), located approximately 40 km south of the site. Evaporation data for the site was sourced from Technical Note 65 for Western Australia for Melrose (~60 km from Leinster). This is presented alongside an interpolation of monthly BOM Climatology Data (1975 to 2005) in Figure 4.

Table 4: Average Monthly Rainfall and Evaporation

Parameter	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Mean Max. Temp.*	°C	37.3	35.5	31.8	28.0	23.2	19.4	19.0	21.7	25.7	30.2	32.8	35.7	-
Mean Min. Temp*	°C	23.3	22.3	19.2	15.4	10.4	7.3	6.1	7.7	10.8	15.1	18.3	21.3	-
Mean Rainfall*	mm	38.5	40.5	36.0	24.6	14.3	14.6	16.0	8.9	3.6	11.8	15.7	25.4	259.3
Highest Rainfall*	mm	133.4	128.4	193.8	74.2	94.8	64.4	72.8	45.0	26.8	69.4	77.2	125.8	439.4
Evap. Melrose**	mm	566	435	401	265	174	123	124	169	247	353	403	486	3,746
Evap. BoM Interp***	mm	450	350	300	200	150	100	100	150	200	300	400	400	3,100
*1994-2020 (BoM Site 012314); ** Technical Note 65; *** BoM 1975-2005														

Figure 4: Average Monthly Rainfall and Evaporation



2.3.3 Surface Topology

The local area consists of basaltic hills ranging up to 30 m above the surrounding colluvial plains and salt lakes and characteristically extensively covered by blocky scree. Colluvial and alluvial cover is generally thin, and outcrops of basement rocks are common on most hills in the area.

2.3.4 Geology

2.3.4.1 Regional Geology

The regional geology has previously been described by BGL (Brooks et al 2019). The BGP sits within the Yakabindie domain of the Agnew-Wiluna Greenstone Belt of the Eastern Goldfields Super Terrane, on the Sir Samuel 1:250,000 map sheet.

The Yakabindie domain consists of the layered Kathleen Valley gabbro (dated at 2.736 Ga – Black et al 2003) overlain by the tholeiitic Mt Goode basalt sequence. A mixed sequence of metamorphosed ultra-mafics and felsic volcanics overly the Mt Goode basalts and in turn sit underneath the unconformable boundary of a late basin conglomeratic sequence (the Jones Creek conglomerates). The domain is bounded to the east by the crustal scale Keith-Kilkenny Shear (Perseverance Fault) and bounded by the Ida Lineament to the West.

2.3.4.2 Local Geology

The surface geology of the Bellevue Project area is readily separated into two areas; subcrop to outcrop in the north and transported alluvium/colluvium in the south. The outcrop consists of Archean mafic lithologies in a range of low hills with thin veneer of residual soils overlying moderately weathering rock to depths of between 10 m to 30 m. Shallow Tertiary and Quaternary colluvium can be found on the slopes and alluvium can be found along the drainage lines of the project area which sits immediately to the west of the northern section of Lake Miranda, part of the local paleo-drainage system. Lake Miranda is a playa lake system dominated by gypisferous dunes, lunettes and sandy, clayey, evaporitic lake floor deposits.

Pleistocene red sand sheets and dunes form remnant deposits to a few metres thickness on the lower, western flanks of the hills. This sand/silt material has been reworked into the lake floor deposits with the evaporites.

2.3.5 Hydrogeology and Hydrology

2.3.5.1 Hydrogeology

The known paleochannel aquifer systems are to the south and east of the Project area. The main aquifer of relevance to mining and dewatering is the fractured-rock aquifer, which is comprised of greenstones, granitoids and minor intrusive rocks. The greenstone belt in the project area is aligned in a north to south orientation, with the associated faults and fracture sets also aligned in this direction. The fractured rock aquifer characterises the extents and degree of fracturing and the interconnectedness of such fractures along strike. Typically, such fractured rock aquifers are quite localised and low in groundwater storage. This preferred orientation for faulting also gives an asymmetry to the preferential flow paths for groundwater, with drawdown propagation expected to extend further along strike (north south), while being more limited across strike (east west).

The pre-mining groundwater levels at Bellevue range between 15 m to 30 m below ground level (mbgl), depending on topography, equivalent to about ~460 m above height datum (m AHD). The levels indicate a relatively flat groundwater gradient regionally towards the south, which is consistent with the regional groundwater flow direction following the major paleo-drainage lines. Groundwater is hypersaline with TDS in the range of 90,000 to 120,000 mg/L.

Groundwater within the Project area flows south from the mine area to the Lake. The lake acts as a groundwater sink where water is lost to the environment and salts concentrate. Water levels at the lake are typically far shallower than at the mine area and may be less than two meters below the surface. These waters support halophytic vegetation across the lake, some which has cultural significance.

2.3.5.2 Design Storm Events

Design rainfall depths (mm) for the project site obtained from the BoM 2016 Rainfall IFD (Intensity Frequency Duration) Data System are shown on Table 5. The design storm storage requirement under DMP (2015) and ANCOLD (2012) guidelines is for a 1:100 year 72-hour duration rainfall event (highlighted in grey) in Table 5.

Table 5: Rare Design Rainfall Depths

Event Duration	Annual Exceedance Probability (1 in x)				
	1 in 100	1 in 200	1 in 500	1 in 1,000	1 in 2,000
24-hour	44	161	191	214	240
48-hour	176	205	248	284	324
72-hour	194	230	283	328	378
96-hour	205	244	303	354	411
120-hour	211	252	314	368	430
144-hour	214	256	319	374	438
168-hour	214	257	319	374	440

2.3.6 Probable Maximum Precipitation

The Probable Maximum Precipitation (PMP) is the theoretically greatest rainfall that is physically possible, based on current knowledge, over a given area for a certain duration.

The Probable Maximum Precipitation (PMP) across the IWLTSF Stage 4 was estimated in accordance with guidelines published by the Australian Bureau of Meteorology (BOM) using the Generalised Short Duration Method (GSDM). The GSDM is noted as being suitable for estimating PMP for durations up to 6 hours for small catchments across all of Australia, including tailings dams and small reservoirs.

The GSDM provides the following equation for estimating PMP:

$$PMP = (S \times D_s + R \times D_R) \times MAF \times EAF$$

Where:

S = Smooth terrain weighted factor

D_S = Smooth terrain rainfall depth read from Depth Duration Area (DDA) curves

R = Rough terrain weighted factor

D_R = Rough terrain rainfall depth read from Depth Duration Area (DDA) curves

MAF = Moisture Adjustment Factor

EAF = Elevation Adjustment Factor

The PMP was estimated based on a maximum duration limit of 4.1 hours for the IWLTSF Stage 4 catchments utilising GSDM as detailed in Table 6.

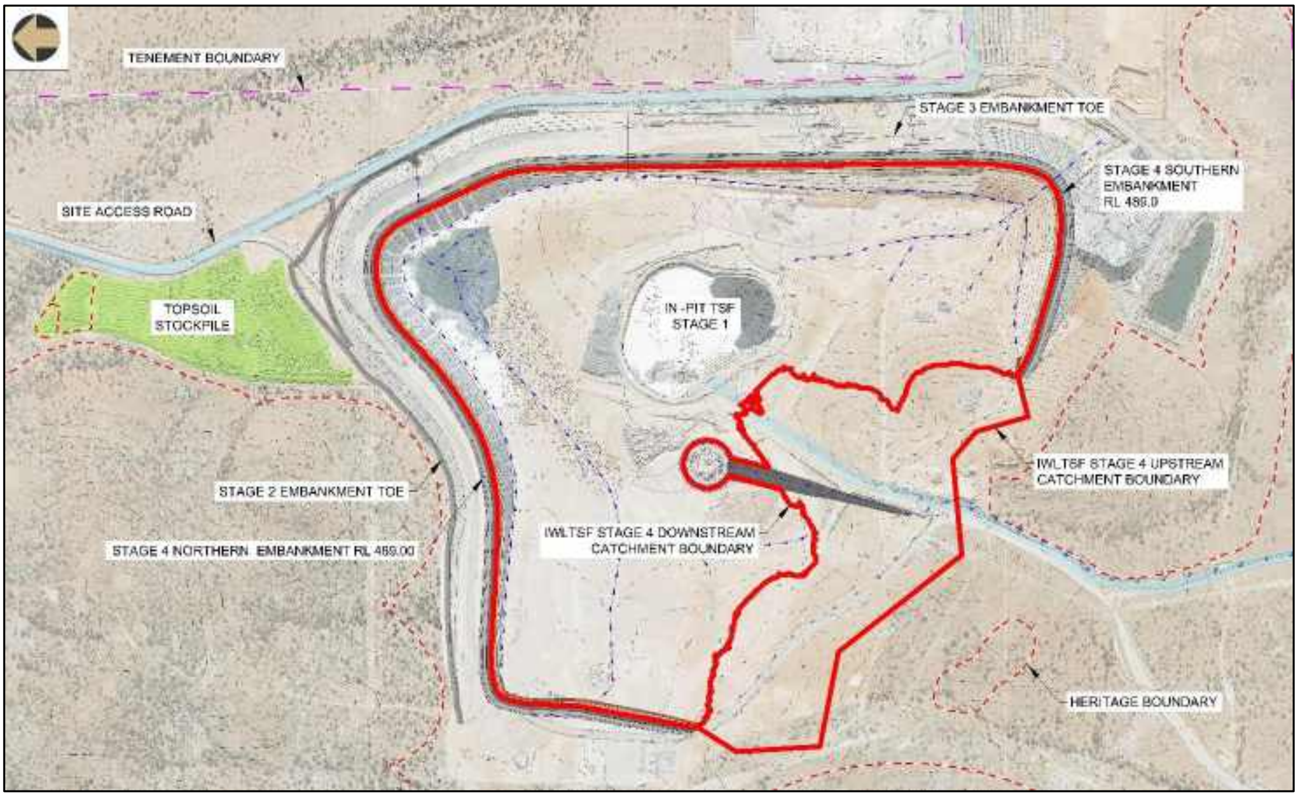
Table 6: PMP Calculation Based on GSDM

Facility	S	R	D_S (mm)	D_R (mm)	MAF	EAF	PMP (mm)
IWLTSF Stage 4	0.0	1.0	-	1,108	0.82	1	910

2.3.7 Catchments

The total catchment area for the proposed IWLTSF Stage 4 is estimated to be approximately 69.9 ha. This includes contributions from the upstream catchment area of 15.1 ha, which partially drains into the facility, and direct runoff from the tailings beach catchment area of 54.8 ha. The combined rainfall runoff volume from these catchments is estimated to be approximately 0.64 Mm^3, based on assumed runoff coefficients of 0.5 for the upstream catchment and 1.0 for the tailings beach catchment. The IWLTSF Stage 4 catchment area is illustrated in Figure 5.

Figure 5: IWLTSF Stage 4 Total Catchment



2.3.8 Runoff

The project site is sparsely vegetated, strewn with cobbles and gravel and sloping topography. An appropriate rational method runoff coefficient for sparsely vegetated areas with soils such as those observed for the upstream catchment of the IWLTSF would be approximately C = 0.5.

The Australian Rainfall and Runoff Data Hub (accessed December 2020) indicates that there are no storm loss data for the project location. Instead, the Australian Rainfall and Runoff: A guide to Flood Estimation (Book 5; Flood Hydrograph Estimation, 2019) was referred to for regional storm initial losses and continuing losses.

The project is located within Region 2, represented by a more uniform climate as opposed to regions that are represented by summer-dominant and winter-dominant climates (the far north or far south of the country). Based on the prediction equations for Region 2, the Initial Loss (IL) and Continuing Loss (CL) are estimated at 37.5 mm and 2.7 mm/hr respectively. It should be noted that the recommended values are derived based upon only 35 catchments (across Australia) and the standard error of the estimates range between 20% and 50%.

Because of the limited number of catchments available, the prediction equations are based upon one or two independent variables. However, it is anticipated that a wide range of characteristics combine to influence the loss values for a particular catchment and therefore judgement is recommended when selecting suitable values for use in design.

For example, for catchments with very dense vegetation, it would be expected that the loss values would be higher. Similarly, steep catchments with little vegetation would be expected to have lower loss values. For the Pilbara, Flavell and Belstead (1986) recommended IL values of approximately 40 mm to 50 mm and a CL of 5 mm/h.

It should be noted that the loss values were derived from reconciling rainfall-based estimates with flood frequency analysis and thus the IL reflects a burst initial loss, and a higher initial loss would be expected if complete storms are adopted, so the range of IL reported by Flavell and Belstead (1986) should be considered a lower limit of expected IL values.

On this basis, a runoff coefficient of C = 0.50 for the IWLTSF upstream catchment has been adopted for the design water balance and pumping requirements.

2.3.9 Sub-surface Conditions and Foundations

2.3.9.1 General

A series of initial Geotechnical Site Investigations (GSI) were carried out between November 2020 and June 2023 within the IWLTSF footprint to assess subsurface conditions and foundation characteristics as part of the IWLTSF Stage 2 and Stage 3 design. As a continuation of these works, additional GSI was recently undertaken for the IWLTSF Stage 4 between November 2024 and February 2025. A report register for the existing GSI works is presented in Table 7.

Table 7: GSI Report Register

Date	Test	Test ID's	Report Referenced
Nov 2020 – Dec 2020	Test Pit	TSF-TP01 to 20	WSD, WPBE, TSF Stage 1 and IPTSF Stage 2 Detailed Design Report Rev 0 (July 2022), P19-11-PR-14, Page 26 – 31, Appendix A and B
Jan 2021	Diamond Core Drilling	BH3A and BH6	
May 2021	RC Drilling	IWL-BH01 to BH16, IWL-BH19 to 20, IWL-BH22 to 23, IWL-BH25 to 27, IWL-BH29 to 32 and IWL-BH35	
May 2021	Test Pit	C-TP01 to C-TP08	
Apr 2023	Test Pit	TP01 to 20	Tailings Storage Facility Design Basis Report (December 2024), P19-11-PR-28 R03 DBR, Page 17 and 18
Nov 2024 - Feb 2025	Diamond Core Drilling	BH01 to 06	IWLTSF Stage 4 North and Stage 4 South Detailed Design Report (March 2025), P19-11PR-29-R01.

2.3.9.2 GSI – November 2020 to December 2020

An initial Geotechnical Site Investigation (GSI) was carried out between the 30th of November and 7th of December 2020 (Ref: P19-11-PR-14). This GSIs comprised:

- Excavation of 20 test pits within the proposed IWLTSF footprint;
- Recovery of disturbed soil samples for laboratory testing;
- Laboratory testing of disturbed soil samples.

2.3.9.2.1 Test Pits (November – December 2020)

A total of twenty (20) test pits, conducted between the 30th of November and 7th of December 2020, were excavated across the proposed IWLTSF location using a 35 t excavator to depths of up to 5.2 m. All test pits were logged and photographed by the supervising engineer and samples were collected from selected pits for laboratory testing. All the tests' pits were backfilled with excavated soil on completion of sampling.

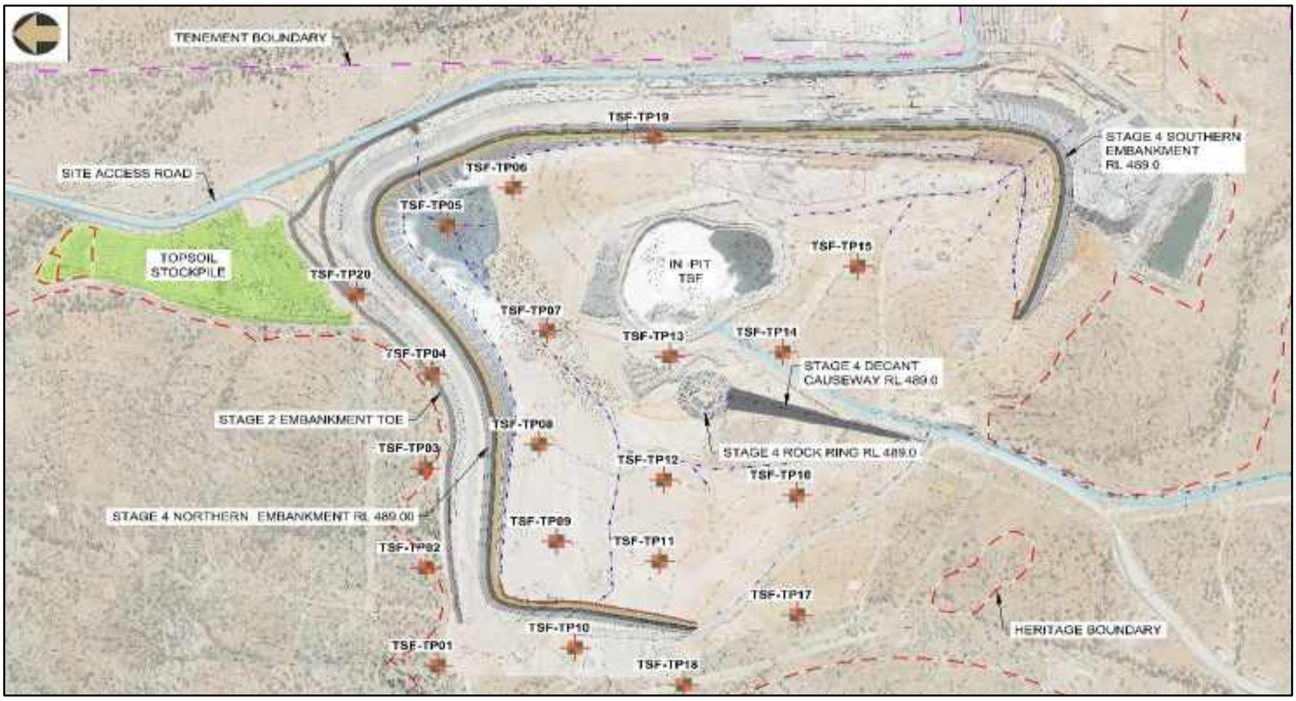
The typical sub-soil stratigraphy at the IWLTSF site was found to comprise a surficial cover of transported colluvial soils, comprising unconsolidated surficial deposits dominated by sandy, gravelly and silty soil. Across much of the IWLTSF site, this layer is underlain by a surficial layer of weathered calcrete, occasionally interbedded with basalt. In other areas the surficial cover of transported colluvial soils is directly underlain by a layer of blocky basalt cobbles and boulders. Where the surficial calcrete layers were broken through, underlying colluvial soils were uncovered comprising of a sandy, gravelly, clayey soil interbedded with some gypsum crystals and weathered basalt cobbles and boulders. Along the eastern most ridge of the IWLTSF site the surficial colluvial soils are underlain by a surficial layer of residual duricrust (hardpan) comprising of variably (iron) cemented soil.

The test pit locations relative to the IWLTSF embankments are presented in Figure 6. A summary of the test pitting is presented in Table 8.

Table 8: Summary of Test Pits (November 2020 – December 2020)

Test Pit Number	Eastings (m E)	Northings (m N)	Depth to Colluvium (m)	Depth to Rock (m)	Colluvium Thickness (m)
TSF-TP01	258,831	6,942,891	0.0	0.1	0.1
TSF-TP02	259,006	6,942,910	1.3	4.0	2.7
TSF-TP03	259,184	6,942,911	1.0	4.2	3.2
TSF-TP04	259,353	6,942,900	0.0	0.1	0.1
TSF-TP05	259,618	6,942,876	1.7	5.2	3.5
TSF-TP06	259,686	6,942,773	0.0	0.1	0.1
TSF-TP07	259,430	6,942,719	0.0	0.2	0.2
TSF-TP08	259,227	6,942,732	0.0	0.1	0.1
TSF-TP09	259,053	6,942,704	0.9	4.1	3.2
TSF-TP10	258,863	6,942,675	0.0	0.15	0.15
TSF-TP11	259,018	6,942,542	1.2	3.5	2.3
TSF-TP12	259,163	6,942,535	0.0	0.15	0.15
TSF-TP13	259,384	6,942,526	0.0	0.1	0.1
TSF-TP14	259,392	6,942,348	0.0	0.1	0.1
TSF-TP15	259,545	6,942,230	2.5	4.0	1.5
TSF-TP16	259,136	6,942,326	0.0	0.15	0.15
TSF-TP17	258,922	6,942,325	1.9	4.0	2.1
TSF-TP18	258,797	6,942,504	0.0	0.2	0.2
TSF-TP19	259,776	6,942,550	0.0	0.15	0.15
TSF-TP20	259,495	6,943,019	1.8	4.2	2.4
Note: Coordinate Reference System: UTM GDA94 Datum (Zone 51)					

Figure 6: Test Pit Locations (November – December 2020)



2.3.9.3 Diamond Core Drilling - January 2021

A total of two (2) diamond core boreholes were drilled across the proposed IWLTSF location between the 25th of January and 29th of January 2021 (Ref: P19-11-PR-14). These boreholes were drilled to depths of between 6.0 m and 9.0 m using a track mounted drilling rig supplied and operated by Edge Drilling Pty Ltd. All boreholes were drilled from ground surface using HQ3 size triple-tube coring techniques with mud flush.

All core was photographed and logged by the supervising geotechnical engineer. The core was placed into core trays and subsequently transported to the laboratory for sample selection and testing.

Standard Penetration Tests (SPT's) were undertaken during drilling with pocket penetrometer testing conducted at select depths. The sub-surface profile across both boreholes was relatively consistent and in-line with ground conditions identified during the test pit programme.

The sub-surface profile encountered at BH3A can be described as:

- Lateritic soils containing varying portions of gravel, sand, silt and clay, extending to a depth of 7.95 m, overlying;
- BASALT, slightly weathered – fresh, high – extremely high strength.

The sub-surface profile encountered at BH6 can be described as:

- CALCRETE, very low – low strength, extending to a depth of 0.6 m, overlying;
- Lateritic soils containing varying portions of gravel, sand, silt and clay, extending to a depth of 3.5 m, overlying;
- Lateritic soils with BASALT cobbles and gravels, extremely - highly weathered, very low strength, becoming interbedded with very low – medium strength, highly – moderately weathered CALCRETE.

The diamond core borehole locations relative to the IWLTSF embankments are presented in Figure 7. A summary of the drilling works is presented in Table 9.

Table 9: Summary of Diamond Core Boreholes (January 2021)

Borehole Number	Eastings (m E)	Northings (m N)	Depth to Colluvium (m)	Depth to Rock (m)	Colluvium Thickness (m)
BH3A	259,681	6,942,325	0.0	7.9	7.9
BH6	259,597	6,943,025	0.6	5.0	4.4
Note: Coordinate Reference System: UTM GDA94 Datum (Zone 51)					

Figure 7: Diamond Core Borehole Locations (January 2021)

2.3.9.4 Rotary Core Drilling - May 2021

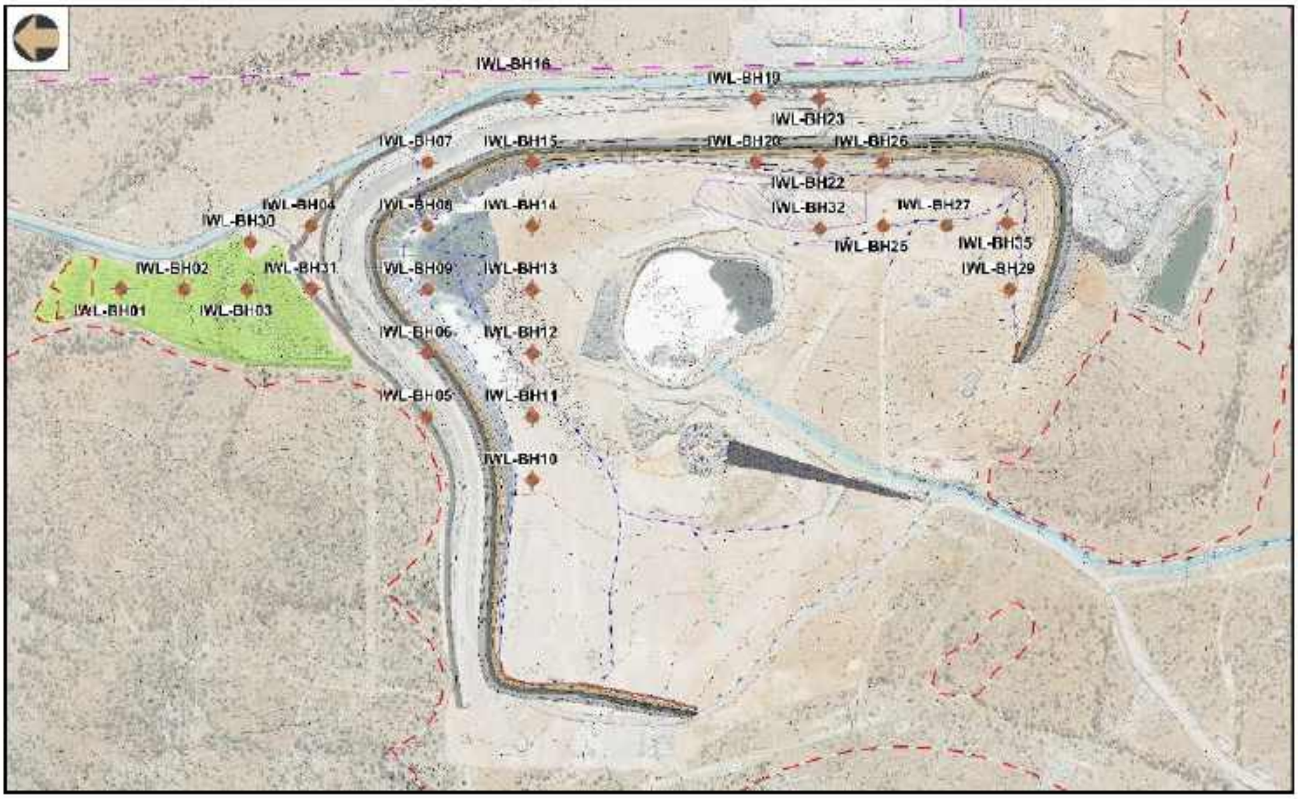
Following the GSI works conducted in November 2020 and January 2021, additional GSI were carried out between the 3rd and 11th of May 2021 (Ref: P19-11-PR-14). These GSIs comprised a total of twenty-eight (28) rotary core boreholes across the proposed IWLTSF footprint. These boreholes were drilled to depths of between 2.0 m and 24.0 m below ground surface using a track mounted drilling rig supplied and operated by Topdrill Pty Ltd. All rotary core cuttings were photographed and logged by the supervising geotechnical engineer.

The diamond core borehole locations relative to the IWLTSF embankments are presented in Figure 8. A summary of the drilling works is presented in Table 10.

Table 10: Summary of Rotary Core Boreholes (May 2021)

Borehole Number	Eastings (m E)	Northings (m N)	Depth to Colluvium (m)	Depth to Rock (m)	Colluvium Thickness (m)
IWL-BH01	259,566	6,943,390	NE	1.0	NE
IWL-BH02	259,565	6,943,291	2.0	10.0	8.0
IWL-BH03	259,565	6,943,191	2.0	6.0	4.0
IWL-BH04	259,665	6,943,091	NE	1.0	NE
IWL-BH05	259,365	6,942,908	NE	0.0	NE
IWL-BH06	259,465	6,942,908	NE	0.0	NE
IWL-BH07	259,765	6,942,907	1.0	5.0	4.0
IWL-BH08	259,665	6,942,907	0.0	4.0	4.0
IWL-BH09	259,565	6,942,907	1.0	4.0	3.0
IWL-BH10	259,265	6,942,743	NE	0.0	NE
IWL-BH11	259,365	6,942,743	1.0	4.0	3.0
IWL-BH12	259,465	6,942,743	1.0	3.0	2.0
IWL-BH13	259,565	6,942,743	NE	0.0	NE
IWL-BH14	259,665	6,942,743	0.0	22.0	22.0
IWL-BH15	259,765	6,942,743	3.0	7.0	4.0
IWL-BH16	259,865	6,942,743	3.0	16.0	13.0
IWL-BH19	259,865	6,942,391	6.0	11.0	5.0
IWL-BH20	259,765	6,942,391	2.0	7.0	5.0
IWL-BH22	259,765	6,942,291	0.0	8.0	8.0
IWL-BH23	259,865	6,942,291	0.0	4.0	4.0
IWL-BH25	259,665	6,942,191	NE	0.0	NE
IWL-BH26	259,765	6,942,191	1.0	10.0	9.0
IWL-BH27	259,665	6,942,091	1.0	5.0	4.0
IWL-BH29	259,565	6,941,991	NE	0.0	NE
IWL-BH30	259,640	6,943,187	NE	3.0	NE
IWL-BH31	259,566	6,943,090	NE	0.0	NE
IWL-BH32	259,661	6,942,290	NE	2.0	NE
IWL-BH35	259,670	6,941,996	1.0	5.0	4.0
Note: Coordinate Reference System: UTM GDA94 Datum (Zone 51), NE = Not Encountered					

Figure 8: Rotary Core Borehole Locations (May 2021)



2.3.9.5 Test Pits - May 2021

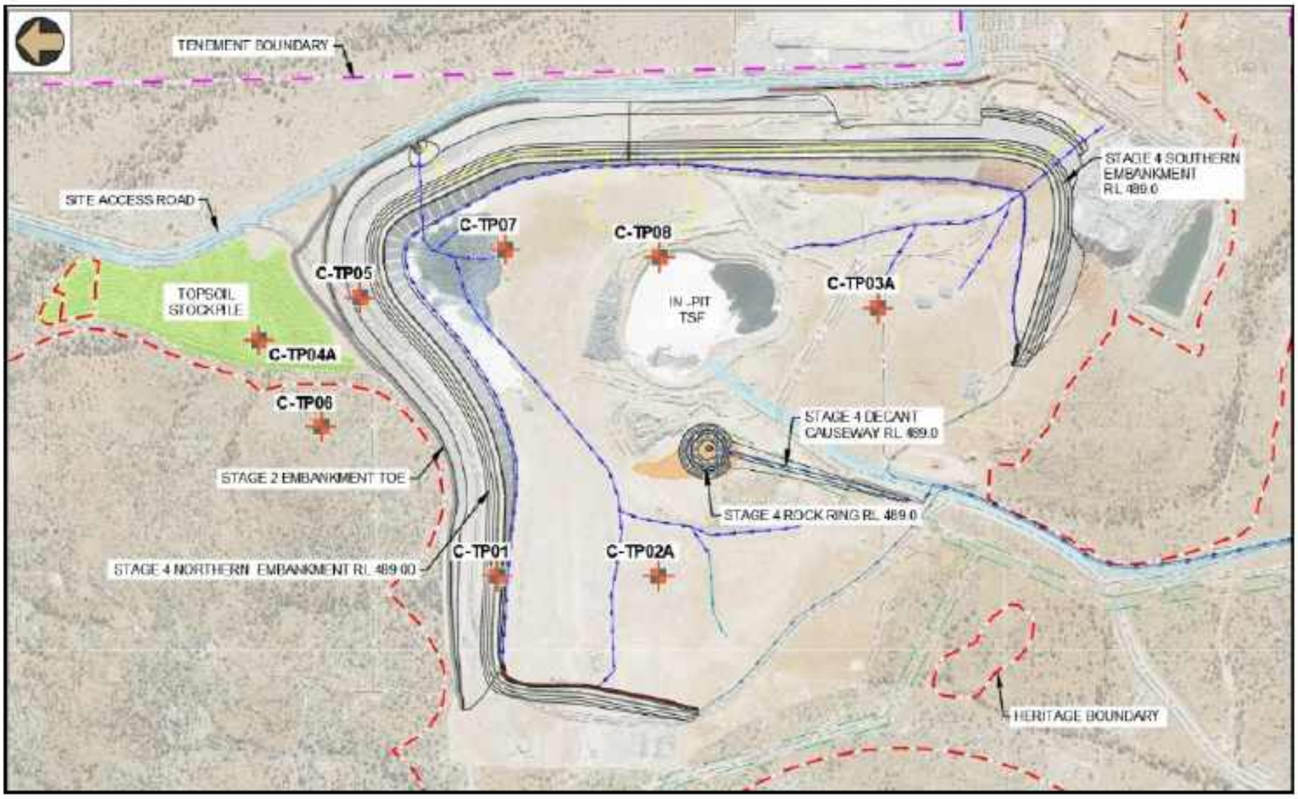
A total of eight (8) calcrete sample test pits were excavated at the proposed IWLTSF location, on the 19th of May 2021, to the maximum depth of the calcrete (1.0 m) to inform geochemical test work related to acid neutralisation (Ref. P19-11-PR-14). A summary of the test pitting is presented in Table 11. The test pit locations relative to the IWLTSF embankments are presented in Figure 9. The site sub-soil stratigraphy on the proposed IWLTSF site comprises the following:

- Silty SAND / sandy SILT, extending to a depth of 0.2 m, overlying;
- CALCRETE, moderately to slightly weathered, low to medium strength, extending to a depth of 1.0 m.

Table 11: Summary of Test Pits (May 2021)

Test Pit Number	Eastings (m E)	Northings (m N)	Depth to Silty Sand (m)	Depth to Rock (m)
C-TP01	259,093	6,942,819	0.3	0.5
C-TP02A	259,096	6,942,523	0.2	0.5
C-TP03A	259,498	6,942,204	0.3	0.6
C-TP04A	259,498	6,943,199	0.2	1.0
C-TP05	259,569	6,942,995	0.2	0.7
C-TP06	259,354	6,943,093	0.2	0.7
C-TP07	259,624	6,942,786	0.2	0.7
C-TP08	259,622	6,942,532	0.2	1.0

Figure 9: Test Pit Locations (May 2021)



2.3.9.6 GSI – April 2023

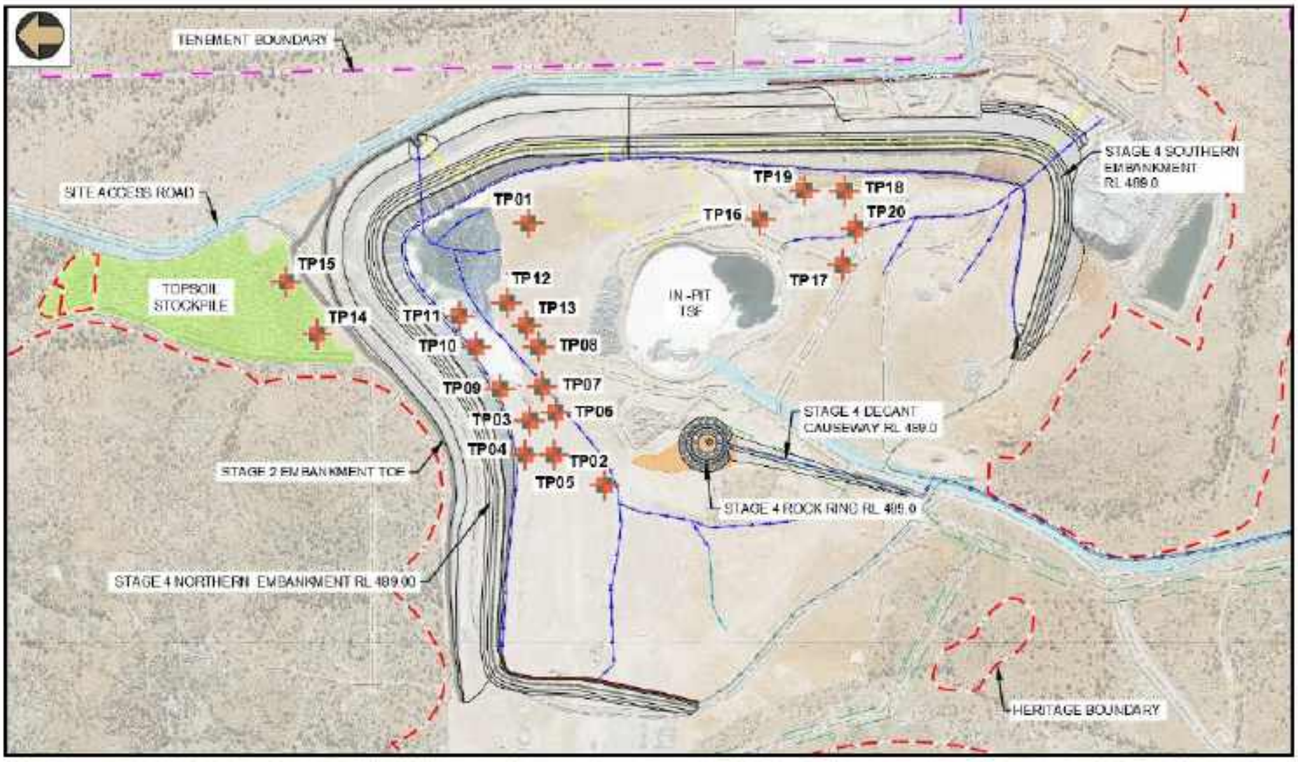
A total of twenty (20) test pits were conducted across the proposed IWLTSF footprint in April 2023 to the maximum depth of 3.5 m. A summary of the test pitting is presented in Table 12. The test pit locations are presented in Figure 10.

Table 12: Summary of Test Pit

Test Pit Number	Eastings (m E)	Northings (m N)	Depth to Soil (m)	Depth to Rock (m)
TP01	259,666	6,942,747	2.3	3.5
TP02	259,259	6,942,620	1.0	2.5
TP03	259,363	6,942,744	0.5	2.5
TP04	259,316	6,942,751	0.5	1.7
TP05	259,315	6,942,711	0.5	2.3
TP06	259,369	6,942,712	0.5	2.0
TP07	259,408	6,942,719	0.4	0.7
TP08	259,415	6,942,748	0.6	1.6
TP09	259,410	6,942,799	1.0	3.0
TP10	259,470	6,942,828	0.6	1.2
TP11	259,517	6,942,862	0.5	0.7
TP12	259,525	6,942,778	0.4	1.2
TP13	259,467	6,942,733	0.6	0.0
TP14	259,507	6,943,106	0.1	0.3
TP15	259,577	6,943,126	1.4	2.4

Test Pit Number	Eastings (m E)	Northings (m N)	Depth to Soil (m)	Depth to Rock (m)
TP16	259,688	6,942,323	0.2	2.1
TP17	259,611	6,942,260	0.1	0.3
TP18	259,714	6,942,238	0.5	1.3
TP19	259,732	6,942,282	0.15	1.4
TP20	259,665	6,942,240	0.2	0.4
Note: Coordinate Reference System: UTM GDA94 Datum (Zone 51)				

Figure 10: Test Pit Locations



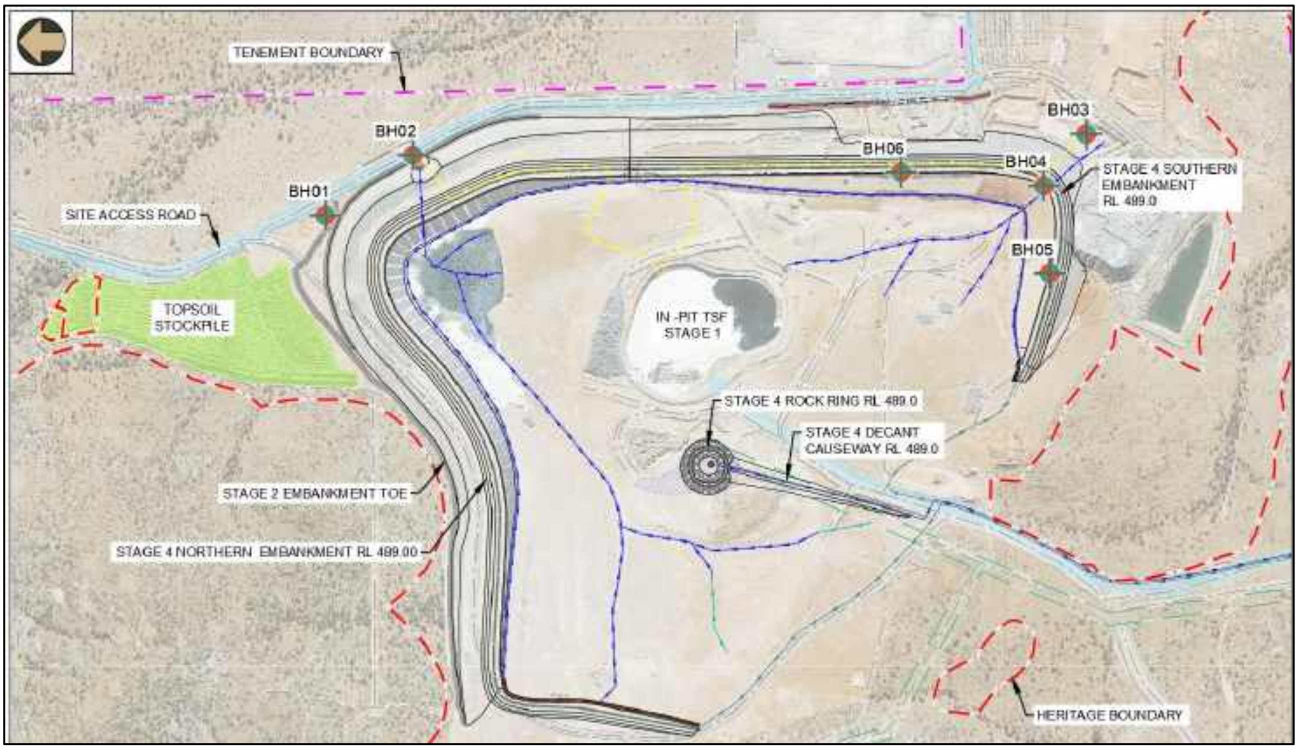
2.3.9.7 GSI – November 2024-February 2025

A total of six (6) boreholes were conducted on the existing IWLTSF (Stage 2 and 3) embankment and downstream between 25th November 2024, and 03rd February 2025, to the maximum depth of 54.0 m. A summary of the borehole is presented in Table 13. The borehole locations are presented in Figure 11.

Table 13: Summary of Borehole Material

Test Pit Number	Eastings (m E)	Northings (m N)	Depth to Soil (m)	Depth to Weathered Zone (m)	Depth to Fresh Rock (m)
BH01	259,711.9	6,943,073.9	2.0	25.3	34.5
BH02	259,807.2	6,942,935.6	9.0	40.4	45.8
BH03	259,852.0	6,941,827.0	2.9	31.2	39.0
BH04	259,761.8	6,941,939.4	19.8*	29.2	47.5
BH05	259,618.6	6,941,931.7	15.5*	-	27.0
BH06	260,235.6	6,940,355.8	13.9*	24.4	40.3
Note: * Embankment Rockfill					

Figure 11: Borehole Locations (November 2024 – February 2025)



2.3.9.8 Interpreted Subsurface Conditions

Based on the previous GSIs the typical sub-soil stratigraphy across the IWLTSF site is understood to comprises a surficial cover of transported colluvial soils, comprising unconsolidated surficial deposits dominated by sandy, gravelly and silty soil. Across parts of the IWLTSF storage basin, this layer is underlain by a surficial layer of weathered calcrete, occasionally interbedded with basalt. In other areas, the surficial cover of transported colluvial soils is directly underlain by a layer of near surface competent basalt rock formations comprising a mixture of cobbles and boulders.

In localised areas where the surficial calcrete layers are broken through, underlying colluvial soils can be uncovered comprising sandy, gravelly and clayey soils which can be interbedded with some gypsum crystals. These soils are typically encountered for a couple of metres underlying the surficial calcrete layers with maximum depths of approximately 4.0 m. In areas the soils can also occur with an interbedded mixture of basalt cobbles and boulders with varying weathering. Along the eastern most ridge of the IWLTSF site (northeast of the Vanguard Pit) the surficial colluvial soils are underlain by a near surface layer of residual duricrust (hardpan) comprising of variably (iron) cemented soil.

The near surface competent ground comprising basalt rock formations or hardpan duricrust are typically present in areas upgradient of the IWLTSF storage basin, to the north, west and southwest, and typically underlay the majority of the IWLTSF embankment structure.

The colluvial soils which underly the weathered calcrete is typically located in lower lying areas across the eastern portion of the IWLTSF storage basin. These low-lying areas within the storage basin ultimately approach two drainage channels at the northeast and southeast corners of the IWLTSF embankments, which are understood to overly ancient paleochannel formations. The ground conditions across the paleochannel formations contrast the broader sub-surface conditions identified across the IWLTSF area identified during the original GSI programmes.

The most recent GSI programme conducted between November 2024 and February 2025, involved targeted diamond borehole drilling within these ancient paleochannel features, downstream and within the existing embankments. The interpretation of the borehole data indicates that the stratigraphy across these paleochannels typically comprise:

- A surficial layer of colluvial soils; overlying

- Residual duricrust (hardpan) of variably iron-cemented soil (present only at the northeast paleochannel); overlying
- An extremely weathered saprolite zone of very stiff to very hard clay; overlying
- Saprock of highly to moderately weathered basalt rock; overlying
- Competent basalt bedrock.

The overall extent of the weathering profile across the paleochannels is extensive, with fresh competent bedrock encountered at approximately 35 m to 40 m and 38 m bgl at the northeast and southeast paleochannels respectively. Based on GSI data, the weathering profile is more extensive to the southeast, however, both areas are in stark contrast to the sub-surface conditions which form the foundation for the majority of the IWLTSF embankment foundations.

2.3.9.9 Laboratory Testing

2.3.9.9.1 GSI November - December 2020

Laboratory testing was carried out, from the GSI work carried out between the 30th of November and 7th of December 2020, on selected disturbed samples recovered from test pits and boreholes across the site in order to characterise the materials for design and construction purposes. The testing was carried out by a NATA accredited laboratory in accordance with Australian Standards and comprised the following:

- Particle Size Distribution (PSD) with Hydrometer (AS 1289 3.6.3, 3.5.1 and 2.1.1);
- Atterberg Limits (AL) with Linear Shrinkage (AS 1289.2.1.1, 7.1.1, 3.1.1, 3.2.1 and 3.4.1);
- Standard Maximum Dry Density (SMDD) (AS 1289.5.1.1);
- 8 Stage Oedometer with Unloading (AS 1289 6.6.1);
- Falling Head Permeability (AS 1289 6.7.2);
- Emerson Class (AS 1289.3.8.1); and
- Pinhole Dispersion (AS 1289.3.8.3).

A summary of the laboratory test results is presented below in Table 14.

Table 14: Summary of Laboratory Testing (November - December 2020)

Sample Number	PSD			Physical Parameters								
	Fines (<75 um)	Sand (>75 um)	Gravel (>2 mm)	Liquid Limit	Plastic Limit	Plastic Index	Linear Shrinkage	Maximum Dry Density	Optimum Moisture Content	Pinhole Dispersion	Emerson Class	Permeability (Remoulded 95% SMDD)
	%	%	%	%	%	%	%	t/m³	%	No.	No.	m/s
TSF-TP02_1.30_4.00	21.4	44.2	34.4	45.45	31.78	13.67	5.78	1.70	20.0	-	-	-
TSF-TP03_1.80_4.20	28.5	43.7	27.8	47.76	37.88	9.89	3.03	1.75	16.5	-	-	-
TSF-TP09_0.90_1.80	31.4	44.5	24.1	58.02	35.56	22.45	7.19	1.80	15.0	-	-	-
TSF-TP09_1.80_4.10	54.6	27.7	17.7	61.92	41.11	20.81	13.45	1.49	31.0	-	-	-
TSF-TP11_1.20_2.10	27.9	43.6	28.5	52.21	37.23	14.98	6.58	1.75	16.5	-	-	-
TSF-TP17_1.90_4.00	43.0	30.7	26.3	50.56	41.28	9.28	8.52	1.65	17.5	-	-	-
TSF-TP20_1.80_4.20	36.5	39.9	23.6	50.41	34.95	15.47	9.56	1.51	24.5	-	-	-
BH-3A_1.00_1.50	85.8	14.0	0.2	69.47	39.25	30.23	18.55	1.50	21.0	-	5	5.7E-8
BH-3A_2.45_3.00	93.0	7.0	0.0	77.99	38.79	39.2	20.74	1.60	17.5	PD2	-	7.9E-8
BH-3A_4.00_4.50	84.7	13.9	1.4	82.63	46.09	36.55	22.28	1.55	17.0	-	5	4.0E-8
BH-3A_5.50_6.00	87.1	11.8	1.1	70.73	41.48	29.25	19.52	1.65	17.0	PD2	-	9.2E-8
BH-6_0.45_0.80	75.7	22.3	2.0	60.72	46.11	14.61	12.21	1.40	27.0	-	5	2.5E-8
BH-6_2.00_2.50	95.5	4.1	0.4	76.44	44.87	31.57	17.48	1.55	19.0	ND1	-	5.2E-8

2.3.9.9.2 GSI November 2024 - February 2025

Laboratory testing is currently in progress for the GSI works carried out between 25th of November 2024 and 3rd of February 2025 on selected disturbed and undisturbed core samples and SPT samples recovered from boreholes on the existing IWLTSF (Stage 2 and 3) embankment and downstream in order to characterise the materials for design and construction purposes.

Samples from three (3) boreholes drilled downstream of the existing IWLTSF embankment have been completed, while testing of samples from the remaining three (3) boreholes on the existing embankment is ongoing, with results expected by early April. The testing is being conducted by a NATA-accredited laboratory in accordance with Australian Standards and includes the following:

- Particle Size Distribution (PSD) with Hydrometer (AS 1289 3.6.3, 3.5.1 and 2.1.1);
- Atterberg Limits (AL) with Linear Shrinkage (AS 1289.2.1.1, 7.1.1, 3.1.1, 3.2.1 and 3.4.1);
- Consolidated Undrained Triaxial (CUTX) (AS 1289.6.4.2);
- Unconsolidated Undrained Triaxial (UUTX) (ASTM D2850);
- Oedometer Consolidation (AS 1289.6.6.1);
- Triaxial Permeability (AS 1289.6.7.3).

A summary of the completed test results is presented below in Table 15.

Table 15: Summary of Laboratory Testing (November 2024 - February 2025)

Sample Number	PSD		Physical Parameters						CUTX			UUTX
	Fines (<75 um)	Sand (>75 um)	Gravel (>2 mm)	Liquid Limit	Plastic Limit	Plastic Index	Linear Shrinkage	Triaxial Permeability	Undrained Shear Angle (Stage 1 and Stage 3)	Undrained Cohesion (Stage 1 and Stage 3)		Undrained Shear Strength
	%	%	%	%	%	%	%	m/s	°	kPa		kPa
BH01_CB1_2.00_3.00	-	-	-	-	-	-	-	$2.03E^{-7}$	32.21	15.15		81
BH01_SPT02_3.00_3.45	37.2	52.1	10.7	41.26	23.07	18.19	9.09	-	-	-	-	
BH01_UDS02_4.95_5.30	52.7	53.4	0.7	43.20	19.92	23.28	11.66	$7.58E^{-9}$	31.80	34.13		127.5
BH01_CB3_8.60_8.80	19.6	45.4	35.0	36.36	24.09	12.26	6.21	$1.81E^{-9}$	32.21	21.17		186.5
BH01_CB04_11.00_12.00	45.6	29.8	24.6	36.95	22.48	14.46	7.17	-	-	-		-
BH01_16.00	-	-	-	-	-	-	-	-	39.69	22.72	249.5	
BH01_CB5_14.00_24.00	43.8	50.5	6.7	54.32	22.97	31.35	15.61	$5.36E^{-7}$	-	-	-	
BH02_UDS02_9.50_9.79	36.0	56.1	7.9	62.23	35.86	26.37	13.14	$3.07E^{-8}$	53.59	30.96		107.5
BH02_UDS03_11.00_11.39	54.4	44.6	1.0	52.48	32.26	20.21	10.54	$2.35E^{-8}$	27.02	30.49	301	
BH02_UDS04_12.50_12.95	51.0	48.0	1.0	58.88	33.76	25.12	12.56	$1.97E^{-7}$	33.82	62.32	120	
BH02_UDS05_14.00_14.45	58.1	39.2	2.7	76.63	34.62	42.02	20.71	$6.13E^{-8}$	36.13	50.83	255.5	
BH02_SPT10_16.50_16.95	38.1	34.2	3.9	54.49	23.38	31.11	15.16	-	-	-	-	
BH03_UDS02_5.00_5.45	46.1	53.4	0.5	60.88	42.21	18.67	9.17	$6.67E^{-8}$	31.38	101.28		144
BH03_UDS04_8.00_8.45	80.7	19.2	0.1	77.84	37.67	40.17	20.42	$3.23E^{-8}$	27.92	27.72		100.5
BH03_UDS06_11.00_11.25	47.7	52.2	0.1	56.05	23.04	33.01	16.45	$0.96E^{-8}$	27.92	33.03		149.5
BH03_UDS08_14.00_14.45	69.2	30.5	0.3	68.61	32.37	36.24	18.39	$2.45E^{-8}$	29.68	162.93	300	

2.3.9.10 Seismic Condition

In the absence of any site-specific Probabilistic Seismic Hazard Assessment (PSHA) information, the publicly available Atlas of Seismic Hazard Maps of Australia (Geoscience Australia 2018) has been referenced as part of this report. For the IWLTSF, the 1:2,000-year (ANCOLD High C SEE) ARI bedrock PGA is estimated to be 0.045 g. The design bedrock PGA has been factored from the 500-year bedrock PGA of 0.020 g.

Ground shaking motion can be amplified or attenuated as it travels from the bedrock surface to the ground surface, and the degree of amplification or attenuation can be quantified through a site response analysis using software such as Oasys Siren or Geomotions SHAKE2000 in conjunction with multiple spectra-matched earthquake time histories and is typically undertaken as part of a PSHA.

In the absence of a PSHA with site response analysis findings, an approximate estimation of the ground surface motion considering soil amplification/attenuation effects can be done by referencing the characteristic natural period of the soil cover overlying bedrock against the design uniform hazard spectrum provided in the Atlas, and the corresponding spectral acceleration is taken to represent the ground surface PGA accounting for such effects. For this approximation given that the IWLTSF is constructed overlying up to approximately 36.0 m of laterite and saprolite extremely weathered materials, overlying rigid rock, the soil effect factor is taken as 1.9.

Besides soil cover influence on the bedrock ground motion, the reflection and diffraction of seismic waves as they reach the IWLTSF slope surfaces can also cause further amplification of ground motions within soils close to the slope surface and is referred to as topographical amplification. Eurocode 8 Designs of structures for earthquake resistance Part 5: Foundations, retaining structures and geotechnical aspects and the New Zealand Transport Agency report NZ TA 613 Seismic design and performance of high cut slopes provides recommendations for topographical amplification factors to be applied to the bedrock PGA on top of soil effects.

Accordingly, a topographical amplification factor of 1.2 is deemed appropriate for the slope geometry of the IWLTSF and has been considered as such in this report. Sections 4.7.2.3 and 4.7.2.4 detail the horizontal acceleration coefficient calculated based on these factors.

2.4 Retaining Structure Properties

The IWLTSF Stage 4 embankment is proposed to be constructed using mine waste, specifically Zone 3A and Zone 3B material sourced from underground mine waste, compacted in lifts through traffic compaction.

Zone 3B will form the bulk of the downstream embankment and will be constructed in maximum 1.0 m traffic-compacted lifts. Following this, Zone 3A will be placed in maximum 0.5 m traffic-compacted lifts. The upstream batter, designated as Zone 3C, will be constructed using transitional material, including historic Vanguard mine waste and borrow pit stockpiles.

The upstream embankment face is proposed to be HDPE-lined. As part of the HDPE liner installation the embankment face will first be lined with a mix of lateritic and saprolitic material, which will be roller-compacted (or constructed with another acceptable method) to create a suitable cohesive subgrade for the HDPE liner. A Bidim A24 geotextile (or equivalent) will then be installed over the subgrade to provide additional puncture protection.

Additionally, the Stage 4 embankment extension, extending across natural ground beyond the existing Stage 2 and Stage 3 embankments, will include a cutoff trench. The cutoff trench will be constructed with Zone 1 low permeability material.

2.4.1 Low Permeability Material – Zone 1

The cutoff trench is proposed to be constructed with low permeability material from obtained from suitable laterite sources available across the site. The cutoff trench is aimed to intercept lateral seepage through and beneath the embankments. The low permeability Zone 1 will be constructed in 300 mm lifts with a minimum required dry density of 95% SMDD and +/-2% OMC. Zone 1 low permeability material must meet the requirement listed in Table 16.

Table 16: Proposed Zone 1 Material Properties

Property	Test Method	Requirement
Soil Classification	AS 1726	SM, SC, GM, GC
Particle Size Distribution	AS 1289	100 % passing 75 mm, > 15 % passing 75 µm
Compacted In-Situ Density	AS 1289	95% SMDD
Plasticity Index	AS 1289	< 20 %
Liquid Limit	AS 1289	< 50 %

2.4.2 HDPE Liner

The HDPE liner proposed for the embankment face is a 1.5 mm thick ATARFIL-HD TM-TMO M EVO AR grade, single-side texture – underside, UV and alkaline resistance or an equivalent alternative.

2.4.3 HDPE Subgrade

The HDPE subgrade is proposed to be constructed from material that has been stockpiled from borrow pit development within Stage 3 basin. This material comprises a mixture of lateritic soil, weakly cemented duricrust and extremely weathered saprolite. During compaction under machine load, oversize particles expected to break and form a cohesive subgrade that suitable for HDPE liner installation. As an additional measure geotextile has been introduced to address any concerns related to oversize remain unbroken and poses a risk to puncture that mitigate by spreading pressure exerted by underlaying rock.

Based on initial sample collected from this borrow pit material and tested, the material characteristic identified are presented in Figure 12 and Figure 13.

Figure 12: Particle Size Index Test Results - HDPE Subgrade

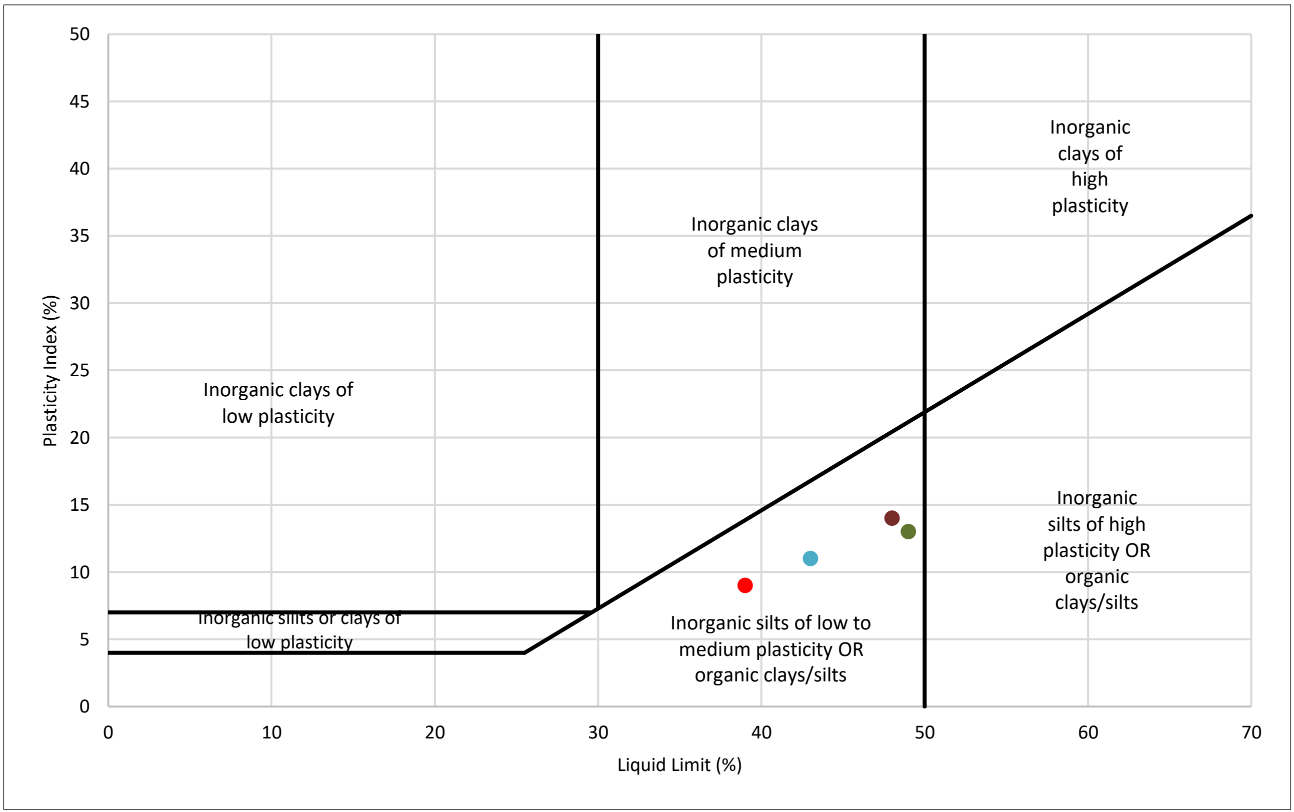
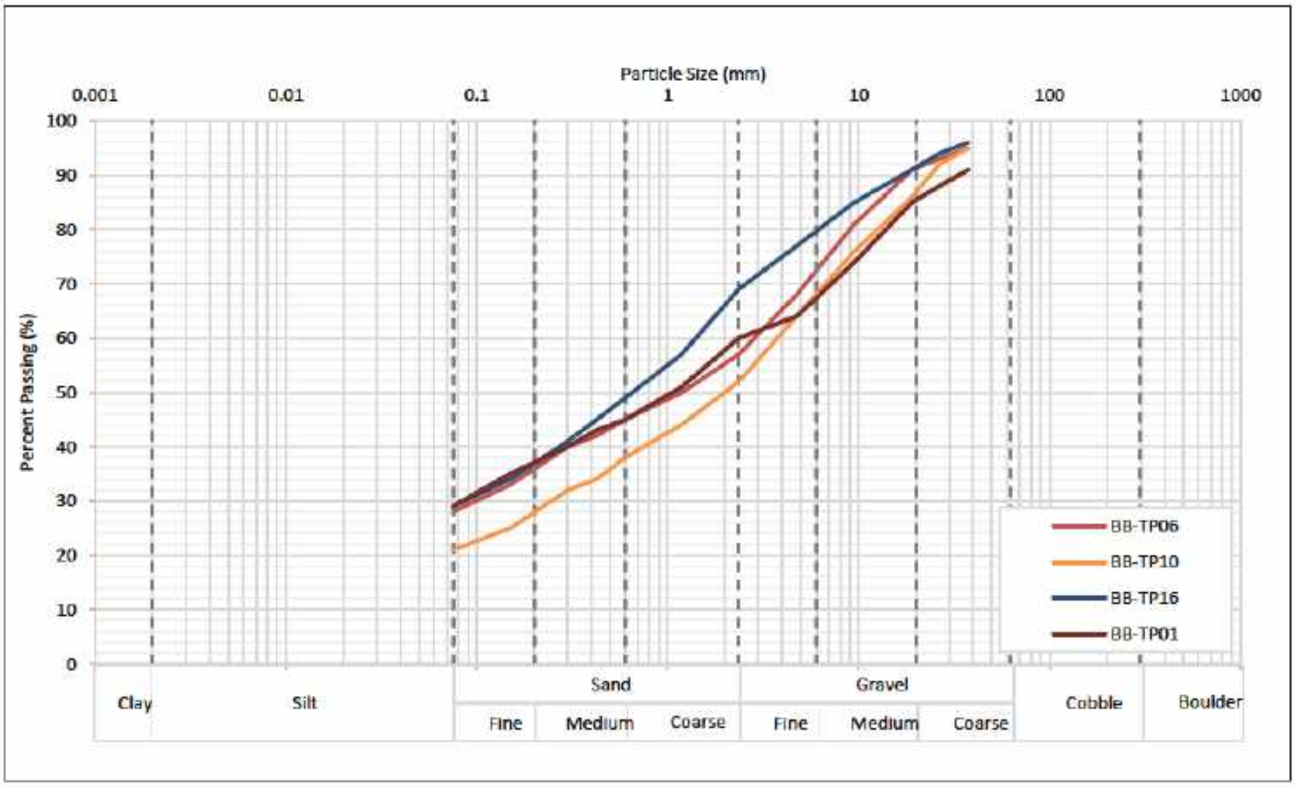


Figure 13: Material Particle Size Distribution Test Results - HDPE Subgrade



Given that the proposed HDPE subgrade minimum thickness is 200 mm, the subgrade does not contribute or affect the strength of the retaining structure. However, the parameters adopted for HDPE subgrade in the absence of laboratory testings and for the purpose of seepage and slope stability analysis are presented in Table 17.

Table 17: Proposed HDPE Subgrade Material Shear Strength Parameters

Material Allocation	Bulk Density (kN/m^3)	Effective Stress Parameters		Total Stress Parameters	
		ϕ' (°)	C' (kPa)	ϕ (°)	C or Su (kPa)
Roller Compacted HDPE Subgrade	18	26	5	-	30

2.4.4 Transitional Material – Zone 3C

Transitional material Zone 3C is proposed to be sourced from historic Vanguard mine waste and borrow pit stockpiles that were rejected for not being suitable for HDPE subgrade during borrow pit development within Stage 3 basin. These materials comprise extremely weathered material to highly weathered rock and duricrust. These materials observed to have distribution of particle size with sufficient fine that enhance binding and interlock when traffic compacted in 300 mm lifts and provide suitable zone that transition between fresh mine waste rock and HDPE subgrade.

Based on site observation of these two materials, the material characteristic adopted is presented in Table 18.

Table 18: PSD Observed in Proposed Zone 3C Material

Parameter	Value
% passing 200 mm	100
% passing 2.36 mm	50

Long term drained strength parameters are quantified by the effective friction angle. In the absence of laboratory testing, the effective friction angle is derived from anecdotal data. Cohesion is not considered in the long-term analyses as it should not be relied upon for geotechnical stability. The geotechnical shear strength parameter values for the traffic compacted transition Zone 3C forming the IWLTSF upstream batter of the embankment is summarised and presented in Table 19.

Table 19: Proposed Zone 3C Material Shear Strength Parameters

Material Allocation	Bulk Density (kN/m³)	Effective Stress Parameters		Total Stress Parameters	
		φ' (°)	C' (kPa)	φ (°)	C or Su (kPa)
Traffic Compacted Zone 3C	20	34	0	-	-

2.4.5 Mine Waste – Zone 3A and Zone 3B

Waste rock material is produced at a rate of approximately 1.0 Mtpa. It is proposed that the waste rock material is hauled downstream of the proposed IWLTSF Stage 4 embankments for placement and compaction to progressively form the downstream zone of the IWLTSF embankments.

In the absence of laboratory test data, the expected mine waste particle size distribution is based on anecdotal data and prior experience using underground run of mine waste is presented in Table 20.

Table 20: Expected Mine Waste PSD

Parameter	Value
% passing 550 mm	95
% passing 270 mm	80
% passing 134 mm	60
% passing 47 mm	40
% passing 7 mm	20
% passing 1 mm	10

Long term drained strength parameters are quantified by the effective friction angle. In the absence of laboratory testing, the effective friction angle is derived from anecdotal data. Cohesion is not considered in the long-term analyses as it should not be relied upon for geotechnical stability. The geotechnical shear strength parameters of mine waste in the downstream zone of the IWLTSF Stage 4 embankment, evaluated based on the different compaction methods used for Zone 3A and Zone 3B are summarized in Table 21.

Table 21: Mine Waste Shear Strength Parameters

Material Allocation	Compaction Method	Bulk Density (kN/m³)	Effective Stress Parameters		Total Stress Parameters	
			φ' (°)	C' (kPa)	φ (°)	C or Su (kPa)
Zone 3A Waste Rock	Traffic Compacted 0.5 m Lifts	22	36	0	-	-
Zone 3B Waste Rock	Traffic Compacted 1.0 m Lifts	21	35	0	-	-

3. Tailings Properties

3.1.1 Laboratory Testing

Representative primary tailings samples were provided to E-Precision laboratory in Perth for geotechnical testing. The laboratory test schedule for the tailings samples included:

- Particle Size Distribution (PSD) with hydrometer (AS 1289 3.6.3, 3.5.1 and 2.1.1).
- Atterberg limits test (AS 1289 2.1.1, 3.1.1, 3.1.2, 3.2.1, 3.3.1, and 3.4.1).
- Air-drying tests (not an Australian Standard Test); and
- Settling tests (undrained and drained) (not an Australian Standard Test).

3.1.2 Primary Tailings Test Results

The results of the PSD, SPD and AL testing for the primary ore tailings are presented in Table 22. The results of the tests are attached as Appendix E.

Table 22: Tailings Characterisation Test Results

Parameter	Value
% finer than 75 µm	84.7
% finer than 2 µm	17.2
Soil Particle Density (t/m3)	2.99
Liquid Limit (%)	31.27
Plastic Limit (%)	25.68
Plasticity Index (%)	5.59
Linear Shrinkage (%)	1.72

Settling tests (undrained and drained) and air-drying tests have been executed at 55% and 60% solids to assist with the assessment and evaluation of the use of a tailings thickener in the processing of the tailings.

The objective of the settling tests is to monitor the tailings settlement and the development of clear supernatant water in both undrained and drained conditions. For the drained settling tests, water was removed through the base of the test cylinder and measured on top of the tailings where supernatant water developed. By monitoring the underdrainage and supernatant, the percentage of water recovered with respect to the initial volume of water in the slurry can be determined.

These measurements provide an indication of how much water will be available for recovery and the speed at which this water is released. The results of the settling and air-drying tests are summarised in Table 23. The laboratory results in Appendix E show the available supernatant water with respect to the total water discharged to the tailings storage.

Table 23: Tailings Settlement and Drying Results

Parameter	Value – 55% Slurry Density	Value – 60% Slurry Density
Cv at 12.5 kPa (m^2/yr)	46.4	53.8
Permeability at 12.5 kPa (m/s)	1.3 E-6	1.5 E-6
Cv at 50.0 kPa (m^2/yr)	45.0	52.6
Permeability at 50.0 kPa (m/s)	3.1 E-7	2.9 E-7
Undrained Supernatant Water (%)	24.5	21
Undrained Density (t/m^3)	1.4	1.52
Drained Supernatant Water (%)	20	13
Drained Density (t/m^3)	1.52	1.82
Underdrainage Water (%)	6	8
Air Drying Density (t/m^3)	1.36	1.48
Air Drying Time (days)	4.8	4.8

The points to note from the laboratory results are:

- Oedometer test results indicate that the tailings consolidate relatively quickly (Cv of 45 m^2/yr to 50 m^2/yr), although the consolidated permeabilities remain high. At an assumed maximum overburden stress of 50 kPa the permeability of the tailings is estimated to be approximately 3.0 E^{-7} m/s. In practice this value will likely vary between 1.0 E^{-8} m/s and 1.0 E^{-9} m/s as consolidation is accelerated by water removal through the underdrainage and decant systems, and saturation of the fractured bedrock.
- Supernatant water available for recovery from the undrained settling test (i.e. no underdrainage installed) for slurry densities of 55% solids and 60% solids is approximately 24.5% and 21%, respectively within 24 hours.
- The dry densities at the completion of the undrained tests are 1.4 t/m^3 for 55% solids and 1.52 t/m^3 for 60% solids. In the semi-arid environment of the project location, it is likely that very little water would be recovered after 24 hours, except during the cooler months of the year when evaporation rates drop water recovery will be significantly higher.
- Supernatant water available for recovery from the drained settling test (i.e. underdrainage installed) for slurry densities of 55% solids and 60% solids peaks at 20% and 13%, respectively within 24 hours.
- The dry densities at the completion of the drained settling tests are 1.52 t/m^3 for 55% solids and 1.82 t/m^3 for 60% solids. In the semi-arid environment of the project location, it is likely that very little water would be recovered after 24-hours, except during the cooler months of the year when evaporation rates drop significantly, and supernatant water recovery rates will be high.
- Underdrainage water, from the drained settling test, available for recovery from both 55% solids and 60% solids, within 24-hours, peaks at 6% and 8%, respectively within 24 hours. It should be noted that for both tests, supernatant water can flow down the inside of the cylinder after approximately 24-hours. This does not mean that additional water would be recovered from the underdrainage beyond this time, as the cylinder provides a flow path which would not exist in operation; and
- The air-drying test on the tailings at 55% solids provides an estimated final dry density of 1.36 t/m^3 after 4.8 days at 50°C. The air-drying test on the tailings at 60% solids provides an estimated final dry density of 1.48 t/m^3 after 4.8 days at 50°C.

3.1.3 Tailings Design Parameters

The IPTSF (Stage 1), IWLTSF (Stage 2 and Stage 3) and future proposed IWLTSF raises will provide tailings storage capacity for the currently projected life of asset tailings production. Due to the downstream construction methodology of the IWLTSF embankments, the strength of the tailings is not relied upon for stability and no upstream raises are currently planned. Assumed tailings parameters are shown in Table 24.

Table 24: Assumed Tailings Parameters

Parameter	Units	Value
In-situ dry density (assumed average)	t/m^3	1.40
Shear strength for slope stability assessment	kPa	10
Permeability	m/s	$1x10^{-6}$ to $1x10^{-7}$
Slurry Density	% (w/w)	55

No rheological test work was carried out as part of this design. Furthermore, design of mechanical infrastructure is not within the scope of this study.

3.1.4 Geochemical Characterisation of Tailings

Earlier 'static' testing (i.e. 'whole-rock' assays and tests) on variability tailings samples indicated that Total Sulphur is not expected to exceed 3.1% (average of 2.41% across 6 samples). Detailed testing of a tailings sample derived from a life-of-mine ore composite has a Sulphide-S value of 2.8%, and a capacity to buffer near pH 7 of 10 kg H2SO4/tonne chiefly reflective of trace amounts of calcite. The sulphide mineral suite comprises mostly pyrrhotite with subordinate pyrite. The tailings classify as Potentially Acid Forming (PAF).

Preliminary results from 'kinetic' (weathering) testing conducted at 30°C, and at an intermediate moisture content of around 15% w/w, corresponding to conditions near-optimal for biogeochemical weathering. When kept constantly moist, acidification of tailings occurred after approximately 80 weeks (i.e. roughly 18 months) during which solubility of minor elements (metals and metalloids) was tightly constrained. However, when subjected to weekly desiccation, no acidification occurred during the full period of testing, and the tailings are predicted to remain circum-neutral (pH 6-8) for up to approximately 4 years had testing continued.

In terms of the timing of routine activities during the IPTSF Stage 1 and subsequent stage IWLTSF Stage 2 and Stage 3 operation (e.g. cycle times determining exposure periods for dormant beaches), the lag time is an important design element. Based on GCA's completed test work, the lag time for the operating IPTSF Stage 1, Stage 2, and Stage 3 is now set at 18 months. This is an update from the previously defined lag time of 3 months stated in the WSD, IPTSF, TSF and IWLTSF Detailed Design Report (Ref: P19-11-PR-14 Rev 1, dated 10 November 2022).

3.1.5 Implications for Tailings Management

The initial tailings test results indicated that the tailings settle quickly and achieve a high in-situ dry density (between 1.5 t/m^3 and 1.8 t/m^3). It should be noted that laboratory test results represent ideal conditions and do not take into account segregation during deposition, seepage losses, as well as the impacts of water recovery through the decant system.

Although the dry density determinations from the settling and airdrying tests represent values obtained without consolidation of the tailings, a conservative minimum in-situ dry density of 1.40 t/m^3 was assumed initially for the IWLTSF Stage 4 and future stages. On this basis the water return from the IWLTSF Stage 4 and future stages are expected to be in the range of 40% to 55% of the slurry water in order to achieve, or exceed, the target in-situ dry densities and mitigate seepage.

4. TSF Design

4.1 Introduction

The Detailed Design of IWLTSF Stage 4 North and Stage 4 South has been aimed at optimising tailings storage capacity and maximising tailings density, maximising water recovery, and reducing the environmental and societal impacts of the facility. The design of the IWLTSF Stage 4 utilise the details discussed in Sections 4 and 5 and the guiding principles in the following standards/guidelines:

- DMP (now DEMIRS), *Guide to Departmental requirements for the management and closure of tailings storage facilities (TSFs)*, 2015
- ANCOLD, *Guidelines on the Consequence Categories for Dams*, 2012
- ANCOLD, *Guidelines of Tailings Dams, Planning, Design, Construction, Operation and Closure*, 2019.
- ANCOLD, *Guidelines for Dams and Appurtenant Structures for Earthquakes*, 2019
- DMP (now DEMIRS), *Code of Practice – Tailings Storage Facilities in Western Australia*, 2013.
- DMP (now DEMIRS), *Guide to the Preparation of a Design Report for Tailings Storage Facilities (TSFs)*, 2015.
- DMP (now DEMIRS), *Guidelines for Preparing Mine Closure Plans*, 2015

4.2 Tailings Storage Facility Design

The objectives of the design of the IWLTSF Stage 4 North and Stage 4 South is to optimise tailings storage capacity, maximise tailings density, achieve water recovery in the range of 55% of the slurry water, reduce seepage and minimise the environmental and societal impact of the facility. Tailings geochemistry test work has indicated that the tailings are PAF, therefore the design has also given consideration to the lag time, ensuring that previously deposited tailings are not exposed longer than 18 months before being covered with fresh tailings.

The embankment geometry and raise heights for Stage 4 has been determined based on constructability and the availability of on-site materials in the required volumes. One of the primary driving factors for the design height is the limitation on slope length for HDPE liner installation, ensuring the stability of the liner by minimising slippage risk and preventing long-term tension-induced damage to the liner.

The IWLTSF Stage 4 North and Stage 4 South embankment will be constructed using mine waste (Zone 3A and Zone 3B) sourced from underground mining waste, compacted in lifts through traffic compaction. Zone 3B will form the bulk of the downstream embankment and will be constructed in maximum 1.0 m traffic-compacted lifts, followed by Zone 3A in maximum 0.5 m traffic compacted lifts. The upstream batter, Zone 3C will be constructed using transitional mine waste material, including historic Vanguard mine waste and other suitable mine waste materials.

The underground development works are expected to produce mine waste at a rate of 1.0 Mtpa, providing sufficient material for embankment earthworks at minimum construction widths. However, suitable transitional mine waste material is limited across the project area. Consequently, the embankment crest width has been designed to the minimum required to meet material availability constraints.

The design has included a 2.0 m crest width for Zone 3C, with widths of 6.0 m for Zone 3A and 5.6 m for Zone 3B respectively, resulting in a total minimum crest width of 13.6 m. The total crest width of the Zone 3B layer has been based on a minimum construction width, with a downstream slope modification to 1V:1.25H above RL 484.5 m (Stage 2 and Stage 3) to facilitate progressive construction of the Stage 4 raise. The Zone 3B downstream slope below RL 484.5 m is shallower at 1.0V:2.0H to enhance global embankment stability.

The HDPE subgrade construction will follow the approach used in previous stages, with a minimum thickness of 200 mm. The upstream embankment face will be lined with mix of lateritic and saprolitic clay material, roller-compacted (or compacted and smooth by an acceptable method) to form a suitable cohesive subgrade for the HDPE liner. The HDPE subgrade will then be covered with Bidim A24 geotextile (or an equivalent material) to provide additional puncture protection before HDPE liner installation. Seaming of the liner will be carried out to connect with the existing liners on the Stage 2 and Stage 3 crests, ensuring a continuous barrier between the tailings and the underlying embankment. An anchor trench will be constructed at the crest and the HDPE liner will be keyed in for stability.

The Stage 4 embankment extension, extending across natural ground beyond the existing Stage 2 and Stage 3 embankments, will include a cutoff trench and toe drain that integrate with the existing Stage 2 and Stage 3 cutoff trenches and underdrainage network. The HDPE liner in this section will be anchored at the bottom into the cutoff trench.

IWLTSF Stage 4 decant water recovery will be facilitated by the construction of a rock ring with access provided via a decant causeway extending from ridgeline to the south of the IWLTSF. The rock ring construction has been postponed from Stage 3 and repositioned from original design locations based on an updated understanding of the surrounding ground conditions and elevations identified through the removal of the nearby Vanguard pit waste dump.

Additionally, a buttress will be constructed at the downstream toe of the IWLTSF embankment located at the southeast corner of the facility, where the Stage 3 embankment has been built to a minimum 10.0 m crest width. This buttress is designed to reinforce the embankment, ensuring compliance with the recommended minimum Factor of Safety (FoS). It will be constructed across the identified paleochannel extents, through the existing downstream borrow area at an elevation of RL 468.0 m, with a maximum height of 5.0 m and a downstream slope of 1.0:2.0 (V:H).

The Stage 4 embankment is proposed to be constructed in two phases: Stage 4 North and Stage 4 South, following the same approach as Stages 2 and 3, to ensure the continuous operation of the IWLTSF during construction.

The Stage 4 North will be constructed after the completion of Stage 2's intermediate operation, once Stage 3 is commissioned and during its operational period. During this time, tailings will be pushed from the Stage 3 south and eastern embankments toward the IPTSF, keeping the pond positioned close to the IPTSF.

Upon the conclusion of Stage 3's operation, when the remaining storage in Stage 2 is resumed for operation, Stage 4 South will be constructed. During this period, tailings will be pushed from the Stage 4 North across the north and eastern embankments towards the IPTSF and rock ring, while the pond is ultimately navigated towards the rock ring.

Since the timeline for Stage 4 South construction and CCIR approval cannot be completed within the remaining storage life of Stage 2, Stage 4 North will need be operated at an intermediate level until Stage 4 South is ready for commissioning. The available period for the construction and CCIR approval of Stage 4 North is estimated to be 14 months, spanning from the conclusion of Stage 2's intermediate storage to the end of Stage 3. Similarly, the available period for the construction and CCIR approval of Stage 4 South is estimated to be 6.5 months, from the conclusion of Stage 3 to the completion of Stage 4's intermediate storage.

The intermediate storage is designed to accommodate a 1:100-year annual exceedance probability (AEP) 72-hour storm event while maintaining required freeboards within the IWLTSF and directing the decant pond toward the rock ring. Additionally, the final configuration of IWLTSF Stage 4 provides capacity for the 1:100-year annual exceedance probability (AEP) 72-hour storm event, incorporating DMP required freeboard and ANCOLD additional freeboard.

The IWLTSF Stage 4 North (footprint in red outline) and Stage 4 South (footprint in green outline) configuration are shown in plan view in Figure 14, while embankment geometries are presented in cross-sections from Figure 15 to Figure 17. The IWLTSF Stage 4 detailed design drawings are included in Appendix A.

Figure 14: IWLTSF Stage 4 General Arrangement (Plan)

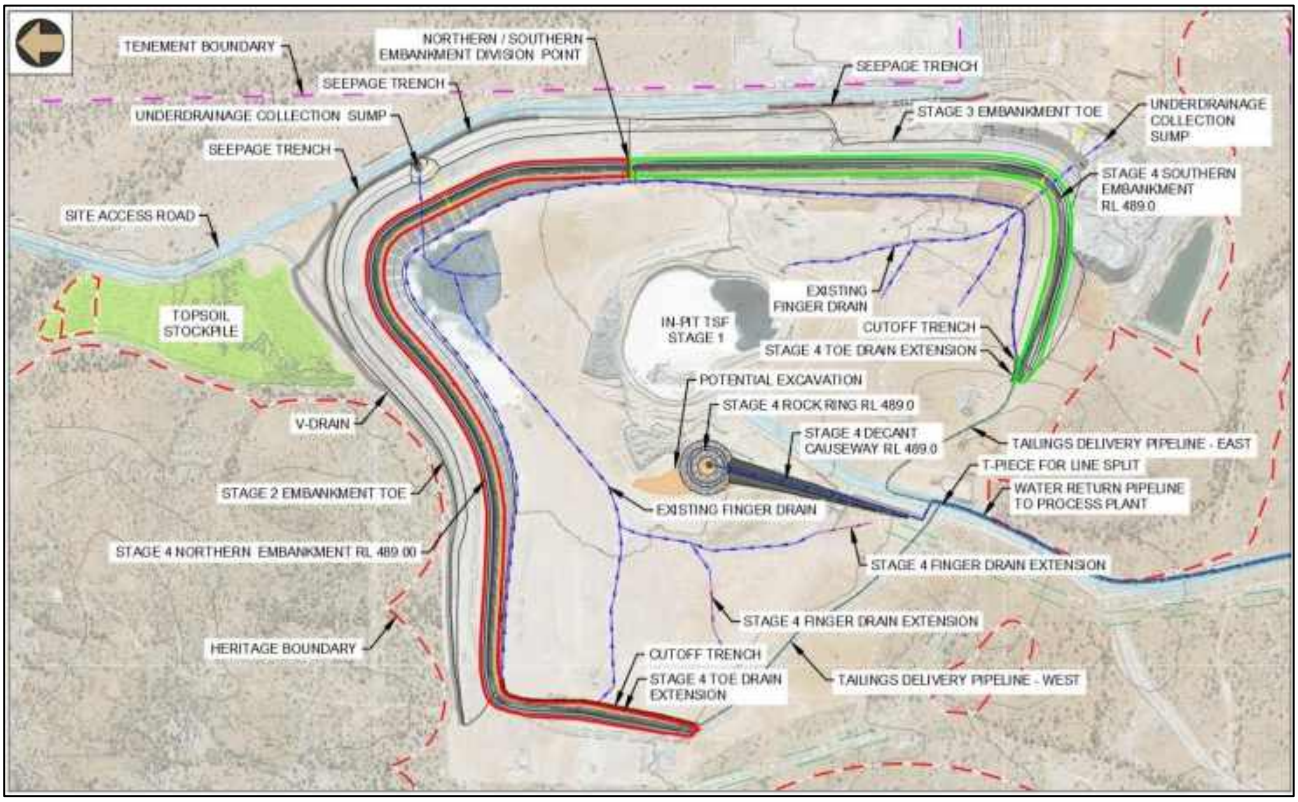


Figure 15: Typical Section IWLTSF Stage 4 North Embankment

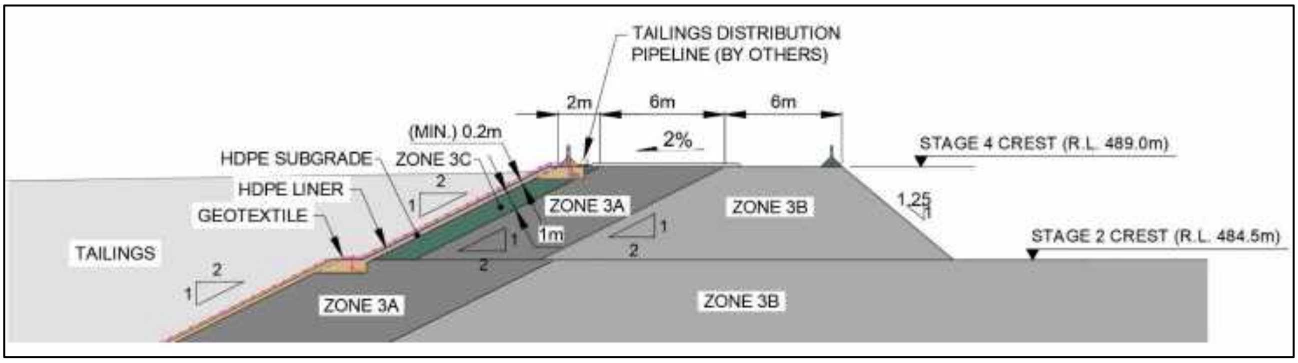


Figure 16: Typical Section IWLTSF Stage 4 South Embankment

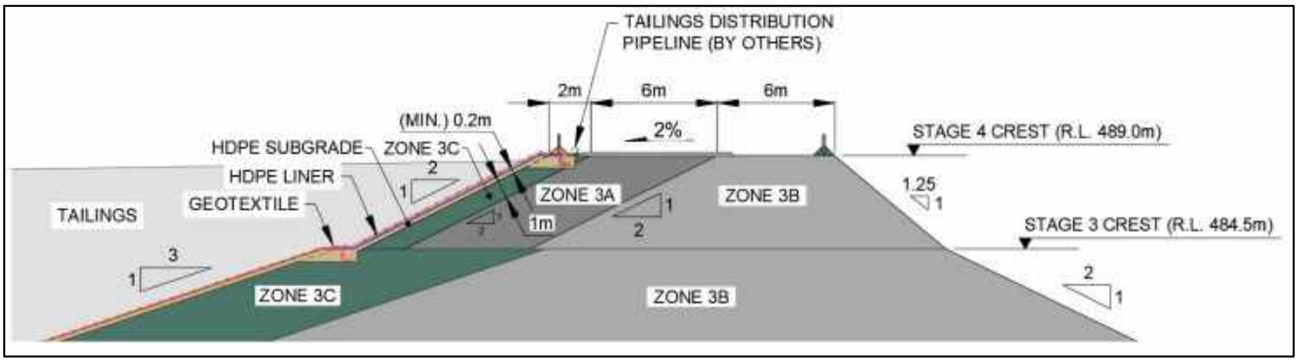
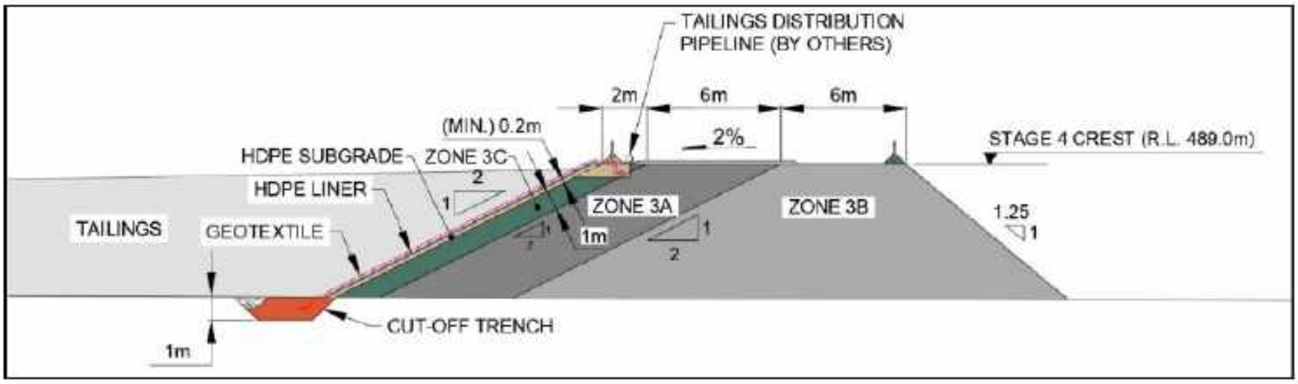


Figure 17: Typical Section IWLTSF Stage 4 Embankment Extension (Extending Across Natural Ground Beyond Stage 2 and 3 Embankments)



4.3 Tailings Management

IWLTSF Stages 4 has been designed with consideration to optimise tailings storage capacity and reduce the geotechnical risks associated with embankment stability and seepage. In addition to geotechnical design, due consideration has been given to the geochemical nature, especially reactivity of the mine tailings.

Based on the kinetic testing conducted on tailings by GCA, the PAF tailings should be characterised by a lag time of at least 18 months (see Section 3.1.4). As such, REC has undertaken tailings management planning through the different phases of the IWLTSF, including construction, commissioning, operation and closure, to ensure that tailings beach exposure times are limited to below the lag time for acidification.

The beach exposure times at the facilities closure correspond to the tailings drying time which will allow earthmoving equipment to traffic the tailings surface and place the required closure surficial cover. Based on REC's experience in the WA Goldfields, tailings derived from fresh rock ores (cf. clay rich oxide ores) typically develop the undrained shear strength required for heavy vehicle trafficking after a period of approximately 3 to 6 months.

A working platform of mine waste can be pushed from the embankment crest and worked around the facility following the spigot cycling route, while working towards the rock ring as the operational pond is removed and the tailings dry. As such, it is anticipated that beach exposure times of between 6 to 12 months may occur during the closure of the facility.

The calculated beach exposure times during the subsequent operational phase of the IWLTSF Stage 4 is presented in Table 25. A contingency of 25% has also been calculated, which accounts for unforeseen operational issues that may eventuate during operation of the facility.

Table 25: Design Beach Exposure Times

Stage 4 Operational Phase	Typical Operation Cycling time (months)	Contingency (+25%)
IWLTSF (Stage 4 North Intermediate Operation)	0.6	0.7
IWLTSF (Stage 4 South Intermediate Operation)	0.4	0.5
IWLTSF (Stage 4 Full Perimeter Operation)	1.0	1.3

4.4 DEMIRS Classification

4.4.1 Hazard Rating

The facilities have been assessed in accordance with the DMP Code of Practice (DMP 2013, Table 1). The assessment concluded that a 'Medium' hazard rating should be assigned to the Stage 4 IWLTSF, as demonstrated in Table 26 (highlighted in grey). Additionally, the facilities were assessed according to the DMP Code of Practice (DMP 2013, Table 2), with maximum embankment heights of '> 15.0 m', the Stage 4 IWLTSF is classified as 'Category 1' facilities, as demonstrated in Table 27 (highlighted in grey).

Table 26: DMP CoP Hazard Rating System

Type of Impact or Damage	Hazard Rating		
	High	Medium	Low
	Extent or Severity of Impact or Damage		
Loss of human life or personal injury	Loss of life or injury is possible	Loss of life or injury is possible although not expected	No potential for loss of life or injury
Adverse human health due to direct physical impact or contamination of the environment	Long-term human exposure is possible, and permanent or prolonged adverse health effects are expected	The potential for human exposure is limited, and temporary adverse health effects are possible	No potential for human exposure
Loss of assets due to direct physical impact or contamination of the environment	Loss of numerous livestock is possible	Loss of some livestock is possible	Limited or no potential for loss of livestock
	Permanent loss of assets (e.g. commercial, industrial, agricultural and pastoral assets, public utilities and infrastructure, mine infrastructure) is possible and no economic repairs can be made	Temporary loss of assets is possible and economic repairs can be made	Limited or no potential for destruction or loss of assets
	Loss of TSF storage capacity is possible and repair is not practicable	Loss of TSF storage capacity is possible and repair is practicable	Insignificant loss of TSF storage capacity is possible
Damage to items of environmental, heritage or historical value due to direct physical impact or contamination of the environment	Permanent or prolonged damage to the natural environment (including soil, and surface and ground water resources) is possible	Temporary damage to the natural environment is possible	Limited or no potential for damage to the natural environment
	Permanent or prolonged adverse effects on flora and fauna are possible	Temporary adverse effects on flora and fauna are possible	Limited or no potential for adverse effects on flora and fauna
	Permanent damage or loss of items of heritage or historical value is possible	Temporary damage of items of heritage or historical value is possible	Limited or no potential for damage of items of heritage or historical

Table 27: DMP CoP Category Rating System

Maximum Embankment or Structure Height (m)	Hazard Rating		
	High	Medium	Low
> 15.0	Category 1	Category 1	Category 1
5.0 - 15.0	Category 1	Category 2	Category 2
< 5.0	Category 1	Category 2	Category 3

4.4.2 IWLTSF Stage 4 Category

In accordance with the DMP Code of Practice (DMP 2013, table 2), the proposed IWLTSF Stage 4 classified as a "Category 1" facility as the TSF has a hazard rating of "Medium" and the embankment will be larger than 15 m in height.

4.5 ANCOLD Consequence Category

4.5.1 General

There are two Consequence Categories that need to be assessed as part of Tailings Dam design. These are the Dam Failure Consequence Category and the Environmental Spill Consequence Category. These are used to determine various design and operational requirements including design of spillways and for flood storage requirements.

4.5.2 Dam Failure Severity Level

In accordance with ANCOLD (2019) Guidelines, seven (7) damage type categories need to be assessed to determine the severity level/impact (Minor, Medium, Major and Catastrophic) of a potential facility failure or spill. In accordance with the Dam Severity Level impact assessment (ANCOLD 2019, Table 1), the proposed IWLTSF Stage 4 is anticipated to be of 'Medium' severity due to the impact of dam failure on business importance, as presented in Table 28. The assess rating is highlighted in grey.

Table 28: ANCOLD Dam Severity Level Rating System

Damage Type	Minor	Medium	Major	Catastrophic
Infrastructure (dam, houses, commerce, farms, community)	<\$10M	\$10M-\$100M	\$100M-\$1B	>\$1B
Business Importance	Some restrictions	Significant impacts	Severe to crippling	Business dissolution, bankruptcy
Public health	<100 people affected	100-1000 people affected	<1000 people affected for more than one month	>10,000 people affected for over one year
Social dislocation	<100 person or <20 business months	100-1000 person months or 20-2000 business months	>1000 person months or >200 business months	>10,000 person months or numerous business failures
Impact Area	<1 km²	< 5km²	< 20km²	> 20km²
Impact Duration	< 1 (wet) year	< 5 years	< 20 years	> 20 years
Impact on natural environment	Damage limited to items of low conservation value (e.g. degraded or cleared land, ephemeral streams, non-endangered flora and fauna). Remediation possible.	Significant effects on rural land and local flora & fauna. Limited effects on: A. Item(s) of local & state natural heritage. B. Native flora and fauna within forestry, aquatic and conservation reserves, or recognised habitat corridors, wetlands or fish breeding areas	Extensive rural effects. Significant effects on river system and areas A & B. Limited effects on: C. Item(s) of National or World natural heritage. D. Native flora and fauna within national parks, recognised wilderness areas, RAMSAR wetlands and nationally protected aquatic reserves. Remediation difficult.	Extensively affects areas A & B. Significantly affects areas C & D. Remediation involves significantly altered ecosystems.

4.5.3 Dam Failure Population at Risk

The dam failure consequence category is adapted from the severity level assessment of damage and loss, combined with the Population at Risk (PAR). The PAR is defined as all people who would be directly exposed to floodwaters assuming they took no action to evacuate. No homes, businesses or recreational areas are located downstream of the IWLTSF. However mining personnel who may be present downstream, including those using the site access road, would be at risk in the event of a plausible failure. Based on this, the PAR for the IWLTSF is considered to be greater than 1 but less than 10 (ANCOLD PAR category of >1 to 10).

4.5.4 Dam Failure Consequence Category

Based on a dam failure severity level of "Medium" and a PAR of >1 to 10, the ANCOLD guidelines recommend the adoption of a 'Significant' Dam Failure Consequence Category rating, upgraded to a 'High C' (see Note 2) for purpose of design. Table 29 summarises the dam failure consequence category, the assess rating is highlighted in grey.

Table 29: ANCOLD Recommended Consequence Category (Table 2, ANCOLD 2019)

Population at Risk (PAR)	Severity of Damage or Loss			
	Minor	Medium	Major	Catastrophic
<1	Very Low	Low	Significant	High C
>1 to 10	Significant (Note 2)	Significant (Note 2)	High C	High B
>10 to 100	High C	High C	High B	High A
>100 to 1000	Note 1	High B	High A	Extreme
>1000		Note 1	Extreme	Extreme

Notes:

1 – With a PAR in excess of 100, it is unlikely Damage will be minor. Similarly, with a PAR in excess of 1,000 it is unlikely Damage will be classified as Medium.

2 – Change to "High C" where there is the potential of one or more lives being lost. The potential for loss of life is determined by the characteristics of the flood area, particularly the depth and velocity of flow.

4.5.5 Environmental Spill Consequence Category

The Environmental Spill Consequence Category is assessed by considering the effect of spilling dam water to the downstream environment (typically through the dam spillway during a flood event). The aerial extent of the spill impact will be significantly smaller than the area that would be affected in the event of a dam failure. The effect of spilling water into the environment from the IWLTSF is primarily driven by the geochemistry of the tailings solids and supernatant.

Water spilled from the IWLTSF under extreme weather events will be significantly diluted, and further diluted again given the downstream environment of the dam is also likely to be flooded. Therefore, the severity of impact on the natural environmental from environmental spills from the IWLTSF would be 'Minor'.

The PAR assigned to a dam spill from the IWLTSF is >1 to 10. The combined Dam Spill Consequence Category has been assessed as 'High C' (Note 2) for the IWLTSF at this stage of the design.

4.5.6 ANCOLD Design Criteria

The recommended design criteria for the IWLTSF Stage 4 have been adopted based on criteria detailed in ANCOLD (2019). The recommended design criteria for 'High C' consequence category facilities have been adopted for the IWLTSF Stage 4. Design criteria for IWLTSF Stage 4 is detailed in Table 30.

Table 30: ANCOLD Design Criteria

Parameter	IWLTSF Stage 4
Consequence Category	High C
Design Storm Event	1:100-year AEP, 72-hour event
Additional Freeboard	0.5 m
Wave Run-up Freeboard	Nil
Operating Basis Earthquake (OBE)	1:1,000-year AEP
Safety Evaluation Earthquake (SEE)	1:2,000-year AEP

4.6 Freeboard

4.6.1 DMP Freeboard

The design of the IWLTSF (Stage 4) has followed the freeboard requirements stipulated by the DMP guidelines (2015) for TSFs. The freeboard requirements vary based on whether a water pond is normally located away from or against a perimeter embankment. Additionally, for a TSF with a water pond normally located against a perimeter wall, the freeboard requirements vary depending on whether the facility has an upstream catchment or not.

These requirements comprise three distinct elements, namely: operational freeboard, beach freeboard and total freeboard. These requirements are graphically illustrated in Figure 18, and are summarised in Table 31, where:

- Operational freeboard is the height difference between the tailings beach and the embankment crest;
- Beach freeboard is the level difference between the tailings beach and the decant water level plus allowance for the 1 in 100-year average recurrence interval (ARI), 72-hour rainfall event, and;
- Total freeboard is the sum of the operational freeboard and beach freeboard plus allowance for the 1 in 100-year average recurrence interval (ARI), 72-hour rainfall event.

Figure 18: Freeboard Definition – Pond Located Away Perimeter Embankment (DEMIRS 2019)

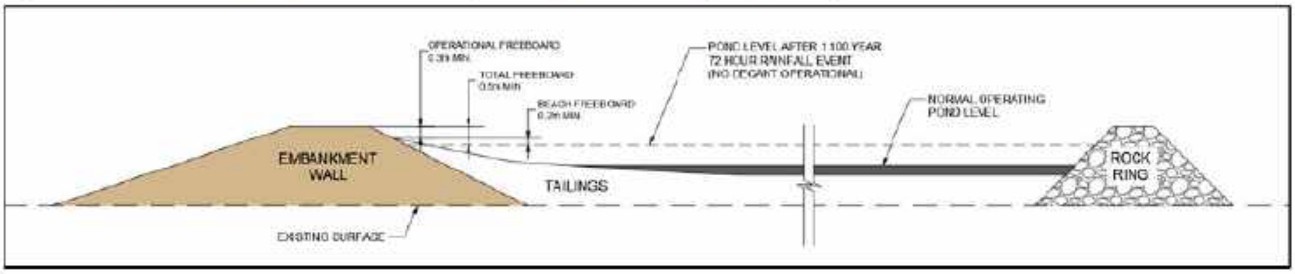


Table 31: DMIRS Freeboard Requirements

Parameter	Water Pond Away
Operational Freeboard	0.3 m
Beach Freeboard	0.2 m
Total Freeboard (minimum)	0.5 m

4.6.2 ANCOLD Freeboard

The design of the IWLTSF Stage 4 has followed the freeboard requirements stipulated by the ANCOLD (2019) guidelines. These requirements comprise the following distinct elements.

Spillway Freeboard:

- Freeboard is the available freeboard above the spillway flood depth; and
- Flood spill depth is the depth of water flow over the spillway for the design flood event.

Contingency Storage Allowance:

- Operational freeboard is the height difference between the tailings beach and the embankment crest/spillway invert level;
- Beach freeboard is the level difference between the tailings beach and the decant water level plus allowance for an extreme storm event;
- Total freeboard is the sum of the operational freeboard and beach freeboard plus allowance for an extreme storm event;
- Additional freeboard is the allowance for further freeboard above the Extreme storage allowance; and
- Wave freeboard is the allowance for wave runup above the Extreme storage allowance.

Extreme Storage Allowance:

- Allowance for the storage of an extreme storm event to prevent spill from the dam.

Wet Season Storage Allowance:

- Allowance for the storage of water which may conservatively be required to be stored on the tailings dam through a combination of excess wet season rainfall runoff from the facility catchment and processing water which cannot be extracted from the dam.

4.6.3 Recommended Freeboard

4.6.3.1 Freeboard Requirements Summary

A summary of the individual freeboard requirements based on DEMIRS and ANCOLD guidelines is presented in Table 34. The most conservative freeboard elements adopted for IWLTSF Stage 4 design are highlighted grey.

Table 32: Freeboard Requirements

Parameter	DEMIRS	ANCOLD
Facility Classification	Category 1	High C
Contingency Storage Allowance (Spillway)		
Spillway Design Flood (1:X-year AEP Design Flood)	-	1:100,000 AEP
Spillway Wave Freeboard Allowance (1:X-year AEP Wind)	-	1:10 AEP
Contingency Storage Allowance (Total Freeboard)		
Operational Freeboard	0.3 m	-
Beach Freeboard	0.2 m	-
Additional Freeboard	-	0.5
Extreme Storage Allowance		
Design Storm Event (1:X-year AEP, X-hour event)	1:100 AEP, 72-hr	1:100 AEP, 72-hr
Wet Season Storage Allowance		
Wet Season Design Storage Allowance (1:X-year AEP) Runoff	-	1:100 AEP wet season runoff

Wave run-up has not been considered for the IWLTSF Stage 4 as tailings beaching will ensure water is stored away from the perimeter embankments. Likewise, spillway freeboard has not been considered as IWLTSF Stage 4 design does not include a spillway. Based on the "High C" consequence category for the IWLTSF, an additional ANCOLD freeboard requirement is required on top of the design storm event for the facility design.

4.6.3.2 Freeboard Limits

In accordance with the classifications of the guidelines, the maximum operating pond level, operational freeboard, and design storm event volume for the IWLTSF Stage 4 was assessed. REC notes that the stormwater storage capacity is dependent upon the development of the beach slope achieved throughout operation. The tailings beach is assumed to have a combined slope profile; 1.5% over the first 150 m, followed by 1.0% for the next 300 m, 0.75% for the subsequent 500 m, and 0.5% for the remaining distance.

A summary of the freeboard limits and requirements for Stage 4 North and Stage 4 South, along with their sequencing order, is presented in Table 33. The maximum operating pond level, normal operating pond level, design storm event volume and freeboard levels for the IWLTSF Stage 4 are presented in Section 4.7.6.

Table 33: Freeboard Limits and Requirements

Parameter	Stage 4 North Intermediate	Stage 4 South Intermediate	Stage 4 North & South (Remaining)
Facility Classification			
ANCOLD	High C	High C	High C
DEMIRS	Category 1	Category 1	Category 1
Embankment Elevations			
Embankment Elevation (RL m)	489.0	489.0	489.0
Contingency Storage Allowance			
Tailings Operational Freeboard (DEMIRS minimum)	0.3 m	0.3 m	0.3 m
Beach Freeboard (DEMIRS minimum)	0.2 m	0.2 m	0.2 m
Additional Freeboard (ANCOLD 2019)	0.5 m	0.5 m	0.5 m
Total Freeboard (Minimum to Max. Operating Pond)	1.0 m	1.0 m	1.0 m
Extreme Storage Allowance			
Design Storm Event (1:100-year AEP, 72-hour event)	0.26	0.26	0.26
Normal Operating Pond			
Minimum Normal Operating Pond Freeboard (m)	1.26	1.26	1.26
Maximum Normal Operating Pond (RL m)	483.24*	487.74	487.74
Note: * Calculated based on Stage 3 embankment elevation (RL 484.5 m), with Stage 4 South under construction and containment not yet provided to the full Stage 4 embankment elevation (RL 489.0) on south.			

4.7 Modelling and Design Assessments

4.7.1 Seepage Assessment

A seepage assessment has been conducted for the proposed IWLTSF Stage 4 embankment.

4.7.1.1 Assessment Methodology

The seepage assessment utilised Slide2 2023, a two-dimensional finite element groundwater seepage analysis software suite. The objective of the seepage assessment was to:

- Determine the expected position of the phreatic surface within the IWLTSF Stage 4 embankment; and
- Estimate seepage outflows (flux) to inform the IWLTSF Stage 4 design.

4.7.1.2 Material Parameters

Adopted design hydraulic parameters for the embankment and foundation material are summarised below in Table 34.

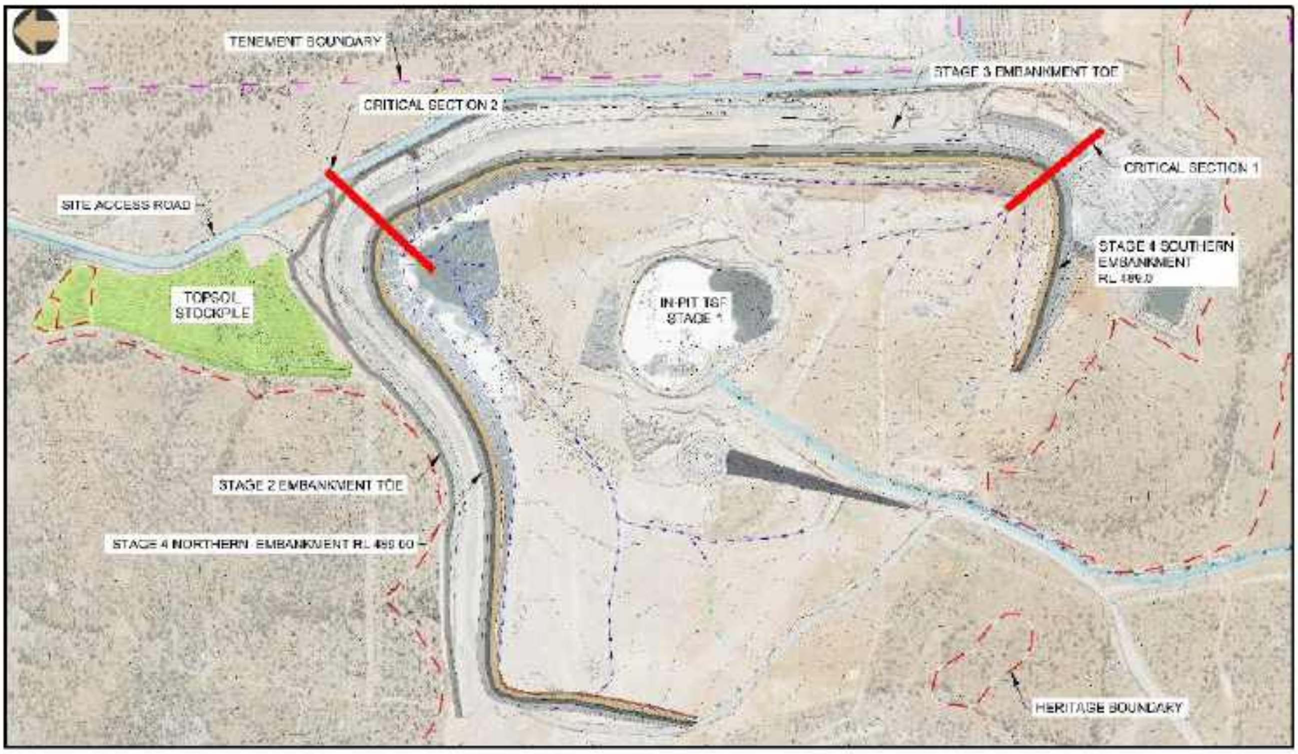
Table 34: Model Hydraulic Conductivity

Material	Hydraulic Conductivity, k (m/s)	Anisotropy, k_h/k_v
Laterite	1e-07	1
Duricrust	1e-07	1
Saprolite V.Stiff -Hard Clay (South)	1e-09	1
Saprolite Hard Clay (South)	1e-09	1
Saprolite Hard Clay (North)	1e-09	1
Saprock XW - HW Zone (South)	1e-09	1
Saprock XW - HW Zone (North)	1e-09	1
Tailings	1e-07	1
HDPE Liner on 200mm Cohesive Subgrade	1e-12	1
Traffic Compacted (0.5m) Mine Waste - Zone 3A	1e-05	1
Traffic-Compacted (1m) Mine Waste - Zone 3B	1e-05	1
Traffic Compacted Transition Material - Zone 3C	1e-05	1
Paddock Dump Mine Waste	1e-05	1
Tip Head Mine waste	1e-05	1
Bed Rock	1e-12	1

4.7.1.3 Assessed Cross Section

Two locations were assessed for seepage conditions on the Northeast and Southeast sides of the embankment, identified as critical sections where the embankment height is greatest. These sections are shown in Figure 19. The maximum embankment heights at the critical cross-sections 1 and 2 for IWLTSF Stage 4 are 27.0 m and 12.0 m, respectively. The selected cross-sections for seepage analysis are based on the geometries outlined in Section 4.7.2.5.

Figure 19: IWLTSF Stage 4 Critical Cross Section (Plan)



4.7.1.4 Analysis

The seepage assessment considered steady-state conditions, assuming that the decant pond was maintained at least 100 m away from the embankment crest, with the tailings facility at full capacity in Stage 4.

4.7.1.5 Boundary Conditions

The following boundary conditions were applied for the IWLTSF seepage analysis:

- Upstream Boundary: Total Head at the pond, 100 m from the embankment crest;
- Downstream Boundary: Total Head at RL 460.0 m; and
- Discharge: Seepage flux through the embankment face.

4.7.1.6 Results

The estimated seepage flux and resulting seepage volumes for the modelled case is detailed in Table 35.

A conservative seepage volume estimate through the embankment, based on the resulting flux estimates, is approximately 5.5 m^3/day through Section 1 for an embankment length of 994 m, and approximately 1.5 m^3/day through Section 2 for an embankment length of 1,516 m during normal operations.

Increased seepage rates are seen for cases where a water pond is stored at greater elevations and/or closer to the upstream crest however, these are considered worst case conditions which may temporarily occur after high intensity rainfall events or where the facilities are not operated in accordance with the Operating Manual (Appendix K).

Table 35: Results of Seepage Analysis

Section	Facility	Embankment Height (m)	Estimated Flux Facility (m^3/day)/m	Total Embankment Length (m)	Seepage Estimate (m^3/day)
1	IWLTSF	27	0.005556	1,516	5.5
2	IWLTSF	12	0.000990	994	1.5

These results are considered conservative upper bound estimates as the models have considered the most critical section, while the embankment height varies between 0.5 m and 27 m for Section 1 and 0.5 m and 12.0 m for Section 2. The Slide2 outputs and figures are presented in Appendix F.

Upon commissioning seepage is likely to emanate from the facilities in a three-dimensional context, and a localised groundwater mound can likely be anticipated beneath the facilities during their operating life.

4.7.2 Stability Assessment

A stability assessment was conducted at two critical sections. The maximum embankment height at Section 1 (Southeast) is 27.0 m, and at Section 2 (Northeast) is 12.0 m.

4.7.2.1 Foundation Material

Subsurface conditions along the critical embankment sections were inferred from the data collected during GSI work conducted from November 2024 to February 2025. This investigation included six boreholes, Standard Penetration Test (SPT) field tests, and undisturbed Shelby tube samples for laboratory testing. Of the six boreholes, laboratory test results from three (BH01, BH02, and BH03) have been received, with the remaining data expected by mid-March 2025. The laboratory test results include particle size distribution (PSD), plasticity index (PI), oedometer tests, triaxial permeability, and triaxial tests (CUTx and UUTx). These results were used to interpret the subsurface conditions and strength parameters for the foundation materials.

The subsurface materials identified have been grouped based on their strength parameters along depth profiles. The summary of materials for the southeastern side (Critical Section 1) and the northeastern side (Critical Section 2) is presented in Table 36 and Table 37, respectively.

Table 36: IWLTSF Southeast Area Subsurface Profile Inferred

Subsurface Profile Unit	Depth (m)
Laterite	0 - 1.5
Saprolite V.Stiff -Hard Clay (South)	1.5 - 9.5
Saprolite Hard Clay (South)	9.5 - 14
Saprock XW - HW Zone (South)	14 - 28
Bedrock	> 28

Table 37: IWLTSF Northeast Area Subsurface Profile Unit Inferred

Subsurface Profile Unit	Depth (m)
Duricrust	0 - 2
Saprolite Hard Clay (North)	2 - 10
Saprock XW - HW Zone (North)	10 - 36
Bedrock	> 36

4.7.2.2 Material Parameters

The interpreted geotechnical strength parameters for the foundation materials, along with the assumed strength parameters for the embankment materials, are summarised in Table 38.

Table 38: Geotechnical Effective and Total Stress Parameters

Material	Unit Weight (kN/m3)	Drain Scenario- Mohr-Coulomb		Undrain Scenario		
		Friction Angle ϕ (°)	Cohesion c' (kPa)	Undrained Shear Strength /Cohesion c or Su (kPa)	Shear Strength Ratio (Su/σ'vo)	
					Peak (kPa)	Liquified (kPa)
Laterite	18	28	5	50	-	-
Duricrust	19	30	50	200	-	-
Saprolite V.Stiff -Hard Clay (South)	18	25	30	110	-	-
Saprolite Hard Clay (South)	19	30	50	150	-	-
Saprolite Hard Clay (North)	19	25	30	100	-	-
Saprock XW - HW Zone (South)	20	32	100	200	-	-
Saprock XW - HW Zone (North)	20	30	50	200	-	-
Tailings	17	27	0	-	0.25	0
HDPE Subgrade	18	26	5	50	-	-
Traffic Compacted Mine Waste - Zone 3A	22	36	0	-	-	-
Traffic Compacted Mine Waste - Zone 3B	21	35	0	-	-	-
Transition Material - Zone 3C	20	34	0	-	-	-
Paddock Dump Mine Waste	21	35	0	-	-	-
Tip Head Mine waste	20	34	0	-	-	-
Bed Rock	23	Infinite Strength				

4.7.2.3 Assessment Methodology

The limit equilibrium analysis approach based on the Morgenstern-Price method of slices has been adopted for the stability assessment and involves predicting the Factor of Safety (FoS) against geotechnical slope failure using the commercial software Slide2 2020. The following soil stress conditions have been considered for assessment:

- Long-term (drained);
- Short-term (undrained);
- Seismic condition considering a 1:2000-year AEP event; and
- Post seismic condition considering liquified tailings.

The 2,000-year AEP event is considered for a 'High C' consequence category for the IWLTSF in accordance with ANCOLD (2019) *Guidelines for Dams and Appurtenant Structures for Earthquake*. The 2,000-year ARI Bedrock PGA is taken as 0.045 g in accordance with recommendations in the Geoscience 2018 Atlas as described in Section 2.3.6.5.

The assessment is based on a pseudo-static approach, whereby a horizontal acceleration coefficient k_h is applied in the Slide2 model to represent the AEP event.

The value of k_h is taken as:

Bedrock PGA × Probability Factor × Soil Effect Factor × Topographic Amplification Factor x 0.5

The value for k_h has been calculated for the IWLTSF according to the requisite AEP is summarised in Table 39.

Table 39: Coefficient of Horizontal Acceleration

Variable	IWLTSF
Operations Phase	SEE
Design ARI (x-year)	2,000
Bedrock PGA (500-year AEP)	0.020
Probability Factor, kP (Perth)	1.52
Design Bedrock PGA	0.045
Soil Effect Factor (Dam Body)	1.9
Topographic Amplification Factor	1.2
Factored PGA	0.1026
Coefficient of Horizontal Acceleration - k_h	0.0513

In the post seismic stability assessment, 80% of the assigned drained condition strength parameters have been considered while the tailings is assumed to undergone liquefied state and strengths were applied accordingly.

4.7.2.4 Seismic Condition

The SSE event has been considered, and is modelled based on a pseudo-static approach, whereby the earthquake is represented by a horizontal acceleration coefficient, kh = 0.5 x PGA. After considering soil effects, this is estimated as 0.5 x 0.1026 = 0.0513 for the IWLTSF.

4.7.2.5 Assessed Cross Section

The IWLTSF Stage 4 critical cross-sections selected for the slope stability analysis are based on the following geometry:

1. Critical Cross Section 1

- 1V:2H batter slope for the upstream face of Stage 4 embankment;
- 1V:1.25H batter slope for the downstream face Stage 4 embankment;

- 14.0 m crest width at Stage 4 embankment;
- 1V:3H batter slope for the upstream face of Stage 3 embankment;
- 1V:2H batter slope for the downstream face Stage 3 embankment;
- 30.0 m crest width at Stage 3 (RL 484.5 m) embankment;
- 10.0 m wide buttress at RL 486.0 m on the downstream embankment toe area.

2. Critical Cross Section 2

- 1V:2H batter slope for the upstream face of Stage 4 embankment;
- 1V:1.25H batter slope for the downstream face Stage 4 embankment;
- 14.0 m crest width at Stage 4 (RL 484.5 m) embankment;
- 1V:3H batter slope for the upstream face of Stage 2 embankment;
- 1V:3H batter slope for the downstream face Stage 2 embankment;
- 73.0 m crest width at Stage 2 embankment.

The critical sections analysed are shown in plan view in Figure 20 and cross sectional view are presented in Figure 21 and Figure 22.

Figure 20: IWLTSF Stage 4 Critical Cross Section (Plan)

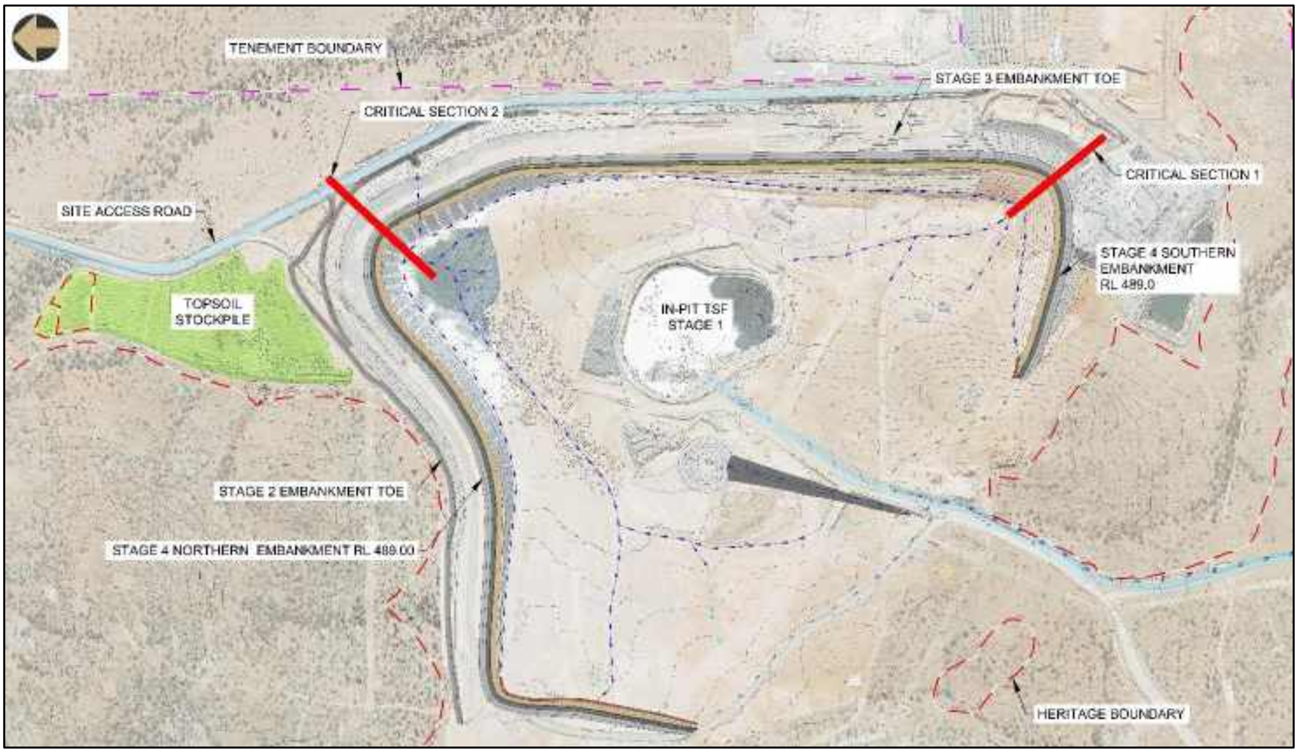


Figure 21: IWLTSF Stage 4 Critical Cross Section – Section 1

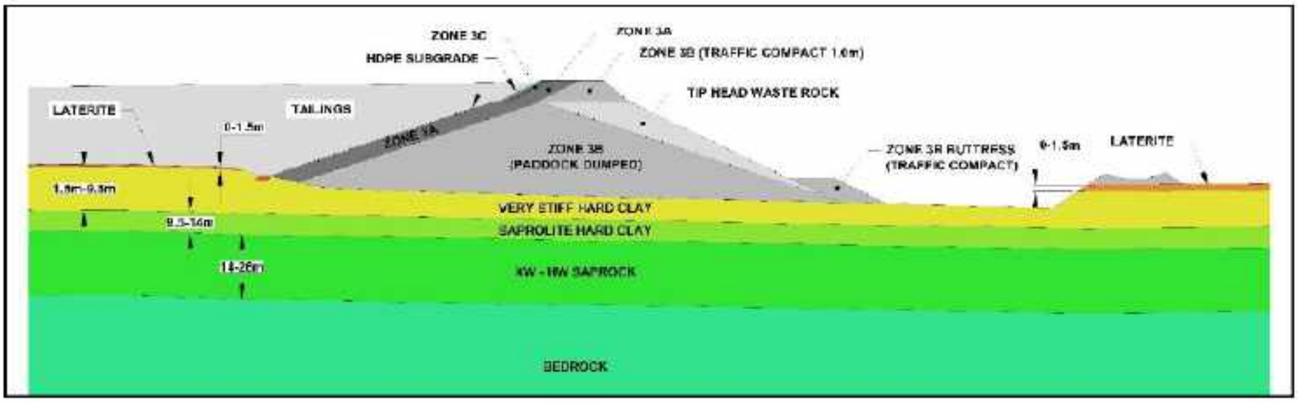
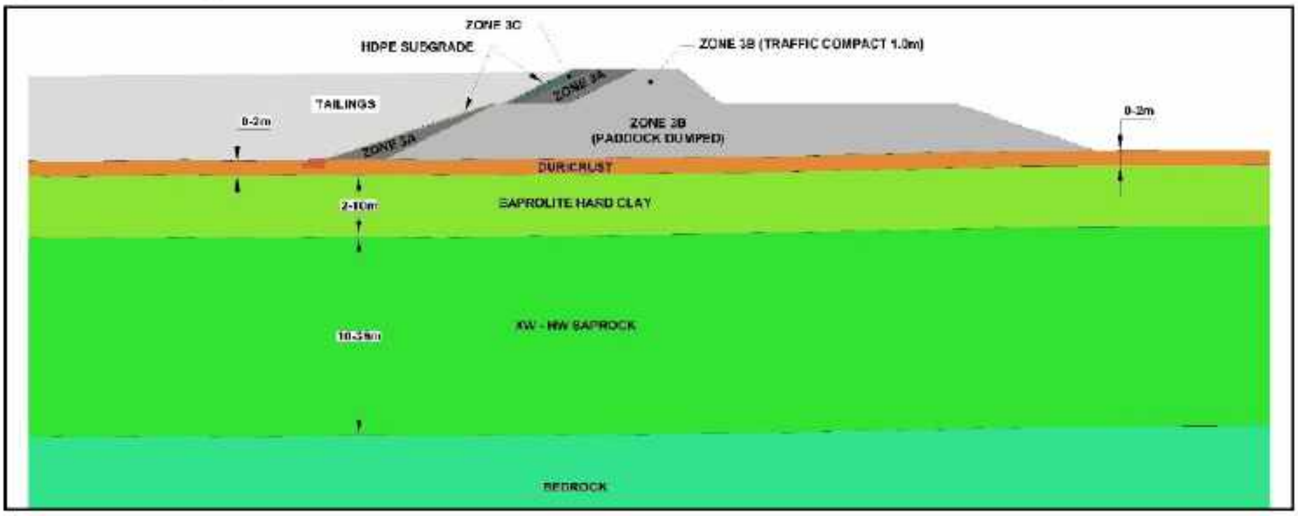


Figure 22: IWLTSF Stage 4 Critical Cross Section – Section 2



4.7.2.6 Results and Recommendations

The stability model output figures are provided in Appendix G, and the predicted slope stability FoS for each case analysed along with the recommended minimum FoS for Section 1 and 2 are summarised in Table 40 and Table 41 respectively.

Table 40: Slope Stability Results for Critical Section 1

Case	Recommended Minimum	Calculated Factor of Safety
Drained	1.50	1.54
Undrained	1.50	1.54
Seismic	1.20	1.33
Post Seismic (Tailings Liquified)	1.0* - 1.20	1.24
Note: * To be related to the confidence in selection of residual shear strength. 1.0 may be adequate for use with lower bound results.		

Table 41: Slope Stability Results for Critical Section 2

Case	Recommended Minimum	Calculated Factor of Safety
Drained	1.50	1.68
Undrained	1.50	1.55
Seismic	1.20	1.45
Post Seismic (Tailings Liquified)	1.0* - 1.20	1.31
Note: * To be related to the confidence in selection of residual shear strength. 1.0 may be adequate for use with lower bound results.		

As a result, it can be concluded that the assessed cross-sections exceed the minimum recommended FoS for the assessed soil stress condition.

4.7.3 Preliminary Dam Break Assessment

4.7.3.1 General

A preliminary dam break analysis was conducted under both 'Sunny Day' and 'Rainy Day' conditions to assess the potential impacts of an embankment breach of the IWLTSF Stage 4 at two critical sections. The 'Sunny Day' analyses assessed dam breaches where potential energy drives a tailings flow slide failure downstream of the facility, whereas the 'Rainy Day' analyses assessed dam breaches under worst conditions due to overtopping under extreme storm events over the facility and its catchment.

This preliminary analysis involved the assessment of breach characteristics, tailings release volumes and the extent of tailings runout under failure conditions. In undertaking this preliminary analysis, embankment critical sections with the greatest height were utilised to assess critical tailings runout distances.

The following cases were considered in the analysis:

- Case 1: IWLTSF Stage 4 South-east embankment breach – 'Sunny Day'. Maximum embankment height of 27.0 m (RL 489.0 m).
- Case 2: IWLTSF Stage 2 South-east embankment breach – 'Rainy Day'. Maximum embankment height of 27.0 m (RL 489.0 m).
- Case 3: IWLTSF Stage 4 North-east embankment breach – 'Sunny Day'. Maximum embankment height of 12.0 m (RL 489.0 m).
- Case 4: IWLTSF Stage 2 North-east embankment breach – 'Rainy Day'. Maximum embankment height of 12.0 m (RL 489.0 m).

4.7.3.2 Tailings Release Volumes

The Sunny Day analysis adopts a tailings release volume of 30% of the stored tailings volume, based on findings of typical past tailings dam failures undertaken by Dalpatram (2011).

For Rainy Day (worst case) failures a conservative approach is adopted with 50% of the stored tailings volume released in accordance with H Rourke & D Luppnow (2015). The PMP across the IWLTSF was estimated in accordance with guidelines published by BOM using the GSDM method. The Rainy Day case incorporates a stormwater volume equivalent to the PMP storm event over the catchment area.

4.7.3.3 Breach Characteristics

It should be noted that in the case of an embankment breach only the tailings local to the breach are released, owed to the viscous nature of tailings. As such, the total volume stored within IPTSF has been disregarded as part of all analyses, as this would not mobilise in the event of failure. Furthermore, tailings stored in the southern part of the IWLTSF basin, below the Vanguard Pit ridgeline, would not mobilise in the event of a failure in the northeastern embankment and have therefore been disregarded from the analysis. Likewise, tailings stored in the northern part of the IWLTSF basin, below the Vanguard Pit ridgeline, would not mobilise in the event of a failure in the southeastern embankment and have also been excluded from the analysis.

The method outlined by T MacDonald and J Langridge – Monopolis (1984) was utilised to determine embankment breach characteristics. The resulting embankment breach characteristics are presented in Table 42.

Table 42: Breach Characteristics

Characteristics	Case 1	Case 2	Case 3	Case 4
IWLTSF Dam Breach Section	Southeast Corner	Southeast Corner	Northeast Corner	Northeast Corner
Conditions	Sunny Day	Rainy Day	Sunny Day	Rainy Day
Embankment Breach Height (m)	27.0	27.0	12.0	12.0
Contributing Cumulative Storage Volume (Mm^3)	3.37	3.37	2.80	2.80
PMP Event Volume (Mm^3)	NA	0.61	NA	0.61
Tailings Breach Release Volume (Mm^3)	1.01	2.32	0.84	2.04
Nominal Breach Width at Crest (m)	13	23	14	31
Equivalent Upstream Tailings Failure Length (m)	190	161	230	540

4.7.3.4 Sunny Day Modelling

The bulk of the existing IWLTSF embankment is constructed using mine waste rock, with compaction effort ranging from traffic compacted to paddock dumping. Similarly, the Stage 4 downstream raise is also proposed to be constructed with mine waste rock. IWLTSF embankments of this kind typically have high factors of safety, well above the recommended minimum factors of safety. Additionally, the IWLTSF design incorporates a turret pump for water return and underdrainage system, as such it is not expected that free water will be allowed to pond on the surface of the facility.

On this basis, the Sunny Day scenario is considered using the energy-based Linear Method, as detailed in the 2010 Mine Waste Conference proceedings by Seddon (2010). The Linear Method is suitable for the Sunny Day assessment of tailings runout distances in above-ground storage facilities and provides a methodology for quantifying runout distances in the case of an embankment breach utilising energy-based principles.

The Linear Method idealises both pre-flow and post-flow tailings masses as rectangular blocks of uniform height and length. The pre-flow block mass is representative of the containment embankment height and accounts for the proportion of tailings accumulated behind the embankment, likely to be released in the event of failure. The post-flow block mass geometry is determined based on potential energy driving a tailings flow slide failure to the environment downstream of the facilities embankment.

It should be noted that the runout distances calculated by this method assume an uninterrupted flow path and do not take into consideration site specific topography or storage effects. As such, further professional judgement is required to select appropriate run-out distances based on an assessment of the site conditions.

The Linear Method runout calculations factor the tailings liquefied undrained shear strength to provide consideration to sliding resistance.

The following cases were considered in the analysis:

- Case 1: Liquefied Strength Ratio of 1.0% - IWLTSF Southeast Corner Embankment.
- Case 2: Liquefied Strength Ratio of 2.0% - IWLTSF Southeast Corner Embankment.
- Case 3: Liquefied Strength Ratio of 1.0% - IWLTSF Northeast Corner Embankment.
- Case 4: Liquefied Strength Ratio of 2.0% - IWLTSF Northeast Corner Embankment.

The runout distance calculations were based adopted liquified undrained shear strengths based on 1.0% and 2.0% of the effective overburden pressure at maximum height for each 'Sunny Day' case.

Potential tailings runout distances calculated based on this method are presented in Table 43. Based on the Linear Method, the IWLTSF Stage 4 (full) during Sunny Day conditions could potentially release tailings which runout between 760 m to 1,180 m and 510 m to 860 from the south-eastern and north-easter embankment respectively. The calculations of the runout distance for a Sunny Day case are presented in Appendix H.

Table 43: Potential Tailings Runout Distance Calculations

Characteristics	Case 1	Case 2	Case 3	Case 4
IWLTSF Dam Breach Section	Southeast Corner	Southeast Corner	Northeast Corner	Northeast Corner
Conditions	Sunny Day	Sunny Day	Sunny Day	Sunny Day
Embankment Breach Height (m)	27.0	27.0	12.0	12.0
Liquefied Strength Ratio (%)	1.0	2.0	1.0	2.0
Liquified Shear Strength (kPa)	2.4	4.8	1.3	2.6
Tailings Runout Distance (m)	1,180	760	860	510
Average Runout Height (m)	3.7	5.4	3.2	4.6

It should be noted that the runout distances and heights presented in Table 43 are numerically calculated and assume an uninterrupted flow path which does not take into consideration site specific topography or storage effects. Dam break runout modelling taking into consideration the surrounding topography based on the dam break volumes and calculations is shown in Figure 23 and Figure 24, representing the breach through IWLTSF southeast corner and northeast embankment breach scenarios respectively. The IWLTSF southeast corner dam break runout represents a runout length of 1.0 km at a runout slope of 1.5%. The IWLTSF Stage 4 northeast dam break runout represents a runout length of 800 m at a runout slope of 1.5%

Figure 23: Dam Break Runout – Section 1

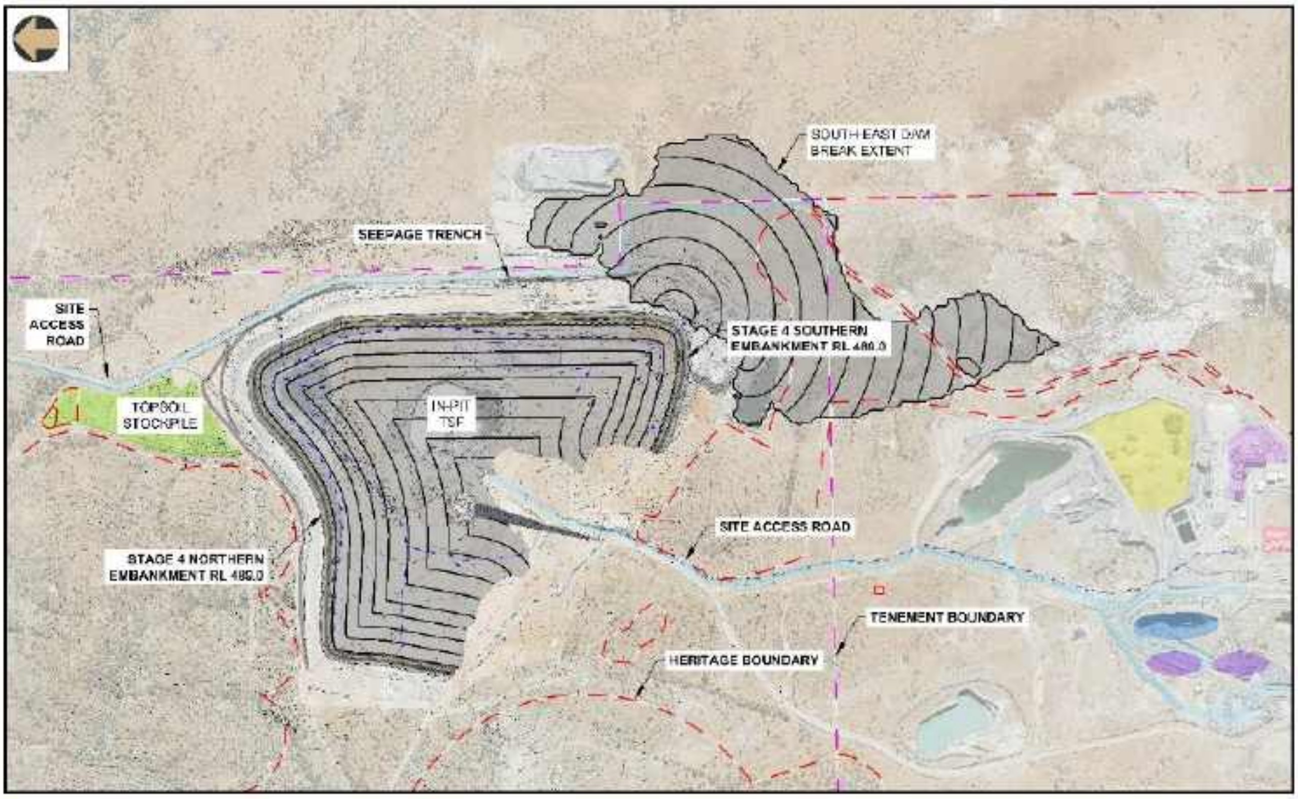
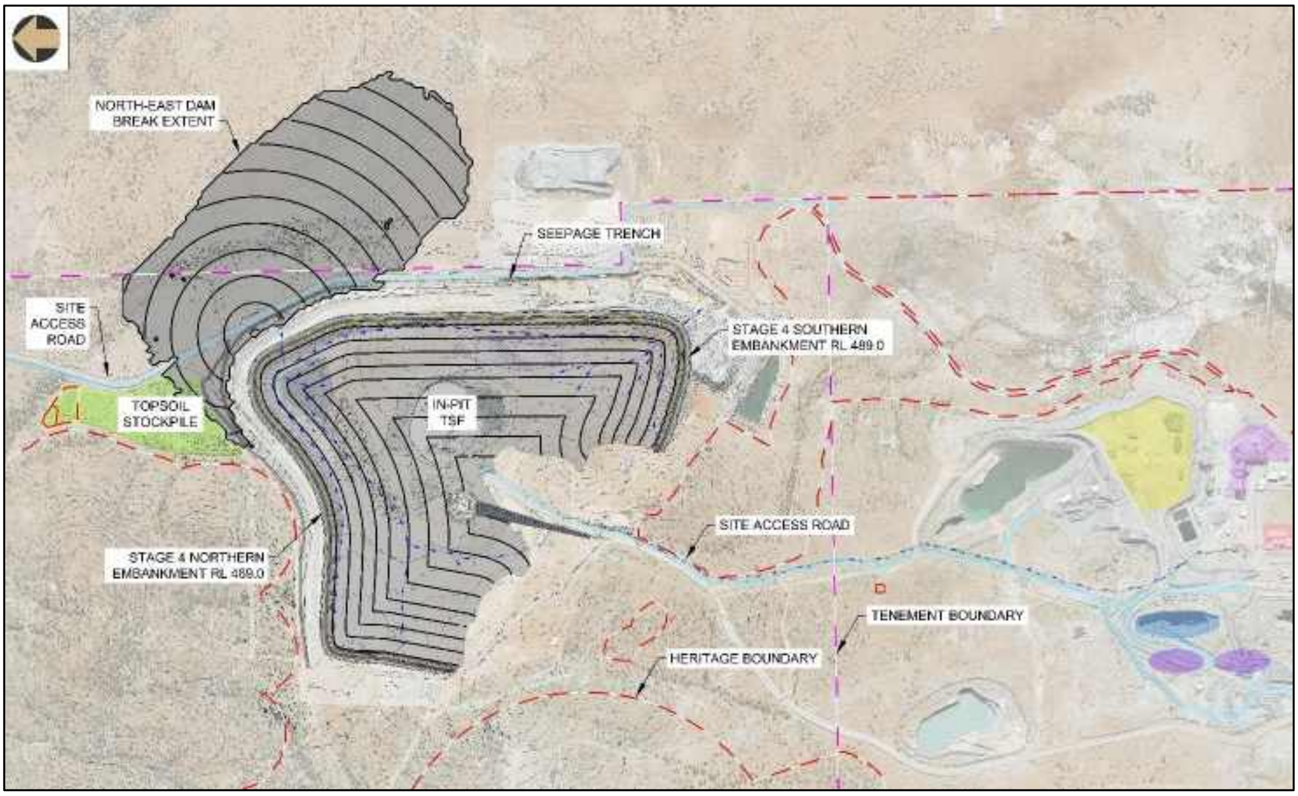


Figure 24: Dam Break Runout – Section 2



4.7.3.5 Rainy Day Modelling

It should be noted that typical breaches occur over a period of approximately 0.5 – 4 hours (MacDonald and Langridge, 1984 Graph). A breach development time of 4 hours was adopted for the analysis to account for the downstream waste rock zones contribution to longer breach development times.

As part of this preliminary dam break assessment, the Rainy Day runout characteristics have been numerically calculated using the Linear Method based on a liquified shear strength ratio of 0.0%, accounting for the PMP event being stored on the facility. Although this approach should not be relied upon as part of a detailed dam break assessment, it is considered representative of a “worst-case” scenario. Additionally, while it is acknowledged that it is good practice to assess the potential impacts of an extreme “worst-case” scenario, it is important to note that this assessment should not form the basis of the classification of the TSF for design purposes. It is important that a risk-based assessment be founded on plausible failure modes and the PAR is defined in accordance with ANCOLD as all people who would be directly exposed to floodwaters assuming they took no action to evacuate. As such the PAR needs to be rationalised as part of the consequence category assessment, taking into consideration the characteristics of the TSF design, tailings, breach, runout flow and surrounding topography.

Breach modelling for the IWLTSF Stage 4 embankment crest geometry indicated that under PMP Rainy Day conditions a potential peak run-out flow of 161 m^3/s could be expected from a failure on the southeast corner of the facility over a period of 4 hours. The Rainy Day breach could potentially result in tailings runout reaching the Plant Site approximately 1.25 km south of the facility.

The numerically calculated runout has not been modelled for the Rainy Day cases.

4.7.3.6 Consequences

The following consequences of a dam break at the IWLTSF are considered most likely:

- Loss of human life: Personnel at nearby laydown areas, IWLTSF operations personnel and mining personnel visiting the IWLTSF are at risk in the event of a plausible failure.

- Runout flows from the IWLTSF south east corner embankment could potentially result in tailings flow reaching the laydown area and processing ponds located on the eastern end of the Plant Site. The PAR for the IWLTSF south east corner embankment is expected to be greater than 1 but less than 10 (ANCOLD PAR category of >1 to 10);
- Runout flows from the IWLTSF north east embankment could potentially result in tailings flow inundating and overtopping the decommissioned site access road adjacent to the facility and downstream area. The PAR for the IWLTSF north east embankment is expected to be less than 1 (ANCOLD PAR category of <1);
- Economic losses: Production losses, plant shutdown, IWLTSF embankment repairs and road repairs;
- Environmental impacts: Potential for contamination of surface soils and surface water requiring environmental 'clean up'.

4.7.3.7 Controls

Embankment breaches, failures and sudden impoundment releases can be caused by numerous events; however, these are largely driven by the size and extent of the decant pond, magnitude of seismic events, tailings deformation and grading and the degree of tailings saturation adjacent to the perimeter embankment. Controls must be implemented to ensure the effective management of the decant pond, with the aim to continuously remove the supernatant water and contain any water pond away from the perimeter embankments. This will assist in reducing the water content in the tailings at the perimeter embankment interface and within the perimeter embankments, minimising the risk of an embankment breach and release of saturated tailings.

Provided that the IWLTSF are operated in accordance with the requirements set out in the Operating Manual (Appendix K), an embankment breach is not considered plausible. If the IWLTSF was found to be in imminent danger of failure or breach, the Emergency Action Plan (EAP) would need to be enacted, which could see the closure of the plant, local access roads and other infrastructure. In the case of failure, engagement with a specialist geotechnical engineer should be made.

Trigger events, which herald potential potentially adverse events can include:

- Non-compliance with minimum freeboard requirements;
- Piezometer readings, which are elevated and are approaching or greater than the prescribed trigger levels;
- Significant embankment distress or damage (i.e. cracking and slumping); and
- Imminent overtopping of embankment crest.

4.7.4 Erosion Control

Mine waste rock will be progressively placed downstream of the IWLTSF to facilitate construction of the future current and future stages. This will likely comprise moderately weathered to fresh rock with 1V:2H downstream batter slopes to minimise erosion.

The existing V-drain located downstream of the IWLTSF northern embankment will minimise erosion of the embankment toe by safely directing stormwater runoff from the natural upstream catchment to the north. This surface runoff is further diverted via a culvert that passes beneath the site access road on the eastern side, directing the flow away from the IWLTSF and allowing it to join existing natural drainage streams downstream.

Internal erosion (piping) of the IWLTSF embankment will be controlled through a combination of the placement of transitional material zone, HDPE subgrade and the installation of a Bidim A24 Geotextile (or equivalent) and HDPE liner.

4.7.5 Seepage

Design measures and operational controls aimed at minimising seepage are discussed in the following sections, and include;

- Design measures
    - Underdrainage;
    - Low rate of rise; and
    - Cut-off trench.
- Operational controls

- o Sub-aerial deposition to promote air-drying (evaporation) whilst continually depositing in thin lifts to minimise dust generation;
- o Maintaining a small decant pond away from the embankment;
- o High rate of water recovery with a target of ~55% of the water from the tailings slurry being recovered;
- o Monitoring of pore pressure development within and downstream of the embankments; and
- o Monitoring of groundwater levels and groundwater quality downstream of the embankments;

4.7.5.1 Design Measures

4.7.5.1.1 Underdrainage System

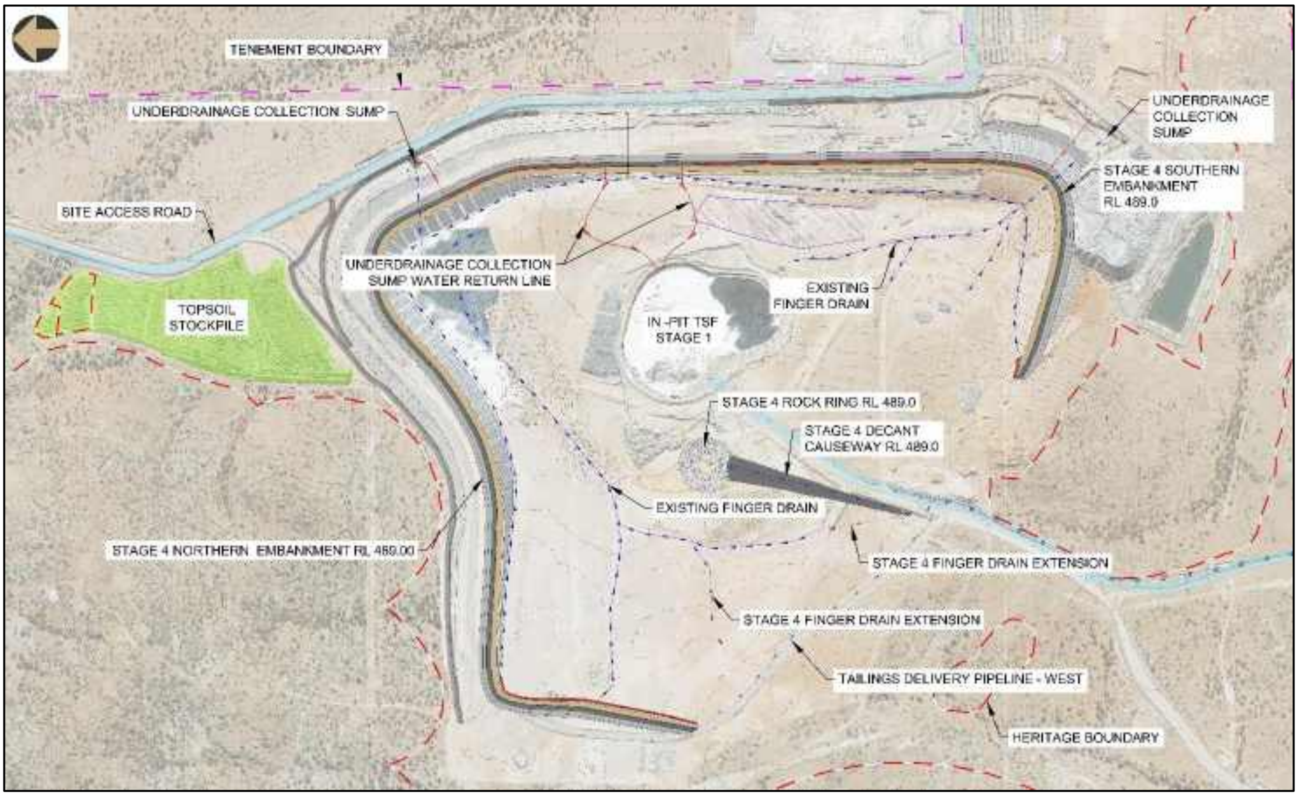
An underdrainage system has been incorporated into the IWLTSF design. The foundation of the IWLTSF comprises of a combination of calcrete, laterite and basalt rock. The in-situ materials located within the footprint (natural ground and basin excavation) are conditioned and compacted through trafficking to aid with seepage control. The existing underdrainage system within the IWLTSF along with the extensions of it network into Stage 4 storage area will benefit of assisting consolidation of the deposited tailings thus promoting early water return, minimising seepage and increasing tailings density. Furthermore, the existing underdrainage system and planned extension of it network into Stage 4 storage area has the benefit of reducing tailings saturation adjacent to the perimeter embankments, in turn lowering the phreatic surface, limiting seepage through the perimeter embankments and improving embankment stability.

It is recommended that the extension of underdrainage network system in Stage 4 storage area is installed as detailed on the drawings attached to this design report. The IWLTSF Stage 2, 3 and 4 underdrainage system layout is shown in Figure 25.

The extension of underdrainage network system comprises:

- Extension of toe drains and integrated with exiting underdrainage network system;
- Extension of finger drains and integrated with exiting underdrainage network system.

Figure 25: IWLTSF Stage 2, 3 and 4 Underdrainage System Layout



4.7.5.1.2 Cut-off Trench

The Stage 4 embankment extension will incorporate a cut-off trench, which will integrate with the existing trench from Stage 2 and Stage 3. This trench acts to key the embankment into the natural ground and restrict lateral seepage beneath the embankment wall. The cut-off trench will be backfilled with compacted 'select' low permeability borrow Zone 1 material.

4.7.5.1.3 Low Permeability Floor

The in-situ material at the location of the IWLTSF is observed to be of low permeability based on field observations during the site visit and geotechnical investigations undertaken by REC.

4.7.5.2 Operational Controls

4.7.5.2.1 Rate of Rise

Tailings discharge will be regularly rotated around the embankment perimeter and the storage surface area will increase. The facility will benefit from a low RoR averaging approximately 3.4 m/yr during Stage 4, and further improving through subsequent downstream stages of operation.

Sub-aerial deposition in thin lifts will promote consolidation through air-drying resulting in a proper beach formation, better water return and thus reduce seepage potential (compared to other deposition strategies such as sub-aqueous deposition or deposition in thick lifts i.e. high RoR).

4.7.5.2.2 Sub-aerial Deposition

As discussed above, sub-aerial deposition in thin lifts will serve to promote the formation of supernatant water and decrease the permeability of the deposited tailings.

4.7.5.2.3 Decant Pond Management

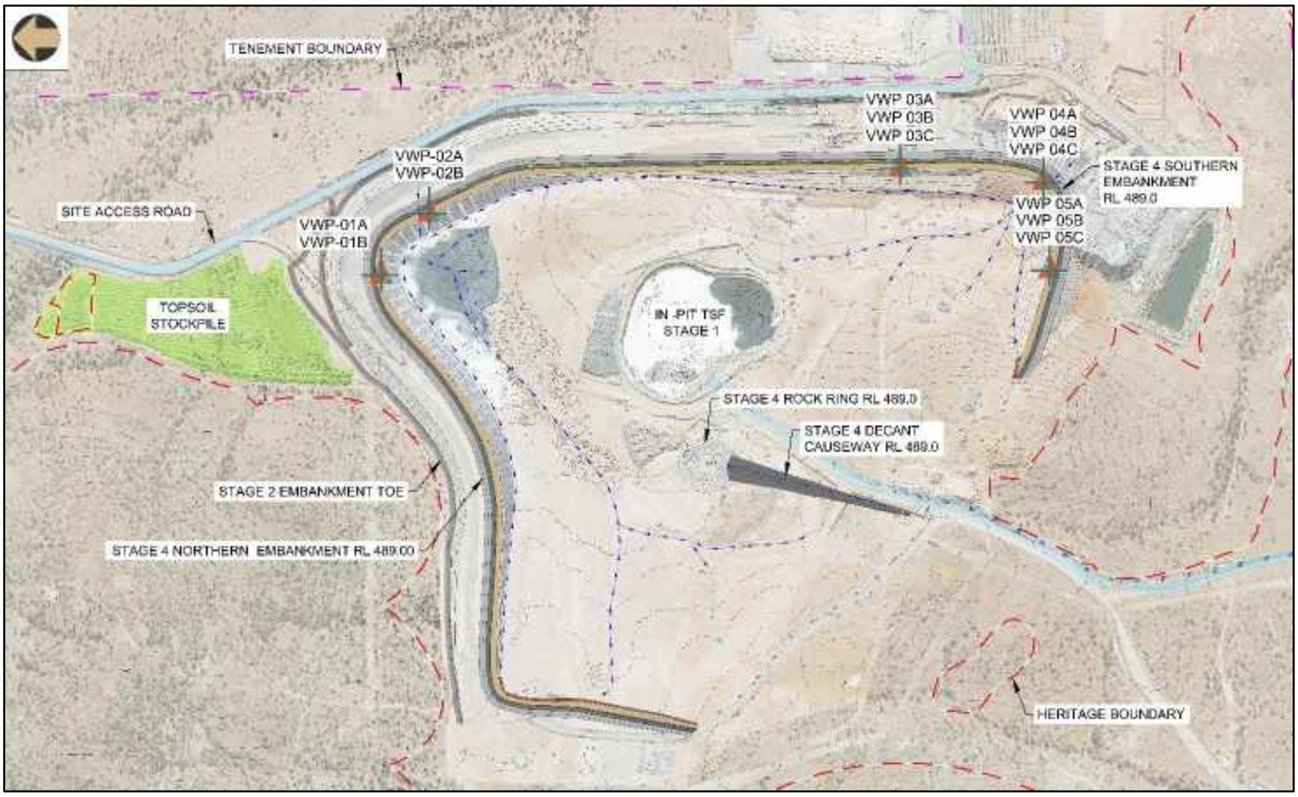
A small decant pond is proposed to be maintained on IWLTSF throughout the operation. The Stage 4 decant pond will primarily be managed within the rock ring. IWLTSF Stage 4 and future embankment raises will benefit from water recovery facilitated by the rock ring filter. A new turret pump will be installed within the rock ring to manage the pond formed by tailings deposition from the western and northern embankments. However, the existing turret pump system in the IPTSF will continue to manage water recovery from tailings deposition in the southern and eastern embankment during the early commissioning phase. Later as the beach develops the decant pond will begin to naturally drain into rock ring.

Maintaining a small decant pond away from the embankment will reduce the potential for embankment seepage. Furthermore, a small decant pond both in depth and aerial extent will minimise hydraulic head driven seepage and unnecessary evaporative losses.

4.7.5.2.4 Pore Pressure Monitoring

Pore pressure development within the IWLTSF embankments will be continuously monitored using existing vibrating wire piezometers (VWPs). As detailed in Section 5.5, thirteen (13) VWPs are installed within the existing IWLTSF embankment. Logger set up and cables of these VWPs will be extended to the Stage 4 embankment to ensure ongoing monitoring of pore pressure is continuous throughout Stage 4 operation. The existing VWP locations are shown in Figure 26.

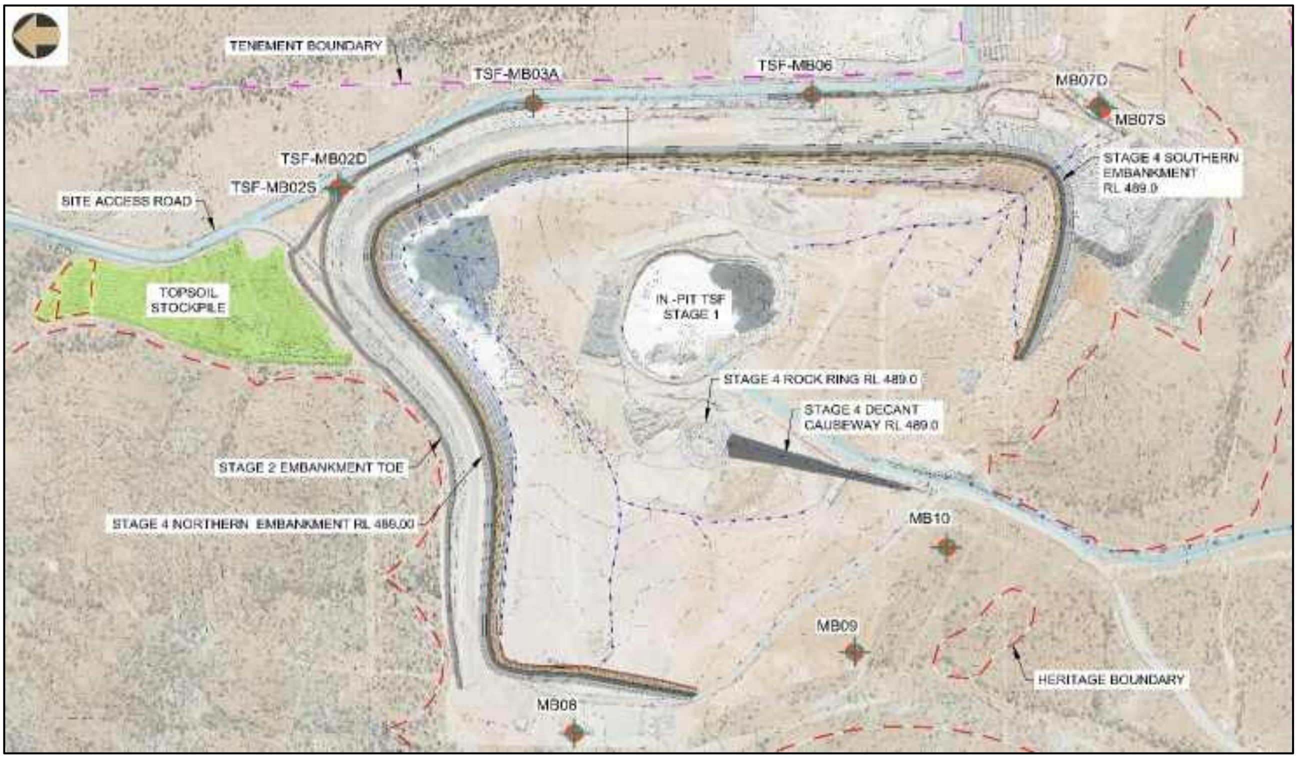
Figure 26: Existing VWP Locations



4.7.5.2.5 Groundwater Monitoring

The existing network of monitoring bores provides adequate coverage for the Stage 4 embankment, allowing for effective monitoring of groundwater levels and quality (against background groundwater quality) downstream of the facility. There are currently 9 monitoring borewells located downstream of the IWLTSF embankment, as detailed in Section 5.5. The existing monitoring bore locations are shown in Figure 30.

Figure 27: Existing Monitoring Bore Locations



4.7.5.2.6 Seepage Quality

Groundwater is hypersaline with TDS in the range of 90,000 to 120,000 mg/L. Water stored within both of the facilities is also assumed to be hypersaline and of similar quality, given that water pumped from underground operations will be stored in the facilities.

At this stage in the design development process the primary seepage management strategy for the TSF is to limit the amount of seepage by means of an underdrainage system.

4.7.6 Surface Water Flow and Storage

Assessment of freeboard has been conducted taking in consideration with the ANCOLD Guidelines on Tailings Dams – Planning, Design, Construction, Operation and Closure (ANCOLD, 2012) and the Code of Practice (CoP): Tailings Storage Facilities in Western Australia (DMP, 2013).

For the purpose of the assessment, IWLTSF Stage 4 was assumed to receive rainfall runoff from the upstream catchment. The freeboard was evaluated for both the Stage 4 North intermediate tailings storage scenario and the Stage 4 full capacity tailings storage scenario, as shown in Figure 28 and Figure 29 using a top-down approach.

For the Stage 4 North intermediate tailings storage scenario, the freeboards have been assessed based on the Stage 3 embankment crest elevation of RL 484.5. This approach demonstrates that Stage 4 North can operate independently at an intermediate storage capacity (RL 486.2) during the construction of the Stage 4 South embankment. Based on a maximum operating pond level of RL 487.74 m, the facility still contains a 1:100 AEP 72-hour storm event and meeting the freeboard requirements.

Additionally, the top-down storage curve in Figure 29 shows that at Stage 4 full capacity, with a maximum operating pond level of RL 487.74 m, there is sufficient freeboard to contain a 1:100 AEP 72-hour storm event, while still maintaining the required freeboard at the embankment crest. The required freeboard for IWLTSF Stage 4 is 1.0 m.

Figure 28*:* Freeboard Assessment - IWLTSF Stage 4 North Intermediate Storage Capacity

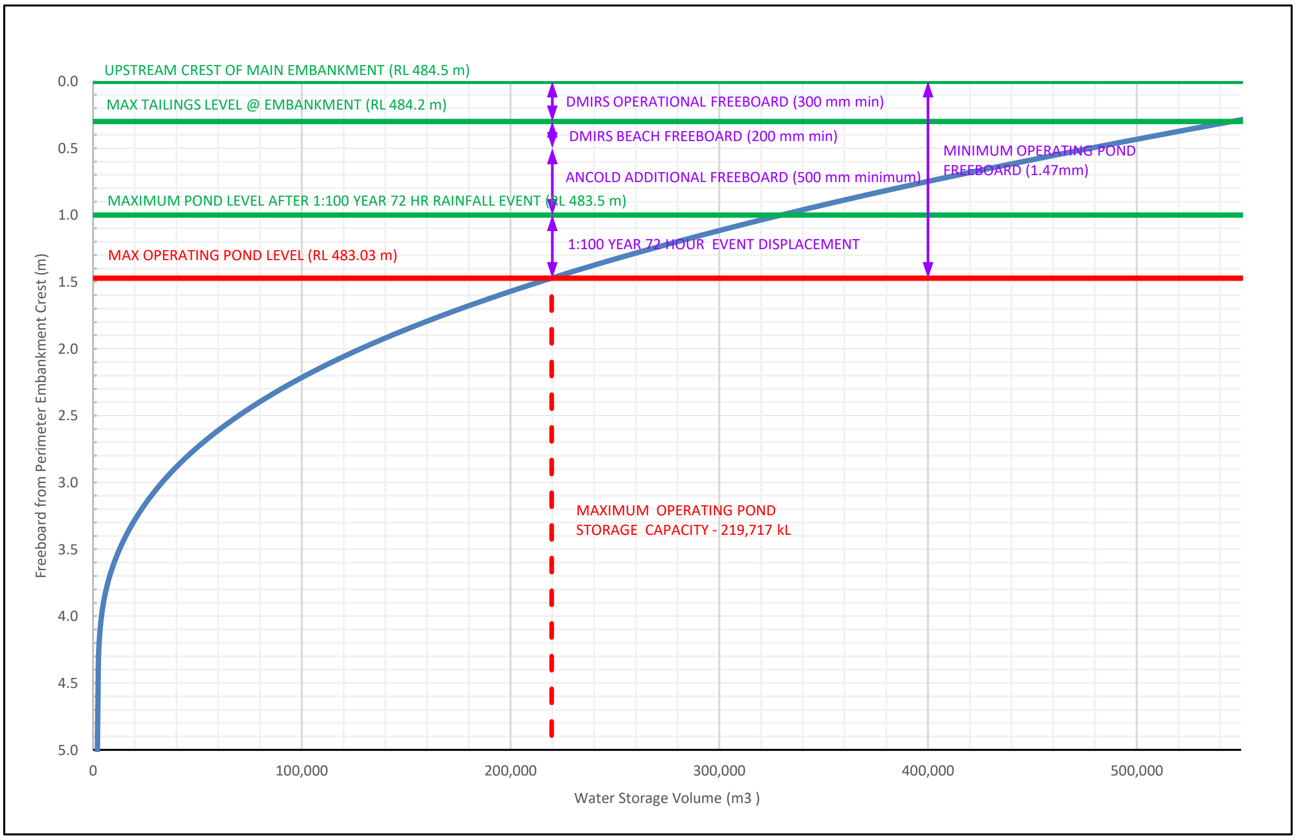
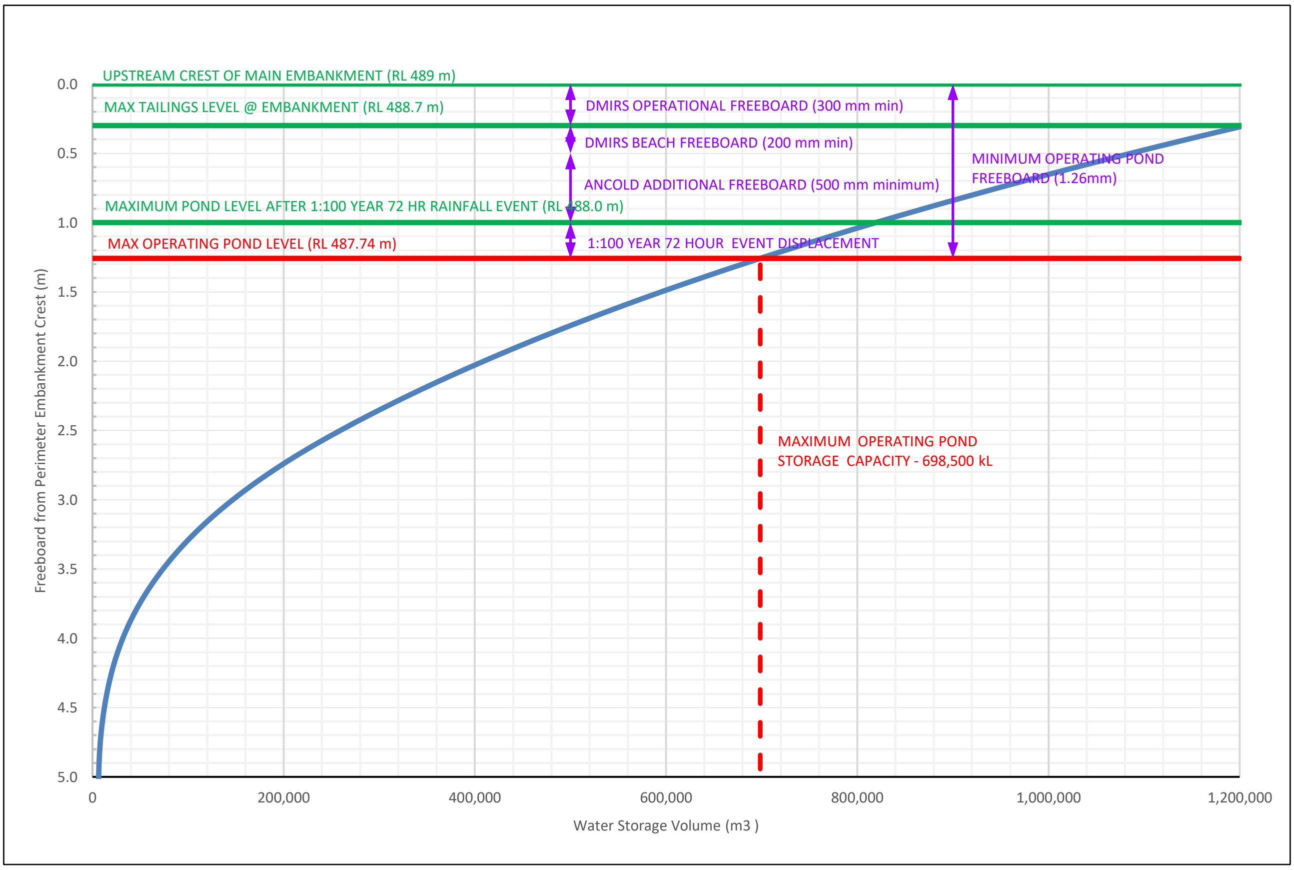


Figure 29*:* Freeboard Assessment - IWLTSF Stage 4 at Full Capacity



The storm water storage capacity is dependent upon the actual beach slope achieved during operation and the volume estimate for the IWLTSF Stage 4 is based on a beach slope of 150 m at 1.5%, followed by 1.0% for 300 m, followed by 0.75% for 500 m and the remaining at 0.5%.

These freeboard requirements are only applicable at the end of the operation of the facility (i.e. dam full tailings). During the operational life of the TSF the risk of overtopping is significantly reduced as the incidental rainfall is contained on the tailings beach on a depression away from the perimeter embankments. Removal of stormwater is managed by designing the decant pumps to extract not only the volume of water required for the target dry density, but also the volume of water expected from the PMP/PMF.

It should be noted that the maximum pond level for IWLTSF could be a combination of small storm events prior to a 1:100 AEP 72-hour storm event; i.e. the maximum pond level at a dam full (tailings) scenario should not be viewed as a maximum operating level under normal circumstances. The freeboard assessment should be revisited prior to reaching dam full of tailings to assess if the above assumptions regarding beach slopes are correct.

A freeboard assessment summary of both scenarios is presented in Table 44.

Table 44: IWLTSF Stage 4 Freeboard Assessment Summary

Parameter	Stage 4 North Intermediate Storage	Stage 4 Full Capacity Storage
Embankment Crest Level (m RL)	489.0	489.0
Max Tailings Level (m)	486.2	488.7
Max Pond Level (m RL)	483.5	488.0
Max Pond Capacity (m^3)	329,550	819,460
Required Stormwater Capacity (m^3)	109,833	120,960
Max Operating Pond Level (m RL)	483.03	487.74
Max Operating Pond Capacity (m^3)	219,713	698,500

4.7.7 Water Balance

A preliminary Water Balance was prepared using an excel spreadsheet for the IWLTSF Stage 4. The spreadsheet calculates an estimation of the inflows and outflows from the facilities and determines the balance after plant water requirements have been met. Water shortfall or water in excess of requirements is indicated on a monthly and annual basis.

Water inflows to the IWLTSF Stage 4 system consist of incidental rainfall and slurry water from the plant. Water outflows consist of evaporation from the supernatant pond and running beaches, evapo-transpiration from drying beaches, seepage, retention of water within tailings and water pumped to the Process Plant.

The following information was used for the water balance:

- Average monthly rainfall figures for Leinster (BOM Station 012314) adjacent to the site (recording period: 1994 to 2020); and
- Evaporation data from interpolation of Technical Note 65.

The following assumptions were made for the water balance:

- Runoff co-efficient of 1.0 for the surface of the tailings;
- Runoff co-efficient of 0.5 for the upstream catchment (refer section 2.3.8);
- Decant pond is to be maintained with a maximum radius not exceeding 8% of the tailings beach area;
- Spigotting and running beaches would have a maximum area of 24,000 m^2;
- The maximum tailings surface area of the facility (tailings full) was adopted; and
- Decant water recovery is maximised to achieve the minimum design in-situ dry density of 1.40 t/m^3.

Under average rainfall and evaporation, the preliminary water balance indicates:

- an average daily water return of 1,715 m^3/day or 71.4 m^3/hr, equivalent to 48% of the total slurry water, for operation of the IWLTSF Stage 4 (based on the operating hours of 8,000 per annum).

It is recommended that the water recovery system (decant pumps and piping) has a minimum capacity of not less than 70 m^3/hr for the IWLTSF Stage 4, to ensure adequate water removal, particularly during high rainfall periods. The Water Balance is presented in Appendix I.

4.8 Design and Construction Details

4.8.1 Bill of Quantities

A preliminary earthwork bill of quantities (BOQ) for the IWLTSF Stage 4 is provided in Table 45.

Table 45: Bill of Quantity

<table>
<tr><th>Items</th><th>Volume (m^3)</th><th>Area (m^2)</th><th>Length (m)</th></tr>
<tr><td colspan="4">Stage 4 North</td></tr>
<tr><td>Zone 3B</td><td>78,200</td><td rowspan="4">NA</td><td rowspan="5">NA</td></tr>
<tr><td>Zone 3A</td><td>37,300</td></tr>
<tr><td>Zone 3C</td><td>12,400</td></tr>
<tr><td>HDPE Subgrade (200mm)</td><td>2,500</td></tr>
<tr><td>Geotextile/HDPE Liner</td><td>NA</td><td>13,800</td></tr>
<tr><td>Cutoff Trench (extension)</td><td rowspan="3">NA</td><td rowspan="3">NA</td><td>330</td></tr>
<tr><td>Toe Drain (extension)</td><td>330</td></tr>
<tr><td>Finger Drain (extension)</td><td>250</td></tr>
<tr><td colspan="4">Stage 4 South</td></tr>
<tr><td>Zone 3B</td><td>58,100</td><td rowspan="5">NA</td><td rowspan="6">NA</td></tr>
<tr><td>Zone 3A</td><td>26,800</td></tr>
<tr><td>Zone 3C</td><td>8,800</td></tr>
<tr><td>Butress (Zone 3A)</td><td>6,000</td></tr>
<tr><td>HDPE Subgrade (200mm)</td><td>1,800</td></tr>
<tr><td>Geotextile/HDPE Liner</td><td>NA</td><td>9,800</td></tr>
<tr><td>Cutoff Trench (extension)</td><td rowspan="2">NA</td><td rowspan="2">NA</td><td>35</td></tr>
<tr><td>Toe Drain (extension)</td><td>35</td></tr>
<tr><td colspan="4">Stage 4 Decant Infrastructure</td></tr>
<tr><td>Decant Causeway (assumed Vanguard dump was removed)</td><td>16,600</td><td rowspan="2">NA</td><td rowspan="2">NA</td></tr>
<tr><td>Rock Ring</td><td>28,200*</td></tr>
<tr><td colspan="4">Note: *On existing ground, no allowance has been made for rock fill volume within the planned low permeability borrow excavation.</td></tr>
</table>

4.8.2 General

Construction of the IWLTSF Stage 4 will be undertaken in accordance with issued for construction (IFC) drawings and earthworks specification developed as part of detailed design and included in Appendix J. Furthermore, construction and operation will be in general accordance with the intent of this design report. This report and the drawings included in Appendix A present the detailed design of the IWLTSF Stage 4.

4.9 Tailings Discharge and Water Management

4.9.1 Tailings Deposition

Tailings are expected to be delivered from the Plant at a production rate of 1.6 Mt of solids per annum (tpa) for the remaining life of the project. At times throughout the mine plan, the rate of deposition may increase or decrease. The solids content (% solids) is expected to be approximately 55%.

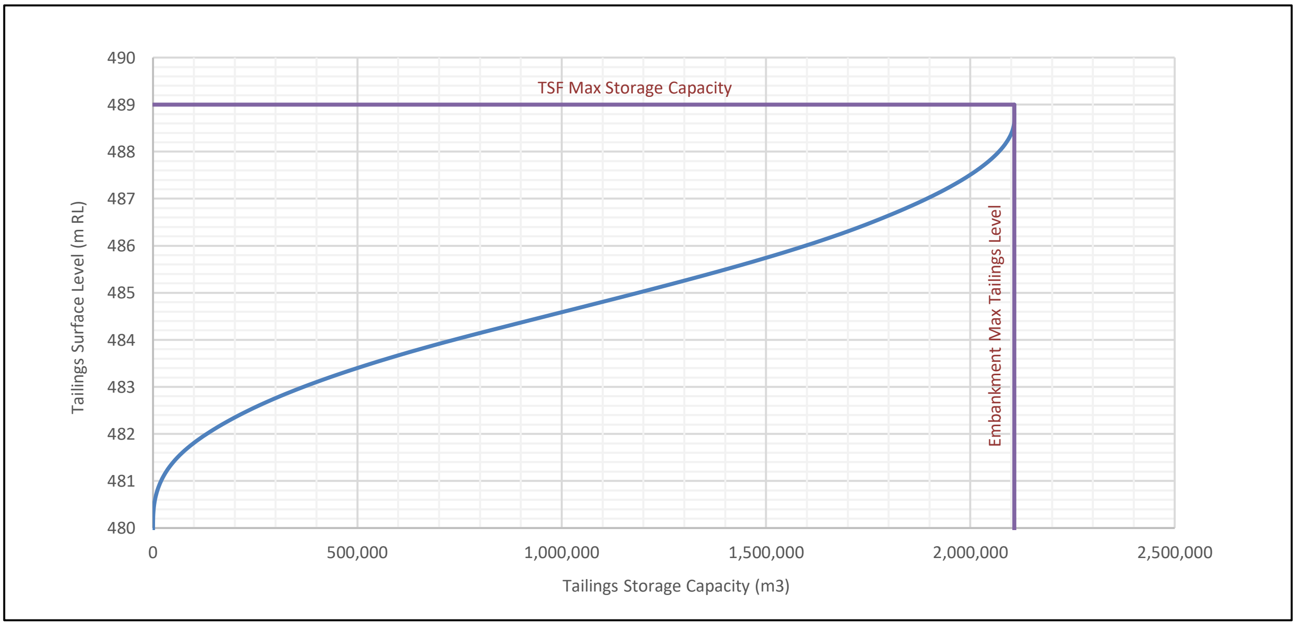
Tailings will be deposited using sub-aerial deposition techniques from multi spigot locations on the perimeter deposition embankments for the operation of the IWLTSF.

Tailings spigotting or deposition within the IWLTSF is to be executed in thin layers of not more than 300 mm to ensure a uniform tailings beach with a fall of 1.5% for 150 m, followed by 1.0% for 300 m, followed by 0.75% for 500 m and a remaining 0.5% is developed. The decant pond shall be developed away from the perimeter embankment/point of discharge. The spigotting/discharge sequence is to be formulated such that the supernatant water pond is always maintained away from the perimeter embankments.

Tailings deposition will occur from the perimeter embankments with spigot intervals of not less than 20 m and not more than 50 m. Conductor pipes, placed on old conveyor belt material, are recommended to prevent damage to the HDPE liner on the embankment face. The diameter of the conductor pipe has to be designed to suit the size of the tailings distribution pipeline and the conveyor matting, to be placed down the embankment, also has to be adjusted to suit the size of the conductor pipe.

Development (filling) of the IWLTSF Stage 4 is shown graphically on Figure 30 in terms of storage volume and tailings storage elevation.

Figure 30: IWLTSF Stage 4 Tailings Storage Capacity Curve



4.9.2 Decant Pond Management

The supernatant pond level must be actively maintained, so as to be kept clear of the perimeter embankments. At no time should the supernatant pond be allowed to encroach within 100 m of the external engineered embankments of the IWLTSF.

The position and extent of the supernatant pond is controlled by the water recovery which is to be maximised. The decant pumping system must be capable of recovering additional water during the wet season.

The Stage 4 decant pond will primarily be managed within the rock ring. IWLTSF Stage 4 and future embankment raises will benefit from water recovery facilitated by the rock ring filter. A new turret pump will be installed within the rock ring to manage the pond formed by tailings deposition from the western and northern embankments.

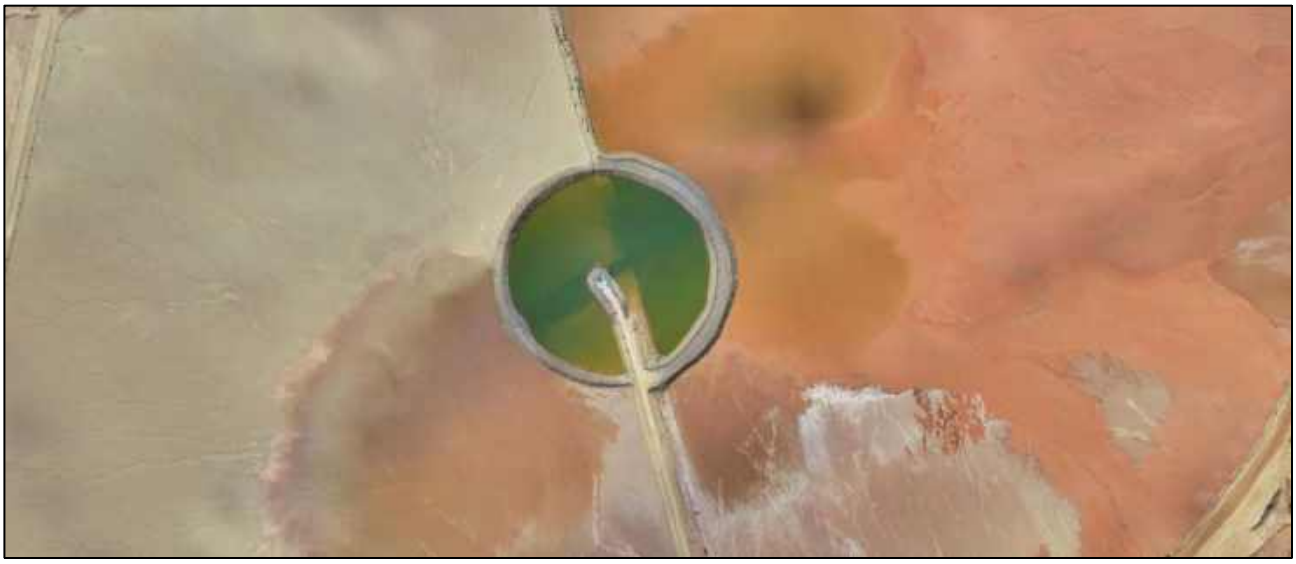
However, the existing turret pump system in the IPTSF will continue to manage water recovery from tailings deposition in the southern and eastern embankment during the early commissioning phase. Later as the beach develops the decant pond begin to naturally drains into rock ring.

The benefits of implementing a well-formed rock ring filter decant arrangement are as follows:

- Increased volume of water can be recovered, since the rock ring forms an efficient filter system to facilitate recovery of water with a low total suspended solids (TSS). The cross-sectional area of the filter (width) and diameter of the decant rock ring filter forms a substantial surface area, with circuitous flow paths, through which the decant water must pass. The ‘flow velocities’ are reduced by the circuitous flow paths through the filter wall, enabling the last remnant of the very fine fraction of solids within the supernatant water to be deposited within the filter, improving the clarity of the water inside the rock ring;
- The clarity of the water within the rock ring is a function of the thickness of the filter walls. Typically, the internal diameter of the rock ring is not less than 25 m and up to 75 m with the perimeter of the rock ring having a crest width of not less than 5 m excluding windrows. The actual constructed width is a function of the equipment used to place the rock forming the filter;
- As the tailings beach rises, a sump is formed within the rock ring, which remains in place as the surrounding tailings beach rises. The impact of the creation of this sump is that the spatial extent of the supernatant pond is reduced and hence evaporation is reduced;
- The improvement in the clarity of the water within the rock ring means that operators are less inclined to stop the operation of the decant pumps due to the turbidity within the supernatant pond, which is typical of what happens on the surface decant ponds which are exposed to windy conditions;
- The presence of the rock does not allow turbulence (wave action) to propagate through the filter wall and the surface area within the ring is sufficiently small to minimise the potential risk of wave action forming within the rock ring; and
- The small pond area, surrounded by a high rock wall which encloses the pond, is also a deterrent to birds that might otherwise land on a larger pond. Impacts on wildlife are reduced by the rock ring.

Because of the large surface area of the filter, the clarity of the water within the rock ring (inside the filter) is much better than could otherwise be achieved without such a structure. The photographs in Figure 31 show the difference in the clarity of the supernatant water inside and outside the rock filter wall.

Figure 31: Typical Rock Ring Water Clarity



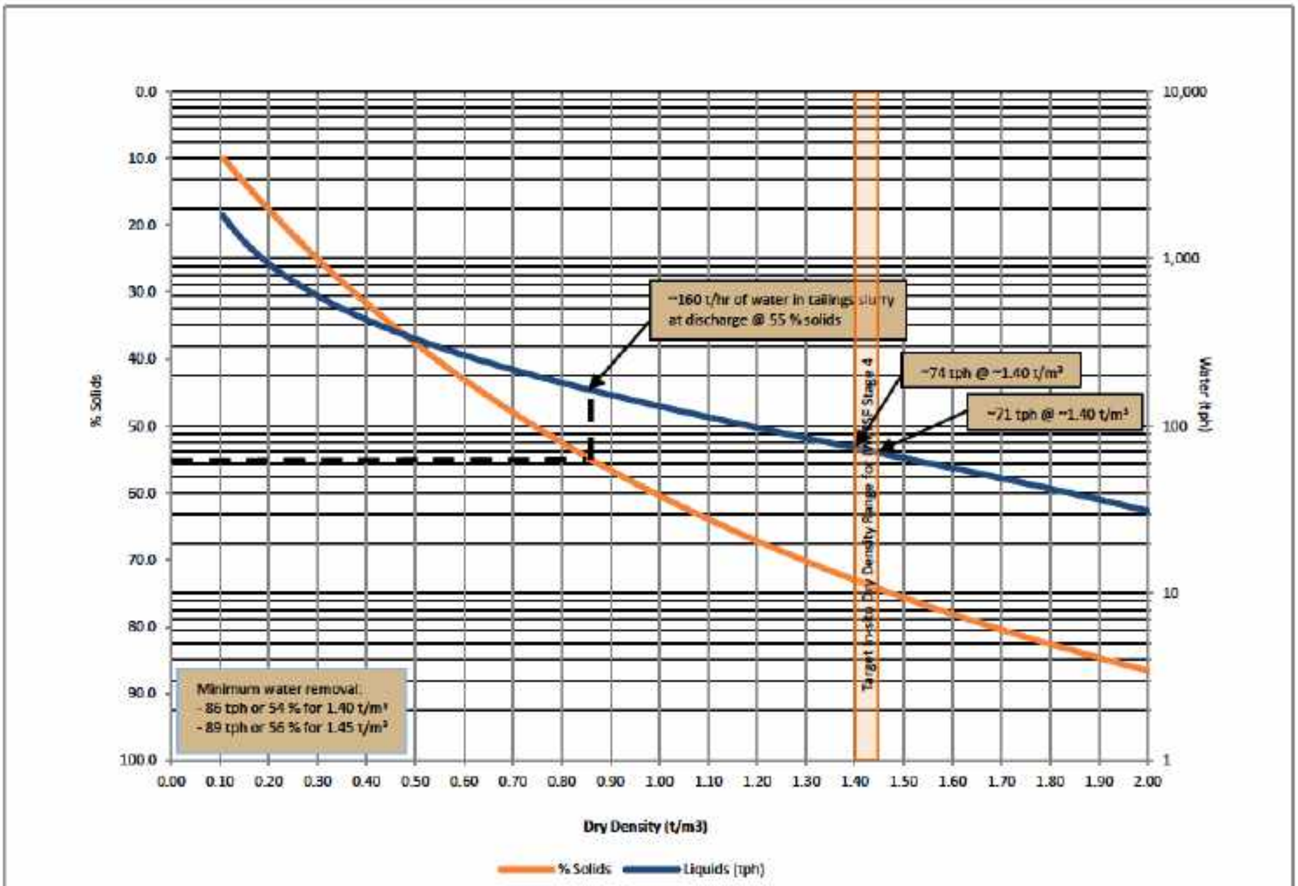
4.9.3 Water Recovery

A minimum in-situ dry density of 1.40 t/m³ has been adopted for the IWLTSF for Stage 4. To achieve this target, an average of 60% of the slurry water entering the IWLTSF has to be removed/recovered.

A beach slope of 1.5% for 150 m, followed by 1.0% for 300 m, followed by 0.75% for 500 m and 0.5% for the remaining length has been assumed as part of the IWLTSF Stage 4 design, assuming that the tailing slurry solids will be 55% at the point of discharge and will segregate with the coarse fraction settling near the perimeter containment deposition points and the finer fraction, silt and clay (materials finer than 75 microns), moving down the beach towards away from the perimeter embankments of the IWLTSF.

Figure 32 presents the dry density relationship for wet tailings produced (1,600 ktpa). Note the minimum recommended total water removal of 86 tph (seepage, evaporation, underdrainage and supernatant). This is the recommended basis for the design of the return water system (pumps and pipes) which excludes the PMP/PMF event. This system can reasonably be expected to be working at maximum capacity in the winter months when evaporation rates are low.

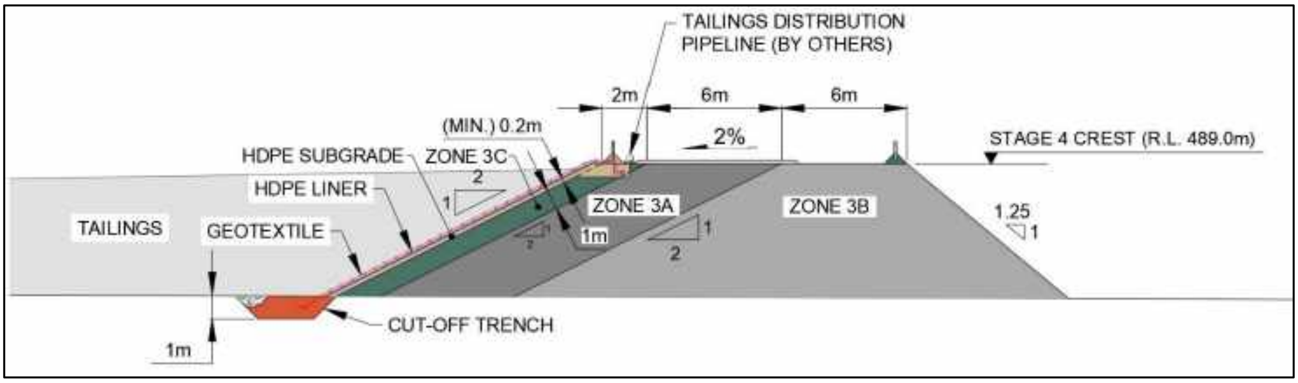
Figure 32: Dry Density Water Recovery Relationship



4.9.4 Seepage Management

The Stage 4 embankment extension, extending across natural ground beyond the existing Stage 2 and Stage 3 embankments, will include a cutoff trench. The trench aims to intercept lateral seepage through and beneath the embankments. The general configuration of the cut-off trench is presented in Figure 33.

Figure 33: Cut-off Trench Configuration



The conditioning of the ground foundation using local earthy borrow (regolith) materials will help control seepage through the IWLTSF floor. The existing underdrainage network system, including the toe and finger drains, will be extended into Stage 4. This will aid in the consolidation of the deposited tailings, promote early water return, and minimise seepage.

Additionally, the installation of the embankment HDPE liner and underlying subgrade overlayed with a geotextile will mitigate seepage through the embankment. To ensure water-tightness, the Stage 4 HDPE liner will be welded to the Stage 2 and 3 HDPE liners at horizontal benches, creating a continuous embankment surface cover.

Furthermore, the existing seepage trench on the northeastern side, along with a planned seepage trench on the eastern side, is expected to intercept any surficial seepage that may occur beneath the embankment.

4.10 Cover and Liners

In order to control seepage and internal erosion (piping) through the IWLTSF embankment, an HDPE liner will be installed on the upstream face of the embankment. Additionally, a 200 mm HDPE subgrade will be constructed to provide a smooth, even surface and minimising the risk of liner puncture by rocks within the embankment. A Bidim A24 geotextile (or equivalent) will be installed between the subgrade and the HDPE liner for enhanced surface suitability and additional puncture protection.

The proposed closure concept outlined in Section 6.0 includes the provision of a vegetation soil cover. Specification of the cover is envisaged to be undertaken during final closure planning and design.

4.11 Quality Assurance

An Earthworks Specification will be developed as part of detailed design. The specification will include a construction quality assurance (CQA) plan and requirements for on-site third-party quality assurance (QA) monitoring. A construction completion report will be prepared by a Competent Person (typically the design engineer) following substantial completion of the IWLTSF construction; in line with the requirements of the CoP: "*Tailings Storage Facilities in Western Australia*" (DMP, 2013) and "*Guide to Departmental Requirements for The Management and Closure of Tailings Storage Facilities*" (TSFs) (DMP, 2015).

4.12 Spillways

The CoP: "*Tailings Storage Facilities in Western Australia*" (DMP, 2013) states that in Western Australia, the use of spillways is not encouraged. As such, the final surface of the IWLTSF has been designed as non-spill facilities which are capable of retaining the closure design storm event.

5. Operational Requirements

5.1 General

An Operating Manual (OM) has been developed as part of Detailed Design in accordance with the DMPs Guide to Departmental requirements for the managements and closure of tailings storage facilities and Code of Practice (CoP): *Tailings Storage Facilities in Western Australia*. IWLTSF Stage 4 Operating Manual is included in Appendix K.

5.2 Management of Water

Tailings are to be deposited from the main embankment of the IWLTSF in a sub-aerial manner in thin lifts and beaching away from the perimeter embankments. The decant pond shall be developed away from the perimeter embankment of the IWLTSF. The spigotting sequence is to be formulated such that the supernatant water pond is always maintained away from the perimeter embankments, initially near IPTSF, and later progressing towards the rock ring as the beach develops.

A new turret pump required to be installed within the rock ring to manage the pond formed by tailings deposition from the western and northern embankments. However, the existing turret pump system in the IPTSF will continue to manage water recovery from tailings deposition in the southern and eastern embankment during the early commissioning phase. Later as the beach develops the decant pond begin to naturally drains into rock ring.

Under normal operating conditions the normal operating pond is not expected to exceed 100,000 m^3 for the IWLTSF Stage 4. The size of the normal operating pond should be as small as practical to minimise seepage potential whilst providing sufficient depth for operation of the decant pump.

The maximum operating pond level for a dam full (tailings) scenario which still provides capacity for the 1:100 AEP 72-hour storm event, DMP required freeboard and ANCOLD additional freeboard is RL 488.0 m for the IWLTSF Stage 4. The maximum operating pond levels represents the storage of 698,500 kL for the IWLTSF Stage 4 full facility. However, it is not the intent of the IWLTSF design that such a large amount of water is stored within the facility.

5.3 Seepage Management

Seepage management within the TSF is achieved by sub-aerial deposition in thin lifts to promote air-drying and maintaining a small decant pond away from the main embankment as described in Section 4.9.2. Maximising water recovery is important in reducing the amount of water available for seepage. In addition, existing seepage trench on northeast side and planned seepage trench on eastern side is expected to intercept surficial seepage that may occur under the embankment.

5.4 Erosion Control

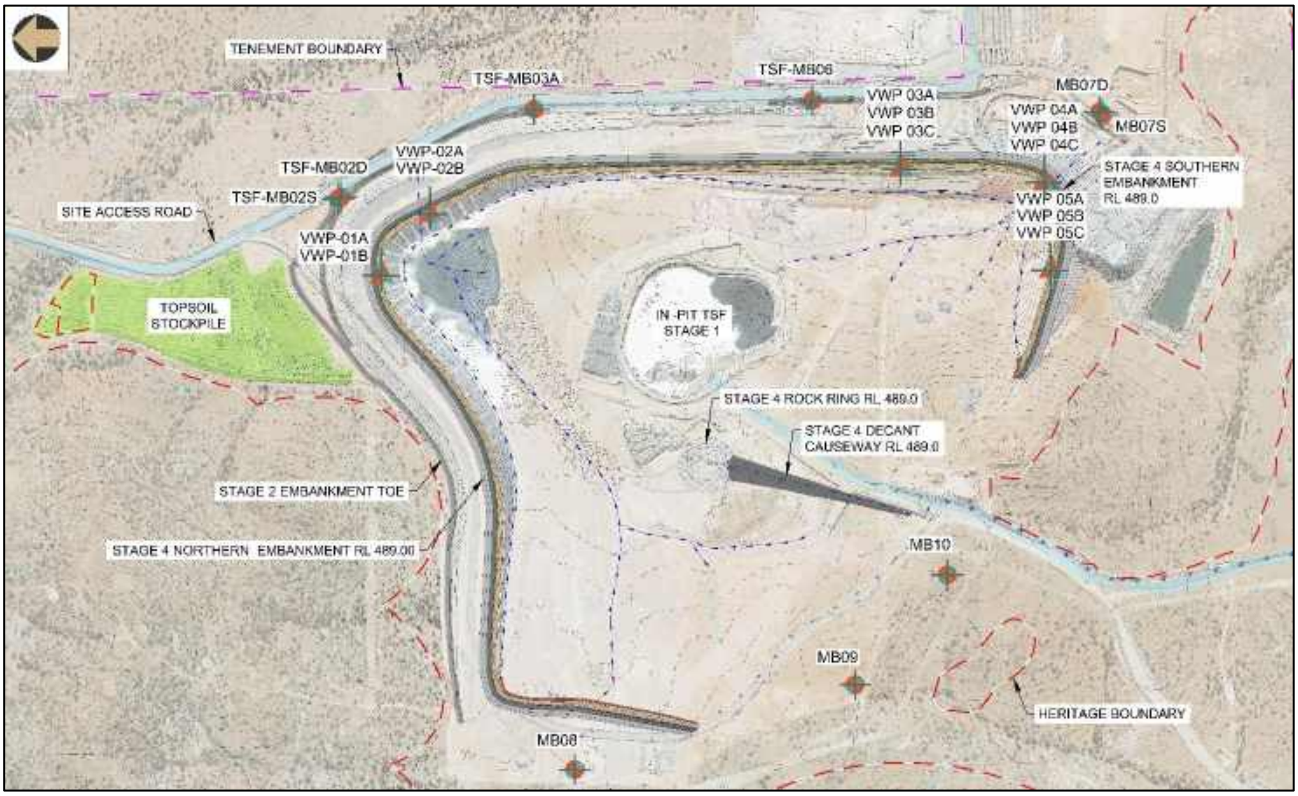
Erosion mitigation features are described in Section 4.7.4. The main embankment batter, upstream and downstream batters of the IWLTSF should be inspected on a regular basis and following heavy rainfall events for signs of excessive erosion and repairs made accordingly.

Sub-aerial tailings deposition on thin lifts across the entire tailings beach will ensure the tailings surface is kept sufficiently moist to prevent excessive wind erosion and dusting of the tailings surface.

5.5 Embankment Instrumentation

The existing monitoring instrumentation provides adequate coverage for Stage 4 of the embankment. The instrumentation includes 12 vibrating wire piezometers (VWPs) at various depths in five locations on the embankment, as well as nine monitoring boreholes downstream. No new instruments will be installed, but the existing VWP cables will need to be extended to the Stage 4 embankment level, and the logger setup will be repositioned on top of the new embankment. Care will be taken during construction to protect the existing VWPs, and the cables will be extended by splicing and encased in conduit along with the embankment construction lifts until reaching the final embankment surface. The existing monitoring instruments are presented in Figure 34.

Figure 34: Embankment Instrumentation Existing



6. Closure Requirements

6.1 General

It is understood that a detailed Project Closure Plan will be developed by others. REC has undertaken the proposed IWLTSF design with closure in mind, developing a preliminary closure concept, taking into consideration:

- The DMP's principal closure objectives for rehabilitated mines - Guidelines for Preparing Mine Closure Plans (DMP, 2015b);
  - (physically) safe to humans and animals,
  - (geo-technically) stable,
  - (geo-chemically) non-polluting/non-contaminating, and
  - capable of sustaining an agreed post-mining land use.
- The Environmental Protection Authority's (EPA) objective for Rehabilitation and Decommissioning to ensure that premises are decommissioned and rehabilitated in an ecologically sustainable manner.

At this point in time, a preliminary closure concept has been developed for the IWLTSF which is to be refined during the Project in light of further technical investigations, as well as the possibility of processing oxide ores with ensuing deposition of oxide-tailings (expected Non-Acid Forming, NAF) at the back end of the IWLTSF with both environmental and rehabilitation cost benefits to achieve required closure outcomes. The site's aridity and hypersaline (lacustrine) setting are important aspects to consider in terms of both restricted tailings weathering and final land use.

The closure concept for the IWLTSF proposed herein centres on infiltration control achieved through a combination of an engineered store and release cover system, and final landform upper-surface hydrology configured with a bunding network to redistribute ponded water from intense rainfall to maximise free water evaporation. The cover and bund system is to be vegetated with plant species endemic to the Project area to establish a sustainable (halophytic) arid-land ecosystem. This generic approach for the closure of TSFs has been in place at mine sites throughout the WA Goldfields for many years (Campbell 2007).

Ongoing exploration and metallurgical evaluations for the Project are aimed at defining sources of oxide ores from satellite pits for milling during the final stages of mining and are thus pertinent to the geochemical nature of the tailings deposited in the IWLTSF as the end of mine life is approached. A final layer of 0.5-1.0 m of oxide ore tailings across the entire tailings surface stands to simplify closure of the IWLTSF overall, especially where the oxide ores concerned are Non Acid Forming (NAF)[1]

Notwithstanding the potential milling of oxide ores at the back end of the Project, for the purposes of this document, it is assumed that no oxide ore tailings are placed as a final layer in the filling of the IWLTSF (i.e. closure of the IWLTSF needs to cater for fresh ore tailings classified as PAF, as above).

6.2 Closure Design Key Conceptual Elements

6.2.1 Embankment Downstream Construction

The IWLTSF embankments are proposed to be constructed in a downstream methodology utilising mine waste to form the bulk downstream zone. The mine waste forming the downstream zone is proposed to be placed and traffic compacted progressively as it is produced through the mine schedule, the final arrangement of the IWLTSF will be determined based on the design for the remaining stages. This will aid in facilitating a (geo-technically) stable structure throughout the life of the facility and post closure.

[1] Should the oxide ores contain traces of sulphides (e.g. Sulphide-S values < 1%), so that the resulting oxide ore tailings classify as Low- Capacity-PAF, their placement as a final layer in the IWLTSF will still benefit closure of this facility.

Additionally, through progressively incorporating mine waste placement into the IWLTSF structure throughout the life-of-mine, rehabilitation costs are spread over the life of the facility, as opposed to being left to final mine closure.

It is expected that the mine waste from the underground development works, placed in the downstream zone of the embankments will form an erosion resistant structure. A thin layer of topsoil should be spread as best as practicable on the downstream batter surfaces as a growth medium to promote revegetation.

6.2.2 Backfilling of Rock Ring Structure

The rock ring void in the centre of the IWLTSF is to be backfilled with waste rock obtained from the rock ring walls and decant causeway embankments which are exposed above the adjoining tailings surface. The uppermost portion of the backfill profile will need to comprise weathered waste rock (oxide waste) that is enriched in 'fines' with appreciable clays and silts, and thus of low permeability.

Backfilling will ultimately provide a consistent, gradual grade toward the (now filled) rock ring area (global topographic low of the IWLTSF) in preparation for the store and release cover system to be placed over the entire tailings surface.

Provision will need to be made for a liner (e.g. HDPE) to be placed over the (filled) rock ring area to restrict infiltration when this topographic low becomes temporarily covered by ponded water from major storms.

6.2.3 Store and Release Cover System

Though the store and release cover system will require technical investigations for design, it will likely comprise a 1.0 m nominal layer of weathered waste rock placed across the entire tailings surface of the IWLTSF.

Preferably, the weathered waste rock will be oxide waste enriched in 'fines' that contain clays and silts, and thus of low to moderate permeability with at least a moderate water holding capacity. Volumetrically, the IWLTSF cover system of this form will require approximately 0.75 Mm^3 of weathered waste rock. Further site investigations will be required in order to delineate borrow areas for sourcing the amounts of weathered waste rock needed for cover construction.

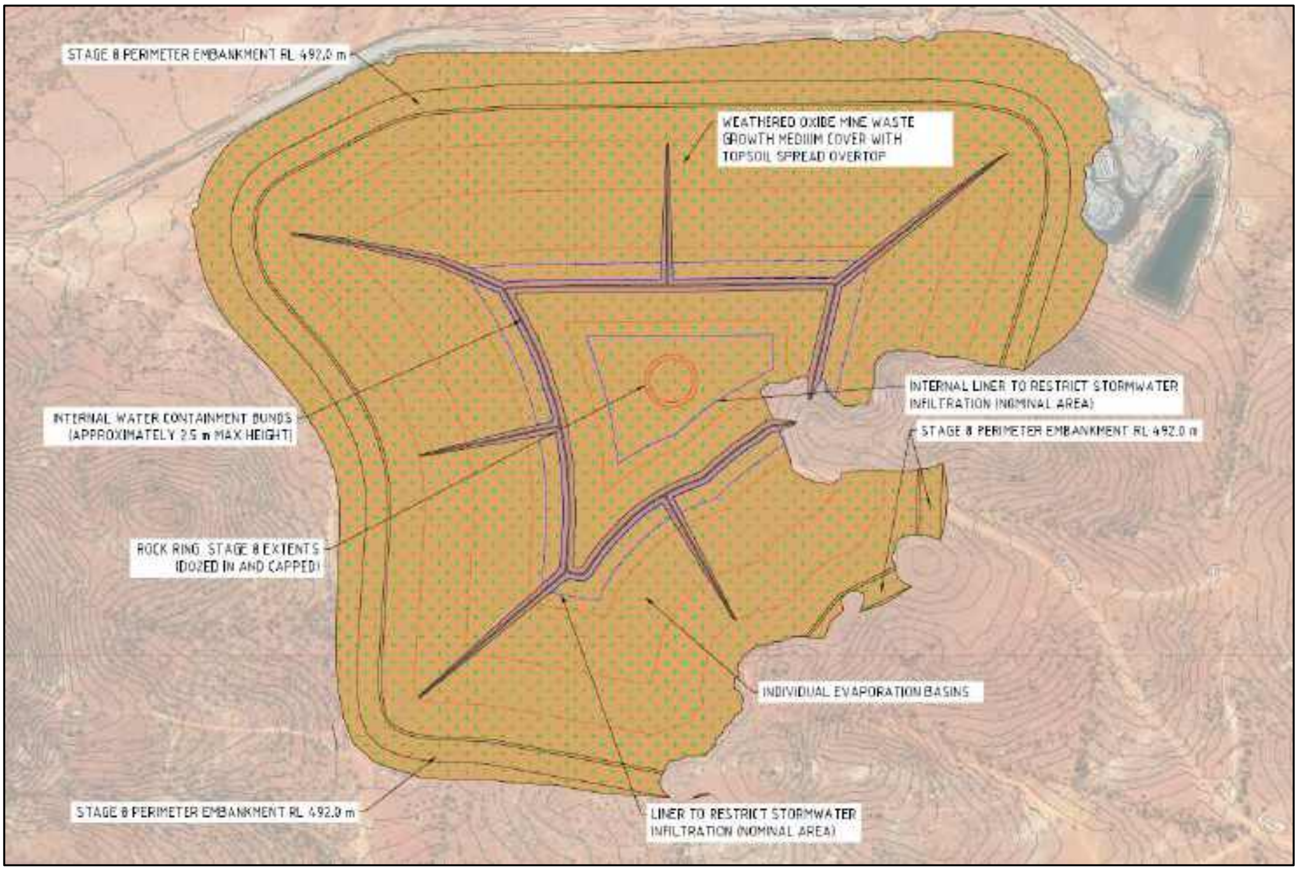
6.2.4 Bunded Evaporation Basins

To cater for water inputs from major storms, a network of bunded evaporation basins is to be established across the covered upper-surface of the IWLTSF. In this way, deep ponds of stormwater are constrained, and free water evaporation from shallow ponded water maximised (e.g. Bennett (2007) for the Thunderbox Gold Mine).

For the Bellevue IWLTSF, a network of eight (8) individual evaporation basins is proposed with areas ranging from 8.2 ha to 13.0 ha. Bunds with a maximum height of 2.5 m (located across beaches and broadly centrally), extending out to 0.0 m adjacent to the perimeter embankments have been designed to store a 1:100 year 72- hour rainfall event while maintaining 1.0 m of freeboard to the bund crest. For the same reason given above for the backfilled rock ring area (i.e. restricting infiltration by ponded water from major storms), provision should be made for a liner (e.g. HDPE) in the topographic low area immediately adjacent to the across-beach bund in each basin, as well as a portion of the upstream face of the bunds. Though further work would be needed for final design, such lining may need to correspond to approximately 10% of each evaporation basin to accommodate water inputs up to a 1:100 year 72-hour rainfall event.

Bunding for the evaporation basins will also need to be provided for physical stability and erosion resistance over the longer term. The preliminary closure design arrangement for the upper-surface of the IWLTSF closure design, based on the preliminary modelling for the final stage is shown in plan on Figure 35.

Figure 35: Rehabilitated IWLTSF Upper-Surface Closure Concept (Plan View)



6.3 Timing of Decommissioning and Rehabilitation Works

Preparation for IWLTSF closure can be undertaken throughout the operation (e.g. weathered waste rock can begin to be stockpiled on top of the IWLTSF embankments, ready to be later accessed for construction of the store and release cover system).

Once the IWLTSF has reached capacity and no further deposition is to occur, the initial stages of decommissioning will commence starting with pumping as much supernatant water as possible out from the rock ring. As the tailings surface around the rock ring dewaters and becomes trafficable, the rock ring and decant causeway embankments standing proud of the final tailing surface need to be dozed down to backfill the rock ring sump; the lower sections of the rock ring sump will be filled with fine tailings which entered the sump during earlier IWLTSF operation. Dewatering of the tailings beaches upstream from the rock ring area will occur at a faster rate via evaporative drying and thus develop strength to support trafficking sooner.

Based on the laboratory weathering testing completed, the lag-time to acidification for the Bellevue tailings derived from fresh ores has been set at 18 months following exposure (e.g. surface of a dormant beach) in the IWLTSF (Section 3.1.4). In terms of commencing and completing the earthworks needed for the decommissioning and rehabilitation of the IWLTSF, the surface-zone tailings in the filled facility may be exposed for up to 6-12 months. Central to safely and effectively backfilling the rock ring sump and placing the store and release cover system is development of sufficient undrained shear strength within the surface tailings for trafficking by heavy earthmoving equipment. This temporary exposure during closure earthworks falls within the lag time to acidification and, as such, poses no adverse impact. Moreover, aside from occasional wetting by episodic rainfall, the surface tailings will remain at residual moisture levels, preventing any significant biogeochemical oxidation of pyrrhotite and pyrite. Therefore, the required exposure period for IWLTSF closure presents no environmental risk.

6.4 Performance Monitoring against Closure Criteria

Closure criteria and a post closure monitoring plan will be developed at a later stage in conjunction with a site wide closure plan.

7. References

1. ANCOLD 2012, Australian National Committee on Large Dams: Guidelines on the Consequence Categories for Dams

2. ANCOLD 2019, Australian National Committee on Large Dams: Guidelines on Tailings Dams Planning, Design, Construction, Operation and Closure

3. ANCOLD 2019, Australian National Committee on Large Dams: Guidelines for Dams and Appurtenant Structures for Earthquakes

4. BoM 2016/17, Bureau of Meteorology Website

5. DMP 2013, Code of Practice (CoP): Tailings Storage Facilities in Western Australia

6. DMP 2015, Guide to Departmental requirements for the management and closure of tailings storage facilities (TSFs)

7. DMP 2015, Guidelines for Preparing Mine Closure Plans

8. DMP 2015, Guide to the preparation of a design report for tailings storage facilities (TSFs)

9. Geoscience Australia 2018, The 2018 Australian Earthquake Hazard Map

10. Vucetic, M 1992, Soil properties and seismic response, Proc. Earthquake Engineering – 10th World Congress, pp. 1199 – 1204

11. Johns, C. A., 'Geotechnical Properties of Mine Tailings and Implication for Tailings Storage Facility Design' Proceedings of GEO2010, Calgary, Alberta.

12. Flavell, D.J. and Belstead, B.S., 1986. Losses for design flood estimation in Western Australia. In: Proceedings of the Hydrology and Water Resources Symposium. Brisbane: Institution of Engineers (Australia), pp.203-208.

13. MacDonald, T.C. and Langridge-Monopolis, J., 1984. Breaching Characteristics of Dam Failures. Journal of Hydraulic Engineering, 110(5), pp.567-586.

14. Seddon, K.D. (2010). Approaches to estimation of run-out distances for liquefied tailings. In R. Jewell & A.B. Fourie (Eds.), Mine Waste 2010: Proceedings of the First International Seminar on the Reduction of Risk in the Management of Tailings and Mine Waste (pp. 63-70). Australian Centre for Geomechanics, Perth.

15. Rourke, H., & Luppnow, D. (2015). The risks of excess water on tailings facilities and its application to dam-break studies. In Proceedings of the Tailings and Mine Waste Management for the 21st Century (pp. 225–230). The Australasian Institute of Mining and Metallurgy: Melbourne.

16. Bennett, J., 2007. Evaporation from mine water storages: A case study from the Thunderbox Gold Mine. In: Proceedings of the 2007 Australian Mine Ventilation Conference. Newcastle: Australasian Institute of Mining and Metallurgy, pp. 123-130.

8. Limitation

Resource Engineering Consultants Pty Ltd (REC) has prepared this geotechnical report for the detailed level design for Stage 4 North and Stage 4 South of the Integrated Waste Landform Tailings Storage Facility (IWLTSF) at the Bellevue Gold Ltd (BGL) Bellevue Gold Project (BGP). This report is provided for the exclusive use of BGL and their consultants for this project only and for the purposes as described in the report. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of REC, does so entirely at its own risk and without recourse to REC for any loss or damage. In preparing this report REC has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after REC's field testing has been completed.

REC's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by REC in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. REC cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by REC. This is because this report has been written as advice and opinion rather than instructions for construction.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of REC.

REC may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to REC.

Any such risk assessment would, however, be necessarily restricted to the geotechnical components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

Appendix i to iii

Appendix 1 – Tailings Storage Data Sheet

Project Data			
Project Operator: **Bellevue Gold Ltd**			
Project Name: **Bellevue Gold Project**		Date: **25/03/2025**	
TSF Name: **IWLTSF Stage 4**	Commodity: **Gold**		
Name of data provider: **Resource Engineering Consultants Pty Ltd**		Phone: [redacted]	
TSF centre co-ordinates (GDA 94):			
6,942,500 m North	**259,340** m East		
Mining Tenement and Holder(s) Details: **Bellevue Gold Ltd**			
TSF Data			
TSF Status: ☐ Proposed ✓ Active ☐ Rehabilitated ☐ Closed	☐ Non-Active ☐ Decommissioned		
Type of TSF:1 **Paddock (Ring-Dyke)**	Number of cells:[2] **1**		
Hazard rating:3 **Medium**	TSF category:[4] **Category 1**		
Catchment area:[5] **69.9 ha**	Nearest water course: **Lake Miranda**		
Date deposition started (mm/yy): **10/2023 (IPTSF Stage 1)**	Date deposition completed (mm/yy): **Ongoing**		
Tailings discharge method:[6] **Multiple-Spigots**	Water recovery method:7 **Pumped Central Decant / Turret Pump**		
Bottom of facility sealed or lined? **No**	Type of seal or liner:[8] **NA**		
Depth to original groundwater level: m	Original groundwater TDS/pH: mg/L		
Ore Process:[9] **CIL/CIP**	Tailings Deposition Rate:[10] **1.35 to 1.6 Mtpa**		
Impoundment volume (Present): **776,500 (mid Jan 25)** m^3	Expected maximum: **4,587,100** m^3		
Mass of solids stored (Present): **1,233,300 (mid Jan 25)** tonnes	Expected maximum: **6,475,100** tonnes		
Above Ground Facilities			
Foundation Soils: **Lateritic Clayey Silt with Sand / Silty Sand**	Foundation Rocks: **Calcrete/Basalt**		
Starter Bund Construction Materials:[11] **Mine Waste, Subgrade, HDPE Liner**	Wall Lifting By: ☐ Upstream ✓ Downstream ☐ Centre Line		
Wall Construction Method/Materials: **Mine Waste, Subgrade, HDPE Liner**	Wall Lifting Material:[12] ✓ Mechanically ☐ Hydraulically		
Present maximum wall height agl:[13] **23.0** m	Expected maximum: **27.0** m		
Crest length (present): **2,100** m	Expected maximum: **2,500** m		
Impoundment Area (present): **38.7** ha	Expected maximum: **55.0** ha		
Below Ground Facilities			
Initial pit depth (Maximum): m	Area of pit base: ha		
Thickness of tailings (present): m	Expected maximum: m		
Current surface area of tailings: ha	Final surface area of tailings: ha		
Properties of Tailings and Return Water			
TDS: mg/L	pH:	Solids Content: **55** %	Density: **1.4** t/m^3
Potentially hazardous substances:[14]		WAD CN: mg/l	Total CN: mg/l
		Any other NPI listed substances in the TSF?[15] **No**	

Explanatory notes for completing tailings storage data sheet

The following notes are provided to assist the proponent to complete the tailings storage data sheet.

1. Paddock (ring-dyke), cross-valley, side-hill, in-pit, depression, waste fill, central thickened discharge, stacked tailings.
2. Number of cells operated using the same decant arrangement.
3. See Table 1 – Hazard rating system in the Code of Practice.
4. See Table 2 – Matrix of hazard ratings in the Code of Practice.
5. Internal for paddock (ring-dyke) type, internal plus external catchment for other facilities.
6. End of pipe, (fixed), end of pipe (movable) single spigot, multi-spigots, cyclone, central thickened discharge (CTD).
7. Gravity feed decant, pumped central decant, floating pump, wall/side mounted pump.
8. Clay, synthetic.
9. See list below for ore process method.
10. Tonnes of solids per year.
11. Record only the main material(s) used for construction, e.g. clay, sand, silt, gravel, laterite, fresh rock, weathered rock, tailings, clayey sand, clayey gravel, sandy clay, silty clay, gravelly clay or any combination of these materials.
12. Any one or combination of the materials listed under item 11 above.
13. Maximum wall height above the ground level (not AHD or RL).
14. Arsenic, Asbestos, Caustic soda, Copper sulphide, Cyanide, Iron sulphide, Lead, Mercury, Nickel sulphide, Sulphuric acid, Xanthates, radioactive elements.
15. NPI – National pollution inventory (contact Department of Environmental Protection for information on NPI listed substances).

Ore Process Methods

The ore process methods may be recorded as follows:

Acid Leaching (Atmospheric)

Acid Leaching (Pressure)

Alkali Leaching (Atmospheric)

Alkali Leaching (Pressure)

Bayer Process

Becher Process

Crushing and Screening

CIL/CIP

Flotation

Gravity Separation

Heap Leaching

Magnetic Separation

Ore Sorters

Pyromet

SX/EW (Solvent Extraction/Electro Wining)

VAT Leaching

Washing and Screening

Appendix 2 – Certificate of Compliance

CERTIFICATION OF COMPLIANCE

Tailings Storage Facility Design Report

For and on behalf of **Resource Engineering Consultant Pty Ltd**.

I, [redacted] being a duly authorised officer of the above company and a qualified geotechnical engineer holding professional registration by a professional body, do hereby certify and confirm that the **Bellevue Gold Ltd** tailings storage facility at the **Bellevue Gold** mine site has been designed in accordance with the current edition of the Tailings storage facilities in Western Australia – code of practice issued by the Department of Mines and Petroleum, Western Australia and the design is referenced as **P19-11-PR-29-R01** dated **25 March 2025**.

[redacted]

Date: **25 March 2025**

Appendix 3 – Further Information

This list is provided for general reference but is not exhaustive.

- Department of Mines and Petroleum, www.dmp.wa.gov.au
    - Tailings storage facilities in Western Australia – code of practice.
    - Safe design of buildings and structures – code of practice
    - Development of an operating manual for tailings storage – guideline
    - Tailings dams – HIF audit guideline and template
    - Mines survey – code of practice

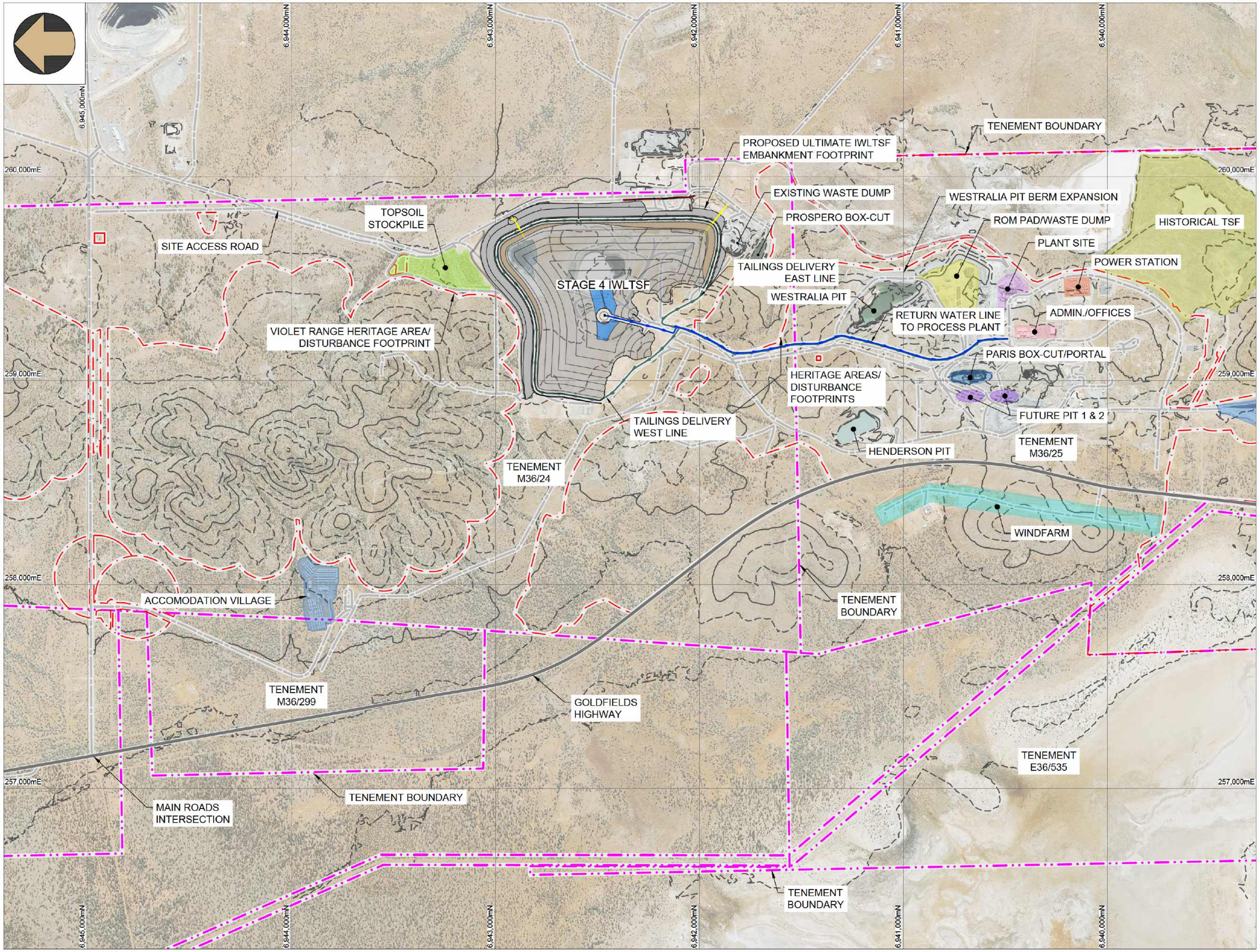
    Information is available online to assist with the submission of mining proposals, plans and reports involving TSFs as required by legislation and the tenement conditions applied under the Mining Act 1978.

    Guidance includes:

    - Guidelines for Geotechnical considerations in open pit mines
    - Guidelines for mining proposals in Western Australia
    - Guidelines for preparing mine closure plans
- The Australian National Committee on Large Dams Inc. (ANCOLD), www.ancold.org.au
    - Guidelines on tailing dams: Planning, design, construction, operations and closure (2012)
    - Guidelines for Design of Dams for Earthquakes (1998)
- Department of Industry Tourism and Resources, www.ret.gov.au
    - Leading practice sustainable development program for the mining industry – Tailings management – guidelines (2007)
- Federal Emergency Management Agency, USA, www.fema.gov
    - Federal Guidelines for dam safety: Earthquake analyses and design of dams

Appendix A

IWLTSF Stage 4 North and Stage 4 South Detailed Design Drawings



0 100 250 500

SCALE 1 : 10,000 (m)

SITE LAYOUT

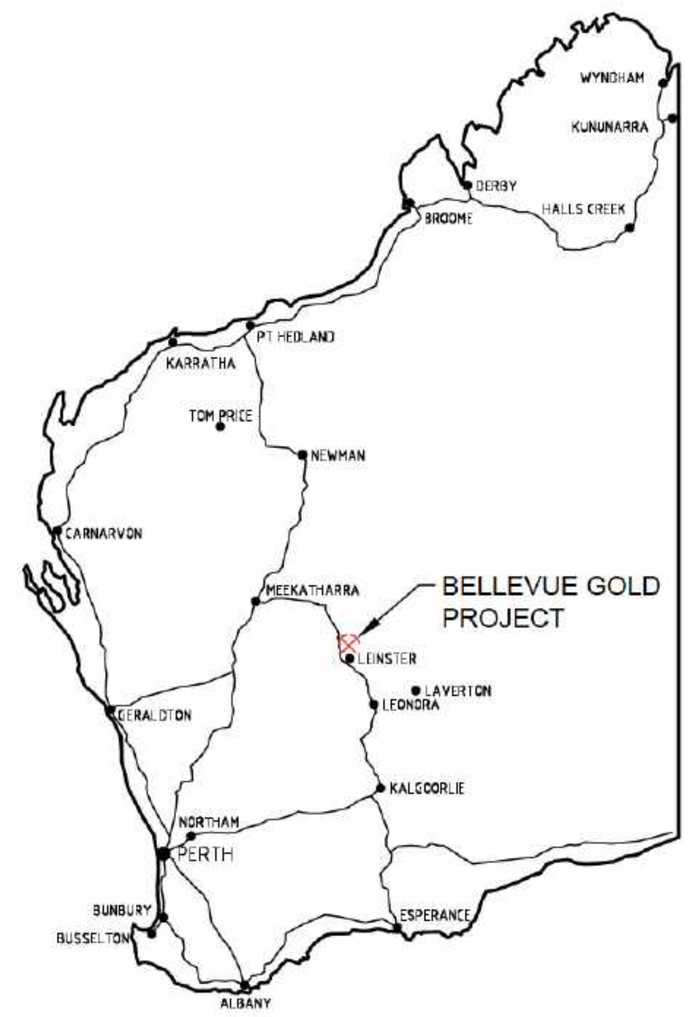
1:10,000

NOTES:

1. HORIZONTAL DATUM: MGA94 ZONE 51
   VERTICAL DATUM: AUSTRALIAN HEIGHT DATUM (AHD)m.
2. SURVEY PROVIDED BY BGL.
3. VANGUARD PIT SHELL PROVIDED BY CLIENT.
4. DESIGN LEVELS SHOWN ARE TO TOP OF CLAY UNLESS NOTED OTHERWISE.
5. DIMENSIONS SHOWN IN METRES U.N.O.
6. USE FIGURED DIMENSIONS, DO NOT SCALE OFF DRAWING.
7. EXISTING UNDERGROUND SERVICES ARE NOT SHOWN ON THIS DRAWING U.N.O. THE CONTRACTOR SHALL CONTACT THE RELEVANT AUTHORITIES TO DETERMINE THE PRESENCE OF UNDERGROUND SERVICES PRIOR TO COMMENCEMENT OF ANY WORKS.
8. ALL RELEVANT WORKING PERMITS SHALL BE ACQUIRED PRIOR TO COMMENCEMENT OF ANY WORKS.
9. ALL CONSTRUCTION WORKS SHALL BE EXECUTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE EARTHWORKS SPECIFICATION.
10. REFER TO ISSUED 3D STRINGS FOR SETOUT INFORMATION.

DRAWING INDEX

TITLE	REV.	NUMBER
SITE LAYOUT & DRAWING INDEX	D	P19-11-29-001
GENERAL ARRANGEMENT	D	P19-11-29-002
GENERAL ARRANGEMENT - NORTH	D	P19-11-29-003
GENERAL ARRANGEMENT - SOUTH	D	P19-11-29-004
DEPOSITION PLAN - NORTH EMBANKMENT	D	P19-11-29-005
DEPOSITION PLAN - SOUTH EMBANKMENT	D	P19-11-29-006
EMBANKMENT LONG. SECTION - SHT 1	C	P19-11-29-010
EMBANKMENT LONG. SECTION - SHT 2	C	P19-11-29-011
EMBANKMENT SECTIONS & DETAILS - SHT 1	D	P19-11-29-012
EMBANKMENT SECTIONS & DETAILS - SHT 2	D	P19-11-29-013
EMBANKMENT CROSS SECTIONS - SHT 1	D	P19-11-29-014
EMBANKMENT CROSS SECTIONS - SHT 2	C	P19-11-29-015
EMBANKMENT CROSS SECTIONS - SHT 3	C	P19-11-29-016
EMBANKMENT CROSS SECTIONS - SHT 4	C	P19-11-29-017
EMBANKMENT CROSS SECTIONS - SHT 4	D	P19-11-29-018
DECANT CAUSEWAY & ROCK RING DETAILS	C	P19-11-29-019
DECANT CAUSEWAY & ROCK RING SECTIONS	C	P19-11-29-020
TYPICAL DETAILS	C	P19-11-29-021
SPIGOT PIPEWORK SECTIONS & DETAILS	C	P19-11-29-025



GEOGRAPHICAL LOCATION

NOT TO SCALE

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
D	21.03.2025	ISSUED FOR CONSTRUCTION	AZ	MK	JB				
C	19.03.2025	INDEX & LAYOUT UPDATED	AZ	MK	JB				
B	14.03.2025	INDEX UPDATED	AZ	MK	JB				
A	17.02.2025	ISSUED FOR CLIENT REVIEW	AS	MK	JB			P19-11-29-001	GENERAL ARRANGEMENT - STAGE 4

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CLIENT

BELLEVUE GOLD

	BY	DATE	INIT.
DRAWN:	A.SANTANA	17.02.2025	
DESIGNED:	M.KHALID	17.02.2025	
CHECKED:	J.BLAKE	17.02.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE

BELLEVUE GOLD LIMITED
BELLEVUE GOLD PROJECT
IWLTSF - STAGE 4 NORTH & SOUTH
SITE LAYOUT & DRAWING INDEX

SCALE: **AS SHOWN** (A1)

DRAWING No.: **P19-11-29-001** REV: **B**

A1 Border v2.0

LEGEND:

HDPE SUBGRADE:	ROLLER COMPACTED HDPE SUBGRADE (300mm LIFTS)	ZONE 1:	PLATE COMPACTED 'LOW PERMEABILITY' (300mm LIFTS)
ZONE 3C :	TRAFFIC COMPACTED TRANSITIONAL MATERIAL (300mm LIFTS)	ZONE 3A:	TRAFFIC COMPACTED MINE WASTE (500mm LIFTS)
ZONE 3B:	TRAFFIC COMPACTED MINE WASTE (1,000mm LIFTS)		

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SCALE 1 : 2,500 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT
D	21.03.2025	ISSUED FOR CONSTRUCTION	AZ	MK	JB		
C	19.03.2025	WATER RETURN LINES AMENDED	AZ	MK	JB		
B	14.03.2025	STAGE 4 BUTTRESS ADDED	AZ	MK	JB		
A	17.02.2025	ISSUED FOR CLIENT REVIEW	AS	MK	JB		

DRG. NO.	REFERENCE DRAWING

rec

CLIENT
BELLEVUE GOLD

	BY	DATE	INIT.
DRAWN:	A.SANTANA	17.02.2025	
DESIGNED:	M.KHALID	17.02.2025	
CHECKED:	J.BLAKE	17.02.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE
BELLEVUE GOLD LIMITED
BELLEVUE GOLD PROJECT
IWLTSF - STAGE 4 NORTH & SOUTH
GENERAL ARRANGEMENT

SCALE 1 : 2,500 (A1)

DRAWING No. P19-11-29-002 REV D

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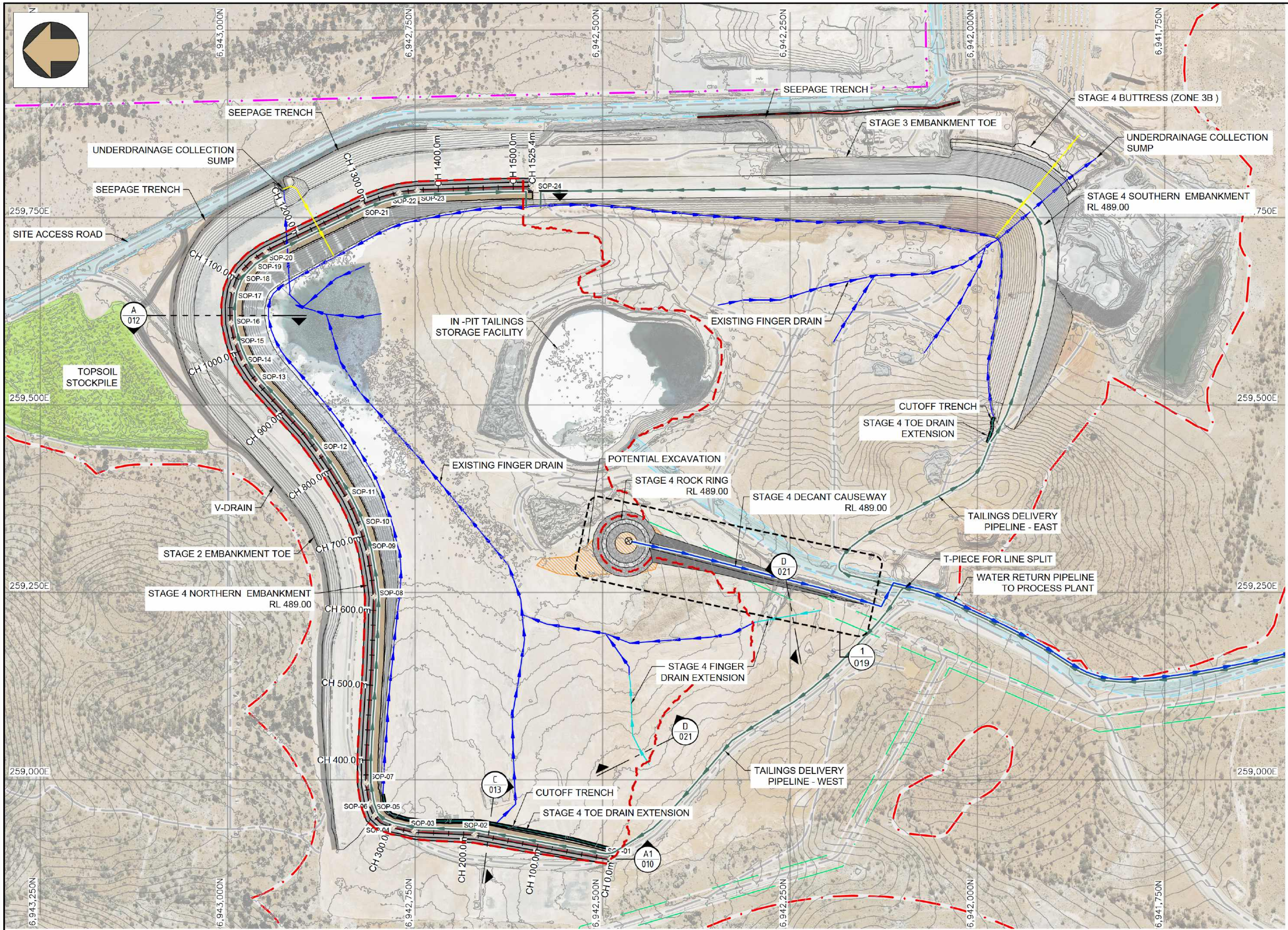

LEGEND:

- TENEMENT BOUNDARY
- HERITAGE BOUNDARY
- FACILITY ZONE - NORTH

NOTES:

1. REFER TO DRAWING P19-11-29-001 FOR GENERAL NOTES.

SETTING OUT POINTS			
POINT I.D.	EASTING	NORTHING	R.L. (m)
SOP-01	258,894.0	6,942,489.4	0.0
SOP-02	258,926.9	6,942,670.5	489.0
SOP-03	258,931.3	6,942,751.3	489.0
SOP-04	258,937.0	6,942,779.4	489.0
SOP-05	258,952.2	6,942,804.0	489.0
SOP-06	258,968.7	6,942,810.4	489.0
SOP-07	258,995.6	6,942,814.6	489.0
SOP-08	259,244.1	6,942,804.3	489.0
SOP-09	259,303.7	6,942,813.0	489.0
SOP-10	259,336.3	6,942,822.5	489.0
SOP-11	259,375.9	6,942,840.4	489.0
SOP-12	259,436.2	6,942,878.7	489.0
SOP-13	259,529.3	6,942,959.4	489.0
SOP-14	259,557.2	6,942,979.0	489.0
SOP-15	259,584.6	6,942,990.0	489.0
SOP-16	259,609.3	6,942,995.5	489.0
SOP-17	259,652.7	6,942,993.1	489.0
SOP-18	259,676.5	6,942,981.8	489.0
SOP-19	259,693.2	6,942,965.4	489.0
SOP-20	259,704.3	6,942,949.1	489.0
SOP-21	259,766.6	6,942,820.4	489.0
SOP-22	259,782.9	6,942,771.3	489.0
SOP-23	259,785.9	6,942,746.8	489.0
SOP-24	259,790.3	6,942,593.7	0.0

0 25 62.5 125
SCALE 1 : 2,500 (m)

LEGEND:

- HDPE SUBGRADE: ROLLER COMPACTED HDPE SUBGRADE (300mm LIFTS)
- ZONE 3C : TRAFFIC COMPACTED TRANSITIONAL MATERIAL (300mm LIFTS)
- ZONE 3A: TRAFFIC COMPACTED MINE WASTE (500mm LIFTS)
- ZONE 3B: TRAFFIC COMPACTED MINE WASTE (1,000mm LIFTS)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT
D	21.03.2025	ISSUED FOR CONSTRUCTION	AZ	MK	JB		
C	19.03.2025	WATER RETURN LINES AMENDED	AZ	MK	JB		
B	14.03.2025	STAGE 4 BUTTRESS ADDED	AZ	MK	JB		
A	17.02.2025	ISSUED FOR CLIENT REVIEW	AS	MK	JB		

DRG. NO.	REFERENCE DRAWING
P19-11-29-021	TYPICAL DETAILS
P19-11-29-019	DECANT CAUSEWAY & ROCK RING DETAILS
P19-11-29-013	EMBANKMENT SECTIONS & DETAILS - SHT 2
P19-11-29-012	EMBANKMENT SECTIONS & DETAILS - SHT 1
P19-11-29-010	EMBANKMENT LONG. SECTION - SHT 1

CLIENT

BELLEVUE GOLD

	BY	DATE	INIT.
DRAWN:	A.SANTANA	17.02.2025	
DESIGNED:	M.KHALID	17.02.2025	
CHECKED:	J.BLAKE	17.02.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE

BELLEVUE GOLD LIMITED
BELLEVUE GOLD PROJECT
IWLTSF - STAGE 4 NORTH & SOUTH
GENERAL ARRANGEMENT - NORTH

SCALE 1 : 2,500 (A1)

DRAWING No. P19-11-29-003

REV D

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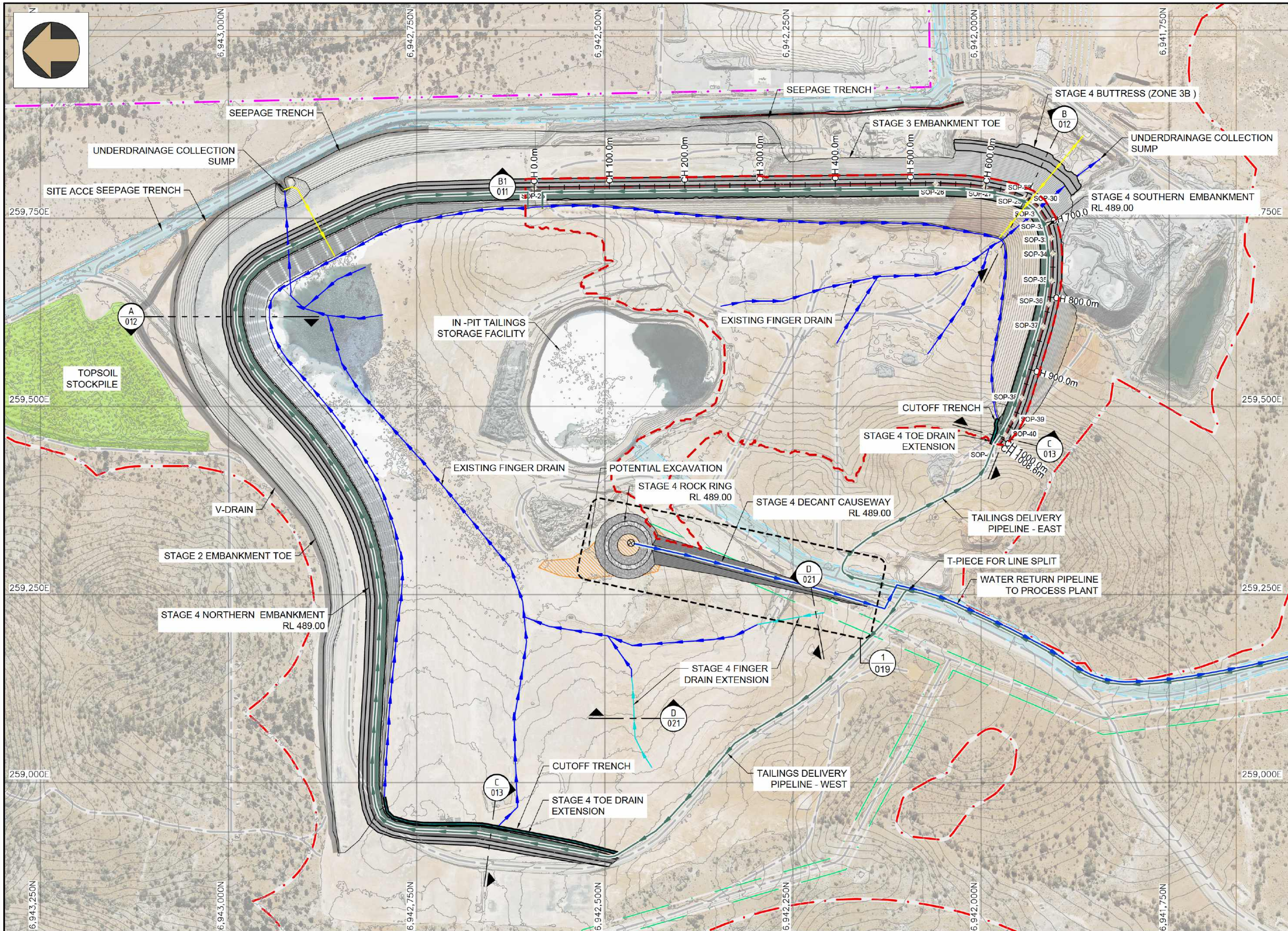

LEGEND:

- TENEMENT BOUNDARY
- HERITAGE BOUNDARY
- FACILITY ZONE - SOUTH

NOTES:

1. REFER TO DRAWING P19-11-29-001 FOR GENERAL NOTES.

SETTING OUT POINTS			
POINT I.D.	EASTING	NORTHING	R.L. (m)
SOP-25	259,790.3	6,942,593.7	489.0
SOP-26	259,796.0	6,942,060.3	489.0
SOP-27	259,791.4	6,941,995.0	489.0
SOP-28	259,785.9	6,941,965.6	489.0
SOP-29	259,777.8	6,941,941.6	489.0
SOP-30	259,772.5	6,941,932.7	489.0
SOP-31	259,762.7	6,941,922.6	489.0
SOP-32	259,744.3	6,941,912.1	489.0
SOP-33	259,723.6	6,941,906.7	489.0
SOP-34	259,703.2	6,941,905.0	489.0
SOP-35	259,667.0	6,941,905.8	489.0
SOP-36	259,636.4	6,941,910.4	489.0
SOP-37	259,606.1	6,941,917.5	489.0
SOP-38	259,511.2	6,941,946.0	489.0
SOP-39	259,483.4	6,941,956.5	489.0
SOP-40	259,461.5	6,941,968.0	489.0
SOP-41	259,447.2	6,941,977.8	0.0

LEGEND:

- HDPE SUBGRADE: ROLLER COMPACTED HDPE SUBGRADE (300mm LIFTS)
- ZONE 3C : TRAFFIC COMPACTED TRANSITIONAL MATERIAL (300mm LIFTS)
- ZONE 3A: TRAFFIC COMPACTED MINE WASTE (500mm LIFTS)
- ZONE 3B: TRAFFIC COMPACTED MINE WASTE (1,000mm LIFTS)

0 25 62.5 125
SCALE 1 : 2,500 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT
D	21.03.2025	ISSUED FOR CONSTRUCTION	AZ	MK	JB		
C	19.03.2025	WATER RETURN LINES AMENDED	AZ	MK	JB		
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DRG. NO.	REFERENCE DRAWING
P19-11-29-021	TYPICAL DETAILS
P19-11-29-019	DECANT CAUSEWAY & ROCK RING DETAILS
P19-11-29-013	EMBANKMENT SECTIONS & DETAILS - SHT 2
P19-11-29-012	EMBANKMENT SECTIONS & DETAILS - SHT 1
P19-11-29-011	EMBANKMENT LONG SECTION - SHT 2

CLIENT: BELLEVUE GOLD

	BY	DATE	INIT.
DRAWN:	A.SANTANA	17.02.2025	
DESIGNED:	M.KHALID	17.02.2025	
CHECKED:	J.BLAKE	17.02.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE
BELLEVUE GOLD LIMITED
BELLEVUE GOLD PROJECT
IWLTSF - STAGE 4 NORTH & SOUTH
GENERAL ARRANGEMENT - SOUTH

SCALE 1 : 2,500 (A1)

DRAWING No. **P19-11-29-004** REV **D**

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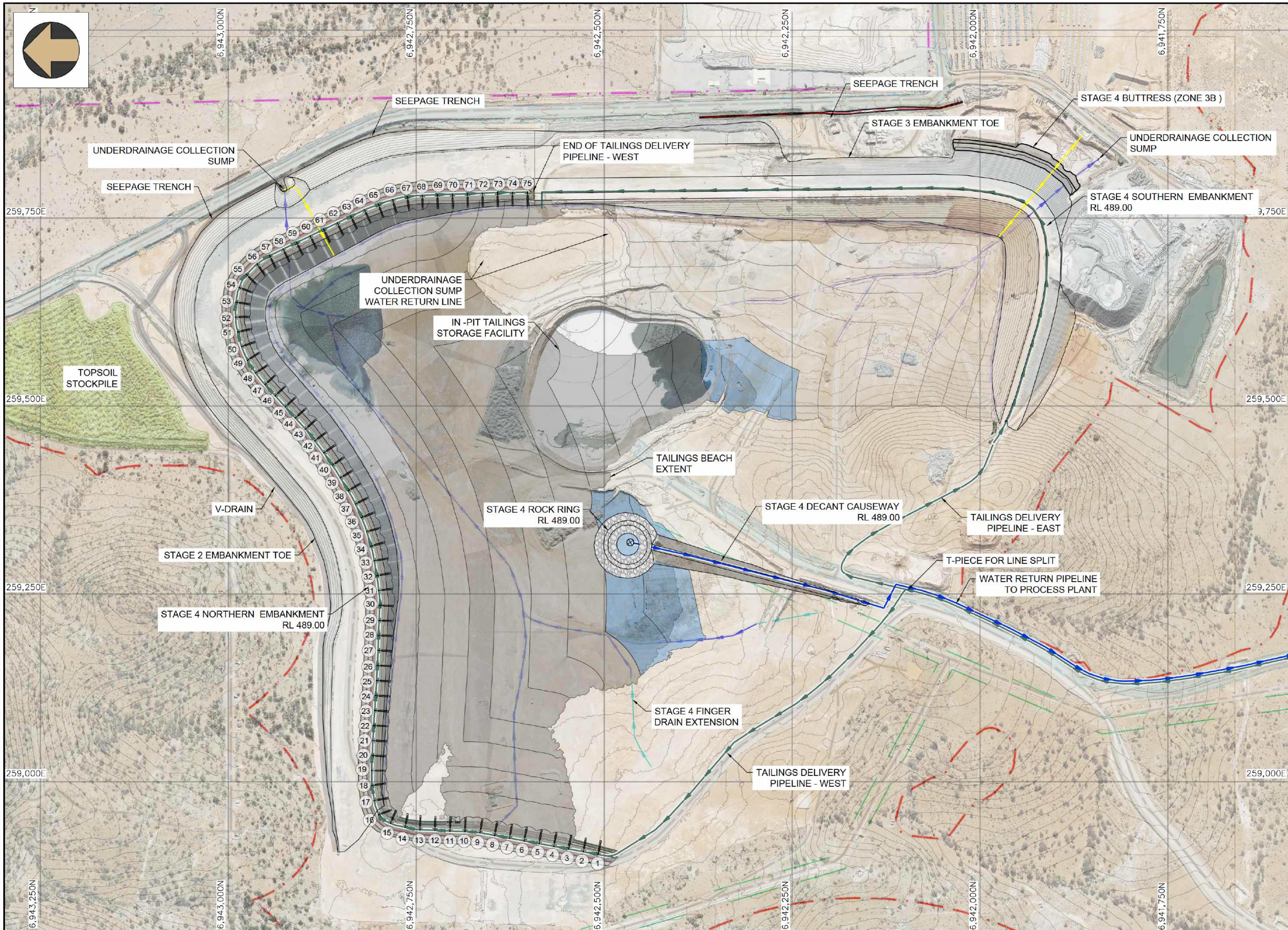

NOTES:

1. REFER TO DRAWING P19-11-29-001 FOR GENERAL NOTES.

LEGEND:

HDPE SUBGRADE:	ROLLER COMPACTED HDPE SUBGRADE (300mm LIFTS)
ZONE 1:	PLATE COMPACTED 'LOW PERMEABILITY' (300mm LIFTS)
ZONE 3C :	TRAFFIC COMPACTED TRANSITIONAL MATERIAL (300mm LIFTS)
ZONE 3A:	TRAFFIC COMPACTED MINE WASTE (500mm LIFTS)
ZONE 3B:	TRAFFIC COMPACTED MINE WASTE (1,000mm LIFTS)

0 25 62.5 125

SCALE 1 : 2,500 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT
D	21.03.2025	ISSUED FOR CONSTRUCTION	AZ	MK	JB		
C	19.03.2025	WATER RETURN LINES AMENDED	AZ	MK	JB		
B	14.03.2025	STAGE 4 BUTTRESS ADDED	AZ	MK	JB		
A	17.02.2025	ISSUED FOR CLIENT REVIEW	AS	MK	JB		

DRG. NO.	REFERENCE DRAWING

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rec

CLIENT

BELLEVUE GOLD

	BY	DATE	INIT.
DRAWN:	A.SANTANA	17.02.2025	
DESIGNED:	M.KHALID	17.02.2025	
CHECKED:	J.BLAKE	17.02.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE

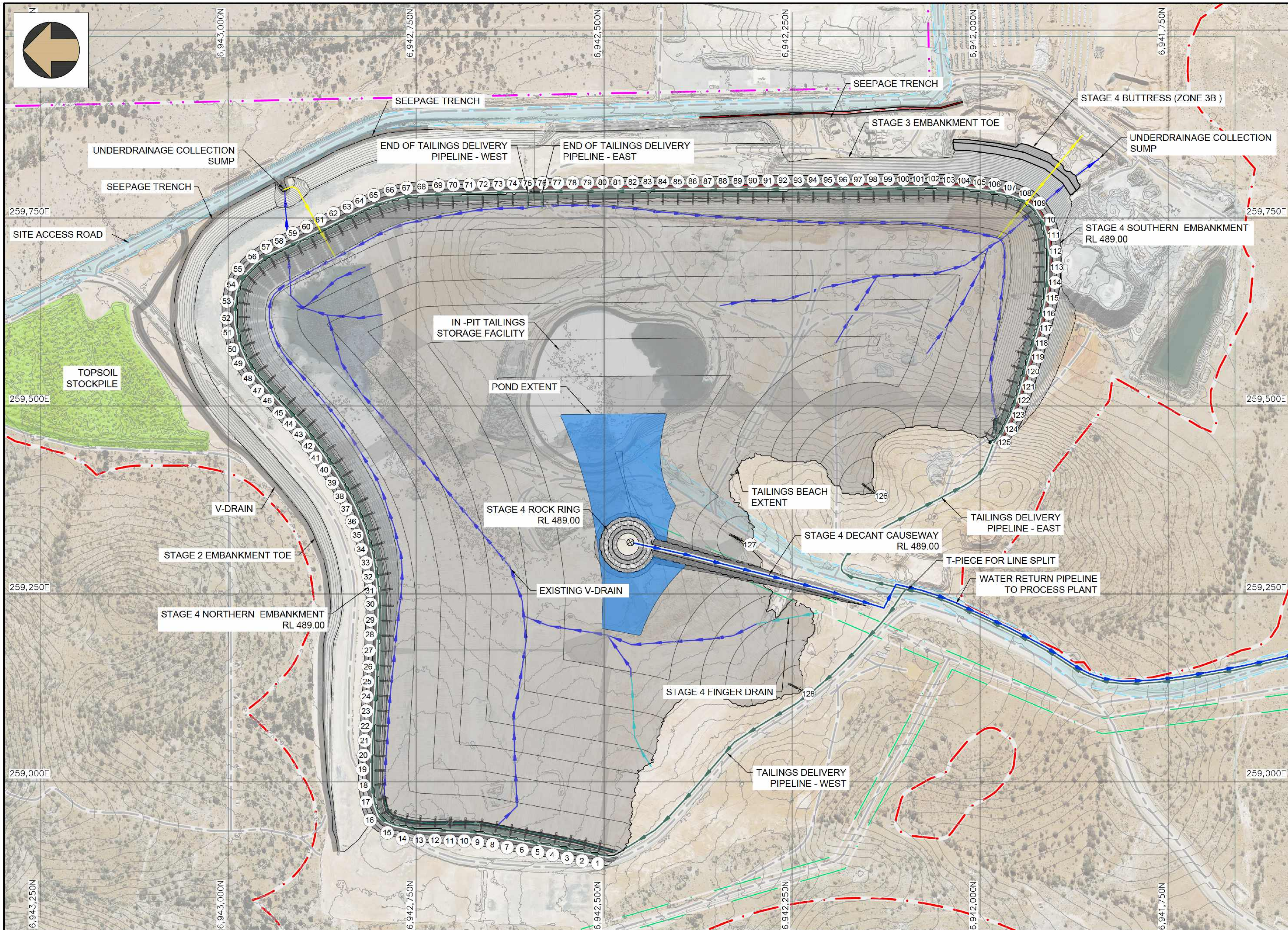
BELLEVUE GOLD LIMITED
BELLEVUE GOLD PROJECT
IWLTSF - STAGE 4 NORTH & SOUTH
DEPOSTION PLAN - NORTH EMBANKMENT

SCALE: 1 : 2,500 (A1)

DRAWING No.: P19-11-29-005

REV: D

A1 Border v2.0



NOTES:

1. REFER TO DRAWING P19-11-29-001 FOR GENERAL NOTES.

LEGEND:

HDPE SUBGRADE:	ROLLER COMPACTED HDPE SUBGRADE (300mm LIFTS)
ZONE 1:	PLATE COMPACTED 'LOW PERMEABILITY' (300mm LIFTS)
ZONE 3C :	TRAFFIC COMPACTED TRANSITIONAL MATERIAL (300mm LIFTS)
ZONE 3A:	TRAFFIC COMPACTED MINE WASTE (500mm LIFTS)
ZONE 3B:	TRAFFIC COMPACTED MINE WASTE (1,000mm LIFTS)

0 25 62.5 125

SCALE 1 : 2,500 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT
D	21.03.2025	ISSUED FOR CONSTRUCTION	AZ	MK	JB		
C	19.03.2025	TAILINGS BEACH AMENDED	AZ	MK	JB		
B	14.03.2025	STAGE 4 BUTTRESS ADDED	AZ	MK	JB		
A	17.02.2025	ISSUED FOR CLIENT REVIEW	AS	MK	JB		

DRG. NO.	REFERENCE DRAWING

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CLIENT: BELLEVUE GOLD

	BY	DATE	INIT.
DRAWN:	A.SANTANA	17.02.2025	
DESIGNED:	M.KHALID	17.02.2025	
CHECKED:	J.BLAKE	17.02.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE
BELLEVUE GOLD LIMITED
BELLEVUE GOLD PROJECT
IWLTSF - STAGE 4 NORTH & SOUTH
DEPOSTION PLAN - SOUTH EMBANKMENT

SCALE: 1 : 2,500 (A1)

DRAWING No.: P19-11-29-006

REV: D

A1 Border v2.0

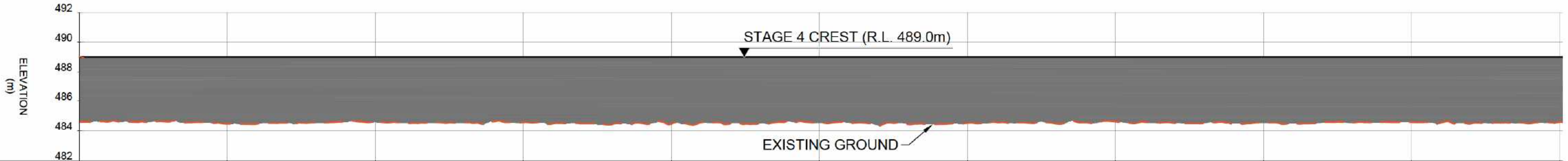
NOTES:

1. REFER TO DRAWING P19-11-29-001 FOR GENERAL NOTES.

EXISTING SURFACE (R.L. m)	486.377	485.592	485.308	485.298	485.917	486.636	484.752	484.605	484.595	484.593
DESIGN SURFACE (R.L. m)	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000
-CUT/+FILL (m)	2.623	3.408	3.692	3.702	3.083	2.364	4.248	4.395	4.405	4.407
CHAINAGE (m)	50.000	100.000	150.000	200.000	250.000	300.000	350.000	400.000	450.000	500.000

A1 / 003 TAILINGS STORAGE FACILITY – NORTHERN EMBANKMENT LONGITUDINAL SECTION – CH. 0.0 TO 500.0m

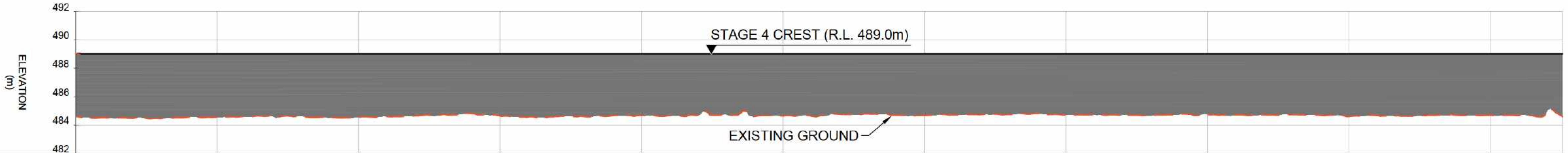
H 1:1,000
V 1:200



EXISTING SURFACE (R.L. m)	484.477	484.588	484.563	484.467	484.528	484.519	484.618	484.524	484.578	484.589
DESIGN SURFACE (R.L. m)	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000
-CUT/+FILL (m)	4.523	4.412	4.437	4.533	4.472	4.481	4.382	4.476	4.422	4.411
CHAINAGE (m)	550.000	600.000	650.000	700.000	750.000	800.000	850.000	900.000	950.000	1000.000

A1 / 003 TAILINGS STORAGE FACILITY – NORTHERN EMBANKMENT LONGITUDINAL SECTION – CH. 500.0 TO 1,000.0m

H 1:1,000
V 1:200



EXISTING SURFACE (R.L. m)	484.555	484.555	484.630	484.659	484.639	484.660	484.727	484.732	484.599	484.682	484.570
DESIGN SURFACE (R.L. m)	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000	
-CUT/+FILL (m)	4.445	4.445	4.370	4.341	4.361	4.340	4.273	4.268	4.401	4.318	
CHAINAGE (m)	1050.000	1100.000	1150.000	1200.000	1250.000	1300.000	1350.000	1400.000	1450.000	1500.000	1525.382

A1 / 003 TAILINGS STORAGE FACILITY – NORTHERN EMBANKMENT LONGITUDINAL SECTION – CH. 1,000 TO 1,525.4m

H 1:1,000
V 1:200

0 2 5 10
SCALE 1 : 200 (m)

0 10 25 50
SCALE 1 : 1,000 (m)

LEGEND:

- HDPE SUBGRADE: ROLLER COMPACTED HDPE SUBGRADE (300mm LIFTS)
- ZONE 1: PLATE COMPACTED 'LOW PERMEABILITY' (300mm LIFTS)
- ZONE 3C : TRAFFIC COMPACTED TRANSITIONAL MATERIAL (300mm LIFTS)
- ZONE 3A: TRAFFIC COMPACTED MINE WASTE (500mm LIFTS)
- ZONE 3B: TRAFFIC COMPACTED MINE WASTE (1,000mm LIFTS)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT
C	21.03.2025	ISSUED FOR CONSTRUCTION	AZ	MK	JB		
B	19.03.2025	MATERIALS LEGEND AMENDED	AZ	MK	JB		
A	17.02.2025	ISSUED FOR CLIENT REVIEW	AS	MK	JB		

DRG. NO.	REFERENCE DRAWING
P19-11-29-003	GENERAL ARRANGEMENT - NORTH

CLIENT

BELLEVUE GOLD

	BY	DATE	INIT.
DRAWN:	A.SANTANA	17.02.2025	
DESIGNED:	M.KHALID	17.02.2025	
CHECKED:	J.BLAKE	17.02.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE

BELLEVUE GOLD LIMITED
BELLEVUE GOLD PROJECT
IWLTSF - STAGE 4 NORTH & SOUTH EMBANKMENT LONG. SECTION - SHT 1

SCALE: **AS SHOWN** (A1)

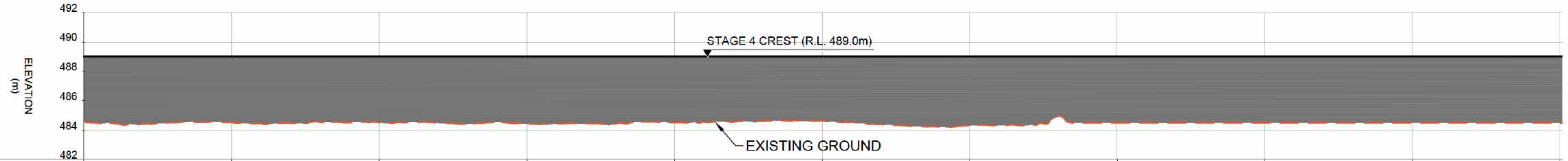
DRAWING No.: **P19-11-29-010**

REV: **C**

A1 Border v2.0

NOTES:

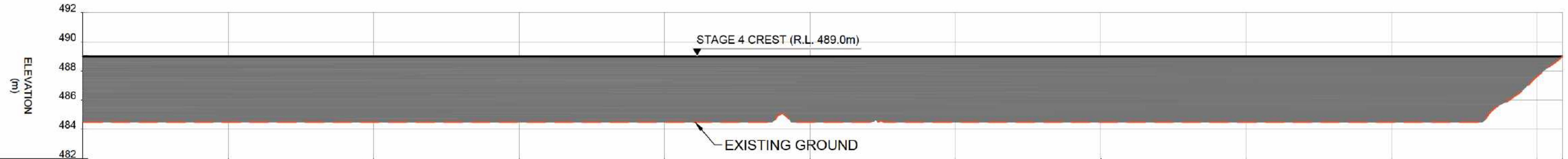
1. REFER TO DRAWING P19-11-29-001 FOR GENERAL NOTES.



EXISTING SURFACE (R.L. m)	484.527	484.528	484.430	484.515	484.619	484.314	484.500	484.500	484.500	484.500
DESIGN SURFACE (R.L. m)	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000
-CUT/+FILL (m)	4.473	4.472	4.570	4.485	4.381	4.686	4.500	4.500	4.500	4.500
CHAINAGE (m)	50.000	100.000	150.000	200.000	250.000	300.000	350.000	400.000	450.000	500.000

B1 / 004 TAILINGS STORAGE FACILITY – SOUTHERN EMBANKMENT LONGITUDINAL SECTION – CH. 0.0 TO 500.0m

H 1:1,000
V 1:200



EXISTING SURFACE (R.L. m)	484.500	484.500	484.500	484.500	484.500	484.500	484.500	484.500	484.500	484.500	487.647	488.997
DESIGN SURFACE (R.L. m)	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000
-CUT/+FILL (m)	4.500	4.500	4.500	4.500	4.500	4.500	4.500	4.500	4.500	4.500	1.353	0.003
CHAINAGE (m)	500.000	550.000	600.000	650.000	700.000	750.000	800.000	850.000	900.000	950.000	1000.000	1008.642

B1 / 004 TAILINGS STORAGE FACILITY – SOUTHERN EMBANKMENT LONGITUDINAL SECTION – CH. 500.0 TO 1,011.1m

H 1:1,000
V 1:200

0 2 5 10
SCALE 1 : 200 (m)

0 10 25 50
SCALE 1 : 1,000 (m)

LEGEND:

HDPE SUBGRADE:	ROLLER COMPACTED HDPE SUBGRADE (300mm LIFTS)
ZONE 1:	PLATE COMPACTED 'LOW PERMEABILITY' (300mm LIFTS)
ZONE 3C :	TRAFFIC COMPACTED TRANSITIONAL MATERIAL (300mm LIFTS)
ZONE 3A:	TRAFFIC COMPACTED MINE WASTE (500mm LIFTS)
ZONE 3B:	TRAFFIC COMPACTED MINE WASTE (1,000mm LIFTS)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT
C	21.03.2025	ISSUED FOR CONSTRUCTION	AZ	MK	JB		
B	19.03.2025	MATERIALS LEGEND AMENDED	AZ	MK	JB		
A	12.12.2024	ISSUED FOR CLIENT REVIEW	AS	MK	JB		

DRG. NO.	REFERENCE DRAWING
P19-11-29-004	GENERAL ARRANGEMENT - SOUTH

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rec

CLIENT
BELLEVUE GOLD

	BY	DATE	INIT.
DRAWN:	A.SANTANA	29.11.2024	
DESIGNED:	M.KHALID	29.11.2024	
CHECKED:	J.BLAKE	06.12.2024	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE
BELLEVUE GOLD LIMITED
BELLEVUE GOLD PROJECT
IWLTSF - STAGE 4 NORTH & SOUTH EMBANKMENT LONG. SECTION - SHT 2

SCALE
AS SHOWN (A1)

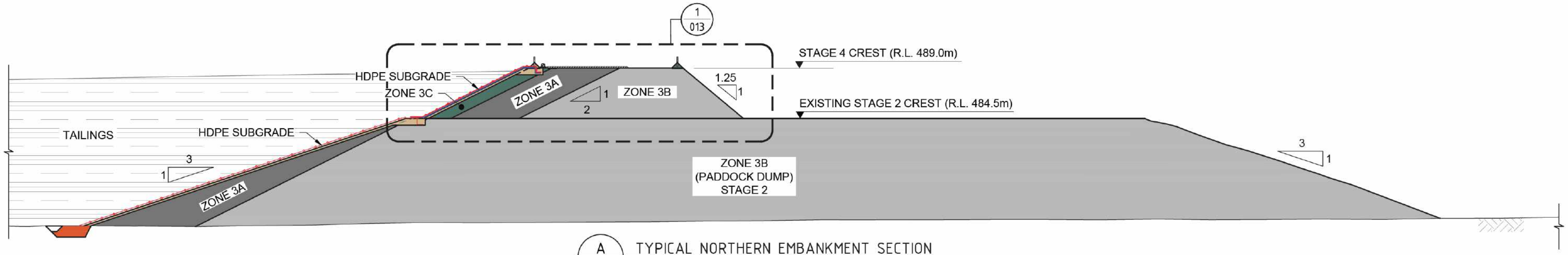
DRAWING No.
P19-11-29-011

REV
C

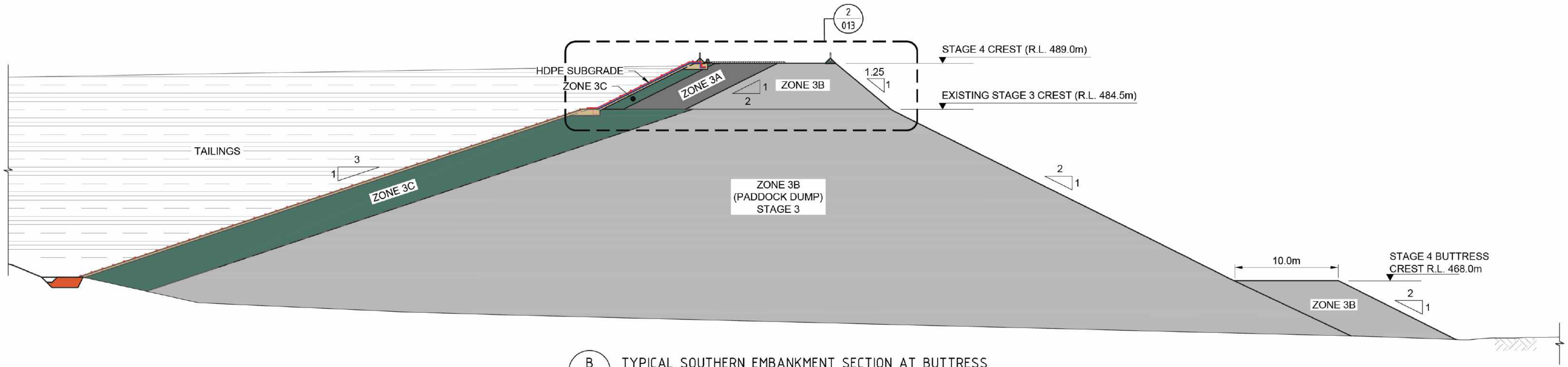
A1 Border v2.0

NOTES:

1. REFER TO DRAWING P19-11-29-001 FOR GENERAL NOTES.



A
003
TYPICAL NORTHERN EMBANKMENT SECTION
1:200



B
004
TYPICAL SOUTHERN EMBANKMENT SECTION AT BUTTRESS
1:200

0 0.4 1.0 2.0
SCALE 1 : 50 (m)

0 1 2.5 5
SCALE 1 : 100 (m)

LEGEND:

- HDPE SUBGRADE: ROLLER COMPACTED HDPE SUBGRADE (300mm LIFTS)
- ZONE 1: PLATE COMPACTED 'LOW PERMEABILITY' (300mm LIFTS)
- ZONE 3C : TRAFFIC COMPACTED TRANSITIONAL MATERIAL (300mm LIFTS)
- ZONE 3A: TRAFFIC COMPACTED MINE WASTE (500mm LIFTS)
- ZONE 3B: TRAFFIC COMPACTED MINE WASTE (1,000mm LIFTS)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
D	21.03.2025	ISSUED FOR CONSTRUCTION	AZ	MK	JB				
C	19.03.2025	ISSUED FOR CLIENT REVIEW	AZ	MK	JB			P19-11-29-013	EMBANKMENT SECTIONS & DETAILS - SHT 2
B	14.03.2025	ISSUED FOR CLIENT REVIEW	AZ	MK	JB			P19-11-29-004	GENERAL ARRANGEMENT - SOUTH
A	12.02.2025	ISSUED FOR CLIENT REVIEW	AS	MK	JB			P19-11-29-003	GENERAL ARRANGEMENT - NORTH

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CLIENT: BELLEVUE GOLD

	BY	DATE	INIT.
DRAWN:	A.SANTANA	12.02.2025	
DESIGNED:	M.KHALID	12.02.2025	
CHECKED:	J.BLAKE	12.02.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

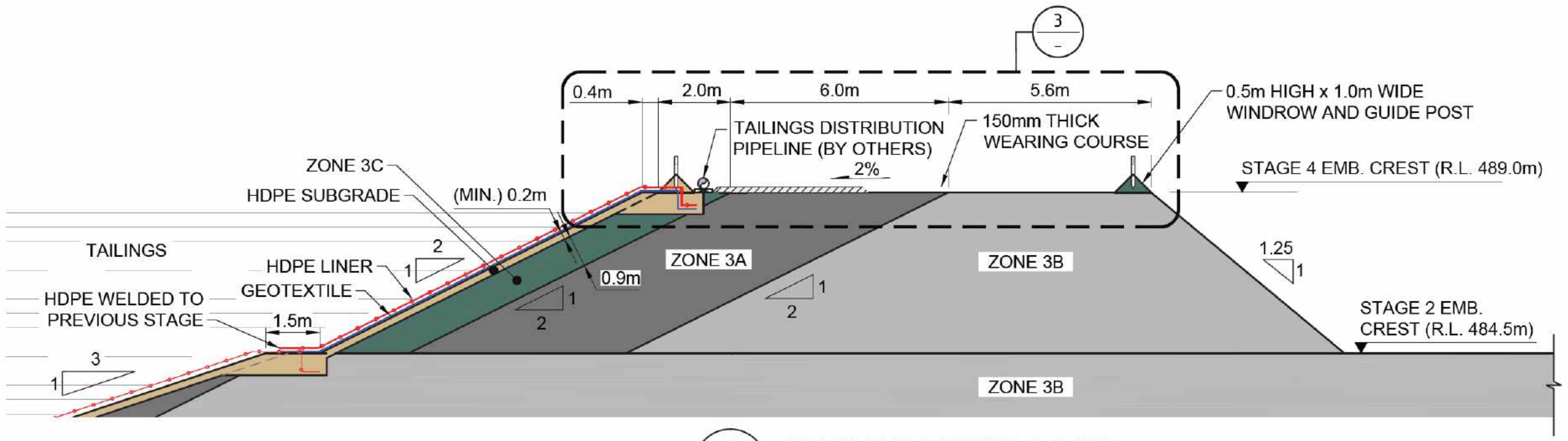
TITLE
BELLEVUE GOLD LIMITED
BELLEVUE GOLD PROJECT
IWLTSF - STAGE 4 NORTH & SOUTH
EMBANKMENT SECTIONS & DETAILS - SHT 1

SCALE: AS SHOWN (A1)

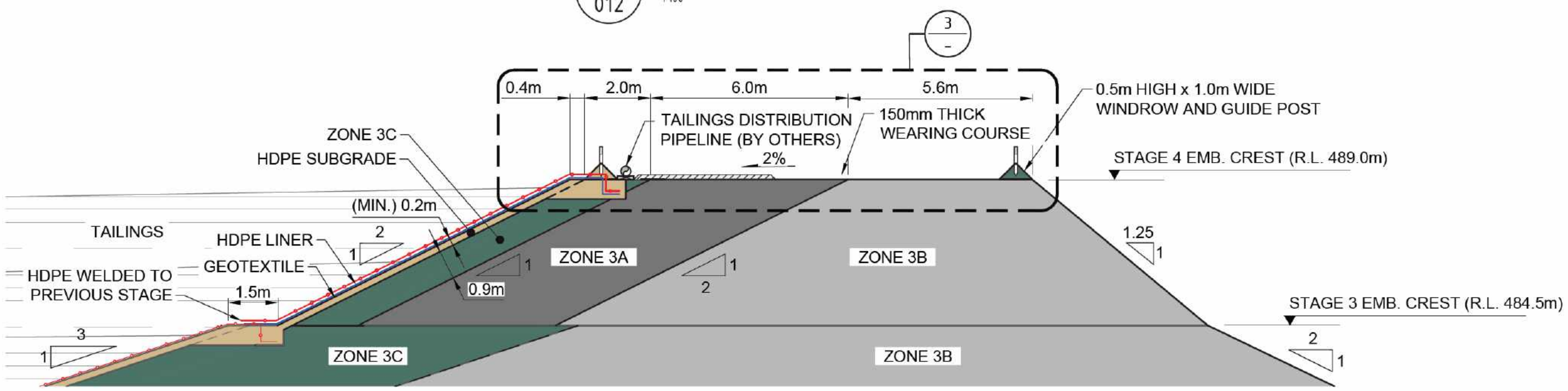
DRAWING No.: P19-11-29-012

REV: D

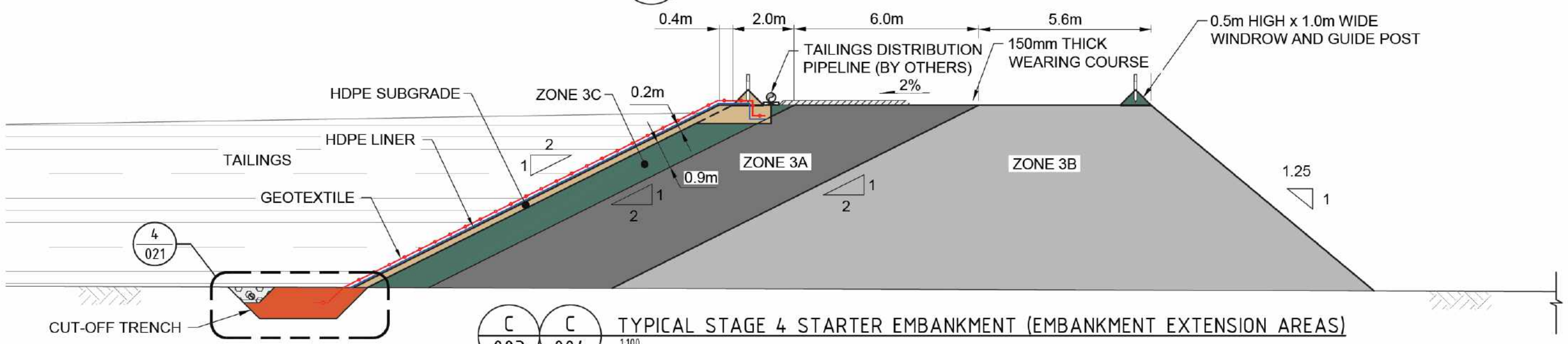
A1 Border v2.0



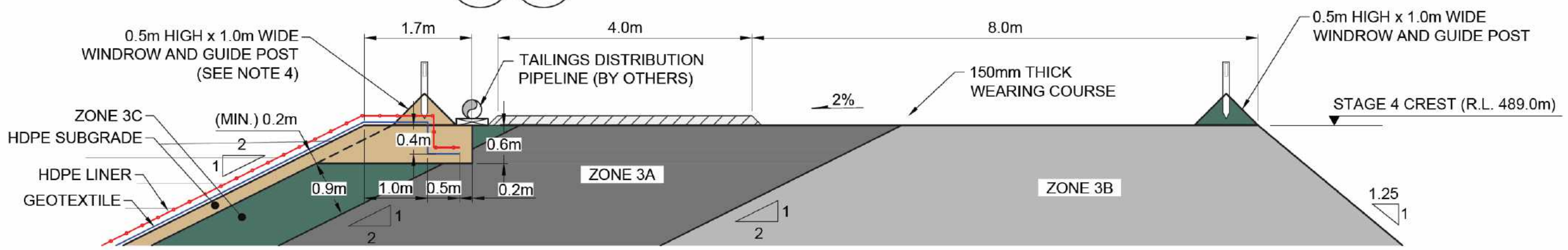
1 / 012 STAGE EMBANKMENT 4 RAISE
1:100



2 / 012 STAGE EMBANKMENT 4 RAISE
1:100



C / 003 C / 004 TYPICAL STAGE 4 STARTER EMBANKMENT (EMBANKMENT EXTENSION AREAS)
1:100



3 / - TYPICAL EMBANKMENT CREST DETAIL
1:50

NOTES:

1. REFER TO DRAWING P19-11-29-001 FOR GENERAL NOTES.

0 0.4 1.0 2.0
SCALE 1 : 50 (m)

0 1 2.5 5
SCALE 1 : 100 (m)

LEGEND:

HDPE SUBGRADE:	ROLLER COMPACTED HDPE SUBGRADE (300mm LIFTS)	
ZONE 1:	PLATE COMPACTED 'LOW PERMEABILITY' (300mm LIFTS)	
ZONE 3C :	TRAFFIC COMPACTED TRANSITIONAL MATERIAL (300mm LIFTS)	
ZONE 3A:	TRAFFIC COMPACTED MINE WASTE (500mm LIFTS)	
ZONE 3B:	TRAFFIC COMPACTED MINE WASTE (1,000mm LIFTS)	

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
D	21.03.2025	ISSUED FOR CONSTRUCTION	AZ	MK	JB			P19-11-29-021	TYPICAL DETAILS
C	19.03.2025	ISSUED FOR CLIENT REVIEW	AZ	MK	JB			P19-11-29-012	EMBANKMENT SECTIONS & DETAILS - SHT 1
B	14.03.2025	ISSUED FOR CLIENT REVIEW	AZ	MK	JB			P19-11-29-004	GENERAL ARRANGEMENT - SOUTH
A	12.02.2025	ISSUED FOR CLIENT REVIEW	AS	MK	JB			P19-11-29-003	GENERAL ARRANGEMENT - NORTH

CLIENT
BELLEVUE GOLD

	BY	DATE	INIT.
DRAWN:	A.SANTANA	12.02.2025	
DESIGNED:	M.KHALID	12.02.2025	
CHECKED:	J.BLAKE	12.02.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE
BELLEVUE GOLD LIMITED
BELLEVUE GOLD PROJECT
IWLTSF - STAGE 4 NORTH & SOUTH
EMBANKMENT SECTIONS & DETAILS - SHT 2

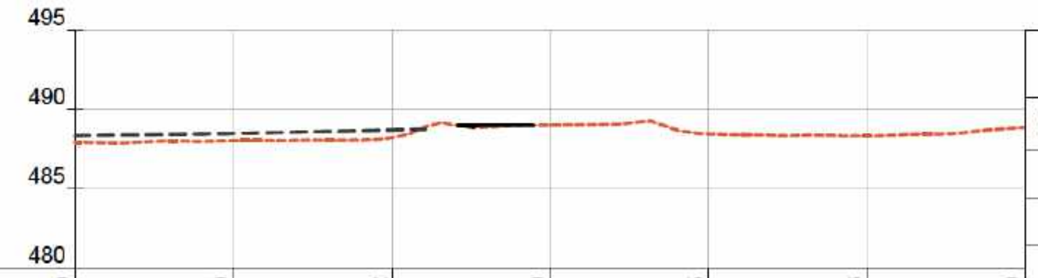
SCALE
AS SHOWN
(A1)

DRAWING No. **P19-11-29-013**
REV **D**

A1 Border v2.0

NOTES:

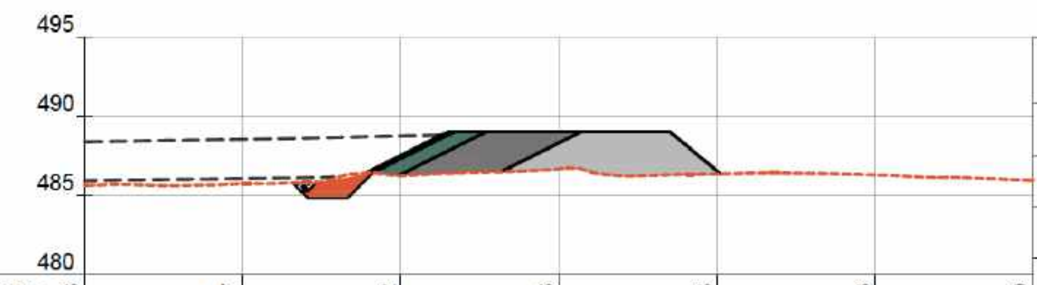
1. REFER TO DRAWING P19-11-29-001 FOR GENERAL NOTES.



EXISTING SURFACE (R.L. m)	487.9	488.0	488.2	489.0	488.5	488.3	488.9
DESIGN SURFACE (R.L. m)							
CUT-/FILL+ (m)							
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

EARTHWORKS AT CH 0.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ZONE 3A	0.00	0.00	0.00
ZONE 3B	0.00	0.00	0.00
ZONE 3C	0.09	0.00	0.00
HDPE	0.00	0.00	0.00

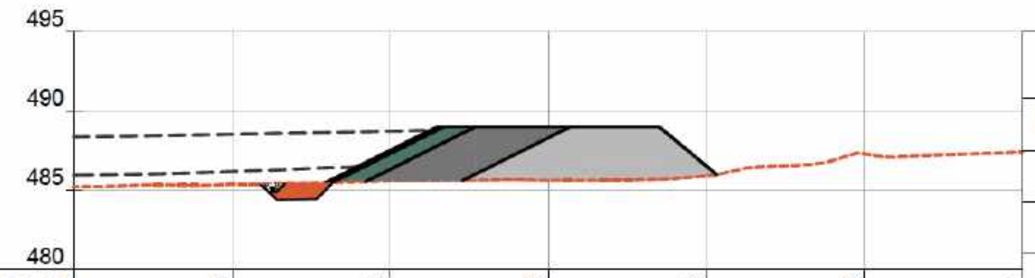
CH 0.0m



EXISTING SURFACE (R.L. m)	485.6	485.7	486.2	486.6	486.3	486.3	485.9
DESIGN SURFACE (R.L. m)			487.3	488.3	486.5		
CUT-/FILL+ (m)			1.06	1.7	0.19		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

EARTHWORKS AT CH 300.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ZONE 3A	8.77	1,518.11	4,699.61
ZONE 3B	25.33	3,443.70	9,227.62
ZONE 3C	5.38	615.74	1,696.16
HDPE	1.04	120.98	337.87

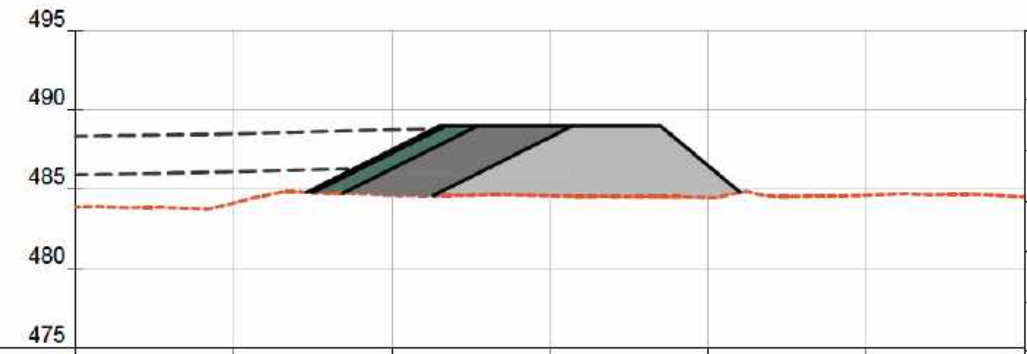
CH 300.0m



EXISTING SURFACE (R.L. m)	485.2	485.4	485.6	485.6	485.9	487.3	487.4
DESIGN SURFACE (R.L. m)			487.3	488.3	486.5		
CUT-/FILL+ (m)			1.74	2.7	0.62		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

EARTHWORKS AT CH 100.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ZONE 3A	20.64	1,032.23	1,032.23
ZONE 3B	36.64	1,832.14	1,832.14
ZONE 3C	7.02	355.52	355.52
HDPE	1.42	70.84	70.84

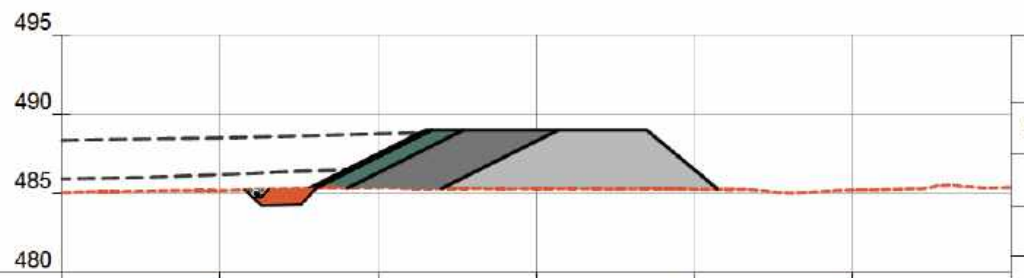
CH 100.0m



EXISTING SURFACE (R.L. m)	483.9	484.1	484.6	484.6	484.5	484.6	484.5
DESIGN SURFACE (R.L. m)			487.3	489.0	486.5		
CUT-/FILL+ (m)			2.67	4.4	2.02		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

EARTHWORKS AT CH 400.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ZONE 3A	26.01	1,633.51	6,333.12
ZONE 3B	55.81	4,223.75	13,451.36
ZONE 3C	7.52	576.13	2,272.29
HDPE	1.65	117.79	455.66

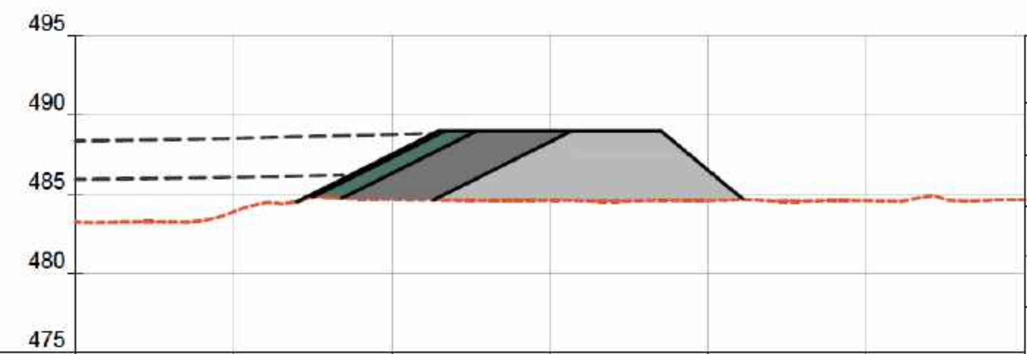
CH 400.0m



EXISTING SURFACE (R.L. m)	485.0	485.2	485.4	485.3	485.3	485.2	485.4
DESIGN SURFACE (R.L. m)			487.3	489.0	486.5		
CUT-/FILL+ (m)			1.94	3.7	1.23		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

EARTHWORKS AT CH 200.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ZONE 3A	22.04	2,149.27	3,181.50
ZONE 3B	42.75	3,951.77	5,783.91
ZONE 3C	7.30	724.91	1,080.43
HDPE	1.46	146.04	216.89

CH 200.0m



EXISTING SURFACE (R.L. m)	483.2	483.9	484.6	484.6	484.6	484.6	484.6
DESIGN SURFACE (R.L. m)			487.3	489.0	486.5		
CUT-/FILL+ (m)			2.65	4.4	1.92		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

EARTHWORKS AT CH 500.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ZONE 3A	26.11	2,596.52	8,929.64
ZONE 3B	55.99	5,600.73	19,052.09
ZONE 3C	7.60	751.71	3,024.00
HDPE	1.74	168.33	623.99

CH 500.0m

TAILINGS STORAGE FACILITY – NORTHERN EMBANKMENT CROSS SECTIONS – CH. 0.0 TO 500.0m

SCALE 1:400

LEGEND:

- HDPE SUBGRADE: ROLLER COMPACTED HDPE SUBGRADE (300mm LIFTS)
- ZONE 3C : TRAFFIC COMPACTED TRANSITIONAL MATERIAL (300mm LIFTS)
- ZONE 3A: TRAFFIC COMPACTED MINE WASTE (500mm LIFTS)
- ZONE 3B: TRAFFIC COMPACTED MINE WASTE (1,000mm LIFTS)

0 4 10 20
SCALE 1 : 400 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT
D	21.03.2025	ISSUED FOR CONSTRUCTION	AZ	MK	JB		
C	19.03.2025	ISSUED FOR CLIENT REVIEW	AZ	MK	JB		
B	14.03.2025	ISSUED FOR CLIENT REVIEW	AZ	MK	JB		
A	17.02.2025	ISSUED FOR CLIENT REVIEW	AS	MK	JB		

DRG. NO.	REFERENCE DRAWING

CLIENT
BELLEVUE GOLD

	BY	DATE	INIT.
DRAWN:	A.SANTANA	17.02.2025	
DESIGNED:	M.KHALID	17.02.2025	
CHECKED:	J.BLAKE	17.02.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE
BELLEVUE GOLD LIMITED
BELLEVUE GOLD PROJECT
IWLTSF - STAGE 4 NORTH & SOUTH
EMBANKMENT CROSS SECTIONS - SHT 1

SCALE
AS SHOWN
(A1)

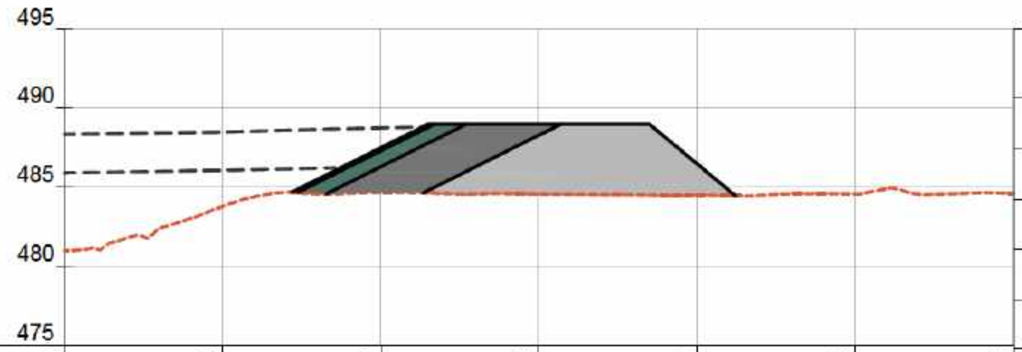
DRAWING No.
P19-11-29-014

REV
D

A1 Border v2.0

NOTES:

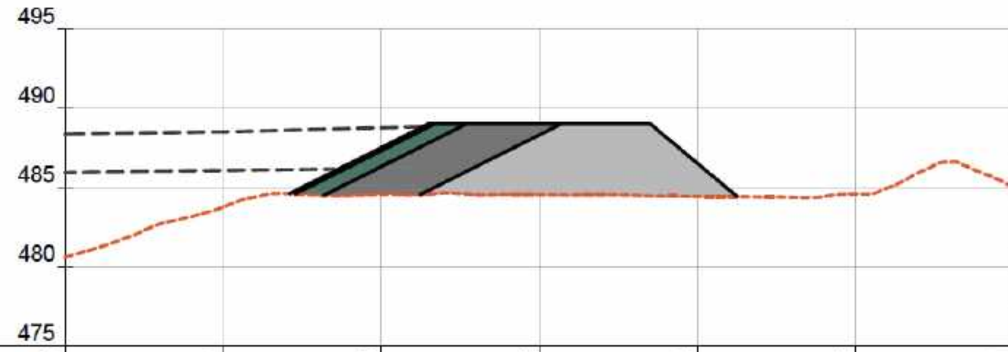
1. REFER TO DRAWING P19-11-29-001 FOR GENERAL NOTES.



EXISTING SURFACE (R.L. m)	481.0	483.8	484.7	484.6	484.5	484.6	484.6
DESIGN SURFACE (R.L. m)			487.3	489.0	486.5		
CUT-/FILL+ (m)			2.61	4.4	2.00		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

CH 600.0m

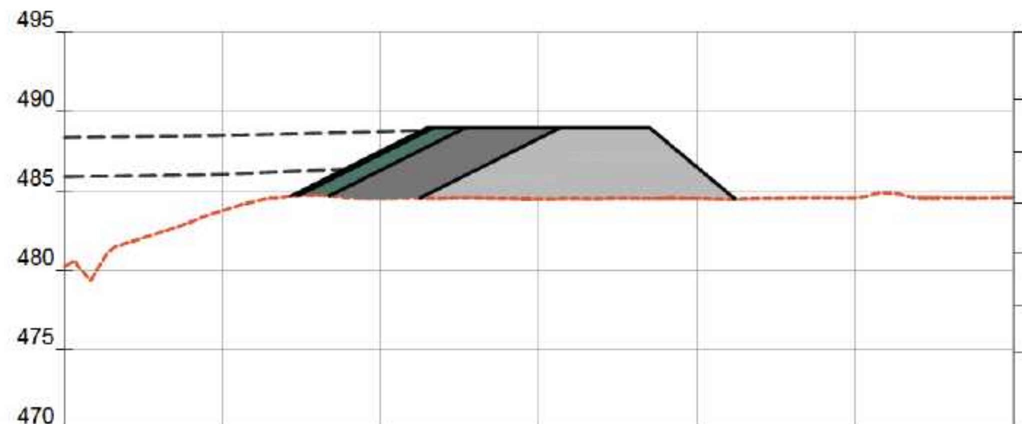
EARTHWORKS AT CH 600.0m			
MATERIAL NAME	AREA (m^2)	VOLUME (m^3)	CUMULATIVE VOLUME (m^3)
ZONE 3A	26.05	2,611.83	11,541.47
ZONE 3B	56.53	5,620.89	24,672.99
ZONE 3C	8.76	820.26	3,844.26
HDPE	1.73	173.79	797.78



EXISTING SURFACE (R.L. m)	480.6	483.7	484.6	484.5	484.4	484.6	485.1
DESIGN SURFACE (R.L. m)			487.3	489.0	486.5		
CUT-/FILL+ (m)			2.75	4.5	2.09		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

CH 900.0m

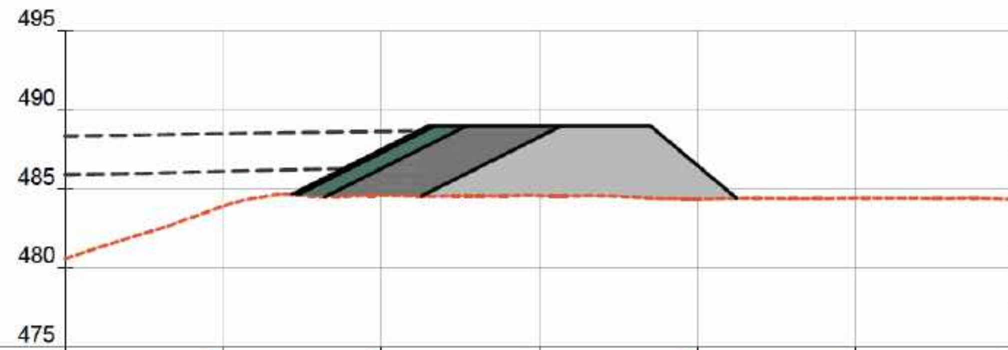
EARTHWORKS AT CH 900.0m			
MATERIAL NAME	AREA (m^2)	VOLUME (m^3)	CUMULATIVE VOLUME (m^3)
ZONE 3A	17.83	2,255.88	19,218.60
ZONE 3B	57.63	5,765.53	41,808.35
ZONE 3C	8.90	905.12	6,552.43
HDPE	1.77	179.61	1,337.72



EXISTING SURFACE (R.L. m)	480.2	483.8	484.5	484.5	484.5	484.6	484.6
DESIGN SURFACE (R.L. m)			487.3	489.0	486.5		
CUT-/FILL+ (m)			2.79	4.5	1.99		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

CH 700.0m

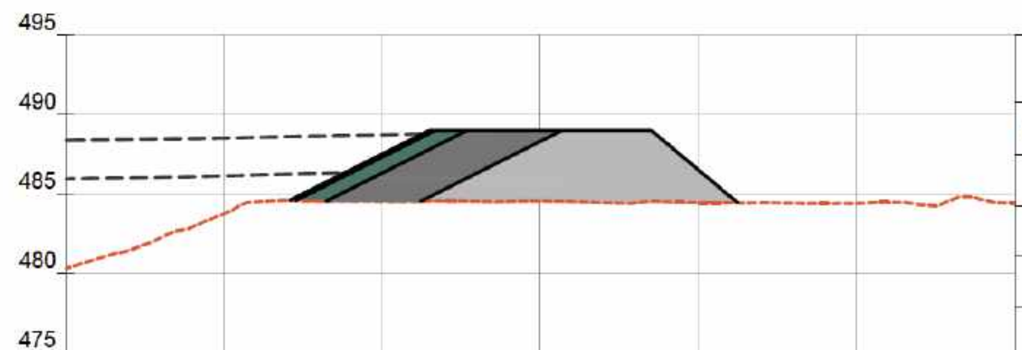
EARTHWORKS AT CH 700.0m			
MATERIAL NAME	AREA (m^2)	VOLUME (m^3)	CUMULATIVE VOLUME (m^3)
ZONE 3A	26.69	2,686.70	14,228.17
ZONE 3B	57.51	5,644.17	30,317.16
ZONE 3C	8.62	896.29	4,740.55
HDPE	1.73	179.01	976.79



EXISTING SURFACE (R.L. m)	480.6	483.9	484.6	484.6	484.4	484.4	484.4
DESIGN SURFACE (R.L. m)			487.3	489.0	486.5		
CUT-/FILL+ (m)			2.70	4.4	2.12		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

CH 1000.0m

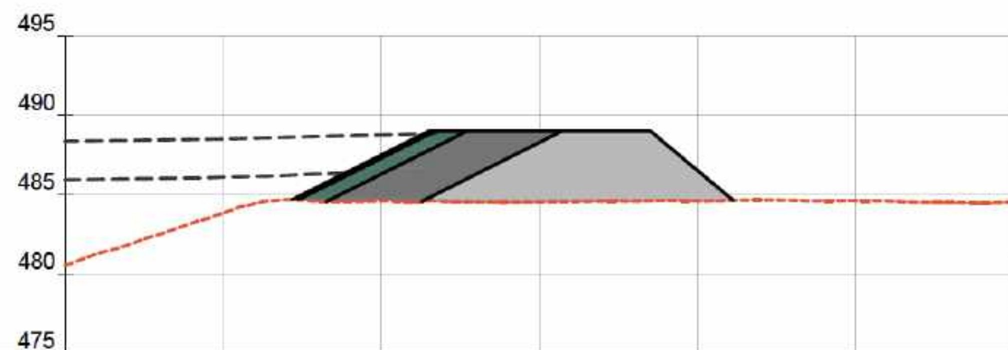
EARTHWORKS AT CH 1000.0m			
MATERIAL NAME	AREA (m^2)	VOLUME (m^3)	CUMULATIVE VOLUME (m^3)
ZONE 3A	17.66	1,749.44	20,968.04
ZONE 3B	57.21	5,803.38	47,611.73
ZONE 3C	7.97	816.32	7,368.76
HDPE	1.73	168.71	1,506.43



EXISTING SURFACE (R.L. m)	480.3	483.7	484.5	484.5	484.4	484.4	484.4
DESIGN SURFACE (R.L. m)			487.3	489.0	486.5		
CUT-/FILL+ (m)			2.81	4.5	2.08		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

CH 800.0m

EARTHWORKS AT CH 800.0m			
MATERIAL NAME	AREA (m^2)	VOLUME (m^3)	CUMULATIVE VOLUME (m^3)
ZONE 3A	26.96	2,734.55	16,962.73
ZONE 3B	58.18	5,725.66	36,042.82
ZONE 3C	8.95	906.77	5,647.31
HDPE	1.77	181.31	1,158.10



EXISTING SURFACE (R.L. m)	480.5	483.8	484.6	484.6	484.6	484.6	484.6
DESIGN SURFACE (R.L. m)			487.3	489.0	486.5		
CUT-/FILL+ (m)			2.68	4.4	1.90		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

CH 1100.0m

EARTHWORKS AT CH 1100.0m			
MATERIAL NAME	AREA (m^2)	VOLUME (m^3)	CUMULATIVE VOLUME (m^3)
ZONE 3A	17.63	1,694.55	22,662.59
ZONE 3B	55.84	5,819.02	53,430.75
ZONE 3C	0.00	363.18	7,731.94
HDPE	1.73	155.48	1,661.91

TAILINGS STORAGE FACILITY – NORTHERN EMBANKMENT CROSS SECTIONS – CH. 600.0 TO 1,100.0m

SCALE 1:400

LEGEND:

- HDPE SUBGRADE: ROLLER COMPACTED HDPE SUBGRADE (300mm LIFTS)
- ZONE 3C : TRAFFIC COMPACTED TRANSITIONAL MATERIAL (300mm LIFTS)
- ZONE 3A: TRAFFIC COMPACTED MINE WASTE (500mm LIFTS)
- ZONE 3B: TRAFFIC COMPACTED MINE WASTE (1,000mm LIFTS)

0 4 10 20

SCALE 1 : 400 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT
C	21.03.2025	ISSUED FOR CONSTRUCTION	AZ	MK	JB		
B	14.03.2025	ISSUED FOR CLIENT REVIEW	AZ	MK	JB		
A	17.02.2025	ISSUED FOR CLIENT REVIEW	AS	MK	JB		

DRG. NO.	REFERENCE DRAWING

CLIENT

BELLEVUE GOLD

	BY	DATE	INIT.
DRAWN:	A.SANTANA	17.02.2025	
DESIGNED:	M.KHALID	17.02.2025	
CHECKED:	J.BLAKE	17.02.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE

BELLEVUE GOLD LIMITED
BELLEVUE GOLD PROJECT
IWLTSF - STAGE 4 NORTH & SOUTH EMBANKMENT CROSS SECTIONS - SHT 2

SCALE: AS SHOWN (A1)

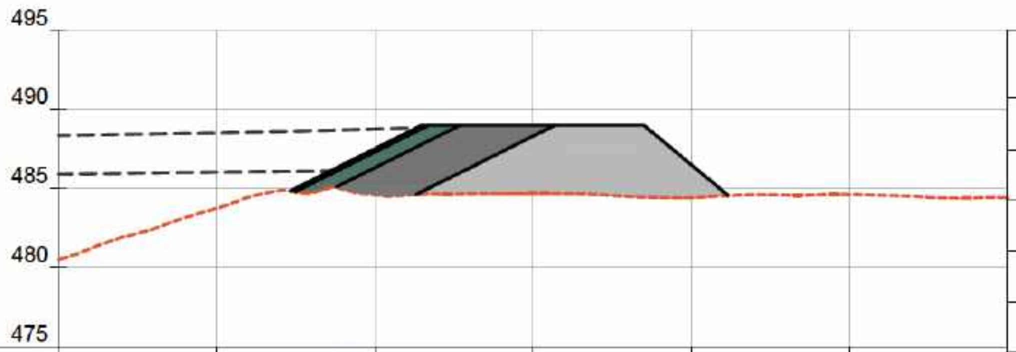
DRAWING No. **P19-11-29-015**

REV **C**

A1 Border v2.0

NOTES:

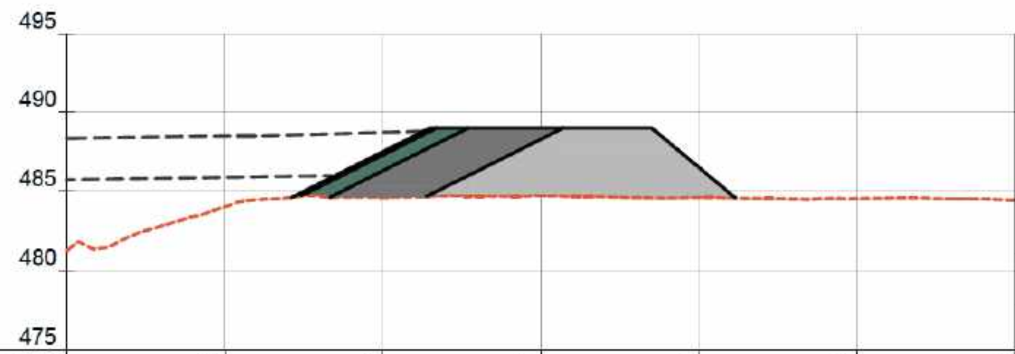
1. REFER TO DRAWING P19-11-29-001 FOR GENERAL NOTES.



EXISTING SURFACE (R.L. m)	480.5	483.7	484.6	484.7	484.4	484.6	484.4
DESIGN SURFACE (R.L. m)			487.3	489.0	486.5		
CUT-/FILL+ (m)			2.71	4.3	2.08		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

EARTHWORKS AT CH 1200.0m			
MATERIAL NAME	AREA (m^2)	VOLUME (m^3)	CUMULATIVE VOLUME (m^3)
ZONE 3A	25.86	2,105.48	24,768.07
ZONE 3B	56.06	5,703.66	59,134.41
ZONE 3C	8.36	393.23	8,125.17
HDPE	1.68	159.15	1,821.06

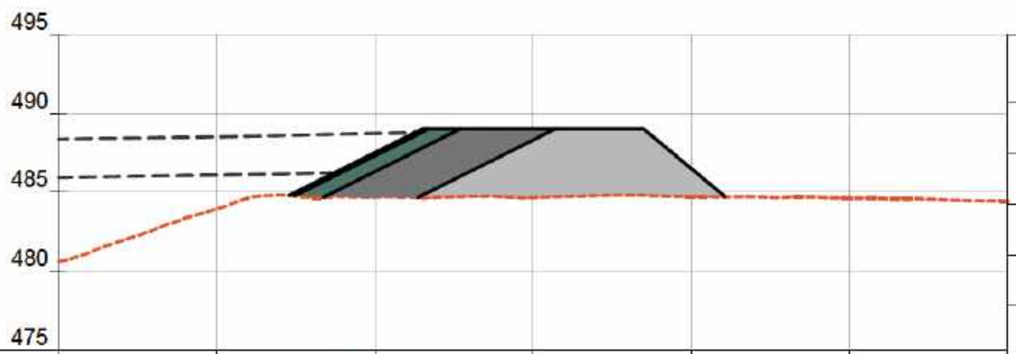
CH 1200.0m



EXISTING SURFACE (R.L. m)	481.2	484.0	484.6	484.7	484.6	484.5	484.5
DESIGN SURFACE (R.L. m)			487.3	489.0	486.5		
CUT-/FILL+ (m)			2.67	4.3	1.90		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

EARTHWORKS AT CH 1400.0m			
MATERIAL NAME	AREA (m^2)	VOLUME (m^3)	CUMULATIVE VOLUME (m^3)
ZONE 3A	26.17	2,549.89	29,888.55
ZONE 3B	54.48	5,438.37	70,049.84
ZONE 3C	0.00	416.83	9,383.07
HDPE	1.73	163.55	2,149.80

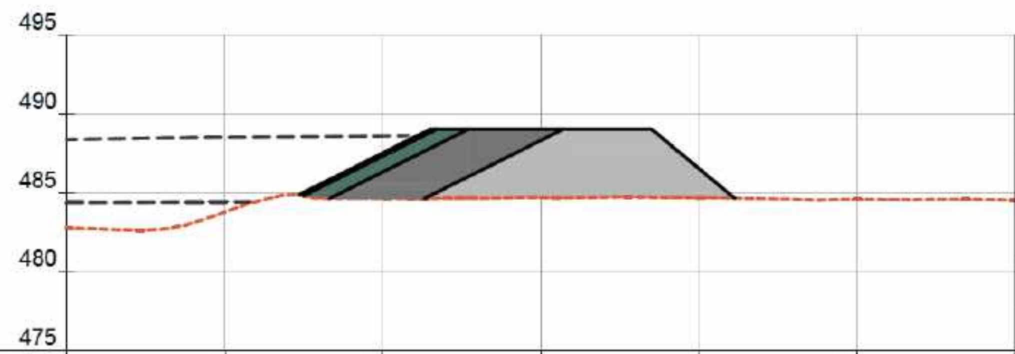
CH 1400.0m



EXISTING SURFACE (R.L. m)	480.6	483.9	484.7	484.7	484.7	484.6	484.4
DESIGN SURFACE (R.L. m)			487.3	489.0	486.5		
CUT-/FILL+ (m)			2.62	4.3	1.78		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

EARTHWORKS AT CH 1300.0m			
MATERIAL NAME	AREA (m^2)	VOLUME (m^3)	CUMULATIVE VOLUME (m^3)
ZONE 3A	25.84	2,570.59	27,338.67
ZONE 3B	53.16	5,477.06	64,611.47
ZONE 3C	8.61	841.07	8,966.24
HDPE	1.66	165.19	1,986.25

CH 1300.0m



EXISTING SURFACE (R.L. m)	482.7	483.8	484.6	484.7	484.7	484.6	484.5
DESIGN SURFACE (R.L. m)			487.3	489.0	486.5		
CUT-/FILL+ (m)			2.70	4.3	1.83		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

EARTHWORKS AT CH 1500.0m			
MATERIAL NAME	AREA (m^2)	VOLUME (m^3)	CUMULATIVE VOLUME (m^3)
ZONE 3A	26.39	2,624.59	32,513.14
ZONE 3B	54.34	5,444.84	75,494.68
ZONE 3C	0.00	0.00	9,383.07
HDPE	1.67	170.00	2,319.80

CH 1500.0m

TAILINGS STORAGE FACILITY - NORTHERN EMBANKMENT CROSS SECTIONS - CH. 1,200.0 TO 1,500.0m

SCALE 1:400

LEGEND:

HDPE SUBGRADE: ROLLER COMPACTED HDPE SUBGRADE (300mm LIFTS)

ZONE 3C : TRAFFIC COMPACTED TRANSITIONAL MATERIAL (300mm LIFTS)

ZONE 3A: TRAFFIC COMPACTED MINE WASTE (500mm LIFTS)

ZONE 3B: TRAFFIC COMPACTED MINE WASTE (1,000mm LIFTS)

0 4 10 20

SCALE 1 : 400 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT
C	21.03.2025	ISSUED FOR CONSTRUCTION	AZ	MK	JB		
B	14.03.2025	ISSUED FOR CLIENT REVIEW	AZ	MK	JB		
A	17.02.2025	ISSUED FOR CLIENT REVIEW	AS	MK	JB		

DRG. NO.	REFERENCE DRAWING

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CLIENT

BELLEVUE GOLD

	BY	DATE	INIT.
DRAWN:	A.SANTANA	17.02.2025	
DESIGNED:	M.KHALID	17.02.2025	
CHECKED:	J.BLAKE	17.02.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE

BELLEVUE GOLD LIMITED
BELLEVUE GOLD PROJECT
IWLTSF - STAGE 4 NORTH & SOUTH EMBANKMENT CROSS SECTIONS - SHT 3

SCALE: **AS SHOWN** (A1)

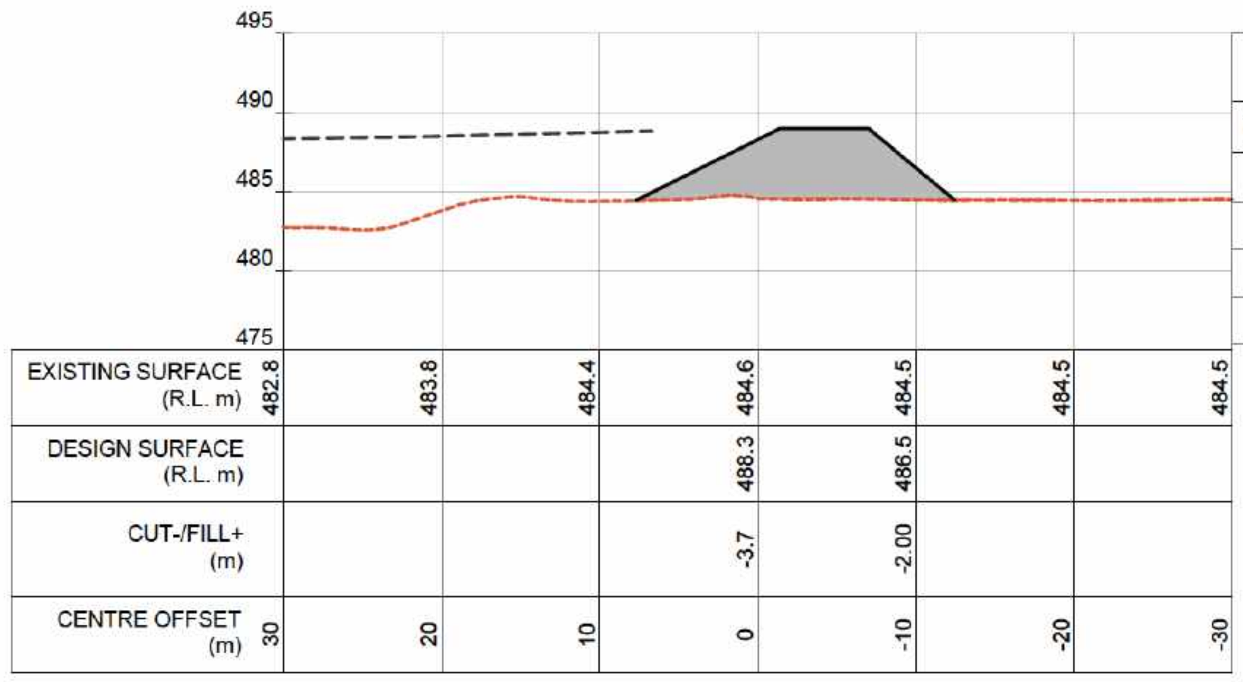
DRAWING No.: **P19-11-29-016**

REV: **C**

A1 Border v2.0

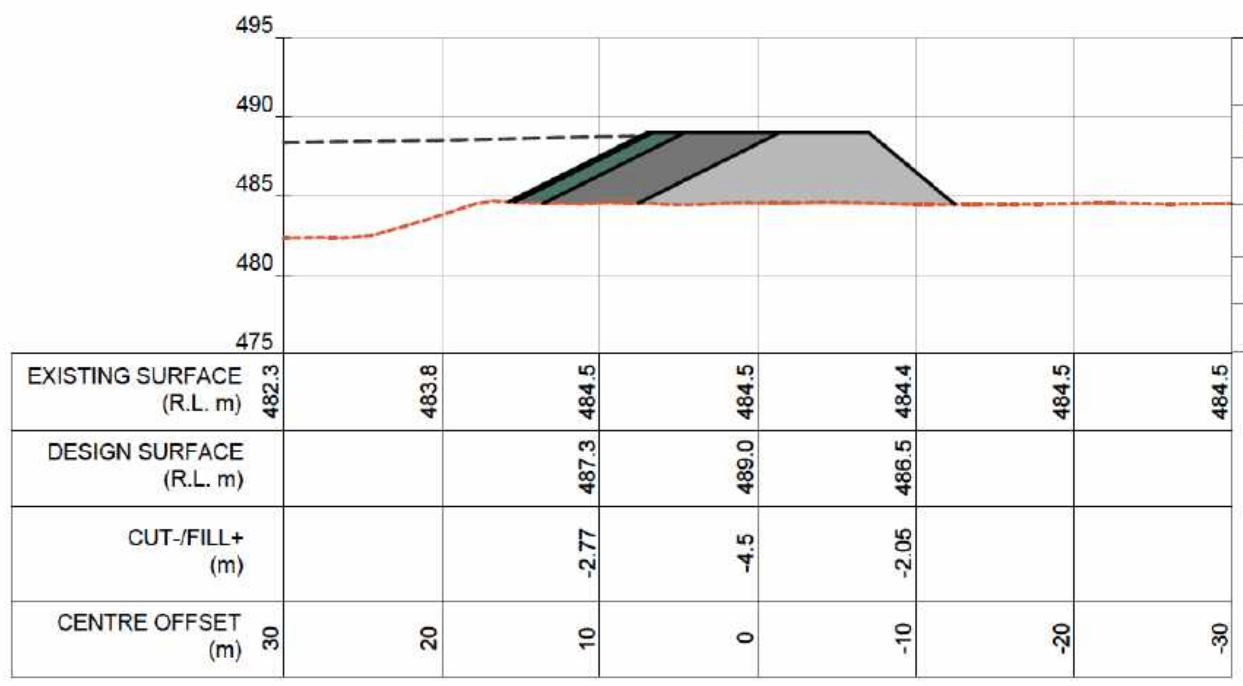
NOTES:

1. REFER TO DRAWING P19-11-29-001 FOR GENERAL NOTES.



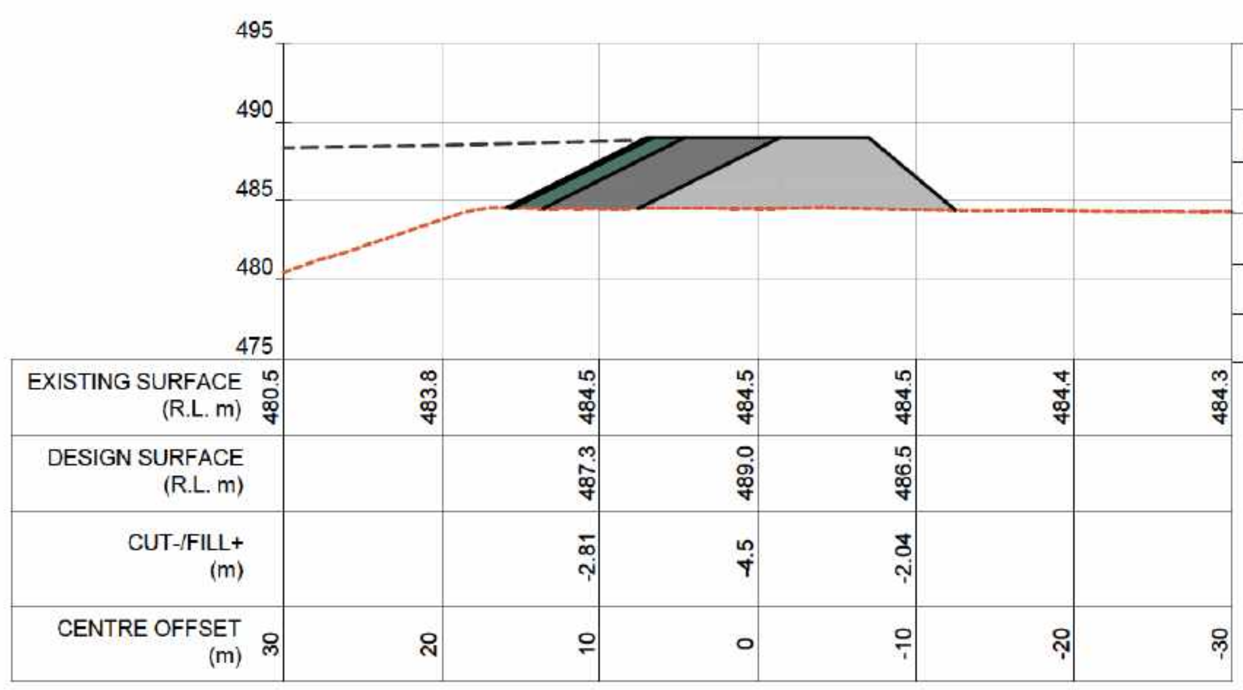
EARTHWORKS AT CH 0.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ZONE 3A	0.00	0.00	0.00
ZONE 3B	56.62	0.00	0.00
ZONE 3C	0.00	0.00	0.00
HDPE	0.00	0.00	0.00

CH 0.0m



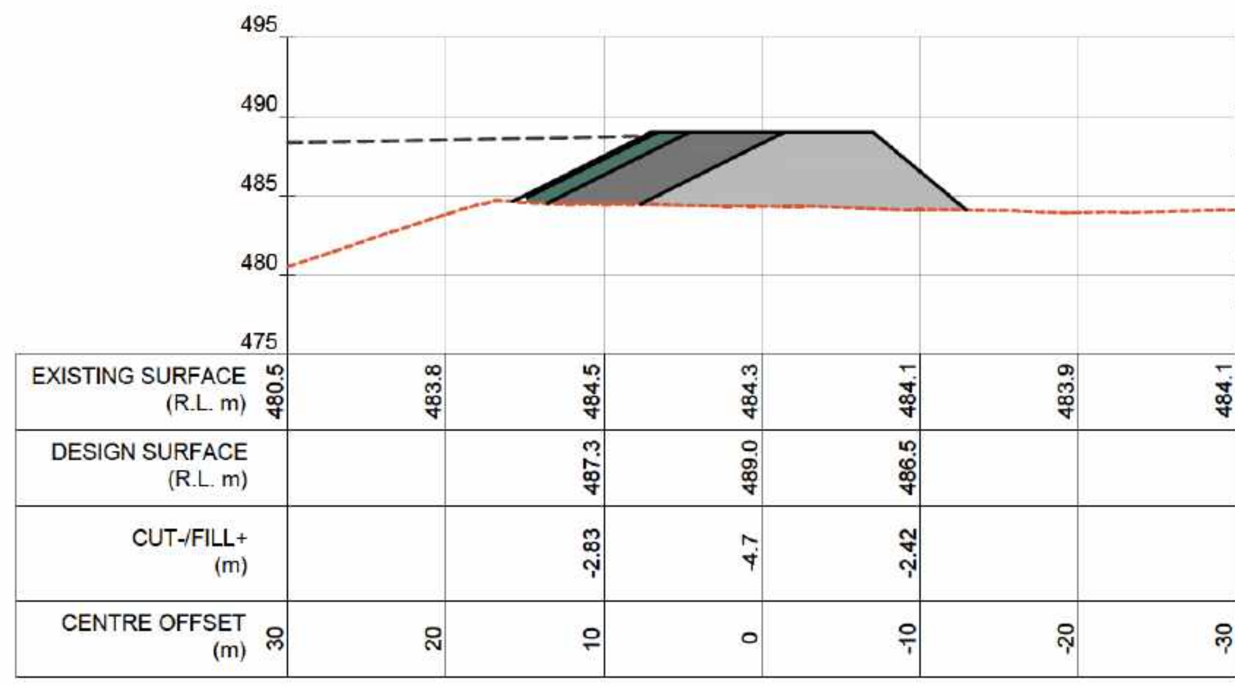
EARTHWORKS AT CH 100.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ZONE 3A	17.90	894.85	894.85
ZONE 3B	57.63	5,712.32	5,712.32
ZONE 3C	8.91	445.49	445.49
HDPE	1.72	85.92	85.92

CH 100.0m



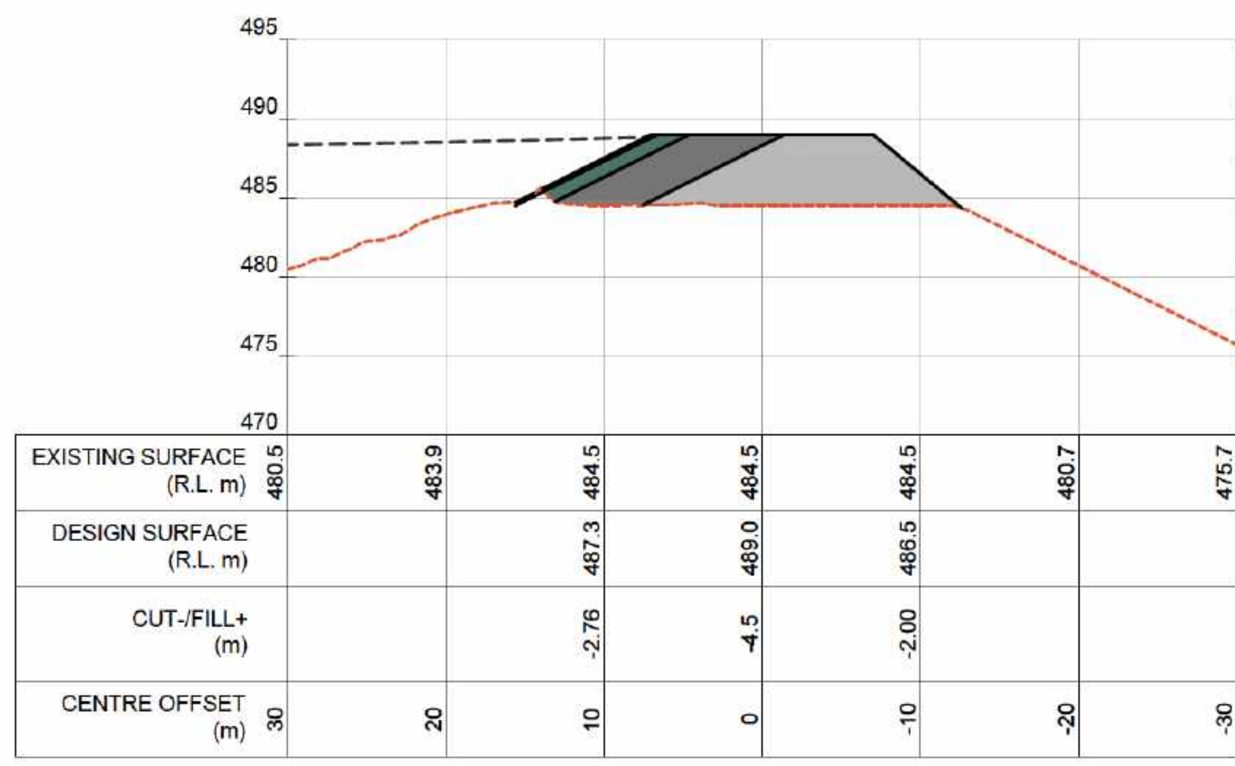
EARTHWORKS AT CH 200.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ZONE 3A	17.90	1,789.95	2,684.80
ZONE 3B	57.39	5,750.83	11,463.15
ZONE 3C	8.93	892.22	1,337.70
HDPE	1.77	174.66	260.58

CH 200.0m



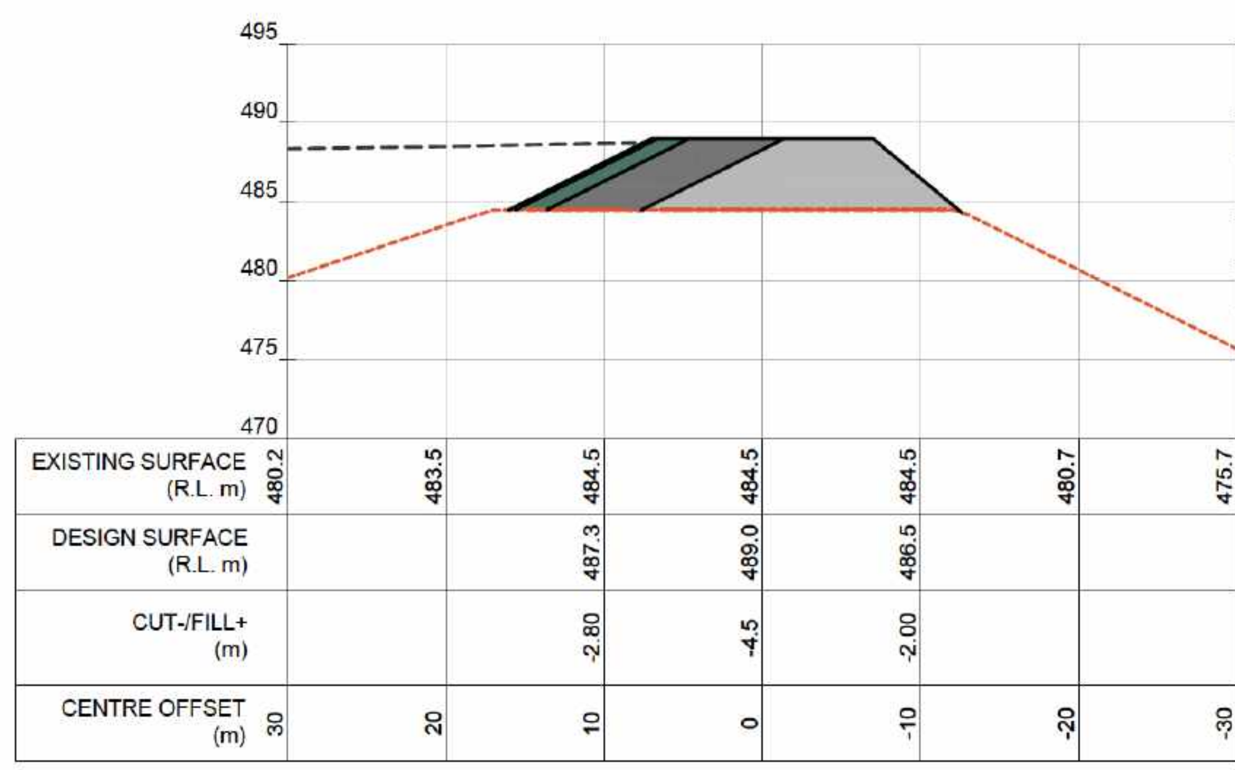
EARTHWORKS AT CH 300.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ZONE 3A	27.16	2,253.07	4,937.88
ZONE 3B	82.50	5,994.54	17,457.68
ZONE 3C	8.84	888.74	2,226.44
HDPE	1.82	169.58	430.16

CH 300.0m



EARTHWORKS AT CH 400.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ZONE 3A	26.61	2,688.66	7,626.54
ZONE 3B	57.28	5,989.07	23,446.76
ZONE 3C	7.87	835.46	3,061.90
HDPE	1.42	152.03	582.19

CH 400.0m



EARTHWORKS AT CH 500.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ZONE 3A	27.05	2,683.35	10,309.89
ZONE 3B	57.65	5,746.50	29,193.26
ZONE 3C	9.00	843.59	3,905.50
HDPE	1.76	159.33	741.53

CH 500.0m

TAILINGS STORAGE FACILITY – SOUTHERN EMBANKMENT CROSS SECTIONS – CH. 0.0 TO 500.0m
SCALE 1:400

LEGEND: HDPE SUBGRADE: ROLLER COMPACTED HDPE SUBGRADE (300mm LIFTS) | ZONE 3C : TRAFFIC COMPACTED TRANSITIONAL MATERIAL (300mm LIFTS) | ZONE 3A: TRAFFIC COMPACTED MINE WASTE (500mm LIFTS) | ZONE 3B: TRAFFIC COMPACTED MINE WASTE (1,000mm LIFTS)

0 4 10 20
SCALE 1 : 400 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT
C	21.03.2025	ISSUED FOR CONSTRUCTION	AZ	MK	JB		
B	14.03.2025	ISSUED FOR CLIENT REVIEW	AZ	MK	JB		
A	17.02.2025	ISSUED FOR CLIENT REVIEW	AS	MK	JB		

DRG. NO.	REFERENCE DRAWING

CLIENT: BELLEVUE GOLD

	BY	DATE	INIT.
DRAWN:	A.SANTANA	17.02.2025	
DESIGNED:	M.KHALID	17.02.2025	
CHECKED:	J.BLAKE	17.02.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE
BELLEVUE GOLD LIMITED
BELLEVUE GOLD PROJECT
IWLTSF - STAGE 4 NORTH & SOUTH EMBANKMENT CROSS SECTIONS - SHT 4

SCALE: AS SHOWN (A1)

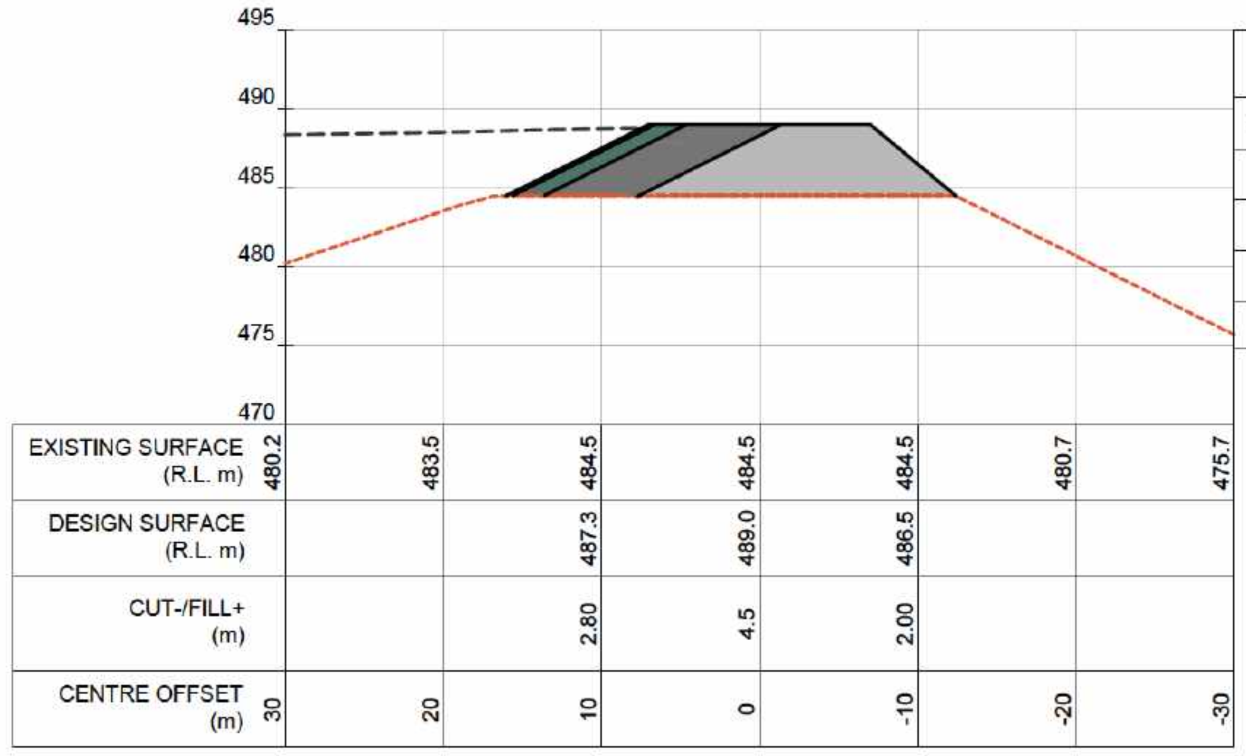
DRAWING No.: P19-11-29-017

REV: C

A1 Border v2.0

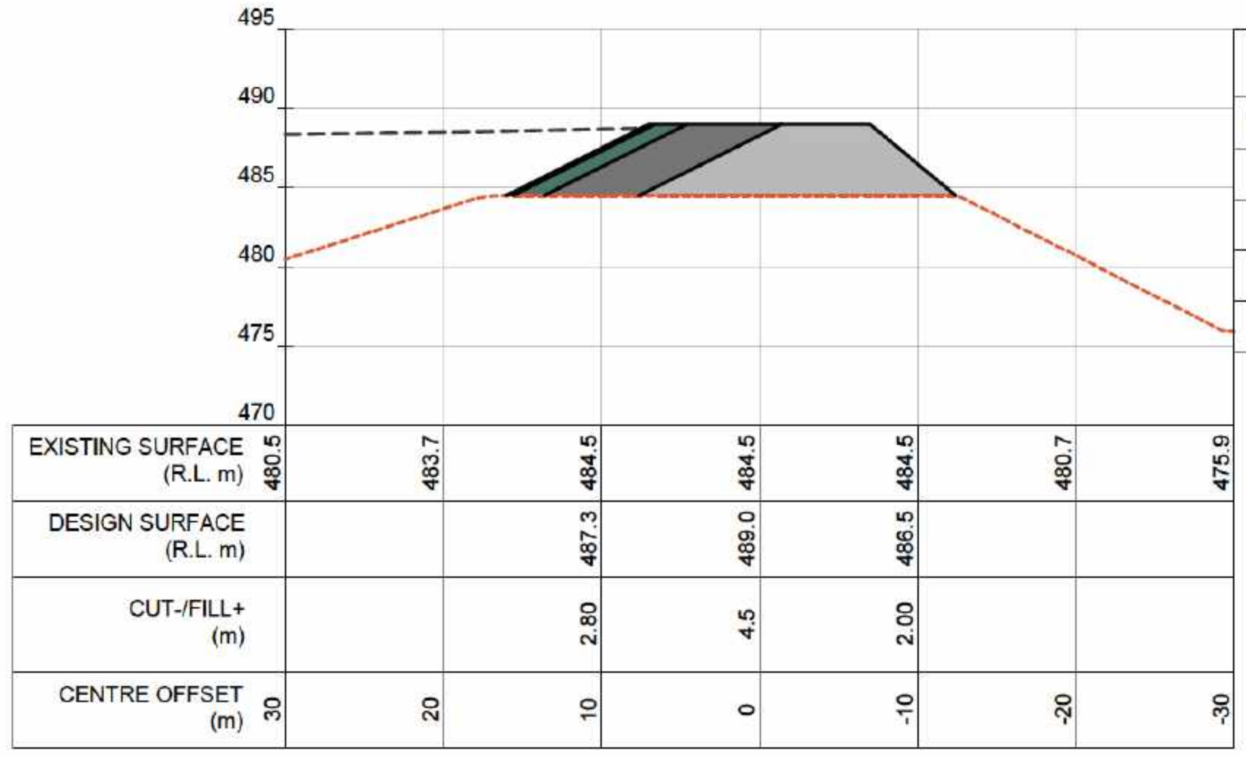
NOTES:

1. REFER TO DRAWING P19-11-29-001 FOR GENERAL NOTES.



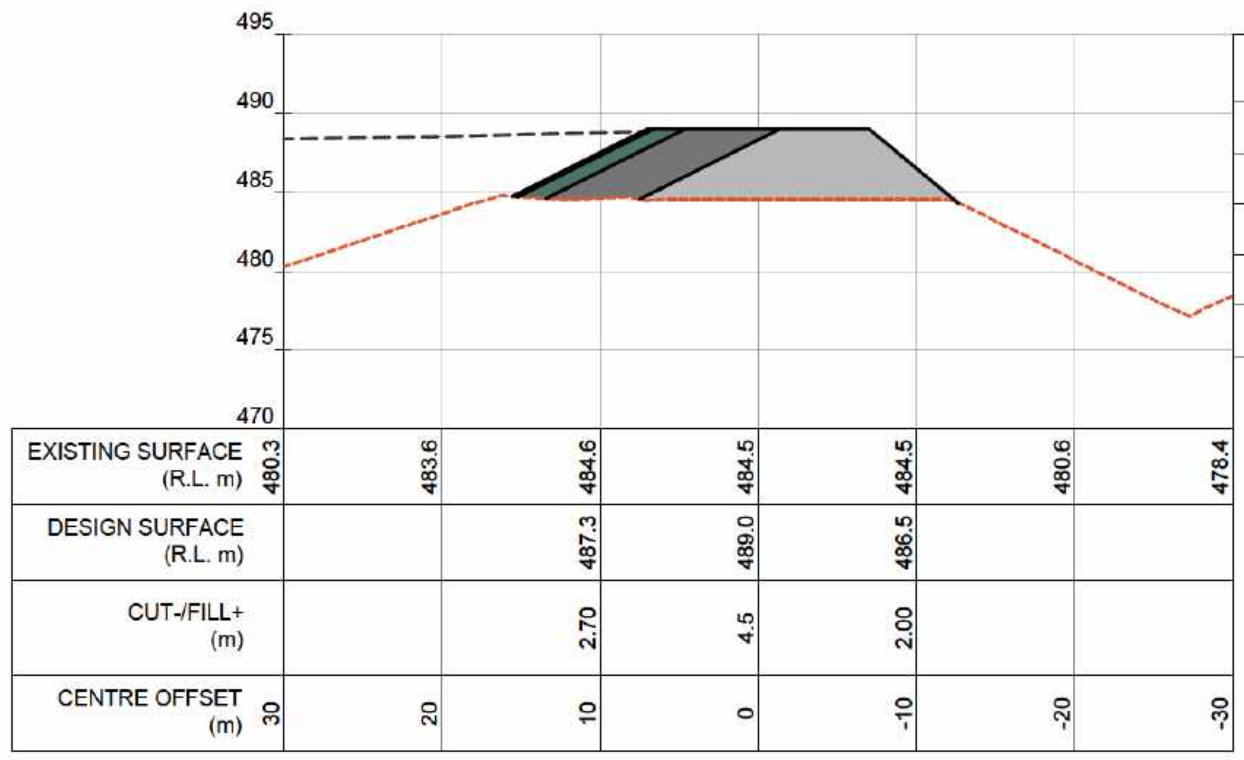
CH 600.0m

EARTHWORKS AT CH 600.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ZONE 3A	27.04	2,680.92	12,990.81
ZONE 3B	57.63	5,790.06	34,983.32
ZONE 3C	9.00	887.17	4,792.67
HDPE	1.76	173.34	914.87



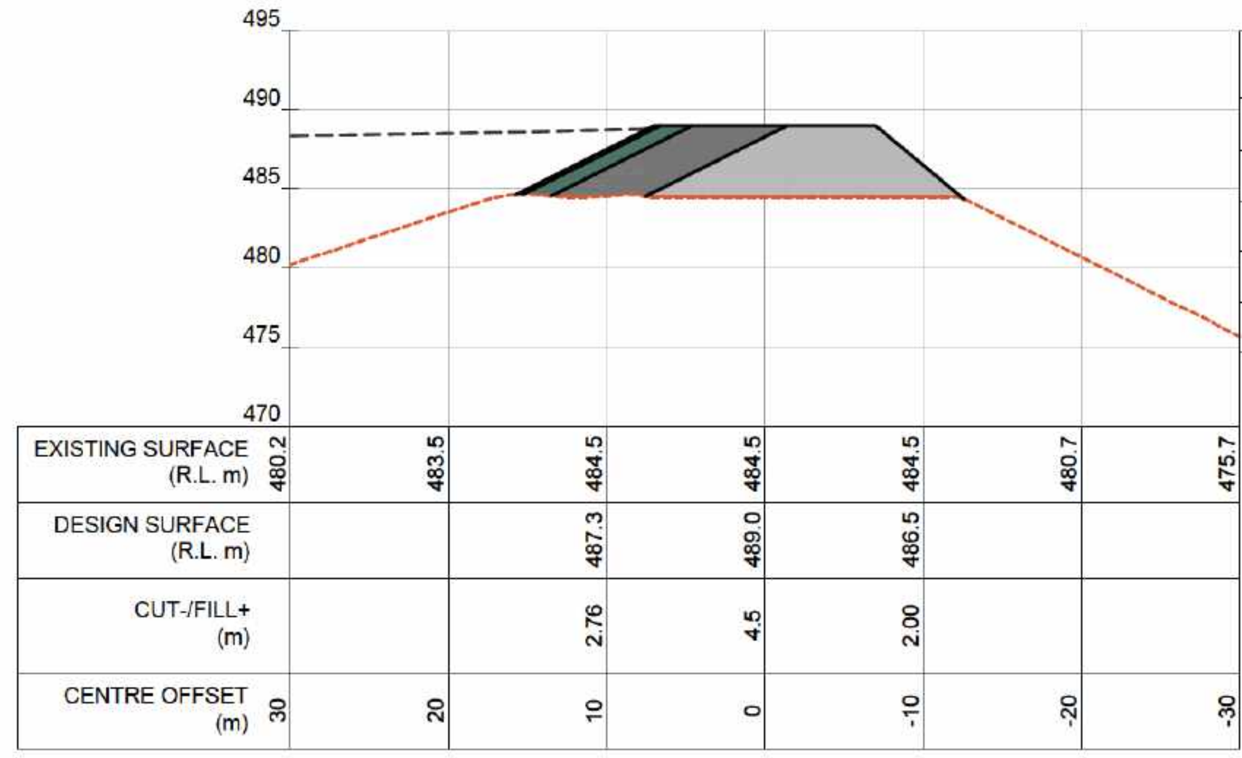
CH 700.0m

EARTHWORKS AT CH 700.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ZONE 3A	27.00	2,510.43	15,501.23
ZONE 3B	57.61	5,971.76	40,955.08
ZONE 3C	9.00	794.37	5,587.04
HDPE	1.76	153.19	1,068.05



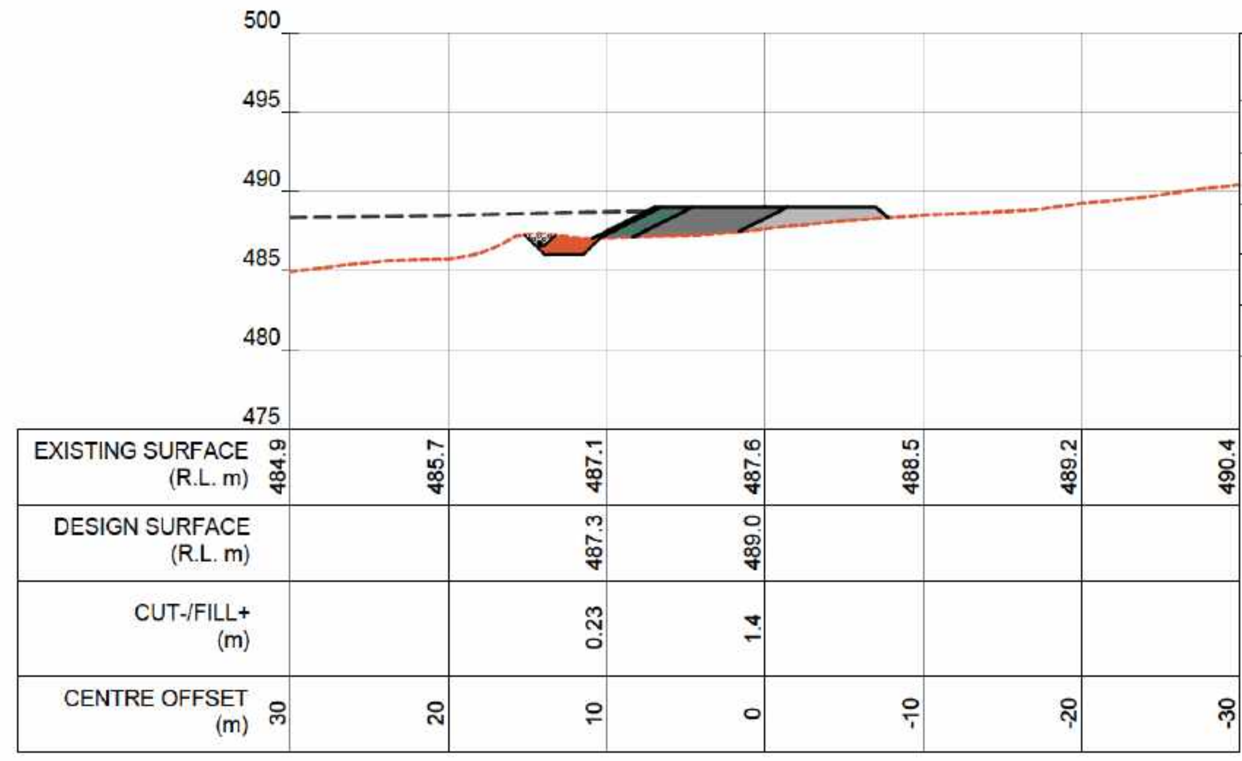
CH 800.0m

EARTHWORKS AT CH 800.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ZONE 3A	26.52	2,607.52	18,108.76
ZONE 3B	57.65	5,839.22	46,794.30
ZONE 3C	8.72	848.54	6,435.59
HDPE	1.72	165.96	1,234.02



CH 900.0m

EARTHWORKS AT CH 900.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ZONE 3A	17.84	2,200.68	20,309.43
ZONE 3B	57.61	5,789.48	52,583.78
ZONE 3C	8.76	861.40	7,296.98
HDPE	1.74	170.26	1,404.27



CH 1000.0m

EARTHWORKS AT CH 1000.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ZONE 3A	7.22	1,237.99	21,547.43
ZONE 3B	7.35	3,281.12	55,864.90
ZONE 3C	2.77	559.46	7,856.44
HDPE	0.72	118.69	1,522.96

TAILINGS STORAGE FACILITY - SOUTHERN EMBANKMENT CROSS SECTIONS - CH. 600.0 TO 1,000.0m

SCALE 1:400

LEGEND:

- HDPE SUBGRADE: ROLLER COMPACTED HDPE SUBGRADE (300mm LIFTS)
- ZONE 3C : TRAFFIC COMPACTED TRANSITIONAL MATERIAL (300mm LIFTS)
- ZONE 3A: TRAFFIC COMPACTED MINE WASTE (500mm LIFTS)
- ZONE 3B: TRAFFIC COMPACTED MINE WASTE (1,000mm LIFTS)

0 4 10 20
SCALE 1 : 400 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT
D	21.03.2025	ISSUED FOR CONSTRUCTION	AZ	MK	JB		
C	19.03.2025	ISSUED FOR CLIENT REVIEW	AZ	MK	JB		
B	14.03.2025	ISSUED FOR CLIENT REVIEW	AZ	MK	JB		
A	17.02.2025	ISSUED FOR CLIENT REVIEW	AS	MK	JB		

DRG. NO.	REFERENCE DRAWING

CLIENT: BELLEVUE GOLD

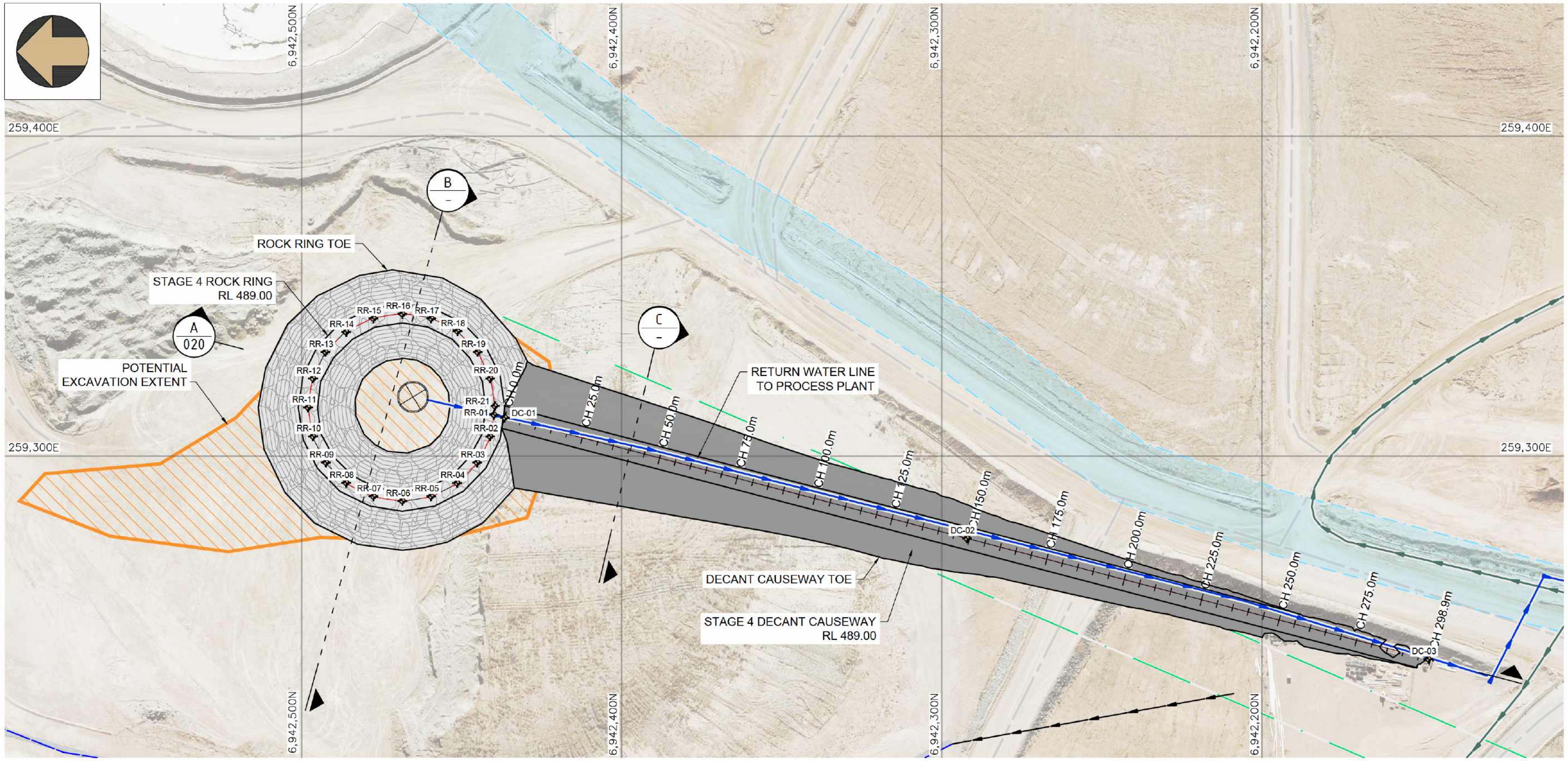
	BY	DATE	INIT.
DRAWN:	A.SANTANA	17.02.2025	
DESIGNED:	M.KHALID	17.02.2025	
CHECKED:	J.BLAKE	17.02.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE
BELLEVUE GOLD LIMITED
BELLEVUE GOLD PROJECT
IWLTSF - STAGE 4 NORTH & SOUTH EMBANKMENT CROSS SECTIONS - SHT 5

SCALE: AS SHOWN (A1)

DRAWING No.: P19-11-29-018 REV: D

A1 Border v2.0



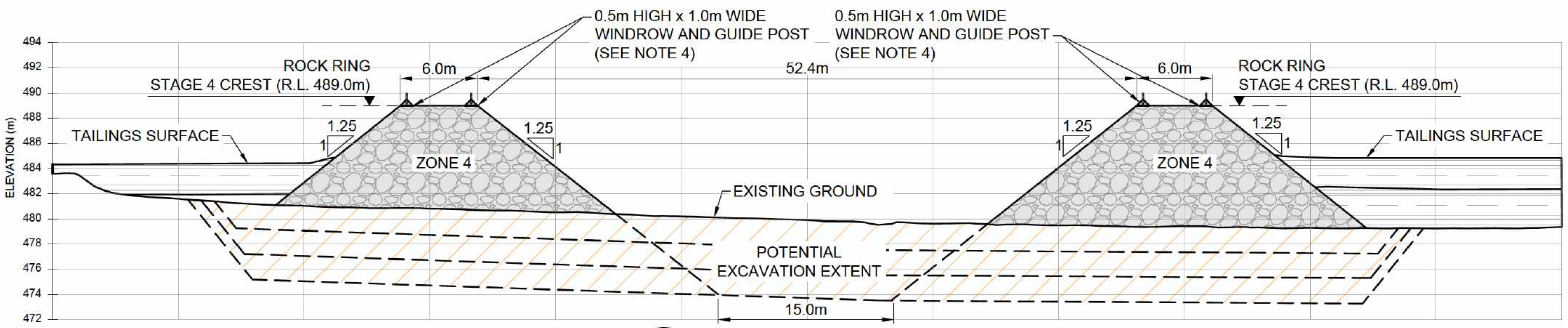
1 003 1 004 ROCK RING AND DECANT CAUSEWAY – PLAN LAYOUT
SCALE 1 : 500

NOTES:

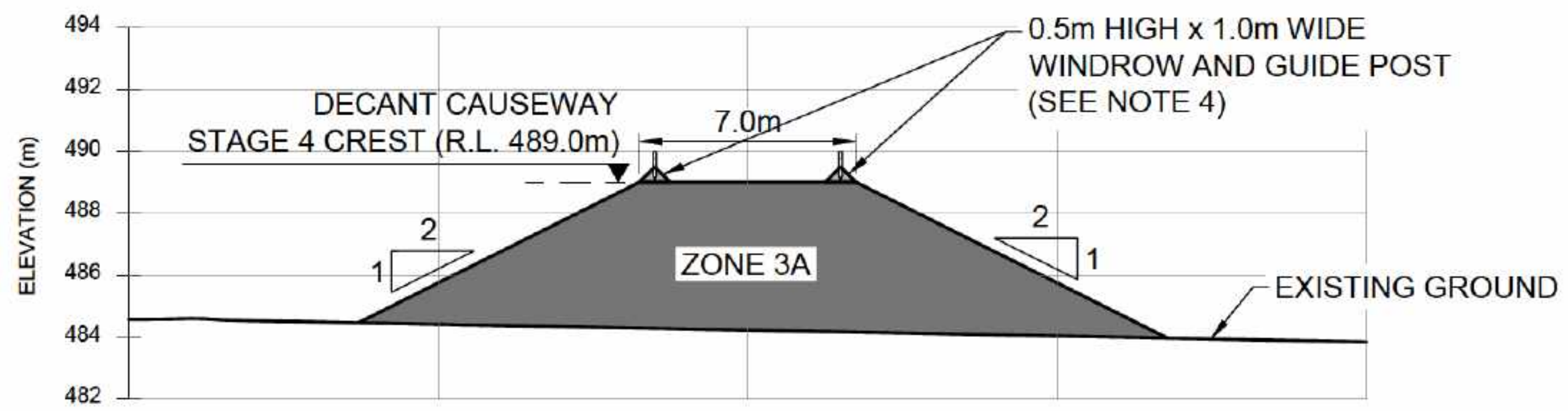
1. REFER TO DRAWING P19-11-29-001 FOR GENERAL NOTES.

ROCK RING SETTING OUT POINTS			
POINT I.D.	EASTING	NORTHING	R.L. (m)
RR-01	259,312.9	6,942,439.9	489.0
RR-02	259,306.2	6,942,441.1	489.0
RR-03	259,298.0	6,942,445.1	489.0
RR-04	259,291.6	6,942,451.4	489.0
RR-05	259,287.5	6,942,459.5	489.0
RR-06	259,286.0	6,942,468.5	489.0
RR-07	259,287.4	6,942,477.5	489.0
RR-08	259,291.7	6,942,486.1	489.0
RR-09	259,298.0	6,942,492.4	489.0
RR-10	259,306.2	6,942,496.4	489.0
RR-11	259,315.2	6,942,498.0	489.0
RR-12	259,324.3	6,942,496.4	489.0
RR-13	259,332.5	6,942,492.5	489.0
RR-14	259,338.8	6,942,486.1	489.0
RR-15	259,343.0	6,942,477.5	489.0
RR-16	259,344.4	6,942,468.5	489.0
RR-17	259,343.0	6,942,459.5	489.0
RR-18	259,339.0	6,942,451.3	489.0
RR-19	259,332.5	6,942,445.0	489.0
RR-20	259,324.3	6,942,441.1	489.0
RR-21	259,315.7	6,942,439.6	489.0

DECANT CAUSEWAY SETTING OUT POINTS			
POINT I.D.	EASTING	NORTHING	R.L. (m)
DC-01	259,312.1	6,942,436.5	489.0
DC-02	259,274.3	6,942,292.1	0.0
DC-03	259,236.6	6,942,148.0	0.0



B – TYP. SECTION – ROCK RING
SCALE 1 : 250



C – TYP. SECTION – DECANT CAUSEWAY
SCALE 1 : 200

LEGEND:

ZONE 3A: TRAFFIC COMPACTED MINE WASTE (500mm LIFTS)

ZONE 3B: TRAFFIC COMPACTED MINE WASTE (1,000mm LIFTS)

ZONE 4: CLEAN COMPETENT ROCKFILL 100% PASSING 300mm, <20% PASSING 2.36mm

SCALE 1 : 200 (m) — 0 2 5 10
SCALE 1 : 250 (m) — 0 2.5 6.25 12.5
SCALE 1 : 750 (m) — 0 7.5 20 40

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
C	21.03.2025	ISSUED FOR CONSTRUCTION	AZ	MK	JB			P19-11-29-019	DECANT CAUSEWAY & ROCK RING SECTIONS
B	14.03.2025	ISSUED FOR CLIENT REVIEW	AZ	MK	JB			P19-11-29-004	GENERAL ARRANGEMENT - SOUTH
A	17.02.2025	ISSUED FOR CLIENT REVIEW	AS	MK	JB			P19-11-29-003	GENERAL ARRANGEMENT - NORTH

CLIENT: BELLEVUE GOLD

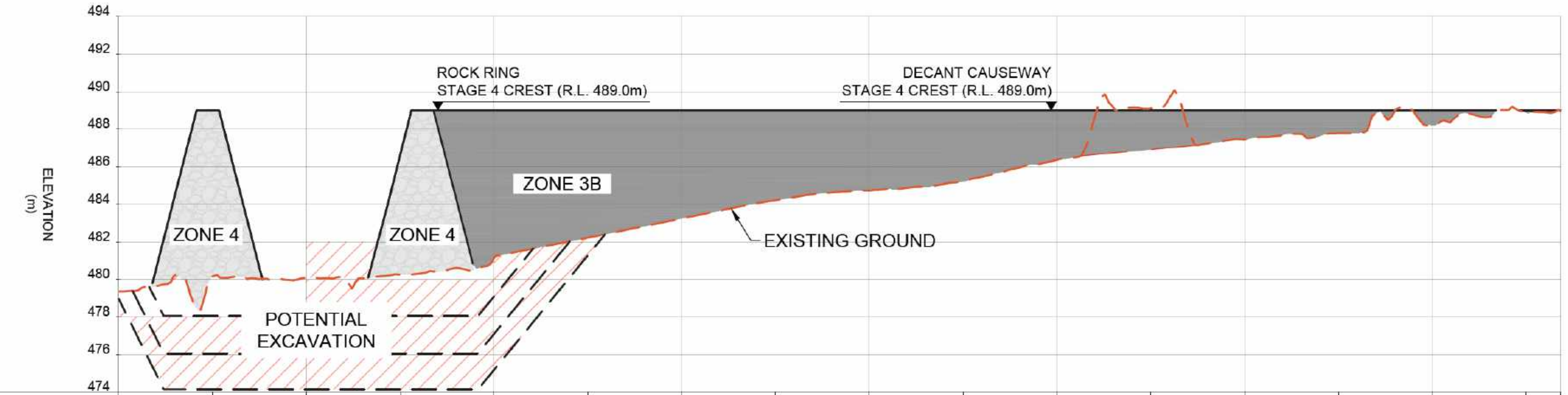
	BY	DATE	INIT.
DRAWN:	A.SANTANA	17.02.2025	
DESIGNED:	M.KHALID	17.02.2025	
CHECKED:	J.BLAKE	17.02.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE
BELLEVUE GOLD LIMITED
BELLEVUE GOLD PROJECT
IWLTSF - STAGE 4 NORTH & SOUTH
DECANT CAUSEWAY & ROCK RING DETAILS

SCALE: AS SHOWN (A1)

DRAWING No. P19-11-29-019 REV C

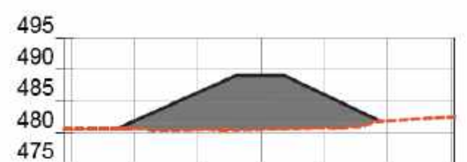
A1 Border v2.0



EXISTING SURFACE (R.L. m)	479.356	480.155	480.077	480.254	481.128	482.222	483.244	484.222	484.738	485.214	486.372	489.119	487.447	487.788	488.226	488.892	489.000
DESIGN SURFACE (R.L. m)		489.000		486.609	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000	489.000	
-CUT/+FILL (m)		8.845		6.355	7.872	6.778	5.756	4.778	4.262	3.786	2.628	-0.119	1.553	1.212	0.774	0.108	
CHAINAGE (m)	0.000	25.000	50.000	75.000	100.000	125.000	150.000	175.000	200.000	225.000	250.000	275.000	300.000	325.000	350.000	375.000	384.086

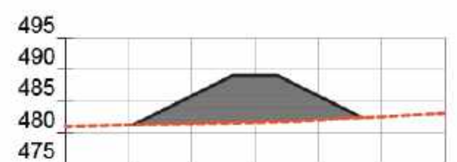
A 019 LONGITUDINAL SECTION - ROCK RING AND DECANT CAUSEAWAY

SCALE 1 : 500



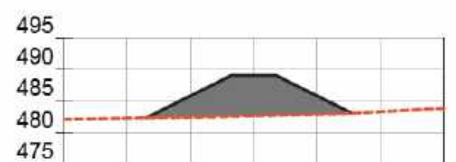
EXISTING SURFACE (R.L. m)	480.5	480.6	480.4	480.4	480.7	481.8	482.4
DESIGN SURFACE (R.L. m)		481.8	486.3	489.0	486.0		
CUT-/FILL+ (m)		1.23	5.87	8.6	5.22		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

CH 0.0m



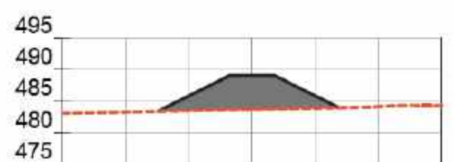
EXISTING SURFACE (R.L. m)	481.0	481.2	481.4	481.6	481.9	482.5	483.0
DESIGN SURFACE (R.L. m)			485.7	489.0	485.7		
CUT-/FILL+ (m)			4.37	7.4	3.83		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

CH 25.0m



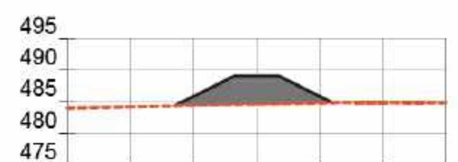
EXISTING SURFACE (R.L. m)	482.0	482.2	482.4	482.6	482.8	483.3	483.8
DESIGN SURFACE (R.L. m)			485.7	489.0	485.7		
CUT-/FILL+ (m)			3.35	6.4	2.93		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

CH 50.0m



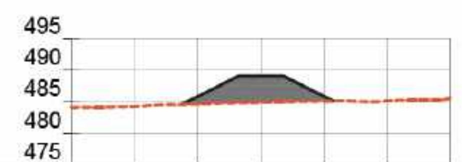
EXISTING SURFACE (R.L. m)	483.0	483.2	483.4	483.6	483.8	484.1	484.3
DESIGN SURFACE (R.L. m)			485.7	489.0	485.7		
CUT-/FILL+ (m)			2.32	5.4	1.92		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

CH 75.0m



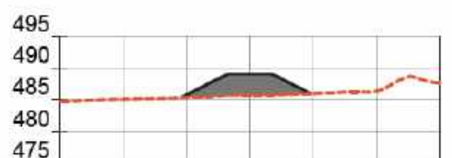
EXISTING SURFACE (R.L. m)	483.9	484.1	484.3	484.5	484.7	484.8	484.7
DESIGN SURFACE (R.L. m)			485.7	489.0	485.7		
CUT-/FILL+ (m)			1.43	4.5	1.03		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

CH 100.0m



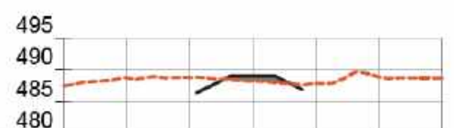
EXISTING SURFACE (R.L. m)	484.0	484.2	484.6	484.9	485.0	485.1	485.6
DESIGN SURFACE (R.L. m)			485.7	489.0	485.7		
CUT-/FILL+ (m)			1.17	4.1	0.76		
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

CH 125.0m



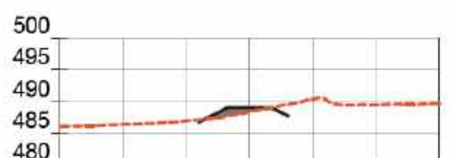
EXISTING SURFACE (R.L. m)	484.7	485.0	485.4	485.7	486.0	486.4	487.7
DESIGN SURFACE (R.L. m)			485.7	489.0			
CUT-/FILL+ (m)			0.38	3.3			
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

CH 150.0m



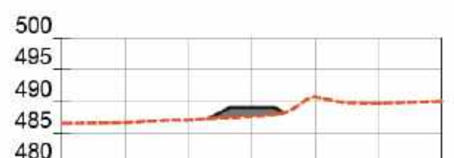
EXISTING SURFACE (R.L. m)	487.4	488.7	488.8	488.2	487.8	488.9	488.7
DESIGN SURFACE (R.L. m)				489.0			
CUT-/FILL+ (m)				0.8			
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

CH 175.0m



EXISTING SURFACE (R.L. m)	486.0	486.4	486.9	488.4	490.3	489.4	489.6
DESIGN SURFACE (R.L. m)				489.0			
CUT-/FILL+ (m)				0.6			
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

CH 200.0m

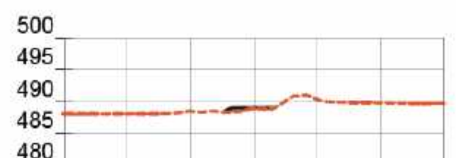


EXISTING SURFACE (R.L. m)	486.5	486.7	487.1	487.7	490.8	489.8	490.0
DESIGN SURFACE (R.L. m)				489.0			
CUT-/FILL+ (m)				1.3			
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

CH 225.0m

EXISTING SURFACE (R.L. m)	487.2	487.3	487.5	488.8	490.4	489.8	489.7
DESIGN SURFACE (R.L. m)				489.0			
CUT-/FILL+ (m)				0.2			
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

CH 250.0m



EXISTING SURFACE (R.L. m)	488.0	488.1	488.5	488.9	490.3	489.8	489.7
DESIGN SURFACE (R.L. m)				489.0			
CUT-/FILL+ (m)				0.1			
CENTRE OFFSET (m)	30	20	10	0	-10	-20	-30

CH 275.0m

0 4 10 20

SCALE 1 : 500 (m)

0 10 25 50

SCALE 1 : 1,000 (m)

LEGEND:

ZONE 3A: TRAFFIC COMPACTED MINE WASTE (500mm LIFTS)

ZONE 3B: TRAFFIC COMPACTED MINE WASTE (1,000mm LIFTS)

ZONE 4: CLEAN COMPETENT ROCKFILL 100% PASSING 300mm, <20% PASSING 2.36mm

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
C	21.03.2025	ISSUED FOR CONSTRUCTION	AZ	MK	JB				
B	14.03.2025	ISSUED FOR CLIENT REVIEW	AZ	MK	JB				
A	12.12.2024	ISSUED FOR CLIENT REVIEW	AS	MK	JB			P19-11-29-019	DECANT CAUSEWAY & ROCK RING DETAILS

CLIENT

BELLEVUE GOLD

	BY	DATE	INIT.
DRAWN:	A.SANTANA	29.11.2024	
DESIGNED:	M.KHALID	29.11.2024	
CHECKED:	J.BLAKE	06.12.2024	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE

BELLEVUE GOLD LIMITED
BELLEVUE GOLD PROJECT
IWLTSF - STAGE 4 NORTH & SOUTH
DECANT CAUSEWAY & ROCK RING SECTIONS

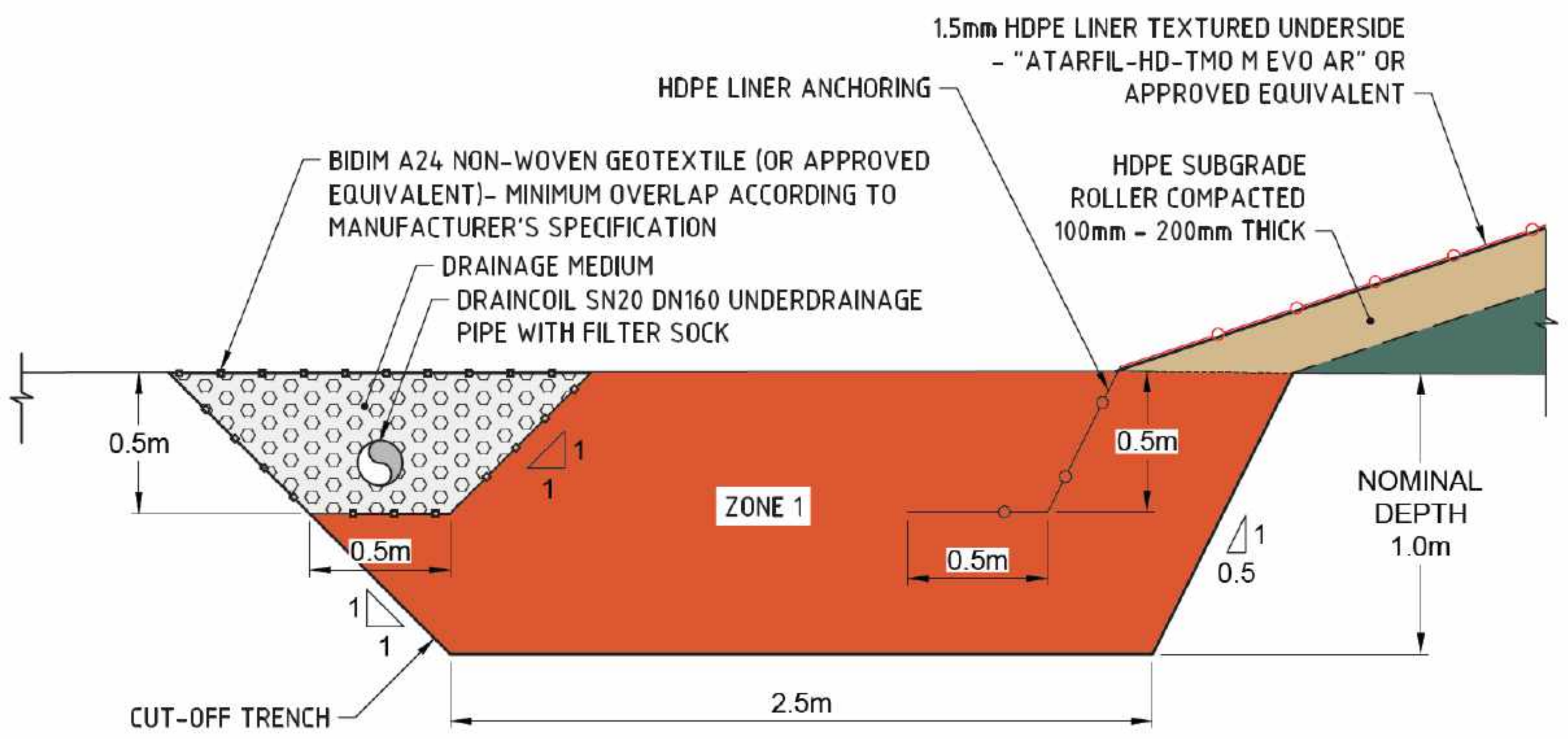
SCALE: **AS SHOWN** (A1)

DRAWING No. **P19-11-29-020** REV **C**

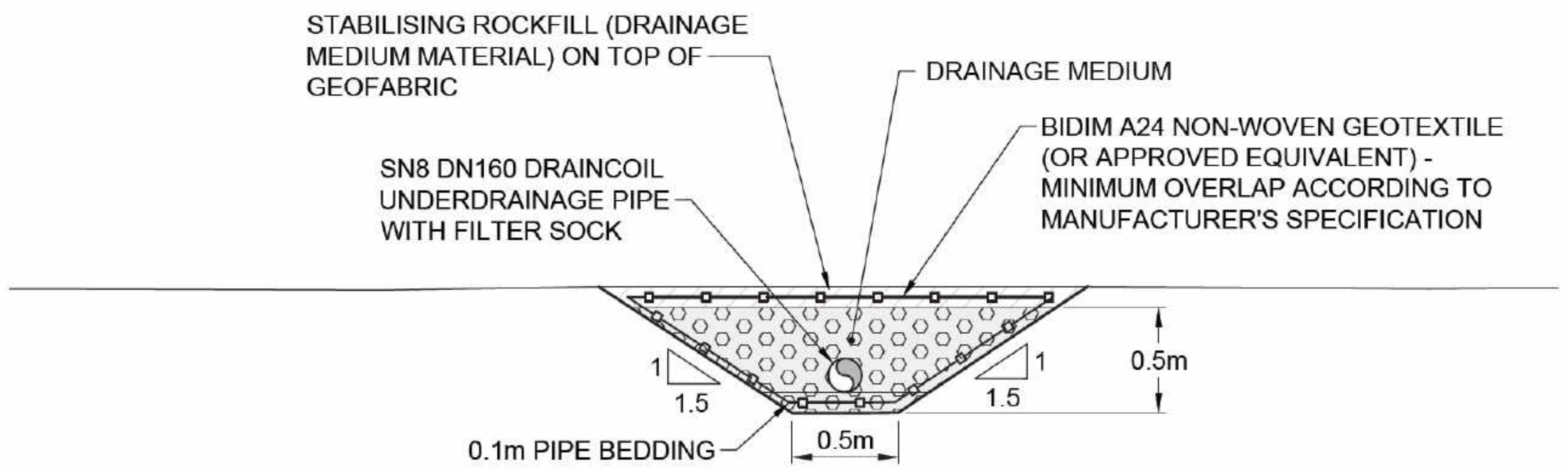
A1 Border v2.0

NOTES:

1. REFER TO DRAWING P19-11-29-001 FOR GENERAL NOTES.



2 / 005 — 4 / 013 CUT-OFF TRENCH & TOE DRAIN DETAIL
1:20



D / 003 — D / 004 FINGER DRAIN SECTION
1:50

0 0.4 1.0 2.0
SCALE 1 : 50 (m)

0 0.2 0.5 1.0
SCALE 1 : 20 (m)

LEGEND:

HDPE SUBGRADE:	ROLLER COMPACTED HDPE SUBGRADE (300mm LIFTS)
ZONE 1:	PLATE COMPACTED 'LOW PERMEABILITY' (300mm LIFTS)
ZONE 3C :	TRAFFIC COMPACTED TRANSITIONAL MATERIAL (300mm LIFTS)
ZONE 3A:	TRAFFIC COMPACTED MINE WASTE (500mm LIFTS)
ZONE 3B:	TRAFFIC COMPACTED MINE WASTE (1,000mm LIFTS)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
C	21.03.2025	ISSUED FOR CONSTRUCTION	AZ	MK	JB			P19-11-29-013	EMBANKMENT SECTIONS & DETAILS - SHT 2
B	19.03.2025	ISSUED FOR CLIENT REVIEW	AZ	MK	JB			P19-11-29-004	GENERAL ARRANGEMENT - SOUTH
A	14.03.2025	ISSUED FOR CLIENT REVIEW	AZ	MK	JB			P19-11-29-003	GENERAL ARRANGEMENT - NORTH

CLIENT: BELLEVUE GOLD

	BY	DATE	INIT.
DRAWN:	A.SANTANA	12.02.2025	
DESIGNED:	M.KHALID	12.02.2025	
CHECKED:	J.BLAKE	14.03.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE
BELLEVUE GOLD LIMITED
BELLEVUE GOLD PROJECT
IWLTSF - STAGE 4 NORTH & SOUTH
TYPICAL DETAILS

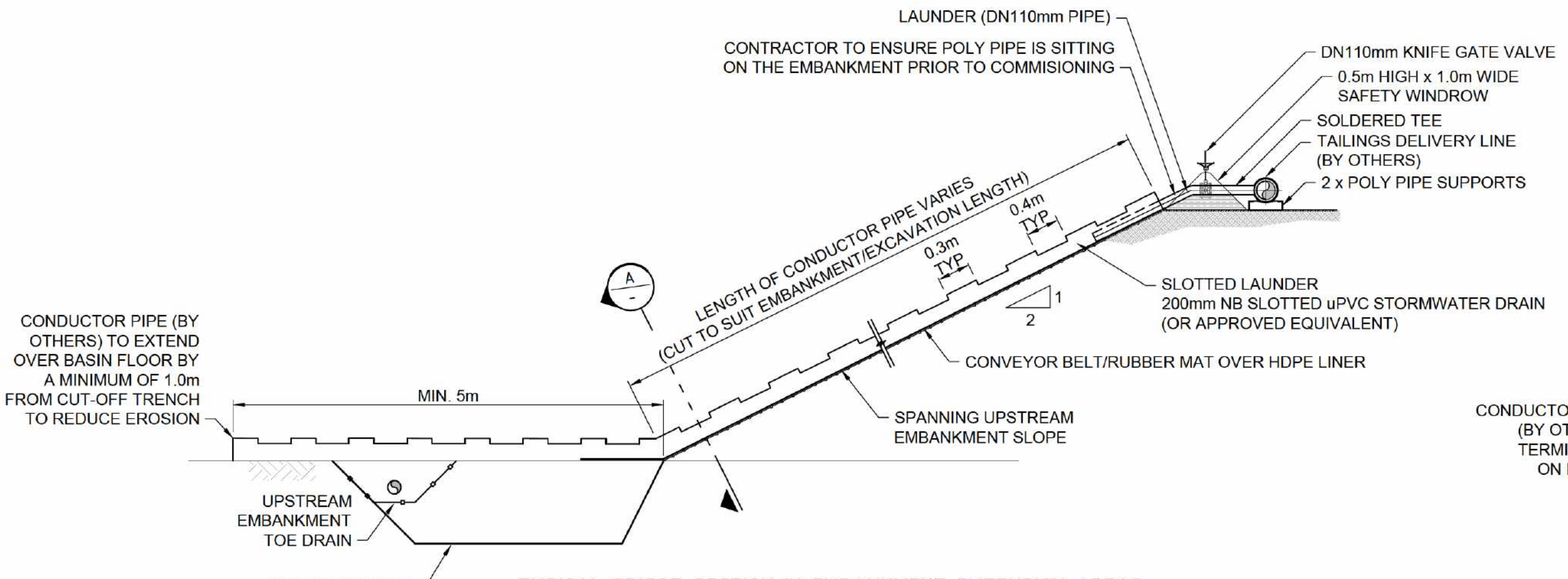
SCALE: AS SHOWN (A1)

DRAWING No.: **P19-11-29-021** REV: **C**

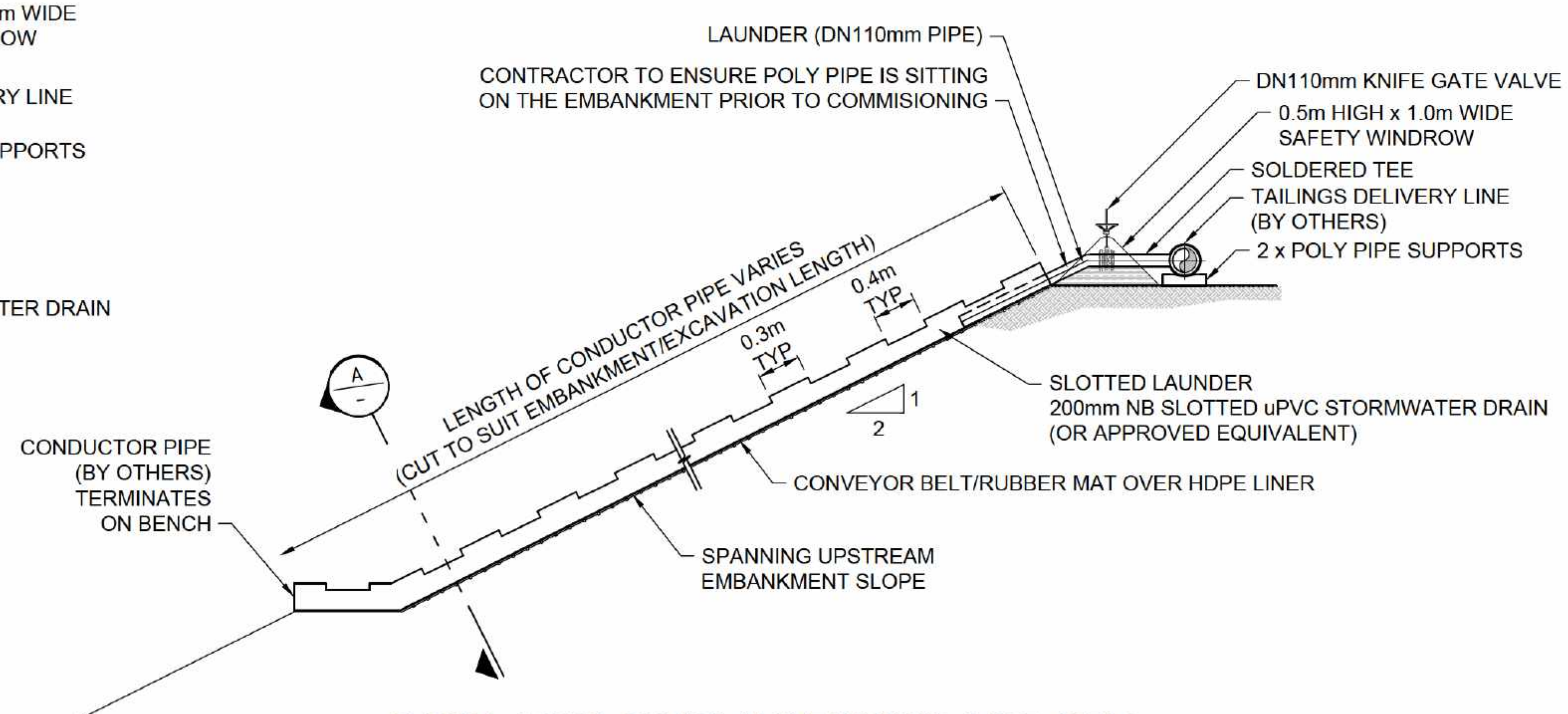
A1 Border v2.0

NOTES:

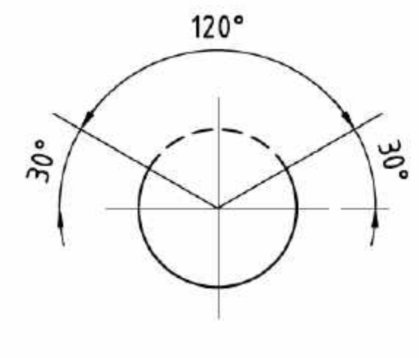
1. REFER TO DRAWING P19-11-29-001 FOR GENERAL NOTES.



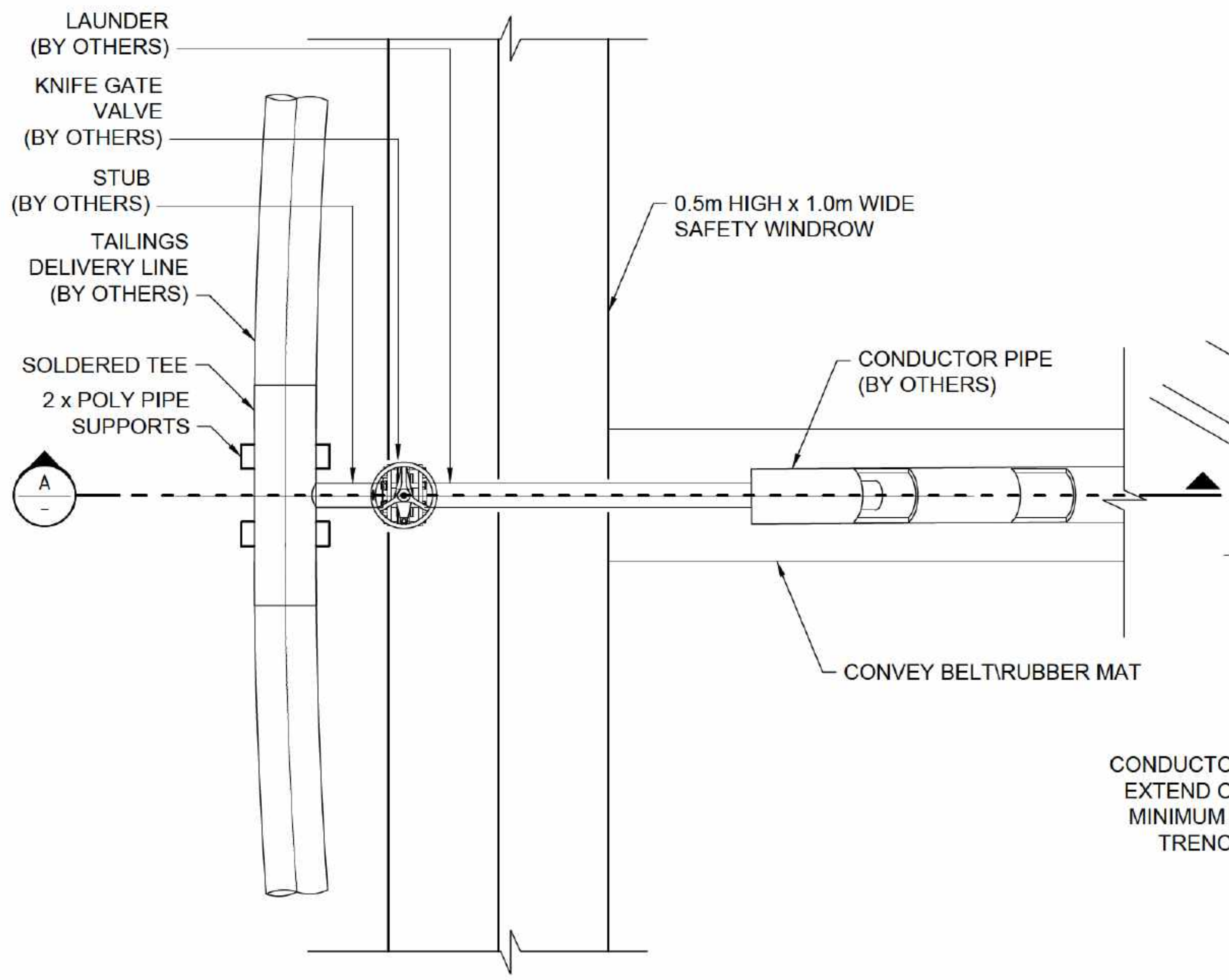
TYPICAL SPIGOT SECTION IN EMBANKMENT EXTENSION AREAS
N.T.S.



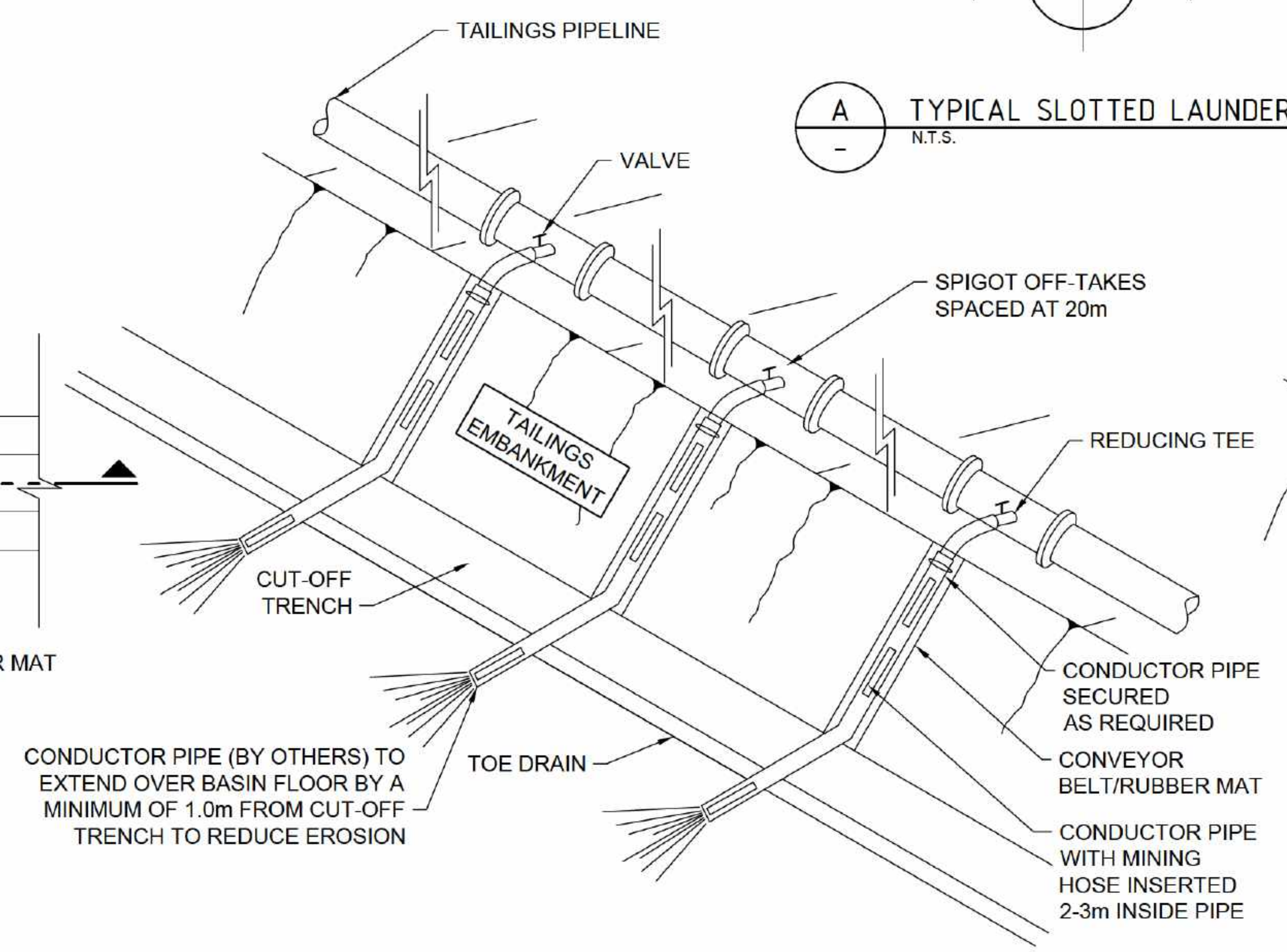
TYPICAL SPIGOT SECTION IN EMBANKMENT RAISE AREAS
N.T.S.



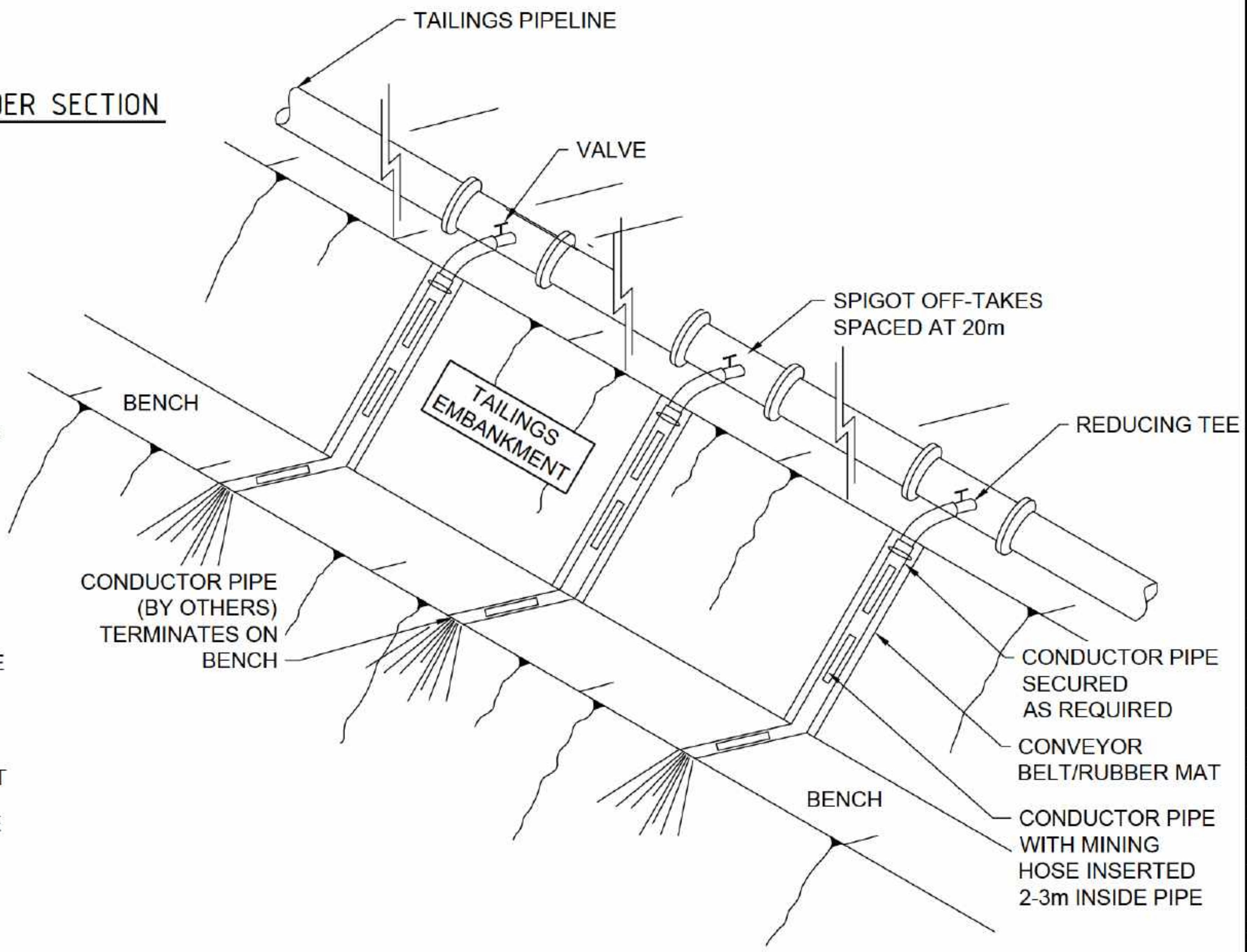
A TYPICAL SLOTTED LAUNDER SECTION
N.T.S.



SPIGOT ARRANGEMENT PLAN
N.T.S.



TYPICAL SPIGOT ARRANGEMENT IN EMBANKMENT EXTENSION AREAS ISOMETERIC
N.T.S.



TYPICAL SPIGOT ARRANGEMENT IN EMBANKMENT EXTENSION AREAS ISOMETERIC
N.T.S.

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT
C	21.03.2025	ISSUED FOR CONSTRUCTION	AZ	MK	JB		
B	19.03.2025	ISSUED FOR CLIENT REVIEW	AZ	MK	JB		
A	12.12.2024	ISSUED FOR CLIENT REVIEW	AS	MK	JB		

DRG. NO.	REFERENCE DRAWING

CLIENT: BELLEVUE GOLD

	BY	DATE	INIT.
DRAWN:	A.SANTANA	29.11.2024	
DESIGNED:	M.KHALID	29.11.2024	
CHECKED:	J.BLAKE	06.12.2024	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE
BELLEVUE GOLD LIMITED
BELLEVUE GOLD PROJECT
IWLTSF - STAGE 4 NORTH & SOUTH
SPIGOT PIPEWORK SECTIONS & DETAILS

SCALE: AS SHOWN (A1)

DRAWING No.: P19-11-29-025 REV: C

A1 Border v2.0

Appendix B

Geotechnical Field Investigation Test Pit Logs and Photographs

TEST PIT LOG

Job No:	P19-11-PR03	Date Started:	03-12-20
Test Pit ID:	TSF-TP01	Date Finished:	03-12-20
Contractor:	Earth Australia Contracting	Bucket Width:	1.5 m Tiger Toothed
Machine:	Kobelco SK350 LC 35-tonne Excavator	Easting:	51J 258831
Logged By:	JB	Northing:	6942891

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Depths (From)	Depths (To)	Main material	Material Description	Comments	DCP Depth (mm)	DCP Blows/100m	Laboratory Samples
0	0.1		Silty SAND, fine - medium grained, sub angular - sub rounded, red brown, dry	With some fine - medium roots and rootlets. Basalt and quartz gravel / cobbles at surface	100	5	
					200	9/70 mm HB Ref	
					300		
					400		
					500		
0.1	0.5		CALCRETE, MS- S, DW, cream, friable, becoming interbedded with basalt cobbles and boulders from 0.5 m		600		
					700		
					800		
					900		
					1000		
0.5	3.3		BASALT, VS, SW, grey, blocky, cobble and gravel (fine - coarse) sized, within a silty sand (fine - medium) cream matrix, mixed with calcrete at top of layer	Refusal at 1.0 m with bucket	1100		
					1200		
					1300		
					1400		
		1.0 m Refusal with bucket. Terminated with Ripper at 3.3 m			1500		
					1600		
					1700		
					1800		
					1900		
					2000		
					2100		
					2200		
					2300		
					2400		
					2500		
					2600		
					2700		
					2800		
					2900		
					3000		

NOTES AND COMMENTS

Many small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m and few small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m.

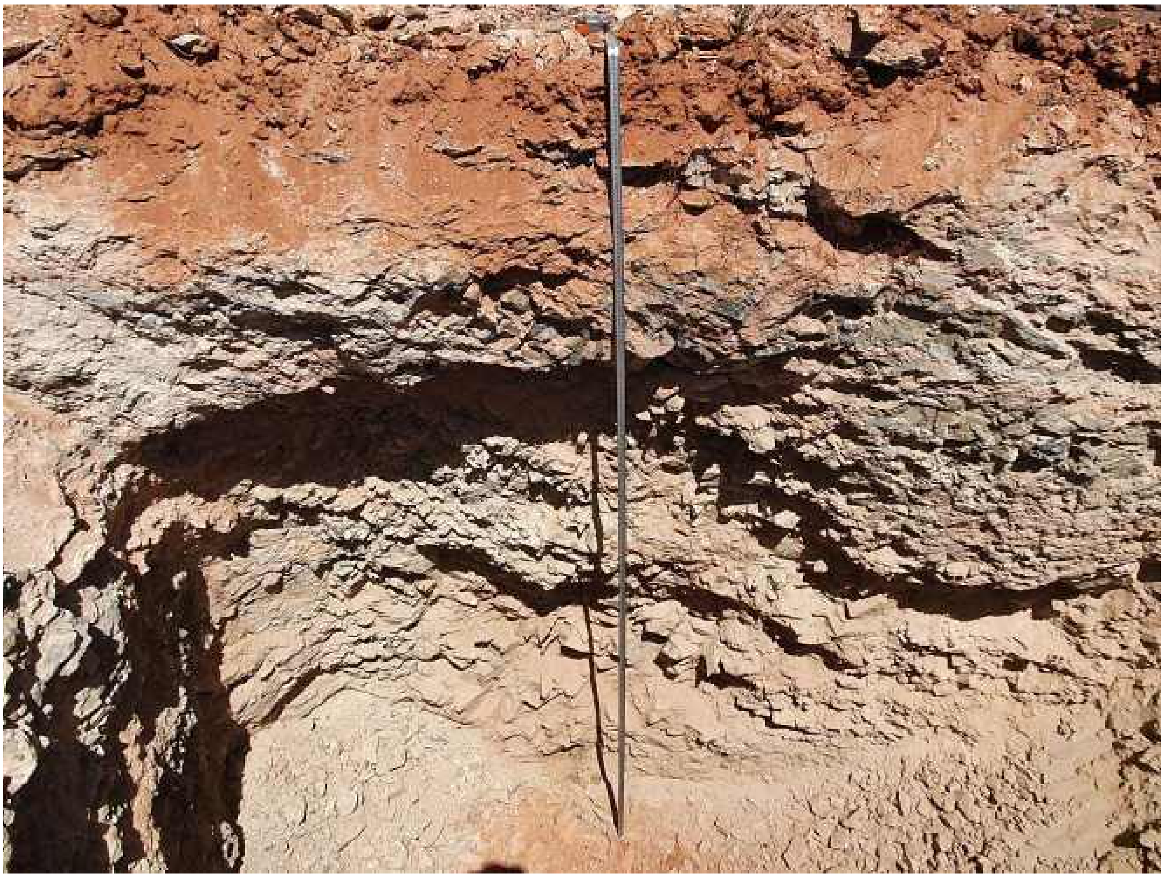
Groundwater recorded at ____________ m on the ____/____/________.

Co-ordinate System:__________________________, Zone: ________________________.

Origin	Soil Name	Group	Consistency	Plasticity/Grain size	Colour	With/Trace	Moisture
TOPSOIL	Primary	Pt	Fine Grain:	Fine grain:	red	clay	dry
CONCRETE	PEAT	OH	very soft	non-plastic	orange	silt	dry to moist
BITUMEN	CLAY	OL	soft	low plasticity	yellow	sand	moist
FILL	SILT	CH	firm	low - medium	brown	gravel	wet
BASSENDEAN SAND	SAND	CL	stiff	medium plasticity	purple	cobbles	moist to wet
SAND FROM TAMALA LST	GRAVEL	MH	very stiff	medium to high	green	OM	saturated
TAMALA LST	COBBLES	ML	hard	high plasticity	white	BR	
GUILDFORD FORMATION	BOULDERS	SW	Coarse Grain:	Coarse Grain:	cream	Fines:	
ALLUVIUM	Secondary:	SP	very loose	Fine	grey	<=15% "Trace"	
COLLUVIUM	clayey	SC	loose	Medium	black	15-30% "With"	
AEOLIAN	silty	SM	medium dense	Coarse Grain:	blue	>30% "Secondary"	
SWAMP DEPOSIT	sandy	GW	dense	Additional:	Additional:	Coarse:	
LATERITE	gravelly	GP	very dense	Unifor, gap graded, poorly graded. Rounded, sub rounded, sub angular, angular, flaky, platy	Can be modified using pale, dark and motled	<=5% "Trace"	
	cobbly	GC				5-12% "With"	
	bouldery	GM				>12% "Secondary"	

TSF – TP01

TSF – TP01



TEST PIT LOG

Job No:	P19-11-PR03	Date Started:	03-12-20
Test Pit ID:	TSF-TP02	Date Finished:	03-12-20
Contractor:	Earth Australia Contracting	Bucket Width:	1.5 m Tiger Toothed
Machine:	Kobelco SK350 LC 35-tonne Excavator	Easting:	51J 259006
Logged By:	JB	Northing:	6942910

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Depths (From)	Depths (To)	Main material	Material Description	Comments	DCP Depth (mm)	DCP Blows/100m	Laboratory Samples
0	0.05		Silty SAND, fine - medium grained, sub angular - sub rounded, red brown, dry	With some fine - medium roots and rootlets.	100	4 / 40 mm HB Ref	
					200		
					300		
					400		
					500		
0.05	1.3		CALCRETE, MS- S, DW, cream, friable, becoming more of a soil and weathered with depth, DW-RS, VW - MS, Sandy (fine - medium), silty GRAVEL, fine - coarse grained, sub angular, cream with calcrete nodules, gravel and cobbles	Variable depth of layer on either side of pit	600		
					700		
					800		
					900		
					1000		
1.3	4.0		Sandy (fine - coarse) GRAVEL with clay (medium plasticity) and silt, fine - coarse grained, sub angular - sub rounded, red brown, moist. Interbedded with weathered basalt cobbles, boulders and gravel (fine - coarse grained), DW, S - VS, purple grey red brown cream,		1100		
					1200		
					1300		
					1400		
		Terminated			1500		
					1600		
					1700		
					1800		
					1900		
					2000		
					2100		
					2200		
					2300		
					2400		
					2500		
					2600		
					2700		
					2800		
					2900		
					3000		

NOTES AND COMMENTS

Many small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m and few small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m.

Groundwater recorded at ____________ m on the ____/____/________.

Co-ordinate System:__________________________, Zone: ____________________.

Origin	Soil Name	Group	Consistency	Plasticity/Grain size	Colour	With/Trace	Moisture
TOPSOIL	Primary	Pt	Fine Grain:	Fine grain:	red	clay	dry
CONCRETE	PEAT	OH	very soft	non-plastic	orange	silt	dry to moist
BITUMEN	CLAY	OL	soft	low plasticity	yellow	sand	moist
FILL	SILT	CH	firm	low - medium	brown	gravel	wet
BASSENDEAN SAND	SAND	CL	stiff	medium plasticity	purple	cobbles	moist to wet
SAND FROM TAMALA LST	GRAVEL	MH	very stiff	medium to high	green	OM	saturated
TAMALA LST	COBBLES	ML	hard	high plasticity	white	BR	
GUILDFORD FORMATION	BOULDERS	SW	Coarse Grain:	Coarse Grain:	cream	Fines:	
ALLUVIUM	Scondary:	SP	very loose	Fine	grey	<=15% "Trace"	
COLLUVIUM	clayey	SC	loose	Medium	black	15-30% "With"	
AEOLIAN	silty	SM	medium dense	Coarse Grain:	blue	>30% "Secondary"	
SWAMP DEPOSIT	sandy	GW	dense	Additional:	Additional:	Coarse:	
LATERITE	gravelly	GP	very dense	Unifor, gap graded, poorly graded. Rounded, sub rounded, sub angular, angular, flaky, platy	Can be modified using pale, dark and motled	<=5% "Trace"	
	cobbly	GC				5-12% "With"	
	bouldery	GM				>12% "Secondary"	

TSF – TP02

TSF – TP02

TEST PIT LOG

Job No:	P19-11-PR03	Date Started:	03-12-20
Test Pit ID:	TSF-TP03	Date Finished:	03-12-20
Contractor:	Earth Australia Contracting	Bucket Width:	1.5 m Tiger Toothed
Machine:	Kobelco SK350 LC 35-tonne Excavator	Easting:	51J 259184
Logged By:	JB	Northing:	6942911

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Depths (From)	Depths (To)	Main material	Material Description	Comments	DCP Depth (mm)	DCP Blows/100m	Laboratory Samples
0	0.1		Silty SAND, fine - medium grained, sub angular - sub rounded, medium dense, with some fine - coarse gravel and cobbles, red brown, dry	With some fine - medium roots and rootlets.	100	7	
					200	10	
					300	4 / 10 mm HB Ref	
					400		
					500		
0.1	1.0		CALCRETE, MS, SW, cream, friable	Excavated as rock / massive slabs	600		
					700		
					800		
					900		
					1000		
1.0	1.8		CALCRETE, DW-RS, VW-MS, weathered calcrete soil as Sandy (fine - medium), silty GRAVEL, fine - coarse grained, sub angular, cream - cream red brown, dry - moist, with calcrete nodules, gravel, cobbles and boulders		1100		
					1200		
					1300		
					1400		
					1500		
1.8	4.2		Sandy (fine - coarse) GRAVEL with clay (medium plasticity), fine - coarse grained, sub angular - sub rounded, red brown, moist. Interbedded with weathered BASALT, S-VS, DW, as cobbles, boulders and gravel (fine - coarse), purple grey red brown cream, somewhat friable		1600		
					1700		
					1800		
					1900		
		Terminated			2000		
					2100		
					2200		
					2300		
					2400		
					2500		
					2600		
					2700		
					2800		
					2900		
					3000		

NOTES AND COMMENTS

Many small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m and few small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m.

Groundwater recorded at ____________ m on the ____/____/____.

Co-ordinate System: ____________________________, Zone: ____________________.

Origin	Soil Name	Group	Consistency	Plasticity/Grain size	Colour	With/Trace	Moisture
TOPSOIL	Primary	Pt	Fine Grain:	Fine grain:	red	clay	dry
CONCRETE	PEAT	OH	very soft	non-plastic	orange	silt	dry to moist
BITUMEN	CLAY	OL	soft	low plasticity	yellow	sand	moist
FILL	SILT	CH	firm	low - medium	brown	gravel	wet
BASSENDEAN SAND	SAND	CL	stiff	medium plasticity	purple	cobbles	moist to wet
SAND FROM TAMALA LST	GRAVEL	MH	very stiff	medium to high	green	OM	saturated
TAMALA LST	COBBLES	ML	hard	high plasticity	white	BR	
GUILDFORD FORMATION	BOULDERS	SW	Coarse Grain:	Coarse Grain:	cream	Fines:	
ALLUVIUM	Secondary:	SP	very loose	Fine	grey	<=15% "Trace"	
COLLUVIUM	clayey	SC	loose	Medium	black	15-30% "With"	
AEOLIAN	silty	SM	medium dense	Coarse Grain:	blue	>30% "Secondary"	
SWAMP DEPOSIT	sandy	GW	dense	Additional:	Additional:	Coarse:	
LATERITE	gravelly	GP	very dense	Unifor, gap graded, poorly graded. Rounded, sub rounded, sub angular, angular, flaky, platy	Can be modified using pale, dark and motled	<=5% "Trace"	
	cobbly	GC				5-12% "With"	
	bouldery	GM				>12% "Secondary"	

TSF – TP03

TSF – TP03

TEST PIT LOG

Job No:	P19-11-PR03	Date Started:	02-12-20
Test Pit ID:	TSF-TP04	Date Finished:	02-12-20
Contractor:	Earth Australia Contracting	Bucket Width:	1.5 m Tiger Toothed
Machine:	Kobelco SK350 LC 35-tonne Excavator	Easting:	51J 259353
Logged By:	JB	Northing:	6942900

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Depths (From)	Depths (To)	Main material	Material Description	Comments	DCP Depth (mm)	DCP Blows/100m	Laboratory Samples
0	0.1		Silty SAND, fine - medium grained, sub angular - sub rounded, medium dense, red brown, dry	With trace fine - medium roots and rootlets. Basalt cobbles and quartz at surface	100	7	
					200	11 / 50 mm HB Ref	
					300		
					400		
					500		
0.1	0.2		CALCRETE, MS, DW, cream, friable, fractured		600		
					700		
					800		
					900		
					1000		
0.2	0.8		CALCRETE, MS, DW, cream, friable, solid, massive		1100		
					1200		
					1300		
					1400		
		Refusal			1500		
					1600		
					1700		
					1800		
					1900		
					2000		
					2100		
					2200		
					2300		
					2400		
					2500		
					2600		
					2700		
					2800		
					2900		
					3000		

NOTES AND COMMENTS

Many small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m and few small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m.

Groundwater recorded at ____________ m on the ____ / ____ / ____.

Co-ordinate System: ________________________, Zone: ________________________.

Origin	Soil Name	Group	Consistency	Plasticity/Grain size	Colour	With/Trace	Moisture
TOPSOIL	Primary	Pt	Fine Grain:	Fine grain:	red	clay	dry
CONCRETE	PEAT	OH	very soft	non-plastic	orange	silt	dry to moist
BITUMEN	CLAY	OL	soft	low plasticity	yellow	sand	moist
FILL	SILT	CH	firm	low - medium	brown	gravel	wet
BASSENDEAN SAND	SAND	CL	stiff	medium plasticity	purple	cobbles	moist to wet
SAND FROM TAMALA LST	GRAVEL	MH	very stiff	medium to high	green	OM	saturated
TAMALA LST	COBBLES	ML	hard	high plasticity	white	BR	
GUILDFORD FORMATION	BOULDERS	SW	Coarse Grain:	Coarse Grain:	cream	Fines:	
ALLUVIUM	Scondary:	SP	very loose	Fine	grey	<=15% "Trace"	
COLLUVIUM	clayey	SC	loose	Medium	black	15-30% "With"	
AEOLIAN	silty	SM	medium dense	Coarse Grain:	blue	>30% "Secondary"	
SWAMP DEPOSIT	sandy	GW	dense	Additional:	Additional:	Coarse:	
LATERITE	gravelly	GP	very dense	Unifor, gap graded, poorly graded. Rounded, sub rounded, sub angular, angular, flaky, platy	Can be modified using pale, dark and motled	<=5% "Trace"	
	cobbly	GC				5-12% "With"	
	bouldery	GM				>12% "Secondary"	

TSF – TP04

TSF – TP04

TEST PIT LOG

Job No:	P19-11-PR03	Date Started:	04-12-20
Test Pit ID:	TSF-TP05	Date Finished:	04-12-20
Contractor:	Earth Australia Contracting	Bucket Width:	1.5 m Tiger Toothed
Machine:	Kobelco SK350 LC 35-tonne Excavator	Easting:	51J 259618
Logged By:	JB	Northing:	6942876

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Depths (From)	Depths (To)	Main material	Material Description	Comments
0	0.15		Silty SAND, fine - medium grained, sub angular - sub rounded, medium dense, with some fine - coarse gravel, red brown, dry	With some fine - medium roots and rootlets. Quartz and basalt gravel and cobbles at surface
0.15	1.7		CALCRETE, MS, SW, cream, friable. Becoming more weathered, cream mottled red brown yellow with depth, friable, W, DW	
1.7	5.0		Clayey SAND, fine - medium grained, sub angular - sub rounded, medium dense, red brown yellow, moist, with gravel (fine - coarse) and cobbles in areas, red brown yellow with green veins	Stained white lense from 2.2 - 2.7 m. With some red brown gypsum crystals throughout
5	5.2		Cemented soil as rock, red brown yellow cream purple, MS, DW.	
		Terminated		

DCP Depth (mm)	DCP Blows/100m	Laboratory Samples
100	8	
200	20 / 70 mm Ref	
300		
400		
500		
600		
700		
800		
900		
1000		
1100		
1200		
1300		
1400		
1500		
1600		
1700		
1800		
1900		
2000		
2100		
2200		
2300		
2400		
2500		
2600		
2700		
2800		
2900		
3000		

NOTES AND COMMENTS

Many small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m and few small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m.

Groundwater recorded at ____________ m on the ____/____/________.

Co-ordinate System: ____________________________, Zone: ____________________.

Origin	Soil Name	Group	Consistency	Plasticity/Grain size	Colour	With/Trace	Moisture
TOPSOIL	Primary	Pt	Fine Grain:	Fine grain:	red	clay	dry
CONCRETE	PEAT	OH	very soft	non-plastic	orange	silt	dry to moist
BITUMEN	CLAY	OL	soft	low plasticity	yellow	sand	moist
FILL	SILT	CH	firm	low - medium	brown	gravel	wet
BASSENDEAN SAND	SAND	CL	stiff	medium plasticity	purple	cobbles	moist to wet
SAND FROM TAMALA LST	GRAVEL	MH	very stiff	medium to high	green	OM	saturated
TAMALA LST	COBBLES	ML	hard	high plasticity	white	BR	
GUILDFORD FORMATION	BOULDERS	SW	Coarse Grain:	Coarse Grain:	cream	Fines:	
ALLUVIUM	Secondary:	SP	very loose	Fine	grey	<=15% "Trace"	
COLLUVIUM	clayey	SC	loose	Medium	black	15-30% "With"	
AEOLIAN	silty	SM	medium dense	Coarse Grain:	blue	>30% "Secondary"	
SWAMP DEPOSIT	sandy	GW	dense	Additional:	Additional:	Coarse:	
LATERITE	gravelly	GP	very dense	Unifor, gap graded, poorly graded. Rounded, sub rounded, sub angular, angular, flaky, platy	Can be modified using pale, dark and motled	<=5% "Trace"	
	cobbly	GC				5-12% "With"	
	bouldery	GM				>12% "Secondary"	

TSF – TP05

TSF – TP05

TEST PIT LOG

Job No:	P19-11-PR03	Date Started:	04-12-20
Test Pit ID:	TSF-TP06	Date Finished:	04-12-20
Contractor:	Earth Australia Contracting	Bucket Width:	1.5 m Tiger Toothed
Machine:	Kobelco SK350 LC 35-tonne Excavator	Easting:	51J 259686
Logged By:	JB	Northing:	6942773

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Depths (From)	Depths (To)	Main material	Material Description	Comments	DCP Depth (mm)	DCP Blows/100m	Laboratory Samples
0	0.1		Silty SAND, fine - medium grained, sub angular - sub rounded, medium dense, with gravel (fine -coarse, sub angular - sub rounded), red brown, dry		100	Refusal	
					200		
					300		
					400		
					500		
0.1	0.35		HARDPAN, S, SW, red brown speckled grey, highly cemented gravel soil		600		
					700		
					800		
					900		
		Refusal			1000		
					1100		
					1200		
					1300		
					1400		
					1500		
					1600		
					1700		
					1800		
					1900		
					2000		
					2100		
					2200		
					2300		
					2400		
					2500		
					2600		
					2700		
					2800		
					2900		
					3000		

NOTES AND COMMENTS

Many small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m and few small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m.

Groundwater recorded at ____________ m on the _____/_____/_______.

Co-ordinate System:__________________________, Zone: __________________________.

Origin	Soil Name	Group	Consistency	Plasticity/Grain size	Colour	With/Trace	Moisture
TOPSOIL	Primary	Pt	Fine Grain:	Fine grain:	red	clay	dry
CONCRETE	PEAT	OH	very soft	non-plastic	orange	silt	dry to moist
BITUMEN	CLAY	OL	soft	low plasticity	yellow	sand	moist
FILL	SILT	CH	firm	low - medium	brown	gravel	wet
BASSENDEAN SAND	SAND	CL	stiff	medium plasticity	purple	cobbles	moist to wet
SAND FROM TAMALA LST	GRAVEL	MH	very stiff	medium to high	green	OM	saturated
TAMALA LST	COBBLES	ML	hard	high plasticity	white	BR	
GUILDFORD FORMATION	BOULDERS	SW	Coarse Grain:	Coarse Grain:	cream	Fines:	
ALLUVIUM	Secondary:	SP	very loose	Fine	grey	<=15% "Trace"	
COLLUVIUM	clayey	SC	loose	Medium	black	15-30% "With"	
AEOLIAN	silty	SM	medium dense	Coarse Grain:	blue	>30% "Secondary"	
SWAMP DEPOSIT	sandy	GW	dense	Additional:	Additional:	Coarse:	
LATERITE	gravelly	GP	very dense	Unifor, gap graded, poorly graded. Rounded, sub rounded, sub angular, angular, flaky, platy	Can be modified using pale, dark and motled	<=5% "Trace"	
	cobbly	GC				5-12% "With"	
	bouldery	GM				>12% "Secondary"	

TSF – TP06

TSF – TP06

TEST PIT LOG

Job No:	P19-11-PR03	Date Started:	02-12-20
Test Pit ID:	TSF-TP07	Date Finished:	02-12-20
Contractor:	Earth Australia Contracting	Bucket Width:	1.5 m Tiger Toothed
Machine:	Kobelco SK350 LC 35-tonne Excavator	Easting:	51J 259430
Logged By:	JB	Northing:	6942719

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Depths (From)	Depths (To)	Main material	Material Description	Comments	DCP Depth (mm)	DCP Blows/100m	Laboratory Samples
0	0.2		Silty SAND, fine - medium grained, sub angular - sub rounded, loose, red brown, dry	With some fine, medium and large roots and rootlets	100	3	
					200	14	
					300	15 / 20 mm HB Ref	
					400		
					500		
0.2	1.0		BASALT, VS, SW - DW, grey stained yellow red brown in areas, massive, blocky, cobble and gravel (medium - coarse) sized, fractures present		600		
					700		
					800		
					900		
		Refusal			1000		
					1100		
					1200		
					1300		
					1400		
					1500		
					1600		
					1700		
					1800		
					1900		
					2000		
					2100		
					2200		
					2300		
					2400		
					2500		
					2600		
					2700		
					2800		
					2900		
					3000		

NOTES AND COMMENTS

Many small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m and few small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m.

Groundwater recorded at ____________ m on the ____/____/________.

Co-ordinate System: ________________________, Zone: ________________________.

Origin	Soil Name	Group	Consistency	Plasticity/Grain size	Colour	With/Trace	Moisture
TOPSOIL	Primary	Pt	Fine Grain:	Fine grain:	red	clay	dry
CONCRETE	PEAT	OH	very soft	non-plastic	orange	silt	dry to moist
BITUMEN	CLAY	OL	soft	low plasticity	yellow	sand	moist
FILL	SILT	CH	firm	low - medium	brown	gravel	wet
BASSENDEAN SAND	SAND	CL	stiff	medium plasticity	purple	cobbles	moist to wet
SAND FROM TAMALA LST	GRAVEL	MH	very stiff	medium to high	green	OM	saturated
TAMALA LST	COBBLES	ML	hard	high plasticity	white	BR	
GUILDFORD FORMATION	BOULDERS	SW	Coarse Grain:	Coarse Grain:	cream	Fines:	
ALLUVIUM	Scondary:	SP	very loose	Fine	grey	<=15% "Trace"	
COLLUVIUM	clayey	SC	loose	Medium	black	15-30% "With"	
AEOLIAN	silty	SM	medium dense	Coarse Grain:	blue	>30% "Secondary"	
SWAMP DEPOSIT	sandy	GW	dense	Additional:	Additional:	Coarse:	
LATERITE	gravelly	GP	very dense	Unifor, gap graded, poorly graded. Rounded, sub rounded, sub angular, angular, flaky, platy	Can be modified using pale, dark and motled	<=5% "Trace"	
	cobbly	GC				5-12% "With"	
	bouldery	GM				>12% "Secondary"	

TSF – TP07

TSF – TP07

TEST PIT LOG

Job No:	P19-11-PR03	Date Started:	03-12-20
Test Pit ID:	TSF-TP08	Date Finished:	03-12-20
Contractor:	Earth Australia Contracting	Bucket Width:	1.5 m Tiger Toothed
Machine:	Kobelco SK350 LC 35-tonne Excavator	Easting:	51J 259227
Logged By:	JB	Northing:	6942732

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Depths (From)	Depths (To)	Main material	Material Description	Comments	DCP Depth (mm)	DCP Blows/100m	Laboratory Samples
0	0.1		Silty SAND, fine - medium grained, sub angular - sub rounded, medium dense, red brown, dry	With some fine, medium and large roots and rootlets. Basalt cobbles and gravel at surface	100	4	
					200	3 / 0 mm HB Ref	
					300		
					400		
					500		
0.1	1.0		CALCRETE, MS, SW, cream, friable, mixed with some BASALT throughout layer (more so at base)		600		
					700		
					800		
					900		
					1000		
1.0	3.2		BASALT, VS, SW, grey, massive, cobble, boulder and gravel (medium - coarse) sized, fractures present. Interbedded with pale brown Silty SAND		1100		
					1200		
					1300		
					1400		
		Terminated			1500		
					1600		
					1700		
					1800		
					1900		
					2000		
					2100		
					2200		
					2300		
					2400		
					2500		
					2600		
					2700		
					2800		
					2900		
					3000		

NOTES AND COMMENTS

Many small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m and few small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m.

Groundwater recorded at ____________ m on the ____/____/____.

Co-ordinate System:______________________, Zone: ______________________.

Origin	Soil Name	Group	Consistency	Plasticity/Grain size	Colour	With/Trace	Moisture
TOPSOIL	Primary	Pt	Fine Grain:	Fine grain:	red	clay	dry
CONCRETE	PEAT	OH	very soft	non-plastic	orange	silt	dry to moist
BITUMEN	CLAY	OL	soft	low plasticity	yellow	sand	moist
FILL	SILT	CH	firm	low - medium	brown	gravel	wet
BASSENDEAN SAND	SAND	CL	stiff	medium plasticity	purple	cobbles	moist to wet
SAND FROM TAMALA LST	GRAVEL	MH	very stiff	medium to high	green	OM	saturated
TAMALA LST	COBBLES	ML	hard	high plasticity	white	BR	
GUILDFORD FORMATION	BOULDERS	SW	Coarse Grain:	Coarse Grain:	cream	Fines:	
ALLUVIUM	Secondary:	SP	very loose	Fine	grey	<=15% "Trace"	
COLLUVIUM	clayey	SC	loose	Medium	black	15-30% "With"	
AEOLIAN	silty	SM	medium dense	Coarse Grain:	blue	>30% "Secondary"	
SWAMP DEPOSIT	sandy	GW	dense	Additional:	Additional:	Coarse:	
LATERITE	gravelly	GP	very dense	Unifor, gap graded, poorly graded. Rounded, sub rounded, sub angular, angular, flaky, platy	Can be modified using pale, dark and motled	<=5% "Trace"	
	cobbly	GC				5-12% "With"	
	bouldery	GM				>12% "Secondary"	

TSF – TP08

TSF – TP08

TEST PIT LOG

Job No:	P19-11-PR03	Date Started:	03-12-20
Test Pit ID:	TSF-TP09	Date Finished:	03-12-20
Contractor:	Earth Australia Contracting	Bucket Width:	1.5 m Tiger Toothed
Machine:	Kobelco SK350 LC 35-tonne Excavator	Easting:	51J 259053
Logged By:	JB	Northing:	6942704

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Depths (From)	Depths (To)	Main material	Material Description	Comments	DCP Depth (mm)	DCP Blows/100m	Laboratory Samples
0	0.1		Silty SAND, fine - medium grained, sub angular - sub rounded, loose, red brown, dry	With some fine - medium roots and rootlets.	100	1	
					200	4 / 30 mm HB Ref	
					300		
					400		
					500		
0.1	0.9		CALCRETE, MS, SW, cream, friable	With some medium and large roots	600		
					700		
					800		
					900		
					1000		
0.9	1.8		Clayey Sandy (fine - medium) GRAVEL, fine - coarse grained, sub angular - sub rounded, loose - medium dense, red brown green yellow with grey black in areas, moist. Interbedded with some Basalt gravel (fine - coarse) and cobbles, grey	Excavated as friable lightly cemented soil / rock. With some red brown and clear gypsum crystals throughout	1100		
					1200		
					1300		
					1400		
					1500		
1.8	4.1		Clayey Sandy (fine - medium) GRAVEL, fine - coarse grained, sub angular - sub rounded, loose - medium dense, red brown yellow. Interbedded with some Basalt gravel (fine - coarse) and cobbles, S, DW, purple	Excavated as friable lightly cemented soil / rock	1600		
					1700		
					1800		
					1900		
		Terminated			2000		
					2100		
					2200		
					2300		
					2400		
					2500		
					2600		
					2700		
					2800		
					2900		
					3000		

NOTES AND COMMENTS

Many small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m and few small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m.

Groundwater recorded at ____________ m on the ____/____/________.

Co-ordinate System:____________________________, Zone: ____________________.

Origin	Soil Name	Group	Consistency	Plasticity/Grain size	Colour	With/Trace	Moisture
TOPSOIL	Primary	Pt	Fine Grain:	Fine grain:	red	clay	dry
CONCRETE	PEAT	OH	very soft	non-plastic	orange	silt	dry to moist
BITUMEN	CLAY	OL	soft	low plasticity	yellow	sand	moist
FILL	SILT	CH	firm	low - medium	brown	gravel	wet
BASSENDEAN SAND	SAND	CL	stiff	medium plasticity	purple	cobbles	moist to wet
SAND FROM TAMALA LST	GRAVEL	MH	very stiff	medium to high	green	OM	saturated
TAMALA LST	COBBLES	ML	hard	high plasticity	white	BR	
GUILDFORD FORMATION	BOULDERS	SW	Coarse Grain:	Coarse Grain:	cream	Fines:	
ALLUVIUM	Secondary:	SP	very loose	Fine	grey	<=15% "Trace"	
COLLUVIUM	clayey	SC	loose	Medium	black	15-30% "With"	
AEOLIAN	silty	SM	medium dense	Coarse Grain:	blue	>30% "Secondary"	
SWAMP DEPOSIT	sandy	GW	dense	Additional:	Additional:	Coarse:	
LATERITE	gravelly	GP	very dense	Unifor, gap graded, poorly graded. Rounded, sub rounded, sub angular, angular, flaky, platy	Can be modified using pale, dark and motled	<=5% "Trace"	
	cobbly	GC				5-12% "With"	
	bouldery	GM				>12% "Secondary"	

TSF – TP09

TSF – TP09

TEST PIT LOG

Job No:	P19-11-PR03	Date Started:	03-12-20
Test Pit ID:	TSF-TP10	Date Finished:	03-12-20
Contractor:	Earth Australia Contracting	Bucket Width:	1.5 m Tiger Toothed
Machine:	Kobelco SK350 LC 35-tonne Excavator	Easting:	51J 258863
Logged By:	JB	Northing:	6942675

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Depths (From)	Depths (To)	Main material	Material Description	Comments	DCP Depth (mm)	DCP Blows/100m	Laboratory Samples
0	0.15		Silty SAND, fine - medium grained, sub angular - sub rounded, medium dense, red brown, dry	With some fine - medium roots and rootlets. Basalt cobbles and gravel at surface	100	4	
					200	10	
					300	18	
					400	5 / 20 mm HB Ref	
					500		
0.15	0.8		BASALT, VS, SW, gravel (fine - coarse) and cobble size, fractured, grey. Interbedded with calcrete in areas, cream, friable, MS, SW		600		
					700		
					800		
					900		
					1000		
0.8	2.8		BASALT, VS, SW, gravel (fine - coarse) and cobble size with some boulders, grey. Interbedded with some pale brown Silty SAND		1100		
					1200		
					1300		
					1400		
		Refusal			1500		
					1600		
					1700		
					1800		
					1900		
					2000		
					2100		
					2200		
					2300		
					2400		
					2500		
					2600		
					2700		
					2800		
					2900		
					3000		

NOTES AND COMMENTS

Many small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m and few small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m.

Groundwater recorded at ____________ m on the _____/_____/_______.

Co-ordinate System:______________________________, Zone: ______________________.

Origin	Soil Name	Group	Consistency	Plasticity/Grain size	Colour	With/Trace	Moisture
TOPSOIL	Primary	Pt	Fine Grain:	Fine grain:	red	clay	dry
CONCRETE	PEAT	OH	very soft	non-plastic	orange	silt	dry to moist
BITUMEN	CLAY	OL	soft	low plasticity	yellow	sand	moist
FILL	SILT	CH	firm	low - medium	brown	gravel	wet
BASSENDEAN SAND	SAND	CL	stiff	medium plasticity	purple	cobbles	moist to wet
SAND FROM TAMALA LST	GRAVEL	MH	very stiff	medium to high	green	OM	saturated
TAMALA LST	COBBLES	ML	hard	high plasticity	white	BR	
GUILDFORD FORMATION	BOULDERS	SW	Coarse Grain:	Coarse Grain:	cream	Fines:	
ALLUVIUM	Secondary:	SP	very loose	Fine	grey	<=15% "Trace"	
COLLUVIUM	clayey	SC	loose	Medium	black	15-30% "With"	
AEOLIAN	silty	SM	medium dense	Coarse Grain:	blue	>30% "Secondary"	
SWAMP DEPOSIT	sandy	GW	dense	Additional:	Additional:	Coarse:	
LATERITE	gravelly	GP	very dense	Unifor, gap graded, poorly graded. Rounded, sub rounded, sub angular, angular, flaky, platy	Can be modified using pale, dark and motled	<=5% "Trace"	
	cobbly	GC				5-12% "With"	
	bouldery	GM				>12% "Secondary"	

TSF – TP10

TSF – TP10

TEST PIT LOG

Job No:	P19-11-PR03	Date Started:	02-12-20
Test Pit ID:	TSF-TP11	Date Finished:	02-12-20
Contractor:	Earth Australia Contracting	Bucket Width:	1.5 m Tiger Toothed
Machine:	Kobelco SK350 LC 35-tonne Excavator	Easting:	51J 259018
Logged By:	JB	Northing:	6942542

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Depths (From)	Depths (To)	Main material	Material Description	Comments	DCP Depth (mm)	DCP Blows/100m	Laboratory Samples
0	0.1		Silty SAND, fine - medium grained, sub angular - sub rounded, medium dense, with some cobbles and gravel, red brown, dry	With some fine - medium roots and rootlets. Basalt cobbles and gravel at surface	100	4	
					200	11	
					300	4 / 20 mm HB Ref	
					400		
					500		
0.1	1.2		CALCRETE, W-MS, DW, cream becoming stained red brown, friable. Interbedded with some Basalt gravel (medium - coarse) and cobbles, grey, VS, SW		600		
					700		
					800		
					900		
					1000		
1.2	2.1		Silty SAND with some clay, fine - medium grained, sub angular - sub rounded, medium dense, red brown cream, moist, with some gravel (fine - medium)	Excavated as soil and lightly cemented rock	1100		
					1200		
					1300		
					1400		
					1500		
2.1	3.5		Weathered BASALT, purple black mottled red brown cream, DW, MS, fractured, as cobble and gravel (medium - coarse) size, some parts friable others quite strong. Interbedded with red brown Silty SAND	Small amount of rock preventing further digging	1600		
					1700		
					1800		
					1900		
		Terminated			2000		
					2100		
					2200		
					2300		
					2400		
					2500		
					2600		
					2700		
					2800		
					2900		
					3000		

NOTES AND COMMENTS

Many small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m and few small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m.

Groundwater recorded at ____________ m on the ____/____/________.

Co-ordinate System: ____________________________, Zone: ____________________________.

Origin	Soil Name	Group	Consistency	Plasticity/Grain size	Colour	With/Trace	Moisture
TOPSOIL	Primary	Pt	Fine Grain:	Fine grain:	red	clay	dry
CONCRETE	PEAT	OH	very soft	non-plastic	orange	silt	dry to moist
BITUMEN	CLAY	OL	soft	low plasticity	yellow	sand	moist
FILL	SILT	CH	firm	low - medium	brown	gravel	wet
BASSENDEAN SAND	SAND	CL	stiff	medium plasticity	purple	cobbles	moist to wet
SAND FROM TAMALA LST	GRAVEL	MH	very stiff	medium to high	green	OM	saturated
TAMALA LST	COBBLES	ML	hard	high plasticity	white	BR	
GUILDFORD FORMATION	BOULDERS	SW	Coarse Grain:	Coarse Grain:	cream	Fines:	
ALLUVIUM	Secondary:	SP	very loose	Fine	grey	<=15% "Trace"	
COLLUVIUM	clayey	SC	loose	Medium	black	15-30% "With"	
AEOLIAN	silty	SM	medium dense	Coarse Grain:	blue	>30% "Secondary"	
SWAMP DEPOSIT	sandy	GW	dense	Additional:	Additional:	Coarse:	
LATERITE	gravelly	GP	very dense	Unifor, gap graded, poorly graded. Rounded, sub rounded, sub angular, angular, flaky, platy	Can be modified using pale, dark and motled	<=5% "Trace"	
	cobbly	GC				5-12% "With"	
	bouldery	GM				>12% "Secondary"	

TSF – TP11

TSF – TP11

TEST PIT LOG

Job No:	P19-11-PR03	Date Started:	02-12-20
Test Pit ID:	TSF-TP12	Date Finished:	02-12-20
Contractor:	Earth Australia Contracting	Bucket Width:	1.5 m Tiger Toothed
Machine:	Kobelco SK350 LC 35-tonne Excavator	Easting:	51J 259163
Logged By:	JB	Northing:	6942535

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Depths (From)	Depths (To)	Main material	Material Description	Comments	DCP Depth (mm)	DCP Blows/100m	Laboratory Samples
0	0.15		Silty SAND, fine - medium grained, sub angular - sub rounded, red brown, dry, medium dense, with some basalt cobbles and gravel (coarse) within	With trace fine - large roots and rootlets. Basalt cobbles and quartz gravel at surface	100	10	
					200	1 / 0 mm HB Ref	
					300		
					400		
					500		
0.15	0.6		CALCRETE, W-MS, DW, cream with some red brown grey, friable. Interbedded with BASALT, VS, SW, grey, massive, boulder and cobble size, some areas slightly more weathered and friable, grey red brown cream	Initial refusal with bucket at 0.5 m	600		
					700		
					800		
					900		
					1000		
0.6	1.2		BASALT, VS, SW, grey, massive	Starting higher in areas	1100		
					1200		
					1300		
					1400		
		Initial refusal with bucket 0.5 m. Ripper used for remaining depth and then terminated.			1500		
					1600		
					1700		
					1800		
					1900		
					2000		
					2100		
					2200		
					2300		
					2400		
					2500		
					2600		
					2700		
					2800		
					2900		
					3000		

NOTES AND COMMENTS

Many small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m and few small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m.

Groundwater recorded at ____________ m on the ____/____/________.

Co-ordinate System:______________________________, Zone: ____________________________.

Origin	Soil Name	Group	Consistency	Plasticity/Grain size	Colour	With/Trace	Moisture
TOPSOIL	Primary	Pt	Fine Grain:	Fine grain:	red	clay	dry
CONCRETE	PEAT	OH	very soft	non-plastic	orange	silt	dry to moist
BITUMEN	CLAY	OL	soft	low plasticity	yellow	sand	moist
FILL	SILT	CH	firm	low - medium	brown	gravel	wet
BASSENDEAN SAND	SAND	CL	stiff	medium plasticity	purple	cobbles	moist to wet
SAND FROM TAMALA LST	GRAVEL	MH	very stiff	medium to high	green	OM	saturated
TAMALA LST	COBBLES	ML	hard	high plasticity	white	BR	
GUILDFORD FORMATION	BOULDERS	SW	Coarse Grain:	Coarse Grain:	cream	Fines:	
ALLUVIUM	Secondary:	SP	very loose	Fine	grey	<=15% "Trace"	
COLLUVIUM	clayey	SC	loose	Medium	black	15-30% "With"	
AEOLIAN	silty	SM	medium dense	Coarse Grain:	blue	>30% "Secondary"	
SWAMP DEPOSIT	sandy	GW	dense	Additional:	Additional:	Coarse:	
LATERITE	gravelly	GP	very dense	Unifor, gap graded, poorly graded. Rounded, sub rounded, sub angular, angular, flaky, platy	Can be modified using pale, dark and motled	<=5% "Trace"	
	cobbly	GC				5-12% "With"	
	bouldery	GM				>12% "Secondary"	

TSF – TP12

TSF – TP12

TEST PIT LOG

Job No:	P19-11-PR03	Date Started:	03-12-20
Test Pit ID:	TSF-TP13	Date Finished:	03-12-20
Contractor:	Earth Australia Contracting	Bucket Width:	1.5 m Tiger Toothed
Machine:	Kobelco SK350 LC 35-tonne Excavator	Easting:	51J 259384
Logged By:	JB	Northing:	6942526

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Depths (From)	Depths (To)	Main material	Material Description	Comments	DCP Depth (mm)	DCP Blows/100m	Laboratory Samples
0	0.1		Silty SAND, fine - medium grained, sub angular - sub rounded, medium dense, red brown, dry		100	2	
					200	3 / 10 mm HB Ref	
					300		
					400		
					500		
0.1	1.1		BASALT, VS, SW, grey, blocky, massive, fractured, gravel (medium - coarse) and cobble sized		600		
					700		
					800		
					900		
		Refusal			1000		
					1100		
					1200		
					1300		
					1400		
					1500		
					1600		
					1700		
					1800		
					1900		
					2000		
					2100		
					2200		
					2300		
					2400		
					2500		
					2600		
					2700		
					2800		
					2900		
					3000		

NOTES AND COMMENTS

Many small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m and few small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m.

Groundwater recorded at ____________ m on the ____/____/________.

Co-ordinate System:__________________________, Zone: ______________________.

Origin	Soil Name	Group	Consistency	Plasticity/Grain size	Colour	With/Trace	Moisture
TOPSOIL	Primary	Pt	Fine Grain:	Fine grain:	red	clay	dry
CONCRETE	PEAT	OH	very soft	non-plastic	orange	silt	dry to moist
BITUMEN	CLAY	OL	soft	low plasticity	yellow	sand	moist
FILL	SILT	CH	firm	low - medium	brown	gravel	wet
BASSENDEAN SAND	SAND	CL	stiff	medium plasticity	purple	cobbles	moist to wet
SAND FROM TAMALA LST	GRAVEL	MH	very stiff	medium to high	green	OM	saturated
TAMALA LST	COBBLES	ML	hard	high plasticity	white	BR	
GUILDFORD FORMATION	BOULDERS	SW	Coarse Grain:	Coarse Grain:	cream	Fines:	
ALLUVIUM	Secondary:	SP	very loose	Fine	grey	<=15% "Trace"	
COLLUVIUM	clayey	SC	loose	Medium	black	15-30% "With"	
AEOLIAN	silty	SM	medium dense	Coarse Grain:	blue	>30% "Secondary"	
SWAMP DEPOSIT	sandy	GW	dense	Additional:	Additional:	Coarse:	
LATERITE	gravelly	GP	very dense	Unifor, gap graded, poorly graded. Rounded, sub rounded, sub angular, angular, flaky, platy	Can be modified using pale, dark and motled	<=5% "Trace"	
	cobbly	GC				5-12% "With"	
	bouldery	GM				>12% "Secondary"	

TSF – TP13

TSF – TP13

TEST PIT LOG

Job No:	P19-11-PR03	Date Started:	02-12-20
Test Pit ID:	TSF-TP14	Date Finished:	02-12-20
Contractor:	Earth Australia Contracting	Bucket Width:	1.5 m Tiger Toothed
Machine:	Kobelco SK350 LC 35-tonne Excavator	Easting:	51J 259392
Logged By:	JB	Northing:	6942348

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Depths (From)	Depths (To)	Main material	Material Description	Comments	DCP Depth (mm)	DCP Blows/100m	Laboratory Samples
0	0.1		Silty SAND, fine - medium grained, sub angular - sub rounded, medium dense, red brown, dry, interbedded with some basalt cobbles and boulders	With trace fine - medium roots and rootlets. Basalt outcrops, cobbles, boulders and gravel at surface	100	4 / 80 mm HB Ref	
					200		
					300		
					400		
					500		
0.1	0.4		BASALT, VS, SW, cobbles and boulders sized, grey - grey red brown cream. Interbedded with CALCRETE, cream with grey and some red brown in areas, W - MS, DW, friable, with some BASALT in matrix		600		
					700		
					800		
					900		
		Refusal			1000		
					1100		
					1200		
					1300		
					1400		
					1500		
					1600		
					1700		
					1800		
					1900		
					2000		
					2100		
					2200		
					2300		
					2400		
					2500		
					2600		
					2700		
					2800		
					2900		
					3000		

NOTES AND COMMENTS

Many small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m and few small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m.

Groundwater recorded at ____________ m on the _____ / _____ / _______.

Co-ordinate System: ____________________________, Zone: ____________________.

Origin	Soil Name	Group	Consistency	Plasticity/Grain size	Colour	With/Trace	Moisture
TOPSOIL	Primary	Pt	Fine Grain:	Fine grain:	red	clay	dry
CONCRETE	PEAT	OH	very soft	non-plastic	orange	silt	dry to moist
BITUMEN	CLAY	OL	soft	low plasticity	yellow	sand	moist
FILL	SILT	CH	firm	low - medium	brown	gravel	wet
BASSENDEAN SAND	SAND	CL	stiff	medium plasticity	purple	cobbles	moist to wet
SAND FROM TAMALA LST	GRAVEL	MH	very stiff	medium to high	green	OM	saturated
TAMALA LST	COBBLES	ML	hard	high plasticity	white	BR	
GUILDFORD FORMATION	BOULDERS	SW	Coarse Grain:	Coarse Grain:	cream	Fines:	
ALLUVIUM	Secondary:	SP	very loose	Fine	grey	<=15% "Trace"	
COLLUVIUM	clayey	SC	loose	Medium	black	15-30% "With"	
AEOLIAN	silty	SM	medium dense	Coarse Grain:	blue	>30% "Secondary"	
SWAMP DEPOSIT	sandy	GW	dense	Additional:	Additional:	Coarse:	
LATERITE	gravelly	GP	very dense	Unifor, gap graded, poorly graded. Rounded, sub rounded, sub angular, angular, flaky, platy	Can be modified using pale, dark and motled	<=5% "Trace"	
	cobbly	GC				5-12% "With"	
	bouldery	GM				>12% "Secondary"	

TSF – TP14

TSF – TP14

TEST PIT LOG

Job No:	P19-11-PR03	Date Started:	02-12-20
Test Pit ID:	TSF-TP15	Date Finished:	02-12-20
Contractor:	Earth Australia Contracting	Bucket Width:	1.5 m Tiger Toothed
Machine:	Kobelco SK350 LC 35-tonne Excavator	Easting:	51J 259545
Logged By:	JB	Northing:	6942230

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Depths (From)	Depths (To)	Main material	Material Description	Comments	DCP Depth (mm)	DCP Blows/100m	Laboratory Samples
0	0.2		Silty SAND, fine - medium grained, sub angular - sub rounded, loose - medium dense, red brown, dry, with some gravel (fine - medium)	With some fine - large roots and rootlets. Basalt cobbles at surface	100	5	
					200	3	
					300	5	
					400	HB Ref	
					500		
0.2	0.8		CALCRETE, MS, DW - SW, cream stained red brown in areas, friable		600		
					700		
					800		
					900		
					1000		
0.8	2.5		CALCRETE, W - MS, XW - DW, cream red brown, friable. Interbedded with BASALT cobbles and gravel (coarse), grey, generally elongated	Excavated as soil. Weaker and more weathered than layer above.	1100		
					1200		
					1300		
					1400		
					1500		
2.5	4.0		Clayey (medium plasticity) SAND, fine - medium grained, sub rounded, red brown, medium dense, moist. Varying to CLAY with sand. With some weathered BASALT, MS, XW - DW, purple red brown grey, friable.	Some areas more clayey Red brown glassey crystallisation in clay as gypsum	1600		
					1700		
					1800		
					1900		
		Terminated			2000		
					2100		
					2200		
					2300		
					2400		
					2500		
					2600		
					2700		
					2800		
					2900		
					3000		

NOTES AND COMMENTS

Many small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m and few small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m.

Groundwater recorded at ____________ m on the ____/____/____.

Co-ordinate System: ________________________, Zone: ________________.

Origin	Soil Name	Group	Consistency	Plasticity/Grain size	Colour	With/Trace	Moisture
TOPSOIL	Primary	Pt	Fine Grain:	Fine grain:	red	clay	dry
CONCRETE	PEAT	OH	very soft	non-plastic	orange	silt	dry to moist
BITUMEN	CLAY	OL	soft	low plasticity	yellow	sand	moist
FILL	SILT	CH	firm	low - medium	brown	gravel	wet
BASSENDEAN SAND	SAND	CL	stiff	medium plasticity	purple	cobbles	moist to wet
SAND FROM TAMALA LST	GRAVEL	MH	very stiff	medium to high	green	OM	saturated
TAMALA LST	COBBLES	ML	hard	high plasticity	white	BR	
GUILDFORD FORMATION	BOULDERS	SW	Coarse Grain:	Coarse Grain:	cream	Fines:	
ALLUVIUM	Secondary:	SP	very loose	Fine	grey	<=15% "Trace"	
COLLUVIUM	clayey	SC	loose	Medium	black	15-30% "With"	
AEOLIAN	silty	SM	medium dense	Coarse Grain:	blue	>30% "Secondary"	
SWAMP DEPOSIT	sandy	GW	dense	Additional:	Additional:	Coarse:	
LATERITE	gravelly	GP	very dense	Unifor, gap graded, poorly graded. Rounded, sub rounded, sub angular, angular, flaky, platy	Can be modified using pale, dark and motled	<=5% "Trace"	
	cobbly	GC				5-12% "With"	
	bouldery	GM				>12% "Secondary"	

TSF – TP15

TSF – TP15

TEST PIT LOG

Job No:	P19-11-PR03	Date Started:	02-12-20
Test Pit ID:	TSF-TP16	Date Finished:	02-12-20
Contractor:	Earth Australia Contracting	Bucket Width:	1.5 m Tiger Toothed
Machine:	Kobelco SK350 LC 35-tonne Excavator	Easting:	51J 259136
Logged By:	JB	Northing:	6942326

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Depths (From)	Depths (To)	Main material	Material Description	Comments	DCP Depth (mm)	DCP Blows/100m	Laboratory Samples
0	0.15		Silty SAND, fine - medium grained, sub angular - sub rounded, medium dense, red brown, dry	With trace fine - medium roots and rootlets. Basalt cobbles, boulders and gravel at surface. Some quartz at surface	100	10	
					200	13 / 50 mm HB ref	
					300		
					400		
					500		
0.15	0.6		CALCRETE, W-MS, DW, cream with some grey stained red brown in areas, friable. Interbedded with BASALT, VS, SW, grey within the calcrete matrix. With some cobbles, boulders and gravel sized BASALT.		600		
					700		
					800		
					900		
		Refusal			1000		
					1100		
					1200		
					1300		
					1400		
					1500		
					1600		
					1700		
					1800		
					1900		
					2000		
					2100		
					2200		
					2300		
					2400		
					2500		
					2600		
					2700		
					2800		
					2900		
					3000		

NOTES AND COMMENTS

Many small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m and few small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m.

Groundwater recorded at ____________ m on the _____ / _____ / _______.

Co-ordinate System: ______________________________, Zone: ______________________.

Origin	Soil Name	Group	Consistency	Plasticity/Grain size	Colour	With/Trace	Moisture
TOPSOIL	Primary	Pt	Fine Grain:	Fine grain:	red	clay	dry
CONCRETE	PEAT	OH	very soft	non-plastic	orange	silt	dry to moist
BITUMEN	CLAY	OL	soft	low plasticity	yellow	sand	moist
FILL	SILT	CH	firm	low - medium	brown	gravel	wet
BASSENDEAN SAND	SAND	CL	stiff	medium plasticity	purple	cobbles	moist to wet
SAND FROM TAMALA LST	GRAVEL	MH	very stiff	medium to high	green	OM	saturated
TAMALA LST	COBBLES	ML	hard	high plasticity	white	BR	
GUILDFORD FORMATION	BOULDERS	SW	Coarse Grain:	Coarse Grain:	cream	Fines:	
ALLUVIUM	Scondary:	SP	very loose	Fine	grey	<=15% "Trace"	
COLLUVIUM	clayey	SC	loose	Medium	black	15-30% "With"	
AEOLIAN	silty	SM	medium dense	Coarse Grain:	blue	>30% "Secondary"	
SWAMP DEPOSIT	sandy	GW	dense	Additional:	Additional:	Coarse:	
LATERITE	gravelly	GP	very dense	Unifor, gap graded, poorly graded. Rounded, sub rounded, sub angular, angular, flaky, platy	Can be modified using pale, dark and motled	<=5% "Trace"	
	cobbly	GC				5-12% "With"	
	bouldery	GM				>12% "Secondary"	

TSF – TP16

TSF – TP16

TEST PIT LOG

Job No:	P19-11-PR03	Date Started:	02-12-20
Test Pit ID:	TSF-TP17	Date Finished:	02-12-20
Contractor:	Earth Australia Contracting	Bucket Width:	1.5 m Tiger Toothed
Machine:	Kobelco SK350 LC 35-tonne Excavator	Easting:	51J 258922
Logged By:	JB	Northing:	6942325

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Depths (From)	Depths (To)	Main material	Material Description	Comments	DCP Depth (mm)	DCP Blows/100m	Laboratory Samples
0	0.1		Silty SAND, fine - medium grained, sub angular - sub rounded, medium dense, red brown, dry	With some fine - medium roots and rootlets	100	4 / 60 mm HB Ref	
					200		
					300		
					400		
					500		
0.1	1.9		CALCRETE, MS, DW - SW, cream with some grey, friable. Interbedded with BASALT, VS, SW, grey within the calcrete matrix. With some cobbles, boulders of BASALT, generally elongated and platey	Localised silt powder within this area	600		
					700		
					800		
					900		
					1000		
1.9	4.0		Clayey, silty SAND, fine - medium grained, sub angular - sub rounded, loose, red brown, moist. Interbedded with some weathered BASALT as gravel (fine - coarse) and cobbles, MS - VS, DW - SW, purple grey red cream brown (some unweathered grey BASALT too)		1100		
					1200		
					1300		
					1400		
		Terminated			1500		
					1600		
					1700		
					1800		
					1900		
					2000		
					2100		
					2200		
					2300		
					2400		
					2500		
					2600		
					2700		
					2800		
					2900		
					3000		

NOTES AND COMMENTS

Many small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m and few small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m.

Groundwater recorded at ____________ m on the ____/____/________.

Co-ordinate System: ____________________________, Zone: ____________________.

Origin	Soil Name	Group	Consistency	Plasticity/Grain size	Colour	With/Trace	Moisture
TOPSOIL	Primary	Pt	Fine Grain:	Fine grain:	red	clay	dry
CONCRETE	PEAT	OH	very soft	non-plastic	orange	silt	dry to moist
BITUMEN	CLAY	OL	soft	low plasticity	yellow	sand	moist
FILL	SILT	CH	firm	low - medium	brown	gravel	wet
BASSENDEAN SAND	SAND	CL	stiff	medium plasticity	purple	cobbles	moist to wet
SAND FROM TAMALA LST	GRAVEL	MH	very stiff	medium to high	green	OM	saturated
TAMALA LST	COBBLES	ML	hard	high plasticity	white	BR	
GUILDFORD FORMATION	BOULDERS	SW	Coarse Grain:	Coarse Grain:	cream	Fines:	
ALLUVIUM	Secondary:	SP	very loose	Fine	grey	<=15% "Trace"	
COLLUVIUM	clayey	SC	loose	Medium	black	15-30% "With"	
AEOLIAN	silty	SM	medium dense	Coarse Grain:	blue	>30% "Secondary"	
SWAMP DEPOSIT	sandy	GW	dense	Additional:	Additional:	Coarse:	
LATERITE	gravelly	GP	very dense	Unifor, gap graded, poorly graded. Rounded, sub rounded, sub angular, angular, flaky, platy	Can be modified using pale, dark and motled	<=5% "Trace"	
	cobbly	GC				5-12% "With"	
	bouldery	GM				>12% "Secondary"	

TSF – TP17

TSF – TP17

TEST PIT LOG

Job No:	P19-11-PR03	Date Started:	03-12-20
Test Pit ID:	TSF-TP18	Date Finished:	03-12-20
Contractor:	Earth Australia Contracting	Bucket Width:	1.5 m Tiger Toothed
Machine:	Kobelco SK350 LC 35-tonne Excavator	Easting:	51J 2598789
Logged By:	JB	Northing:	6942504

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Depths (From)	Depths (To)	Main material	Material Description	Comments	DCP Depth (mm)	DCP Blows/100m	Laboratory Samples
0	0.2		Silty SAND, fine - medium grained, sub angular - sub rounded, medium dense, red brown, dry	With some fine - medium roots and rootlets. Basalt gravel and cobbles at surface	100	5	
					200	2 / 0 mm HB Ref	
					300		
					400		
					500		
0.2	1.0		CALCRETE, MS, DW, cream, friable. Becoming interbedded with some BASALT cobbles, grey, VS, SW from 0.4 m	Rootlets throughout in areas	600		
					700		
					800		
					900		
		Refusal			1000		
					1100		
					1200		
					1300		
					1400		
					1500		
					1600		
					1700		
					1800		
					1900		
					2000		
					2100		
					2200		
					2300		
					2400		
					2500		
					2600		
					2700		
					2800		
					2900		
					3000		

NOTES AND COMMENTS

Many small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m and few small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m.

Groundwater recorded at ____________ m on the _____ / _____ / _______.

Co-ordinate System: ____________________________, Zone: ____________________.

Origin	Soil Name	Group	Consistency	Plasticity/Grain size	Colour	With/Trace	Moisture
TOPSOIL	Primary	Pt	Fine Grain:	Fine grain:	red	clay	dry
CONCRETE	PEAT	OH	very soft	non-plastic	orange	silt	dry to moist
BITUMEN	CLAY	OL	soft	low plasticity	yellow	sand	moist
FILL	SILT	CH	firm	low - medium	brown	gravel	wet
BASSENDEAN SAND	SAND	CL	stiff	medium plasticity	purple	cobbles	moist to wet
SAND FROM TAMALA LST	GRAVEL	MH	very stiff	medium to high	green	OM	saturated
TAMALA LST	COBBLES	ML	hard	high plasticity	white	BR	
GUILDFORD FORMATION	BOULDERS	SW	Coarse Grain:	Coarse Grain:	cream	Fines:	
ALLUVIUM	Secondary:	SP	very loose	Fine	grey	<=15% "Trace"	
COLLUVIUM	clayey	SC	loose	Medium	black	15-30% "With"	
AEOLIAN	silty	SM	medium dense	Coarse Grain:	blue	>30% "Secondary"	
SWAMP DEPOSIT	sandy	GW	dense	Additional:	Additional:	Coarse:	
LATERITE	gravelly	GP	very dense	Unifor, gap graded, poorly graded. Rounded, sub rounded, sub angular, angular, flaky, platy	Can be modified using pale, dark and motled	<=5% "Trace"	
	cobbly	GC				5-12% "With"	
	bouldery	GM				>12% "Secondary"	

TSF – TP18

TSF – TP18

TEST PIT LOG

Job No:	P19-11-PR03	Date Started:	04-12-20
Test Pit ID:	TSF-TP19	Date Finished:	04-12-20
Contractor:	Earth Australia Contracting	Bucket Width:	1.5 m Tiger Toothed
Machine:	Kobelco SK350 LC 35-tonne Excavator	Easting:	51J 259776
Logged By:	JB	Northing:	6942550

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Depths (From)	Depths (To)	Main material	Material Description	Comments	DCP Depth (mm)	DCP Blows/100m	Laboratory Samples
0	0.15		Silty SAND, fine - medium grained, sub angular - sub rounded, medium dense, red brown, dry	Trace rootlets. Ironstone gravel and cobbles at surface. Conglomerate at surface	100	Ref	
					200		
					300		
					400		
					500		
0.15	0.3		HARDPAN, S, SW, red brown speckled grey in areas, cemented soil containing ironstone gravel / cobble	Rootlets throughout in areas	600		
					700		
					800		
					900		
		Refusal			1000		
					1100		
					1200		
					1300		
					1400		
					1500		
					1600		
					1700		
					1800		
					1900		
					2000		
					2100		
					2200		
					2300		
					2400		
					2500		
					2600		
					2700		
					2800		
					2900		
					3000		

NOTES AND COMMENTS

Many small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m and few small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m.

Groundwater recorded at ____________ m on the ____/____/________.

Co-ordinate System: __________________________, Zone: ______________________.

Origin	Soil Name	Group	Consistency	Plasticity/Grain size	Colour	With/Trace	Moisture
TOPSOIL	Primary	Pt	Fine Grain:	Fine grain:	red	clay	dry
CONCRETE	PEAT	OH	very soft	non-plastic	orange	silt	dry to moist
BITUMEN	CLAY	OL	soft	low plasticity	yellow	sand	moist
FILL	SILT	CH	firm	low - medium	brown	gravel	wet
BASSENDEAN SAND	SAND	CL	stiff	medium plasticity	purple	cobbles	moist to wet
SAND FROM TAMALA LST	GRAVEL	MH	very stiff	medium to high	green	OM	saturated
TAMALA LST	COBBLES	ML	hard	high plasticity	white	BR	
GUILDFORD FORMATION	BOULDERS	SW	Coarse Grain:	Coarse Grain:	cream	Fines:	
ALLUVIUM	Secondary:	SP	very loose	Fine	grey	<=15% "Trace"	
COLLUVIUM	clayey	SC	loose	Medium	black	15-30% "With"	
AEOLIAN	silty	SM	medium dense	Coarse Grain:	blue	>30% "Secondary"	
SWAMP DEPOSIT	sandy	GW	dense	Additional:	Additional:	Coarse:	
LATERITE	gravelly	GP	very dense	Unifor, gap graded, poorly graded. Rounded, sub rounded, sub angular, angular, flaky, platy	Can be modified using pale, dark and motled	<=5% "Trace"	
	cobbly	GC				5-12% "With"	
	bouldery	GM				>12% "Secondary"	

TSF – TP19

TSF – TP19

TEST PIT LOG

Job No:	P19-11-PR03	Date Started:	03-12-20
Test Pit ID:	TSF-TP20	Date Finished:	03-12-20
Contractor:	Earth Australia Contracting	Bucket Width:	1.5 m Tiger Toothed
Machine:	Kobelco SK350 LC 35-tonne Excavator	Easting:	51J 259495
Logged By:	JB	Northing:	6943019

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Depths (From)	Depths (To)	Main material	Material Description	Comments	DCP Depth (mm)	DCP Blows/100m	Laboratory Samples
0	0.1		Silty SAND, fine - medium grained, sub angular - sub rounded, medium dense, red brown, dry		100	4	
					200	15	
					300	HB Ref	
					400		
					500		
0.1	1.2		CALCRETE, MS, SW, cream, friable		600		
					700		
					800		
					900		
					1000		
1.2	1.8		Sandy (fine - medium) clayey GRAVEL, fine - coarse grained, sub angular, medium dense, red brown yellow, moist. With some BASALT gravel and cobbles.	With some fine brown gypsum crystals.	1100		
					1200		
					1300		
					1400		
					1500		
1.8	4.2		CLAY with sand (fine - medium) with gravel (fine - coarse, sub angular as BASALT mostly, red brown - red brown yellow, moist, soft. Interbedded with weathered BASALT, MS - S, DW, purple, some parts friable, gravel and cobble sized (some unweathered grey BASALT throughout layer also).		1600		
					1700		
					1800		
					1900		
		Terminated			2000		
					2100		
					2200		
					2300		
					2400		
					2500		
					2600		
					2700		
					2800		
					2900		
					3000		

NOTES AND COMMENTS

Many small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m and few small (1 - 2 mm) / medium (2 - 10 mm) / large (>10 mm) roots to ____________ m.

Groundwater recorded at ____________ m on the _____ / _____ / _______.

Co-ordinate System: ____________________________, Zone: ____________________.

Origin	Soil Name	Group	Consistency	Plasticity/Grain size	Colour	With/Trace	Moisture
TOPSOIL	Primary	Pt	Fine Grain:	Fine grain:	red	clay	dry
CONCRETE	PEAT	OH	very soft	non-plastic	orange	silt	dry to moist
BITUMEN	CLAY	OL	soft	low plasticity	yellow	sand	moist
FILL	SILT	CH	firm	low - medium	brown	gravel	wet
BASSENDEAN SAND	SAND	CL	stiff	medium plasticity	purple	cobbles	moist to wet
SAND FROM TAMALA LST	GRAVEL	MH	very stiff	medium to high	green	OM	saturated
TAMALA LST	COBBLES	ML	hard	high plasticity	white	BR	
GUILDFORD FORMATION	BOULDERS	SW	Coarse Grain:	Coarse Grain:	cream	Fines:	
ALLUVIUM	Scondary:	SP	very loose	Fine	grey	<=15% "Trace"	
COLLUVIUM	clayey	SC	loose	Medium	black	15-30% "With"	
AEOLIAN	silty	SM	medium dense	Coarse Grain:	blue	>30% "Secondary"	
SWAMP DEPOSIT	sandy	GW	dense	Additional:	Additional:	Coarse:	
LATERITE	gravelly	GP	very dense	Unifor, gap graded, poorly graded. Rounded, sub rounded, sub angular, angular, flaky, platy	Can be modified using pale, dark and motled	<=5% "Trace"	
	cobbly	GC				5-12% "With"	
	bouldery	GM				>12% "Secondary"	

TSF – TP20

TSF – TP20

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE NO.: 3A

CLIENT: Bellevue Gold Limited
PROJECT: IWL TSF
LOCATION: Bellevue Gold Mine
JOB NUMBER:

DATE COMMENCED: 26/1/2021
DATE COMPLETED: 27/1/2021
[redacted]

Drill Contractor: Edge Drilling | Bore Size: HQ | Hole Angle: 0° | Easting: 259,681 | Surface RL:
Drill Model: DDR004 | Drill Fluid: Bentonite | Bearing: N/A | Northing: 6,942,325 | Datum: GDA94 Zone 51

Method	Casing	Drill Rate (min/m)	Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/Test	Field Records/Comments	Water
HQ coring			0.0 – 0.25	Tertiary Sediments (Laterite)		ML	Gravelly SILT (TOPSOIL), low plasticity, medium to coarse ironstone gravel and sub-angular to angular, red brown	D					
			0.25 – 1.5			SC	Clayey SAND, fine to medium grained, sub-rounded to sub-angular, low plasticity, red brown with mottled white	D	MD - D			PP@1.0 m = 350 kPa PP@1.25 m = 250 kPa PP@1.5 m = 300 kPa	
			1.5 –			CL - CM	Sandy CLAY, low to medium plasticity, magnesite / kaolinite seam infill and rootlets present, red brown with mottle white		St			SPT@1.5 m = 3, 5, 4 N = 9 SPT@2.0 m = 2, 5, 5 N = 10 PP@2.5 m = 400 kPa PP@2.75 m = 500 kPa	
			3.0				... becoming yellow brown					SPT@3.0 m = 5, 5, 8 N = 13	
			4.0				... becoming medium to high plasticity					PP@4.25 m = 350 kPa SPT@4.5 m = 6, 7, 7 N = 14	

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE NO.: 3A

CLIENT: Bellevue Gold Limited
PROJECT: IWL TSF
LOCATION: Bellevue Gold Mine
JOB NUMBER: [redacted]

DATE COMMENCED: 26/1/2021
DATE COMPLETED: 27/1/2021

Drill Contractor: Edge Drilling | Bore Size: HQ | Hole Angle: 0° | Easting: 259,681 | Surface RL:
Drill Model: DDR004 | Drill Fluid: Bentonite | Bearing: N/A | Northing: 6,942,325 | Datum: GDA94 Zone 51

Method	Casing	Drill Rate (min/m)	Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/Test	Field Records/Comments	Water
HQ coring			5.5, 6.0, 6.5, 7.0, 7.5	Tertiary Sediments (Laterite)			... becoming red to red brown, with iron induration ... becoming black grey to red brown, partially cemented	D				PP@5.25 m = 350 kPa PP@5.5 m = 550 kPa PP@5.75 m = 450 kPa SPT@6.0 m = 6, 10, 9 N = 19 PP@6.75 m = > 600 kPa PP@7.25 m = 400 kPa SPT@7.5 m = 13, 18, R (18/130 mm) (hammer bounce @430 mm penetration)	
HQ coring			8.0, 8.5	Greenstone formation			BASALT, fine grained, slightly weathered to fresh, high to extremely high strength, sheared seams infilled with kaolinite clay of medium to high plasticity, grey to black grey	D	H - EH				
							End of Hole at 9.0 m						

BOREHOLE LOG

BOREHOLE NO.: 3A

GEOTECHNICAL AND TAILINGS

CLIENT:	Bellevue Gold Limited	DATE COMMENCED: 26/1/2021	
PROJECT:	IWL TSF	DATE COMPLETED: 27/1/2021	
LOCATION:	Bellevue Gold Mine	[redacted]	
JOB NUMBER:			

Drill Contractor: Edge Drilling	Bore Size: HQ	Hole Angle: 0°	Easting: 259,681	Surface RL:
Drill Model: DDR004	Drill Fluid: Bentonite	Bearing: N/A	Northing: 6,942,325	Datum: GDA94 Zone 51

Core tray - 0.0 m to 5.0 m

Core tray - 5.0 m to 9.0 m

BOREHOLE LOG		BOREHOLE NO.: 6
	GEOTECHNICAL AND TAILINGS	SHEET: 1 OF 3

CLIENT: Bellevue Gold Limited
PROJECT: IWL TSF
LOCATION: Bellevue Gold Mine
JOB NUMBER:

DATE COMMENCED: 27/1/2021
DATE COMPLETED: 27/1/2021
[redacted]

Drill Contractor: Edge Drilling	Bore Size: HQ	Hole Angle: 0°	Easting: 259,597 Surface RL:
Drill Model: DDR004	Drill Fluid: Bentonite	Bearing: N/A	Northing: 6,943,025 Datum: GDA94 Zone 51

Method	Casing	Drill Rate (min/m)	Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/Test	Field Records/Comments	Water
HQ coring				Tertiary Sediments (Laterite)		ML	Sandy SILT (TOPSOIL), low plasticity, red brown	D				SPT@0.0 m = 9, 23, 23 N = 46	
			0.5				CALCRETE, medium to coarse grained, vuggy, with interbedded horizontal seams of sandy SILT of low plasticity, white to yellow brown with red	D	VL - L				
						ML	Sandy SILT with CALCRETE gravels, low plasticity, red brown		St				
			1.0				CORE LOSS - 0.80 m to 1.30 m						
			1.5			CM - CH	Sandy CLAY, medium to high plasticity, magnesite / kaolinite seam infill present, red brown to yellow brown with white veins		St - VSt			SPT@1.5 m = 6, 6, 5 N = 11	
			2.0									PP@2.25 m = 600 kPa	
			2.5									PP@2.5 m = 500 kPa	
							... core between 22.95 m and 3.00m destroyed by mistake					PP@2.75 m = 600 kPa	
			3.0									SPT@3.0 m = 5, 5, 6 N = 11	
			3.5	Greenstone formation		CM - CH	Sandy CLAY (residual soil), medium to high plasticity, with coarse grained quartz and basalt gravels / cobbles, basalt cobbles are extremely to highly weathered, very low strength, with kaolinite clay infill seams, yellow brown to orange brown		VSt			PP@3.5 m = 500 kPa	
			4.0									PP@4.25 m = 350 kPa	
			4.5									SPT@4.5 m = 6, 12, 12 N = 24	

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE NO.: 6

CLIENT: Bellevue Gold Limited
PROJECT: IWL TSF
LOCATION: Bellevue Gold Mine
JOB NUMBER:

DATE COMMENCED: 27/1/2021
DATE COMPLETED: 27/1/2021
[redacted]

Drill Contractor: Edge Drilling | Drill Model: DDR004
Bore Size: HQ | Drill Fluid: Bentonite
Hole Angle: 0° | Bearing: N/A
Easting: 259,597 | Northing: 6,943,025
Surface RL: | Datum: GDA94 Zone 51

Method	Casing	Drill Rate (min/m)	Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/Test	Field Records/Comments	Water
HQ coring			5.5	Greenstone formation			... with CALCRETE, very low to medium strength, highly to moderately weathered, white yellow	D				PP@5.5 m = 450 kPa PP@5.75 m = 450 kPa	
							End of Hole at 6.0 m						

BOREHOLE LOG	GEOTECHNICAL AND TAILINGS	BOREHOLE NO.: 6 SHEET: 3 OF 3

CLIENT: Bellevue Gold Limited	DATE COMMENCED: 27/1/2021
PROJECT: IWL TSF	DATE COMPLETED: 27/1/2021
LOCATION: Bellevue Gold Mine	[redacted]
JOB NUMBER:	

Drill Contractor: Edge Drilling	Bore Size: HQ		259,597	e RL:
Drill Model: DDR004	Drill Fluid: Bentonite	Bearing: N/A	Northing: 6,943,025	Datum: GDA94 Zone 51

Core tray - 0.0 m to 5.0 m

Core tray - 5.0 m to 6.0 m

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH04

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259665	Surface RL:			
Equipment:	RC	Hole Length:		Northing:	6943091	Datum:	GDA94 Zone 51		

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							CALCRETE/LATERITE, fine- medium						
			1.0										
							SAPROLITE, grey brown, low plasticity, sandy (medium- coarse grained), gravelly basalt fragments						
			2.0										
			3.0										
			4.0										
			5.0										
			6.0										
			7.0										
			8.0										
			9.0										

BOREHOLE LOG

BOREHOLE No.: IWL-BH04

REC GEOTECHNICAL AND TAILINGS

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259665	Surface RL:			
Equipment:	RC	Hole Length:		Northing:	6943091	Datum:	GDA94 Zone 51		

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							...continued						
			11.0										
			12.0										
			13.0										
			14.0										
			15.0										
			16.0										
			17.0										
			18.0				Terminated						
			19.0										

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH30

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259640	Surface RL:		
Equipment:	RC	Hole Length:		Northing:	6943187	Datum:	GDA94 Zone 51	

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0–3.0				CALCRETE, gravel (fine - coarse grained), sandy (fine - coarse grained) with clay, red brown cream, medium plasticity, with trace clear brown gypsum fragments						
			3.0–5.0				Quartz fragments, cobble / gravel size						
			5.0–7.0				SAPROLITE, cream /cream brown						
			7.0–				SAPROLITE, grey / green grey						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH30

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259640	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6943187	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							...continued						
			11.0										
			12.0										
			13.0										
			14.0										
							Terminated						
			15.0										
			16.0										
			17.0										
			18.0										
			19.0										

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH03

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259565	Surface RL:			
Equipment:	RC	Hole Length:		Northing:	6943191	Datum:	GDA94 Zone 51		

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0–2.0				CALCRETE, cream red brown, Silty SAND with gravels (fine-medium)with clay, trace gypsum crystals						
			2.0–6.0				LATERITE, red brown, CLAY with gravels (fine- coarse), medium plasticity						
			6.0–8.0				SAPROLITE, red brown, as low plasticity CLAY						
			8.0–				SAPROLITE, green yellow grey, as SILT						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

BOREHOLE No.: IWL-BH03
SHEET 2 OF 2

GEOTECHNICAL AND TAILINGS

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259565	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6943191	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							...continued						
			11.0										
			12.0										
							Terminated						
			13.0										
			14.0										
			15.0										
			16.0										
			17.0										
			18.0										
			19.0										

BOREHOLE LOG

BOREHOLE No.: IWL-BH16
SHEET 1 OF 2

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259865	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6942743	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0–3.0				CALCRETE, cream red brown, Clayey sandy (fine - coarse) GRAVEL (fine - coarse) with silt, medium plasticity						
			3.0–				LATERITE, Clayey SAND (fine - coarse) with gravel (fine - coarse), medium plasticity, red brown, with some cream CALCRETE						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH16

SHEET 2 OF 2

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259865	Surface RL:			
Equipment:	RC	Hole Length:		Northing:	6942743	Datum:	GDA94 Zone 51		

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			11.0				SAPROLITE, as CLAY, orange brown, medium plasticity						
			12.0										
			13.0										
			14.0										
			15.0										
			16.0				SAPROLITE, yellow brown						
			17.0										
			18.0										
			19.0				Terminated						

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH15

SHEET 1 OF 2

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259765	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6942743	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0 – 3.0				CALCRETE, Silty, sandy (fine - coarse) GRAVEL (fine - coarse), crean to cream red brown, clear white gypsum crystals in final 1.0 m						
			3.0 – 7.0				LATERITE, Clayey SAND (fine- coarse) with gravel (fine- coarse), medium plasticity						
			7.0 –				SAPROLITE, yellow brown						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG		BOREHOLE No.: IWL-BH15 SHEET 2 OF 2

GEOTECHNICAL AND TAILINGS

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259765	Surface RL:		
Equipment:	RC	Hole Length:		Northing:	6942743	Datum:	GDA94 Zone 51	

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							...continued						
			11.0										
			12.0										
							Terminated						
			13.0										
			14.0										
			15.0										
			16.0										
			17.0										
			18.0										
			19.0										

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH07

SHEET 1 OF 2

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259765	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6942907	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							CALCRETE, Sandy (fine-coarse) GRAVEL (fine-coarse) with clay, low plasticity, red brown cream						
			1.0				LATERITE, Sandy (fine - coarse) CLAY with Gravel (fine - coarse), medium plasticity, red brown trace cream						
			2.0										
			3.0				LATERITE, CLAY, high plasticity, red brown						
			4.0										
			5.0				SAPROLITE, yellow brown						
			6.0										
			7.0										
			8.0										
			9.0										

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH07

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259765	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6942907	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							...continued						
			11.0										
			12.0				Terminated						
			13.0										
			14.0										
			15.0										
			16.0										
			17.0										
			18.0										
			19.0										

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259566	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6943390	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0–1.0				CALCRETE, Sandy (fine-coarse) GRAVEL (fine to coarse), with fines, cream yellow						
			1.0–5.0				SAPROLITE, Gravelly (fine - coarse) SAND (fine - coarse) with clay, cream brown grey, medium plasticity, with fragements of BASALT and clear brown gypsum throughout						
			5.0–9.0				SAPROLOTE, CLAY, medium plasticity, red brown grey, with BASALT fragments						
			9.0–				SAPROLOTE, cream grey						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH01

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259566	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6943390	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							...continued						
			11.0										
			12.0				Terminated						
			13.0										
			14.0										
			15.0										
			16.0										
			17.0										
			18.0										
			19.0										

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH02

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259565	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6943291	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0–2.0				CALCRETE/ cemented lateritic soils, sandy (fine-coarse medium) SILT with gravel, red brown orange cream						
			2.0–4.0				LATERITE, Sandy CLAY (fine-coarse), medium plasticity, red brown to red brown grey, with black BASALT fragments and brown and white						
			4.0–7.0				LATERITE, sandy (fine - coarse) CLAY, medium plasticity, red brown with some green mottlling						
			7.0–				LATERITE, CLAY with sand (fine - coarse), medium plasticity, red brown - red brown orange, trace clear gypsum						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH02

SHEET 2 OF 2

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259565	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6943291	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							SAPROLITE, gravelly (fine - coarse), grey yellow						
			11.0										
			12.0										
							Terminated						
			13.0										
			14.0										
			15.0										
			16.0										
			17.0										
			18.0										
			19.0										

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH31

SHEET 1 OF 1

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259566	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6943090	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0–1.0				BASALT, sandy (fine - coarse) GRAVEL (fine - coarse) with clay, medium plasticity, interbedded with some CALCRETE, grey with some red brown cream						
			1.0–7.0				BASALT, sandy (fine - coarse) GRAVEL (fine - coarse), grey black						
			7.0				Terminated						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

REC GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH09
SHEET 1 OF 1

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	[redacted]	
LOCATION:	Bellevue Gold Project		
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259565	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6942907	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0 – 1.0				CALCRETE / LATERITE, with some BASALT fragments						
			1.0 – 4.0				LATERITE, gravelly (fine - coarse) SAND (fine - coarse) with clay, red brown - red brown cream, tending toward CALCRETE in final 1.0 m						
			4.0 – 6.0				BASALT, GRAVEL (fine - coarse) with sand (fine - coarse), grey black						
			6.0				Terminated						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH06

SHEET 1 OF 1

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259465	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6942908	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0 – 2.0				BASALT, sandy (fine - coarse) GRAVEL (fine - coarse), grey black, with some cream orange fines						
			2.0 – 6.0				BASALT, GRAVEL (fine - coarse), grey black						
			6.0				Terminated						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

REC GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH05
SHEET 1 OF 1

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259365	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6942908	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0–6.0				BASALT, sandy (fine - coarse) GRAVEL (fine - coarse), grey black						
			6.0				Terminated						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG		BOREHOLE No.: IWL-BH10 SHEET 1 OF 1

GEOTECHNICAL AND TAILINGS

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259265	Surface RL:			
Equipment:	RC	Hole Length:		Northing:	6942743	Datum:	GDA94 Zone 51		

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							BASALT, grey black gravel, sand fragments (fine - coarse grained)						
			1.0										
			2.0										
			3.0										
			4.0										
			5.0										
			6.0				Terminated						
			7.0										
			8.0										
			9.0										

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH11

SHEET 1 OF 1

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259365	Surface RL:			
Equipment:	RC	Hole Length:		Northing:	6942743	Datum:	GDA94 Zone 51		

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0 – 2.0				CALCRETE, sandy (fine - coarse) GRAVEL (fine - coarse), red brown cream, becoming LATERITE, cemented in final 1.0 m						
			2.0 – 4.0				LATERITE, silty SAND, low - medium plasticity, red brown						
			4.0 – 5.0				SAPROLITE, pale brown with some red brown cream, BASALT fragments						
			5.0 – 6.0				BASALT, GRAVEL (fine - coarse), grey black						
			6.0				Terminated						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG		BOREHOLE No.: IWL-BH12 SHEET 1 OF 1

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259465	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6942743	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0 – 3.0				CALCRETE, sandy (fine - coarse) GRAVEL (fine - coarse), red brown cream, becoming LATERITE, cemented in final 2.0 m, with trace clear gypsum						
			3.0 – 6.0				SAPROLITE, grey black, with BASALT fragments, GRAVEL (fine - coarse), tending towards BASALT in final 1.0 m						
			6.0				Terminated						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH13

SHEET 1 OF 1

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259565	Surface RL:			
Equipment:	RC	Hole Length:		Northing:	6942743	Datum:	GDA94 Zone 51		

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0–2.0				BASALT, sandy (fine - coarse) GRAVEL (fine - coarse), grey black with some red brown CALCRETE/LATERITE						
			2.0–6.0				SAPROLITE, grey black, with BASALT fragments, Sandy (fine - coarse) GRAVEL (fine - coarse), tending towards BASALT in final 1.0 m						
			6.0				Terminated						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH14

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		
Contractor:	Top drill	Hole Width:	
Equipment:	RC	Hole Length:	Northing: 6942743 Datum: GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0 – 2.0				LATERITE, sandy (fine - coarse) GRAVEL (fine - coarse), red brown cream, minor grey black BASALT fragments						
			2.0 – 6.0				LATERITE, sandy (fine - coarse), gravelly (fine - coarse) CLAY, medium plasticity, red brown						
			6.0 –				LATERITE, CLAY with some sand (fine - coarse), high plasticity, red brown						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH14

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259665	Surface RL:		
Equipment:	RC	Hole Length:		Northing:	6942743	Datum:	GDA94 Zone 51	

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							...continued						
			11.0										
			12.0										
			13.0										
			14.0										
			15.0										
			16.0										
			17.0										
			18.0										
			19.0										

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	[redacted]	
LOCATION:	Bellevue Gold Project		
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259665	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6942743	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							...continued						
			21.0										
			22.0				SAPROLITE, yellow brown						
			23.0										
			24.0				Terminated						
			25.0										
			26.0										
			27.0										
			28.0										
			29.0										

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH23

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259865	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6942291	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0–2.0				LATERITE, gravelly (fine - coarse) SAND (fine - coarse), trace clay, low plasticity						
			2.0–4.0				LATERITE, gravelly (fine - coarse) SAND (fine - coarse), trace clay, low plasticity, trace grey black BASALT fragments						
			4.0–6.0				SAPROLITE, CLAY, medium plasticity, brown						
			6.0–				SAPROLITE, CLAY, medium plasticity, cream brown						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH23

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259865	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6942291	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							...continued						
			11.0										
			12.0				SAPROLITE, grey yellow brown						
			13.0										
			14.0										
			15.0										
			16.0										
			17.0										
			18.0				Terminated						
			19.0										

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH22

CLIENT: Bellevue Gold Limited
PROJECT: Geotechnical Services
LOCATION: Bellevue Gold Project
JOB NUMBER: P19-11-PR-05

DATE COMMENCED: 8/05/2021
DATE COMPLETED: 8/05/2021
[redacted]

Contractor: Top drill | Hole Width: | Easting: 259765 | Surface RL:
Equipment: RC | Hole Length: | Northing: 6942291 | Datum: GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0 – 1.0				LATERITE, sandy (fine - coarse) GRAVEL (fine - coarse), red brown cream						
			1.0 – 3.0				LATERITE, clayey SAND (fine-coarse) with gravel (fine - coarse), red brown cream						
			3.0 – 5.0				LATERITE, CLAY, low plasticity, red brown grey						
			5.0 – 8.0				LATERITE, sandy (fine - coarse) CLAY with some gravel (fine - coarse), red brown, with minor black grey BASALT fragments						
			8.0 –				SAPROLITE, gravelly (fine), sandy (fine - coarse) CLAY, grey brown, with minor grey black BASALT fragments						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH22

SHEET 2 OF 2

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259765	Surface RL:			
Equipment:	RC	Hole Length:		Northing:	6942291	Datum:	GDA94 Zone 51		

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							...continued						
			11.0										
			12.0										
			13.0										
			14.0										
			15.0										
			16.0										
			17.0										
			18.0				Terminated						
			19.0										

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH26

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		
Contractor:	Top drill	Hole Width:	
Equipment:	RC	Hole Length:	
Northing:	6942191	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0 – 2.0				LATERITE, sandy (fine - coarse) GRAVEL (fine - coarse), red brown cream, with trace grey black BASALT fragments, more so CALCRETE in top 1.0 m						
			2.0 – 4.0				LATERITE, sandy (fine - coarse) CLAY with gravel (fine - coarse), medium plasticity, red brown cream						
			4.0 –				LATERITE, low plasticity, red brown, BASALT cobbles at 7.0 - 8.0 m						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

REC GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH26

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:					
Equipment:	RC	Hole Length:		Northing:	6942191	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			11.0				SAPROLITE, CLAY, grey yellow, with minor grey black BASALT fragments						
			12.0				Terminated						
			13.0										
			14.0										
			15.0										
			16.0										
			17.0										
			18.0										
			19.0										

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH27

SHEET 1 OF 1

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259665	Surface RL:			
Equipment:	RC	Hole Length:		Northing:	6942091	Datum:	GDA94 Zone 51		

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0 – 2.0				LATERITE, clayey GRAVEL (fine - medium) with sand (fine - medium), medium - high plasticity, red brown cream, with minor grey black BASALT fragments, more so CALCRETE in top 1.0 m tending to become more clayey						
			2.0 – 5.0				LATERITE, clayey GRAVEL (fine - medium) with sand (fine - medium), medium plasticity, red brown, with minor grey black BASALT fragments						
			5.0 – 6.0				SAPROLITE, grey brown, with minor grey black BASALT fragments						
			6.0				Terminated						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH35
SHEET 1 OF 1

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		
Contractor: Top drill	Hole Width:	Easting: 259670	Surface RL:
Equipment: RC	Hole Length:	Northing: 6941996	Datum: GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0 – 3.0				LATERITE, gravelly (fine - coarse) SAND (fine - coarse) with clay, red brown cream, medium plasticity, quartz/gypsum fragements in final 1.0 m, more so CALCRETE in top 1.0 m						
			3.0 – 5.0				LATERITE, clayey, gravelly (fine - medium) SAND (fine- coarse), medium plasticity, red brown, with minor grey black BASALT fragments						
			5.0 – 6.0				SAPROLITE, grey, with grey black BASALT fragments						
			6.0				Terminated						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH29
SHEET 1 OF 1

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259565	Surface RL:			
Equipment:	RC	Hole Length:		Northing:	6941991	Datum:	GDA94 Zone 51		

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							BASALT, sandy (fine - coarse) GRAVEL (fine - coarse), grey black						
			1.0										
			2.0										
							Terminated						
			3.0										
			4.0										
			5.0										
			6.0										
			7.0										
			8.0										
			9.0										

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH25

SHEET 1 OF 1

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259665	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6942191	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0–4.0				BASALT, sandy (fine - coarse) GRAVEL (fine - coarse), grey black						
			4.0				Terminated						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

REC GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH32

SHEET 1 OF 1

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259661	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6942290	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0–2.0				CALCRETE/LATERITE, sandy (fine - coarse) GRAVEL (fine - coarse), red brown cream, interbedded with grey black BASALT fragments						
			2.0–7.0				BASALT, sandy (fine- coarse) GRAVEL (fine - coarse), grey black, interbedded with pale brown clay of high plasticity						
			7.0–10.0				SAPROLITE, grey black, with BASALT fragments						
			10.0				Terminated						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH20

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259765	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6942391	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0 – 2.0				CALCRETE, sandy (fine - coarse) GRAVEL (fine - coarse) with clay, low plasticity, cream red brown						
			2.0 – 7.0				LATERITE, CLAY, medium - high plasticity, red brown, trace CALCRETE and BASALT fragments, trace organics from 5.0 - 6.0 m						
			7.0 –				SAPROLITE, CLAY, medium - high plasticity, yellow brown, with minor grey black BASALT fragments and gypsum						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH20

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259765	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6942391	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							...continued						
			11.0										
			12.0				SAPROLITE, CLAY, low - medium plasticity, grey brown, with BASALT fragments						
			13.0										
			14.0										
			15.0										
			16.0										
			17.0										
			18.0				Terminated						
			19.0										

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH19

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259865	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6942391	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0 – 3.0				CALCRETE, sandy (fine - coarse) GRAVEL (fine - coarse), cream red brown						
			3.0 – 6.0				SAPROLITE, CLAY, high plasticity, cream brown purple						
			6.0 –				LATERITE, CLAY, with sand (fine - coarse) and gravel (fine - coarse), medium - high plasticity, red brown						

Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH19

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259865	Surface RL:			
Equipment:	RC	Hole Length:		Northing:	6942391	Datum:	GDA94 Zone 51		

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							...continued						
			11.0				SAPROLITE, brown grey						
			12.0										
			13.0				SAPROLITE, grey yellow						
			14.0										
			15.0										
			16.0										
			17.0										
			18.0				Terminated						
			19.0										

BOREHOLE LOG

GEOTECHNICAL AND TAILINGS

BOREHOLE No.: IWL-BH08

CLIENT: Bellevue Gold Limited
PROJECT: Geotechnical Services
LOCATION: Bellevue Gold Project
JOB NUMBER: P19-11-PR-05

DATE COMMENCED: 8/05/2021
DATE COMPLETED: 8/05/2021

[redacted]

Contractor: Top drill | Hole Width: | Easting: 259665 | Surface RL:
Equipment: RC | Hole Length: | Northing: 6942907 | Datum: GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0–3.0				LATERITE, sandy (fine - coarse) GRAVEL (fine - coarse) with clay, low plasticity, red brown cream, trace white gypsum, minor grey black BASALT fragments, interbedded with some CALCRETE						
			3.0–4.0				LATERITE, gravelly (fine - coarse) SAND (fine - coarse) with clay, low plasticity, red brown						
			4.0–				SAPROLITE, yellow grey, with grey black BASALT fragments						

Depth scale (m): 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0

BOREHOLE LOG

BOREHOLE No.: IWL-BH08

GEOTECHNICAL AND TAILINGS

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	8/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	8/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-05		

Contractor:	Top drill	Hole Width:		Easting:	259665	Surface RL:	
Equipment:	RC	Hole Length:		Northing:	6942907	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							SAPROLITE, grey, with grey black BASALT fragments						
			11.0										
			12.0										
							Terminated						
			13.0										
			14.0										
			15.0										
			16.0										
			17.0										
			18.0										
			19.0										

EXCAVATION LOG

GEOTECHNICAL AND TAILINGS

TEST PIT No.: C-TP01

SHEET 1 OF 1

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	21/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	21/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-08		

Contractor:	Hole Width:	Easting:	259093	Surface RL:	
Equipment:	Hole Length:	Northing:	6942819	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							Silty SAND / sandy SILT, fine to medium-grained, low plasticity, red-brown, with organic roots.						
			0.5				CALCRETE, medium - coarse grained, white-brown to yellow-brown, indistinct fabric, with some dolerite gravels, low - medium strength, moderately - slightly weathered.						
			1.0										
							Terminated						
			1.5										
			2.0										
			2.5										
			3.0										
			3.5										
			4.0										
			4.5										

EXCAVATION LOG

GEOTECHNICAL AND TAILINGS

TEST PIT No.: C-TP02A

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	21/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	21/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-08		

Contractor:	Hole Width:	Easting:	259096	Surface RL:	
Equipment:	Hole Length:	Northing:	6942523	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							Silty SAND / sandy SILT, fine to medium-grained, low plasticity, red-brown, with organic roots.						
			0.5				CALCRETE, cream mottledred brown grey, friable localised interbudding with BASALT gravels and cobbles, SW VS, grey black. As soil dry- moist, sandy (fine-medium) GRAVEL (fine- coarse grained) with silt, pale brown cream						
			1.0										
							Terminated						
			1.5										
			2.0										
			2.5										
			3.0										
			3.5										
			4.0										
			4.5										

EXCAVATION LOG

GEOTECHNICAL AND TAILINGS

TEST PIT No.: C-TP03A

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	21/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	21/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-08		

Contractor:	Hole Width:	Easting:	259498	Surface RL:	
Equipment:	Hole Length:	Northing:	6942204	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							Silty SAND / sandy SILT, fine to medium-grained, low plasticity, red-brown, with organic roots.						
			0.5				CALCRETE, medium - coarse grained, white-brown to yellow-brown, indistinct fabric, with some dolerite gravels, low - medium strength, moderately - slightly weathered.						
			1.0				Terminated						
			1.5										
			2.0										
			2.5										
			3.0										
			3.5										
			4.0										
			4.5										

EXCAVATION LOG

TEST PIT No.: C-TP04A

SHEET 1 OF 1

GEOTECHNICAL AND TAILINGS

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	21/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	21/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-08		

Contractor:		Hole Width:		Easting:	259498	Surface RL:	
Equipment:		Hole Length:		Northing:	6943199	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
			0.0–0.5				Silty SAND / sandy SILT, fine to medium-grained, low plasticity, red-brown, with organic roots.						
			0.5–1.0				CALCRETE, medium - coarse grained, white-brown to yellow-brown, indistinct fabric, with some dolerite gravels, low - medium strength, moderately - slightly weathered.						
			1.0				Terminated						

Depth scale (m): 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5

EXCAVATION LOG

GEOTECHNICAL AND TAILINGS

TEST PIT No.: C-TP05

SHEET 1 OF 1

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	21/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	21/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-08		

Contractor:	Hole Width:	Easting:	259569	Surface RL:	
Equipment:	Hole Length:	Northing:	6942995	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							Silty SAND / sandy SILT, fine to medium-grained, low plasticity, red-brown, with organic roots.						
			0.5				CALCRETE, medium - coarse grained, white-brown to yellow-brown, indistinct fabric, with some dolerite gravels, low - medium strength, moderately - slightly weathered.						
			1.0				Terminated						
			1.5										
			2.0										
			2.5										
			3.0										
			3.5										
			4.0										
			4.5										

EXCAVATION LOG

GEOTECHNICAL AND TAILINGS

TEST PIT No.: C-TP06

SHEET 1 OF 1

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	21/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	21/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-08		

Contractor:	Hole Width:	Easting:	259354	Surface RL:	
Equipment:	Hole Length:	Northing:	6943093	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							Silty SAND / sandy SILT, fine to medium-grained, low plasticity, red-brown, with organic roots.						
			0.5				CALCRETE, medium - coarse grained, white-brown to yellow-brown, indistinct fabric, with some dolerite gravels, low - medium strength, moderately - slightly weathered.						
			1.0										
			1.5				Terminated						
			2.0										
			2.5										
			3.0										
			3.5										
			4.0										
			4.5										

EXCAVATION LOG

TEST PIT No.: C-TP07
SHEET 1 OF 1

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	21/05/2021
PROJECT:	Geotechnical Services	[redacted]	
LOCATION:	Bellevue Gold Project		
JOB NUMBER:	P19-11-PR-08		

Contractor:	Hole Width:	Easting:	259624	Surface RL:	
Equipment:	Hole Length:	Northing:	6942786	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							Silty SAND / sandy SILT, fine to medium-grained, low plasticity, red-brown, with organic roots.						
			0.5										
							CALCRETE, medium - coarse grained, white-brown to yellow-brown, indistinct fabric, with some dolerite gravels, low - medium strength, moderately - slightly weathered.						
			1.0										
							Terminated						
			1.5										
			2.0										
			2.5										
			3.0										
			3.5										
			4.0										
			4.5										

EXCAVATION LOG

GEOTECHNICAL AND TAILINGS

TEST PIT No.: C-TP08
SHEET 1 OF 1

CLIENT:	Bellevue Gold Limited	DATE COMMENCED:	21/05/2021
PROJECT:	Geotechnical Services	DATE COMPLETED:	21/05/2021
LOCATION:	Bellevue Gold Project	[redacted]	
JOB NUMBER:	P19-11-PR-08		

Contractor:	Hole Width:	Easting:	259622	Surface RL:	
Equipment:	Hole Length:	Northing:	6942532	Datum:	GDA94 Zone 51

Method	Support	Duration (mins)	R.L.: (m) Depth (m)	Geological Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency/ Strength	Weathering/ Cementation	Sample/ Test	Field Records/Comments	Water
							Silty SAND / sandy SILT, fine to medium-grained, low plasticity, red-brown, with organic roots.						
			0.5				CALCRETE, medium - coarse grained, white-brown to yellow-brown, indistinct fabric, with some dolerite gravels, low - medium strength, moderately - slightly weathered.						
			1.0										
							Terminated						
			1.5										
			2.0										
			2.5										
			3.0										
			3.5										
			4.0										
			4.5										

Resource Engineering Consultants
B/355 Scarborough Beach Rd, Osborne Park, WA, 6017
Phone: (08) 6444 7988

Geotechnical Log - Borehole

BH01

UTM	: 51	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259712.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6943074.00	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 40.5 m BGL	Date	: 08/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples: SPT	Samples: UDS	Testing: SPT	Remarks: Field Records/Comments
PQ DIAMOND DRILLING		0 – 0.5	Soil		SP	Soil- SP: Gravelly SAND, fine grained, fine to medium sized gravel, with low to medium plasticity clay, red brown, moist, loose to medium dense.	M	L-MD				
		0.5 – 2.0	Duricrust		ML	Duricrust- Clayey SILT, low to medium plasticity, red brown, dry, stiff to very stiff, with fine to medium sized gravel, with fine to coarse grained sand.	D	St-VSt	SPT (1.5 – 1.95)		11,15,12 (N=27)	
		2.0 –	Rock		BAS	ROCK- BASALT: very fine to fine grained, pale grey, very low to low strength, distinctly weathered, distinct.		VLS-LS	SPT (3.0 – 3.45)	UDS 1	7,11,16 (N=27)	
									SPT (4.5 – 4.95)		9,19,17 (N=36)	

N Value Graph

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consolo cohesion
CF undrained consolo friction angle
FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

Resource Engineering Consultants
B/355 Scarborough Beach Rd, Osborne Park, WA, 6017
Phone: (08) 6444 7988

Geotechnical Log - Borehole
BH01

UTM	: 51	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259712.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6943074.00	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 40.5 m BGL	Date	: 08/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples SPT	Samples UDS	Testing SPT	N Value Graph	Remarks Field Records/Comments
PQ DIAMOND DRILLING		5.5–10 (6, 7, 8, 9)	Rock		BAS	ROCK- BASALT: very fine to fine grained, pale grey, very low to low strength, distinctly weathered, distinct.		VLS-LS		UDS 2	8,8,33 (N=41); 33/15mm (N=>50)		

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consols cohesion
- CF undrained consols friction angle
- FH falling head permeability
- CH constan head permeability
- CBR californian bearing ratio

Resource Engineering Consultants
B/355 Scarborough Beach Rd, Osborne Park, WA, 6017
Phone: (08) 6444 7988

Geotechnical Log - Borehole
BH01

UTM	: 51	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259712.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6943074.00	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 40.5 m BGL	Date	: 08/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples SPT	Samples UDS	Testing SPT	N Value Graph (0 10 20 30 40 50)	Remarks Field Records/Comments
PQ DIAMOND DRILLING		10.0–13.5 (11, 12, 13)	Rock		BAS	ROCK- BASALT: very fine to fine grained, pale grey, very low to low strength, distinctly weathered, distinct.		VLS-LS					
		13.5–15.0 (14)	Rock		Sapro	ROCK- SAPROLITE: very fine to fine grained, pale green, lamination fabric, very low to low strength, distinctly weathered, distinct.		VLS-LS					

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consolo cohesion
CF undrained consolo friction angle
FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

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B/355 Scarborough Beach Rd, Osborne Park, WA, 6017
Phone: (08) 6444 7988

Geotechnical Log - Borehole
BH01

UTM	: 51	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259712.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6943074.00	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 40.5 m BGL	Date	: 08/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples SPT	Samples UDS	Testing SPT	N Value Graph (0 10 20 30 40 50)	Remarks Field Records/Comments
PQ DIAMOND DRILLING		16, 17, 18, 19	Rock		Sapro	ROCK- SAPROLITE: very fine to fine grained, pale green, lamination fabric, very low to low strength, distinctly weathered, distinct.		VLS-LS					

Method	
EX	excavator
BH	backhoe bucket
NE	natural exposure
EE	existing xcavation
RP	ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency

VS	Very soft
S	Soft
F	Firm
St	Stiff
VSt	Very stiff
H	Hard

Density

VL	Very loose
L	Loose
MD	Medium dense
D	Dense
VD	Very dense

Moisture

D	Dry
M	Moist
W	Wet
PL	plastic limit
LL	liquid limit

Soil Samples

B	bulk
D	disturbed
U(63)	U(63) push tube
U(50)	U(50) push tube
WS	water

In Situ Testing

PP	pen penetrometer
VS	vane shear
DCP	dynamic cone penetrometer

Laboratory Results

UC	undrained unconsol cohesion
UF	undrained unconsol friction angle
MC	moisture content
DD	dry density
LL	liquid limit
PL	plastic limit
LS	linear shrinkage
CC	undrained consols cohesion
CF	undrained consols friction angle
FH	falling head permeability
CH	constan head permeablity
CBR	californian bearing ratio

Resource Engineering Consultants
B/355 Scarborough Beach Rd, Osborne Park, WA, 6017
Phone: (08) 6444 7988

Geotechnical Log - Borehole
BH01

UTM	: 51	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259712.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6943074.00	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 40.5 m BGL	Date	: 08/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples SPT	Samples UDS	Testing SPT	N Value Graph (0 10 20 30 40 50)	Remarks Field Records/Comments
PQ DIAMOND DRILLING		21, 22	Rock		Sapro	ROCK- SAPROLITE: very fine to fine grained, pale green, lamination fabric, very low to low strength, distinctly weathered, distinct.		VLS-LS			30/60mm,0,0 (N=)		
						Commenced Coring at 23m							

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consols cohesion
CF undrained consols friction angle
FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

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Geotechnical Log - Borehole

BH01

UTM	: 51	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259712.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6943074.00	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 40.5 m BGL	Date	: 08/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS LS MS HS VHS EHS)	Testing SPT	RQD% and TCR%	Defect Spacing (mm) (30 100 300 1000 3000)	Defect Description
		21										
		22										
		23				Commenced Coring at 23m						
PQ DIAMOND (ROCK)		24	Rock		Sapro	ROCK- SAPROLITE: very fine to fine grained, pale green, lamination fabric, very low to low strength, distinctly weathered, distinct,				RQD = 62% TCR = 100%; RQD = 73% TCR = 100%		IR, VR, Stained,Coating, , Heavily fractured Basalt Pale Grey High strength High quartz mineral content in join face,

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
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OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
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VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consolo cohesion
CF undrained consolo friction angle
FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

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Geotechnical Log - Borehole
BH01

UTM	: 51	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259712.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6943074.00	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 40.5 m BGL	Date	: 08/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS, LS, MS, HS, VHS, EHS)	Testing SPT	RQD% and TCR%	Defect Spacing (mm) (30, 100, 300, 1000, 3000)	Defect Description
PQ DIAMOND (ROCK)			Rock		Sapro	ROCK- SAPROLITE: very fine to fine grained, pale green, lamination fabric, very low to low strength, distinctly weathered, distinct.				RQD = 73% TCR = 100%		J, 50°, Planar,Undulating, SO, CT, , <1 mm Infill.
		26	Rock		Sapro	ROCK- SAPROLITE: fine grained, pale green, medium strength, distinctly weathered, indistinct, moist, 23.6 to 24.3 highly fractured moderately weathered high strength basalt pale grey spacing 30 to 50 mm spacing joints 0 degree vr ct/s high quartz mineral content.	DW			RQD = 70% TCR = 100%		Planar,Undulating, Rough,Smooth, STN, OP, Moderately-slightly weathered. Basalt. Joint spacing 50mm - 150mm 25.5-25.8 and 33.0-33.3 Near rectical JT (60) running middle of the core. 31-32 Extremely weathered Basalt, very low strength, crumbles under finger-some portion. JT spacing 50 mm 60' angle running vertical accross core 1mm infill seams JT clay brown and green medium plastic, moist.
		27								RQD = 50% TCR = 100%		
		28										
		29								RQD = 58.67% TCR = 100%		

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consolo cohesion
CF undrained consolo friction angle
FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

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Geotechnical Log - Borehole
BH01

UTM	: 51	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259712.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6943074.00	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 40.5 m BGL	Date	: 08/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength	SPT	RQD% and TCR%	Defect Spacing (mm)	Defect Description
PQ DIAMOND (ROCK)		31, 32, 33, 34	Rock		Sapro	ROCK- SAPROLITE: fine grained, pale green, medium strength, distinctly weathered, indistinct, moist, 23.6 to 24.3 highly fractured moderately weathered high strength basalt pale grey spacing 30 to 50 mm spacing joints 0 degree vr cl/s high quartz mineral content.	DW	MS		RQD = 26.67% TCR = 86.67%; RQD = 66.67% TCR = 100%; RQD = 46.67% TCR = 100%		J, 30°, PL, RO, STN, OP,
			Rock		BAS	ROCK- BASALT: fine grained, grey, high to very high strength, moderately to fresh weathered.	MW-F	HS–VHS		RQD = 82.67% TCR = 100%		

Estimated Strength scale: VLS, LS, MS, HS, VHS, EHS
Defect Spacing scale: 30, 100, 300, 1000, 3000

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consolo cohesion
- CF undrained consolo friction angle
- FH falling head permeability
- CH constan head permeability
- CBR californian bearing ratio

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Geotechnical Log - Borehole

BH01

UTM	: 51	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259712.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6943074.00	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 40.5 m BGL	Date	: 08/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS, LS, MS, HS, VHS, EHS)	Testing SPT	RQD% and TCR%	Defect Spacing (mm) (30, 100, 300, 1000, 3000)	Defect Description
PQ DIAMOND (ROCK)		36 – 39	Rock		BAS	ROCK- BASALT: fine grained, grey, high to very high strength, moderately to fresh weathered.	MW-F			RQD = 82.67% TCR = 100%		J, Planar,Irregular, RO, Veneer,Stained, OP, J, 50°, Planar,Undulating, RO, STN, ,
										RQD = 90.67% TCR = 100%		J, 30°, Planar,Undulating, RO, STN, ,
										RQD = 87.33% TCR = 100%		J, 30°, PL, Rough,Smooth, Stained,Clean, OP, J, 60°, PL, Rough,Smooth, CL, OP,
										RQD = 100% TCR = 100%		

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
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MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consols cohesion
- CF undrained consols friction angle
- FH falling head permeability
- CH constan head permeability
- CBR californian bearing ratio

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Geotechnical Log - Borehole
BH01

UTM	: 51	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259712.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6943074.00	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 40.5 m BGL	Date	: 08/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS, LS, MS, HS, VHS, EHS)	Testing: SPT	RQD% and TCR%	Defect Spacing (mm) (30, 100, 300, 1000, 3000)	Defect Description
			Rock		BAS	ROCK- BASALT: fine grained, grey, high to very high strength, moderately to fresh weathered.	MW-F	HS–VHS		RQD = 100% TCR = 100%		
						BH01 Terminate at 40.5m						

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
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OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consols cohesion
CF undrained consols friction angle
FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

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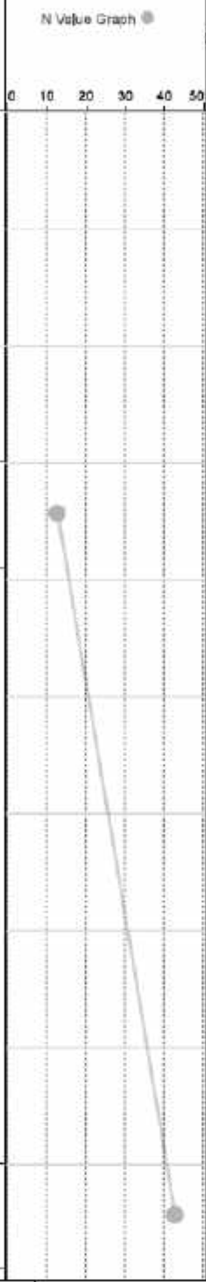
Geotechnical Log - Borehole
BH02

UTM	: 51 J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259807.22	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6942935.64	Logged By	: MK	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	: JB	Location	: Bellevue WA
Total Depth	: 45.8 m BGL	Date	: 08/12/2024	Loc Comment	: On top of ex access road

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples: SPT	Samples: UDS	Testing: SPT	N Value Graph	Remarks: Field Records/Comments
PQ DIAMOND (SOIL)		0 – 1.7	Fill		CL-CI	Fill Gravelly CLAY CL-CI: low to medium plasticity, red brown, stiff, fine to medium sized gravel, inorganic, moist, top of road, laterite fill material. 0.5 m spout and 0.5 m washed core loss.	M	St					
		1.5									17,7,6 (N=13)		
		1.7 – 3.8	Fill			Fill GRAVEL grey, dense to very dense, fine to coarse sized, dry, waste rock fill.	D	D-VD					
		3.8 –	Duricrust		SC	Duricrust- SC: Clayey to silty SAND, fine to medium grained, low plasticity clay, red brown, very dense, duricrust parent rock is basalt. calcrete, fine to medium grain, white cream interbedded in 50 mm thick and 200 to 300 mm spacing in red brown duricrust, fragments cannot be broken by finger. quartz fragments occasionally occurring. portion between 5.4 to 5.5 is extremely weathered duricrust, some has soil properties, fine medium silty sand trace clay, dry, low to medium plastic, stiff to very stiff.	D	VD					
		4.8									8,16,27 (N=43)		



Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
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Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
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- LS linear shrinkage
- CC undrained consolo cohesion
- CF undrained consolo friction angle
- FH falling head permeability
- CH constan head permeablity
- CBR californian bearing ratio

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Geotechnical Log - Borehole
BH02

UTM	: 51 J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259807.22	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6942935.64	Logged By	: MK	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	: JB	Location	: Bellevue WA
Total Depth	: 45.8 m BGL	Date	: 06/12/2024	Loc Comment	: On top of ex access road

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples SPT	Samples UDS	Testing SPT	Remarks Field Records/Comments
PQ DIAMOND (SOIL)		6, 7, 8	Duricrust		SC	Duricrust- SC: Clayey to silty SAND, fine to medium grained, low plasticity clay, red brown, very dense, duricrust parent rock is basalt, calcrete, fine to medium grain, white cream interbedded in 50 mm thick and 200 to 300 mm spacing in red brown duricrust, fragments cannot be broken by finger, quartz fragments occasionally occurring. portion between 5.4 to 5.6 is extremely weathered duricrust, some has soil properties, fine medium silty sand trace clay, dry, low to medium plastic, stiff to very stiff,	D	VD			23,27/110mm (N=>50); 18,32 (N=>50)	
			Duricrust		DUR	Duricrust DUR: pale yellow green, duricrust parent rock basalt, highly cemented.						
		9	Rock		Sapro	Extremely weathered, rock- Silty CLAY, medium plasticity, pale green, stiff, with fine to medium grained sand, occasionally occurring hard saprolite/duricrust transitional 150 mm length, distinctively weathered, medium strength.	M	St			15,21,20 (N=41)	UDS tube buckled at the bottom due to hard ground

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
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OH	org silts high plastic	Pt	peat of high org soils

Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consolo cohesion
- CF undrained consolo friction angle
- FH falling head permeability
- CH constan head permeability
- CBR californian bearing ratio

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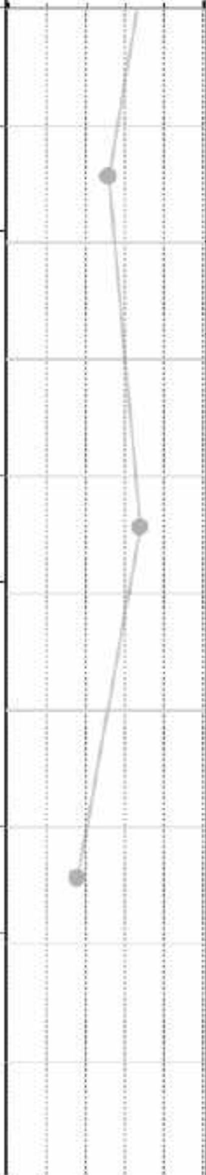
Geotechnical Log - Borehole
BH02

UTM	: 51 J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259807.22	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6942935.64	Logged By	: MK	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	: JB	Location	: Bellevue WA
Total Depth	: 45.8 m BGL	Date	: 08/12/2024	Loc Comment	: On top of ex access road

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples SPT	Samples UDS	Testing SPT	N Value Graph	Remarks Field Records/Comments
PQ DIAMOND (SOIL)		10–13	Rock		Sapro	Extremely weathered, rock- Silty CLAY, medium plasticity, pale green, stiff, with fine to medium grained sand, occasionally occurring hard saprolite/duricrust transitional 150 mm length, distinctively weathered, medium strength.	M	St					
		~10.7									9,11,15 (N=26)		
		~11.2								VS 2x80			Vane Shear 2 x 80 kPa
		~12.2									8,16,18 (N=34)		
		~12.7								VS 2x70			
		13–15	Rock		Sapro	ROCK- SAPROLITE: fine to medium grained, pale green and yellow, low to medium strength, highly weathered, moist/dry, band of iron staining outer surface of the core in some areas, natural defects can't be identified as the core breaks during handling.	M-D	LS-MS					
		~13.7									12,9,9 (N=18)		
		~14.2								VS 2x114 & VS res 2x22			



Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consolo cohesion
CF undrained consolo friction angle
FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

Resource Engineering Consultants
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Phone: (08) 6444 7988

Geotechnical Log - Borehole
BH02

UTM	: 51 J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259807.22	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6942935.64	Logged By	: MK	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	: JB	Location	: Bellevue WA
Total Depth	: 45.8 m BGL	Date	: 08/12/2024	Loc Comment	: On top of ex access road

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples: SPT	Samples: UDS	Testing: SPT	N Value Graph (0 10 20 30 40 50)	Remarks: Field Records/Comments
PQ DIAMOND (SOIL)		16 17	Rock		Sapro	ROCK- SAPROLITE: fine to medium grained, pale green and yellow, low to medium strength, highly weathered, moist/dry, band of iron staining outer surface of the core in some areas. natural defects can't be identified as the core breaks during handling.	M-D	LS-MS		450 recovered 130 at bottom UDS, rest caught from SPT outer cut dropped	8,12,20 (N=32) 13,17,17 (N=34)		UDS tube recovered 450mm sample which of 130mm at the bottom is undisturbed material, above 130mm caught from SPT outer column failed to recover from drilling
						Commenced Coring at 17.3m							

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
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GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
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OH	org silts high plastic	Pt	peat of high org soils

Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consols cohesion
- CF undrained consols friction angle
- FH falling head permeability
- CH constan head permeablity
- CBR californian bearing ratio

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Geotechnical Log - Borehole
BH02

UTM	: 51 J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259807.22	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6942935.64	Logged By	: MK	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	: JB	Location	: Bellevue WA
Total Depth	: 45.8 m BGL	Date	: 06/12/2024	Loc Comment	: On top of ex access road

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS, LS, MS, HS, VHS, EHS)	RQD% and TCR%	Defect Graphic	Defect Spacing (mm) (30, 100, 300, 1000, 3000)	Defect Description
		16 17				Commenced Coring at 17.3m						P, 30°, Planar,Undulating, Rough,Smooth, Veneer,Coating, C, coating M-H plastic clay pale green,
PQ DIAMOND (ROCK)		18 19	Rock		Sapro	ROCK- SAPROLITE: very fine to medium grained, pale green yellow and grey, medium to high strength, highly to moderately weathered, slightly weathered basalt occurring occasionally with some breaking into fine gravels. 17.4 to 17.6 slightly weathered very high strength basalt. occasionally occurring fragmented basalt unit, moderately weathered medium to high strength. 30.25 - 30.65 highly to moderately weathered basalt, high strength. at 31.85m, 25mm thick quartz band at 32.0m, 10mm thick quartz band 32.4 - 37.0 pale green to pale yellow colour 37.0 - 38.0 pale yellow to cream colour 34.9 - 38.4 quartz occurring frequently in fragments at high quantity, medium to coarse gravel size, angular, some crush into fine to medium sand grains under finger pressure. 38.4 - 38.85 core loss due to rock jamming in tube 39.45 - 39.75 slightly weathered basalt, high to very high strength 39.95 - 40.15 highly to moderately weathered basalt, medium to high strength..	HW-MW					J, 45°, PL, Rough,Smooth, Veneer,Coating, , coating M-H plastic clay pale green, P, 45°, PL, SO, Veneer,Coating, C.

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
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MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consol cohesion
- CF undrained consol friction angle
- FH falling head permeability
- CH constan head permeablity
- CBR californian bearing ratio

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Geotechnical Log - Borehole
BH02

UTM	: 51 J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259807.22	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6942935.64	Logged By	: MK	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	: JB	Location	: Bellevue WA
Total Depth	: 45.8 m BGL	Date	: 06/12/2024	Loc Comment	: On top of ex access road

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS, LS, MS, HS, VHS, EHS)	RQD% and TCR%	Defect Graphic	Defect Spacing (mm) (30, 100, 300, 1000, 3000)	Defect Description
PQ DIAMOND (ROCK)		21 22 23 24	Rock		Sapro	ROCK- SAPROLITE: very fine to medium grained, pale green yellow and grey, medium to high strength, highly to moderately weathered, slightly weathered basalt occurring occasionally with some breaking into fine gravels. 17.4 to 17.6 slightly weathered very high strength basalt. occasionally occurring fragmented basalt unit, moderately weathered medium to high strength. 30.25 - 30.65 highly to moderately weathered basalt, high strength. at 31.85m, 25mm thick quartz band at 32.0m, 10mm thick quartz band 32.4 - 37.0 pale green to pale yellow colour 37.0 - 38.0 pale yellow to cream colour 34.9 - 38.4 quartz occurring frequently in fragments at high quantity, medium to coarse gravel size, angular, some crush into fine to medium sand grains under finger pressure. 38.4 - 38.85 core loss due to rock jamming in tube 39.45 - 39.75 slightly weathered basalt, high to very high strength 39.95 - 40.15 highly to moderately weathered basalt, medium to high strength..	HW-MW					J, 75°, PL, SO, Veneer,Coating, , coating M-H plastic clay pale green, J, IR, Rough,Smooth, Veneer,Coating, , coating M-H plastic clay pale green, J, IR, Rough,Smooth, Veneer,Coating, , coating M-H plastic clay pale green, J, 70°, Planar,Undulating, Rough,Smooth, Veneer,Coating, , coating M-H plastic clay pale green, J, 70°, Planar,Undulating, Veneer,Coating, , coating M-H plastic clay pale green

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
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OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consols cohesion
CF undrained consols friction angle
FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

rec

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Geotechnical Log - Borehole

BH02

UTM	: 51 J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259807.22	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6942935.64	Logged By	: MK	Project	: TSF GSI
Ground Elevation : Not Surveyed		Reviewed By	: JB	Location	: Bellevue WA
Total Depth	: 45.8 m BGL	Date	: 08/12/2024	Loc Comment	: On top of ex access road

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS, LS, MS, HS, VHS, EHS)	RQD% and TCR%	Defect Graphic	Defect Spacing (mm) (30, 100, 300, 1000, 3000)	Defect Description
PQ DIAMOND (ROCK)		26 27 28 29	Rock		Sapro	ROCK- SAPROLITE: very fine to medium grained, pale green yellow and grey, medium to high strength, highly to moderately weathered, slightly weathered basalt occurring occasionally with some breaking into fine gravels. 17.4 to 17.6 slightly weathered very high strength basalt. occasionally occurring fragmented basalt unit, moderately weathered medium to high strength. 30.25 - 30.65 highly to moderately weathered basalt, high strength. at 31.85m, 25mm thick quartz band at 32.0m, 10mm thick quartz band 32.4 - 37.0 pale green to pale yellow colour 37.0 - 38.0 pale yellow to cream colour 34.9 - 38.4 quartz occurring frequently in fragments at high quantity, medium to coarse gravel size, angular, some crush into fine to medium sand grains under finger pressure, 38.4 - 38.85 core loss due to rock jamming in tube 39.45 - 39.75 slightly weathered basalt, high to very high strength 39.95 - 40.15 highly to moderately weathered basalt, medium to high strength..	HW-MW					J, UN, Rough,Smooth, Veneer,Coating, , J, 20°, PL, Rough,Smooth, STN, , dark grey/black stain, J, 20°, PL, Rough,Smooth, STN, , dark grey/black stain, J, 50°, UN, RO, STN, , dark grey/black stain, J, 60°, PL, Smooth,Rough, VN, , M-H plastic clay, pale green and black, J, 40°, Undulating,Irregular, SO, CT, , M-H plastic clay, pale green, J, 45°, PL, SO, Veneer,Coating, , iron stained and M-H plastic clay, pale green,

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
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OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consols cohesion
- CF undrained consols friction angle
- FH falling head permeability
- CH constan head permeablity
- CBR californian bearing ratio

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Geotechnical Log - Borehole

BH02

UTM	: 51 J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
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Total Depth	: 45.8 m BGL	Date	: 08/12/2024	Loc Comment	: On top of ex access road

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VL, L, M, H, VH, EH)	RQD% and TCR%	Defect Graphic	Defect Spacing (mm) (30, 100, 300, 1000, 3000)	Defect Description
PQ DIAMOND (ROCK)		31, 32, 33, 34	Rock		Sapro	ROCK- SAPROLITE: very fine to medium grained, pale green yellow and grey, medium to high strength, highly to moderately weathered, slightly weathered basalt occurring occasionally with some breaking into fine gravels. 17.4 to 17.6 slightly weathered very high strength basalt. occasionally occurring fragmented basalt unit, moderately weathered medium to high strength. 30.25 - 30.65 highly to moderately weathered basalt, high strength. at 31.85m, 25mm thick quartz band at 32.0m, 10mm thick quartz band 32.4 - 37.0 pale green to pale yellow colour 37.0 - 38.0 pale yellow to cream colour 34.9 - 38.4 quartz occurring frequently in fragments at high quantity, medium to coarse gravel size, angular, some crush into fine to medium sand grains under finger pressure. 38.4 - 38.85 core loss due to rock jamming in tube 39.45 - 39.75 slightly weathered basalt, high to very high strength 39.95 - 40.15 highly to moderately weathered basalt, medium to high strength..	HW-MW					J, 20°, PL, Rough,Smooth, Veneer,Coating, ,

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

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GW	well graded gravels	SW	well graded sands
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B bulk
D disturbed
U(63) U(63) push tube
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In Situ Testing
PP pen penetrometer
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UC undrained unconsol cohesion
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Geotechnical Log - Borehole

BH02

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Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS, LS, MS, HS, VHS, EHS)	RQD% and TCR%	Defect Graphic	Defect Spacing (mm) (30, 100, 300, 1000, 3000)	Defect Description
PQ DIAMOND (ROCK)		36 37 38 39	Rock		Sapro	ROCK- SAPROLITE: very fine to medium grained, pale green yellow and grey, medium to high strength, highly to moderately weathered, slightly weathered basalt occurring occasionally with some breaking into fine gravels. 17.4 to 17.6 slightly weathered very high strength basalt. occasionally occurring fragmented basalt unit, moderately weathered medium to high strength. 30.25 - 30.65 highly to moderately weathered basalt, high strength. at 31.85m, 25mm thick quartz band at 32.0m, 10mm thick quartz band 32.4 - 37.0 pale green to pale yellow colour 37.0 - 38.0 pale yellow to cream colour 34.9 - 38.4 quartz occurring frequently in fragments at high quantity, medium to coarse gravel size, angular, some crush into fine to medium sand grains under finger pressure. 38.4 - 38.85 core loss due to rock jamming in tube 39.45 - 39.75 slightly weathered basalt, high to very high strength 39.95 - 40.15 highly to moderately weathered basalt, medium to high strength..	HW-MW		RQD = 21.33% TCR = 100%			J, 70°, PL, Rough,Smooth, Veneer,Veneer,Coati, 3mm calcite and clay. J, 20°, PL, Rough,Smooth, Veneer,Coating, C. 1mm calcite.

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
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Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
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In Situ Testing
PP pen penetrometer
VS vane shear
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Laboratory Results
UC undrained unconsol cohesion
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Geotechnical Log - Borehole
BH02

UTM	: 51 J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259807.22	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6942935.64	Logged By	: MK	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	: JB	Location	: Bellevue WA
Total Depth	: 45.8 m BGL	Date	: 08/12/2024	Loc Comment	: On top of ex access road

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength	RQD% and TCR%	Defect Graphic	Defect Spacing (mm)	Defect Description
PQ DIAMOND (ROCK)			Rock		Sapro	ROCK- SAPROLITE: very fine to medium grained, pale green yellow and grey, medium to high strength, highly to moderately weathered, slightly weathered basalt occurring occasionally with some breaking into fine gravels. 17.4 to 17.6 slightly weathered very high strength basalt. occasionally occurring fragmented basalt unit, moderately weathered medium to high strength, 30.25 - 30.65 highly to moderately weathered basalt, high strength. at 31.85m, 25mm thick quartz band at 32.0m, 10mm thick quartz band 32.4 - 37.0 pale green to pale yellow colour 37.0 - 38.0 pale yellow to cream colour 34.9 - 38.4 quartz occurring frequently in fragments at high quantity, medium to coarse gravel size, angular, some crush into fine to medium sand grains under finger pressure. 38.4 - 38.85 core loss due to rock jamming in tube 39.45 - 39.75 slightly weathered basalt, high to very high strength 39.95 - 40.15 highly to moderately weathered basalt, medium to high strength..	HW-MW		RQD = 21.33% TCR = 100%			J, 25°, Planar,Undulating, Rough,Very Rough, Veneer,Coating, , calcite,
		41	Rock		BAS		SW-F		RQD = 82% TCR = 100%			J, UN, RO, Veneer,Stained, , calcite, J, 30°, UN, RO, Veneer,Stained, , J, 55°, PL, Rough,Smooth, CT, , pale green clay,
		42				ROCK- BASALT: very fine grained, grey to dark grey, very high to extremely high strength, slightly to fresh weathered, remarkable quartz veins observed at 41.65m and 44.8m at 50 to 70 degrees.						
		43							RQD = 89.33% TCR = 100%			
		44							RQD = 55.33% TCR = 100%			

Estimated Strength: VLS, LS, MS, HS, VHS, EHS
Defect Spacing (mm): 30, 100, 300, 1000, 3000

Method		Water				Consistency		Moisture		In Situ Testing		Laboratory Results	
EX	excavator		complete water less		Level during drilling	VS	Very soft	D	Dry	PP	pen penetrometer	UC	undrained unconsol cohesion
BH	backhoe bucket		Water inflow	P	partial water loss	S	Soft	M	Moist	VS	vane shear	UF	undrained unconsol friction angle
NE	natural exposure		water level	N	none encountered	F	Firm	W	Wet	DCP	dynamic cone penetrometer	MC	moisture content
EE	existing xcavation					St	Stiff	PL	plastic limit			DD	dry density
RP	ripper					VSt	Very stiff	LL	liquid limit			LL	liquid limit
						H	Hard					PL	plastic limit

USC Classification				Density		Soil Samples		Laboratory Results	
GW	well graded gravels	SW	well graded sands	VL	Very loose	B	bulk	LS	linear shrinkage
GP	poorly graded gravels	SP	poorly graded sands	L	Loose	D	disturbed	CC	undrained consolo cohesion
GM	silty gravel	SM	silty sands	MD	Medium dense	U(63)	U(63) push tube	CF	undrained consolo friction angle
GC	clayey gravel	SC	clayey sands	D	Dense	U(50)	U(50) push tube	FH	falling head permeability
ML	inorg silts low plastic	CL	inorg clay low plastic	VD	Very dense	WS	water	CH	constan head permeablity
MH	inorg clay high plastic	CI	inorg clay med plastic					CBR	californian bearing ratio
OL	org silts low plastic	CH	inorg clay high plastic						
OH	org silts high plastic	Pt	peat of high org soils						

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Geotechnical Log - Borehole
BH02

UTM	: 51 J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259807.22	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6942935.64	Logged By	: MK	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	: JB	Location	: Bellevue WA
Total Depth	: 45.8 m BGL	Date	: 08/12/2024	Loc Comment	: On top of ex access road

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS, LS, MS, HS, VHS, EHS)	RQD% and TCR%	Defect Graphic	Defect Spacing (mm) (30, 100, 300, 1000, 3000)	Defect Description
PQ DIAMOND (ROCK)			Rock		BAS	ROCK- BASALT: very fine grained, grey to dark grey, very high to extremely high strength, slightly to fresh weathered, remarkable quartz veins observed at 41.65m and 44.6m at 50 to 70 degrees.	SW-F		RQD = 100% TCR = 100%			

BH02 Terminate at 45.8m

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consolo cohesion
CF undrained consolo friction angle
FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

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Phone: (08) 6444 7988

Geotechnical Log - Borehole

BH03

UTM	:	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 0.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 0.00	Logged By	: Muhammadh Khalid	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 39 m BGL	Date	: 14/12/2024	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples: SPT	Samples: UDS	Testing: SPT	N Value Graph (0 10 20 30 40 50)	Remarks: Field Records/Comments
PQ DIAMOND (SOIL)			Fill		SW	Fill Gravelly SAND SW: red brown, dense, fine to coarse grained, fine to medium sized gravel, with low plasticity silt, trace medium plasticity clay, moist to dry.	M-D	D					
		1	Fill		GP	Fill GRAVEL GP: grey, dense, coarse sized, rock fill, likely boulder.		D					

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consol cohesion
CF undrained consol friction angle
FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

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Geotechnical Log - Borehole

BH03

UTM	:	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 0.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 0.00	Logged By	: Muhammadh Khalid	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 39 m BGL	Date	: 14/12/2024	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples SPT	Samples UDS	Testing SPT	N Value Graph (0 10 20 30 40 50)	Remarks Field Records/Comments
PQ DIAMOND (SOIL)			Duricrust		ML	Duricrust- Clayey SILT, low to medium plasticity, red brown, dry, stiff to very stiff, with fine to medium sized gravel, trace fine to coarse grained sand, breaking during handling.	D	St-VSt					
		3	SAPROLITE		CI-CH	Saprolite- CLAY, medium to high plasticity, pale green and red brown mottled, moist, stiff to very stiff, breaking during handling.	M	St-VSt			3,3,2 (N=5)	●	

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water loss
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consols cohesion
CF undrained consols friction angle
FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

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Geotechnical Log - Borehole
BH03

UTM	:	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 0.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 0.00	Logged By	: Muhammadh Khalid	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 39 m BGL	Date	: 14/12/2024	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples SPT	Samples UDS	Testing SPT	N Value Graph (0 10 20 30 40 50)	Remarks Field Records/Comments
PQ DIAMOND (SOIL)		5	SAPROLITE		CI-CH	Saprolite- CLAY, medium to high plasticity, pale green and red brown mottled, moist, stiff to very stiff, breaking during handling.	M	St-VSt			5,7,9 (N=16)		

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consols cohesion
CF undrained consols friction angle
FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

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Geotechnical Log - Borehole

BH03

UTM	:	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 0.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 0.00	Logged By	: Muhammadh Khalid	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 39 m BGL	Date	: 14/12/2024	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples SPT	Samples UDS	Testing SPT	N Value Graph	Remarks Field Records/Comments
PQ DIAMOND (SOIL)		7	SAPROLITE		CI-CH	Saprolite- CLAY, medium to high plasticity, pale green and red brown mottled, moist, stiff to very stiff, breaking during handling.	M	St-VSt			4,6,9 (N=15); 2,3,5 (N=8)		

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification
GW well graded gravels
GP poorly graded gravels
GM silty gravel
GC clayey gravel
ML inorg silts low plastic
MH inorg clay high plastic
OL org silts low plastic
OH org silts high plastic
SW well graded sands
SP poorly graded sands
SM silty sands
SC clayey sands
CL inorg clay low plastic
CI inorg clay med plastic
CH inorg clay high plastic
Pt peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consol cohesion
CF undrained consolo friction angle
FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

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Geotechnical Log - Borehole
BH03

UTM	:	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 0.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 0.00	Logged By	: Muhammadh Khalid	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 39 m BGL	Date	: 14/12/2024	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples: SPT	Samples: UDS	Testing: SPT	N Value Graph	Remarks: Field Records/Comments
PQ DIAMOND (SOIL)		9	SAPROLITE		CI-CH	Saprolite- CLAY, medium to high plasticity, pale green and red brown mottled, moist, stiff to very stiff, breaking during handling.	M	St-VSt			6,8,6 (N=14)		
						Commenced Coring at 9.7m							

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water loss
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consolo cohesion
- CF undrained consolo friction angle
- FH falling head permeability
- CH constan head permeablity
- CBR californian bearing ratio

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Geotechnical Log - Borehole
BH03

UTM	:	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 0.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 0.00	Logged By	: Muhammadh Khalid	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 39 m BGL	Date	: 14/12/2024	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS, LS, MS, HS, VHS, EHS)	Testing: SPT	RQD% and TCR%	Defect Spacing (mm) (30, 100, 300, 1000, 3000)	Defect Description
		6										
		7										
		8										
		9				Commenced Coring at 9.7m						
PQ DIAMOND (ROCK)			Rock		Sapro	ROCK- SAPROLITE: very fine to fine grained, pale green and yellow brown, very low strength, highly weathered, 10mm red brown banding	HW	VLS				

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification
GW well graded gravels
GP poorly graded gravels
GM silty gravel
GC clayey gravel
ML inorg silts low plastic
MH inorg clay high plastic
OL org silts low plastic
OH org silts high plastic
SW well graded sands
SP poorly graded sands
SM silty sands
SC clayey sands
CL inorg clay low plastic
CI inorg clay med plastic
CH inorg clay high plastic
Pt peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consolo cohesion
CF undrained consolo friction angle
FH falling head permeability
CH constan head permeablity
CBR californian bearing ratio

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Geotechnical Log - Borehole
BH03

UTM	:	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 0.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 0.00	Logged By	: Muhammadh Khalid	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 39 m BGL	Date	: 14/12/2024	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS LS MS HS VHS EHS)	Testing: SPT	RQD% and TCR%	Defect Spacing (mm) (30 100 300 1000 3000)	Defect Description
PQ DIAMOND (ROCK)		11, 12, 13, 14	Rock		Sapro	ROCK- SAPROLITE: very fine to fine grained, pale green and yellow brown, very low strength, highly weathered, 10mm red brown banding similar to iron staining throughout, joint noted occurring along quartz vein (2mm) turning black, quartz dense zone 22.16-22.23m and 22.95-23.67m breaking into quartz fragments as fine gravel .	HW		8,12,8 (N=20); 7,8,10 (N=18); 8,11,17 (N=28)			

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consola cohesion
CF undrained consola friction angle
FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

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Geotechnical Log - Borehole
BH03

UTM	:	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 0.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 0.00	Logged By	: Muhammadh Khalid	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 39 m BGL	Date	: 14/12/2024	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VL S, LS, MS, HS, VHS, EHS)	Testing SPT	RQD% and TCR%	Defect Spacing (mm) (30, 100, 300, 1000, 3000)	Defect Description
PQ DIAMOND (ROCK)		15–19	Rock		Sapro	ROCK- SAPROLITE: very fine to fine grained, pale green and yellow brown, very low strength, highly weathered, 10mm red brown banding similar to iron staining throughout, joint noted occurring along quartz vein (2mm) turning black, quartz dense zone 22.16-22.23m and 22.95-23.67m breaking into quartz fragments as fine gravel .	HW	VLS	9,16,20 (N=36); 9,16,19 (N=35); 6,12,18 (N=30); 6,13,15 (N=28)			J, 80°, PL, SO, CT, , pale green clay,; J, 65°, Planar,Undulating, Smooth,Rough, CT, , pale green clay,

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consol cohesion
CF undrained consol friction angle
FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

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Phone: (08) 6444 7988

Geotechnical Log - Borehole
BH03

UTM	:	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 0.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 0.00	Logged By	: Muhammadh Khalid	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 39 m BGL	Date	: 14/12/2024	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS, LS, MS, HS, VHS, EHS)	Testing SPT	RQD% and TCR%	Defect Spacing (mm) (30, 100, 300, 1000, 3000)	Defect Description
PQ DIAMOND (ROCK)		21, 22, 23	Rock		Sapro	ROCK- SAPROLITE: very fine to fine grained, pale green and yellow brown, very low strength, highly weathered, 10mm red brown banding similar to iron staining throughout, joint noted occurring along quartz vein (2mm) turning black. quartz dense zone 22.16-22.23m and 22.95-23.67m breaking into quartz fragments as fine gravel.	HW		9,17,23 (N=40); 18,23,25 (N=48)			J, 60°, PL, Smooth,Rough, CT, , pale green clay, J, 40°, PL, SO, CT, , pale green clay to wax,
		24	Rock		QZ	ROCK- QUARTZ: fine to coarse grained, white cream and yellow mottled, low to medium strength, distinctly weathered, quartz intense, some crumbles under finger pressure into fine to medium size gravels.	DW		18,23,24 (N=47)			
			SAPROLITE		CI-CH	Saprolite- Gravelly CLAY, medium to high						

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consols cohesion
- CF undrained consols friction angle
- FH falling head permeability
- CH constan head permeablity
- CBR californian bearing ratio

rec

Resource Engineering Consultants
B/355 Scarborough Beach Rd, Osborne Park, WA, 6017
Phone: (08) 6444 7988

Geotechnical Log - Borehole

BH03

UTM	:	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 0.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 0.00	Logged By	: Muhammadh Khalid	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 39 m BGL	Date	: 14/12/2024	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS, LS, MS, HS, VHS, EHS)	Testing: SPT	RQD% and TCR%	Defect Spacing (mm) (30, 100, 300, 1000, 3000)	Defect Description
PQ DIAMOND (ROCK)	WATER INFLOW- 24.9 - 27.8 m likely water strike/water table	25.5 – 28	SAPROLITE		CI-CH	Saprolite- Gravelly CLAY, medium to high plasticity, pale green and yellow, stiff, medium sized gravel, crumbles under finger pressure into gravel (low strength rock properties) and clay (can be mould), possibly ground water or water strike around this profile.			8,12,24 (N=36); 22,28,0 (N=>50)			
		28	Rock		BAS	ROCK- BASALT: very fine grained, pale green to brown and grey, medium to high strength, highly to moderately weathered, iron staining and quartz veins and joints with coating of dark brown and pale green clay.	HW-MW					—70°, PL, SO, CT, OP, dark grey and pale green clay.
	WATER INFLOW- 28.6-29.0 m likely water strike/water table		SAPROLITE		CI-CH	Saprolite- CLAY, medium to high plasticity, pale green and yellow, very stiff, material washed out during drilling, possibly ground water or water strike.						
		29	Rock		BAS	ROCK- BASALT: very fine grained, grey, medium to high strength, highly to moderately weathered, closed joints weathered to clay infill, pale green.	HW-MW			RQD = 0% TCR = 100%		
			Rock		BAS	ROCK- BASALT: very fine to fine grained, pale green to yellow brown, low to medium strength, distinctly weathered, transitioning to saprolite.	DW					

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

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OH	org silts high plastic	Pt	peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
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UF undrained unconsol friction angle
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PL plastic limit
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CC undrained consol cohesion
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FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

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Geotechnical Log - Borehole
BH03

UTM	:	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 0.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 0.00	Logged By	: Muhammadh Khalid	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 39 m BGL	Date	: 14/12/2024	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS, LS, MS, HS, VHS, EHS)	Testing SPT	RQD% and TCR%	Defect Spacing (mm) (30, 100, 300, 1000, 3000)	Defect Description
PQ DIAMOND (ROCK)			Rock		BAS	ROCK- BASALT: very fine to fine grained, pale green to yellow brown, low to medium strength, distinctly weathered, transitioning to saprolite.	DW					
		31	Rock		BAS	ROCK- BASALT: very fine to fine grained, grey and yellow brown, medium to high strength, highly to moderately weathered, veins turning into infill/coating clay closed joints, yellow brown and pale green.	HW-MW			RQD = 0% TCR = 100%		
		32, 33, 34	Rock		BAS	ROCK- BASALT: very fine grained, grey, high to very high strength, moderately to slightly weathered, breaks at closed joints with firm hammer blow, joints pale green and yellow and cream (possibly kaolinite) veneer, clay and iron stain, multiple veins turning into joints occurring at 30-50mm spacing.	MW-SW			RQD = 10% TCR = 100%; RQD = 40% TCR = 100%; RQD = 46.67% TCR = 100%		Planar,Undulating, Rough,Smooth, Coating,Veneer, C. 1mm to 5mm thick veins turning to joint, orientations 0-5, 40, 80 pale green clay, kaolinite in some ,

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
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OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consolo cohesion
- CF undrained consolo friction angle
- FH falling head permeability
- CH constan head permeability
- CBR californian bearing ratio

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Geotechnical Log - Borehole

BH03

UTM	:	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 0.00	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 0.00	Logged By	: Muhammadh Khalid	Project	: TSF GSI
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 39 m BGL	Date	: 14/12/2024	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength	SPT	RQD% and TCR%	Defect Spacing (mm)	Defect Description
PQ DIAMOND (ROCK)			Rock		BAS	ROCK- BASALT: very fine grained, grey, high to very high strength, moderately to slightly weathered, breaks at closed joints with firm hammer blow, joints pale green and yellow and cream (possibly kaolinite) veneer, clay and iron stain, multiple veins turning into joints occurring at 30-50mm spacing.	MW-SW	H-VH		RQD = 46.67% TCR = 100%		
		36	Rock		BAS	ROCK- BASALT: very fine grained, grey, high to very high strength, moderately to slightly weathered, breaks at closed joints with firm hammer blow, joints pale green and yellow veneer, clay and iron stain, fewer veins, solid core fresh.	MW-SW	H-VH		RQD = 86.67% TCR = 100%		Planar, Undulating, RO, Veneer, Stained, C, <1mm thick veins turning to joint, orientations 0-5, 20, 40, VN - pale green clay, SN - iron stain,
		37										
		38								RQD = 100% TCR = 100%		
			Rock		BAS	ROCK- BASALT: very fine grained, grey, very high to extremely high strength, slightly to fresh weathered, closed joints, stained pale yellow, solid core fresh and extremely high strength, only breaks at closed joints/veins with firm hammer blow.	SW-F	VH-EH				

BH03 Terminate at 39m

Method		Water				Consistency		Moisture		In Situ Testing		Laboratory Results	
EX	excavator	◄	complete water loss	⊻	Level during drilling	VS	Very soft	D	Dry	PP	pen penetrometer	UC	undrained unconsol cohesion
BH	backhoe bucket	►	Water inflow	P	partial water loss	S	Soft	M	Moist	VS	vane shear	UF	undrained unconsol friction angle
NE	natural exposure	▼	water level	N	none encountered	F	Firm	W	Wet	DCP	dynamic cone penetrometer	MC	moisture content
EE	existing xcavation					St	Stiff	PL	plastic limit			DD	dry density
RP	ripper					VSt	Very stiff	LL	liquid limit			LL	liquid limit
						H	Hard					PL	plastic limit
												LS	linear shrinkage
												CC	undrained consolo cohesion
												CF	undrained consolo friction angle
												FH	falling head permeability
												CH	constan head permeablity
												CBR	californian bearing ratio

USC Classification

GW	well graded gravels	SW	well graded sands
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MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Density

VL	Very loose
L	Loose
MD	Medium dense
D	Dense
VD	Very dense

Soil Samples

B	bulk
D	disturbed
U(63)	U(63) push tube
U(50)	U(50) push tube
WS	water

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Geotechnical Log - Borehole

BH-04

UTM	: 51J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259761.82	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6941939.43	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: 470.90 (m)	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 54 m BGL	Date	: 10/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples: SPT	Samples: UDS	Testing: SPT	N Value Graph (0 10 20 30 40 50)	Remarks: Field Records/Comments
PQ DIAMOND DRILLING		0–5 (1, 2, 3, 4)	Fill		GP	Fill GRAVEL GP: grey, dense, coarse sized, waste embankment fill.		D					

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
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Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consolo cohesion
- CF undrained consolo friction angle
- FH falling head permeability
- CH constan head permeability
- CBR californian bearing ratio

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Geotechnical Log - Borehole
BH-04

UTM	: 51J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259761.82	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6941939.43	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: 470.90 (m)	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 54 m BGL	Date	: 10/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples: SPT	Samples: UDS	Testing: SPT	N Value Graph (0 10 20 30 40 50)	Remarks: Field Records/Comments
PQ DIAMOND DRILLING		6, 7, 8, 9	Fill		GP	Fill GRAVEL GP: grey, dense, coarse sized, waste embankment fill.		D					

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water loss
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
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Consistency
VS Very soft
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VSt Very stiff
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Density
VL Very loose
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D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
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CC undrained consolo cohesion
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FH falling head permeability
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CBR californian bearing ratio

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Geotechnical Log - Borehole
BH-04

UTM	: 51J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259761.82	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6941939.43	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: 470.90 (m)	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 54 m BGL	Date	: 10/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples: SPT	Samples: UDS	Testing: SPT	N Value Graph (0 10 20 30 40 50)	Remarks: Field Records/Comments
PQ DIAMOND DRILLING		11 – 14	Fill		GP	Fill GRAVEL GP: grey, dense, coarse sized, waste embankment fill.		D					

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
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Consistency
VS Very soft
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F Firm
St Stiff
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Density
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Moisture
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W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

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UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consola cohesion
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FH falling head permeability
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CBR californian bearing ratio

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Geotechnical Log - Borehole

BH-04

UTM	: 51J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
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Ground Elevation	: 470.90 (m)	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 54 m BGL	Date	: 10/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples: SPT	Samples: UDS	Testing: SPT	N Value Graph (0 10 20 30 40 50)	Remarks: Field Records/Comments
PQ DIAMOND DRILLING		16, 17, 18, 19	Fill		GP	Fill GRAVEL GP: grey, dense, coarse sized, waste embankment fill.		D					
						Commenced Coring at 19.8m							

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification
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Geotechnical Log - Borehole

BH-04

UTM	: 51J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259761.82	Driller Supplier	:	Client	: Bellevue Gold
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Ground Elevation : 470.90 (m)		Reviewed By	:	Location	: Bellevue WA
Total Depth	: 54 m BGL	Date	: 10/01/2025	Loc Comment :	

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS LS MS HS VHS EHS)	Testing SPT	Samples SPT	RQD% and TCR%	Defect Spacing (mm) (30 100 300 1000 3000)	Defect Description
		16											
		17											
		18											
		19											
						Commenced Coring at 19.8m							
PQ DIAMOND			Rock		ARG	Extremely weathered, rock- Gravelly to clayey to sandy SILT, non-plastic, pale green, stiff to	XW						

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification
GW well graded gravels
GP poorly graded gravels
GM silty gravel
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OL org silts low plastic
OH org silts high plastic
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BH-04

UTM	: 51J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259761.82	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6941939.43	Logged By	: JR	Project	: TSF GSI
Ground Elevation : 470.90 (m)		Reviewed By	:	Location	: Bellevue WA
Total Depth	: 54 m BGL	Date	: 10/01/2025	Loc Comment :	

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS, LS, MS, HS, VHS, EHS)	Testing SPT	Samples SPT	RQD% and TCR%	Defect Spacing (mm) (30, 100, 300, 1000, 3000)	Defect Description
PQ DIAMOND (ROCK)		21	Rock		ARG	Extremely weathered, rock- Gravelly to clayey to sandy SILT, non-plastic, pale green, stiff to very stiff, fine to medium sized gravel, fine grained sand.	XW				RQD = 51% TCR = 84.67%		90°, UN, VR, CL, Open,Closed, fracture between two defects.
		22							12,16,26 (N=44)				
		23									RQD = 86% TCR = 100%		
		24							12,13,21 (N=34)		RQD = 76% TCR = 100%		

Method	Water		Consistency	Moisture	In Situ Testing	Laboratory Results
EX excavator	complete water less	Level during drilling	VS Very soft	D Dry	PP pen penetrometer	UC undrained unconsol cohesion
BH backhoe bucket	Water inflow	P partial water loss	S Soft	M Moist	VS vane shear	UF undrained unconsol friction angle
NE natural exposure	water level	N none encountered	F Firm	W Wet	DCP dynamic cone penetrometer	MC moisture content
EE existing xcavation			St Stiff	PL plastic limit		DD dry density
RP ripper			VSt Very stiff	LL liquid limit		LL liquid limit
			H Hard			PL plastic limit

USC Classification		Density	Soil Samples	Laboratory Results
GW well graded gravels	SW well graded sands	VL Very loose	B bulk	LS linear shrinkage
GP poorly graded gravels	SP poorly graded sands	L Loose	D disturbed	CC undrained consolo cohesion
GM silty gravel	SM silty sands	MD Medium dense	U(63) U(63) push tube	CF undrained consolo friction angle
GC clayey gravel	SC clayey sands	D Dense	U(50) U(50) push tube	FH falling head permeability
ML inorg silts low plastic	CL inorg clay low plastic	VD Very dense	WS water	CH constan head permeablity
MH inorg clay high plastic	CI inorg clay med plastic			CBR californian bearing ratio
OL org silts low plastic	CH inorg clay high plastic			
OH org silts high plastic	Pt peat of high org soils			

Geotechnical Log - Borehole

BH-04

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Phone: (08) 6444 7988

UTM	: 51J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259761.82	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6941939.43	Logged By	: JR	Project	: TSF GSI
Ground Elevation : 470.90 (m)		Reviewed By	:	Location	: Bellevue WA
Total Depth	: 54 m BGL	Date	: 10/01/2025	Loc Comment :	

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS, LS, MS, HS, VHS, EHS)	Testing SPT	Samples SPT	RQD% and TCR%	Defect Spacing (mm) (30, 100, 300, 1000, 3000)	Defect Description
PQ DIAMOND (ROCK)		26 – 29	Rock		ARG	Extremely weathered, rock- Gravelly to clayey to sandy SILT, non-plastic, pale green, stiff to very stiff, fine to medium sized gravel, fine grained sand.	XW		13,14,16 (N=30); 12,18,18 (N=36); 8,11,11 (N=22)		RQD = 75% TCR = 100%; RQD = 60% TCR = 100%; RQD = 60% TCR = 88%		
			Rock		BAS	ROCK- BASALT: very fine to fine to medium grained, khaki with pale brown, medium to high strength, distinctly weathered, indistinct, dry, thin bands (~3 cm) of slightly to moderately weathered basalt at 26.6 and 26.9, red brown discoloration bands throughout,	DW				RQD = 83.12% TCR = 100%		80°, Curved,Undulating, Rough,Smooth, VN, Closed,Open,Infilled

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consolo cohesion
- CF undrained consolo friction angle
- FH falling head permeability
- CH constan head permeability
- CBR californian bearing ratio

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Geotechnical Log - Borehole
BH-04

UTM	: 51J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259761.82	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6941939.43	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: 470.90 (m)	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 54 m BGL	Date	: 10/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength	Testing SPT	Samples SPT	RQD% and TCR%	Defect Spacing (mm)	Defect Description
PQ DIAMOND (ROCK)		31, 32, 33, 34	Rock		BAS	ROCK- BASALT: very fine to fine to medium grained, khaki with pale brown, medium to high strength, distinctly weathered, indistinct, dry, thin bands (~3 cm) of slightly to moderately weathered basalt at 26.6 and 26.9, red brown discoloration bands throughout.	DW		16,32,18 (N=50) Refusal; (N=0) Refusal; 20 (N=40) Refusal		RQD = 84,62% TCR = 100%; RQD = 75,33% TCR = 100%; RQD = 82,96%		
			Rock		BAS	ROCK- BASALT: very fine to fine grained, khaki and grey, high strength, highly to moderately weathered, indistinct, dry.	HW-MW				RQD = 46% TCR = 100%		90°, Undulating,Curved, Smooth,Polished, Veneer,Coating, Closed,Open,Infilled

Estimated Strength: VLS, LS, MS, HS, VHS, EHS. Defect Spacing (mm): 30, 100, 300, 1000, 3000.

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consol cohesion
- CF undrained consol friction angle
- FH falling head permeability
- CH constan head permeability
- CBR californian bearing ratio

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Geotechnical Log - Borehole

BH-04

UTM	: 51J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259761.82	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6941939.43	Logged By	: JR	Project	: TSF GSI
Ground Elevation : 470.90 (m)		Reviewed By	:	Location	: Bellevue WA
Total Depth	: 54 m BGL	Date	: 10/01/2025	Loc Comment :	

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS LS MS HS VHS EHS)	Testing SPT	Samples SPT	RQD% and TCR%	Defect Spacing (mm) (30 100 300 1000 3000)	Defect Description
PQ DIAMOND (ROCK)		36, 37, 38, 39	Rock		BAS	ROCK- BASALT: very fine to fine grained, khaki and grey, high strength, highly to moderately weathered, indistinct, dry.	HW-MW	HS			RQD = 46% TCR = 100%; RQD = 69.33% TCR = 100%; RQD = 89.33% TCR = 100%; RQD = 52% TCR = 100%		

Method	
EX	excavator
BH	backhoe bucket
NE	natural exposure
EE	existing xcavation
RP	ripper

Water

◄	complete water less	⊻	Level during drilling
►	Water inflow	P	partial water loss
⊻	water level	N	none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency	
VS	Very soft
S	Soft
F	Firm
St	Stiff
VSt	Very stiff
H	Hard

Density	
VL	Very loose
L	Loose
MD	Medium dense
D	Dense
VD	Very dense

Moisture	
D	Dry
M	Moist
W	Wet
PL	plastic limit
LL	liquid limit

Soil Samples	
B	bulk
D	disturbed
U(63)	U(63) push tube
U(50)	U(50) push tube
WS	water

In Situ Testing	
PP	pen penetrometer
VS	vane shear
DCP	dynamic cone penetrometer

Laboratory Results	
UC	undrained unconsol cohesion
UF	undrained unconsol friction angle
MC	moisture content
DD	dry density
LL	liquid limit
PL	plastic limit
LS	linear shrinkage
CC	undrained consols cohesion
CF	undrained consols friction angle
FH	falling head permeability
CH	constan head permeability
CBR	californian bearing ratio

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Geotechnical Log - Borehole
BH-04

UTM	: 51J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259761.82	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6941939.43	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: 470.90 (m)	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 54 m BGL	Date	: 10/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS, LS, MS, HS, VHS, EHS)	Testing SPT	Samples SPT	RQD% and TCR%	Defect Spacing (mm) (30, 100, 300, 1000, 3000)	Defect Description
PQ DIAMOND (ROCK)		40–41	Rock		BAS	ROCK- BASALT: very fine to fine grained, khaki and grey, high strength, highly to moderately weathered, indistinct, dry.	HW-MW				RQD = 52% TCR = 100%		
		41–44	Rock		BAS	ROCK- BASALT: fine to medium to coarse grained, grey, medium to high strength, highly weathered, indistinct, wet, heavily fractured throughout. observed changing water return at 41 m depth.	HW				RQD = 22.67% TCR = 100%; RQD = 0% TCR = 80%		45°, UN, Rough,Smooth, VN, OP,
		44–	Rock		BAS	ROCK- BASALT: very fine to fine grained, blue grey, high strength, moderately weathered, indistinct, moist.	MW				RQD = 59.33% TCR = 100%		90°, UN, Smooth,Polished, Veneer,Coating,Stai Closed,Open,

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consolo cohesion
- CF undrained consolo friction angle
- FH falling head permeability
- CH constan head permeablity
- CBR californian bearing ratio

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Geotechnical Log - Borehole

BH-04

UTM	: 51J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259761.82	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6941939.43	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: 470.90 (m)	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 54 m BGL	Date	: 10/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS, LS, MS, HS, VHS, EHS)	Testing: SPT	Samples: SPT	RQD% and TCR%	Defect Spacing (mm) (30, 100, 300, 1000, 3000)	Defect Description
PQ DIAMOND (ROCK)		46	Rock		BAS	ROCK- BASALT: very fine to fine grained, blue grey, high strength, moderately weathered, indistinct, moist.	MW	HS			RQD = 80% TCR = 100%; RQD = 24% TCR = 100%		90°, Curved,Undulating, Polished,Smooth, Coating,Veneer, Closed,Open,
		47–48	Rock		BAS	ROCK- BASALT: very fine to fine grained, dark grey, very high strength, slightly weathered, indistinct, glassy texture, dry.	SW	VHS					45°, Planar,Curved, Polished,Slickenside, CT, Closed,Open, fractured area,
		49	Rock		BAS	ROCK- BASALT: very fine to fine grained, dark grey, extremely high strength, fresh weathered, indistinct, glassy texture, dry.	F	EHS			RQD = 72.67% TCR = 94%; RQD = 90% TCR = 100%		

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consols cohesion
- CF undrained consols friction angle
- FH falling head permeability
- CH constan head permeability
- CBR californian bearing ratio

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Geotechnical Log - Borehole
BH-04

UTM	: 51J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259761.82	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6941939.43	Logged By	: JR	Project	: TSF GSI
Ground Elevation : 470.90 (m)		Reviewed By	:	Location	: Bellevue WA
Total Depth	: 54 m BGL	Date	: 10/01/2025	Loc Comment :	

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS LS MS HS VHS EHS)	Testing SPT	Samples SPT	RQD% and TCR%	Defect Spacing (mm) (30 100 300 1000 3000)	Defect Description
PQ DIAMOND (ROCK)		51 52 53	Rock		BAS	ROCK- BASALT: very fine to fine grained, dark grey, extremely high strength, fresh weathered, indistinct, glassy texture, dry.	F	EHS			RQD = 90% TCR = 100% RQD = 86.67% TCR = 100% RQD = 91.33% TCR = 100%		
						BH-04 Terminated at 54m							

Method	Water		USC Classification		Consistency	Moisture	In Situ Testing	Laboratory Results
EX excavator	complete water loss	Level during drilling	GW well graded gravels	SW well graded sands	VS Very soft	D Dry	PP pen penetrometer	UC undrained unconsol cohesion
BH backhoe bucket	Water inflow	P partial water loss	GP poorly graded gravels	SP poorly graded sands	S Soft	M Moist	VS vane shear	UF undrained unconsol friction angle
NE natural exposure	water level	N none encountered	GM silty gravel	SM silty sands	F Firm	W Wet	DCP dynamic cone penetrometer	MC moisture content
EE existing xcavation			GC clayey gravel	SC clayey sands	St Stiff	PL plastic limit		DD dry density
RP ripper			ML inorg silts low plastic	CL inorg clay low plastic	VSt Very stiff	LL liquid limit		LL liquid limit
			MH inorg clay high plastic	CI inorg clay med plastic	H Hard	**Soil Samples**		PL plastic limit
			OL org silts low plastic	CH inorg clay high plastic	**Density**	B bulk		LS linear shrinkage
			OH org silts high plastic	Pt peat of high org soils	VL Very loose	D disturbed		CC undrained consolo cohesion
					L Loose	U(63) U(63) push tube		CF undrained consolo friction angle
					MD Medium dense	U(50) U(50) push tube		FH falling head permeability
					D Dense	WS water		CH constan head permeability
					VD Very dense			CBR californian bearing ratio

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Geotechnical Log - Borehole
BH-05

UTM	: 51J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259618.61	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6941931.73	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: 484.5 (m)	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 31.5 m BGL	Date	: 30/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples: SPT	Samples: UDS	Testing: SPT	N Value Graph (0 10 20 30 40 50)	Remarks: Field Records/Comments
PQ DIAMOND DRILLING		0–4.6 (1, 2, 3, 4)	Fill		GP	Fill GRAVEL GP: grey, dense, coarse sized, waste embankment fill.		D					

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consolo cohesion
- CF undrained consolo friction angle
- FH falling head permeability
- CH constan head permeability
- CBR californian bearing ratio

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Geotechnical Log - Borehole
BH-05

UTM	: 51J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259618.61	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6941931.73	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: 484.5 (m)	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 31.5 m BGL	Date	: 30/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples SPT	Samples UDS	Testing SPT	N Value Graph (0 10 20 30 40 50)	Remarks Field Records/Comments
PQ DIAMOND DRILLING		6, 7, 8, 9	Fill		GP	Fill GRAVEL GP: grey, dense, coarse sized, waste embankment fill.		D					

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consol cohesion
CF undrained consol friction angle
FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

Resource Engineering Consultants
B/355 Scarborough Beach Rd, Osborne Park, WA, 6017
Phone: (08) 6444 7988

Geotechnical Log - Borehole
BH-05

UTM	: 51J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259618.61	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6941931.73	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: 484.5 (m)	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 31.5 m BGL	Date	: 30/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples: SPT	Samples: UDS	Testing: SPT	N Value Graph (0 10 20 30 40 50)	Remarks: Field Records/Comments
PQ DIAMOND DRILLING		11, 12, 13, 14	Fill		GP	Fill GRAVEL GP: grey, dense, coarse sized, waste embankment fill.		D					
						Commenced Coring at 15m							

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water loss
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consols cohesion
CF undrained consols friction angle
FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

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Geotechnical Log - Borehole
BH-05

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Ground Elevation : 484.5 (m)		Reviewed By	:	Location	: Bellevue WA
Total Depth	: 31.5 m BGL	Date	: 30/01/2025	Loc Comment :	

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS, LS, MS, HS, VHS, EHS)	Testing: SPT	RQD% and TCR%	Defect Spacing (mm) (30, 100, 300, 1000, 3000)	Defect Description
						Commenced Coring at 15m						
PQ DIAMOND (ROCK)		15–20	Rock		BSLT	ROCK- BASALT: very fine to fine to medium to coarse grained, dark grey, high strength, highly to moderately weathered, indistinct, moist, heavily fractured throughout.	HW-MW			RQD = 18% TCR = 86.67%		45°, UN, Rough,Smooth, CL, Open,Closed, fracture between two defects,
										RQD = 8.67% TCR = 100%		
										RQD = 66% TCR = 100%		
										RQD = 0% TCR = 53.33%		

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification
GW well graded gravels
GP poorly graded gravels
GM silty gravel
GC clayey gravel
ML inorg silts low plastic
MH inorg clay high plastic
OL org silts low plastic
OH org silts high plastic
SW well graded sands
SP poorly graded sands
SM silty sands
SC clayey sands
CL inorg clay low plastic
CI inorg clay med plastic
CH inorg clay high plastic
Pt peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consolo cohesion
CF undrained consolo friction angle
FH falling head permeability
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BH-05

UTM	: 51J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259618.61	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6941931.73	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: 484.5 (m)	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 31.5 m BGL	Date	: 30/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS LS MS HS VHS EHS)	Testing SPT	RQD% and TCR%	Defect Spacing (mm) (30 100 300 1000 3000)	Defect Description
PQ DIAMOND (ROCK)		21–26	Rock		BSLT	ROCK- BASALT: fine to medium to coarse grained, dark grey, high to very high strength, moderately to slightly weathered, indistinct, moist, heavily fractured throughout.	MW-SW	HS–VHS		RQD = 44.67% TCR = 100%; RQD = 0% TCR = 100%; RQD = 21.67% TCR = 100%		60°, Curved,Undulating, Rough,Smooth, VN, Closed,Open,Infilled,
		26–27.8	Rock		BSLT	ROCK- BASALT: very fine to fine grained, dark grey, extremely high strength, fresh weathered, indistinct, glassy texture, dry.	F	EHS		RQD = 43.33% TCR = 100%; RQD = 74% TCR = 100%		90°, Undulating,Curved, PO, Coating,Veneer, Closed,Open,Infilled,

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consola cohesion
CF undrained consola friction angle
FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

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Geotechnical Log - Borehole
BH-05

UTM	: 51J	Drill Rig	: Precision Drilling	Job Number	: P19-11-PR-30
Easting (m)	: 259618.61	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6941931.73	Logged By	: JR	Project	: TSF GSI
Ground Elevation	: 484.5 (m)	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 31.5 m BGL	Date	: 30/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS, LS, MS, HS, VHS, EHS)	Testing: SPT	RQD% and TCR%	Defect Spacing (mm) (30, 100, 300, 1000, 3000)	Defect Description
PQ DIAMOND (ROCK)		29, 30, 31	Rock		BSLT	ROCK- BASALT: very fine to fine grained, dark grey, extremely high strength, fresh weathered, indistinct, glassy texture, dry.	F	EHS		RQD = 74% TCR = 100%; RQD = 78.67% TCR = 100%; RQD = 40.67% TCR = 93.33%		

BH-05 Terminated at 31.5m

Method		Water		Consistency		Moisture		In Situ Testing		Laboratory Results	
EX	excavator		complete water loss / Level during drilling	VS	Very soft	D	Dry	PP	pen penetrometer	UC	undrained unconsol cohesion
BH	backhoe bucket		Water inflow	S	Soft	M	Moist	VS	vane shear	UF	undrained unconsol friction angle
NE	natural exposure		water level	F	Firm	W	Wet	DCP	dynamic cone penetrometer	MC	moisture content
EE	existing xcavation	P	partial water loss	St	Stiff	PL	plastic limit			DD	dry density
RP	ripper	N	none encountered	VSt	Very stiff	LL	liquid limit			LL	liquid limit
				H	Hard					PL	plastic limit

USC Classification			
GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Density		Soil Samples		Laboratory Results (cont.)	
VL	Very loose	B	bulk	LS	linear shrinkage
L	Loose	D	disturbed	CC	undrained consols cohesion
MD	Medium dense	U(63)	U(63) push tube	CF	undrained consols friction angle
D	Dense	U(50)	U(50) push tube	FH	falling head permeability
VD	Very dense	WS	water	CH	constan head permeability
				CBR	californian bearing ratio

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Geotechnical Log - Borehole

BH06

UTM	: 51	Drill Rig	:	Job Number	: P19-11-PR-30
Easting (m)	: 260235.68	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6940355.85	Logged By	: Joshua Blake	Project	: TSF GSI
Ground Elevation	: 465.86 (m)	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 40.3 m BGL	Date	: 10/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples: SPT	Samples: UDS	Testing: SPT	N Value Graph (0 10 20 30 40 50)	Remarks: Field Records/Comments
PQ DIAMOND (SOIL)		0–5 (1, 2, 3, 4)	Fill		GP	Fill GRAVEL GP: grey, dense, coarse sized, waste embankment fill.		D					

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consolo cohesion
- CF undrained consolo friction angle
- FH falling head permeability
- CH constant head permeability
- CBR californian bearing ratio

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Geotechnical Log - Borehole
BH06

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Total Depth	: 40.3 m BGL	Date	: 10/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples SPT	Samples UDS	Testing SPT	N Value Graph (0 10 20 30 40 50)	Remarks Field Records/Comments
PQ DIAMOND (SOIL)		6, 7, 8, 9	Fill		GP	Fill GRAVEL GP: grey, dense, coarse sized, waste embankment fill.		D					

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
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Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consolo cohesion
- CF undrained consolo friction angle
- FH falling head permeability
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- CBR californian bearing ratio

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Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples SPT	Samples UDS	Testing SPT	N Value Graph (0 10 20 30 40 50)	Remarks Field Records/Comments
PQ DIAMOND (SOIL)		11, 12, 13	Fill		GP	Fill GRAVEL GP: grey, dense, coarse sized, waste embankment fill.		D					
		14	Duricrust			Duricrust- SILT, low plasticity, red and pale yellow, moist, stiff to very stiff, with fine to coarse grained sand, trace fine sized gravel, presence of pale yellow material increases with depth, to 50-50 at ~20.5 m depth.	M	St-VSt					

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
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OH	org silts high plastic	Pt	peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
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Total Depth	: 40.3 m BGL	Date	: 10/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples SPT	Samples UDS	Testing SPT	N Value Graph	Remarks Field Records/Comments
PQ DIAMOND (SOIL)		15.5–20.5 (16, 17, 18, 19)	Duricrust			Duricrust- SILT, low plasticity, red and pale yellow, moist, stiff to very stiff, with fine to coarse grained sand, trace fine sized gravel, presence of pale yellow material increases with depth, to 50-50 at ~20.5 m depth.	M	St-VSt		01; 02	5,6,8 (N=14); 6,7,7 (N=14); 4,5,5 (N=10)	0 10 20 30 40 50	

Method	Water		Consistency	Moisture	In Situ Testing	Laboratory Results
EX excavator	complete water loss	Level during drilling	VS Very soft	D Dry	PP pen penetrometer	UC undrained unconsol cohesion
BH backhoe bucket	Water inflow	P partial water loss	S Soft	M Moist	VS vane shear	UF undrained unconsol friction angle
NE natural exposure	water level	N none encountered	F Firm	W Wet	DCP dynamic cone penetrometer	MC moisture content
EE existing xcavation			St Stiff	PL plastic limit		DD dry density
RP ripper			VSt Very stiff	LL liquid limit		LL liquid limit
			H Hard			PL plastic limit

USC Classification		Density	Soil Samples	Laboratory Results
GW well graded gravels	SW well graded sands			LS linear shrinkage
GP poorly graded gravels	SP poorly graded sands		B bulk	CC undrained consolo cohesion
GM silty gravel	SM silty sands	VL Very loose	D disturbed	CF undrained consolo friction angle
GC clayey gravel	SC clayey sands	L Loose	U(63) U(63) push tube	FH falling head permeability
ML inorg silts low plastic	CL inorg clay low plastic	MD Medium dense	U(50) U(50) push tube	CH constan head permeablity
MH inorg clay high plastic	CI inorg clay med plastic	D Dense	WS water	CBR californian bearing ratio
OL org silts low plastic	CH inorg clay high plastic	VD Very dense		
OH org silts high plastic	Pt peat of high org soils			

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Geotechnical Log - Borehole
BH06

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Total Depth	: 40.3 m BGL	Date	: 10/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Samples: SPT	Samples: UDS	Testing: SPT	Remarks: Field Records/Comments
PQ DIAMOND (SOIL)		21, 22	Duricrust			Duricrust- SILT, low plasticity, red and pale yellow, moist, stiff to very stiff, with fine to coarse grained sand, trace fine sized gravel, presence of pale yellow material increases with depth, to 50-50 at ~20.5 m depth.	M	St-VSt		03; 04	4,5,6 (N=11)	
		23, 24	SAPROLITE		CI	Saprolite- Silty CLAY, medium plasticity, pale green yellow, moist, stiff to very stiff, with fine to medium grained sand, approximately 0.5 to 1m of transitional yellowish material between duricrust and presumed laterite.	M	St-VSt			9,11,20 (N=31); 11,29,23 (N=>50)	
						Commenced Coring at 24.4m						

N Value Graph

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
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MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consolo cohesion
- CF undrained consolo friction angle
- FH falling head permeability
- CH constan head permeability
- CBR californian bearing ratio

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Geotechnical Log - Borehole
BH06

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Northing (m)	: 6940355.85	Logged By	: Joshua Blake	Project	: TSF GSI
Ground Elevation	: 465.86 (m)	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 40.3 m BGL	Date	: 10/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS LS MS HS VHS EHS)	Testing: SPT	RQD% and TCR%	Defect Spacing (mm) (30 100 300 1000 3000)	Defect Description
		21										
		22										
		23										
		24				Commenced Coring at 24.4m						
PQ DIAMOND (ROCK)			Rock	Δ V Δ	BAS	ROCK- BASALT: very fine to fine grained, green, medium strength, distinctly weathered, indistinct, moist, thin bands (~3 cm) of slightly to moderately weathered basalt at 26.6 and 26.9, red brown discoloration bands throughout.	DW	MS				J, UN, VR, VN, C, fracture between two defects,

Method	Water	Consistency	Moisture	In Situ Testing	Laboratory Results
EX excavator	complete water less; Level during drilling	VS Very soft	D Dry	PP pen penetrometer	UC undrained unconsol cohesion
BH backhoe bucket	Water inflow; P partial water loss	S Soft	M Moist	VS vane shear	UF undrained unconsol friction angle
NE natural exposure	water level; N none encountered	F Firm	W Wet	DCP dynamic cone penetrometer	MC moisture content
EE existing xcavation	**USC Classification**	St Stiff	PL plastic limit		DD dry density
RP ripper	GW well graded gravels; SW well graded sands	VSt Very stiff	LL liquid limit		LL liquid limit
	GP poorly graded gravels; SP poorly graded sands	H Hard	**Soil Samples**		PL plastic limit
	GM silty gravel; SM silty sands	**Density**	B bulk		LS linear shrinkage
	GC clayey gravel; SC clayey sands	VL Very loose	D disturbed		CC undrained consol cohesion
	ML inorg silts low plastic; CL inorg clay low plastic	L Loose	U(63) U(63) push tube		CF undrained consol friction angle
	MH inorg clay high plastic; CI inorg clay med plastic	MD Medium dense	U(50) U(50) push tube		FH falling head permeability
	OL org silts low plastic; CH inorg clay high plastic	D Dense	WS water		CH constan head permeablity
	OH org silts high plastic; Pt peat of high org soils	VD Very dense			CBR californian bearing ratio

Resource Engineering Consultants
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Phone: (08) 6444 7988

Geotechnical Log - Borehole
BH06

UTM	: 51	Drill Rig	:	Job Number	: P19-11-PR-30
Easting (m)	: 260235.68	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6940355.85	Logged By	: Joshua Blake	Project	: TSF GSI
Ground Elevation	: 465.86 (m)	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 40.3 m BGL	Date	: 10/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength	Testing SPT	RQD% and TCR%	Defect Spacing (mm)	Defect Description
PQ DIAMOND (ROCK)		26, 27, 28, 29	Rock		BAS	ROCK- BASALT: very fine to fine grained, green, medium strength, distinctly weathered, indistinct, moist, thin bands (~3 cm) of slightly to moderately weathered basalt at 26.6 and 26.9, red brown discoloration bands throughout.	DW	MS				J, CV, VR, STN, C, J, 25°, PL, RO, STN, C, J, PL, VR, STN, C, J, 45°, PL, VR, VN, C, J, 65°, PL, RO, STN, C, SS, PL, VR, STN, C, fractured area, J, 60°, PL, VR, STN, C, J, 60°, PL, VR, STN, C,
			Rock		BAS	ROCK- BASALT: very fine to fine grained, khaki and grey, medium strength, distinctly weathered, indistinct, moist, darker discolouration, similar	DW	MS				

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consols cohesion
CF undrained consols friction angle
FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

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Geotechnical Log - Borehole

BH06

UTM	: 51	Drill Rig	:	Job Number	: P19-11-PR-30
Easting (m)	: 260235.68	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6940355.85	Logged By	: Joshua Blake	Project	: TSF GSI
Ground Elevation	: 465.86 (m)	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 40.3 m BGL	Date	: 10/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength	SPT	RQD% and TCR%	Defect Spacing (mm)	Defect Description
PQ DIAMOND (ROCK)		30–35 (31, 32, 33, 34)	Rock		BAS	ROCK- BASALT: very fine to fine grained, khaki and grey, medium strength, distinctly weathered, indistinct, moist, darker discolouration, similar red brown oxide bands as previous.	DW	MS				J, 45°, PL, VR, STN, C, 1000m spacing 3 joints.

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consols cohesion
- CF undrained consols friction angle
- FH falling head permeability
- CH constan head permeability
- CBR californian bearing ratio

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Phone: (08) 6444 7988

Geotechnical Log - Borehole
BH06

UTM	: 51	Drill Rig	:	Job Number	: P19-11-PR-30
Easting (m)	: 260235.68	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6940355.85	Logged By	: Joshua Blake	Project	: TSF GSI
Ground Elevation	: 465.86 (m)	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 40.3 m BGL	Date	: 10/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS LS MS HS VHS EHS)	Testing SPT	RQD% and TCR%	Defect Spacing (mm) (30 100 300 1000 3000)	Defect Description
PQ DIAMOND (ROCK)		36	Rock		BAS	ROCK- BASALT: very fine to fine grained, khaki and grey, medium strength, distinctly weathered, indistinct, moist, darker discolouration, similar red brown oxide bands as previous.	DW	MS				
		37, 38, 39	Rock		BAS	ROCK- BASALT: fine grained, blue grey with pale brown, high strength, moderately weathered, indistinct, moist, heavily fractured throughout, rock component appears slightly to moderately weathered, sandy clay infills between fractures. extremely weathered between 35.3 to 35.7 m. .	MW	HS				

Method
EX excavator
BH backhoe bucket
NE natural exposure
EE existing xcavation
RP ripper

Water
complete water less
Water inflow
water level
Level during drilling
P partial water loss
N none encountered

USC Classification
GW well graded gravels
GP poorly graded gravels
GM silty gravel
GC clayey gravel
ML inorg silts low plastic
MH inorg clay high plastic
OL org silts low plastic
OH org silts high plastic
SW well graded sands
SP poorly graded sands
SM silty sands
SC clayey sands
CL inorg clay low plastic
CI inorg clay med plastic
CH inorg clay high plastic
Pt peat of high org soils

Consistency
VS Very soft
S Soft
F Firm
St Stiff
VSt Very stiff
H Hard

Density
VL Very loose
L Loose
MD Medium dense
D Dense
VD Very dense

Moisture
D Dry
M Moist
W Wet
PL plastic limit
LL liquid limit

Soil Samples
B bulk
D disturbed
U(63) U(63) push tube
U(50) U(50) push tube
WS water

In Situ Testing
PP pen penetrometer
VS vane shear
DCP dynamic cone penetrometer

Laboratory Results
UC undrained unconsol cohesion
UF undrained unconsol friction angle
MC moisture content
DD dry density
LL liquid limit
PL plastic limit
LS linear shrinkage
CC undrained consolo cohesion
CF undrained consolo friction angle
FH falling head permeability
CH constan head permeability
CBR californian bearing ratio

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Geotechnical Log - Borehole

BH06

UTM	: 51	Drill Rig	:	Job Number	: P19-11-PR-30
Easting (m)	: 260235.68	Driller Supplier	:	Client	: Bellevue Gold
Northing (m)	: 6940355.85	Logged By	: Joshua Blake	Project	: TSF GSI
Ground Elevation	: 465.86 (m)	Reviewed By	:	Location	: Bellevue WA
Total Depth	: 40.3 m BGL	Date	: 10/01/2025	Loc Comment	:

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Estimated Strength (VLS LS MS HS VHS EHS)	Testing: SPT	RQD% and TCR's	Defect Spacing (mm) (30 100 300 1000 3000)	Defect Description
PQ DIAMOND (ROCK)			Rock	Δ V Δ	BAS	ROCK- BASALT: fine grained, blue grey with pale brown, high strength, moderately weathered, indistinct, moist, heavily fractured throughout, rock component appears slightly to moderately weathered, sandy clay infills between fractures. extremely weathered between 35.3 to 35.7 m. .	MW					
			Rock	Δ V Δ	BAS	ROC[illegible] grey, very high to extremely high strength, slightly to fresh weathered, indistinct, moist.	SW-F					

BH06 Terminated at 40.3m

Method
- EX excavator
- BH backhoe bucket
- NE natural exposure
- EE existing xcavation
- RP ripper

Water
- complete water less
- Water inflow
- water level
- Level during drilling
- P partial water loss
- N none encountered

USC Classification

GW	well graded gravels	SW	well graded sands
GP	poorly graded gravels	SP	poorly graded sands
GM	silty gravel	SM	silty sands
GC	clayey gravel	SC	clayey sands
ML	inorg silts low plastic	CL	inorg clay low plastic
MH	inorg clay high plastic	CI	inorg clay med plastic
OL	org silts low plastic	CH	inorg clay high plastic
OH	org silts high plastic	Pt	peat of high org soils

Consistency
- VS Very soft
- S Soft
- F Firm
- St Stiff
- VSt Very stiff
- H Hard

Density
- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

Moisture
- D Dry
- M Moist
- W Wet
- PL plastic limit
- LL liquid limit

Soil Samples
- B bulk
- D disturbed
- U(63) U(63) push tube
- U(50) U(50) push tube
- WS water

In Situ Testing
- PP pen penetrometer
- VS vane shear
- DCP dynamic cone penetrometer

Laboratory Results
- UC undrained unconsol cohesion
- UF undrained unconsol friction angle
- MC moisture content
- DD dry density
- LL liquid limit
- PL plastic limit
- LS linear shrinkage
- CC undrained consolo cohesion
- CF undrained consolo friction angle
- FH falling head permeability
- CH constan head permeability
- CBR californian bearing ratio

Appendix C

Geotechnical Field Investigation Borehole Drillings and Photographs

(08) 6444 7988
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Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH01	**BH Depth**	0 - 6 m

rec	(08) 6444 7988 B/355 Scarborough Beach Rd, Osborne Park, WA, 6017 info@rec.com.au	**Photo description**	Core Tray Photos		
		Client	Bellevue Gold		
		Location	Bellevue WA		
		Project name	TSF GSI		
		Project No	P19-11-PR-30	**Scale**	Not to Scale
		BH No	BH01	**BH Depth**	6 - 12 m

Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	Scale	Not to Scale
BH No	BH01	BH Depth	12 - 18 m

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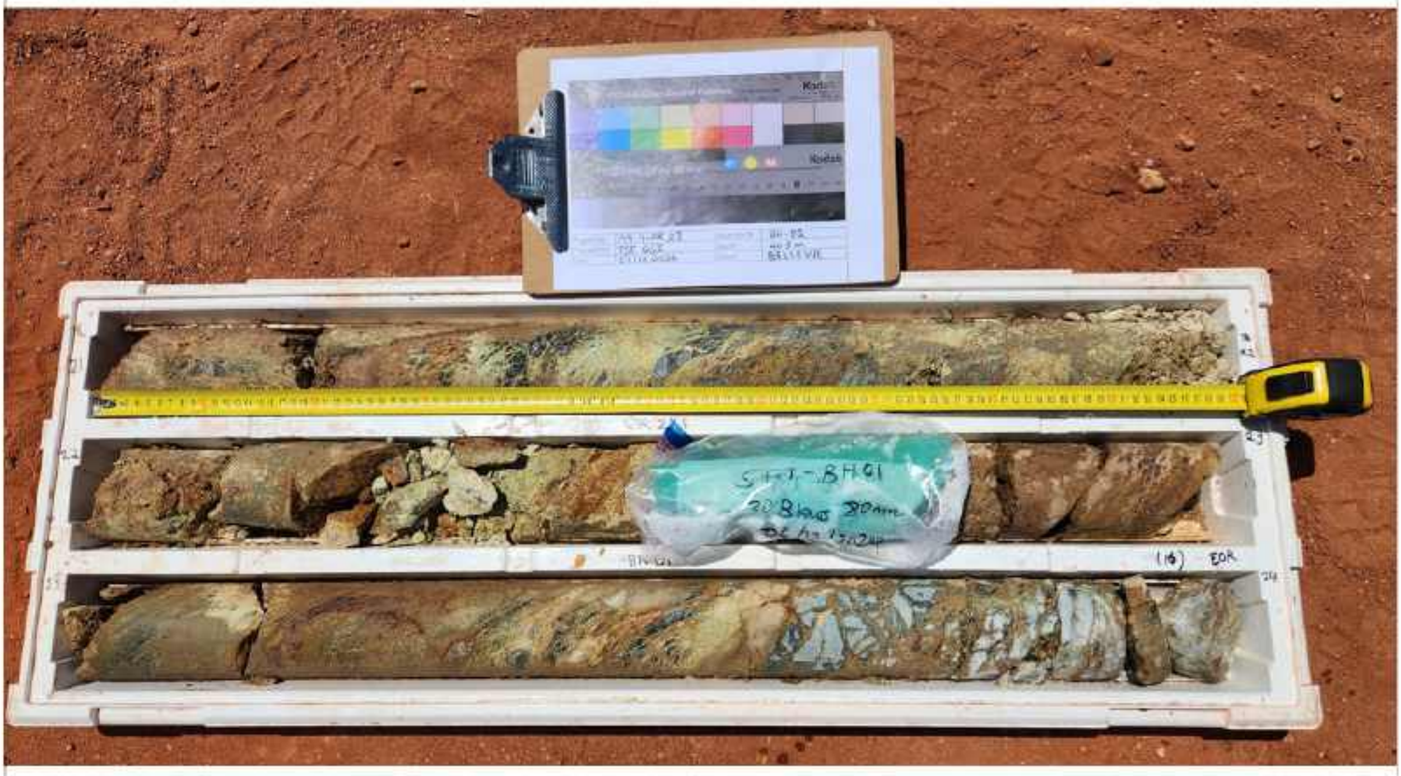

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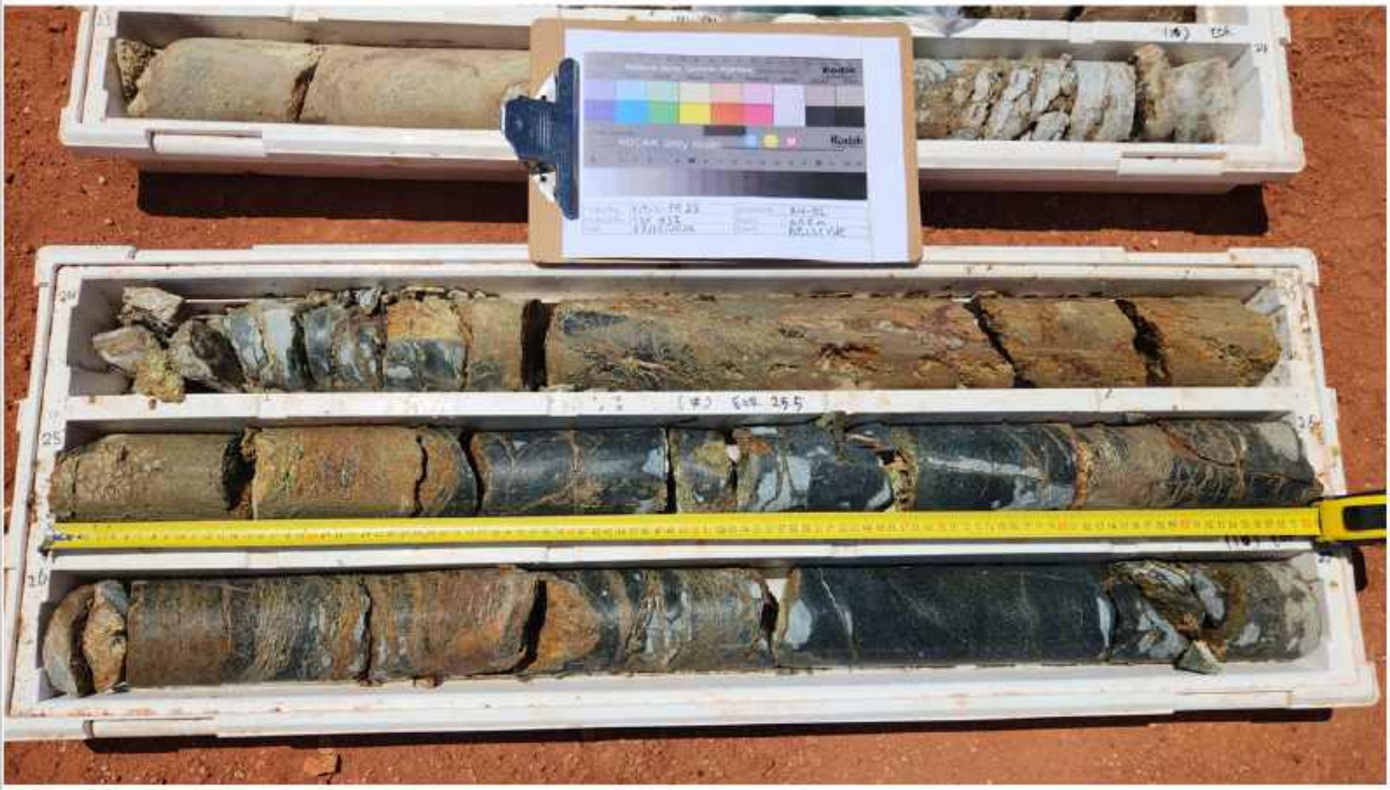
Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH01	**BH Depth**	18 - 24 m



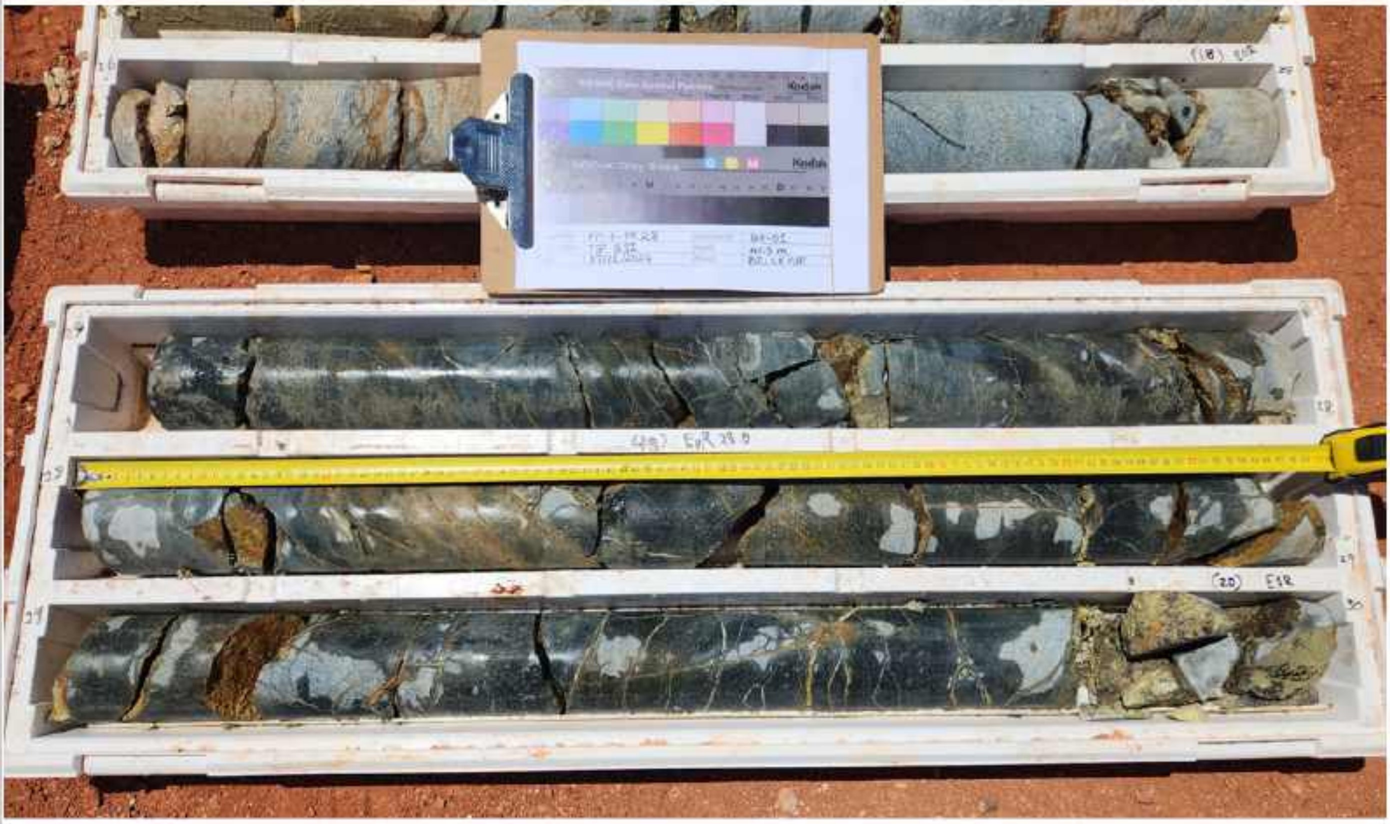


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Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH01	**BH Depth**	24 - 30 m

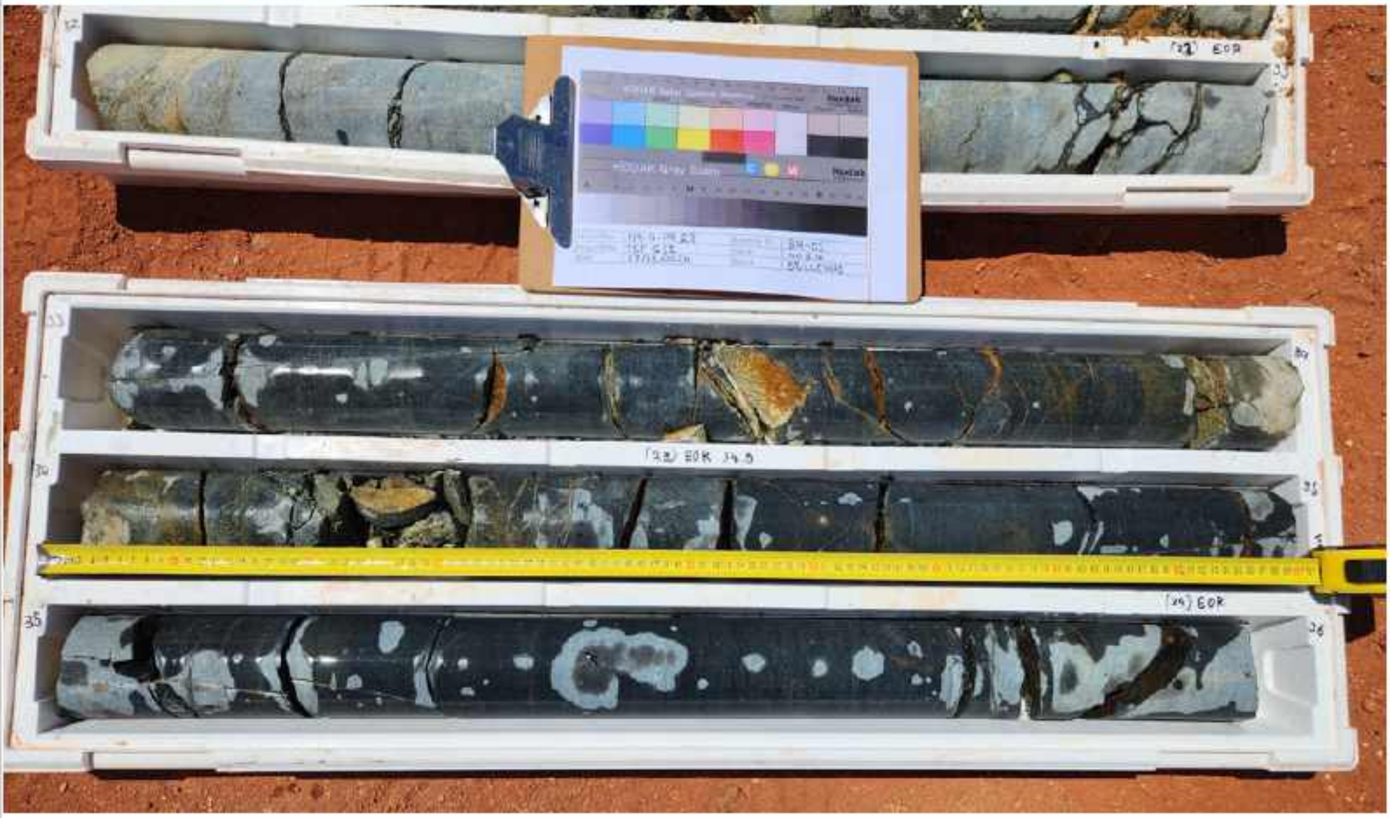

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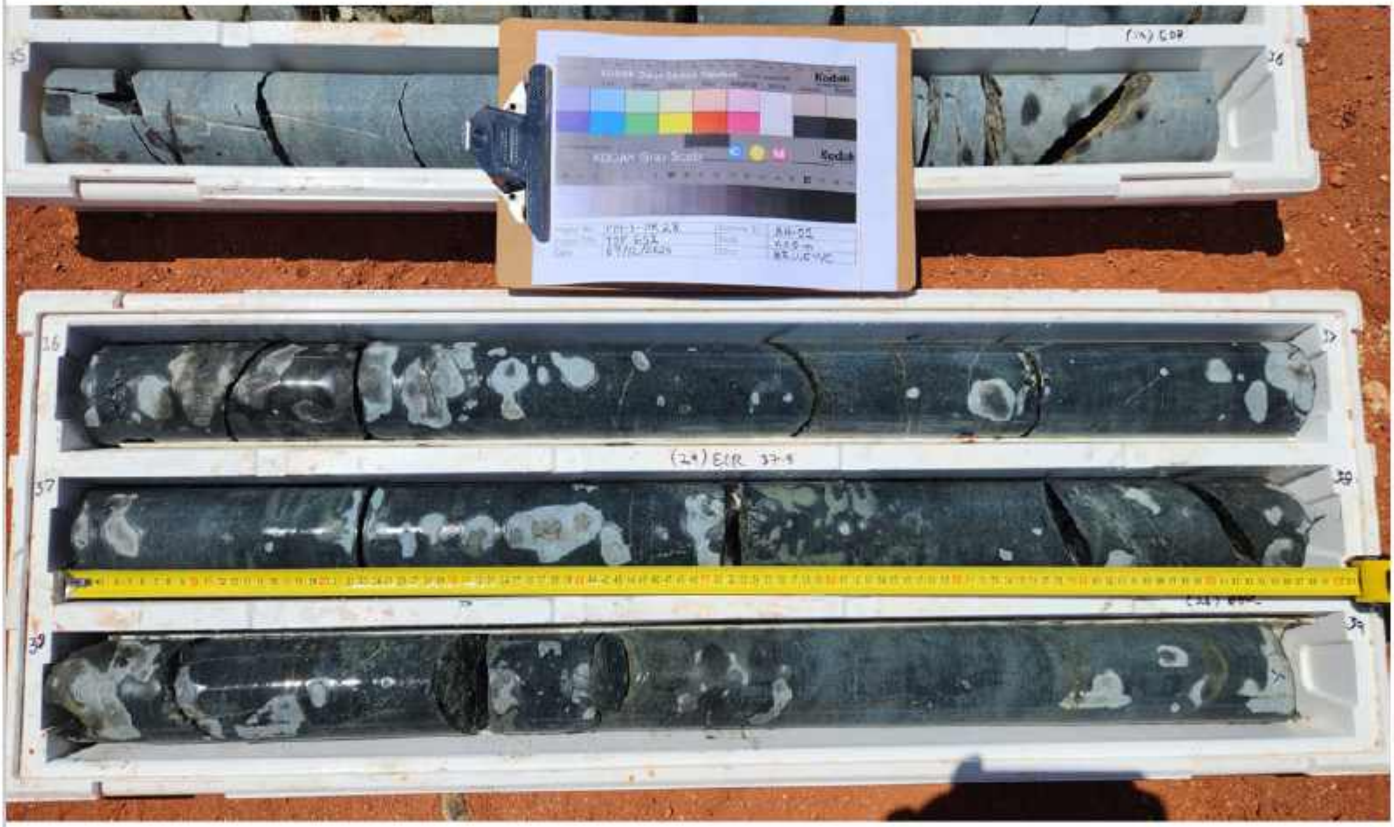
Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH01	**BH Depth**	30 - 36 m



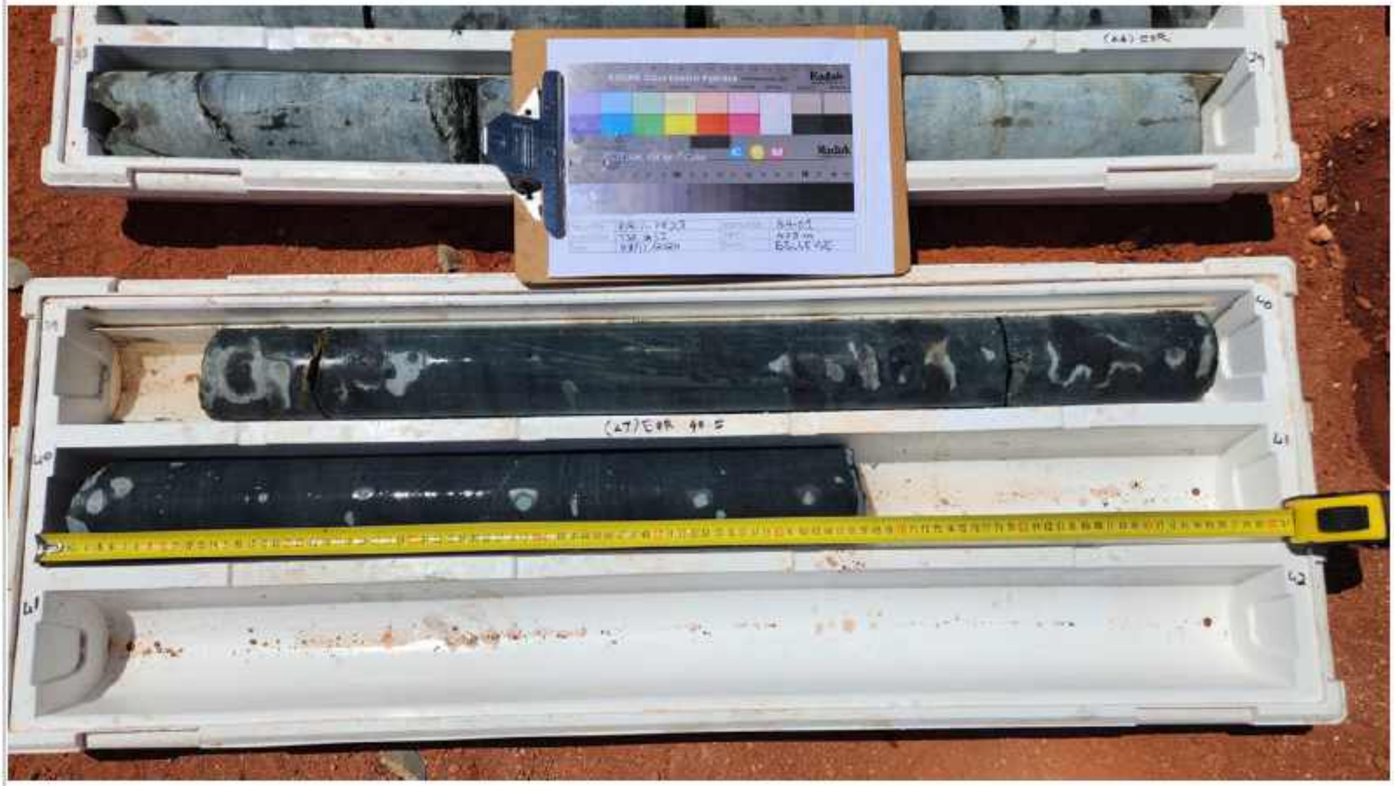


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Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH01	**BH Depth**	36 - 40.5 m

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Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH02	**BH Depth**	0 - 6 m

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Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH02	**BH Depth**	6 - 12 m

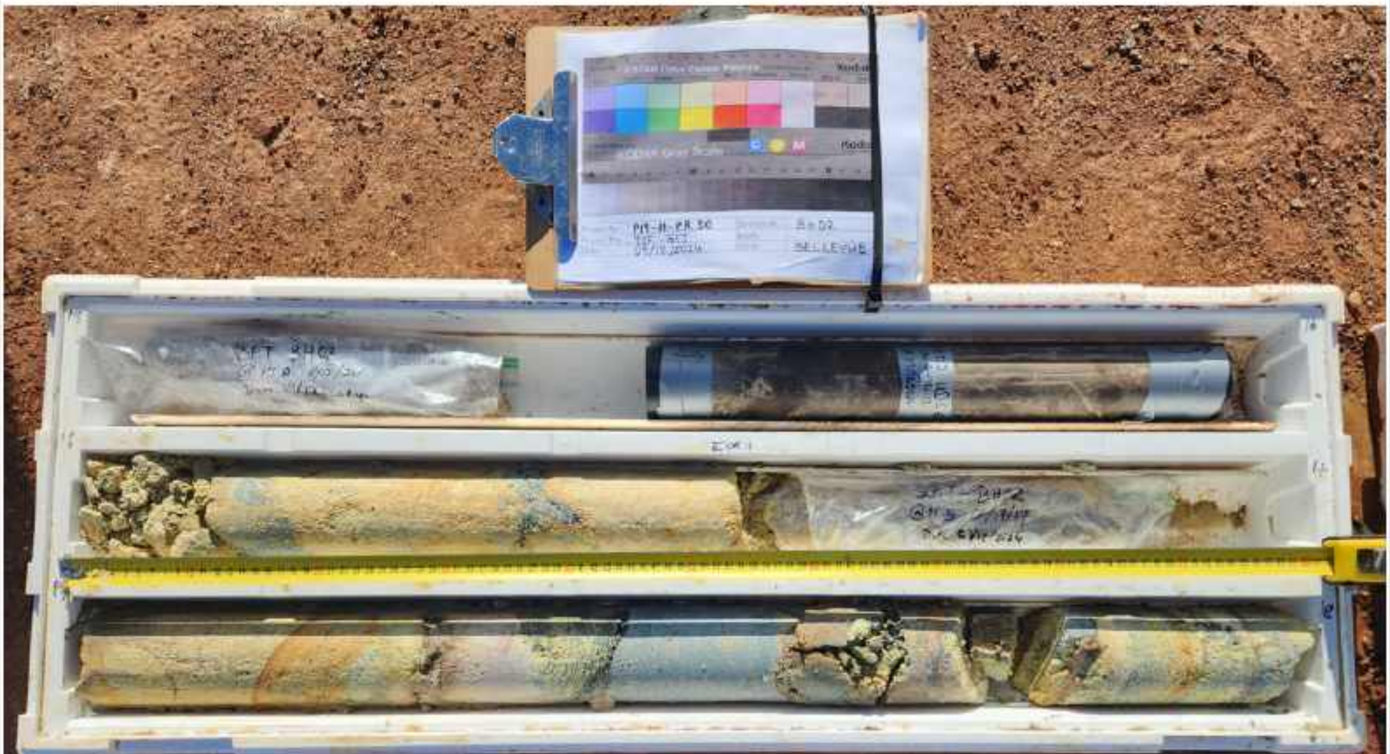

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Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH02	**BH Depth**	12 - 18 m

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Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH02	**BH Depth**	18 - 24 m

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Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH02	**BH Depth**	24 - 30 m

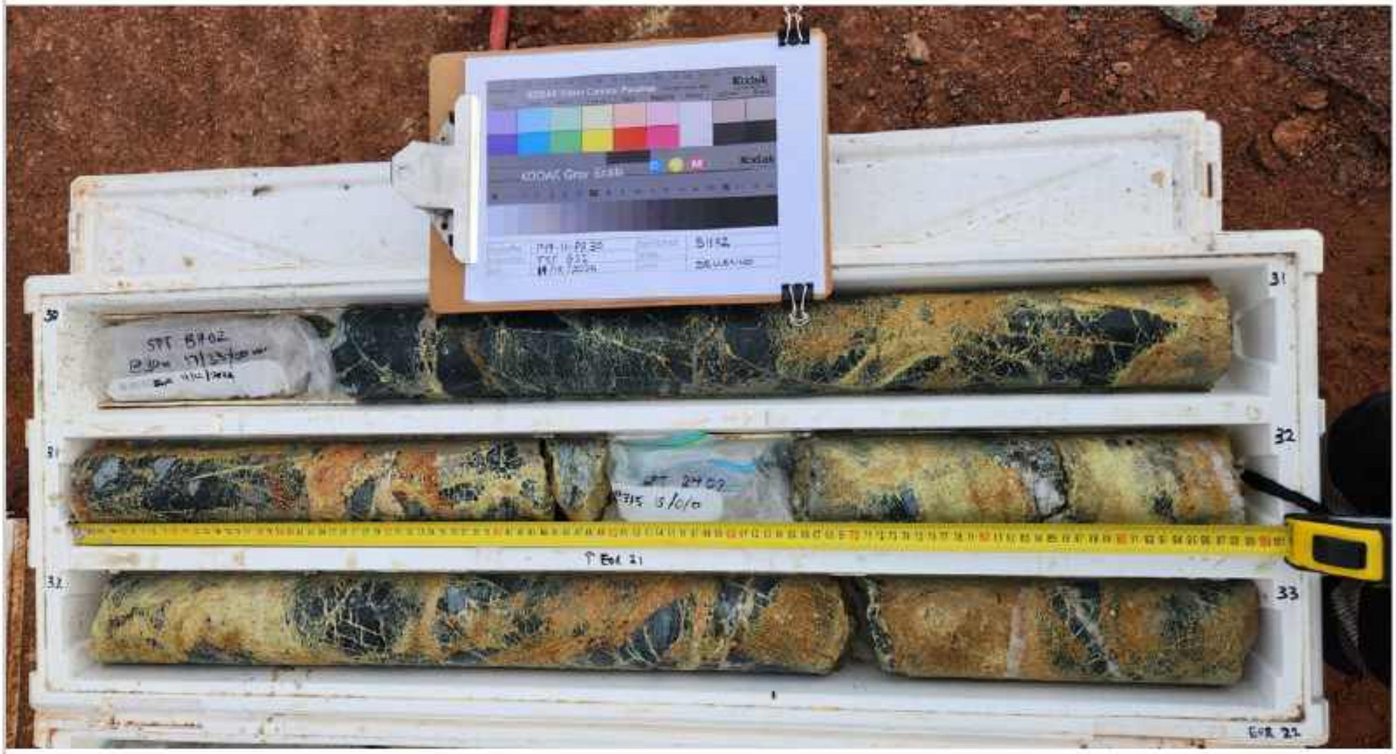

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Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH02	**BH Depth**	30 - 36 m

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Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH02	**BH Depth**	36 - 42 m

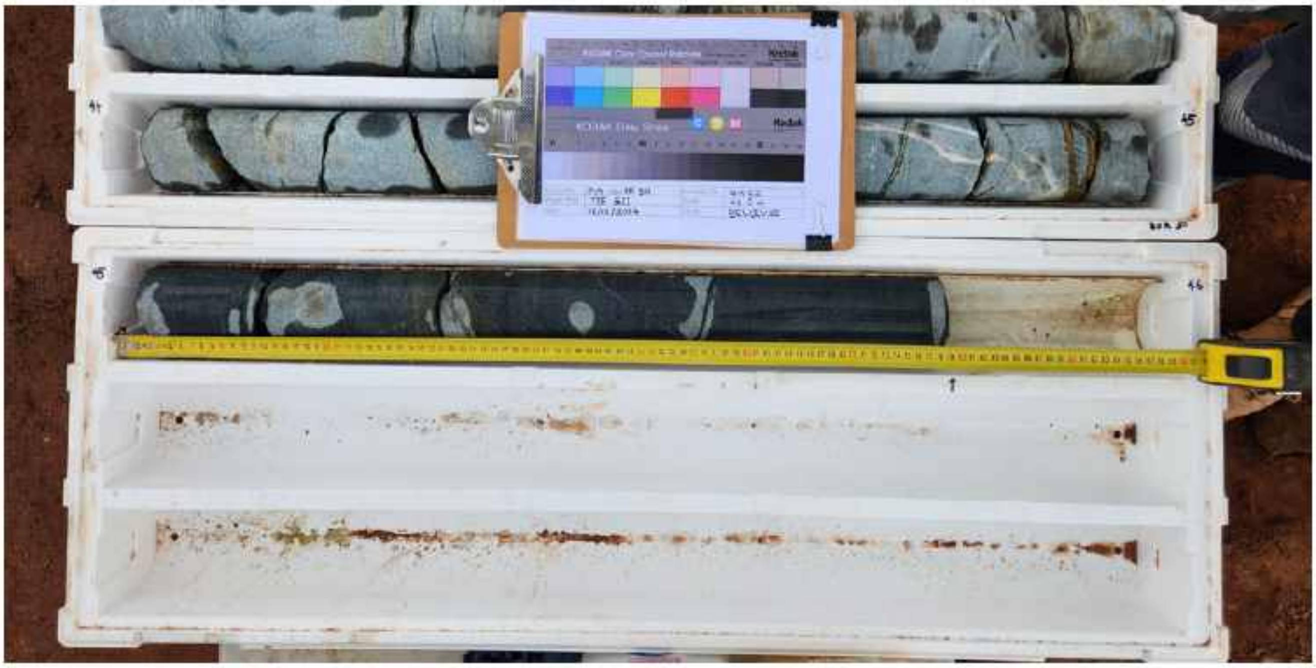

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Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH02	**BH Depth**	42 - 46 m

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Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH03	**BH Depth**	0 - 6 m

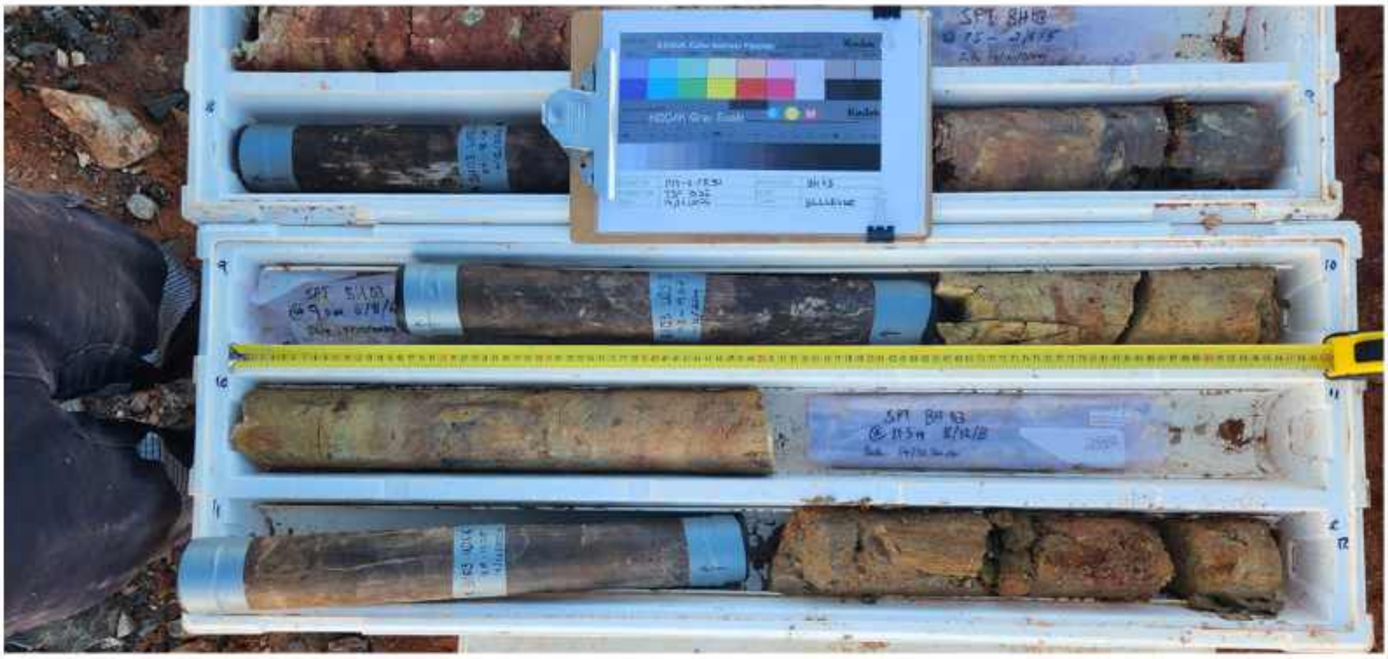

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Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH03	**BH Depth**	6 - 12 m

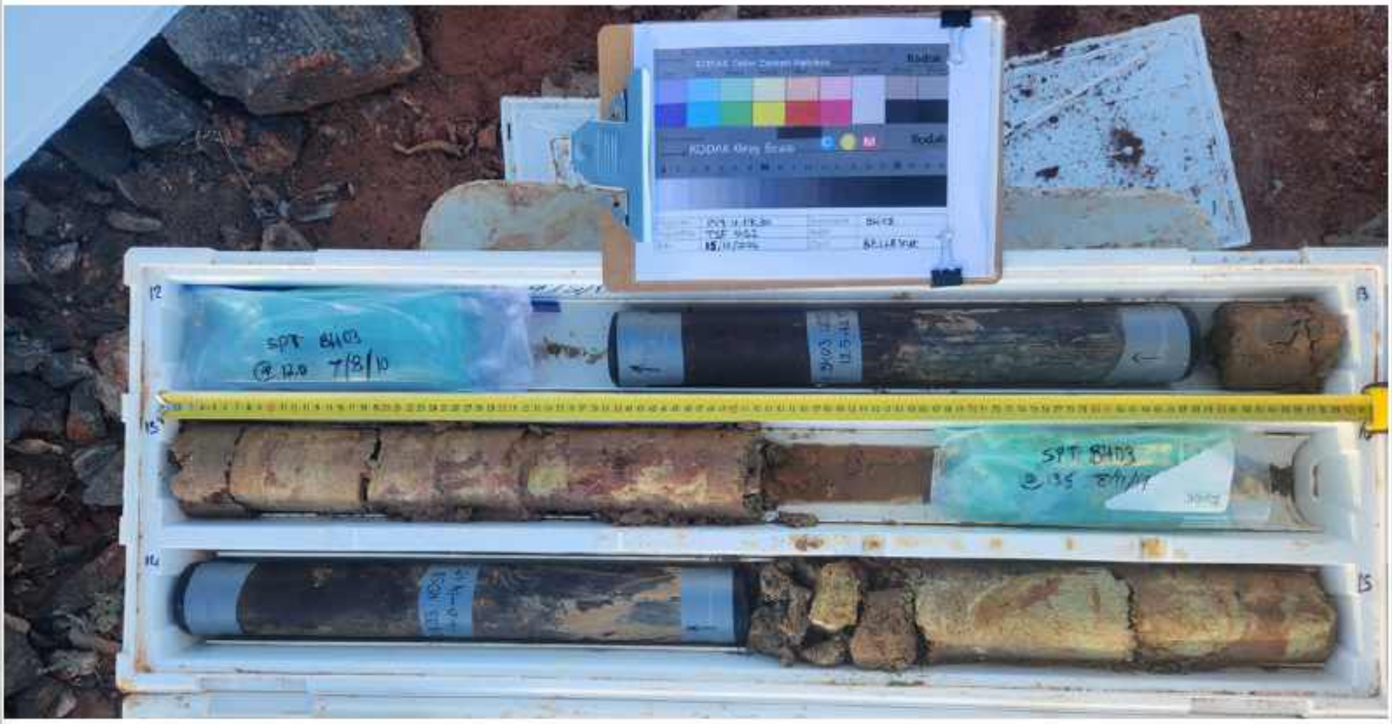

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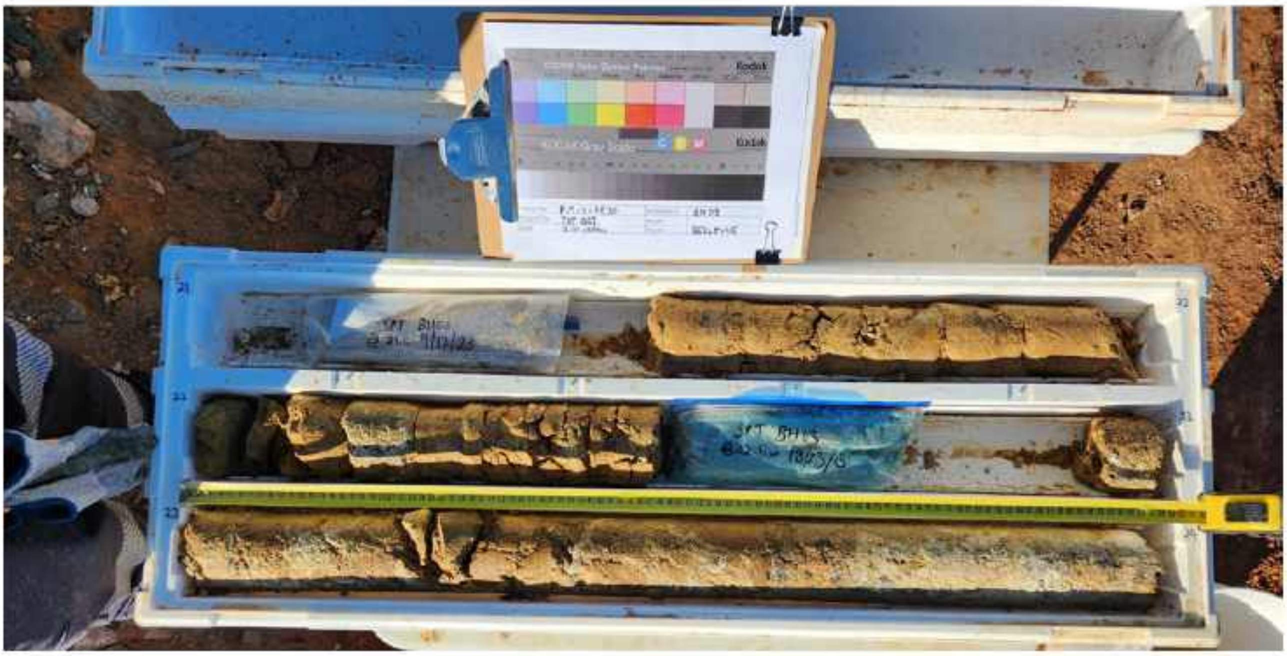
Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH03	**BH Depth**	12 - 18 m



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Osborne Park, WA, 6017

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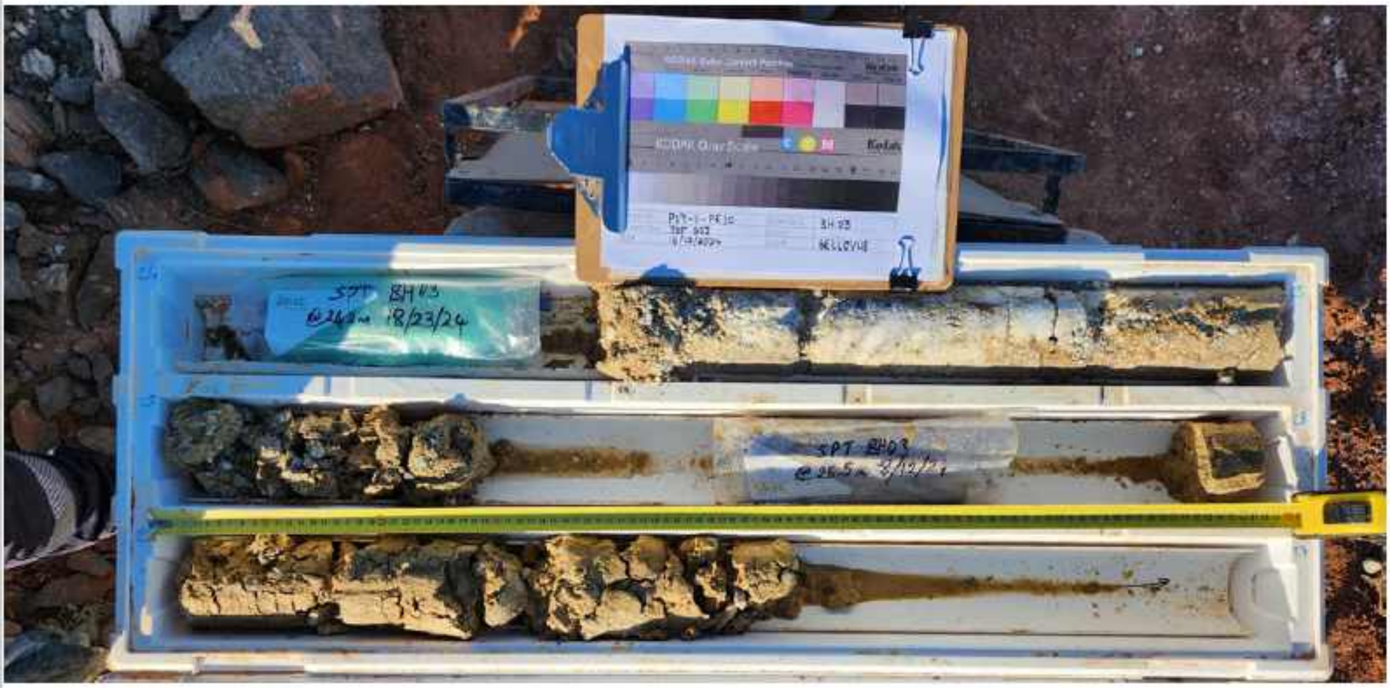
Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH03	**BH Depth**	18 - 24 m



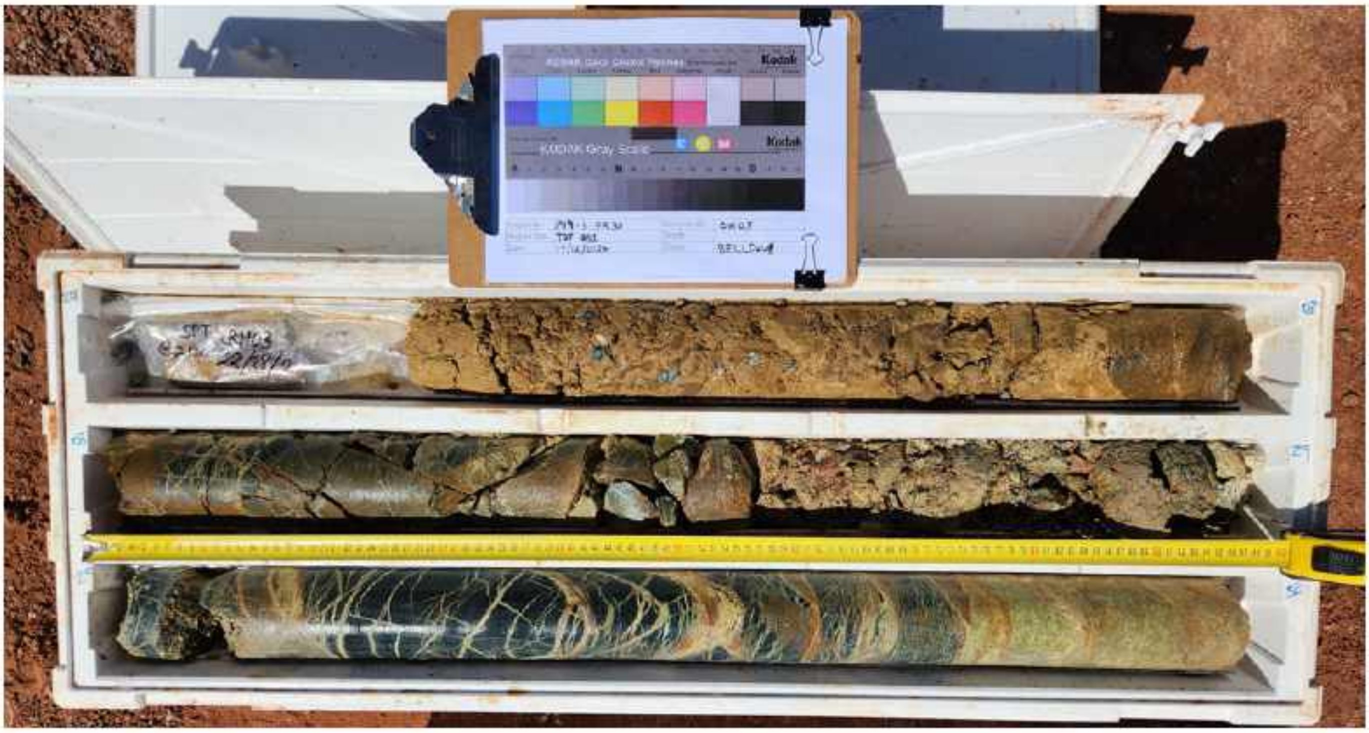


Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH03	**BH Depth**	24 - 30 m

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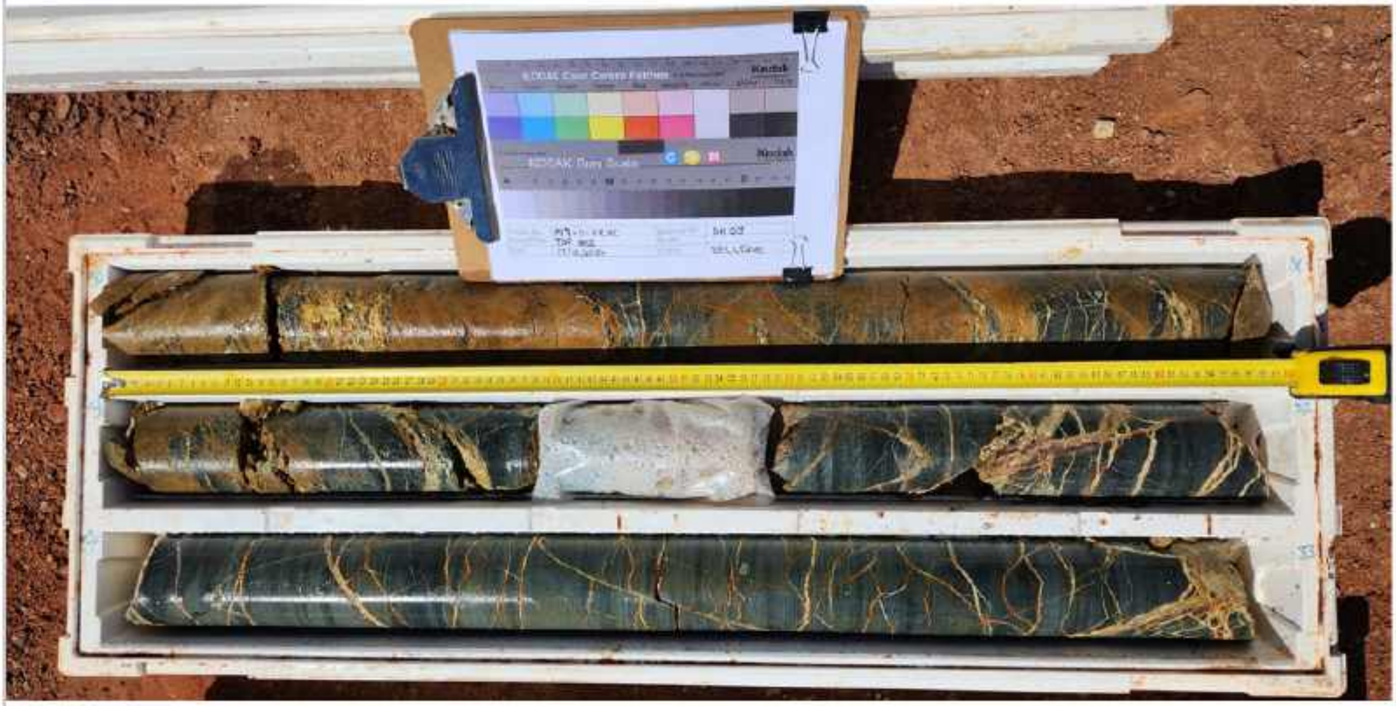

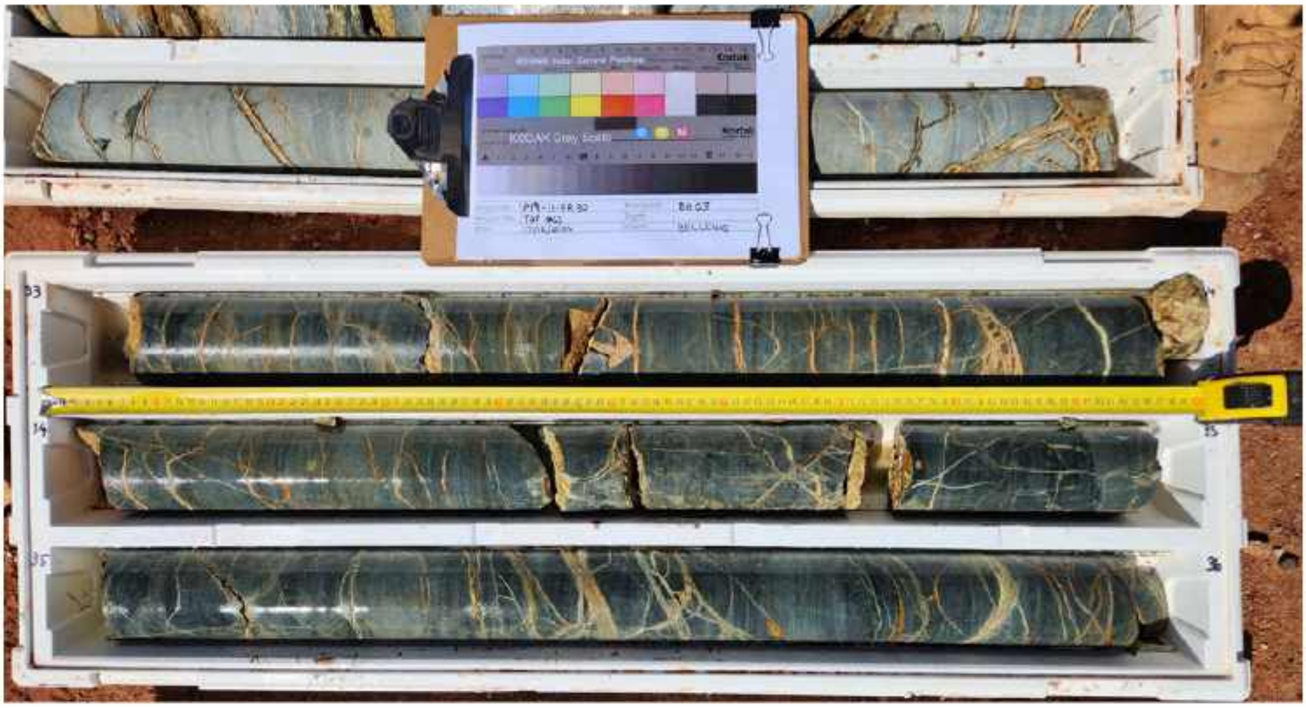

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Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH03	**BH Depth**	30 - 36 m

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Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH03	**BH Depth**	36 - 39 m

rec
(08) 6444 7988
B/355 Scarborough Beach Rd, Osborne Park, WA, 6017
info@rec.com.au

Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH04	**BH Depth**	19.8 - 25 m

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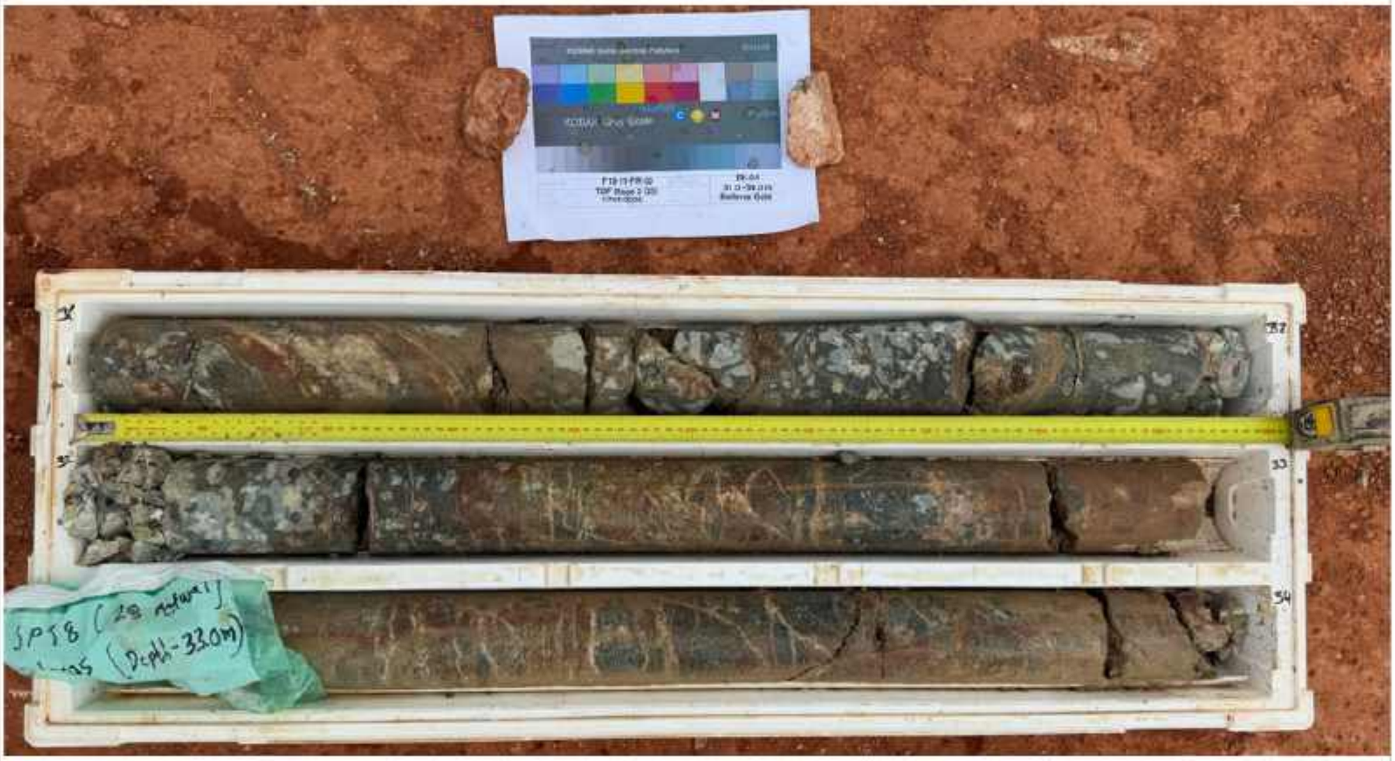
info@rec.com.au

Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH04	**BH Depth**	25 - 31 m



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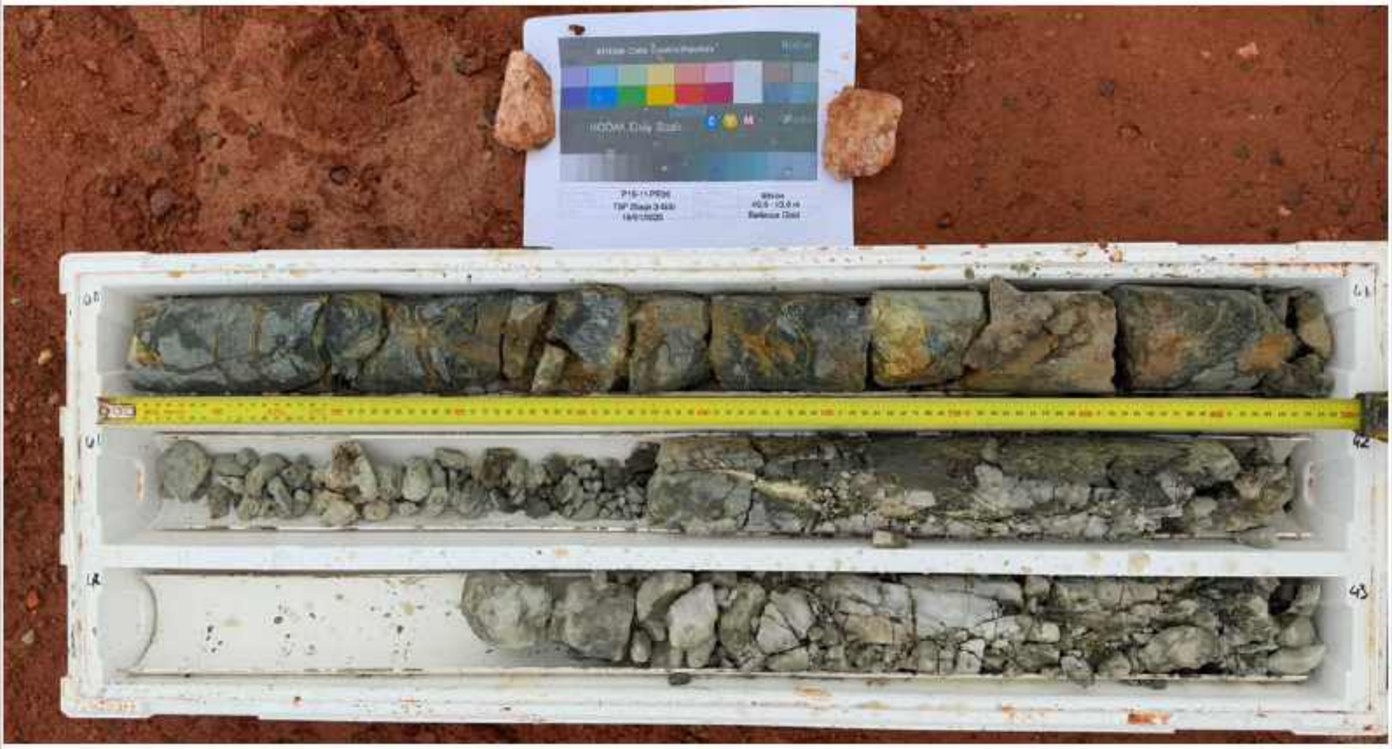
Osborne Park, WA, 6017

info@rec.com.au

Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH04	**BH Depth**	31 - 37 m



rec	(08) 6444 7988 B/355 Scarborough Beach Rd, Osborne Park, WA, 6017 info@rec.com.au	**Photo description**	Core Tray Photos		
		Client	Bellevue Gold		
		Location	Bellevue WA		
		Project name	TSF GSI		
		Project No	P19-11-PR-30	**Scale**	Not to Scale
		BH No	BH04	**BH Depth**	37 - 43 m

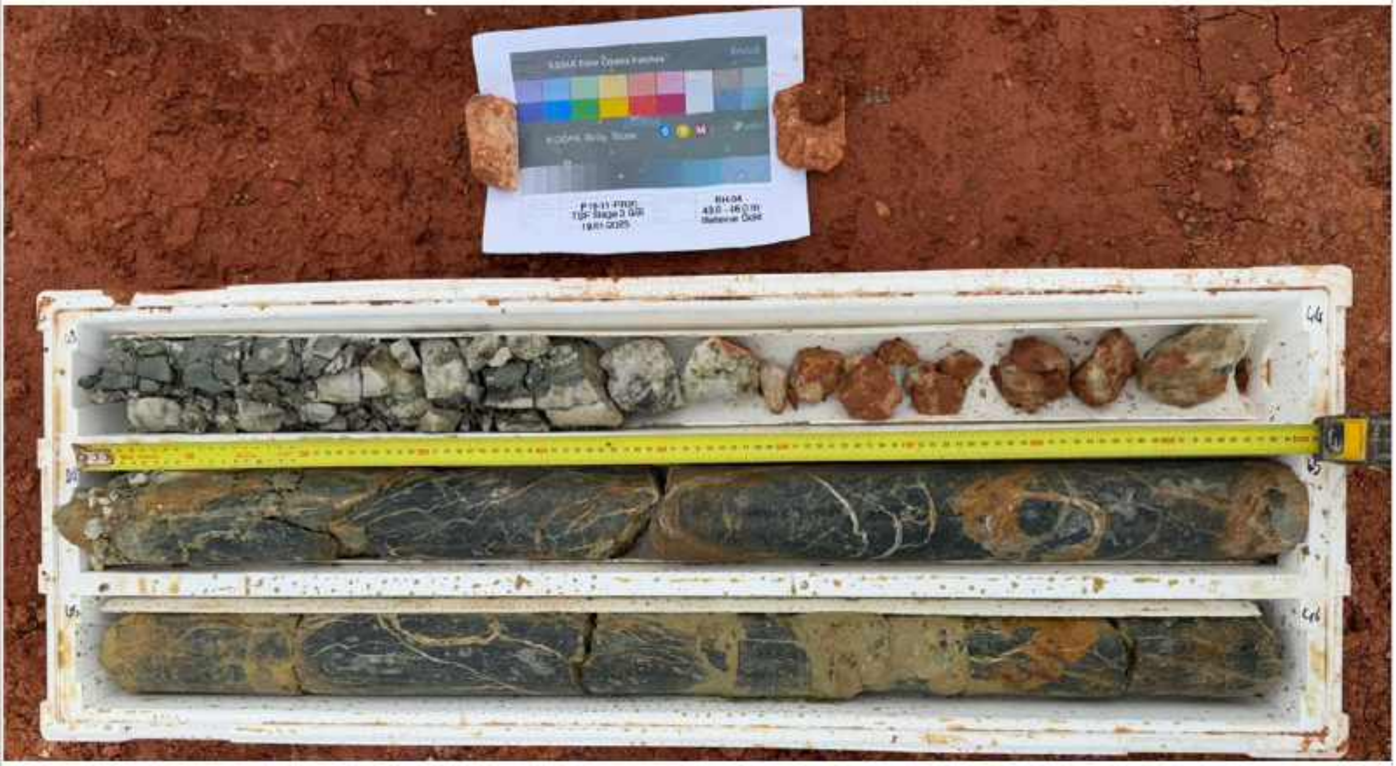


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Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH04	**BH Depth**	43 - 49 m

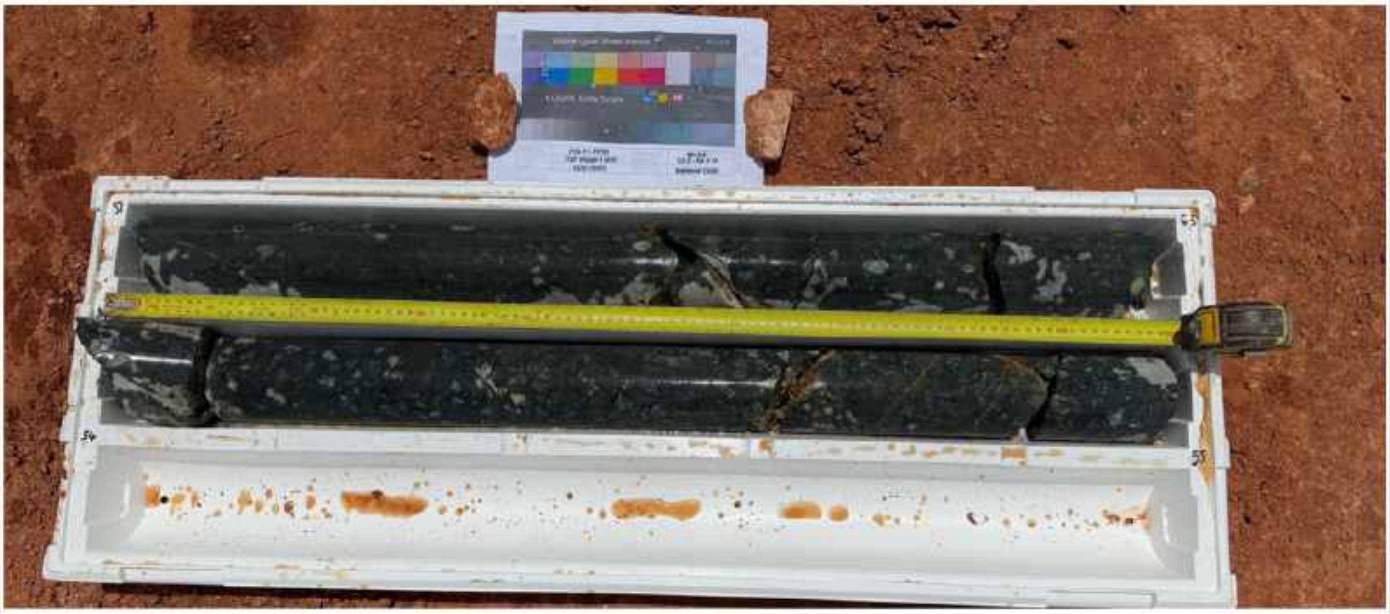

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Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH04	**BH Depth**	49 - 54 m

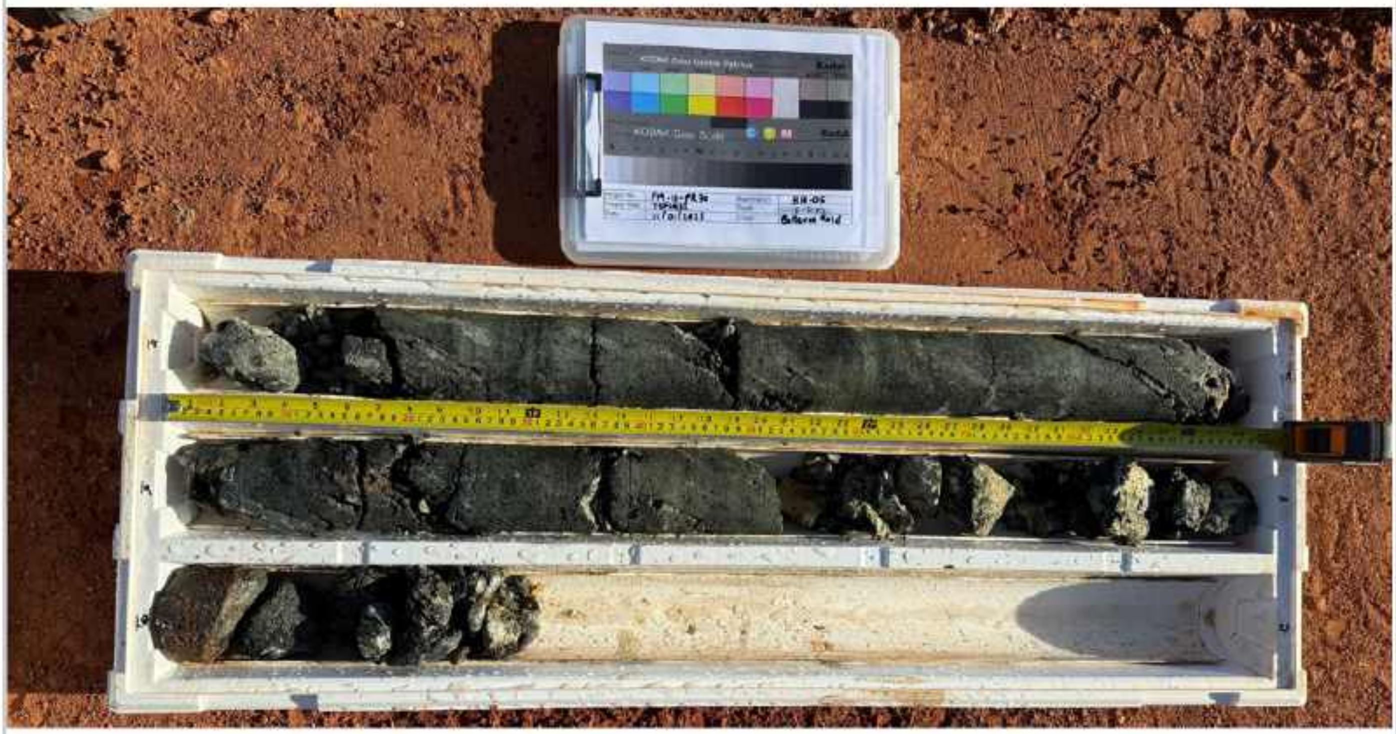

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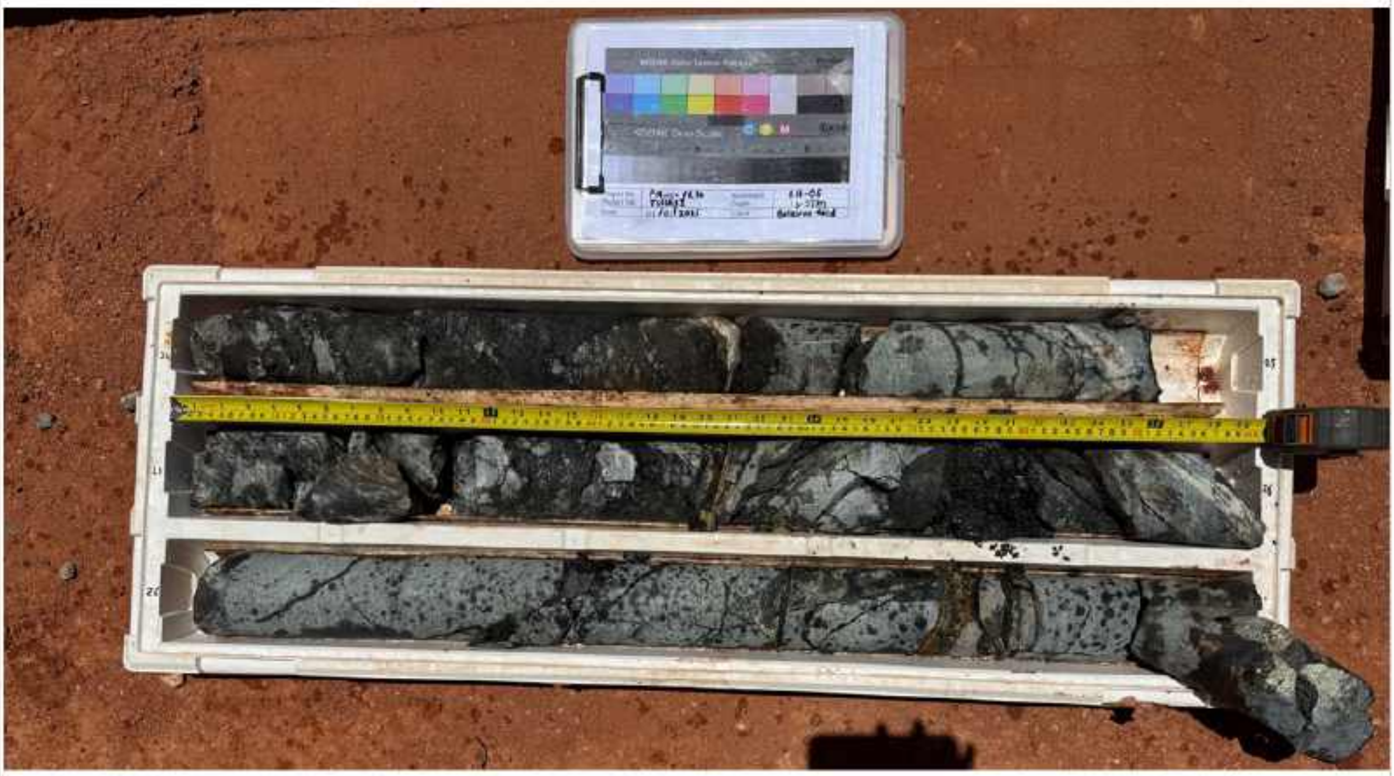
Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH05	**BH Depth**	15 - 21 m



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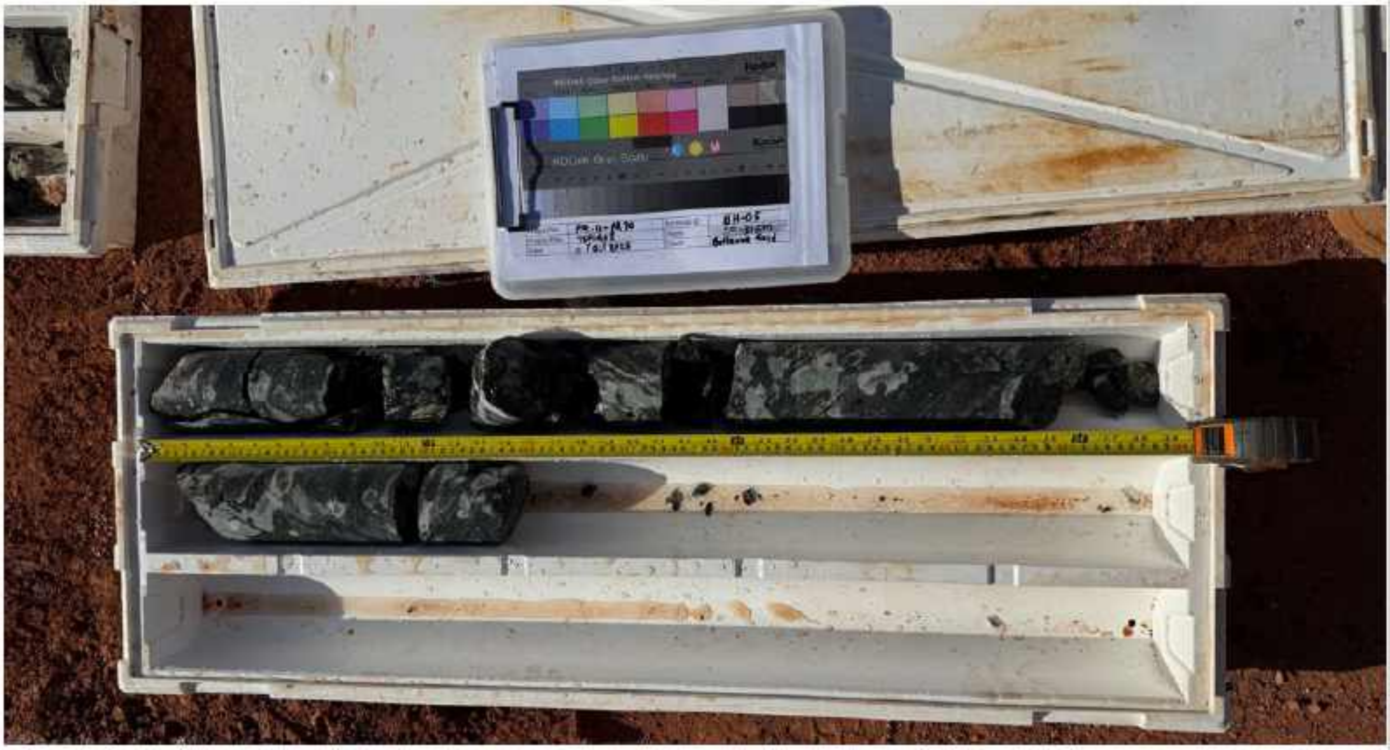
info@rec.com.au

Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	Scale	Not to Scale
BH No	BH05	BH Depth	21 - 27 m



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info@rec.com.au

Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH05	**BH Depth**	27 -31.5 m

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Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH06	**BH Depth**	13.9 - 19 m

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Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	Scale	Not to Scale
BH No	BH06	BH Depth	19 - 25 m

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info@rec.com.au

Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH06	**BH Depth**	25 - 31 m

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info@rec.com.au

Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH06	**BH Depth**	31 - 37 m

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Photo description	Core Tray Photos		
Client	Bellevue Gold		
Location	Bellevue WA		
Project name	TSF GSI		
Project No	P19-11-PR-30	**Scale**	Not to Scale
BH No	BH06	**BH Depth**	37 - 43 m

rec	(08) 6444 7988 B/355 Scarborough Beach Rd, Osborne Park, WA, 6017 info@rec.com.au	**Photo description**	Core Tray Photos		
		Client	Bellevue Gold		
		Location	Bellevue WA		
		Project name	TSF GSI		
		Project No	P19-11-PR-30	**Scale**	Not to Scale
		BH No	BH06	**BH Depth**	43 - 45 m

Appendix D

Geotechnical Laboratory Test Results and Certificates

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16 Gympie Way, Willetton
WA 6155

[redacted]

E-Precision Laboratory

MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

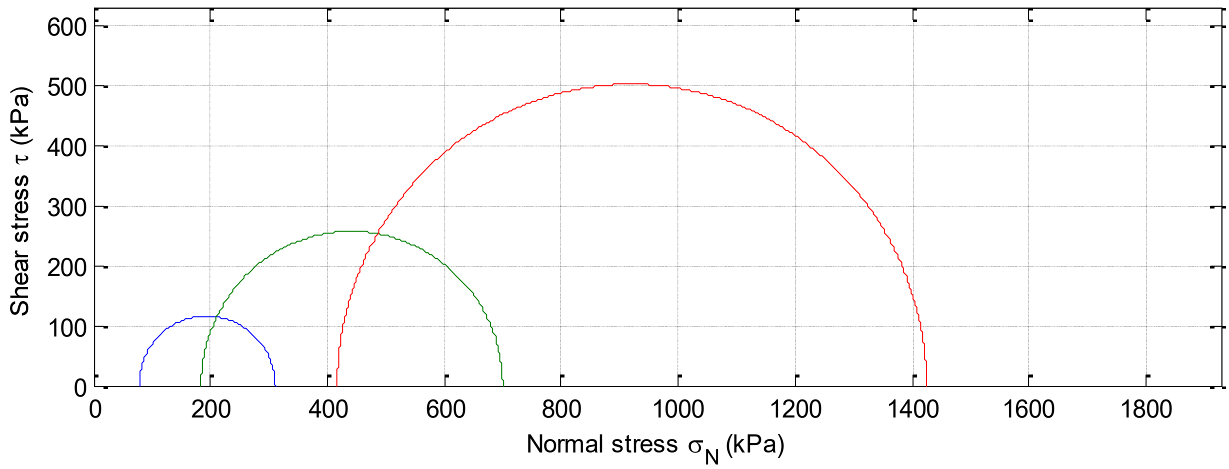
Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB1	Lab:	EPLab
Sample ID:	BH01-CB1_CU3		
Depth (m):	2.00 - 3.00	Room Temperature at Test:	~ 19°c

Tested by:	PHIL	Initial Moisture (%):	21.87	Strain Rate (mm/min):	0.006
Height (mm):	125.19	Final Moisture (%):	19.29	Skempton's (B):	1
Diameter (mm):	60.37	Bulk Density (t/m³):	1.82	Geology:	-
L/D Ratio:	2.07	Dry Density (t/m³):	1.49		

Failure Criteria used: Peak Principle Stress Ratio

Mohr Circle Diagram



Interpretations conducted using Matlab

Interpretation from Mohr Circle:	Stages 1 / 2	Stages 1 / 3	Stage 2 / 3
Cohesion C' (kPa):	6.46	15.15	36.38
Angle of Shear Resistance Φ' (Degrees) :	34.99	32.21	30.96

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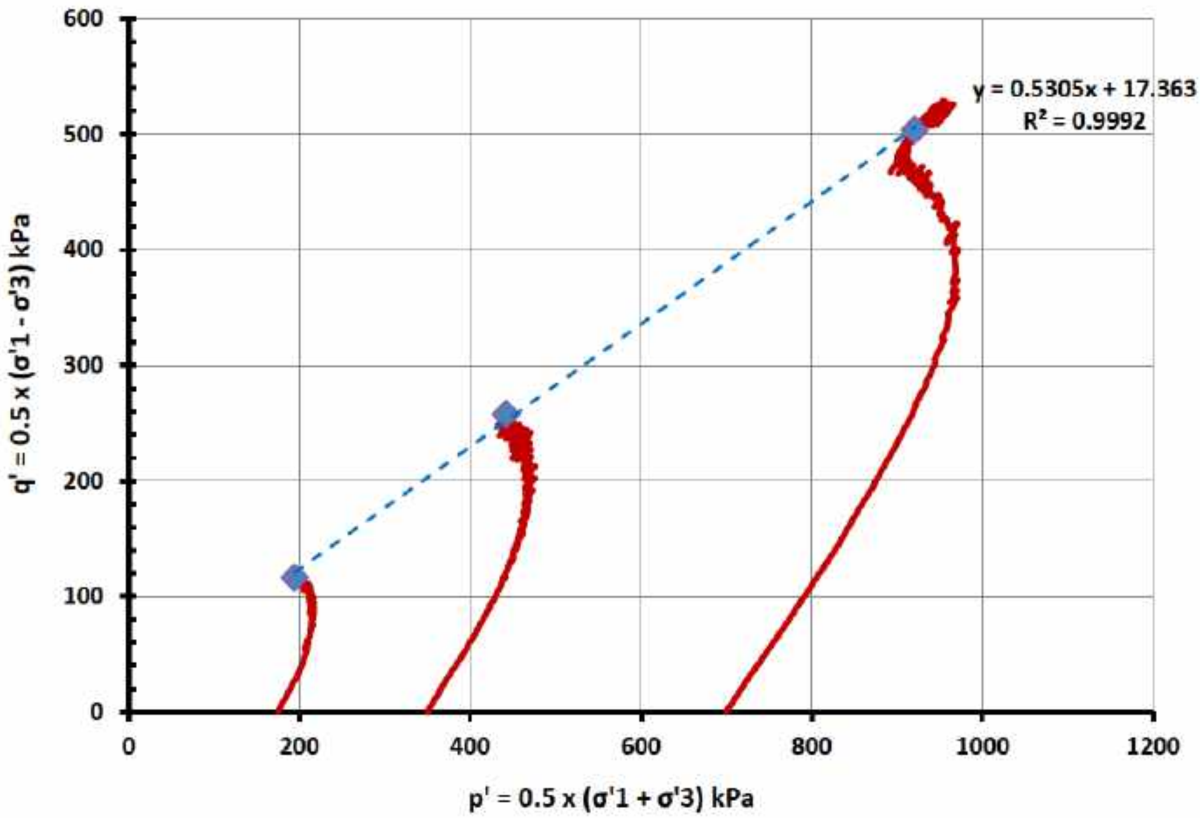
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB1	Lab:	EPLab
Sample ID:	BH01-CB1_CU3		
Depth (m):	2.00 - 3.00	Room Temperature at Test:	~ 19°C

MIT Effective Stress Path (q' vs p' diagram)



MIT Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : 20.47
Angle of Shear Resistance Φ' (Deg) : 32.01

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[redacted]

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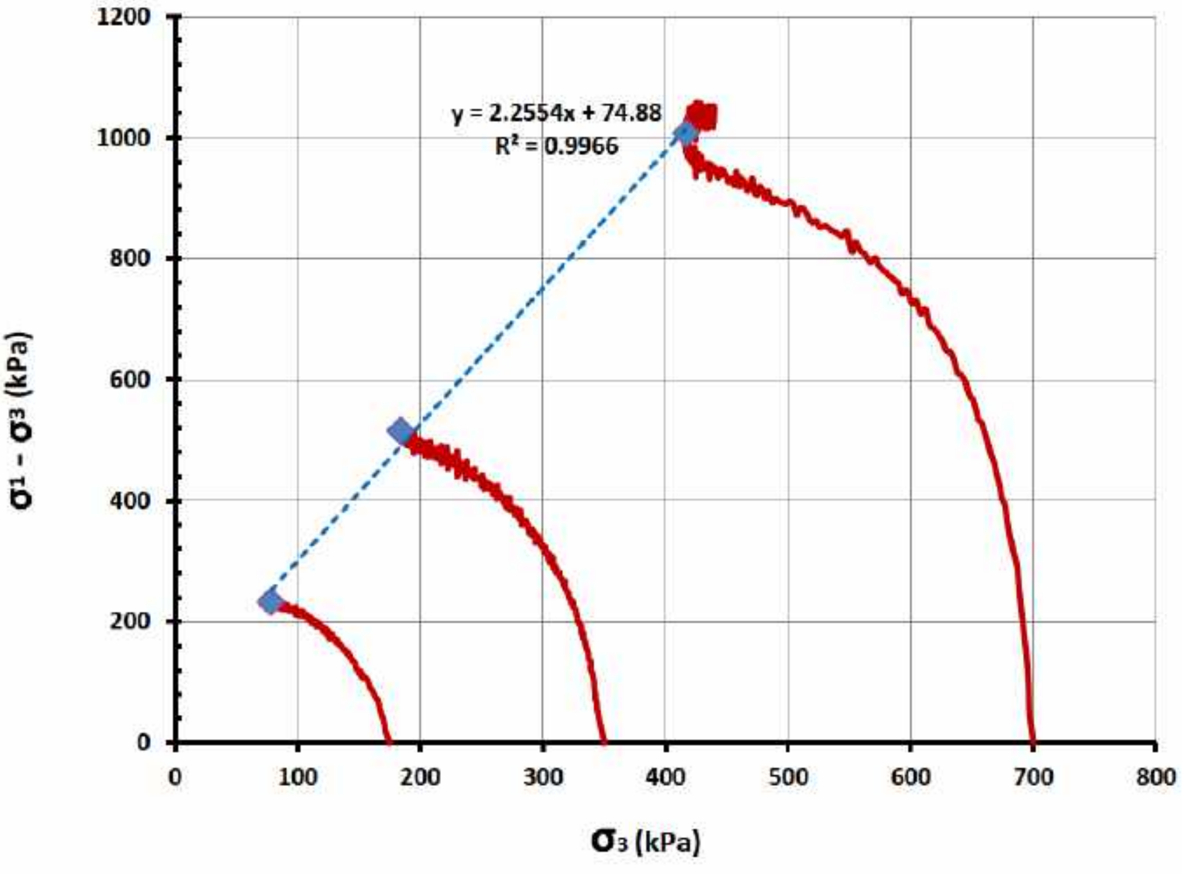
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB1	Lab:	EPLab
Sample ID:	BH01-CB1_CU3		
Depth (m):	2.00 - 3.00	Room Temperature at Test:	~ 19°C

Modified Mohr Coulomb Stress Path



Modified Mohr Coulomb Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : **20.74**

Angle of Shear Resistance Φ' (Deg) : **32.04**

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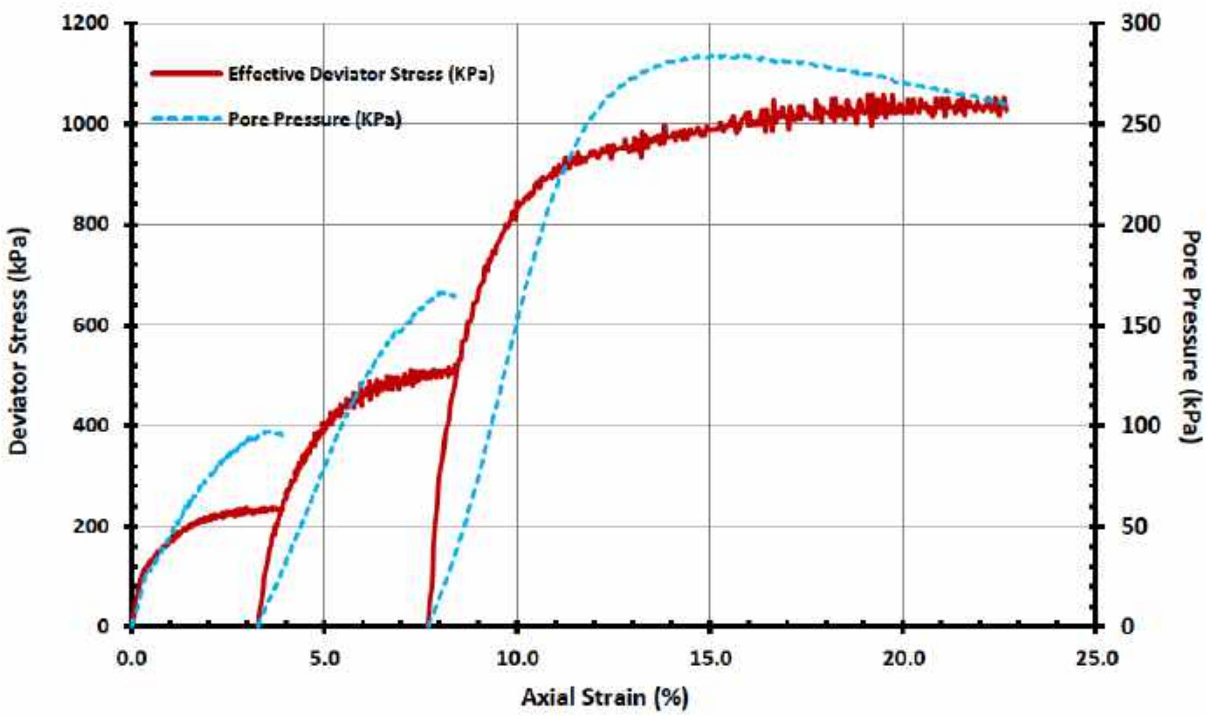
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB1	Lab:	EPLab
Sample ID:	BH01-CB1_CU3		
Depth (m):	2.00 - 3.00	Room Temperature at Test:	~ 19°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				σ'_1	σ'_3	σ'_1 / σ'_3		
1	175	0	97	311	78	3.99	233	3.73
2	350	0	166	700	184	3.80	516	8.22
3	700	0	283	1424	417	3.42	1007	16.23

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[redacted]

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB1	Lab:	EPLab
Sample ID:	BH01-CB1_CU3		
Depth (m):	2.00 - 3.00	Room Temperature at Test:	~ 19°C

Photo After Test

Sample ID:	BH01-CB1	**Depth (m):**	2.00 - 3.00
Lab ID:	BH01-CB1_CU3	**Date Tested:**	05/02/2025

Failure Mode: **Intact Shear** **32.6 °**

Notes:

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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16 Gympie Way, Willetton
WA 6155
[redacted]

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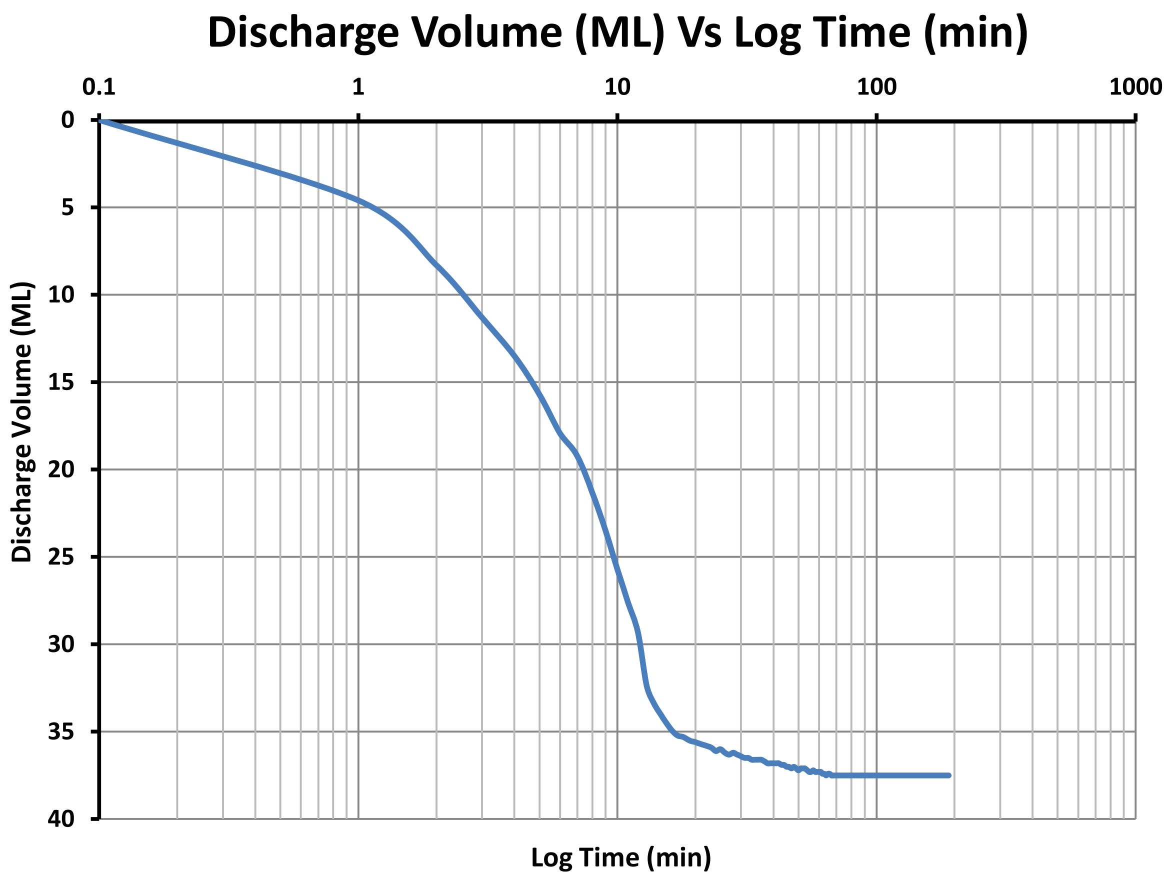
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB1	Lab:	EPLab
Sample ID:	BH01-CB1_CU3		
Depth (m):	2.00 - 3.00	Room Temperature at Test:	~ 19°C



Cv (cm²/s): 0.065 based on t_{90}

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[redacted]

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

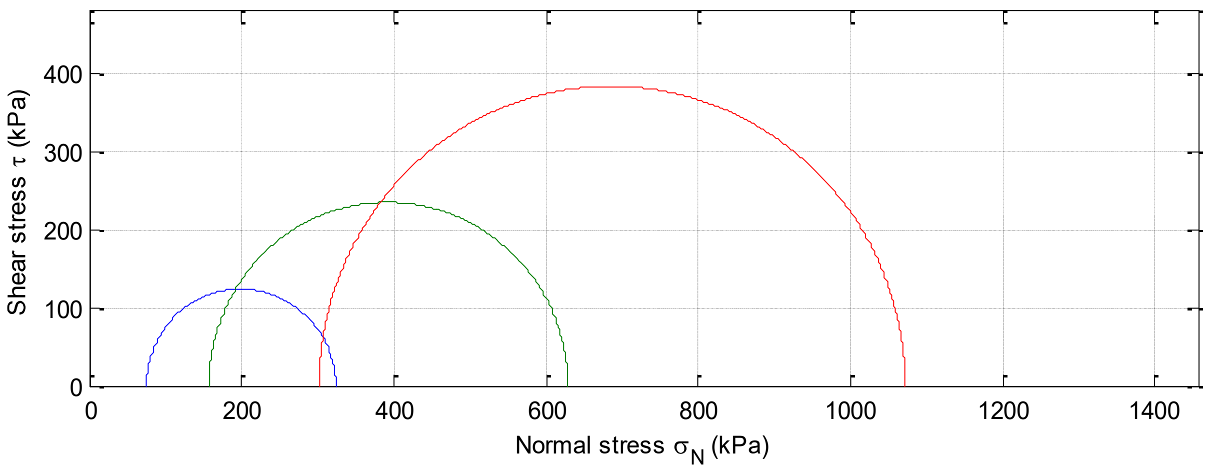
Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB3	Lab:	EPLab
Sample ID:	BH01-CB3_CU3		
Depth (m):	8.60 - 8.80	Room Temperature at Test:	~ 19°c

Tested by:	PHIL	Initial Moisture (%):	12.64	Strain Rate (mm/min):	0.006
Height (mm):	126.75	Final Moisture (%):	11.44	Skempton's (B):	1
Diameter (mm):	61.78	Bulk Density (t/m³):	1.81	Geology:	-
L/D Ratio:	2.05	Dry Density (t/m³):	1.60		

Failure Criteria used: Peak Principle Stress Ratio

Mohr Circle Diagram



Interpretations conducted using Matlab

Interpretation from Mohr Circle:	Stages 1 / 2	Stages 1 / 3	Stage 2 / 3
Cohesion C' (kPa):	11.68	21.17	42.72
Angle of Shear Resistance Φ' (Degrees) :	35.37	32.21	30.54

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WA 6155

[redacted]

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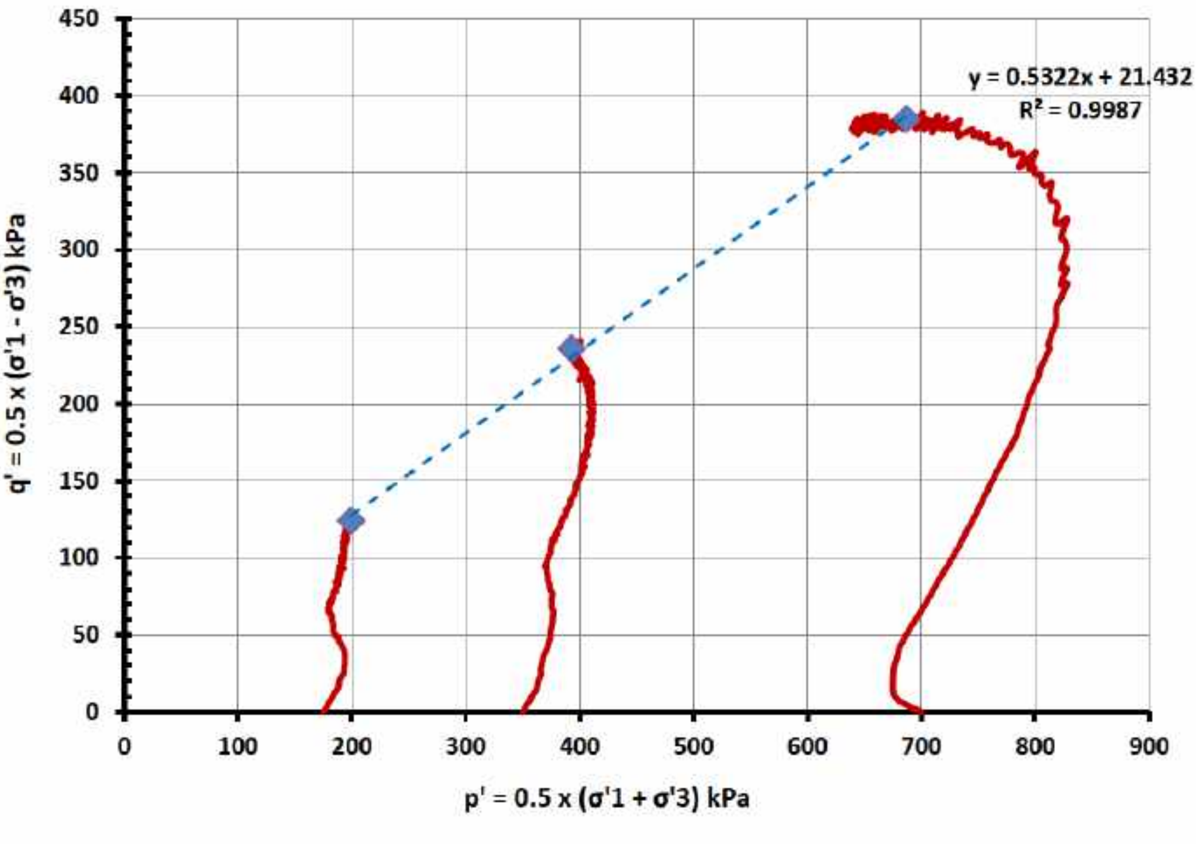
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB3	Lab:	EPLab
Sample ID:	BH01-CB3_CU3		
Depth (m):	8.60 - 8.80	Room Temperature at Test:	~ 19°C

MIT Effective Stress Path (q' vs p' diagram)



MIT Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	25.27
Angle of Shear Resistance Φ' (Deg) :	32.01

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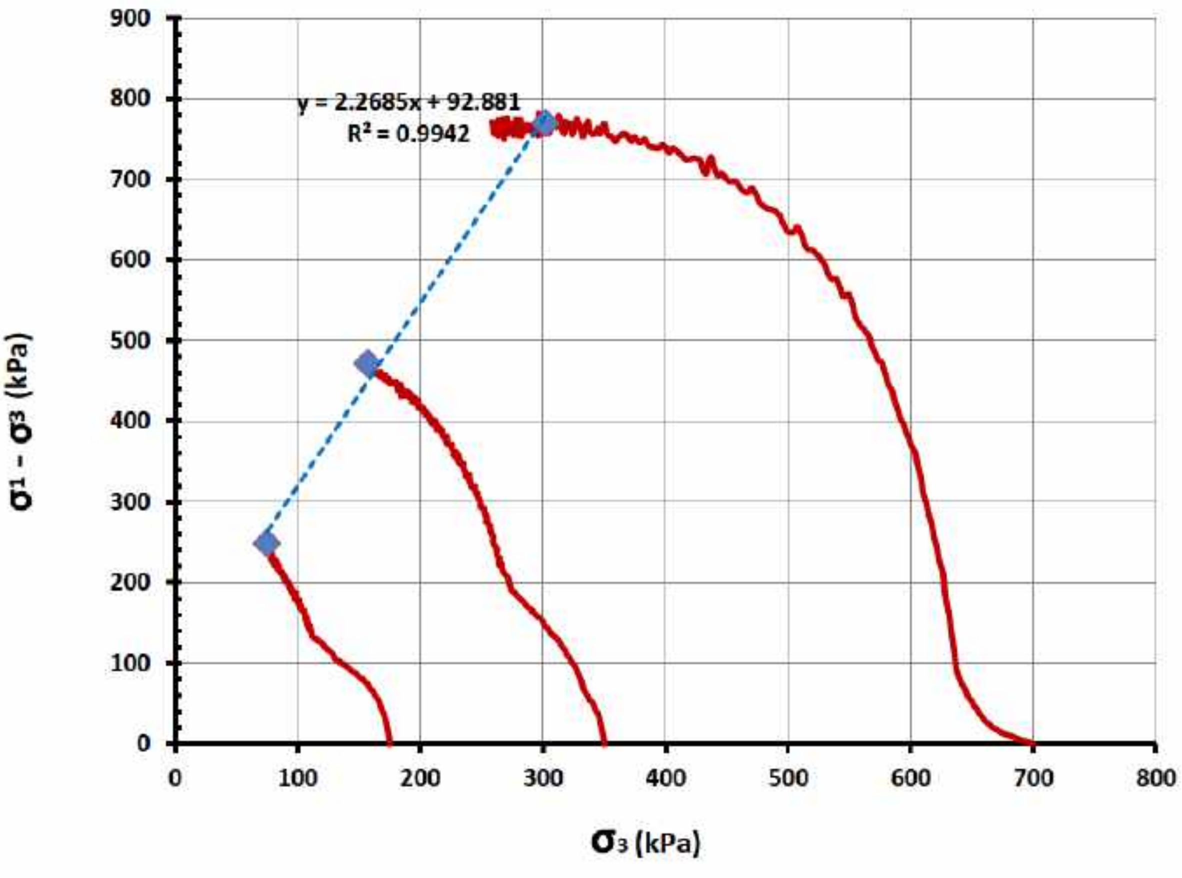
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB3	Lab:	EPLab
Sample ID:	BH01-CB3_CU3		
Depth (m):	8.60 - 8.80	Room Temperature at Test:	~ 19°C

Modified Mohr Coulomb Stress Path



Modified Mohr Coulomb Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	25.68
Angle of Shear Resistance Φ' (Deg) :	32.11

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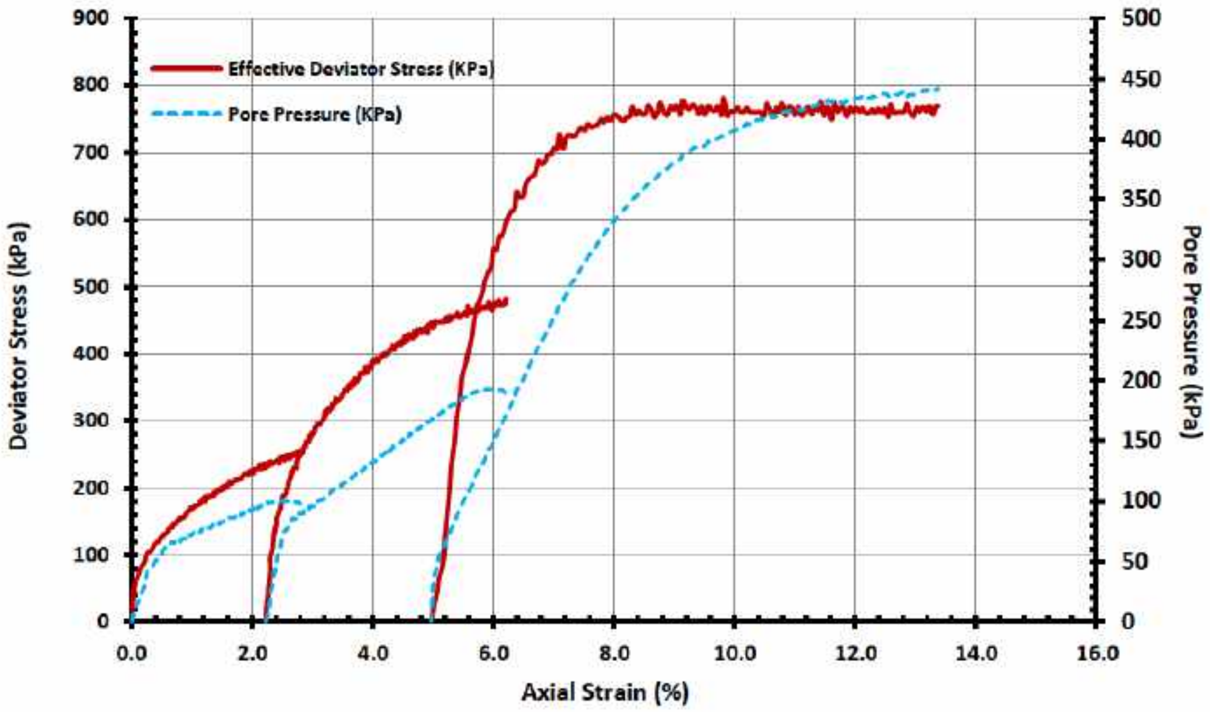
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB3	Lab:	EPLab
Sample ID:	BH01-CB3_CU3		
Depth (m):	8.60 - 8.80	Room Temperature at Test:	~ 19°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				σ'_1	σ'_3	σ'_1 / σ'_3		
1	175	0	100	324	75	4.31	249	2.64
2	350	0	193	629	157	4.00	472	6.06
3	700	0	398	1072	302	3.55	770	9.57

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WA 6155

E[redacted]

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB3	Lab:	EPLab
Sample ID:	BH01-CB3_CU3		
Depth (m):	8.60 - 8.80	Room Temperature at Test:	~ 19°C

Photo After Test

Sample ID:	BH01-CB3	**Depth (m):**	8.60 - 8.80
Lab ID:	BH01-CB3_CU3	**Date Tested:**	05/02/2025

Failure Mode: **Bulging** **N/A °**

Notes:

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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WA 6155

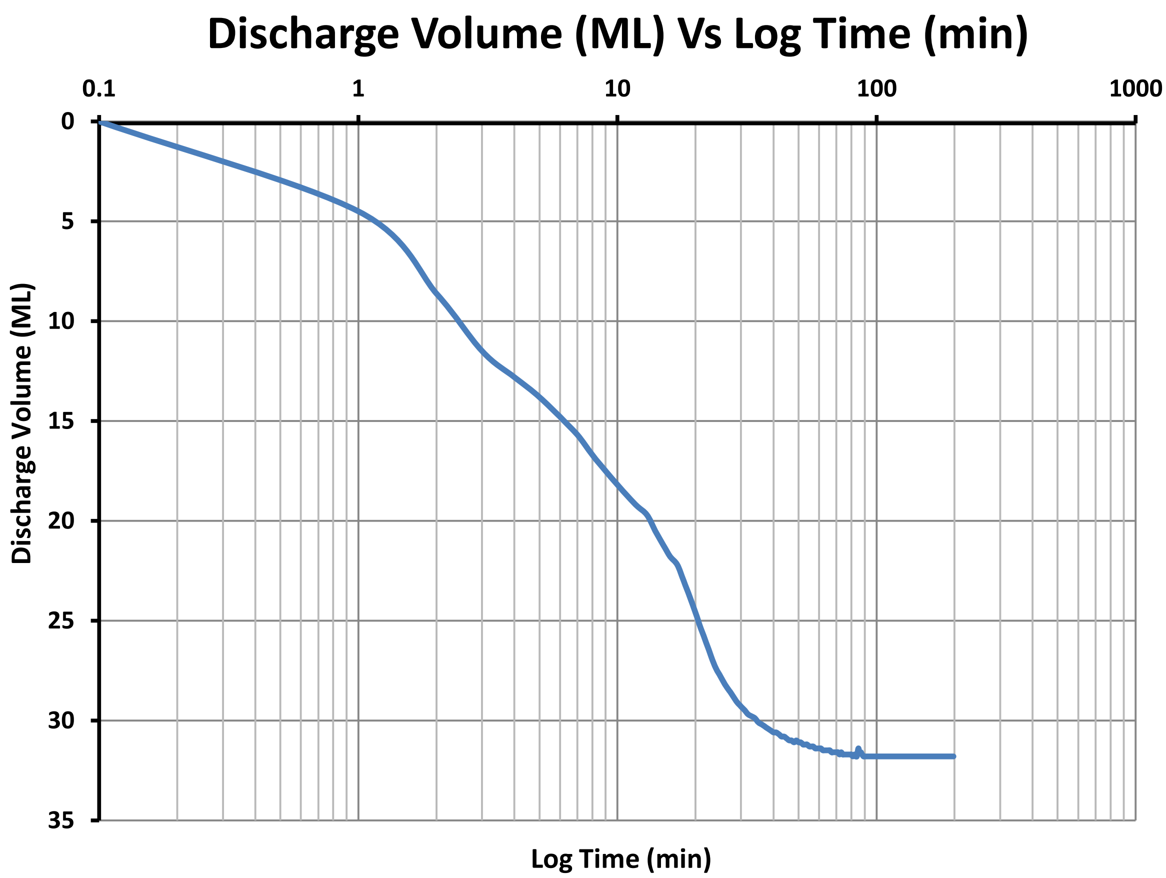
[redacted]

E-Precision Laboratory

MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB3	Lab:	EPLab
Sample ID:	BH01-CB3_CU3		
Depth (m):	8.60 - 8.80	Room Temperature at Test:	~ 19°C



Cv (cm^2/s): 0.049 based on $\mathbf{t_{90}}$

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[redacted]

E-Precision Laboratory

MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

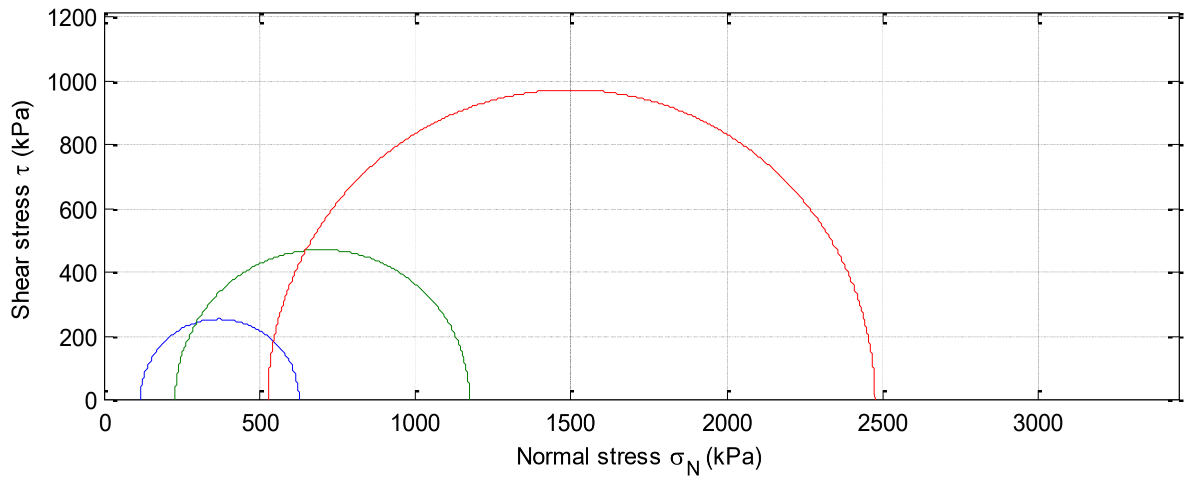
Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB5	Lab:	EPLab
Sample ID:	BH01-CB5_CU3		
Depth (m):	16	Room Temperature at Test:	~ 19°c

Tested by:	PHIL	Initial Moisture (%):	8.20	Strain Rate (mm/min):	0.006
Height (mm):	165.29	Final Moisture (%):	19.93	Skempton's (B):	1
Diameter (mm):	82.18	Bulk Density (t/m³):	2.17	Geology:	-
L/D Ratio:	2.01	Dry Density (t/m³):	2.00		

Failure Criteria used: Peak Principle Stress Ratio

Mohr Circle Diagram



Interpretations conducted using Matlab

Interpretation from Mohr Circle:	Stages 1 / 2	Stages 1 / 3	Stage 2 / 3
Cohesion C' (kPa):	11.69	22.72	41.09
Angle of Shear Resistance Φ' (Degrees) :	41.35	39.69	38.66

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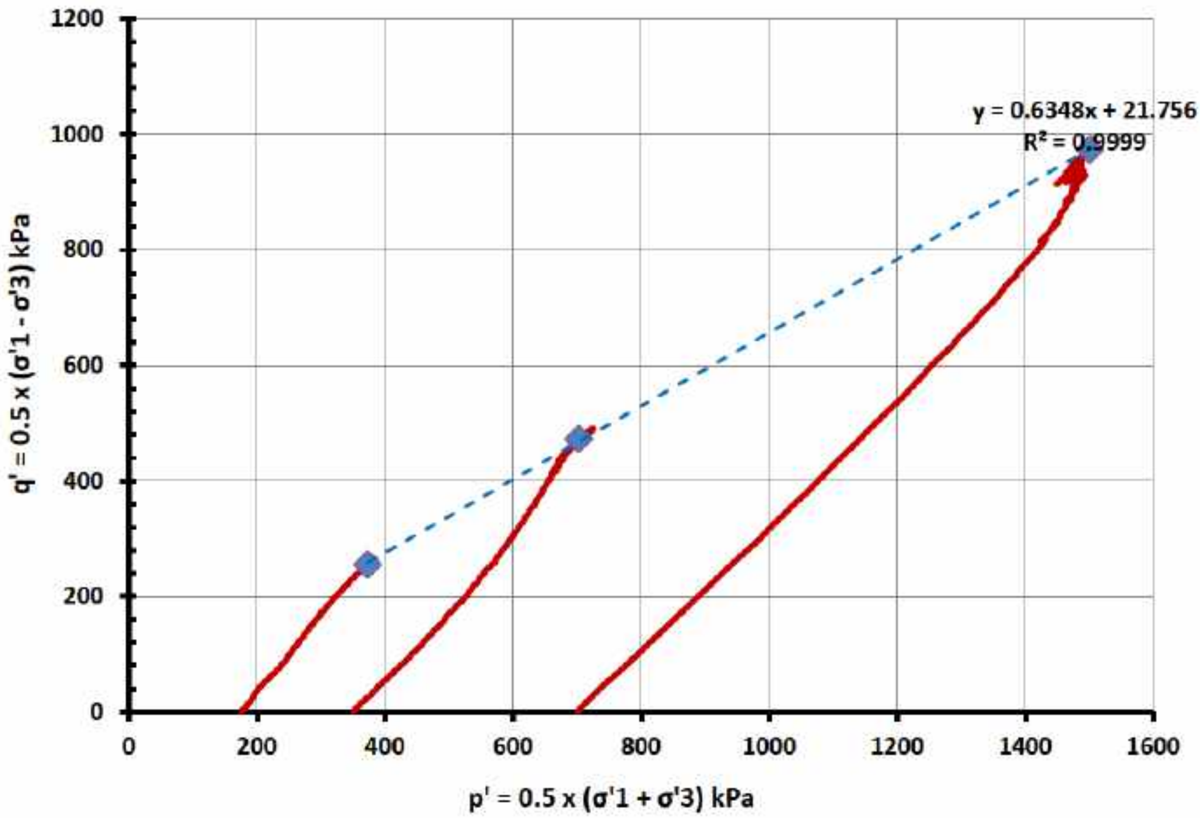
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB5	Lab:	EPLab
Sample ID:	BH01-CB5_CU3		
Depth (m):	16	Room Temperature at Test:	~ 19°C

MIT Effective Stress Path (q' vs p' diagram)



MIT Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	28.02
Angle of Shear Resistance Φ' (Deg) :	39.05

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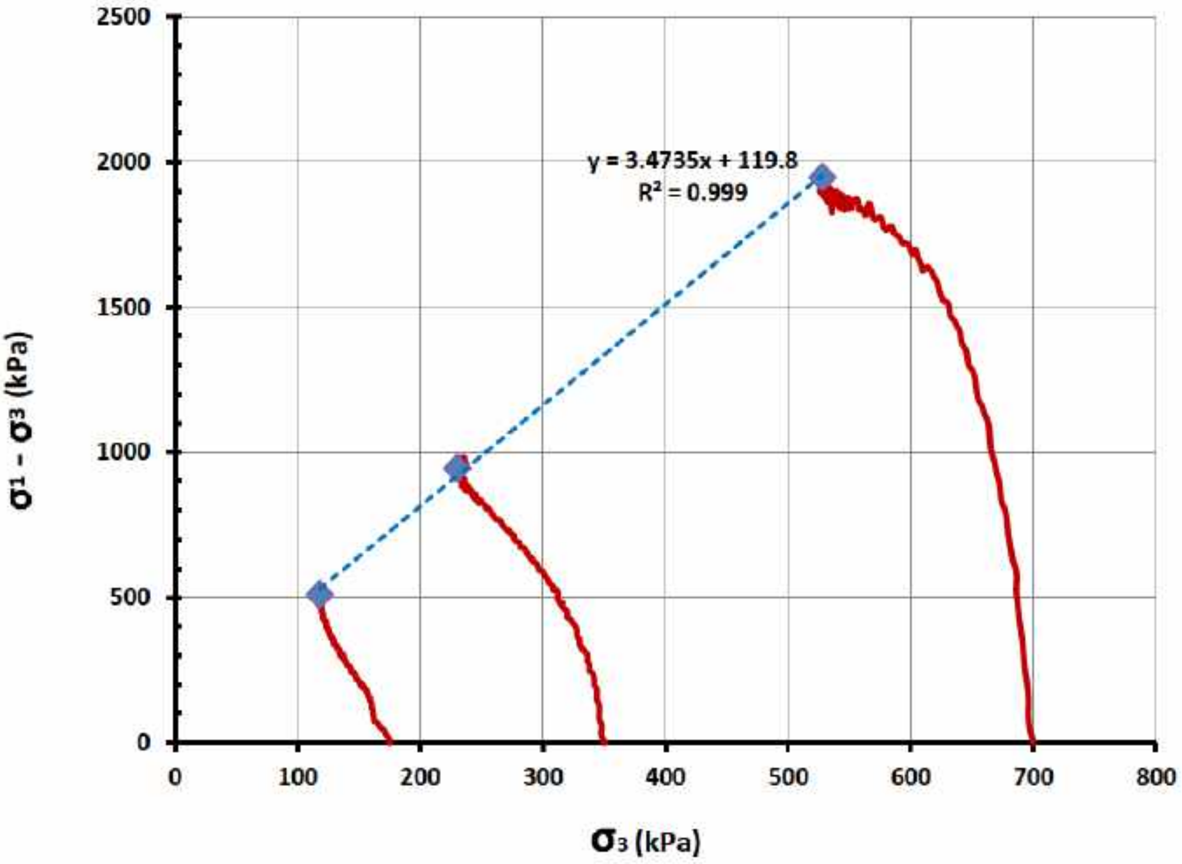
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB5	Lab:	EPLab
Sample ID:	BH01-CB5_CU3		
Depth (m):	16	Room Temperature at Test:	~ 19°C

Modified Mohr Coulomb Stress Path



Modified Mohr Coulomb Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	28.33
Angle of Shear Resistance Φ' (Deg) :	39.37

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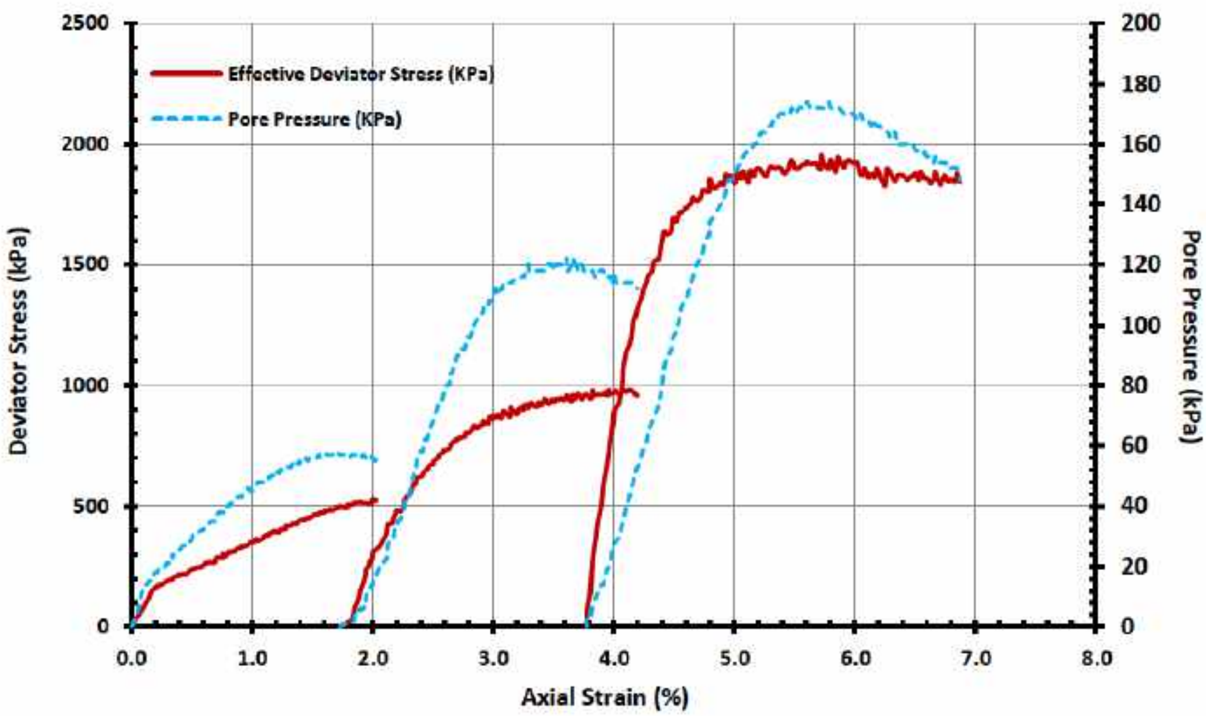
E-Precision Laboratory

MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB5	Lab:	EPLab
Sample ID:	BH01-CB5_CU3		
Depth (m):	16	Room Temperature at Test:	~ 19°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				σ'_1	σ'_3	σ'_1 / σ'_3		
1	175	0	57	628	118	5.32	510	1.86
2	350	0	120	1175	230	5.11	945	3.68
3	700	0	172	2475	528	4.69	1947	5.86

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E-PRECISION LABORATORY

MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB5	Lab:	EPLab
Sample ID:	BH01-CB5_CU3		
Depth (m):	16	Room Temperature at Test:	~ 19°C

Photo After Test

Sample ID:	BH01-CB5	**Depth (m):**	1900/1/16
Lab ID:	BH01-CB5_CU3	**Date Tested:**	05/02/2025

Failure Mode: **Intact Shear** **38.6 °**

Notes:

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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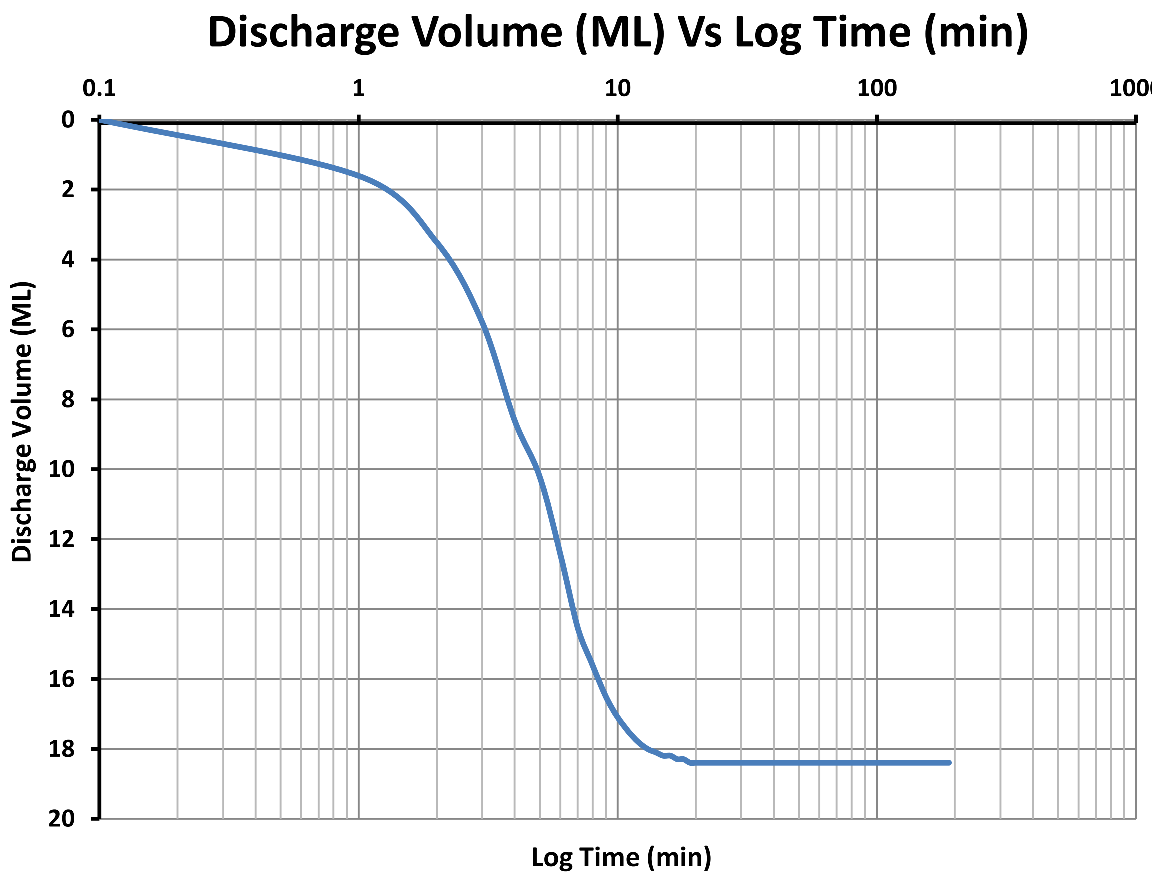
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB5	Lab:	EPLab
Sample ID:	BH01-CB5_CU3		
Depth (m):	16	Room Temperature at Test:	~ 19°C



Cv (cm²/s): 0.708 based on t_{90}

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

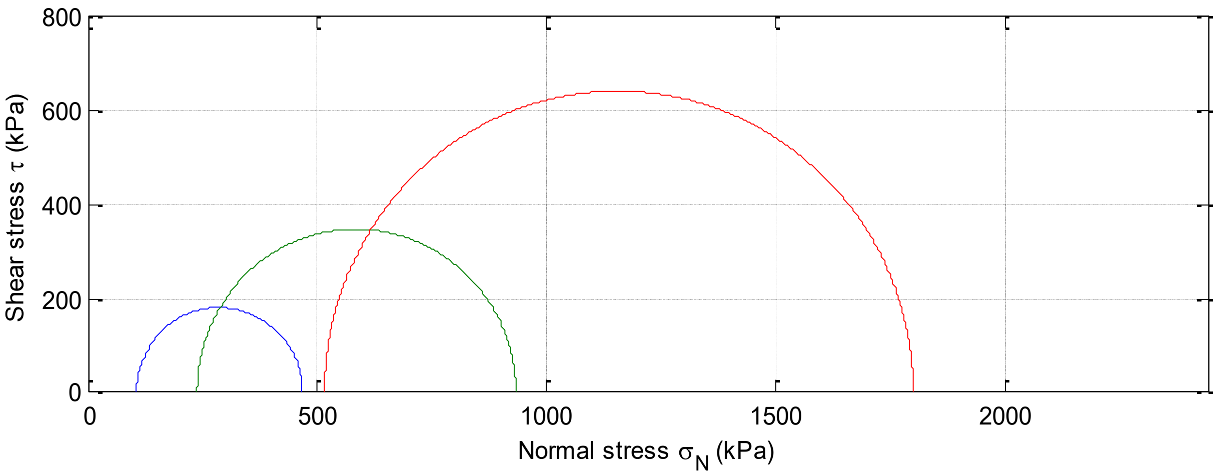
Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-UDS02	Lab:	EPLab
Sample ID:	BH01-UDS02_CU3		
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°c

Tested by:	PHIL	Initial Moisture (%):	27.78	Strain Rate (mm/min):	0.006
Height (mm):	125.23	Final Moisture (%):	28.49	Skempton's (B):	1
Diameter (mm):	62.45	Bulk Density (t/m³):	2.19	Geology:	-
L/D Ratio:	2.01	Dry Density (t/m³):	1.71		

Failure Criteria used: Peak Principle Stress Ratio

Mohr Circle Diagram



Interpretations conducted using Matlab

Interpretation from Mohr Circle:	Stages 1 / 2	Stages 1 / 3	Stage 2 / 3
Cohesion C' (kPa):	24.96	34.13	54.02
Angle of Shear Resistance Φ' (Degrees) :	33.82	31.80	30.96

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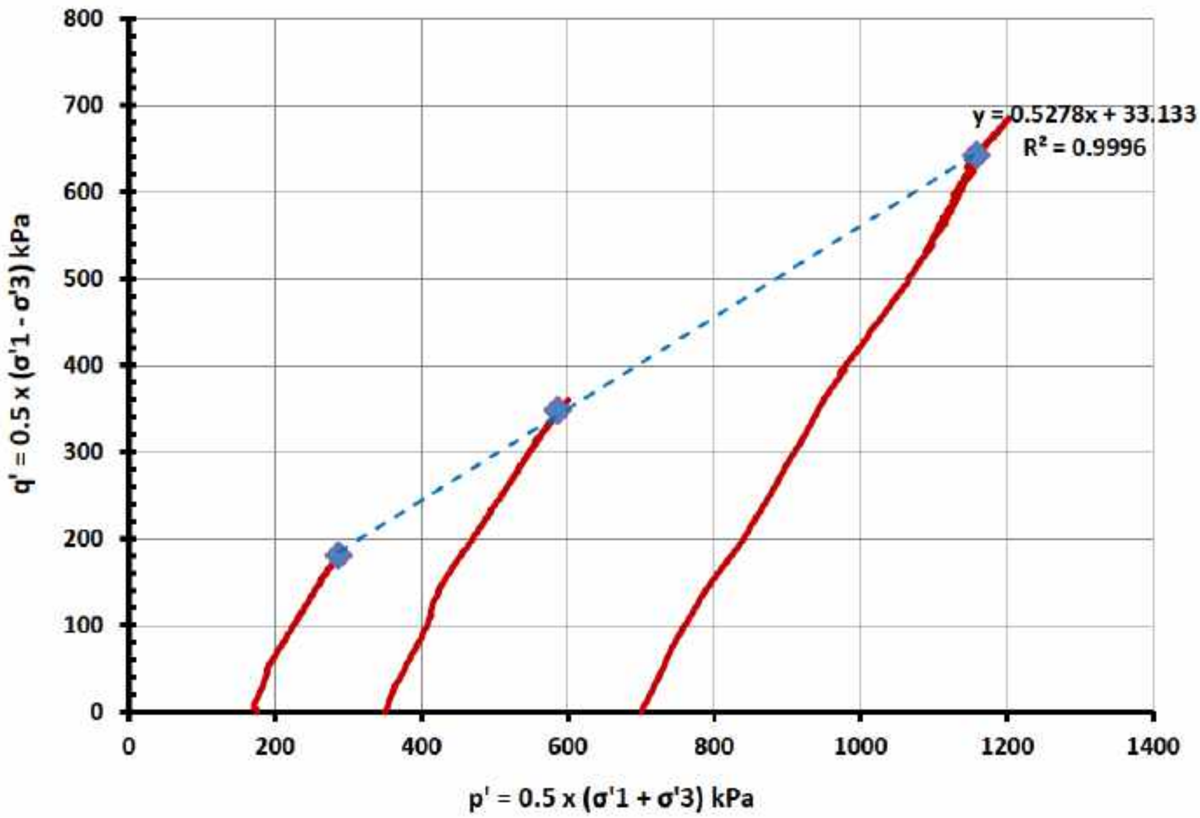
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-UDS02	Lab:	EPLab
Sample ID:	BH01-UDS02_CU3		
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

MIT Effective Stress Path (q' vs p' diagram)



MIT Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	**39.07**
Angle of Shear Resistance Φ' (Deg) :	**32.01**

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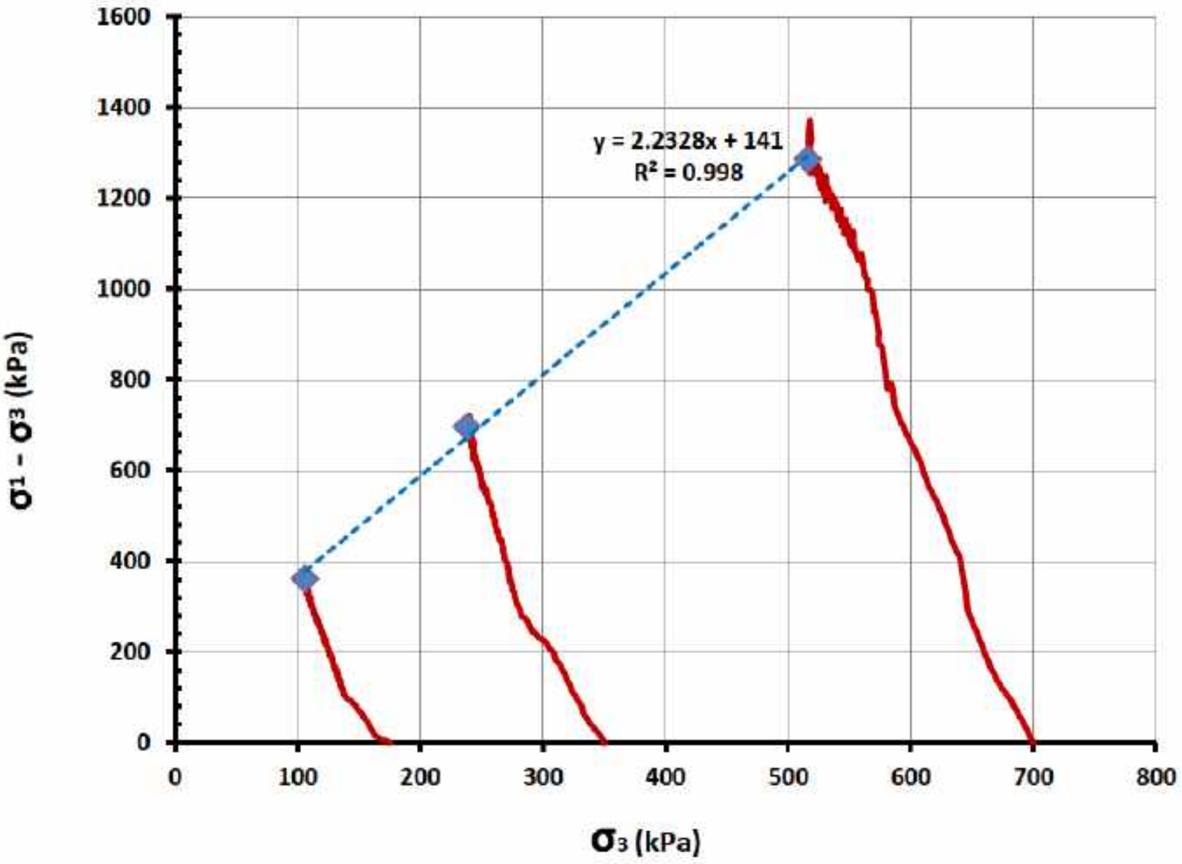
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-UDS02	Lab:	EPLab
Sample ID:	BH01-UDS02_CU3		
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Modified Mohr Coulomb Stress Path



Modified Mohr Coulomb Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	**39.23**
Angle of Shear Resistance Φ' (Deg) :	**31.82**

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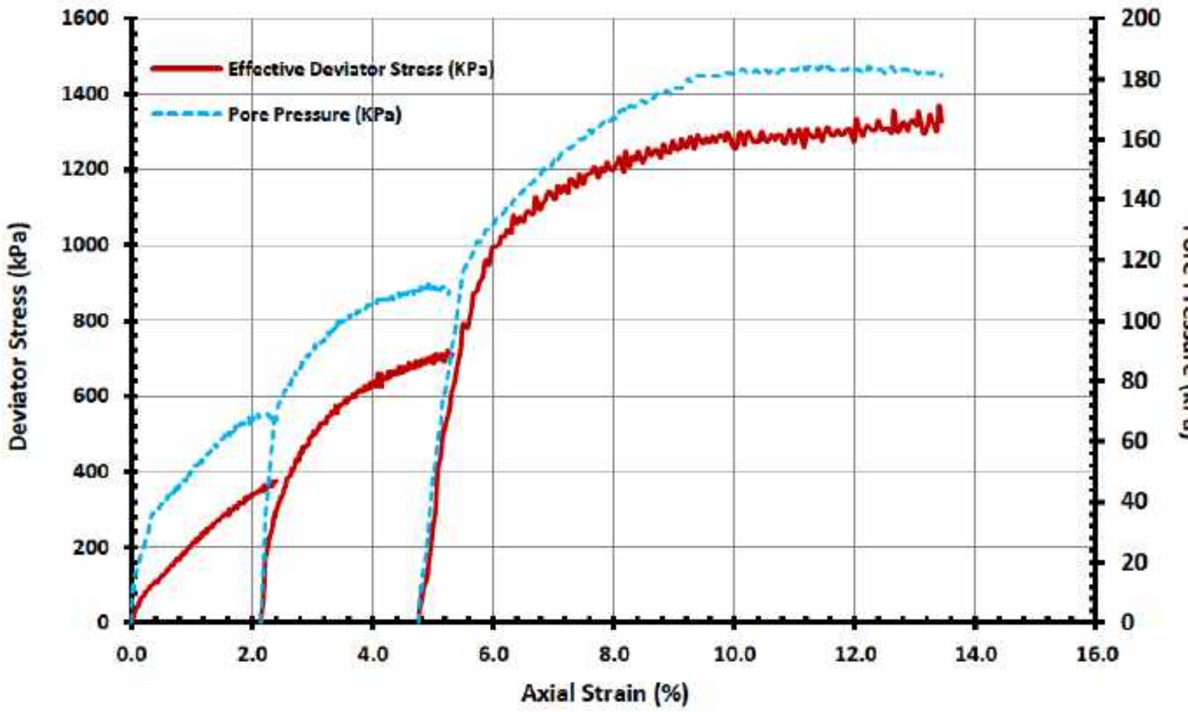
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-UDS02	Lab:	EPLab
Sample ID:	BH01-UDS02_CU3		
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				σ'_1	σ'_3	σ'_1 / σ'_3		
1	175	0	69	468	106	4.41	362	2.27
2	350	0	112	934	238	3.92	696	4.94
3	700	0	184	1801	516	3.49	1285	11.36

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-UDS02	Lab:	EPLab
Sample ID:	BH01-UDS02_CU3		
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Photo After Test

Sample ID:	BH01-UDS02	**Depth (m):**	4.95 - 5.30
Lab ID:	BH01-UDS02_CU3	**Date Tested:**	05/02/2025

Failure Mode: **Intact Shear** **32.5 °**

Notes: **Sample extracted from Shelby Tube**

Stored and Tested the Sample as received
Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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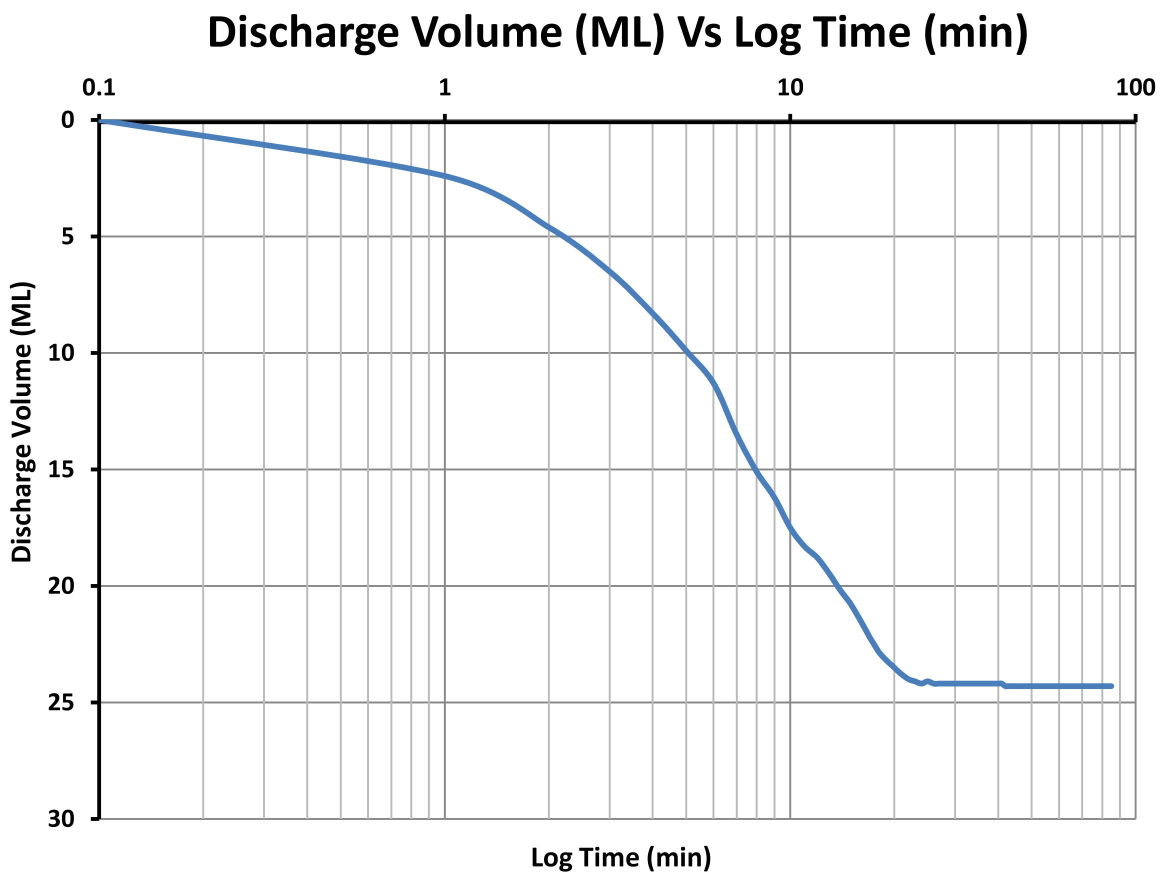
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-UDS02	Lab:	EPLab
Sample ID:	BH01-UDS02_CU3		
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C



Cv (cm²/s): 0.054 based on t_{90}

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

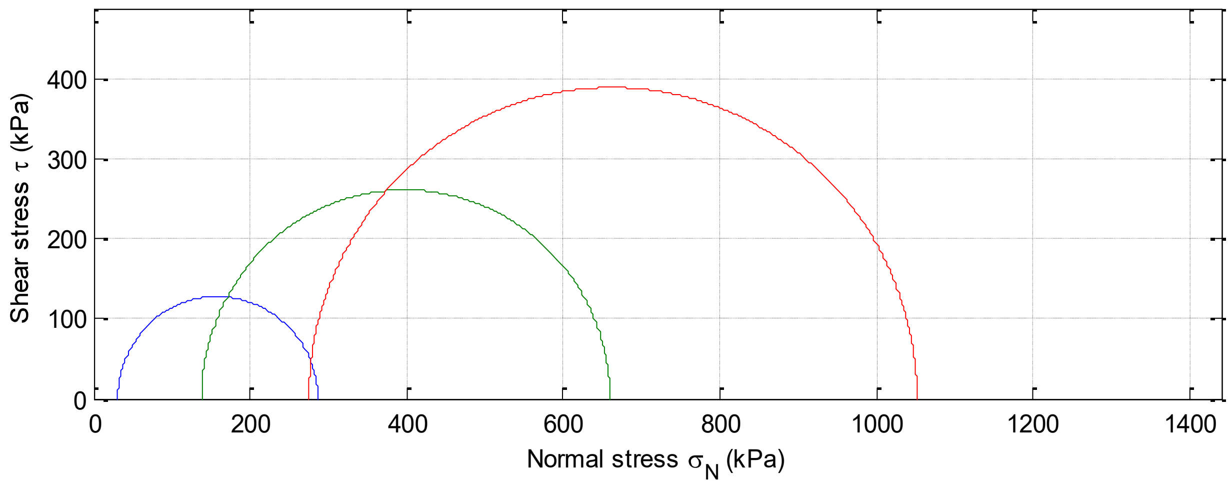
Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS02	Lab:	EPLab
Sample ID:	BH02-UDS02_CU3		
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 19°C

Tested by:	PHIL	Initial Moisture (%):	36.62	Strain Rate (mm/min):	0.006
Height (mm):	125.33	Final Moisture (%):	25.85	Skempton's (B):	1
Diameter (mm):	60.16	Bulk Density (t/m³):	1.94	Geology:	-
L/D Ratio:	2.08	Dry Density (t/m³):	1.42		

Failure Criteria used: Peak Principle Stress Ratio

Mohr Circle Diagram



Interpretations conducted using Matlab

Interpretation from Mohr Circle:	**Stages 1 / 2**	**Stages 1 / 3**	**Stage 2 / 3**
Cohesion C' (kPa):	47.92	53.59	78.37
Angle of Shear Resistance Φ' (Degrees) :	33.82	30.96	28.81

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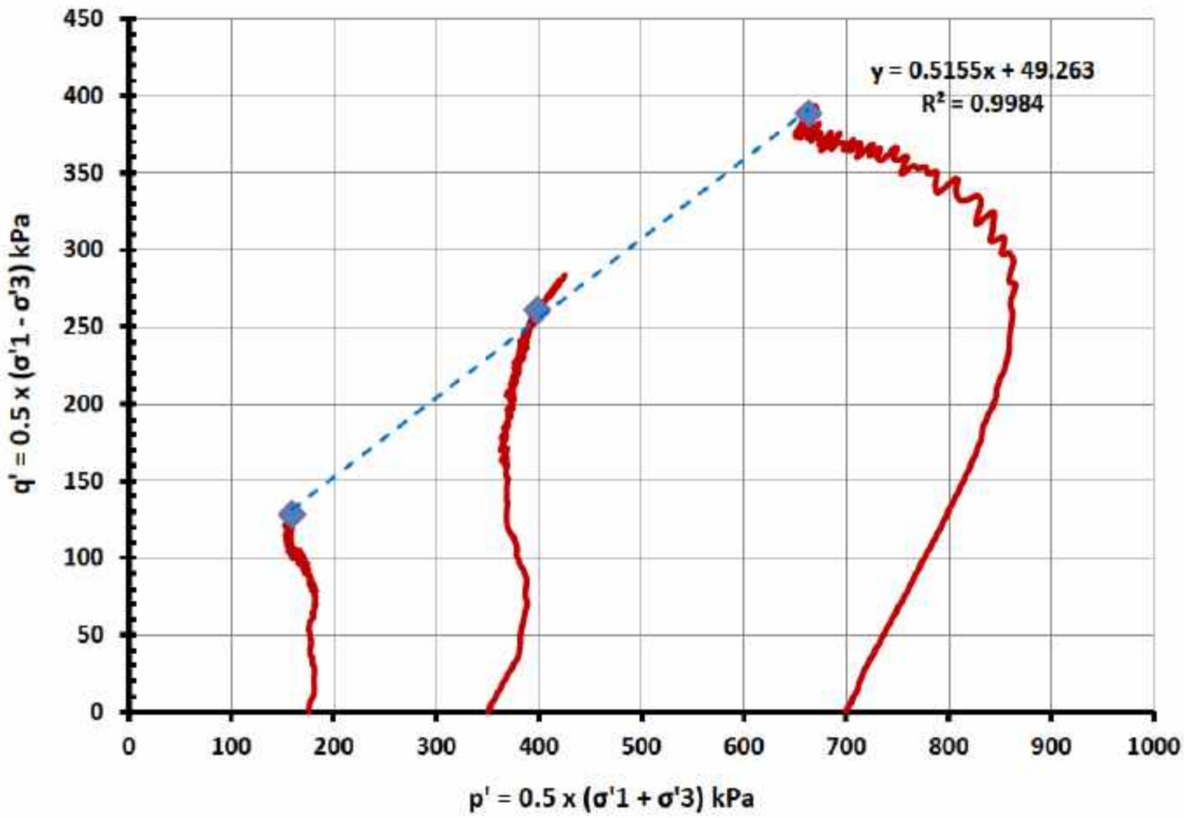
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS02	Lab:	EPLab
Sample ID:	BH02-UDS02_CU3		
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 19°C

MIT Effective Stress Path (q' vs p' diagram)



MIT Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	57.67
Angle of Shear Resistance Φ' (Deg) :	31.33

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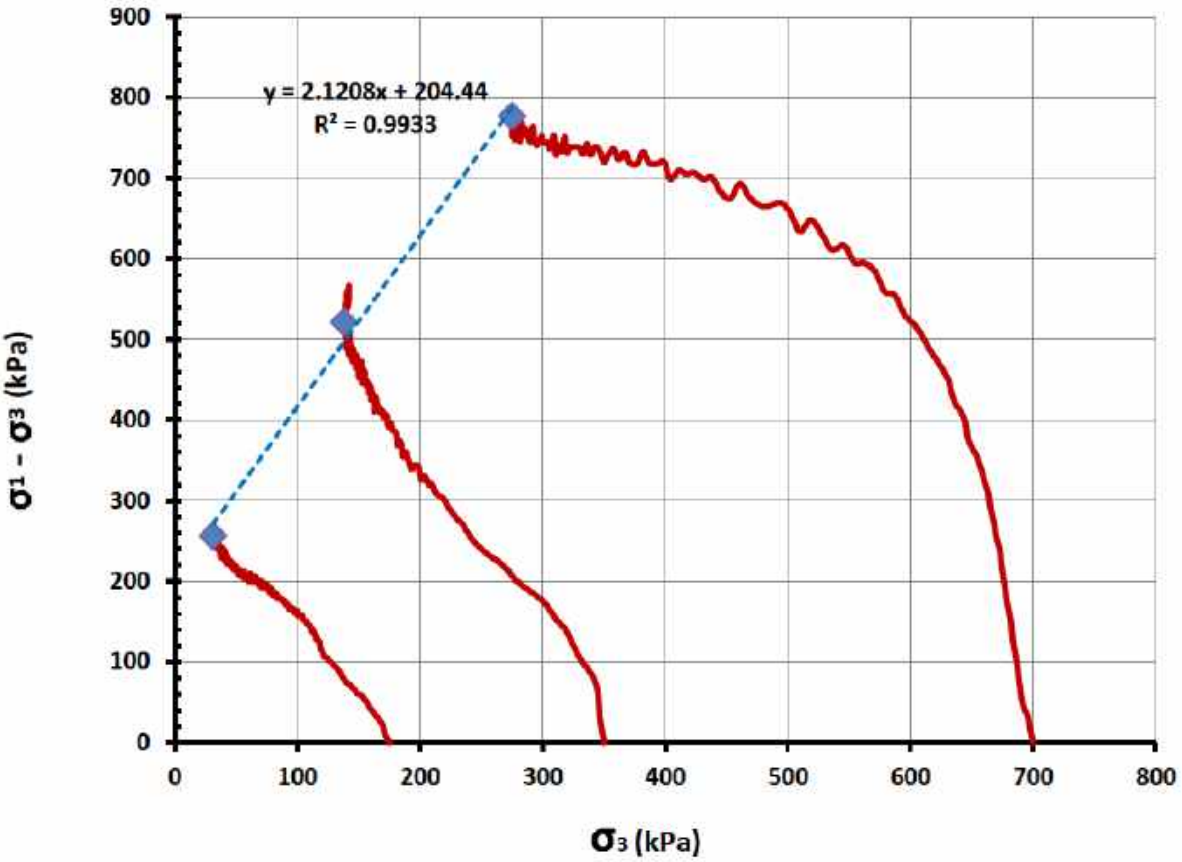
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS02	Lab:	EPLab
Sample ID:	BH02-UDS02_CU3		
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 19°C

Modified Mohr Coulomb Stress Path



Modified Mohr Coulomb Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	57.87
Angle of Shear Resistance Φ' (Deg) :	30.97

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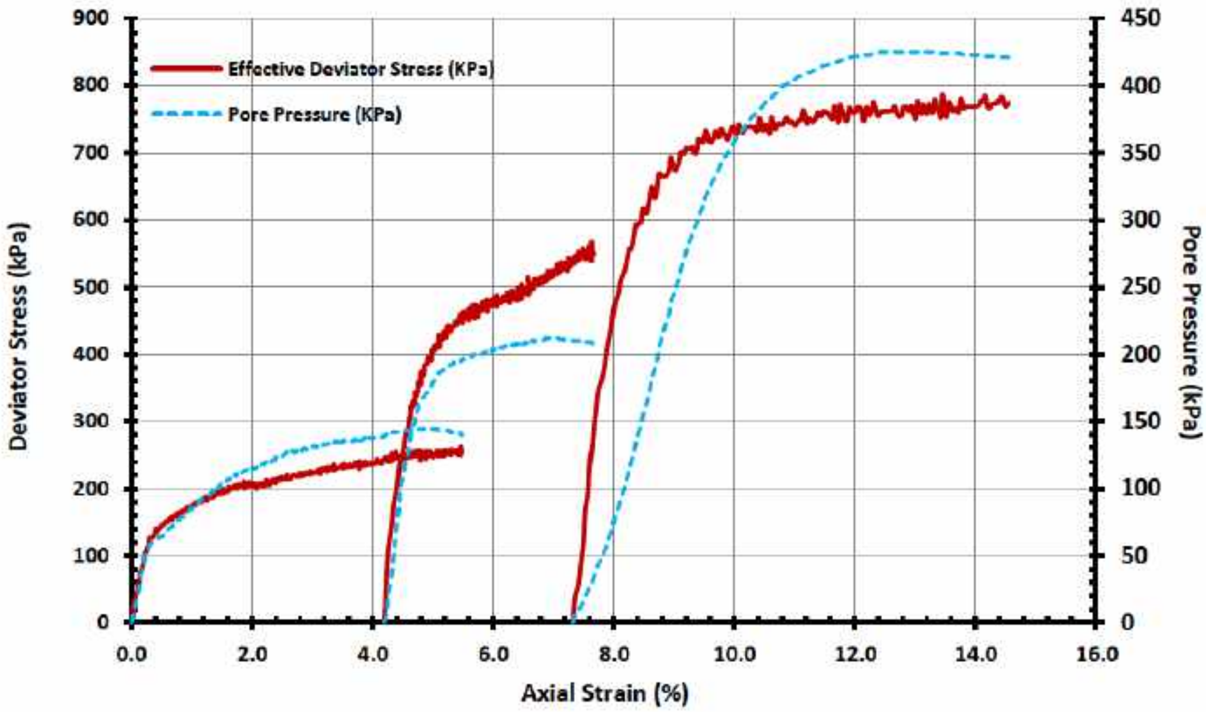
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS02	Lab:	EPLab
Sample ID:	BH02-UDS02_CU3		
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 19°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'₀	U'f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				σ'_1	σ'_3	σ'_1 / σ'_3		
1	175	0	144	287	31	9.27	256	5.07
2	350	0	212	660	138	4.78	522	7.09
3	700	0	425	1052	275	3.83	777	13.05

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS02	Lab:	EPLab
Sample ID:	BH02-UDS02_CU3		
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 19°C

Photo After Test

Sample ID:	BH02-UDS02	**Depth (m):**	9.50 - 9.79
Lab ID:	BH02-UDS02_CU3	**Date Tested:**	05/02/2025

Failure Mode: **Intact Shear** **33.1 °**

Notes: **Sample remolded to insitu density as received**

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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[redacted]

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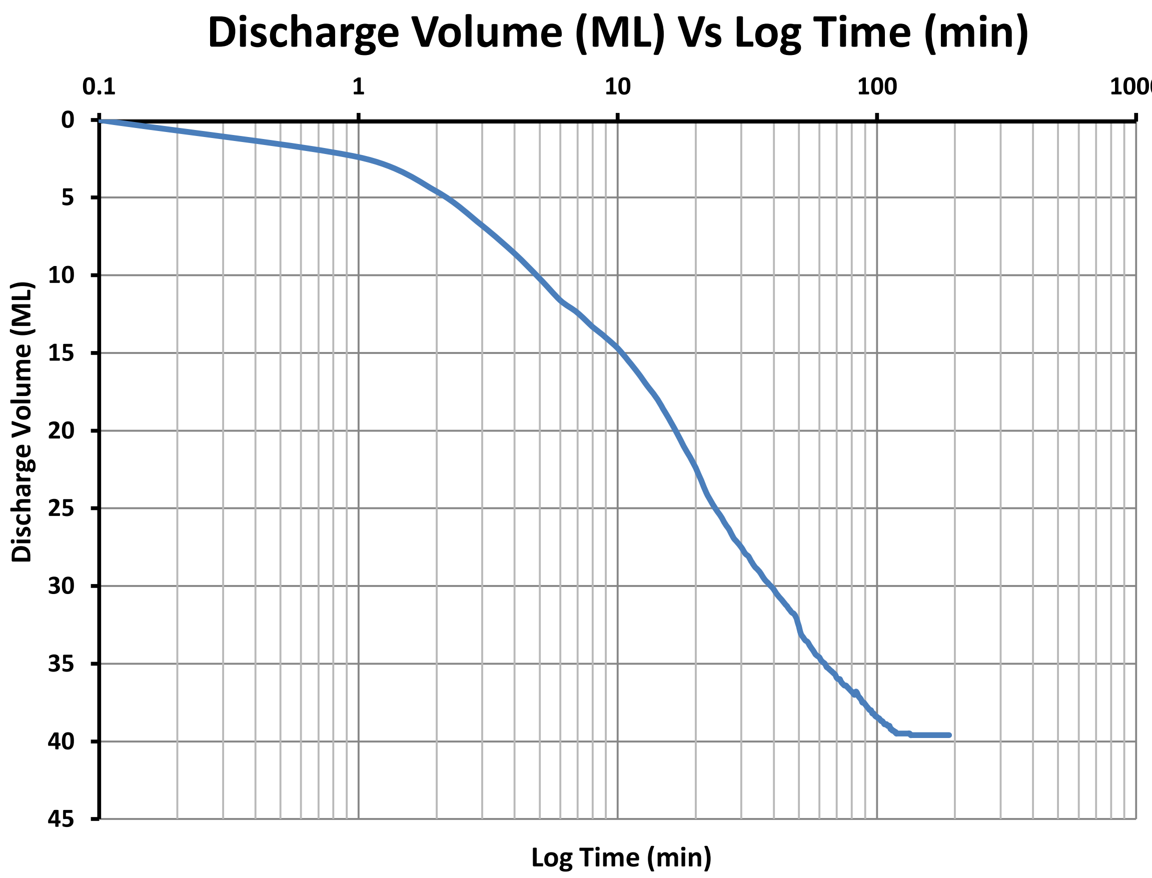
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS02	Lab:	EPLab
Sample ID:	BH02-UDS02_CU3		
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 19°C



Cv (cm²/s): 0.035 based on t_{90}

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

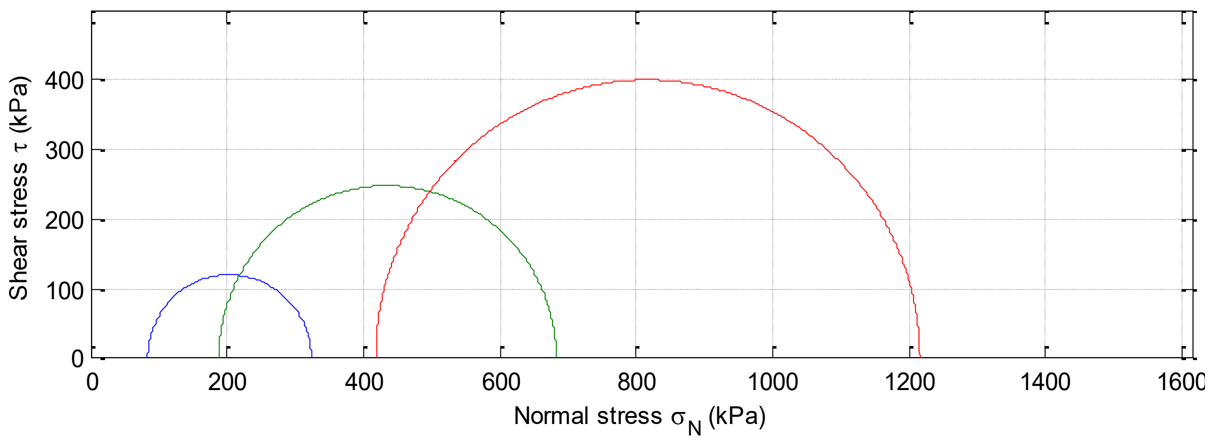
Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS03	Lab:	EPLab
Sample ID:	BH02-UDS03_CU3		
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 19°c

Tested by:	PHIL	Initial Moisture (%):	30.54	Strain Rate (mm/min):	0.006
Height (mm):	125.02	Final Moisture (%):	23.67	Skempton's (B):	1
Diameter (mm):	62.91	Bulk Density (t/m³):	1.88	Geology:	-
L/D Ratio:	1.99	Dry Density (t/m³):	1.44		

Failure Criteria used: Peak Principle Stress Ratio

Mohr Circle Diagram



Interpretations conducted using Matlab

Interpretation from Mohr Circle:	Stages 1 / 2	Stages 1 / 3	Stage 2 / 3
Cohesion C' (kPa):	9.16	30.49	81.24
Angle of Shear Resistance Φ' (Degrees) :	33.42	27.02	23.27

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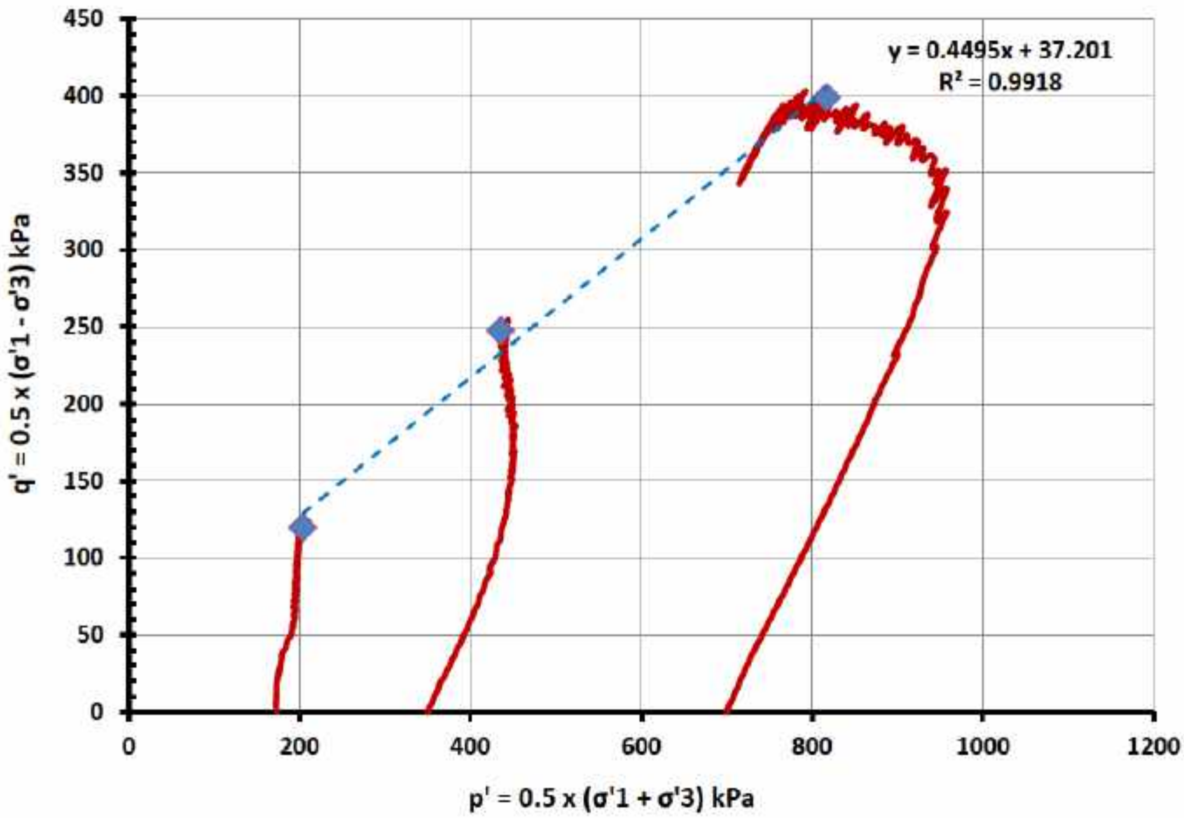
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS03	Lab:	EPLab
Sample ID:	BH02-UDS03_CU3		
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 19°C

MIT Effective Stress Path (q' vs p' diagram)



MIT Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	**41.66**
Angle of Shear Resistance Φ' (Deg) :	**26.74**

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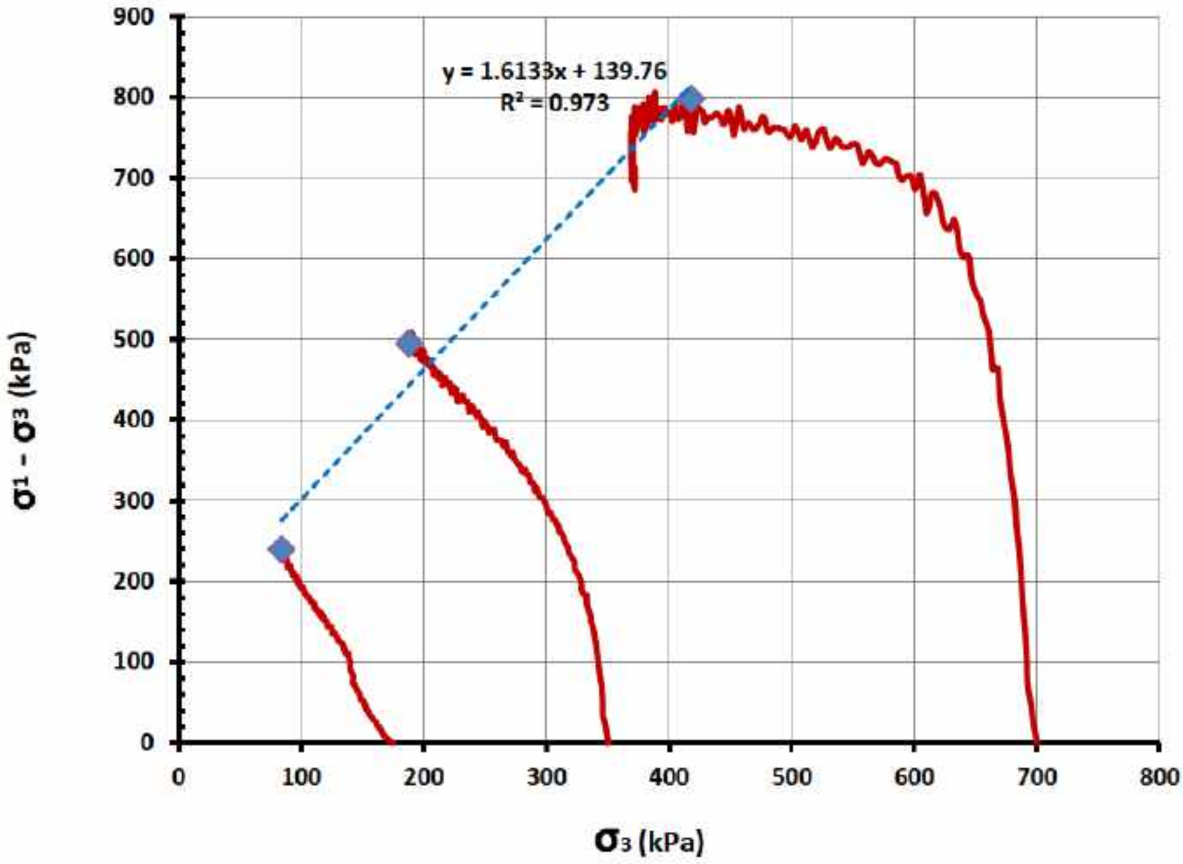
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS03	Lab:	EPLab
Sample ID:	BH02-UDS03_CU3		
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 19°C

Modified Mohr Coulomb Stress Path



Modified Mohr Coulomb Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : 43.25

Angle of Shear Resistance Φ' (Deg) : 26.49

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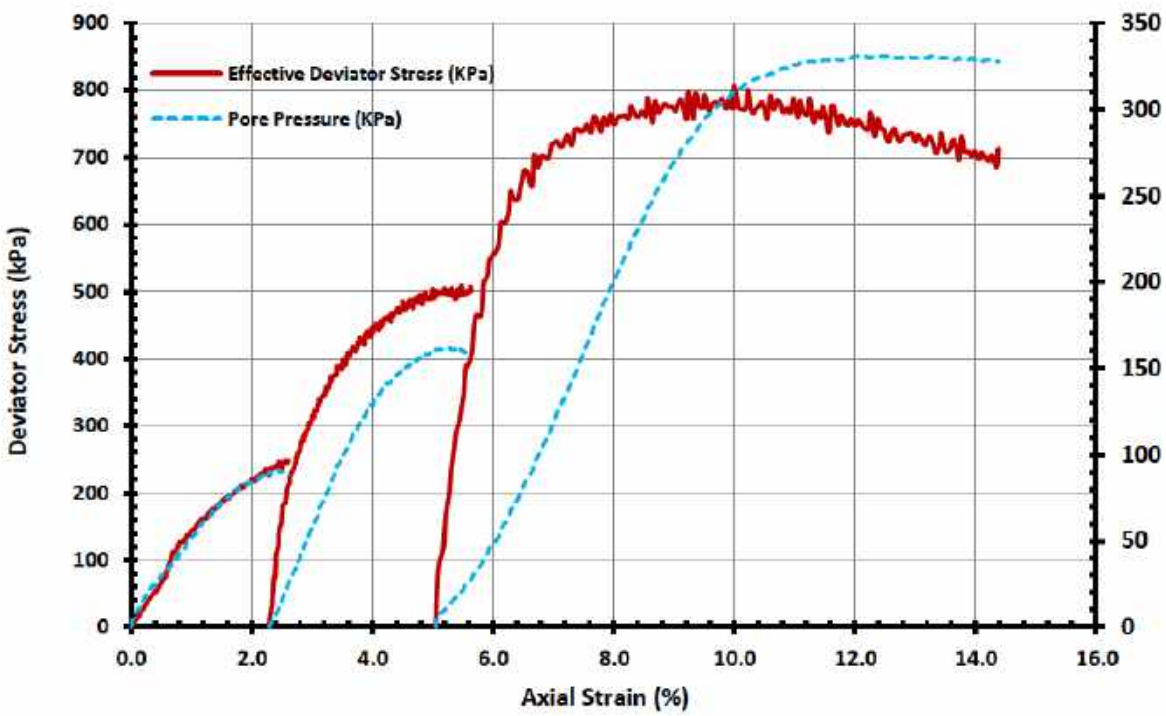
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS03	Lab:	EPLab
Sample ID:	BH02-UDS03_CU3		
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 19°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				σ'_1	σ'_3	σ'_1 / σ'_3		
1	175	0	91	324	84	3.85	240	2.45
2	350	0	162	683	188	3.63	495	5.29
3	700	0	282	1216	418	2.91	798	9.25

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS03	Lab:	EPLab
Sample ID:	BH02-UDS03_CU3		
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 19°C

Photo After Test

Sample ID:	BH02-UDS03	**Depth (m):**	11.00 - 11.39
Lab ID:	BH02-UDS03_CU3	**Date Tested:**	05/02/2025

Failure Mode: **Intact Shear** **30.4 °**

<u>Notes:</u> **Sample extracted from Shelby Tube**

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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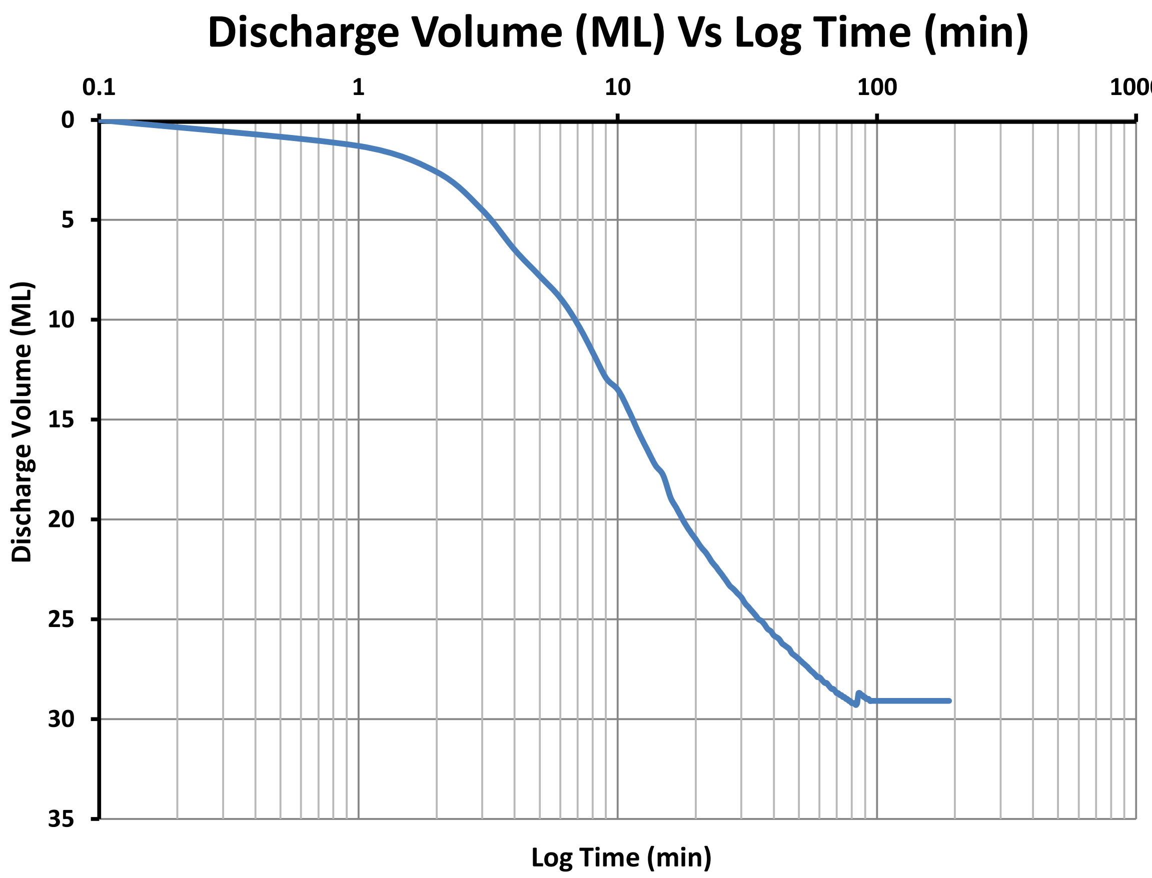
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS03	Lab:	EPLab
Sample ID:	BH02-UDS03_CU3		
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 19°C



Cv (cm²/s): 0.019 based on t_{90}

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

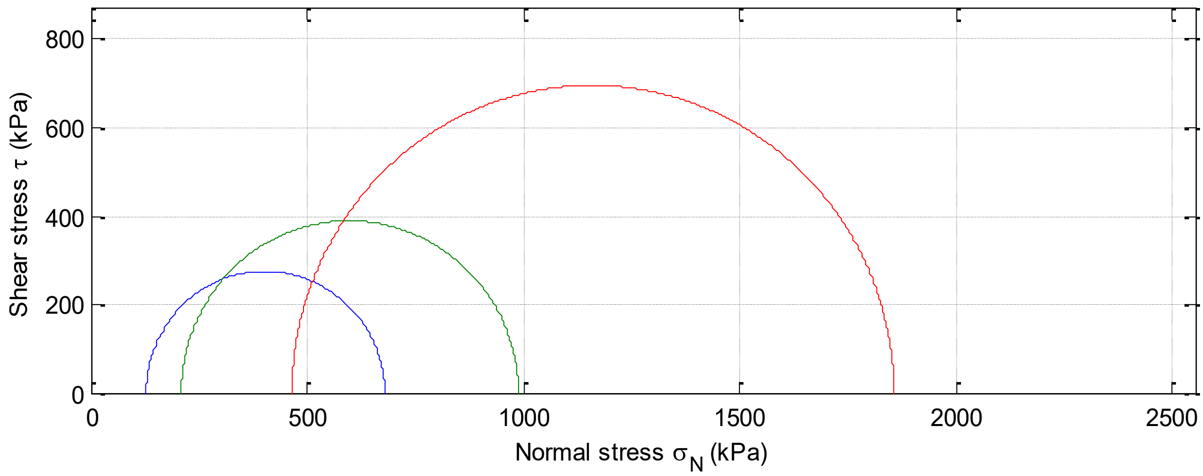
Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS04	Lab:	EPLab
Sample ID:	BH02-UDS04_CU3		
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 19°c

Tested by:	PHIL	Initial Moisture (%):	26.43	Strain Rate (mm/min):	0.006
Height (mm):	128.98	Final Moisture (%):	32.63	Skempton's (B):	0.99
Diameter (mm):	64.42	Bulk Density (t/m³):	2.02	Geology:	-
L/D Ratio:	2.00	Dry Density (t/m³):	1.60		

Failure Criteria used: Peak Principle Stress Ratio

Mohr Circle Diagram



Interpretations conducted using Matlab

Interpretation from Mohr Circle:	Stages 1 / 2	Stages 1 / 3	Stage 2 / 3
Cohesion C' (kPa):	49.07	62.32	76.13
Angle of Shear Resistance Φ' (Degrees) :	35.75	33.82	33.02

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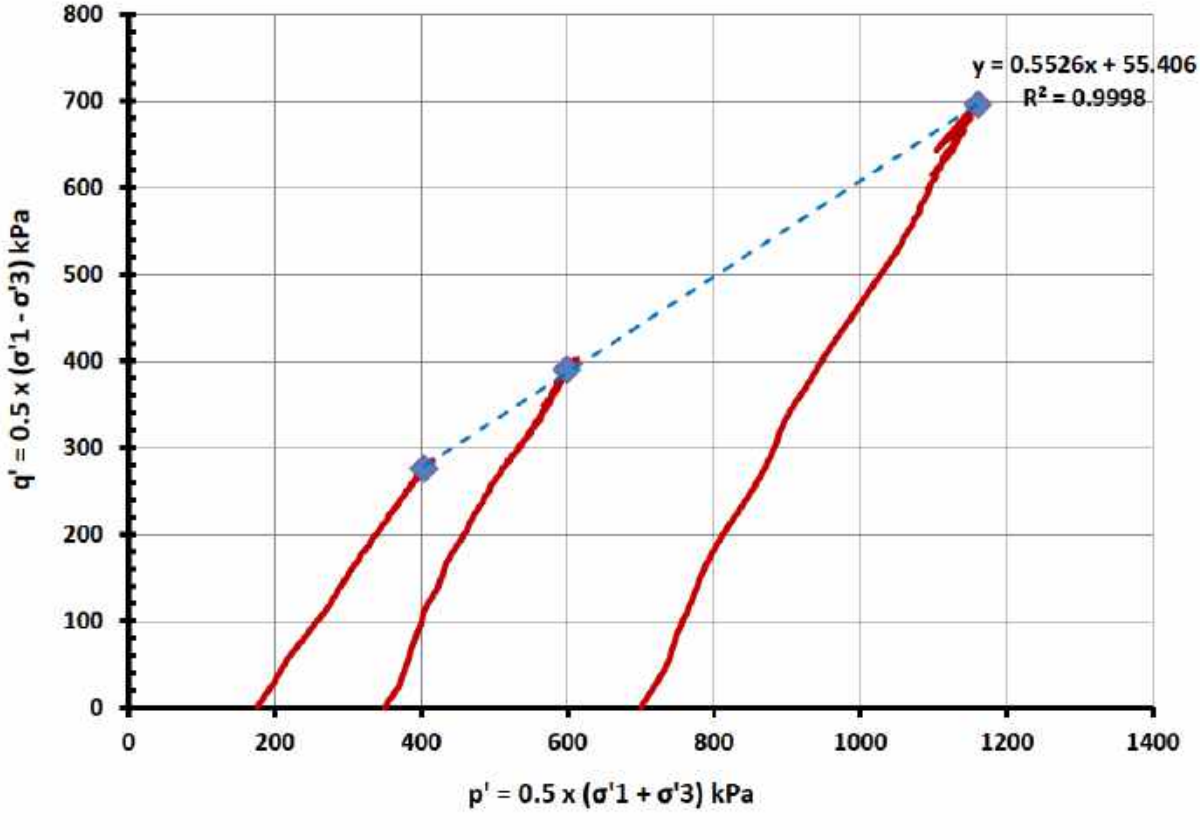
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS04	Lab:	EPLab
Sample ID:	BH02-UDS04_CU3		
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 19°C

MIT Effective Stress Path (q' vs p' diagram)



MIT Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	**66.35**
Angle of Shear Resistance Φ' (Deg) :	**33.37**

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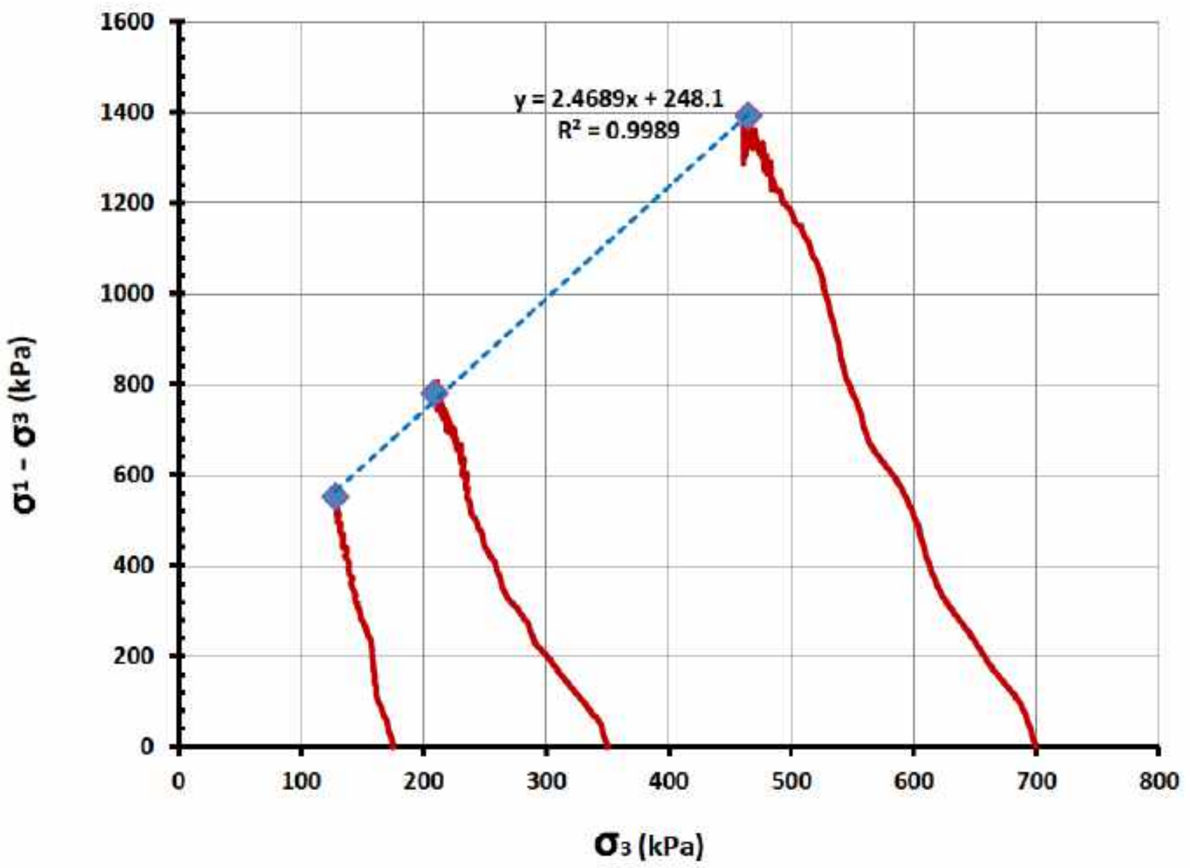
E-PRECISION LABORATORY

MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS04	Lab:	EPLab
Sample ID:	BH02-UDS04_CU3		
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 19°C

Modified Mohr Coulomb Stress Path



Modified Mohr Coulomb Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	**66.59**
Angle of Shear Resistance Φ' (Deg) :	**33.54**

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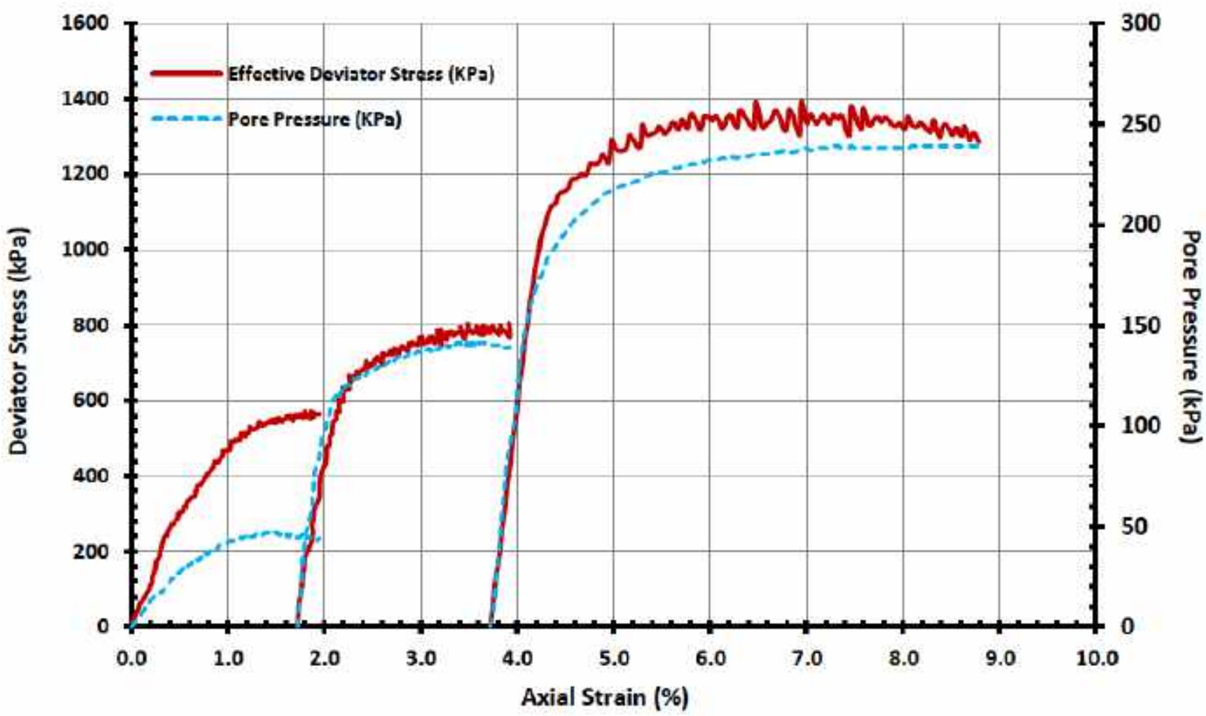
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS04	Lab:	EPLab
Sample ID:	BH02-UDS04_CU3		
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 19°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				σ'_1	σ'_3	σ'_1 / σ'_3		
1	175	0	47	680	128	5.31	552	1.60
2	350	0	141	989	209	4.73	780	3.72
3	700	0	235	1857	465	3.99	1392	6.48

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS04	Lab:	EPLab
Sample ID:	BH02-UDS04_CU3		
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 19°C

Photo After Test

Sample ID:	BH02-UDS04	**Depth (m):**	12.50 - 12.95
Lab ID:	BH02-UDS04_CU3	**Date Tested:**	05/02/2025

Failure Mode: **Intact Shear** **35.6 °**

Notes:

Stored and Tested the Sample as received
Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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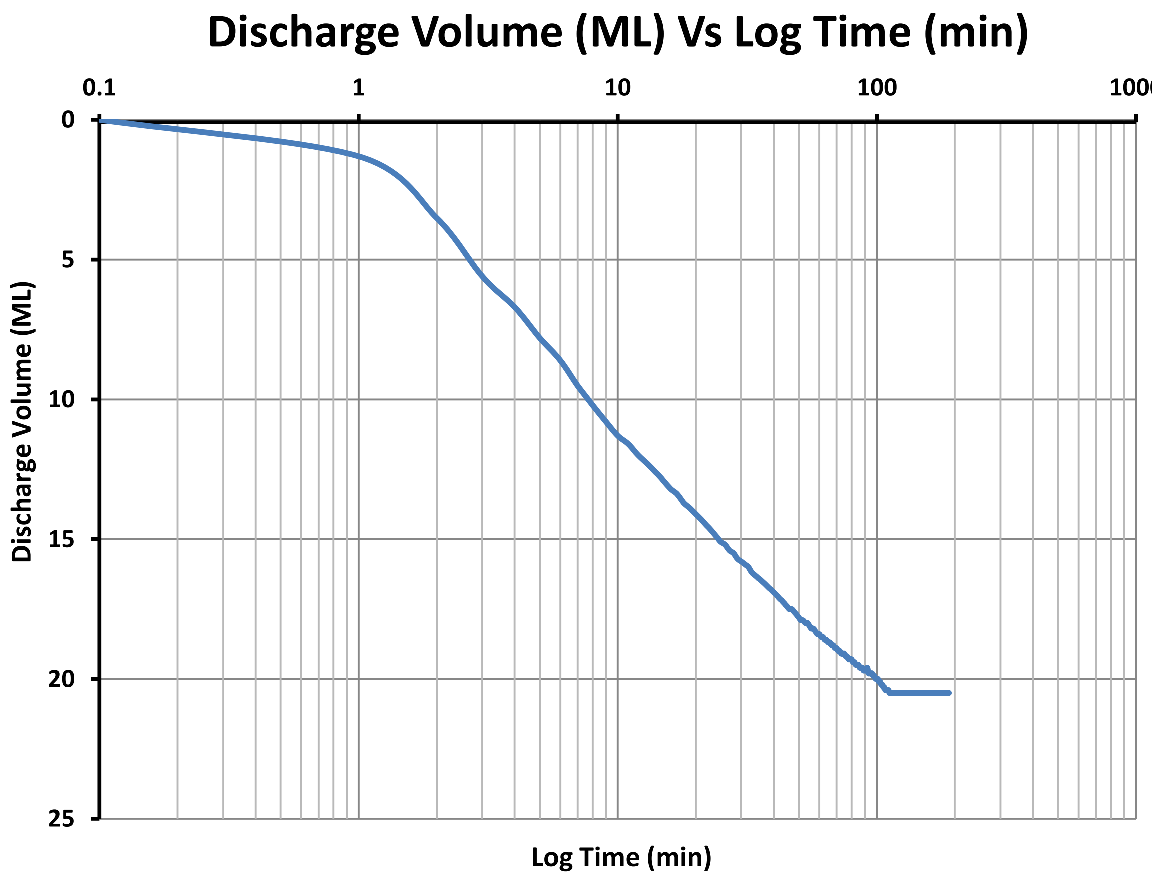
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS04	Lab:	EPLab
Sample ID:	BH02-UDS04_CU3		
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 19°C



Cv (cm²/s): 0.046 based on **t_{90}**

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

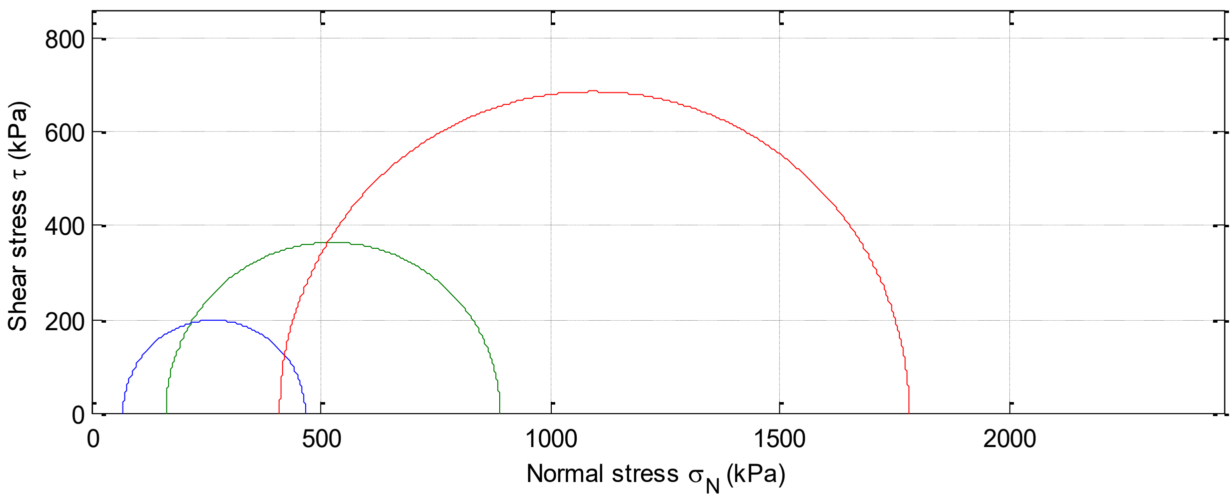
Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS05	Lab:	EPLab
Sample ID:	BH02-UDS05_CU3		
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°c

Tested by:	PHIL	Initial Moisture (%):	20.55	Strain Rate (mm/min):	0.006
Height (mm):	127.35	Final Moisture (%):	19.28	Skempton's (B):	0.98
Diameter (mm):	63.18	Bulk Density (t/m³):	2.07	Geology:	-
L/D Ratio:	2.02	Dry Density (t/m³):	1.72		

Failure Criteria used: Peak Principle Stress Ratio

Mohr Circle Diagram



Interpretations conducted using Matlab

Interpretation from Mohr Circle:	Stages 1 / 2	Stages 1 / 3	Stage 2 / 3
Cohesion C' (kPa):	35.24	50.83	81.50
Angle of Shear Resistance Φ' (Degrees) :	39.69	36.13	34.22

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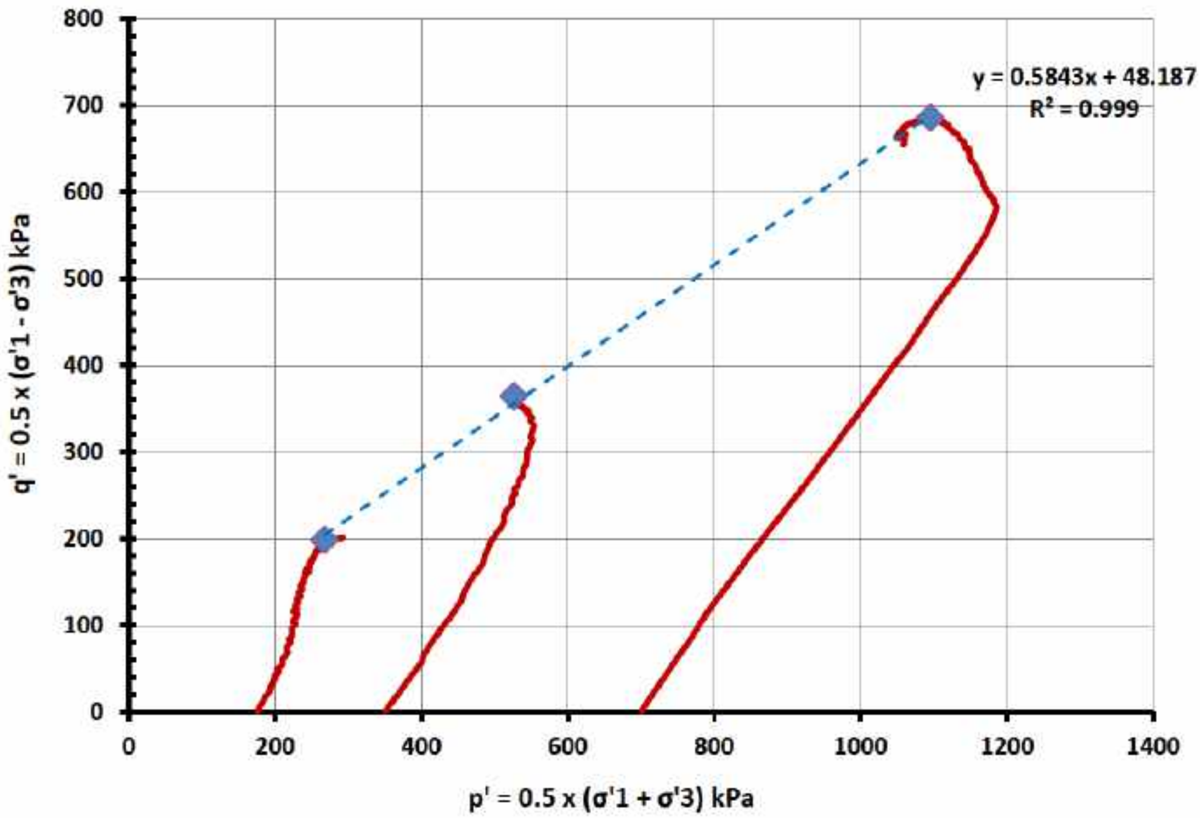
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS05	Lab:	EPLab
Sample ID:	BH02-UDS05_CU3		
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C

MIT Effective Stress Path (q' vs p' diagram)



MIT Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	59.16
Angle of Shear Resistance Φ' (Deg) :	35.45

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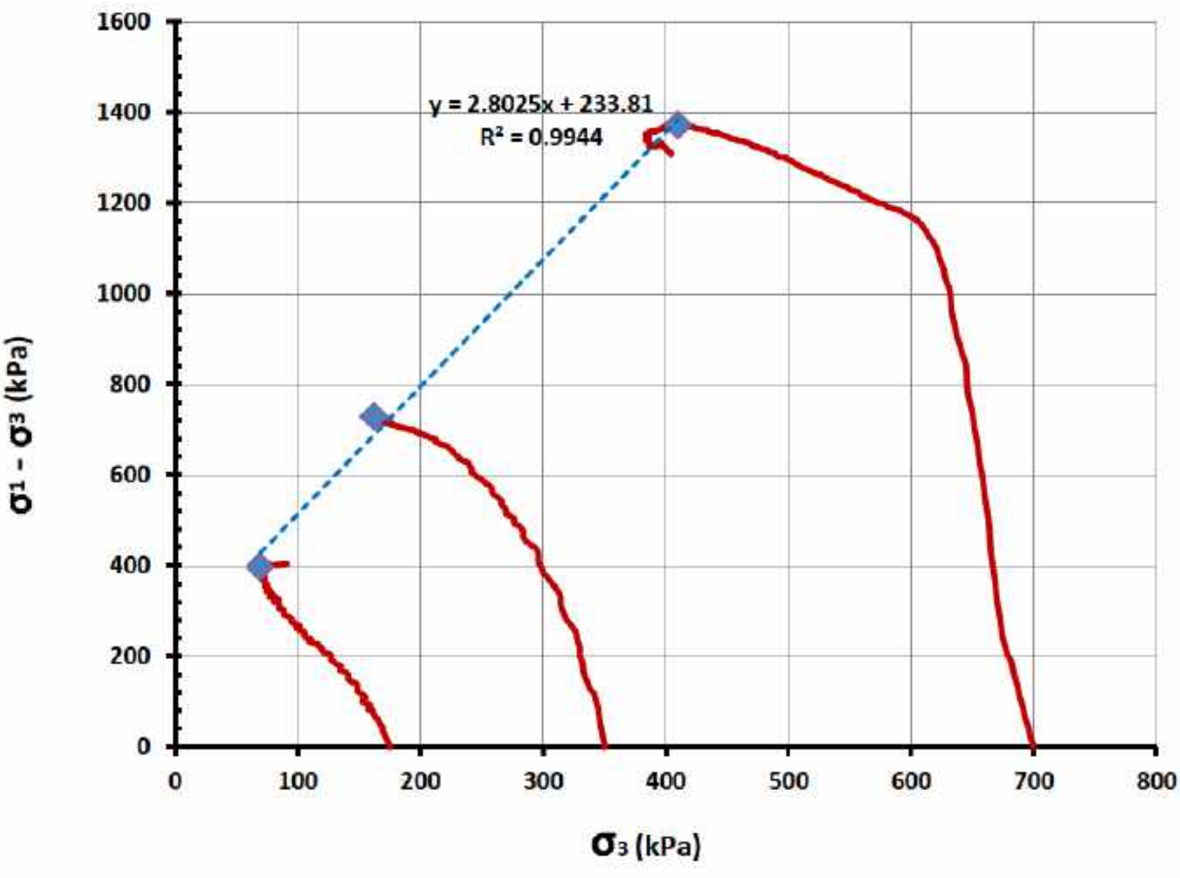
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS05	Lab:	EPLab
Sample ID:	BH02-UDS05_CU3		
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C

Modified Mohr Coulomb Stress Path



Modified Mohr Coulomb Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : **59.97**

Angle of Shear Resistance Φ' (Deg) : **35.69**

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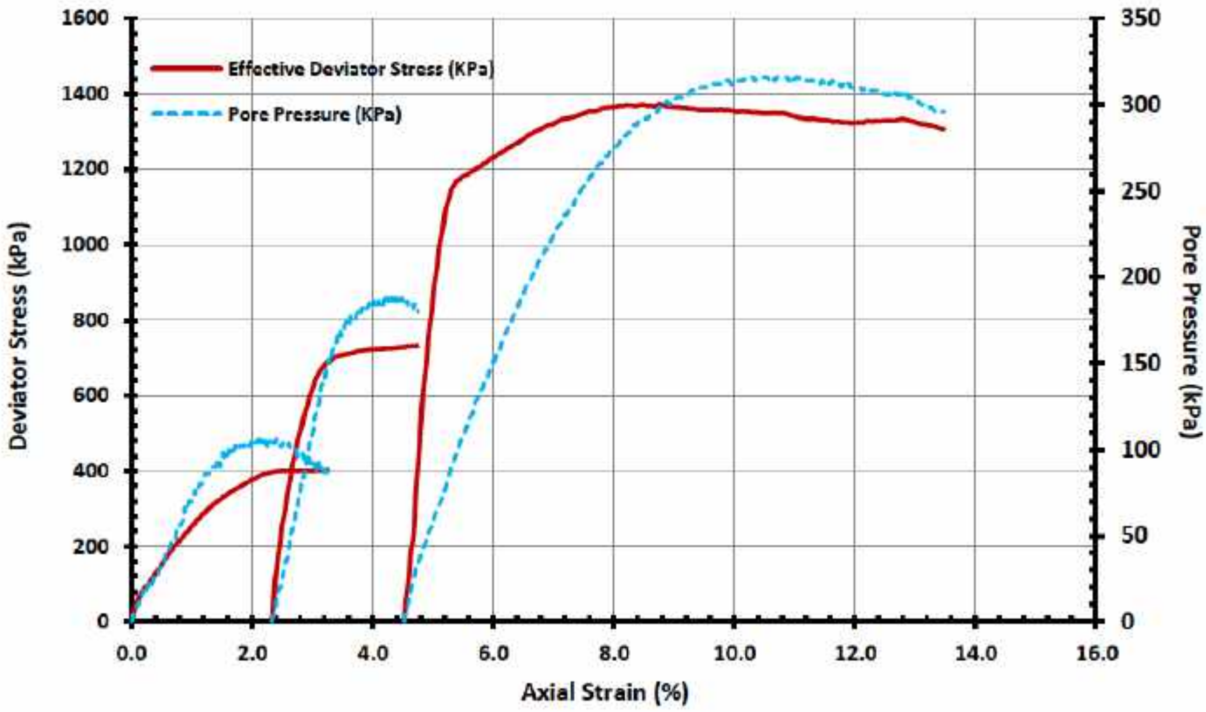
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS05	Lab:	EPLab
Sample ID:	BH02-UDS05_CU3		
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'₀	U'f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				σ'_1	σ'_3	σ'_1 / σ'_3		
1	175	0	106	466	69	6.76	397	2.34
2	350	0	188	891	162	5.50	729	4.49
3	700	0	290	1782	410	4.35	1372	8.49

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS05	Lab:	EPLab
Sample ID:	BH02-UDS05_CU3		
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C

Photo After Test

Sample ID:	BH02-UDS05	**Depth (m):**	14.00 - 14.45
Lab ID:	BH02-UDS05_CU3	**Date Tested:**	10/02/2025

Failure Mode: **Intact Shear** **36.3 °**

Notes:

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer) [redacted]

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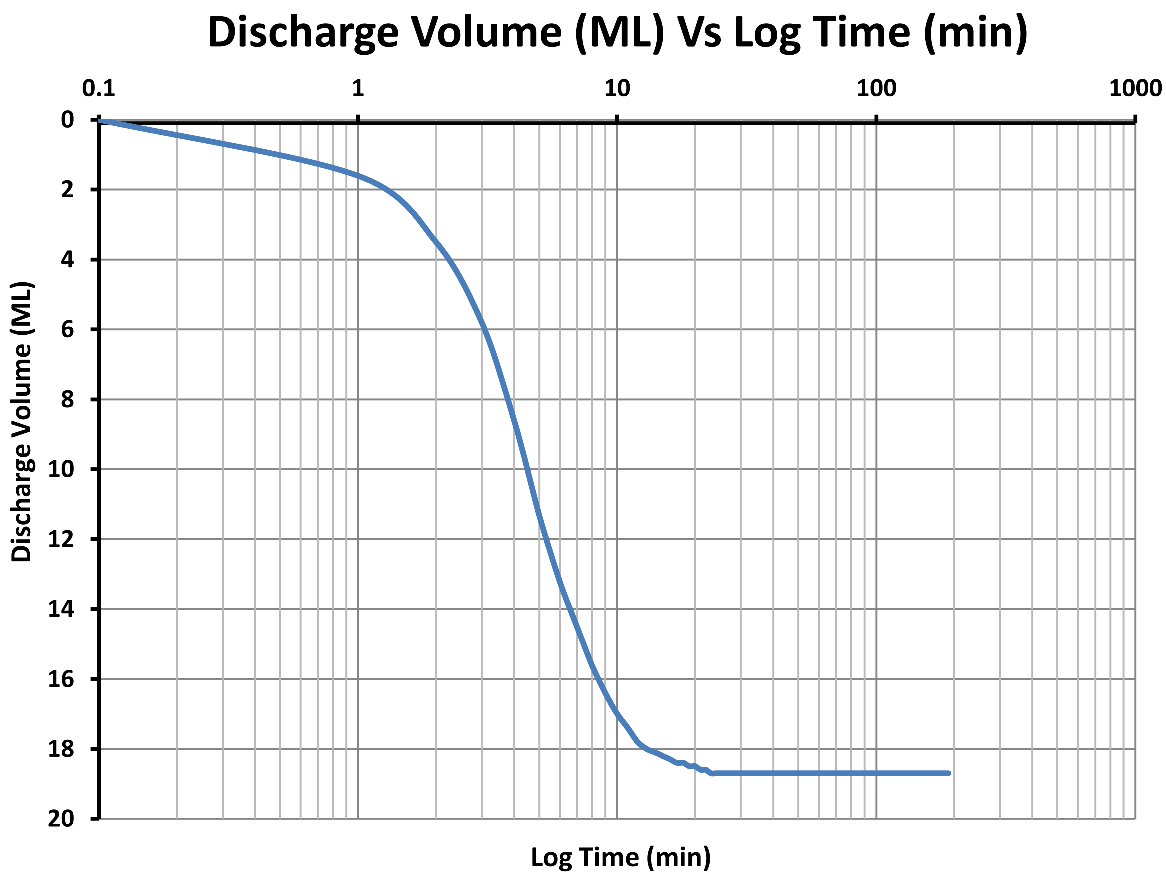
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS05	Lab:	EPLab
Sample ID:	BH02-UDS05_CU3		
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C



Cv (cm^2/s): 0.068 based on $\mathbf{t_{90}}$

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

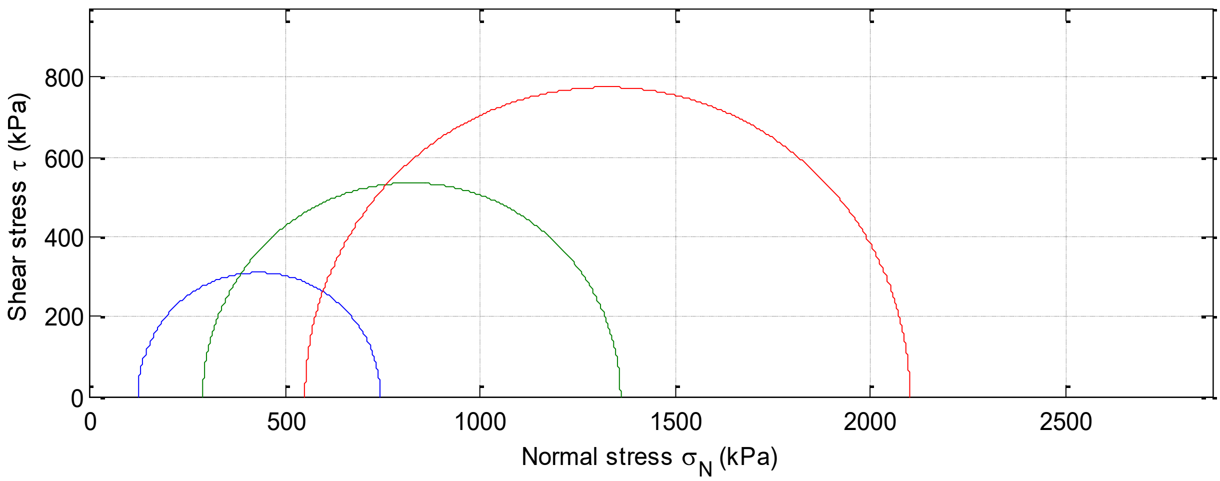
Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS02	Lab:	EPLab
Sample ID:	BH03-UDS02_CU3		
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 19°c

Tested by:	PHIL	Initial Moisture (%):	28.49	Strain Rate (mm/min):	0.006
Height (mm):	124.95	Final Moisture (%):	31.68	Skempton's (B):	1
Diameter (mm):	62.39	Bulk Density (t/m³):	1.94	Geology:	-
L/D Ratio:	2.00	Dry Density (t/m³):	1.51		

Failure Criteria used: Peak Principle Stress Ratio

Mohr Circle Diagram



Interpretations conducted using Matlab

Interpretation from Mohr Circle:	Stages 1 / 2	Stages 1 / 3	Stage 2 / 3
Cohesion C' (kPa):	77.49	101.28	161.14
Angle of Shear Resistance Φ' (Degrees) :	34.99	31.38	28.37

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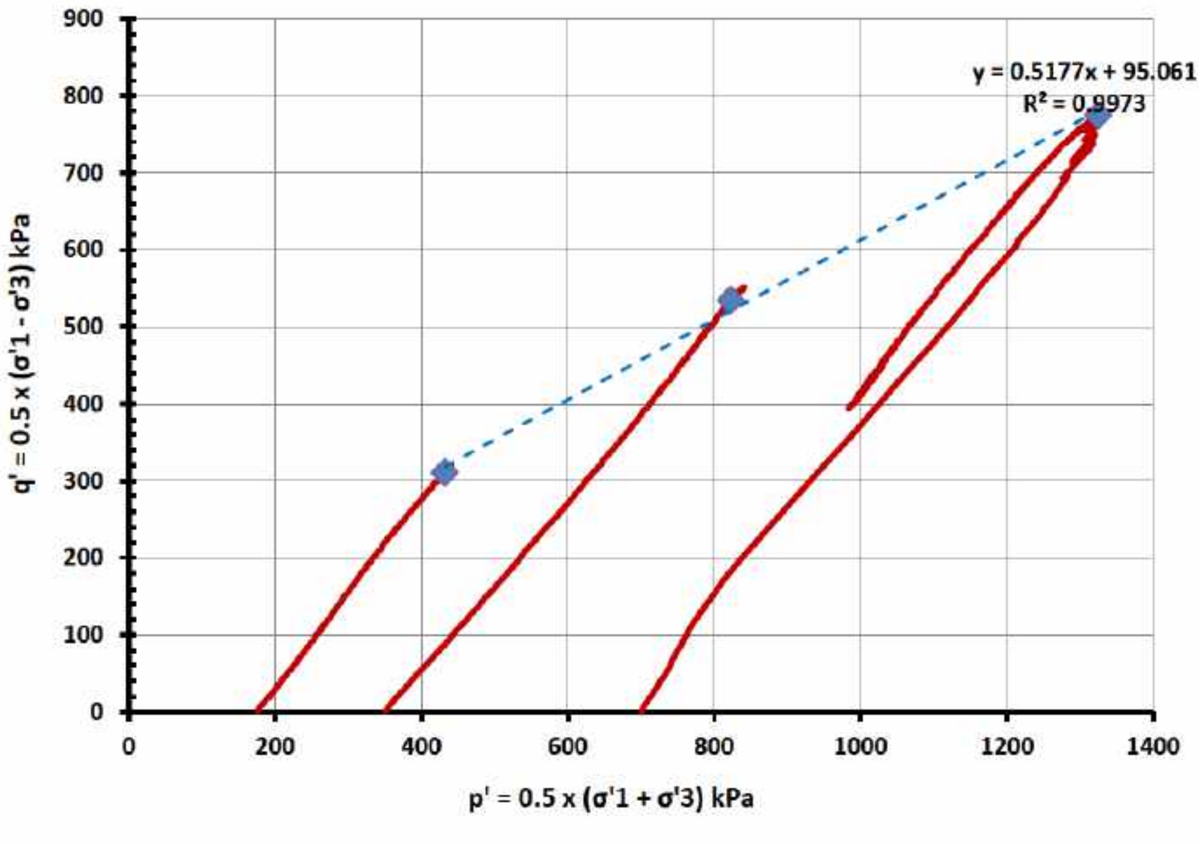
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS02	Lab:	EPLab
Sample ID:	BH03-UDS02_CU3		
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 19°C

MIT Effective Stress Path (q' vs p' diagram)



MIT Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	**111.29**
Angle of Shear Resistance Φ' (Deg) :	**31.33**

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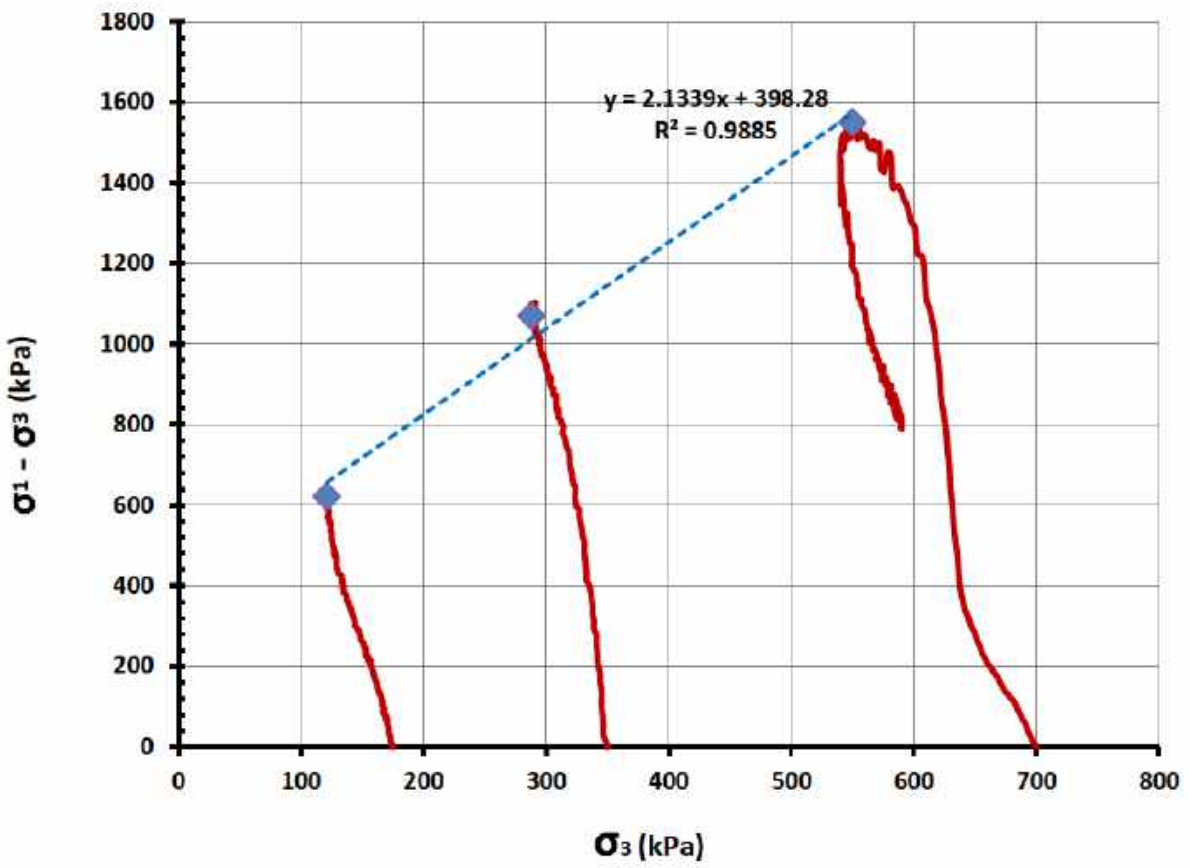
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS02	Lab:	EPLab
Sample ID:	BH03-UDS02_CU3		
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 19°C

Modified Mohr Coulomb Stress Path



Modified Mohr Coulomb Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	**112.56**
Angle of Shear Resistance Φ' (Deg) :	**31.05**

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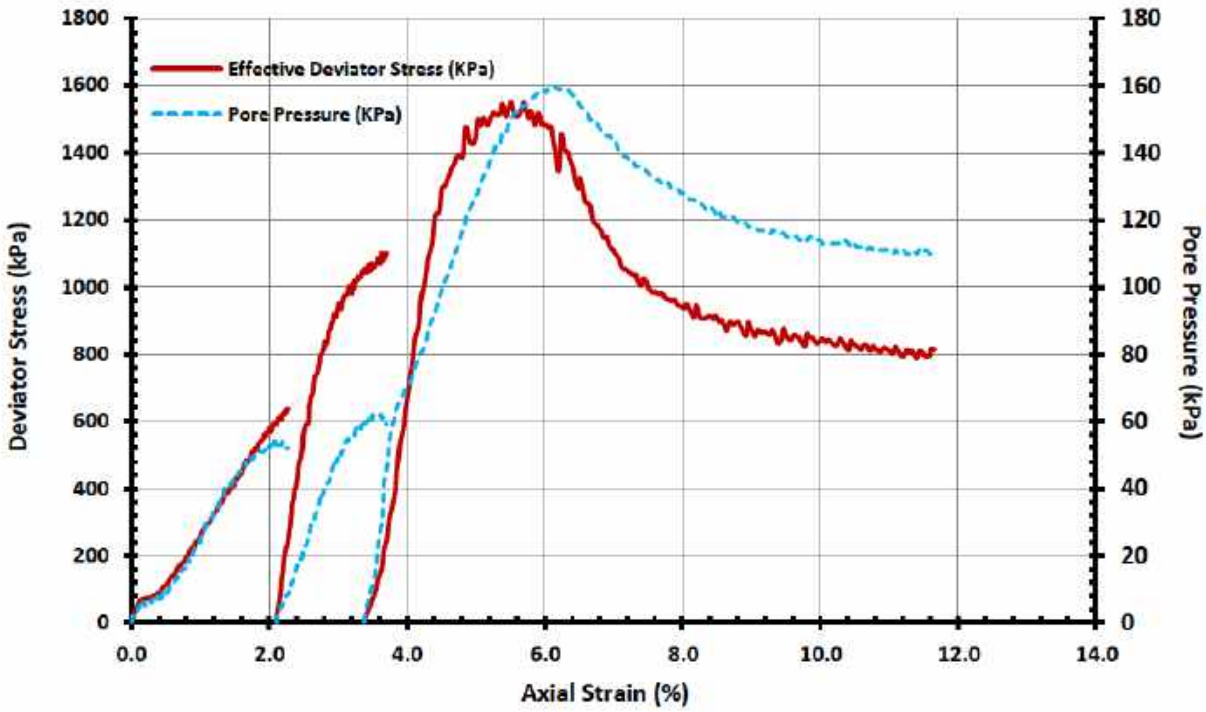
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS02	Lab:	EPLab
Sample ID:	BH03-UDS02_CU3		
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 19°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				σ'_1	σ'_3	σ'_1 / σ'_3		
1	175	0	54	743	121	6.14	622	2.19
2	350	0	62	1358	288	4.71	1070	3.61
3	700	0	150	2100	550	3.82	1550	5.52

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS02	Lab:	EPLab
Sample ID:	BH03-UDS02_CU3		
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 19°C

Photo After Test

Sample ID:	**BH03-UDS02**	**Depth (m):**	5.00 - 5.45
Lab ID:	BH03-UDS02_CU3	**Date Tested:**	05/02/2025

Failure Mode: **Intact Shear** **32.2 °**

Notes: **Sample extracted from Shelby Tube**

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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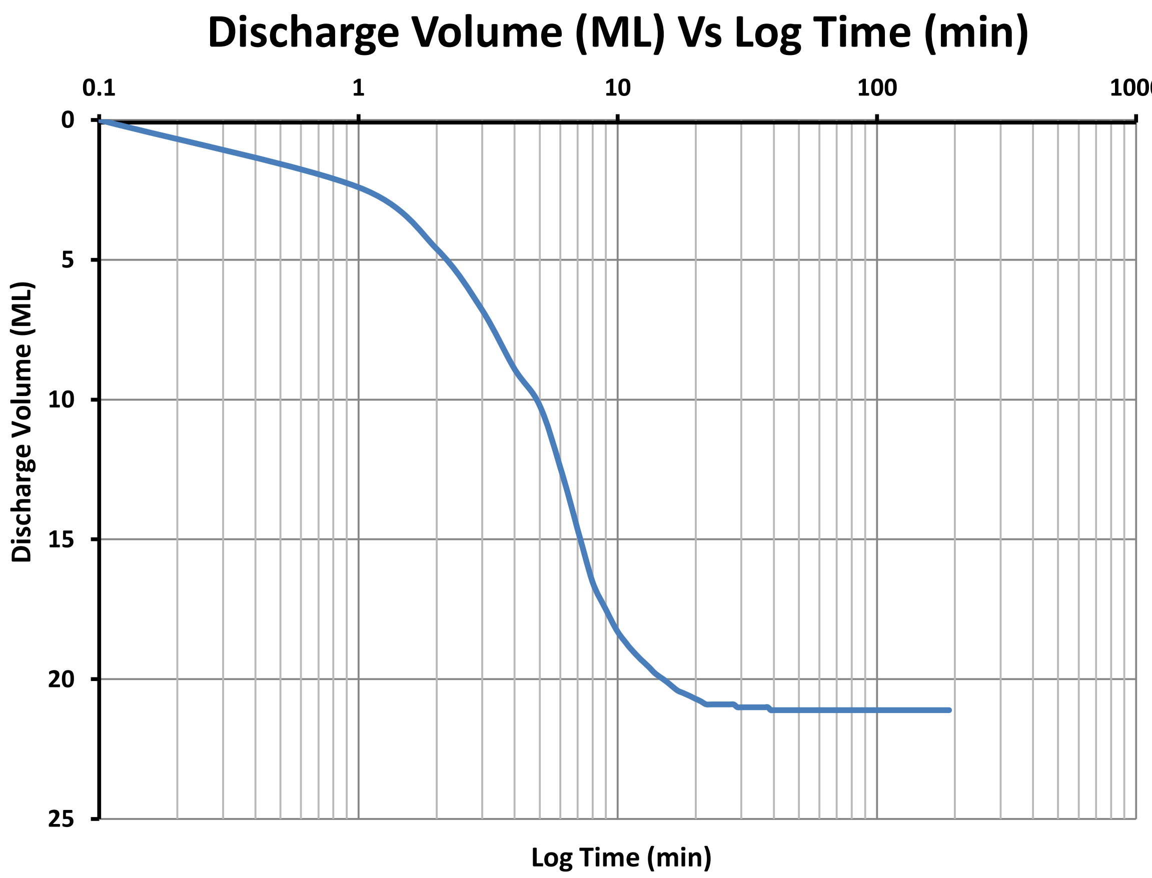
E-Precision Laboratory

MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS02	Lab:	EPLab
Sample ID:	BH03-UDS02_CU3		
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 19°C



Cv (cm^2/s): 0.054 based on $\mathbf{t_{90}}$

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E-PRECISION LABORATORY

MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

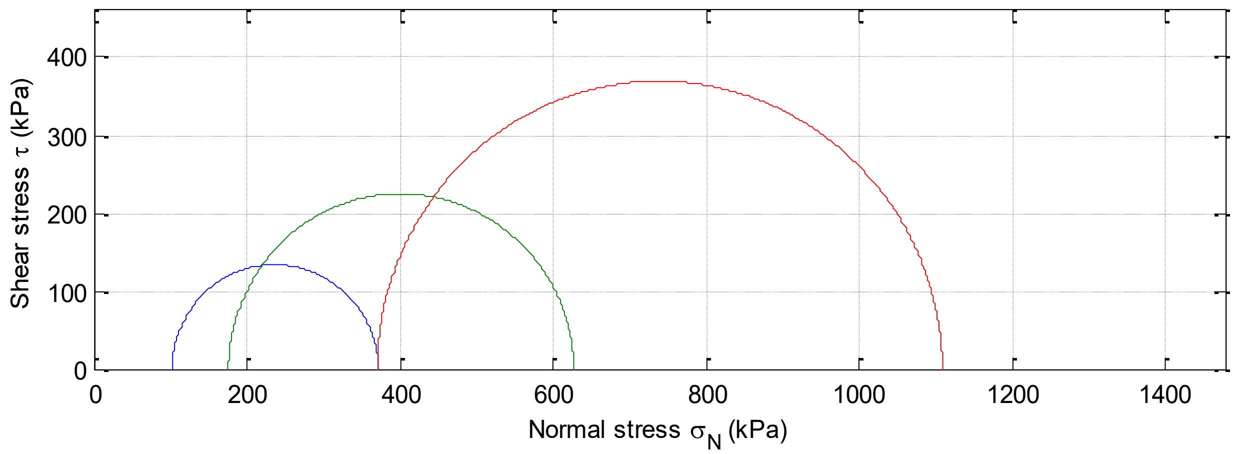
Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS04	Lab:	EPLab
Sample ID:	BH03-UDS04_CU3		
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 19°c

Tested by:	PHIL	Initial Moisture (%):	28.60	Strain Rate (mm/min):	0.006
Height (mm):	126.98	Final Moisture (%):	25.43	Skempton's (B):	1
Diameter (mm):	63.65	Bulk Density (t/m³):	1.93	Geology:	-
L/D Ratio:	1.99	Dry Density (t/m³):	1.50		

Failure Criteria used: Peak Principle Stress Ratio

Mohr Circle Diagram



Interpretations conducted using Matlab

Interpretation from Mohr Circle:	Stages 1 / 2	Stages 1 / 3	Stage 2 / 3
Cohesion C' (kPa):	5.53	27.72	60.54
Angle of Shear Resistance Φ' (Degrees) :	33.42	27.92	25.17

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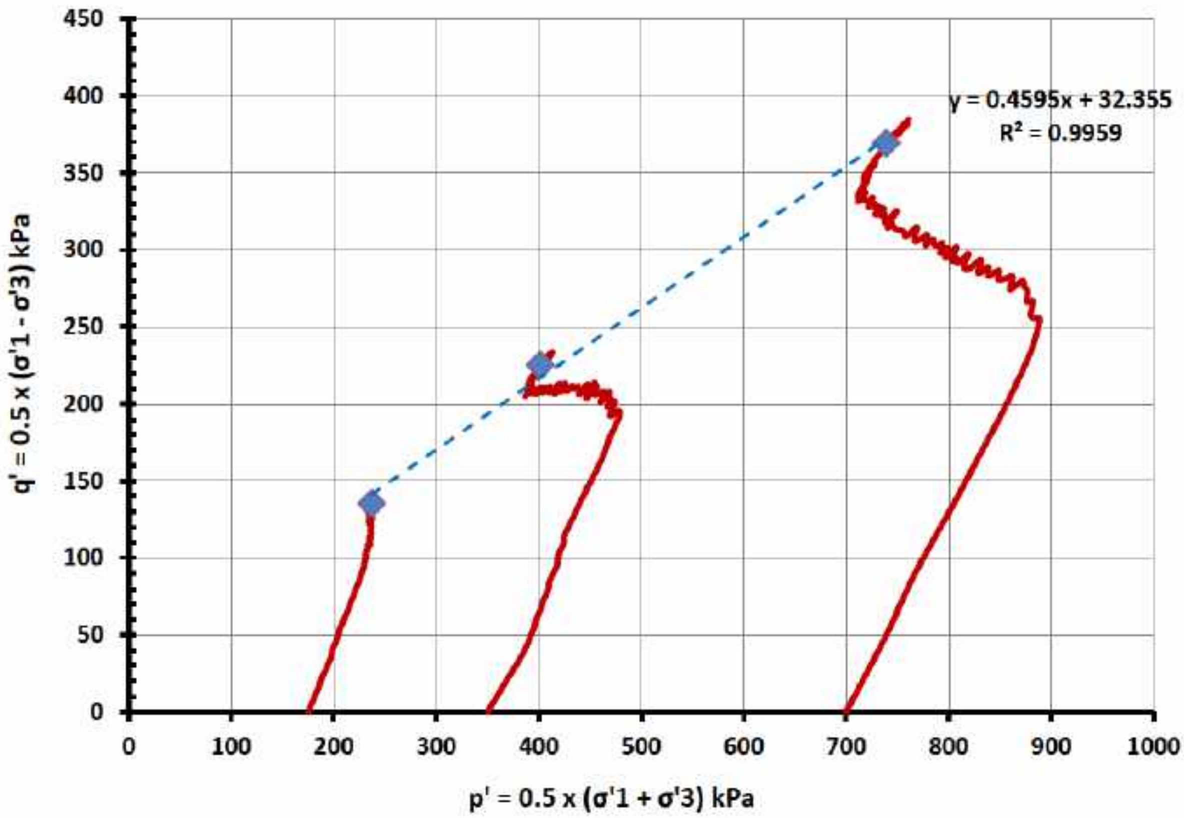
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS04	Lab:	EPLab
Sample ID:	BH03-UDS04_CU3		
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 19°C

MIT Effective Stress Path (q' vs p' diagram)



MIT Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	36.44
Angle of Shear Resistance Φ' (Deg) :	27.39

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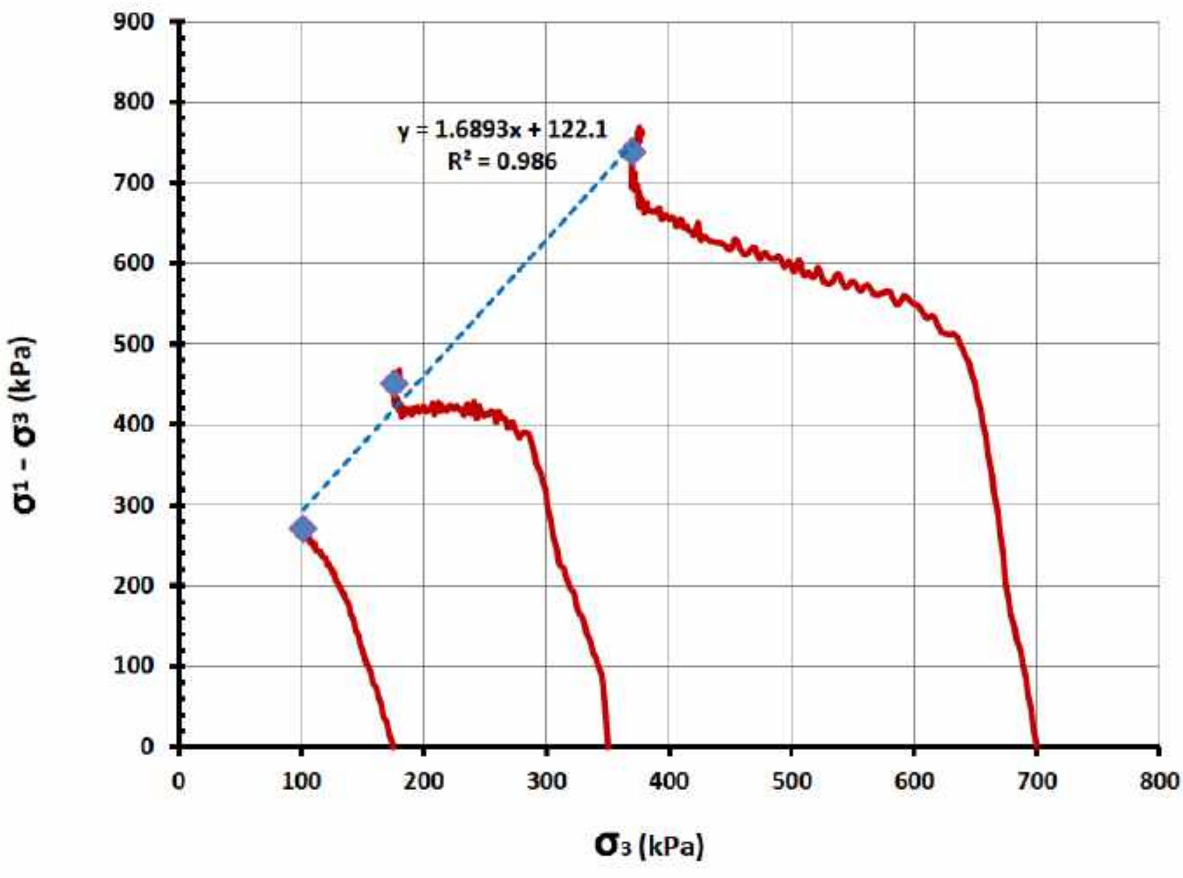
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS04	Lab:	EPLab
Sample ID:	BH03-UDS04_CU3		
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 19°C

Modified Mohr Coulomb Stress Path



Modified Mohr Coulomb Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	37.22
Angle of Shear Resistance Φ' (Deg) :	27.26

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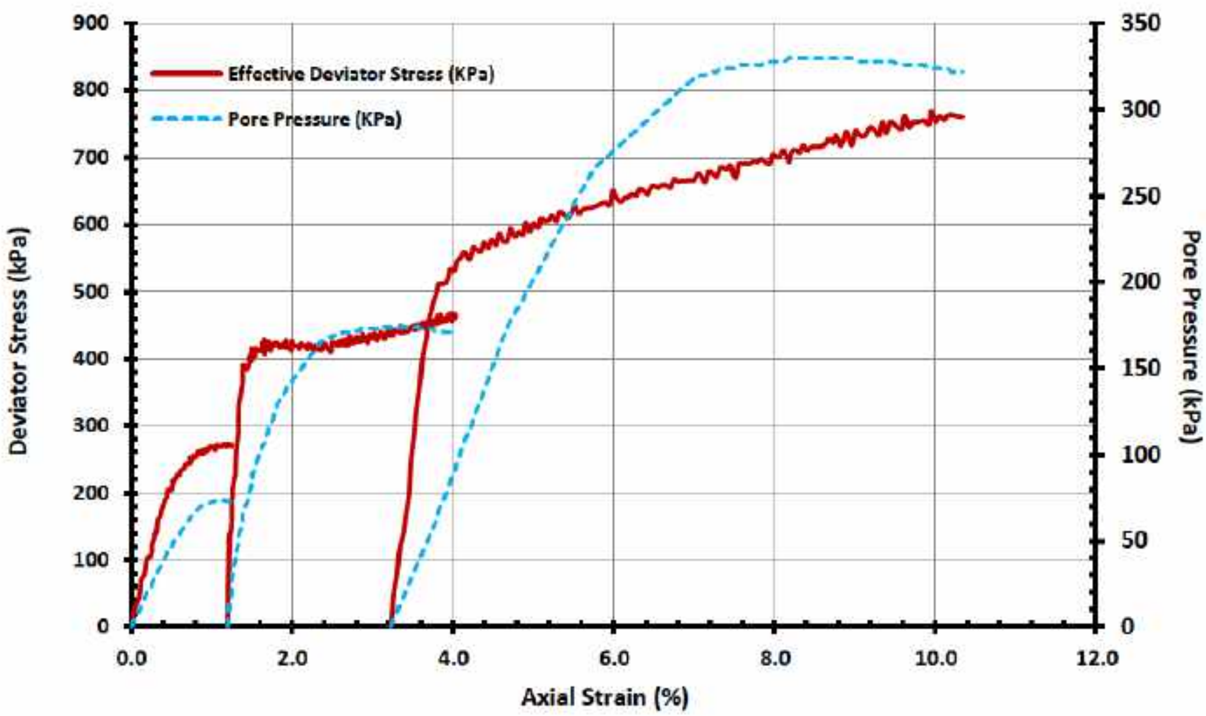
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS04	Lab:	EPLab
Sample ID:	BH03-UDS04_CU3		
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 19°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				σ'_1	σ'_3	σ'_1 / σ'_3		
1	175	0	74	372	102	3.67	271	1.15
2	350	0	174	627	176	3.56	451	3.53
3	700	0	330	1108	370	3.00	738	8.91

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS04	Lab:	EPLab
Sample ID:	BH03-UDS04_CU3		
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 19°C

Photo After Test

Sample ID:	BH03-UDS04	**Depth (m):**	8.00 - 8.45
Lab ID:	BH03-UDS04_CU3	**Date Tested:**	10/02/2025

Failure Mode: **Intact Shear** **46.6 °**

Notes:

Stored and Tested the Sample as received
Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer [redacted]

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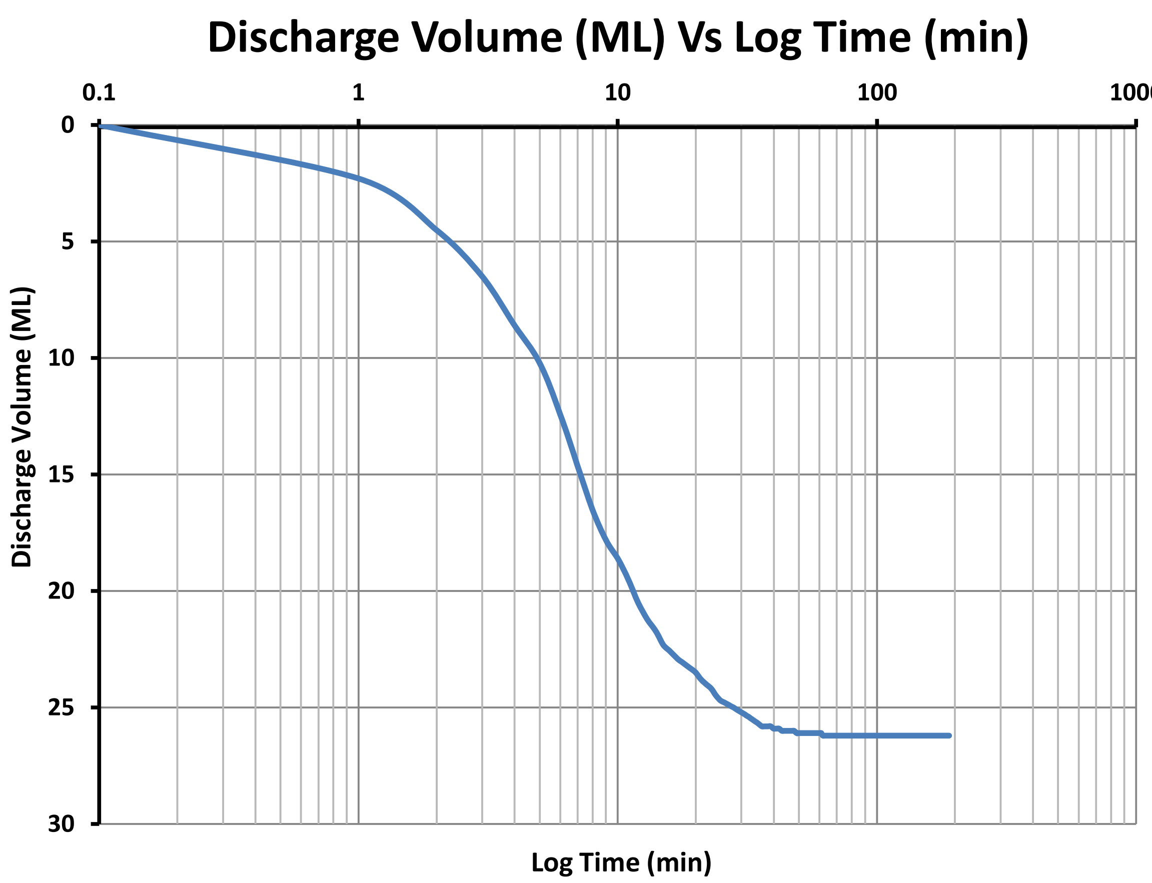
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS04	Lab:	EPLab
Sample ID:	BH03-UDS04_CU3		
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 19°C



Cv (cm²/s): 0.039 based on t_{90}

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WA 6155

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E-Precision Laboratory

MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

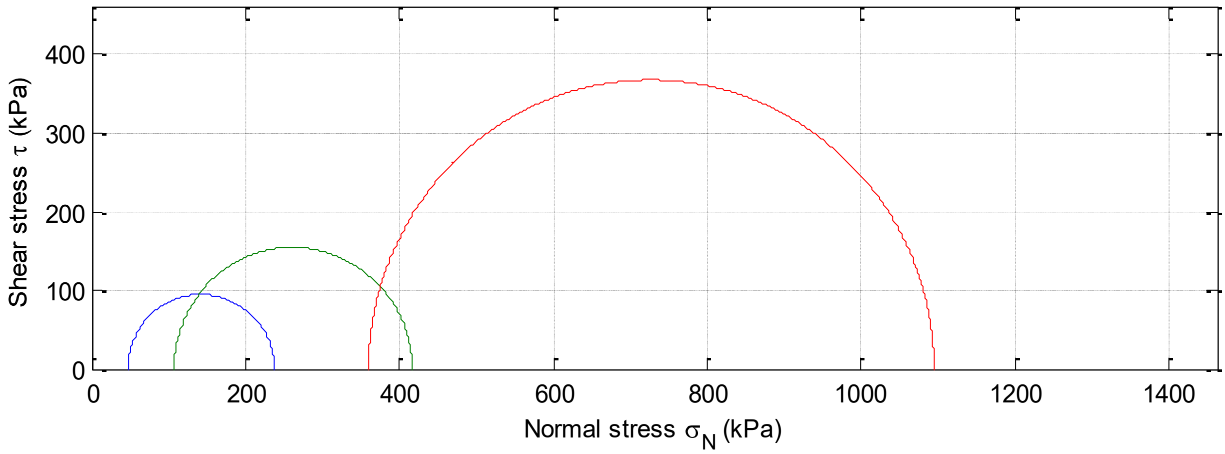
Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS06	Lab:	EPLab
Sample ID:	BH03-UDS06_CU3		
Depth (m):	11.00 - 11.25	Room Temperature at Test:	~ 19°c

Tested by:	PHIL	Initial Moisture (%):	35.38	Strain Rate (mm/min):	0.006
Height (mm):	165.32	Final Moisture (%):	24.60	Skempton's (B):	0.99
Diameter (mm):	62.87	Bulk Density (t/m³):	1.83	Geology:	-
L/D Ratio:	2.63	Dry Density (t/m³):	1.35		

Failure Criteria used: Peak Principle Stress Ratio

Mohr Circle Diagram



Interpretations conducted using Matlab

Interpretation from Mohr Circle:	**Stages 1 / 2**	**Stages 1 / 3**	**Stage 2 / 3**
Cohesion C' (kPa):	28.31	33.03	39.78
Angle of Shear Resistance Φ' (Degrees) :	29.68	27.92	27.02

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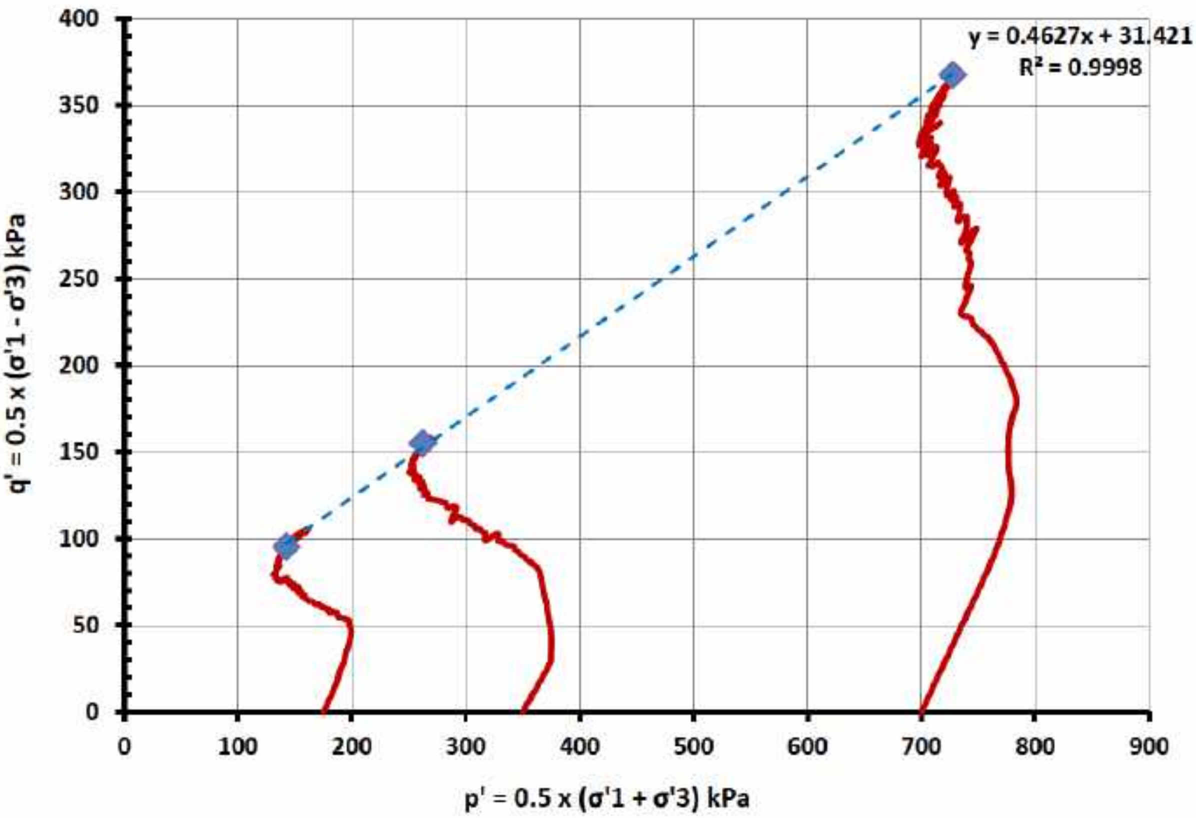
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS06	Lab:	EPLab
Sample ID:	BH03-UDS06_CU3		
Depth (m):	11.00 - 11.25	Room Temperature at Test:	~ 19°C

MIT Effective Stress Path (q' vs p' diagram)



MIT Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	35.39
Angle of Shear Resistance Φ' (Deg) :	27.39

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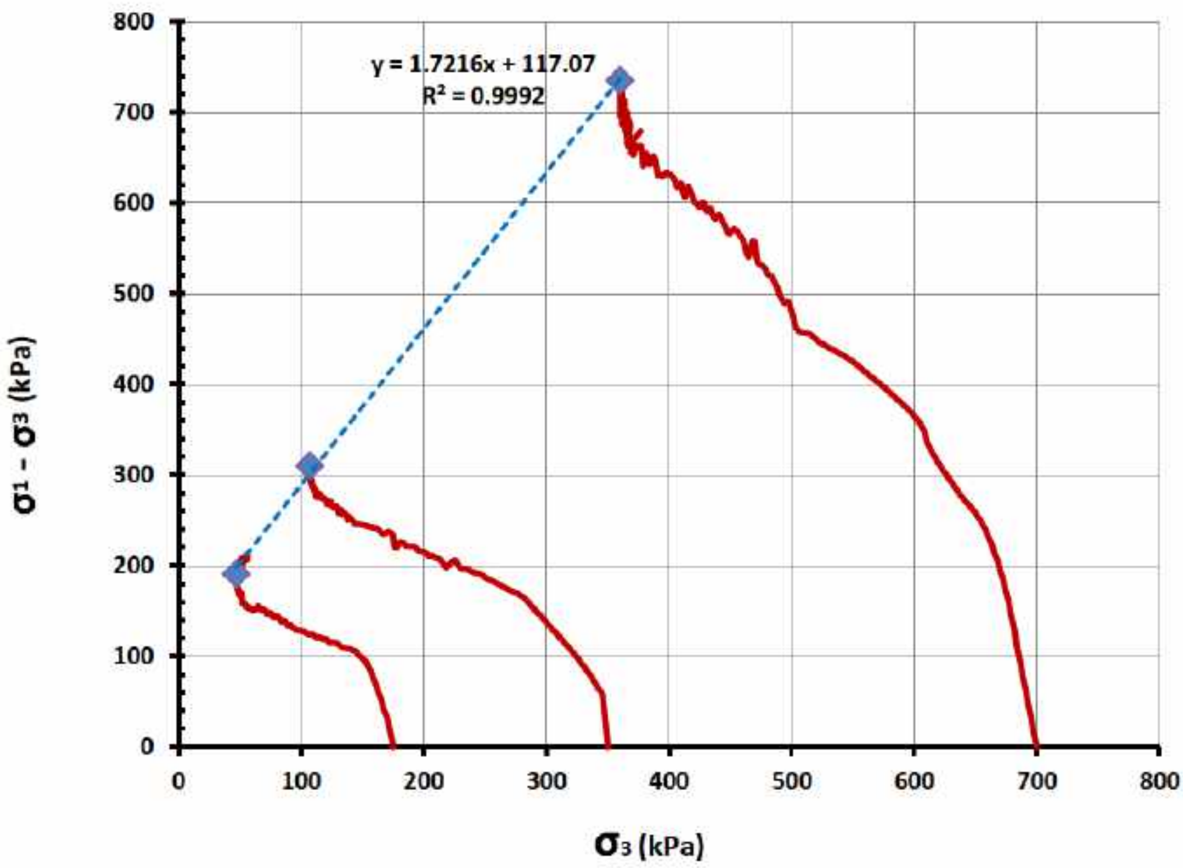
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS06	Lab:	EPLab
Sample ID:	BH03-UDS06_CU3		
Depth (m):	11.00 - 11.25	Room Temperature at Test:	~ 19°C

Modified Mohr Coulomb Stress Path



Modified Mohr Coulomb Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	**35.49**
Angle of Shear Resistance Φ' (Deg) :	**27.54**

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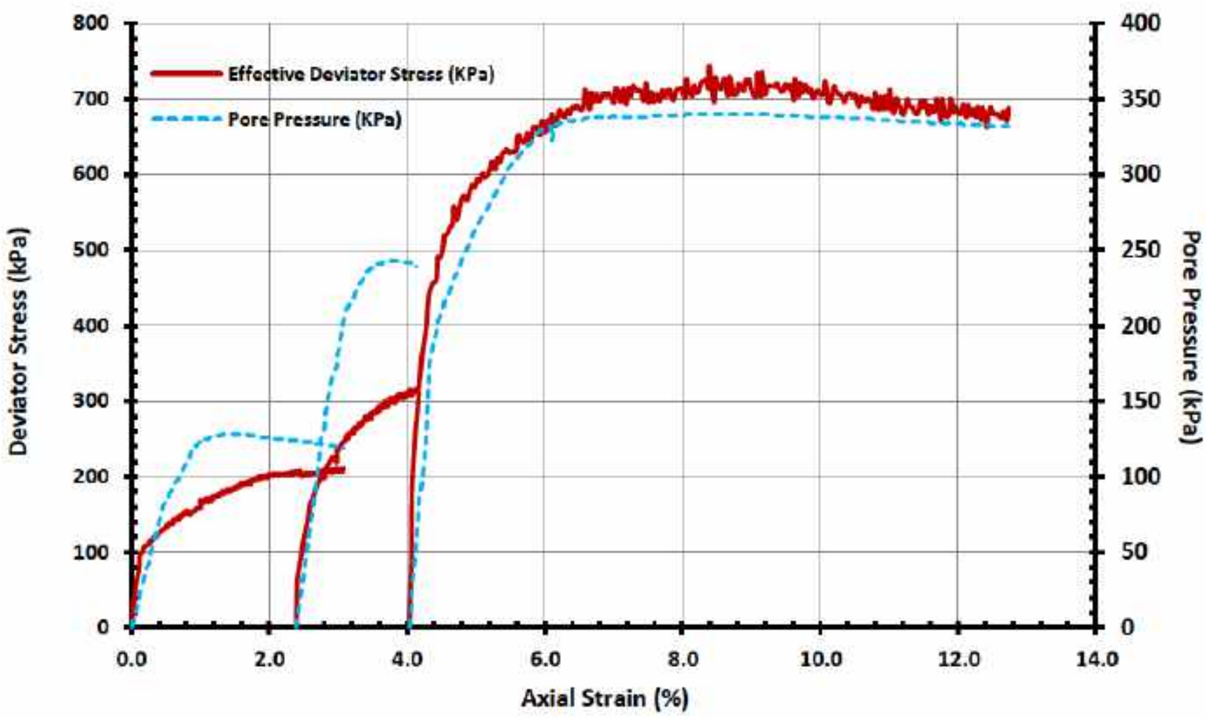
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS06	Lab:	EPLab
Sample ID:	BH03-UDS06_CU3		
Depth (m):	11.00 - 11.25	Room Temperature at Test:	~ 19°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				σ'_1	σ'_3	σ'_1 / σ'_3		
1	175	0	128	238	47	5.06	191	1.66
2	350	0	243	417	107	3.90	310	3.89
3	700	0	340	1095	360	3.04	735	9.16

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS06	Lab:	EPLab
Sample ID:	BH03-UDS06_CU3		
Depth (m):	11.00 - 11.25	Room Temperature at Test:	~ 19°C

Photo After Test

Sample ID:	BH03-UDS06	**Depth (m):**	11.00 - 11.25
Lab ID:	BH03-UDS06_CU3	**Date Tested:**	10/02/2025

Failure Mode: **Intact Shear** **27 °**

Notes:

Stored and Tested the Sample as received
Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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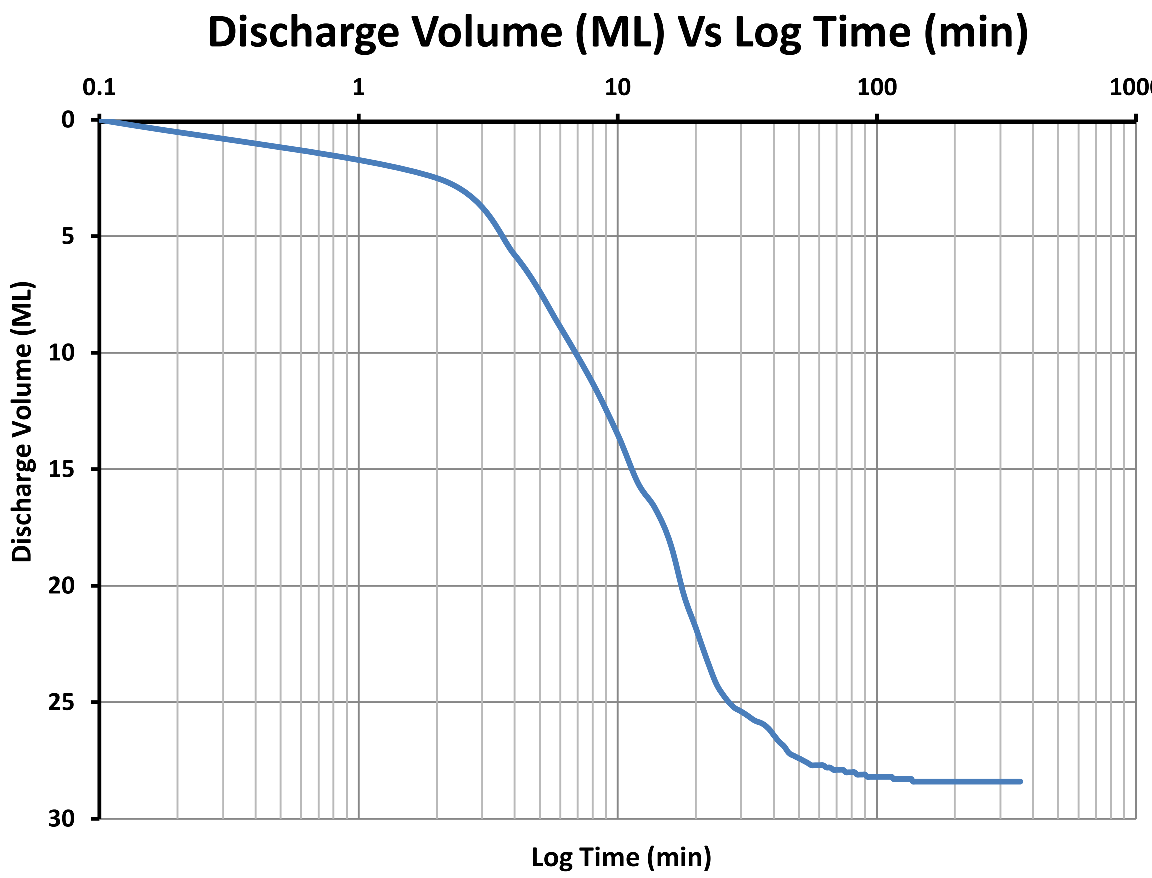
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS06	Lab:	EPLab
Sample ID:	BH03-UDS06_CU3		
Depth (m):	11.00 - 11.25	Room Temperature at Test:	~ 19°C



Cv (cm²/s): 0.048 based on t_{90}

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

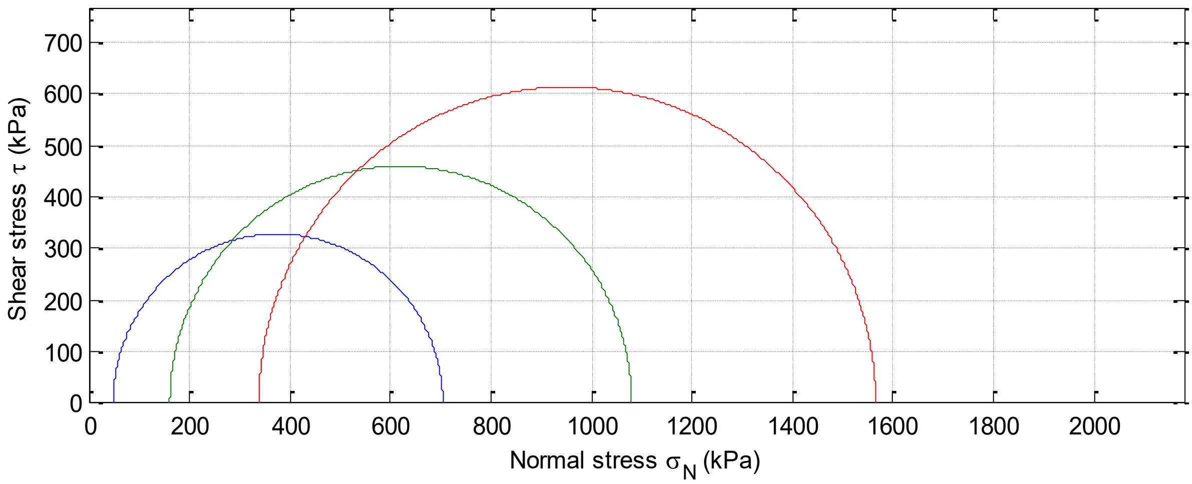
Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS08	Lab:	EPLab
Sample ID:	BH03-UDS08_CU3		
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°c

Tested by:	PHIL	Initial Moisture (%):	34.02	Strain Rate (mm/min):	0.006
Height (mm):	129.63	Final Moisture (%):	37.55	Skempton's (B):	1
Diameter (mm):	64.15	Bulk Density (t/m³):	1.98	Geology:	-
L/D Ratio:	2.02	Dry Density (t/m³):	1.48		

Failure Criteria used: Peak Principle Stress Ratio

Mohr Circle Diagram



Interpretations conducted using Matlab

Interpretation from Mohr Circle:	Stages 1 / 2	Stages 1 / 3	Stage 2 / 3
Cohesion C' (kPa):	149.19	162.93	192.97
Angle of Shear Resistance Φ' (Degrees) :	32.62	29.68	27.92

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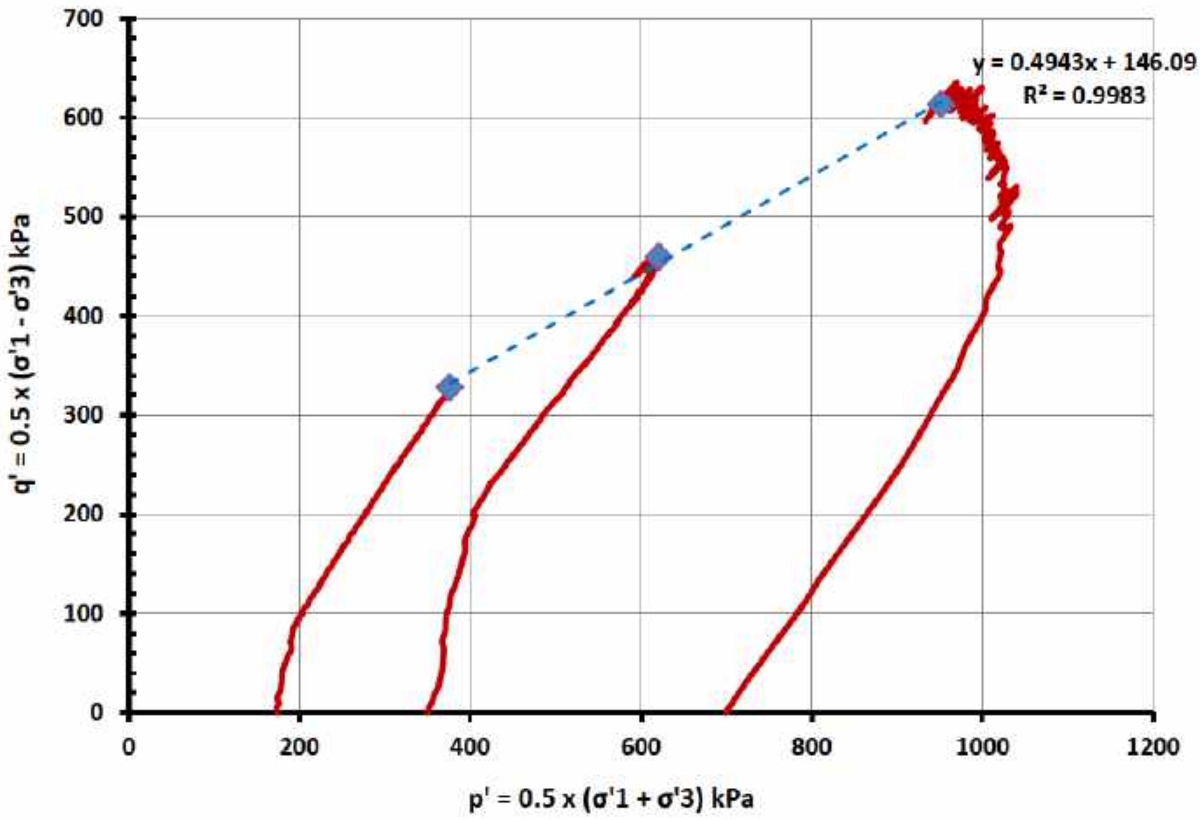
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS08	Lab:	EPLab
Sample ID:	BH03-UDS08_CU3		
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C

MIT Effective Stress Path (q' vs p' diagram)



MIT Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	167.59
Angle of Shear Resistance Φ' (Deg) :	29.34

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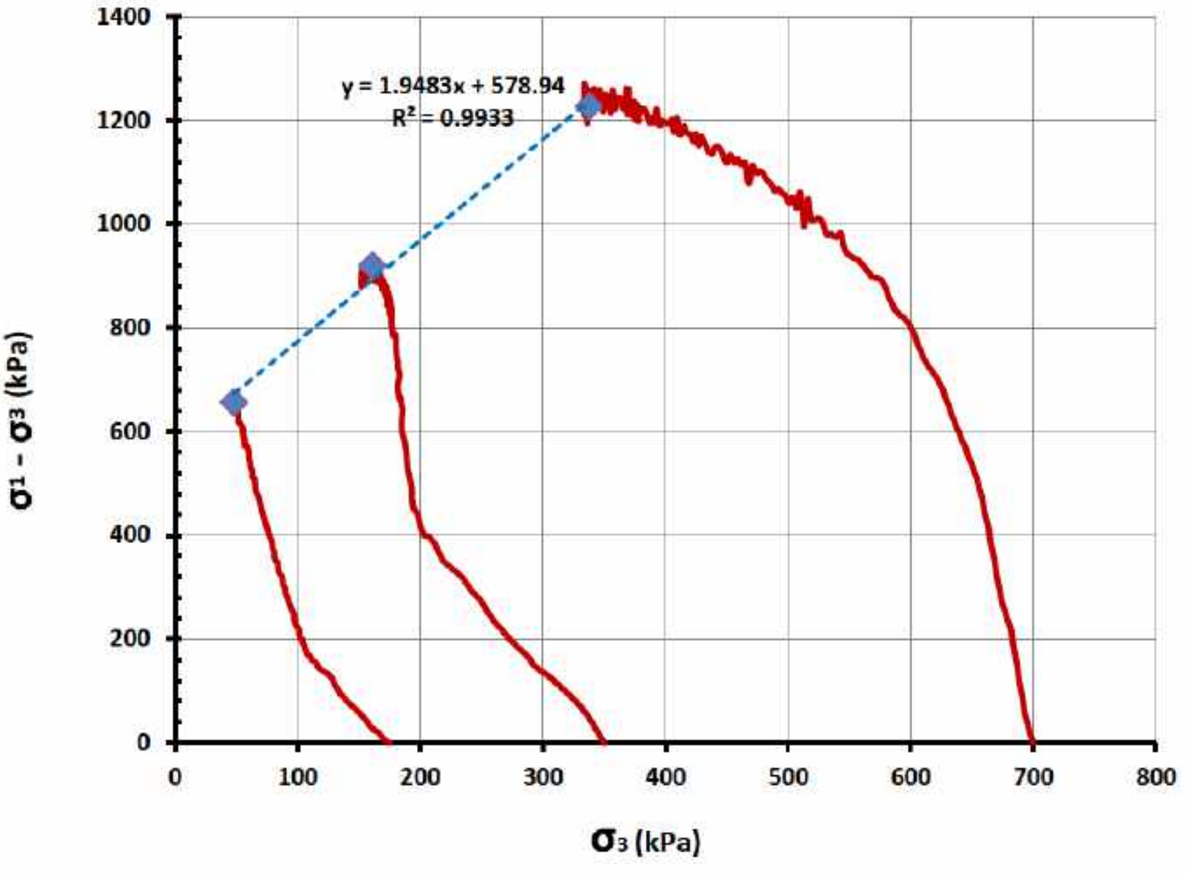
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS08	Lab:	EPLab
Sample ID:	BH03-UDS08_CU3		
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C

Modified Mohr Coulomb Stress Path



Modified Mohr Coulomb Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : 168.54

Angle of Shear Resistance Φ' (Deg) : 29.58

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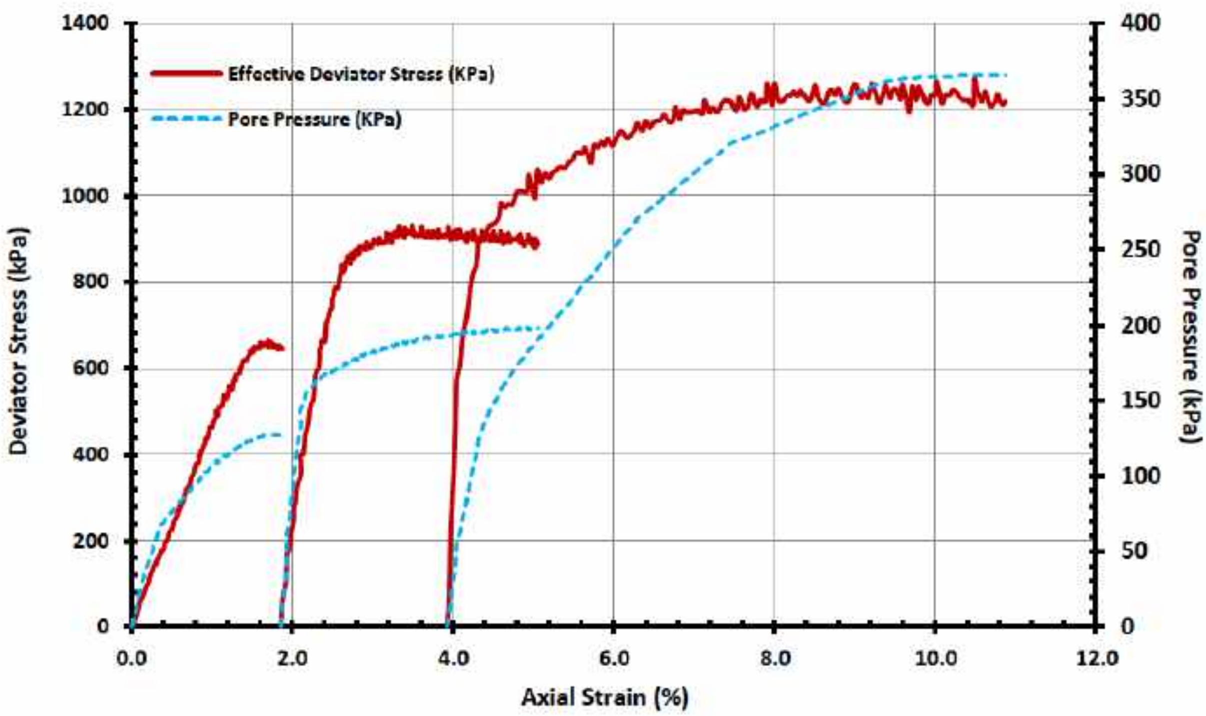
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS08	Lab:	EPLab
Sample ID:	BH03-UDS08_CU3		
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				σ'_1	σ'_3	σ'_1 / σ'_3		
1	175	0	127	704	48	14.67	656	1.65
2	350	0	189	1080	161	6.71	919	3.46
3	700	0	362	1565	338	4.63	1227	9.44

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS08	Lab:	EPLab
Sample ID:	BH03-UDS08_CU3		
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C

Photo After Test

Sample ID:	BH03-UDS08	**Depth (m):**	14.00 - 14.45
Lab ID:	BH03-UDS08_CU3	**Date Tested:**	10/02/2025

Failure Mode: **Intact Shear** **42.5 °**

Notes:

Stored and Tested the Sample as received
Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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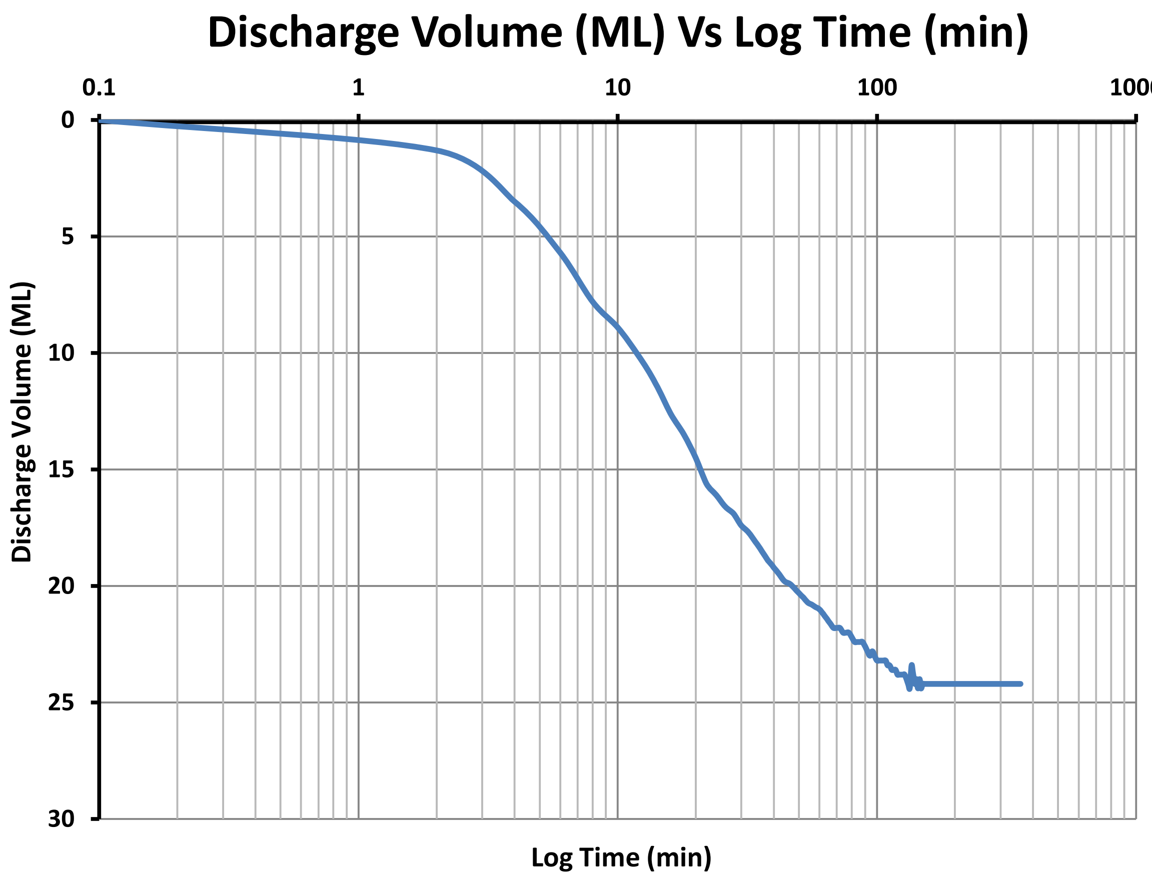
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	REC	Date Tested:	10/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS08	Lab:	EPLab
Sample ID:	BH03-UDS08_CU3		
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C



Cv (cm²/s): 0.047 based on t_{90}

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E-Precision Laboratory

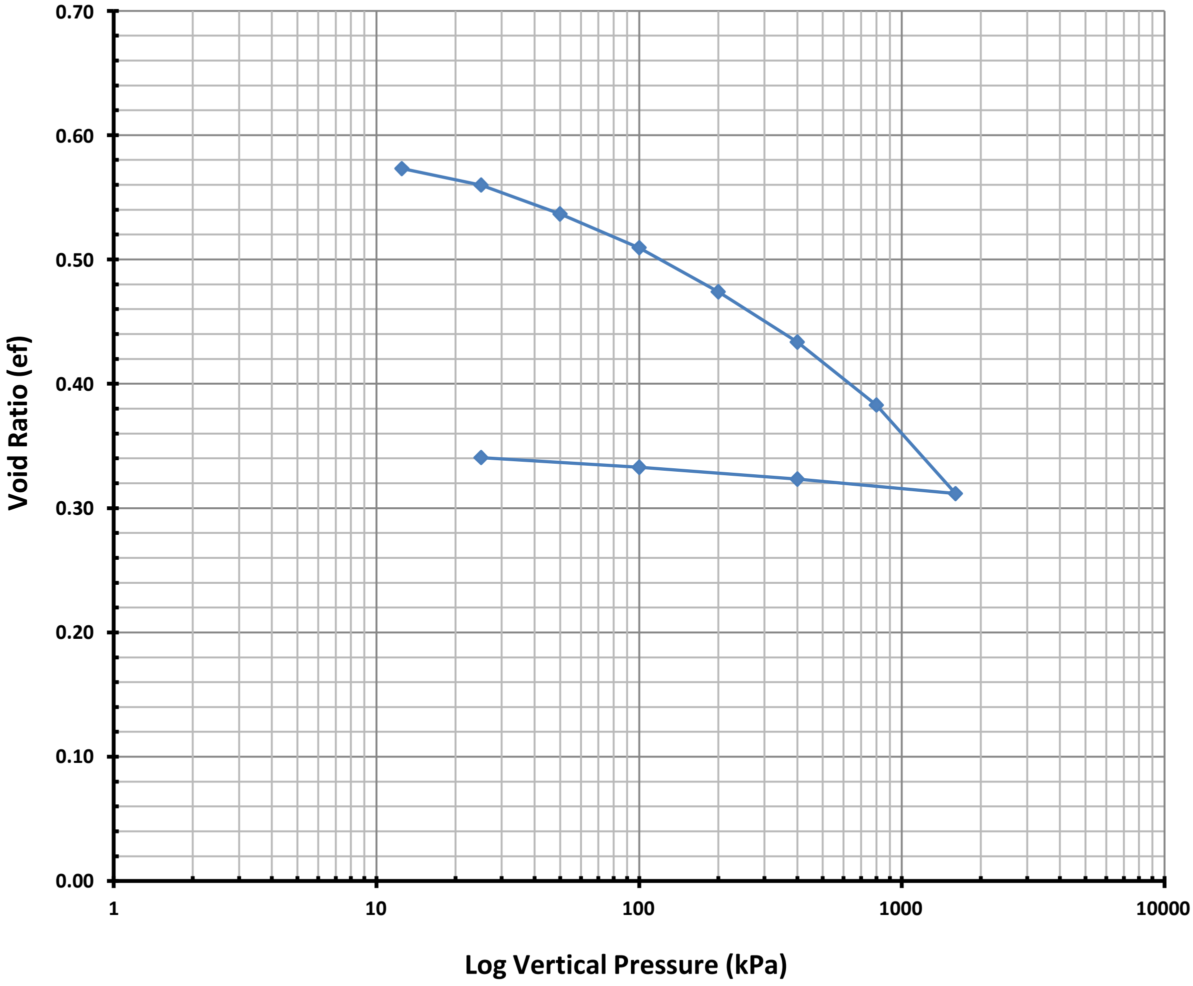
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB01		
Lab ID:	BH01-CB01_OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°c

Tested by:	Phil	Initial Moisture (%):	21.05	Test Condition:	Undrained
Height (mm):	20.84	Final Moisture Content (%):	26.33	Sample Condition:	Saturated
Diameter (mm):	61.80	Bulk Density (t/m³):	1.84	Particle Density (t/m³):	2.416
Direction:	Vertical	Dry Density (t/m³):	1.52	Initial Void Ratio (e_i):	0.590

Void Ratio (e_f) Vs Log of Vertical Pressure (kPa)



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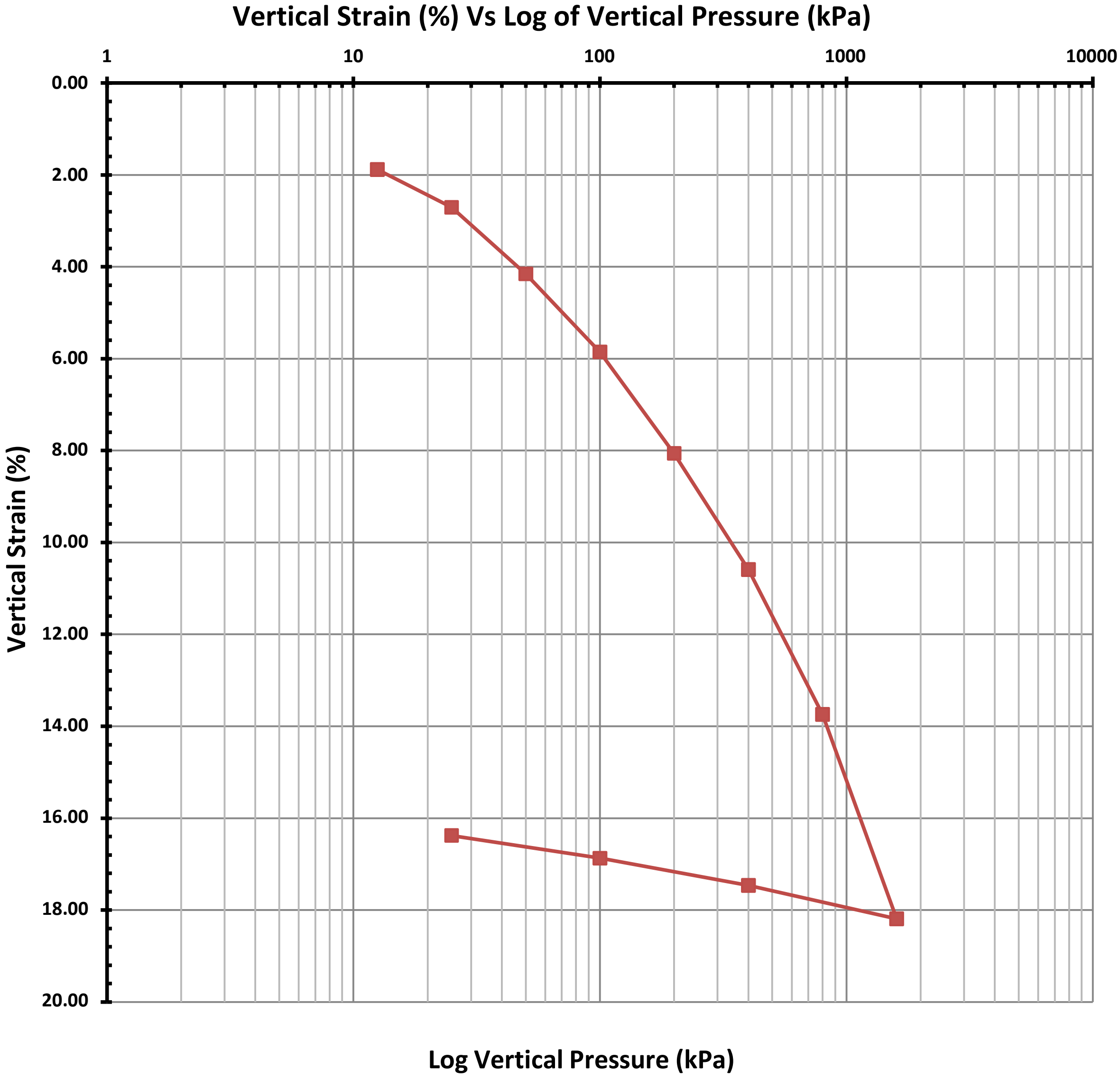
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB01		
Lab ID:	BH01-CB01_OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°c



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E-PRECISION LABORATORY

CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB01		
Lab ID:	BH01-CB01_OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Test Results

*

Stages	Vert Disp (mm)	Cv (m²/yr)		Compressibility Mv (m²/kN)	K (m/s)		Void Ratio (e_f)	Vertical Strain (%)
		*t_{50}	t_{90}					
Stage 1 @ 12.5kPa	0.393	10.889	-	1.51E-03	5.1E-09		0.573	1.89
Stage 2 @ 25kPa	0.564	5.357	-	6.69E-04	1.1E-09		0.560	2.71
Stage 3 @ 50kPa	0.866	3.473	-	5.96E-04	6.4E-10		0.537	4.16
Stage 4 @ 100kPa	1.220	3.356	-	3.54E-04	3.7E-10		0.509	5.85
Stage 5 @ 200kPa	1.680	3.193	-	2.34E-04	2.3E-10		0.474	8.06
Stage 6 @ 400kPa	2.207	3.017	-	1.38E-04	1.3E-10		0.433	10.59
Stage 7 @ 800kPa	2.864	2.113	-	8.82E-05	5.8E-11		0.383	13.74
Stage 8 @ 1600kPa	3.791	0.972	-	6.45E-05	1.9E-11		0.312	18.19
Unload @ 400kPa	3.639							
Unload @ 100kPa	3.516							
Unload @ 25kPa	3.413							

** Values interpreted via lab only*

Comments: **Core Sample**
Cv values to be interpreted via Engineer

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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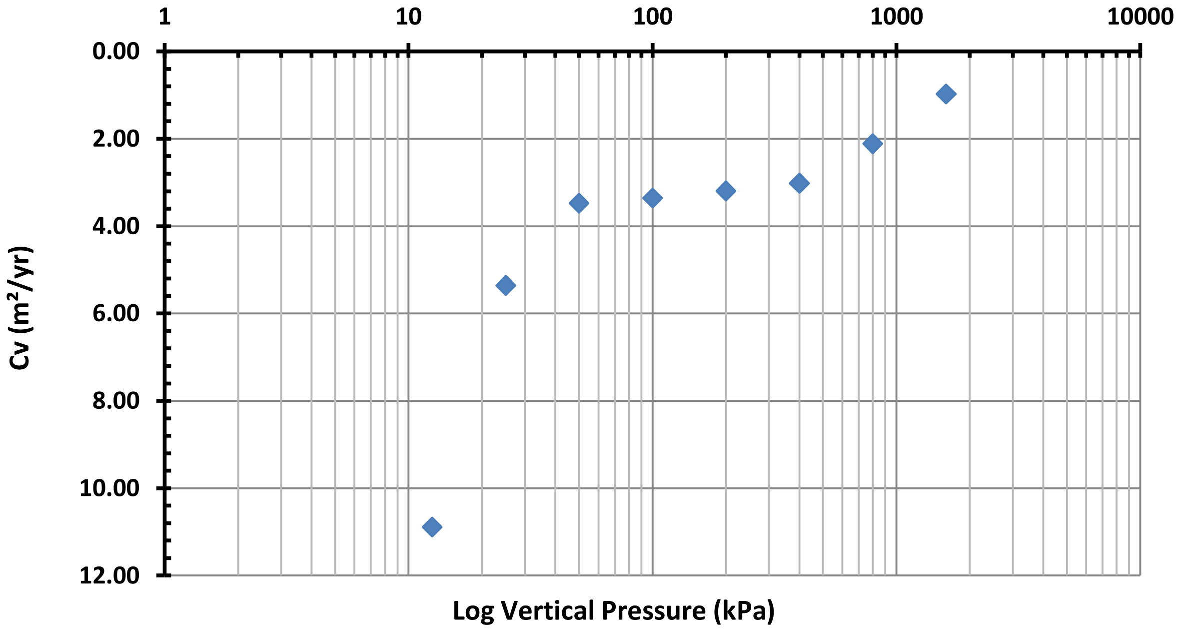
E-PRECISION LABORATORY

CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

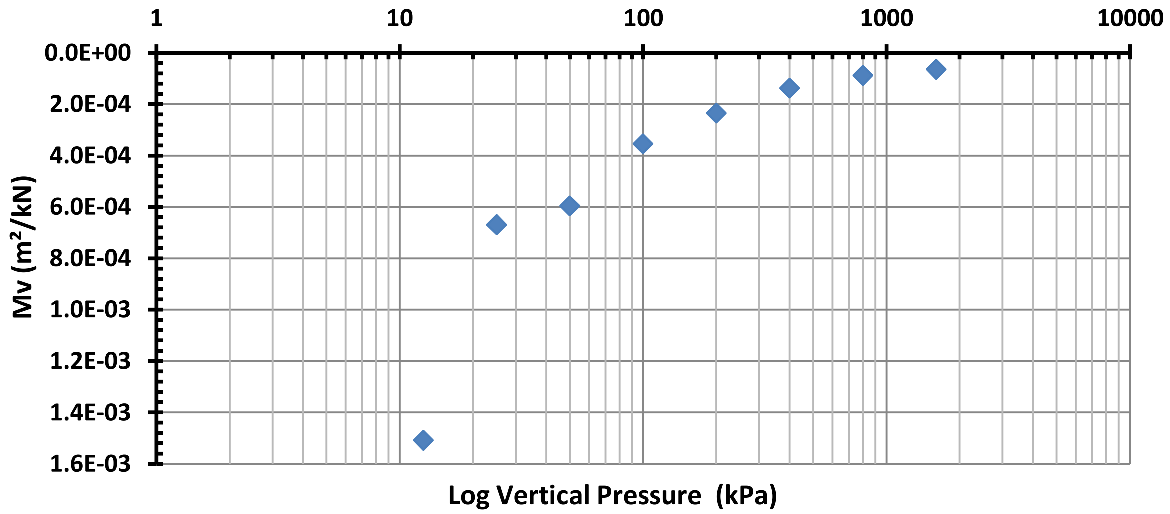
Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB01		
Lab ID:	BH01-CB01_OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Cv (m^2/yr) Vs Log of Vertical Pressure (kPa)



* Plot based on Log (time) data

Mv (m^2/kN) Vs Log of Vertical Pressure (kPa)



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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB01		
Lab ID:	BH01-CB01_OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

TEST RESULTS PLEASE SEE PAGES BELOW

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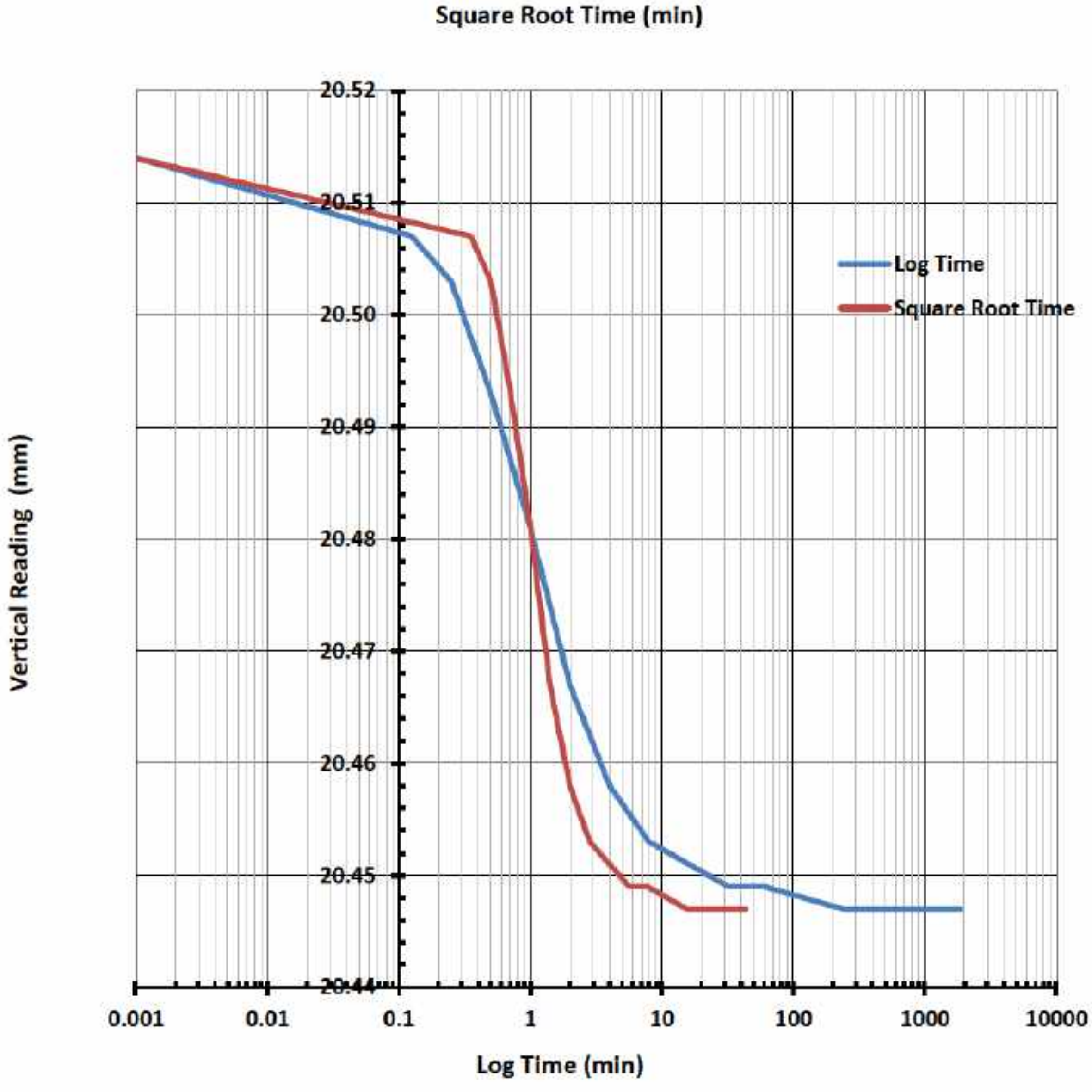
E-PRECISION LABORATORY

CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB01		
Lab ID:	BH01-CB01_OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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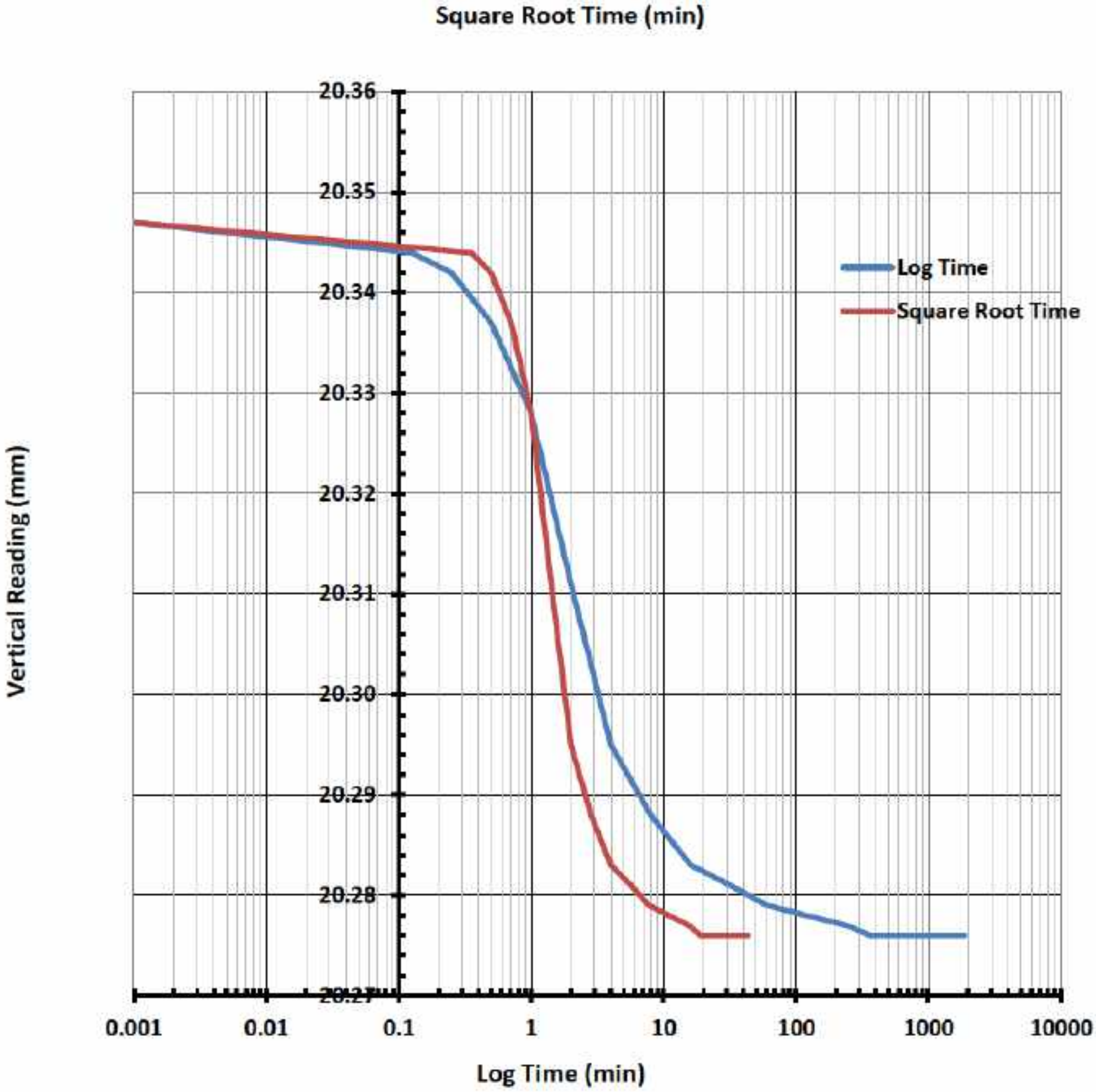
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB01		
Lab ID:	BH01-CB01_OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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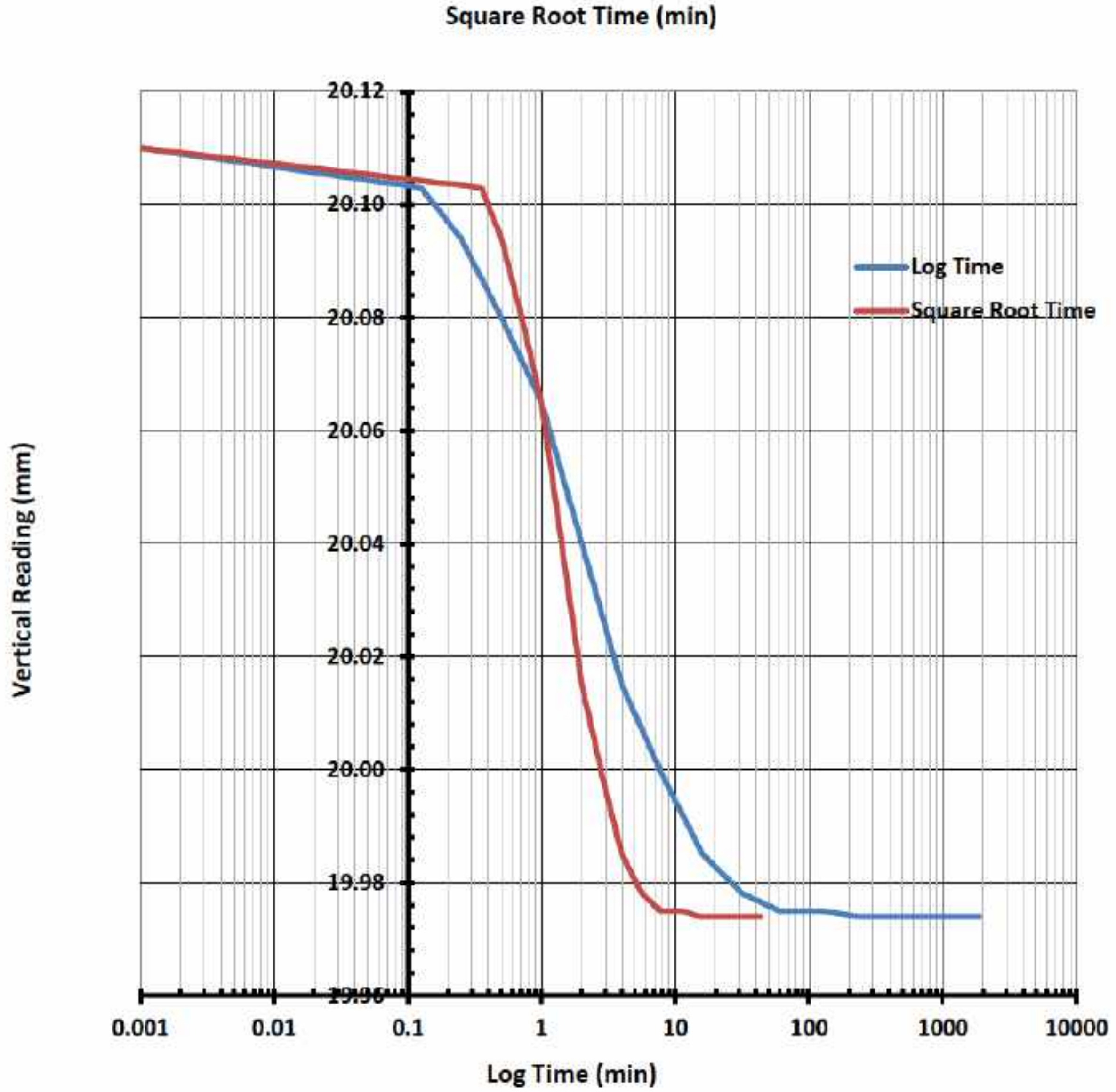
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB01		
Lab ID:	BH01-CB01_OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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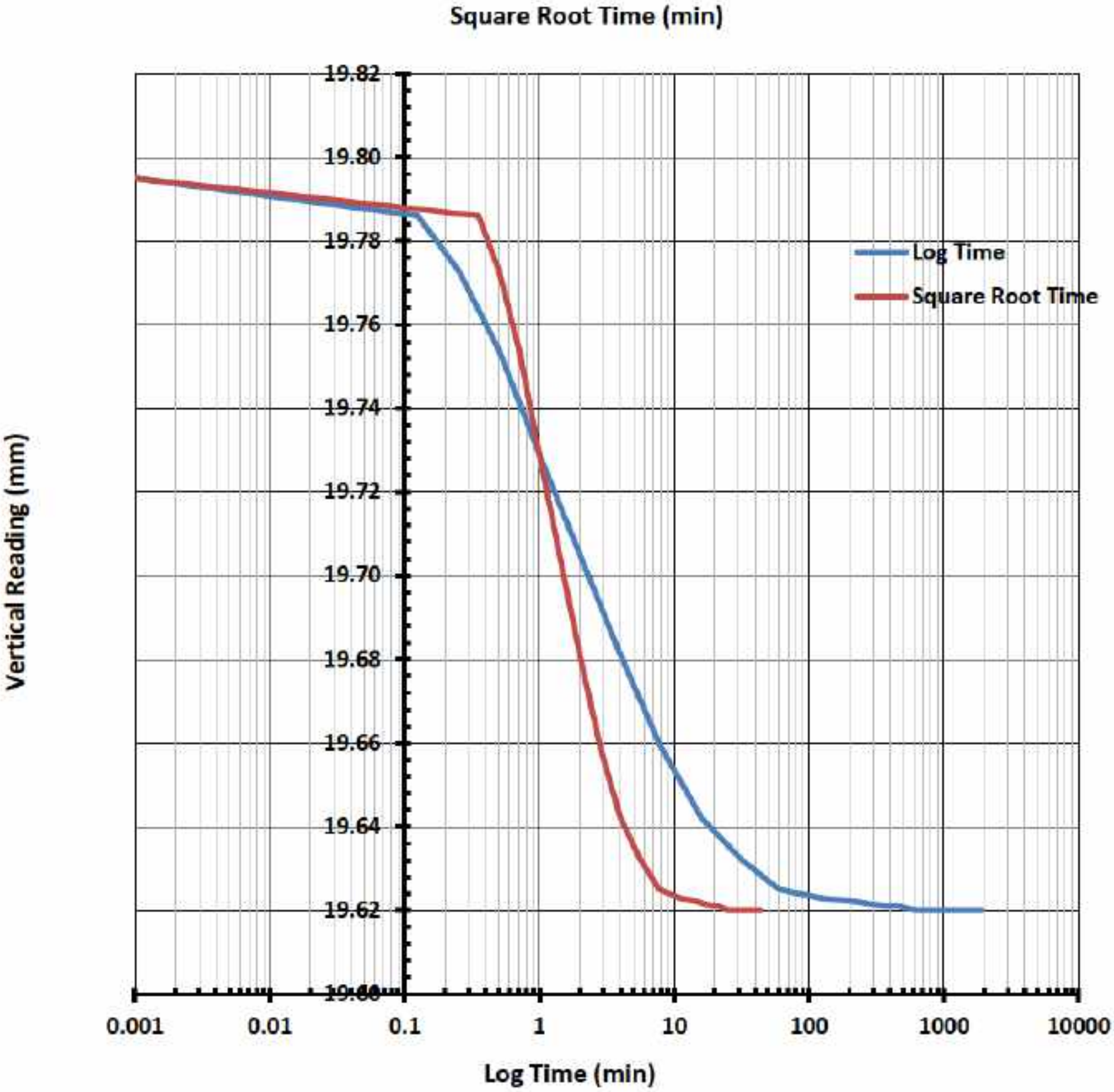
E-PRECISION LABORATORY

CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB01		
Lab ID:	BH01-CB01_OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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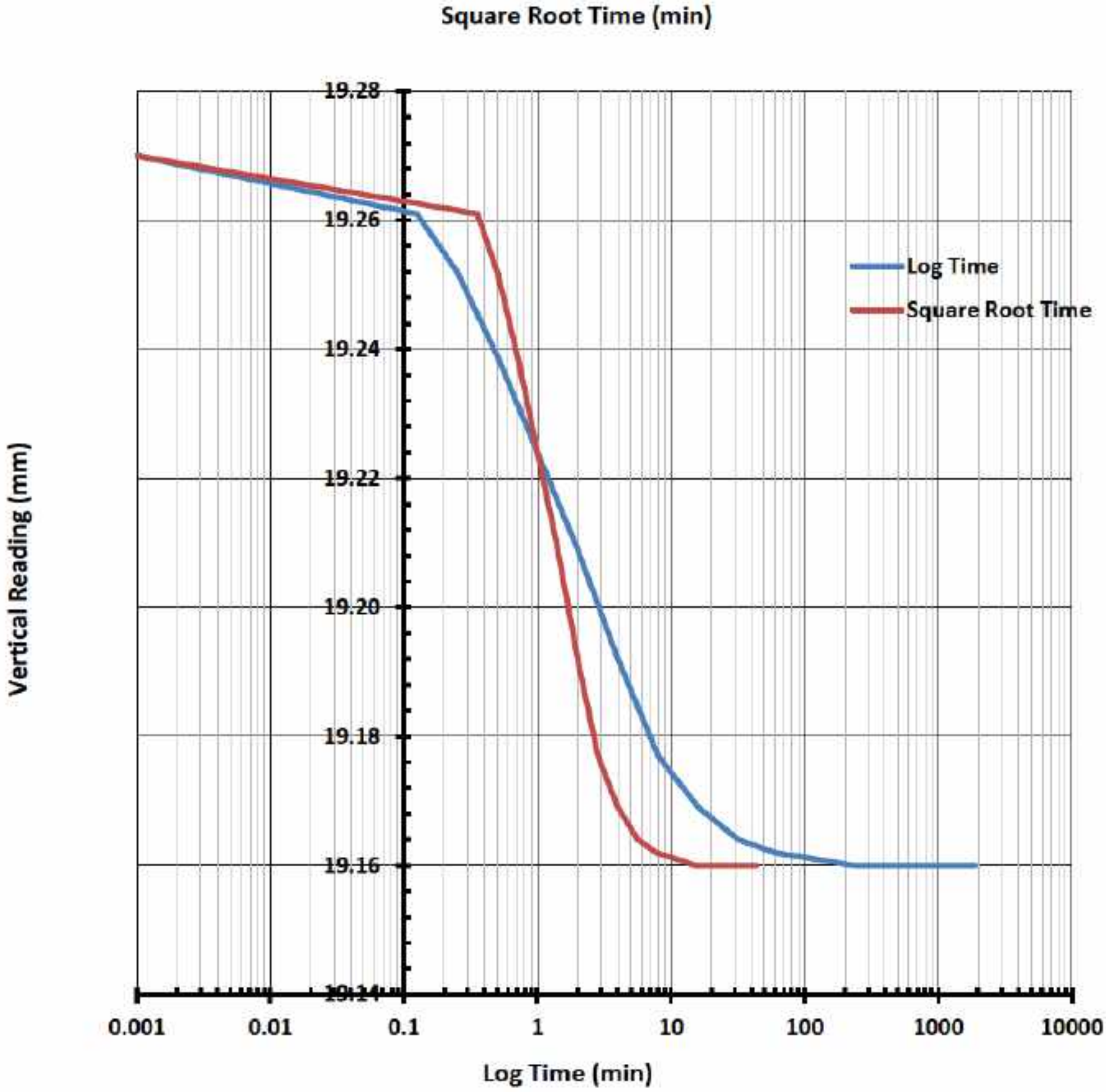
E-PRECISION LABORATORY

CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB01		
Lab ID:	BH01-CB01_OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa



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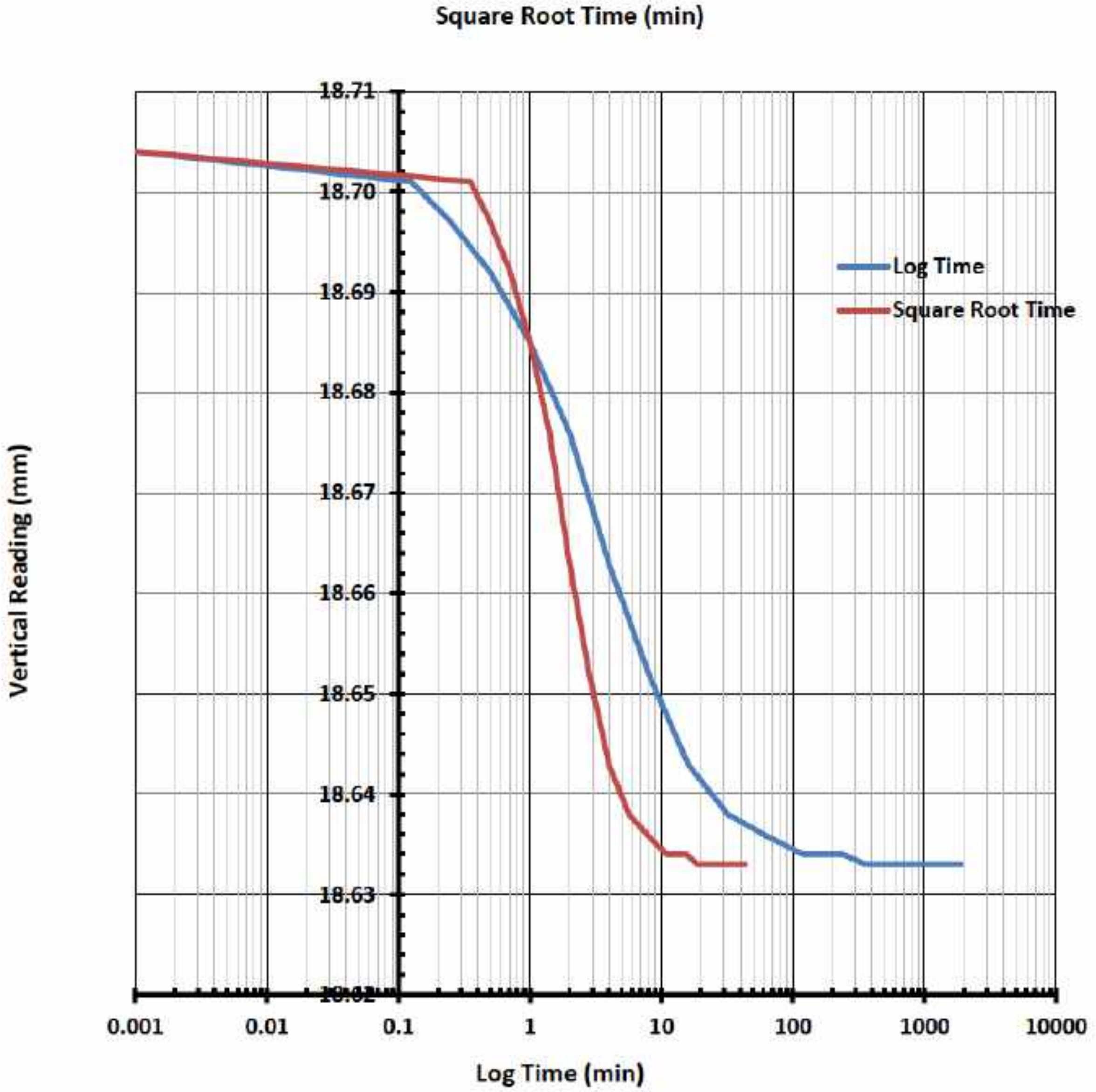
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB01		
Lab ID:	BH01-CB01_OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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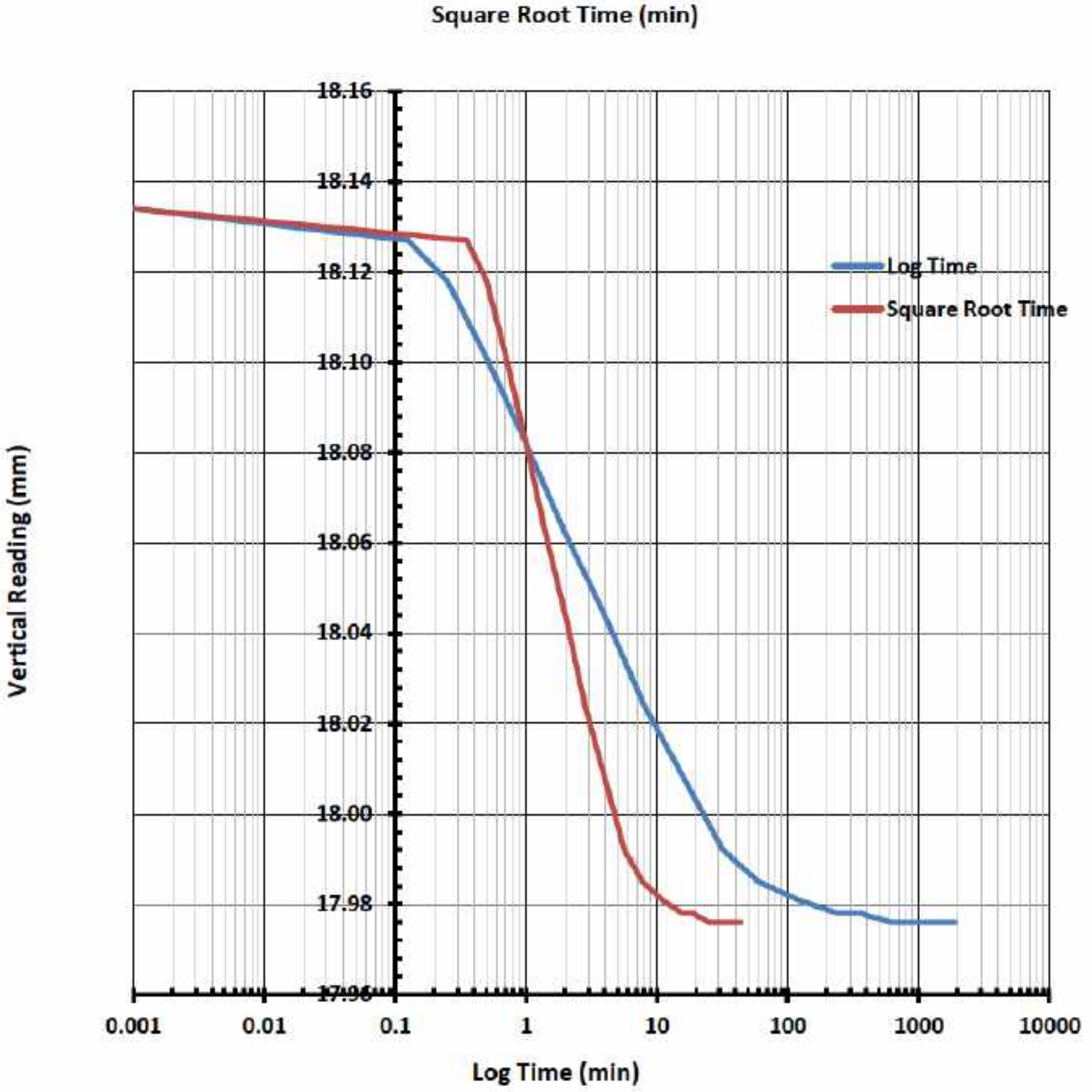
E-Precision Laboratory

CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client: REC		Date Tested:	04/02/2025
Project: Bellevue TSF Testing 2025		EP Lab Job Number:	REC
Sample ID: BH01-CB01			
Lab ID: BH01-CB01_OED		Lab:	EPLab
Depth (m): 4.95 - 5.30		Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa



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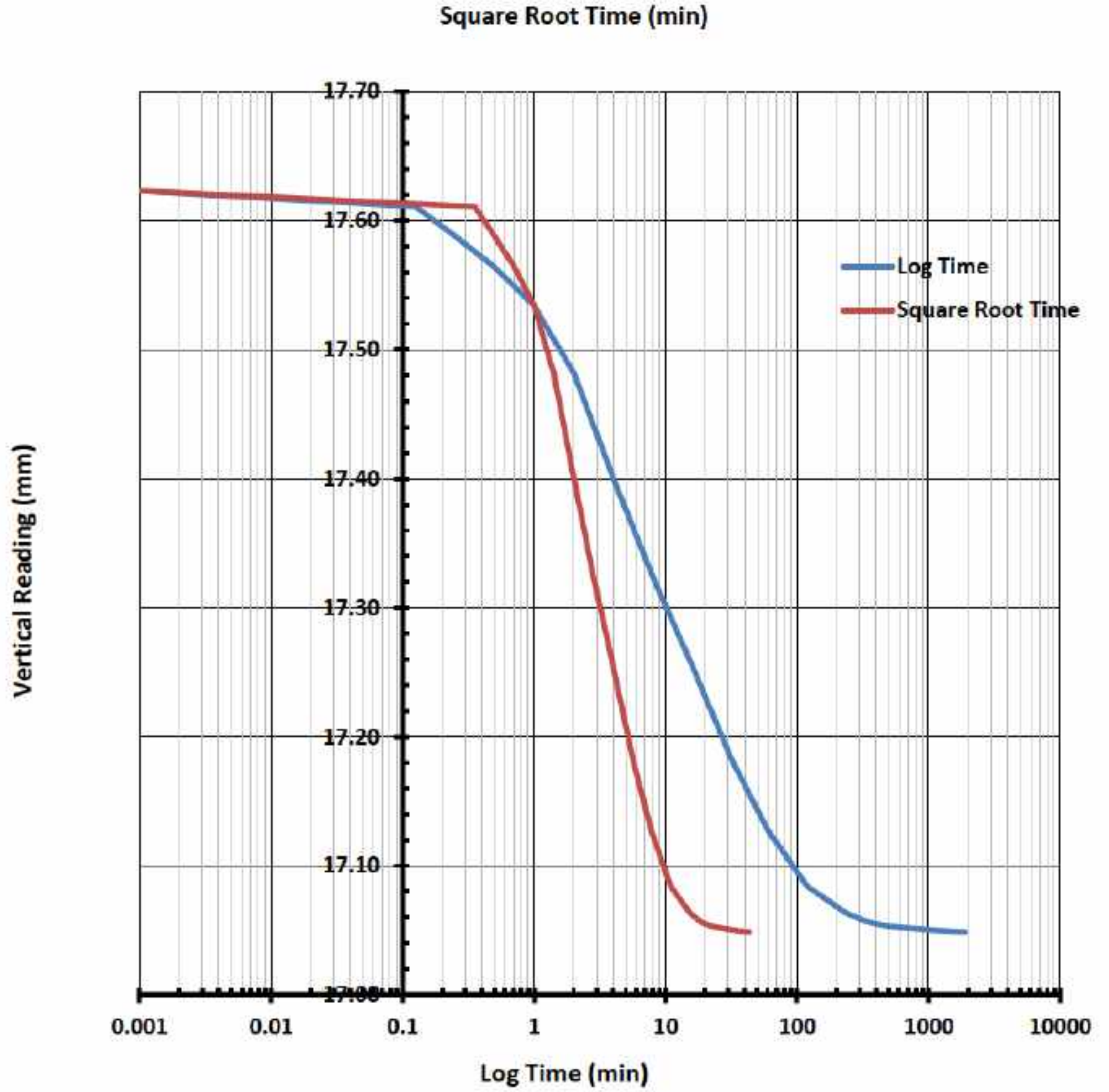
E-Precision Laboratory

CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB01		
Lab ID:	BH01-CB01_OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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E-Precision Laboratory

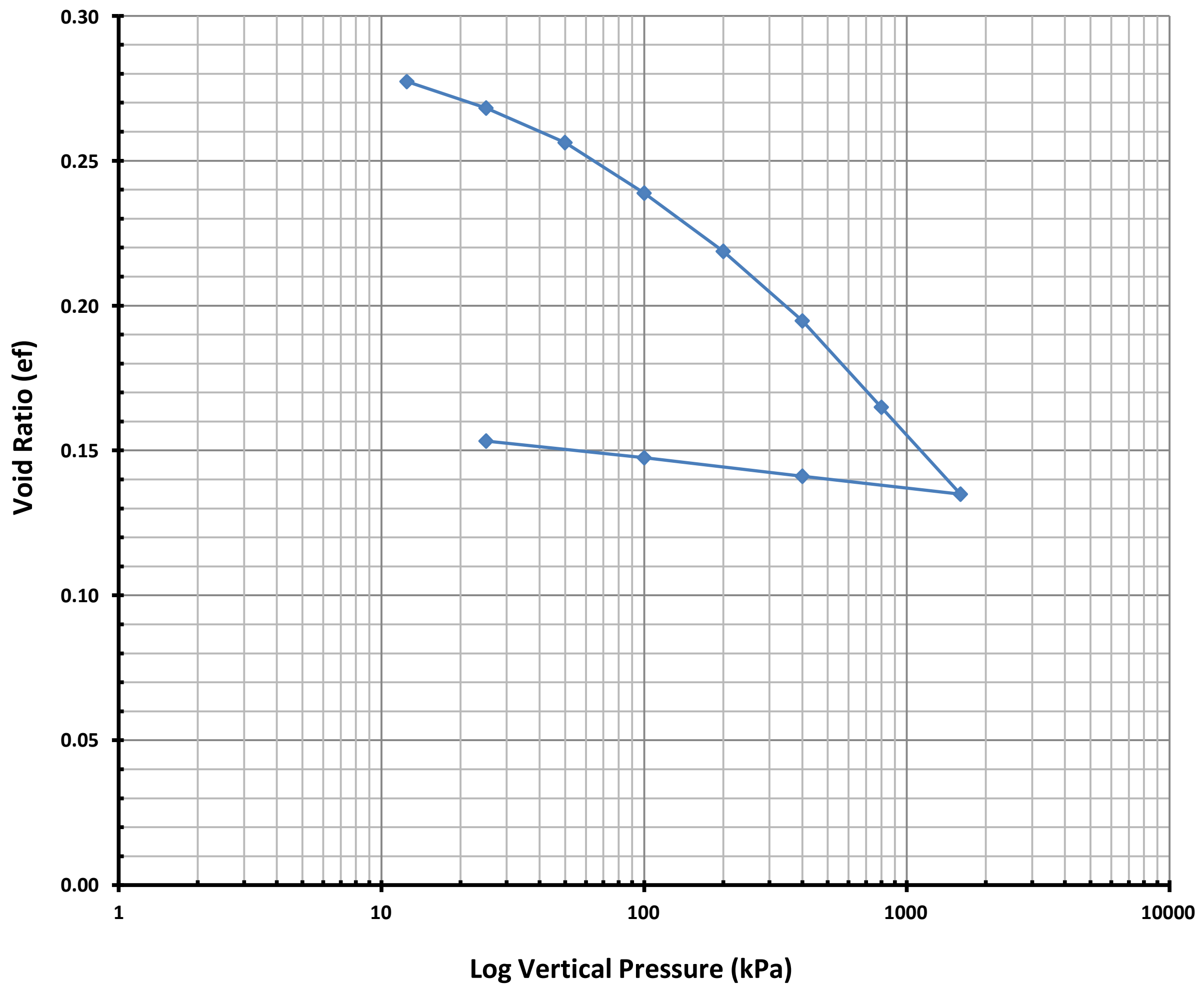
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB05		
Lab ID:	BH01-CB05_OED	Lab:	EPLab
Depth (m):	16.25	Room Temperature at Test:	~ 19°c

Tested by:	Phil	Initial Moisture (%):	12.05	Test Condition:	Undrained
Height (mm):	20.13	Final Moisture Content (%):	21.55	Sample Condition:	Saturated
Diameter (mm):	61.80	Bulk Density (t/m³):	2.15	Particle Density (t/m³):	2.479
Direction:	Vertical	Dry Density (t/m³):	1.92	Initial Void Ratio (e_i):	0.290

Void Ratio (e_f) Vs Log of Vertical Pressure (kPa)



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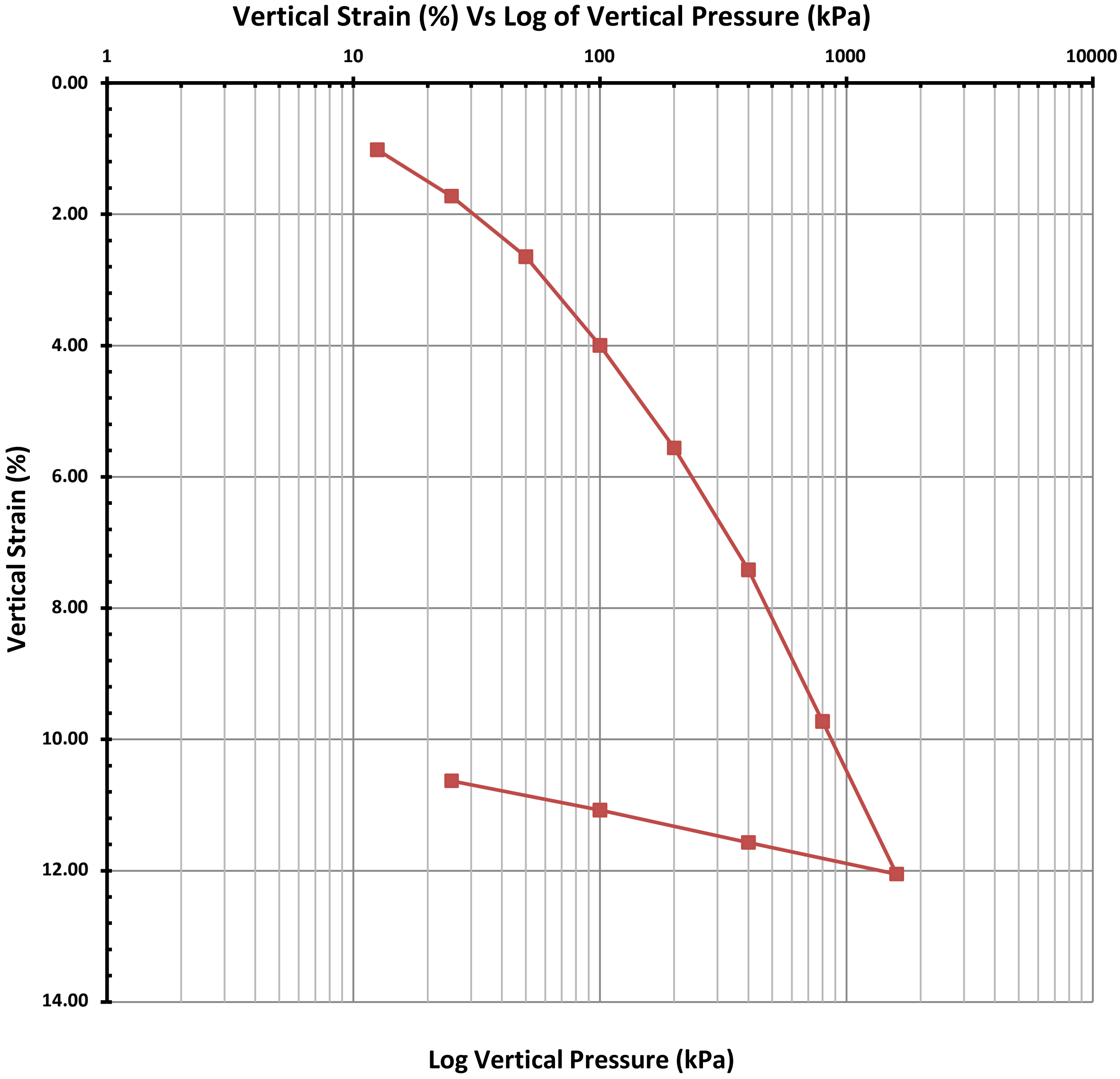
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB05		
Lab ID:	BH01-CB05_OED	Lab:	EPLab
Depth (m):	16.25	Room Temperature at Test:	~ 19°c



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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB05		
Lab ID:	BH01-CB05_OED	Lab:	EPLab
Depth (m):	16.25	Room Temperature at Test:	~ 19°C

Test Results

*

Stages	Vert Disp (mm)	Cv (m²/yr)		Compressibility Mv (m²/kN)	K (m/s)		Void Ratio (e_f)	Vertical Strain (%)
		*t_{50}	t_{90}					
Stage 1 @ 12.5kPa	0.205	10.341	-	8.15E-04	2.6E-09		0.277	1.02
Stage 2 @ 25kPa	0.347	5.099	-	5.70E-04	9.0E-10		0.268	1.72
Stage 3 @ 50kPa	0.533	3.337	-	3.76E-04	3.9E-10		0.256	2.65
Stage 4 @ 100kPa	0.805	3.247	-	2.78E-04	2.8E-10		0.239	4.00
Stage 5 @ 200kPa	1.119	3.146	-	1.62E-04	1.6E-10		0.219	5.56
Stage 6 @ 400kPa	1.493	3.028	-	9.84E-05	9.3E-11		0.195	7.42
Stage 7 @ 800kPa	1.958	2.882	-	6.24E-05	5.6E-11		0.165	9.73
Stage 8 @ 1600kPa	2.426	2.053	-	3.22E-05	2.1E-11		0.135	12.05
Unload @ 400kPa	2.329							
Unload @ 100kPa	2.230							
Unload @ 25kPa	2.140							

** Values interpreted via lab only*

Comments: **Core Sample**
Cv values to be interpreted via Engineer

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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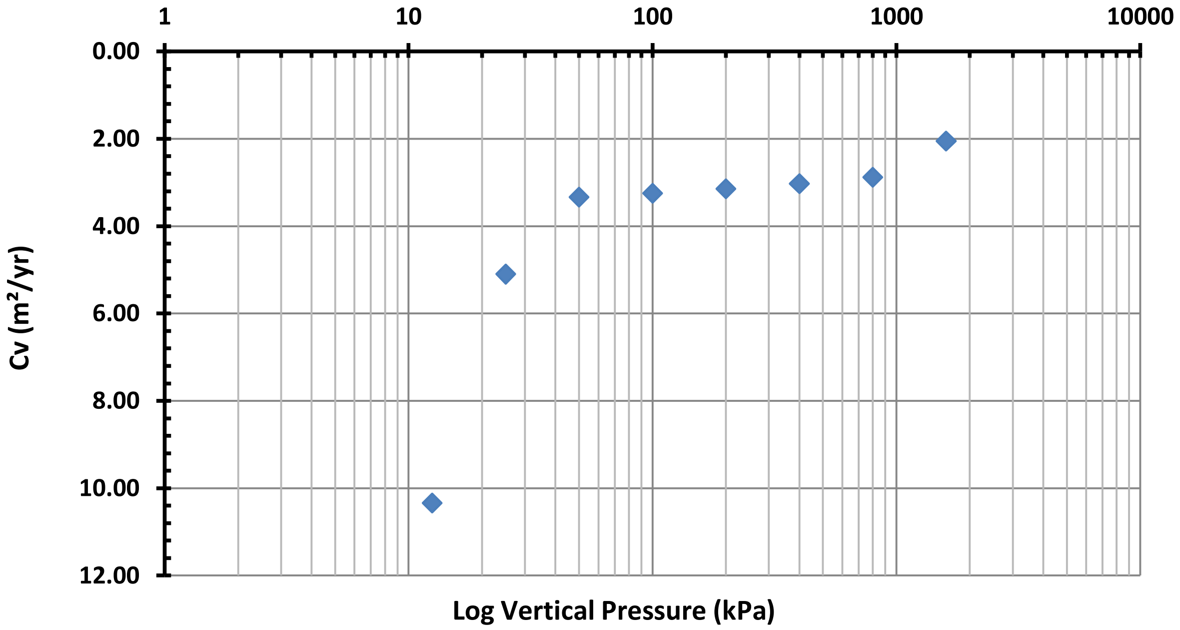
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

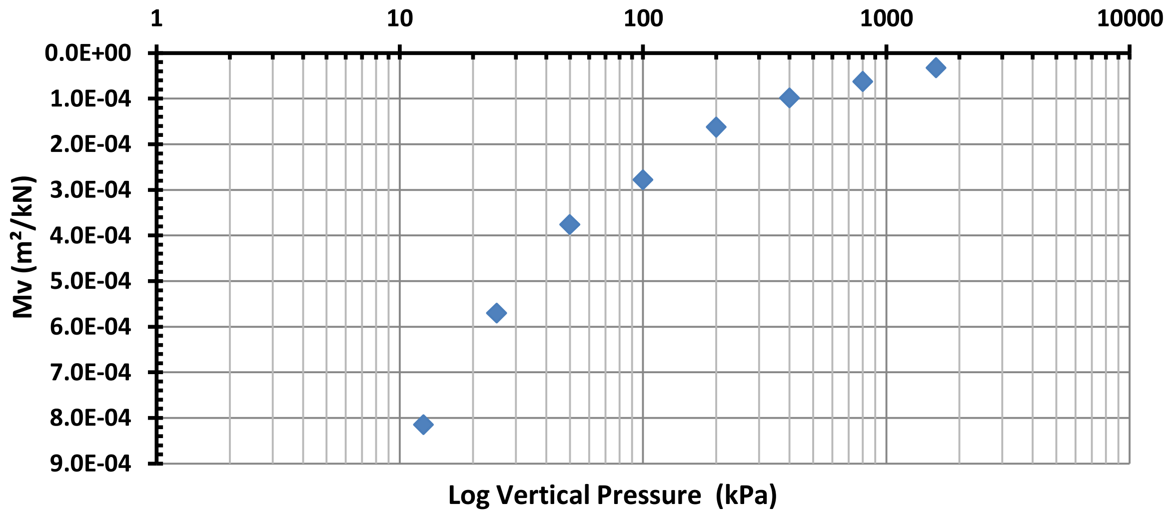
Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB05		
Lab ID:	BH01-CB05_OED	Lab:	EPLab
Depth (m):	16.25	Room Temperature at Test:	~ 19°C

Cv (m²/yr) Vs Log of Vertical Pressure (kPa)



* Plot based on Log (time) data

Mv (m²/kN) Vs Log of Vertical Pressure (kPa)



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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB05		
Lab ID:	BH01-CB05_OED	Lab:	EPLab
Depth (m):	16.25	Room Temperature at Test:	~ 19°C

TEST RESULTS PLEASE SEE PAGES BELOW

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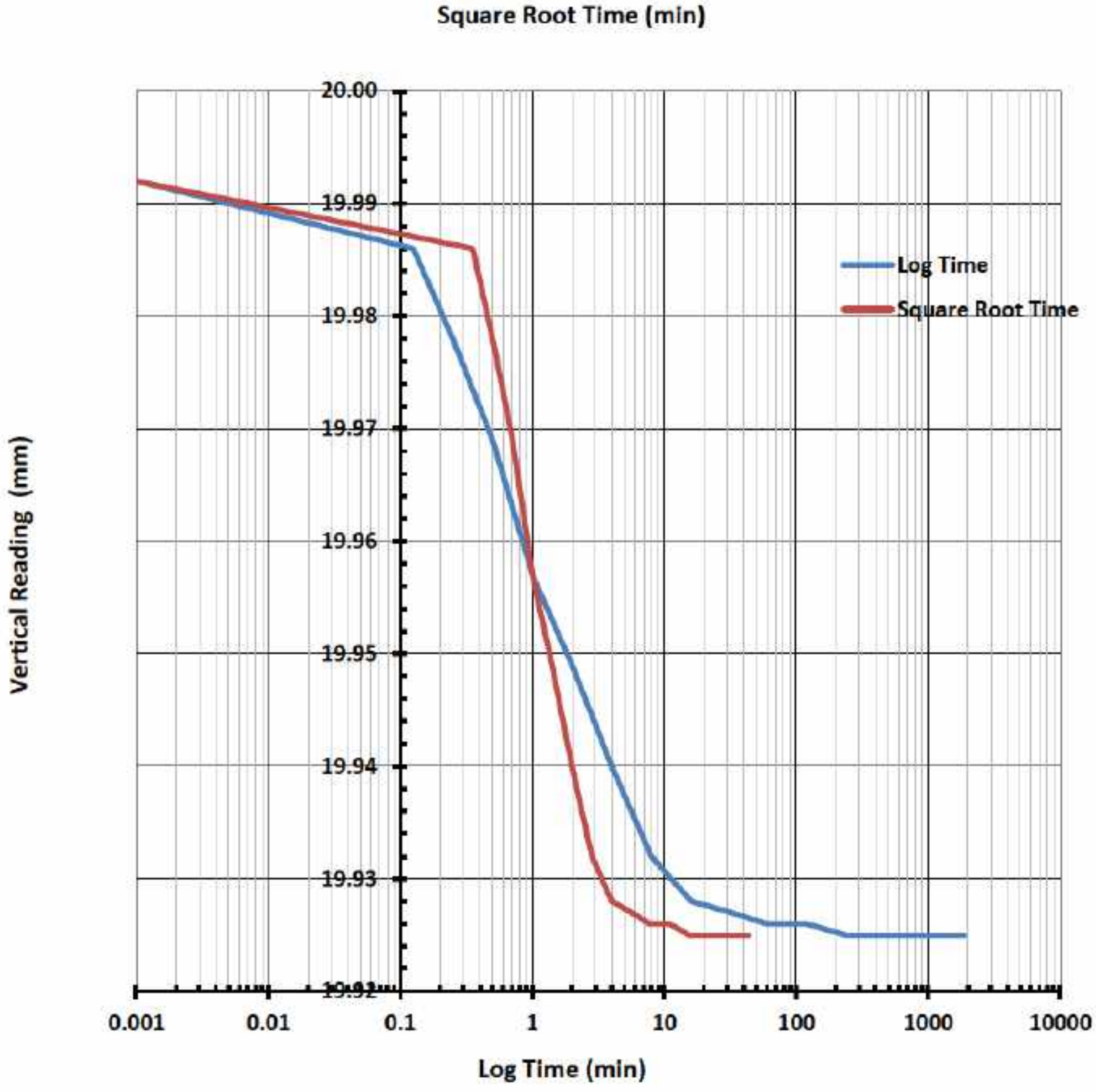
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB05		
Lab ID:	BH01-CB05_OED	Lab:	EPLab
Depth (m):	16.25	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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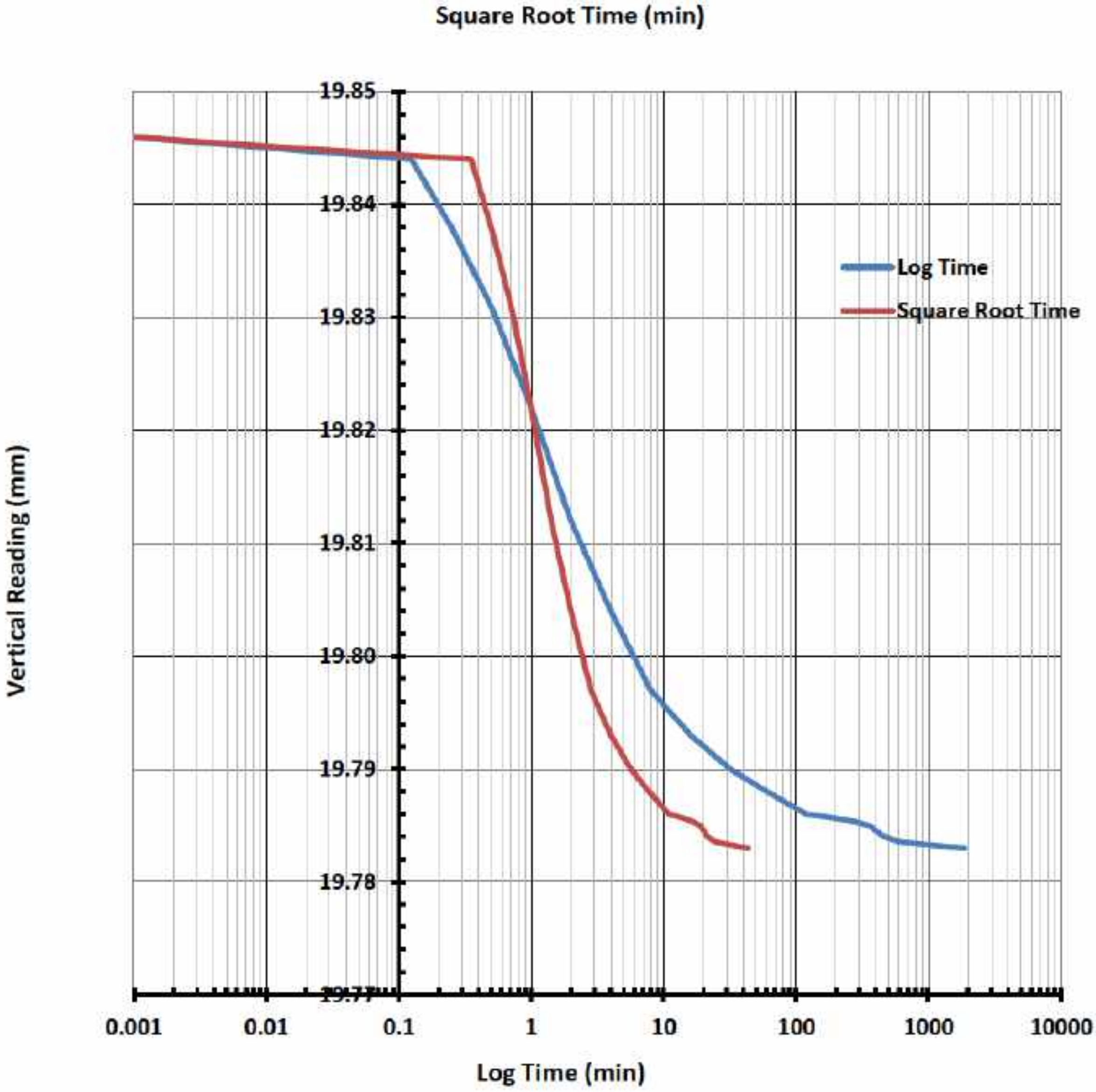
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB05		
Lab ID:	BH01-CB05_OED	Lab:	EPLab
Depth (m):	16.25	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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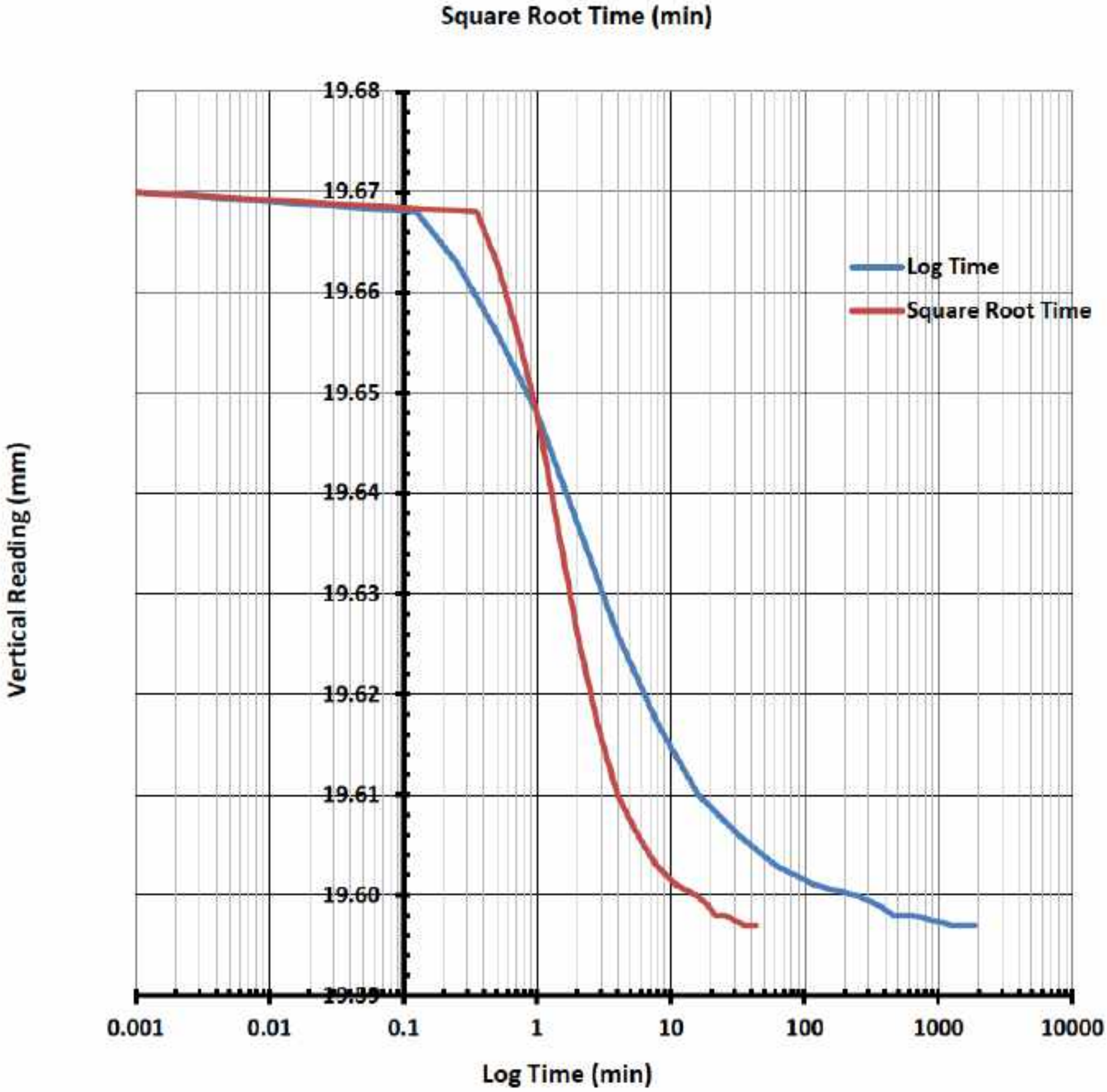
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB05		
Lab ID:	BH01-CB05_OED	Lab:	EPLab
Depth (m):	16.25	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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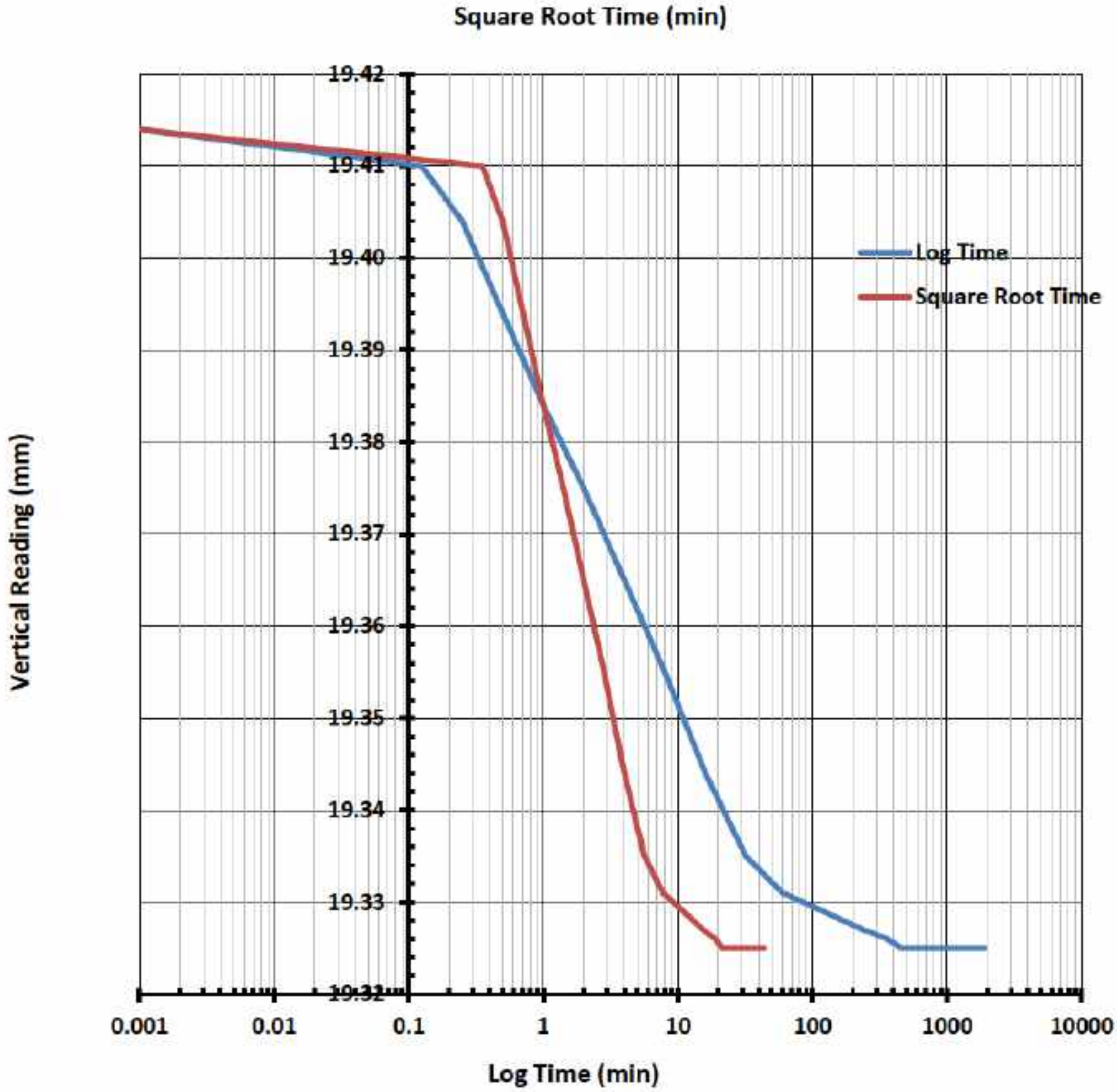
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB05		
Lab ID:	BH01-CB05_OED	Lab:	EPLab
Depth (m):	16.25	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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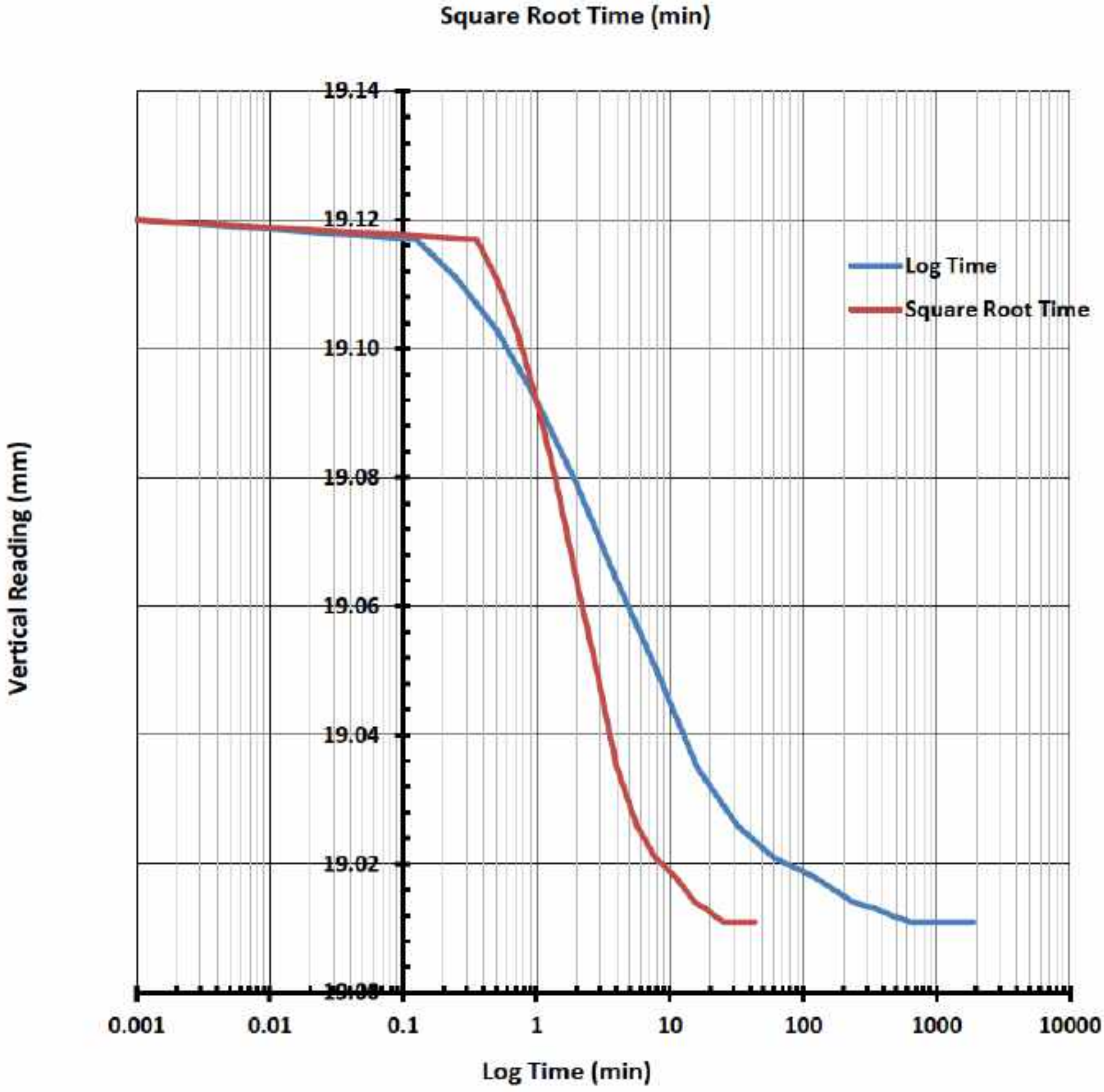
Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB05		
Lab ID:	BH01-CB05_OED	Lab:	EPLab
Depth (m):	16.25	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa



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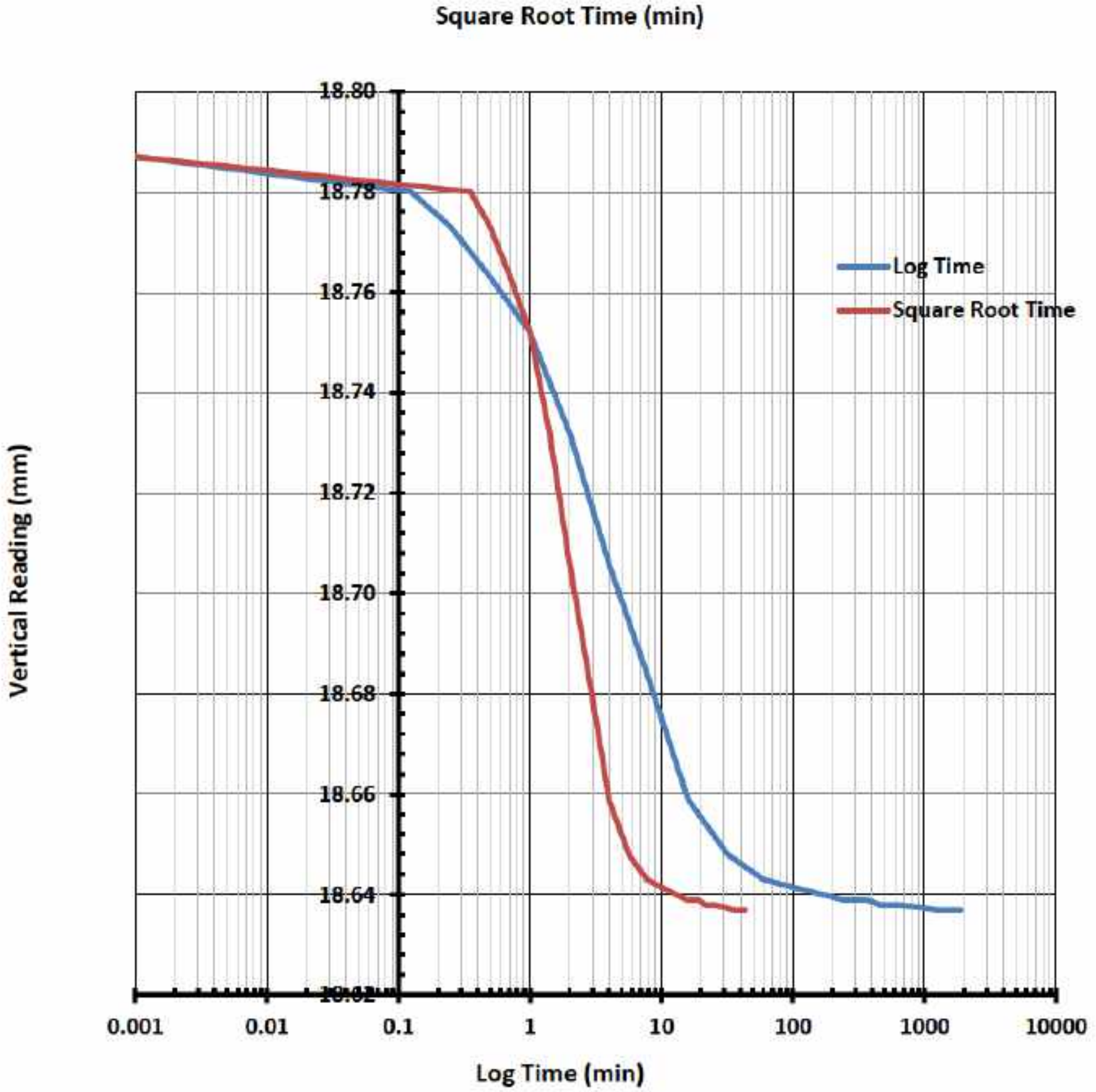
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB05		
Lab ID:	BH01-CB05_OED	Lab:	EPLab
Depth (m):	16.25	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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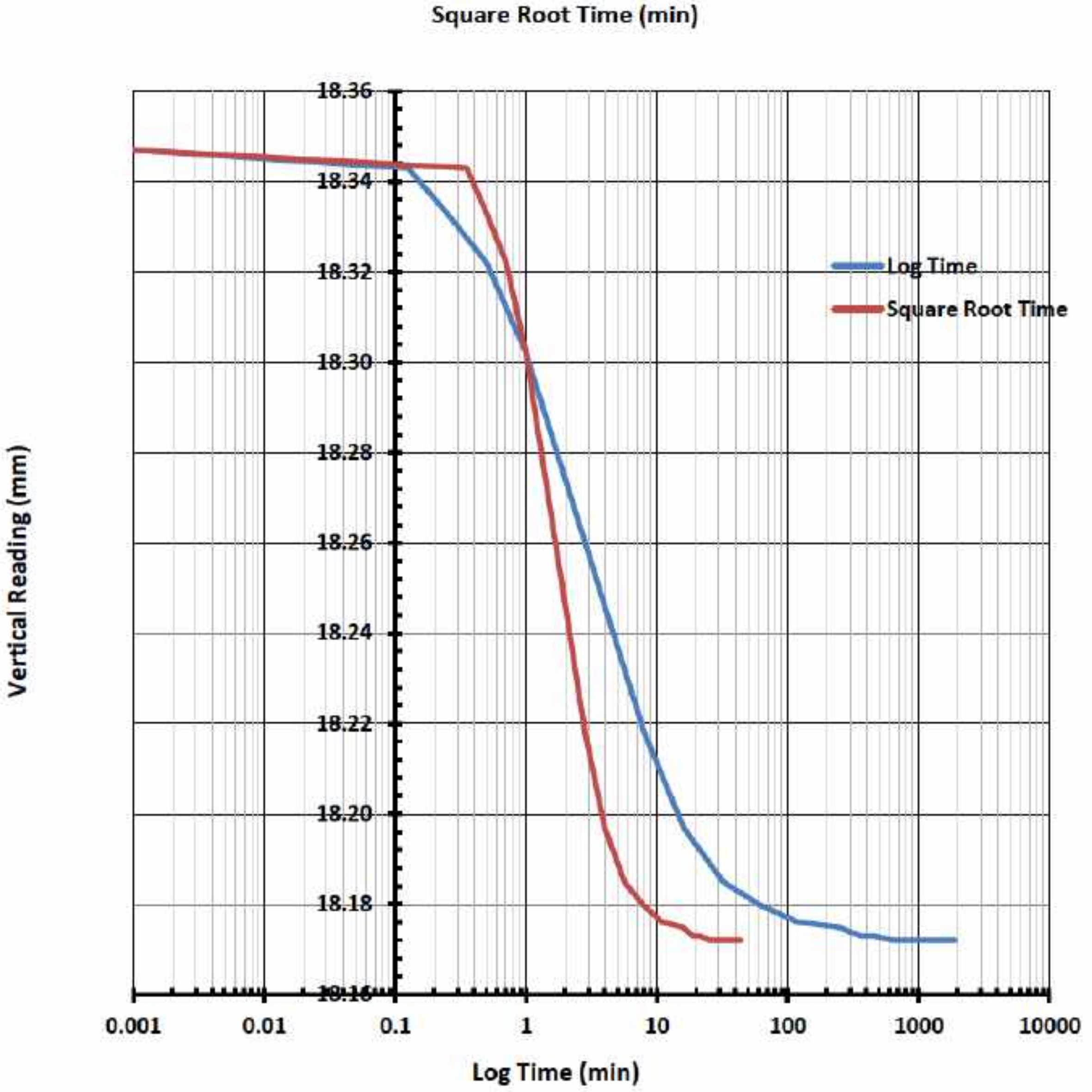
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB05		
Lab ID:	BH01-CB05_OED	Lab:	EPLab
Depth (m):	16.25	Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa



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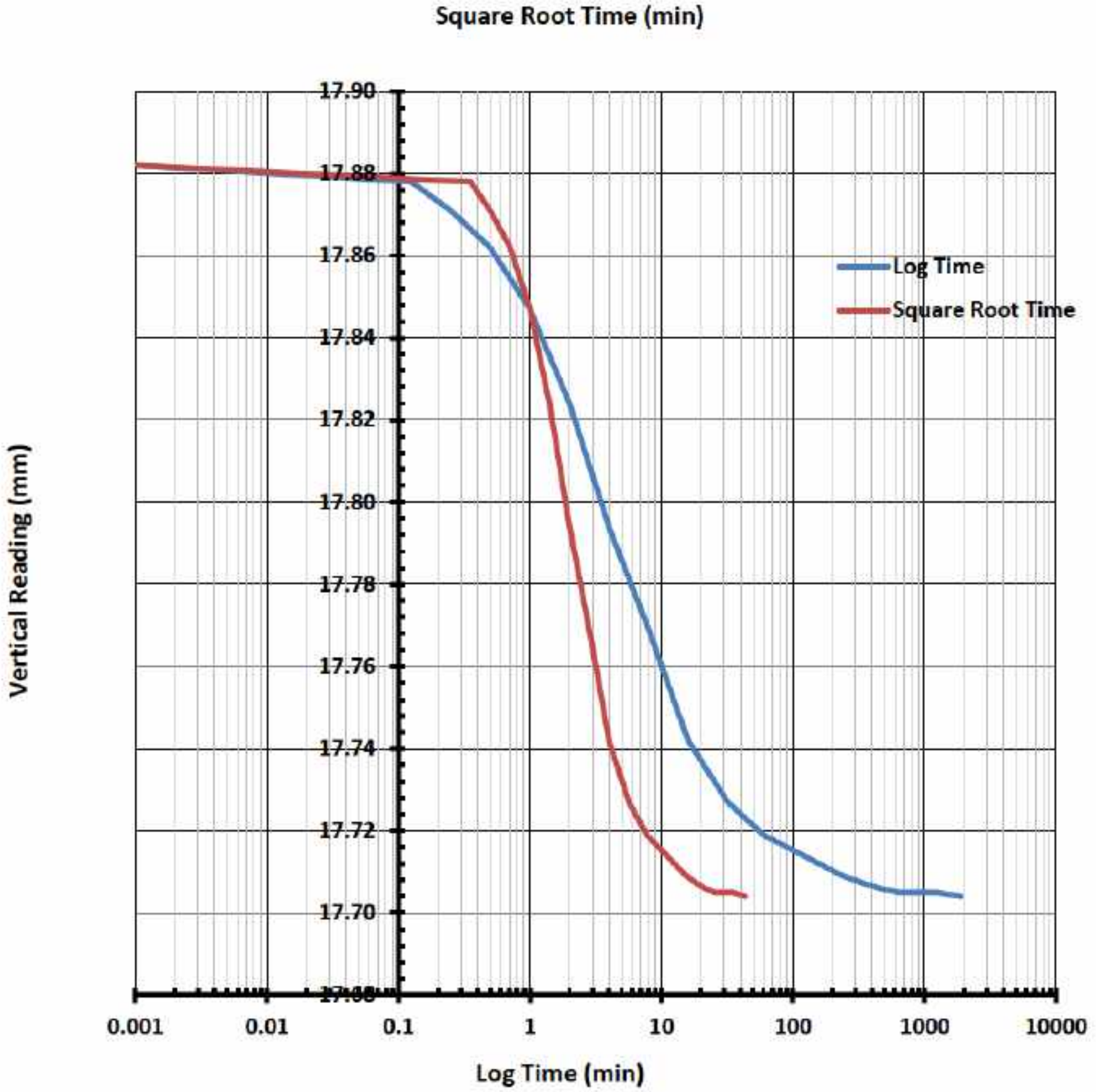
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-CB05		
Lab ID:	BH01-CB05_OED	Lab:	EPLab
Depth (m):	16.25	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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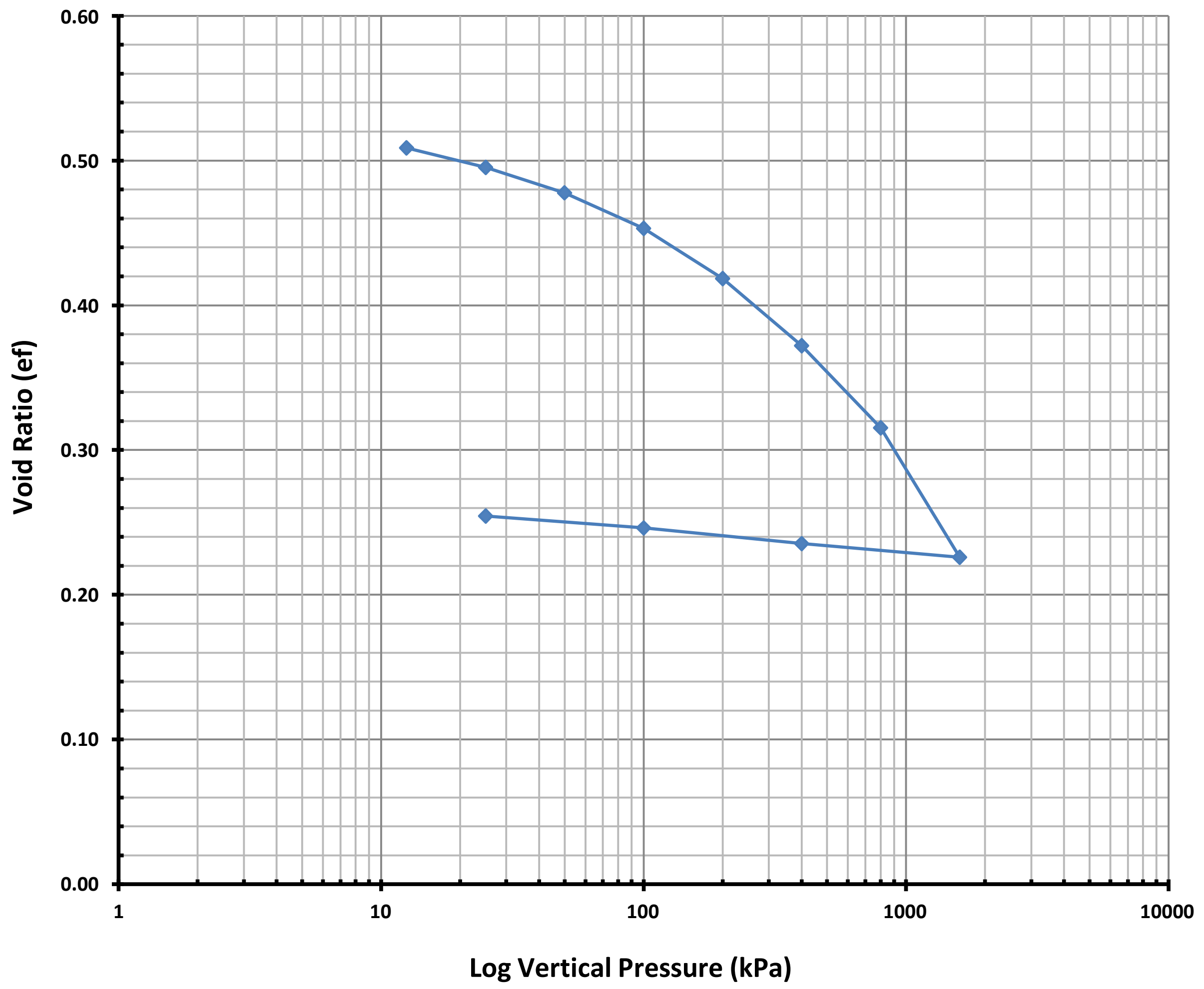
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-UDS02		
Lab ID:	BH01-UDS02-OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Tested by:	Phil	Initial Moisture (%):	27.97	Test Condition:	Undrained
Height (mm):	20.04	Final Moisture Content (%):	32.67	Sample Condition:	Saturated
Diameter (mm):	61.80	Bulk Density (t/m³):	2.16	Particle Density (t/m³):	2.584
Direction:	Vertical	Dry Density (t/m³):	1.69	Initial Void Ratio (e_i):	0.529

Void Ratio (e_f) Vs Log of Vertical Pressure (kPa)



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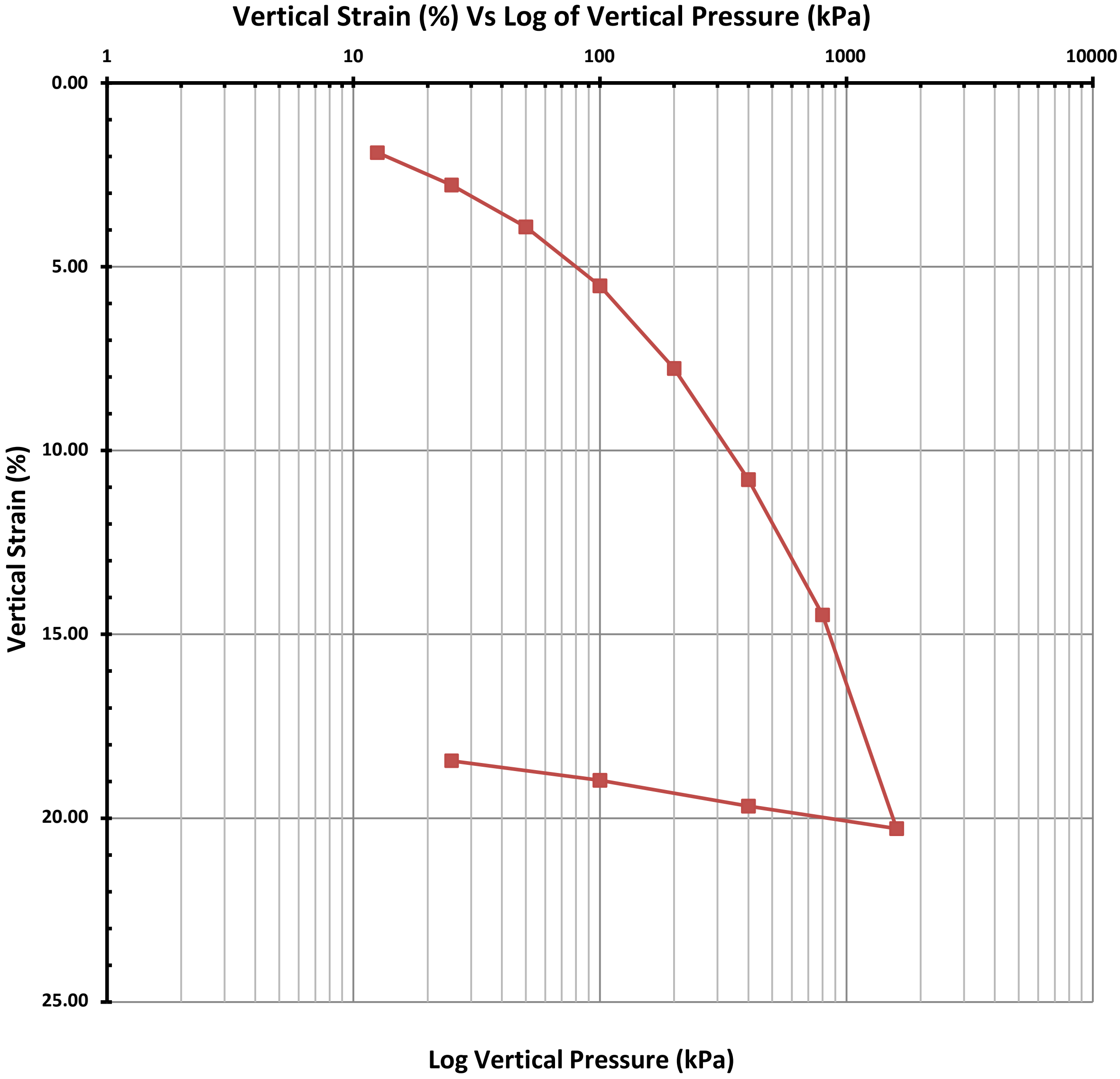
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-UDS02		
Lab ID:	BH01-UDS02-OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C



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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-UDS02		
Lab ID:	BH01-UDS02-OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Test Results

*

Stages	Vert Disp (mm)	Cv (m^2/yr)		Compressibility Mv (m^2/kN)	K (m/s)		Void Ratio (e_f)	Vertical Strain (%)
		*t_{50}	t_{90}					
Stage 1 @ 12.5kPa	0.380	5.057	-	1.52E-03	2.4E-09		0.509	1.90
Stage 2 @ 25kPa	0.556	3.303	-	7.16E-04	7.4E-10		0.495	2.77
Stage 3 @ 50kPa	0.785	2.422	-	4.70E-04	3.5E-10		0.478	3.92
Stage 4 @ 100kPa	1.106	1.564	-	3.33E-04	1.6E-10		0.453	5.52
Stage 5 @ 200kPa	1.557	0.996	-	2.38E-04	7.4E-11		0.418	7.77
Stage 6 @ 400kPa	2.162	0.842	-	1.64E-04	4.3E-11		0.372	10.79
Stage 7 @ 800kPa	2.900	0.773	-	1.03E-04	2.5E-11		0.315	14.47
Stage 8 @ 1600kPa	4.065	0.677	-	8.50E-05	1.8E-11		0.226	20.28
Unload @ 400kPa	3.943							
Unload @ 100kPa	3.802							
Unload @ 25kPa	3.695							

** Values interpreted via lab only*

Comments: **Samples collected from Shelby tubes**
Cv values to be interpreted via Engineer

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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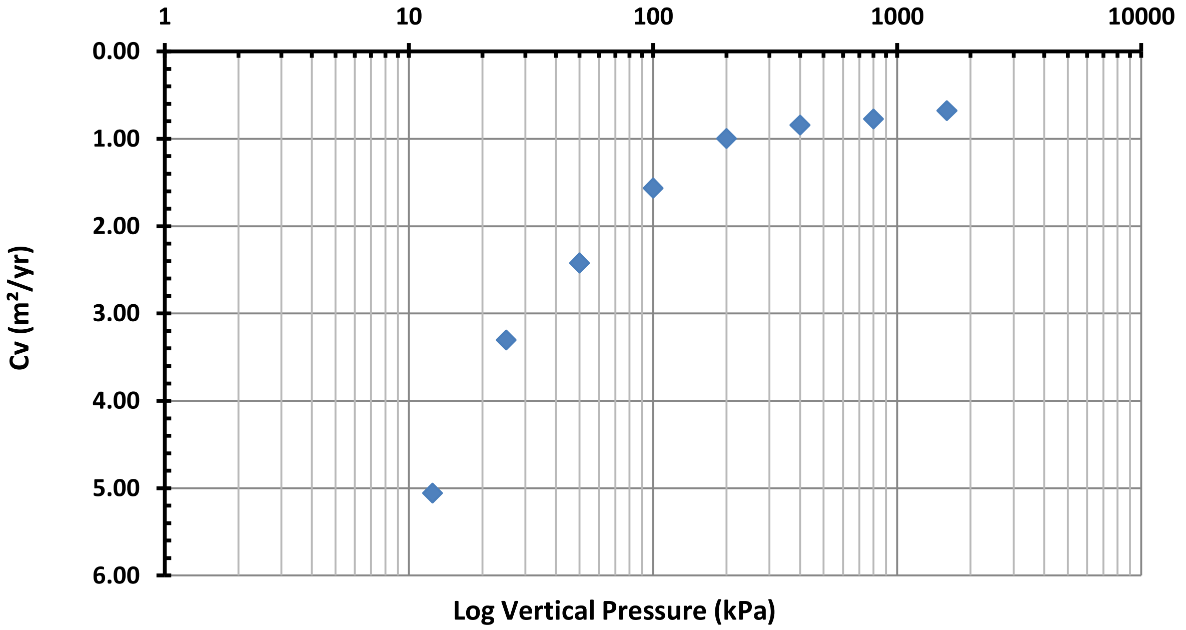
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

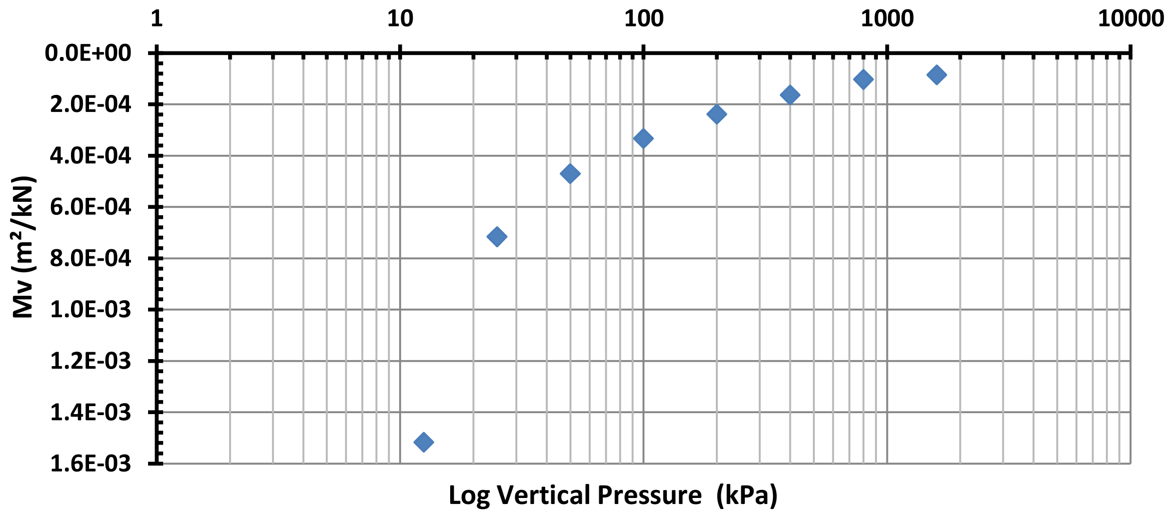
Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-UDS02		
Lab ID:	BH01-UDS02-OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Cv (m²/yr) Vs Log of Vertical Pressure (kPa)



* Plot based on Log (time) data

Mv (m²/kN) Vs Log of Vertical Pressure (kPa)



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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-UDS02		
Lab ID:	BH01-UDS02-OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

<u>TEST RESULTS PLEASE SEE PAGES BELOW</u>

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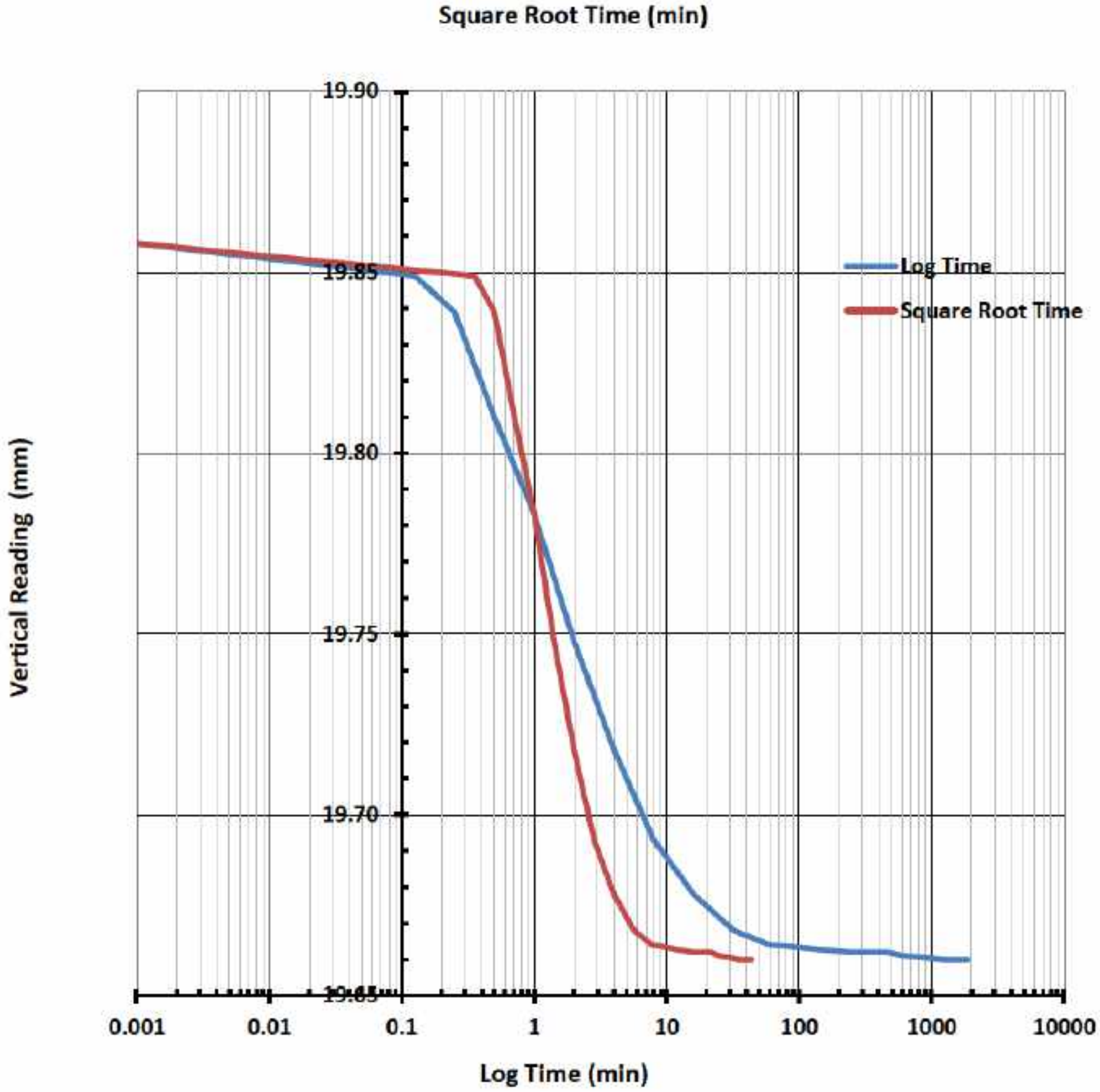
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-UDS02		
Lab ID:	BH01-UDS02-OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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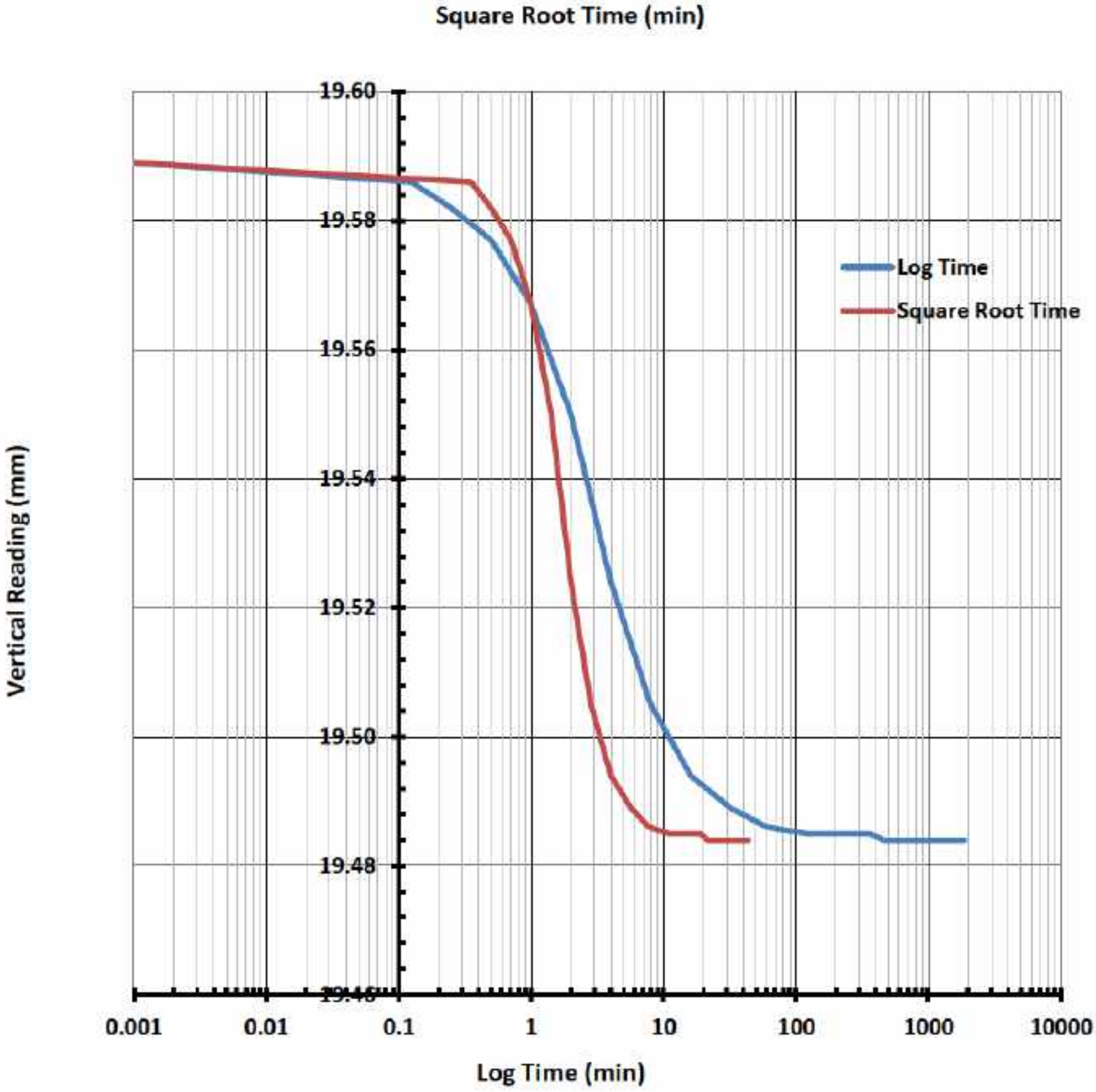
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-UDS02		
Lab ID:	BH01-UDS02-OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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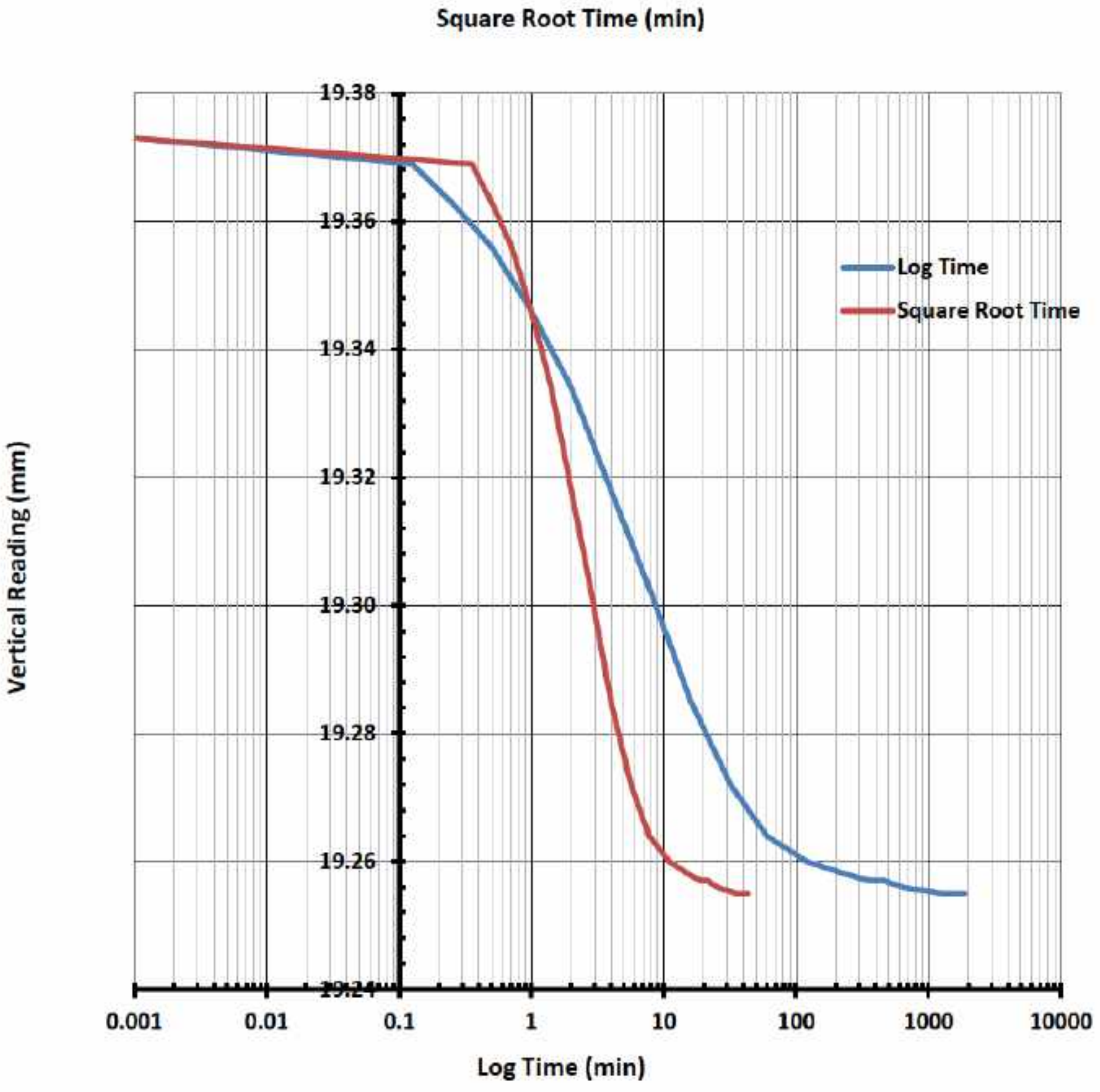
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-UDS02		
Lab ID:	BH01-UDS02-OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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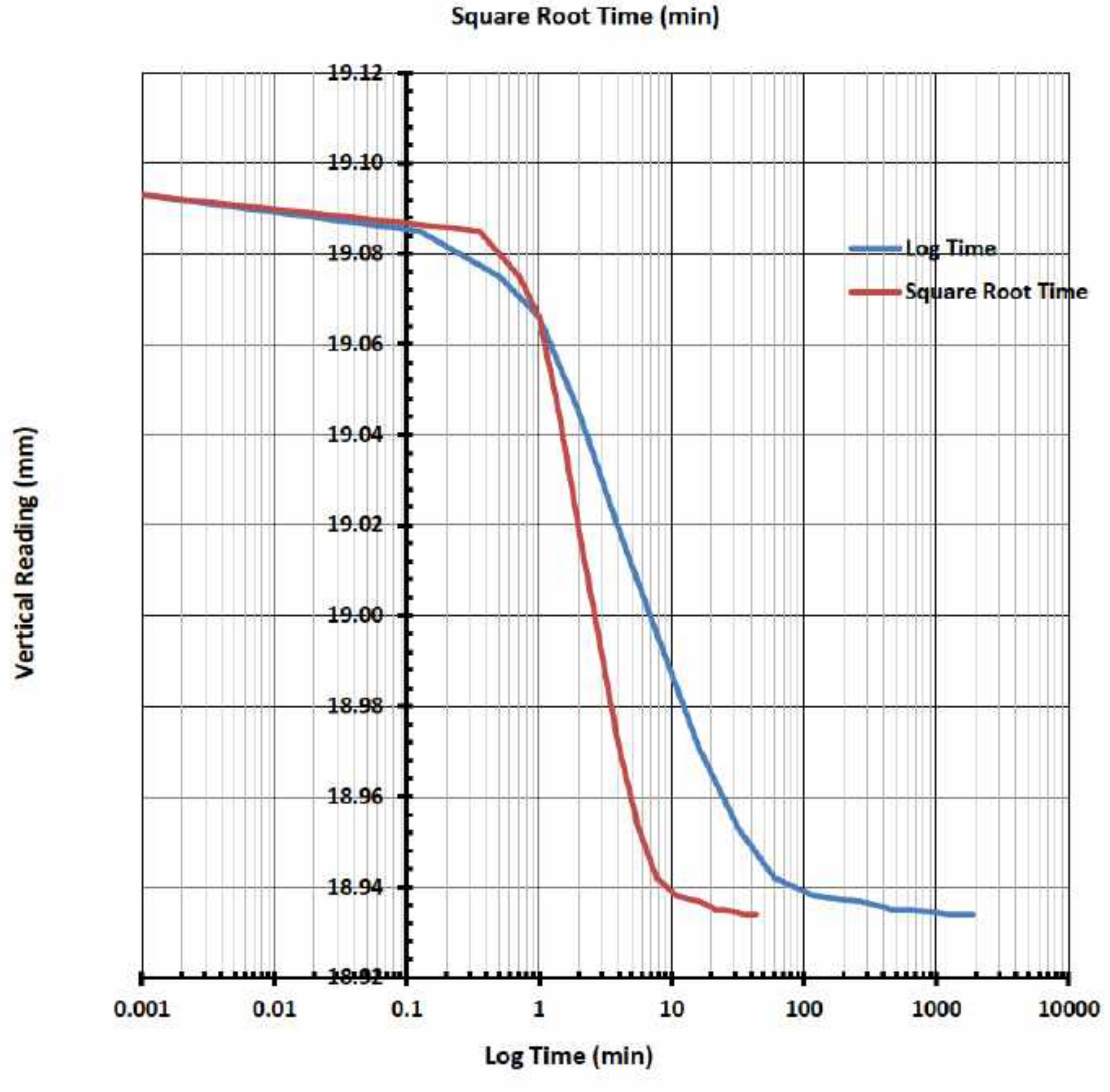
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-UDS02		
Lab ID:	BH01-UDS02-OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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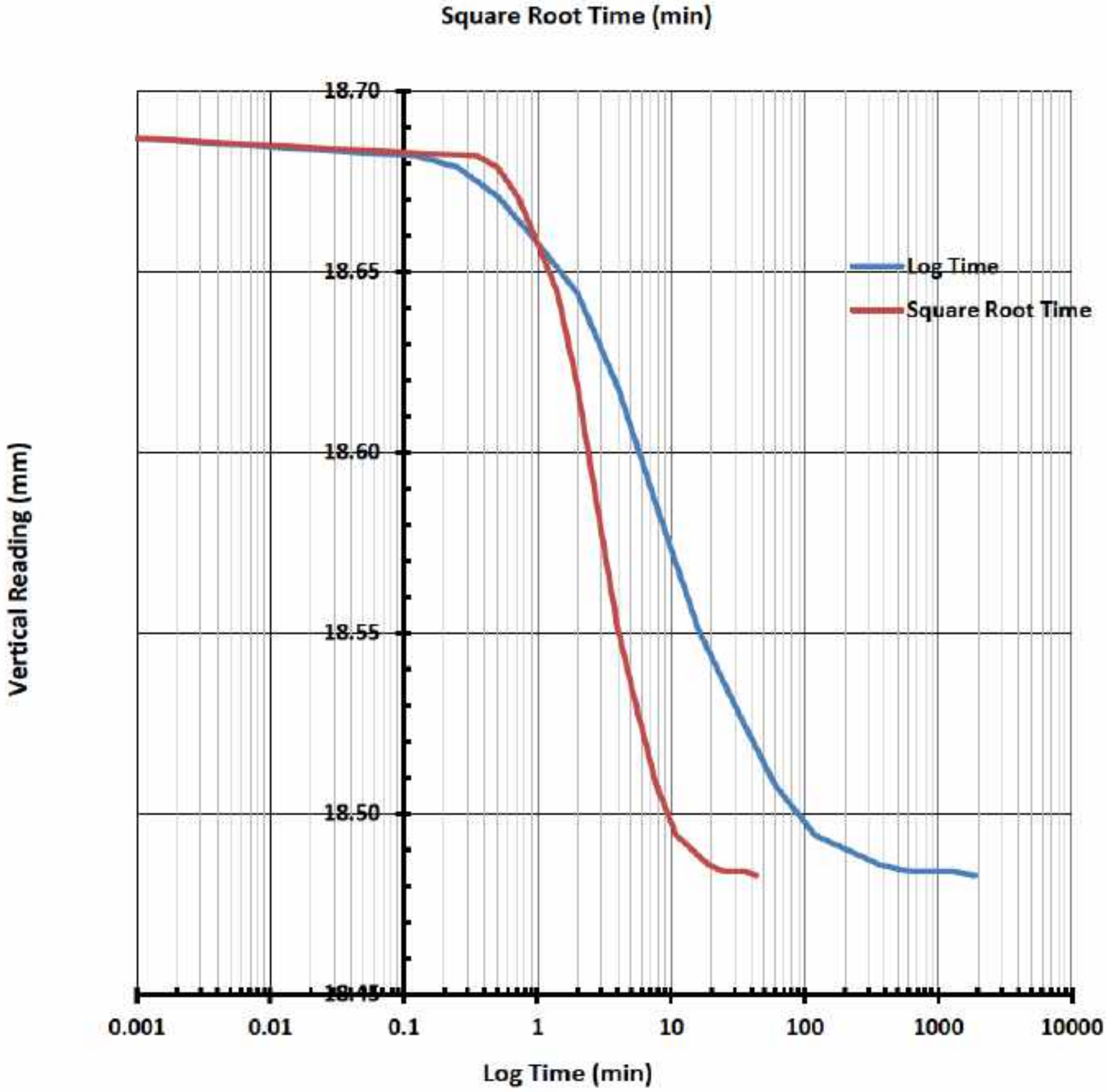
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-UDS02		
Lab ID:	BH01-UDS02-OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa



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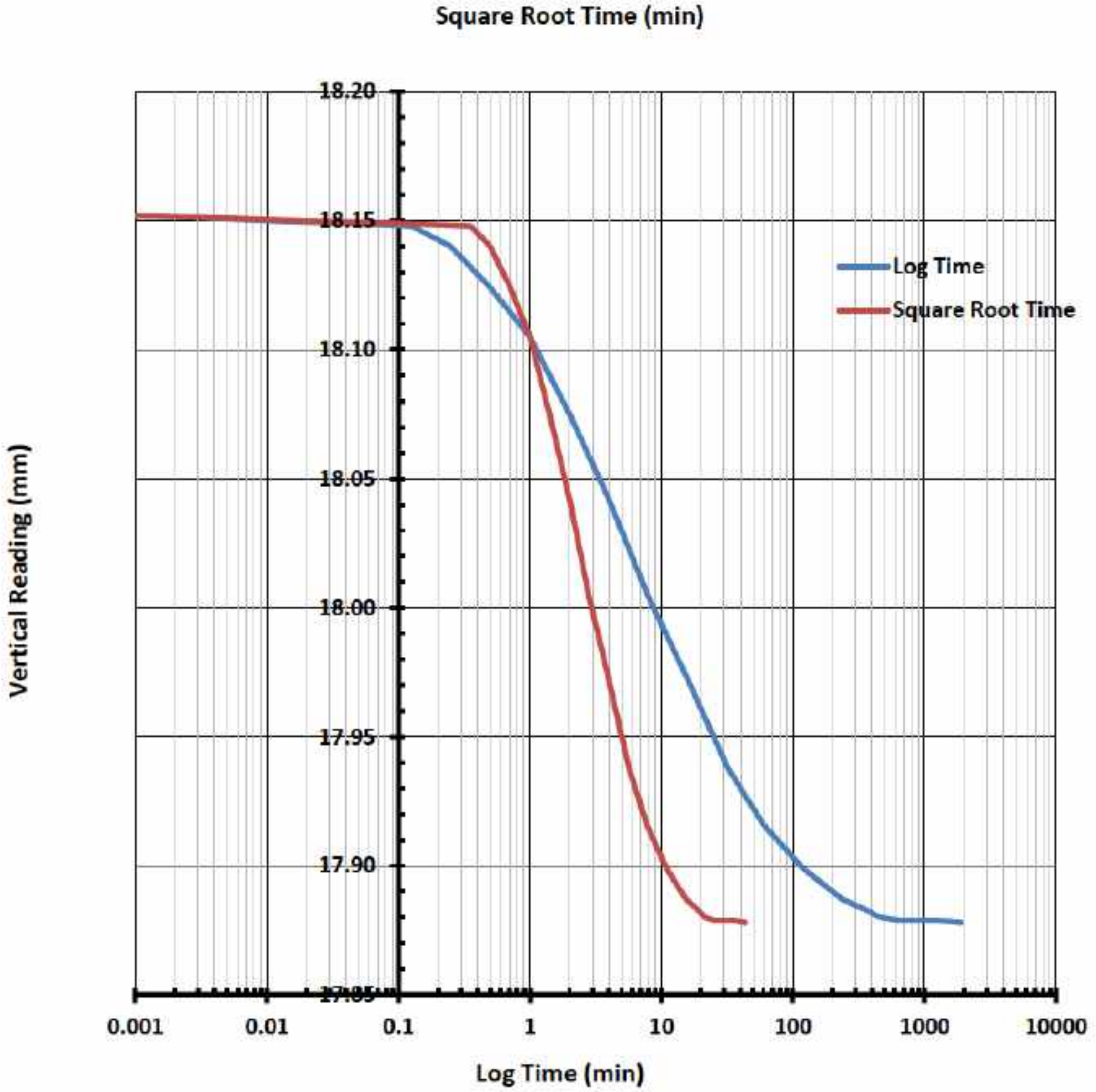
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-UDS02		
Lab ID:	BH01-UDS02-OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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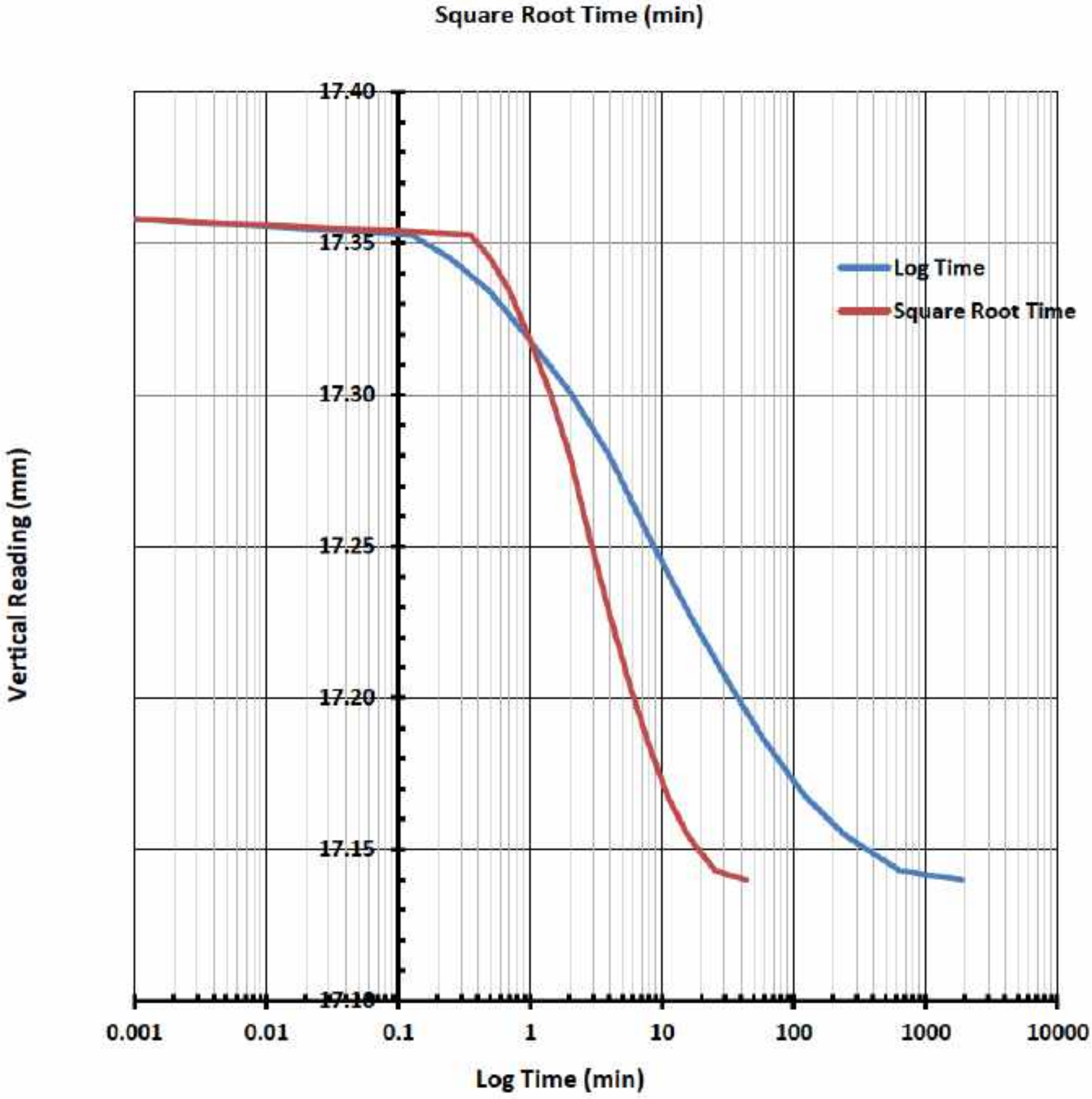
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-UDS02		
Lab ID:	BH01-UDS02-OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa



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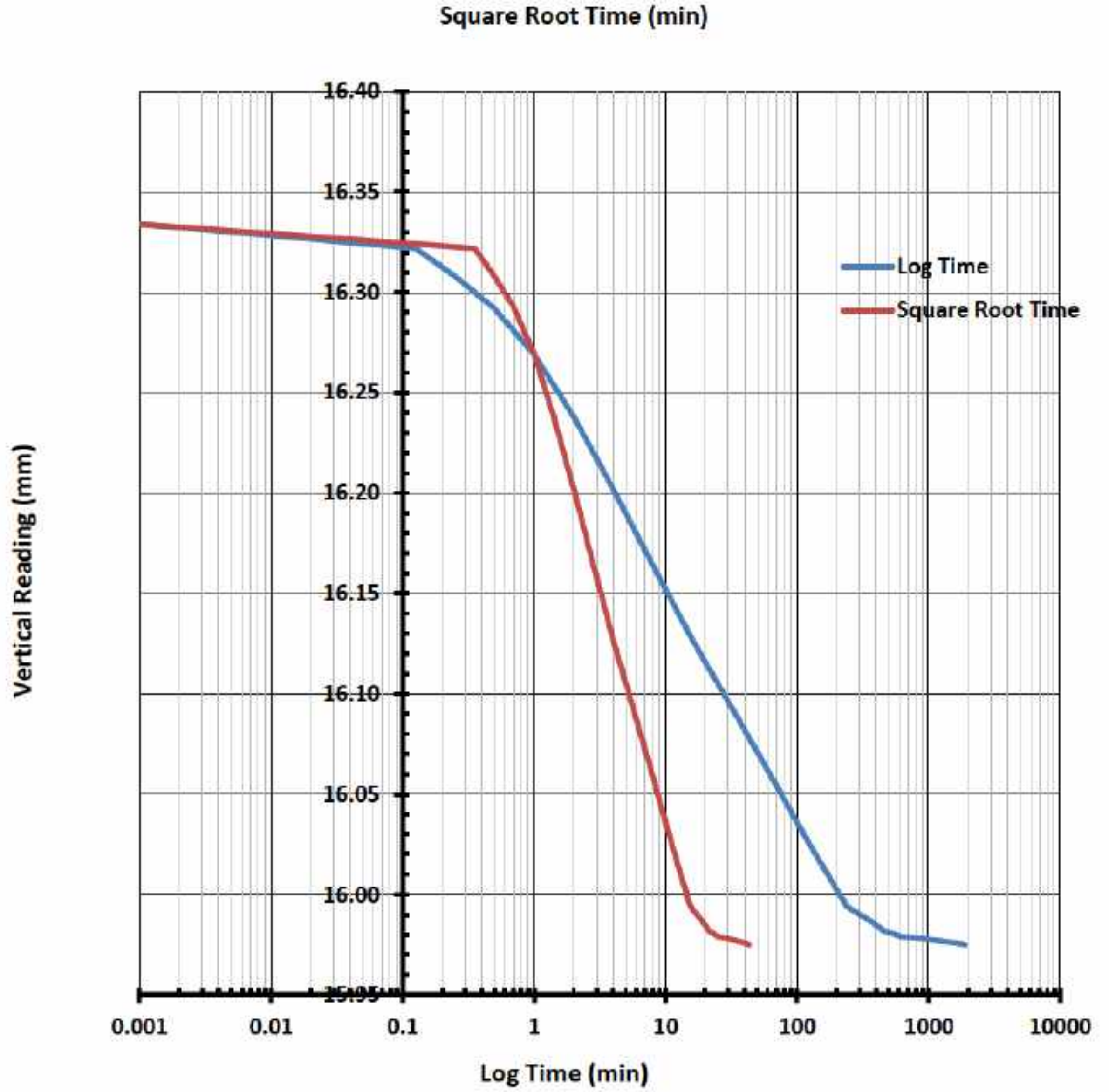
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH01-UDS02		
Lab ID:	BH01-UDS02-OED	Lab:	EPLab
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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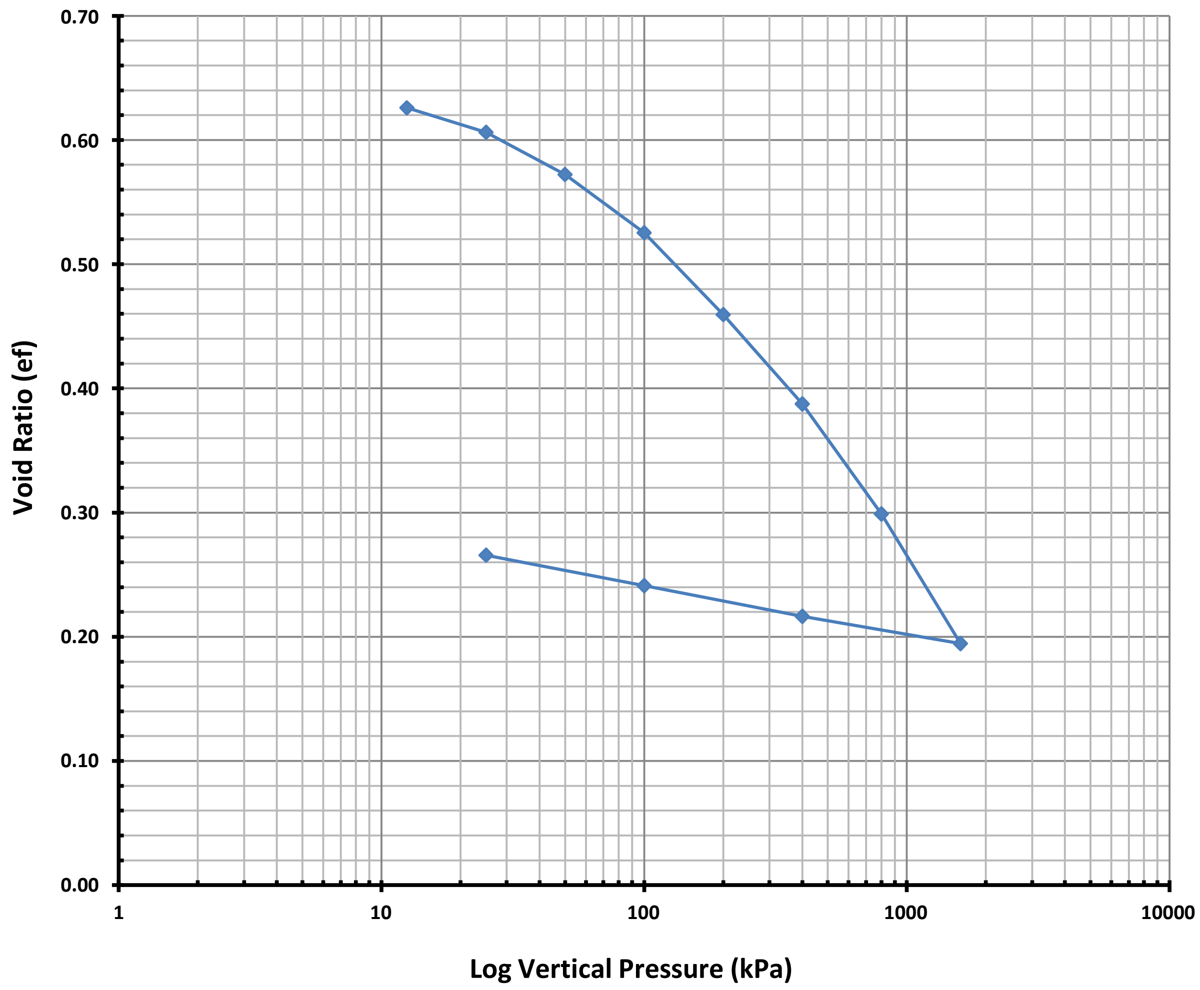
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS02		
Lab ID:	BH02-UDS02_OED	Lab:	EPLab
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 19°C

Tested by:	Phil	Initial Moisture (%):	34.57	Test Condition:	Undrained
Height (mm):	20.03	Final Moisture Content (%):	34.13	Sample Condition:	Saturated
Diameter (mm):	61.80	Bulk Density (t/m³):	1.93	Particle Density (t/m³):	2.365
Direction:	Vertical	Dry Density (t/m³):	1.43	Initial Void Ratio (e_i):	0.648

Void Ratio (e_f) Vs Log of Vertical Pressure (kPa)



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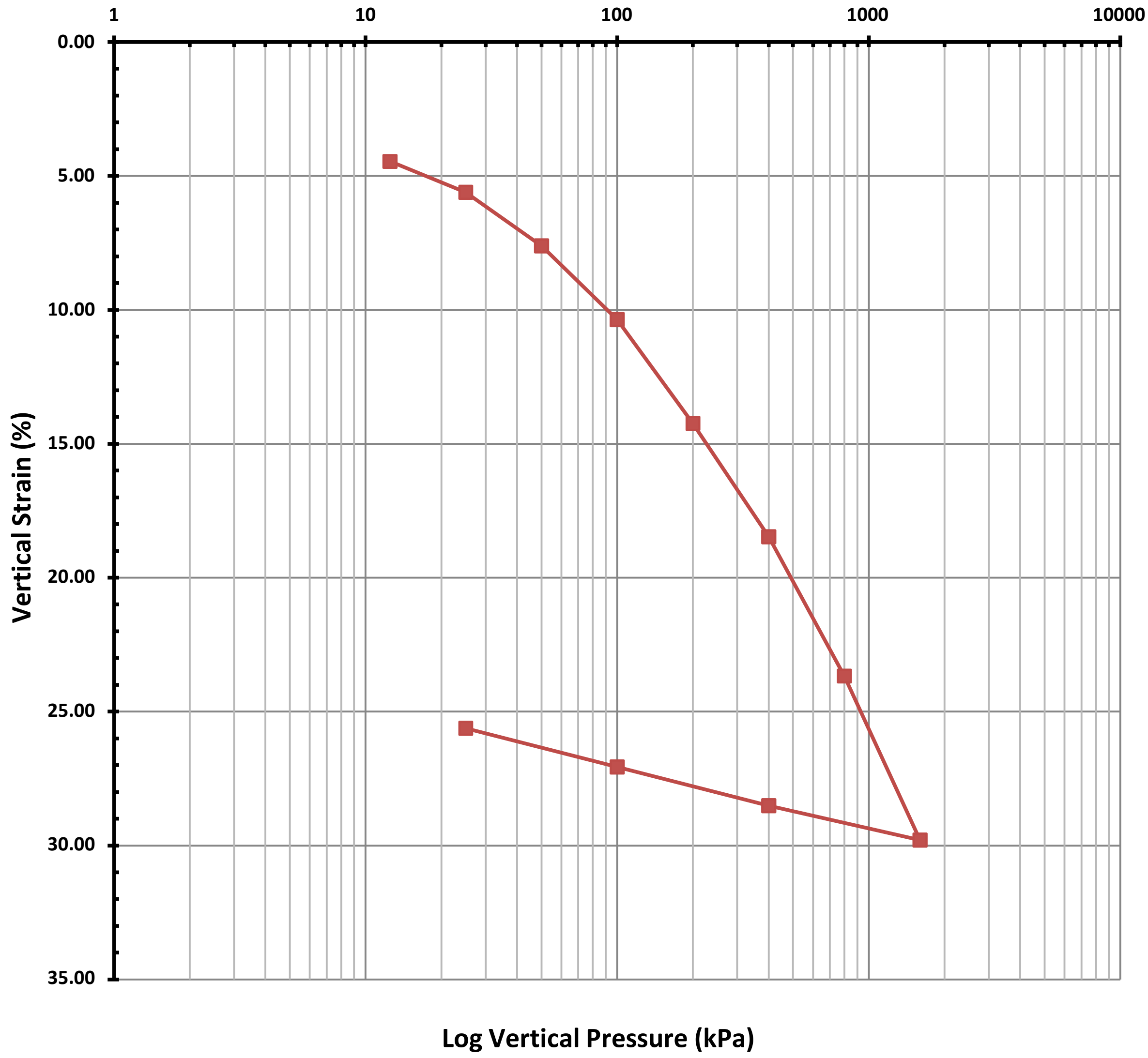
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS02		
Lab ID:	BH02-UDS02_OED	Lab:	EPLab
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 19°c

Vertical Strain (%) Vs Log of Vertical Pressure (kPa)



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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS02		
Lab ID:	BH02-UDS02_OED	Lab:	EPLab
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 19°C

Test Results

*

Stages	Vert Disp (mm)	Cv (m²/yr) *t_{50}	Cv (m²/yr) t_{90}	Compressibility Mv (m²/kN)	K (m/s)		Void Ratio (e_f)	Vertical Strain (%)
Stage 1 @ 12.5kPa	0.893	3.192	-	3.57E-03	3.5E-09		0.626	4.46
Stage 2 @ 25kPa	1.124	1.338	-	9.66E-04	4.0E-10		0.606	5.61
Stage 3 @ 50kPa	1.524	1.795	-	8.46E-04	4.7E-10		0.572	7.61
Stage 4 @ 100kPa	2.076	1.407	-	5.97E-04	2.6E-10		0.525	10.36
Stage 5 @ 200kPa	2.852	0.970	-	4.32E-04	1.3E-10		0.459	14.24
Stage 6 @ 400kPa	3.700	0.779	-	2.47E-04	6.0E-11		0.387	18.47
Stage 7 @ 800kPa	4.742	0.622	-	1.60E-04	3.1E-11		0.299	23.67
Stage 8 @ 1600kPa	5.969	0.533	-	1.00E-04	1.7E-11		0.195	29.80
Unload @ 400kPa	5.712							
Unload @ 100kPa	5.421							
Unload @ 25kPa	5.132							

** Values interpreted via lab only*

Comments: **Samples collected from Shelby tubes**
Cv values to be interpreted via Engineer

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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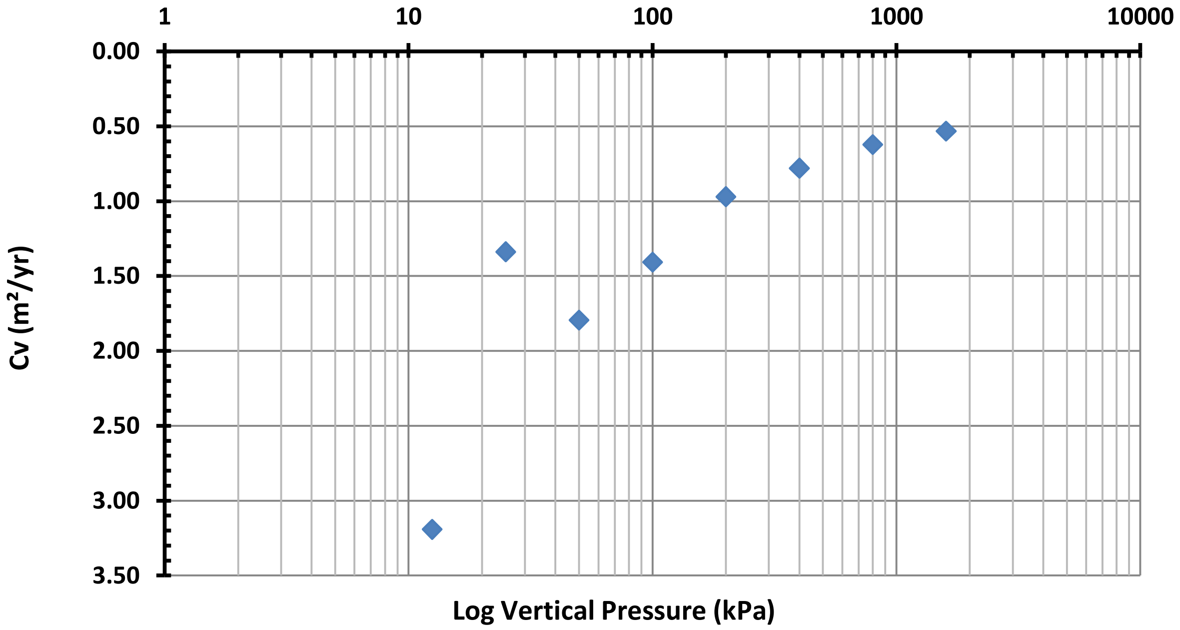
E-PRECISION LABORATORY

CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

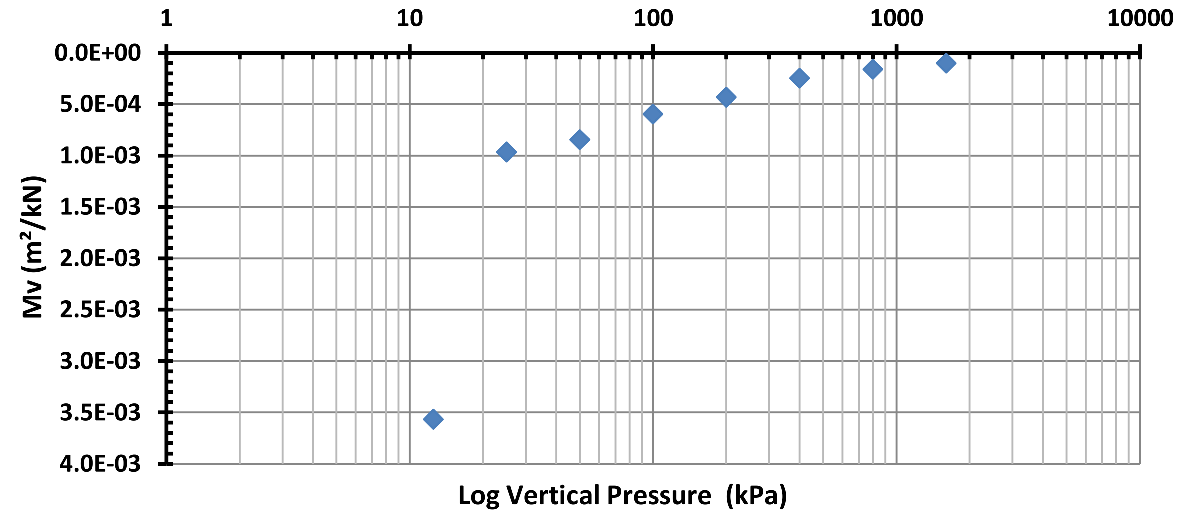
Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS02		
Lab ID:	BH02-UDS02_OED	Lab:	EPLab
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 19°C

Cv (m²/yr) Vs Log of Vertical Pressure (kPa)



* Plot based on Log (time) data

Mv (m²/kN) Vs Log of Vertical Pressure (kPa)



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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS02		
Lab ID:	BH02-UDS02_OED	Lab:	EPLab
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 19°C

TEST RESULTS PLEASE SEE PAGES BELOW

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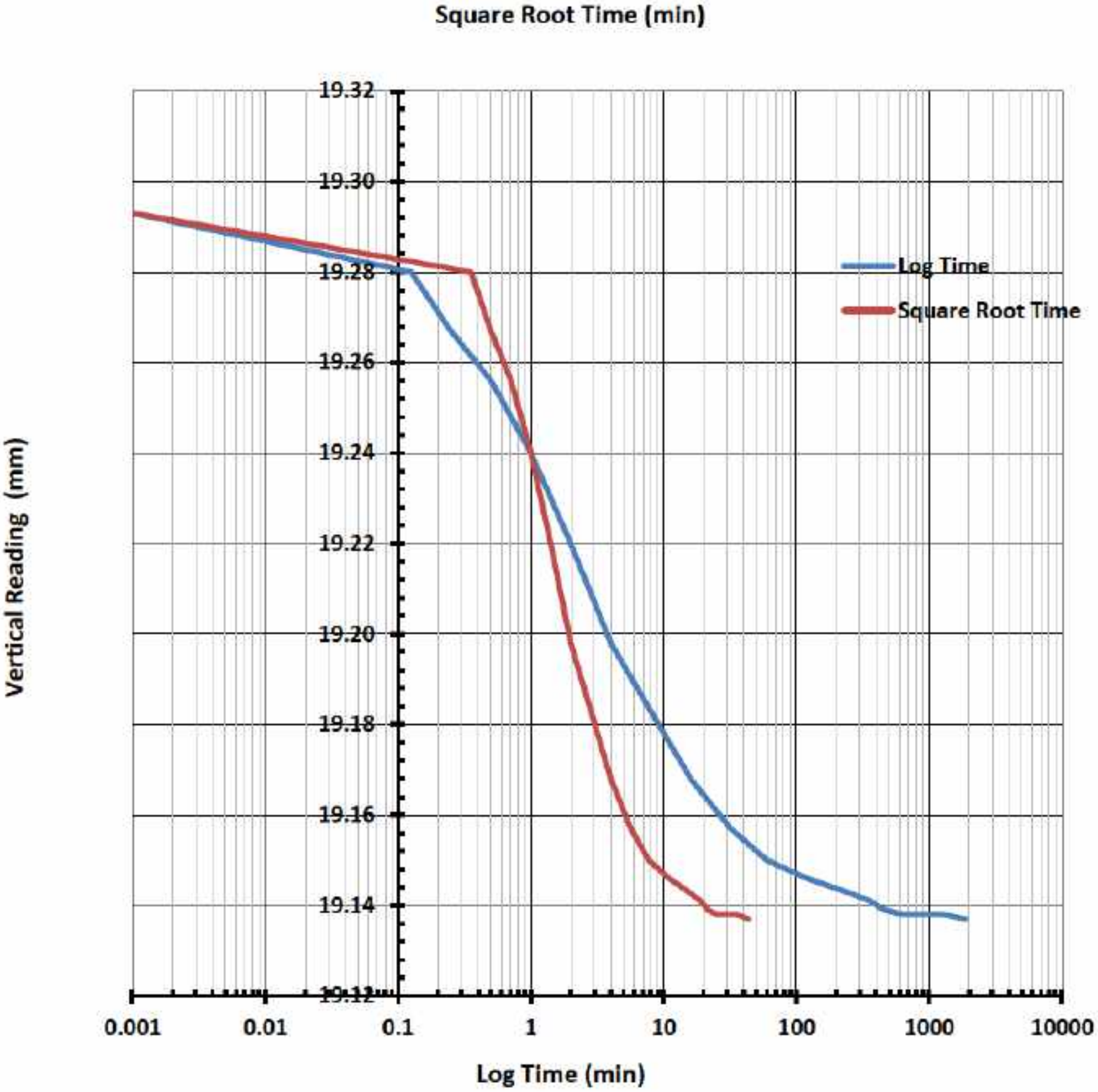
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS02		
Lab ID:	BH02-UDS02_OED	Lab:	EPLab
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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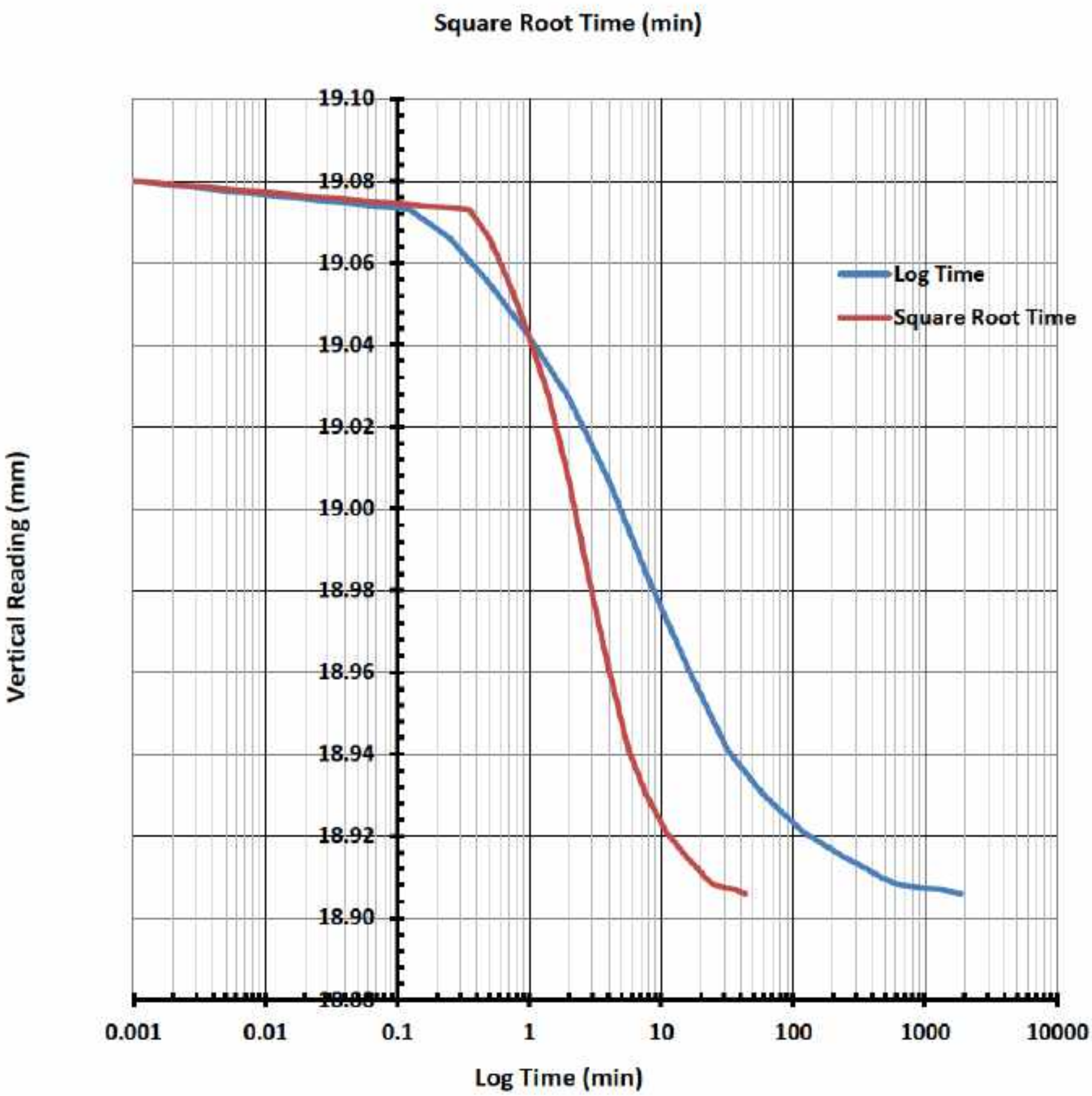
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS02		
Lab ID:	BH02-UDS02_OED	Lab:	EPLab
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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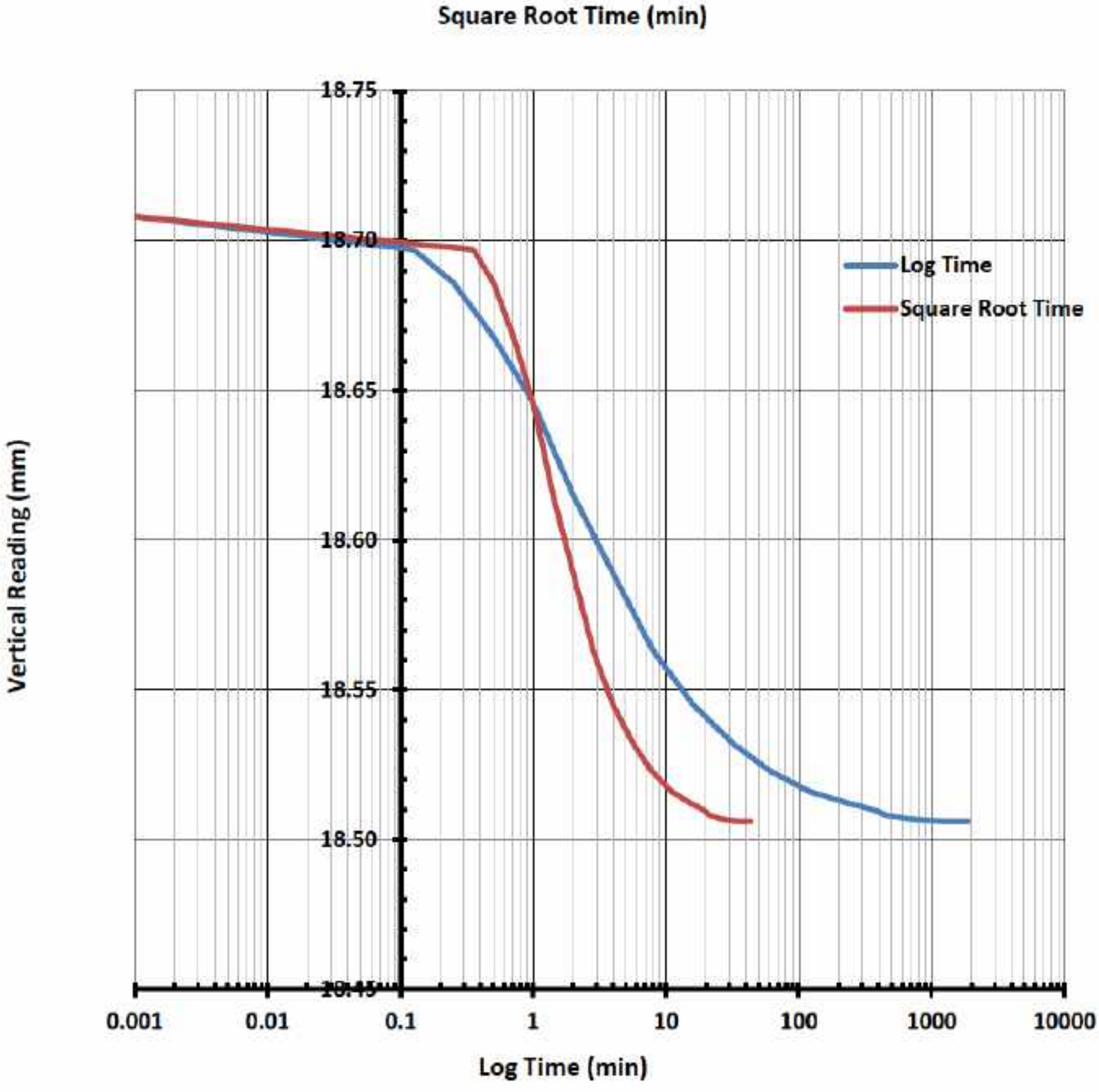
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS02		
Lab ID:	BH02-UDS02_OED	Lab:	EPLab
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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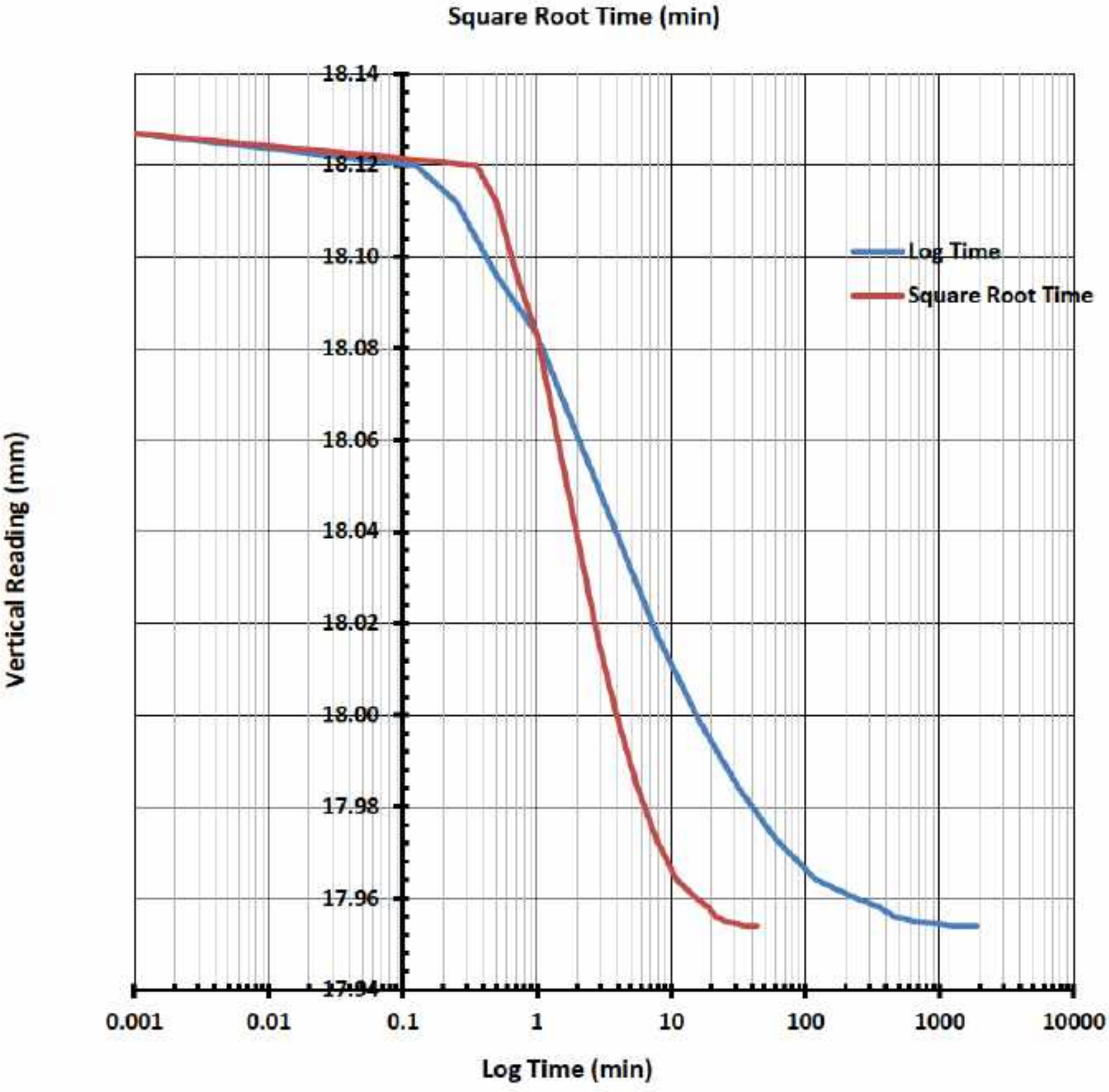
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS02		
Lab ID:	BH02-UDS02_OED	Lab:	EPLab
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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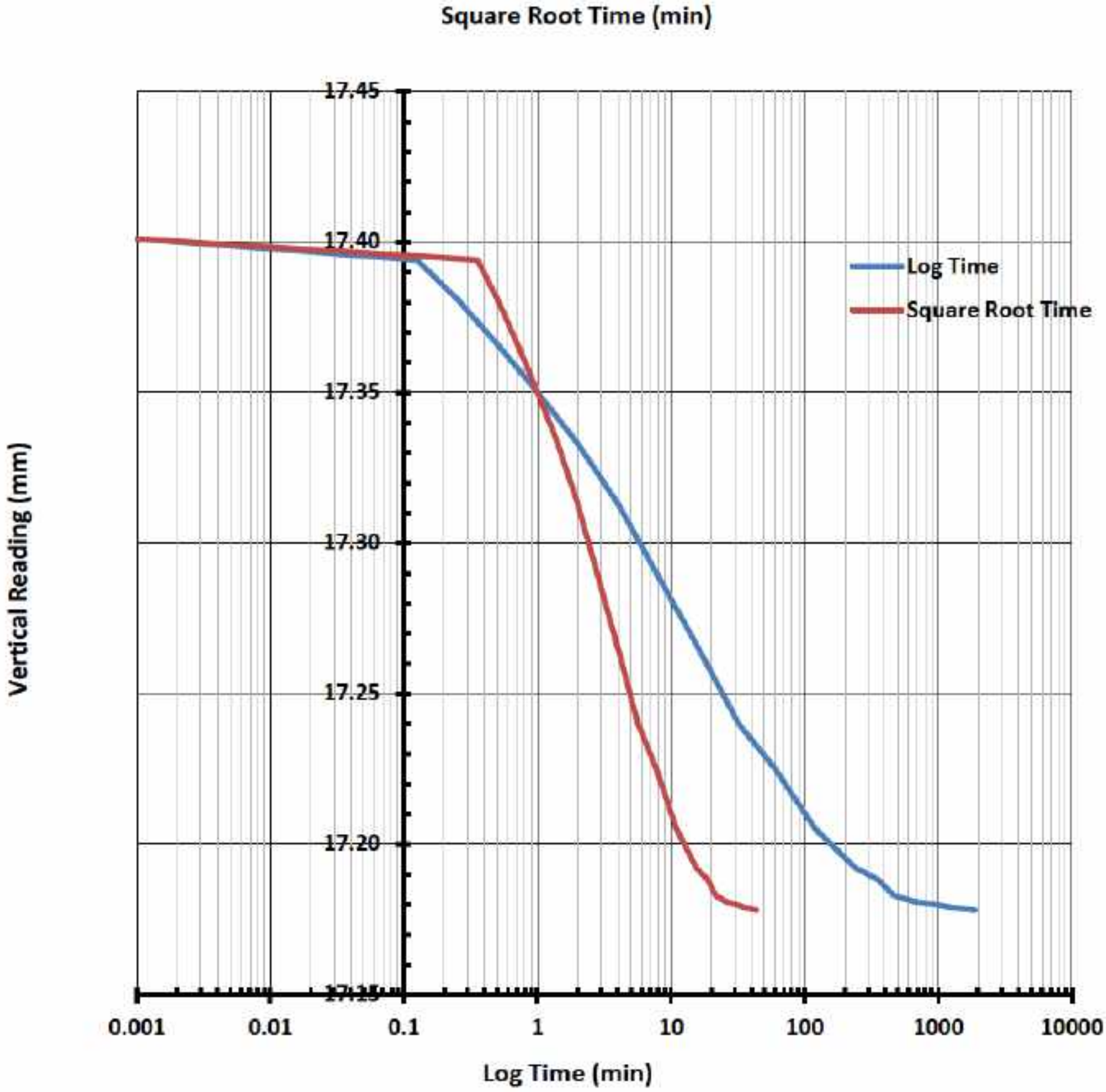
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS02		
Lab ID:	BH02-UDS02_OED	Lab:	EPLab
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa



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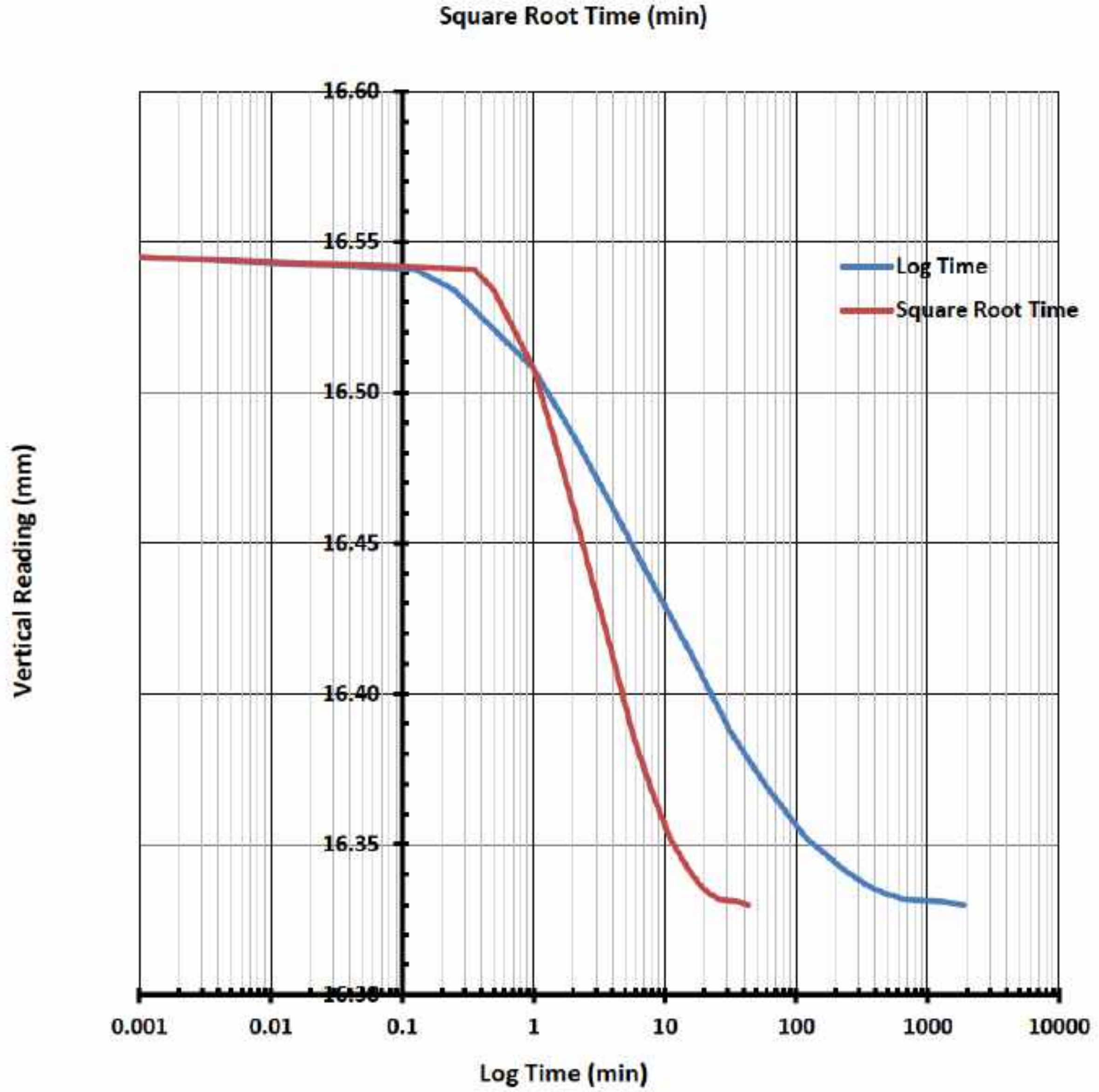
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS02		
Lab ID:	BH02-UDS02_OED	Lab:	EPLab
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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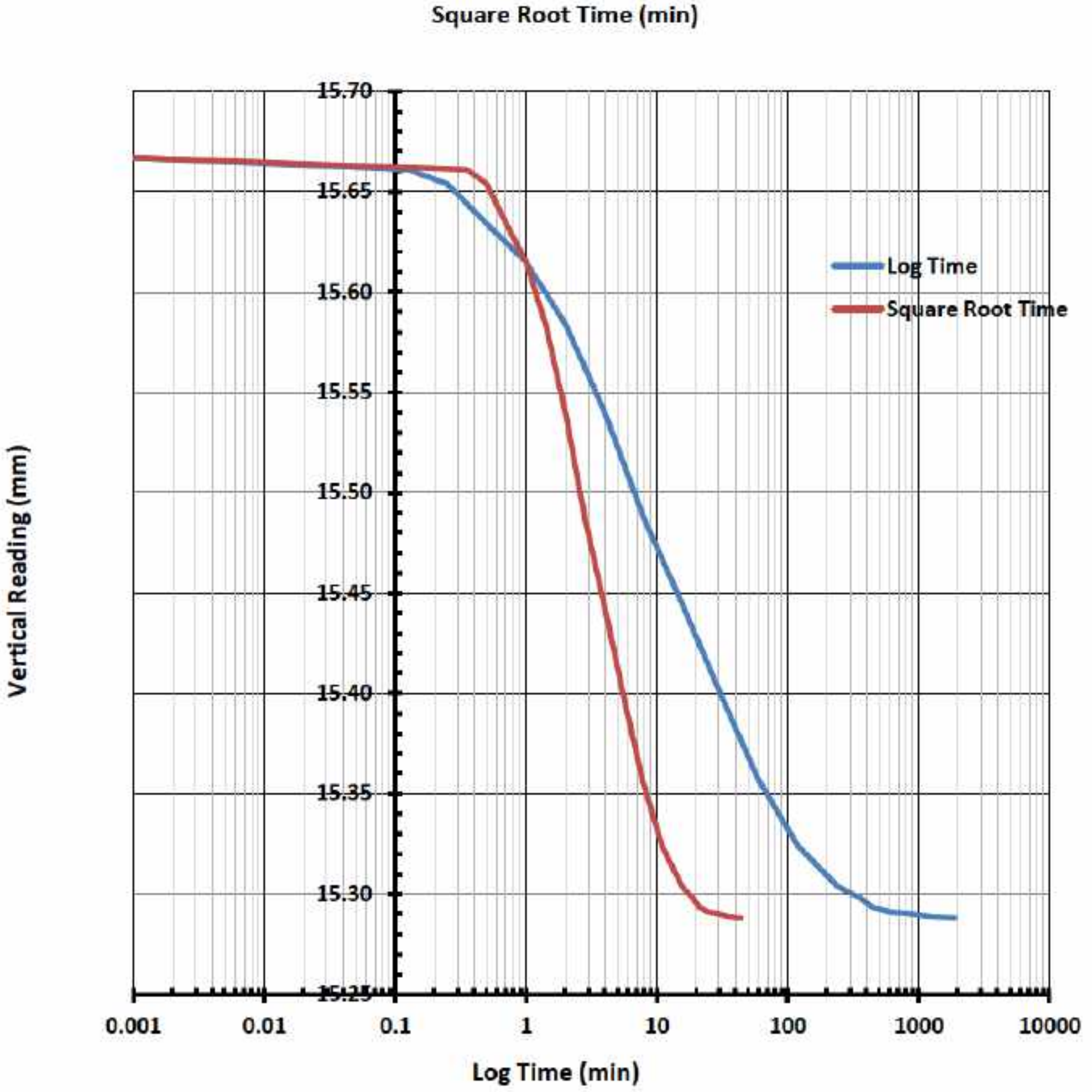
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS02		
Lab ID:	BH02-UDS02_OED	Lab:	EPLab
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa



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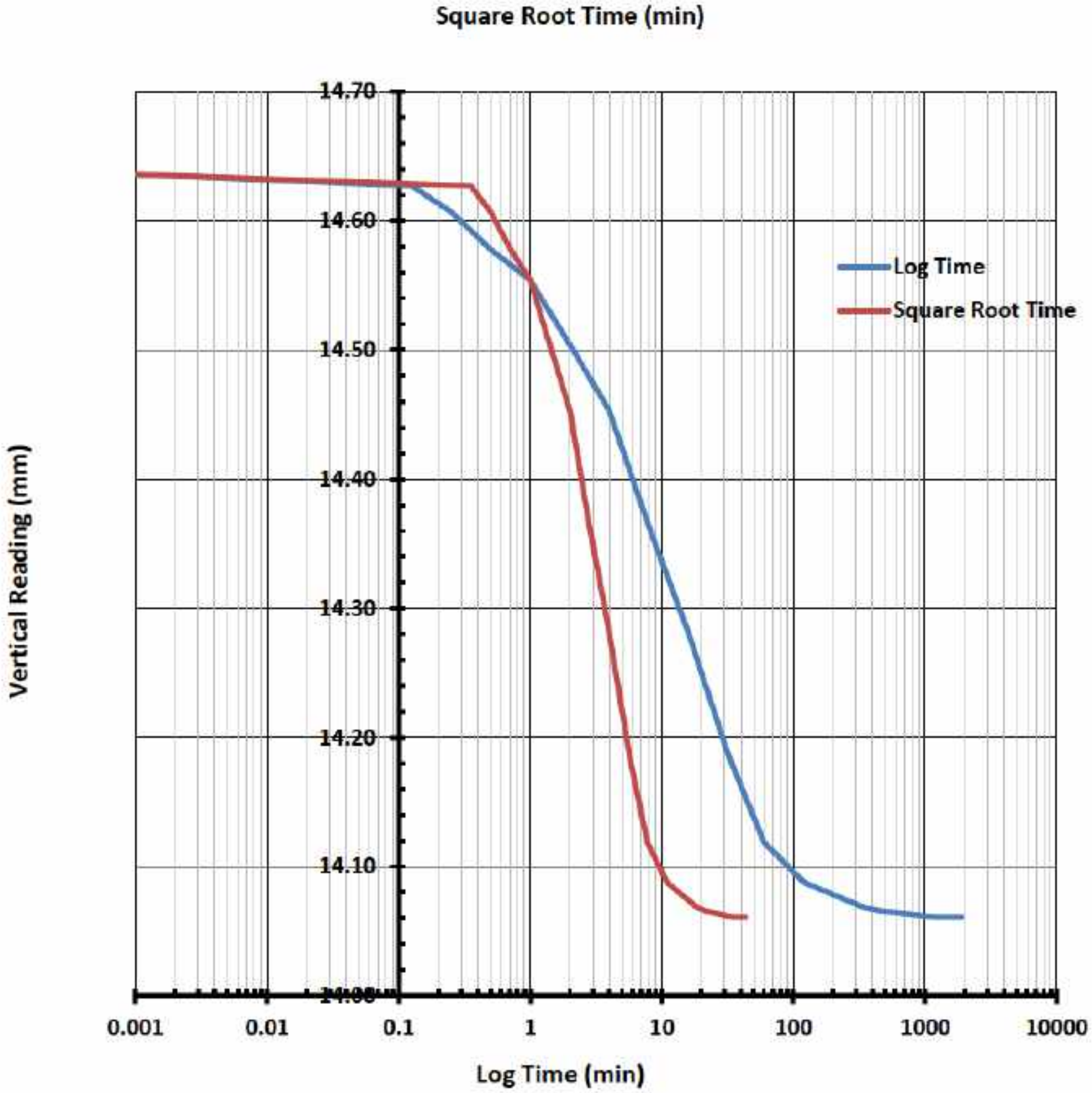
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS02		
Lab ID:	BH02-UDS02_OED	Lab:	EPLab
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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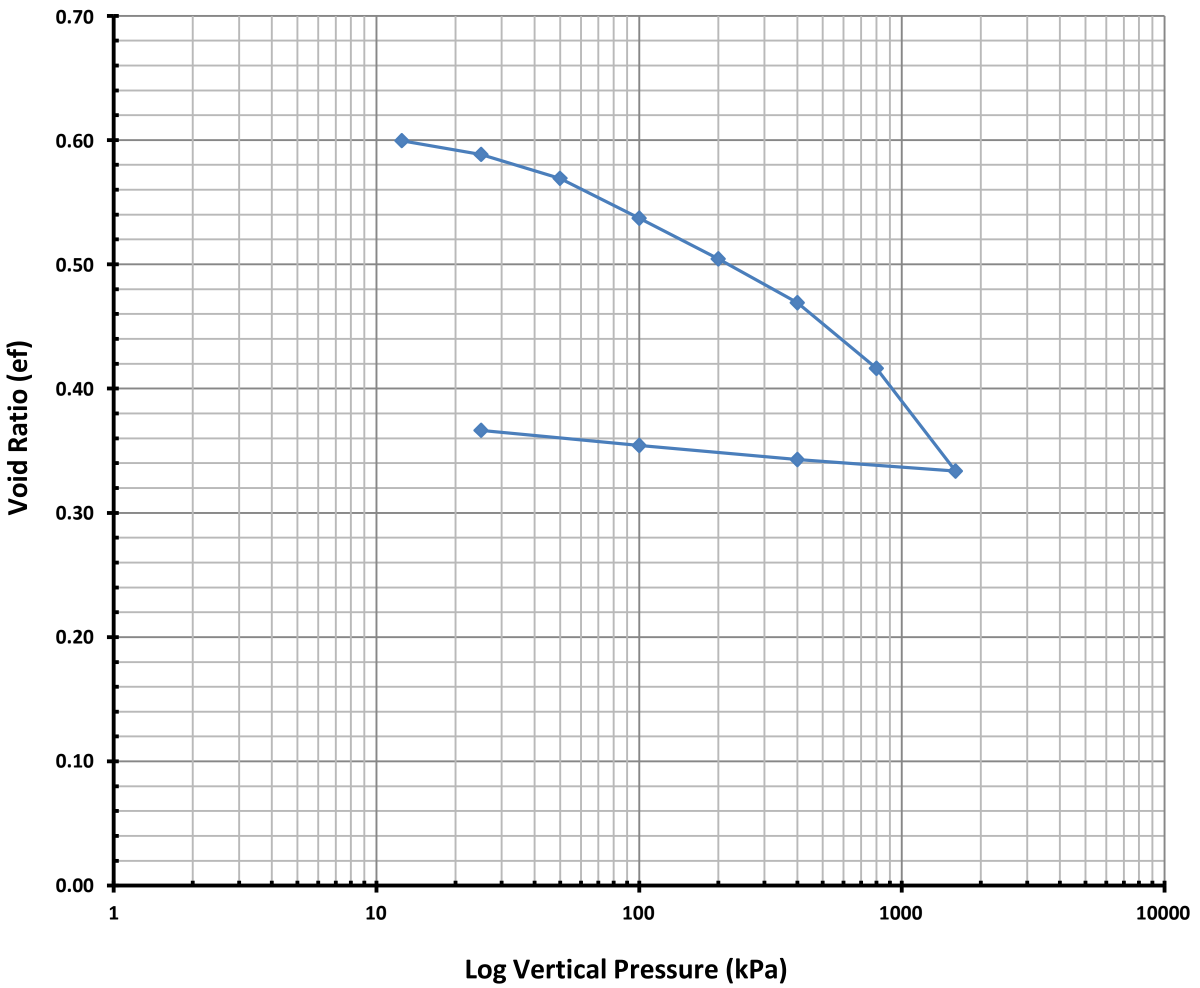
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS03		
Lab ID:	BH02-UDS03_OED	Lab:	EPLab
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 19°C

Tested by:	Phil	Initial Moisture (%):	28.42	Test Condition:	Undrained
Height (mm):	20.23	Final Moisture Content (%):	33.33	Sample Condition:	Saturated
Diameter (mm):	61.38	Bulk Density (t/m³):	1.87	Particle Density (t/m³):	2.347
Direction:	Vertical	Dry Density (t/m³):	1.46	Initial Void Ratio (e_i):	0.611

Void Ratio (e_f) Vs Log of Vertical Pressure (kPa)



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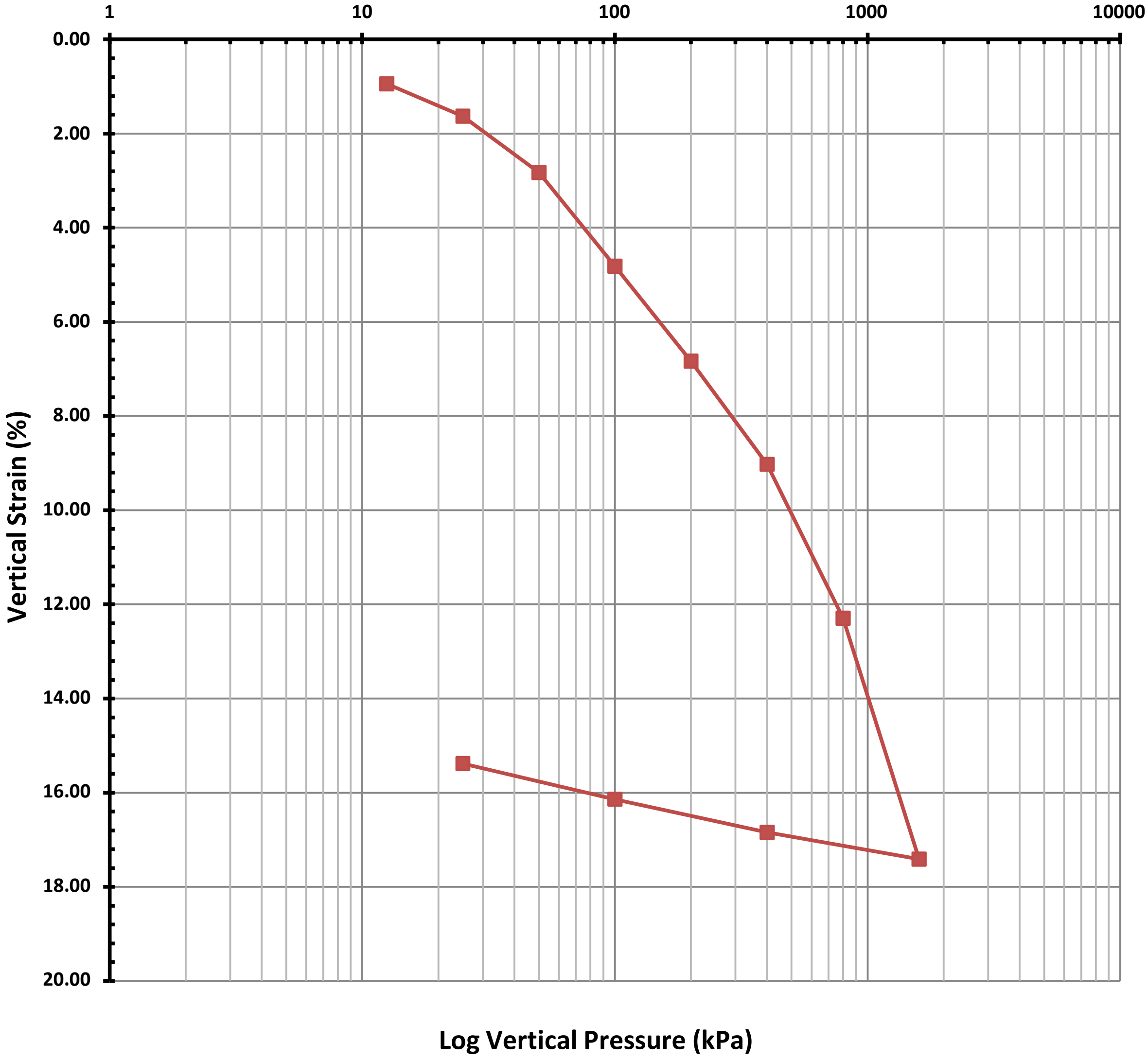
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS03		
Lab ID:	BH02-UDS03_OED	Lab:	EPLab
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 19°c

Vertical Strain (%) Vs Log of Vertical Pressure (kPa)



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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS03		
Lab ID:	BH02-UDS03_OED	Lab:	EPLab
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 19°C

Test Results

*

Stages	Vert Disp (mm)	Cv (m^2/yr)		Compressibility Mv (m^2/kN)	K (m/s)		Void Ratio (e_f)	Vertical Strain (%)
		*t_{50}	t_{90}					
Stage 1 @ 12.5kPa	0.192	2.618	-	7.58E-04	6.2E-10		0.600	0.95
Stage 2 @ 25kPa	0.331	2.069	-	5.55E-04	3.6E-10		0.588	1.63
Stage 3 @ 50kPa	0.572	1.682	-	4.86E-04	2.5E-10		0.569	2.83
Stage 4 @ 100kPa	0.975	1.217	-	4.10E-04	1.6E-10		0.537	4.82
Stage 5 @ 200kPa	1.383	1.033	-	2.12E-04	6.8E-11		0.504	6.84
Stage 6 @ 400kPa	1.826	0.889	-	1.18E-04	3.2E-11		0.469	9.03
Stage 7 @ 800kPa	2.487	0.765	-	8.98E-05	2.1E-11		0.416	12.29
Stage 8 @ 1600kPa	3.522	0.618	-	7.29E-05	1.4E-11		0.334	17.41

Unload @ 400kPa	3.407
Unload @ 100kPa	3.265
Unload @ 25kPa	3.112

** Values interpreted via lab only*

Comments: **Samples collected from Shelby tubes**
Cv values to be interpreted via Engineer

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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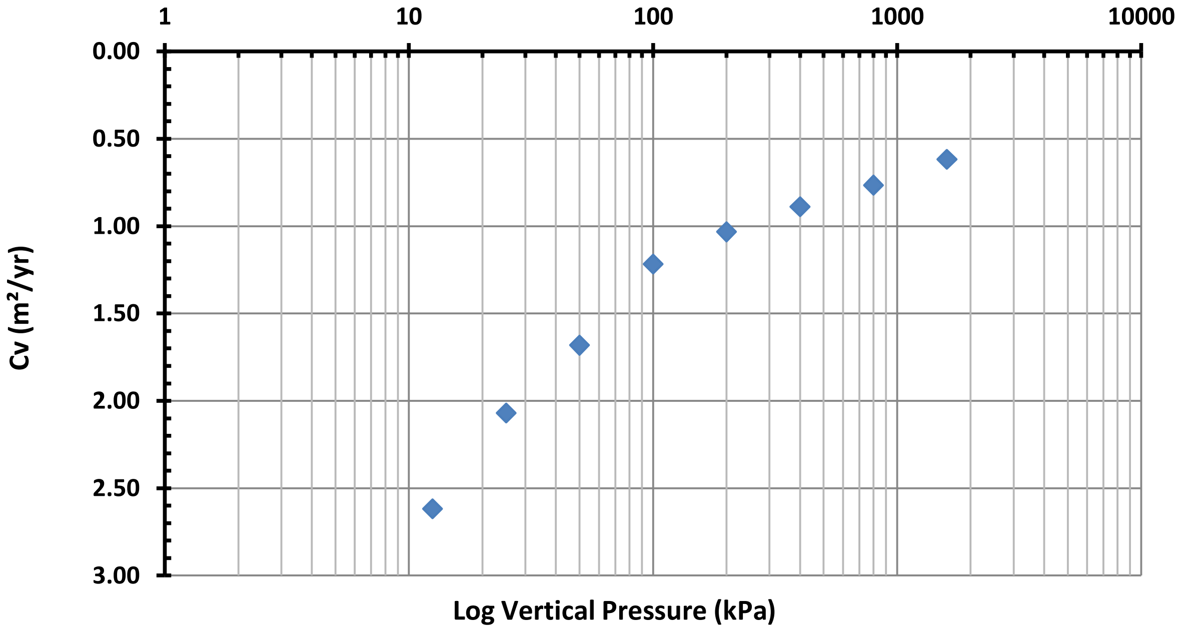
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

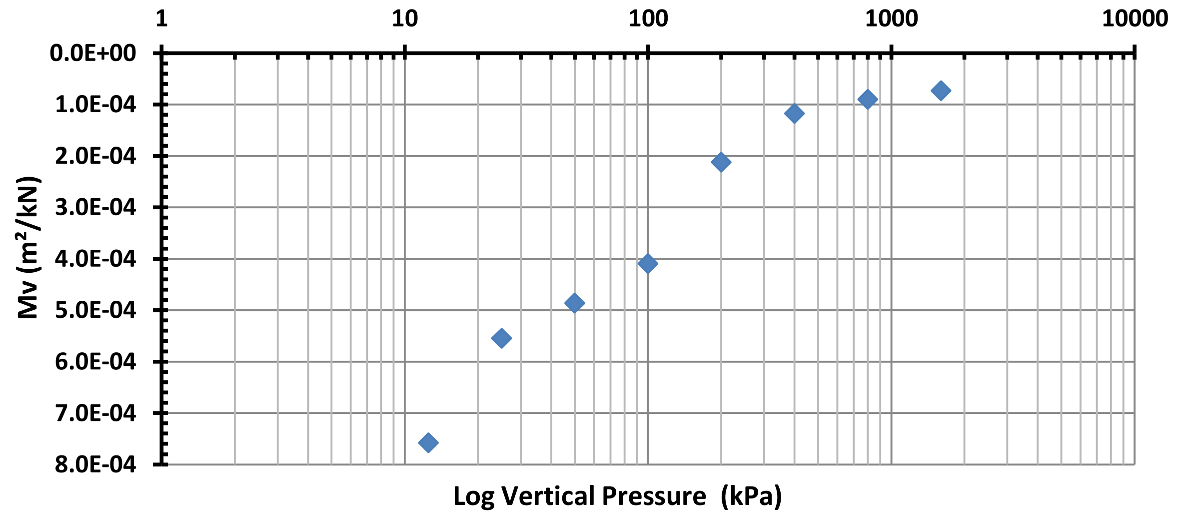
Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS03		
Lab ID:	BH02-UDS03_OED	Lab:	EPLab
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 19°C

Cv (m^2/yr) Vs Log of Vertical Pressure (kPa)



* Plot based on Log (time) data

Mv (m^2/kN) Vs Log of Vertical Pressure (kPa)



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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS03		
Lab ID:	BH02-UDS03_OED	Lab:	EPLab
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 19°C

TEST RESULTS PLEASE SEE PAGES BELOW

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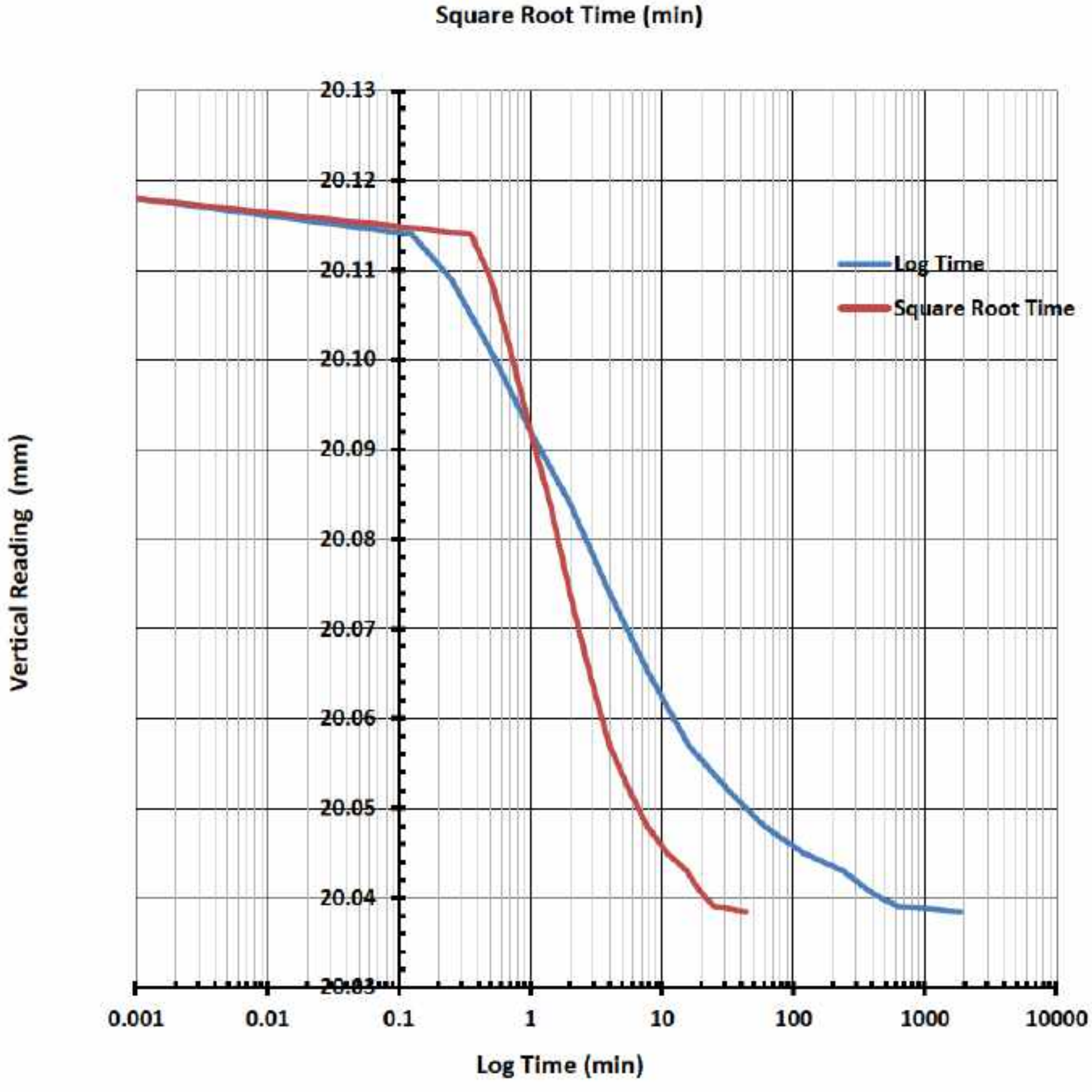
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS03		
Lab ID:	BH02-UDS03_OED	Lab:	EPLab
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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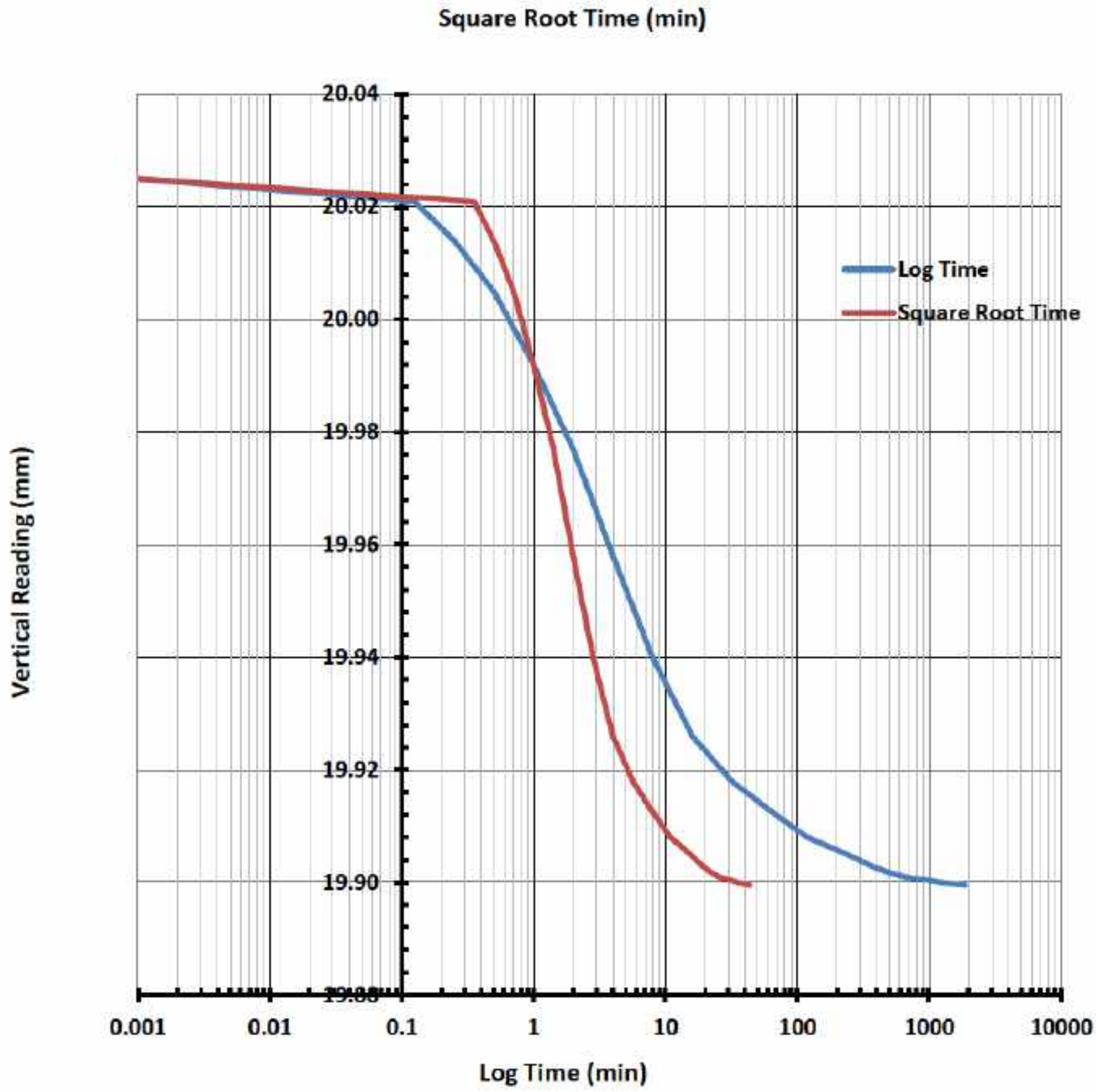
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS03		
Lab ID:	BH02-UDS03_OED	Lab:	EPLab
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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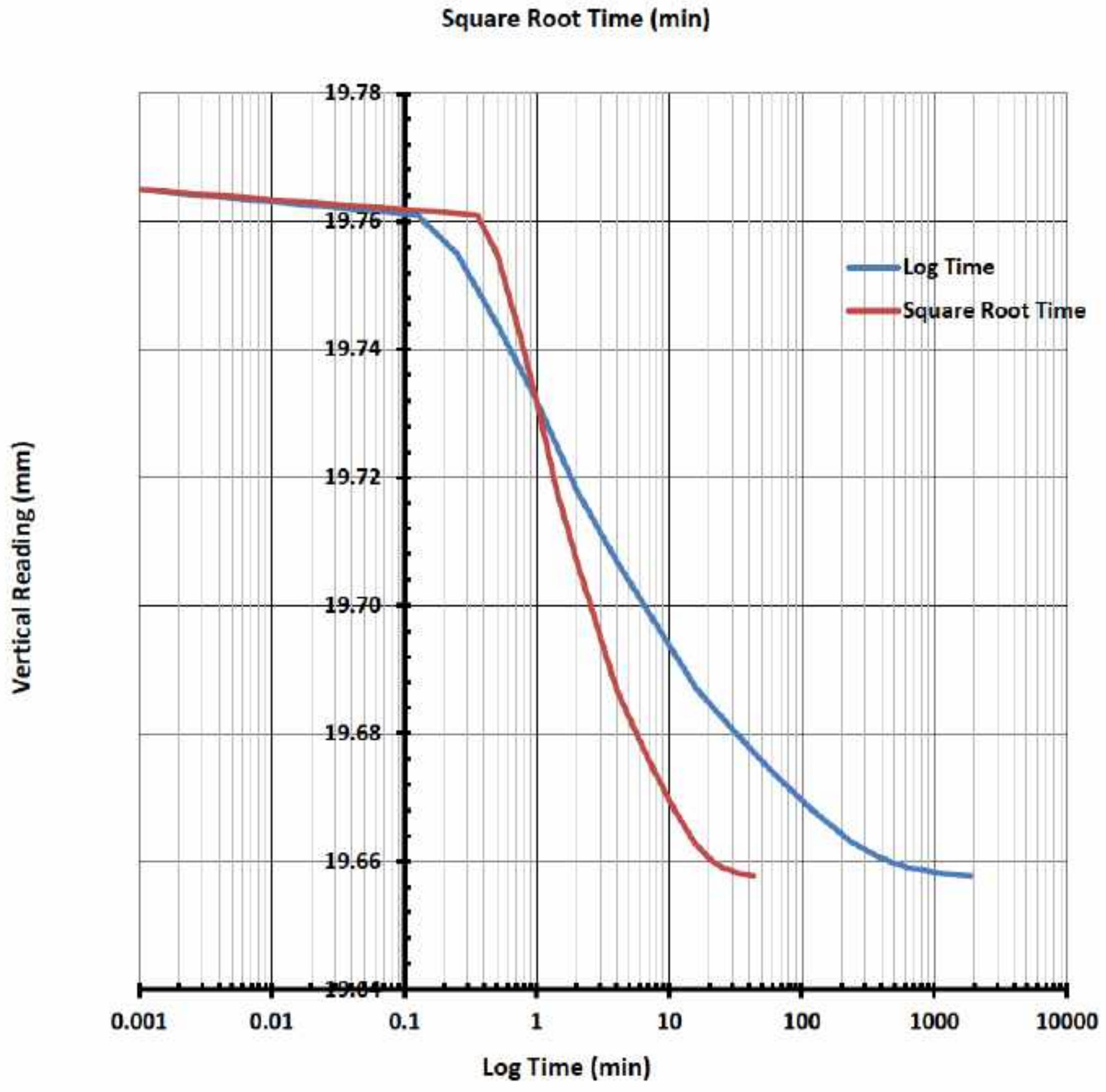
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS03		
Lab ID:	BH02-UDS03_OED	Lab:	EPLab
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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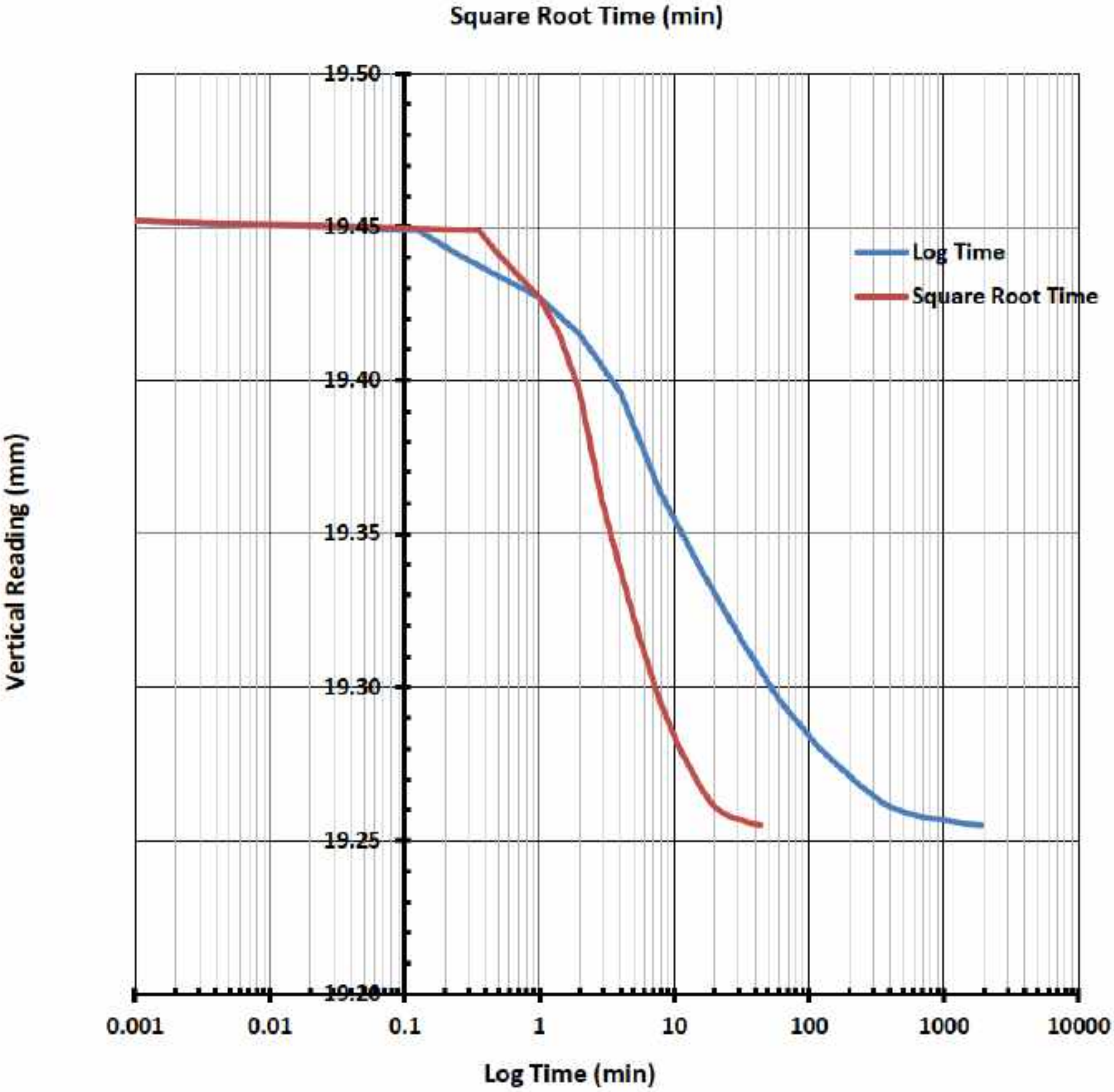
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS03		
Lab ID:	BH02-UDS03_OED	Lab:	EPLab
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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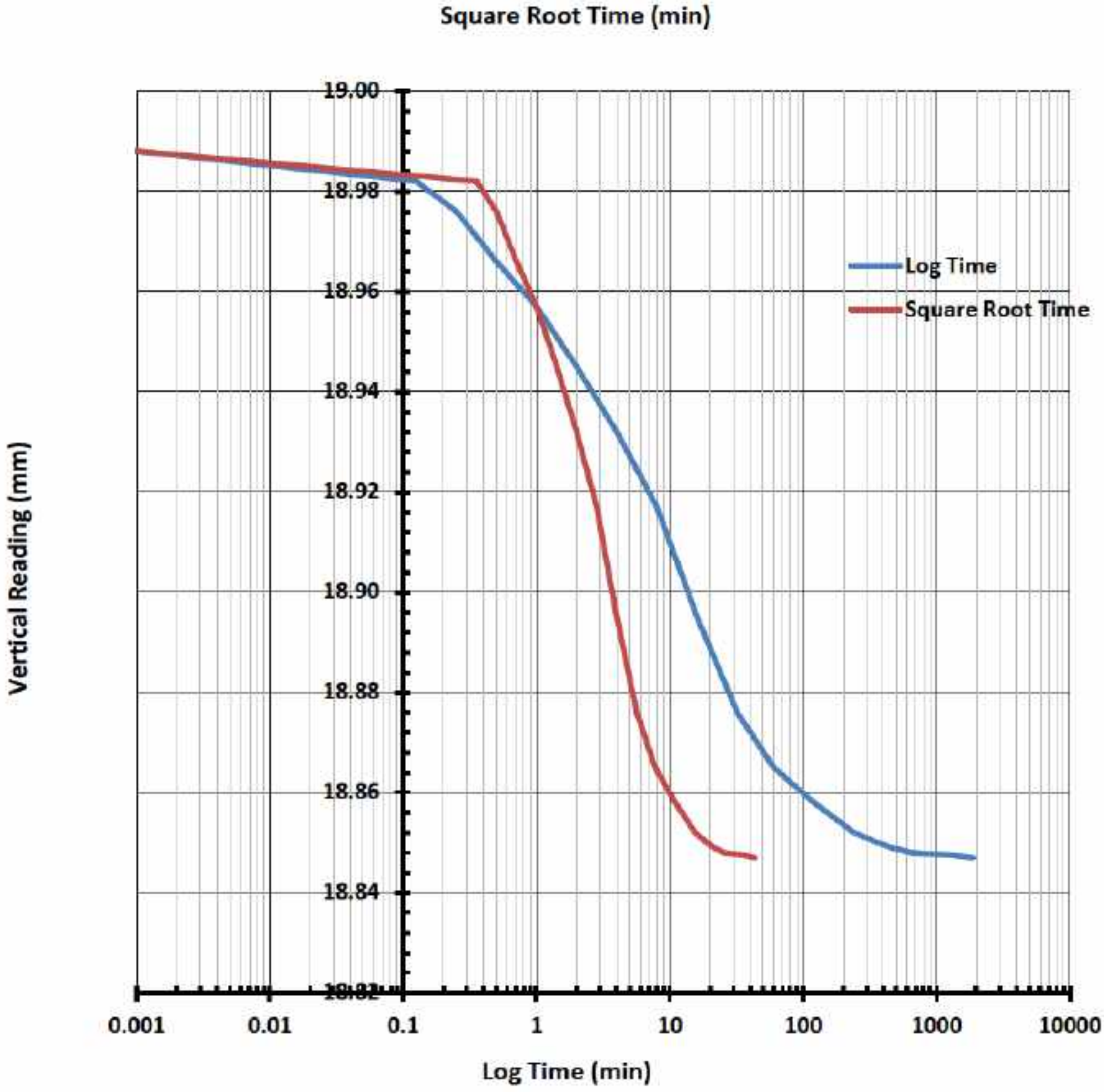
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS03		
Lab ID:	BH02-UDS03_OED	Lab:	EPLab
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa



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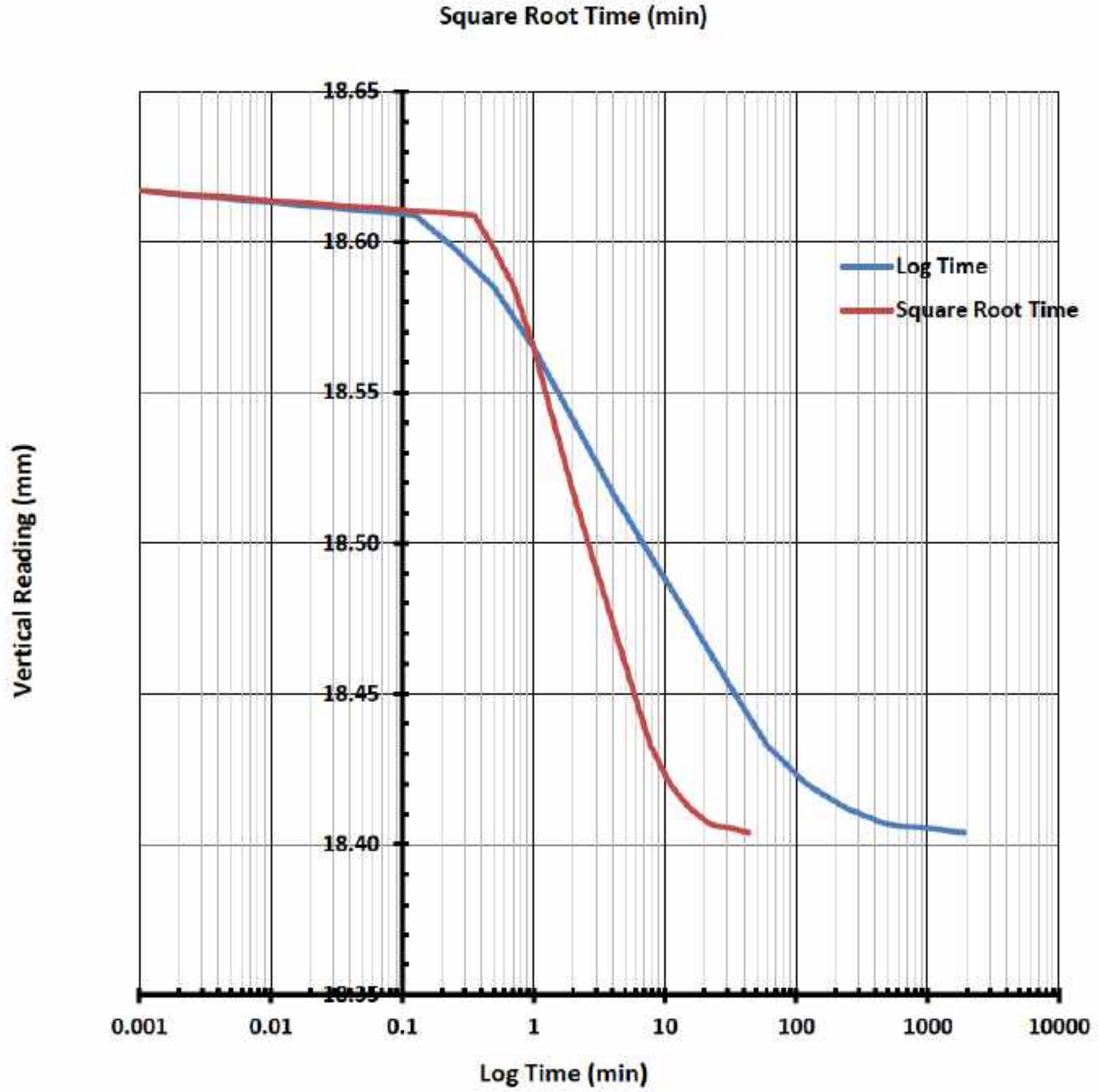
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS03		
Lab ID:	BH02-UDS03_OED	Lab:	EPLab
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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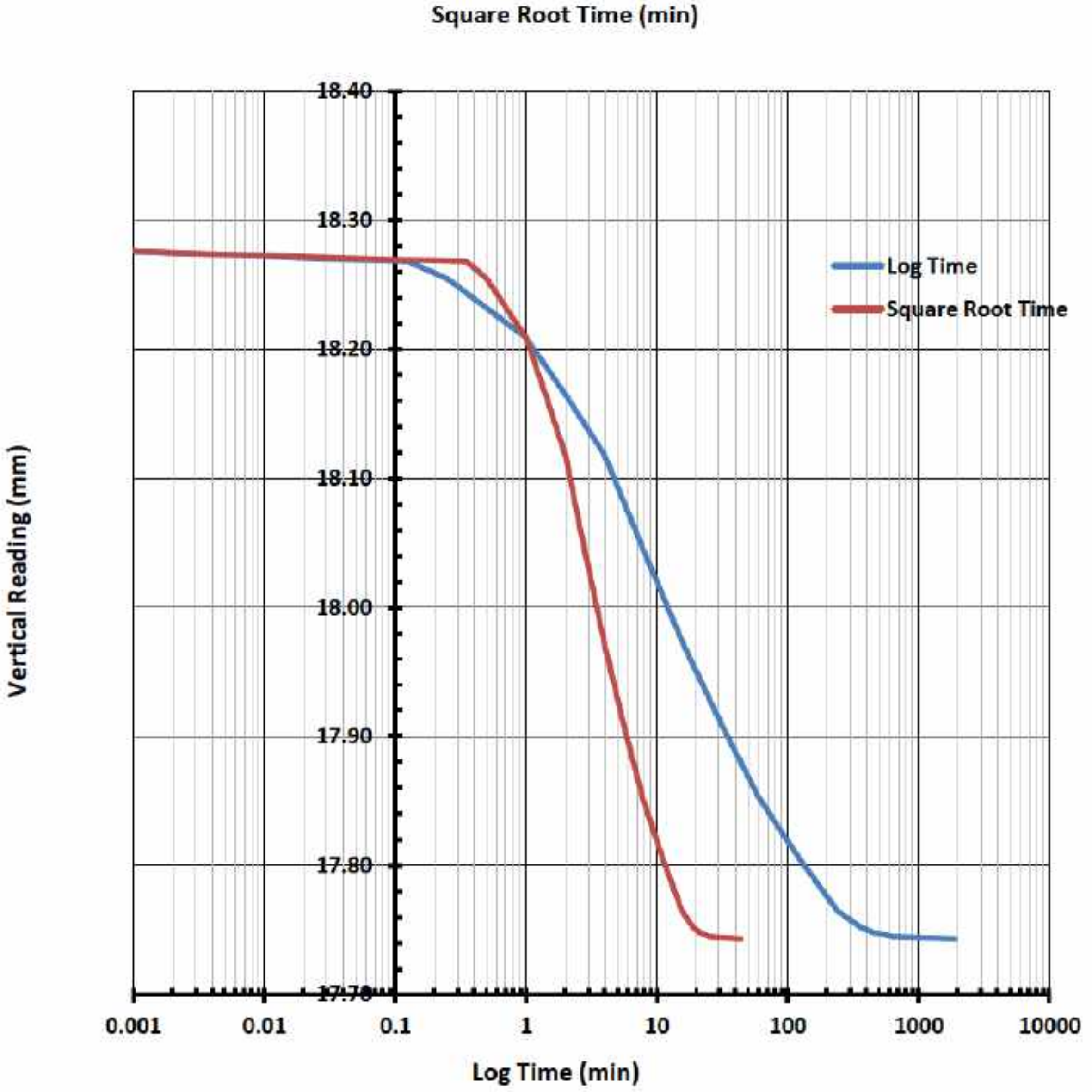
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS03		
Lab ID:	BH02-UDS03_OED	Lab:	EPLab
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa



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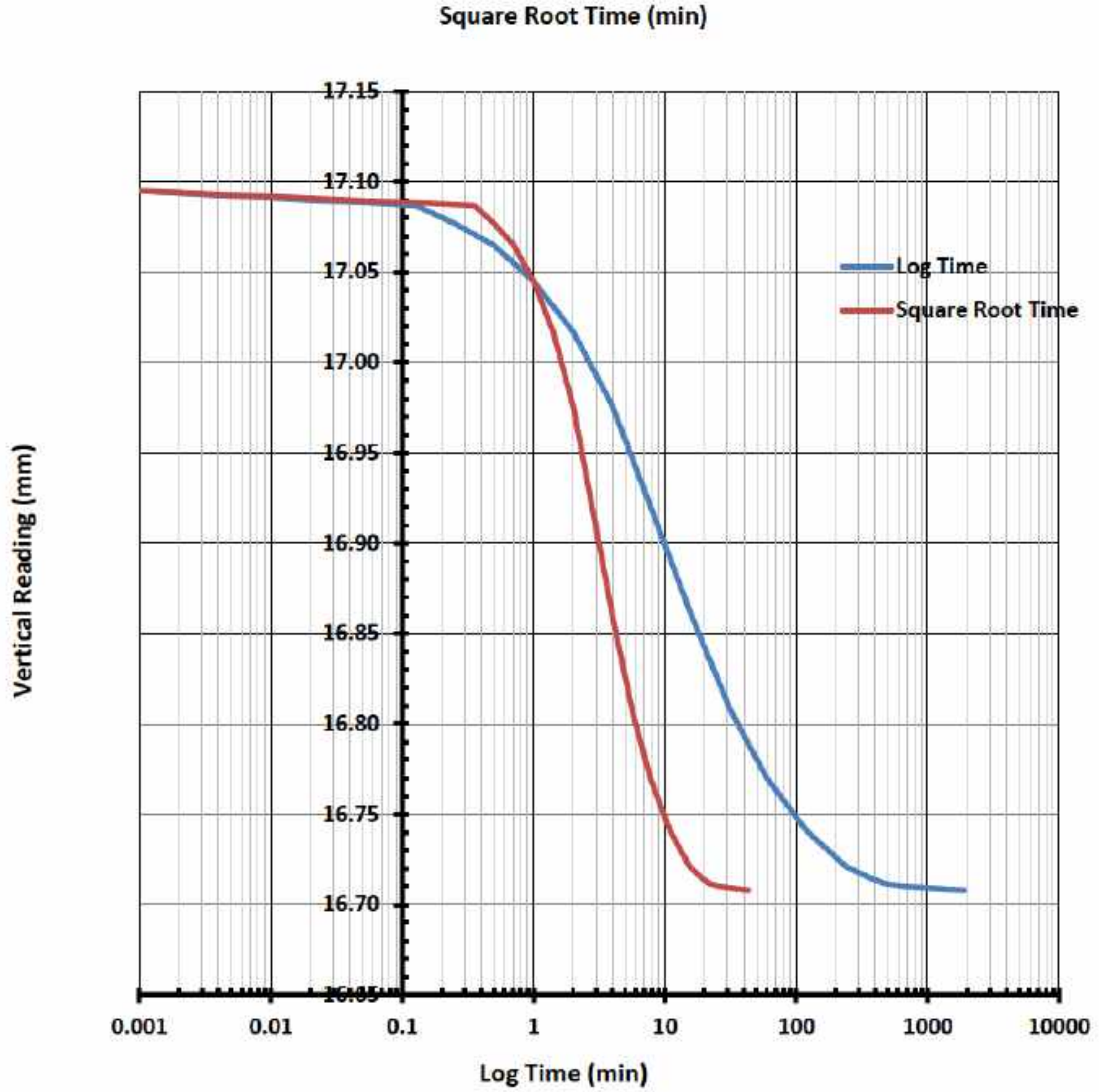
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS03		
Lab ID:	BH02-UDS03_OED	Lab:	EPLab
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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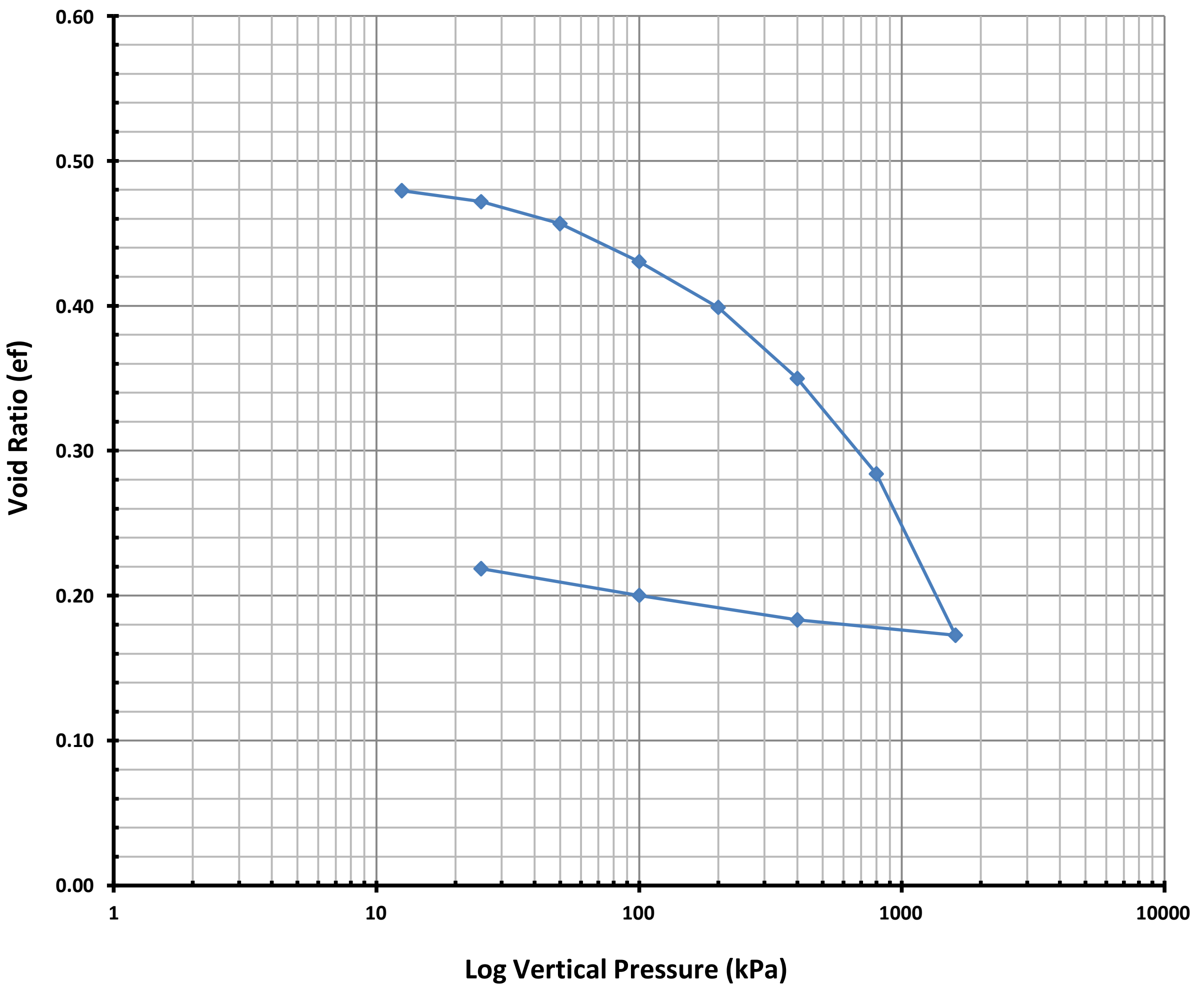
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS04		
Lab ID:	BH02-UDS04_OED	Lab:	EPLab
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 19°c

Tested by:	Phil	Initial Moisture (%):	25.45	Test Condition:	Undrained
Height (mm):	20.11	Final Moisture Content (%):	35.05	Sample Condition:	Saturated
Diameter (mm):	61.80	Bulk Density (t/m³):	2.02	Particle Density (t/m³):	2.401
Direction:	Vertical	Dry Density (t/m³):	1.61	Initial Void Ratio (e_i):	0.489

Void Ratio (e_f) Vs Log of Vertical Pressure (kPa)



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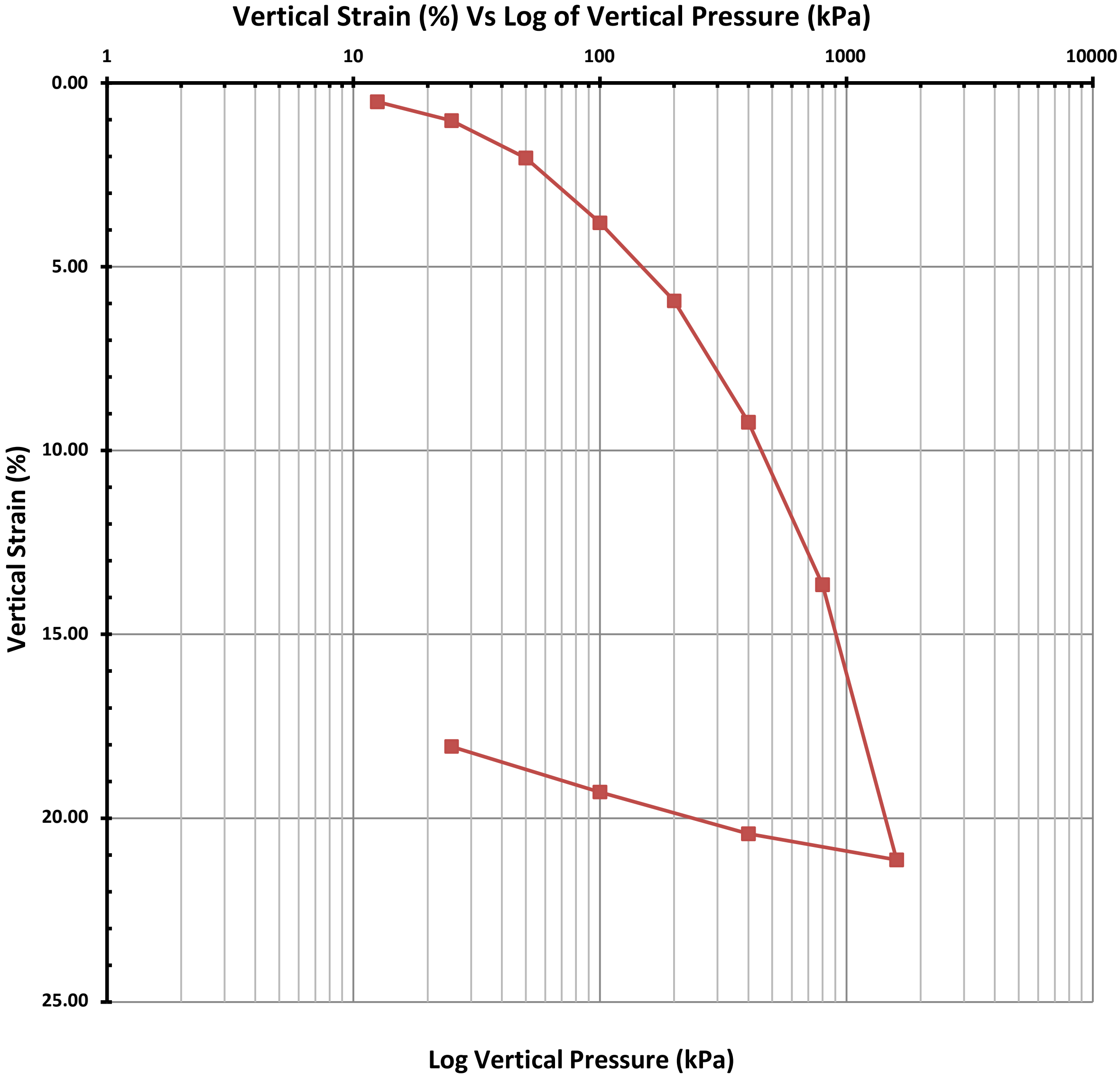
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS04		
Lab ID:	BH02-UDS04_OED	Lab:	EPLab
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 19°c



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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS04		
Lab ID:	BH02-UDS04_OED	Lab:	EPLab
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 19°C

Test Results

*

Stages	Vert Disp (mm)	Cv (m^2/yr)		Compressibility Mv (m^2/kN)	K (m/s)		Void Ratio (e_f)	Vertical Strain (%)
		*t_{50}	t_{90}					
Stage 1 @ 12.5kPa	0.103	5.213	-	4.09E-04	6.6E-10		0.479	0.51
Stage 2 @ 25kPa	0.206	3.440	-	4.13E-04	4.4E-10		0.472	1.02
Stage 3 @ 50kPa	0.410	2.038	-	4.10E-04	2.6E-10		0.457	2.04
Stage 4 @ 100kPa	0.765	1.635	-	3.60E-04	1.8E-10		0.430	3.80
Stage 5 @ 200kPa	1.192	1.168	-	2.21E-04	8.0E-11		0.399	5.93
Stage 6 @ 400kPa	1.856	0.974	-	1.75E-04	5.3E-11		0.350	9.23
Stage 7 @ 800kPa	2.745	0.819	-	1.22E-04	3.1E-11		0.284	13.65
Stage 8 @ 1600kPa	4.250	0.606	-	1.08E-04	2.0E-11		0.173	21.13

Unload @ 400kPa	4.108
Unload @ 100kPa	3.879
Unload @ 25kPa	3.630

** Values interpreted via lab only*

Comments: **Samples collected from Shelby tubes**
Cv values to be interpreted via Engineer

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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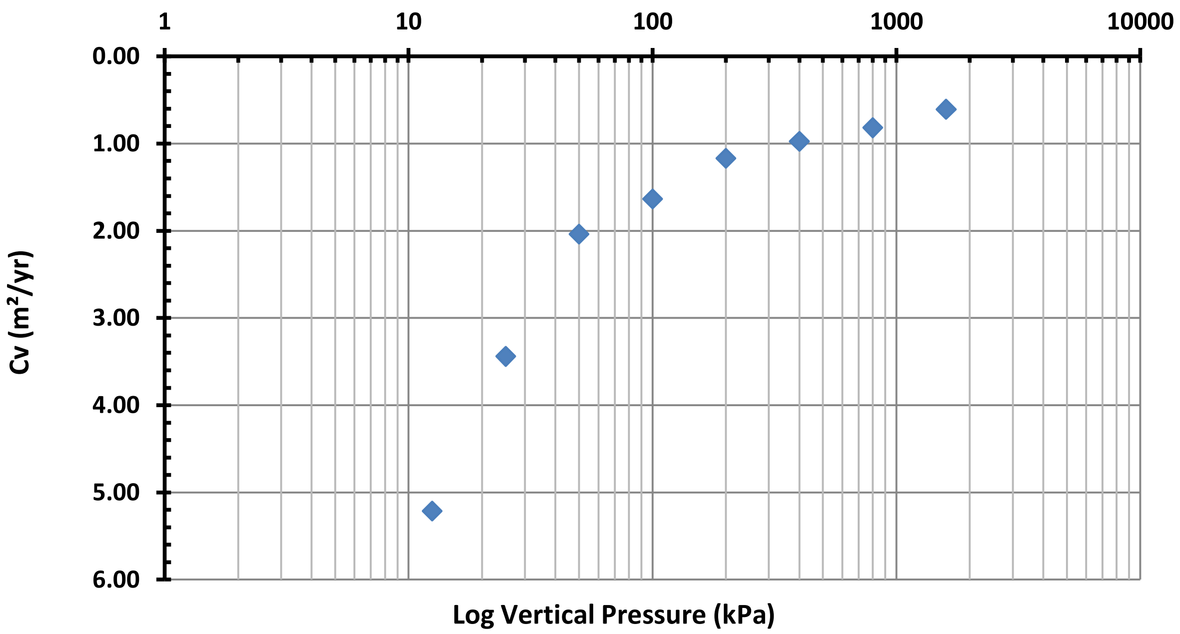
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

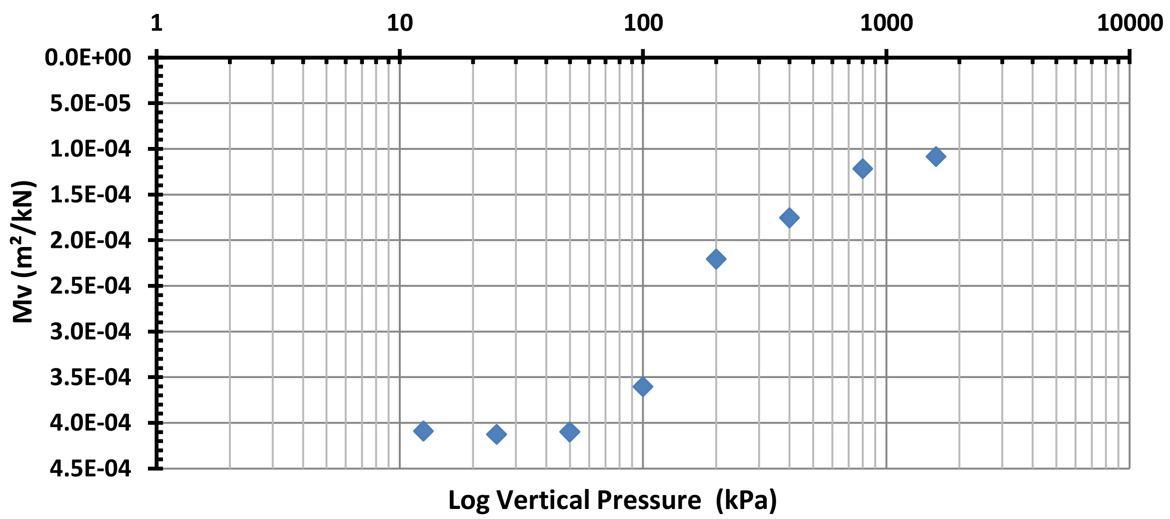
Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS04		
Lab ID:	BH02-UDS04_OED	Lab:	EPLab
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 19°C

Cv (m^2/yr) Vs Log of Vertical Pressure (kPa)



* Plot based on Log (time) data

Mv (m^2/kN) Vs Log of Vertical Pressure (kPa)



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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS04		
Lab ID:	BH02-UDS04_OED	Lab:	EPLab
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 19°C

TEST RESULTS PLEASE SEE PAGES BELOW

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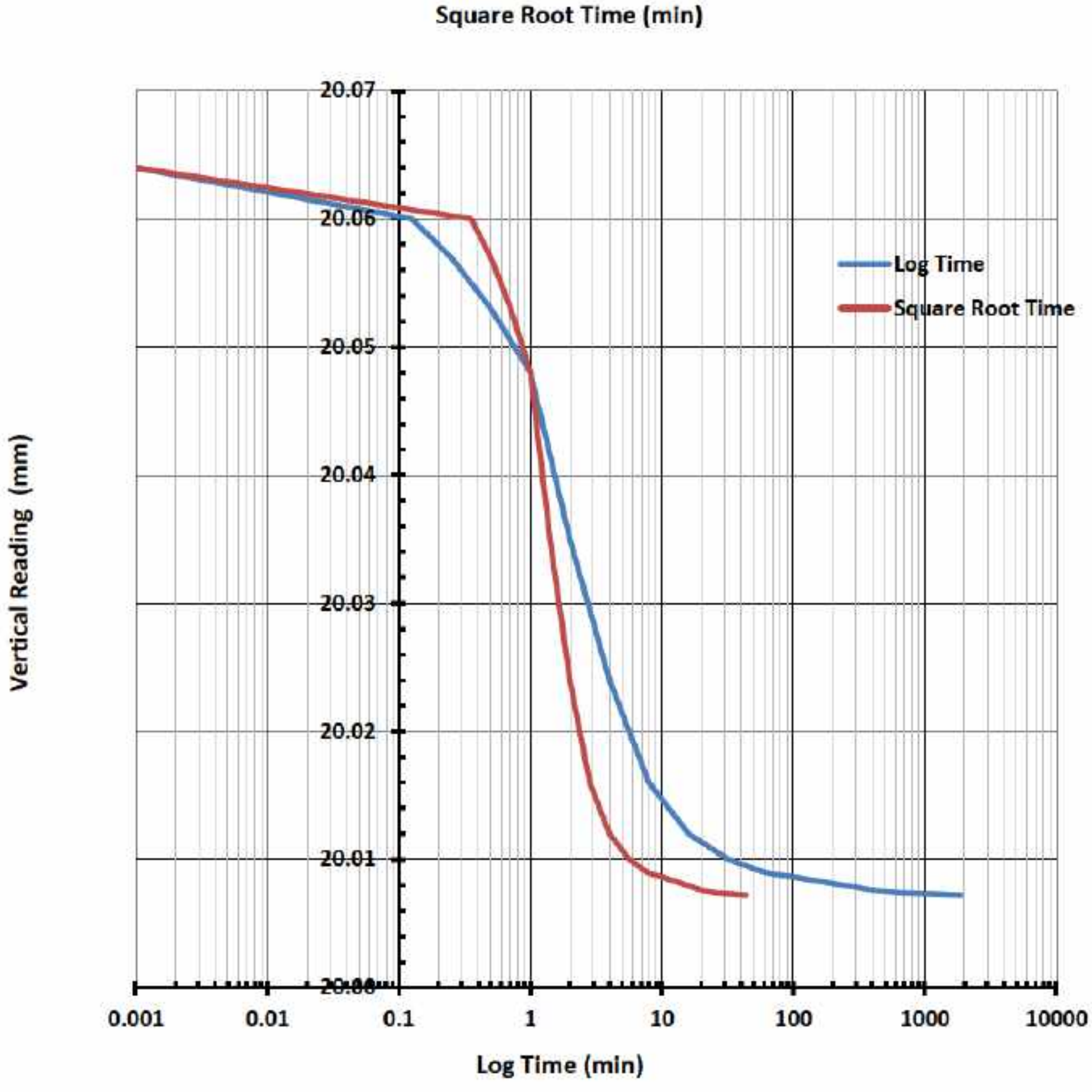
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS04		
Lab ID:	BH02-UDS04_OED	Lab:	EPLab
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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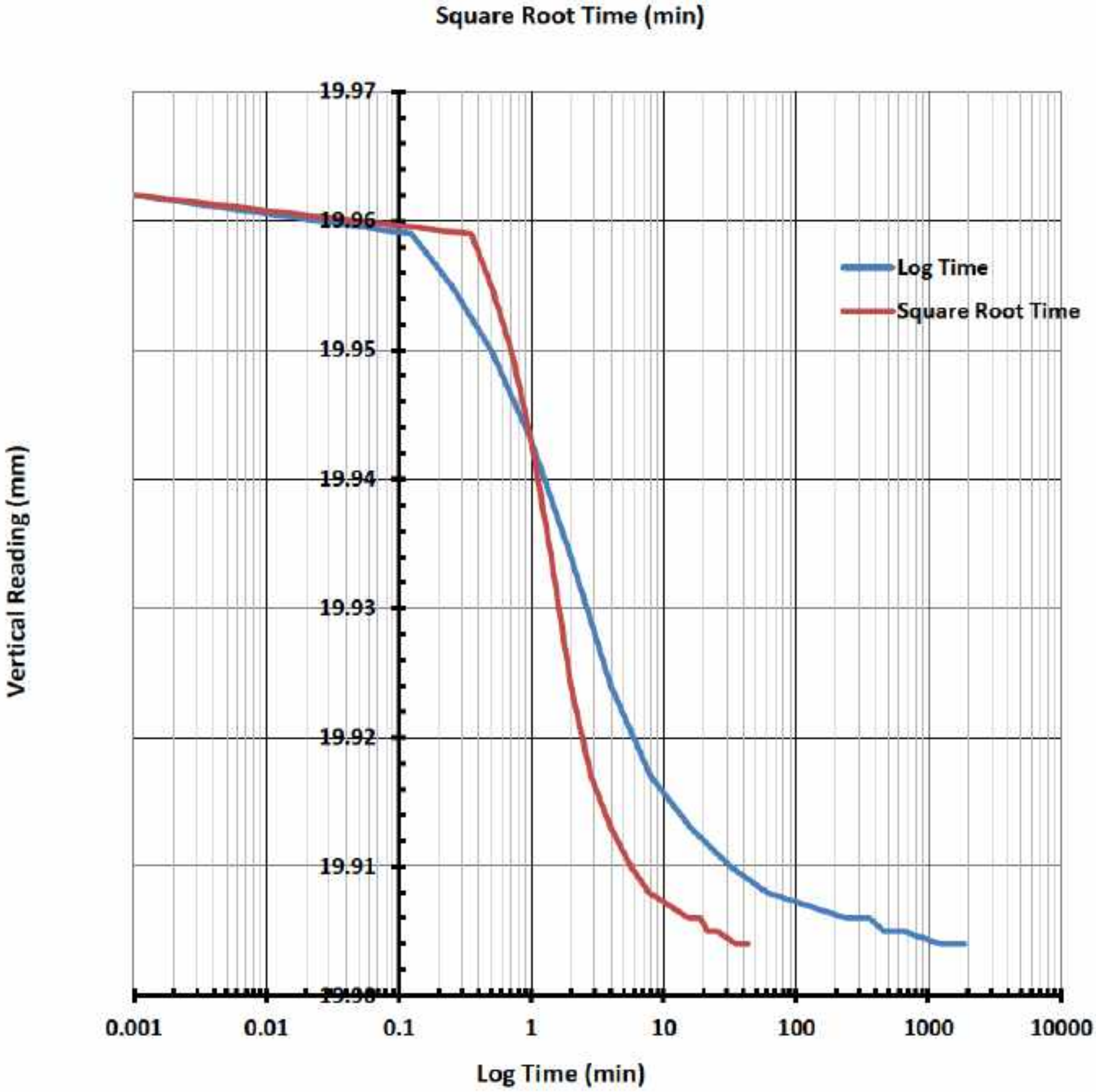
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS04		
Lab ID:	BH02-UDS04_OED	Lab:	EPLab
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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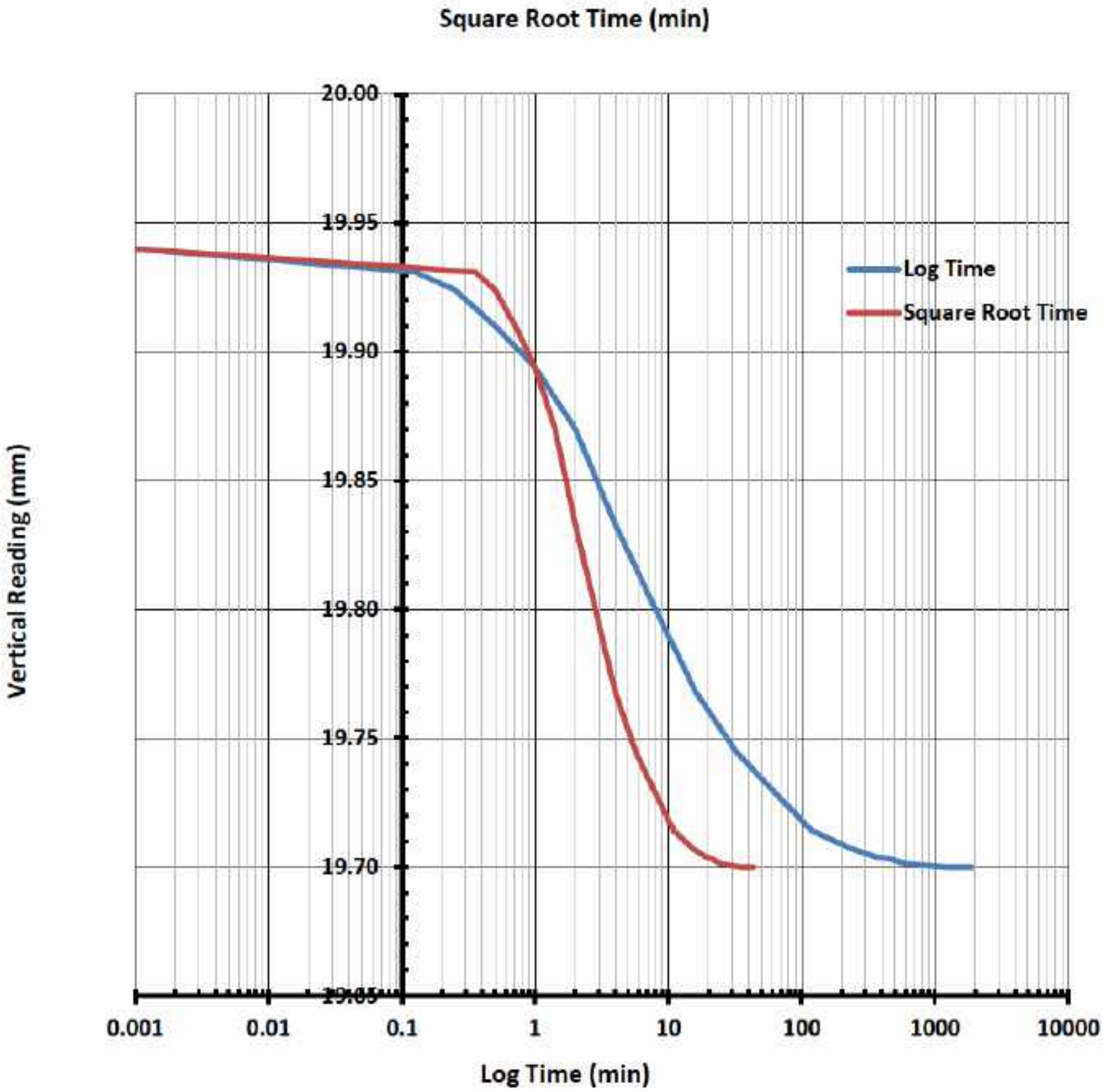
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS04		
Lab ID:	BH02-UDS04_OED	Lab:	EPLab
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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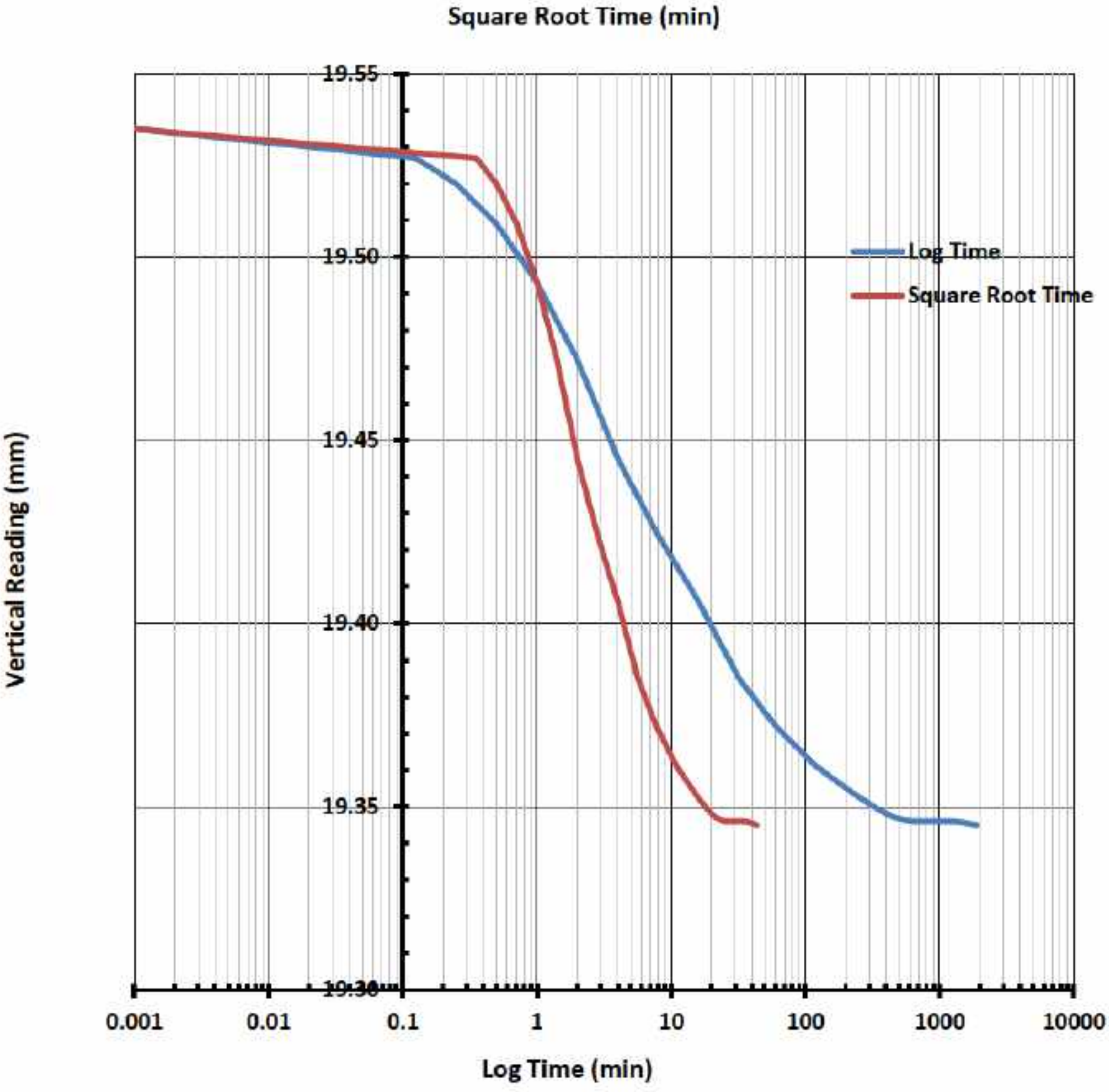
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS04		
Lab ID:	BH02-UDS04_OED	Lab:	EPLab
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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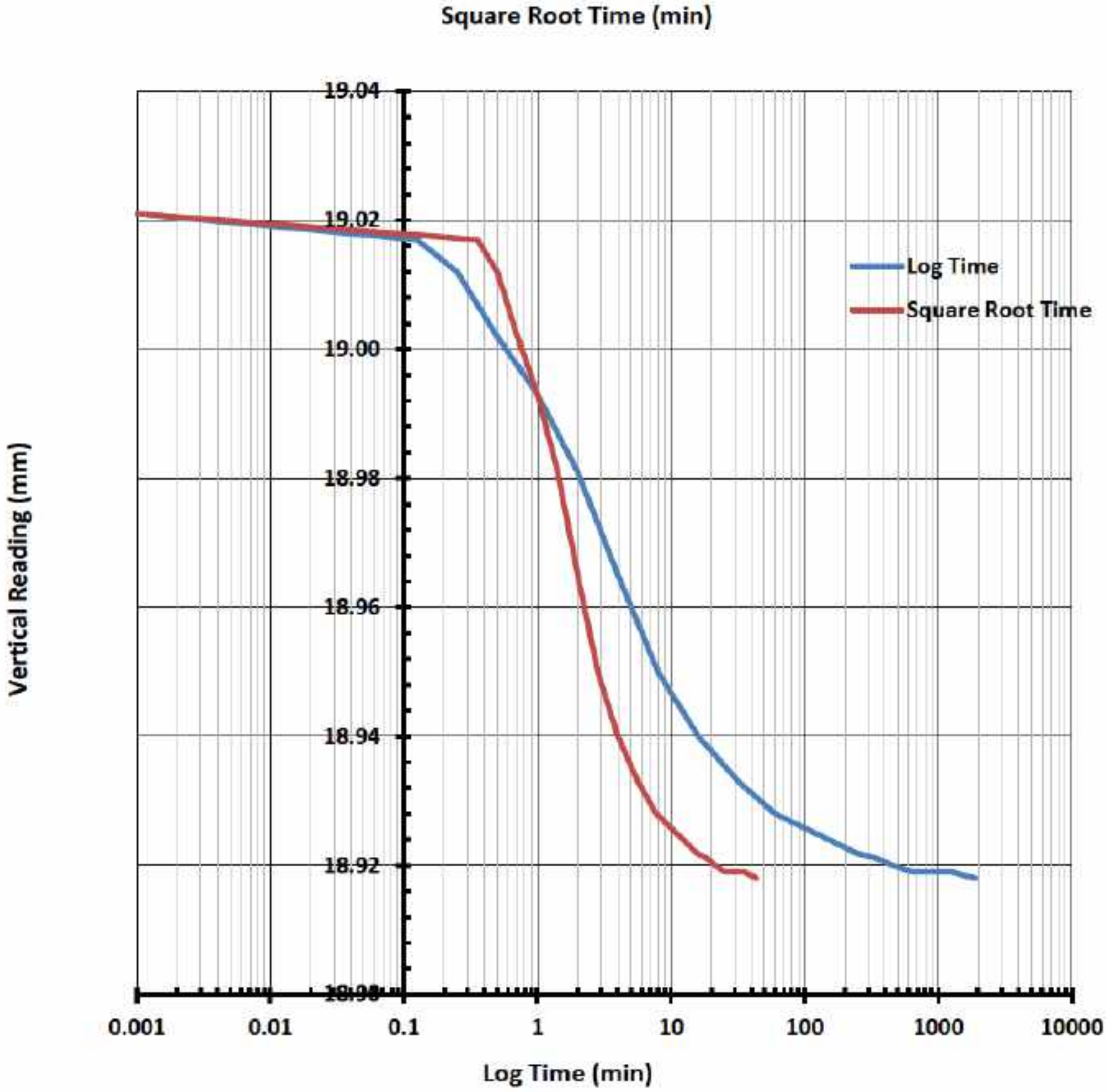
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS04		
Lab ID:	BH02-UDS04_OED	Lab:	EPLab
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa



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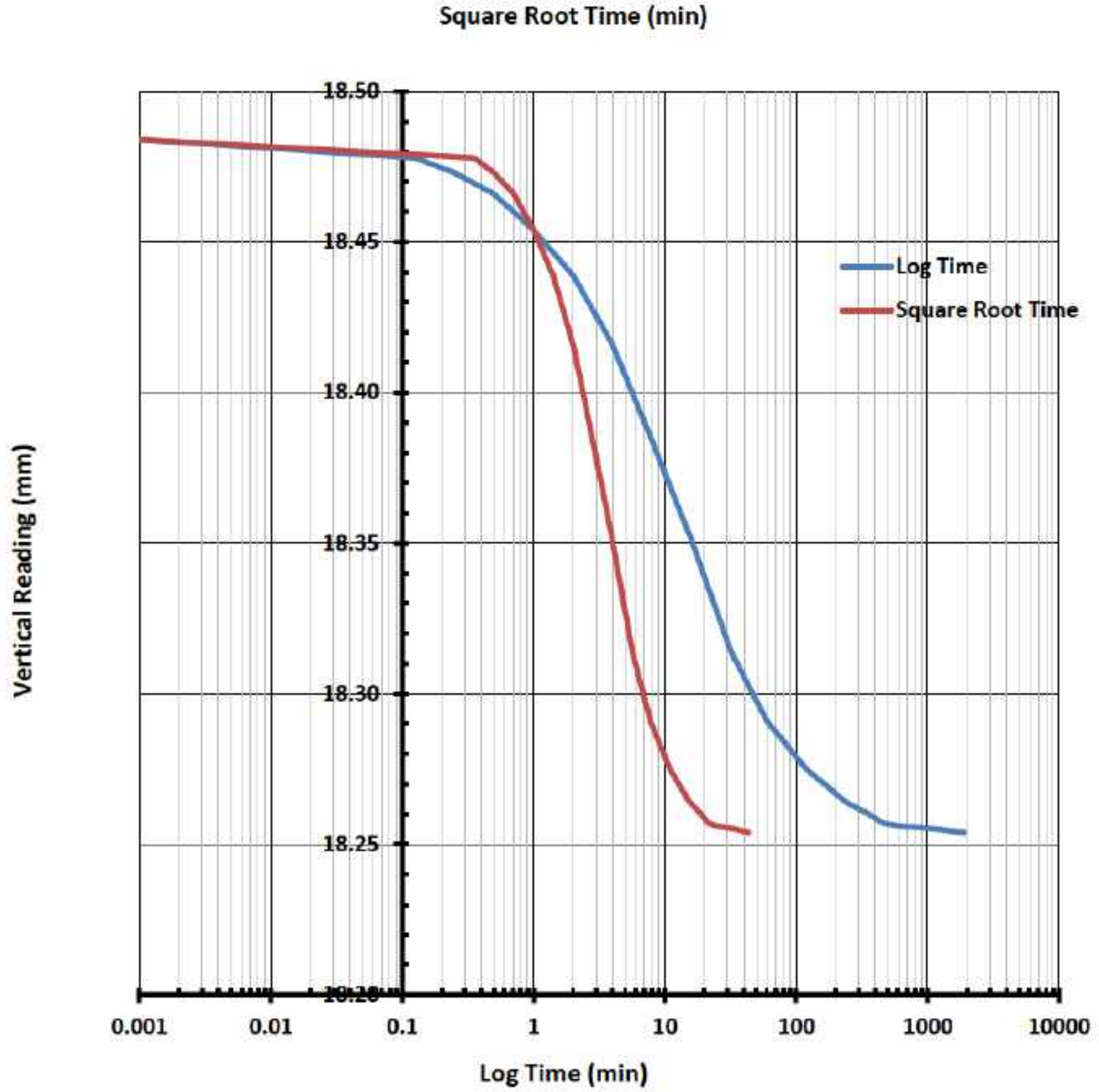
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client: REC		Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS04		
Lab ID:	BH02-UDS04_OED	Lab:	EPLab
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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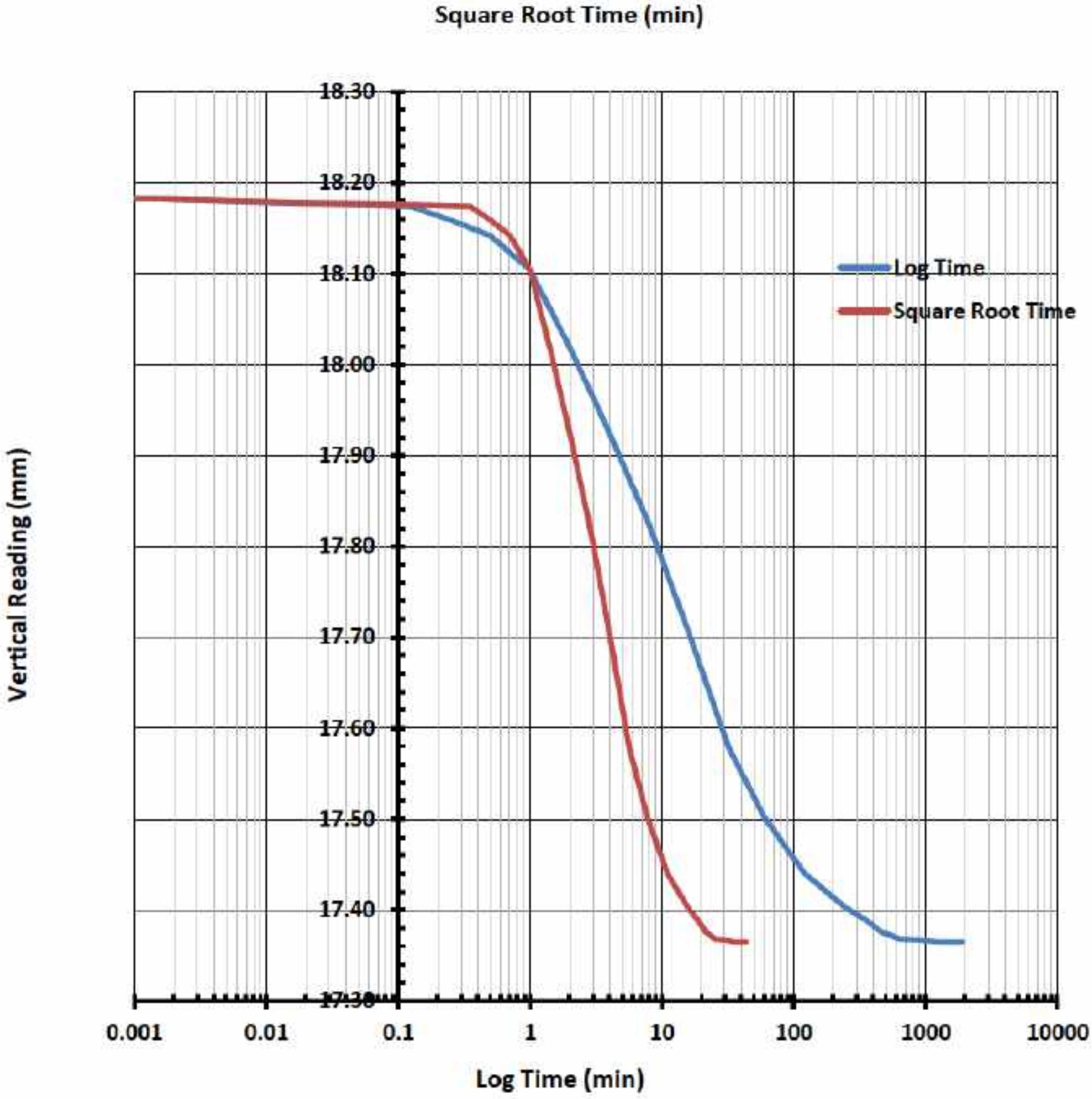
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS04		
Lab ID:	BH02-UDS04_OED	Lab:	EPLab
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa



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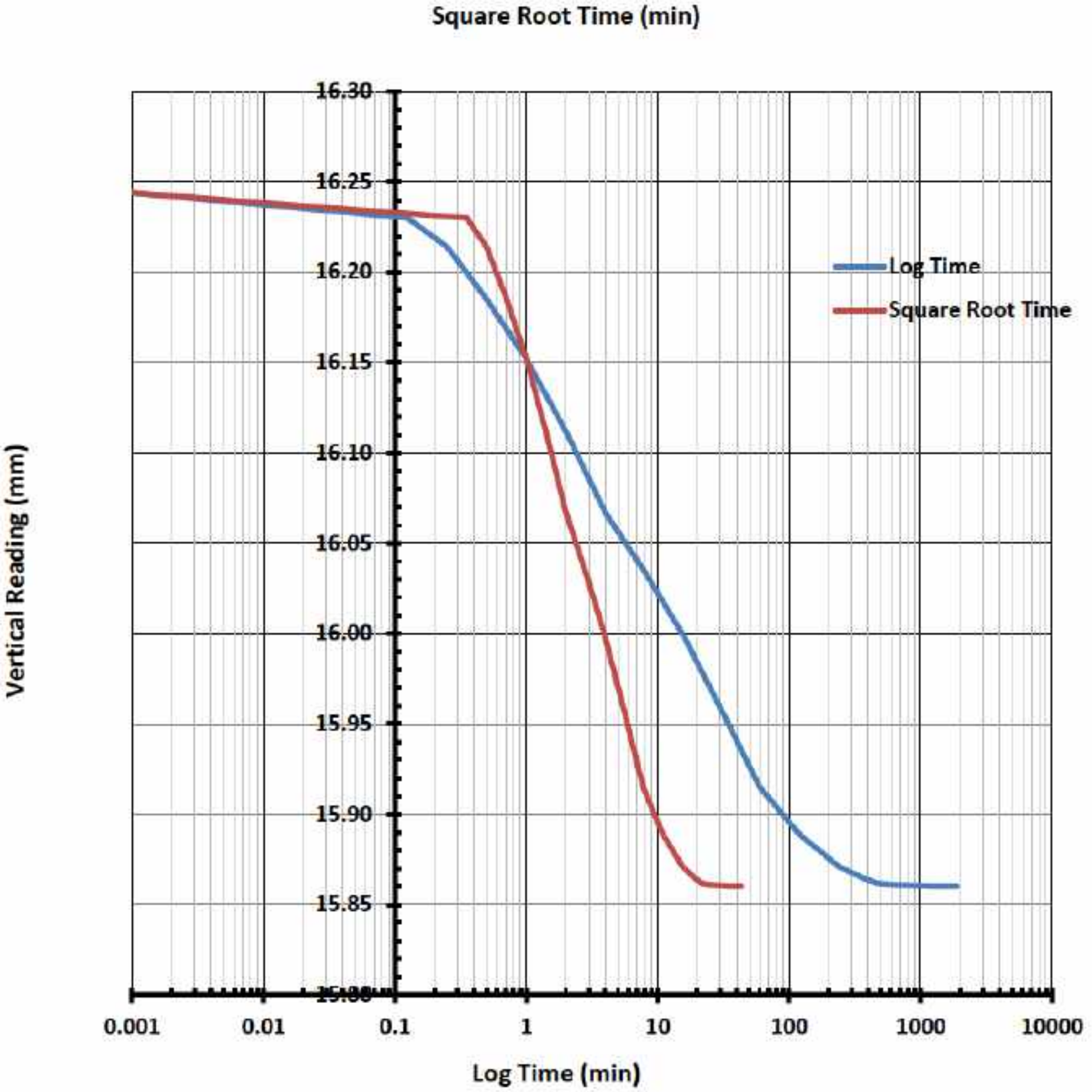
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH02-UDS04		
Lab ID:	BH02-UDS04_OED	Lab:	EPLab
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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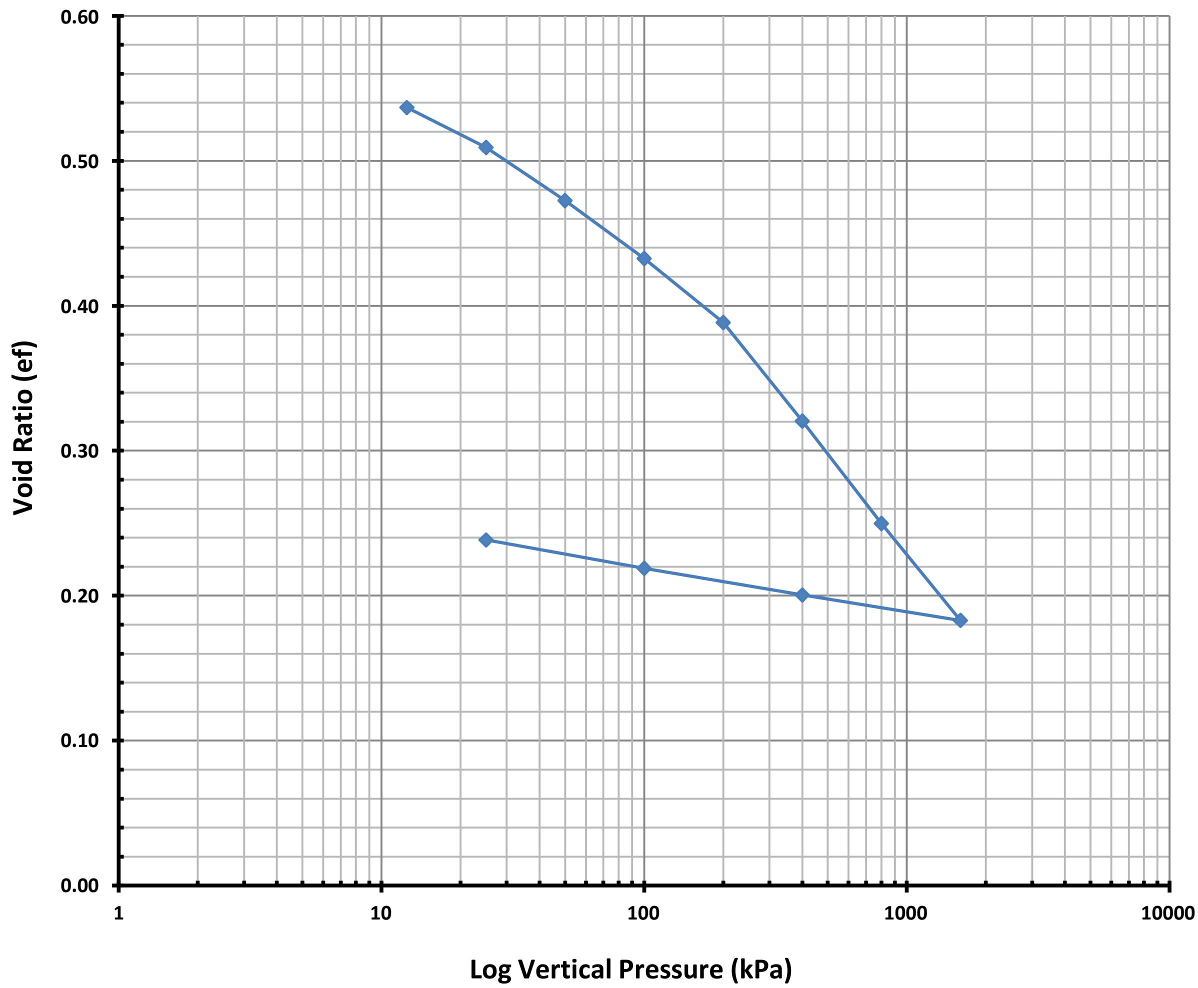
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS02		
Lab ID:	BH03-UDS02_OED	Lab:	EPLab
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 19°c

Tested by:	Phil	Initial Moisture (%):	29.14	Test Condition:	Undrained
Height (mm):	20.13	Final Moisture Content (%):	33.33	Sample Condition:	Saturated
Diameter (mm):	61.85	Bulk Density (t/m³):	1.95	Particle Density (t/m³):	2.404
Direction:	Vertical	Dry Density (t/m³):	1.51	Initial Void Ratio (e_i):	0.591

Void Ratio (e_f) Vs Log of Vertical Pressure (kPa)



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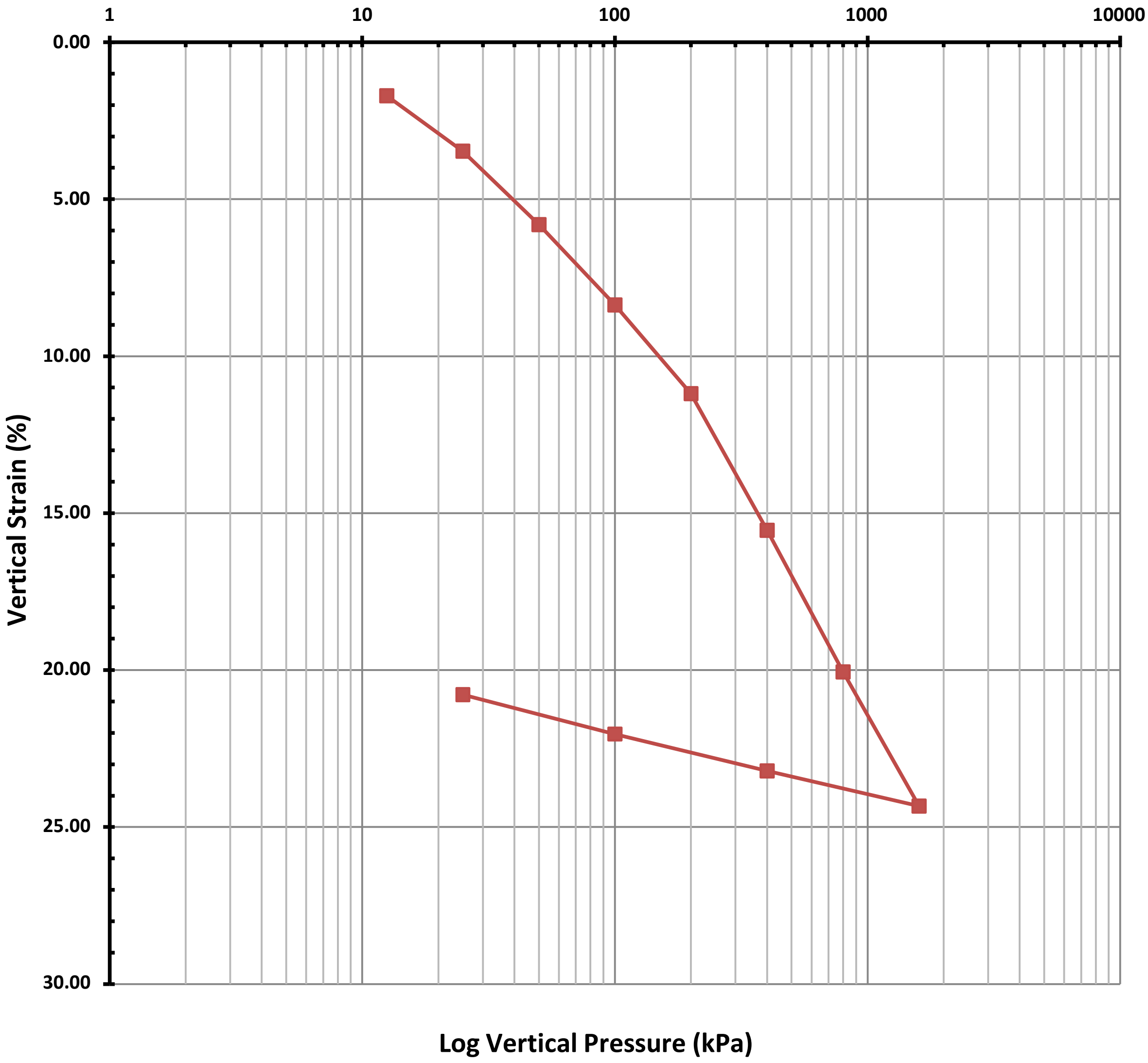
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS02		
Lab ID:	BH03-UDS02_OED	Lab:	EPLab
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 19°c

Vertical Strain (%) Vs Log of Vertical Pressure (kPa)



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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS02		
Lab ID:	BH03-UDS02_OED	Lab:	EPLab
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 19°C

Test Results

*

Stages	Vert Disp (mm)	Cv (m^2/yr)		Compressibility Mv (m^2/kN)	K (m/s)		Void Ratio (e_f)	Vertical Strain (%)
		*t_{50}	t_{90}					
Stage 1 @ 12.5kPa	0.344	1.281	-	1.37E-03	5.4E-10		0.537	1.71
Stage 2 @ 25kPa	0.699	1.106	-	1.44E-03	4.9E-10		0.509	3.47
Stage 3 @ 50kPa	1.170	1.048	-	9.70E-04	3.2E-10		0.473	5.81
Stage 4 @ 100kPa	1.685	0.994	-	5.43E-04	1.7E-10		0.433	8.37
Stage 5 @ 200kPa	2.253	0.934	-	3.08E-04	8.9E-11		0.388	11.19
Stage 6 @ 400kPa	3.129	0.847	-	2.45E-04	6.5E-11		0.320	15.54
Stage 7 @ 800kPa	4.038	0.765	-	1.34E-04	3.2E-11		0.250	20.06
Stage 8 @ 1600kPa	4.898	0.682	-	6.68E-05	1.4E-11		0.183	24.33
Unload @ 400kPa	4.673							
Unload @ 100kPa	4.436							
Unload @ 25kPa	4.184							

** Values interpreted via lab only*

Comments: **Samples collected from Shelby tubes**
Cv values to be interpreted via Engineer

Samples supplied by the Client
Authorised Signatory (Geotechnical Engineer): [redacted]

The results of tests performed apply only to the specific sample at time of test unless otherwise clearly stated. Reference should be made to E-Precision Laboratory's "Standard Terms and Conditions" E-Precision Laboratory ABN 431 559 578 87

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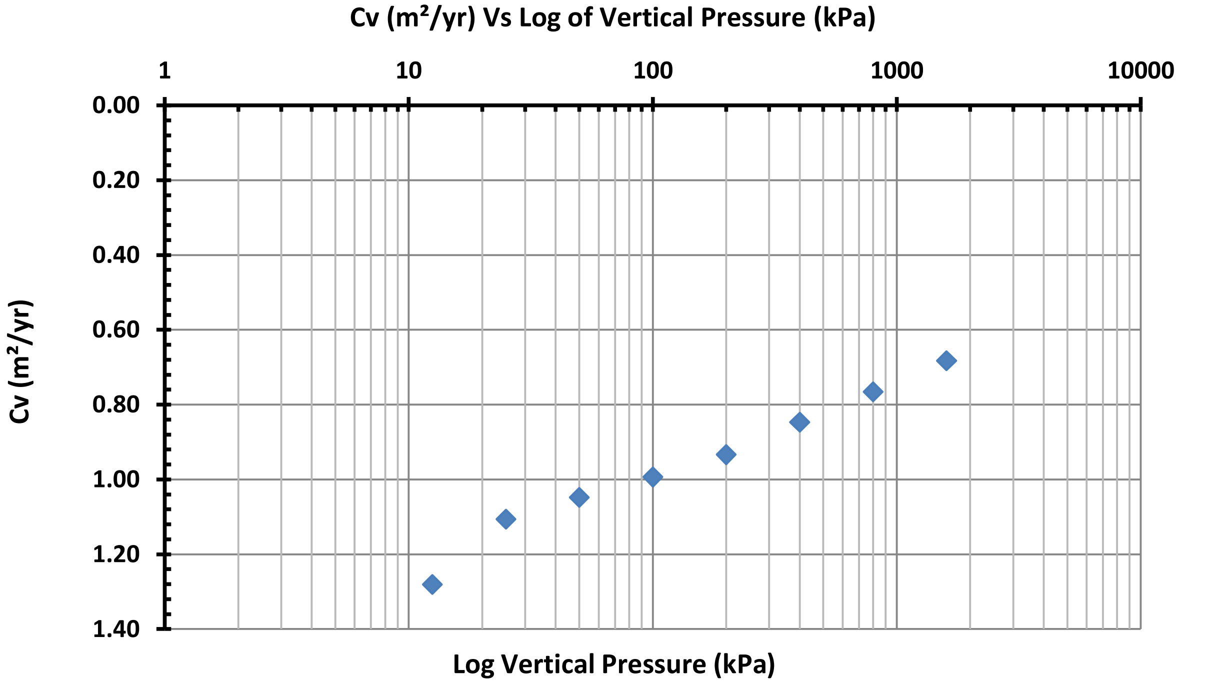
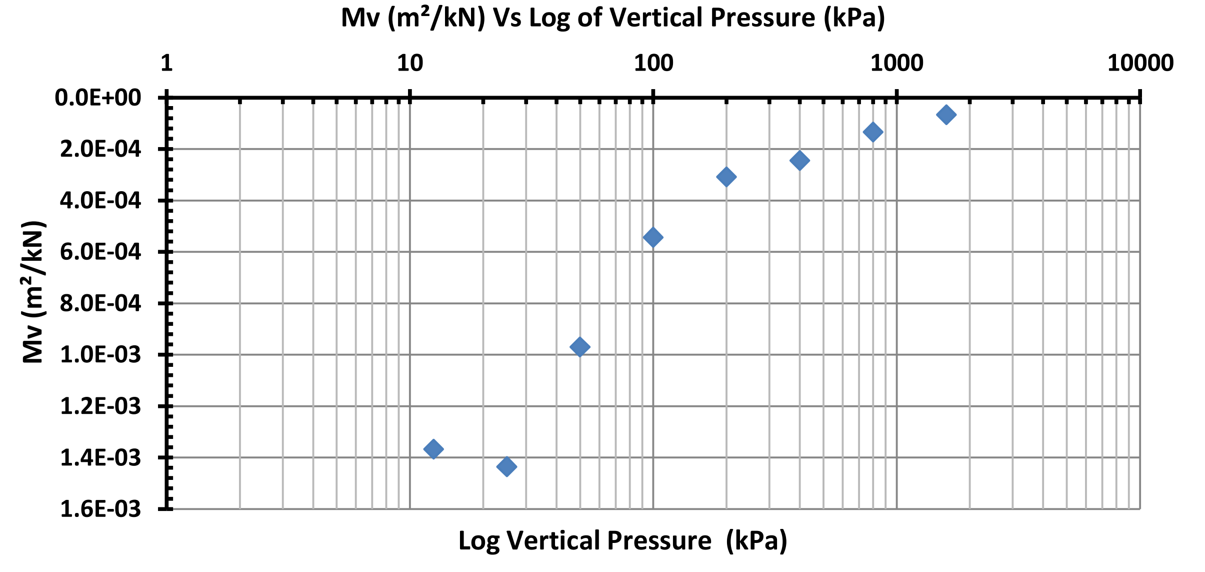
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS02		
Lab ID:	BH03-UDS02_OED	Lab:	EPLab
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 19°C



* Plot based on Log (time) data



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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS02		
Lab ID:	BH03-UDS02_OED	Lab:	EPLab
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 19°C

TEST RESULTS PLEASE SEE PAGES BELOW

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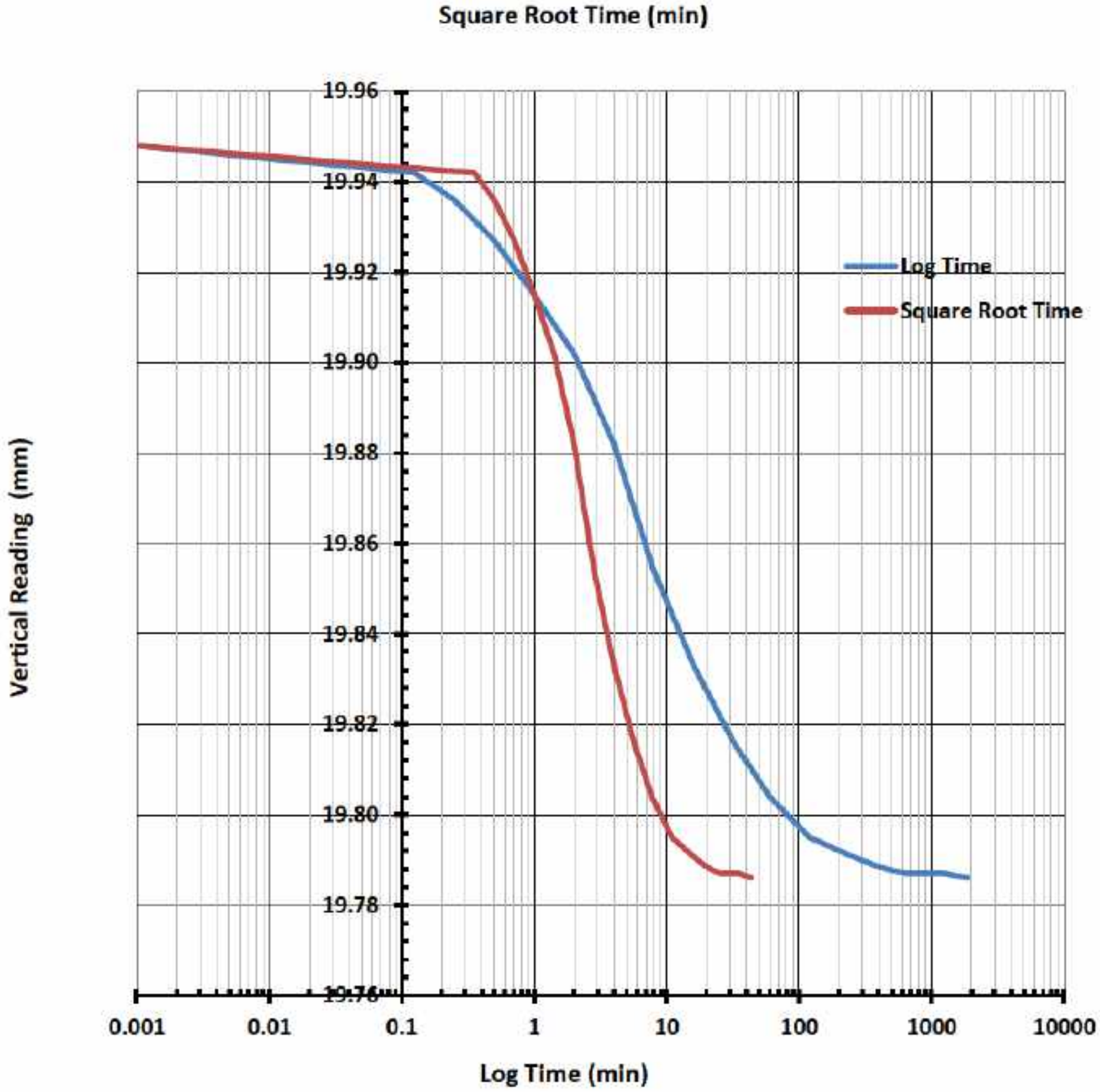
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS02		
Lab ID:	BH03-UDS02_OED	Lab:	EPLab
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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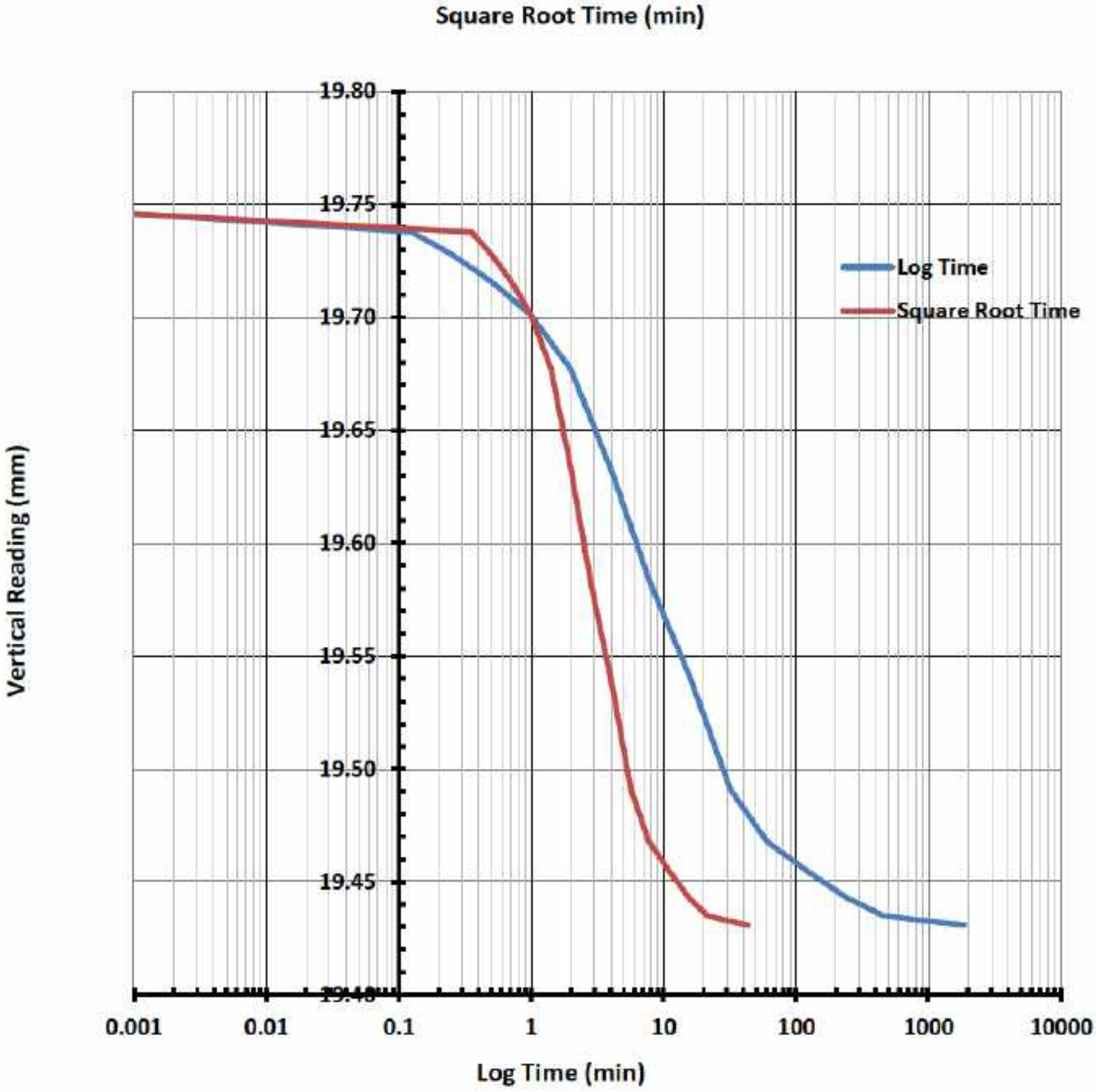
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS02		
Lab ID:	BH03-UDS02_OED	Lab:	EPLab
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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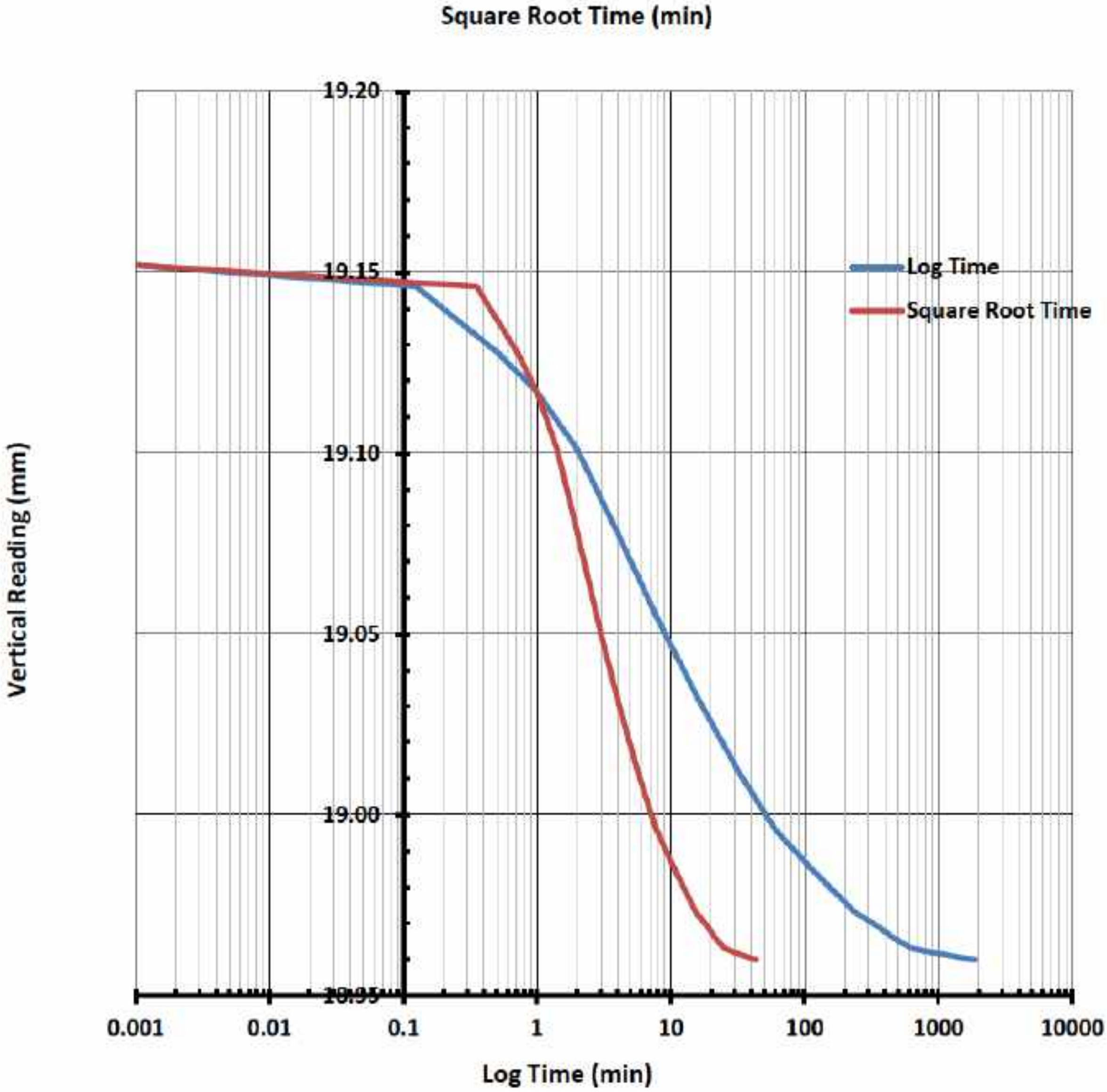
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS02		
Lab ID:	BH03-UDS02_OED	Lab:	EPLab
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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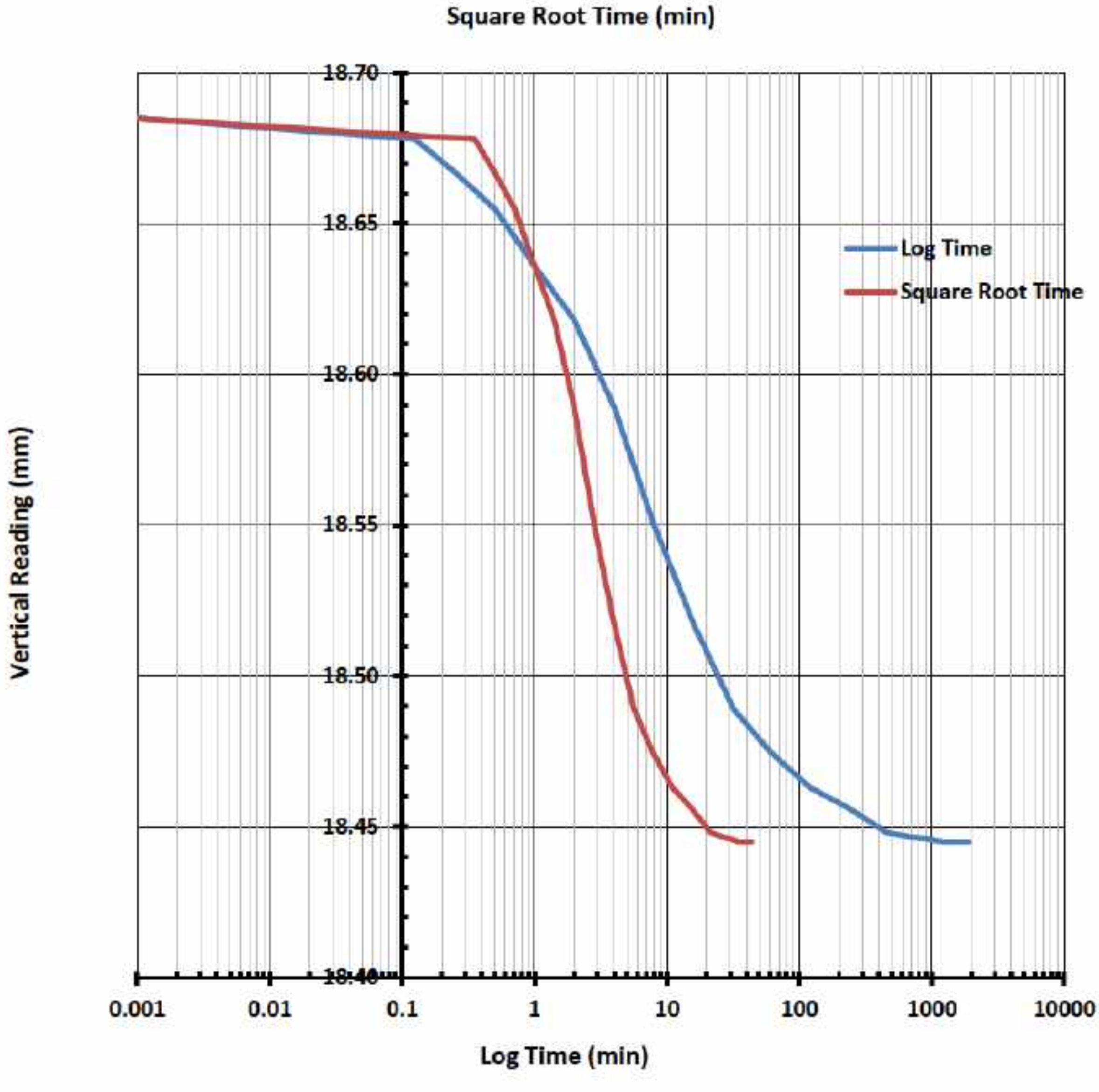
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS02		
Lab ID:	BH03-UDS02_OED	Lab:	EPLab
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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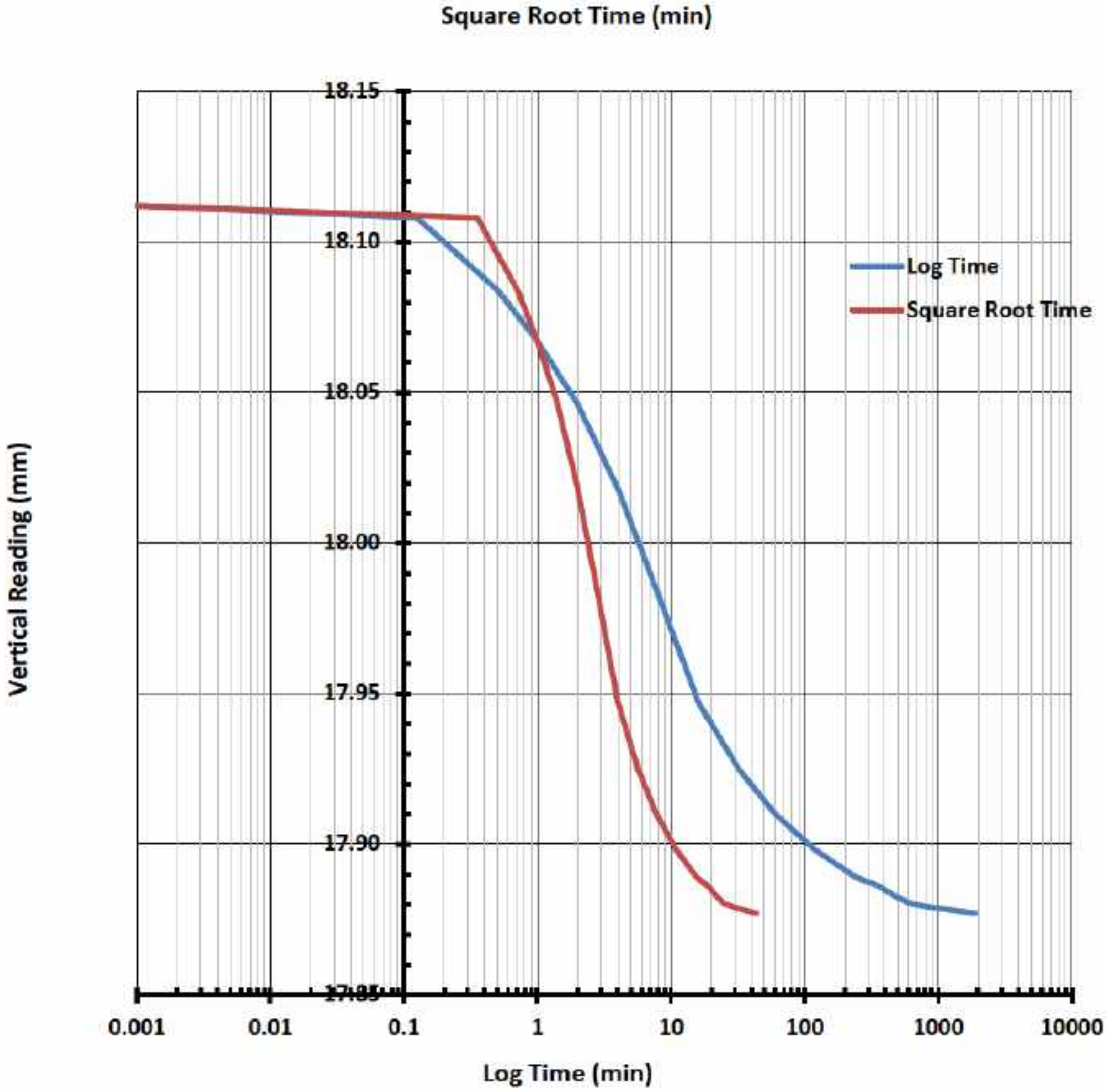
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS02		
Lab ID:	BH03-UDS02_OED	Lab:	EPLab
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa



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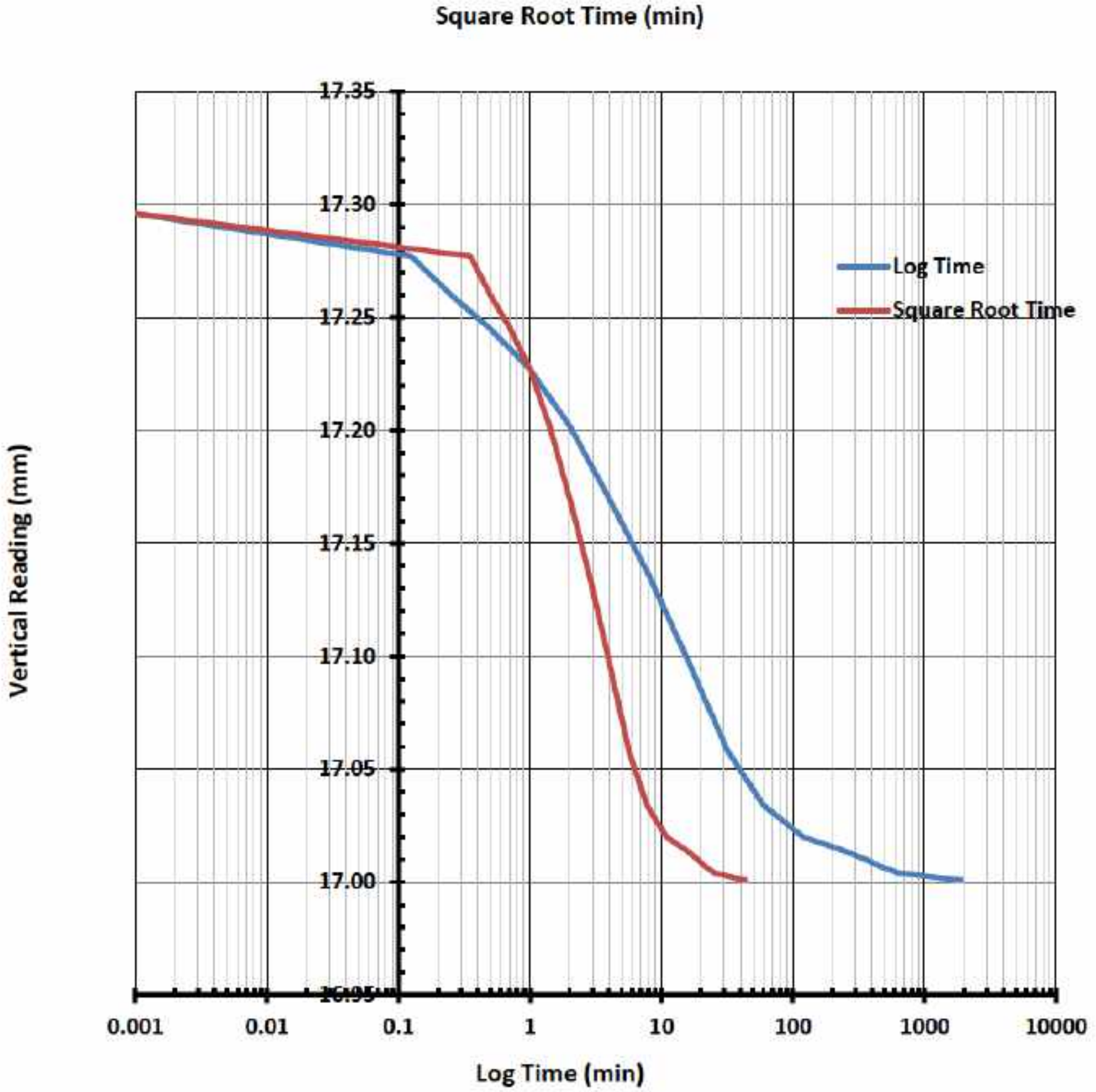
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS02		
Lab ID:	BH03-UDS02_OED	Lab:	EPLab
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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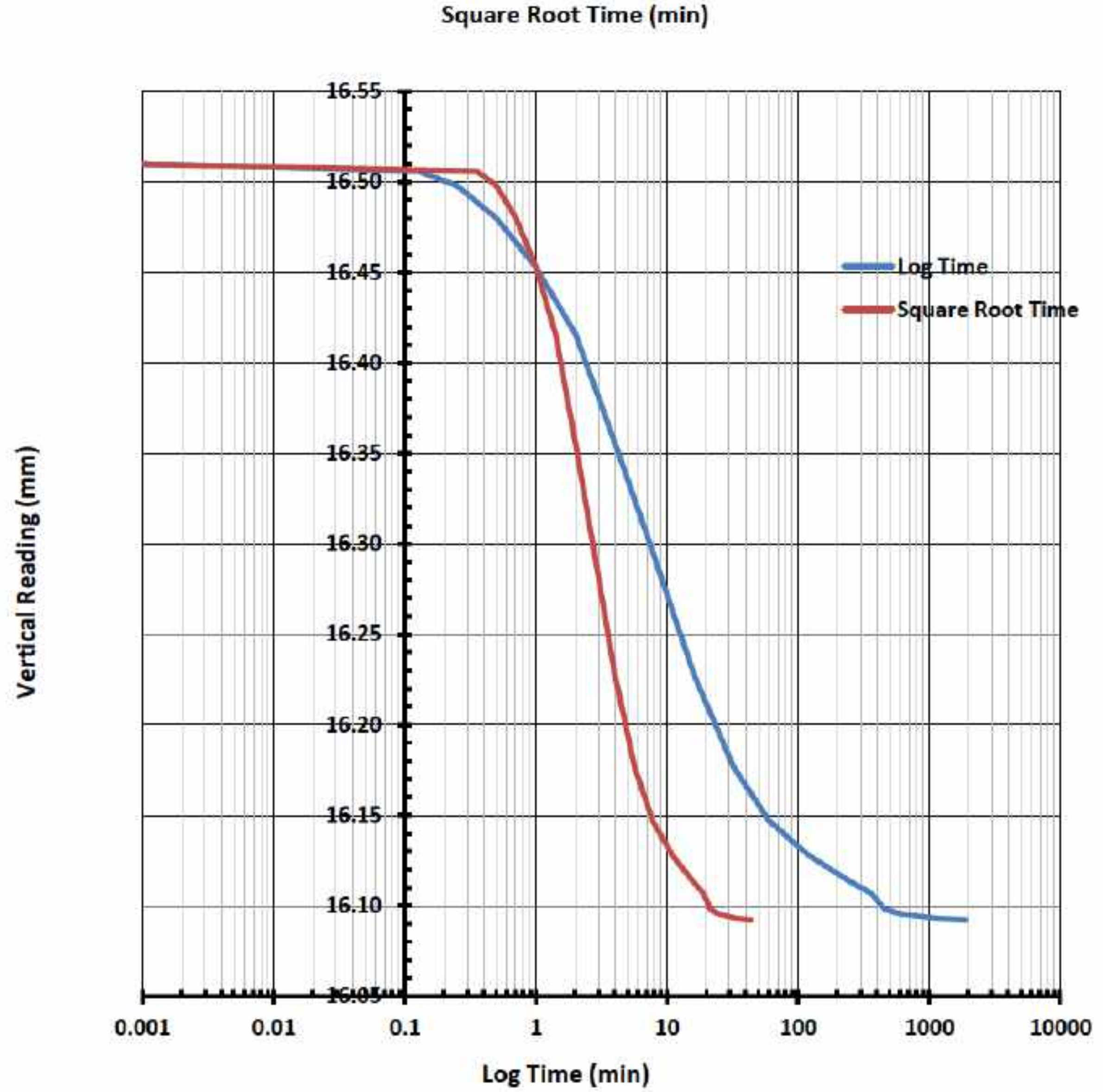
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS02		
Lab ID:	BH03-UDS02_OED	Lab:	EPLab
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa



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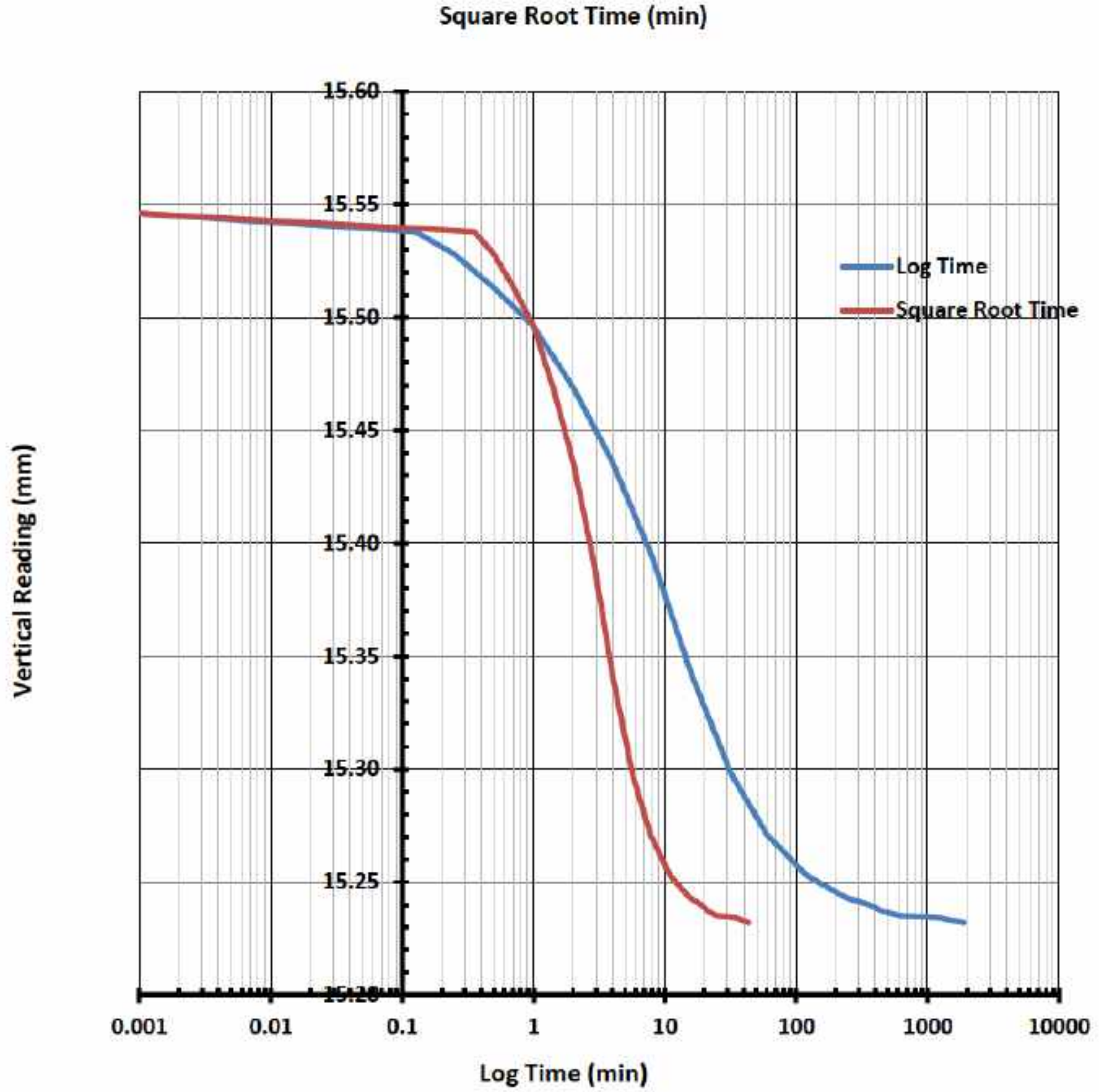
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS02		
Lab ID:	BH03-UDS02_OED	Lab:	EPLab
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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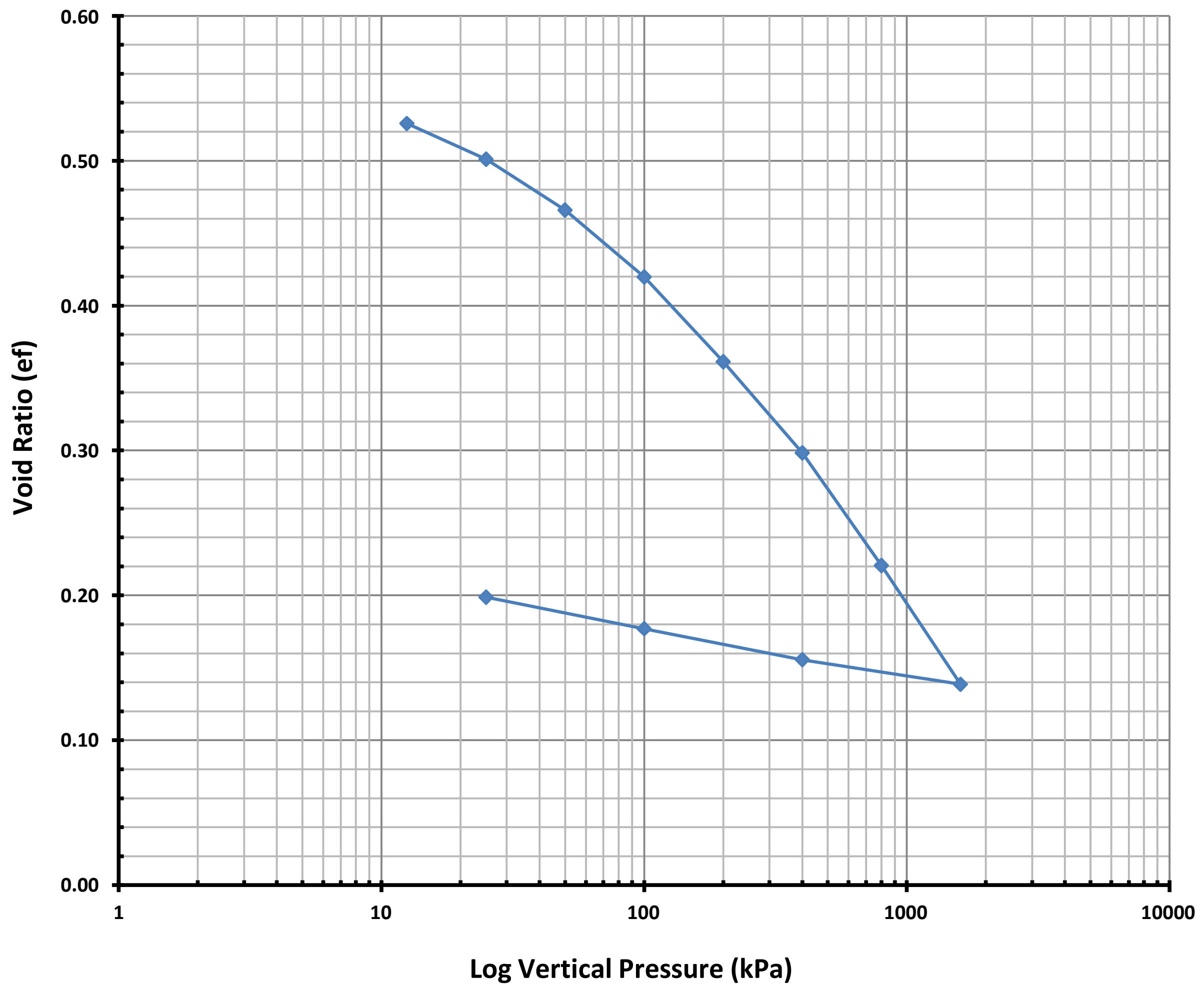
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS04		
Lab ID:	BH03-UDS04_OED	Lab:	EPLab
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 19°c

Tested by:	Phil	Initial Moisture (%):	26.97	Test Condition:	Undrained
Height (mm):	20.06	Final Moisture Content (%):	35.16	Sample Condition:	Saturated
Diameter (mm):	61.80	Bulk Density (t/m³):	1.93	Particle Density (t/m³):	2.395
Direction:	Vertical	Dry Density (t/m³):	1.52	Initial Void Ratio (e_i):	0.577

Void Ratio (e_f) Vs Log of Vertical Pressure (kPa)



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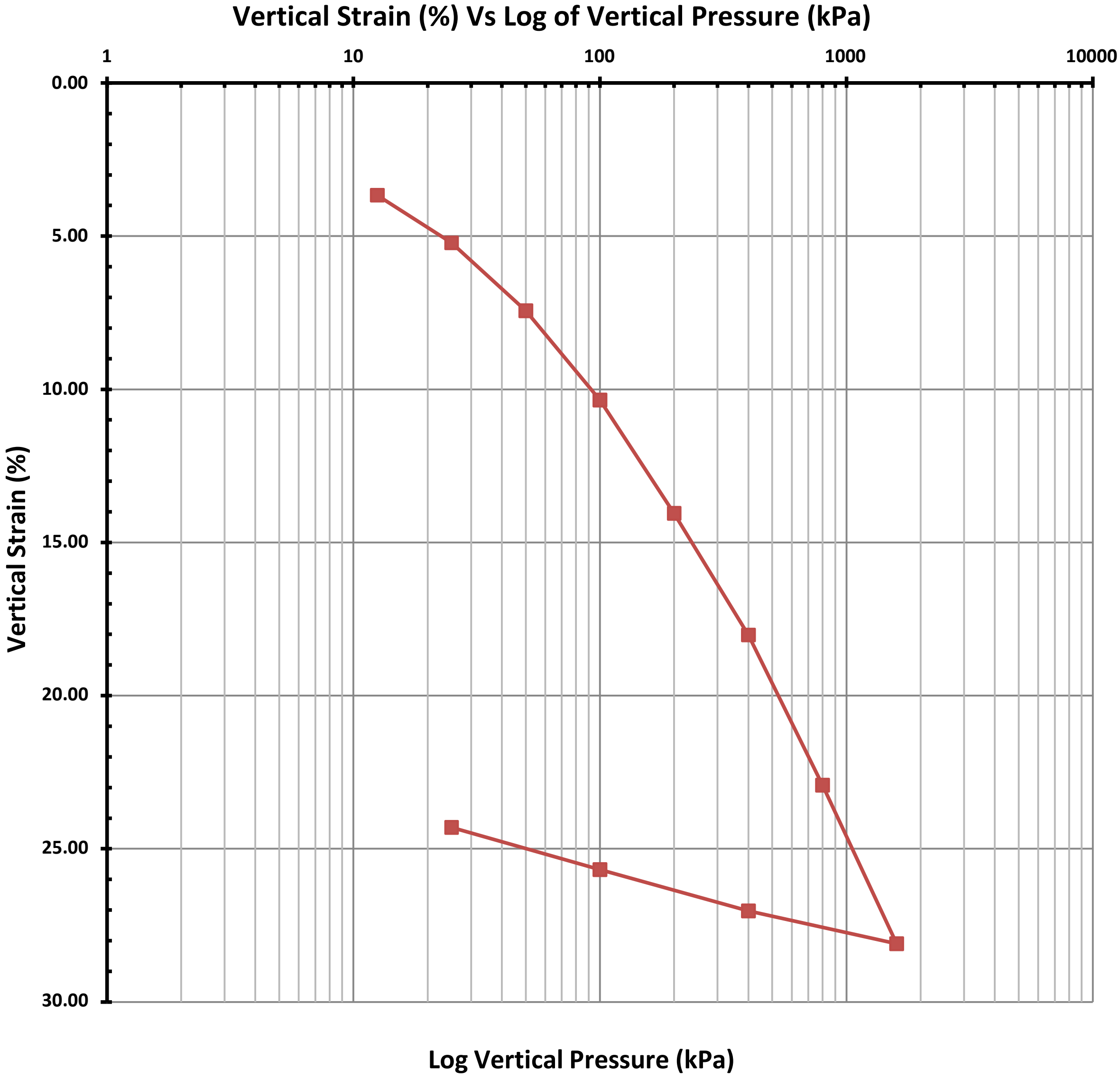
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS04		
Lab ID:	BH03-UDS04_OED	Lab:	EPLab
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 19°c



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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS04		
Lab ID:	BH03-UDS04_OED	Lab:	EPLab
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 19°C

Test Results

*

Stages	Vert Disp (mm)	Cv (m^2/yr)		Compressibility Mv (m^2/kN)	K (m/s)		Void Ratio (e_f)	Vertical Strain (%)
		*t_{50}	t_{90}					
Stage 1 @ 12.5kPa	0.735	1.234	-	2.93E-03	1.1E-09		0.526	3.66
Stage 2 @ 25kPa	1.047	1.188	-	1.29E-03	4.8E-10		0.501	5.22
Stage 3 @ 50kPa	1.492	1.136	-	9.36E-04	3.3E-10		0.466	7.44
Stage 4 @ 100kPa	2.077	1.072	-	6.30E-04	2.1E-10		0.420	10.35
Stage 5 @ 200kPa	2.818	0.993	-	4.12E-04	1.3E-10		0.361	14.05
Stage 6 @ 400kPa	3.615	0.916	-	2.31E-04	6.6E-11		0.298	18.02
Stage 7 @ 800kPa	4.599	0.805	-	1.50E-04	3.7E-11		0.221	22.93
Stage 8 @ 1600kPa	5.637	0.712	-	8.39E-05	1.9E-11		0.139	28.10

Unload @ 400kPa	5.422
Unload @ 100kPa	5.151
Unload @ 25kPa	4.875

** Values interpreted via lab only*

Comments: **Samples collected from Shelby tubes**
Cv values to be interpreted via Engineer

Samples supplied by the Client
Authorised Signatory (Geotechnical Engineer): [redacted]

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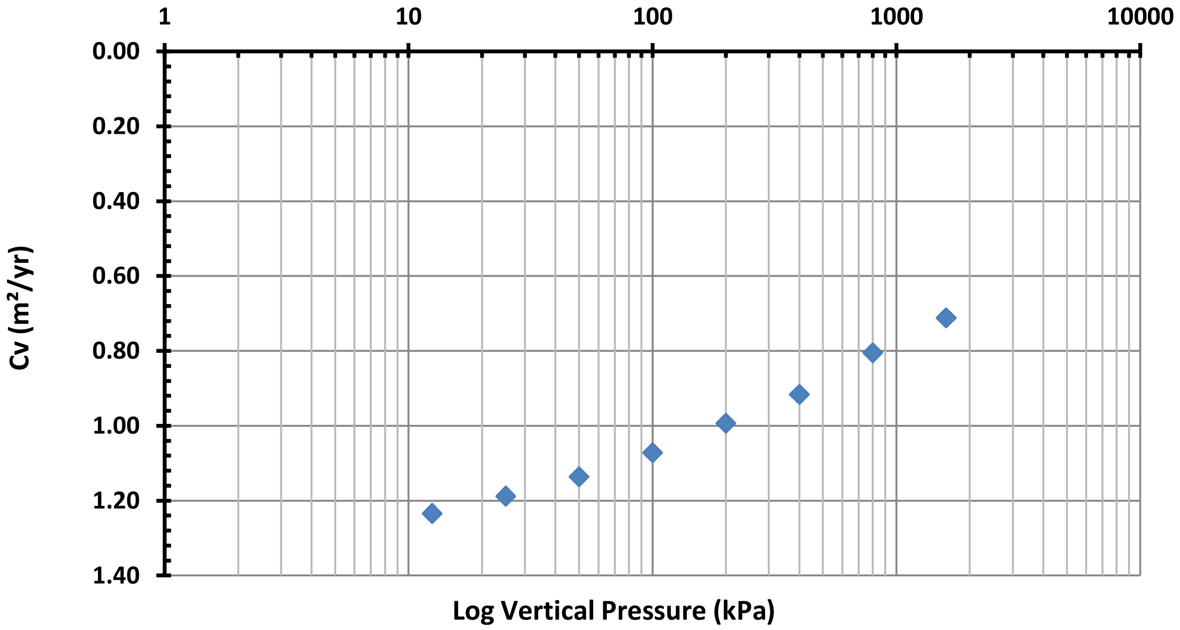
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

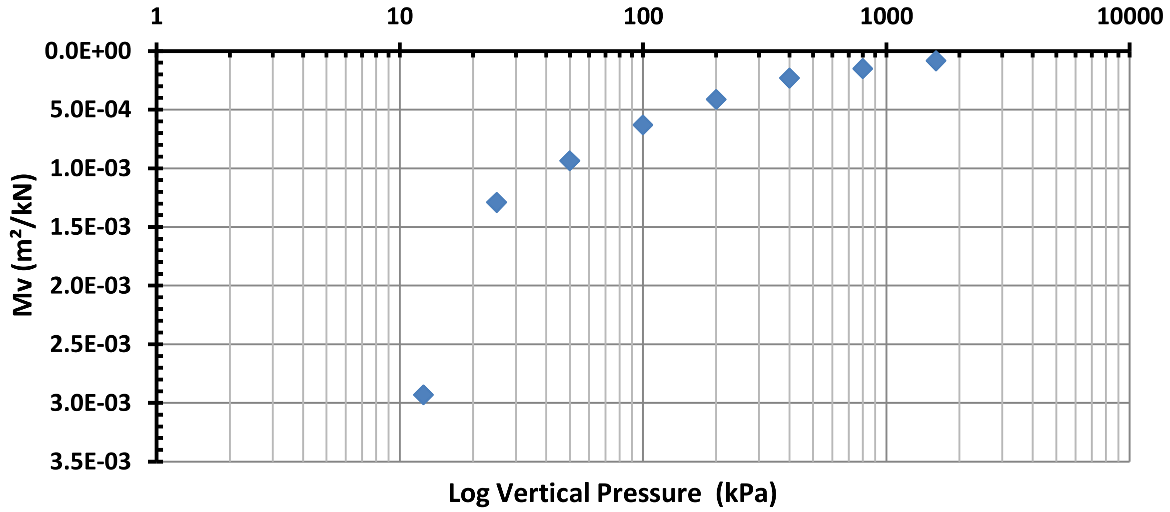
Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS04		
Lab ID:	BH03-UDS04_OED	Lab:	EPLab
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 19°C

Cv (m²/yr) Vs Log of Vertical Pressure (kPa)



* Plot based on Log (time) data

Mv (m²/kN) Vs Log of Vertical Pressure (kPa)



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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS04		
Lab ID:	BH03-UDS04_OED	Lab:	EPLab
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 19°C

TEST RESULTS PLEASE SEE PAGES BELOW

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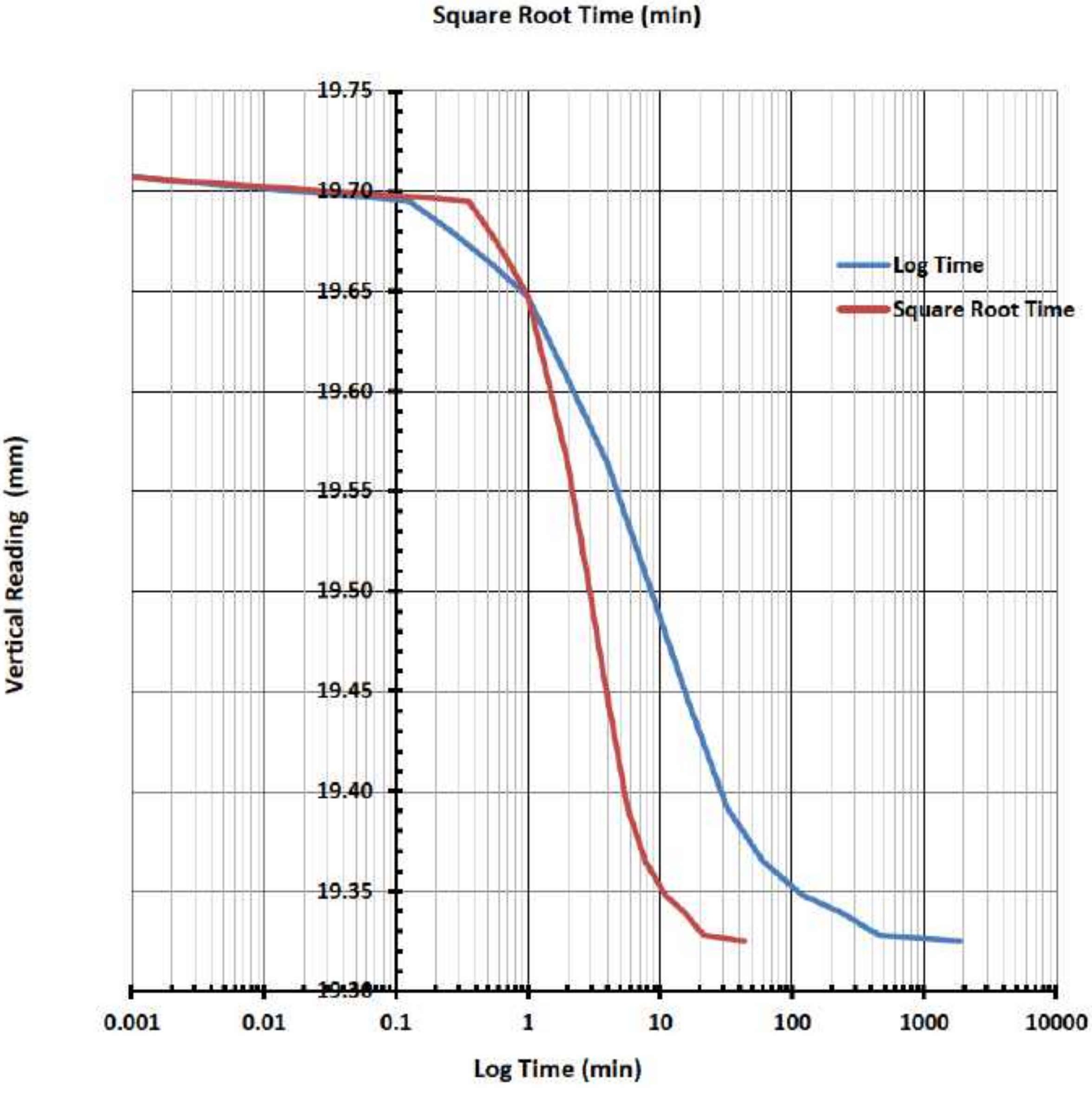
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS04		
Lab ID:	BH03-UDS04_OED	Lab:	EPLab
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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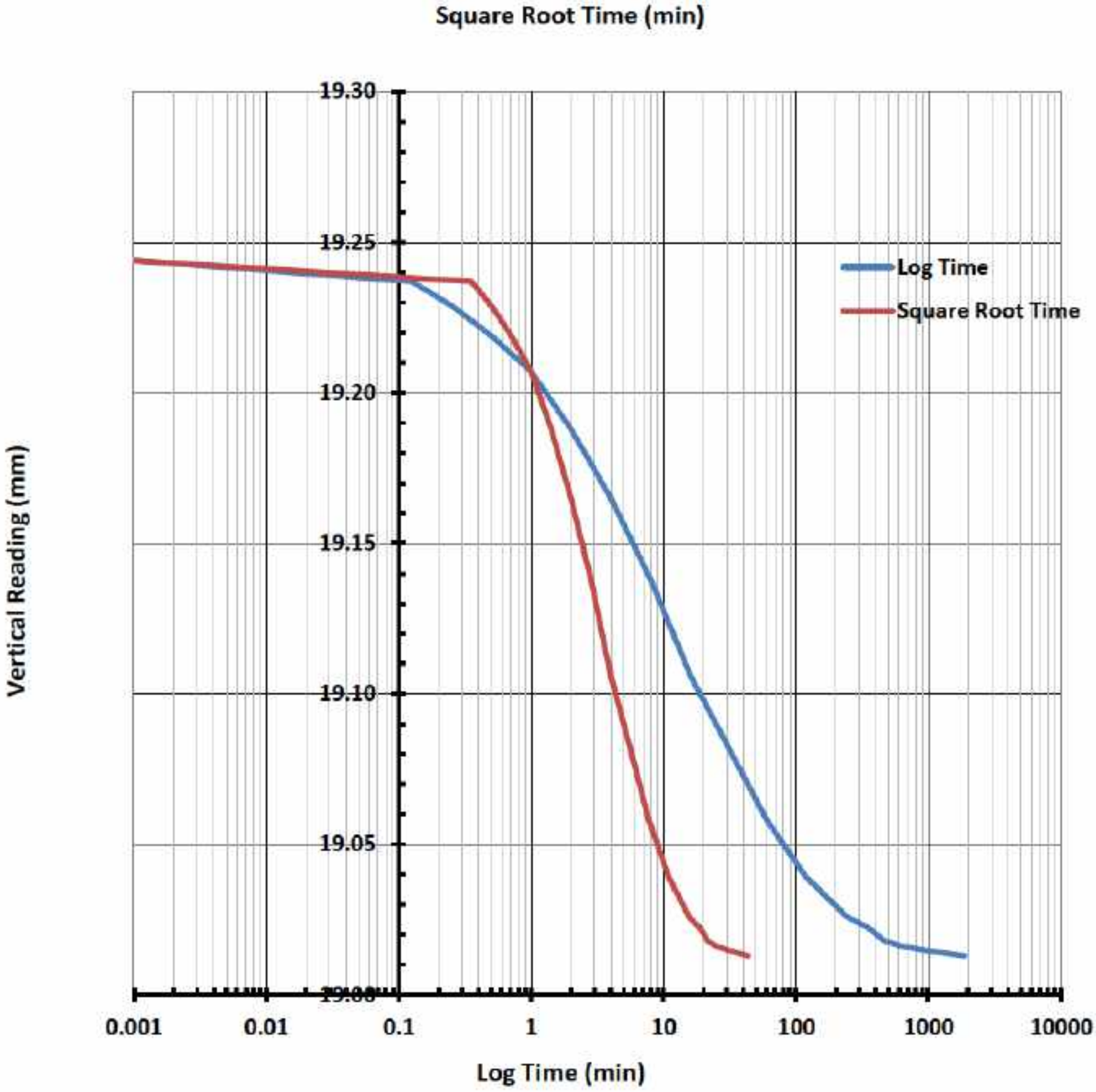
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS04		
Lab ID:	BH03-UDS04_OED	Lab:	EPLab
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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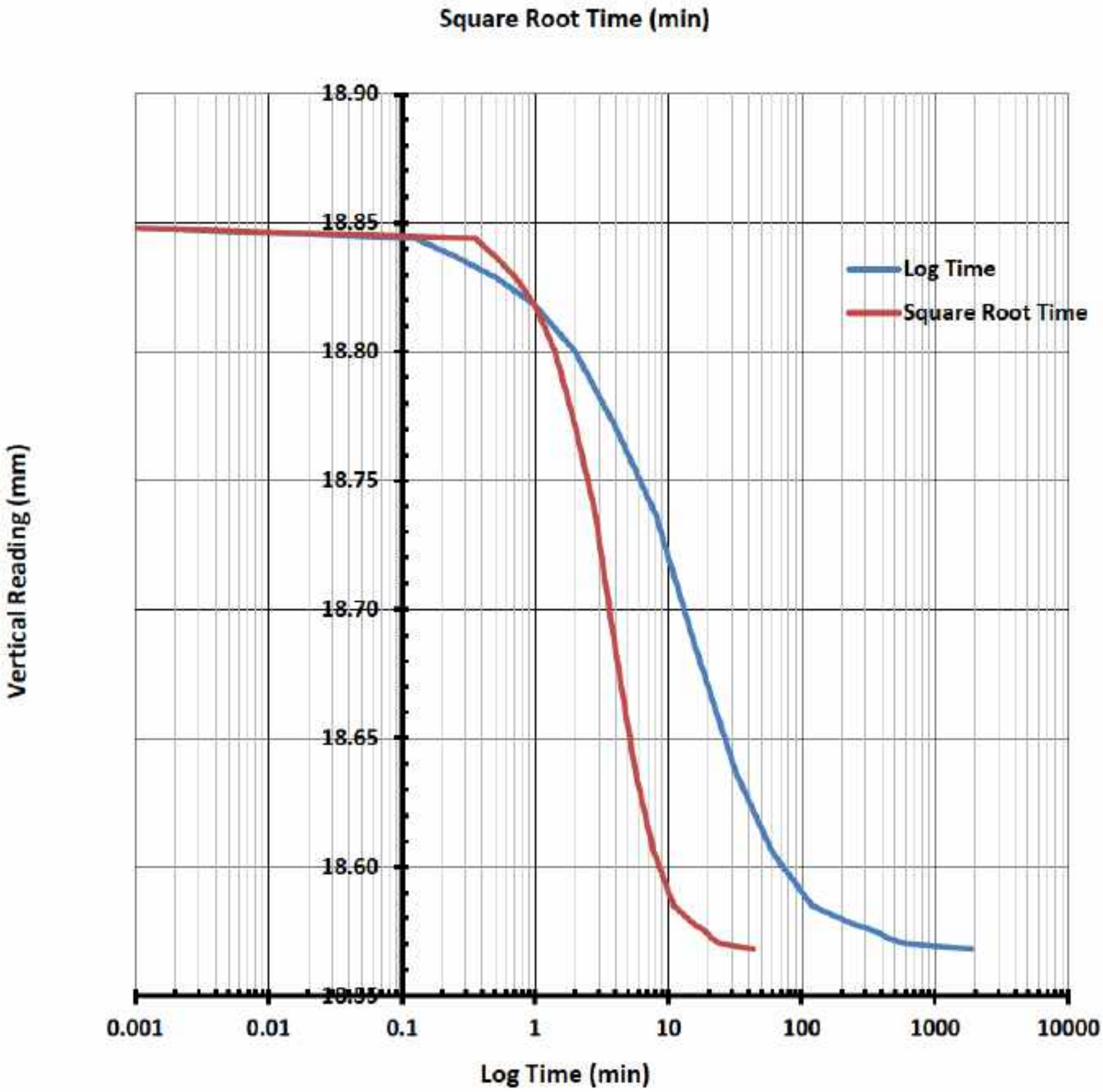
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS04		
Lab ID:	BH03-UDS04_OED	Lab:	EPLab
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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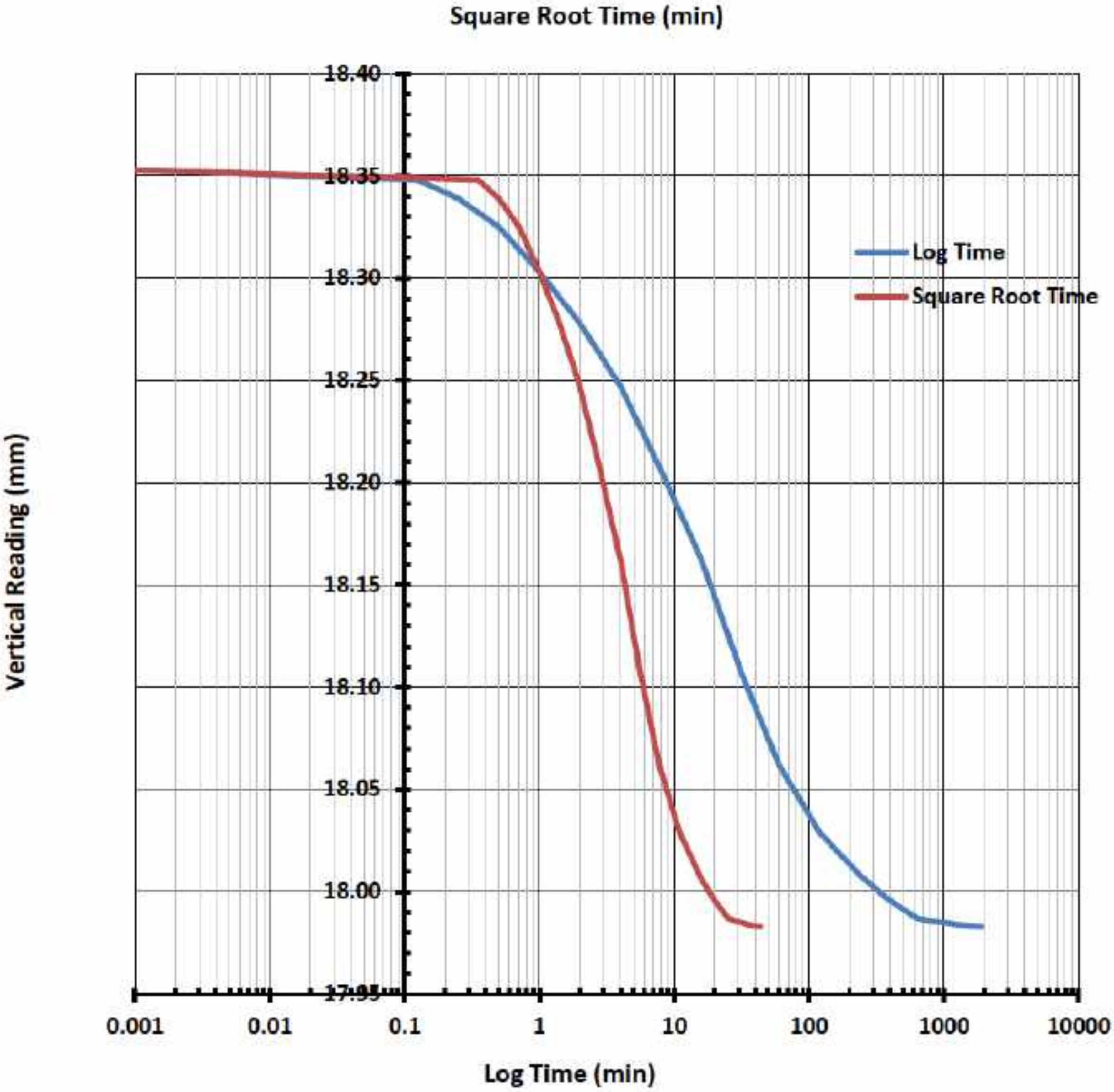
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS04		
Lab ID:	BH03-UDS04_OED	Lab:	EPLab
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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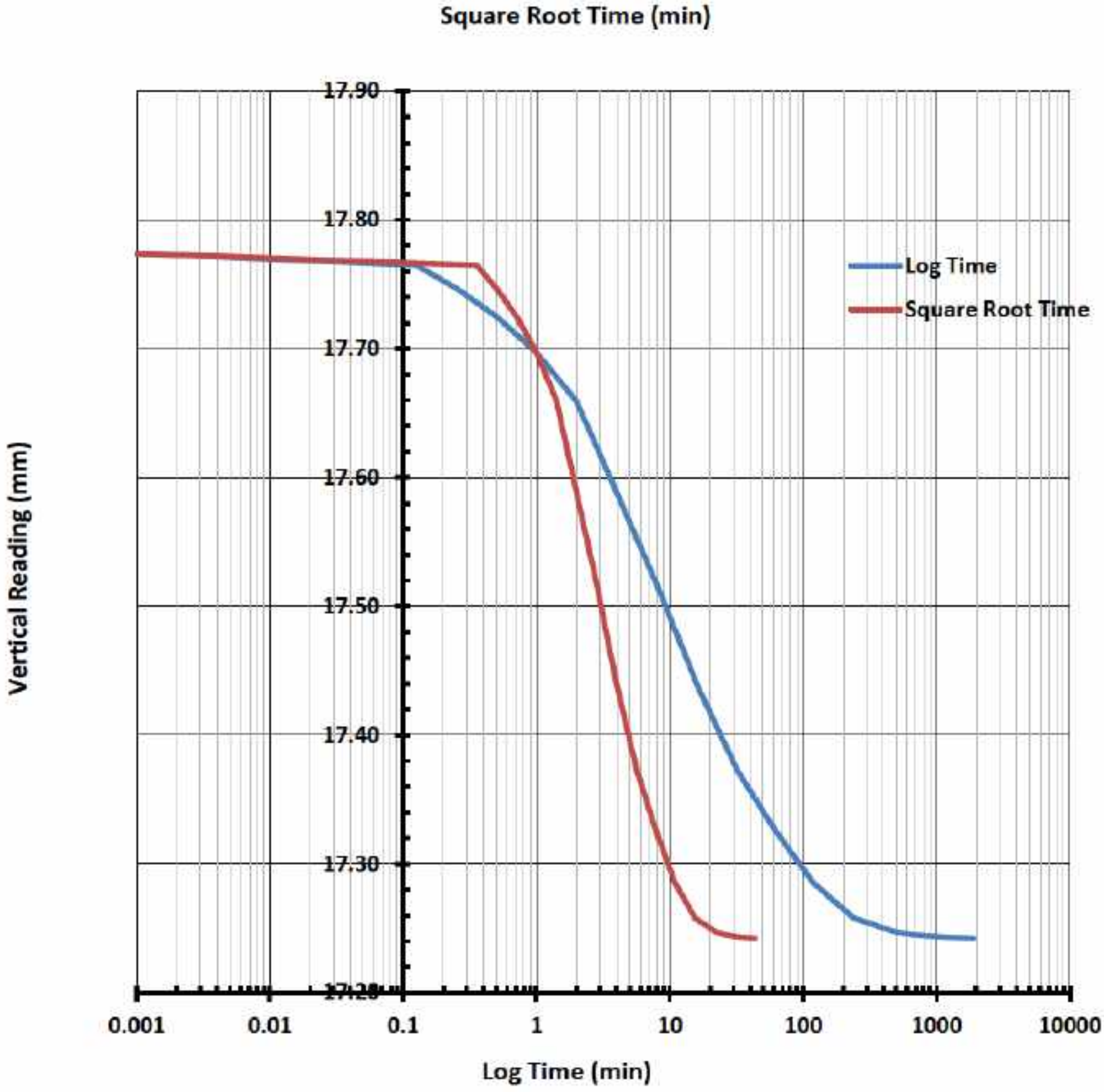
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS04		
Lab ID:	BH03-UDS04_OED	Lab:	EPLab
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa



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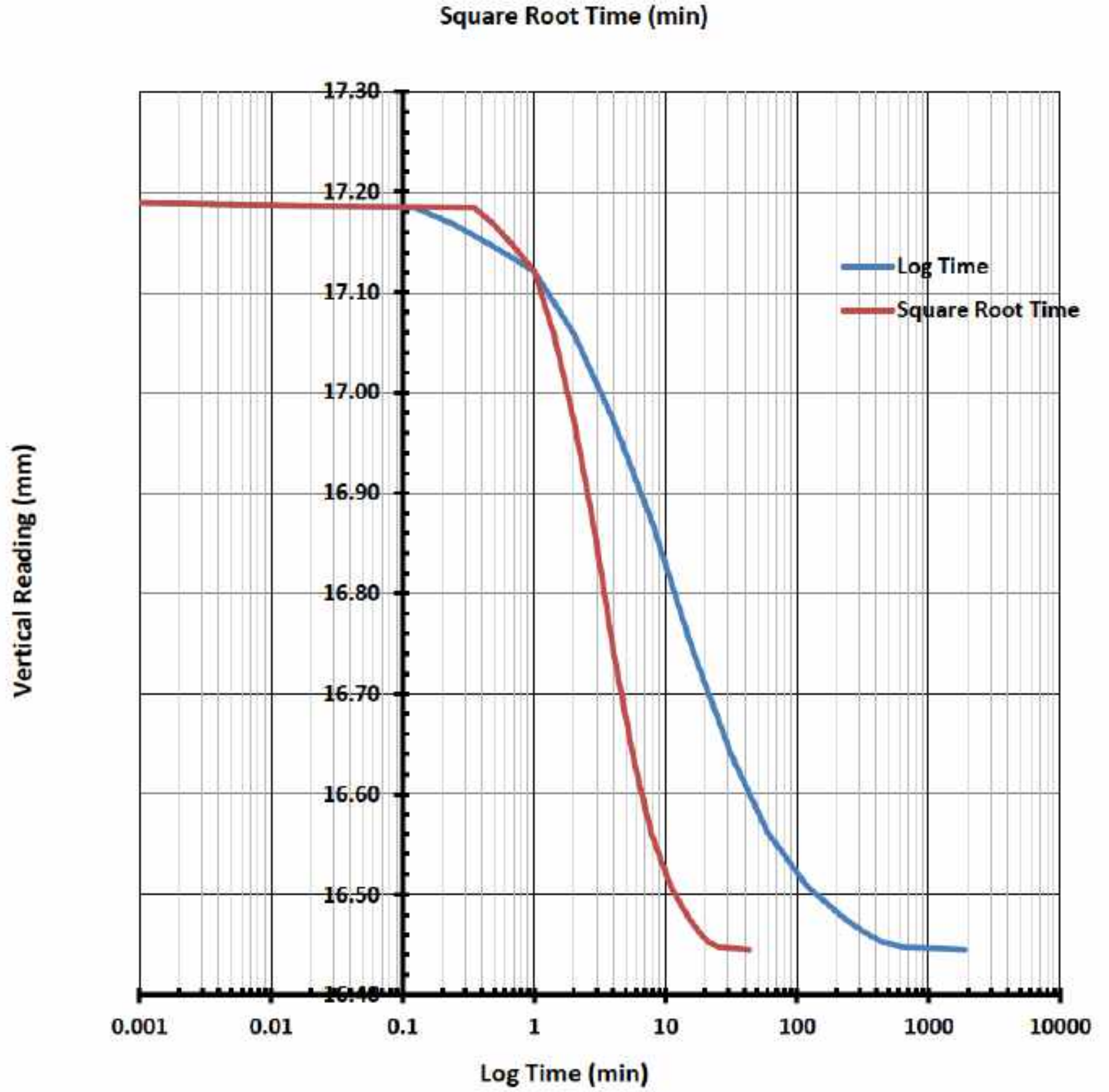
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS04		
Lab ID:	BH03-UDS04_OED	Lab:	EPLab
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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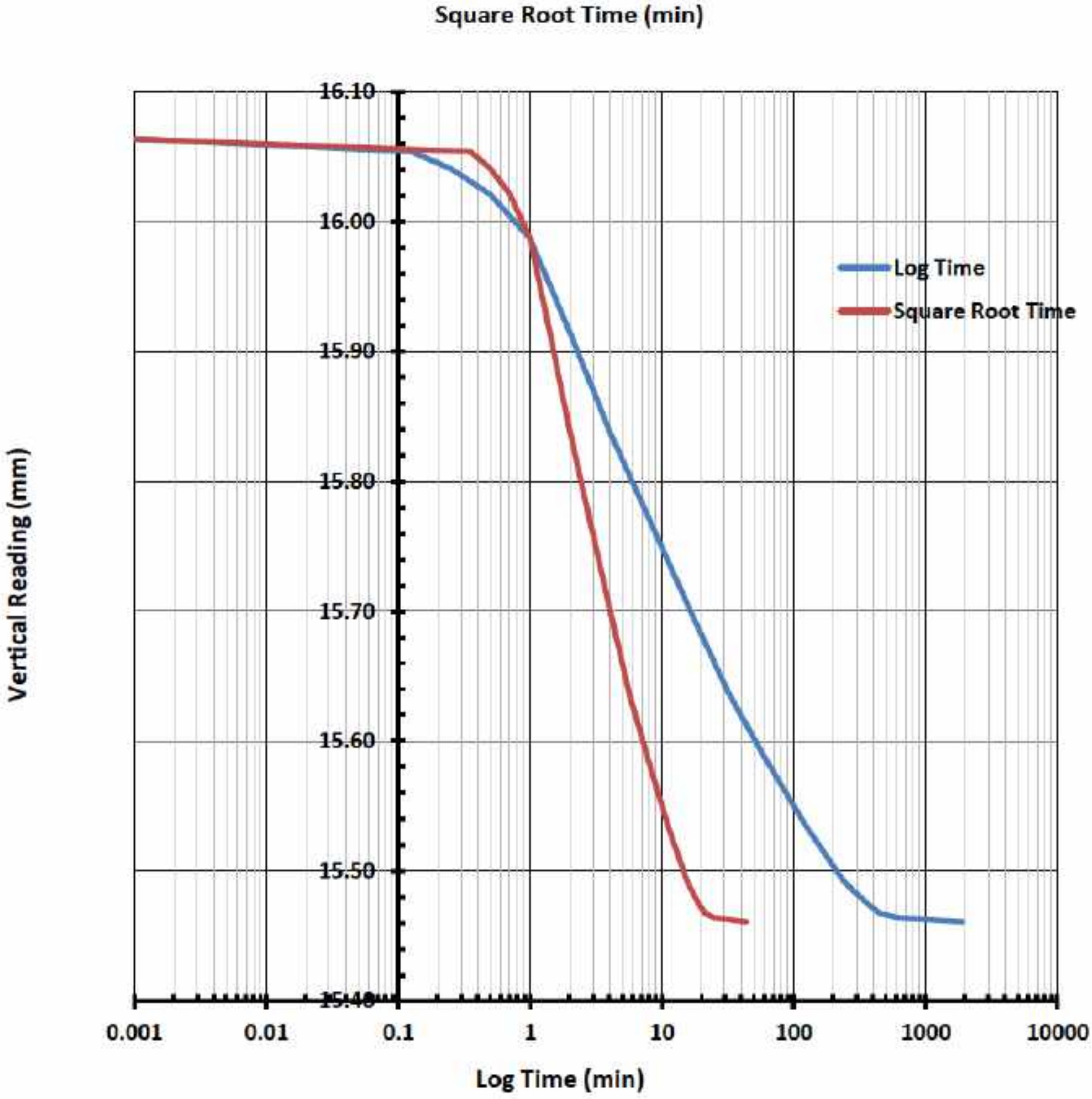
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS04		
Lab ID:	BH03-UDS04_OED	Lab:	EPLab
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa



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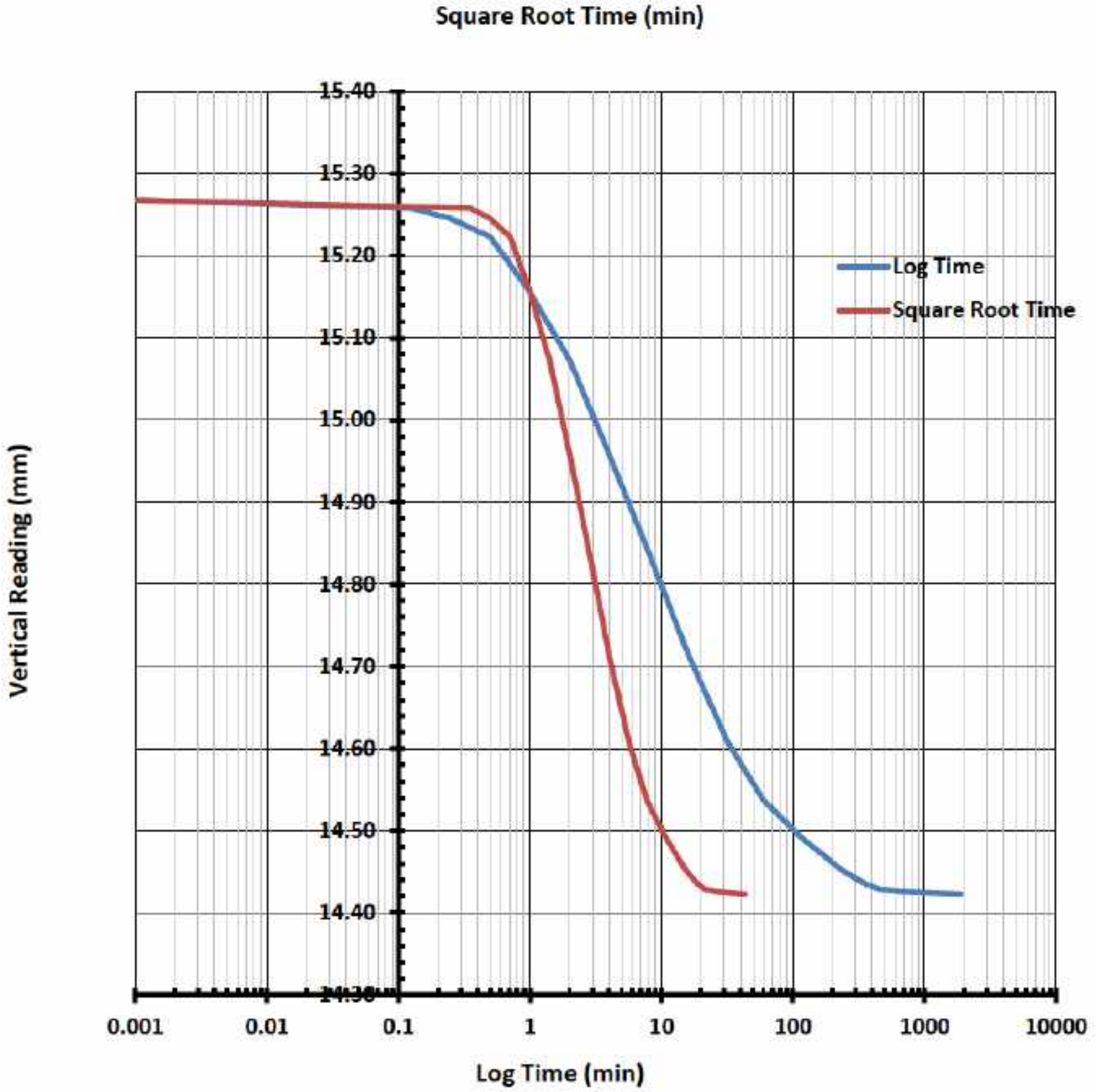
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS04		
Lab ID:	BH03-UDS04_OED	Lab:	EPLab
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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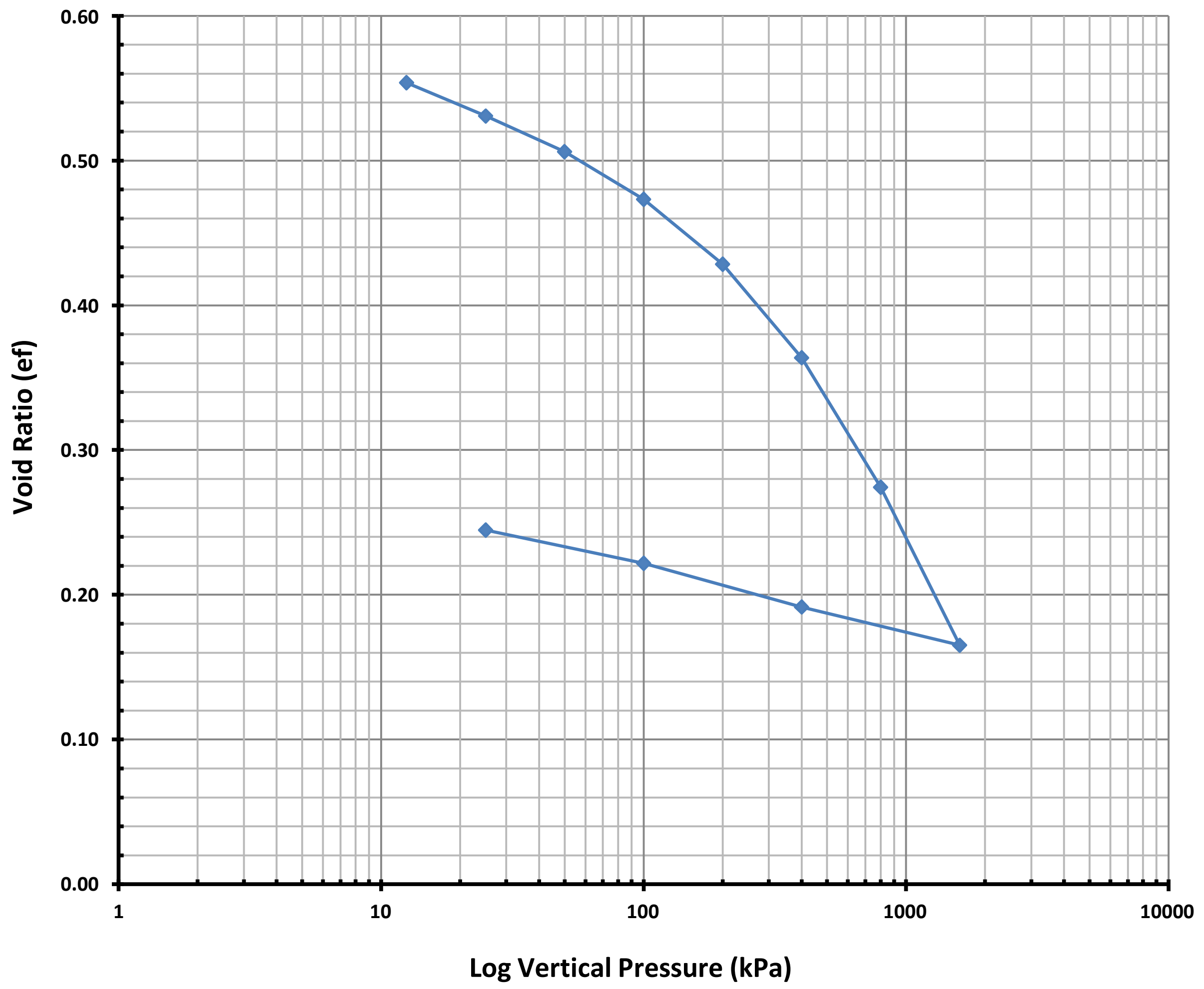
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS08		
Lab ID:	BH03-UDS08_OED	Lab:	EPLab
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C

Tested by:	Phil	Initial Moisture (%):	33.71	Test Condition:	Undrained
Height (mm):	20.15	Final Moisture Content (%):	36.67	Sample Condition:	Saturated
Diameter (mm):	61.80	Bulk Density (t/m³):	1.99	Particle Density (t/m³):	2.382
Direction:	Vertical	Dry Density (t/m³):	1.48	Initial Void Ratio (e_i):	0.604

Void Ratio (e_f) Vs Log of Vertical Pressure (kPa)



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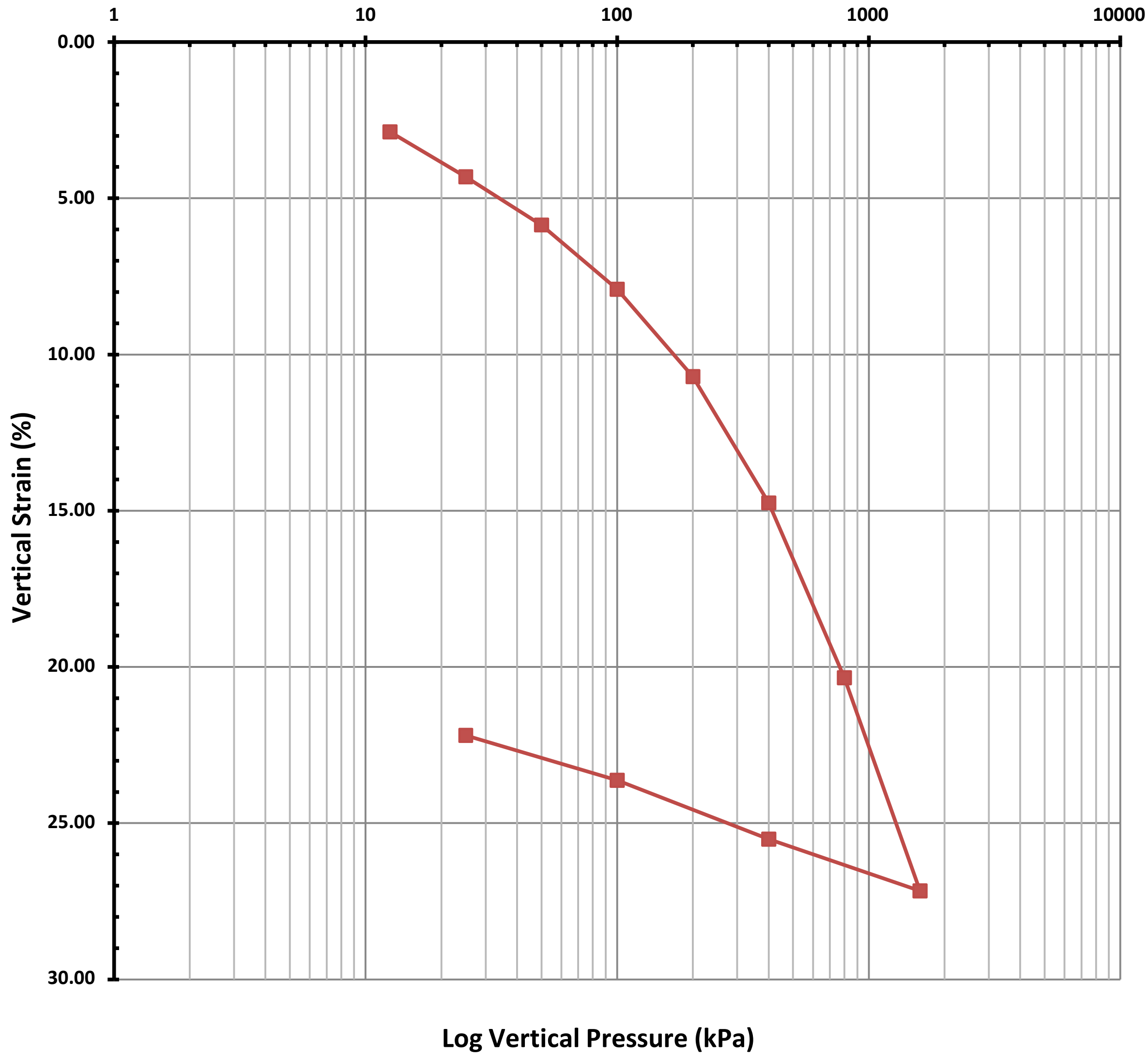
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS08		
Lab ID:	BH03-UDS08_OED	Lab:	EPLab
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°c

Vertical Strain (%) Vs Log of Vertical Pressure (kPa)



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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS08		
Lab ID:	BH03-UDS08_OED	Lab:	EPLab
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C

Test Results

*

Stages	Vert Disp (mm)	Cv (m^2/yr)		Compressibility Mv (m^2/kN)	K (m/s)		Void Ratio (e_f)	Vertical Strain (%)
		*t_{50}	t_{90}					
Stage 1 @ 12.5kPa	0.579	1.258	-	2.30E-03	9.0E-10		0.554	2.87
Stage 2 @ 25kPa	0.869	1.221	-	1.19E-03	4.5E-10		0.531	4.31
Stage 3 @ 50kPa	1.180	1.180	-	6.45E-04	2.4E-10		0.506	5.86
Stage 4 @ 100kPa	1.594	1.131	-	4.36E-04	1.5E-10		0.473	7.91
Stage 5 @ 200kPa	2.158	1.070	-	3.04E-04	1.0E-10		0.428	10.71
Stage 6 @ 400kPa	2.972	0.973	-	2.26E-04	6.9E-11		0.364	14.75
Stage 7 @ 800kPa	4.099	0.766	-	1.64E-04	3.9E-11		0.274	20.34
Stage 8 @ 1600kPa	5.474	0.582	-	1.07E-04	1.9E-11		0.165	27.17

Unload @ 400kPa	5.141
Unload @ 100kPa	4.761
Unload @ 25kPa	4.471

** Values interpreted via lab only*

Comments: **Samples collected from Shelby tubes**
Cv values to be interpreted via Engineer

Samples supplied by the Client
Authorised Signatory (Geotechnical Engineer): [redacted]

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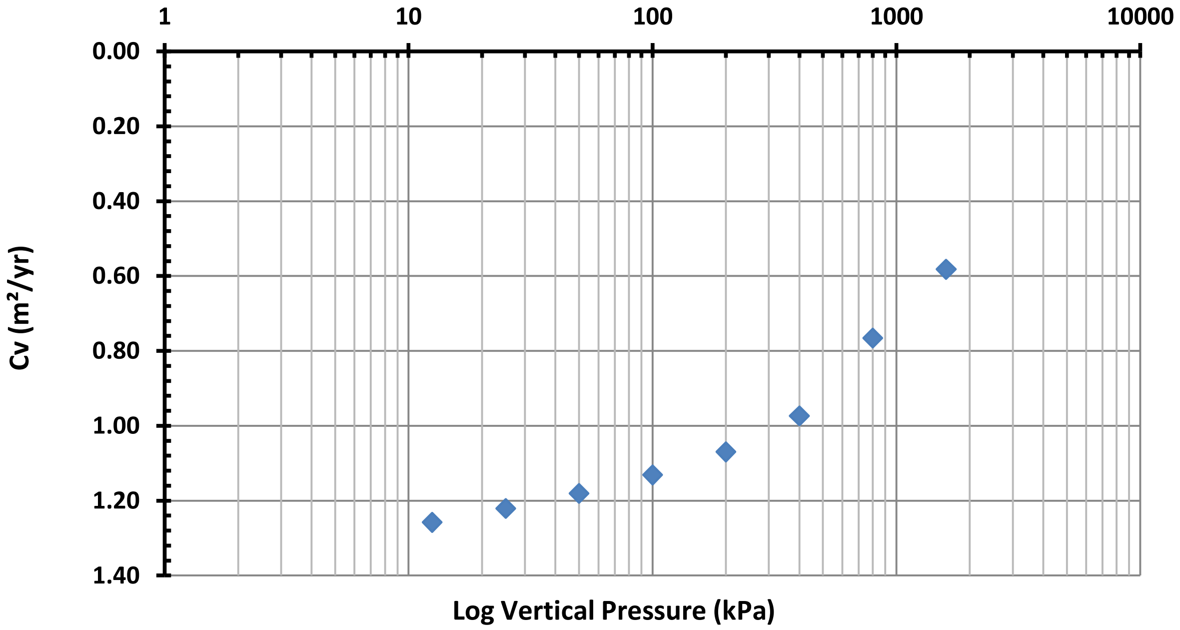
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

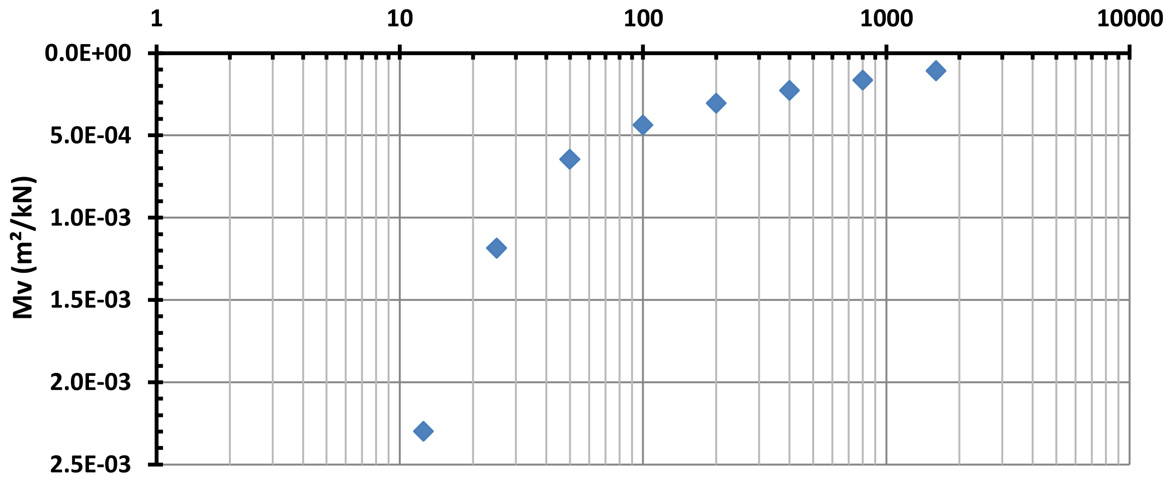
Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS08		
Lab ID:	BH03-UDS08_OED	Lab:	EPLab
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C

Cv (m²/yr) Vs Log of Vertical Pressure (kPa)



* Plot based on Log (time) data

Mv (m²/kN) Vs Log of Vertical Pressure (kPa)



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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS08		
Lab ID:	BH03-UDS08_OED	Lab:	EPLab
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C

TEST RESULTS PLEASE SEE PAGES BELOW

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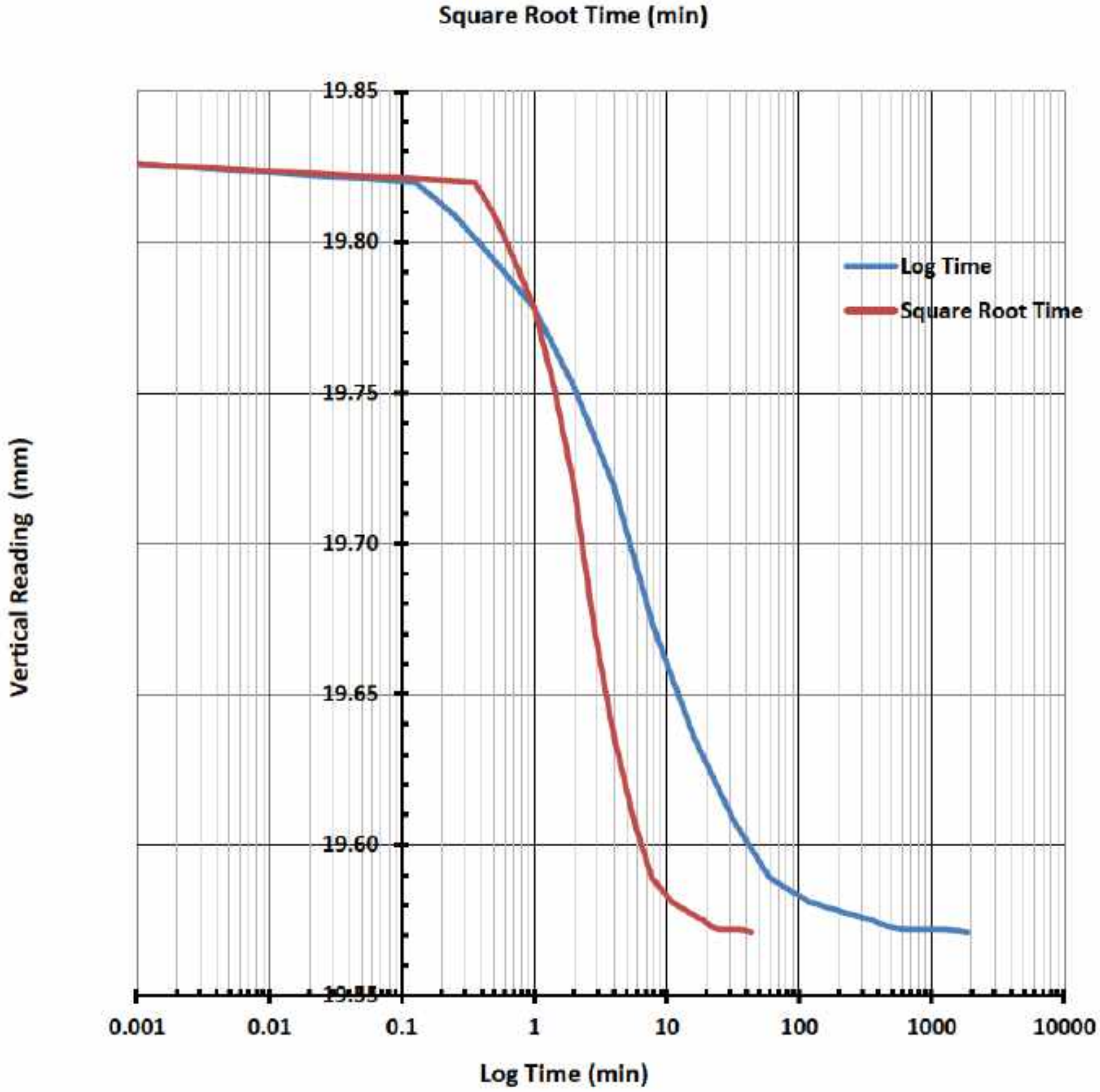
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS08		
Lab ID:	BH03-UDS08_OED	Lab:	EPLab
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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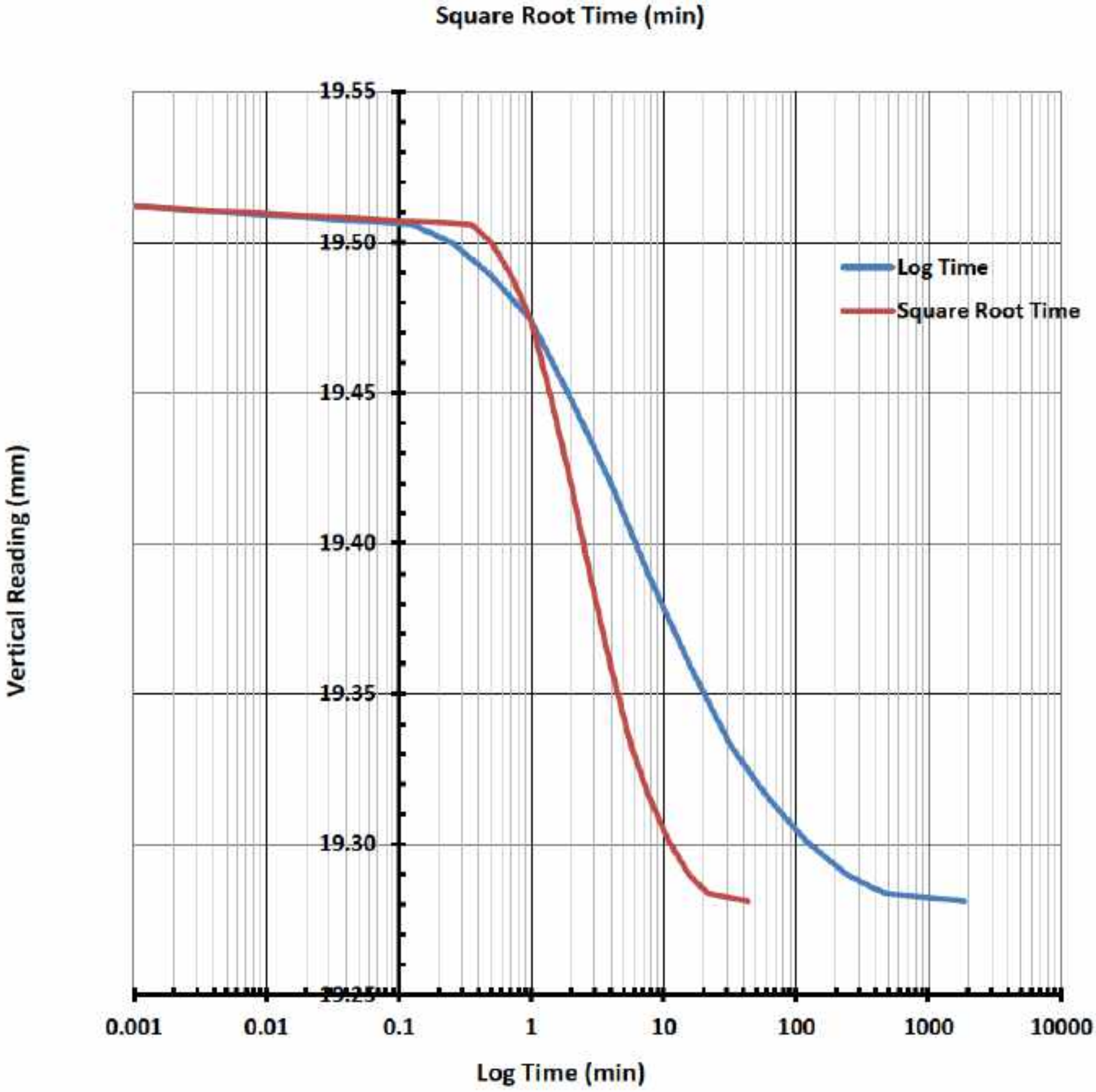
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS08		
Lab ID:	BH03-UDS08_OED	Lab:	EPLab
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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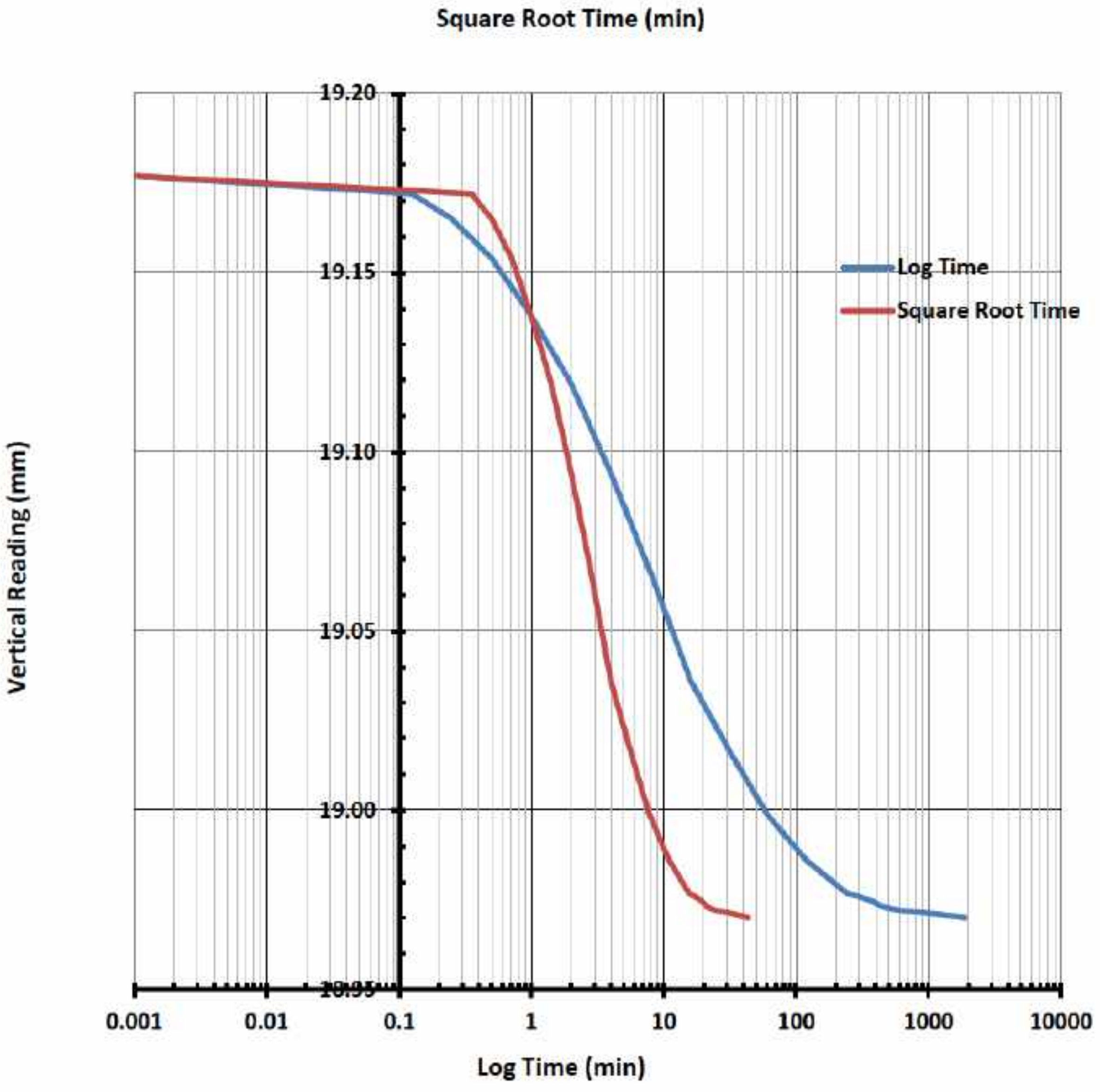
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS08		
Lab ID:	BH03-UDS08_OED	Lab:	EPLab
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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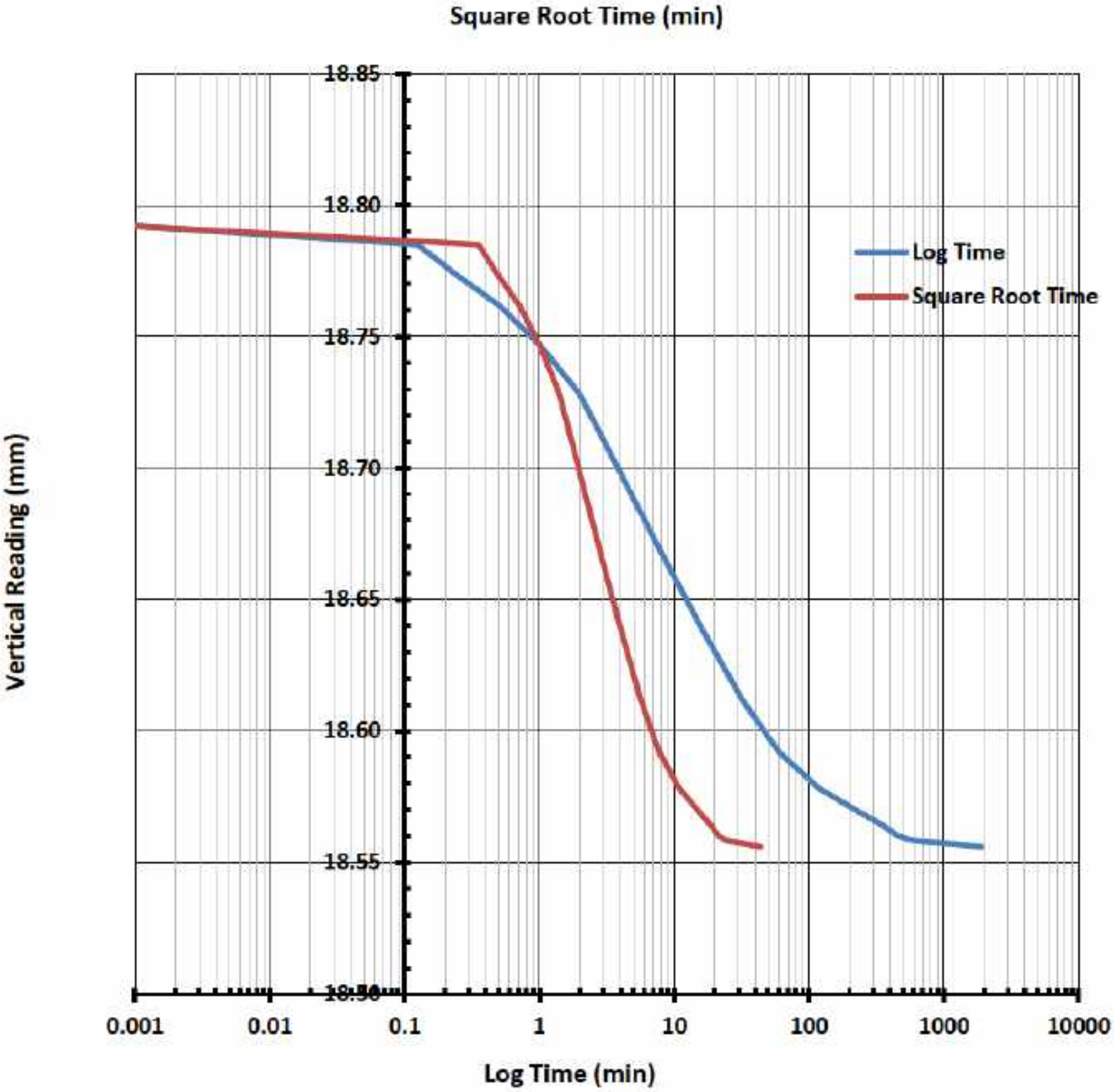
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS08		
Lab ID:	BH03-UDS08_OED	Lab:	EPLab
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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16 Gympie Way, Willetton
WA 6155
[redacted]

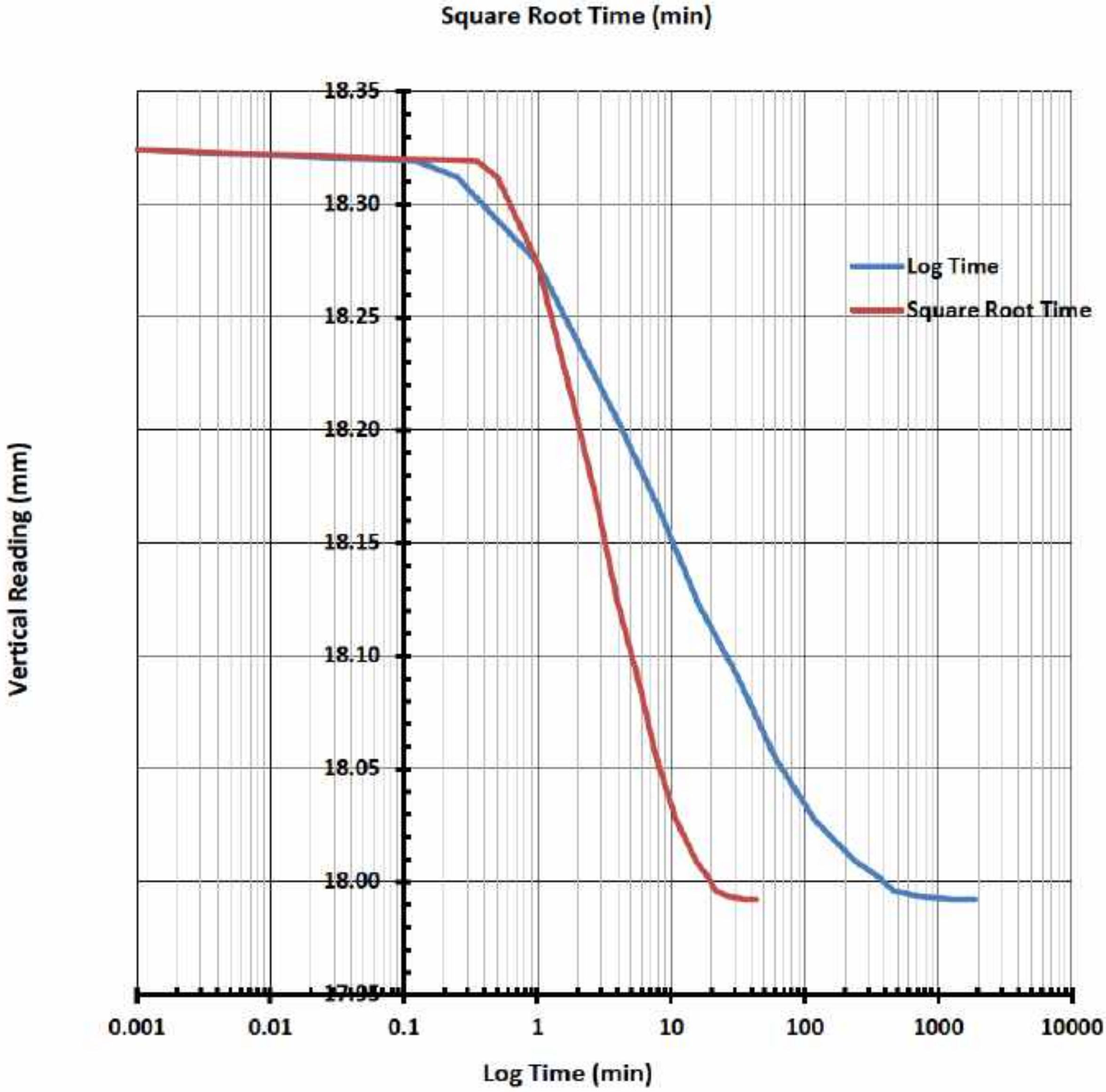
E-Precision Laboratory

CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS08		
Lab ID:	BH03-UDS08_OED	Lab:	EPLab
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa



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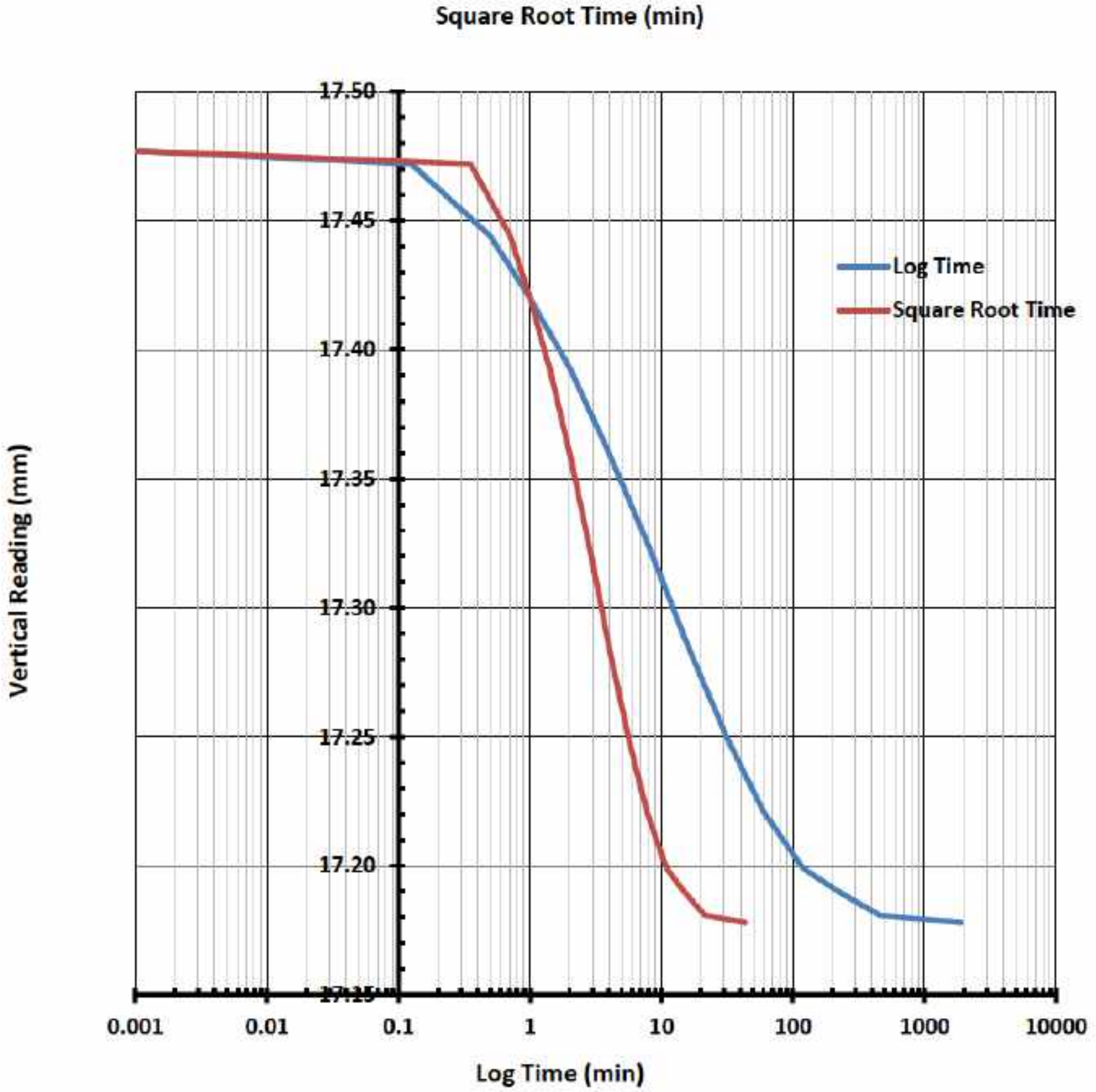
E-Precision Laboratory

CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS08		
Lab ID:	BH03-UDS08_OED	Lab:	EPLab
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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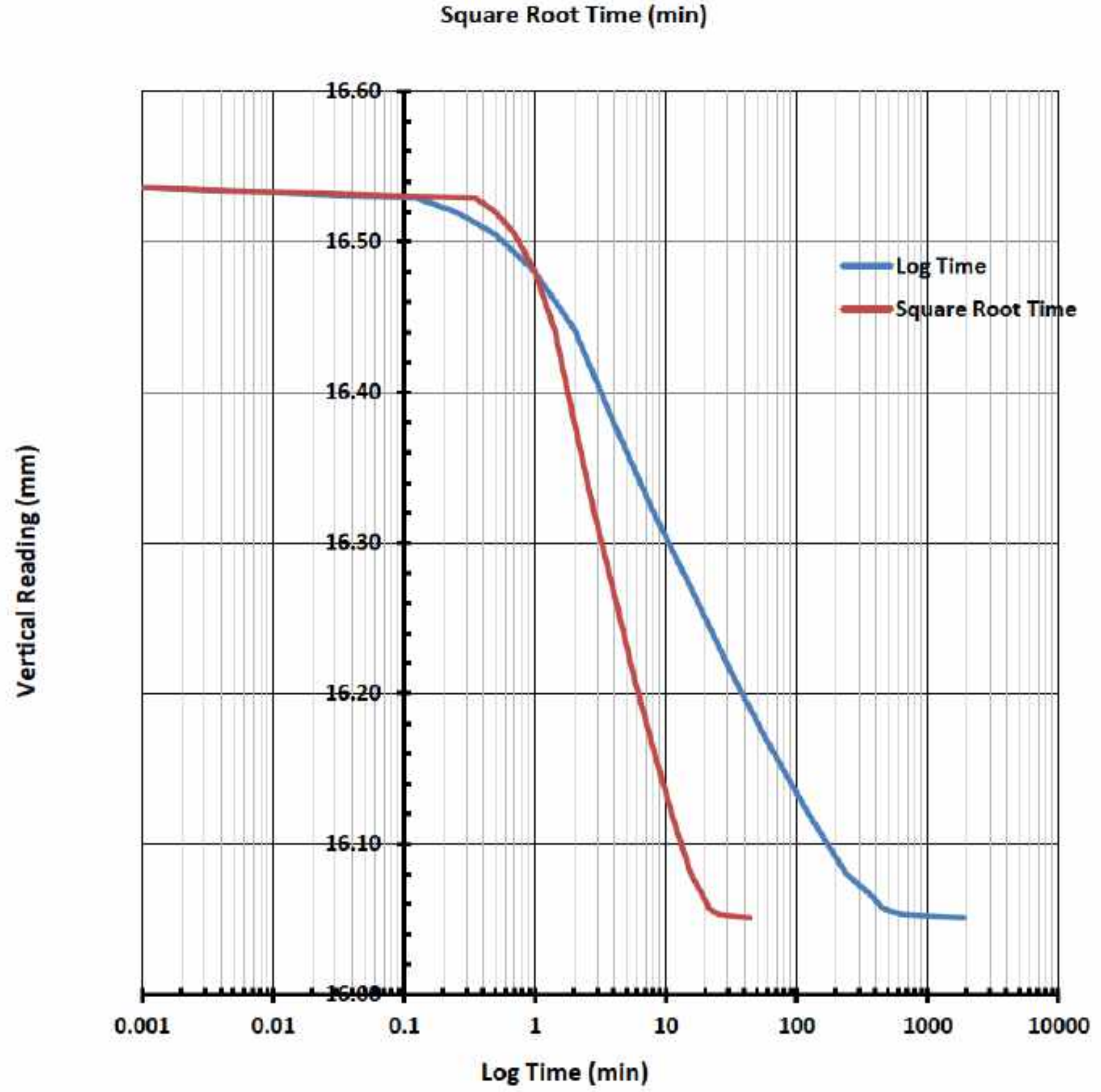
E-Precision Laboratory

CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS08		
Lab ID:	BH03-UDS08_OED	Lab:	EPLab
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa



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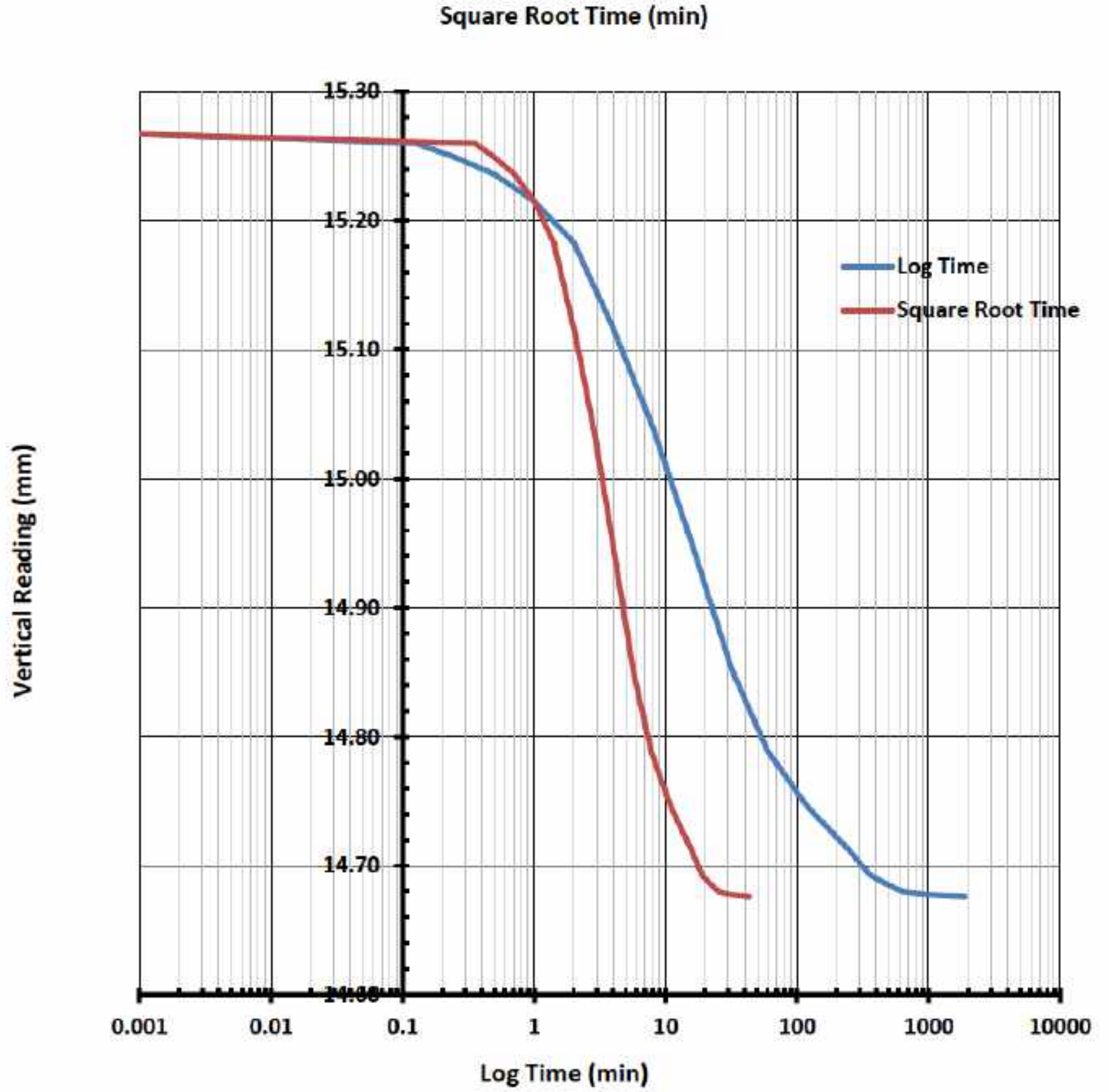
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC	Date Tested:	04/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample ID:	BH03-UDS08		
Lab ID:	BH03-UDS08_OED	Lab:	EPLab
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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E-PRECISION LABORATORY

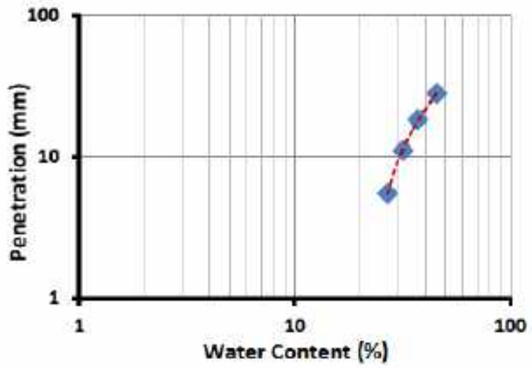
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

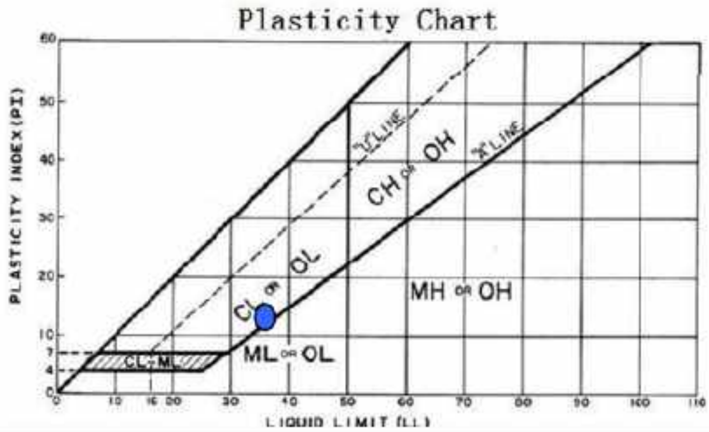
Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF Testing 2025	Lab:	EPLAB
Sample No:	BH01-CB3	Job Number:	REC
Lab ID:	BH01-CB3_ATT		
Depth (m):	8.60 - 8.80	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	36.36
Plastic Limit (%):	24.09
Plasticity Index (%):	12.26
Liquidity Index (%):	-
Shrinkage Limit (%):	19.69
Linear Shrinkage(%):	6.21

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

The results of tests performed apply only to the specific sample at time of test unless otherwise clearly stated. Reference should be made to E-Precision Laboratory's "Standard Terms and Conditions" E-Precision Laboratory ABN 431 559 578 87

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E-PRECISION LABORATORY

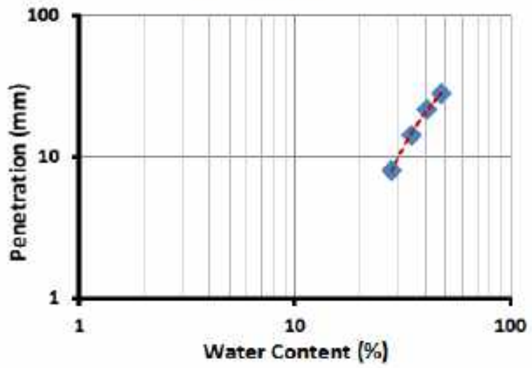
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

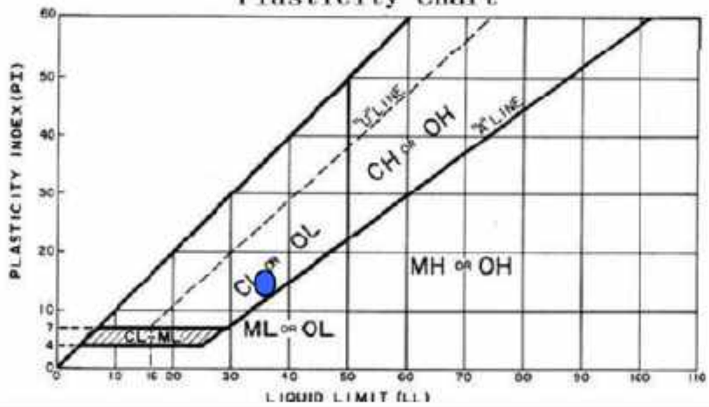
Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF Testing 2025	Lab:	EPLAB
Sample No:	BH01-CB4	Job Number:	REC
Lab ID:	BH01-CB4_ATT		
Depth (m):	11.00 - 12.00	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	36.95
Plastic Limit (%):	22.48
Plasticity Index (%):	14.46
Liquidity Index (%):	-
Shrinkage Limit (%):	17.86
Linear Shrinkage(%):	7.17

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250[redacted]

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatu[redacted]

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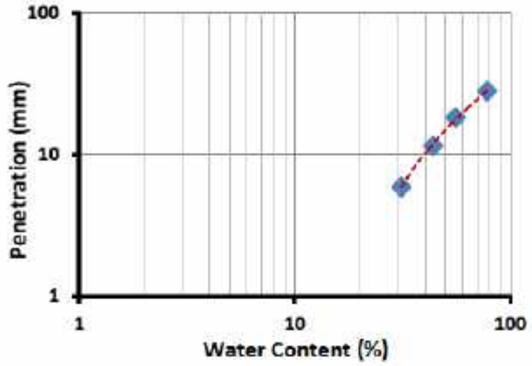
ATTERBERG LIMITS TEST REPORT

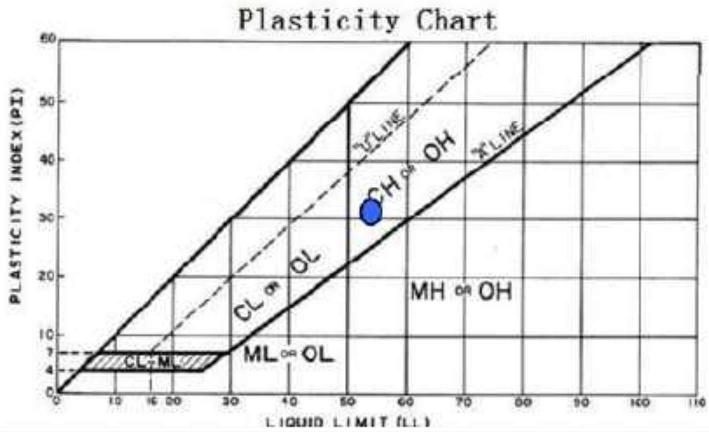
Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF Testing 2025	Lab:	EPLAB
Sample No:	BH01-CB5	Job Number:	REC
Lab ID:	BH01-CB5_ATT		
Depth (m):	14.00 - 24.00 @ 16.00m	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	54.32
Plastic Limit (%):	22.97
Plasticity Index (%):	31.35
Liquidity Index (%):	-
Shrinkage Limit (%):	14.93
Linear Shrinkage(%):	15.61

Results Chart





Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

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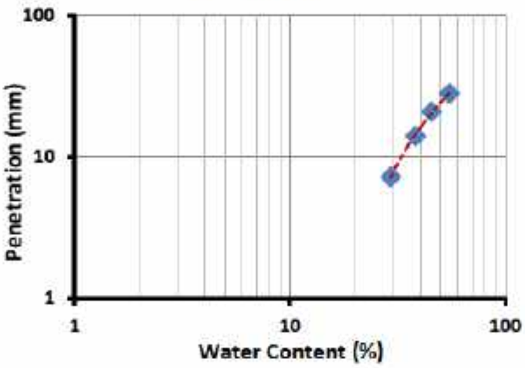
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

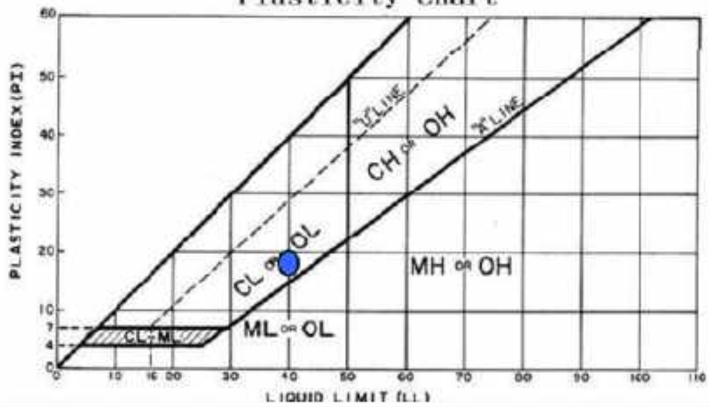
Client:	REC	Date Tested:	09/02/2025
Project:	Bellevue TSF Testing 2025	Lab:	EPLAB
Sample No:	BH01-SPT02	Job Number:	REC
Lab ID:	BH01-SPT02_ATT		
Depth (m):	3.00 - 3.45	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	41.26
Plastic Limit (%):	23.07
Plasticity Index (%):	18.19
Liquidity Index (%):	-
Shrinkage Limit (%):	17.43
Linear Shrinkage(%):	9.09

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

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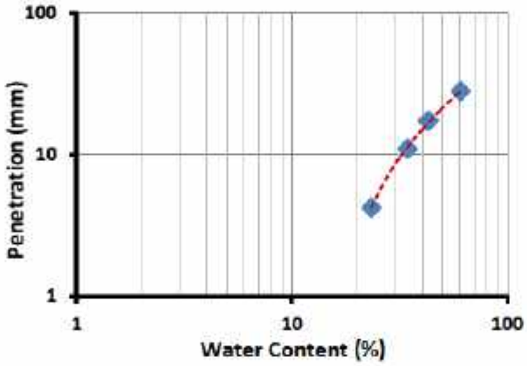
ATTERBERG LIMITS TEST REPORT

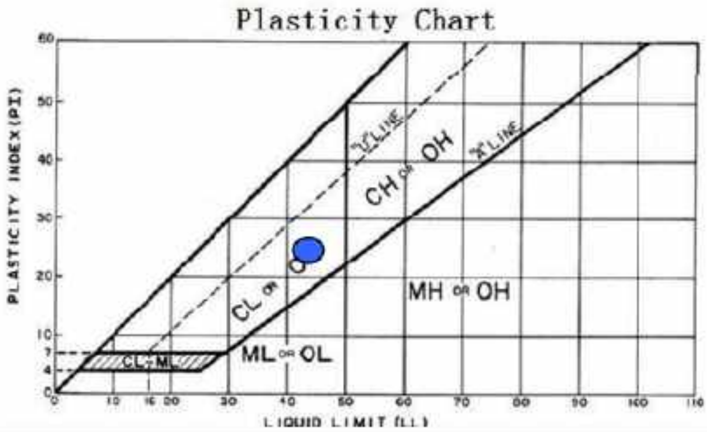
Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

Client:	REC	Date Tested:	09/02/2025
Project:	Bellevue TSF Testing 2025	Lab:	EPLAB
Sample No:	BH01-UDS02	Job Number:	REC
Lab ID:	BH01-UDS02_ATT		
Depth (m):	4.95 - 5.30	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	43.20
Plastic Limit (%):	19.92
Plasticity Index (%):	23.28
Liquidity Index (%):	-
Shrinkage Limit (%):	14.28
Linear Shrinkage(%):	11.66

Results Chart





Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm [redacted]

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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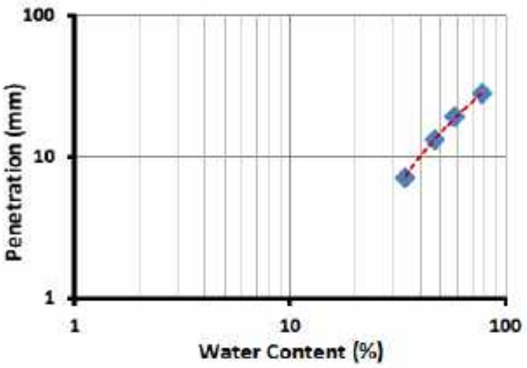
ATTERBERG LIMITS TEST REPORT

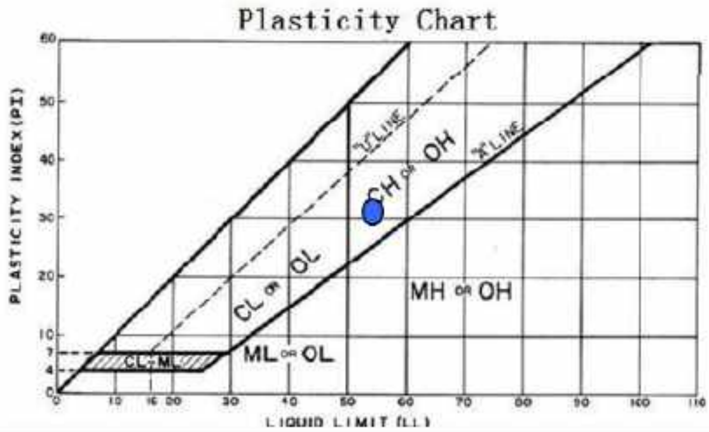
Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF Testing 2025	Lab:	EPLAB
Sample No:	BH02-SPT10	Job Number:	REC
Lab ID:	BH02-SPT10_ATT		
Depth (m):	16.50 - 16.95	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	54.49
Plastic Limit (%):	23.38
Plasticity Index (%):	31.11
Liquidity Index (%):	-
Shrinkage Limit (%):	15.21
Linear Shrinkage(%):	15.16

Results Chart





Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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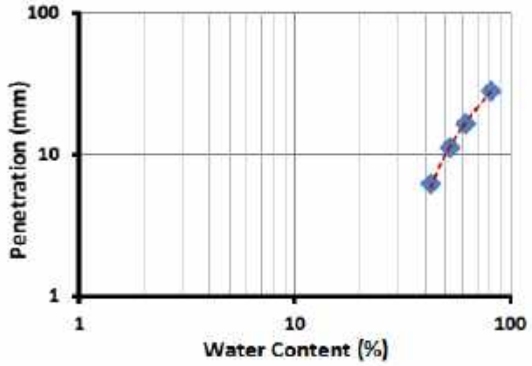
ATTERBERG LIMITS TEST REPORT

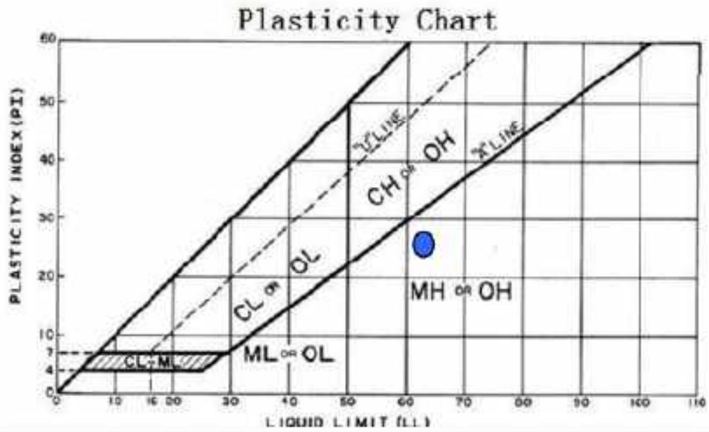
Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

Client:	REC	Date Tested:	09/02/2025
Project:	Bellevue TSF Testing 2025	Lab:	EPLAB
Sample No:	BH02-UDS02	Job Number:	REC
Lab ID:	BH02-UDS02_ATT		
Depth (m):	9.50 - 9.79	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	62.23
Plastic Limit (%):	35.86
Plasticity Index (%):	26.37
Liquidity Index (%):	-
Shrinkage Limit (%):	23.97
Linear Shrinkage(%):	13.14

Results Chart





Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

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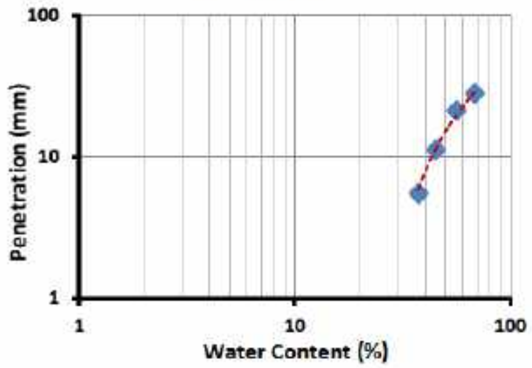
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

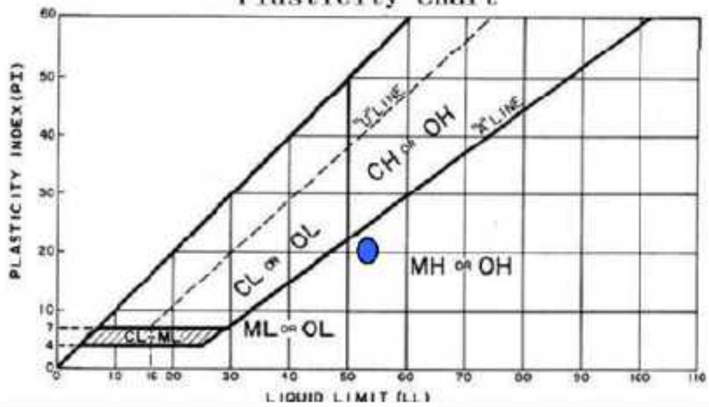
Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF Testing 2025	Lab:	EPLAB
Sample No:	BH02-UDS03	Job Number:	REC
Lab ID:	BH02-UDS03_ATT		
Depth (m):	11.00 - 11.39	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	52.48
Plastic Limit (%):	32.26
Plasticity Index (%):	20.21
Liquidity Index (%):	-
Shrinkage Limit (%):	23.40
Linear Shrinkage(%):	10.54

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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16 Gympie Way, Willetton
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E-PRECISION LABORATORY

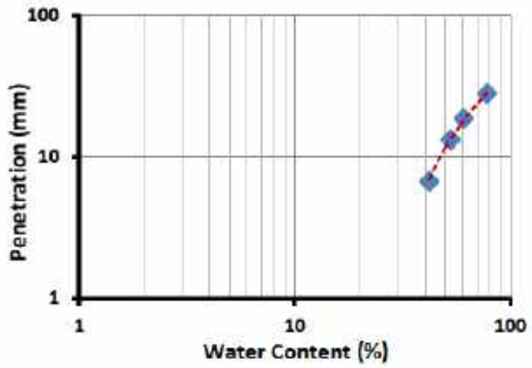
ATTERBERG LIMITS TEST REPORT

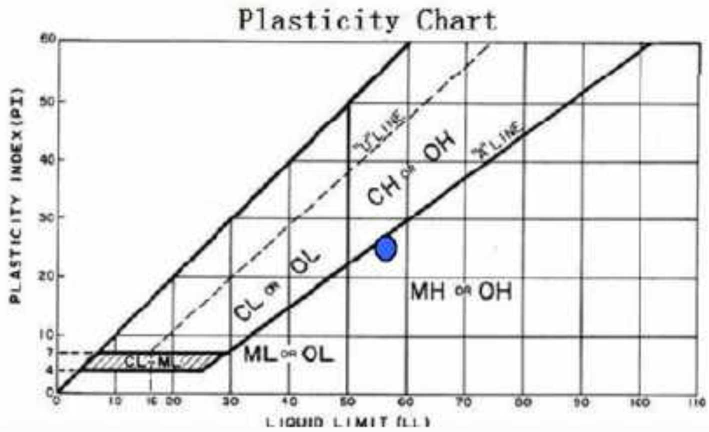
Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF Testing 2025	Lab:	EPLAB
Sample No:	BH02-UDS04	Job Number:	REC
Lab ID:	BH02-UDS04_ATT		
Depth (m):	12.50 - 12.95	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	58.88
Plastic Limit (%):	33.76
Plasticity Index (%):	25.12
Liquidity Index (%):	-
Shrinkage Limit (%):	22.97
Linear Shrinkage(%):	12.56

Results Chart





Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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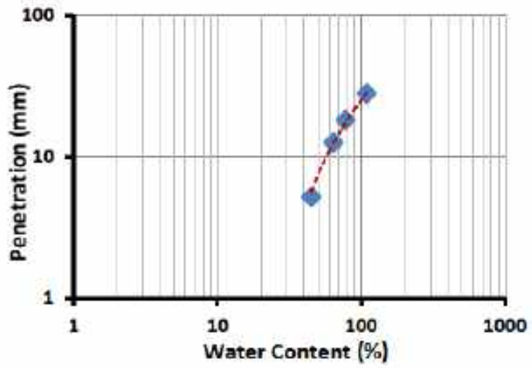
ATTERBERG LIMITS TEST REPORT

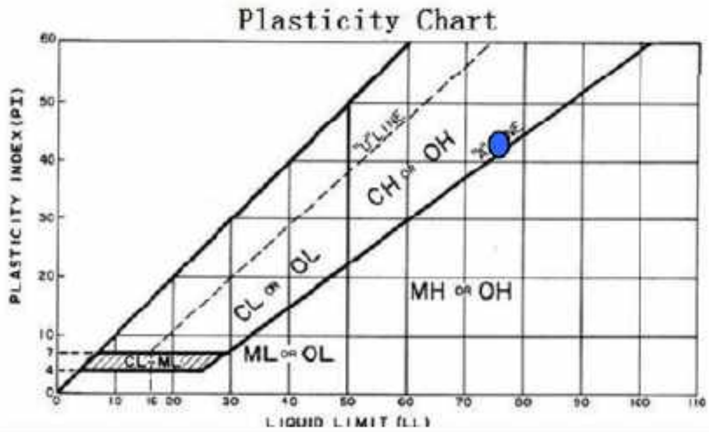
Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

Client:	REC	Date Tested:	13/02/2025
Project:	Bellevue TSF Testing 2025	Lab:	EPLAB
Sample No:	BH02-UDS05	Job Number:	REC
Lab ID:	BH02-UDS05_ATT		
Depth (m):	14.00 - 14.45	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	76.63
Plastic Limit (%):	34.62
Plasticity Index (%):	42.02
Liquidity Index (%):	-
Shrinkage Limit (%):	19.61
Linear Shrinkage(%):	20.71

Results Chart





Notes: The sample/s were tested oven dried, dry sieved and in a 125-250 [redacted]

Stored and Tested the Sample as received

Samples supplied by the Client

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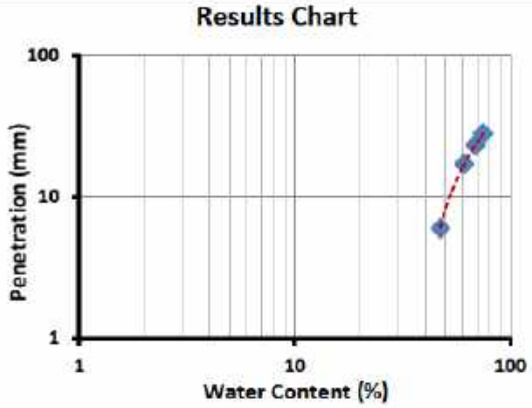
ATTERBERG LIMITS TEST REPORT

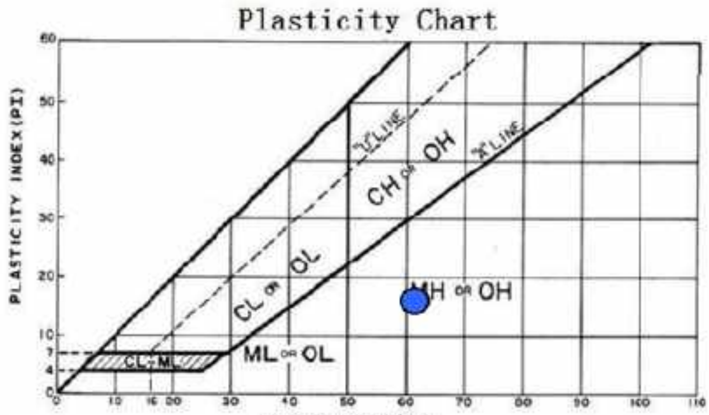
Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

Client:	REC	Date Tested:	13/02/2025
Project:	Bellevue TSF Testing 2025	Lab:	EPLAB
Sample No:	BH03-UDS02	Job Number:	REC
Lab ID:	BH03-UDS02_ATT		
Depth (m):	5.00 - 5.45	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	60.88
Plastic Limit (%):	42.21
Plasticity Index (%):	18.67
Liquidity Index (%):	-
Shrinkage Limit (%):	30.98
Linear Shrinkage(%):	9.17

Results Chart





Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatur [redacted]

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E-PRECISION LABORATORY

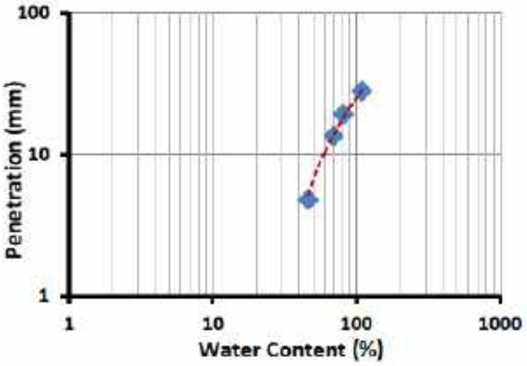
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

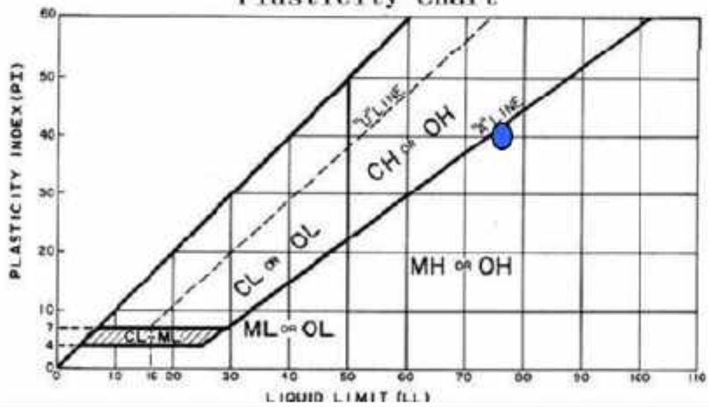
Client:	REC	Date Tested:	13/02/2025
Project:	Bellevue TSF Testing 2025	Lab:	EPLAB
Sample No:	BH03-UDS04	Job Number:	REC
Lab ID:	BH03-UDS04_ATT		
Depth (m):	8.00 - 8.45	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	77.84
Plastic Limit (%):	37.67
Plasticity Index (%):	40.17
Liquidity Index (%):	-
Shrinkage Limit (%):	21.60
Linear Shrinkage(%):	20.42

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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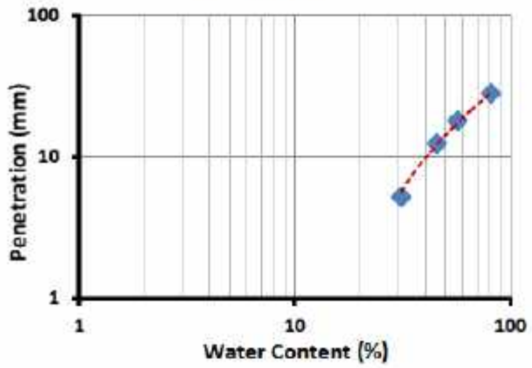
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

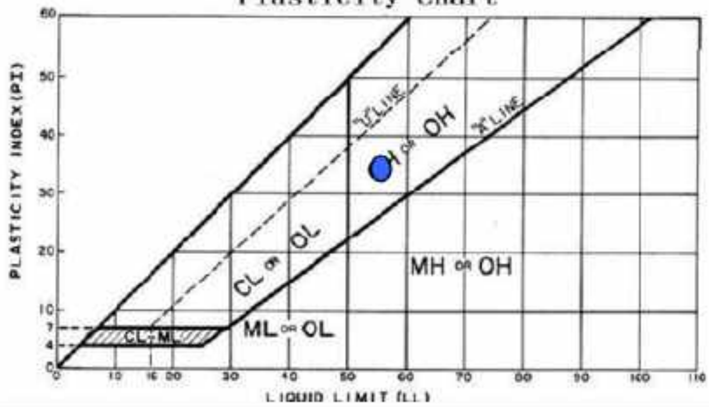
Client:	REC	Date Tested:	09/02/2025
Project:	Bellevue TSF Testing 2025	Lab:	EPLAB
Sample No:	BH03-UDS06	Job Number:	REC
Lab ID:	BH03-UDS06_ATT		
Depth (m):	11.00 - 11.25	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	56.05
Plastic Limit (%):	23.04
Plasticity Index (%):	33.01
Liquidity Index (%):	-
Shrinkage Limit (%):	14.72
Linear Shrinkage(%):	16.45

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature [redacted]

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E-PRECISION LABORATORY

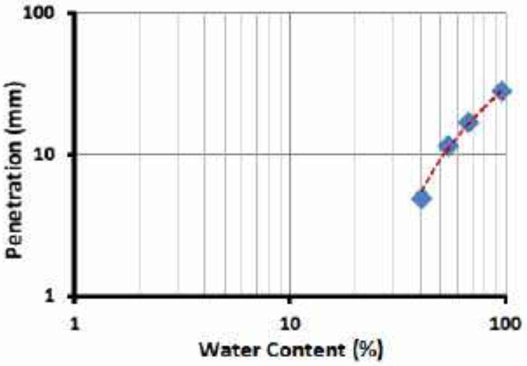
ATTERBERG LIMITS TEST REPORT

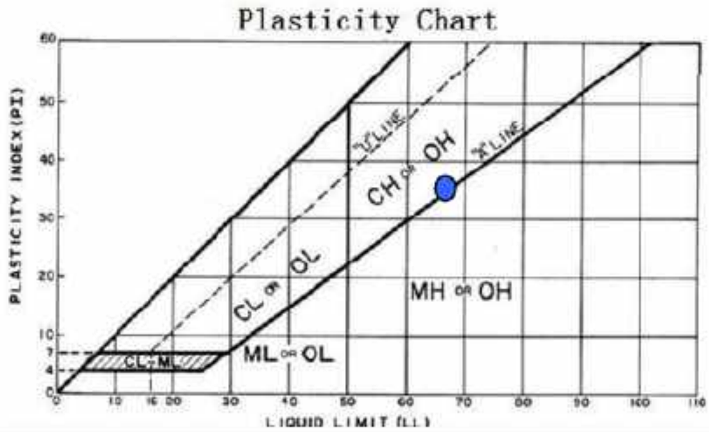
Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

Client:	REC	Date Tested:	13/02/2025
Project:	Bellevue TSF Testing 2025	Lab:	EPLAB
Sample No:	BH03-UDS08	Job Number:	REC
Lab ID:	BH03-UDS08_ATT		
Depth (m):	14.00 - 14.45	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	68.61
Plastic Limit (%):	32.37
Plasticity Index (%):	36.24
Liquidity Index (%):	-
Shrinkage Limit (%):	19.50
Linear Shrinkage(%):	18.39

Results Chart





Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatur [redacted]

The results of tests performed apply only to the specific sample at time of test unless otherwise clearly stated. Reference should be made to E-Precision Laboratory's "Standard Terms and Conditions" E-Precision Laboratory ABN 431 559 578 87

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E-Precision Laboratory

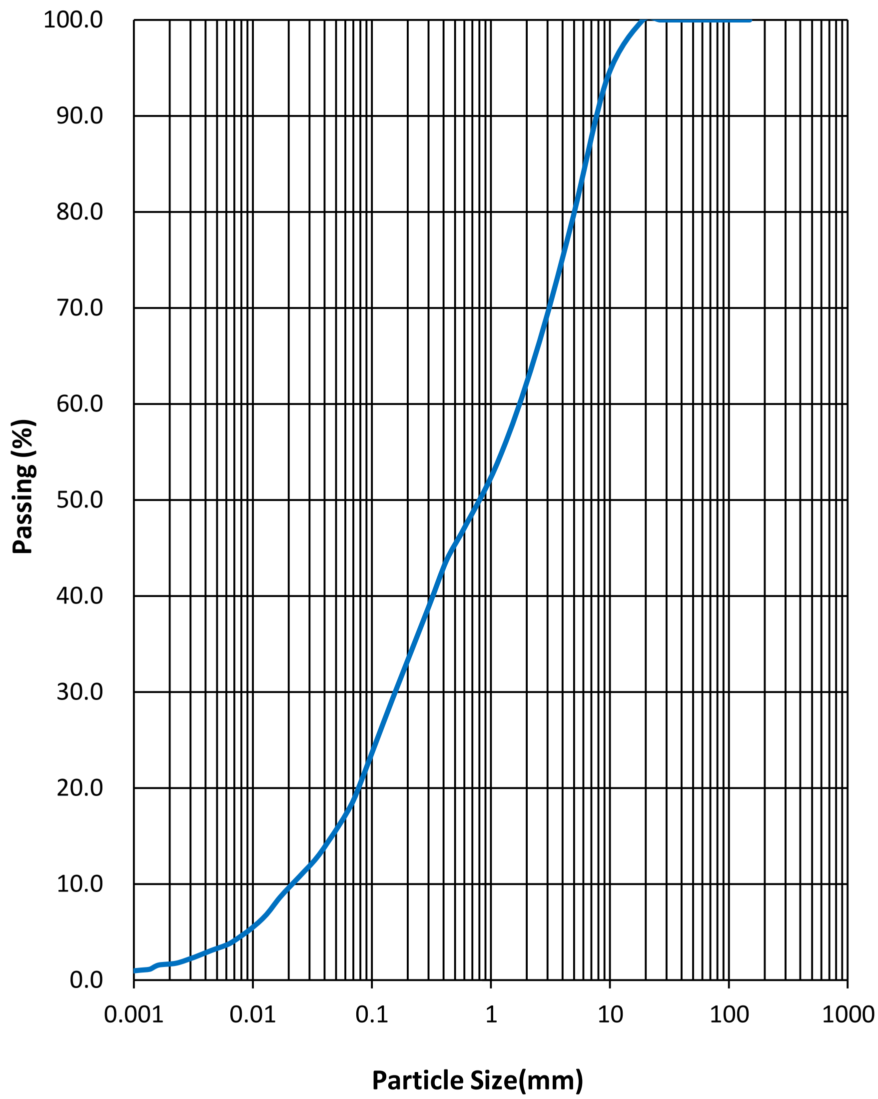
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB3	Depth (m):	8.60 - 8.80
Lab ID:	BH01-CB3_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.465
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	93.9
4.75	78.7
2.36	65.0
1.18	54.3
0.6	47.1
0.425	43.7
0.3	38.8
0.15	29.3
0.075	19.6
0.06135	17.4
0.04811	15.3
0.03454	12.8
0.02471	10.8
0.01698	8.6
0.01254	6.6
0.00894	5.0
0.00636	3.8
0.00451	3.1
0.00320	2.4
0.00227	1.7
0.00161	1.5
0.00136	1.1
0.00113	1.0
0.00095	0.9

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature: [redacted]

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E-Precision Laboratory

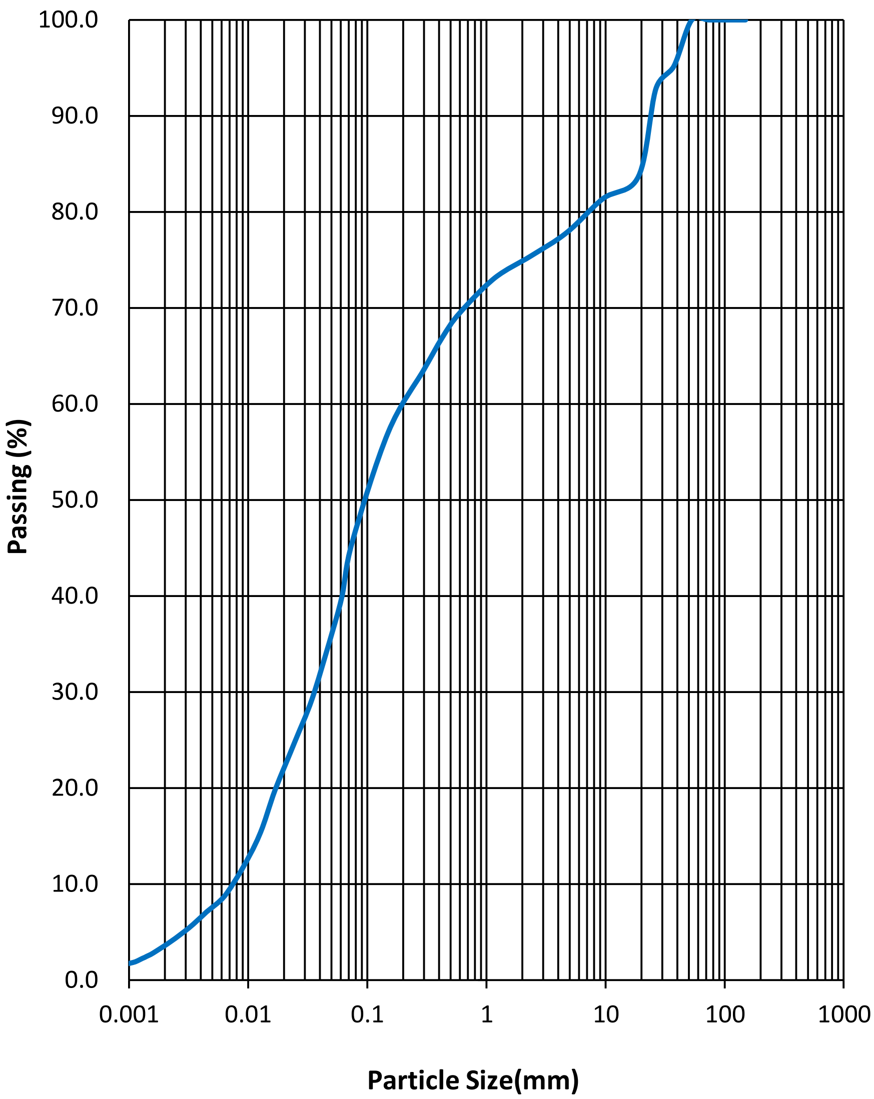
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB4 @ 11.60m	Depth (m):	11.00 - 12.00
Lab ID:	BH01-CB4_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.479
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	95.2
26.5	92.8
19	83.7
9.5	81.4
4.75	77.9
2.36	75.4
1.18	73.1
0.6	69.5
0.425	66.9
0.3	63.6
0.15	57.0
0.075	45.6
0.06106	39.8
0.04789	35.1
0.03438	29.2
0.02459	24.8
0.01690	19.8
0.01248	15.1
0.00889	11.6
0.00633	8.7
0.00449	7.1
0.00319	5.4
0.00226	4.0
0.00160	2.8
0.00135	2.4
0.00113	1.9
0.00094	1.7

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature: [redacted]

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WA 6155
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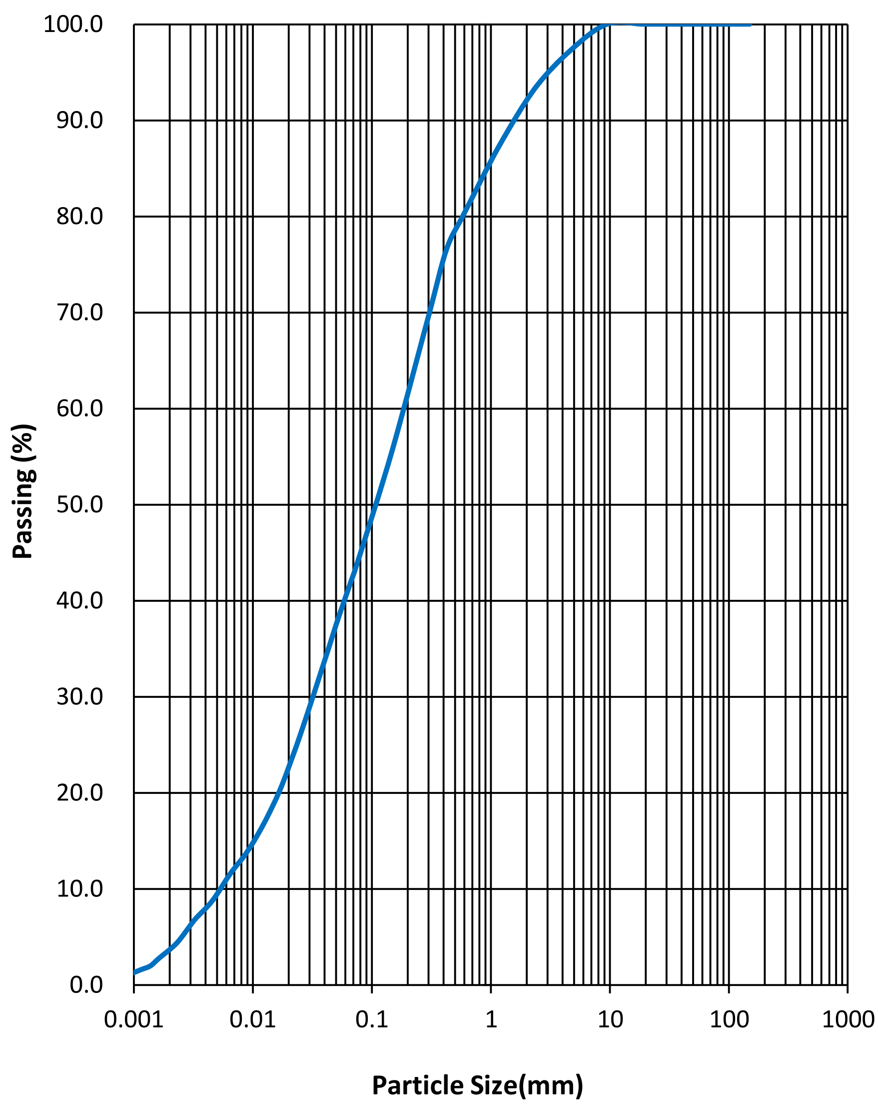
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB5 @ 16.00m	Depth (m):	14.00 - 24.00
Lab ID:	BH01-CB5_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.435
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	97.4
2.36	93.3
1.18	87.4
0.6	80.3
0.425	76.6
0.3	69.6
0.15	55.8
0.075	43.8
0.06450	41.5
0.05026	37.5
0.03583	31.9
0.02551	26.3
0.01746	20.7
0.01281	17.1
0.00909	14.0
0.00645	11.6
0.00458	8.8
0.00325	6.8
0.00230	4.4
0.00163	2.8
0.00138	2.0
0.00115	1.6
0.00096	1.2

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signatur [redacted]

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16 Gympie Way, Willetton
WA 6155

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E-PRECISION LABORATORY

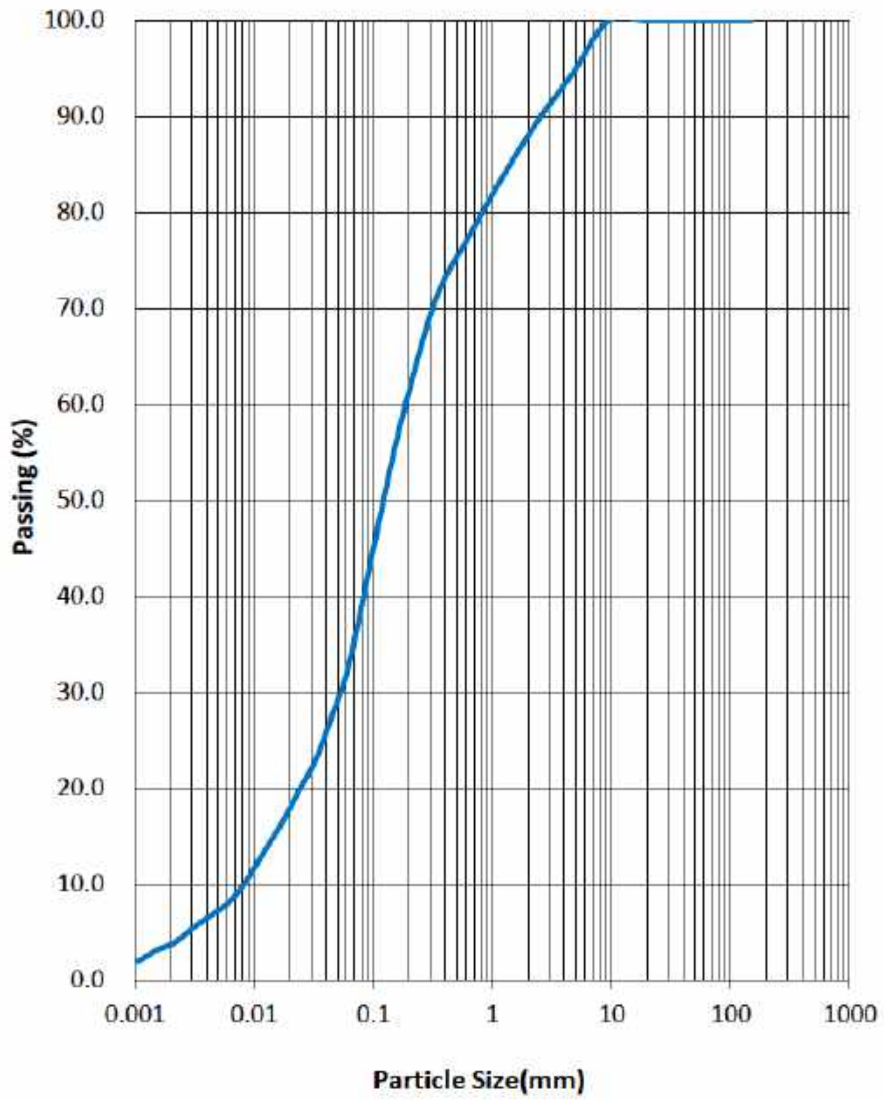
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-SPT02	Depth (m):	3.00 - 3.45
Lab ID:	BH01-SPT02_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.556
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	94.5
2.36	89.3
1.18	83.3
0.6	76.9
0.425	73.7
0.3	69.1
0.15	55.0
0.075	37.2
0.05954	31.8
0.04669	28.0
0.03354	23.1
0.02398	19.7
0.01647	16.0
0.01213	13.3
0.00865	10.3
0.00615	8.1
0.00436	6.8
0.00310	5.5
0.00220	3.9
0.00156	3.2
0.00132	2.6
0.00110	2.1
0.00092	1.7

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature: [redacted]

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E-Precision Laboratory

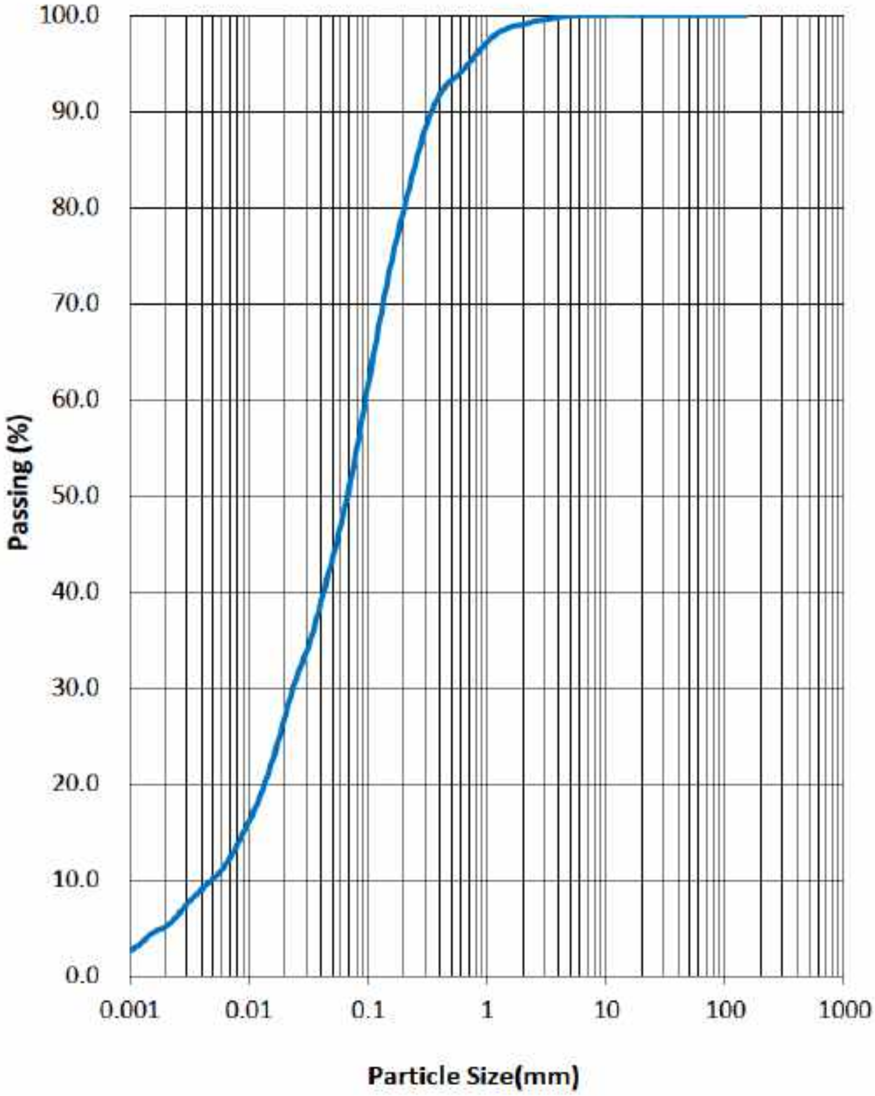
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH01-UDS02	Depth (m):	4.95 - 5.30
Lab ID:	BH01-UDS02_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.584
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	99.9
2.36	99.3
1.18	98.0
0.6	94.0
0.425	92.3
0.3	88.0
0.15	73.0
0.075	52.7
0.05864	46.8
0.04599	41.5
0.03302	35.0
0.02362	30.0
0.01629	23.0
0.01202	18.3
0.00857	14.4
0.00610	11.2
0.00433	9.4
0.00307	7.6
0.00218	5.5
0.00155	4.4
0.00131	3.7
0.00109	2.9
0.00091	2.4

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature: [redacted]

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E-Precision Laboratory

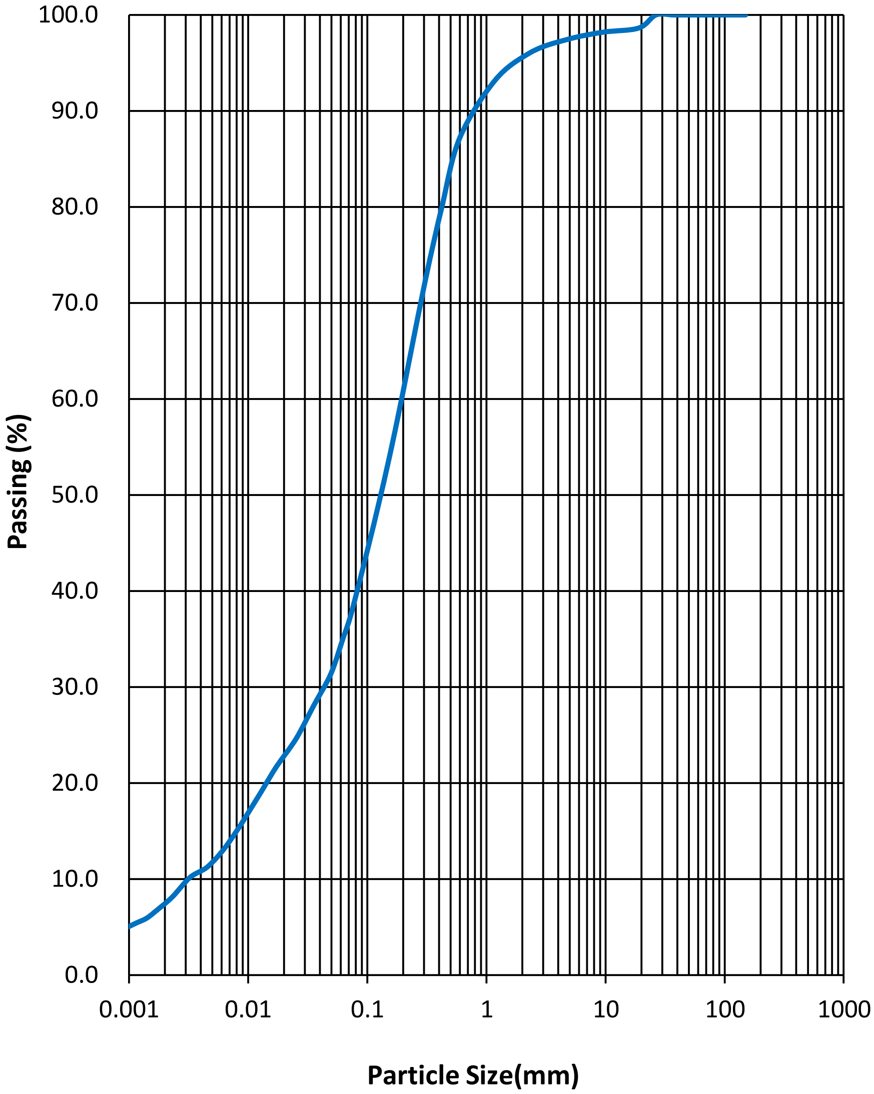
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-SPT10	Depth (m):	16.50 - 16.95
Lab ID:	BH02-SPT10_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.395
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	98.6
9.5	98.2
4.75	97.4
2.36	96.1
1.18	93.2
0.6	87.2
0.425	80.2
0.3	71.7
0.15	53.4
0.075	38.1
0.06338	35.3
0.04961	31.4
0.03540	28.0
0.02526	24.6
0.01727	21.7
0.01271	19.0
0.00905	16.0
0.00644	13.3
0.00458	11.3
0.00324	10.2
0.00230	8.1
0.00164	6.6
0.00138	5.9
0.00115	5.4
0.00096	5.0

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

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E-Precision Laboratory

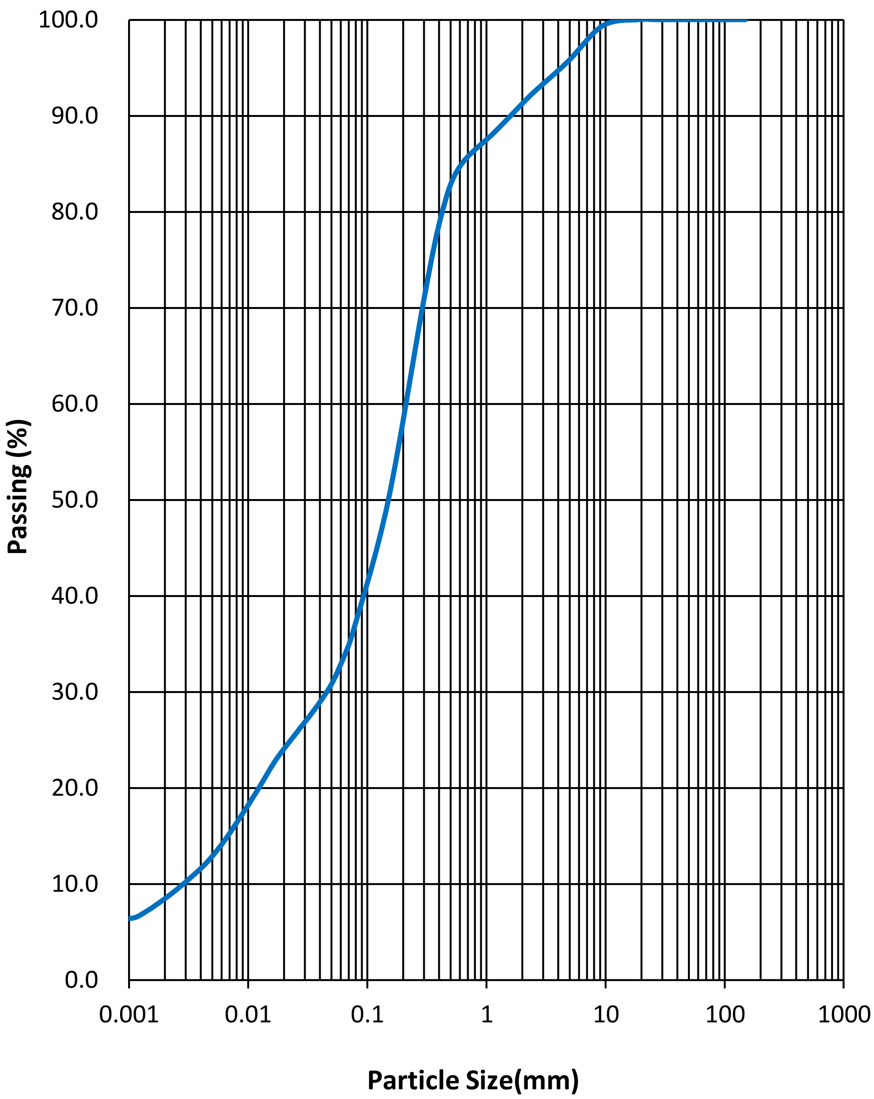
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS02	Depth (m):	9.50 - 9.79
Lab ID:	BH02-UDS02_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m^3):	2.365
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	99.4
4.75	95.5
2.36	92.1
1.18	88.3
0.6	84.7
0.425	79.9
0.3	70.9
0.15	49.9
0.075	36.0
0.06336	33.6
0.04954	30.7
0.03533	28.0
0.02516	25.7
0.01720	23.0
0.01268	20.3
0.00905	17.4
0.00646	14.7
0.00459	12.4
0.00326	10.6
0.00232	9.1
0.00164	7.7
0.00139	7.1
0.00116	6.6
0.00097	6.4

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signatur [redacted]

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E-Precision Laboratory

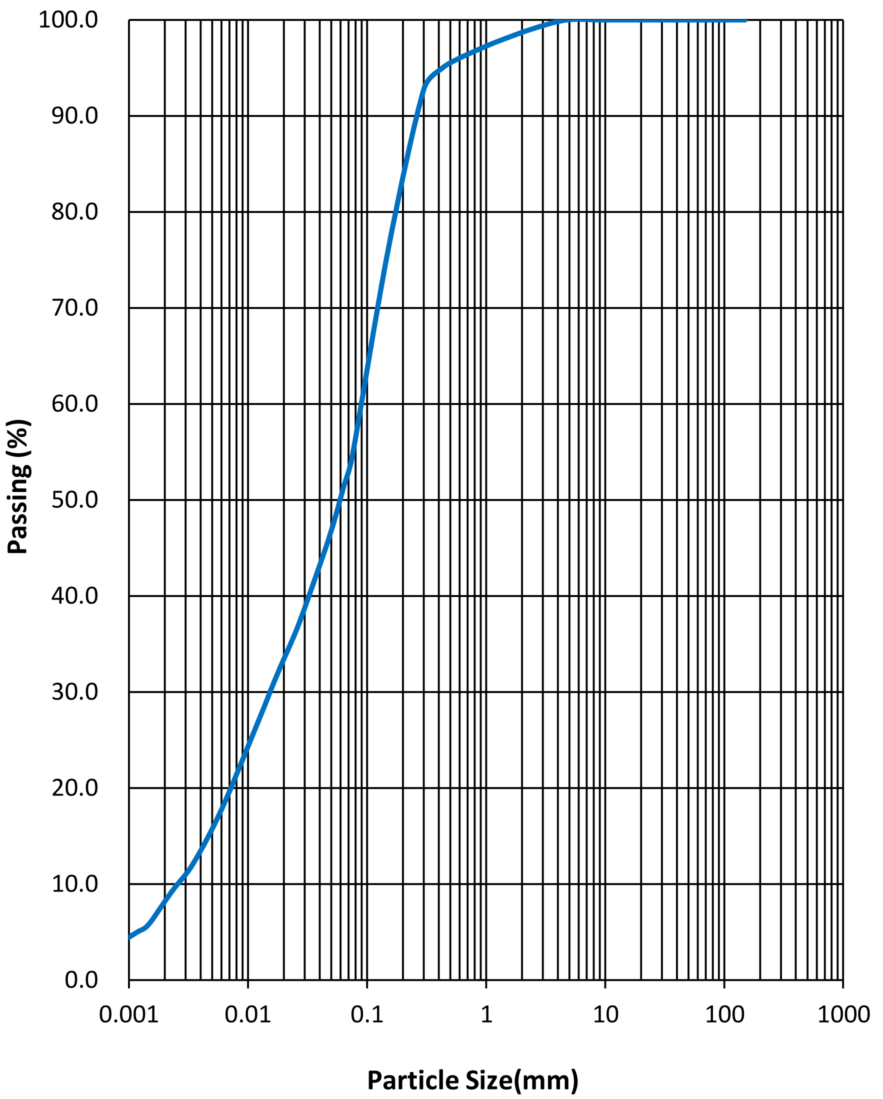
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS03	Depth (m):	11.00 - 11.39
Lab ID:	BH02-UDS03_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.347
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	100.0
2.36	99.0
1.18	97.6
0.6	96.0
0.425	94.9
0.3	92.8
0.15	75.9
0.075	54.4
0.06374	51.4
0.04986	46.7
0.03565	41.4
0.02547	36.4
0.01744	31.7
0.01285	27.6
0.00918	23.2
0.00654	18.8
0.00465	15.0
0.00331	11.7
0.00235	9.4
0.00167	6.8
0.00141	5.6
0.00117	5.0
0.00098	4.4

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signat[redacted]

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E-Precision Laboratory

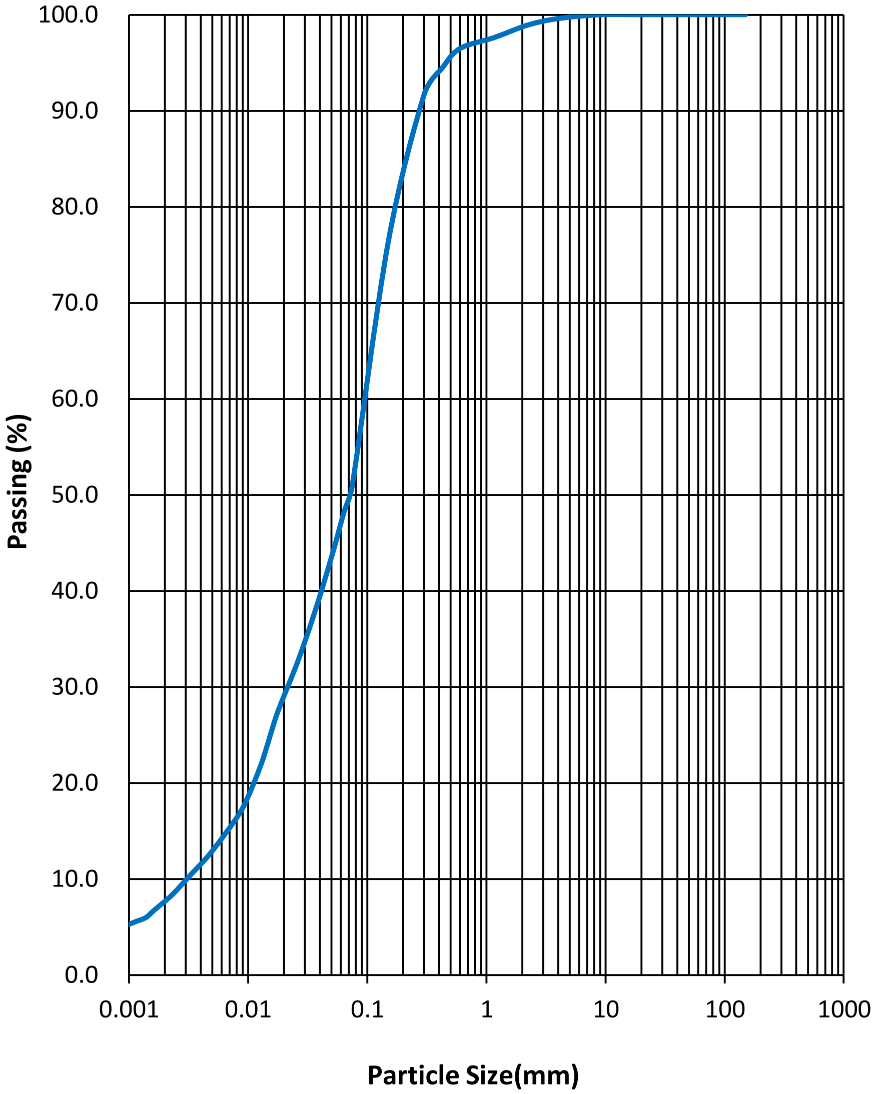
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS04	Depth (m):	12.50 - 12.95
Lab ID:	BH02-UDS04_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.401
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	99.7
2.36	99.0
1.18	97.6
0.6	96.5
0.425	94.4
0.3	91.7
0.15	76.3
0.075	51.0
0.06461	48.4
0.05041	43.6
0.03597	37.6
0.02563	32.4
0.01752	27.2
0.01288	22.0
0.00916	17.6
0.00650	14.8
0.00461	12.4
0.00327	10.4
0.00232	8.4
0.00164	6.8
0.00139	6.0
0.00115	5.6
0.00096	5.2

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature: [redacted]

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E-Precision Laboratory

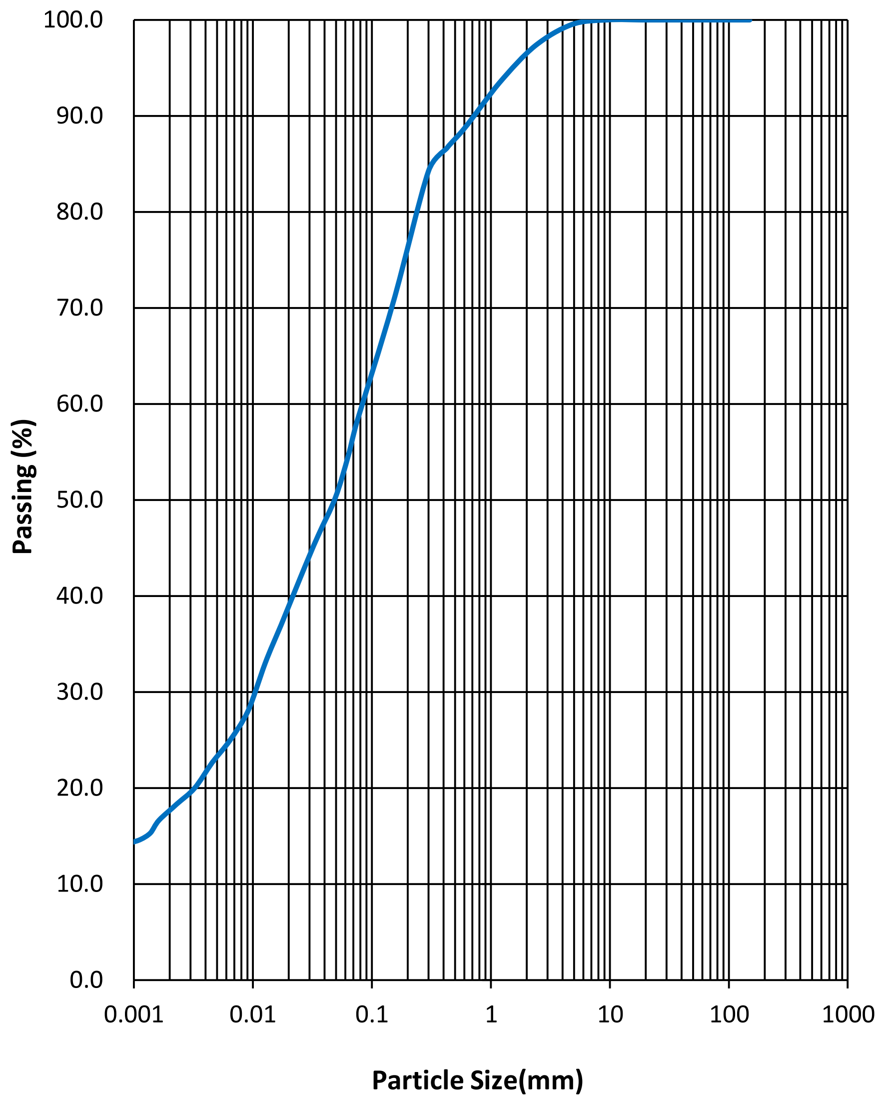
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS05	Depth (m):	14.00 - 14.45
Lab ID:	BH02-UDS05_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.378
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	99.5
2.36	97.3
1.18	93.4
0.6	88.7
0.425	86.6
0.3	84.2
0.15	70.4
0.075	58.1
0.06346	54.6
0.04955	50.3
0.03529	46.3
0.02515	41.9
0.01721	36.9
0.01267	33.0
0.00904	28.0
0.00643	25.0
0.00456	22.6
0.00324	20.0
0.00230	18.3
0.00163	16.6
0.00138	15.3
0.00114	14.6
0.00096	14.3

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature [redacted]

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16 Gympie Way, Willetton
[redacted]

E-Precision Laboratory

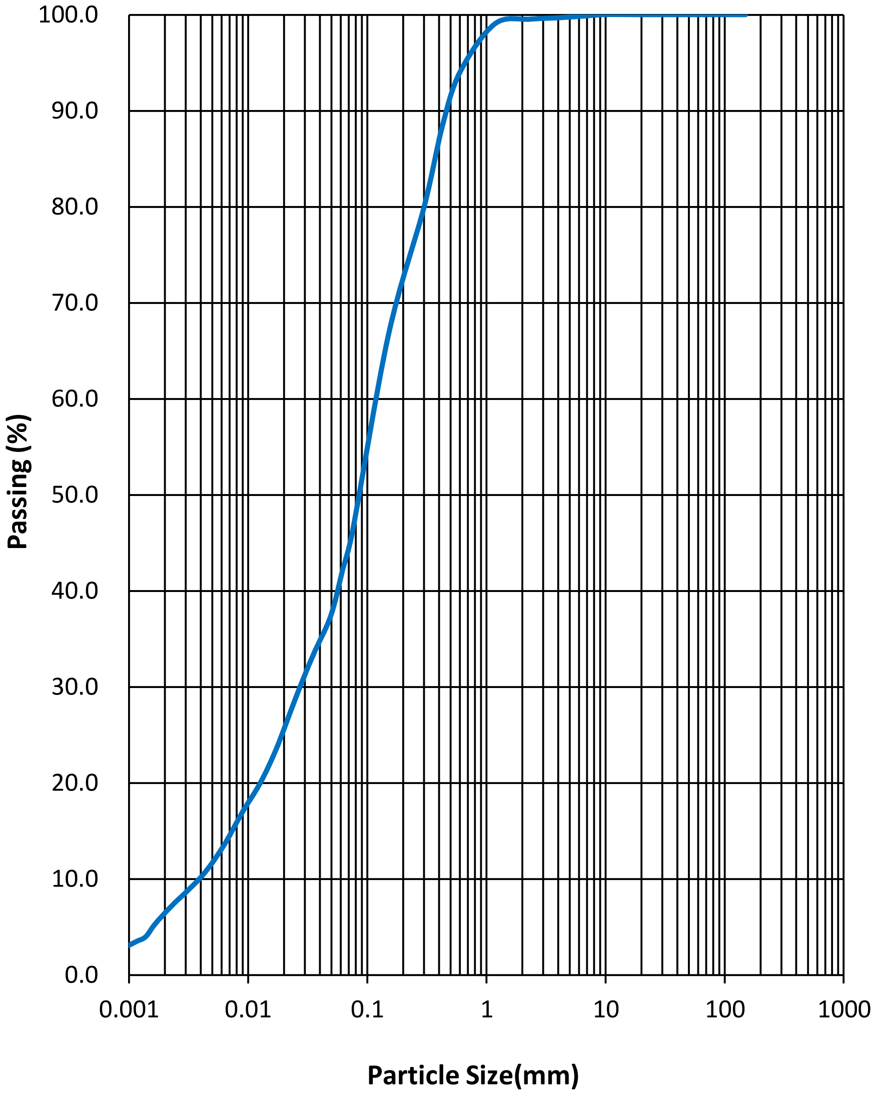
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS02	Depth (m):	5.00 - 5.45
Lab ID:	BH03-UDS02_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.404
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	99.7
2.36	99.5
1.18	99.0
0.6	94.0
0.425	88.3
0.3	80.0
0.15	66.5
0.075	46.1
0.06267	42.4
0.04915	37.3
0.03509	33.3
0.02509	28.8
0.01724	23.6
0.01270	20.1
0.00904	17.0
0.00643	13.8
0.00458	11.0
0.00325	9.0
0.00231	7.3
0.00164	5.3
0.00139	4.0
0.00115	3.5
0.00096	3.0

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signatur [redacted]

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16 Gympie Way, Willetton
[redacted]

E-PRECISION LABORATORY

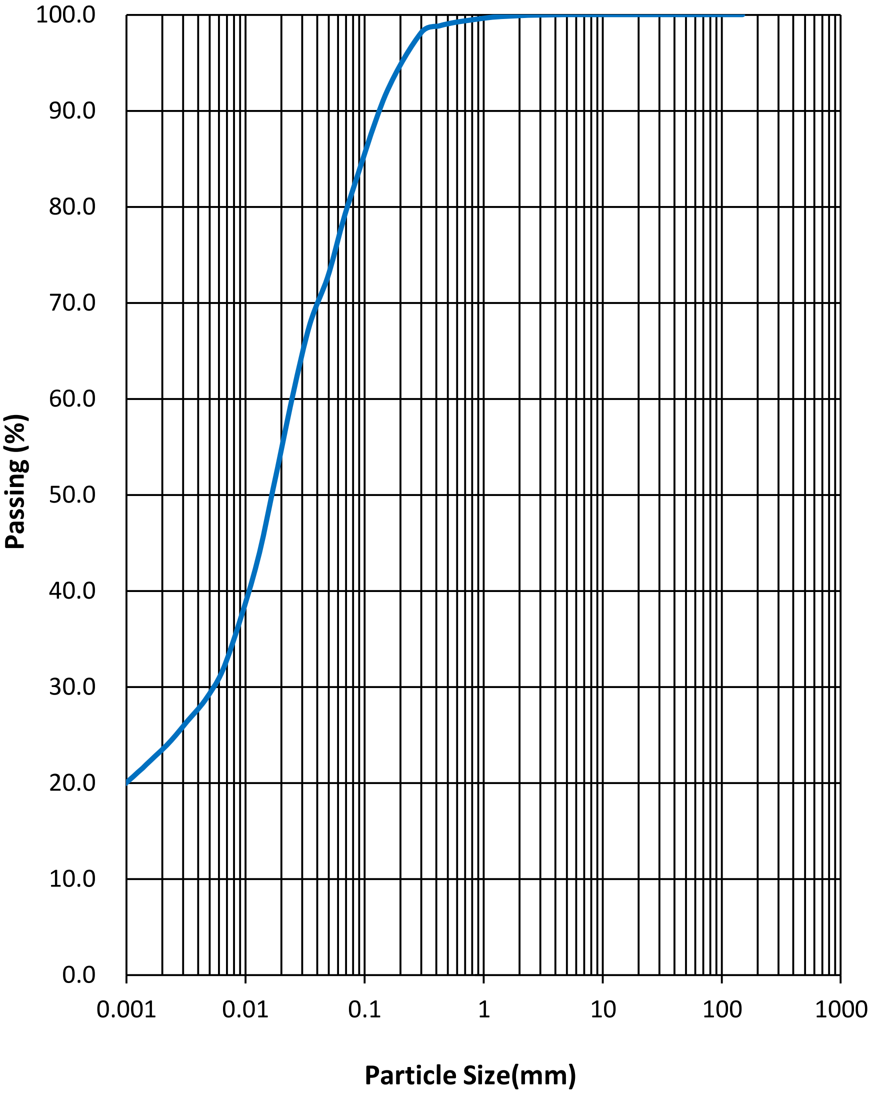
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS04	Depth (m):	8.00 - 8.45
Lab ID:	BH03-UDS04_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.395
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	100.0
2.36	99.9
1.18	99.7
0.6	99.2
0.425	98.8
0.3	98.1
0.15	91.6
0.075	80.7
0.06259	77.5
0.04882	72.6
0.03476	67.8
0.02483	60.3
0.01706	50.6
0.01260	43.1
0.00899	37.0
0.00640	31.7
0.00454	28.6
0.00322	26.4
0.00228	24.2
0.00162	22.4
0.00137	21.6
0.00114	20.7
0.00095	19.8

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature [redacted]

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E-Precision Laboratory

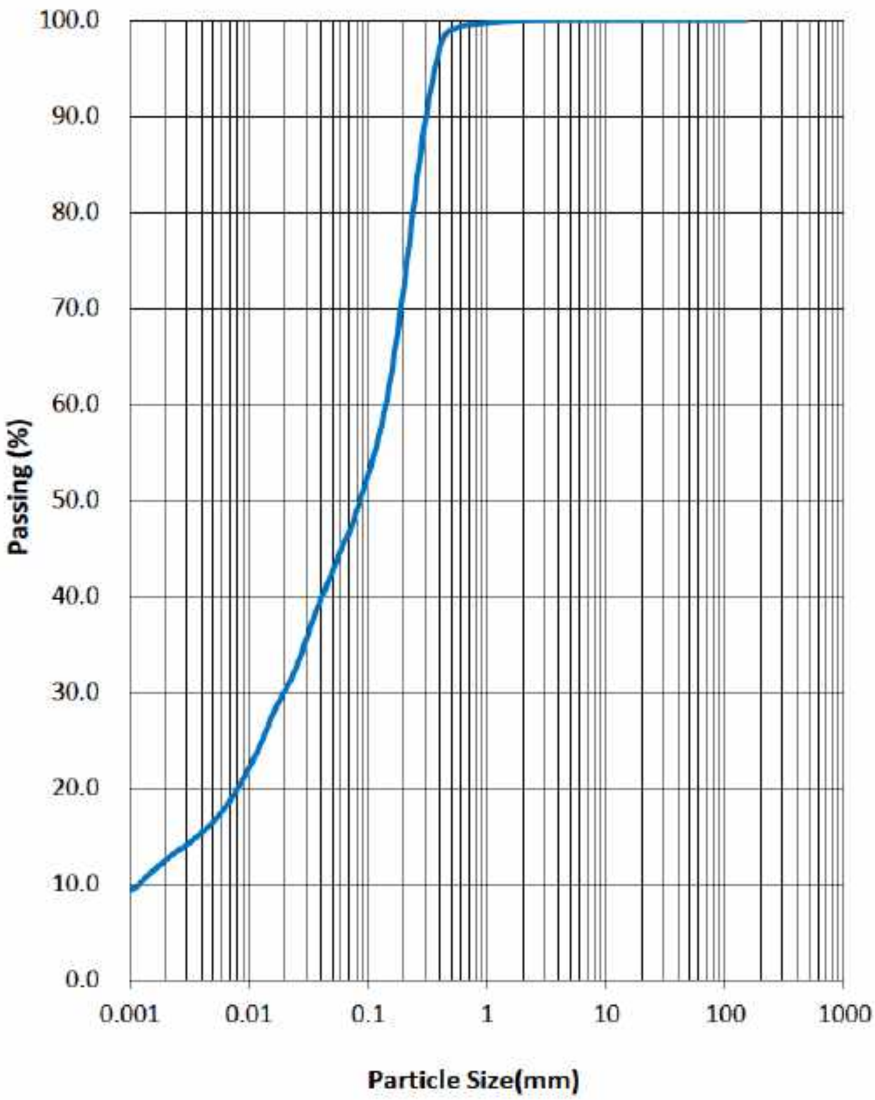
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS06	Depth (m):	11.00 - 11.25
Lab ID:	BH03-UDS06_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.422
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	100.0
2.36	99.9
1.18	99.8
0.6	99.3
0.425	98.0
0.3	89.0
0.15	61.5
0.075	47.7
0.06208	45.5
0.04847	42.1
0.03464	37.6
0.02479	32.4
0.01696	28.5
0.01251	24.6
0.00892	20.9
0.00635	18.0
0.00451	15.9
0.00320	14.4
0.00227	13.1
0.00161	11.5
0.00136	10.7
0.00113	9.7
0.00095	9.1

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature: [redacted]

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WA 6155
[redacted]

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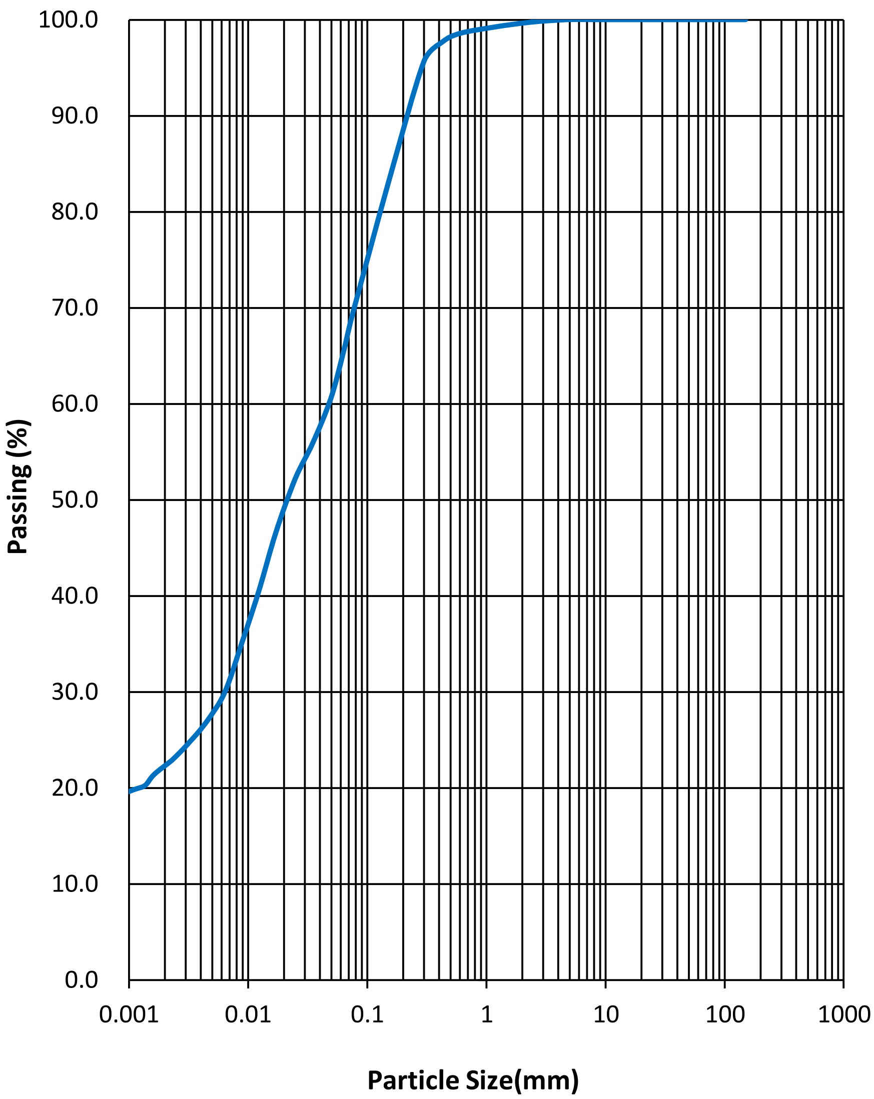
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	REC	Date Tested:	05/02/2025
Project:	Bellevue TSF 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS08	Depth (m):	14.00 - 14.45
Lab ID:	BH03-UDS08_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.382
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	100.0
2.36	99.7
1.18	99.2
0.6	98.6
0.425	97.7
0.3	95.7
0.15	83.0
0.075	69.2
0.06297	65.4
0.04917	60.5
0.03503	56.0
0.02492	52.2
0.01704	46.6
0.01257	40.9
0.00897	35.3
0.00640	30.0
0.00455	27.0
0.00322	24.8
0.00229	22.9
0.00162	21.4
0.00137	20.3
0.00114	19.9
0.00095	19.5

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature: [redacted]

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E-PRECISION LABORATORY

TRIAXIAL PERMEABILITY TEST REPORT

Test Method: AS1289 6.7.3

Client:	REC	Date Tested:	06/02/2025
Project:	Bellevue TSF Testing 2025	Date Reported:	18/02/2025
Lab:	EPLAB	EP Lab Job Number:	REC
Tested by:	Phil		
Checked by:	Phil		

Lab ID:	BGL25_TPERM_01	BGL25_TPERM_02	BGL25_TPERM_03	
Client ID:	BH01/UDS02	Extract Core BH01-CB1	Extract Core BH01-CB3	
Sample ID:	BH01	BH01	BH01	
From Depth (m):	4.95	2.5	8.6	
To Depth (m):	5.3	2.75	8.8	
Sample Conditions:	Insitu	Insitu	Insitu	
Cell Pressure (kPa):	75	30	125	
Inlet Pressure (kPa):	50	25	75	
Outlet Pressure (kPa):	25	10	25	
Initial Bulk Density (t/m^3):	2.189	1.823	1.815	
Initial Moisture Content (%):	16.32	22.06	13.11	
Initial Dry Density (t/m^3):	1.88	1.49	1.60	
Saturation (Skempton's B):	0.98	1.00	1.00	
K_{20} (m/s):	**7.58×10^{-8}**	**2.03×10^{-7}**	**1.81×10^{-8}**	

Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

[redacted]

Authorised Signatory (Geotechnical Engineer):

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16 Gympie Way, Willetton
WA 6155
E-[redacted]

E-Precision Laboratory

TRIAXIAL PERMEABILITY TEST REPORT

Test Method: AS1289 6.7.3

Client:	REC	Date Tested:	06/02/2025
Project:	Bellevue TSF Testing 2025	Date Reported:	18/02/2025
Lab:	EPLAB	EP Lab Job Number:	REC
Tested by:	Phil		
Checked by:	Phil		

Lab ID:	BGL25_TPERM_04	BGL25_TPERM_05	BGL25_TPERM_06	
Client ID:	Extract Core BH01-CB5	BH02/UDS02	BH02/UDS03	
Sample ID:	BH01	BH02	BH02	
From Depth (m):	16.85	9.5	11	
To Depth (m):	17	9.79	11.385	
Sample Conditions:	Insitu	Remolded	Insitu	
Cell Pressure (kPa):	250	125	150	
Inlet Pressure (kPa):	50	75	75	
Outlet Pressure (kPa):	10	25	25	
Initial Bulk Density (t/m^3):	2.168	1.945	1.887	
Initial Moisture Content (%):	8.33	36.79	31.56	
Initial Dry Density (t/m^3):	2.00	1.42	1.43	
Saturation (Skempton's B):	1.00	0.99	0.99	
K_{20} (m/s):	**5.36×10^{-7}**	**3.07×10^{-8}**	**2.35×10^{-8}**	

Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorised Signatory (Geotechnical [redacted]

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16 Gympie Way, Willetton

[redacted]

E-PRECISION LABORATORY

TRIAXIAL PERMEABILITY TEST REPORT

Test Method: AS1289 6.7.3

Client:	REC	Date Tested:	06/02/2025
Project:	Bellevue TSF Testing 2025	Date Reported:	18/02/2025
Lab:	EPLAB	EP Lab Job Number:	REC
Tested by:	Phil		
Checked by:	Phil		

Lab ID:	BGL25_TPERM_07	BGL25_TPERM_08	BGL25_TPERM_09	
Client ID:	BH02/UDS04	BH02/UDS05	BH03/UDS02	
Sample ID:	BH02	BH02	BH03	
From Depth (m):	12.5	14	5	
To Depth (m):	12.95	14.45	5.45	
Sample Conditions:	Insitu	Insitu	Insitu	
Cell Pressure (kPa):	175	175	75	
Inlet Pressure (kPa):	50	85	50	
Outlet Pressure (kPa):	25	25	25	
Initial Bulk Density (t/m^3):	2.013	2.065	1.933	
Initial Moisture Content (%):	25.61	21.17	27.85	
Initial Dry Density (t/m^3):	1.60	1.70	1.51	
Saturation (Skempton's B):	1.00	0.99	1.00	
K_{20} (m/s):	1.97×10^{-7}	6.13×10^{-8}	6.67×10^{-8}	

Notes:

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical [redacted]

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WA 6155
[redacted]

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TRIAXIAL PERMEABILITY TEST REPORT

Test Method: AS1289 6.7.3

Client:	REC	Date Tested:	06/02/2025
Project:	Bellevue TSF Testing 2025	Date Reported:	18/02/2025
Lab:	EPLAB	EP Lab Job Number:	REC
Tested by:	Phil		
Checked by:	Phil		

Lab ID:	BGL25_TPERM_10	BGL25_TPERM_11	BGL25_TPERM_12	
Client ID:	BH03/UDS04	BH03/UDS06	BH03/UDS08	
Sample ID:	BH03	BH03	BH03	
From Depth (m):	8	11	14	
To Depth (m):	8.45	11.25	14.45	
Sample Conditions:	Insitu	Insitu	Insitu	
Cell Pressure (kPa):	100	150	175	
Inlet Pressure (kPa):	50	75	75	
Outlet Pressure (kPa):	25	25	25	
Initial Bulk Density (t/m^3):	1.936	1.833	1.979	
Initial Moisture Content (%):	28.91	34.95	35.62	
Initial Dry Density (t/m^3):	1.50	1.36	1.46	
Saturation (Skempton's B):	1.00	1.00	0.99	
K_{20} (m/s):	**3.23×10^{-8}**	**0.96×10^{-8}**	**2.45×10^{-8}**	

Notes:

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical E[redacted]

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WA 6155
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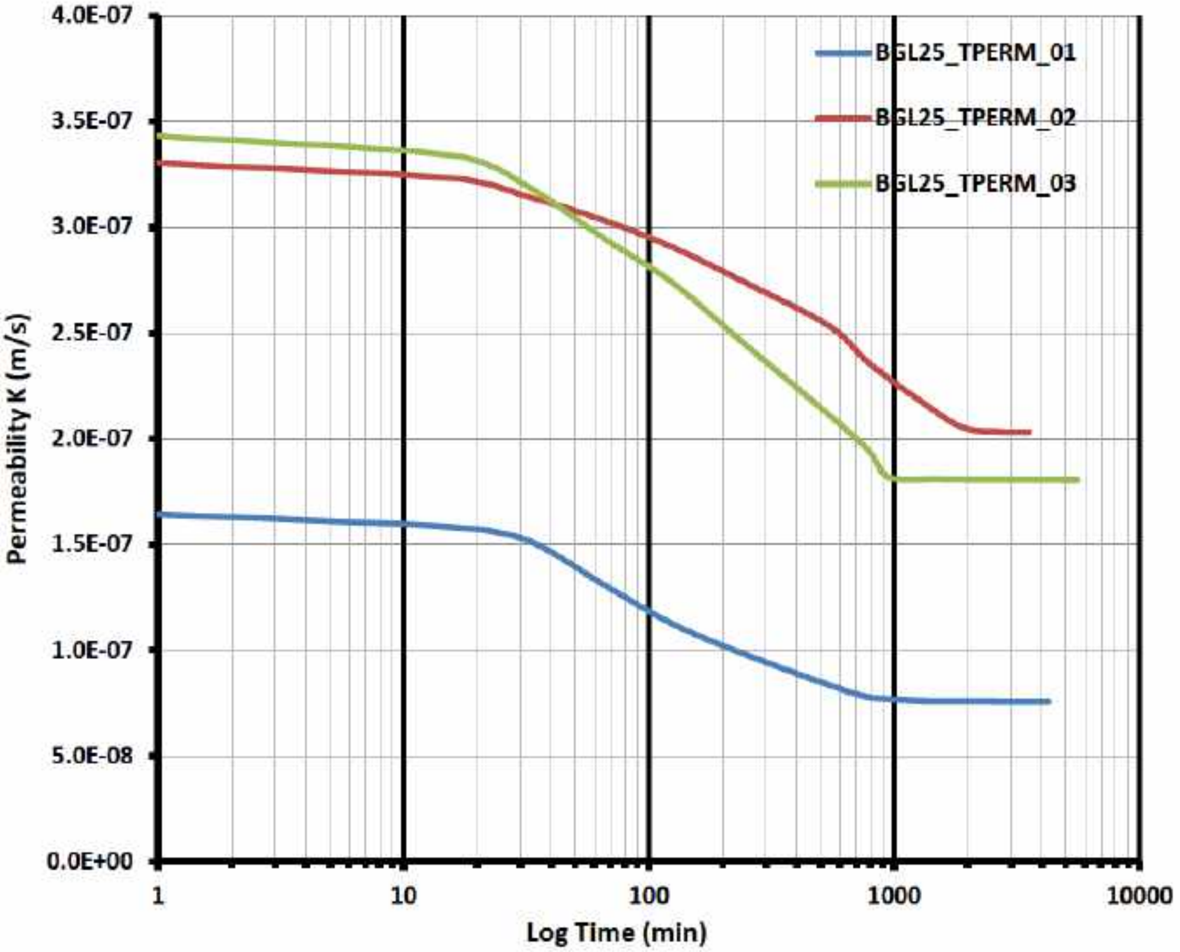
TRIAXIAL PERMEABILITY TEST REPORT

Test Method: AS1289 6.7.3

Client:	REC	Date Tested:	06/02/2025
Project:	Bellevue TSF Testing 2025	Date Reported:	18/02/2025
Lab:	EPLAB	EP Lab Job Number:	REC



Notes:

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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[redacted]

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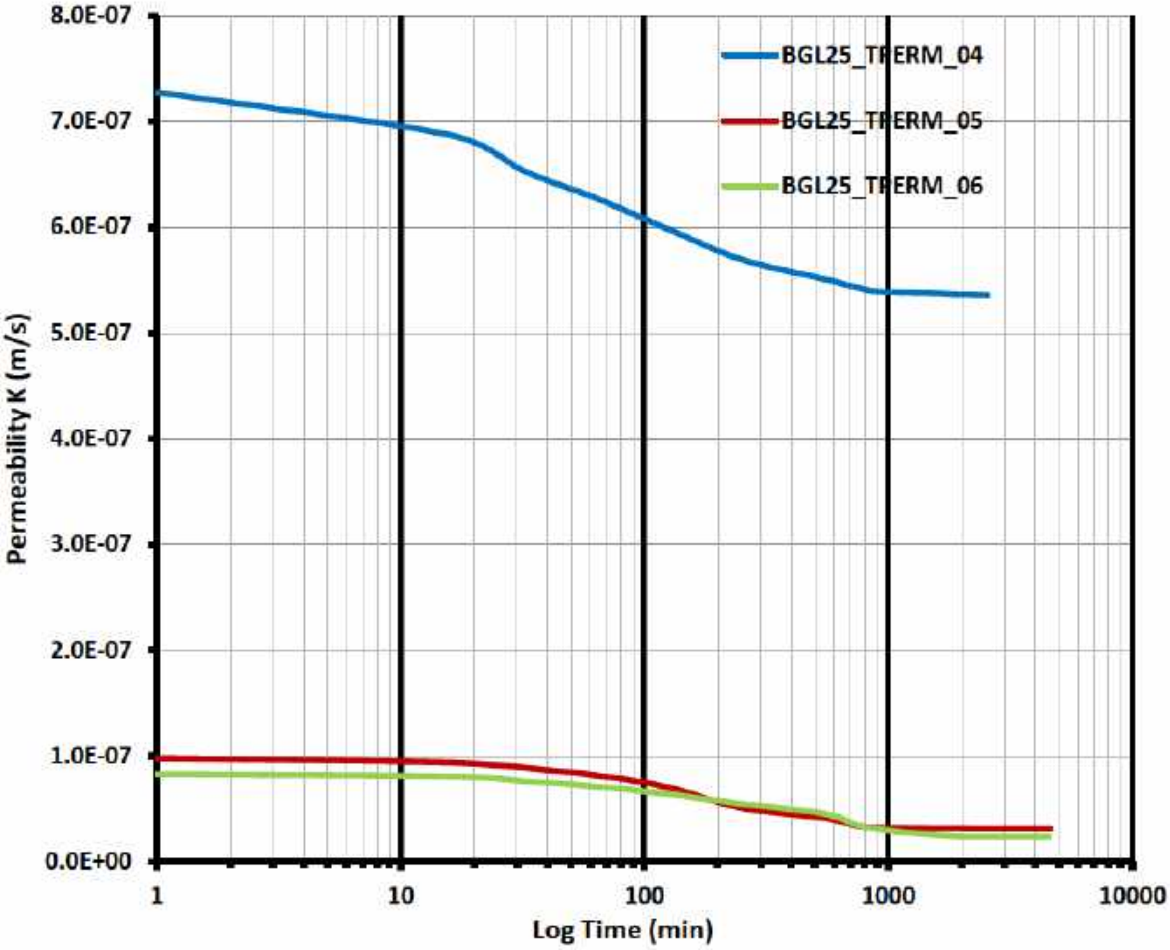
TRIAXIAL PERMEABILITY TEST REPORT

Test Method: AS1289 6.7.3

Client:	REC	Date Tested:	06/02/2025
Project:	Bellevue TSF Testing 2025	Date Reported:	18/02/2025
Lab:	EPLAB	EP Lab Job Number:	REC



Notes:

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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WA 6155
[redacted]

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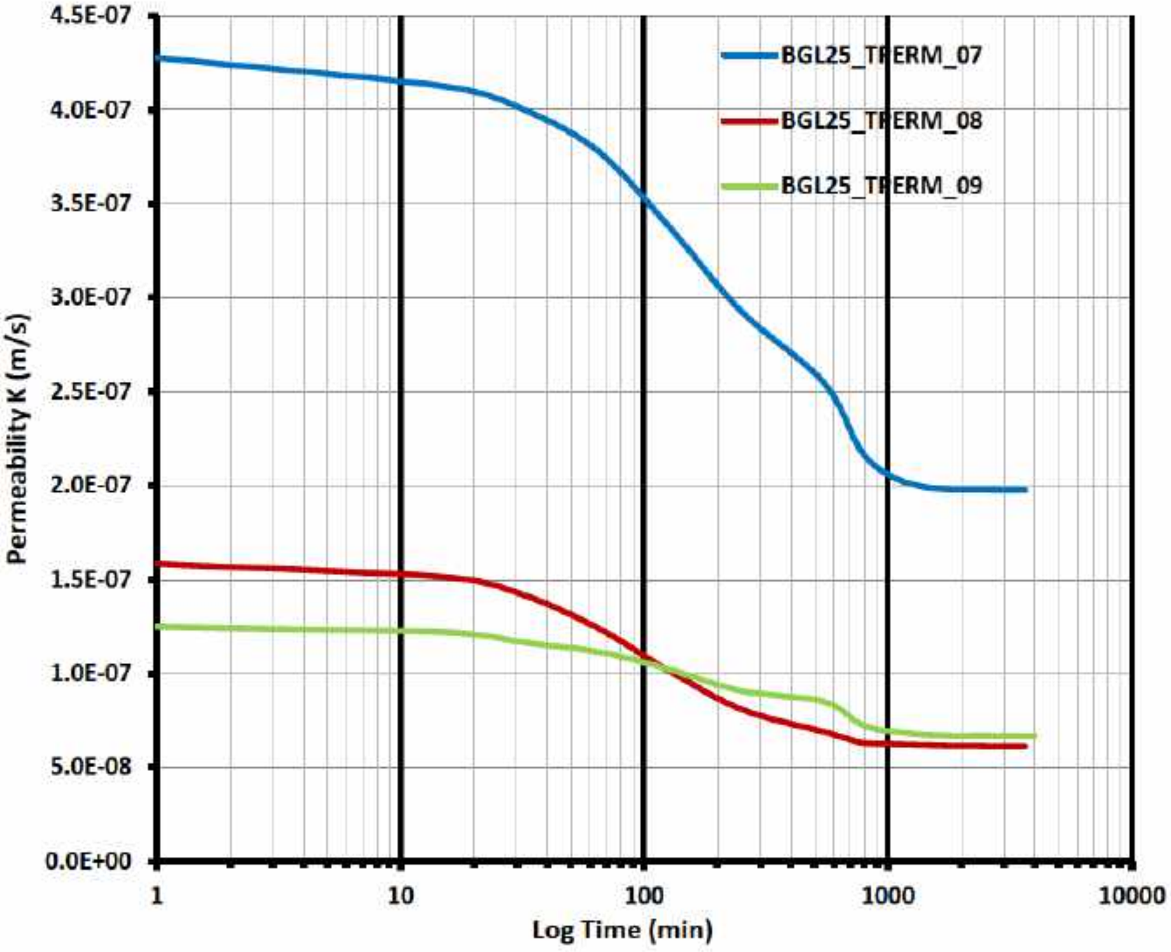
TRIAXIAL PERMEABILITY TEST REPORT

Test Method: AS1289 6.7.3

Client:	REC	Date Tested:	06/02/2025
Project:	Bellevue TSF Testing 2025	Date Reported:	18/02/2025
Lab:	EPLAB	EP Lab Job Number:	REC



Notes:

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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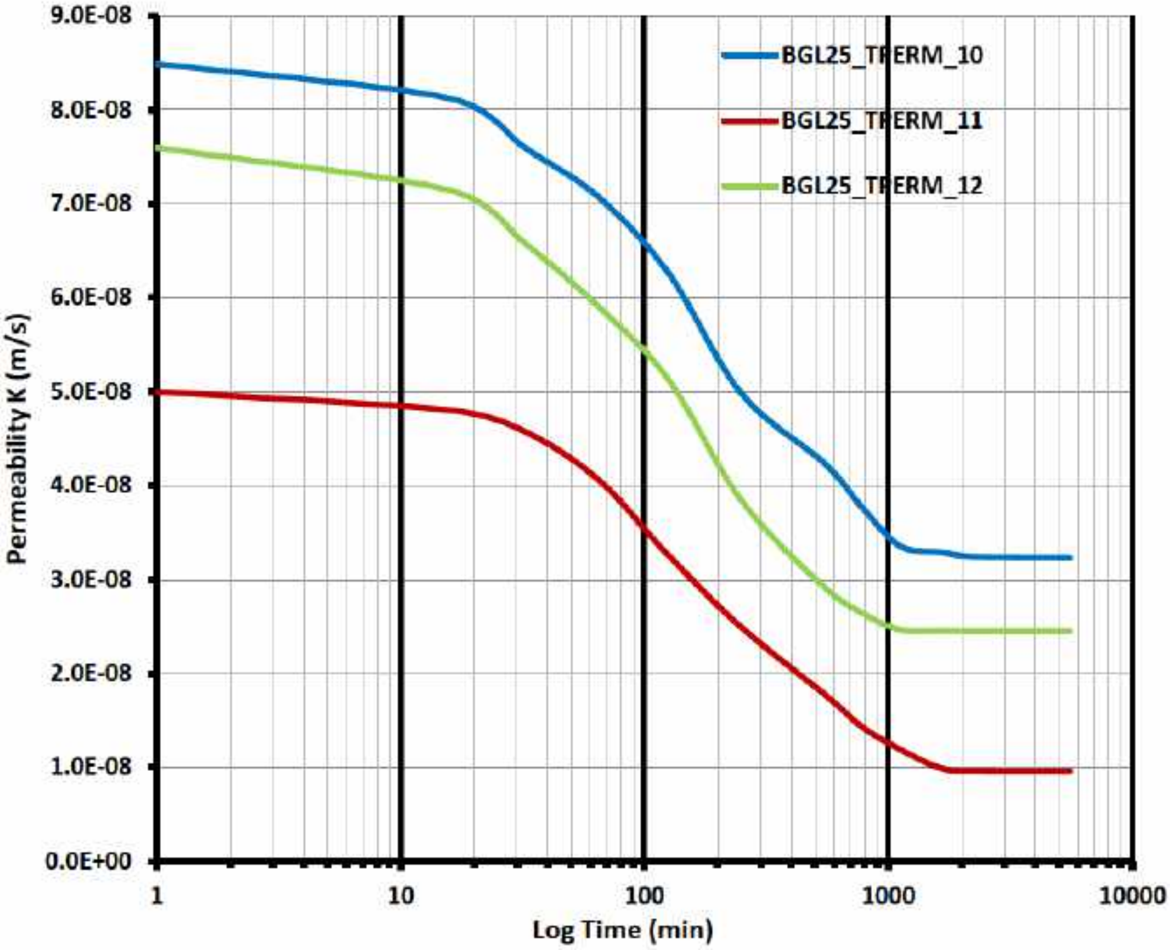
[redacted]

E-PRECISION LABORATORY

TRIAXIAL PERMEABILITY TEST REPORT

Test Method: AS1289 6.7.3

Client:	REC	Date Tested:	06/02/2025
Project:	Bellevue TSF Testing 2025	Date Reported:	18/02/2025
Lab:	EPLAB	EP Lab Job Number:	REC



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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E-Precision Laboratory

SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

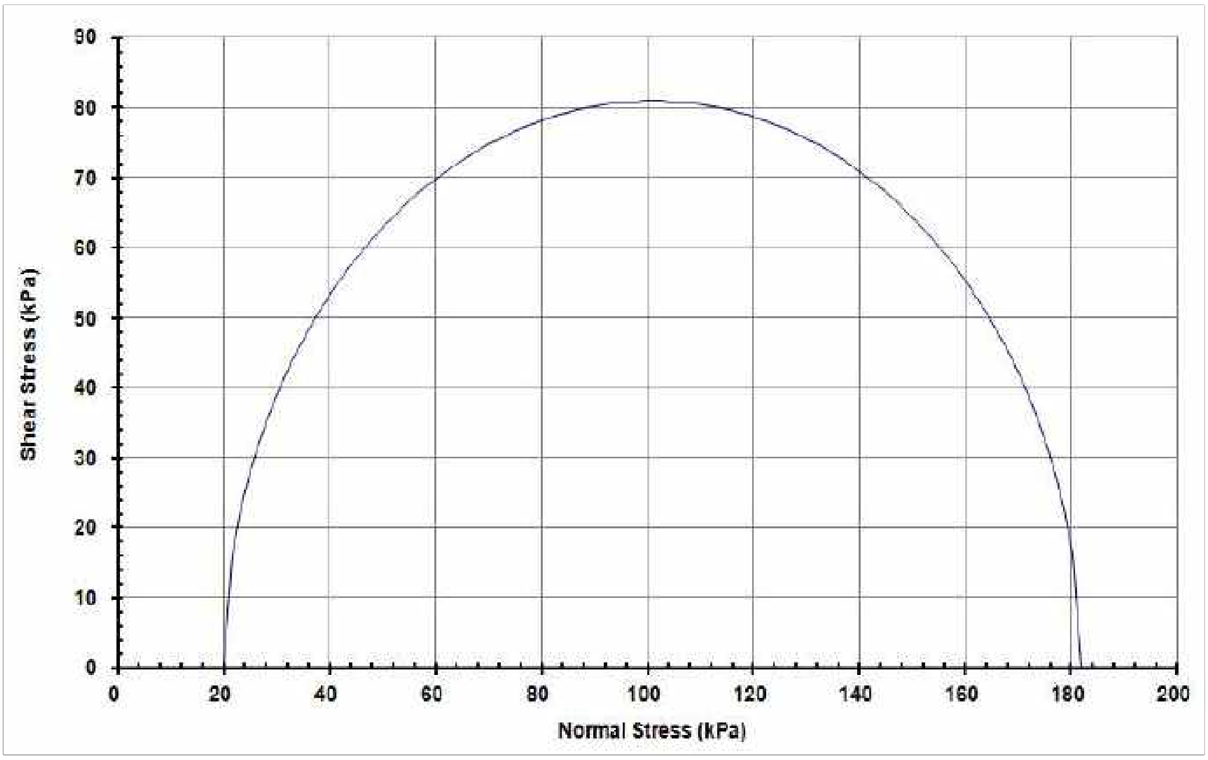
Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB1	Lab:	EPLAB
Sample ID:	BH01-CB1_UU		
Depth (m):	2.00 - 3.00	Room Temperature at Test:	~ 18°C

Tested by:	PHIL	Initial Moisture (%):	20.94	Strain Rate (mm/min):	0.05
Height (mm):	126.05	Final Moisture (%):	20.94	Skempton's (B):	-
Diameter (mm):	60.19	Bulk Density (t/m³):	1.83	Geology:	-
L/D Ratio:	2.09	Dry Density (t/m³):	1.51		

Failure Criteria used: Peak Deviator Stress

Mohr Circle Diagram (Effective Stress)



Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

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E-Precision Laboratory

SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB1	Lab:	EPLAB
Sample ID:	BH01-CB1_UU		
Depth (m):	2.00 - 3.00	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID:	BH01-CB1	**Depth (m):**	2.00 - 3.00
Lab ID:	BH01-CB1_UU	**Date Tested:**	08/02/2025

Failure Mode: Bulging Failure

Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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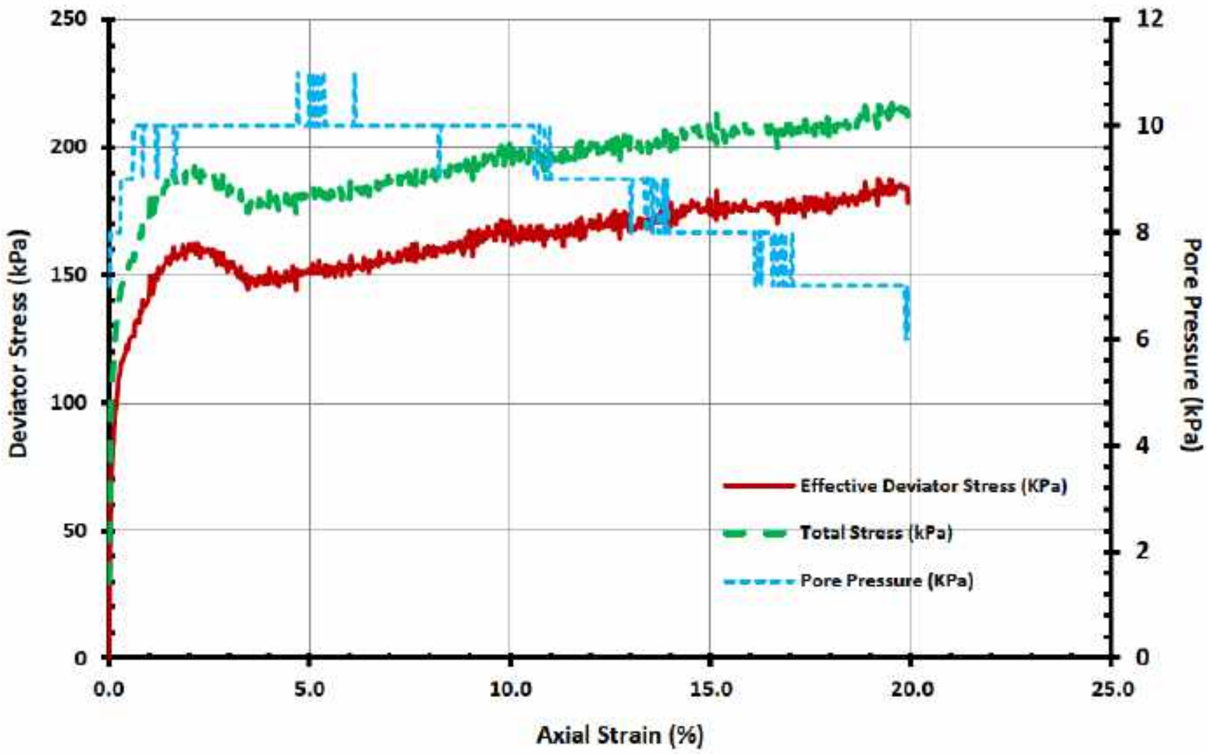
E-PRECISION LABORATORY

SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB1	Lab:	EPLab
Sample ID:	BH01-CB1_UU		
Depth (m):	2.00 - 3.00	Room Temperature at Test:	~ 18°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses $\sigma'1$	$\sigma'3$	$\sigma'1 / \sigma'3$	$\sigma'_1 - \sigma'_3$	Strain (%)
1	30	7	10	182	20	9.10	162	2.00

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SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

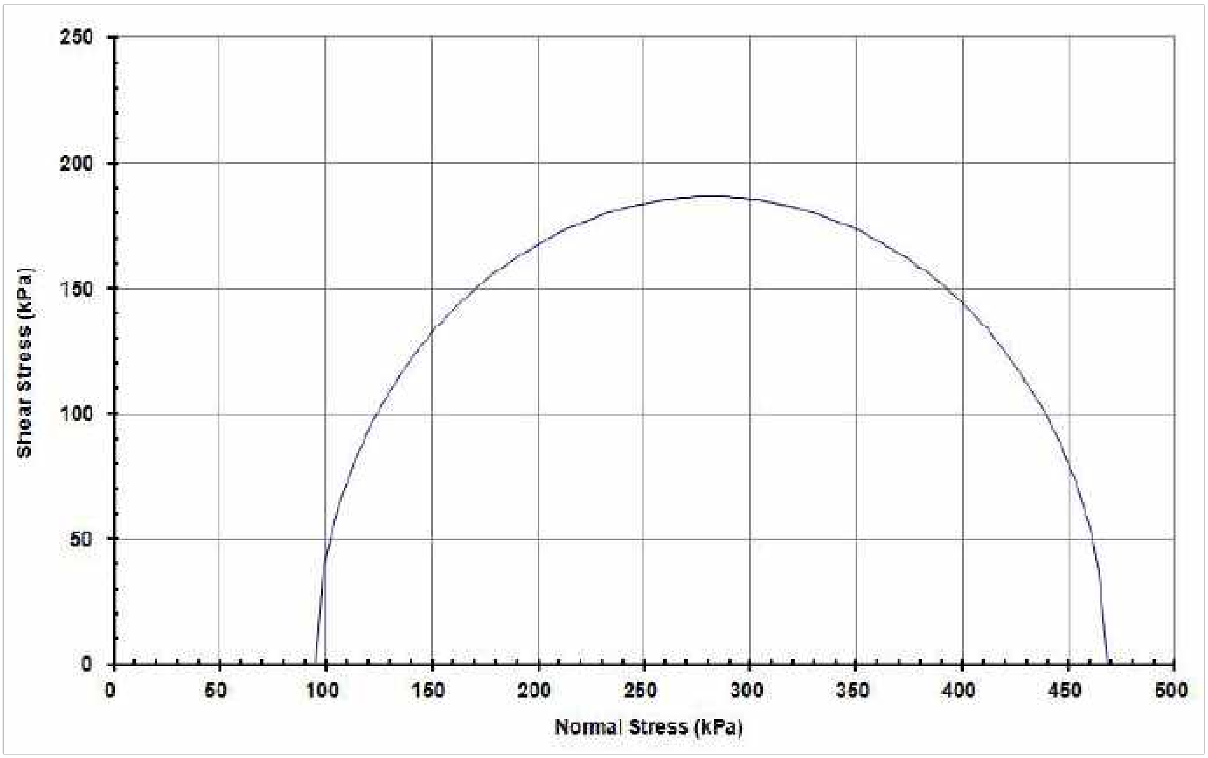
Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB3	Lab:	EPLAB
Sample ID:	BH01-CB3_UU		
Depth (m):	8.60 - 8.80	Room Temperature at Test:	~ 18°C

Tested by:	PHIL	Initial Moisture (%):	12.25	Strain Rate (mm/min):	0.05
Height (mm):	126.29	Final Moisture (%):	12.25	Skempton's (B):	-
Diameter (mm):	60.32	Bulk Density (t/m³):	1.83	Geology:	-
L/D Ratio:	2.09	Dry Density (t/m³):	1.63		

Failure Criteria used: Peak Deviator Stress

Mohr Circle Diagram (Effective Stress)



Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

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SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB3	Lab:	EPLAB
Sample ID:	BH01-CB3_UU		
Depth (m):	8.60 - 8.80	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID:	**BH01-CB3**	**Depth (m):**	**8.60 - 8.80**
Lab ID:	**BH01-CB3_UU**	**Date Tested:**	**08/02/2025**

Failure Mode: Bulging Failure

Notes:

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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[redacted]

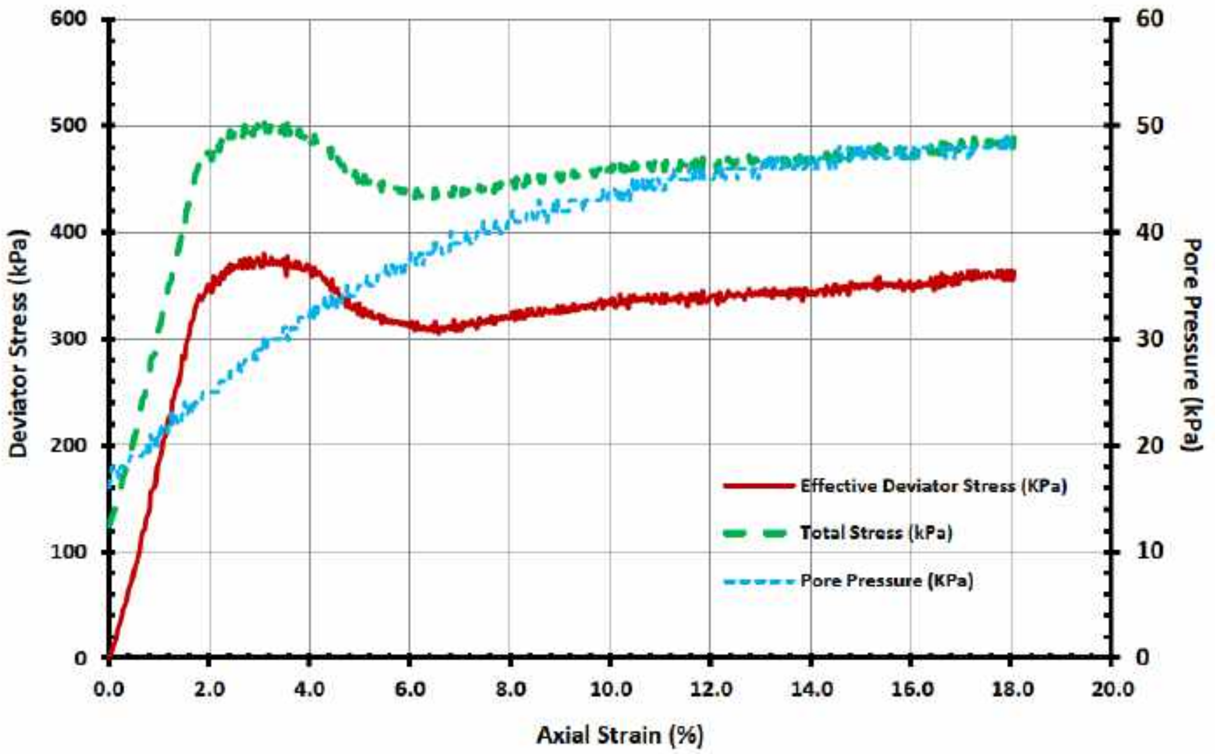
E-PRECISION LABORATORY

SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB3	Lab:	EPLab
Sample ID:	BH01-CB3_UU		
Depth (m):	8.60 - 8.80	Room Temperature at Test:	~ 18°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				$\sigma'1$	$\sigma'3$	$\sigma'1 / \sigma'3$		
1	125	16	30	468	95	4.93	373	3.09

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SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

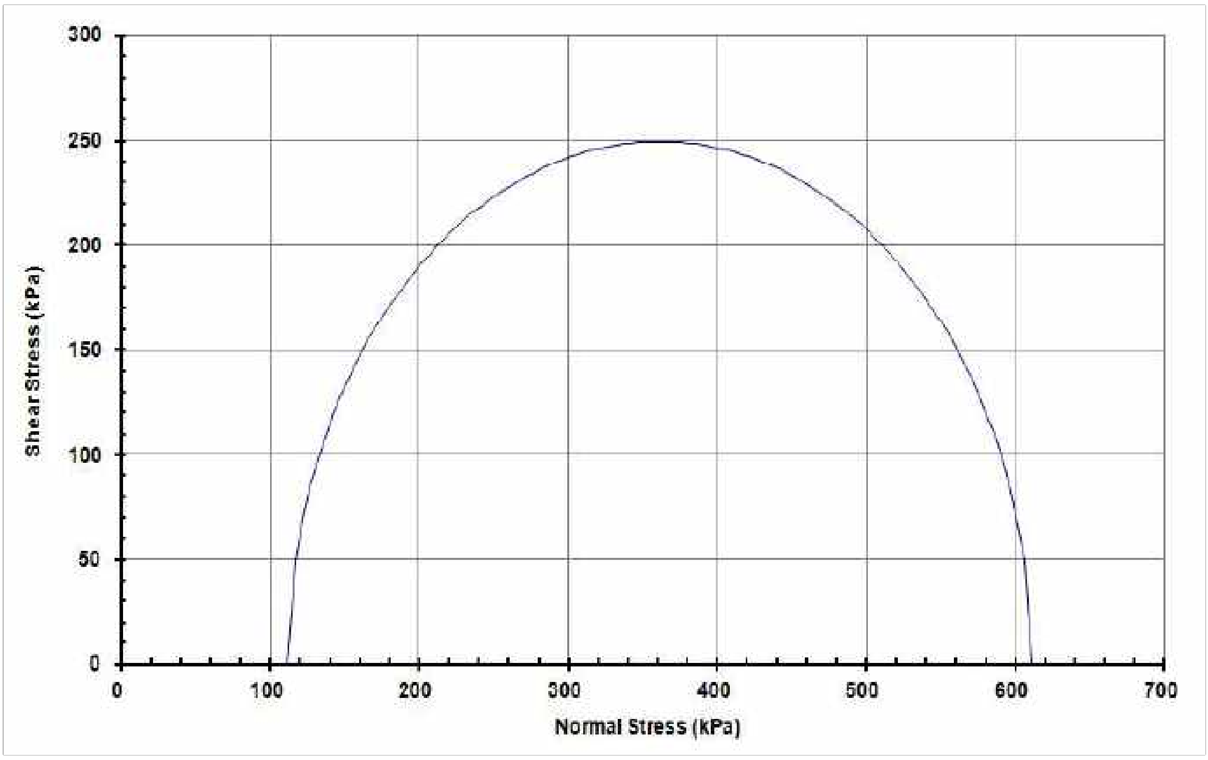
Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB5	Lab:	EPLAB
Sample ID:	BH01-CB5_UU		
Depth (m):	16	Room Temperature at Test:	~ 18°C

Tested by:	PHIL	Initial Moisture (%):	6.15	Strain Rate (mm/min):	0.05
Height (mm):	165.99	Final Moisture (%):	6.15	Skempton's (B):	-
Diameter (mm):	82.09	Bulk Density (t/m³):	2.14	Geology:	-
L/D Ratio:	2.02	Dry Density (t/m³):	2.02		

Failure Criteria used: Peak Deviator Stress

Mohr Circle Diagram (Effective Stress)



Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

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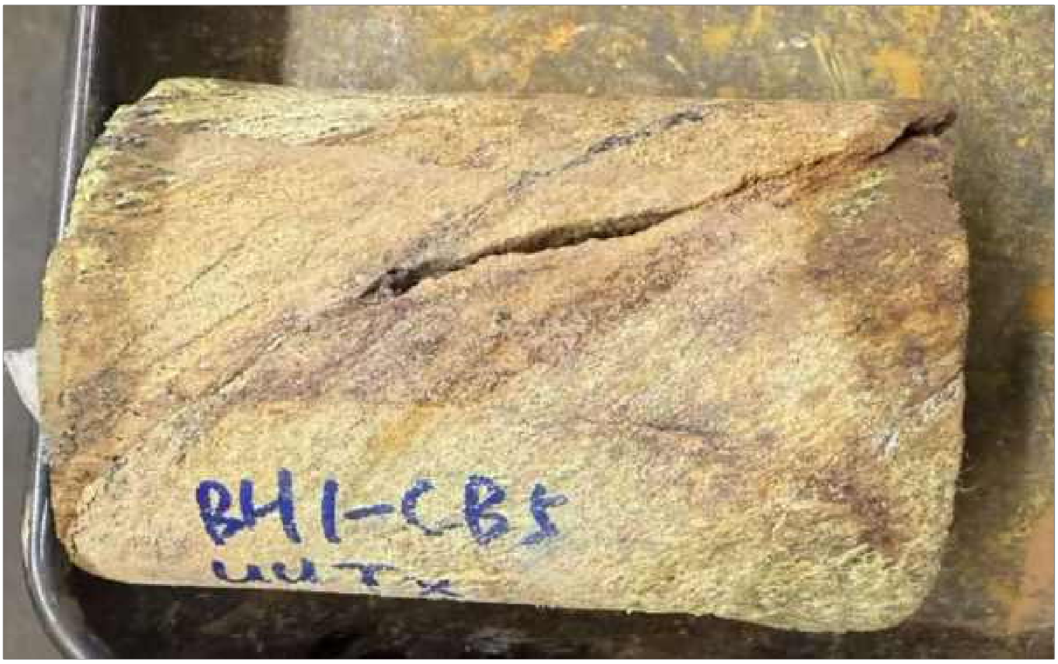
SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB5	Lab:	EPLAB
Sample ID:	BH01-CB5_UU		
Depth (m):	16	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID:	BH01-CB5	**Depth (m):**	16.00
Lab ID:	BH01-CB5_UU	**Date Tested:**	08/02/2025



Failure Mode: Intact Shear @ 36.2°

Notes:

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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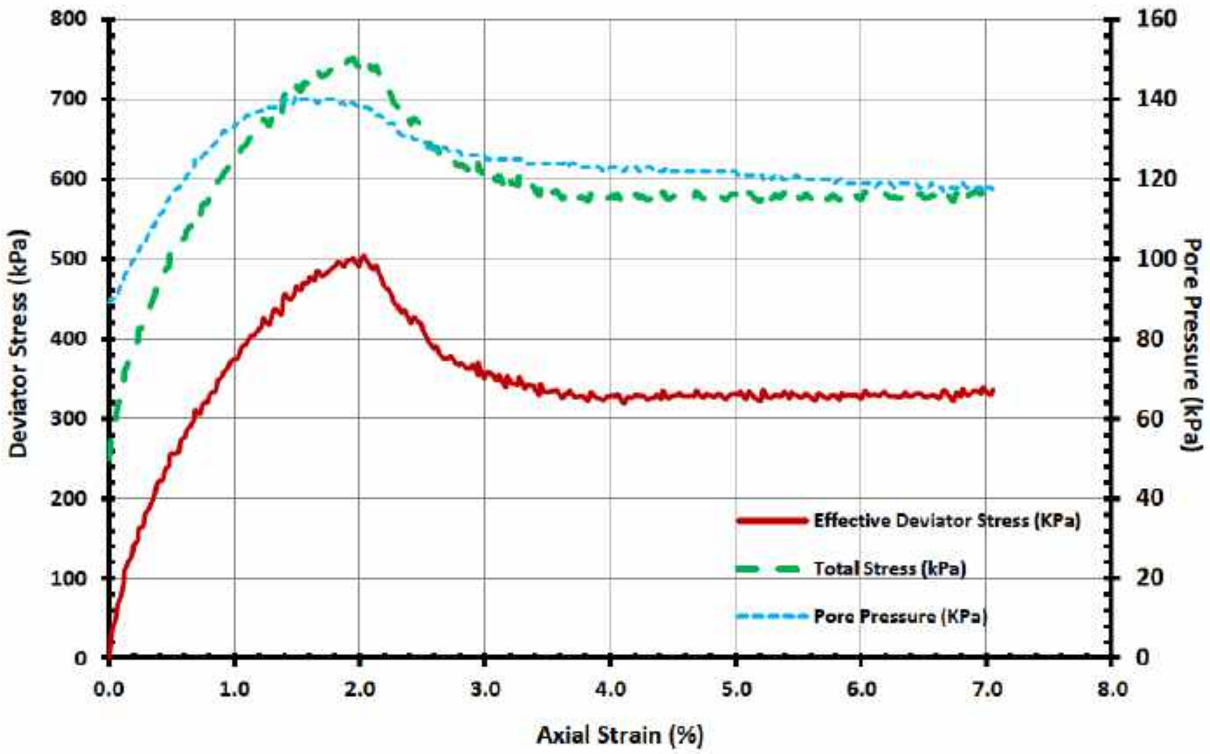
SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH01-CB5	Lab:	EPLab
Sample ID:	BH01-CB5_UU		
Depth (m):	16	Room Temperature at Test:	~ 18°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				$\sigma'1$	$\sigma'3$	$\sigma'1 / \sigma'3$		
1	250	89	138	611	112	5.45	499	1.90

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E-PRECISION LABORATORY

SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

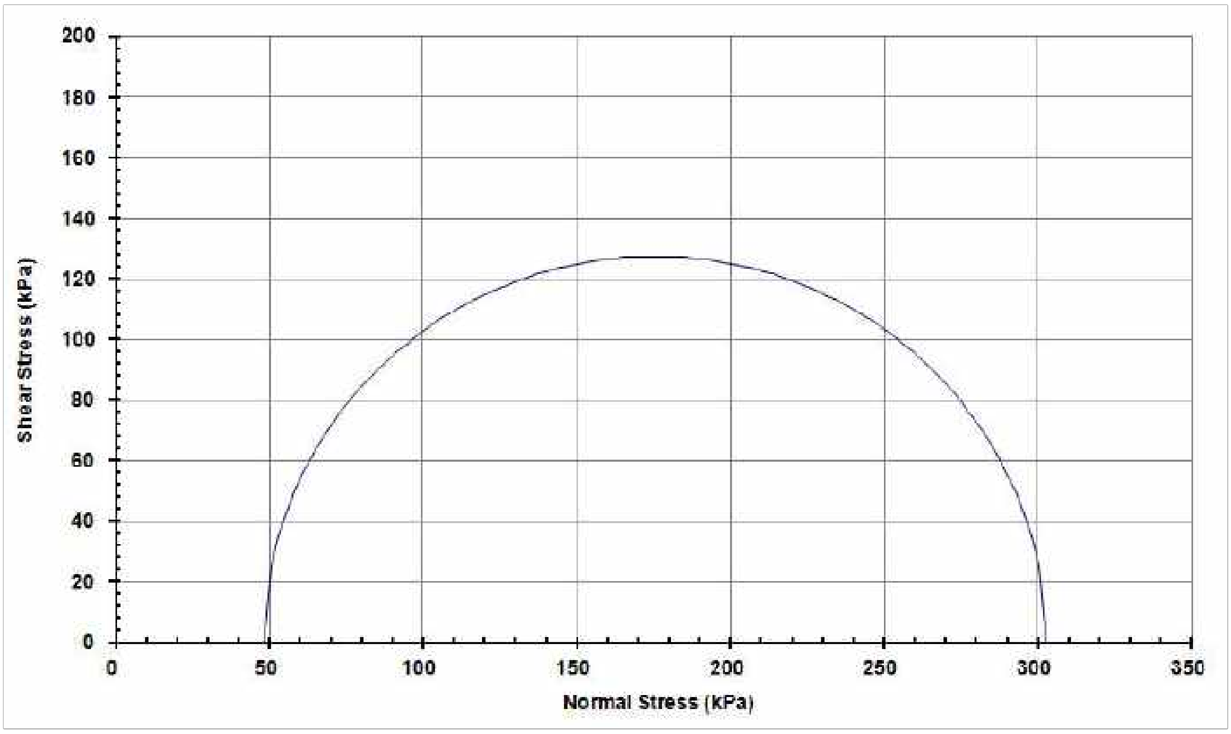
Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH01-UDS02	Lab:	EPLAB
Sample ID:	BH01-UDS02_UU		
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 18°C

Tested by:	PHIL	Initial Moisture (%):	27.55	Strain Rate (mm/min):	0.05
Height (mm):	126.53	Final Moisture (%):	27.55	Skempton's (B):	-
Diameter (mm):	63.85	Bulk Density (t/m³):	2.17	Geology:	-
L/D Ratio:	1.98	Dry Density (t/m³):	1.70		

Failure Criteria used: Peak Deviator Stress

Mohr Circle Diagram (Effective Stress)



Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

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SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH01-UDS02	Lab:	EPLAB
Sample ID:	BH01-UDS02_UU		
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID:	BH01-UDS02	**Depth (m):**	4.95 - 5.30
Lab ID:	BH01-UDS02_UU	**Date Tested:**	08/02/2025

Failure Mode: Intact Shear @ 26.5°

Notes: **Sample extruded from Shelby Tube**

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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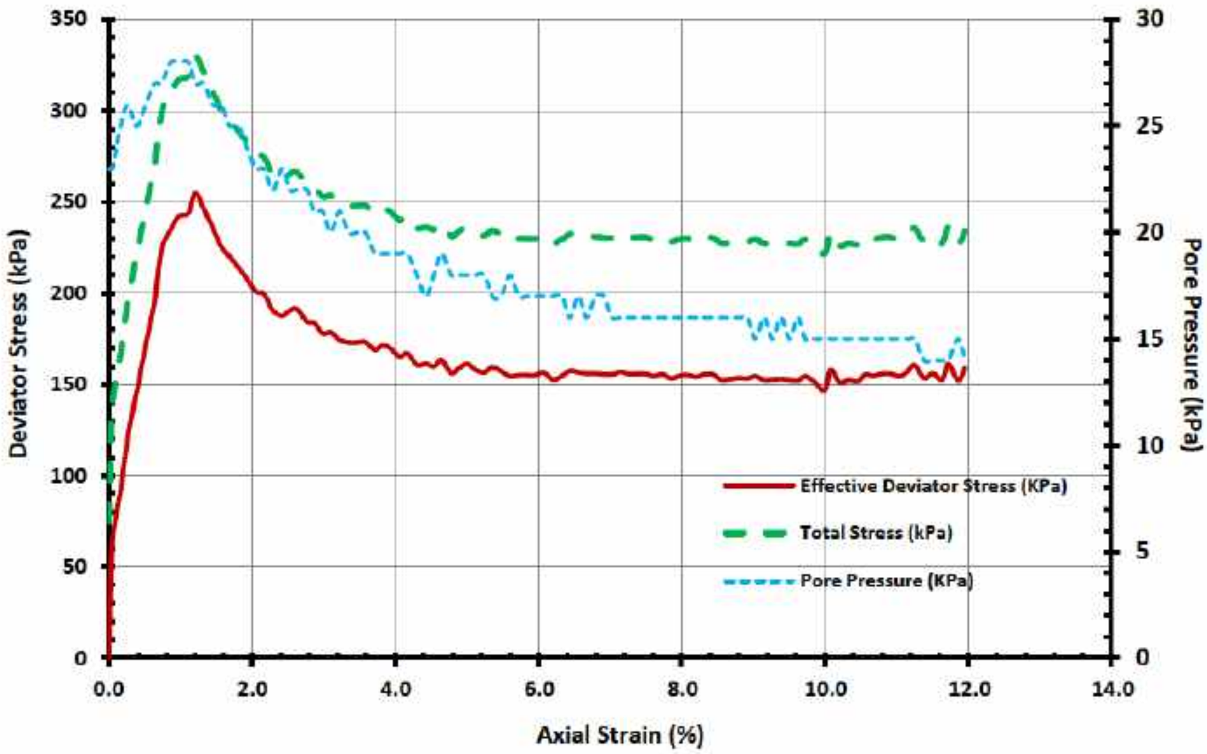
SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH01-UDS02	Lab:	EPLab
Sample ID:	BH01-UDS02_UU		
Depth (m):	4.95 - 5.30	Room Temperature at Test:	~ 18°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				$\sigma'1$	$\sigma'3$	$\sigma'1 / \sigma'3$		
1	75	23	27	303	48	6.31	255	1.21

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SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

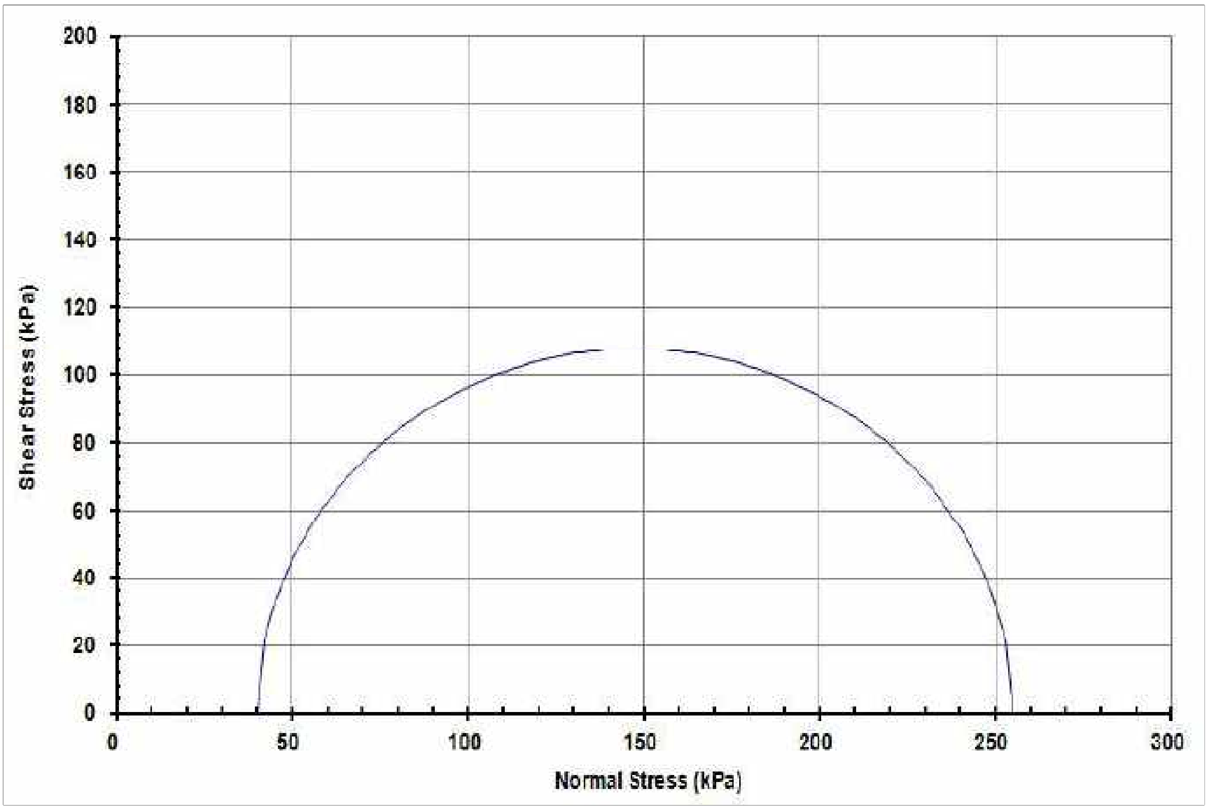
Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS02	Lab:	EPLAB
Sample ID:	BH02-UDS02_UU		
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 18°C

Tested by:	PHIL	Initial Moisture (%):	35.71	Strain Rate (mm/min):	0.05
Height (mm):	126.55	Final Moisture (%):	35.71	Skempton's (B):	-
Diameter (mm):	60.76	Bulk Density (t/m³):	1.93	Geology:	-
L/D Ratio:	2.08	Dry Density (t/m³):	1.43		

Failure Criteria used: Peak Deviator Stress

Mohr Circle Diagram (Effective Stress)



Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

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SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS02	Lab:	EPLAB
Sample ID:	BH02-UDS02_UU		
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID:	BH02-UDS02	**Depth (m):**	9.50 - 9.79
Lab ID:	BH02-UDS02_UU	**Date Tested:**	08/02/2025

Failure Mode: Intact Shear @ 24.7°

Notes: **Sample extruded from Shelby Tube**

Stored and Tested the Sample as received

Samples supplied by the Client

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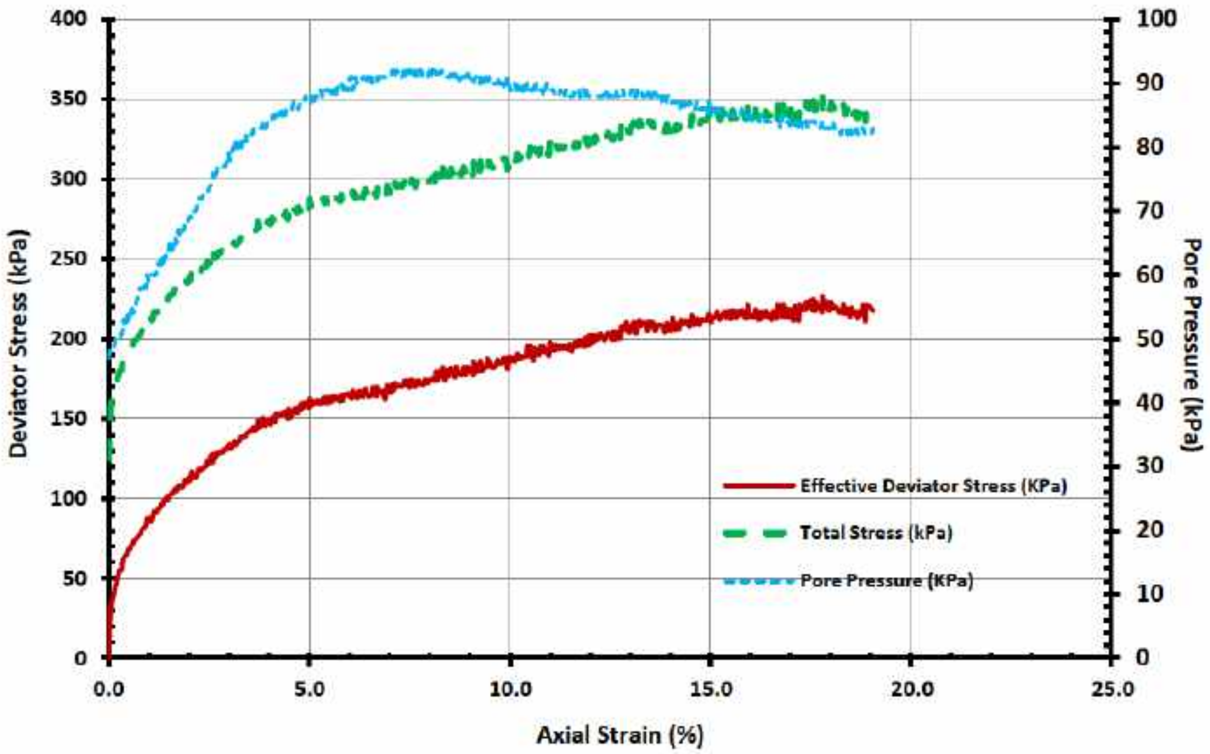
SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS02	Lab:	EPLab
Sample ID:	BH02-UDS02_UU		
Depth (m):	9.50 - 9.79	Room Temperature at Test:	~ 18°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				$\sigma'1$	$\sigma'3$	$\sigma'1 / \sigma'3$		
1	125	47	85	255	40	6.37	215	15.92

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SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

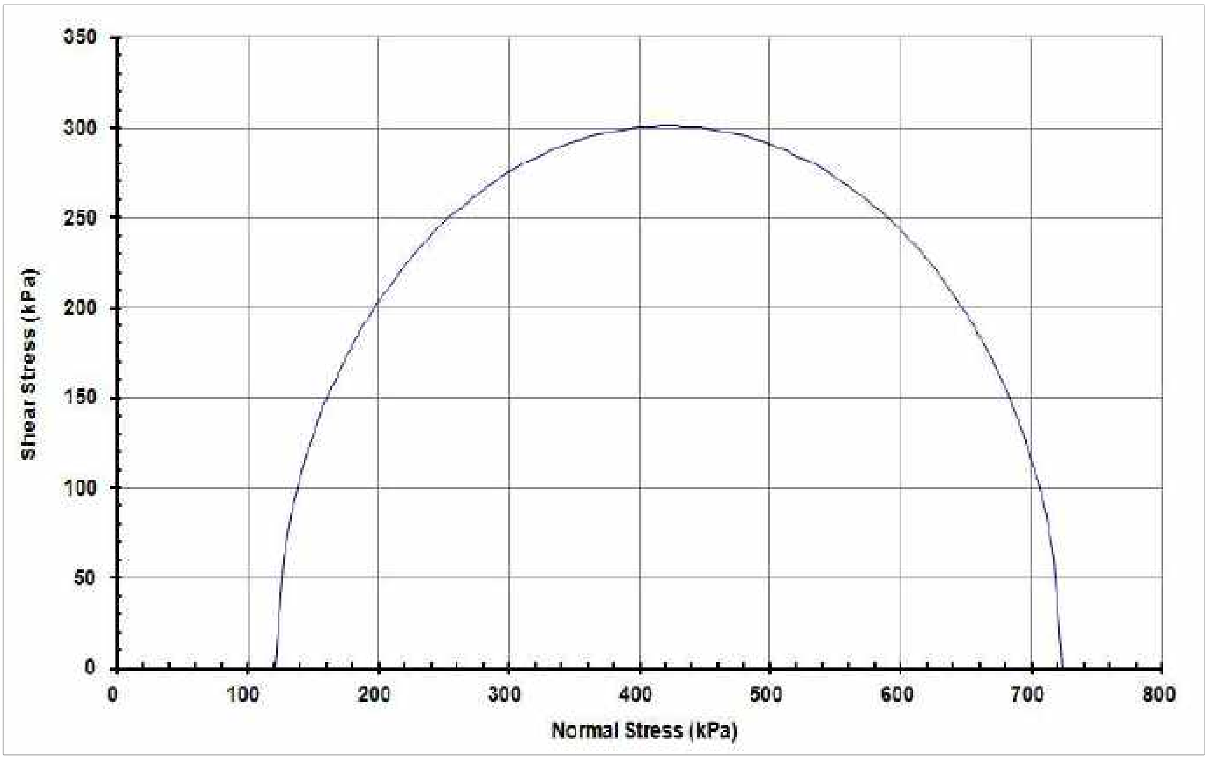
Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS03	Lab:	EPLAB
Sample ID:	BH02-UDS03_UU		
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 18°C

Tested by:	PHIL	Initial Moisture (%):	29.45	Strain Rate (mm/min):	0.05
Height (mm):	127.31	Final Moisture (%):	29.45	Skempton's (B):	-
Diameter (mm):	63.85	Bulk Density (t/m³):	1.89	Geology:	-
L/D Ratio:	1.99	Dry Density (t/m³):	1.46		

Failure Criteria used: Peak Deviator Stress

Mohr Circle Diagram (Effective Stress)



Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

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SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS03	Lab:	EPLAB
Sample ID:	BH02-UDS03_UU		
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID:	BH02-UDS03	**Depth (m):**	11.00 - 11.39
Lab ID:	BH02-UDS03_UU	**Date Tested:**	08/02/2025

Failure Mode: Intact Shear @ 46.1°

Notes:

Stored and Tested the Sample as received

Samples supplied by the Client

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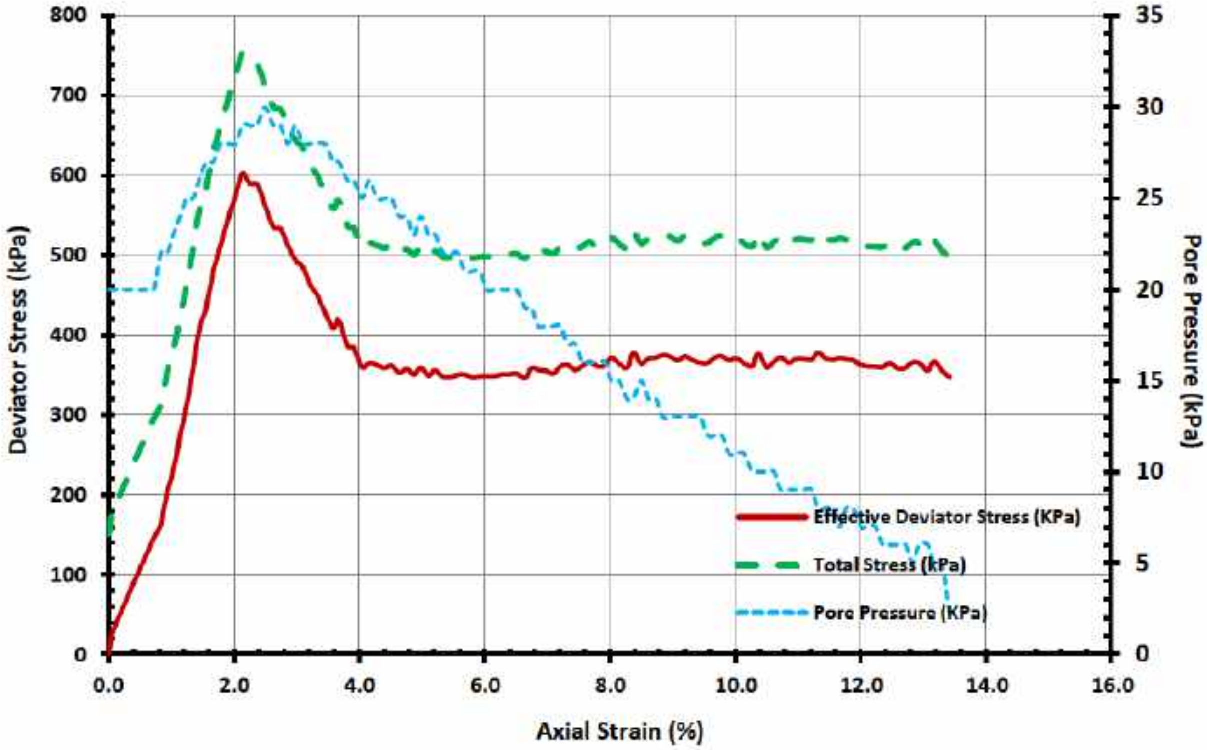
SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS03	Lab:	EPLab
Sample ID:	BH02-UDS03_UU		
Depth (m):	11.00 - 11.39	Room Temperature at Test:	~ 18°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				$\sigma'1$	$\sigma'3$	$\sigma'1 / \sigma'3$		
1	150	20	29	723	121	5.98	602	2.14

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SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

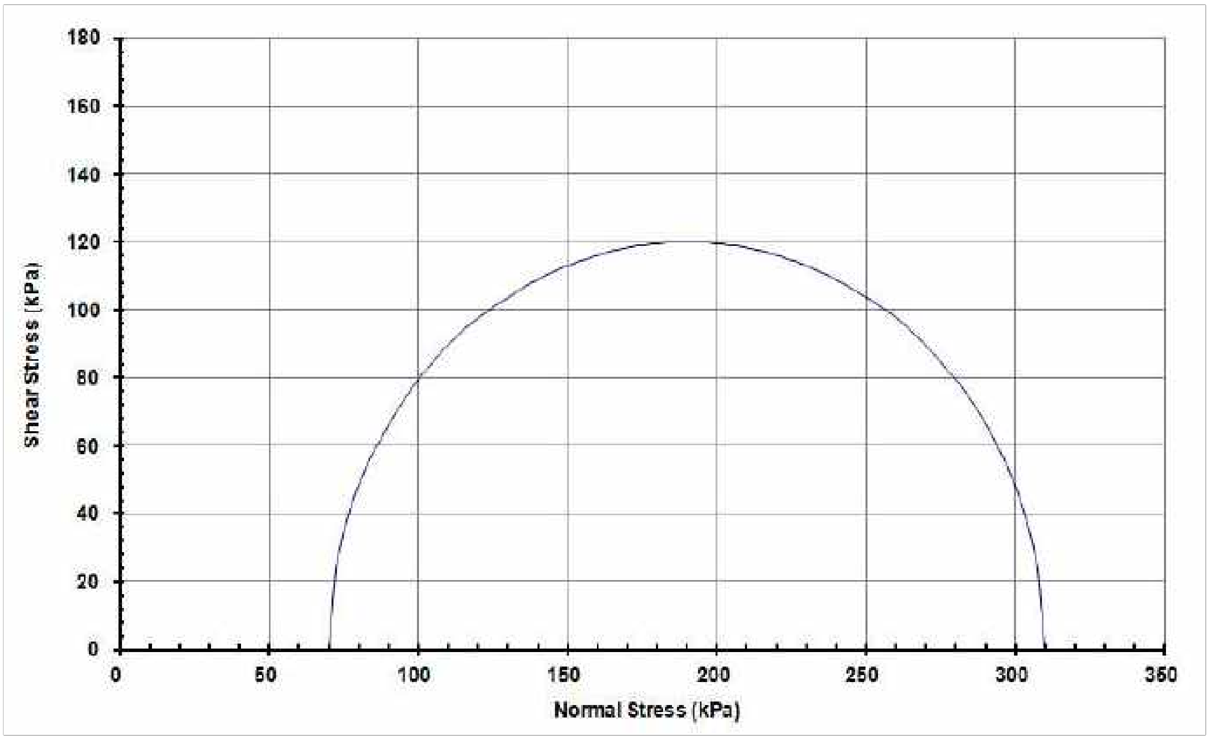
Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS04	Lab:	EPLAB
Sample ID:	BH02-UDS04_UU		
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 18°C

Tested by:	PHIL	Initial Moisture (%):	26.63	Strain Rate (mm/min):	0.05
Height (mm):	125.65	Final Moisture (%):	26.63	Skempton's (B):	-
Diameter (mm):	61.80	Bulk Density (t/m^3):	2.02	Geology:	-
L/D Ratio:	2.03	Dry Density (t/m^3):	1.59		

Failure Criteria used: Peak Deviator Stress

Mohr Circle Diagram (Effective Stress)



Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

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SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS04	Lab:	EPLAB
Sample ID:	BH02-UDS04_UU		
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID:	BH02-UDS04	**Depth (m):**	12.50 - 12.95
Lab ID:	BH02-UDS04_UU	**Date Tested:**	08/02/2025

Failure Mode: Intact Shear @ 29°

Notes:

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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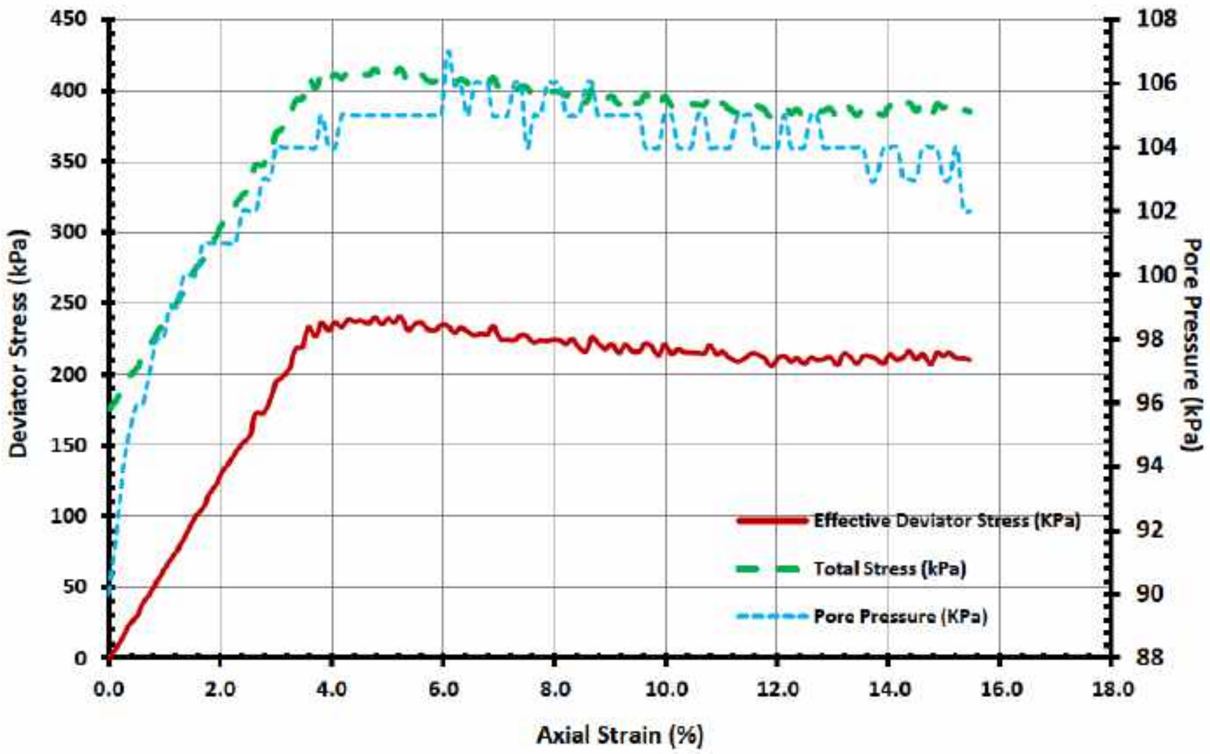
SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS04	Lab:	EPLab
Sample ID:	BH02-UDS04_UU		
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 18°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				$\sigma'1$	$\sigma'3$	$\sigma'1 / \sigma'3$		
1	175	90	105	310	70	4.43	240	4.78

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SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

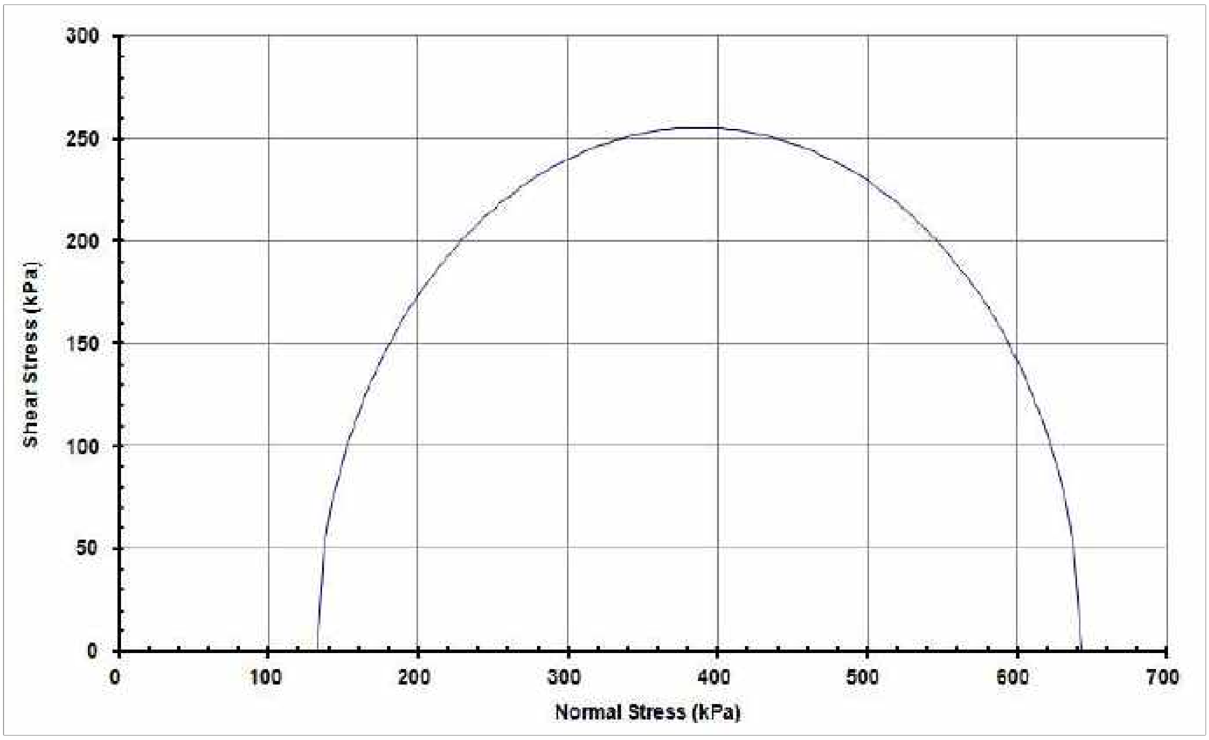
Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS05	Lab:	EPLAB
Sample ID:	BH02-UDS05_UU		
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 18°C

Tested by:	PHIL	Initial Moisture (%):	21.78	Strain Rate (mm/min):	0.05
Height (mm):	126.54	Final Moisture (%):	21.78	Skempton's (B):	-
Diameter (mm):	63.57	Bulk Density (t/m³):	2.07	Geology:	-
L/D Ratio:	1.99	Dry Density (t/m³):	1.70		

Failure Criteria used: Peak Deviator Stress

Mohr Circle Diagram (Effective Stress)



Interpretation from Mohr Circle:	**Stage 1 & 2**	**Stage 1 & 3**	**Stage 2 & 3**
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

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SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS05	Lab:	EPLAB
Sample ID:	BH02-UDS05_UU		
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID:	BH02-UDS05	**Depth (m):**	14.00 - 14.45
Lab ID:	BH02-UDS05_UU	**Date Tested:**	08/02/2025

Failure Mode: Intact Shear @ 37.3°

Notes:

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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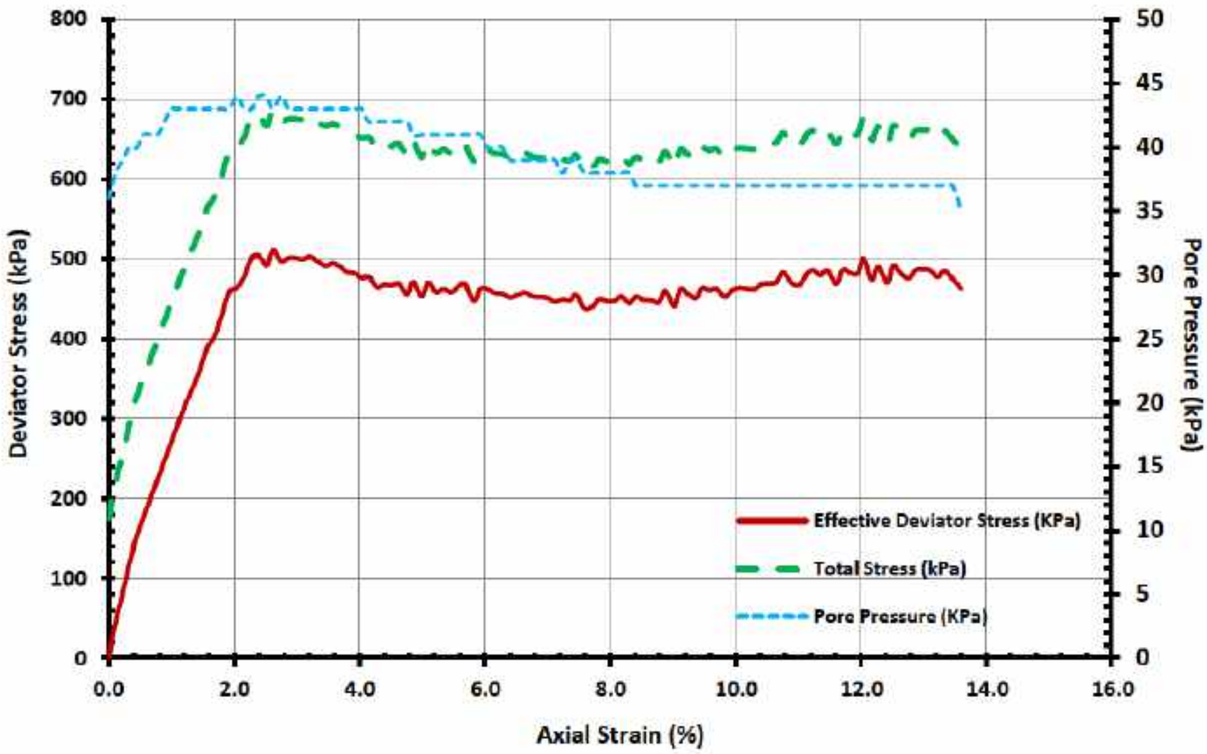
SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client: REC		Date Tested:	08/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH02-UDS05	Lab:	EPLab
Sample ID:	BH02-UDS05_UU		
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 18°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses $\sigma'1$	$\sigma'3$	$\sigma'1 / \sigma'3$	$\sigma'_1 - \sigma'_3$	Strain (%)
1	175	36	43	643	132	4.87	511	2.62

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SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

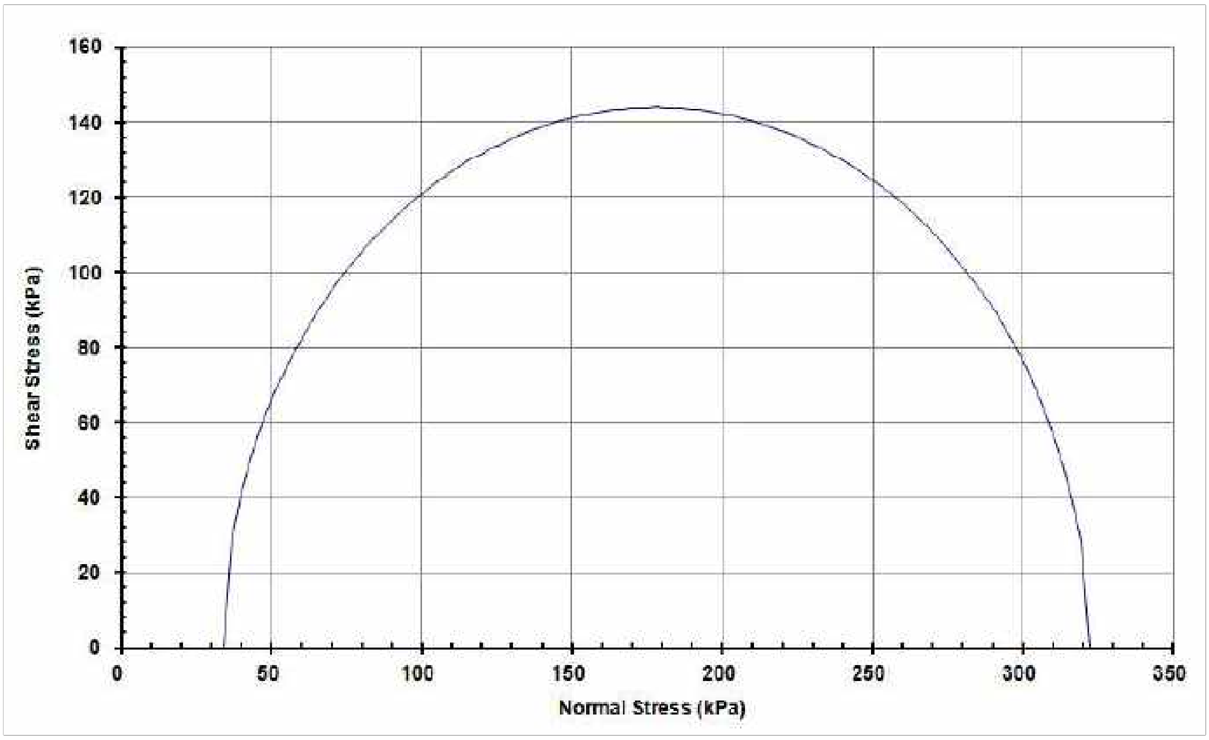
Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS02	Lab:	EPLAB
Sample ID:	BH03-UDS02_UU		
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 18°C

Tested by:	PHIL	Initial Moisture (%):	27.22	Strain Rate (mm/min):	0.05
Height (mm):	118.76	Final Moisture (%):	27.22	Skempton's (B):	-
Diameter (mm):	63.11	Bulk Density (t/m³):	1.91	Geology:	-
L/D Ratio:	1.88	Dry Density (t/m³):	1.50		

Failure Criteria used: Peak Deviator Stress

Mohr Circle Diagram (Effective Stress)



Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

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SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS02	Lab:	EPLAB
Sample ID:	BH03-UDS02_UU		
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID:	BH03-UDS02	**Depth (m):**	5.00 - 5.45
Lab ID:	BH03-UDS02_UU	**Date Tested:**	12/02/2025

Failure Mode: Intact Shear @ 35.8°

Notes:

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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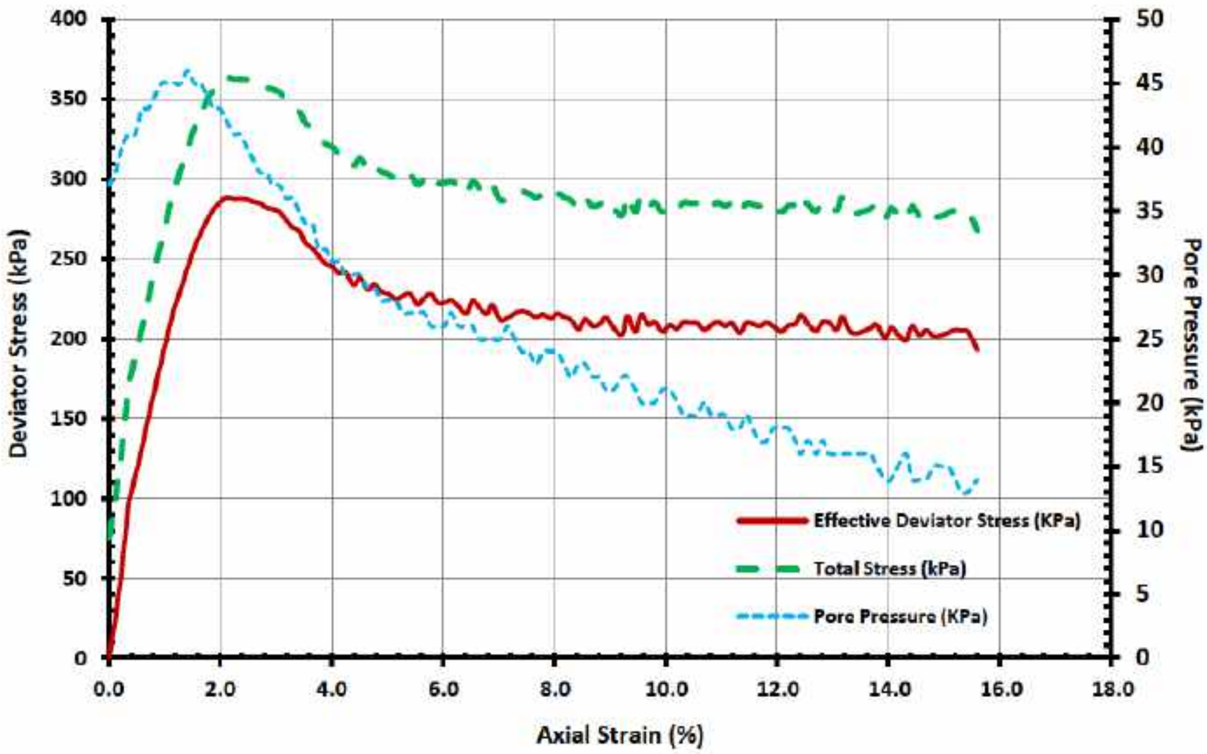
SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS02	Lab:	EPLab
Sample ID:	BH03-UDS02_UU		
Depth (m):	5.00 - 5.45	Room Temperature at Test:	~ 18°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				$\sigma'1$	$\sigma'3$	$\sigma'1 / \sigma'3$		
1	75	37	41	322	34	9.46	288	2.36

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SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

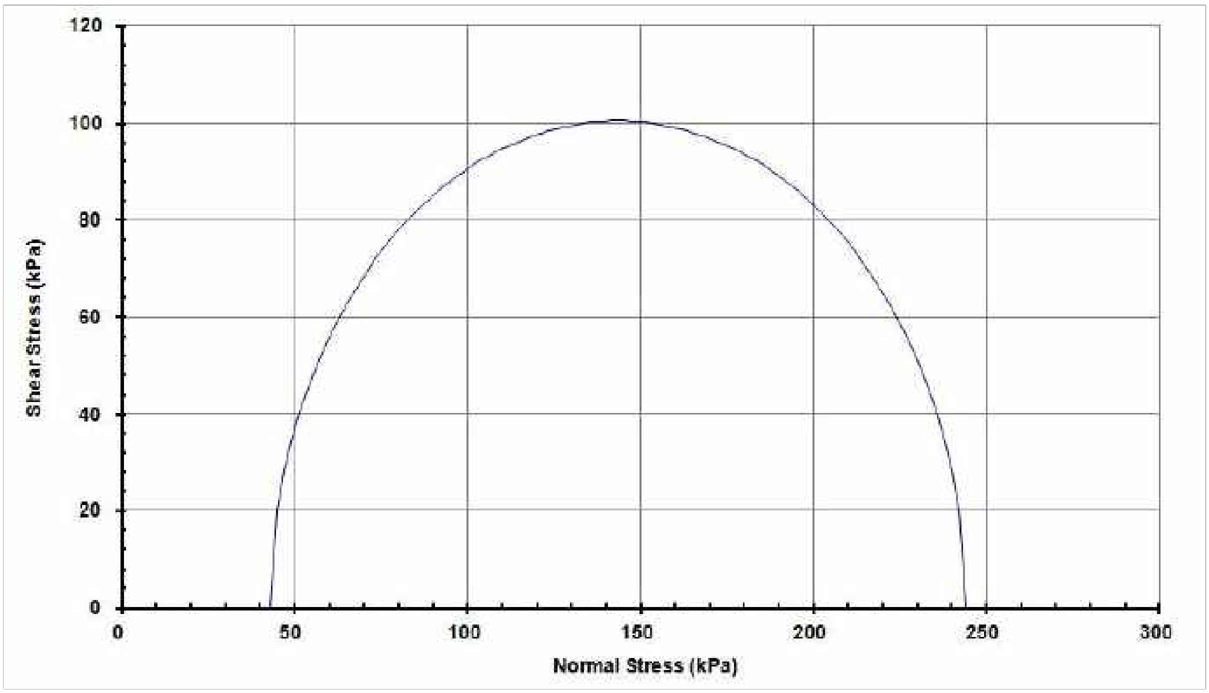
Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS04	Lab:	EPLAB
Sample ID:	BH03-UDS04_UU		
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 18°c

Tested by:	PHIL	Initial Moisture (%):	29.01	Strain Rate (mm/min):	0.05
Height (mm):	126.85	Final Moisture (%):	29.01	Skempton's (B):	-
Diameter (mm):	63.61	Bulk Density (t/m³):	1.93	Geology:	-
L/D Ratio:	1.99	Dry Density (t/m³):	1.50		

Failure Criteria used: Peak Deviator Stress

Mohr Circle Diagram (Effective Stress)



Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

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SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS04	Lab:	EPLAB
Sample ID:	BH03-UDS04_UU		
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID:	BH03-UDS04	**Depth (m):**	8.00 - 8.45
Lab ID:	BH03-UDS04_UU	**Date Tested:**	12/02/2025

Failure Mode: Intact Shear @ 36.6°

Notes:

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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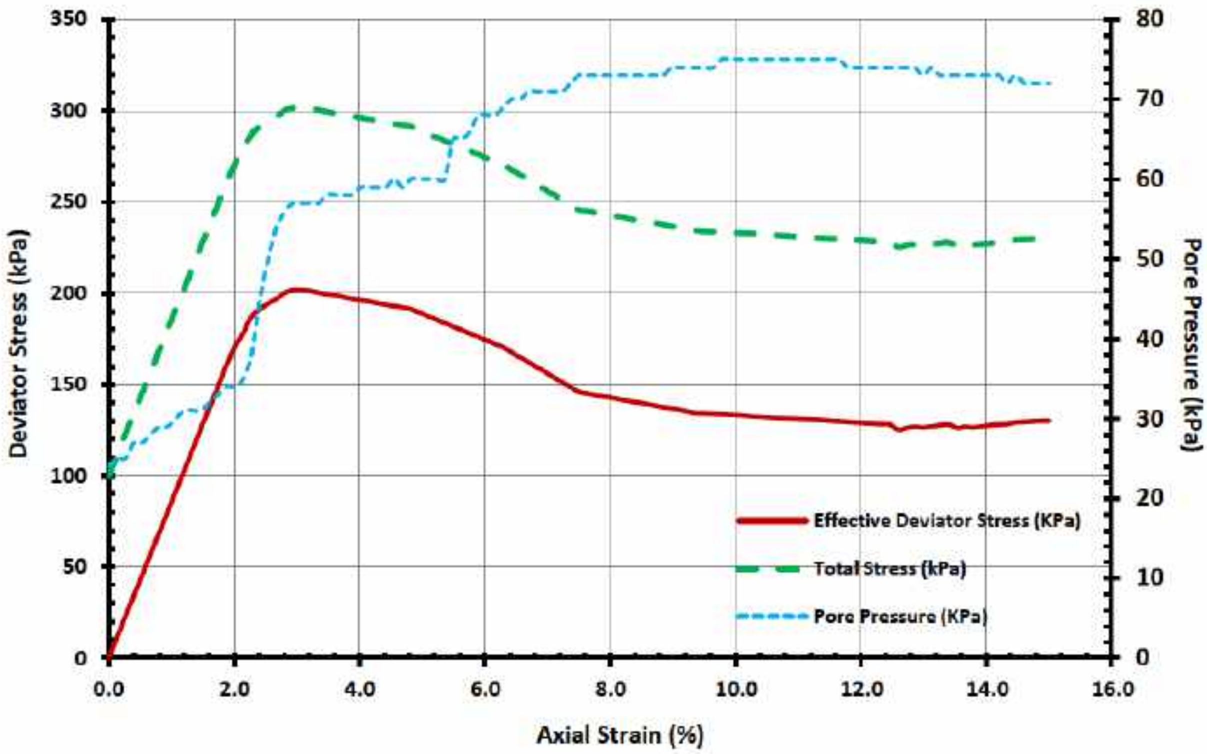
SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS04	Lab:	EPLab
Sample ID:	BH03-UDS04_UU		
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 18°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				$\sigma'1$	$\sigma'3$	$\sigma'1 / \sigma'3$		
1	100	24	57	244	43	5.68	201	3.22

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E-Precision Laboratory

SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

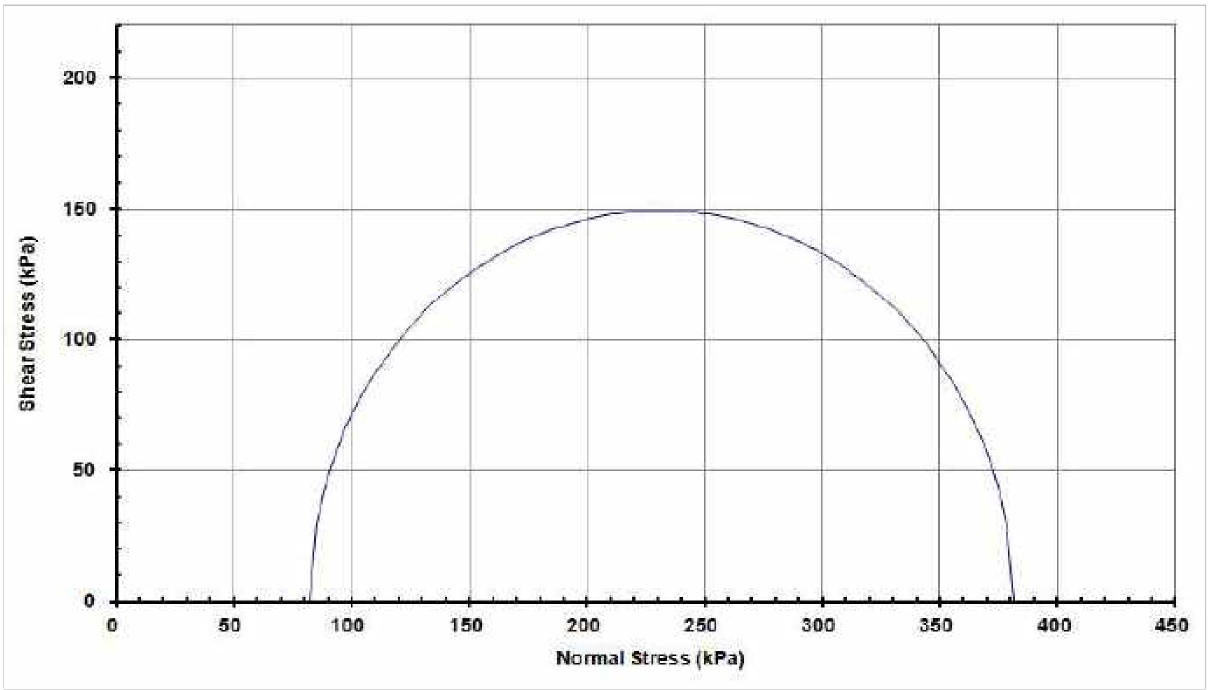
Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS06	Lab:	EPLAB
Sample ID:	BH03-UDS06_UU		
Depth (m):	11.00 - 11.25	Room Temperature at Test:	~ 18°C

Tested by:	PHIL	Initial Moisture (%):	32.15	Strain Rate (mm/min):	0.05
Height (mm):	126.82	Final Moisture (%):	32.15	Skempton's (B):	-
Diameter (mm):	63.18	Bulk Density (t/m³):	1.84	Geology:	-
L/D Ratio:	2.01	Dry Density (t/m³):	1.39		

Failure Criteria used: Peak Deviator Stress

Mohr Circle Diagram (Effective Stress)



Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

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E-Precision Laboratory

SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS06	Lab:	EPLAB
Sample ID:	BH03-UDS06_UU		
Depth (m):	11.00 - 11.25	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID:	BH03-UDS06	**Depth (m):**	11.00 - 11.25
Lab ID:	BH03-UDS06_UU	**Date Tested:**	12/02/2025

Failure Mode: Intact Shear @ 32.5°

Notes:

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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[redacted]

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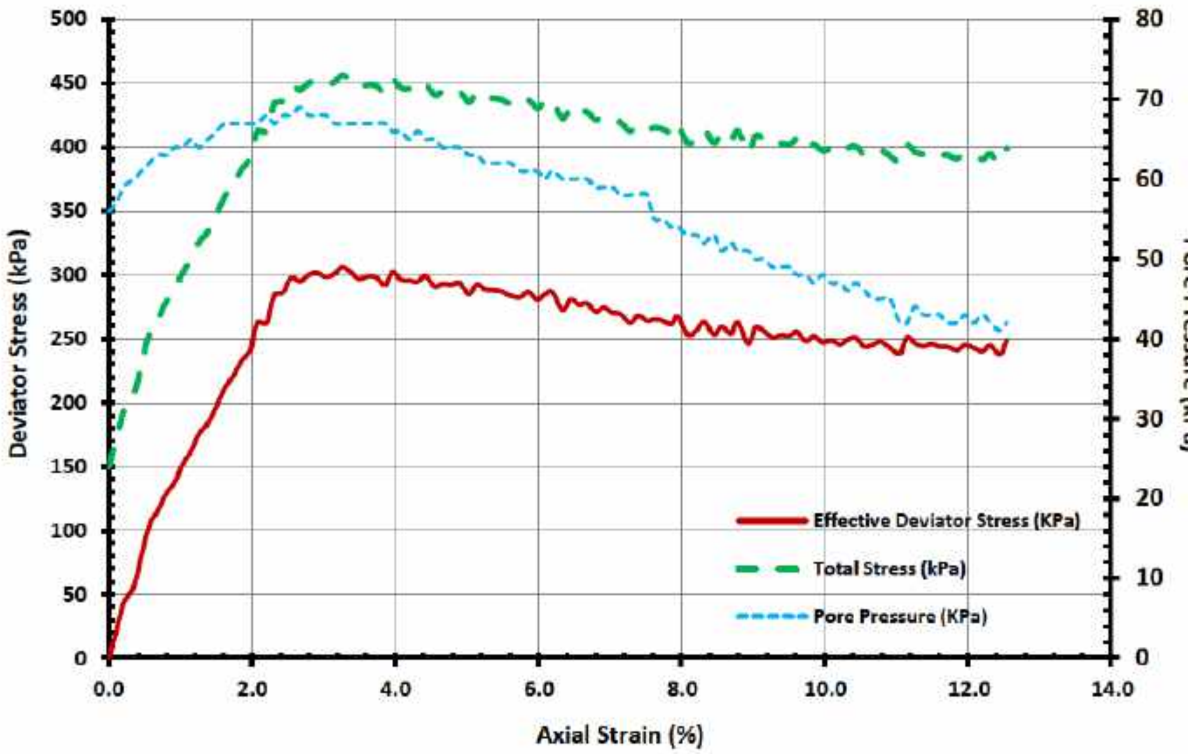
SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS06	Lab:	EPLab
Sample ID:	BH03-UDS06_UU		
Depth (m):	11.00 - 11.25	Room Temperature at Test:	~ 18°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				$\sigma'1$	$\sigma'3$	$\sigma'1 / \sigma'3$		
1	150	56	68	381	82	4.64	299	3.04

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SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

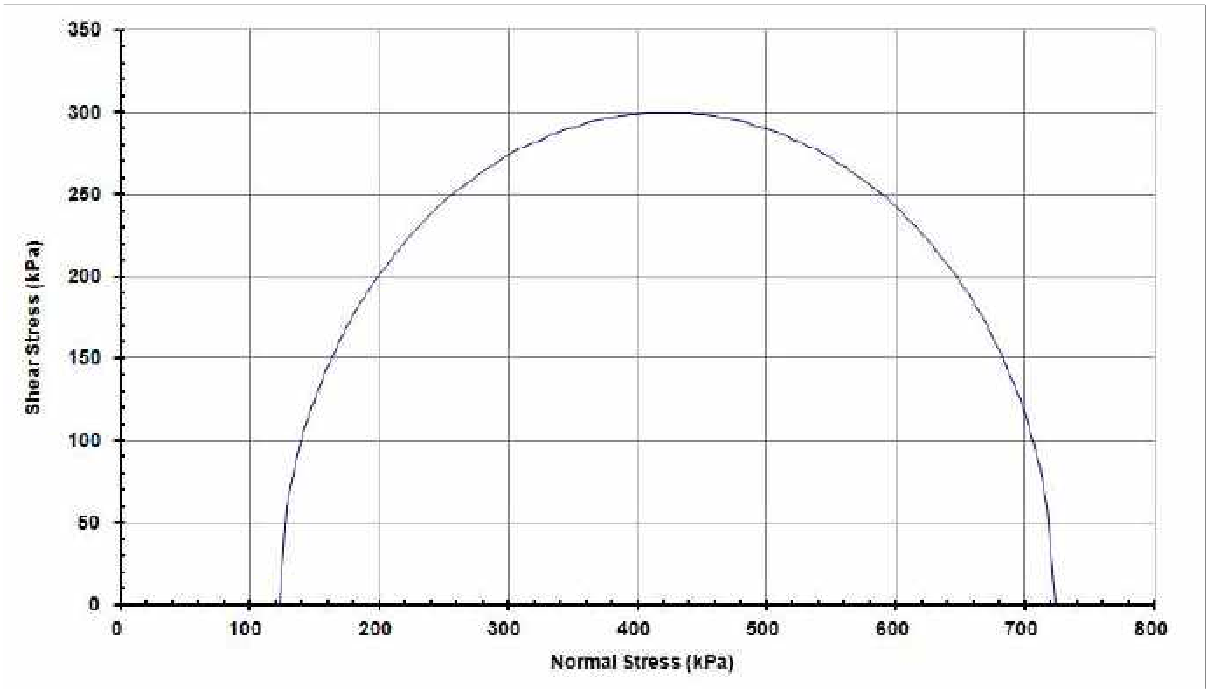
Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS08	Lab:	EPLAB
Sample ID:	BH03-UDS08_UU		
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 18°C

Tested by:	PHIL	Initial Moisture (%):	30.60	Strain Rate (mm/min):	0.05
Height (mm):	126.95	Final Moisture (%):	30.60	Skempton's (B):	-
Diameter (mm):	64.57	Bulk Density (t/m³):	2.00	Geology:	-
L/D Ratio:	1.97	Dry Density (t/m³):	1.53		

Failure Criteria used: Peak Deviator Stress

Mohr Circle Diagram (Effective Stress)



Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

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SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS08	Lab:	EPLAB
Sample ID:	BH03-UDS08_UU		
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID:	BH03-UDS08	**Depth (m):**	14.00 - 14.45
Lab ID:	BH03-UDS08_UU	**Date Tested:**	12/02/2025

Failure Mode: Intact Shear @ 37.6°

Notes:

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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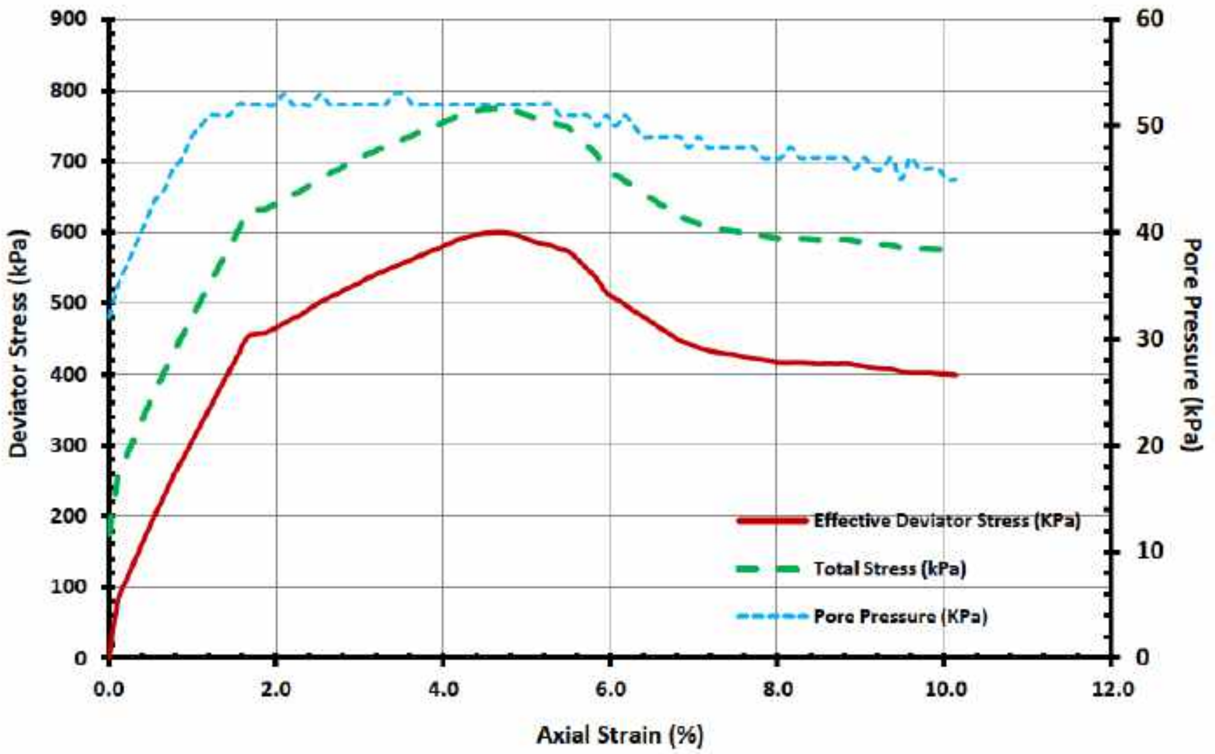
E-PRECISION LABORATORY

SINGLE-STAGE UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: ASTM D2850 / Inhouse Method

Client:	REC	Date Tested:	12/02/2025
Project:	Bellevue TSF Testing 2025	EP Lab Job Number:	REC
Sample No:	BH03-UDS08	Lab:	EPLab
Sample ID:	BH03-UDS08_UU		
Depth (m):	14.00 - 14.45	Room Temperature at Test:	~ 18°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				$\sigma'1$	$\sigma'3$	$\sigma'1 / \sigma'3$		
1	175	32	52	723	123	5.88	600	4.63

Appendix E

Tailings Laboratory Test Results

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E-Precision Laboratory

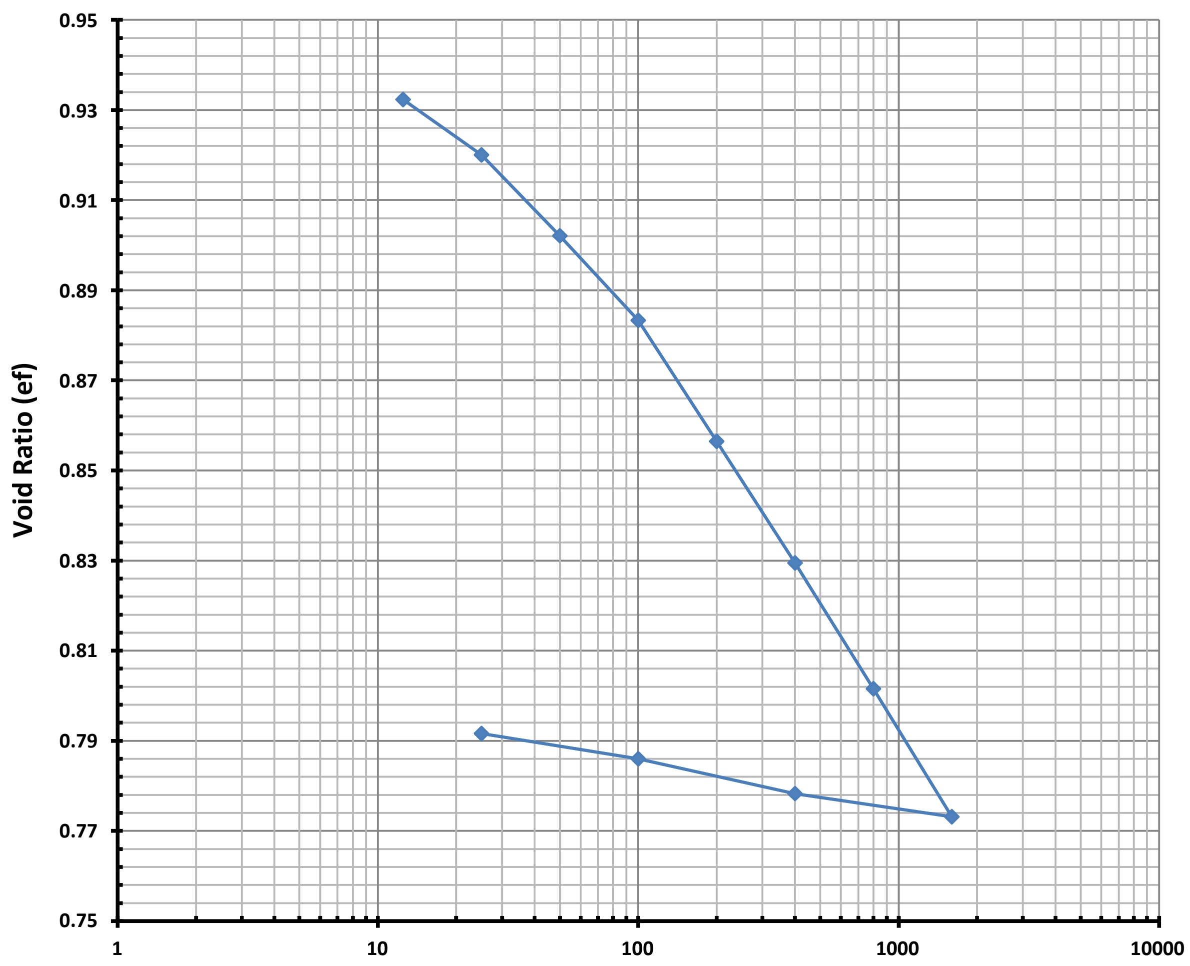
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	55% Tailings W/W%		
Lab ID:	BELLEVUE_55%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Tested by:	Phil	Initial Moisture (%):	34.94	Test Condition:	Undrained
Height (mm):	37.26	Final Moisture Content (%):	44.12	Sample Condition:	55% Solids
Diameter (mm):	61.80	Bulk Density (t/m^3):	2.05	Particle Density (t/m^3):	2.996
Direction:	Vertical	Dry Density (t/m^3):	1.52	Initial Void Ratio (e_i):	0.973

Void Ratio (e_f) Vs Log of Vertical Pressure (kPa)



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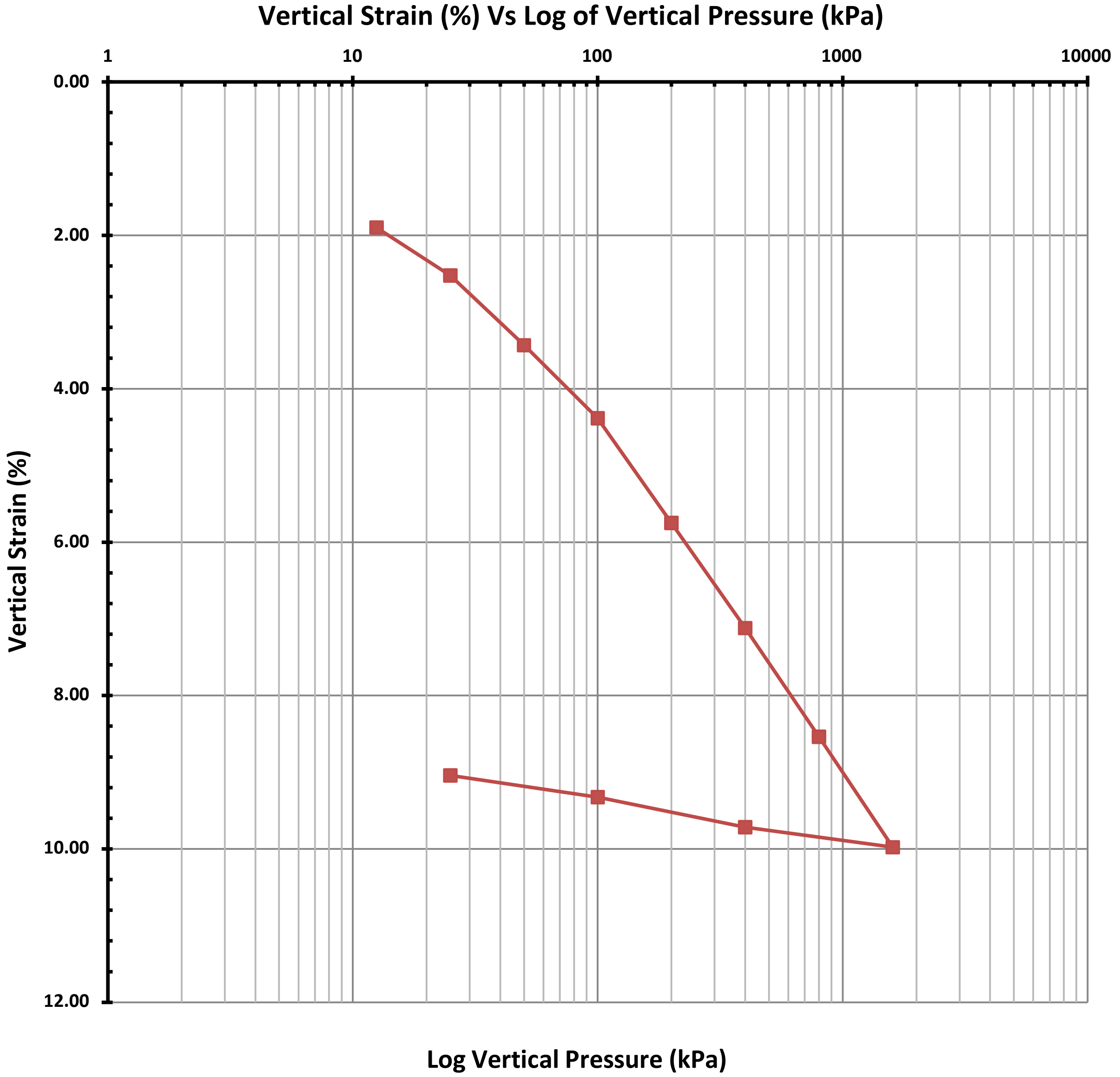
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	55% Tailings W/W%		
Lab ID:	BELLEVUE_55%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C



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E-PRECISION LABORATORY

CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	55% Tailings W/W%		
Lab ID:	BELLEVUE_55%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Test Results

*

Stages	Vert Disp (mm)	Cv (m²/yr)		Compressibility Mv (m²/kN)	K (m/s)	Cα (10^{-3})	Void Ratio (e_f)	Vertical Strain (%)
		*t_{50}	t_{90}					
Stage 1 @ 12.5kPa	0.71	46.373	-	1.52E-03	1.3E-06	0.11	0.932	1.90
Stage 2 @ 25kPa	0.94	45.822	-	5.10E-04	4.4E-07	0.05	0.920	2.52
Stage 3 @ 50kPa	1.28	44.962	-	3.73E-04	3.1E-07	0.24	0.902	3.43
Stage 4 @ 100kPa	1.63	44.155	-	1.97E-04	1.6E-07	0.11	0.883	4.39
Stage 5 @ 200kPa	2.14	43.036	-	1.43E-04	1.1E-07	0.46	0.856	5.75
Stage 6 @ 400kPa	2.65	41.743	-	7.28E-05	5.7E-08	0.35	0.829	7.12
Stage 7 @ 800kPa	3.18	40.415	-	3.81E-05	2.9E-08	0.08	0.802	8.54
Stage 8 @ 1600kPa	3.72	39.195	-	1.97E-05	1.4E-08	0.05	0.773	9.98
Unload @ 400kPa	3.62							
Unload @ 100kPa	3.48							
Unload @ 12.5kPa	3.37							

** Values interpreted via lab only*

Comments: **Sample collected from Settlement Drained Test**
Cv values to be interpreted via Engineer

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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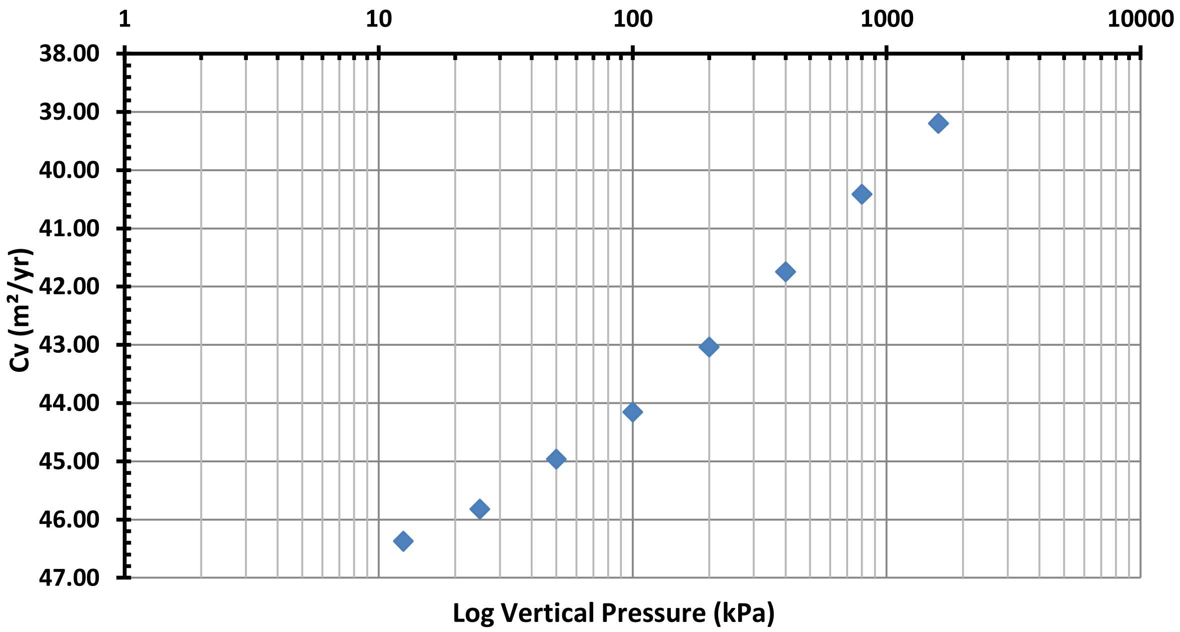
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

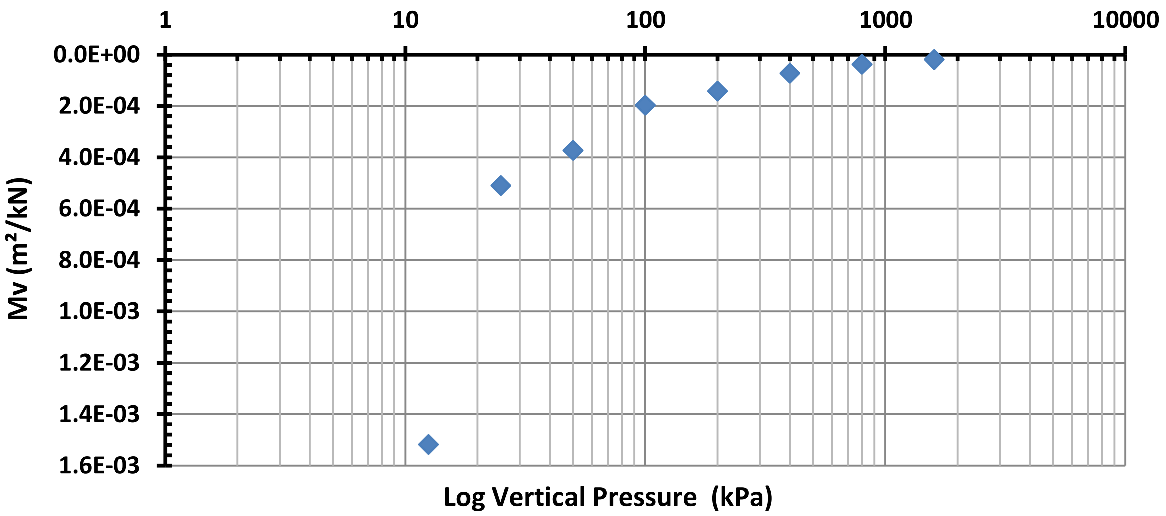
Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	55% Tailings W/W%		
Lab ID:	BELLEVUE_55%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Cv (m²/yr) Vs Log of Vertical Pressure (kPa)



* Plot based on Log (time) data

Mv (m²/kN) Vs Log of Vertical Pressure (kPa)



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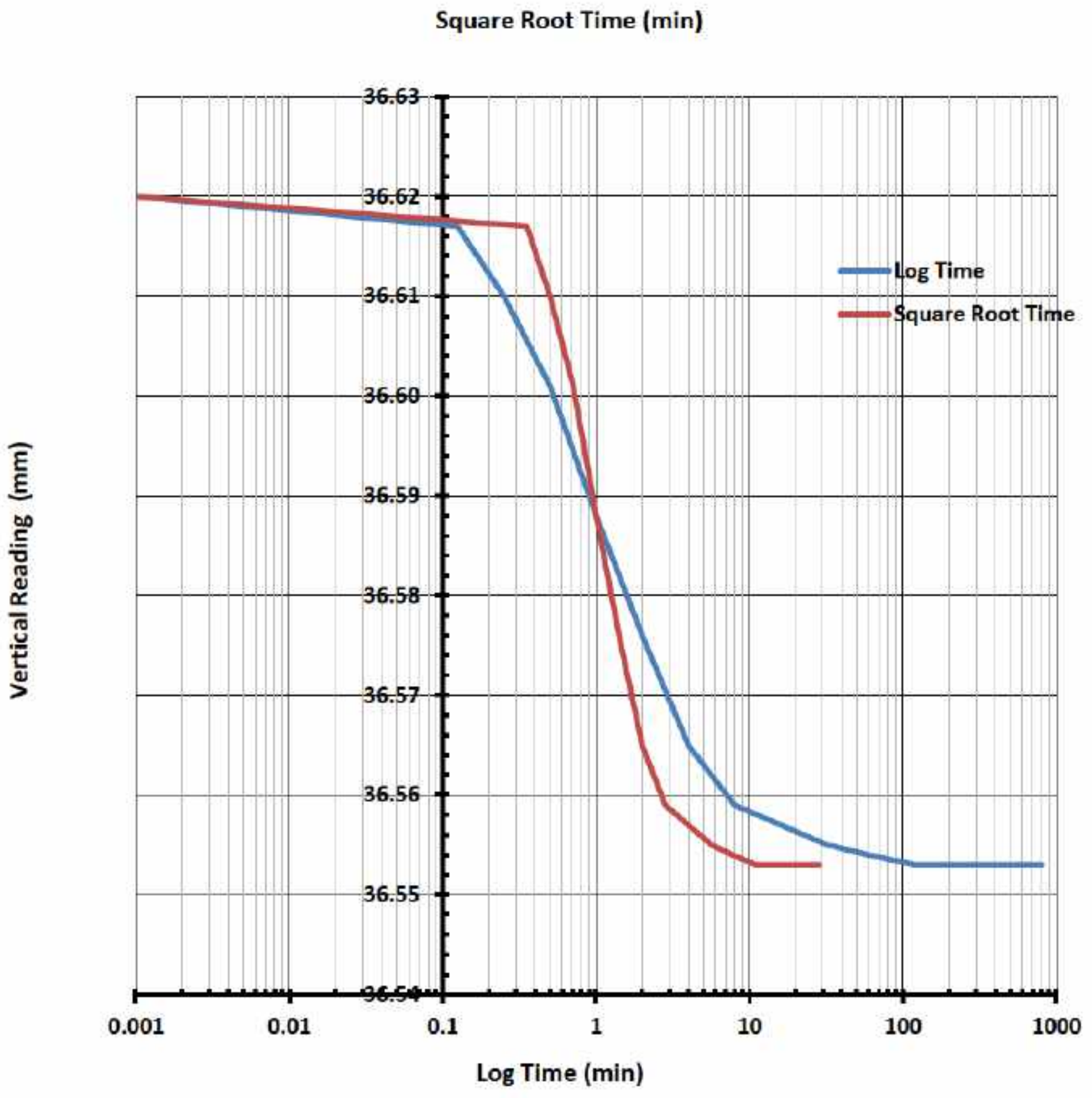
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	55% Tailings W/W%		
Lab ID:	BELLEVUE_55%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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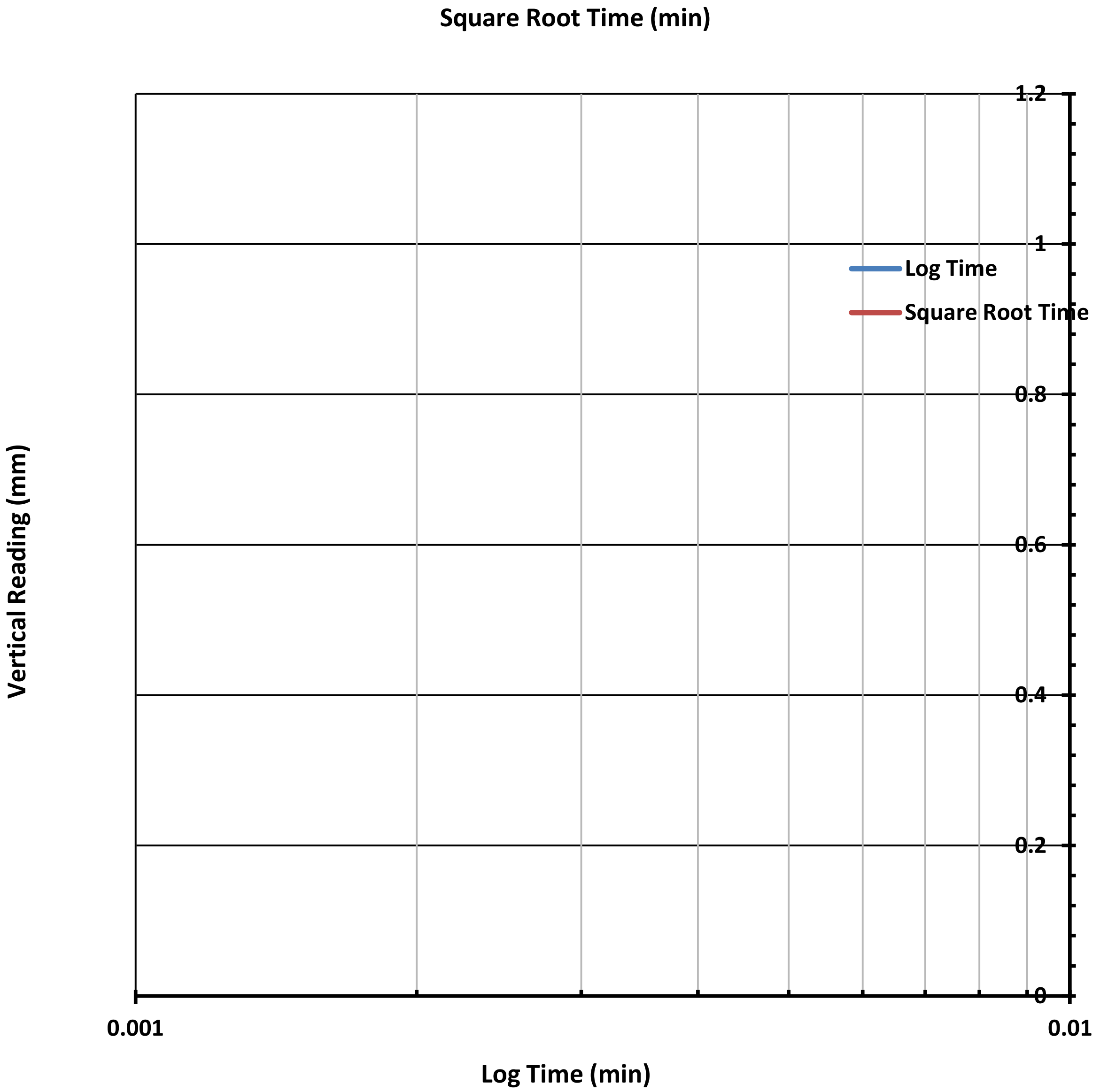
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	55% Tailings W/W%		
Lab ID:	BELLEVUE_55%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

N/A



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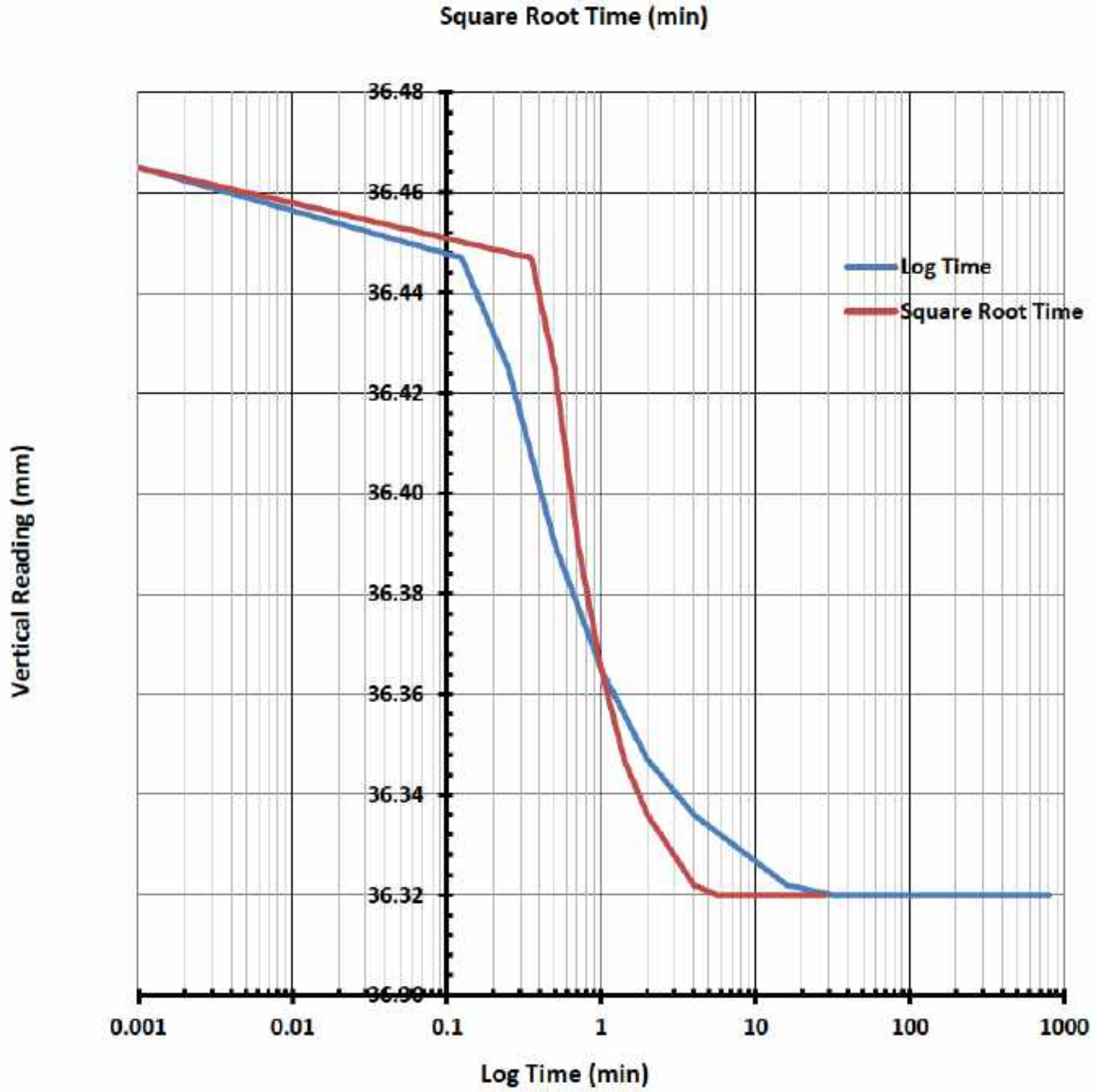
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	55% Tailings W/W%		
Lab ID:	BELLEVUE_55%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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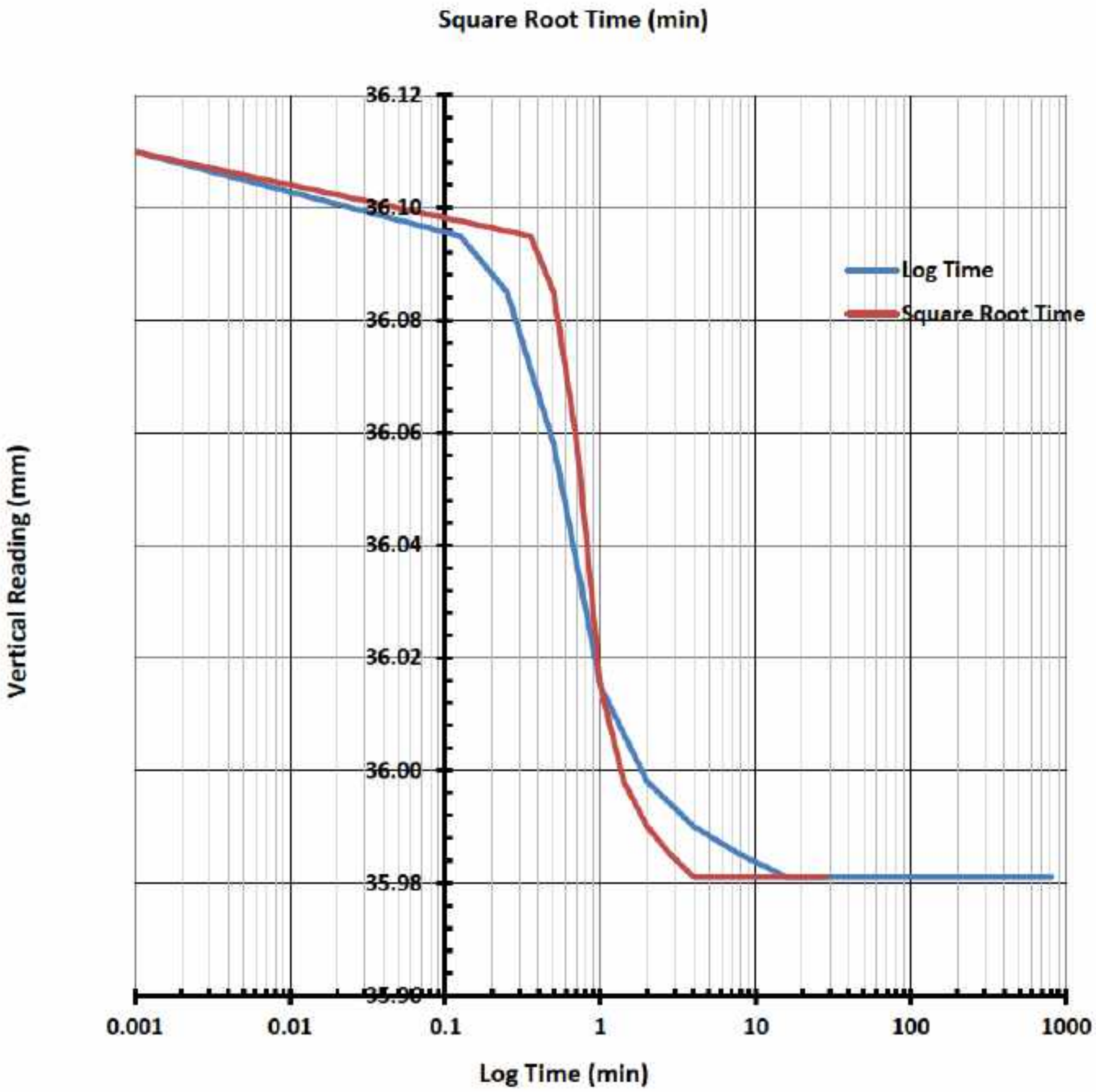
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	**REC Tailings**	**Date Tested:**	18/11/2020
	Bellevue Tailings Testing 2020	**EP Lab Job Number:**	**REC**
Sample ID:	55% Tailings W/W%		
Lab ID:	BELLEVUE_55%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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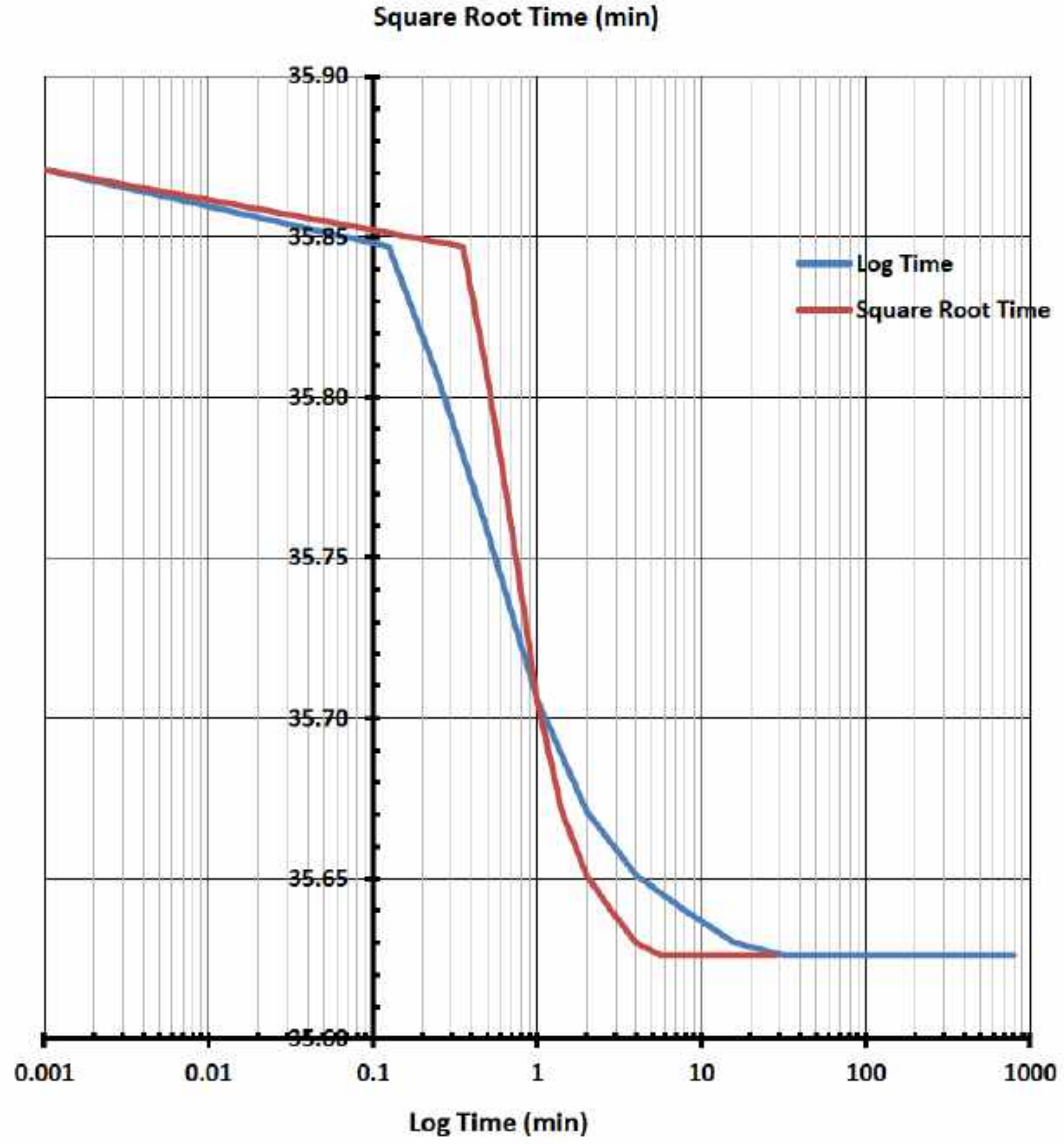
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	55% Tailings W/W%		
Lab ID:	BELLEVUE_55%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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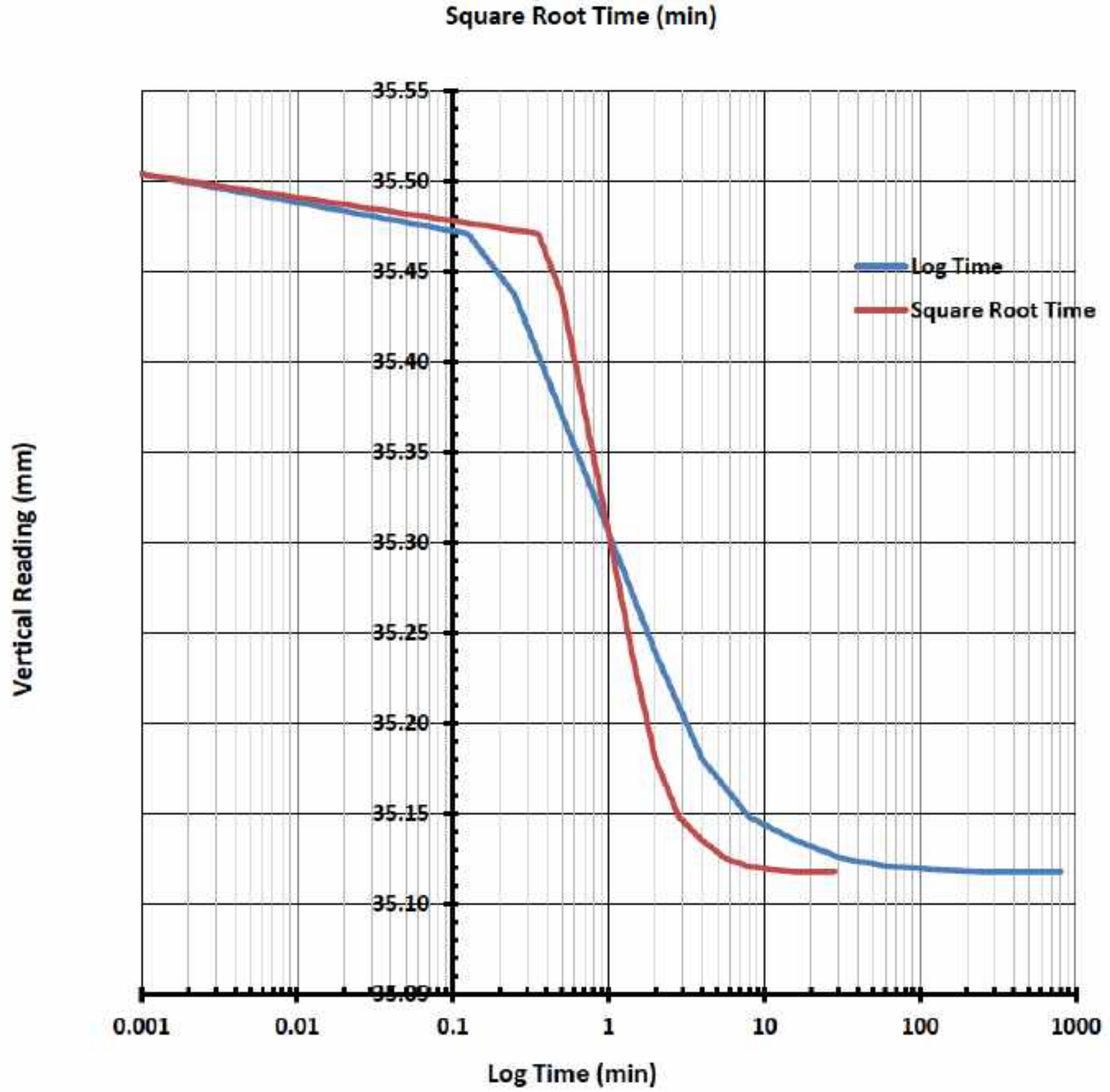
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	55% Tailings W/W%		
Lab ID:	BELLEVUE_55%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa



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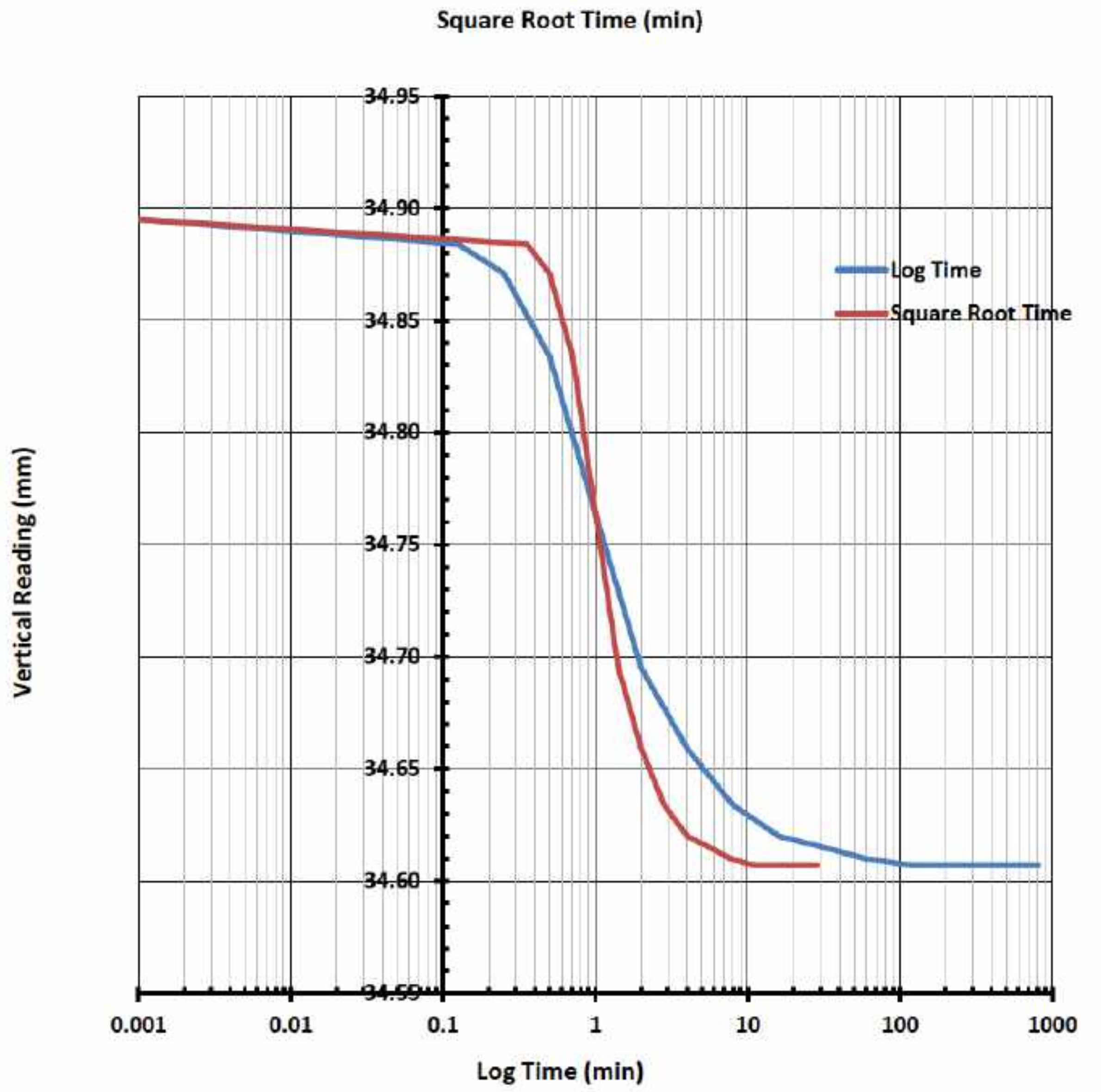
E-PRECISION LABORATORY

CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	55% Tailings W/W%		
Lab ID:	BELLEVUE_55%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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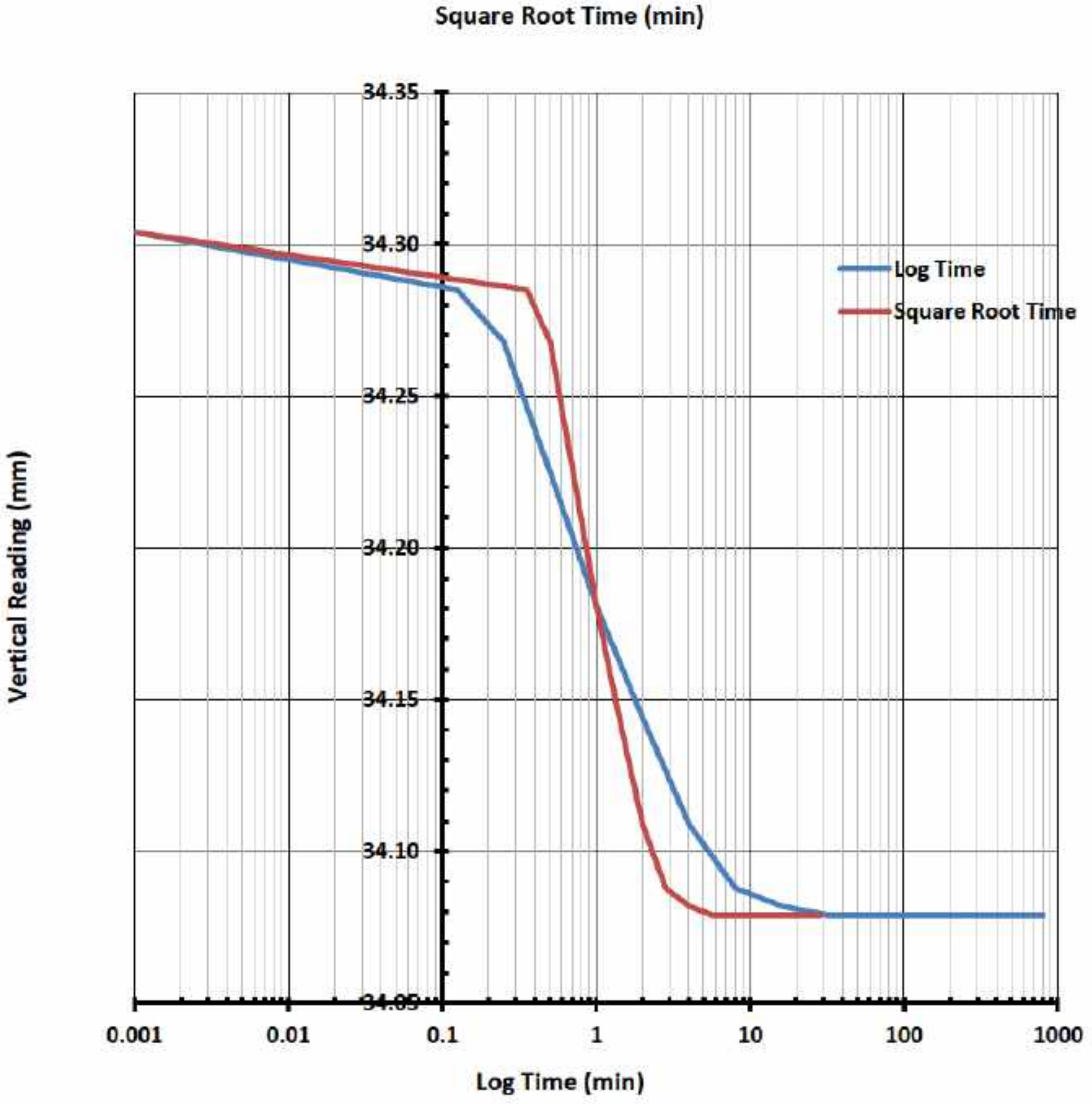
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	55% Tailings W/W%		
Lab ID:	BELLEVUE_55%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa



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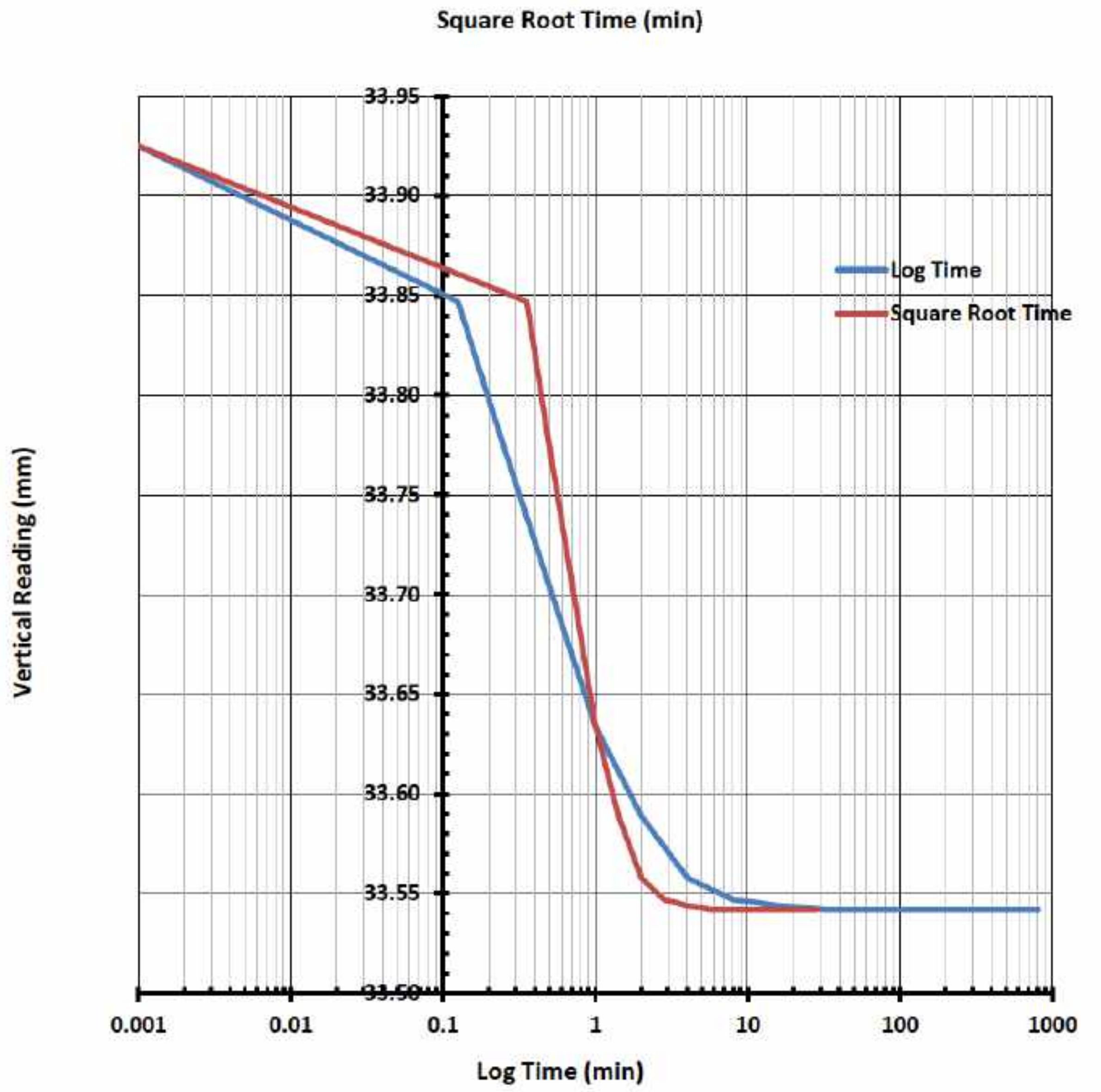
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	55% Tailings W/W%		
Lab ID:	BELLEVUE_55%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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E-PRECISION LABORATORY

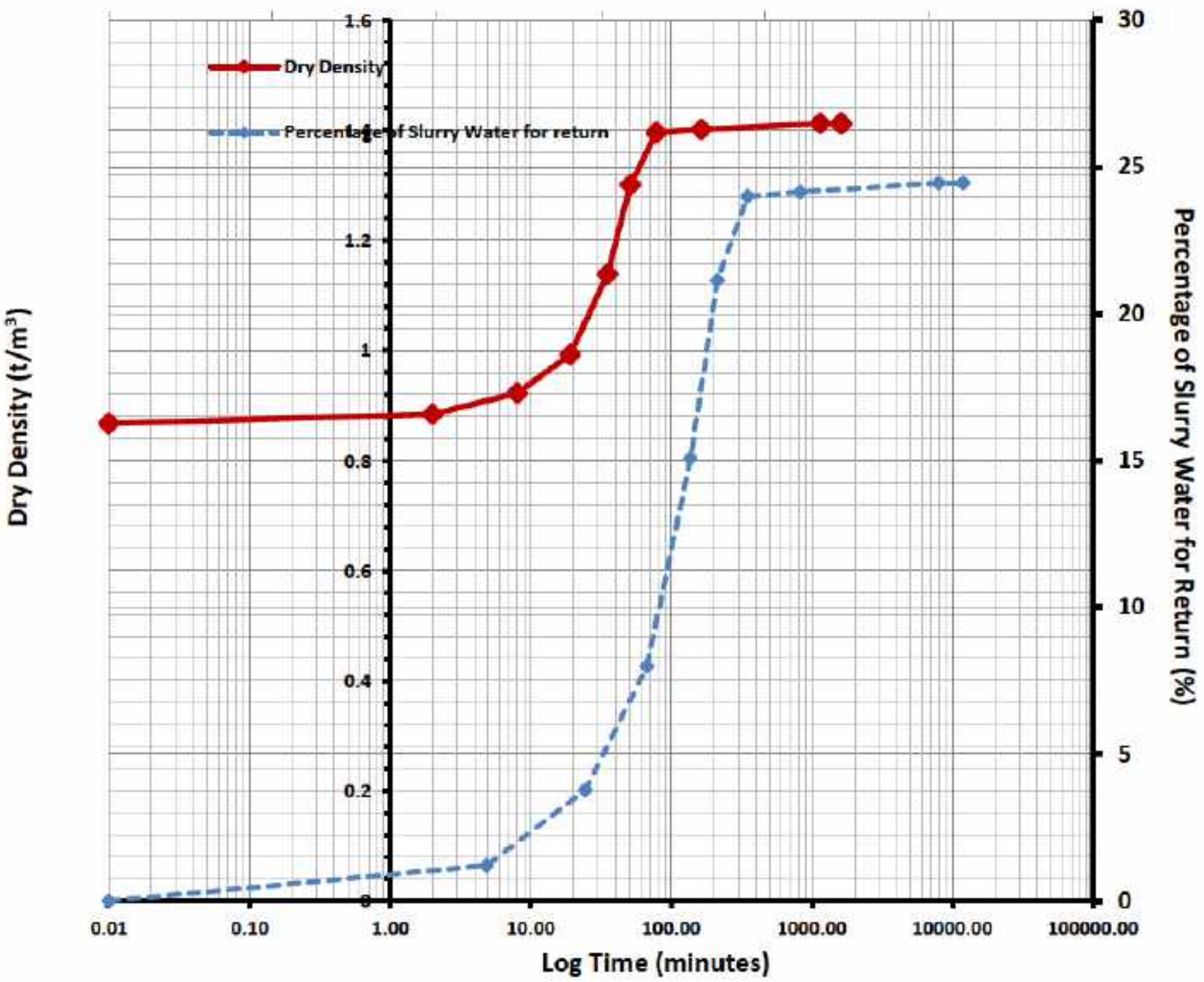
SETTLEMENT TESTING TAILINGS

METHOD: IN-HOUSE METHOD

Client:	REC Tailings	Date Tested:	15/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample No:	55% Tailings W/W%		
Lab ID:	BELLEVUE_55%_2020_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil	**Initial Dry Density (t/m^3):** 0.868
Type of Test: Settlement Testing	**Particle Density (t/m^3):** 2.996
Sample Preparation: as instructed @ 55% Solids	**Initial Bulk Density (t/m^3):** 1.577

Undrained Dry Density (t/m^3) Vs Log Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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E-PRECISION LABORATORY

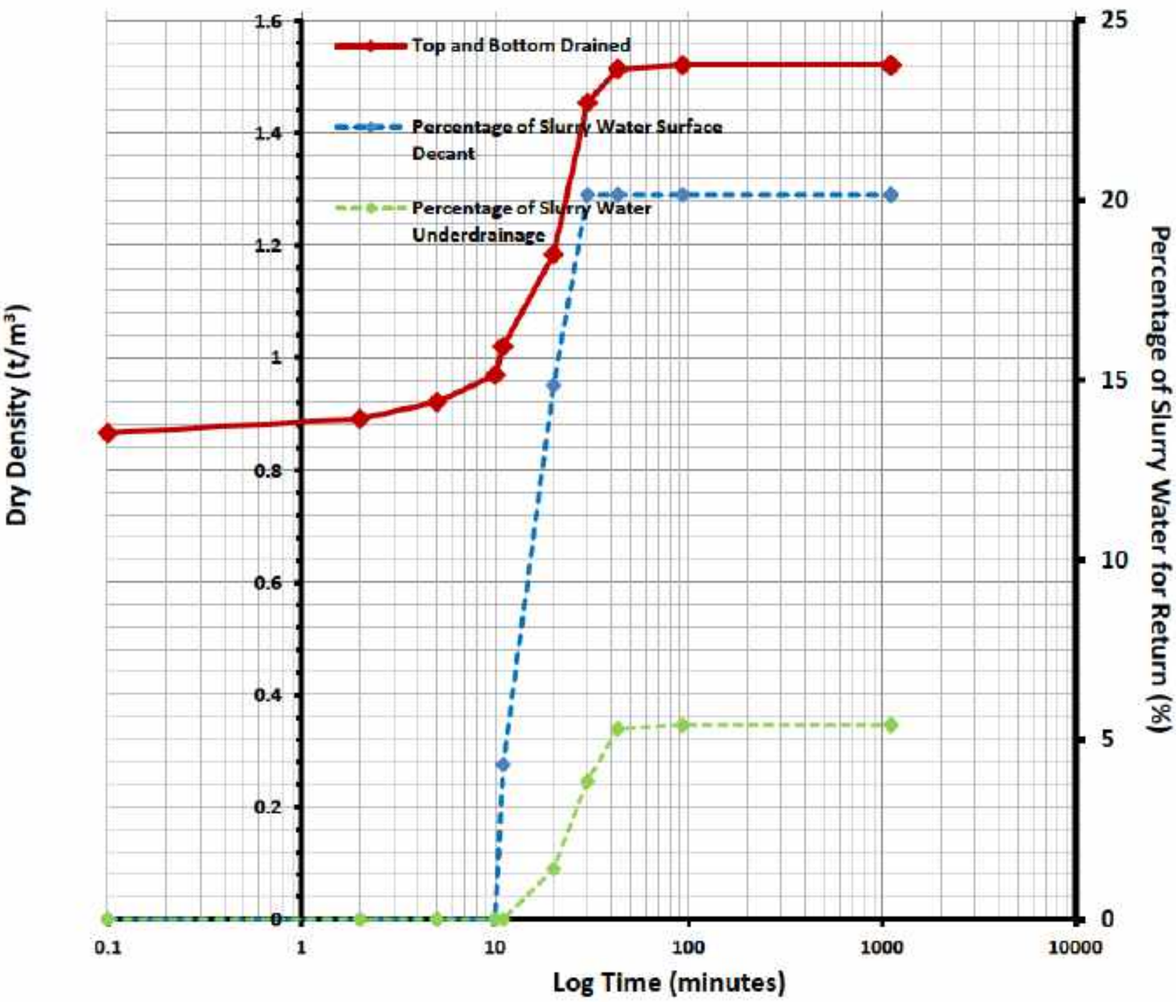
SETTLEMENT TESTING TAILINGS

METHOD: IN-HOUSE METHOD

Client:	REC Tailings	Date Tested:	15/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample No:	55% Tailings W/W%		
Lab ID:	BELLEVUE_55%_2020_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil	**Initial Dry Density (t/m^3):** 0.866
Type of Test: Settlement Testing	**Particle Density (t/m^3):** 2.996
Sample Preparation: as instructed @ 55% Solids	**Initial Bulk Density (t/m^3):** 1.574

Top and Bottom Drained Dry Density (t/m^3) Vs Log Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

The results of tests performed apply only to the specific sample at time of test unless othe[redacted]
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SETTLEMENT TESTING TAILINGS

METHOD: IN-HOUSE METHOD

Client:	REC Tailings	Date Tested:	15/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample No:	55% Tailings W/W%		
Lab ID:	BELLEVUE_55%_2020_SETTLEMENT	Room Temperature at Test:	19°

Tested by:	Phil	**Initial Dry Density (t/m³):**	-
Type of Test:	Settlement Testing	**Particle Density (t/m³):**	-
Sample Preparation:	as instructed @ 55% Solids	**Initial Bulk Density (t/m3):**	-

Photo of Test Setup

Undrained

Drained

Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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WA 6163

[redacted]

E-PRECISION LABORATORY

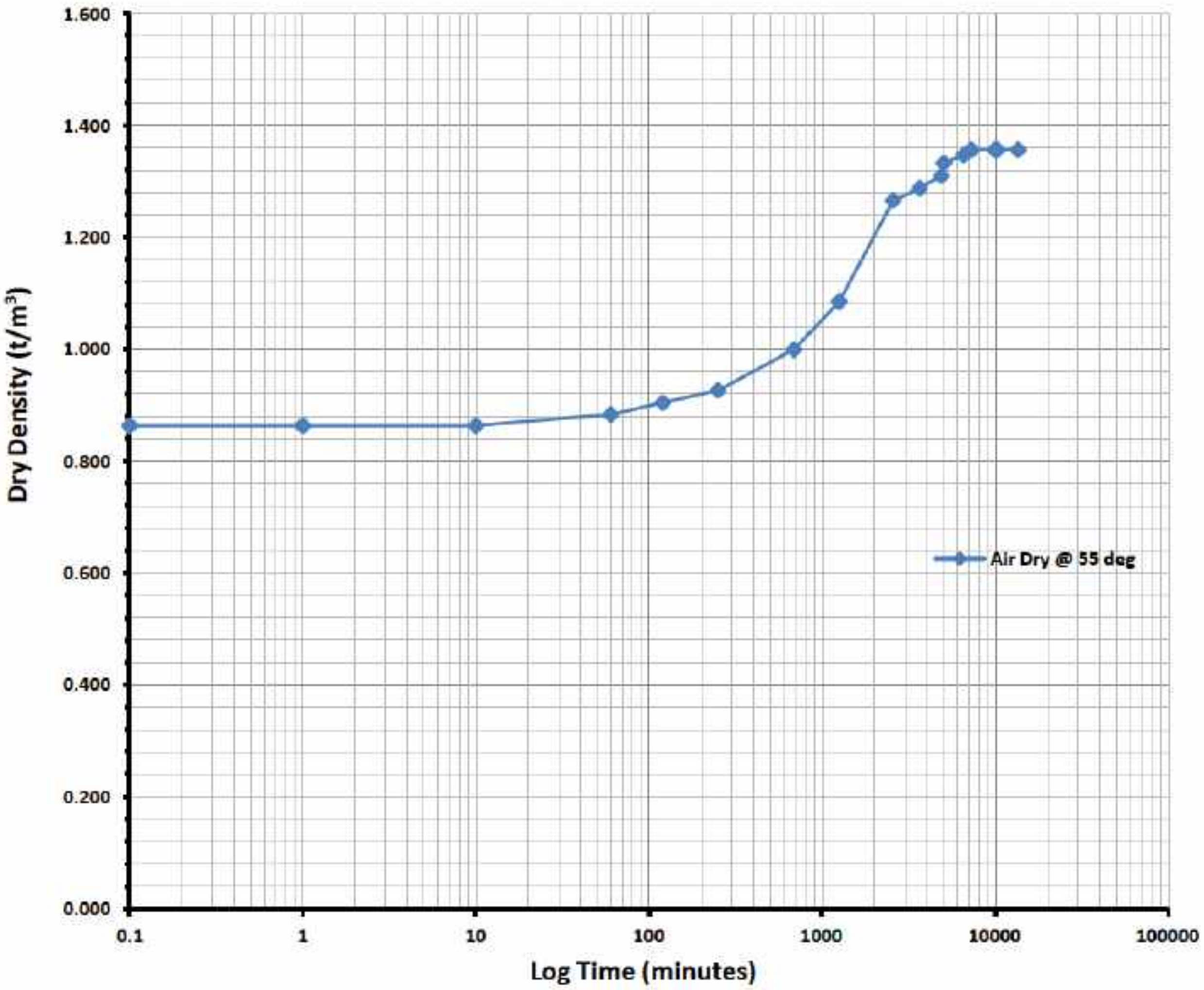
AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	REC Tailings	Date Tested:	14/11/2020
Project:	Bellevue Tailings Testing	EP Lab Job Number:	REC
Sample No:	55% Solids	Lab:	EPLab
Lab ID:	BELLEVUE_55%_SOLIDS	Room Temperature at Test:	21°

Tested by:	Phil	**Initial Bulk Density (t/m³):**	1.583
Type of Test:	Air Dry Testing	**Particle Density (t/m³):**	2.996
Sample Preparation:	55% Dry Solids*	**Moisture Content Initial (%):**	83.486

Dry Density (t/m³) Vs Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer) [redacted]

The results of tests performed apply only to the specific sample at time of test unless otherwise clearly stated. Reference should be made to E-Precision Laboratory's "Standard Terms and Conditions" E-Precision Laboratory ABN 431 559 578 87

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E-PRECISION LABORATORY

AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	REC Tailings	Date Tested:	14/11/2020
Project:	Bellevue Tailings Testing	EP Lab Job Number:	REC
Sample No:	55% Solids	Lab:	EPLab
Lab ID:	BELLEVUE_55%_SOLIDS	Room Temperature at Test:	19°

Tested by:	Phil	**Initial Bulk Density (t/m³):**	1.583
Type of Test:	Air Dry Testing	**Particle Density (t/m³):**	2.996
Sample Preparation:	55% Dry Solids*	**Moisture Content Initial (%):**	83.486

Photo after Testing

** sample oven dried @ 55deg*

Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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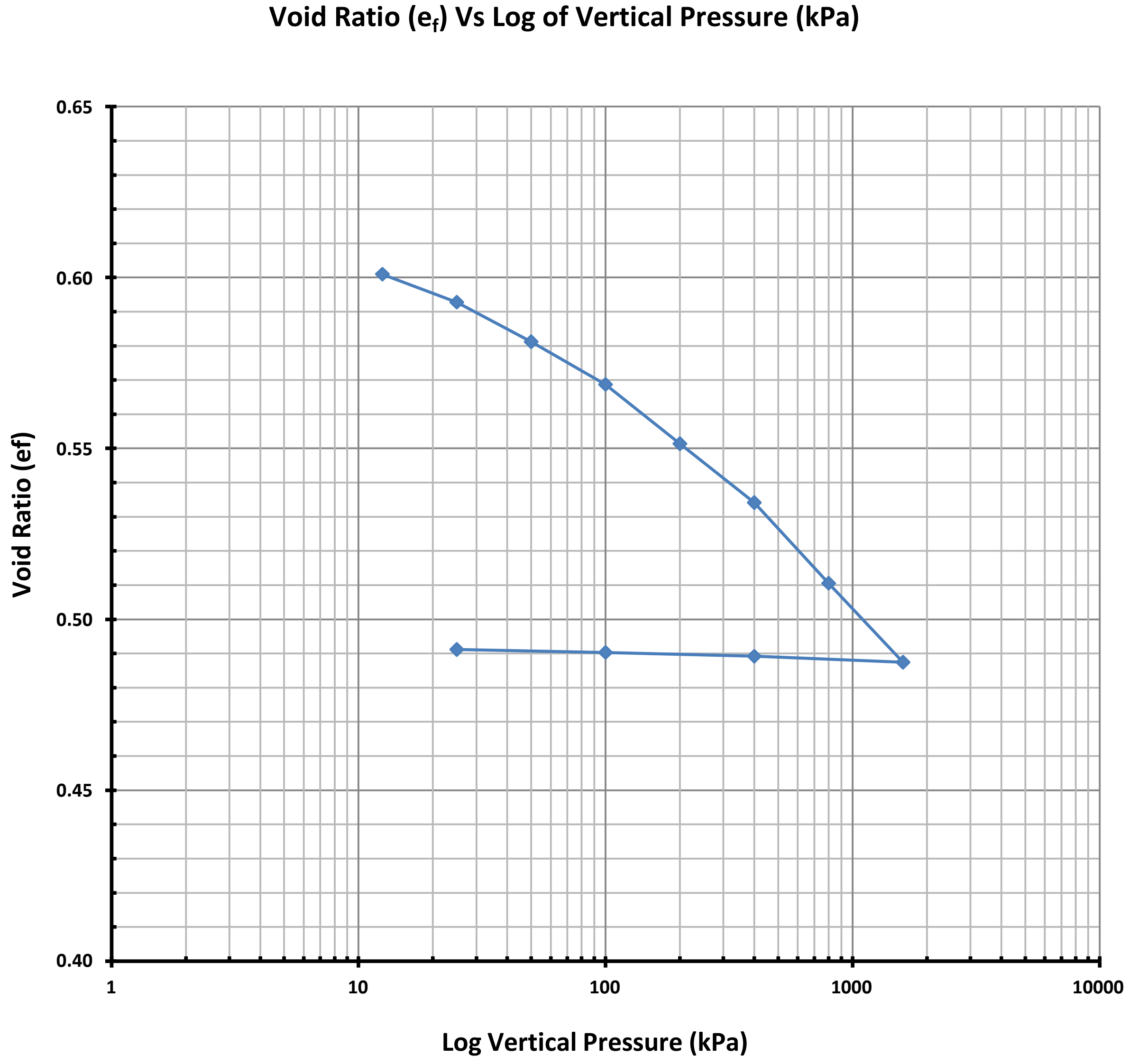
E-Precision Laboratory

CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	60% Tailings W/W%		
Lab ID:	BELLEVUE_60%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°c

Tested by:	Phil	Initial Moisture (%):	33.02	Test Condition:	Undrained
Height (mm):	40.13	Final Moisture Content (%):	38.46	Sample Condition:	60% Solids
Diameter (mm):	61.80	Bulk Density (t/m³):	2.43	Particle Density (t/m³):	2.996
Direction:	Vertical	Dry Density (t/m³):	1.83	Initial Void Ratio (e_i):	0.637



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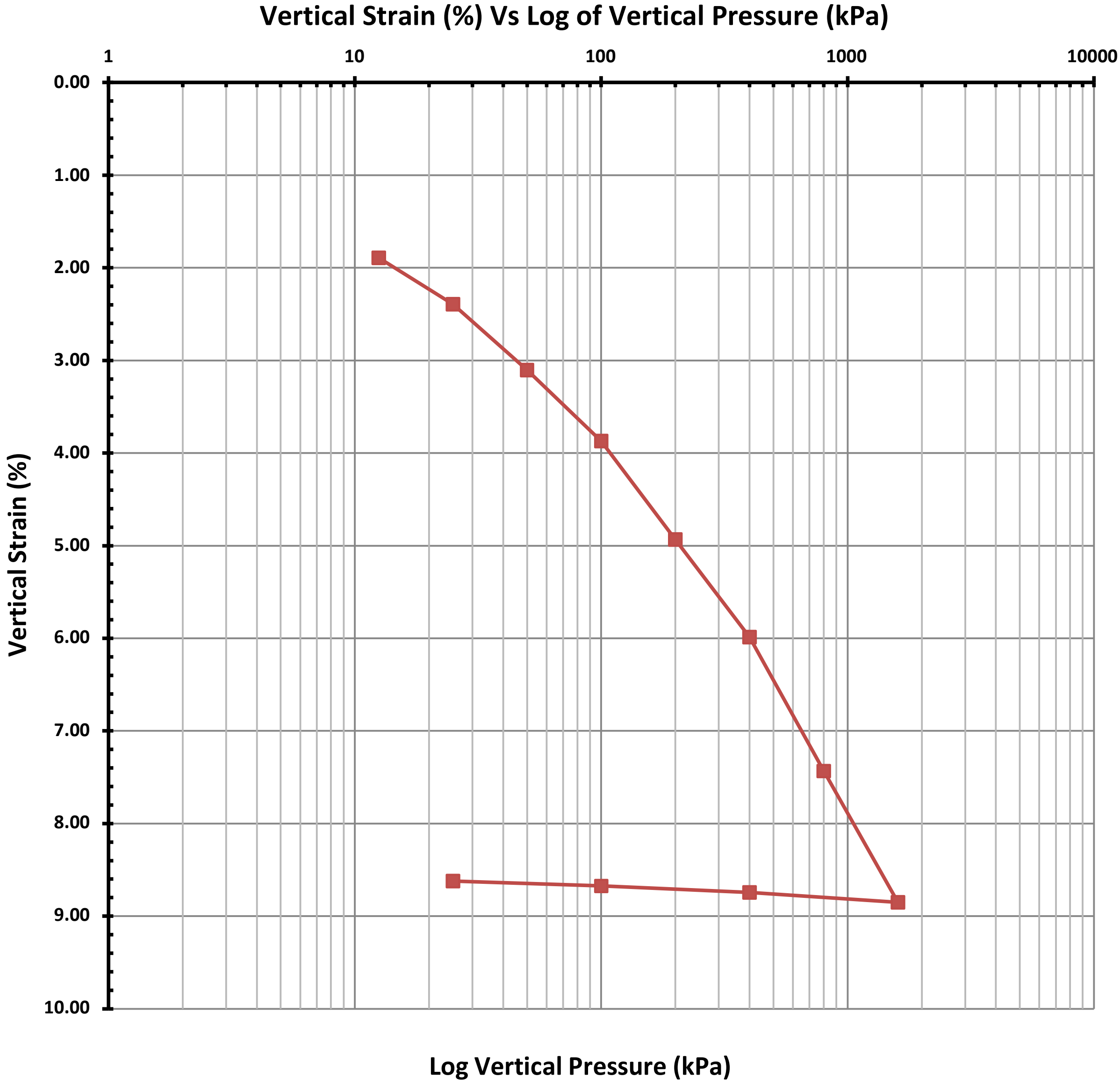
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	60% Tailings W/W%		
Lab ID:	BELLEVUE_60%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C



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E-PRECISION LABORATORY

CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	60% Tailings W/W%		
Lab ID:	BELLEVUE_60%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Test Results

*

Stages	Vert Disp (mm)	Cv (m^2/yr)		Compressibility Mv (m^2/kN)	K (m/s)	Cα (10^{-3})	Void Ratio (e_f)	Vertical Strain (%)
		*t_{50}	t_{90}					
Stage 1 @ 12.5kPa	0.76	53.828	-	1.52E-03	1.5E-06	0.27	0.601	1.89
Stage 2 @ 25kPa	0.96	53.269	-	4.08E-04	4.1E-07	0.10	0.593	2.39
Stage 3 @ 50kPa	1.25	52.556	-	2.91E-04	2.9E-07	1.02	0.581	3.10
Stage 4 @ 100kPa	1.55	51.713	-	1.58E-04	1.5E-07	0.20	0.569	3.87
Stage 5 @ 200kPa	1.98	50.616	-	1.11E-04	1.0E-07	0.50	0.551	4.93
Stage 6 @ 400kPa	2.40	49.475	-	5.54E-05	5.1E-08	0.20	0.534	5.99
Stage 7 @ 800kPa	2.98	48.091	-	3.84E-05	3.4E-08	0.32	0.511	7.43
Stage 8 @ 1600kPa	3.55	46.567	-	1.91E-05	1.7E-08	0.27	0.487	8.85
Unload @ 400kPa	3.51							
Unload @ 100kPa	3.48							
Unload @ 12.5kPa	3.46							

** Values interpreted via lab only*

Comments: **Sample collected from Settlement Drained Test**
Cv values to be interpreted via Engineer

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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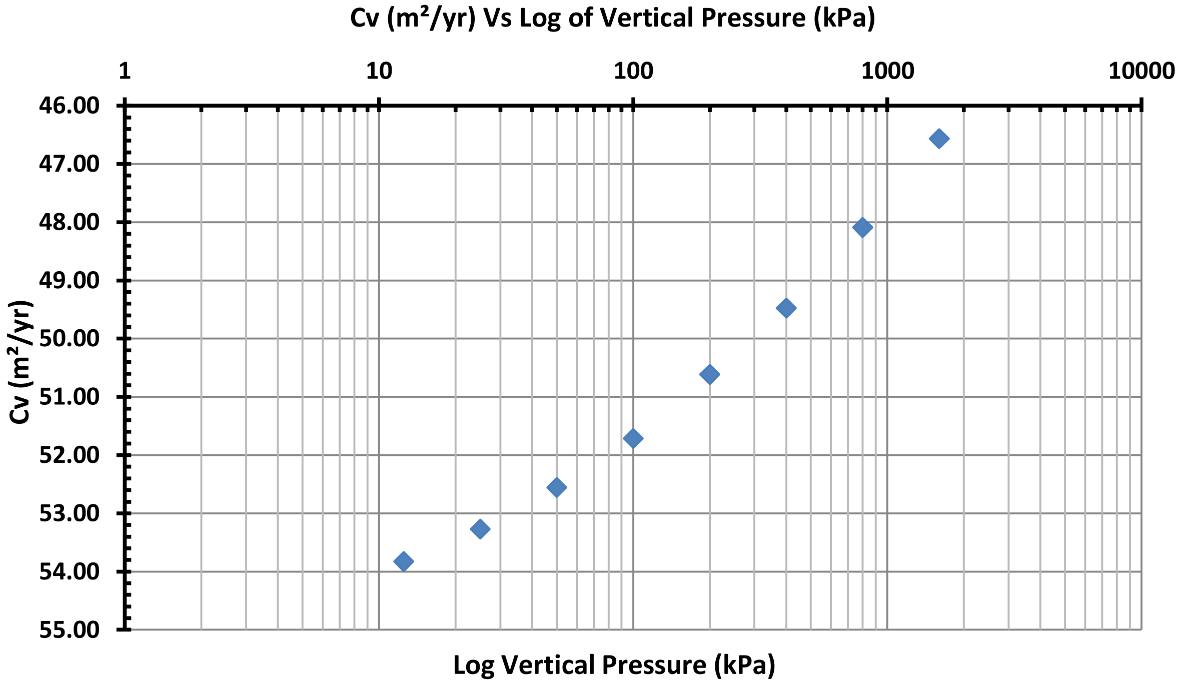
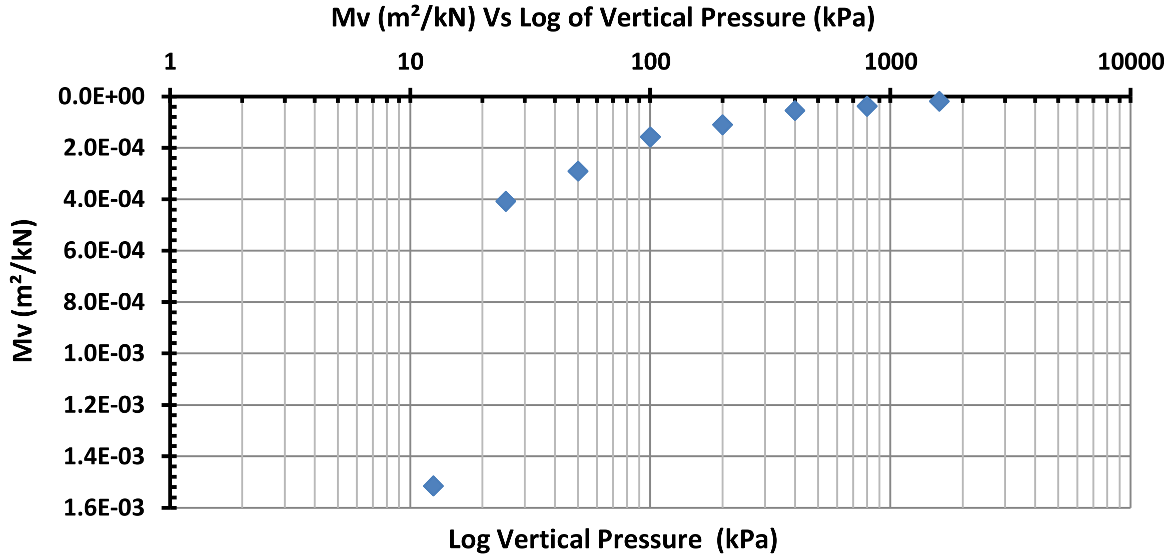
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	60% Tailings W/W%		
Lab ID:	BELLEVUE_60%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C



* Plot based on Log (time) data



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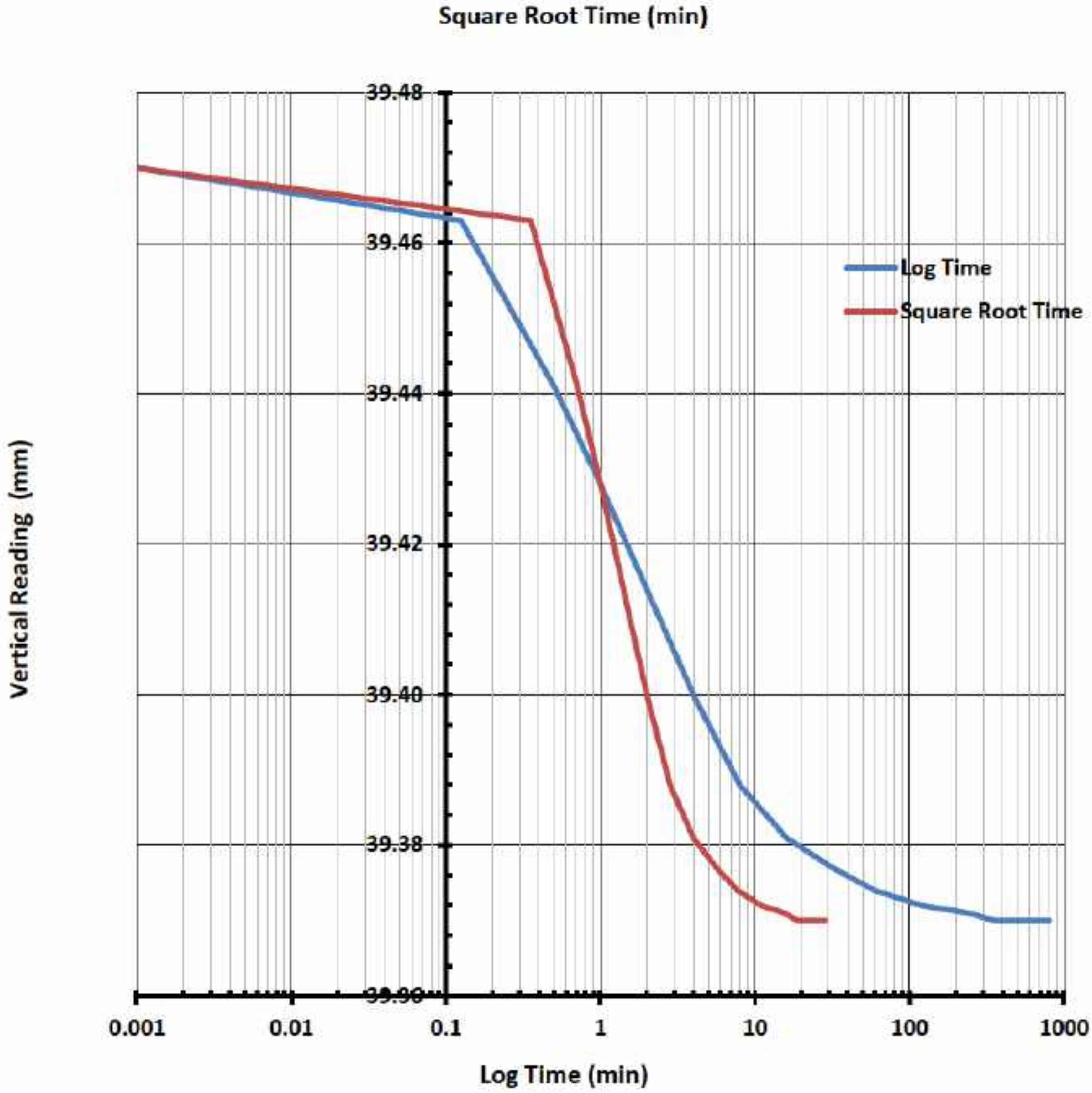
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	60% Tailings W/W%		
Lab ID:	BELLEVUE_60%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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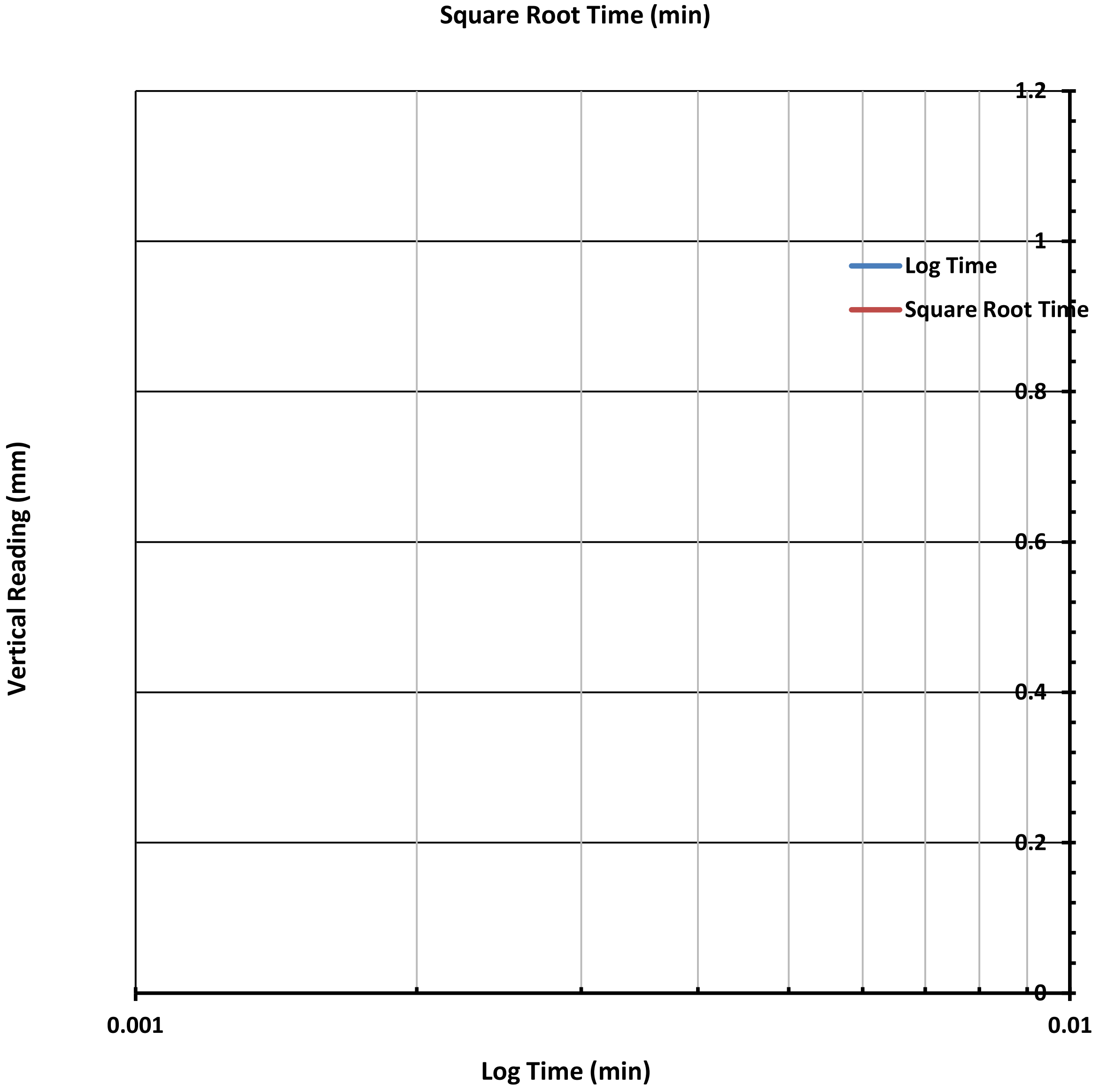
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	60% Tailings W/W%		
Lab ID:	BELLEVUE_60%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

N/A



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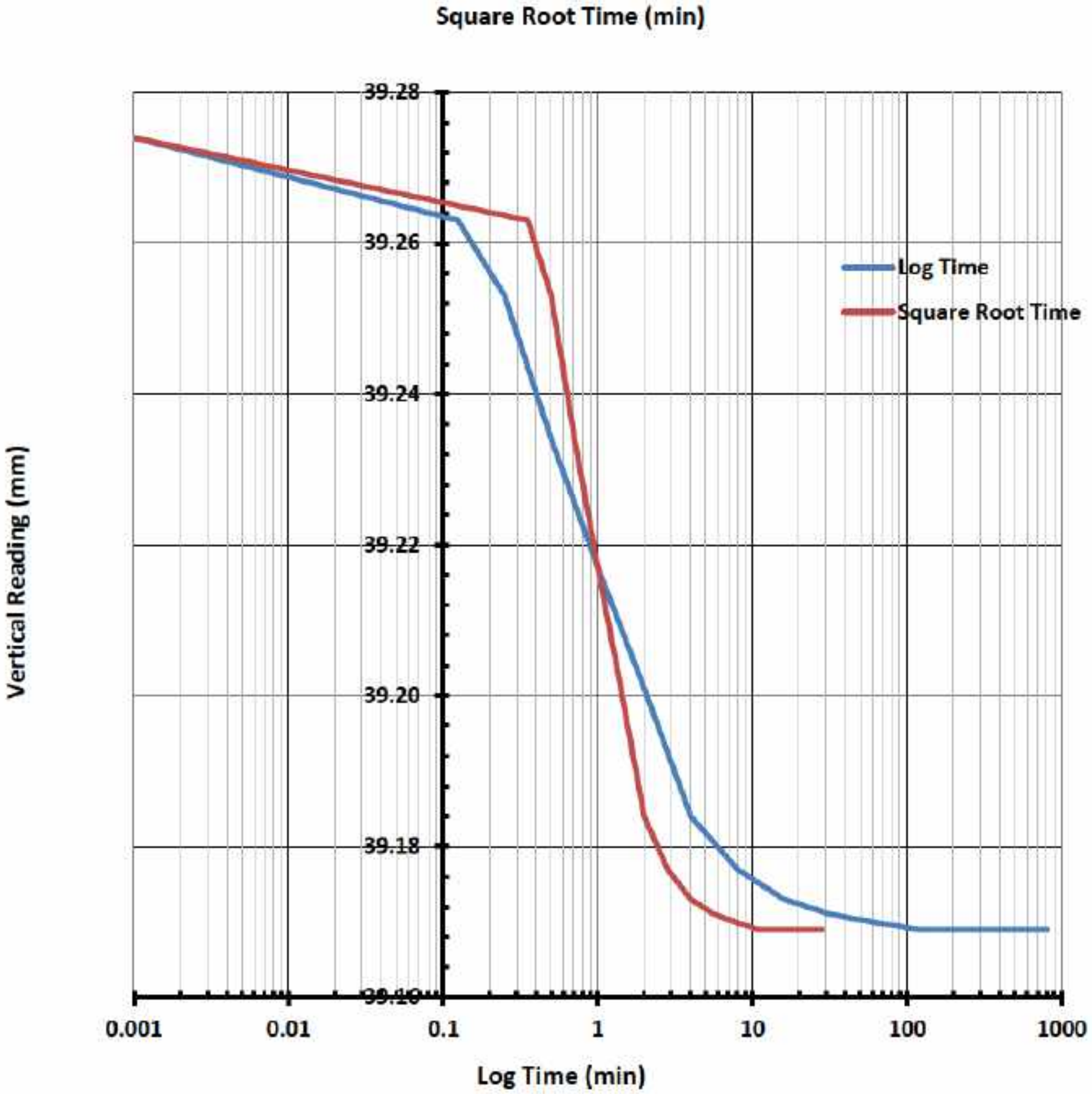
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	60% Tailings W/W%		
Lab ID:	BELLEVUE_60%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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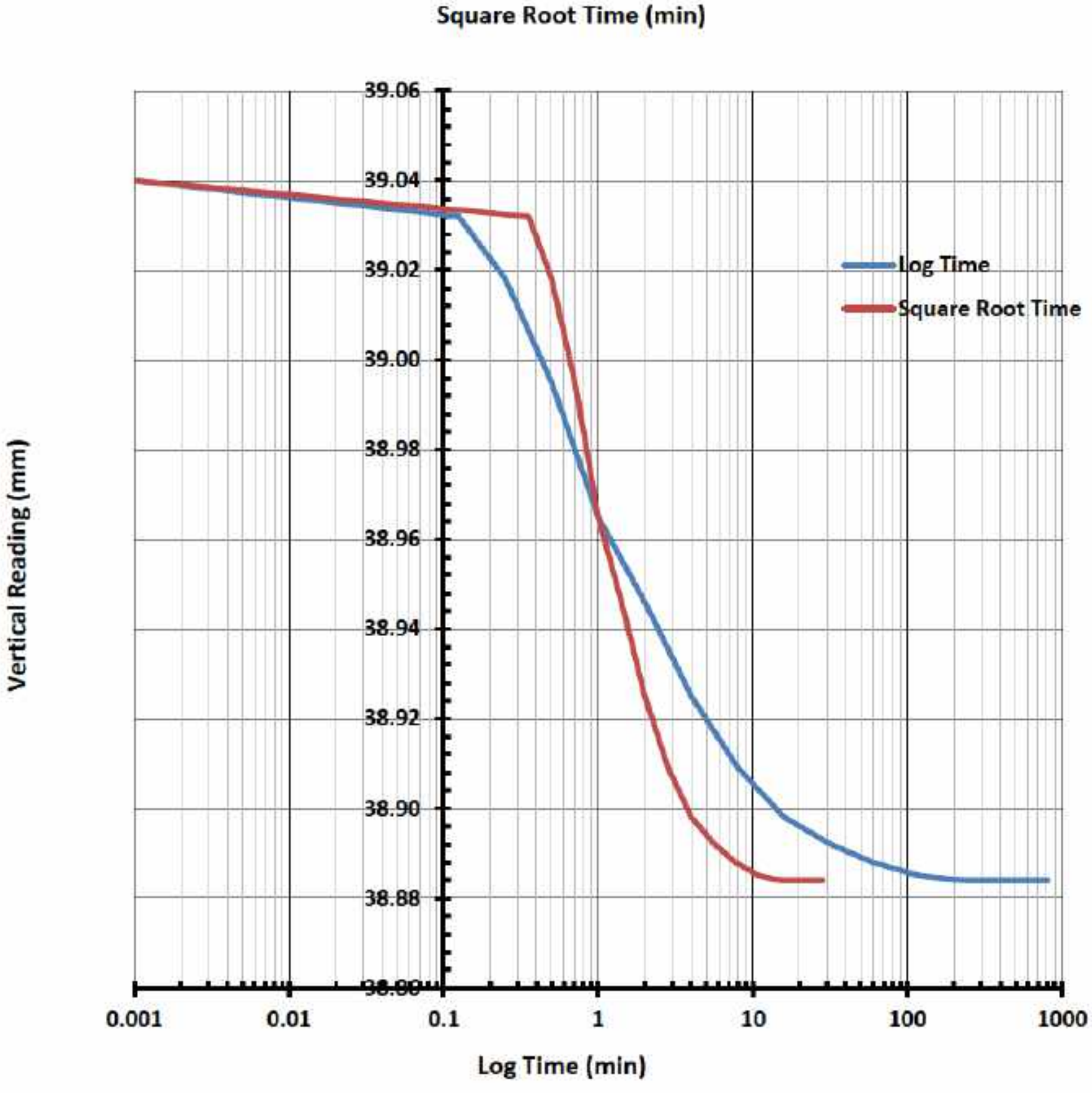
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	60% Tailings W/W%		
Lab ID:	BELLEVUE_60%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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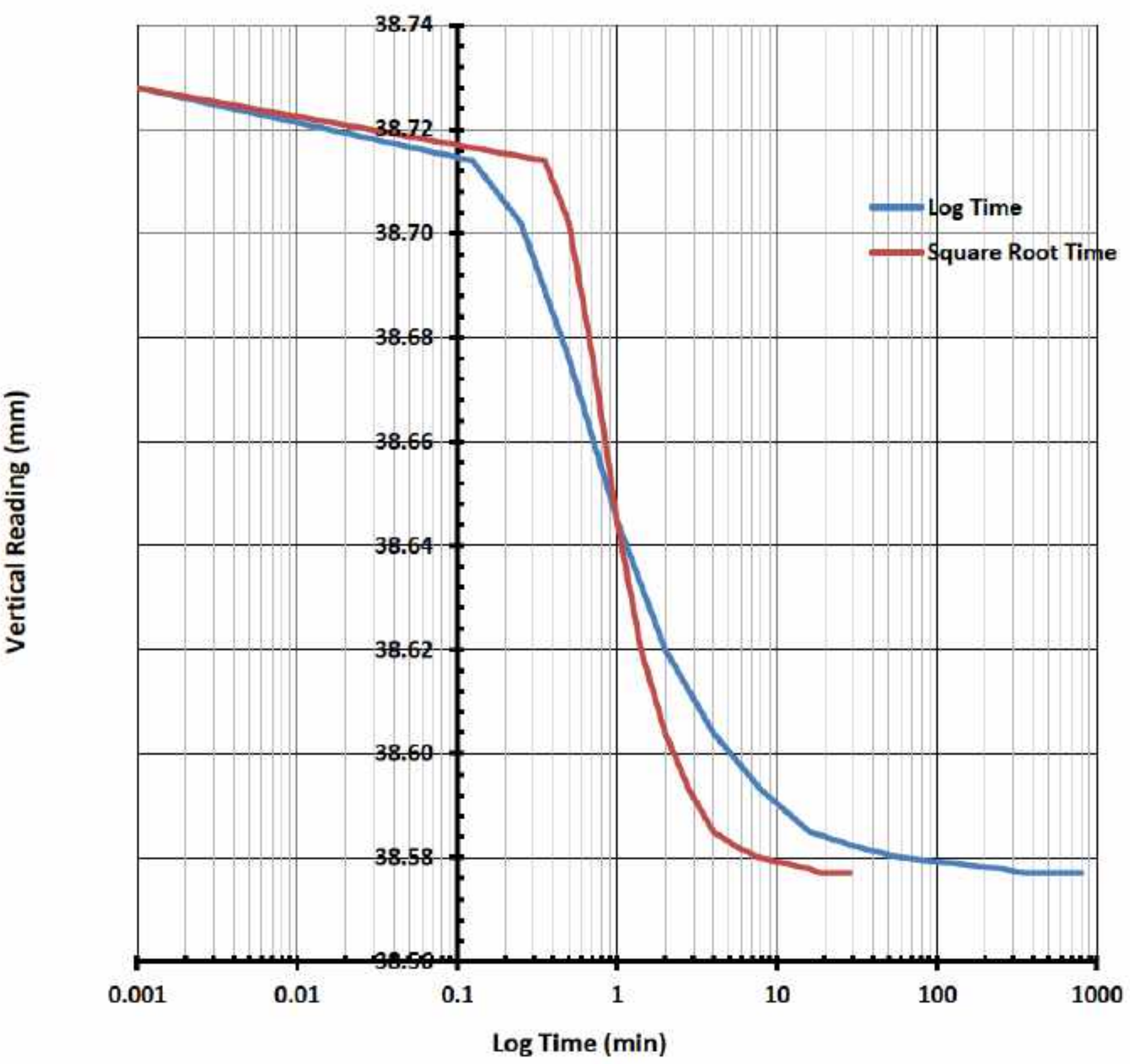
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	60% Tailings W/W%		
Lab ID:	BELLEVUE_60%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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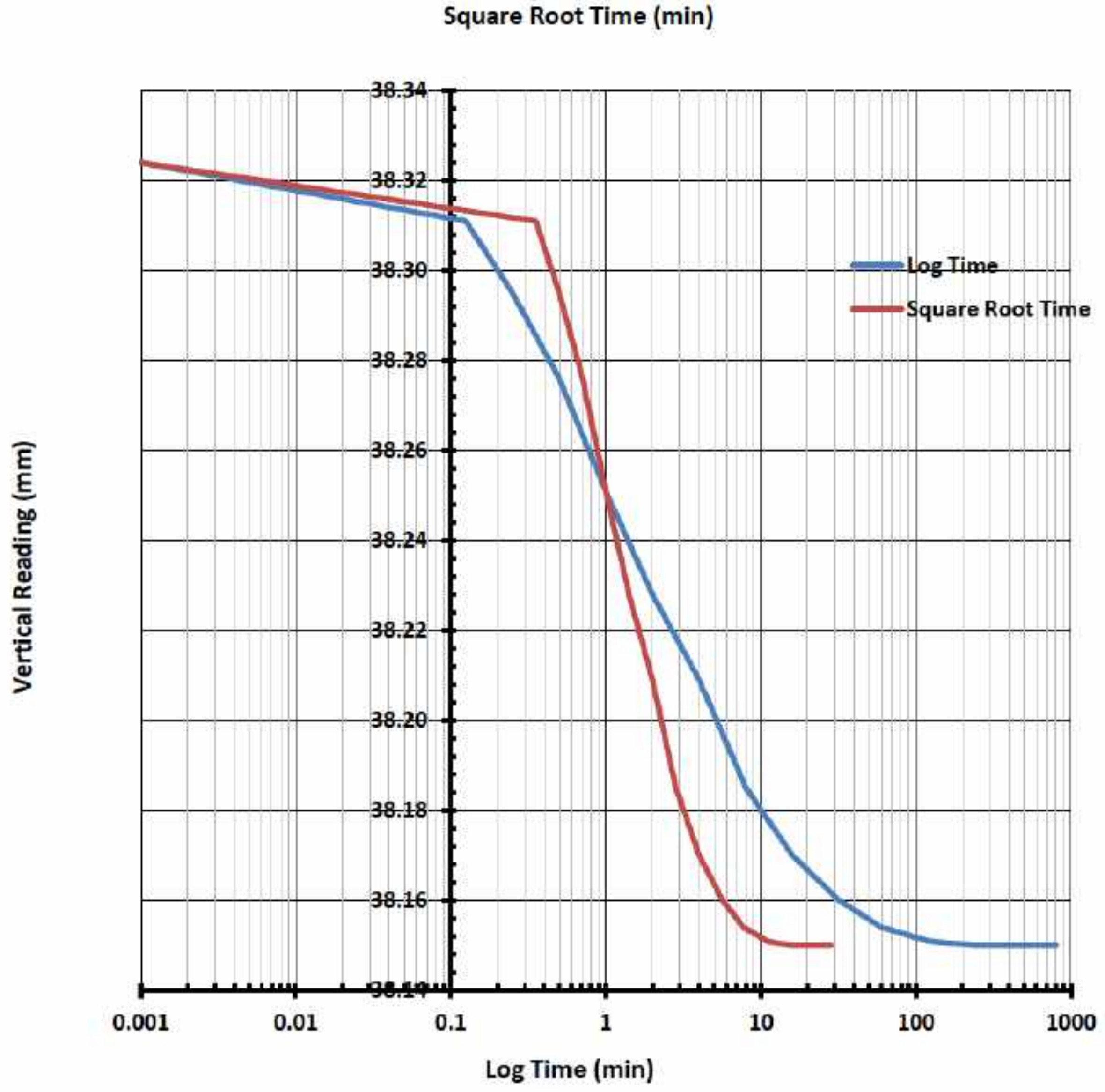
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	60% Tailings W/W%		
Lab ID:	BELLEVUE_60%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa



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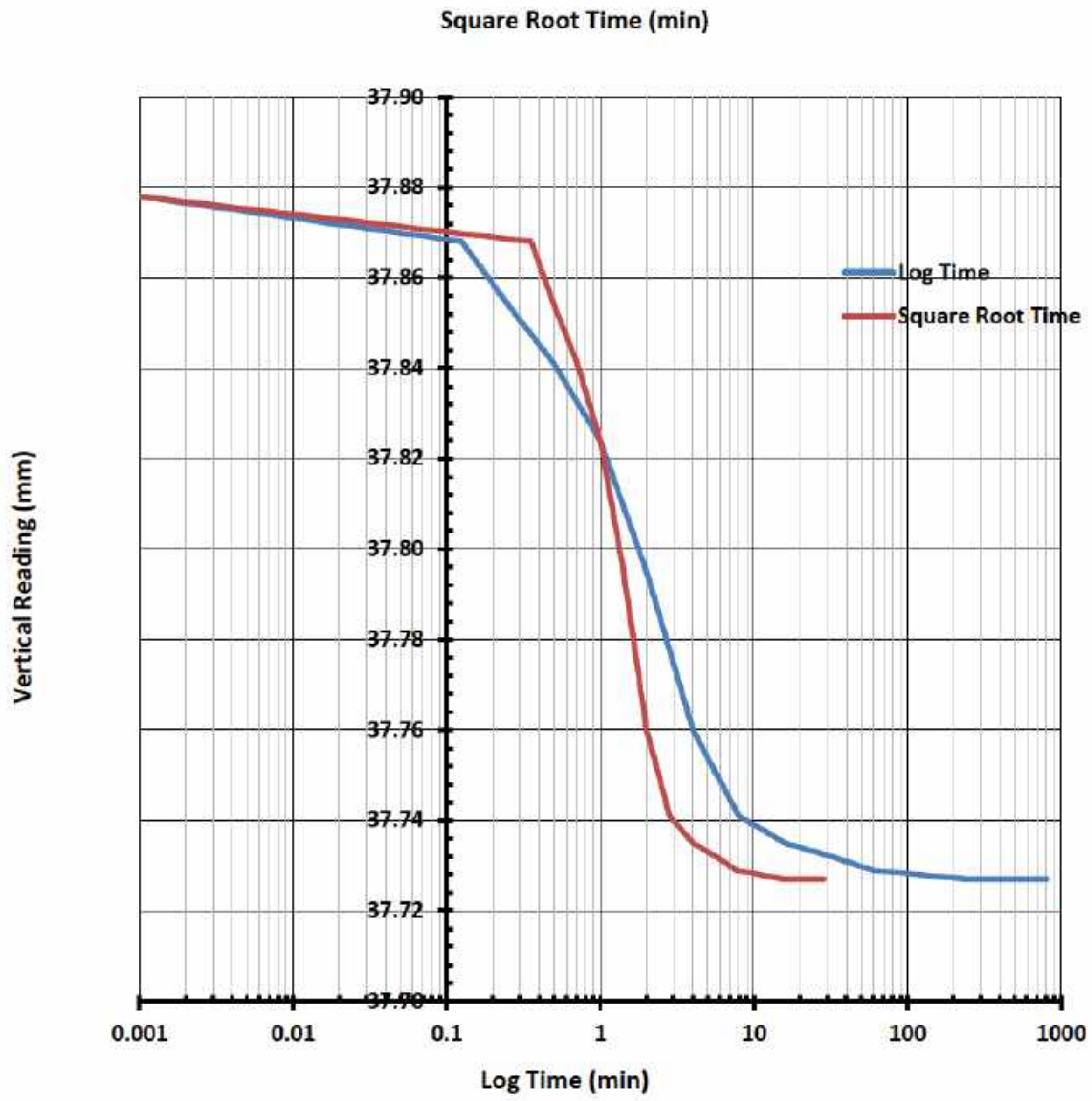
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	60% Tailings W/W%		
Lab ID:	BELLEVUE_60%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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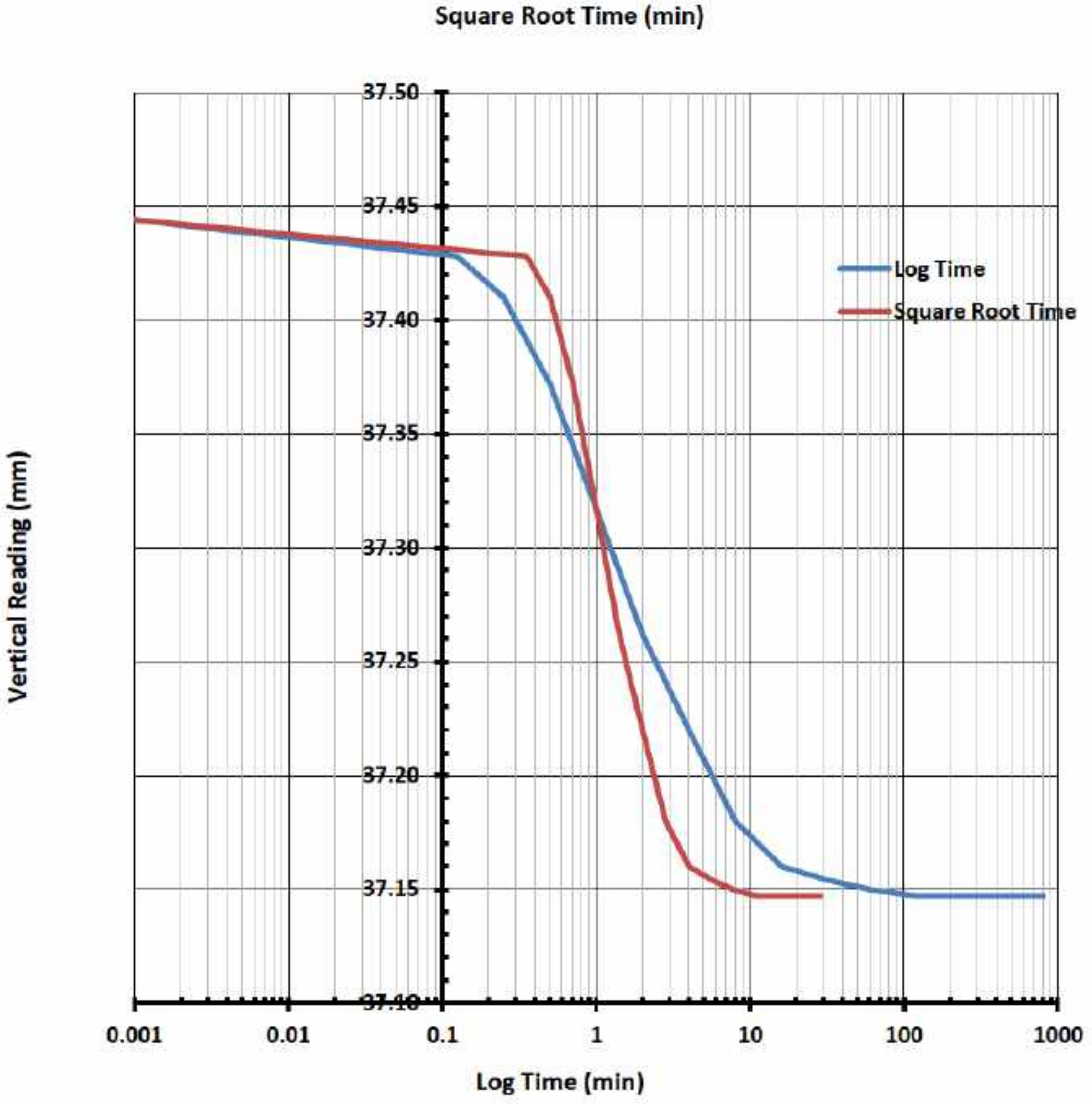
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	60% Tailings W/W%		
Lab ID:	BELLEVUE_60%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa



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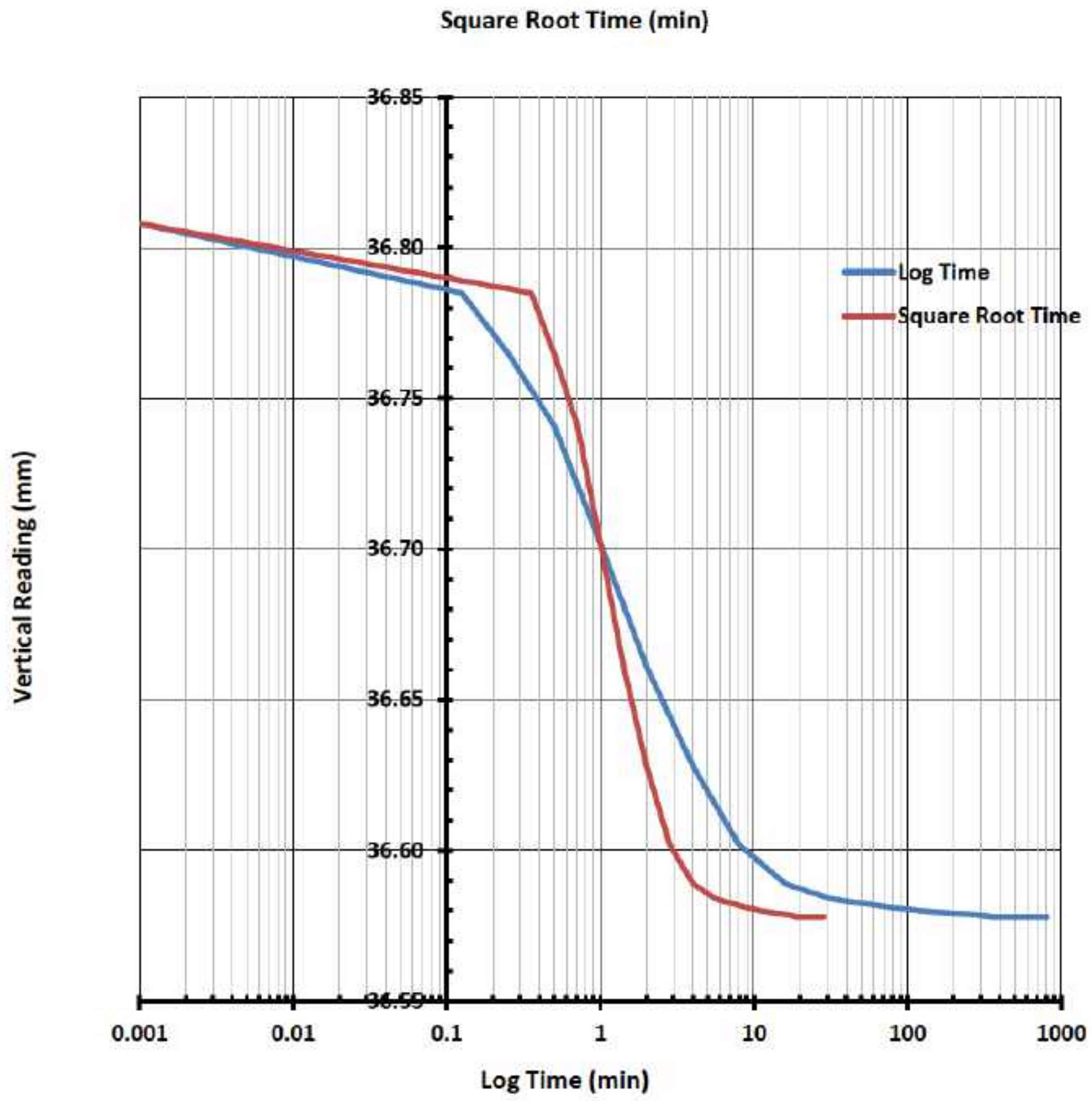
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	REC Tailings	Date Tested:	18/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample ID:	60% Tailings W/W%		
Lab ID:	BELLEVUE_60%_2020_SETTLEMENT	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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E-PRECISION LABORATORY

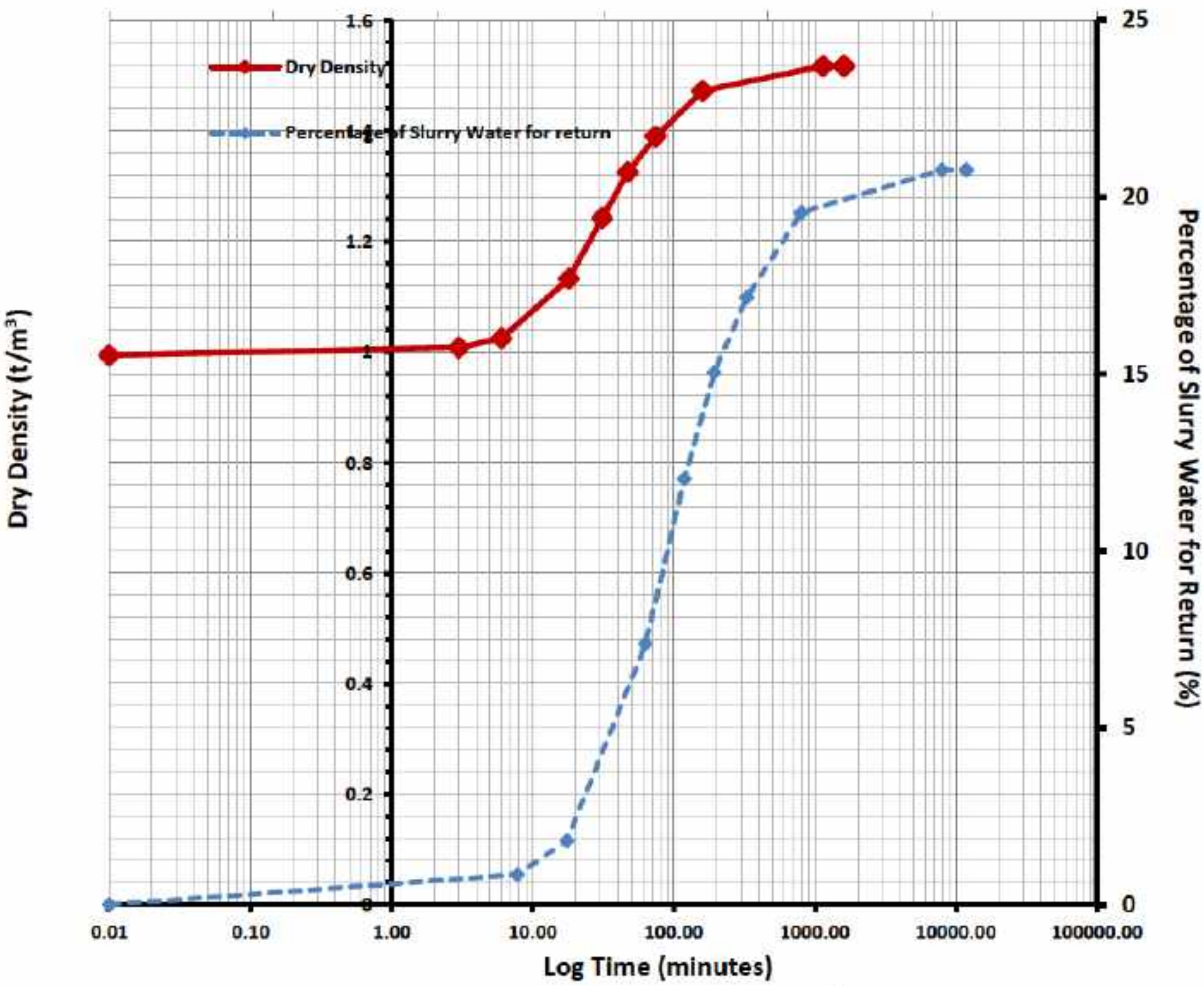
SETTLEMENT TESTING TAILINGS

METHOD: IN-HOUSE METHOD

Client:	REC Tailings	Date Tested:	15/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample No:	60% Tailings W/W%		
Lab ID:	BELLEVUE_60%_2020_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Initial Dry Density (t/m^3): 0.994
Type of Test: Settlement Testing
Particle Density (t/m^3): 2.996
Sample Preparation: as instructed @ 60% Solids
Initial Bulk Density (t/m^3): 1.661

Undrained Dry Density (t/m^3) Vs Log Time (minutes)



Comments:

[redacted]

Authorised Signature (Geotechnical Engineer):

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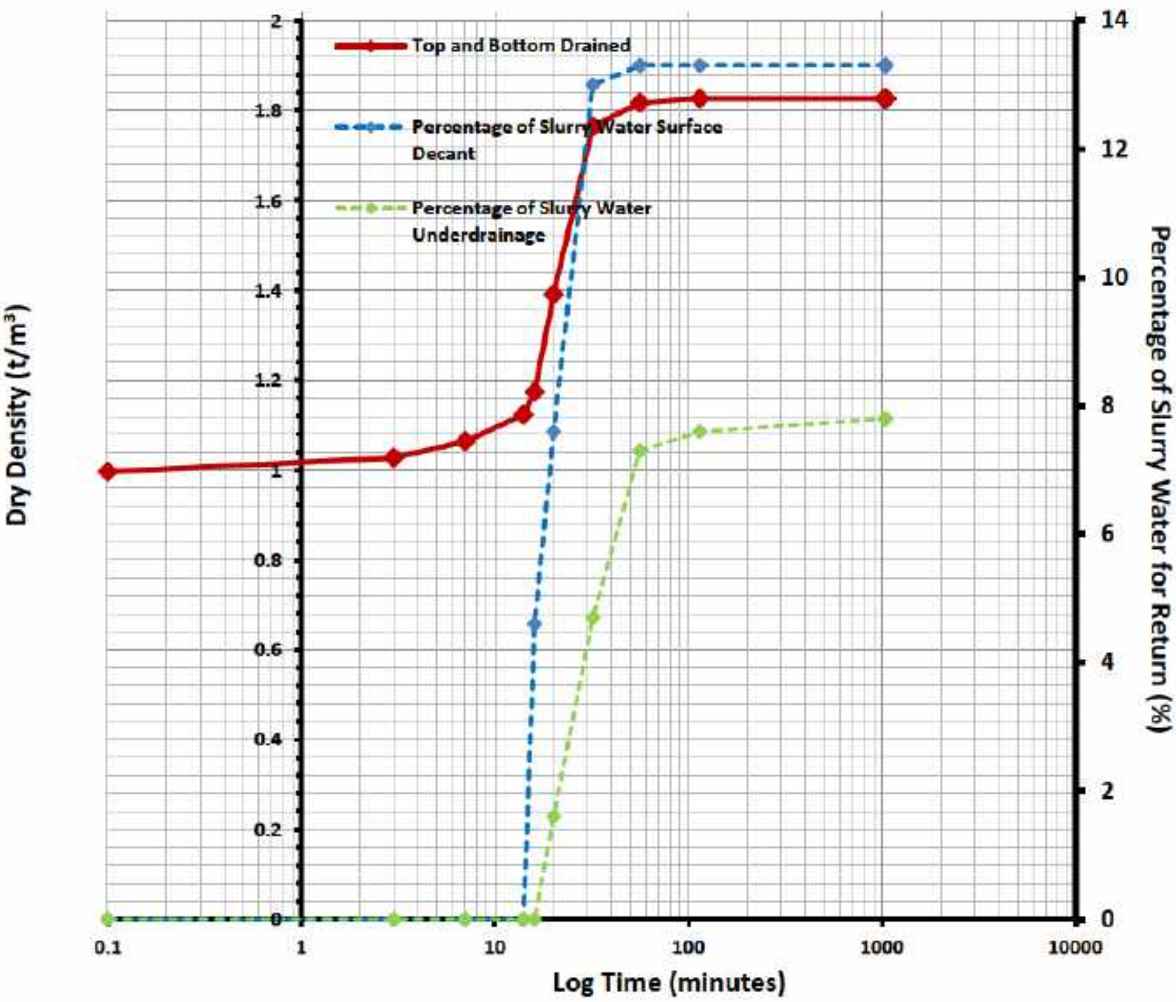
SETTLEMENT TESTING TAILINGS

METHOD: IN-HOUSE METHOD

Client:	REC Tailings	Date Tested:	15/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample No:	60% Tailings W/W%		
Lab ID:	BELLEVUE_60%_2020_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil	**Initial Dry Density (t/m^3):** 0.996
Type of Test: Settlement Testing	**Particle Density (t/m^3):** 2.996
Sample Preparation: as instructed @ 60% Solids	**Initial Bulk Density (t/m^3):** 1.660

Top and Bottom Drained Dry Density (t/m^3) Vs Log Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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[redacted]

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SETTLEMENT TESTING TAILINGS

METHOD: IN-HOUSE METHOD

Client:	REC Tailings	Date Tested:	15/11/2020
Project:	Bellevue Tailings Testing 2020	EP Lab Job Number:	REC
Sample No:	60% Tailings W/W%		
Lab ID:	BELLEVUE_60%_2020_SETTLEMENT	Room Temperature at Test:	19°

Tested by:	Phil	**Initial Dry Density (t/m³):**	-
Type of Test:	Settlement Testing	**Particle Density (t/m³):**	-
Sample Preparation:	as instructed @ 60% Solids	**Initial Bulk Density (t/m3):**	-

Photo of Test Setup

Undrained

Drained

Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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E-PRECISION LABORATORY

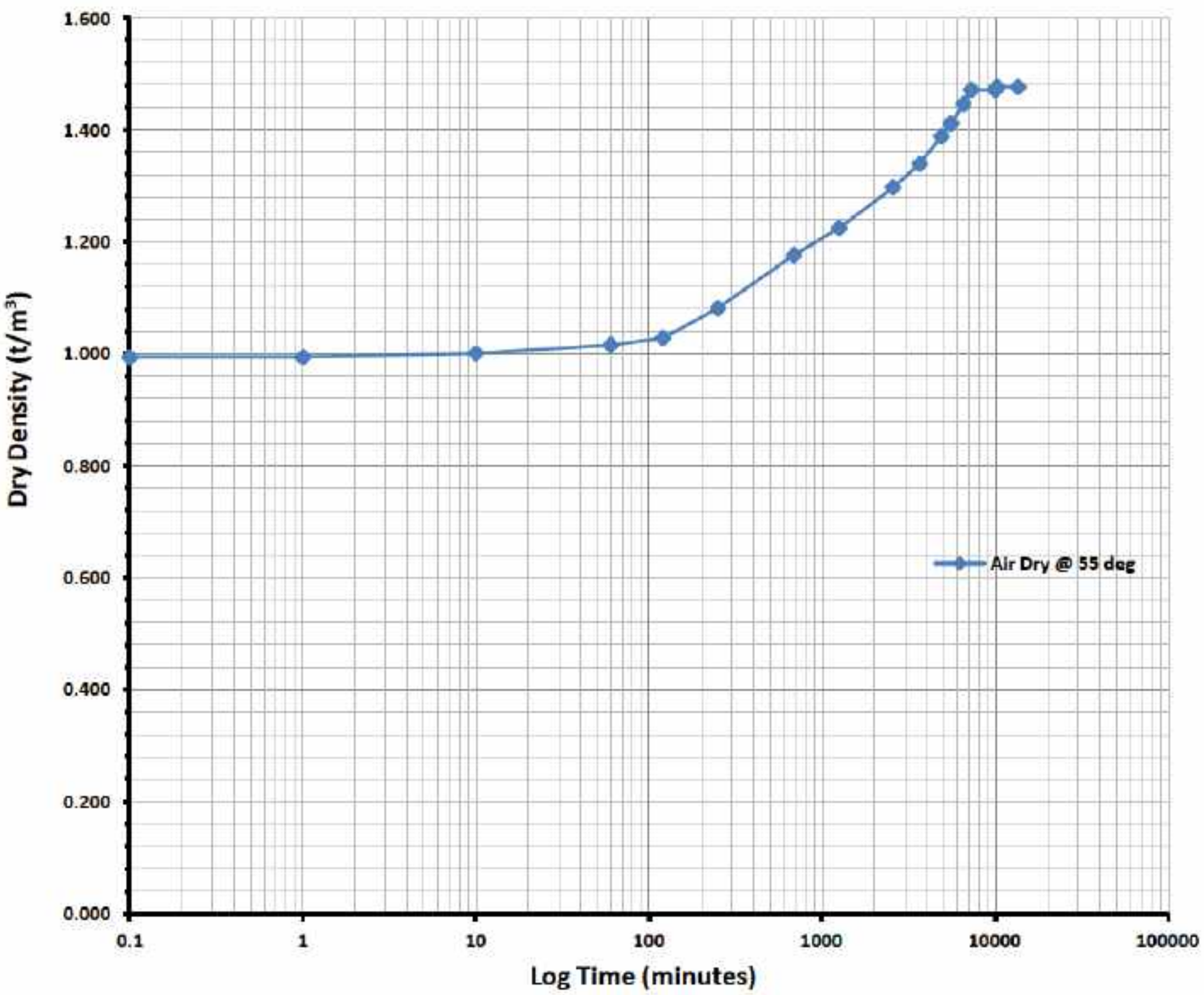
AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	REC Tailings	Date Tested:	14/11/2020
Project:	Bellevue Tailings Testing	EP Lab Job Number:	REC
Sample No:	60% Solids	Lab:	EPLab
Lab ID:	BELLEVUE_60%_SOLIDS	Room Temperature at Test:	21°

Tested by: Phil	**Initial Bulk Density (t/m^3):** 1.663
Type of Test: Air Dry Testing	**Particle Density (t/m^3):** 2.996
Sample Preparation: 60% Dry Solids*	**Moisture Content Initial (%):** 67.364

Dry Density (t/m^3) Vs Time (minutes)



Comments: [redacted]

Authorised Signature (Geotechnical Engineer):

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E-Precision Laboratory

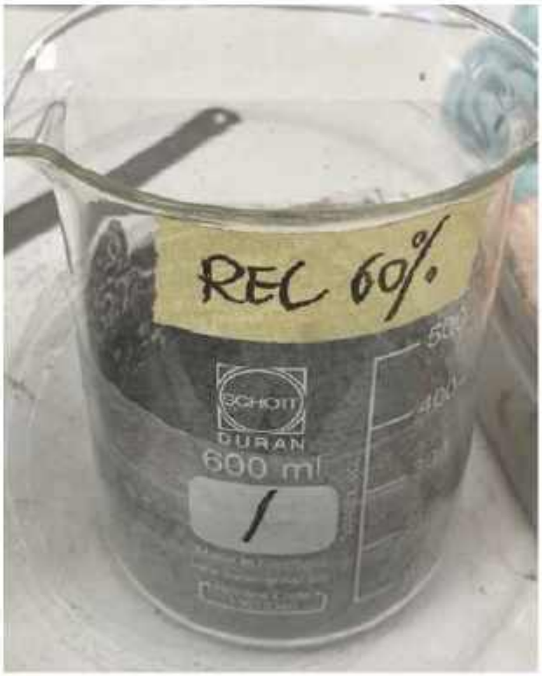
AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	REC Tailings	Date Tested:	14/11/2020
Project:	Bellevue Tailings Testing	EP Lab Job Number:	REC
Sample No:	60% Solids	Lab:	EPLab
Lab ID:	BELLEVUE_60%_SOLIDS	Room Temperature at Test:	19°

Tested by:	Phil	**Initial Bulk Density (t/m³):**	1.663
Type of Test:	Air Dry Testing	**Particle Density (t/m³):**	2.996
Sample Preparation:	60% Dry Solids*	**Moisture Content Initial (%):**	67.364

Photo after Testing



** sample oven dried @ 55deg*

Comments:

Authorised Signature (Geotechnical Engineer) [redacted]

The results of tests performed apply only to the specific sample at time of test unless [redacted]
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E-PRECISION LABORATORY

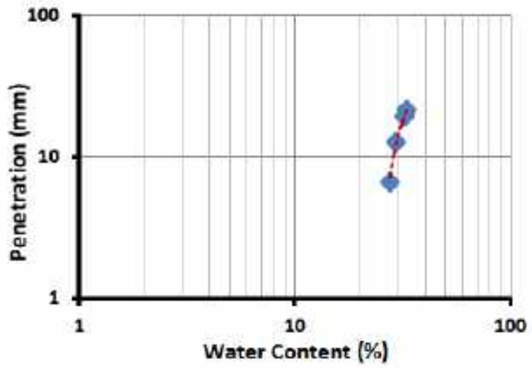
ATTERBERG LIMITS TEST REPORT

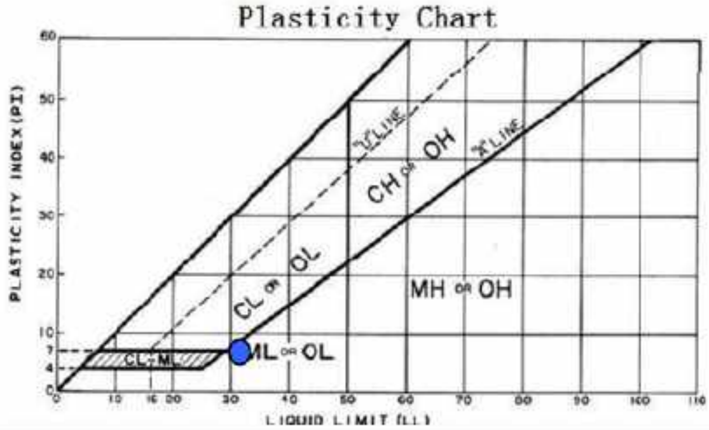
Test Method: BS1377 AS1289.2.1.1 7.1.1 3.1.1 3.2.1 3.4.1

Client:	REC Tailings	Date Tested:	14/11/2020
Project:	Bellevue Tailings	Lab:	EPLAB
Sample No:	Tailings Sample received	Job Number:	REC
Lab ID:	TAILINGS_BELLEVUE_112020_ATT		
Depth(m):	-	Room Temperature at Test:	20°C
Tested by:	Raymond	**Sample Description:**	-
Moisture Content (%):	-	**Wet Density (t/m³):**	-
		Dry Density (t/m³):	-

Liquid Limit (%):	31.27
Plastic Limit (%):	25.68
Plasticity Index (%):	5.59
Liquidity Index (%):	-
Shrinkage Limit (%):	23.25
Linear Shrinkage(%):	1.72

Results Chart





Notes: The sample/s were tested oven dried, dry sieved and in a 125-250m[redacted]

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature

The results of tests performed apply only to the specific sample at time of test unless otherwise clearly state

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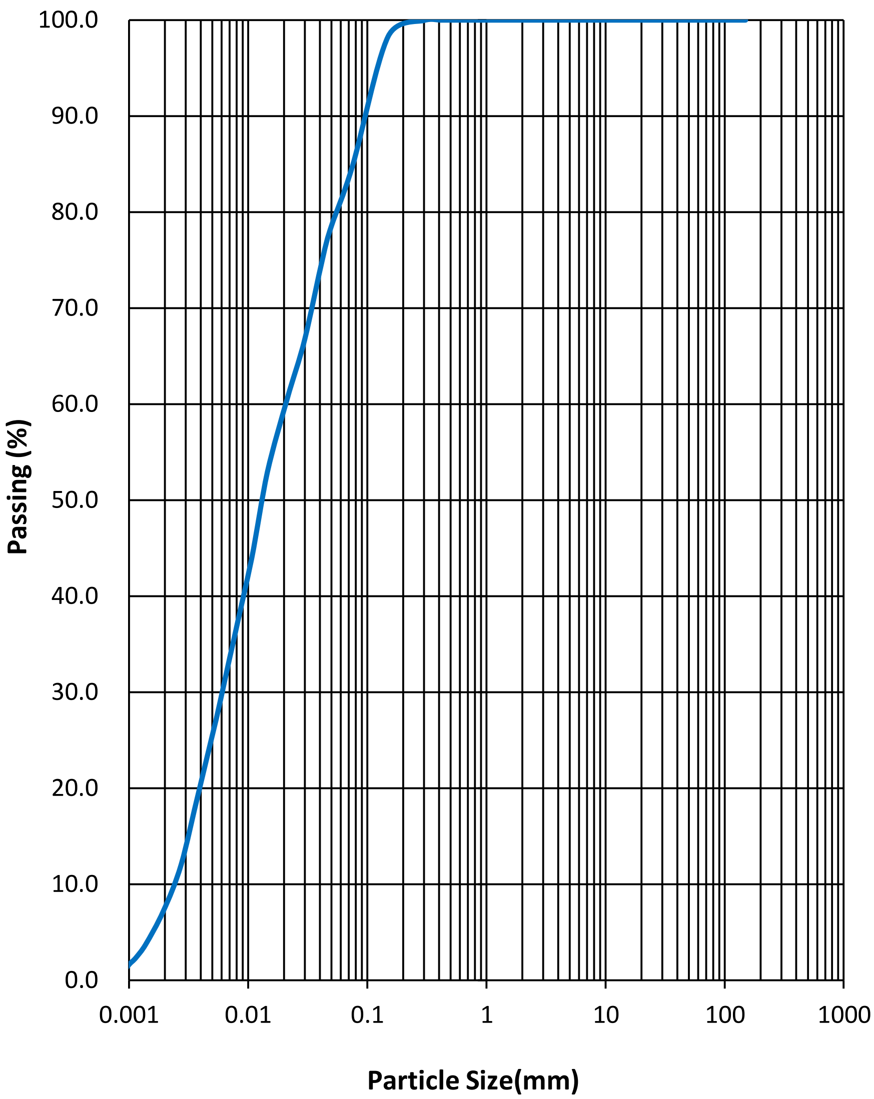
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3, 3.5.1

Client:	REC Tailings	Date Tested:	15/11/2020
Project:	Bellevue Tailings	EP Lab Job Number:	REC
Sample No:	Tailings Sample received	Depth(m):	-
Lab ID:	TAILINGS_BELLEVUE_112020_PSD	Room Temperature at Test:	19°C
Tested by:	Kohei	2.36mm Particle Density (t/m³):	2.99
Checked by:	Phil		

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	100.0
2.36	100.0
1.18	100.0
0.6	100.0
0.425	100.0
0.3	100.0
0.15	98.3
0.075	84.7
0.05008	78.6
0.04202	75.1
0.02993	66.8
0.02127	60.6
0.01453	52.9
0.01069	43.9
0.00760	35.6
0.00541	27.3
0.00385	19.7
0.00274	12.1
0.00194	7.2
0.00138	3.7
0.00114	2.4
0.00100	1.7
0.00091	1.0

PSD Graph



Notes: *Sample oven dried at 55deg*
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signatu [redacted]

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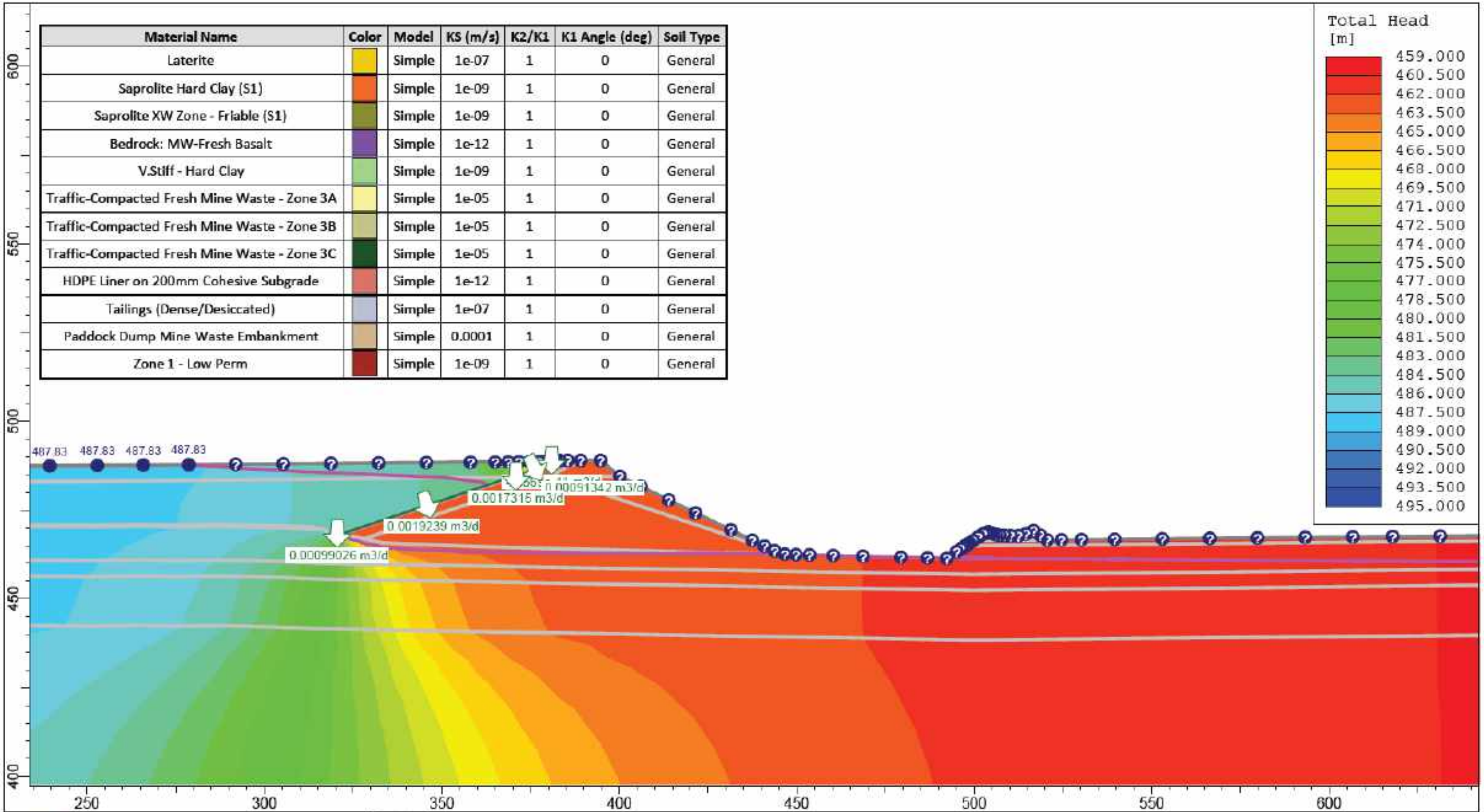
Appendix F

Seepage Assessment Results

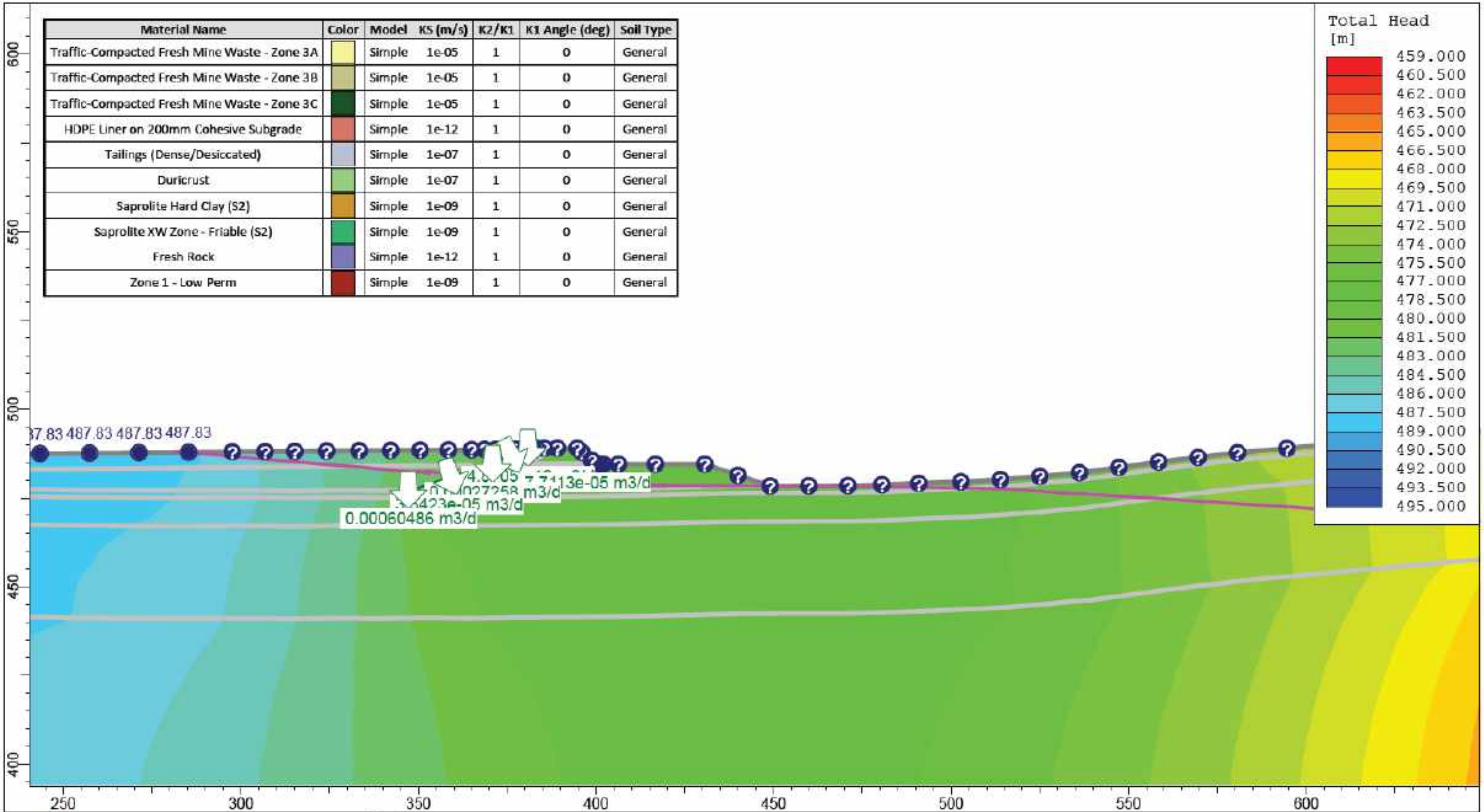


Material Name	Color	Model	KS (m/s)	K2/K1	K1 Angle (deg)	Soil Type
Laterite		Simple	1e-07	1	0	General
Saprolite Hard Clay (S1)		Simple	1e-09	1	0	General
Saprolite XW Zone - Friable (S1)		Simple	1e-09	1	0	General
Bedrock: MW-Fresh Basalt		Simple	1e-12	1	0	General
V.Stiff - Hard Clay		Simple	1e-09	1	0	General
Traffic-Compacted Fresh Mine Waste - Zone 3A		Simple	1e-05	1	0	General
Traffic-Compacted Fresh Mine Waste - Zone 3B		Simple	1e-05	1	0	General
Traffic-Compacted Fresh Mine Waste - Zone 3C		Simple	1e-05	1	0	General
HDPE Liner on 200mm Cohesive Subgrade		Simple	1e-12	1	0	General
Tailings (Dense/Desiccated)		Simple	1e-07	1	0	General
Paddock Dump Mine Waste Embankment		Simple	0.0001	1	0	General
Zone 1 - Low Perm		Simple	1e-09	1	0	General

rec

Project	TSF Stage 4		
Group	1st Section Stage 4	*Scenario*	Drained
Drawn By	JR	*Company*	REC
Date	28/02/2025, 2:56:11 PM	*File Name*	Seepage Analysis.slmd

SLIDEINTERPRET 9.031

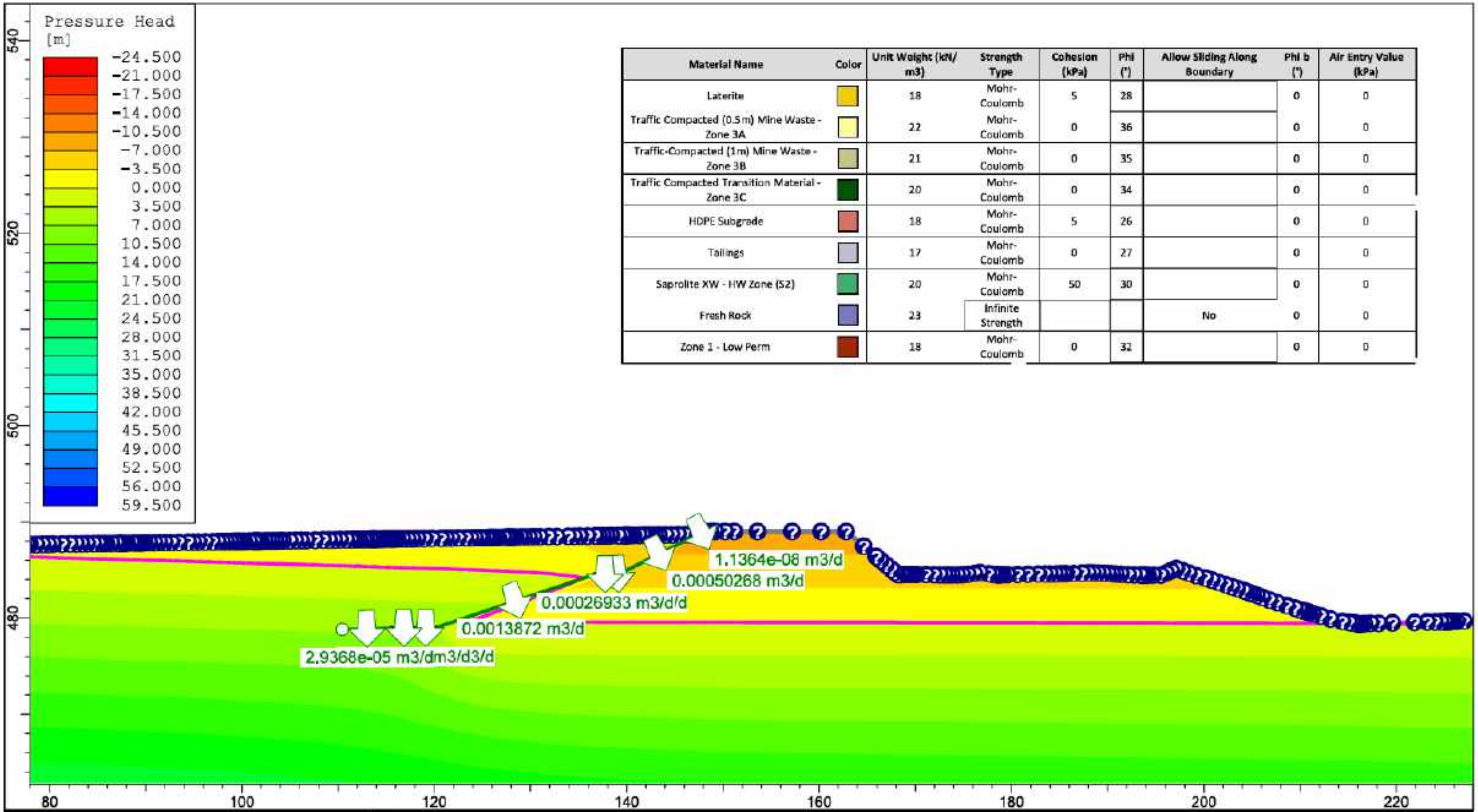


Material Name	Color	Model	KS (m/s)	K2/K1	K1 Angle (deg)	Soil Type
Traffic-Compacted Fresh Mine Waste - Zone 3A		Simple	1e-05	1	0	General
Traffic-Compacted Fresh Mine Waste - Zone 3B		Simple	1e-05	1	0	General
Traffic-Compacted Fresh Mine Waste - Zone 3C		Simple	1e-05	1	0	General
HDPE Liner on 200mm Cohesive Subgrade		Simple	1e-12	1	0	General
Tailings (Dense/Desiccated)		Simple	1e-07	1	0	General
Duricrust		Simple	1e-07	1	0	General
Saprolite Hard Clay (S2)		Simple	1e-09	1	0	General
Saprolite XW Zone - Friable (S2)		Simple	1e-09	1	0	General
Fresh Rock		Simple	1e-12	1	0	General
Zone 1 - Low Perm		Simple	1e-09	1	0	General

rec

SLIDEINTERPRET 9.031

Project	TSF Stage 4		
Group	2nd Section Stage 4	Scenario	Drained
Drawn By	JR	Company	REC
Date	28/02/2025, 2:56:11 PM	File Name	Seepage Analysis.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Allow Sliding Along Boundary	Phi b (°)	Air Entry Value (kPa)
Laterite		18	Mohr-Coulomb	5	28		0	0
Traffic Compacted (0.5m) Mine Waste - Zone 3A		22	Mohr-Coulomb	0	36		0	0
Traffic-Compacted (1m) Mine Waste - Zone 3B		21	Mohr-Coulomb	0	35		0	0
Traffic Compacted Transition Material - Zone 3C		20	Mohr-Coulomb	0	34		0	0
HDPE Subgrade		18	Mohr-Coulomb	5	26		0	0
Tailings		17	Mohr-Coulomb	0	27		0	0
Saprolite XW - HW Zone (S2)		20	Mohr-Coulomb	50	30		0	0
Fresh Rock		23	Infinite Strength			No	0	0
Zone 1 - Low Perm		18	Mohr-Coulomb	0	32		0	0

Project	TSF Stage 4		
Group	3rd Section Stage 4	Scenario	Drained
Drawn By	JR	Company	REC
Date	28/02/2025, 2:56:11 PM	File Name	Seepage Analysis

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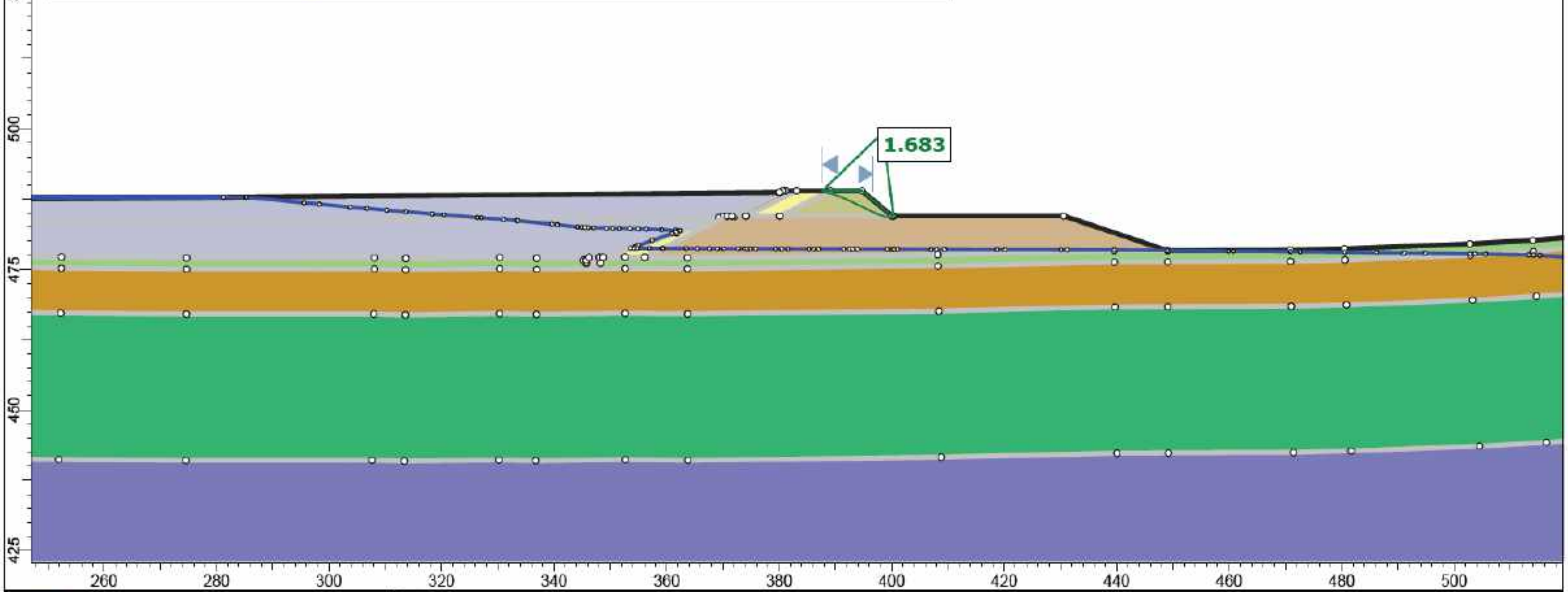
SLIDEINTERPRET 9.036

Appendix G

Slope Stability Analysis Results

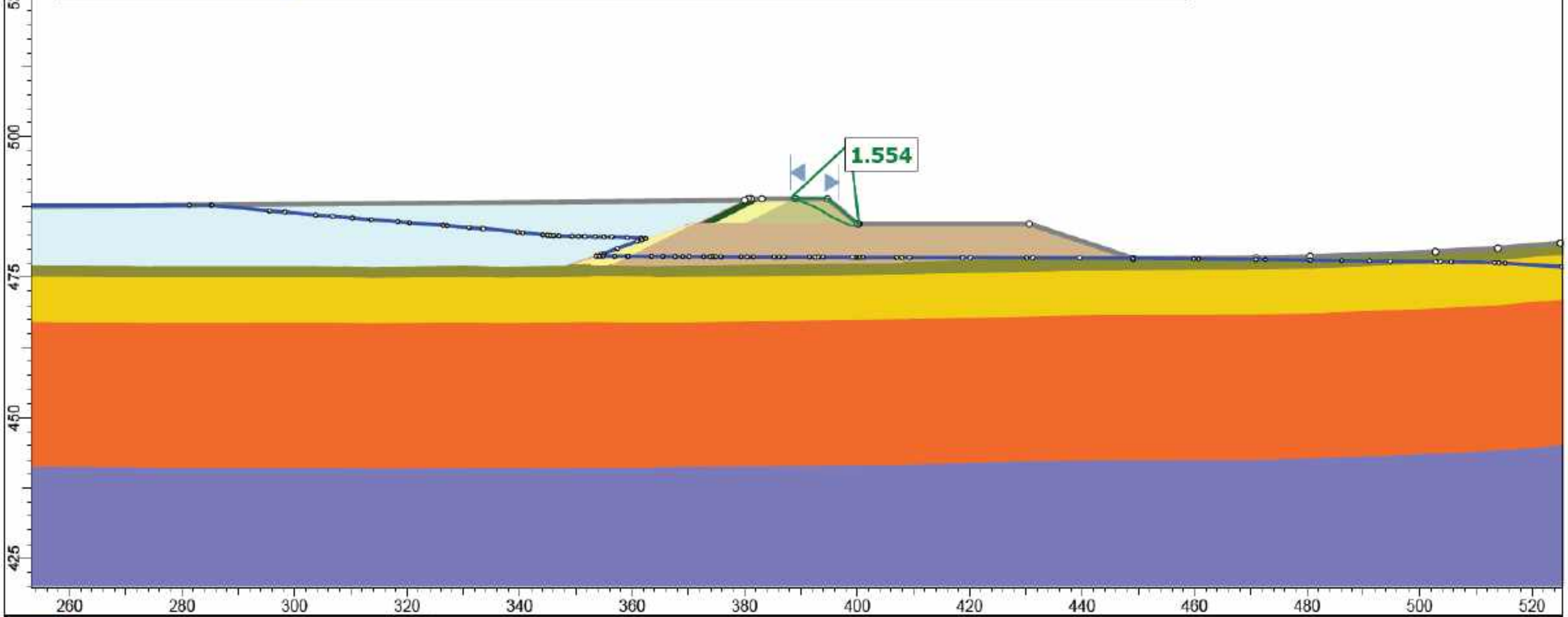
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Allow Sliding Along Boundary	Water Surface	Ru Value
Traffic Compacted (0.5m) Mine Waste - Zone 3A		22	Mohr-Coulomb	0	36		None	0
Traffic Compacted (1m) Mine Waste - Zone 3B		21	Mohr-Coulomb	0	35		None	0
Traffic Compacted Transition Material - Zone 3C		20	Mohr-Coulomb	0	34		None	0
HDPE Subgrade		18	Mohr-Coulomb	5	26		None	0
Tailings		17	Mohr-Coulomb	0	27		None	0
Paddock Dump Mine Waste		21	Mohr-Coulomb	0	35		None	0
Duricrust		19	Mohr-Coulomb	50	30		None	0
Saprolite Hard Clay		19	Mohr-Coulomb	30	25		None	0
Saprolite XW - HW Zone		20	Mohr-Coulomb	50	30		None	0
Fresh Rock		23	Infinite Strength			No	None	0



Project	TSF Stage 4		
Group	2nd Section Stage 4	Scenario	Drained
Drawn By	JR	Company	REC
Date	28/02/2025, 2:56:11 PM	File Name	Stability Analysis - Section 2_Final.slmd

SLIDEINTERPRET 9.031

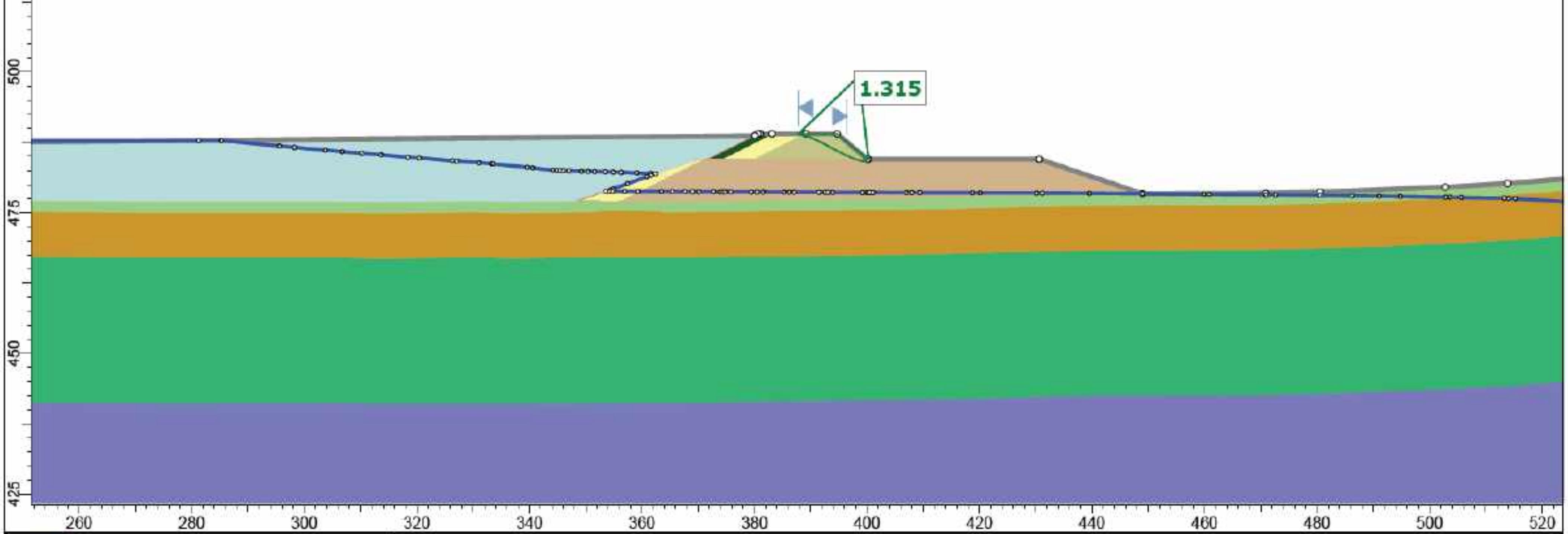
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Cohesion Type	Allow Sliding Along Boundary	Vertical Stress Ratio	Minimum Shear Strength (kPa)	Water Surface	Ru Value
Traffic Compacted (0.5m) Mine Waste - Zone 3A		22	Mohr-Coulomb	0	36					None	0
Traffic-Compacted (1m) Mine Waste - Zone 3B		21	Mohr-Coulomb	0	35					None	0
Traffic Compacted Transition Material - Zone 3C		20	Mohr-Coulomb	0	34					None	0
HDPE Subgrade		18	Mohr-Coulomb	5	26					None	0
Tailings - Undrained		17	Vertical Stress Ratio					0.25	0	None	0
Paddock Dump Mine Waste		21	Mohr-Coulomb	0	35					None	0
Duricrust - Undrained		19	Undrained	200		Constant				None	0
Saprolite Hard Clay - Undrained		19	Undrained	100		Constant				None	0
Saprolite XW - HW Zone - Undrained		20	Undrained	200		Constant				None	0
Fresh Rock		23	Infinite Strength				No			None	0



Project	TSF Stage 4		
Group	2nd Section Stage 4	*Scenario*	Undrained
Drawn By	JR	*Company*	REC
Date	28/02/2025, 2:56:11 PM	*File Name*	Stability Analysis - Section 2_Final.slmd

SLIDEINTERPRET 9.031

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Allow Sliding Along Boundary	Water Surface	Hu Type	Hu	Ru Value
Traffic Compacted (0.5m) Mine Waste - Zone 3A - PS		22	Mohr-Coulomb	0	30.2		None			0
Traffic-Compacted (1m) Mine Waste - Zone 3B - PS		20	Mohr-Coulomb	0	29.3		None			0
Traffic Compacted Transition Material - Zone 3C - PS		20	Mohr-Coulomb	0	28		None			0
HDPE Subgrade - PS		18	Mohr-Coulomb	4	21.3		None			0
Tailings - Post Seismic		17	Mohr-Coulomb	0	22.2		None			0
Paddock Dump Mine Waste - PS		21	Mohr-Coulomb	0	29.3		Water Table	Custom	1	
Duricrust - PS		19	Mohr-Coulomb	40	24.8		None			0
Saprolite Hard Clay - PS		19	Mohr-Coulomb	24	20.5		None			0
Saprolite XW - HW Zone - PS		20	Mohr-Coulomb	40	24.8		None			0
Fresh Rock		23	Infinite Strength			No	None			0



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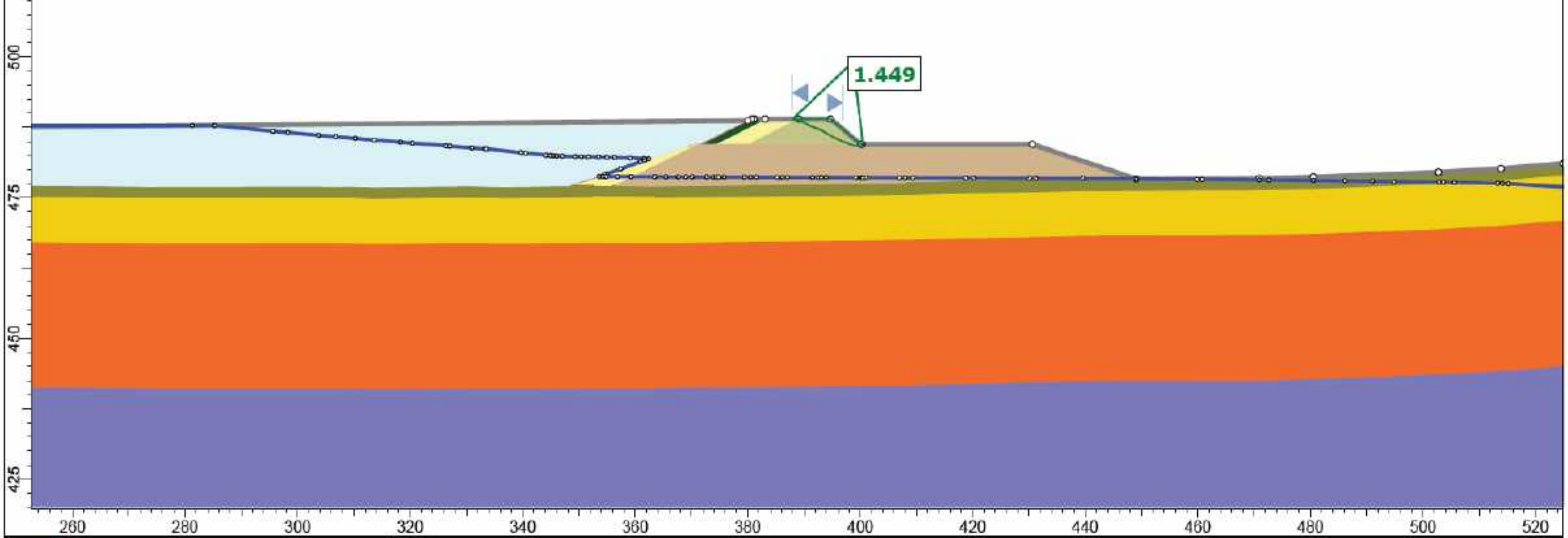
Project	TSF Stage 4		
Group	2nd Section Stage 4	*Scenario*	Post - Seismic
Drawn By	JR	*Company*	REC
Date	28/02/2025, 2:56:11 PM	*File Name*	Stability Analysis - Section 2_Final.slmd

SLIDEINTERPRET 9.031

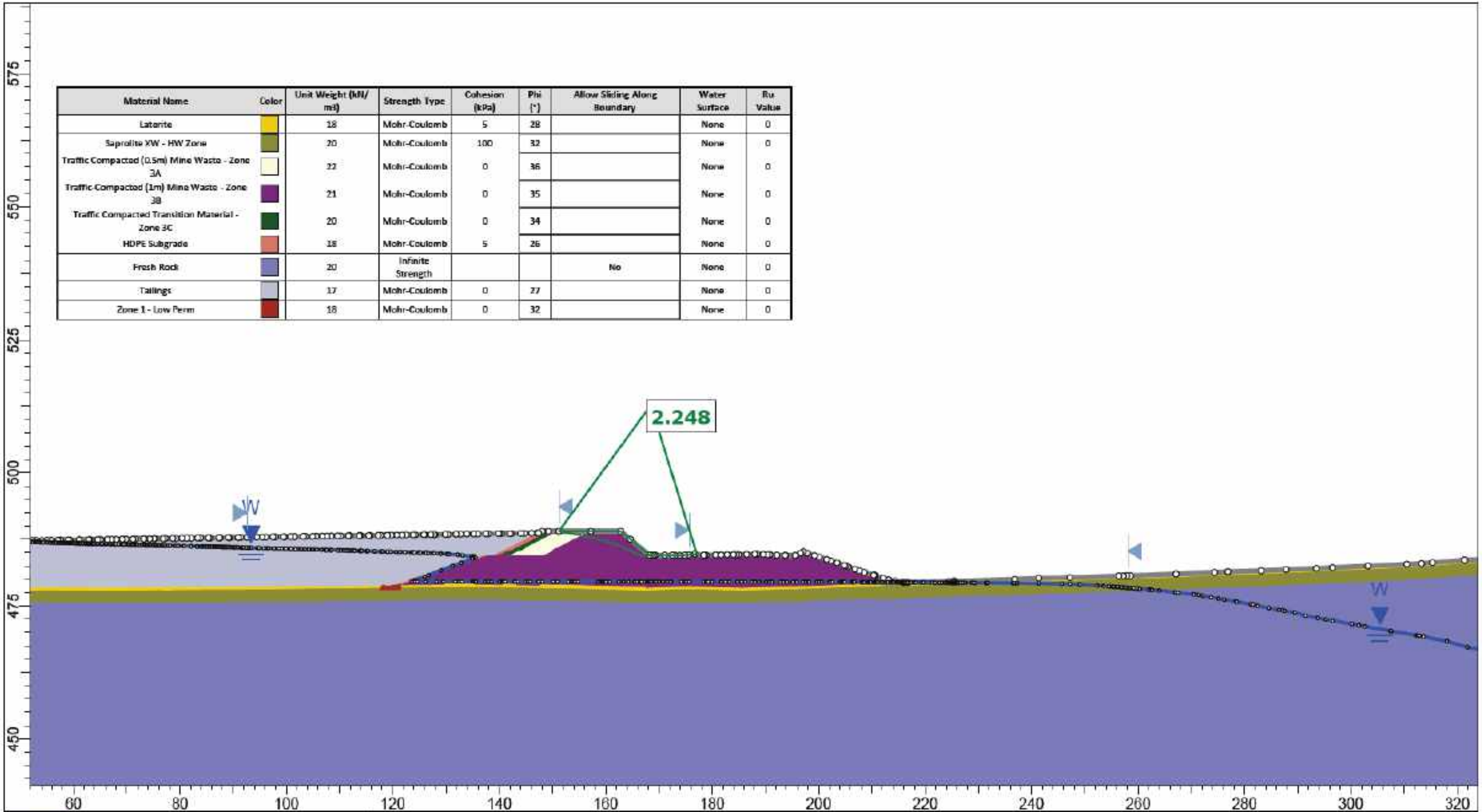
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Cohesion Type	Allow Sliding Along Boundary	Vertical Stress Ratio	Minimum Shear Strength (kPa)	Water Surface	Ru Value
Traffic Compacted (0.5m) Mine Waste - Zone 3A		22	Mohr-Coulomb	0	36					None	0
Traffic-Compacted (1m) Mine Waste - Zone 3B		21	Mohr-Coulomb	0	35					None	0
Traffic Compacted Transition Material - Zone 3C		20	Mohr-Coulomb	0	34					None	0
HDPE Subgrade		18	Mohr-Coulomb	5	26					None	0
Tailings - Undrained		17	Vertical Stress Ratio					0.25	0	None	0
Paddock Dump Mine Waste		21	Mohr-Coulomb	0	35					None	0
Duricrust - Undrained		19	Undrained	200		Constant				None	0
Saprolite Hard Clay - Undrained		19	Undrained	100		Constant				None	0
Saprolite XW - HW Zone - Undrained		20	Undrained	200		Constant				None	0
Fresh Rock		23	Infinite Strength				No			None	0



Project	TSF Stage 4		
Group	2nd Section Stage 4	*Scenario*	Pseudo Static
Drawn By	JR	*Company*	REC
Date	28/02/2025, 2:56:11 PM	*File Name*	Stability Analysis - Section 2_Final.slmd

SLIDEINTERPRET 9.031

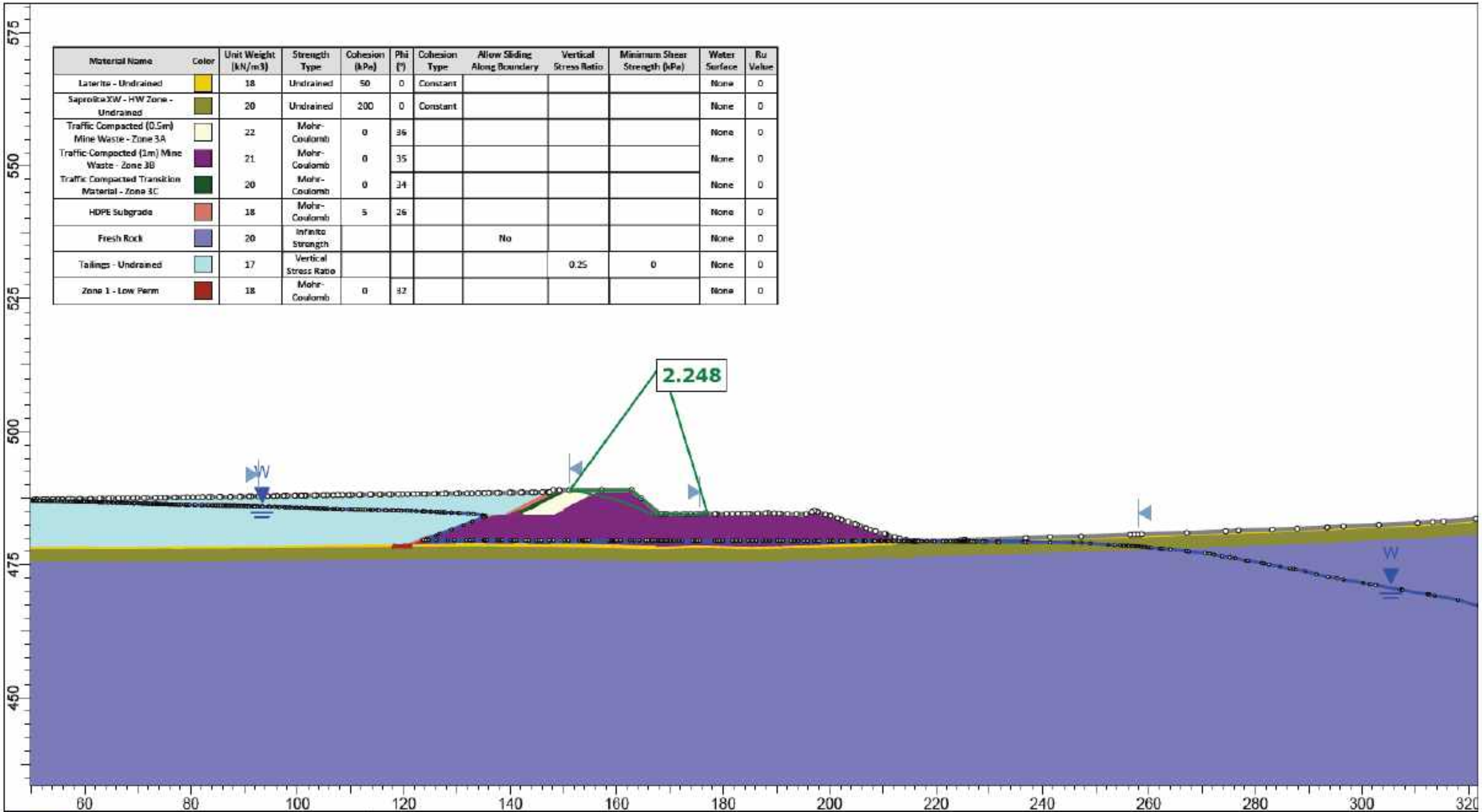
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Allow Sliding Along Boundary	Water Surface	Ru Value
Laterite		18	Mohr-Coulomb	5	28		None	0
Saprolite XW - HW Zone		20	Mohr-Coulomb	100	32		None	0
Traffic Compacted (0.5m) Mine Waste - Zone 3A		22	Mohr-Coulomb	0	36		None	0
Traffic Compacted (1m) Mine Waste - Zone 3B		21	Mohr-Coulomb	0	35		None	0
Traffic Compacted Transition Material - Zone 3C		20	Mohr-Coulomb	0	34		None	0
HDPE Subgrade		18	Mohr-Coulomb	5	26		None	0
Fresh Rock		20	Infinite Strength			No	None	0
Tailings		17	Mohr-Coulomb	0	27		None	0
Zone 1 - Low Perm		18	Mohr-Coulomb	0	32		None	0



Project	TSF Stage 4		
Group	3rd Section Stage 4	Scenario	Drained
Drawn By	JR	Company	REC
Date	7/03/2025, 12:14:08 PM	File Name	Stability Analysis

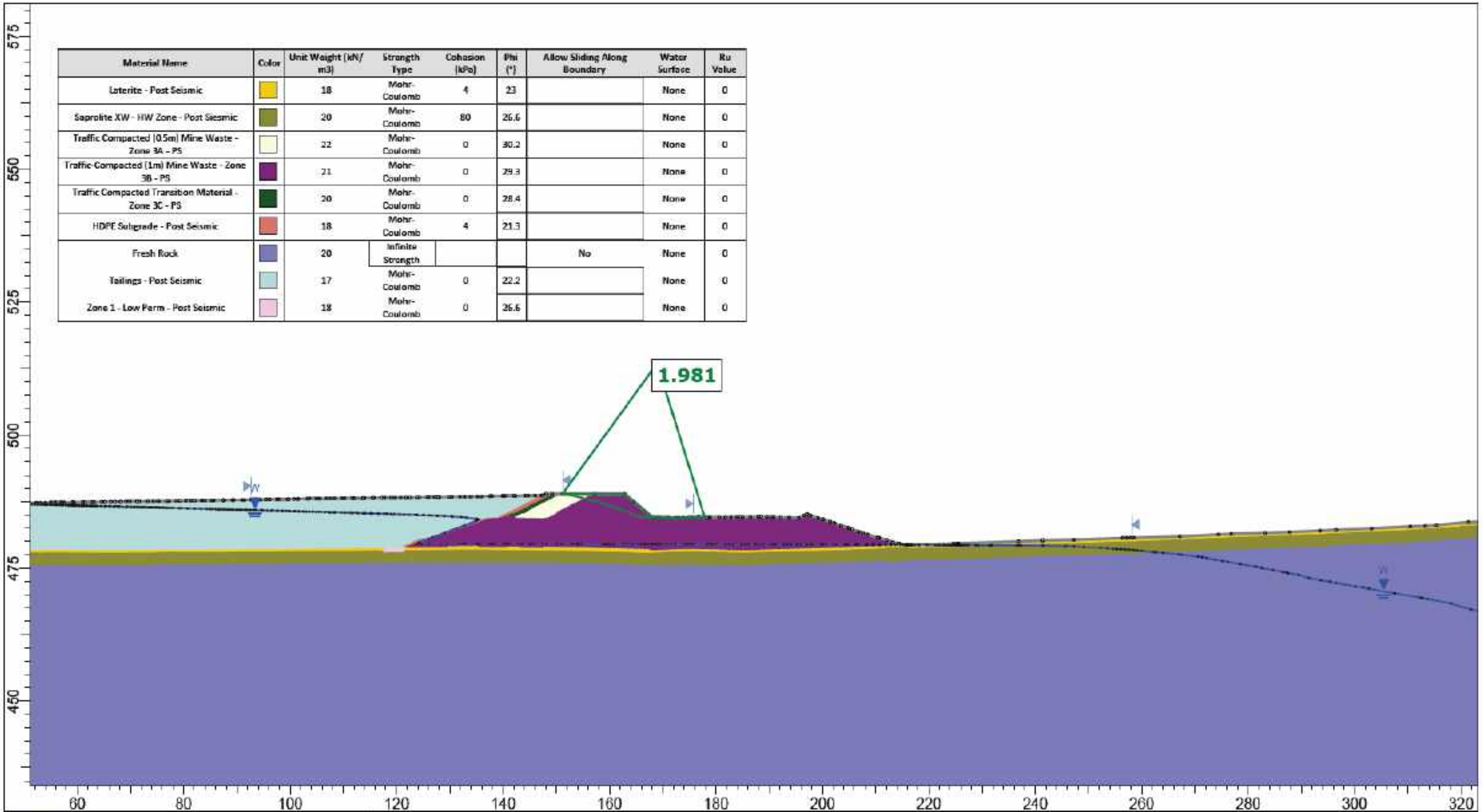
SLIDEINTERPRET 9.038

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Cohesion Type	Allow Sliding Along Boundary	Vertical Stress Ratio	Minimum Shear Strength (kPa)	Water Surface	Ru Value
Laterite - Undrained		18	Undrained	50	0	Constant				None	0
Saprolite XW - HW Zone - Undrained		20	Undrained	200	0	Constant				None	0
Traffic Compacted (0.5m) Mine Waste - Zone 3A		22	Mohr-Coulomb	0	36					None	0
Traffic-Compacted (1m) Mine Waste - Zone 3B		21	Mohr-Coulomb	0	35					None	0
Traffic Compacted Transition Material - Zone 3C		20	Mohr-Coulomb	0	34					None	0
HDPE Subgrade		18	Mohr-Coulomb	5	26					None	0
Fresh Rock		20	Infinite Strength				No			None	0
Tailings - Undrained		17	Vertical Stress Ratio					0.25	0	None	0
Zone 1 - Low Perm		18	Mohr-Coulomb	0	32					None	0



Project	TSF Stage 4		
Group	3rd Section Stage 4	Scenario	Undrained
Drawn By	JR	Company	REC
Date	7/03/2025, 12:14:08 PM	File Name	Stability Analysis

SLIDEINTERPRET 9.038



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Allow Sliding Along Boundary	Water Surface	Ru Value
Laterite - Post Seismic		18	Mohr-Coulomb	4	23		None	0
Saprolite XW - HW Zone - Post Siesmic		20	Mohr-Coulomb	80	26.6		None	0
Traffic Compacted (0.5m) Mine Waste - Zone 3A – PS		22	Mohr-Coulomb	0	30.2		None	0
Traffic-Compacted (1m) Mine Waste - Zone 3B - PS		21	Mohr-Coulomb	0	29.3		None	0
Traffic Compacted Transition Material - Zone 3C - PS		20	Mohr-Coulomb	0	28.4		None	0
HDPE Subgrade - Post Seismic		18	Mohr-Coulomb	4	21.3		None	0
Fresh Rock		20	Infinite Strength			No	None	0
Tailings - Post Seismic		17	Mohr-Coulomb	0	22.2		None	0
Zone 1 - Low Perm - Post Seismic		18	Mohr-Coulomb	0	26.6		None	0

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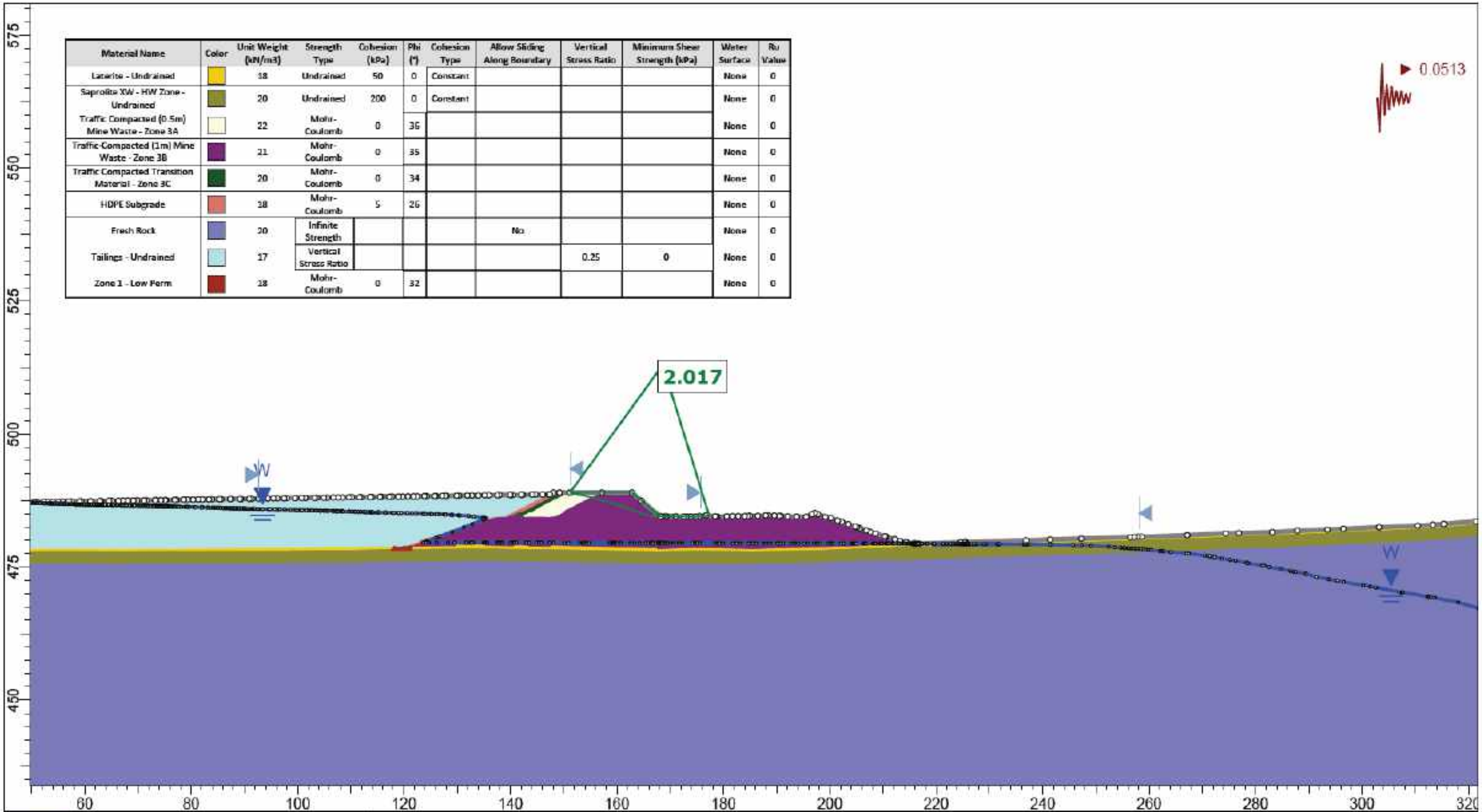
Project	TSF Stage 4		
Group	3rd Section Stage 4	*Scenario*	Post - Seismic
Drawn By	JR	*Company*	REC
Date	7/03/2025, 12:14:08 PM	*File Name*	Stability Analysis

SLIDEINTERPRET 9.038



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Cohesion Type	Allow Sliding Along Boundary	Vertical Stress Ratio	Minimum Shear Strength (kPa)	Water Surface	Ru Value
Laterite - Undrained		18	Undrained	50	0	Constant				None	0
Saprolite XW - HW Zone - Undrained		20	Undrained	200	0	Constant				None	0
Traffic Compacted (0.5m) Mine Waste - Zone 3A		22	Mohr-Coulomb	0	36					None	0
Traffic-Compacted (1m) Mine Waste - Zone 3B		21	Mohr-Coulomb	0	35					None	0
Traffic Compacted Transition Material - Zone 3C		20	Mohr-Coulomb	0	34					None	0
HDPE Subgrade		18	Mohr-Coulomb	5	26					None	0
Fresh Rock		20	Infinite Strength				No			None	0
Tailings - Undrained		17	Vertical Stress Ratio					0.25	0	None	0
Zone 1 - Low Perm		18	Mohr-Coulomb	0	32					None	0

Project	TSF Stage 4
Group	3rd Section Stage 4
Scenario	Pseudo Static
Drawn By	JR
Company	REC
Date	7/03/2025, 12:14:08 PM
File Name	Stability Analysis

rec

SLIDEINTERPRET 9.038

Appendix H

Dam Break Assessment Results

PROJECT	: BELLEVUE GOLD PROJECT		
CLIENT	: BELLEVUE GOLD LIMITED		
LOCATION	: IWLTSF - NORTH EAST		
SUBJECT	: DAM BREAK STUDY - IWLTSF ULTIMATE EMBANKMENT HEIGHT 15.0 M AT CREST RL 489.0 M	Date	07-Mar-25
CASE 1 Scenario:	Base case (Sunny Day Failure Conditions)	Job No	P19-11-PR29
		Rev	DRAFT

BREACH CHARACTERISTICS — Using Empirical Method

Input Parameters	Value	Unit	Comments		
New Embankment Crest Level	489.0	mRL	From design	No. of Cells	1
Lowest Ground Level	474.0	mRL	From survey contours	Approx. Length from Centre Point to Peri Emb	800 m
Maximum Embankment Height	15.0	m	From design		
			From design		
Approximate Emb Length corresponding to Critical Section	300	m	From design	Approx. Emb Vol (at critical section)	53,000 m^3
Embankment Crest Width	14.0	m	From design		
Upstream Embankment Slope	2.0	H to 1V	From design		
Downstream Embankment Slope	1.25	H to 1V	From design (average)		
Approx. Embankment Cross Section Area at Breach Location	860.0	m^2	Embankment cross section area at highest section		Assuming basin volume wont contribute
				Existing total storage capacity	3.472 Mt
Total Tailings Tonnes stored in TSF at New Crest Level	3.92	Mt	Estimated total storage capacity		
Dry Density	1.4	t/m^3	From design report	New storage volume	m^3
Bulk Density	1.86	t/m^3	Assumed moisture content of 'whole tailings depth' of 33%	New storage capacity	Mt
Total Tailings Volume stored in TSF (V_T) at New Crest Level	2,800,000	m^3	Estimated total tailings volume		
NO PMP Storm Volume over TSF Catchment	0	m^3	*Sunny Day Failure Scenario - No PMP storm event adopted*		
Total Released Tailings Volume from the TSF (V_F)	840,000	m^3	Caculated – approximate 30% of stored tailings volume (A Dalpatram (2011), 'Estimation of Tailings Dam Break Discharges')		
	687	acre-feet	Converted from m^3 to acre-feet (1 acre-feet = 1233 m3)		

Note: For the purpose of the analysis, the tailings 'failure volume' was assumed to be occured through a portion of the new storage. A geotechnical side height same as the raised embankment height was adopted for conservative tailings run-out calculations. Tailings released from the embankment breaches were assumed to be liquefied.

Output Parameters - Breach Characteristics	Value	Unit	Comments
Breach Shape - Trapezoidal Side Slopes	6.0	V to 1H	Adopted approximate trapezoidal breach shape (T MacDonald and J Langridge - Monopolis, 1984)
Geotechnical 'Slide' Height (H_s)	15.0	m	Adopted geotechnical slide height same as total embankment height for conservative assessment
	49.2	feet	Converted from meter to feet
Breach Formation Factor (V_F x H_s)	12,600,000	m^3 x m	Used this figure to predict the volume of embankment material removed during a breach
	3.4E+04	acre-ft x ft	Converted from m^3 x m to acre-feet x feet
Embankment Volume Eroded during Breach (V_M)	1.0E+04	yd^3	Embankment volume removed during a breach (determined from **Figure 1**, T MacDonald and J Langridge - Monopolis, 1984)
	7,664	m^3	Converted from cubic yard to cubic meter (1 cubic yard = 0.765 cubic meter)
Average Breach Width (W_{ave})	12	m	Calculated based on the removed embankment volume during a breach and embankment geometry
Base Breach Width (W_b)	9	m	
Top Breach Width (W_t)	14	m	
Breach Shape Area (A_T)	177	m^2	Breach shape area at highest embankment section
Equivalent Released Tailings Volume behind Breach Area	40,615	m^3	Used this figure to estimate the equivalent tailings failed length behind breach area
Equivalent Tailings Failed Length behind Breach Area (x_o)	230	m	Calculated based on the released tailings volume (behind breach area) and breach shape

RUN-OUT CALCULATION (K. Seddon 2010)

Method: Energy Based Approximate - to estimate the run-out distance for liquefied tailings (over an assumed horizontal plane/run-out base)

4.2 Linear method

The simplest solution can be obtained if it is assumed that the runout tongue is of uniform thickness.

From the geometry,

$$H_o x_o = h\, x_f$$

$$\therefore h = (x_o / x_f) H_o$$

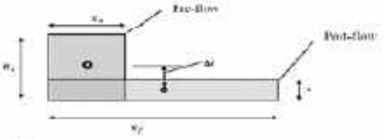


Figure 2 Simplified flow slide geometry

and re-arranging gives:

$$x_f^2 + x_o x_f - 2\gamma x_o H_o^2 / s_u = 0 \qquad (6)$$

in which x_f is the only unknown, and the required runout distance (Ro) is:

$$Ro = x_f - x_o \qquad (7)$$

Input Parameters	Value	Unit
Tailings Bulk Density (ρ)	1.86	t/m^3
Geotechnical 'Slide' Height (H_s)	15.0	m
Equivalent Tailings Failed Length (x_o)	230	m

Output Parameters	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7
Liquefied Strength Ratio ($S_{u(LIQ)}$ / σ'_{vo})	0.0%	1.0%	2.0%	3.0%	4.0%	5.0%	6.0%
Liquefied Shear Strength ($s_{u(LIQ)}$) (kPa)	0.0	1.3	2.6	4.0	5.3	6.6	7.9
Unit Weight (γ) (kN/m^3)	18.6	18.6	18.6	18.6	18.6	18.6	18.6
Pre-flow Tailings Failed Length (x_o) (m)	230	230	230	230	230	230	230
Pre-flow Breach Height (H_o) (m)	15.0	15	15	15	15	15	15
A = 1	1	1	1	1	1	1	1
B = x_o (m)	230	230	230	230	230	230	230
C = -2*γ*x_o*H_o*H_o/s_u	-102,203,706	-1,442,177	-726,208	-486,287	-364,397	-291,726	-243,220
Solution x_f (m)	10,000	1,001	745	601	500	437	391
Run-out Distance R_o (m)	9,770	860	510	360	270	210	160

PROJECT	: BELLEVUE GOLD PROJECT	
CLIENT	: BELLEVUE GOLD LIMITED	
LOCATION	: IWLTSF - NORTH EAST	
SUBJECT	: DAM BREAK STUDY - IWLTSF ULTIMATE EMBANKMENT HEIGHT 15.0 M AT CREST RL 489.0 M	Date: 07-Mar-25
CASE 2A Scenario:	Worst Case (PMP Rainy Day Failure Conditions)	Job No: P19-11-PR29
		Rev: DRAFT

BREACH CHARACTERISTICS	Using Empirical Method		MacDonald and Langridge - Monopolis (1984)		
Input Parameters	**Value**	**Unit**	**Comments**		
New Embankment Crest Level	489.0	mRL	From design	No. of Cells	1
Lowest Ground Level	474.0	mRL	From survey contours	Approx. Length from Centre Point to Peri Emb	800 m
Maximum Embankment Height	15.0	m	From design		
			From design		
Approximate Emb Length corresponding to Critical Section	300	m	From design (per cell)	Approx Emb Vol (at critical section)	65,000 m³
Embankment Crest Width	14.0	m	From design		
Upstream Embankment Slope	2.0	H to 1V	From design		
Downstream Embankment Slope	1.3	H to 1V	From design (average)		
Approx. Embankment Cross Section Area at Breach Location	575.6	m²	Embankment cross section area at highest section		Assuming basin volume wont contribute
				Existing total storage capacity	3.5 Mt
Total Tailings Tonnes stored in TSF at New Crest Level	3.82	Mt	Estimated total storage capacity		
Dry Density	1.4	t/m³	From design report	New storage volume	m³
Bulk Density	1.06	t/m³	Assumed moisture content of 'whole tailings depth' of 33%	New storage capacity	Mt
Total Tailings Volume stored in TSF (V_T) at New Crest Level	2,800,000	m³	Estimated total tailings volume		
Extreme Storm Volume over 'whole' TSF Catchment	626,000	m³	*Rainy Day Failure Scenario - PMP Storm Event Adopted*		
Total Released Tailings Volume from the TSF (V_F)	2,036,100	m³	Caculated - approximate 50% of storage volume (Assuming more water released, so more tailings mobilized)		
	1,085	acre-feet	Converted from m³ to acre-feet (1 acre-feet = 1233 m3)		

Note: For the purpose of the analysis, the tailings 'failure volume' was assumed to be coccured through a portion of the new storage. A total 'breach' height same as the raised embankment height was adopted for conservative tailings run-out calculations. Tailings released from the embankment breaches were assumed to be liquefied

Output Parameters - Breach Characteristics	**Value**	**Unit**	**Comments**
Breach Shape - Trapezoidal Side Slopes	3.0	V to 1H	Adopted approximate trapezoidal breach shape (T MacDonald and J Langridge - Monopolis, 1984)
Breach Height (H_w)	15.0	m	Adopted the bottom of the breach is at the crest of existing downstream embankment
	49.2	feet	Converted from meter to feet
Breach Formation Factor (V_F x H_w)	30,541,500	m³ x m	Used this figure to predict the volume of embankment material removed during a breach
	8.2E+04	acre-ft x ft	Converted from m³ x m to acre-foot x feet
Embankment Volume Eroded during Breach (V_{er})	2.0E+04	yrd³	Embankment volume removed during a breach (determined from **Figure 1**, T MacDonald and J Langridge - Monopolis, 1984)
	15,155	m³	Converted from cubic yard to cubic meter (1 cubic yard = 0.765 cubic meter)
Average Breach Width (W_{ave})	26	m	Calculated based on the removed embankment volume during a breach and embankment geometry
Base Breach Width (W_b)	21	m	
Top Breach Width (W_t)	31	m	
Breach Shape Area (A_b)	395	m²	Breach shape area at highest embankment section
Equivalent Released Tailings Volume behind Breach Area	212,619	m³	Used this figure to estimate the equivalent tailings failed length behind breach area
Equivalent Tailings Failed Length behind Breach Area (x_b)	540	m	Calculated based on the released tailings volume (behind breach area) and breach shape
Adopted Breach Development Time (t_f)	1.00	hour	Breaches typically occur over time periods of 0.5 to 4 hours (determined from **Figure 2**, T MacDonald and J Langridge - Monopolis, 1984)
Released Tailings Run-out Flow (Q_f)	566	m³/s	Calculated based on released tailings volume and breach development time

PROJECT	: BELLEVUE GOLD PROJECT		
CLIENT	: BELLEVUE GOLD LIMITED		
LOCATION	: IWLTSF - SOUTH EAST		
SUBJECT	: DAM BREAK STUDY - IWLTSF ULTIMATE EMBANKMENT HEIGHT 27.0 M AT CREST RL 489.0 M	Date	07-Mar-25
CASE 1 Scenario:	Base case (Sunny Day Failure Conditions)	Job No	P19-11-PR29
		Rev	DRAFT

BREACH CHARACTERISTICS

Using Empirical Method

Input Parameters	Value	Unit	Comments		
New Embankment Crest Level	489.0	mRL	From design	No. of Cells	1
Lowest Ground Level	462.0	mRL	From survey contours	Approx. Length from Centre Point to Peri Emb	800 m
Maximum Embankment Height	27.0	m	From design		
			From design		
Approximate Emb Length corresponding to Critical Section	300	m	From design	Approx. Emb Vol (at critical section)	113,400 m³
Embankment Crest Width	14.0	m	From design		
Upstream Embankment Slope	2.0	H to 1V	From design		
Downstream Embankment Slope	1.25	H to 1V	From design (average)		
Approx. Embankment Cross Section Area at Breach Location	1,700.0	m²	Embankment cross section area at highest section		Assuming basin volume wont contribute
				Existing total storage capacity	3.472 Mt
Total Tailings Tonnes stored in TSF at New Crest Level	4.72	Mt	Estimated total storage capacity		
Dry Density	1.4	t/m³	From design report	New storage volume	m³
Bulk Density	1.86	t/m³	Assumed moisture content of 'whole tailings depth' of 33%	New storage capacity	Mt
Total Tailings Volume stored in TSF (V_T) at New Crest Level	3,370,000	m³	Estimated total tailings volume		
NO PMP Storm Volume over TSF Catchment	0	m³	*Sunny Day Failure Scenario - No PMP storm event adopted*		
Total Released Tailings Volume from the TSF (V_F)	1,011,000	m³	Caculated – approximate 30% of stored tailings volume (A Dalpatram (2011), 'Estimation of Tailings Dam Break Discharges')		
	827	acre-feet	Converted from m³ to acre-feet (1 acre-feet = 1233 m3)		

Note: For the purpose of the analysis, the tailings 'failure volume' was assumed to be occured through a portion of the new storage. A geotechnical side height same as the raised embankment height was adopted for conservative tailings run-out calculations. Tailings released from the embankment breaches were assumed to be liquefied.

Output Parameters - Breach Characteristics	Value	Unit	Comments
Breach Shape - Trapezoidal Side Slopes	6.0	V to 1H	Adopted approximate trapezoidal breach shape (T MacDonald and J Langridge - Monopolis, 1984)
Geotechnical 'Slide' Height (H_s)	27.0	m	Adopted geotechnical slide height same as total embankment height for conservative assessment
	88.5	feet	Converted from meter to feet
Breach Formation Factor ($V_F \times H_s$)	27,297,000	m³ x m	Used this figure to predict the volume of embankment material removed during a breach
	7.3E+04	acre-ft x ft	Converted from m³ x m to acre-feet x feet
Embankment Volume Eroded during Breach (V_M)	1.8E+04	yrd³	Embankment volume removed during a breach (determined from **Figure 1**, T MacDonald and J Langridge - Monopolis, 1984)
	13,899	m³	Converted from cubic yard to cubic meter (1 cubic yard = 0.765 cubic meter)
Average Breach Width (W_{ave})	8	m	Calculated based on the removed embankment volume during a breach and embankment geometry
Base Breach Width (W_b)	3	m	
Top Breach Width (W_t)	13	m	
Breach Shape Area (A_F)	221	m²	Breach shape area at highest embankment section
Equivalent Released Tailings Volume behind Breach Area	42,718	m³	Used this figure to estimate the equivalent tailings failed length behind breach area
Equivalent Tailings Failed Length behind Breach Area (x_o)	190	m	Calculated based on the released tailings volume (behind breach area) and breach shape

RUN-OUT CALCULATION (K. Seddon 2010)

Method: Energy Based Approximate - to estimate the run-out distance for liquefied tailings (over an assumed horizontal plane/run-out base)

4.2 Linear method

The simplest solution can be obtained if it is assumed that the runout tongue is of uniform thickness.

From the geometry,

$$H_o x_o = h\, x_f$$

$$\therefore h = (x_o / x_f) H_o$$

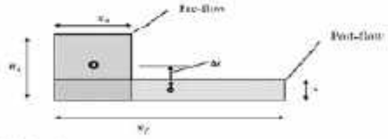


Figure 2 Simplified flow slide geometry

and re-arranging gives:

$$x_f^2 + x_o x_f - 2\gamma_w H_o^2 / s_u = 0 \qquad (6)$$

in which x_f is the only unknown, and the required runout distance (Ro) is:

$$Ro = x_f - x_o \qquad (7)$$

Input Parameters	Value	Unit
Tailings Bulk Density (ρ)	1.86	t/m³
Geotechnical 'Slide' Height (H_s)	27.0	m
Equivalent Tailings Failed Length (x_o)	190	m

Output Parameters	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7
Liquefied Strength Ratio ($S_{u(LIQ)} / \sigma'_{vo}$)	0.0%	1.0%	2.0%	3.0%	4.0%	5.0%	6.0%
Liquefied Shear Strength ($s_{u(LIQ)}$) (kPa)	0.0	2.4	4.8	7.1	9.5	11.8	14.2
Unit Weight (γ) (kN/m³)	18.6	18.6	18.6	18.6	18.6	18.6	18.6
Pre-flow Tailings Failed Length (x_o) (m)	190	190	190	190	190	190	190
Pre-flow Breach Height (H_o) (m)	27.0	27	27	27	27	27	27
A = 1	1	1	1	1	1	1	1
B = x_o (m)	190	190	190	190	190	190	190
C = -2*γ*x_o*H_o*H_o/s_u	-162,196,294	-2,144,464	-1,079,839	-721,609	-541,843	-433,783	-361,658
Solution x_f (m)	12,239	1,372	948	760	667	570	514
Run-out Distance R_o (m)	12,050	1,180	760	570	480	380	320

PROJECT	: BELLEVUE GOLD PROJECT		
CLIENT	: BELLEVUE GOLD LIMITED		
LOCATION	: IWLTSF - SOUTH EAST		
SUBJECT	: DAM BREAK STUDY - IWLTSF ULTIMATE EMBANKMENT HEIGHT 27.0 M AT CREST RL 489.0 M	Date	07-Mar-25
CASE 2A Scenario:	Worst Case (PMP Rainy Day Failure Conditions)	Job No	P19-11-PR29
		Rev	DRAFT

BREACH CHARACTERISTICS — Using Empirical Method — MacDonald and Langridge - Monopolis (1984)

Input Parameters	Value	Unit	Comments		
New Embankment Crest Level	489.0	mRL	From design	No. of Cells	1
Lowest Ground Level	462.0	mRL	From survey contours	Approx. Length from Centre Point to Peri Emb	800 m
Maximum Embankment Height	27.0	m	From design		
			From design		
Approximate Emb Length corresponding to Critical Section	300	m	From design (per cell)	Approx Emb Vol (at critical section)	113,400 m^3
Embankment Crest Width	14.0	m	From design		
Upstream Embankment Slope	2.0	H to 1V	From design		
Downstream Embankment Slope	1.3	H to 1V	From design (average)		
Approx. Embankment Cross Section Area at Breach Location	1,662.6	m^2	Embankment cross section area at highest section		Assuming basin volume wont contribute
				Existing total storage capacity	3.6 Mt
Total Tailings Tonnes stored in TSF at New Crest Level	4.72	Mt	Estimated total storage capacity		
Dry Density	1.4	t/m³	From design report	New storage volume	[illegible] m^3
Bulk Density	1.06	t/m³	Assumed moisture content of 'whole tailings depth' of 33%	New storage capacity	Mt
Total Tailings Volume stored in TSF (V_T) at New Crest Level	3,370,000	m³	Estimated total tailings volume		
Extreme Storm Volume over 'whole' TSF Catchment	[illegible]	m³	*Rainy Day Failure Scenario - PMP Storm Event Adopted*		
Total Released Tailings Volume from the TSF (V_F)	2,321,100	m³	Calculated – approximate 60% of storage volume (Assuming more water released, so more tailings mobilized)		
	1,898	acre-feet	Converted from m^3 to acre-feet (1 acre-feet = 1233 m3)		

Note: For the purpose of the analysis, the tailings 'failure volume' was assumed to be occured through a portion of the new storage. A total 'breach' height same as the raised embankment height was adopted for conservative tailings run-out calculations. Tailings released from the embankment breaches were assumed to be liquefied

Output Parameters - Breach Characteristics	Value	Unit	Comments
Breach Shape - Trapezoidal Side Slopes	4.5	V to 1H	Adopted approximate trapezoidal breach shape (T MacDonald and J Langridge - Monopolis, 1984)
Breach Height (H_w)	27.0	m	Adopted the bottom of the breach is at the crest of existing downstream embankment
	88.5	feet	Converted from meter to feet
Breach Formation Factor ($V_F \times H_w$)	62,669,700	$m^3 \times m$	Used this figure to predict the volume of embankment material removed during a breach
	1.7E+05	acre-ft x ft	Converted from m^3 x m to acre-feet x feet
Embankment Volume Eroded during Breach (V_M)	3.4E+04	yd³	Embankment volume removed during a breach (determined from **Figure 1**, T MacDonald and J Langridge - Monopolis, 1984)
	26,358	m³	Converted from cubic yard to cubic meter (1 cubic yard = 0.765 cubic meter)
Average Breach Width (W_{ave})	[illegible]	m	Calculated based on the removed embankment volume during a breach and embankment geometry
Base Breach Width (W_b)	11	m	
Top Breach Width (W_t)	[illegible]	m	
Breach Shape Area (A_F)	455	m²	Breach shape area at highest embankment section
Equivalent Released Tailings Volume behind Breach Area	176,929	m³	Used this figure to estimate the equivalent tailings failed length behind breach area
Equivalent Tailings Failed Length behind Breach Area (x_L)	390	m	Calculated based on the released tailings volume (behind breach area) and breach shape
Adopted Breach Development Time (t_F)	1.00	hour	Breaches typically occur over time periods of 0.5 to 4 hours (determined from **Figure 2**, T MacDonald and J Langridge - Monopolis, 1984)
Released Tailings Run-out Flow (Q_F)	[illegible]	m³/s	Calculated based on released tailings volume and breach development time

Appendix I

Static Water Balance

	YEAR		YEAR 1											
	DATE		Sep-26	Oct-26	Nov-26	Dec-26	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27
	DAYS IN MONTH		30	31	30	31	31	28	31	30	31	30	31	31
	MONTH		1	2	3	4	5	6	7	8	9	10	11	12
	OPERATIONAL PHASE		Stage 4 North Intermediate Storage					Stage 4 South Intermediate Storage				Stage 4 Full Capacity		
RAINFALL														
Monthly Rainfall (mm)	Rainfall Scenario	1	3,6	11,8	15,7	25,4	38,5	40,5	36,0	24,6	14,3	14,6	16,0	8,9
Stage 4 North Intermediate Storage Surface Area (m^2)	Tailings beach runoff coefficient	1,0	433,299	433,299	433,299	433,299	433,299	Not relevant during this period						
Stage 4 South Intermediate Storage Surface Area (m^2)	Tailings beach runoff coefficient	1,0	Not relevant during this period					456,424	456,424	456,424	456,424	Not relevant during this period		
Stage 4 Full Capacity Surface Area (m^2)	Tailings beach runoff coefficient	1.0	Not relevant during this period									548,020	548,020	548,020
Stage 4 North Intermediate Upstream Catchment Area (m^2)	Upstream catchment runoff coefficient	0,5	265,701	265,701	265,701	265,701	265,701	Not relevant during this period						
Stage 4 South Intermediate Upstream Catchment Area (m^2)	Upstream catchment runoff coefficient	0,5	Not relevant during this period					242,576	242,576	242,576	242,576	Not relevant during this period		
Stage 4 Full Capacity Upstream Catchment Area (m^2)	Upstream catchment runoff coefficient	0,5	Not relevant during this period									150,980	150,980	150,980
Rainfall Inflow Total Volume from Tailings Surface (m^3/month)			1,560	5,113	6,803	11,006	16,682	18,485	16,431	11,228	6,527	8,001	8,768	4,877
Rainfall Inflow Total Volume from Upstream Catchment (m^3/month)			478	1,568	2,086	3,374	5,115	4,912	4,366	2,984	1,734	1,102	1,208	672
Total Rainfall Inflow Total Volume (m^3/month)			2,038	6,681	8,889	14,380	21,797	23,397	20,798	14,212	8,261	9,103	9,976	5,549
DEPOSITION														
Production Rate (t/month)	From Production Schedule (tpa)	1,600,000	133,333	133,333	133,333	133,333	133,333	133,333	133,333	133,333	133,333	133,333	133,333	133,333
Slurry Density (%)	From Plant Designer	55,0%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
Volume of Tailings Solids into Facility (m^3/month)			95,238	95,238	95,238	95,238	95,238	95,238	95,238	95,238	95,238	95,238	95,238	95,238
Cumulative Volume of Tailings Solids in Facility (m^3)			95,238	190,476	285,714	380,952	476,190	571,429	666,667	761,905	857,143	952,381	1,047,619	1,142,857
Volume of Slurry Water into Facility (m^3/month)			109,091	109,091	109,091	109,091	109,091	109,091	109,091	109,091	109,091	109,091	109,091	109,091
TOTAL WATER TO BE REMOVED (m^3/month)			**111,129**	**116,771**	**117,979**	**123,471**	**130,888**	**132,488**	**129,889**	**123,303**	**117,352**	**118,194**	**119,067**	**114,640**
CUMULATIVE VOLUME OF WATER TO BE REMOVED (m^3/month)			**111,129**	**226,901**	**344,880**	**468,351**	**599,239**	**731,727**	**861,616**	**984,918**	**1,102,270**	**1,220,465**	**1,339,532**	**1,454,172**
EVAPORATION (from pond and wet beaches)														
Monthly Evaporation (mm)	Evap and Pan Factor from Tech Note 65 (Melrose, ~60 km from Leinster)	0,65	247	353	403	486	566	435	401	265	174	123	124	169
Stage 4 North Intermediate Storage Tailings Pool Area (m^2)	Assume 8% of the beach surface area (0,5 m pool depth for pump function)	0,08	34,664	34,664	34,664	34,664	34,664	Not relevant during this period						
Stage 4 South Intermediate Storage Tailings Pool Area (m^2)	Assume 8% of the beach surface area (0,5 m pool depth for pump function)	0,08	Not relevant during this period					36,514	36,514	36,514	36,514	Not relevant during this period		
Stage 4 Full Capacity Tailings Pool Area (m2)	Assume 8% of the beach surface area (0.5 m pool depth for pump function)	0.08	Not relevant during this period									43,842	43,842	43,842
Stage 4 North Intermediate Storage Tailings Running Beaches (m^2)	Active spigots x spacing x length to pond	4 X 20 X 300	24,000	24,000	24,000	24,000	24,000	Not relevant during this period						
Stage 4 North Intermediate Storage Tailings Running Beaches (m^2)	Active spigots x spacing x length to pond	4 X 20 X 300	Not relevant during this period					24,000	24,000	24,000	24,000	Not relevant during this period		
Stage 4 Full Capacity Tailings Running Beaches (m^2)	Active spigots x spacing x length to pond	4 X 20 X 300	Not relevant during this period									24,000	24,000	24,000
Total Evaporation Outflow (m^3/month)	Using total wet area		9,418	13,460	15,367	18,532	21,582	17,110	15,773	10,424	6,844	5,424	5,468	7,452
EVAPOTRANSPIRATION (from dry beaches)														
Tailings Beaches Area (m^2)			433,299	433,299	433,299	433,299	433,299	456,424	456,424	456,424	456,424	548,020	548,020	548,020
Total Evapotranspiration Outflow (m^3/month)	Depth factor	0,3	925	1,322	1,510	1,821	2,120	1,722	1,588	1,049	689	591	595	812
RETENTION														
IWLTSF Stage 4 Volume Retained in Tailings (MC W/W%)	Dependant on in-situ density - read from "DD vs MC" sheet		36,25%	36,25%	36,25%	36,25%	36,25%	36,25%	36,25%	36,25%	36,25%	36,25%	36,25%	36,25%
IWLTSF Stage 4 Volume Retained in Tailings (m^3/month)	1 ton of water equivalent to 1 m^3 of water		48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333
Total Retain Volume in Tailings (m^3/month)			48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,335	48,333
DECANT WATER FROM FACILITY														
Decant pump rate (tph)			65	63	65	66	71	89	78	80	74	79	77	68
Underdrainage pump rate (tph)			16	16	16	16	18	22	20	20	19	20	19	17
Volume of water pumped to plant (m^3/month)			46,836	46,853	47,154	48,962	53,049	59,801	58,082	57,581	55,373	56,744	57,331	50,704
Water removed as a percentage of slurry water out to the facility (%)		47,9%	43%	43%	43%	45%	49%	55%	53%	53%	51%	52%	53%	46%
Water return expressed as a percentage of total water into facility (%)		42,9%	42%	40%	40%	40%	41%	45%	45%	47%	47%	48%	48%	44%
TOTAL WATER REMOVED (m^3/month)			**111,129**	**116,771**	**117,979**	**123,471**	**130,888**	**132,488**	**129,889**	**123,303**	**117,352**	**118,194**	**119,067**	**114,640**
CUMULATIVE VOLUME OF WATER REMOVED (m^3/month)			**111,129**	**226,901**	**344,880**	**468,351**	**599,239**	**731,727**	**861,616**	**984,918**	**1,102,270**	**1,220,465**	**1,339,532**	**1,454,172**
MONTHLY DEFECIT/SURPLUS (m^3/month)			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
ESTIMATED SEEPAGE FROM FACILITY (m^3/month)			5,616	5,803	5,616	5,803	5,803	5,521	6,112	5,915	6,112	7,102	7,339	7,339

rec

YEAR				YEAR 2										
DATE	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28
DAYS IN MONTH	30	31	31	30	31	30	31	31	29	31	30	31	30	31
MONTH	10	11	12	13	14	15	16	17	18	19	20	21	22	23
OPERATIONAL PHASE	Stage 4 Full Capacity													

RAINFALL

			Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28
Monthly Rainfall (mm)	Rainfall Scenario	1	14,6	16,0	8,9	3,6	11,8	15,7	25,4	38,5	40,5	36,0	24,6	14,3	14,6	16,0
Stage 4 North Intermediate Storage Surface Area (m^2)	Tailings beach runoff coefficient	1,0	Not relevant during this period													
Stage 4 South Intermediate Storage Surface Area (m^2)	Tailings beach runoff coefficient	1,0	Not relevant during this period													
Stage 4 Full Capacity Surface Area (m^2)	Tailings beach runoff coefficient	1,0	548,020	548,020	548,020	548,020	548,020	548,020	548,020	548,020	548,020	548,020	548,020	548,020	548,020	548,020
Stage 4 North Intermediate Upstream Catchment Area (m^2)	Upstream catchment runoff coefficient	0,5	Not relevant during this period													
Stage 4 South Intermediate Upstream Catchment Area (m^2)	Upstream catchment runoff coefficient	0,5	Not relevant during this period													
Stage 4 Full Capacity Upstream Catchment Area (m^2)	Upstream catchment runoff coefficient	0,5	150,980	150,980	150,980	150,980	150,980	150,980	150,980	150,980	150,980	150,980	150,980	150,980	150,980	150,980
Rainfall Inflow Total Volume from Tailings Surface (m^3/month)			8,001	8,768	4,877	1,973	6,467	8,604	13,920	21,099	22,195	19,729	13,481	7,837	8,001	8,768
Rainfall Inflow Total Volume from Upstream Catchment (m^3/month)			1,102	1,208	672	272	891	1,185	1,917	2,906	3,057	2,718	1,857	1,080	1,102	1,208
Total Rainfall Inflow Total Volume (m^3/month)			9,103	9,976	5,549	2,245	7,357	9,789	15,837	24,005	25,252	22,446	15,338	8,916	9,103	9,976

DEPOSITION

			Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28
Production Rate (t/month)	From Production Schedule (tpa)	1,600,000	133,333	133,333	133,333	133,333	133,333	133,333	133,333	133,333	133,333	133,333	133,333	133,333	133,333	133,333
Slurry Density (%)	From Plant Designer	55,0%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
Volume of Tailings Solids into Facility (m^3/month)			95,238	95,238	95,238	95,238	95,238	95,238	95,238	95,238	95,238	95,238	95,238	95,238	95,238	95,238
Cumulative Volume of Tailings Solids In Facility (m^3)			952,381	1,047,619	1,142,857	1,238,095	1,333,333	1,428,571	1,523,810	1,619,048	1,714,286	1,809,524	1,904,762	2,000,000	2,095,238	2,190,476
Volume of Slurry Water into Facility (m^3/month)			109,091	109,091	109,091	109,091	109,091	109,091	109,091	109,091	109,091	109,091	109,091	109,091	109,091	109,091

	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28
TOTAL WATER TO BE REMOVED (m^3/month)	**118,194**	**119,067**	**114,640**	**111,336**	**116,448**	**118,880**	**124,928**	**133,096**	**134,343**	**131,537**	**124,429**	**118,007**	**118,194**	**119,067**
CUMULATIVE VOLUME OF WATER TO BE REMOVED (m^3/month)	**1,220,465**	**1,339,532**	**1,454,172**	**1,565,507**	**1,681,956**	**1,800,836**	**1,925,764**	**2,058,860**	**2,193,203**	**2,324,740**	**2,449,169**	**2,567,176**	**2,685,371**	**2,804,438**

EVAPORATION (from pond and wet beaches)

			Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28
Monthly Evaporation (mm)	Evap and Pan Factor from Tech Note 65 (Melrose, ~60 km from Leinster)	0.85	123	124	169	247	353	403	486	566	435	401	265	174	123	124
Stage 4 North Intermediate Storage Tailings Pool Area (m^2)	Assume 8% of the beach surface area (0,5 m pool depth for pump function)	0.08	Not relevant during this period													
Stage 4 South Intermediate Storage Tailings Pool Area (m^2)	Assume 8% of the beach surface area (0,5 m pool depth for pump function)	0.08	Not relevant during this period													
Stage 4 Full Capacity Tailings Pool Area (m2)	Assume 8% of the beach surface area (0,5 m pool depth for pump function)	0.08	43,842	43,842	43,842	43,842	43,842	43,842	43,842	43,842	43,842	43,842	43,842	43,842	43,842	43,842
Stage 4 North Intermediate Storage Tailings Running Beaches (m^2)	Active spigots x spacing x length to pond	4 X 20 X 300	Not relevant during this period													
Stage 4 North Intermediate Storage Tailings Running Beaches (m^2)	Active spigots x spacing x length to pond	4 X 20 X 300	Not relevant during this period													
Stage 4 Full Capacity Tailings Running Beaches (m^2)	Active spigots x spacing x length to pond	4 X 20 X 300	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000
Total Evaporation Outflow (m^3/month)	Using total wet area		5,424	5,468	7,452	10,892	15,566	17,771	21,431	24,959	19,182	17,683	11,686	7,673	5,424	5,468

EVAPOTRANSPIRATION (from dry beaches)

			Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28
Tailings Beaches Area (m^2)			548,020	548,020	548,020	548,020	548,020	548,020	548,020	548,020	548,020	548,020	548,020	548,020	548,020	548,020
Total Evapotranspiration Outflow (m^3/month)	Depth factor	0.3	591	595	812	1,186	1,695	1,935	2,334	2,716	2,089	1,926	1,272	836	591	595

RETENTION

			Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28
IWLTSF Stage 4 Volume Retained in Tailings (MC W/W%)	Dependant on in-situ density - read from "DD vs MC" sheet		36.25%	36.25%	36.25%	36.25%	36.25%	36.25%	36.25%	36.25%	36.25%	36.25%	36.25%	36.25%	36.25%	36.25%
IWLTSF Stage 4 Volume Retained in Tailings (m^3/month)	1 ton of water equivalent to 1 m^3 of water		48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333
Total Retain Volume in Tailings (m^3/month)			48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333	48,333

DECANT WATER FROM FACILITY

			Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28
Decant pump rate (tph)			79	77	68	61	58	61	46	50	62	57	58	54	59	58
Underdrainage pump rate (tph)			20	19	17	15	15	15	15	17	21	19	19	18	20	19
Volume of water pumped to plant (m^3/month)			56,744	57,331	50,704	43,822	43,515	43,738	45,491	49,747	57,873	56,266	56,035	53,826	56,744	57,331
Water removed as a percentage of slurry water out to the facility (%)		47.9%	52%	53%	46%	40%	40%	40%	42%	46%	53%	52%	51%	49%	52%	53%
Water return expressed as a percentage of total water into facility (%)		42.9%	48%	48%	44%	39%	37%	37%	36%	37%	43%	43%	45%	46%	48%	48%

	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28
TOTAL WATER REMOVED (m^3/month)	**118,194**	**119,067**	**114,640**	**111,336**	**116,448**	**118,880**	**124,928**	**133,096**	**134,343**	**131,537**	**124,429**	**118,007**	**118,194**	**119,067**
CUMULATIVE VOLUME OF WATER REMOVED (m^3/month)	**1,220,466**	**1,339,532**	**1,454,172**	**1,565,507**	**1,681,956**	**1,800,836**	**1,925,764**	**2,058,860**	**2,193,203**	**2,324,740**	**2,449,169**	**2,567,176**	**2,685,371**	**2,804,438**
MONTHLY DEFECIT/SURPLUS (m^3/month)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28
ESTIMATED SEEPAGE FROM FACILITY (m^3/month)	7,102	7,339	7,339	7,102	7,339	7,102	7,339	7,339	6,866	7,339	7,102	7,339	7,102	7,339

Appendix J

Earthwork Specification

REPORT REF	P19-11-PR-29-R02	25 MARCH 2025

Earthworks Specification
IWLTSF Stage 4 North and Stage 4 South
Bellevue Gold Project
Bellevue Gold Limited

CLIENT DETAILS

REC DETAILS

Bellevue Gold Limited

[redacted]

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Resource Engineering Consultants Pty Ltd

ACN: 626 931 753

Trading as REC

ABN: 66 626 931 753

[redacted]

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This document, once read in its entirety, may be relied upon for the purposes stated within the limits of:

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Report

Title:	Earthworks Specification – IWLTSF Stage 4 North and Stage 4 South
File:	P19-11-PR-29-R02
Author(s):	[redacted]
Client:	Bellevue Gold Limited
Contact:	[redacted]
Synopsis:	This document presents the Earthworks Specification for the IWLTSF Stage 4 North and Stage 4 South raise at the Bellevue Gold Ltd Bellevue Gold Project.

Revision

Date	Revision	Purpose	[redacted]
19 MAR. 2025	DRAFT	ISSUED FOR REVIEW AND COMMENT	
25 MAR. 2025	0	ISSUED FOR USE	
Recipients are responsible for eliminating all superseded documents in their possession			

Distribution

Date	Revision	Approved	Recipient(s)	No of Copies
19 MAR. 2025	DRAFT	MH	BELLEVUE GOLD LIMITED	1. PDF
25 MAR. 2025	0	MH	BELLEVUE GOLD LIMITED	1. PDF
Recipients are responsible for eliminating all superseded documents in their possession				

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Terminology and Abbreviations

The following terminology and abbreviations have been used in this document:

AS	Australian Standard
BGL	Bellevue Gold Limited
BGP	Bellevue Gold Project
IPTSF	In-Pit Tailings Storage Facility
IWLTSF	Integrated Waste Landform Tailings Storage Facility
NATA	National Association of Testing Authorities
OMC	Optimum Moisture Content
QAQC	Quality Assurance and Quality Control
RL	Reduced Level
SMDD	Standard Maximum Dry Density
t/m^3	Tonnes per cubic metre
TSF	Tailings Storage Facility
USCS	Unified Soil Classification System
WSD	Water Storage Dam

1. General

1.1 Summary

This specification prescribes the requirements for the earthworks construction to achieve the site-finished grades indicated on the IWLTSF Stage 4 North and Stage 4 South Construction Drawings at the Bellevue Gold Limited (BGL) Bellevue Gold Project (BGP), approximately 430 km north of Kalgoorlie and 40 km north of the regional town of Leinster, Western Australia. Also prescribed are the requirements for clearing and grubbing; the removal, replacement and disposal of unsuitable materials; the disposal of surplus materials and the furnishing, placement and compaction of embankment fill material.

The Contractor shall coordinate work prescribed by this Specification with other related works to be performed.

1.1.1 Related Specifications

The Contractor is required to coordinate all works detailed in this Specification. This Specification must be read in conjunction with the latest revision of the following documents:

- IWLTSF Stage 4 North and Stage 4 South Detailed Design Report (Ref. P19-11-PR-29-R01)
- IWLTSF Stage 4 North and Stage 4 South Detailed Design Drawing (Ref. P19-11-PR-29 IFC)

A complete list of the IFC drawings applicable to this work is provided in the following Table 1.

Table 1: List of Drawings

Title	Drawing Number
Site Layout and Drawing Index	P19-11-PR29-001
Site General Arrangement – Stage 4	P19-11-PR29-002
Site General Arrangement – Stage 4 North	P19-11-PR29-003
Site General Arrangement – Stage 4 South	P19-11-PR29-004
Deposition Arrangement – Stage 4 North	P19-11-PR29-005
Deposition Arrangement – Stage 4 South	P19-11-PR29-006
Embankment Long Section SHT 1 of 2	P19-11-PR29-010
Embankment Long Section SHT 2 of 2	P19-11-PR29-011
Embankment Typical Sections	P19-11-PR29-012
Embankment Cross Sections SHT 1 of 4	P19-11-PR29-013
Embankment Cross Sections SHT 2 of 4	P19-11-PR29-14
Embankment Cross Sections SHT 3 of 4	P19-11-PR29-15
Embankment Cross Sections SHT 4 of 4	P19-11-PR29-16
Embankment Cross Sections SHT 4 of 4	P19-11-PR29-17
Decant Causeway and Rock Ring Details	P19-11-PR29-18
Decant Causeway and Rock Ring Details	P19-11-PR29-19
Typical Details	P19-11-PR29-020
Spigot Pipework Sections and Details	P19-11-PR29-025

1.1.2 Terminology

The following terms are defined as stated, unless otherwise indicated.

Table 2: Terminology

Term	Definition
Contractor	Appropriate individual, partnership, company or corporation contractually obligated to perform the work prescribed in this Specification and associated Specifications (Section 1.1) and becomes contractually obligated to the Owner.
Design Drawings	Detailed IFC Design Drawings issued by the Owner to the Contractor.
Engineer	The engineer (or designated representative) appointed by the Owner who is responsible for evaluating the suitability of the materials involved in the work, and for verifying the compliance of the work to the requirements of the Specifications.
Independent Testing and Inspection Firm	The company, partnership or corporation retained to perform the inspections and tests required determining and verifying compliance of the work with the requirements of this Specification.
Modified Maximum Dry Density	The maximum dry density achieved as per AS 1289.5.1.2 when testing a sample of material representative of that to be compacted in the field.
Optimum Moisture Content	The moisture content at which the Maximum Modified Dry Density is achieved.
Owner	Bellevue Gold Limited (BGL)
Project Superintendent	The designated representative of the Contractor appointed by the Contractor who is responsible for the work by the Contractor.
Standard Maximum Dry Density	The maximum dry density achieved as per AS 1289.5.1.1 when testing a sample of material representative of that to be compacted in the field.
Work / Works	The activities specified within this document as the responsibility for the Contractor.

1.2 References

The publications listed below form part of this Specification. Each publication shall be the latest revision and addendum in effect on the date this Specification is issued for construction, unless noted otherwise. Except as modified by the requirements specified herein or the details of the Design Drawings, work included in this Specification shall conform to the applicable provisions of these publications. Referenced documents are as given in Section 1.1.1.

The works shall be carried out to comply with the latest revision of the Design Drawings, Codes and Standards specified or to the appropriate Australian Standards, or to other recognised International Standards approved by the Owner or the Engineer where there is no comparable Australian Standard.

The applicable Australian Standards for earthworks are as follows:

- AS 1289 - Methods of testing soils for engineering purposes.
- AS 1726 - Geotechnical site investigations.
- AS 3798 - Guidelines on earthworks for commercial and residential developments.

1.3 Submittals

All submittals shall be delivered to the Owner. The following information shall be submitted prior to the work:

- One month before the start of the work, the Contractor shall submit a description of fill procedures/sequences.
- One month before the start of work, the Contractor shall submit proposed methods and construction details for any excavation where groundwater is expected to be encountered, to ensure that all excavations are kept dry during construction. Discharge/disposal of the dewatering system effluent shall be coordinated with the temporary installations for Storm Water Management and dust control. Certified design calculations are required for all groundwater dewatering systems. However, it is not expected to encounter any groundwater during IWLTSF construction work.

The following information shall be submitted at the completion of work:

- All field and laboratory test results and comments shall be compiled and submitted at earthwork completion for permanent project records.

1.4 Site Conditions

Detailed geotechnical investigations of the site conditions have been conducted and the test pit logs, borehole logs, photographs and laboratory test results from these investigations are included in the IWLTSF Stage 4 North and Stage 4 South Detailed Design Report.

The information contained in the documents shall not be construed as a guarantee of the depth, extent, or character of materials and groundwater level and quality actually present.

The Contractor should be aware of any existing piezometers and monitoring bores and shall not damage this existing infrastructure. Any costs to repair or replace the instrumentation due to damage during construction by the Contractor, shall be recovered from the Contractor. Information on the existing piezometers and monitoring bore location can be referred in IWLTSF Stage 2 RL 484.5 m Critical Containment Infrastructure Report (REF: P19-11-PR-025-R01) and IWLTSF Stage 3 RL 484.5 m Critical Containment Infrastructure Report (REF: P19-11-PR-028-R05).

2. Materials

2.1 General

Satisfactory materials shall be free from large lumps or clods, refuse or other material that might prevent proper compaction. All material shall be approved for use by the Engineer prior to placement.

The material zones are as follows:

- Zone 1 Fill Material – the in-situ material sourced from excavations and used as bulk fill or select fill, as appropriate, to construct the IWLTSF cut-off trench, as indicated on the Design Drawings.
- Zone 3A Mine Waste Material – this material shall be suitable waste material used as bulk fill to construct the upstream zone of the IWLTSF embankment adjacent to Zone 3B, as indicated on the Design Drawings.
- Zone 3B Mine Waste Material – this material shall be suitable waste material used as bulk fill to construct the downstream zone of the IWLTSF embankment, as indicated on the Design Drawings.
- Zone 3C Transitional Material – this material shall be suitable waste material used as bulk fill to construct the upstream zone of the IWLTSF embankment adjacent to the low-permeability interface, as indicated on the Design Drawings.
- Zone 4 Clean Competent Rockfill – this material to be used to construct the rock ring as indicated on the Design Drawings.
- HDPE Subgrade Material – this material to be used to construct the subgrade to receive HDPE liner in the upstream face of the IWLTSF and anchoring trench at the embankment crest, as indicated on the Design Drawings.
- Wearing Course – this material to be used to construct the wearing course in designated areas as indicated on the Design Drawings.
- Drainage Medium – this material to be used to in the constructions of toe drains and finger drains, as indicated on the Design Drawings.

2.2 Zone 1 Fill Material

Zone 1 fill material for the construction shall be sourced from suitable laterite sources available across the site or designated borrow area and must meet the requirements listed in Table 3. Test frequencies are provided in Section 4.5.

Table 3: Zone 1 Embankment Fill Material Properties

Property	Test Method	Requirement
Soil Classification	AS 1726	SM, SC, GM, GC
Particle Size Distribution	AS 1289	100 % passing 75 mm, > 15 % passing 75 µm
Compacted In-Situ Density	AS 1289	95% SMDD
Plasticity Index	AS 1289	< 20 %
Liquid Limit	AS 1289	< 50 %

2.3 Zone 3A/3B Mine Waste

The Zone 3 bulk rock mine waste material for the construction of the IWLTSF embankment shall be competent rock material sourced from the underground exploration development works. Zone 3A rock mine waste fill shall meet the requirements listed in Table 4. The Zone 3B bulk rock mine waste fill, located further downstream is not required to meet the maximum particle size detailed in Table 4.

Table 4: Zone 3A/3B Mine Waste Fill Material Properties

Property	Test Method	Requirement
Soil Classification	AS 1726	SM, SC, GM, GC with Cobbles
Particle Size Distribution	AS 1289	100 % passing 300 mm (Zone 3A only)

2.4 Zone 3C Mine Waste

The Zone 3C transitional material for the construction of the IWLTSF embankment shall consist of oxide mine waste, historical weathered mine waste material, or laterite/duricrust material obtained from various borrow sources across the project site, or a combination of these materials. The historical Vanguard mine waste, currently located within the TSF footprint, has been identified as suitable for Zone 3C. Material rejected for HDPE subgrade from the borrow area within the IWLTSF Stage 3 basin, primarily gravelly silty sand with cobbles, is also appropriate for use in Zone 3C. All Zone 3C transitional material shall meet the requirements listed in Table 5, and any occasional boulders larger than 200 mm should be selectively removed. Material compliance shall be verified through visual inspection, with no additional testing required, subject to the satisfaction of the Project Superintendent/Engineer.

Table 5: Zone 3C Mine Waste Fill Material Properties

Property	Test Method	Requirement
Soil Classification	AS 1726	SM, SC, GM, GC with Cobbles
Particle Size Distribution	AS 1289	100 % passing 200 mm and 50 % passing 2.36 mm

2.5 HDPE Subgrade Material

HDPE subgrade material to be used to construct a suitable subgrade to receive HDPE liner in the upstream face of the IWLTSF, and anchoring trench at the embankment crest. When borrowing material for HDPE subgrade, materials containing gravels and rock that has potential to pierce the HDPE liner should be avoided. HDPE subgrade forming the upstream face of the IWLTSF should be roller compacted or alternative construction methodology to achieve smooth and compacted surface suitable to receive HDPE liner. Construction of the anchoring trench at the embankment crest shall use HDPE subgrade material using a handheld plate compactor.

The material for the construction of HDPE subgrade shall consist of lateritic soil, weakly cemented duricrust and extremely weathered saprolite sourced from material borrowed from stage 3 basin. The subgrade shall be lined with Bidim A24 geotextile (or equivalent) to provide enhanced puncture protection before HDPE liner installation. The HDPE subgrade material must meet the requirements listed in Table 6. Test frequencies are provided in Section 4.5.

Table 6: HDPE Subgrade Material Properties

Property	Test Method	Requirement
Soil Classification	AS 1726	SM, SC, GM, GC
Particle Size Distribution	AS 1289	**90 % passing 20 mm and 60 % passing 4.75 mm**
Plasticity Index	AS 1289	< 20 %
Liquid Limit	AS 1289	< 50 %

2.6 Wearing Course

The Wearing Course material shall comprise crushed and screened waste rock materials derived from the mine development works. If sizing requirements cannot be satisfied through the waste product, purpose crushed and screened aggregate is proposed to be used for the wearing course. Alternative material sources can be considered on approval by the design engineer.

The wearing course is proposed to be constructed for the access road on embankment crest, decant causeway and access ramp. The wearing course medium material must meet the requirements listed in Table 7.

Table 7: Wearing Course Material Properties

Property	Test Method	Requirement
Soil Classification	AS 1726	GW
Particle Size Distribution	AS 1289	100 % passing 37.5 mm

2.7 Drainage Medium

The Drainage Medium material shall comprise crushed and screened waste rock materials derived from the mine development works. If sizing requirements cannot be satisfied through the waste product, purpose crushed and screened aggregate is proposed to be used for the drainage medium. Alternative material sources can be considered on approval by the design engineer.

The drainage medium material to be used to in the constructions of toe drains and finger drains. The drainage medium material must meet the requirements listed in Table 8.

Table 8: Drainage Medium Material Properties

Property	Test Method	Requirement
Soil Classification	AS 1726	GW
Particle Size Distribution	AS 1289	100 % passing 50 mm, < 25 % passing 0.075 mm
Plasticity	AS 1289	Non-Plastic

2.8 Unsuitable Material

Materials that do not meet the requirements listed in the preceding sections and soil having insufficient strength or stability to carry the loads that will be superimposed on the completed fill or embankment without excessive settlement or loss of stability, must not be used in the constructed works.

Material containing vegetable matter, muck refuse, large rocks, debris, or other materials that could cause the embankment fill not to compact and organic soils with Unified Soil Classifications of Pt, OH or OL are considered to be unsuitable material and shall be removed from site.

3. Execution

3.1 Examination

Before starting work, the Contractor shall thoroughly examine the site to ascertain conditions under which the work must be performed and the nature of the materials to be used in the construction. The Contractor shall obtain all necessary site-specific permits prior to commencing work on site.

3.2 Site Preparation

3.2.1 Construction Layout

The earthworks shall be set out in accordance with the Design Drawings. The Contractor shall examine the site and verify all existing levels and survey control points and the set-out points shown on the Design Drawings, before commencing the earthworks. The Contractor shall be responsible for checking and agreeing the correctness of all values of monuments, datum or benchmarks, prior to the commencement of work. The Engineer may find it necessary to revise the lines, levels and grades of any part of the works during progress because of conditions revealed during construction.

The Contractor shall confirm that there are no existing services in the area. If any services are noted, the Contractor shall bring them to the notice of the Owner.

3.2.2 Clearing and Grubbing

The Contractor shall remove trees, stumps, roots, rubbish and any debris and vegetation resting on or protruding through the ground surface, from the designated areas as shown on the Design Drawings. Trees, stumps, roots and other vegetation shall be removed to the bottom of their root zone. The cut materials from the clearing works may, with the permission of the Engineer, be placed on the outer, downstream, batter slope.

3.2.3 Topsoil Stripping

The Contractor shall remove soil only to such depth that the soil meets the definition of topsoil. The Contractor shall avoid mixing topsoil with subsoil or other undesirable materials. The Contractor shall place the removed topsoil in stockpiles to a maximum height of two metres.

3.2.4 Stockpiling

The Contractor shall deposit material resulting from the clearing and grubbing operations in the disposal areas. The Contractor shall cover with soil or burn if permitted by applicable regulations.

3.2.5 Haul Roads and Access

The Contractor shall clear all vegetation, standing and fallen, from the agreed routes of all haul roads. The Contractor shall push this vegetation into heaps.

The Contractor shall form up, lay base course as is necessary and do all things necessary to form and maintain haul roads linking the mine waste dumps/borrow areas to the site and other haul roads necessary for the works.

The Contractor shall keep all haul roads sprayed and wetted to totally prevent the generation of airborne dust during the course of road construction and usage.

3.2.6 Foundation Preparation

The Contractor shall remove unsuitable material as directed by the Engineer.

The Contractor shall scarify/tyne, water and compact any areas of loose material on the surface of the construction footprint which have been identified by the Engineer.

Material containing vegetable matter, cohesive materials, debris or other materials that could cause the embankment fill not to compact and organic soils with Unified Soil Classifications of Pt, OH, or OL are considered to be unsuitable material and shall be removed from site.

All areas to receive fill shall be left in a clean and suitable condition to allow an uninterrupted placement of fill. No fill shall be placed until the base of all excavations has been inspected and approved by the Engineer.

All areas to receive pipework shall be graded smooth and be free of any rock, cobbles and other deleterious materials that could damage the pipework.

3.3 Fill and Compaction

3.3.1 General

The Contractor shall utilise satisfactory materials resulting from excavation and removal of unsuitable materials to the fullest extent in the construction.

3.3.2 Embankment Surface Preparation

The Contractor shall immediately prior to placing the first layer of fill materials, scarify the surface of areas on which fill is to be placed to a depth of no less than 150 mm and then proof compact to no less than 95 % of the Standard Maximum Dry Density (SMDD).

3.3.3 Proof Compaction

After the site construction areas (that is the areas subject to cut to a subgrade level / areas to be filled / areas where foundations are to be constructed) have been stripped to the satisfaction of the Supervising Engineer, the site construction areas should be proof compacted using a heavy, self-propelled, smooth drum vibrating roller (11 tonnes in the front module), capable of operating in variable frequency modes. A Dynamic CA 251D, or equivalent, is recommended (subject to the protection of adjacent buildings from damaging ground vibrations).

The following proof compaction procedure is recommended:

- The entire site should be given a minimum of four (4) passes with the roller operating in the low frequency/high amplitude mode. A pass should include a minimum overlap of 20%.
- The site should then be given an additional minimum of four (4) passes with the roller operating in the high frequency/low amplitude mode.
- All weak areas, that deform excessively under rolling, shall be removed and replaced with fill material approved by design engineer.
- On completion of vibratory rolling, two (2) passes of the site should be made with the roller operating in a static mode. This will compact soil in the upper 300 mm that were disturbed by cyclic mobility.

It is recommended that the proof compaction be monitored by an Engineer experienced in earthworks.

3.3.4 Placement and Compaction of Zone 1 Fill Material

The Contractor shall construct the works using suitable material in accordance with Section 2.2, sourced from within the designated borrow areas approved by the Engineer.

Prior to the compaction, all fill material shall be moisture conditioned (as appropriate), to achieve a moisture content within ± 2 % of the OMC as determined by AS 1289.

The moisture content shall be uniformly distributed throughout the fill and there shall be no clods of soil.

Approved water shall be used for moisture control during compaction.

The construction methodology for Zone 1 Fill Material (low permeability) placement shall be as follows:

i. Spread a loose lift of moisture cured embankment fill material with a loose thickness not exceeding 300 mm.

ii. The loose lifts shall be wetted with a water spray bar or similar, to lubricate and maximise mechanical interlock of the particles during compaction.

iii. Grade, mix to ensure the moisture is uniformly distributed and trim with a grader.

iv. Compaction of each loose lift shall be undertaken with 6 to 10 passes using handheld plate compactor to 95 % of the maximum SMDD, at a moisture content within ± 2 % of OMC, as determined by AS 1289.

v. Test the material for compaction (refer to Section 4 for testing requirements).

vi. After successful compaction testing, add another lift and repeat steps i) to v).

vii. Placement shall be continuous. If the material dries out due to inactivity at the site, it should be lightly watered and compacted prior to fill placement recommencing.

viii. The Contractor shall verify the above construction methodology prior to execution.

Where the required finished grade has a slope steeper than 1 vertical to 4 horizontal, overbuild the slope by no less than 600mm (measured horizontally) and trim back to finished grade after compaction.

3.3.5 Placement and Compaction of Zone 3A/3B Fill Material

The Contractor shall construct the works using suitable material in accordance with Section 2.3, sourced from within the designated borrow areas approved by the Engineer.

The construction methodology for Zone 3A/3B Fill Material (bulk rock fill mine waste) placement shall be as follows:

i. Spread a loose lift of embankment fill material with a loose thickness not exceeding 1.0 m in Zone 3B 0.5 m in Zone 3A.

ii. The loose lifts shall be wetted with a water spray bar or similar, to lubricate and maximise mechanical interlock of the particles during compaction.

iii. Compaction of each loose lift shall be undertaken by heavy earthmoving machinery trafficking the work area (traffic compacted).

iv. Any weak areas (those that deform excessively under compaction) shall be removed and replaced with new fill at the direction of the Company Representative.

v. After sufficient trafficking of the placed layer, add another lift and repeat steps i) to iv).

vi. Placement shall be continuous. If the material dries out due to inactivity at the site, it should be lightly watered and compacted prior to fill placement recommencing.

vii. The Contractor shall verify the above construction methodology prior to execution.

3.3.6 Placement and Compaction of Zone 3C Fill Material

The Contractor shall construct the works using suitable material in accordance with Section 2.4, sourced from within the designated borrow areas approved by the Engineer.

The construction methodology for Zone 3C Fill Material (transitional material) placement shall be as follows:

i. Spread a loose lift of embankment fill material with a loose thickness not exceeding 300 mm in Zone 3C.

ii. The loose lifts shall be wetted with a water spray bar or similar, to lubricate and maximise mechanical interlock of the particles during compaction.

iii. Compaction of each loose lift shall be undertaken by heavy earthmoving machinery trafficking the work area (traffic compacted).

iv. Any weak areas (those that deform excessively under compaction) shall be removed and replaced with new fill at the direction of the Company Representative.

v. After sufficient trafficking of the placed layer, add another lift and repeat steps i) to iv).

vi. Placement shall be continuous. If the material dries out due to inactivity at the site, it should be lightly watered and compacted prior to fill placement recommencing.

vii. The Contractor shall verify the above construction methodology prior to execution.

3.3.7 Placement and Compaction of HDPE Subgrade

The Contractor shall construct the works using suitable material in accordance with Section 2.4, sourced from within the designated borrow areas approved by the Engineer.

Prior to the compaction, all fill material shall be moisture conditioned (as appropriate), to achieve a moisture content within ± 2 % of the OMC as determined by AS 1289.

The moisture content shall be uniformly distributed throughout the fill and there shall be no clods of soil.

Approved water shall be used for moisture control during compaction.

The construction methodology for HDPE subgrade material placement shall be as follows:

i. Spread a loose lift of moisture cured embankment fill material with a loose thickness not exceeding 300 mm.

ii. The loose lifts shall be wetted with a water spray bar or similar, to lubricate and maximise mechanical interlock of the particles during compaction.

iii. Grade, mix to ensure the moisture is uniformly distributed and trim with a grader.

iv. Compaction shall be carried out using either a smooth drum roller compactor or a dozer, with 6 to 10 passes. Where compaction is undertaken using a dozer, trimming with an excavator bucket shall be performed afterward to achieve a smooth, even surface.

viii. The Contractor shall verify the above construction methodology prior to execution.

Any depression resulting from material loss into the Zone 3C transition material shall be backfilled and compacted as per the specification. Any protrusion greater than 50 mm on compacted subgrade surface must be selectively removed and backfilled. Surface level defects on the rolled and compacted subgrade surface shall not exceed 50 mm under a 3.0 m straight edge.

3.3.8 Surface and Drainage

The Contractor shall conduct fill operations in such a manner and sequence that proper drainage is maintained at all times in and around the work area. Promptly remove surface waters that become impounded. Remove and replace with satisfactory fill materials or stabilise (by drying, or by approved mechanical or chemical amendment methods) materials that become loosened due to exposure to the elements.

3.3.9 Maintenance

The Contractor shall maintain the final surfaces in a well-drained, dewatered and sufficiently moist condition to prevent shrinkage cracking and minimise dusting. The compacted surface must be smooth and generally free from roller marks, ruts, holes, depressions or protrusions.

4. Testing and Inspection

4.1 Testing Firm/Facilities

An Independent Testing and Inspection Firm will be retained by the Owner to perform field and laboratory testing and soil evaluations for control of construction activities and/or to verify compliance of the work with the requirements of this Specification. The performance or lack of performance of Quality Control tests and inspections shall not be construed as granting relief from the requirements of these Specifications or the other contract documents.

The Independent Testing and Inspection Firm shall meet the technical criteria of NATA or ASTM for agencies involved in soil and rock inspection and testing. Any work failing to meet the criteria of the Specification shall be rectified at the Contractor's expense.

4.2 Finishing Tolerances

The Contractor shall fine grade the surfaces and perform all work to a vertical tolerance of ± 50 mm from the elevations shown on the Design Drawings, unless otherwise stated on the drawing. All lines and dimensions shall be constructed to within a horizontal tolerance of ± 1 % and with a maximum tolerance of 100 mm from the dimensions and lines on the Design Drawings. The average slope of batters shall not exceed the specified slope.

4.3 Material Suitability

Prior to the placement of HDPE subgrade, laboratory testing shall be performed by the Independent Testing and Inspection Firm to assess the suitability of the materials for construction. Materials shall meet the requirements outlined in Section 2.0 of this Specification. Compaction criteria for the construction shall be established by performing compaction testing on representative samples in accordance with AS 1289.1.1 as appropriate to the materials.

4.4 Compaction Testing

Field density testing shall be performed by the Independent Testing and Inspection Firm on the compacted embankment material to ensure the compaction criteria meets the requirements of this Specification. The preferred field density testing method is the Nuclear Density test method in accordance with AS 1289.5.8.1. The calibration curves shall be checked and adjusted using either the sand cone method as described in AS 1289.5.3.1, or by an approved method by the Engineer.

The calibration checks of both the density and moisture of each gauge shall be made at the beginning of the project, on each different type of material encountered and at intervals as directed by the Engineer. The number of tests shall be increased if visual inspection indicates non-uniform moisture content or variable compaction effort considered inadequate to achieve the specified dry density.

The Contractor shall provide surveys of the locations and Reduced Levels (RLs) of the test sites.

4.5 Testing Program

The testing for Zone 1 Cutoff Trench and HDPE Subgrade shall follow the requirements of Table 9 as a minimum.

Table 9: Quality Control Test Schedule

Material	Property	Test Method	Frequency - Stockpile
Zone 1, HDPE Subgrade	Soil Classification	AS 1726	1:5,000m³
	Plasticity	AS 1289	1:5,000m³
	Particle Size Distribution	AS 1289	1:5,000m³
	Field Density (Zone 1 only)	AS 1289	1:2,500m³

4.6 Additional Inspections

The Contractor shall perform random surveys of the top of every third layer to monitor fill progress.

5. Clean Up

Upon completion of the work, the Contractor shall leave the project site clear of debris and surplus material resulting from the construction operations.

Appendix A

IWLTSF Stage 4 North and Stage 4 South Detailed Design Drawings

Efficiency
Recalibrated.

[redacted]

ACN: 626 931 753

Appendix K

Operating Manual

REPORT REF	P19-11-PR-29-R03	25 MARCH 2025

Operating Manual
IWLTSF Stage 4 North and Stage 4 South
Bellevue Gold Limited
Bellevue Gold Project

CLIENT DETAILS

Bellevue Gold Limited

REC DETAILS

[redacted]

Efficiency
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Resource Engineering Consultants Pty Ltd

ACN: 626 931 753

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Report

Title:	Operating Manual
File:	P19-11-PR-29-R03
Author(s):	[redacted]
Client:	Bellevue Gold Limited
Contact:	[redacted]
Synopsis:	This document presents the Operating Manual for the Stage 4 North and Stage 4 South Integrated Waste Landform Tailings Storage Facility (IWLTSF) at the Bellevue Gold Ltd Bellevue Gold Project.

Revision

Date	Revision	Purpose	[redacted]
25 MAR. 2025	A	ISSUED FOR REVIEW AND COMMENT	
Recipients are responsible for eliminating all superseded documents in their possession			

Distribution

Date	Revision	Approved	Recipient(s)	No of Copies
25 MAR. 2025	A	MH	BELLEVUE GOLD LIMITED	1. PDF
Recipients are responsible for eliminating all superseded documents in their possession				

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Terminology and Abbreviations

The following terminology and abbreviations have been used in this document:

AE	Accountable Executive
ANCOLD	Australian National Committee on Large Dams
ARI	Average Recurrence Interval
AEP	Annual Exceedance Probability
ALARP	As Low as Reasonably Practical
BGL	Bellevue Gold Limited
BGP	Bellevue Gold Project
CCIR	Critical Containment Infrastructure Report
CoP	Code of Practice
DAR	Deviance Accountability Report
DBR	Design Basis Report
DMP	Department of Mines and Petroleum
DMIRS	Department of Mines Industry Safety and Regulation
DSR	Dam Safety Review
EoR	Engineer of Record
EPA	Environmental Protection Agency
EPRP	Emergency Preparedness and Response Plan
GCA	Graeme Campbell & Associates Pty Ltd
GISTM	Global Industry Standard on Tailings Management
HDPE	High-Density Polyethylene
HST	Health, Safety, and Training
ICMM	International Council on Mining and Metals
IFC	Issued for Construction
ISTR	Independent Senior Technical Reviewer
IWLTSF	Integrated Waste Landform Tailings Storage Facility
kPa	Kilopascal
LoM	Life of Mine
MB	Monitoring Bore
m/s	Meters per Second
Mm^3	Million Cubic Meters
Mt	Million Tonnes
NA	Not Applicable

NAF	Non-Acid Forming
PAF	Potentially Acid-Forming
PAR	Population at Risk
QA/QC	Quality Assurance/Quality Control
REC	Resource Engineering Consultants Pty Ltd
RL	Reduced Level
RTFE	Responsible Tailings Facility Engineer
TDS	Total Dissolved Solids
TMP	Tailings Management Plan
TSF	Tailings Storage Facility
t/m^3	Tonnes per Cubic Meter
VWP	Vibrating Wire Piezometer
WA	Western Australia
WB	Water Balance
WSD	Water Storage Dam
WI	Work Instruction

1. General

1.1 Summary

Resource Engineering Consultants Pty Ltd (REC) has prepared this Operating Manual for the Stage 4 North and Stage 4 South Integrated Waste Landform Tailings Storage Facility (IWLTSF) at the Bellevue Gold Ltd (BGL) Bellevue Gold Project (BGP). The BGP is situated in the Sir Samuel region of Western Australia's North-eastern Goldfields, approximately 430 km north of Kalgoorlie and 40 km north of Kalgoorlie and 40 km north of the regional town of Leinster, and adjacent to the Goldfields Highway. The proposed Stage 4 IWLTSF and its operational sequencing configurations are shown in plan on Figures 1 to 3 respectively.

Figure 1: IWLTSF Stage 4 (North Intermediate) Tailings Deposition

Figure 2: IWLTSF Stage 4 (South Intermediate) Tailings Deposition

Figure 3: IWLTSF Stage 4 (North and South Final) Tailings Deposition

IWLTSF Stage 4 North and Stage 4 South has been designed in downstream embankment configuration with an embankment raise height of 4.5 m, increasing the facility elevation to RL 489.0 m. The proposed IWLTSF Stage 4 North and Stage 4 South raise provides approximately 2.1 Mm^3 or 2.9 Mt of tailings storage capacity, based on an assumed average tailings dry density of 1.4 t/m^3. At a maximum planned throughput of 1.6 Mtpa, this provides a minimum storage life of approximately 1.8 years.

Construction work for the IWLTSF must be undertaken in accordance with drawings and an earthworks specification. Furthermore, the operation of these facilities must be executed in accordance with the intent of the design and Operating Manual (OM).

IWLTSF Stage 4 North and Stage 4 South have been designed in accordance with the Australian National Committee on Large Dams (ANCOLD) Guidelines (ANCOLD, 2012), with a Dam Failure Consequence Category of 'High C' assigned to the facility. Similarly, an assessment based on the Department of Mines and Petroleum (DMP) Code of Practice (DMP 2013, Table 1) determined a 'Medium' hazard rating, while classification under Table 2 of the DMP Code of Practice (DMP 2013, Table 2) designates IWLTSF Stage 4 as a 'Category 1' facility. The IWLTSF Stage 4 has capacity for the 1:100-year annual exceedance probability (AEP) 72-hour storm event, DMP required freeboard and ANCOLD additional freeboard.

Tailings are to be deposited from the perimeter embankment of the IWLTSF in a sub-areal manner in thin lifts to form a decant pond away from the main embankment.

The OM for the IWLTSF describes the operating procedures recommended for the safe management and control of the IWLTSF. The provisions of the Operating Manuals must be strictly adhered to by the Owner and the storages must be constructed and operated strictly in accordance with the provisions of the Operations Manuals and in accordance with the design. REC shall not be liable in any respect whatsoever for any damage to or failure in the operations of the tailings and water storages resulting from failure of the Owner, its servants or agents to comply with the provisions of the design and Operating Manuals for these facilities.

The Appendices referred to in this document comprise the following and are to be attached to this document by the Owner:

- Appendix A: Emergency Assembly Points (**OWNER TO ATTACH**)
- Appendix B: Regulatory Licence and Lease Conditions (**OWNER TO ATTACH**)
- Appendix C: Operating Manual Forms for Process Plant Staff (**OWNER TO ATTACH**)

1.2 Scope of the Operating Manual

The Operating Manual for Plant Staff ('this document') details the requirements for personnel who have the responsibility for day-to-day operation and maintenance of the IWLTSF.

The objectives of the day-to-day management for the facilities are:

- Ensuring the facilities and all associated infrastructure are operated, maintained and monitored to achieve the design objectives;
- Ensuring the facilities are operated in accordance with the design parameters that have been provided by the Owner for use in the design of the facilities. Where changes in the parameters are proposed, the process plant management must advise the designers in order that the impact of the changes can be fully assessed; and
- Ensuring the facility is operated and maintained to remove water ponding against the upstream embankment.

This document also sets out the requirements for operating the IWLTSF including Tailings Storage Management (TSM) and water management aspects comprising:

- Water recovery from the IWLTSF;
- Tailings placement/deposition;
- The routine daily inspections and monitoring; and
- The objectives of the daily inspection and monitoring programme.

1.3 Roles and Responsibilities

1.3.1 Key Roles

They key roles in relation to the design, construction, operations, maintenance, surveillance and closure of the BGL TSF in accordance with GISTM are defined in the following sections.

1.3.1.1 Engineer of Record (EoR)

The Engineer of Record (EoR) is the qualified engineering firm responsible for confirming that the tailings facility is designed, constructed, and decommissioned with appropriate concern for integrity of the facility, and that it aligns with and meets applicable regulations, statutes, guidelines, codes, and standards. The EoR may delegate responsibility but not accountability.

The EoR's duties (without limiting general duties) include:

General:

a) Contribute to the risk management system for the TSF.

b) Provide design continuity and ongoing technical support to the Responsible Tailings Facility Engineer (RTFE) with respect to TSF.

c) Participate in formal risk assessment and development and monitoring of critical controls to maintain the integrity of the TSF.

Design Criteria:

a) Prepare the Design Basis Report (DBR) (GISTM requirement 4.8).

b) Issue the DBR to the Independent Tailings Senior Reviewer(s) (ITRS) for review (GISTM requirement 4.8).

c) Review and update the DBR ever time there is a material change in:

   i) Design assumptions

   ii) Design criteria.

   iii) Design; and/or

   iv) The knowledge base (GISTM requirement 4.8).

Design:

a) Responsible for design (GISTM requirement 9.1).

b) Responsible for the design report.

Construction and Operation:

a) Prepare (with the assistance of the Responsible Tailings Facility Engineer (RTFE) and approve (sign) the Critical Containment Infrastructure Report (CCIR) (as built report) (GISTM requirement 6.3).

b) Support the RTFE in providing the Operations Maintenance and Surveillance (OMS) manual to all levels of personnel involved in the TMS (GISTM requirement 6.4).

c) Prepare a periodic Deviance Accountability Report (DAR) as required by change management systems including recommendations for managing risk and resulting updates in design, DBR, OMS and monitoring program. The DAR is to be submitted by the EoR to the Accountable Executive (AE) for approval. (GISTM requirement 6.5).

d) Consider new and emerging technologies and approaches and use the evolving knowledge in the refinement of the design, construction and operation of the tailings facility. (GISTM requirement 6.6).

TSF Monitoring Systems:

a) Develop and document a monitoring program for the TSF including performance criteria/parameters (GISTM requirement 7.1 -7.3).

b) Establish program (frequency) for analysis of technical monitoring data (GISTM requirement 7.4).

c) Review evidence submitted and report (for update) in risk management and design (as required). (GISTM requirement 7.4).

d) Report on performance outside expected ranges and ensure compliance with Trigger Action Response Plan (TARP) or critical controls (GISTM requirement 7.4).

e) Review and approve technical monitoring reports (GISTM requirement 7.5).

Management and Governance:

a) Attend scheduled communications with Accountable Executive(s) (GSIOTM requirement 8.4).

b) Liaise with the RTFE and AE.

c) Appointment of Replacement EoR:

d) If a change of EoR is necessary, assist with the preparation of a detailed plan for comprehensive transfer of data, information, knowledge and experience with the construction procedures and materials. (GSIOTM requirement 9.5).

Review:

a) Assist multi-disciplinary team with update of risk assessments (GISTM requirement 10.1).

b) Conduct annual (or more frequently if required) TSF construction and performance reviews (GISTM requirement 10.4).

c) Review and approve technical monitoring reports and annual auditing (GISTM requirement 7.5).

d) Certify design and documentation of TSF, cell raising construction (including drawings, specifications, scope of work, schedule, resign report etc.).

e) Review monthly monitoring results (i.e., piezometer levels).

f) Support the Mine Owner (MO), AE and RTFE in any other technical matters relating to maintaining the effective TSF integrity including the provision of appropriate training.

g) Undertake the 5 yearly dam safety review.

h) Provide design documentation for cell raises.

i) Provide construction monitoring of TSF cell raises, including monitoring QA/QC, schedule, safety and issue of construction report and compliance certificate on completion of the construction program.

j) Provide other geotechnical services as requested by the RTFE.

Deliverables (EoR to prepare unless agreed otherwise):

a) Design Basis Report.

b) Design Report(s).

c) Critical Containment Infrastructure Report(s).

d) Review of OMS Manual.

e) Annual Performance/Audit Report.

f) Deviance Accountability Report.

g) Dam Safety Review Report (annually for ANCOLD high consequence TSF's and dams).

h) Emergency Preparedness and Response Plan (EPRP) (EoR to review and RTFE to update).

i) Impact Assessments and Mitigation Plans (EoR to review annually and RTFE to update).

1.3.1.2 Responsible Tailings Facility Engineer (RTFE)

The RTFE shall be appointed by the MO to be responsible for the tailings facility. The RTFE must be available at all times during construction, operations and closure. The RTFE has clearly defined, delegated responsibility for management of the tailings facility and has appropriate qualifications and experience compatible with the level of complexity of the tailings facility. The RTFE is responsible for the scope of work and budget requirements for the tailings facility, including risk management. The RTFE may delegate specific tasks and responsibilities for aspects of tailings management to qualified personnel but not accountability.

The RTFE's duties (without limiting general duties) include:

General:

a) Responsible for the integrity of the TSF and coordinating activities related to the TSF including planning, design, operation, construction, maintenance, and surveillance of the TSF (GISTM requirement 8.5).

b) Keep AE and EoR appraised of the status of TSF at all times including giving notice immediately if there is any material change or risk of any material change in the integrity of the TSF.

c) Keep the Tailings Management Master Plan (TMMP) current and obtain any necessary approvals for same and review it at least annually for completeness and accuracy.

Specific:

a) Responsible for the integrity of the tailings facility (GISTM requirement 8.5).

b) Liaise with the EoR, operations, planning, regulatory affairs, social performance, and environmental teams (GISTM requirement 8.5).

c) Implement the TSF design.

d) Establish a change management system (GISTM requirement 6.5).

e) Monitor system and communication of the results to the EoR, including performance reviews (GISTM requirements 7.2, 7.3).

f) Review and approve technical monitoring reports (GISTM requirements 7.5).

g) Assist the EoR, with the Critical Containment Infrastructure Report and signing this Report (GISTM requirement 6.3).

h) Assist the EoR with preparation of the OMS Manual (GISTM requirement 6.4).

i) Maintain production databases (i.e., ore and tailings production).

j) Record water balance and provide this to the EoR monthly (i.e., slurry density and water return).

k) Maintain site knowledge and plan for the life of site tailings requirements.

l) Manage tailings storage capital funding.

m) Manage the TMP.

n) Manage cell lifts.

o) Co-ordinate with the cell raise contractor to ensure delivery of projects on time and on budget.

p) Incident reporting and investigations associated with incidents related to cell construction and stability.

q) Review TSF piezometer data.

r) Train personnel associated with the TSF (GISTM requirement 6.4).

1.3.1.3 Accountable Executive (AE)

The Accountable Executive(s) (AE) is one or more executive(s) who is/are directly answerable to the Chief Executive Officer (CEO) on matters related to GISTM, communicates with the Board of Directors, and who is accountable for the safety of tailings facilities and for minimising the social and environmental consequences of a potential tailings facility failure. The AE may delegate responsibilities but not accountability.

The AE's duties (without limiting general duties) include:

General:

a) Responsible for the safety of tailings facilities and for minimizing the social and environmental consequences of a potential tailings facility failure.

Specific:

b) Responsible for the safety of the TSF and for environmental and social performance (GISOTM requirements 7.1, 8.2, 8.3, 8.4).

c) Appoint:

i) RTFE (GISTM requirements 8.5, 8.6).

ii) EoR (GISTM requirements 9.1 to 9.5, 8.6); and

iii) ISTR (GISTM requirement 8.7).

iv) Approve the adopted design criteria and measures to reduce the risk of failure of existing facilities to as low as reasonably practical (ALARP) (GISTM requirements 4.3, 4.7, 5.7).

v) Responsible for tailings management training, emergency preparedness and response (GISTM requirement 8.4).

vi) Responsible for establishment of a process for addressing concerns (GISTM requirement 12.1).

1.3.1.4 Independent Tailings Senior Reviewer (ITSR)

The Independent Tailings Senior Reviewer (ITSR) is a person or board that provides independent technical review of the design, construction, operation, closure and management of the tailings facilities. The ITSR are reviewer(s) which are third-parties who are not, and have not been directly involved with the design or operation of the tailings facility. The expertise of the ITSR member(s) shall reflect the range of issues relevant to the facility and its context and the complexity of these issues.

The ITSR's duties (without limiting general duties) include:

General:

a) Review aspects of EoR's performance of EoR duties as required.

Specific:

a) Review of the design, construction, risk assessments, governance systems and other risk management matters that can affect the tailings facility, ensuring that the required expertise and skill sets are involved.

b) Review of the adopted external loading design criteria and measures to reduce the risk of failure of existing facilities to ALARP (GISTM requirements 4.2, 4.7, 5.7).

c) Review of the alternatives analysis (GISTM requirement 3.2), design, construction, risk assessments (GISTM requirements 10.1), governance systems and other risk management matters (GISTM requirement 10.6) that can affect the tailings facility.

d) Review the Design Basis Report (GISTM requirement 4.8).

e) Determine the frequency of Dam Safety Review (GISTM requirement 10.5).

1.3.2 Organisational Structure

The organisational structure for the Bellevue Gold Project TSFs is presented as Figure 4.

Figure 4: Organisation Structure

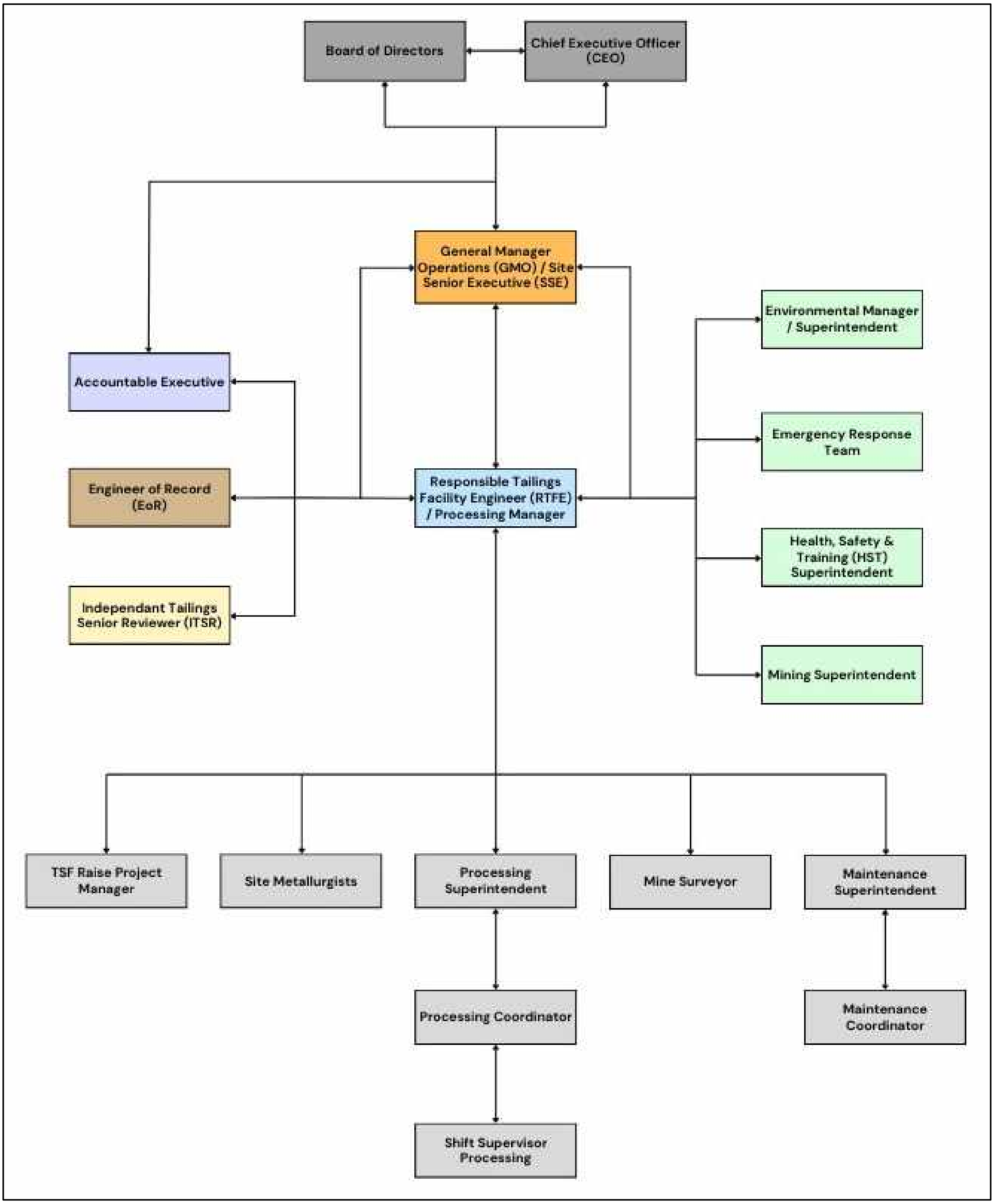


Table 1: Individual Responsibilities – RACI Matrix

Description	Chief Executive Officer (CEO)	Accountable Executive (AE)	Engineer of Record (EoR)	Independent Tailings Senior Reviewer (ITSR)	GM Operations / SSE	Responsible Tailings Facility Engineer (RTFE) / Process Manager	Processing Superintendent	Processing Co-ordinator	Shift Supervisor Processing	TSF Raise Construction Supervisor	Site Metallurgists	Mine Surveyor	Maintenance Superintendent	Maintenance Co-ordinator	Environmental Manager/Superintendent	HST Superintendent	Emergency Response Team	Mining Superintendent
ROLE APPOINTMENTS																		
Appoint the EoR, RTFE and ISTR	A	R	C	C	C	C	I	I	I	I	I	I	I	I	I	I	I	I
Appointment of Replacement EoR	A	R	R	C	C	C	I	I	I	I	I	I	I	I	I	I	I	I
DESIGN DEVELOPMENT, CONSTRUCTION, REPORTING AND REVIEW																		
Life of Operation Plan - TSF planning	I	A	R	C	A	A	C	C	C	C	C	I	C	C	C	I	I	C
Prefeasibility / Scoping Studies / Feasibility Designs	I	A	R	C	A	A	C	C	C	C	C		C	C	C	I	I	C
Develop Detailed Design of New TSF's and Raises	I	A	R	C	A	A	C	C	C	C	C	I	C	C	C	I	I	C
Develop & Update Design Basis Report	I	A	R	C	A	A	C	C	C	C	C		C	C	C	I	I	C
Develop & Update Deviance Accountability Report	I	A	R	C	A	A	C	C	C	C	C		C	C	C	I	I	C
Design Documentation Review	I	A	R	R	A	R	C	C	C	C	C		I	I	C	I	I	C
Construction Monitoring of TSF / TSF Raises	I	A	R	C	A	A	C	C	C	R	C	R	C	C	C	I	I	C
Develop & Review Critical Containment Infrastructure Report	I	A	R	R	A	R	C	C	C	C	C	C	C	C	R			C
Geochem/Geotech Tailings Properties Review	I	A	R	R	C	A	C	C	C	I	C				R	I	I	C
Develop & Review Impact Assessments and Mitigation Plans	I	A	R	R	A	R	C	C	C	C	C		C	C	R	C	C	C
Develop & Review Risk Assessment for the TSF	I	A	R	R	A	R	C	C	C	C	C		C	C	R	C	C	C
OPERATIONS AND MAINTENANCE																		
Develop, Review & Update Operations Manual	I	A	R	C	A	R	R	R	C	C	C	I	C	C	C	I	I	C

Description	Chief Executive Officer (CEO)	Accountable Executive (AE)	Engineer of Record (EoR)	Independent Tailings Senior Reviewer (ITSR)	GM Operations / SSE	Responsible Tailings Facility Engineer (RTFE) / Process Manager	Processing Superintendent	Processing Co-ordinator	Shift Supervisor Processing	TSF Raise Construction Supervisor	Site Metallurgists	Mine Surveyor	Maintenance Superintendent	Maintenance Co-ordinator	Environmental Manager/Superintendent	HST Superintendent	Emergency Response Team	Mining Superintendent
Develop, Review & Update Tailings Management System	I	A	R	C	A	R	R	R	C	C	C	I	C	C	C	I	I	C
Develop, Review & Update Change Management System	I	A	R	C	A	R	R	R	C	C	C	I	I	I	C	C	C	C
Develop and Maintain the Knowledge Base	I	A	R	C	A	R	R	R	C	C	C	I	I	I	C			C
Provide Operating, Monitoring and Surveillance Data to the EoR at Required Intervals	I	A	C	I	A	A	R	R	I	I	I	I	I	I	I			I
Manage TSF Budgeting	I	A	C		A	R	R	R	C	R	C	C	C	C	C			C
Deposition Planning		A	R	I	I	A	R	R	R	I	I	I			I			I
Operation of TSF	I	A	C	I	I	A	R	R	R	I	I		I	I	I	I		I
TSF Personnel Training	I	A			A	R	R	R	R	C	C	C	C	C	C	R	C	C
Rectification Works	I	A	C	I	I	A	R	R	R	C	C		R	R	C			I
Maintenance of Infrastructure (Pipework, Pumps, Generators etc)		A	C		I	A	C	C	C	C	C		R	R	C			I
Incident Reporting and Investigations	I	A	C	C	A	R	C	C	C	C	C	C	C	C	R	R	C	R
SURVEILLANCE AND MONITORING																		
Develop, Review & Implement a Monitoring Program	I	A	R	C	A	R	R	R	R	C	C	I	I	I	R	C	C	C
Develop, Review & Implement a TARP or Critical Controls	I	A	R	C	A	R	R	R	R	I	C	C	I	I	R	C	C	C
Examine & Review TSF Monitoring Data	I	A	R	C	A	R	C	C	C	C	C	I	C	C	R	C	C	C
Develop & Review Technical Monitoring Reports	I	A	R	C	A	R	C	C	C	I	C	I	I	I	R	C	C	C
Monitor TSF Piezometers		A	C	I	A	A	C	C	C	I	I		I	I	R	I	I	I
Monitor Groundwater Standpipes and Decant (licenced)		A	C	I	A	A	C	C	C	I	I		I	I	R	I	I	I

Description	Chief Executive Officer (CEO)	Accountable Executive (AE)	Engineer of Record (EoR)	Independent Tailings Senior Reviewer (ITSR)	GM Operations / SSE	Responsible Tailings Facility Engineer (RTFE) / Process Manager	Processing Superintendent	Processing Co-ordinator	Shift Supervisor Processing	TSF Raise Construction Supervisor	Site Metallurgists	Mine Surveyor	Maintenance Superintendent	Maintenance Co-ordinator	Environmental Manager/Superintendent	HST Superintendent	Emergency Response Team	Mining Superintendent
Visual Inspections as per Licence Requirements		A	C	I	A	A	R	R	R	R	I		I	I	R	I	I	I
Aerial Survey (monthly)		A	C	I	A	A	C	C	C	I	I	R	I	I	C	I	I	I
Bathymetric Survey (quarterly to biannually)		A	C	I	A	A	C	C	C	I	I	R	I	I	C	I	I	I
AUDITING																		
Annual Inspection of TSF by EoR	I	A	R	I	A	A	C	C	I	I	C	I	C	C	C			I
Develop Annual Audit Compliance Report (licenced)	I	A	R	C	A	A	C	C	I	C	C	I	I	I	A	I	I	C
Determine the Frequency of the Dam Safety Review	A	R	C	C	R	R	C	C	I	I	C	I	I	I	C	I	I	C
Dam Safety Review Inspection of TSF by EoR (5-yearly)	I	A	R	I	A	A	C	C	I	C	C	I	C	C	C			C
Develop 5-Yearly Dam Safety Review Report	I	A	R	C	A	A	C	C	I	C	C	I	I	I	C	I	I	C
EMERGENCY RESPONSE																		
Emergency Planning	I	A	C	I	A	A	R	R	R	R	I	I	I	I	C	R	R	C
Emergency Management	I	A	C	I	A	A	R	R	R	R	I	I	I	I	C	R	R	C
Regulatory Liaison on Emergency Response	I	A	C	I	A	A	C	C	C		I				R	R	R	C
Develop & Review Emergency Preparedness and Response Plan	I	A	R	I	A	R	R	R	R	R	I	I	I	I	R	R	R	C
CLOSURE																		
Develop & Review TSF Closure Plan	I	A	R	C	A	A	C	C	I	C	C	I	C	C	R	I	I	C
Implement TSF Closure & Decommissioning Plan	I	A	C	C	A	A	C	C	I	C	C	I	C	C	R	I	I	C

Table 2: Individual Responsibilities Details – Responsibility Activity Legend

Responsibility Activity Legend		Role
Responsible	R	The person who carries out the process of task assignment. Responsible for executing the job.
Accountable	A	The person who is ultimately accountable for the process or task being completed appropriately. Responsible person(s) are accountable to this person.
Communicated	C	People who are not directly involved with carrying out the task, but who are consulted. May be a stakeholder or subject matter expert.
Informed	I	Those who receive output from the process or task, or who have a need to stay informed.

1.4 Operator Training

All operators of the IWLTSF and associated components and Contractors working on the facilities must complete the requisite training, competency testing and be aware of the emergency procedures prior to being allowed to work on the facilities and associated components.

The Site Manager is responsible for ensuring that the training, competency testing and emergency awareness of operators and Contractors is completed.

Personnel inspecting the IWLTSF should be advised of the regulatory requirements for the facility as part of their induction and training.

Copies of the regulatory Licence and or Lease Conditions relevant to the facilities are attached to this document in Appendix B. The Site Manager and Process Plant Foreman must insert these documents in Appendix B of this Operations Manual and must ensure that each time the regulatory conditions are changed (renewed, amended or updated) the documents are changed, and the staff are advised of the changes and the training confirmation records updated accordingly.

1.5 Guidelines, Codes, Practice and Standards

The following Guidelines, Codes of Practice and Standards are relevant to the operation of the IWLTSF:

i) Government of Western Australia Department of Mines and Petroleum (DMP): "Guide to Departmental requirements for the management and closure of tailings storage facilities (TSFs)", 2015;

ii) Government of Western Australia Department of Mines and Petroleum (DMP) Code of Practice (CoP): "Tailings Storage Facilities in Western Australia", 2013;

iii) Australian National Committee on Large Dams (ANCOLD): "Guidelines on the Consequence Categories for Dams", 2012; and

iv) Australian National Committee on Large Dams (ANCOLD): "Guidelines on Tailings Dams Planning, Design, Construction, Operation and Closure", 2019.

v) Australian National Committee on Large Dams (ANCOLD): "Guidelines on Selection of Acceptable Flood Capacity", 2000.

2. Summary of Operating Procedures

2.1 Introduction

The following considerations have been incorporated into the design of the IWLTSF.

- To optimise tailings storage capacity and reduce the risks associated with embankment stability and seepage, tailings will be deposited from the embankment and along the perimeter of the storage as depicted in the drawings.
- Tailings deposition and beaching will be controlled such that the supernatant water is ponded away from the engineered embankment. Tailings will be deposited such that the in-situ densities within the stored tailings and the water return for reuse in the process plant is maximised.
- Tailings in the form of a slurry will be discharged subaerially (discharge exposed to air) and or sub-aqueously (discharge to slurry/water) depending on the slurry and water levels at the point of discharge from the upstream face of the main embankment. Tailings will be deposited in discrete layers from numerous spigot point discharges.

The deposition regime is aimed at minimising the supernatant pond over the surface of the tailings beach to promote drying of the tailings and maintaining the supernatant pond around the decant facility. Under no circumstances is the supernatant pond allowed to extend to reach the perimeter embankment.

Depending on the decommissioning plan adopted for the IWLTSF, it may be necessary to alter the deposition philosophy near the end of the mine life. Appropriate procedures shall be developed if changes to deposition or freeboard criteria are required. If necessary, appropriate government authorities shall be advised of any changes especially to freeboard criteria. As tailings deposition progresses, there may be a requirement for the deposition locations to be moved in order to maximise the utilisation of the tailings storage area.

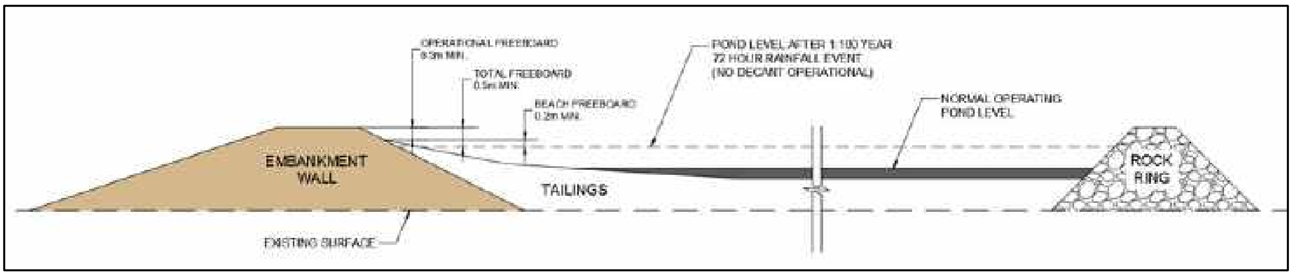
Tailings discharge or spigotting is to be carried out such that the supernatant pond is always maintained around the decant facility and associated pump. The supernatant pond is always to be maintained below the perimeter containment embankments and bunds.

The IWLTSF have been sized to accommodate storm events. The IFD data obtained from the BOM indicates the 1 in 100 AEP 72-hour storm is approximately 194 mm. The design of the facilities has been followed the freeboard requirements stipulated by the DMP guidelines (2015) for TSFs. The freeboard requirements vary based on whether a water pond is normally located away from or against a perimeter embankment. Additionally, for a TSF with a water pond normally located against a perimeter wall, the freeboard requirements vary depending on whether the facility has an upstream catchment or not.

These requirements comprise three distinct elements, namely: operational freeboard, beach freeboard and total freeboard. These elements are graphically illustrated in Figure 5, and are summarised in Table 3, where:

- Operational freeboard is the height difference between the tailings beach and the embankment crest;
- Beach freeboard is the level difference between the tailings beach and the decant water level plus allowance for the 1 in 100-year average recurrence interval (ARI), 72-hour rainfall event, and;
- Total freeboard is the sum of the operational freeboard and beach freeboard plus allowance for the 1 in 100-year average recurrence interval (ARI), 72-hour rainfall event.

Figure 5: Freeboard Definition – Pond Located Away from Perimeter Embankment (DMP, 2015)



A construction sequence and deposition sequencing plan have been developed to ensure the timely completion of Stage 4 construction while maintaining continuous storage for tailings operations. To achieve this, Stage 4 North will be operated at an intermediate storage capacity for a period of time to allow for the construction of Stage 4 South and its CCIR approval. During this initial phase, the decant pond will be managed within the IPTSF and adjacent low-lying areas, generally central to the facility.

Once Stage 4 North reaches its intermediate storage capacity and Stage 4 South is ready for commissioning, tailings operations will transition to Stage 4 South. During this phase, the decant pond will continue to be managed within the IPTSF, while tailings will be deposited from the south, gradually encapsulating the IPTSF. By this stage, the decant pond will either remain within the IPTSF or be pumped into the rock ring for recovery.

Tailings deposition will continue in Stage 4 South until the beach elevation aligns with that of Stage 4 North. Thereafter, the remaining capacity of Stage 4 will be operated as a single storage facility, with tailings deposition cycled along the entire perimeter embankment.

During final phase of Stage 4 operation, to maintain the decant pond within and around the rock ring, intermittent operation of three open-end tailings discharge points from different locations around the hill in the south, adjacent to the decant causeway, will be required.

In accordance with the classification undertaken by DMIRS (2015) and ANCOLD (2019), A summary of the freeboard limits and requirements for Stage 4 North and Stage 4 South, along with their sequencing order, is presented in Table 3.

Table 3: Freeboard Limits and Requirements

Parameter	Stage 4 North Intermediate	Stage 4 South Intermediate	Stage 4 North & South (Remaining)
Facility Classification			
ANCOLD	High C	High C	High C
DEMIRS	Category 1	Category 1	Category 1
Embankment Elevations			
Embankment Elevation (RL m)	489.0	489.0	489.0
Contingency Storage Allowance			
Tailings Operational Freeboard (DEMIRS minimum)	0.3 m	0.3 m	0.3 m
Beach Freeboard (DEMIRS minimum)	0.2 m	0.2 m	0.2 m
Additional Freeboard (ANCOLD 2019)	0.5 m	0.5 m	0.5 m
Total Freeboard (Minimum to Max. Operating Pond)	1.0 m	1.0 m	1.0 m
Extreme Storage Allowance			
Design Storm Event (1:100-year AEP, 72-hour event)	0.26	0.26	0.26
Normal Operating Pond			
Minimum Normal Operating Pond Freeboard (m)	1.26	1.26	1.26
Maximum Normal Operating Pond (RL m)	483.24*	487.74	487.74
Note: * Calculated based on Stage 3 embankment elevation (RL 484.5 m), with Stage 4 South under construction and containment not yet provided to the full Stage 4 embankment elevation (RL 489.0) on south.			

The IWLTSF Stage 4 North intermediate, Stage 4 South intermediate and Stage 4 North and South remaining operation, including construction periods, will result will result in varying levels of the supernatant pond and retained water within the facility. At the completion of construction and tailings operation for each stage, the computed freeboard height (vertical distance from the embankment crest to the tailings solids and supernatant pond) must be determined.

To manage the tailings facility effectively the following must be adhered to:

- Water recovery must be maximised at all times; and
- The minimum freeboard requirement must be maintained at all times.

The tailings storage area will assume the form of a truncated prism with a depressed cone in the top surface. Frequent inspections (multiple times per day) should be made of the:

- Freeboard;
- Tailings lines;
- Water return lines;
- Discharge points;
- Decant system;
- The position of the supernatant ponds in relation to the water recovery system;
- The perimeter containment embankments; and
- Monitoring and instrumentation.

The embankments should be inspected once per day. If seepage has occurred, particular attention should be paid to the embankments in the vicinity of the seepage. Only by regular inspection and appropriate remedial action can the performance of the water return system be optimised, and operational problems be avoided.

Operation, safety and environmental aspects should be periodically reviewed during an inspection by a suitably experienced and qualified engineer. This inspection should be done at least every year.

The operational design of the tailings storage located at the Bellevue Gold Project is aimed at:

- Providing return water to the plant; and
- Maximising the in-situ density of the tailings which in turn maximises the storage capacity of the tailings facility.

2.2 Related Documents

This document is to be used in conjunction with the following related documents:

- IWLTSF Stage 4 Design Report;
- Operating Manual for Process Plant Management; and
- Construction Specifications (Earthworks).

The forms which are relevant to this Operations Manual are provided in Appendix C and comprise the following templates:

- Daily Inspection Log Sheet (OMPPS1);
- Operations Personnel Contact Details (OMPPS2); and
- Training Confirmation Record (OMPPS3).

The content of these templates is considered to be the reasonable minimum to be used to monitor the performance of the IWLTSF. The content of the templates can be modified by the site management, if required, to meet any additional site-specific requirements.

A plan showing the location of the Assembly Points in the event of an emergency is to be prepared by the Processing Manager. This plan should be designated Figure 1 and be placed behind the text of the report in Appendix A.

3. Operating Methodology

3.1 Background to Tailings Deposition

The method of deposition of tailings into the IWLTSF is one of the major controlling factors to achieve or exceed the design requirements. The method of tailings deposition influences:

- In-situ densities within the stored tailings; and
- Water return for reuse in the process plant.

It is essential that a detailed understanding of the various components of the tailings system is acquired to understand the tailings deposition. The tailings system components include:

- Tailings pipeline from the process plant to the IWLTSF including the associated valves in this pipeline which direct tailings to the various distribution points;
- Spigot operation and the spigotting (tailings deposition) process; and
- Flushing procedures for the tailings pipeline(s) and spigots.

3.2 Tailings Management

3.2.1 Tailings Pipelines

For the Bellevue Gold Project, tailings are transported from the process plant to the IWLTSF via a large diameter HDPE pipe to embankments where the tailings are to be discharged. This pipeline is contained within a system of bunds to enable any spillage or leakage to be contained. An access track is located outside the bunds to facilitate pipeline inspections and maintenance. This track extends from the process plant to the embankment of the IWLTSF and onto the crest of the embankment. Flow meters are installed on opposite ends of the tailings pipelines with remote monitoring to aid in the detection of spills.

For the IWLTSF, the pipe divides via a manifold into four distribution lines to distribute the tailings to the active deposition points. The distribution lines are known as the A, B, C and D lines. The manifold also provides for flushing capabilities for water sourced from the return water line from the decant facility to the process plant. The tailings distribution lines comprise lengths of welded HDPE pipe. Teed off-takes or spigots are located at 20 m intervals in the discharge area on the embankments, totalling approximately 124 at IWLTSF Stage 4.

3.2.2 Tailings Deposition

Tailings will be delivered from the Plant at a production rate of approximately 1,600,000 tonnes of solids per annum (tpa) for 1.75 years (base case production scenario). At times throughout the mine plan, the rate of deposition may increase or decrease. Tailings will be produced using a thickener with a resultant solids content (% solids) of approximately 55%.

Tailings in the form of a thickened slurry will be discharged sub-aerially (discharge exposed to air) or subaqueously (discharged to slurry/water) depending on the slurry and water levels at the point of discharge from the upstream face of the perimeter embankment / pit berm within the IWLTSF at the time of discharge. The tailings should be deposited at a low velocity from numerous spigot discharge points for the IWLTSF. Deposition should occur for a period of two to three days from each group of spigots. Each spigot comprises a hose with clamp/valve to shut off the flow.

Tailings spigotting or deposition within the IWLTSF will be executed in thin layers of not more than 300 mm to facilitate the development of a uniform tailings beach and optimise drying, consolidation and the in-situ density of the stored tailings. Tailings deposition will be formulated such that the supernatant water pond is always maintained away from the perimeter embankments / point of discharge. The deposition sequence will be based on cyclic deposition that is sequential deposition along the IWLTSF embankment, such that each layer of tailings assists the formation of sloped tailings beaches to facilitate the drainage and drying processes to achieve maximum dry density of the deposited tailings.

Tailings deposition will occur from multiple spigot points regularly spaced at intervals not less than 20 m and not more than 50 m. The design and operation of the pumping and piping system will dictate the number of spigots which can be opened at any one time. Deposition from a single point discharge will not occur for the IWLTSF.

As the IWLTSF is lined with HDPE across the upstream embankment face and low permeability in-situ materials across the valley floor, care will be taken to ensure that the tailings are not discharged so as to damage the HDPE and earthworks or allow tailings slurry flow to erode the perimeter containment bunds. Conductor pipes (slotted) will be utilised to ensure the tailings are deposited past the toe of the embankments and internal underdrainage excavation.

Furthermore, tailings deposition will be undertaken to prevent oxidation and the potential subsequent development of Acid Mine Drainage (AMD) by ensuring fresh tailings are deposited over the existing tailings within the lag time limit for acidification (18 months) as detailed in Section 3.2.3.

3.2.3 PAF Tailings Management

Though kinetic testing by Graeme Campbell & Associates Pty Ltd (GCA) is still in hand, the current indications are that the PAF tailings will be characterised by a lag time of at least 18 months. As such, operation of the facilities requires careful consideration be given to the geochemical nature, especially reactivity of the mine tailings.

BGL's works approval conditions stipulate that tailings should not be left uncovered for a period greater than 3 months due to the lag time of acidification. It is understood that these license conditions are based on preliminary testing by GCA at the time of submission of the Detailed Design Report, and do not reflect updated/current test results. As such, a maximum lag time for acidification of 18 months is considered appropriate for the IWLTSF.

Throughout the construction, commissioning, operation, and closure of the IWLTSF, the tailings beach exposure times (to atmospheric oxidation) will be limited to below the lag time for acidification (18 months). As such, fresh tailings will be deposited over existing tailings within the lag time limit (18 months).

3.2.4 Tailings Line Flushing

The tailings distribution mains will be thoroughly flushed after each deposition cycle to ensure that no tailings solids have settled in the pipeline. During the flushing process the spigots on each distribution line will be progressively closed, furthest from the plant first and closest to the plant last and the inoperative distribution main left filled with water. The water retained in the distribution main limits the potential for blockages when the tailings deposition is switched to the inoperative line.

3.2.5 SCATs Management

SCATs material developed as a byproduct from processing activities at the BGL Process Plant are produced at an approximate rate of 4.0 – 5.0 tonnes per day. It is understood that geochemical testing is currently underway to identify whether the SCATs byproduct is PAF. In the case of the SCATs material being PAF, careful consideration is required with respect to the materials management and storage given its geochemical nature and reactivity.

Similar strategies to the management of the PAF tailings shall be implemented for PAF SCATs in accordance with Section 6.3.3. That is, throughout construction, commissioning, operation, and closure of the IPTSF and IWLTSF, the SCATs material exposure times (to atmospheric oxidation) will be limited to below the lag time for acidification (18 months). As such, fresh tailings will be deposited over the SCATs material (minimum 1.0 m coverage for encapsulation) or 1.0 m of overlying water cover shall be provided to prevent oxidation within the lag time limit (18 months).

Consideration should be given to the storage of PAF SCATs across the wider IWLTSF where planned tailings beaching activities provide coverage over these materials within the lag time limit (18 months), without compromising their overall development and facility water recovery.

3.3 Water Management

3.3.1 Decant Operation

The supernatant pond level must be actively maintained, to be kept clear of the perimeter embankments. At no time will the supernatant pond be allowed to encroach within 100 m of the external engineered embankments of the IWLTSF.

The position and extent of the supernatant pond is controlled by the water recovery which will be maximised. The decant pumping system will be capable of recovering additional water during the wet season.

Water recovery will be carried out through the operation of one (1) turret pump each in IWLTSF Stage 4A and Stage 4D, and two (2) turret pumps in Stage 4B and 4C. The position of these turret pumps will be continuously optimised as the deposited tailings fill the lower basins and move upstream along the embankments/pit benches, following the decant pond, to maximise water recovery.

The turret pumps will be used during the commissioning phase of the facility and will continue until the completion of Stage 4D, at which point water recovery will be transitioned fully to a rock ring filter. During early commissioning the following factors will be considered in the managing of the decant pond:

- Little or no pond around the decant facility is likely to produce turbid or dirty water in the water return;
- A large pond around the decant will produce clear water but evaporation losses from the pond will be high;
- To limit seepage risk, the water pond will not be allowed to exceed a distance of 100 m from the perimeter embankments; and
- The water pond will not be so large that the storm freeboard volume is compromised.

The process of tailings deposition is to ensure that the pond is positioned away from the perimeter embankments.

A bathymetric survey of the supernatant pond will be conducted periodically to establish accurate water volumes and submerged beach profiles.

3.3.2 Underdrainage Operation

The extension of finger drains will be installed within the basins of Stage 4 IWLTSF to assist with the consolidation of deposited tailings, thus promoting early water return, minimising seepage and increasing in-situ stored tailings densities.

The existing submersible pumps will be still used at the base of each of the existing underdrainage collection sumps and connected to diesel generators. The submersible pump will pump collected underdrainage water back onto the facility. This will be undertaken by routing return pipes up the embankment downstream face, across the embankment alignment and crossing the embankment crest into the facility. The submersible pumps will be run at all times. A backup diesel generator and backup pump will be available for deployment in case of failure of the system.

3.3.3 Water Recovery

The decant pond on the IWLTSF will be maintained at the smallest practical operational size to maximise water return to the plant and allow the tailings beaches to drain, dry and desiccate. The size of the pond will be largely governed by operational requirements and the efficiency of the decant system in removing water.

Based on the tailings test results, there will be some loss of water via seepage. Under average rainfall and evaporation, the preliminary water balance indicates:

- an average daily water returns of 1715 m^3/day or 71.4 m^3/hr, equivalent to 48% of the total slurry water, for operation of the IWLTSF (Stage 4) (based on the operating hours of 8,000 per annum).

3.3.4 Storm Events

The IWLTSF have been sized to accommodate storm events and the DMIRS minimum total freeboard, comprising the operational freeboard (300 mm) and beach freeboard (200 mm) in additional to ANCOLD requirements.

The vertical distance between the embankment crest and the adjacent deposited tailings beach or standing water level which corresponds with this level will have to be determined, after construction for each embankment crest level. At this stage the maximum operating pond levels for the proposed embankment crest levels are as follows:

- IWLTSF Stage 4 (Embankment Crest Level RL 489.0 m) maximum operating pond level RL 487.74m;

Water recovery will be maximised at all times for the IWLTSF. The minimum freeboard requirements will be maintained at all times.

3.3.5 Decant Pipelines

For the Bellevue Gold Project, decanted water transported from the IWLTSF to the process plant will be undertaken via a large diameter HDPE pipe. This pipeline is contained within a system of bunds to enable any spillage or leakage to be contained. An access track is located outside the bunds to facilitate pipeline inspections and maintenance (inspections of the pipelines are to occur twice daily and records of these inspections kept). This track extends from the process plant to the decant locations for the IWLTSF. Flow meters will also be installed on opposite ends of the tailings pipelines with remote monitoring to aid in the detection of spills.

3.4 Commissioning Plan

A detailed Commissioning Plan will be developed in the future.

3.5 Daily Inspections

The daily inspections, twice per shift (day shift and night shift) for a minimum total of 4 inspections per day, are to be executed by the Metallurgy Superintendent and the designated, trained, Operators as it is expected these staff have responsibility for the general day to day operation and maintenance of TSFs. As part of the inspections these staff will be required to complete the daily inspection log (Doc No. OMPPS1).

The process plant management has the responsibility for verifying that these inspections are occurring, and that these inspections are following the requirements.

The date and time of each inspection is to be entered into the Process Plant Foreman's logbook and is to be signed by the person allocated to undertake the inspection on that shift to ensure the requirements have been undertaken. The Daily Inspections must cover the following:

- The pipelines (tailings delivery line and water return line) to and from the tailings storage facility;
- Bunding arrangements;
- Leak detection;
- Pumps;
- Spigots and valves;
- Spigotting and deposition;
- Location and size of the supernatant water pond;
- The decant and decant pump;
- The embankment crest, upstream and downstream face;
- Seepage from the embankment toe, if any;
- The general integrity of the embankment i.e. any new cracking, any new seepage (daily);

- Any changes to existing cracking or seepage;
- The integrity of the HDPE liner (damages, tearing etc); and
- Process Water Pond.

Any leaks or failures of the tailings pipeline, damage to the bunds or HDPE liner in the process water pond or abnormally high water levels in the process water pond will be immediately reported to the following personnel or project equivalents, as appropriate, and an incident report completed:

- Site Manager; and
- Process Plant Foreman.

3.5.1 Tailings and Return Water System

All tailings' lines and water return lines are located in bunded corridors. The tailings lines, particularly on the embankment crests of the IWLTSF, are sensitive to temperature and the expansion and contraction of this line can cause leaks and in extreme situations, failure of the pipeline.

The process water pond must also be inspected to ensure that the water from the IWLTSF water return pipes is clear and the level of the water in the pond is at or below the design level. High water levels, above the design water level, must be reported. The HDPE liners to the process water pond are also susceptible to damage from animals. Any damage to HDPE liners noted during the inspection must be reported immediately, to the personnel list above, and an incident report completed.

3.5.2 Decant System

The position and size of the pond in relation to the decant facility must be inspected at least once per shift. Any abnormalities must be immediately reported immediately to the maintenance and process plant personnel.

3.5.3 Embankments

As part of each inspection of the IWLTSF, the containment embankments, including berms and batter slopes, must be visually assessed. The presence of any new cracking or other features such as seepage, embankment erosion or scour (caused by tailings deposition or rainfall runoff), HDPE damage or any other obvious changes to the physical state of the embankment since the previous inspection must be entered into the Process Plant Foreman's logbook and on the inspection form, and immediately reported to the following personnel:

- Site Manager;
- Process Plant Foreman; and
- Design Consultant.

3.5.4 Seepage

Monitoring bores are installed adjacent to the IWLTSF to monitor ground water levels and quality. The integrity of these bores will be routinely checked to ensure the bores remain intact and are not damaged. It is the responsibility of the Environmental Department to measure ground water levels and collect water samples for analysis as per site license conditions.

3.5.5 Instrumentation

The instrumentation and monitoring bores installed into embankments and close to the IWLTSF must be inspected for damage. Any damage must be reported to the following personnel:

- Site Manager;
- Process Plant Foreman; and
- Design Consultant.

3.6 Warning Signs and Fencing

Warning signs around the facilities are recommended and the integrity of the stock fencing adjacent to the IWLTSF must be checked daily. Any observed damage to fencing must be immediately reported to the relevant personnel or project equivalents, as appropriate, and an incident report completed.

4. Emergency Action Plan

4.1 Response Actions

In the event of an emergency the site emergency response team must immediately be notified and advised of the nature of the emergency to enable the emergency action plan to be implemented which is appropriate to the nature of the emergency. The site emergency response plan contains the details presented in Sections, 4.2 to 4.4, such that response activities are co-ordinated with operations personnel.

At the time of the emergency the Process Plant Foreman or his designated trained representative is to ensure that:

a) All personnel and Contractors who were or are working in or around TSFs are accounted for;

b) Personnel Contact Details are provided on form (OMPPS2) appended to this document. This form must be reviewed quarterly as a minimum and must be updated immediately in the event of personnel leaving or joining the operation.

c) The site Emergency Response team are immediately contacted and advised of the nature of the emergency and any assistance required is requested; and

d) All mine based personnel listed in Table 1 are immediately contacted and advised of the nature of the emergency and any assistance required is requested.

All personnel who are working in the vicinity of the emergency are expected to be present at the muster points and are expected to be aware of other assembly points around the TSF and the relevant reporting procedures. Emergency assembly points are shown on Figure 1 in Appendix A of this document.

4.2 Tailings Storage

The embankments have been designed with an adequate factor of safety against failure under normal operating and seismic load conditions, appropriate for the location of the IWLTSF.

Normal operating conditions refers to the tailings surface and water pond surface within the freeboard requirements.

The probability of embankment failure during normal operations is very low, given that:

a) The embankment construction has been, or should have been, carried out in accordance with the design;

b) The implementation of the tailings operation methodology (Section 2), including the routine inspections and maintenance practices are adhered to as set out in Operations Manual.

However, in the unlikely event of embankment failure, the flow of tailings from the storage will be controlled by the degree of saturation of the tailings at the time of failure.

Action to control a small-scale embankment failure and limit environmental damage would include:

a) Assess the requirement to shut down the process plant, or reduce process plant throughput;

b) Diversion of tailings deposition to areas not affected by the small-scale embankment failure;

c) Construction of bunds by earthmoving equipment to divert and contain the tailings;

d) Contact a suitably qualified geotechnical organisation for technical assistance;

e) Deployment of pumps to recover tailings water and return it either to the IWLTSF if structurally sound or to the plant water storage facilities if evaporation and or dilution is impractical;

f) Undertaking a thorough inspection of the area with or without a specialist, dependent on the scale of the failure, prior to the commencement of any repairs;

g) Undertaking remedial and repair work of the damaged embankment or affected area;

h) Clean up of tailings as soon as practicable after embankment repairs have been completed and the storage is considered in a safe condition;

i) Preparing an incident report, detailing all factors prior to the incident and the situation after clean-up. The report should identify causes of the problem and what actions will be taken to prevent a similar occurrence. This report should detail the on-going monitoring programme to fully assess the impact of the incident; and

j) Advise all appropriate government departments as necessary of the incident, review the conditions of operating licence and lease conditions to ensure that the timing of reports and content of reports meets the regulatory requirements.

Action to control large-scale embankment failure and to limit environmental damage would include:

a) Shut down of the process plant;

b) Construction of bunds by earthmoving equipment to divert and contain the tailings;

c) Contact a suitably qualified geotechnical organisation for technical assistance;

d) Advising the relevant regulatory authorities;

e) Deployment of pumps to recover tailings water and return it to the IWLTSF if structurally sound or to the plant water storage facilities if evaporation and or dilution is impractical;

f) Undertaking a thorough inspection of the area with the assistance specialist prior to the commencement of any repairs;

g) Repairing the damaged embankment;

h) Clean-up of tailings as soon as practical after the embankment repairs have been completed;

i) Prepare an incident report, detailing all factors prior to the incident and the situation after clean-up. The report should identify causes of the problem and what actions will be taken to prevent a similar occurrence. This report should detail the on-going monitoring programme to fully assess the impact of the incident;

j) Advise all appropriate regulatory authorities as necessary of the incident; and

k) Review conditions of any license or lease conditions in respect to the timing of advising the regulatory authorities and the contents of that notification (reporting criteria).

It must be stressed however, that the safe operation of the IWLTSF relies upon the implementation of procedures which comprise, tailings deposition, decant operation, and routine inspections and maintenance, as set out in the Operations Manual to minimise the potential for a catastrophic event such as a failed embankment.

4.3 Tailings Lines and Water Return Lines

The tailings lines from the process plant to the tailings storage and the return water lines from the decant facilities to the process water dam are to be located inside bunded, open trenches to contain any spillage of materials resulting from leaks or burst pipes during operation. In the event of pipeline failure, the Process Plant Superintendent is to be notified and the affected pipeline is to be shut down until repaired and the spilled materials collected and/or pumped, as appropriate, and deposited in the IWLTSF. An internal incident report is to be completed and the Site Environmental Department informed.

4.4 Process Water Dam

The decant pump is operated manually and run at all times. The pump is only switched off during:

a) During plant shutdowns or maintenance periods; and

b) When dirty water is pumped into the process water pond or; when embankment construction is scheduled in accordance with the design.

Alternative pumping equipment / and or pump locations will be required during periods of pump maintenance and when embankment construction work is being undertaken.

5. Incident Reporting

The objective of regular inspections by the designated process plant staff and monitoring by the environmental staff is to identify any problems prior to them causing a major impact on the operation or integrity of the IWLTSF and associated infrastructure.

The inspections may result in the identification of an event, of which the nature and extent may require reporting to senior staff and in some cases to relevant regulatory authorities.

6. References

1. ANCOLD 2012, Australian National Committee on Large Dams: Guidelines on the Consequence Categories for Dams
2. ANCOLD 2019, Australian National Committee on Large Dams: Guidelines on Tailings Dams Planning, Design, Construction, Operation and Closure
3. ANCOLD 2019, Australian National Committee on Large Dams: Guidelines for Dams and Appurtenant Structures for Earthquakes
4. DMP 2013, Code of Practice (CoP): Tailings Storage Facilities in Western Australia
5. DMP 2015, Guide to Departmental Requirements for the Management and Closure of tailings storage facilities (TSFs)
6. DMP 2015, Guidelines for Preparing Mine Closure Plans
7. DMP 2015, Guide to the Preparation of a design report for tailings storage facilities (TSFs)

7. Limitations

Resource Engineering Consultants Pty Ltd (REC) has prepared this Operating Manual for the Integrated Waste Landform Storage Facility (IWLTSF) (Stage 4) at the Bellevue Gold Ltd (BGL) Bellevue Gold Project (BGP). This report is provided for the exclusive use of BGL and their consultants for this project only and for the purposes as described in the report. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of REC, does so entirely at its own risk and without recourse to REC for any loss or damage. In preparing this report REC has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after REC's field testing has been completed.

REC's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by REC in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. REC cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by REC. This is because this report has been written as advice and opinion rather than instructions for construction.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of REC.

REC may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to REC.

Any such risk assessment would, however, be necessarily restricted to the geotechnical components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

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