Appendix 7

Meadowbank and Whale Tail
2024 Annual Geotechnical Inspection

CONFIDENTIAL

REPORT

2024 Annual Geotechnical Inspection

Meadowbank Complex, NU

Submitted to:

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Executive Summary

Agnico Eagle Mines Ltd. (AEM) mandated WSP Canada Inc. (WSP) to carry out the 2024 geotechnical inspection of the Meadowbank mining complex, including the Meadowbank and Whale Tail Mine sites, in accordance with requirements of the water licenses (No. 2AM-MEA1530 and 2AM-WTP1830). The inspection, carried out from July 19 to 26, 2024, concerned the geotechnical aspects and review of available instrument data for the dewatering dikes; structures of the tailings pond (tailings storage facility [TSF]) and all-weather access road (AWAR) located between the Meadowbank site and the Town of Baker Lake, as well as the road between the Meadowbank and Whale Tail Mine sites (Whale Tail Haul Road [WTHR]); fuel storage infrastructures at the Meadowbank site, Whale Tail Mine site, and Baker Lake; and other site infrastructures such as attenuation pond jetties, diversion ditches and surface water management infrastructures, access roads, landfills, contaminated soil storage areas (landfarm), wastewater management pond (Stormwater Pond), Rock Storage Facility till plug, diffusers, erosion and sediment protection structures, airstrip, and retaining walls.

Based on observations collected during the inspection, as well as instrumentation data, the condition of the dewatering dikes is satisfactory. It is recommended to continue reporting piezometers with data below 0°C in the past on East Dike, Bay-Goose Dike, and Whale Tail Dike, and with careful interpretation since damage may have occurred. Once a piezometer freezes, it is no longer completely reliable even if it thaws.

Subsidence and tension cracks observed in 2013 and 2014 on the upstream side of the thermal cover of Bay-Goose Dike were still partly visible but were mostly repaired by resurfacing operations and are not considered active. Water accumulation at the downstream toe and flow from the downstream side of Bay-Goose Dike to Bay-Goose pit should continue to be monitored using a receptacle and stopwatch. Flow areas identified as North Channel, Channel 1, and Channel 3 should continue to be monitored as instrumentation data and field observations seem to indicate flow is draining directly into the pit instead of accumulating at the downstream dike toe. The flow of the Central Channel area should also continue to be monitored. Flow measurements show a strong correlation with precipitation so most of the water is interpreted to be runoff, not seepage.

The dewatering dikes at the Whale Tail Mine site were in good condition during inspection. Settlement at the east abutment of Whale Tail Dike, detected from cracks in previous years, has been surveyed and progressed since 2021 but does not negatively impact dike performance and AEM conducted surface remediation as well as adding a stabilization buttress. IVR D-1 Dike still showed signs of settlement in the west side but now appears stable and is performing well.

Seepage through the foundation of Whale Tail Dike, which is managed by the downstream collection trench and measured at the downstream V-Notch, was stable based on visual observations and instrument data. Seepage is managed by redirecting it to the attenuation pond via gravity. Monitoring of the instrumentation data and seepage rates should continue to aid in the understanding of spatial and temporal evolution of the seepage.

No seepage was observed in 2024 at the downstream toe of Waste Rock Storage Facility Dike and instrumentation data indicates the foundation was frozen all year long. This confirms the effectiveness of the thermal berm that was constructed in 2020 upstream of the dike, as well as the low upstream pond level management strategy that was part of the AEM mitigation plan. Monitoring of the instrumentation data must continue to validate the effect of these measures on the foundation and assess its long-term thermal behaviour.

Based on observations collected during the inspection, as well as instrumentation data, the TSF structures are generally in good condition. The tailings beaches were adequate along the structures. After the South Cell Pond was drawn down in 2021, water was no longer ponding against the south side of Central Dike and Saddle Dam 5, as well as the downstream side of the west end of the Stormwater Dike separating the two TSF cells. Saddle Dam 3 was also free of ponded water against its upstream side.

Small cracks were observed on the crest of Stormwater Dike in 2024 in the area of previous deformation. It is possible these new cracks are desiccation cracks. WSP recommends continuing to monitor cracks and potential movements of the Stormwater Dike and follow the emergency measures plan in case the situation deteriorates. Several seams in the exposed liner appear to be deteriorating and failing. Water presence against the downstream dike toe is geotechnically acceptable, although water was farther from the dike in 2024. Progressive closure cover of the North Cell has reached part of the dike.

Most traces of erosion and tension cracks in the fine filter material of the North Cell Internal Structure have disappeared after remediation work and progressing capping operations. Some new minor tension cracks were present in the newly built sector but do not affect the performance of the TSF containment, as the filters are still operational. The structure is performing well.

A water pond is present at the downstream toe of Central Dike. Water accumulation is fed by underground flow partly connected to the south cell of the TSF. During the inspection, water accumulation was observed at the downstream dike toe, approximately between Station 0+300 and the southern access road at Station 0+830. The water was orange with high turbidity earlier in the season, similar to previous years, colouring and turbidity interpreted to be associated with bacterial processes and not internal erosion (AEM 2017). At the time of inspection, an average seepage rate of approximately 76.8 m^3/h was being pumped to Pit A to maintain the downstream pond level at an elevation between 114.8 m and 115.1 m.

Most of the AWAR culverts were in good condition. It is recommended that special attention be paid to culverts R-00A (2+550), PC-14 (4+260), unnamed culvert at 5+700, PC-10 (36+865), and PC-16 (54+950). If insufficient capacity to manage runoff is observed at the time of the spring freshet, WSP recommends clearing the obstructions or repairing the culverts. It is also recommended to monitor the progress of erosion of culverts PC-17A (8+830), PC-11 (39+552), R14 (67+840), R18-B (82+500), R-20 (85+490), R-23 (93+600), and R24 (98+100) during the spring freshet since there are signs of water flow below the road at these locations. If the condition of these culverts continues to deteriorate due to erosion, it is recommended to repair them. The bridges along the AWAR were in good geotechnical condition with no notable sign of abutment erosion observed. Signs of settlement and minor tension cracks in the abutment were observed at some bridges. Remediation work is not required at this time; however, the situation should continue to be monitored.

The presence of unstable blocks and loose rocks along steep walls is still observed in quarries 3, 7, 9, 10, 16, 18, and 23 along the AWAR, although no significant degradation of wall conditions was observed in the absence of work in these quarries. High unstable piles of gravel were also noted in Quarry 2. It is recommended that workers use caution in these quarries if work resumes and for AEM to inform them of potential hazards.

The culverts on WTHR were in good condition. It is recommended to pay special attention to culverts #7 (118+013), #7-2 (118+016), #8 (118+125), #12 (4+179 to 4+186; 3 outlets out of 5), #13 (120+615), #15 (120+850), #27-2 (123+300), #35 (124+581), #37 (125+035), #38 (125+049), #45 (125+710), #48 (127+203), #54 (128+388), #57 (128+635), #61 (129+050), #64 (129+920), #65 (130+924), #66 (132+324), #67 (132+689), #69 (133+784), #70 (133+837), #82 (136+143), #83 (136+300), #85 (136+671), #86 (136+740), #87 (136+810), #88

(136+861), #89 (137+180), #97 (138+436), #99 (138+830), #101 (139+025), #111 (142+461), #112 (142+630), #113 (142+736), #114 (142+810), #115 (142+865), #116 (142+940), #118 (143+433), #119 (143+777), #133 (148+141), #137 (148+940), #138 (149+000), #150 (152+171 to 152+179), #156 (153+506), #163 (156+474), #167 (157+843), #185 (162+404), #217 (166+790), #226 (168+935 to 168+937), #234 (170+385), #241 (171+235), #243 (171+593), #244 (171+625), #256 (173+350), #260 (174+185), #268 (175+774), #278 (177+870), and #281 (178+350). If insufficient capacity to manage runoff is observed at the time of the spring freshet, WSP recommends clearing the obstructions or repairing the culverts. It is also recommended to monitor the erosion progress of culverts #167 (41 + 843) and #232 (53 + 928) since there are signs of water flow under the road at these locations. Culvert erosion should be monitored during the spring freshet and during any larger precipitation events. The bridges along WTHR were in good geotechnical condition with no notable sign of abutment erosion observed besides limited surficial erosion of the granular fill and/or surficial tension cracks at some bridge locations, which poses no geotechnical concern but should continue to be monitored.

During the inspection of the quarries and eskers along WTHR, unstable and loose rocks along steep walls and unstable ground slopes were observed in all quarries and eskers except eskers #3, #5, and #6. No significant degradation of the wall and slope condition was observed in the absence of work in these locations; however, it is recommended that workers be cautious at these locations if work resumes and AEM advises them of dangers of falling boulders or potential slope failures.

The fuel storage infrastructure at the Whale Tail Mine site and the Meadowbank site was in good condition.

Water accumulation was lower than usual in the containment areas of all fuel storage infrastructures. The disposal of fluids accumulated in secondary containment infrastructure should continue to be managed to minimize the amount of water in contact with the base of the tanks. At the Baker Lake fuel storage infrastructure, exposed geomembrane was observed along the north and south side of Tanks 1 to 4, in the northeastern corner of Tank 4, and on the south side of Tanks 5 and 6. It is recommended to cover the exposed area with a geotextile and backfill material to restore the protection of the geomembrane. There have been occurrences of several fuel leaks in the past years.

A hole in the exposed geomembrane was present at the Baker Lake at the top of the slope south of Tank 3. Large holes (about 1 m in diameter) were also observed in the middle of the slope on the east and south side of Tank 6, as well as the west side of Tank 5. It is recommended to repair the liner and restore the granular cover at these locations. The liner should be repaired, and the exposed area should be covered with geotextile and backfill material to restore the protection of the geomembrane. Animal burrows were observed at the Baker Lake site on the south side of Tanks 4, 6 and 8. It is recommended to assess whether the underlying geosynthetics were damaged. The geomembrane of the 20 Jet A fuel tanks at the Baker Lake site remains exposed but little water is ponding in the containment area. The geomembrane had a tear in the southwest corner of the tanks where the repair did not hold and the liner needs to be repaired again to restore containment. It is recommended to remain vigilant during the spring freshet and throughout the year to manage water accumulation in the containment area.

It is recommended to monitor the performance of the five culverts installed in Vault Road during the spring freshet. A set of two culverts is installed between lakes NP1 and NP2 near the Meadowbank site; culverts are in good and stable condition despite deformation at their extremities. Another set of three culverts is installed farther down the road to the Vault pit; these culverts are all partially collapsed in the middle.

The Meadowbank West and East Diversion ditches and their sediment control elements, as well as the Whale Tail Mine site diversion ditches, were in good condition besides some sloughing that can potentially affect its capacity if the material falls into the ditch. The ditch was visibly dry most of the year but should continue to be inspected during the spring freshet.

The landfill, wastewater management pond (Stormwater Pond), airstrip, and crusher retaining wall at Meadowbank, as well as the diffusers, landfill, and attenuation pond jetties at the Whale Tail Mine site were in good condition. The Meadowbank and Amaruq contaminated soil storage areas (landfarms) were in good condition.

Sommaire exécutif

Agnico Eagle Mines Ltée (AEM) a mandaté WSP Associés Ltée (WSP) pour réaliser l'inspection géotechnique 2024 du complexe minier Meadowbank, y compris les sites de Meadowbank et Whale Tail Mine, en conformité avec les exigences du permis d'utilisation des eaux d'AEM (licences No. 2AM-MEA1530 et 2AM-WTP1830). L'inspection a été réalisée du 19 au 26 juillet 2024 et concernait les aspects géotechniques et la revue des données d'instruments disponibles pour les digues d'assèchement, les structures du parc à résidus (PAR), les structures de la route d'accès (AWAR, *all-weather access road*) située entre le site de Meadowbank et la ville de Baker Lake, ainsi que la route située entre les sites de Meadowbank et de la mine de Whale Tail (WTHR, *Whale Tail Haul Road*), les infrastructures d'entreposage du carburant au site de Meadowbank, au site de Whale Tail Mine et à Baker Lake, ainsi que d'autres infrastructures du site telles que les jetées des bassins d'atténuation, les fossés de dérivation et les infrastructures de gestion des eaux de surface, les routes d'accès, les zones d'entreposage de matières résiduelles, les zones d'entreposage de sols contaminés, l'étang de gestion des eaux usées (Stormwater Pond), le till de colmatage de la halde à stériles (RSF), les diffuseurs, la structure de protection contre l'érosion et les sédiments, la piste d'atterrissage ainsi que les murs de soutènement.

Selon les observations collectées lors de l'inspection et d'après les données d'instrumentation, la condition des digues d'assèchement est satisfaisante. Il est recommandé de continuer à signaler les piézomètres qui ont enregistré par le passé des données à une température inférieure à 0 °C aux digues East Dike, Bay-Goose Dike et Whale Tail Dike (WTD) et d'être très prudent lors de l'interprétation de leurs données, car les piézomètres pourraient être endommagés. Une fois qu'un piézomètre a gelé, il n'est plus totalement fiable même s'il dégèle.

L'affaissement et les fissures de tension observés en 2013 et 2014 du côté amont de la couverture thermique de la digue Bay-Goose Dike étaient encore partiellement visibles, mais ils ont été en grande partie réparés par des opérations de resurfaçage et ne sont pas considérés comme actifs. L'accumulation d'eau au pied aval et l'écoulement du côté aval de la digue Bay-Goose Dike vers la fosse Bay-Goose doivent continuer à être surveillés à l'aide chronomètre et d'un seau en plastique. Les zones d'écoulement identifiées comme North Channel, Channel 1 et Channel 3 doivent continuer à être surveillées attentivement, car les données d'instrumentation et les observations de terrain semblent indiquer que l'écoulement dans ces zones se fait directement dans la fosse au lieu de s'accumuler au pied de la digue en aval. L'écoulement de la zone d'écoulement Central Channel doit continuer à être surveillé. Ces structures montrent une forte corrélation entre les précipitations et le débit, de sorte que la majeure partie de l'eau est probablement du ruissellement et non de l'infiltration.

Les digues d'assèchement du site de (WTD, Waste Rock Storage Facility Dike, Mammoth Dike, North-East Dike) étaient en bonne condition lors de l'inspection. Le tassement au niveau de la culée Est de la digue WTD, détecté par des fissures au cours des années précédentes, a été surveillé et a progressé depuis 2021 mais n'affecte pas négativement la performance de la digue et AEM a procédé à une réparation de la surface et à l'ajout d'un renforcement de la stabilisation. La digue IVR D-1 montrait encore des signes de tassement dans sa partie ouest mais semble s'être stabilisée et fonctionne bien.

Les exfiltrations à travers la fondation de la digue WTD gérée par la tranchée de collecte en aval et mesurée au niveau de l'aval du V-Notch étaient stables d'après les observations visuelles et les données des instruments. Les exfiltrations sont gérées par redirection gravitaire vers le bassin d'atténuation. Le suivi de l'instrumentation et des exfiltrations doit se poursuivre afin de comprendre l'évolution spatiale et temporelle des exfiltrations.

Aucune exfiltration n’a été observée en 2024 au pied aval de la digue Waste Rock Storage Facility Dike et les données d’instrumentation indiquent que sa fondation était gelée toute l’année. Cela confirme l’efficacité de la berme thermique construite en 2020 en amont de la digue, ainsi que de la stratégie de maintien d’un niveau d’eau bas dans le réservoir en amont inclus dans le plan de mitigation d’AEM. Le suivi des instruments doit se poursuivre pour valider l’effet de ces mesures sur la fondation et évaluer son comportement thermique à long terme.

Sur la base des observations collectées lors de l’inspection, ainsi que des données d’instrumentation, les structures du TSF sont globalement en bonne condition. La plage de résidus était adéquate tout le long des structures. Après l’abaissement du niveau d’eau dans la Cellule Sud en 2021, il n’y avait plus d’eau accumulée le long du côté sud de Central Dike et Saddle Dam 5, ainsi que du côté aval de l’extrémité ouest de la digue Stormwater Dike qui sépare les deux cellules du TSF. Le côté amont de Saddle Dam 3 était également libre d’accumulation d’eau.

De petites fissures ont été observées sur la crête de la digue des eaux pluviales en 2024 dans la zone où des déformations s'étaient produites précédemment. Il est possible que ces nouvelles fissures soient des fissures de dessiccation. Il est recommandé de continuer à surveiller les mouvements potentiels de la digue Stormwater Dike et de suivre le plan de mesures d’urgence en cas de détérioration de la situation. Plusieurs soudures du liner exposé semblent se détériorer et se rompre. La présence d’eau le long du pied aval est acceptable d’un point de vue géotechnique pour cette digue, bien que l'eau ait été plus éloignée de la digue en 2024. La couverture de fermeture progressive de la cellule nord a atteint une partie de la digue.

La plupart des traces d’érosion et des fissures de tension dans le matériau de filtre fin de la digue North Cell Internal Structure ont disparu après les travaux de remédiation et recouvrement. De nouvelles fissures de tension mineures étaient présentes dans le secteur récemment construit, mais elles n'affectent pas la performance du confinement du TSF, car les filtres sont toujours opérationnels. La structure est encore en bonne condition.

Un étang d’eau est présent au pied aval de la digue Central Dike. Cette accumulation d’eau est alimentée par un écoulement souterrain qui est relié en partie à la Cellule Sud du TSF. Lors de l’inspection, l’accumulation d’eau a été observée au pied aval de la digue, approximativement entre le chaînage 0+300 et le chemin d’accès sud au chaînage 0+830. L’eau avait une coloration orange avec une forte turbidité plus tôt dans la saison, comme au cours des années précédentes. La coloration et la turbidité étant interprétées comme étant associées à des processus bactériens et non à l'érosion interne (AEM 2017). Au moment de l’inspection, un taux d’exfiltration moyen d’approximativement 76.8 m^3/h était pompé vers le Pit A pour maintenir le niveau de l’étang d’eau au pied aval à l’Él. entre 114.8 m et 115.1 m.

La plupart des ponceaux de l’AWAR étaient en bonne condition. Il est recommandé de prêter une attention particulière aux ponceaux R-00A (2 + 550), PC-14 (4 + 260), au ponceau non identifié au kilomètre 5 + 700, au ponceau PC-10 (36+865) et au ponceau PC-16 (54 + 950). Si une capacité insuffisante à gérer les écoulements est observée au moment de la crue printanière. WSP recommande de dégager les obstructions ou de réparer les ponceaux. Il est également recommandé de suivre la progression de l’érosion des ponceaux PC 17A (8 + 830), PC-11 (39 + 552), R14 (67 + 840), R18-B (82 + 500), R-20 (85 + 490), R-23 (93 + 600) and R24 (98 + 100) lors de la crue printanière, puisqu’il y a des signes d’écoulement d’eau en dessous de la route à ces emplacements. Si la condition de ces ponceaux continue à se détériorer en raison de l’érosion, il est recommandé de les réparer. Les ponts le long de l’AWAR étaient en bonne condition géotechnique et aucun signe notable d’érosion n’a été observé. Des signes de tassement et des fissures de tension mineures dans la culée ont été observés sur certains ponts. Il n’est pas requis d’effectuer des travaux de remédiation pour le moment, cependant la situation doit être surveillée.

La présence de blocs instables et de roches meubles le long de parois raides est encore observée dans les carrières 3, 7, 9, 10, 16, 18 et 23 situées le long de l’AWAR, bien qu’aucune dégradation significative des parois n’ait été relevée en l’absence de travaux dans les carrières. De hautes piles de gravier instables ont également été observées dans la carrière 2. Il est recommandé aux travailleurs d’être prudents dans ces carrières en cas de reprise des travaux et à AEM de les informer des dangers potentiels.

Les ponceaux de la WTHR étaient en bonne condition. Il est recommandé de prêter une attention particulière aux ponceaux #7 (118+013), #7-2 (118+016), #8 (118+125), #12 (4+179 to 4+186; 3 outlets out of 5), #13 (120+615), #15 (120+850), #27-2 (123+300), #35 (124+581), #37 (125+035), #38 (125+049), #45 (125+710), #48 (127+203), #54 (128+388), #57 (128+635), #61 (129+050), #64 (129+920), #65 (130+924), #66 (132+324), #67 (132+689), #69 (133+784), #70 (133+837), #82 (136+143), #83 (136+300), #85 (136+671), #86 (136+740), #87 (136+810), #88 (136+861), #89 (137+180), #97 (138+436), #99 (138+830), #101 (139+025), #111 (142+461), #112 (142+630), #113 (142+736), #114 (142+810), #115 (142+865), #116 (142+940), #118 (143+433), #119 (143+777), #133 (148+141), #137 (148+940), #138 (149+000), #150 (152+171 to 152+179), #156 (153+506), #163 (156+474), #167 (157+843), #185 (162+404), #217 (166+790), #226 (168+935 to 168+937), #234 (170+385), #241 (171+235), #243 (171+593), #244 (171+625), #256 (173+350), #260 (174+185), #268 (175+774), #278 (177+870), and #281 (178+350). Si une capacité insuffisante à gérer les écoulements est observée au moment de la crue printanière, WSP recommande de dégager les obstructions ou de réparer les ponceaux. Il est également recommandé de suivre la progression de l’érosion des ponceaux #167 (41+843) et #232 (53+928), puisqu’il y a des signes d’écoulement d’eau en dessous de la route à ces emplacements. L’érosion des ponceaux devrait être suivie lors de la crue printanière et lors de toute précipitation importante. Les ponts le long de la WTHR étaient en bonne condition géotechnique, et aucun signe notable d’érosion des culées n’a été observé, à l’exception d’une faible érosion superficielle du remblai granulaire et/ou des fissures de tension superficielles à certains endroits du pont, ce qui n’est pas problématique d’un point de vue géotechnique, mas doit être surveillé.

Lors de l’inspection des carrières et des eskers le long de la WTHR, des roches instables et meubles le long de parois raides et des pentes de sol instables ont été observées dans toutes les carrières et les eskers, à l’exception des eskers #3, #5 et #6. Bien qu’aucune dégradation significative des parois et des pentes n’ait été relevée en l’absence de travaux, il est recommandé aux travailleurs d’être prudents à ces emplacements en cas de reprise du travail et à AEM de les informer des dangers de chute de blocs ou de ruptures de pente.

Les infrastructures d’entreposage de carburant du site de Whale Tail Mine et de Meadowbank étaient en bonne condition.

L’accumulation d’eau dans les cellules de confinement de toutes les infrastructures d’entreposage de carburant a été plus faible que d'habitude. L’évacuation des fluides accumulés dans les infrastructures de confinement secondaire devrait continuer à être gérée de sorte à minimiser la quantité d’eau en contact avec la base des cuves. Au site de Baker Lake, de la géomembrane exposée a été observée au nord et sud des réservoirs 1 à 4, dans le coin nord-est du réservoir 4, et sur le côté sud des réservoirs 5 et 6. Il est recommandé de couvrir la zone exposée avec un géotextile et un matériau de remblai pour rétablir la protection de la géomembrane. Au cours des dernières années, plusieurs cas de fuites de carburant ont été constatés.

Un trou dans la géomembrane exposée était présent au lac Baker, au sommet de la pente au sud de la cuve 3. De grands trous (d'environ 1 m de diamètre) ont également été observés au milieu de la pente sur les côtés est et sud du réservoir 6, ainsi que sur le côté ouest de la cuve 5. Il est recommandé de réparer le liner et de restaurer la couverture granulaire à ces endroits. Le liner doit être réparé et la zone exposée doit être recouverte d'un géotextile et d'un matériau de remblai afin de restaurer la protection de la géomembrane. Des trous d'animaux ont été observés sur le site de Baker Lake, du côté sud des réservoirs 4, 6 et 8. Il est recommandé d'évaluer si les géosynthétiques sous-jacents ont été endommagés. La géomembrane des 20 cuves de carburant Jet A sur le site de Baker Lake reste exposée, mais peu d'eau s'accumule dans la zone de confinement. La géomembrane s'est déchirée dans le coin sud-ouest des cuves, où la réparation n'a pas tenu et où la membrane doit être réparée à nouveau pour rétablir le confinement. Il est recommandé de rester vigilant pendant la crue printanière et tout au long de l'année pour gérer l'accumulation d'eau dans la zone de confinement.

Il est recommandé de suivre la performance des cinq ponceaux installés dans la route de Vault lors de la crue printanière. Une série de deux ponceaux est installée entre les lacs NP1 et NP2 à proximité du site de Meadowbank; les ponceaux sont en bon état et stables malgré la déformation à leurs extrémités. Une autre série de trois ponceaux est installée plus loin sur la route vers la fosse Vault, et ces ponceaux sont tous partiellement effondrés au milieu.

Les fossés de dérivation Ouest et Est de Meadowbank et leurs éléments de contrôle des sédiments, ainsi que les fossés de dérivation du site de Whale Tail Mine, étaient en bonne condition, à l'exception de quelques éboulements qui peuvent potentiellement affecter leur capacité si les matériaux tombent dans le fossé. Le fossé était visiblement sec la majeure partie de l'année, mais WSP recommande de continuer à l'inspecter pendant la crue printanière.

La zone d’entreposage des matières résiduelles, l’étang de gestion des eaux usées (Stormwater Pond), la piste d’atterrissage et le mur de soutènement du concasseur à Meadowbank, ainsi que les diffuseurs, la zone d’entreposage des matières résiduelles, la rampe de l’étang d’atténuation et le mur de soutènement de l’infrastructure d’enlèvement des débris métalliques de Whale Tail Mine étaient en bonne condition. À Meadowbank et au site de Whale Tail Mine, les zones d’entreposage des sols contaminés étaient en bonne condition.

Study Limitations

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Abbreviations

Abbreviation	Definition
AEM	Agnico Eagle Mines Ltd.
AWAR	all-weather access road
BC	British Columbia
CSB	cement-soil bentonite
El.	elevation
GPS	Global Positioning System
GSP	Groundwater Storage Pond
HDPE	high-density polyethylene
LLDPE	linear low-density polyethylene
NCIS	North Cell Internal Structure
OMS	operation, maintenance and surveillance
RSF	rock storage facility
SB	soil bentonite
SWTC	South Whale Tail Channel
TARP	Trigger Action Response Plan
TH	thermistor
TSF	tailings storage facility
VDV	Vista Data Vision
VWP	vibrating wire piezometer
WRSF	waste rock storage facility
WSP	WSP Canada Inc.
WTD	Whale Tail Dike
WTHR	Whale Tail Haul Road
WTS	Whale Tail South

Units

Symbol	Definition
°	degree
°C	degree Celsius
%	percent
h	hour
ha	hectare
m	metre
m^3	cubic metre
m^3/d	cubic metres per day
m^3/h	cubic metres per hour
mg/L	milligrams per litre
mm	millimetre
mm/s	millimetres per second
tpd	tonnes per day

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1.0 INTRODUCTION

Agnico Eagle Mines Ltd.'s (AEM) Meadowbank Complex mandated WSP Canada Inc. (WSP) to conduct the 2024 annual geotechnical inspection, pursuant to the requirement of Type A Water Licence Permit No. 2AM-MEA1530 and 2AM-WTP1830 for the Meadowbank Complex, Nunavut, including the Meadowbank and Whale Tail Mine sites.

Under Part I, Item 12 (pages 23 and 24), AEM is required to undertake an annual geotechnical inspection of its facilities between the months of July and September.

The following structures were inspected at the Meadowbank site:

- Dewatering dikes (East Dike, South Camp Dike, Bay-Goose Dike, and Vault Dike)
- Tailings storage facilities (TSFs; Stormwater Dike, Saddle Dam 1, Saddle Dam 2, Saddle Dam 3, Saddle Dam 4, Saddle Dam 5, Central Dike, and North Cell Internal Structure [NCIS])
- South Cell Pond and North Cell pond (reclaim ponds)
- Geotechnical instrumentation
- All-weather access road (AWAR) and site roads (culverts and bridges at water crossings in particular)
- Quarries on site and along the AWAR
- Landfill and contaminated soil storage and bioremedial landfarm facility
- Bulk fuel storage facilities at the mine site and in Baker Lake
- Shoreline protection
- Sediment and erosion control structures
- Other structures: sumps, airstrip, crusher retaining wall, waste rock storage facility (WRSF) till plug, RF1 RF2, Stormwater pond, diversion ditches (Meadowbank and Baker Lake)

The following structures were inspected at the Whale Tail Mine site:

- Dewatering and water management dikes (Whale Tail Dike [WTD], WRSF Dike, IVR Dike, and Mammoth Dike)
- Dewatering jetties and attenuation ponds (Whale Tail and IVR)
- Geotechnical instrumentation
- Whale Tail Haul Road (WTHR) and site roads (culverts and bridges at water crossings in particular)
- Quarries and eskers along WTHR
- Bulk fuel storage facilities
- Shoreline protection and diffusers
- Sediment and erosion control structures
- Underground Ore Stockpile Saline Ditch, Underground WRSF Saline Ditch, IVR Diversion Ditch, and South Whale Tail Channel (SWTC)

- Landfill and contaminated soil storage and bioremedial landfarm facility
- Other structures: sumps and non-contact water management infrastructures

The geotechnical instrumentation analyses were based on data collected by AEM and shared with WSP via the Vista Data Vision (VDV,2024) online application. WSP had access to the VDV application only during geotechnical instrumentation analysis, and the graphs are not included in the report.

The 2024 geotechnical inspection was conducted from July 19 to 26 by Marion Habersetzer, a professional geotechnical engineer from WSP. During the inspection, the weather was sunny with daily temperatures varying between 7°C and 25°C. The inspection was scheduled at the time of year when the seasonal depth of thaw (active layer) is expected to be near its maximum. Surface water flow is generally low to moderate at this time of year. Peak water flows typically occur during the spring thaw (mid-June through mid-July).

This report describes the geotechnical aspects of the areas inspected and presents general observations and recommendations. Figure 1 shows the main mine site area.

1.1 Scope Limitations

The scope of the inspection is limited to the geotechnical aspects of each facility listed in Section 1.0. The inspection did not include other assessments such as structural, mechanical, or environmental. For additional information related to the limitations of this scope, reference should be made to the Study Limitations provided at the beginning of this report.

1.2 Roles and Responsibilities

The visual inspection sections of this report were prepared by Vanessa Andrade, P.Eng. and Marion Habersetzer, P.Eng., who was the on-site lead for the Meadowbank Complex 2024 geotechnical inspection. These sections were reviewed by Fiona Esford, P.Eng., senior lead and technical reviewer for this mandate.

The instrumentation data review sections of this report were prepared by Vanessa Andrade under the supervision of Fernando Junqueira, P.Eng., and Fiona Esford, P.Eng.

2.0 PRIORITY LEVEL DEFINITIONS FOR RECOMMENDATIONS

In this report, each recommendation is assigned a priority level. The ranking system is used to help AEM determine the priorities of the recommendations. Priority levels and descriptions are based on those in the *Health, Safety, and Reclamation Code for Mines in British Columbia* (Ministry of Energy and Mines 2017) and the associated Guidance Document.

The priority levels and descriptions presented in Table 1 are used in this document. It is recommended that status of each recommendation be reported on in the next geotechnical safety system inspection for a follow-up and/or closeout, as appropriate. The recommendations are presented in each section below and summarized in Table 2. Structure refers to any kind of geotechnical structure assessed during the geotechnical inspection, including dams, storage facilities, roads, bridges, and others.

Table 1: Priority Levels and Descriptions

Priority Level	Description
P-1	A high priority or actual structure safety issue considered immediately dangerous to life, health, or the environment; or a significant risk of regulatory enforcement.
P-2	If not corrected, could likely result in structure safety issues leading to injury, environmental impact, or significant regulatory enforcement; or a repetitive deficiency that demonstrates a systematic breakdown of procedures.
P-3	Single occurrences of deficiencies or non-conformance that alone would not be expected to result in structure safety issues.
P-4	Best Management Practice – further improvements are necessary to meet industry best practices or reduce potential risks.

3.0 MEADOWBANK DEWATERING DIKES

The dewatering dikes at Meadowbank include East Dike, South Camp Dike, Bay-Goose Dike, and Vault Dike. East Dike has been in operation since dewatering of the northwest arm of Second Portage Lake was completed in 2009. Bay-Goose Dike and South Camp Dike became operational in July 2012 when dewatering of the Bay-Goose Basin was completed. Construction of Vault Dike was completed in March 2013 and phase 2 of dewatering of Vault Lake was completed in 2014.

The most current version of the operation, maintenance and surveillance (OMS) manual (AEM 2024b) is dated January 2024 for the Meadowbank dewatering dikes. The most current version of the overall Emergency Response Plan for the mine (AEM 2023) is dated September 2023. It is good practice to review these documents each year to maintain updated information, particularly the 24-hour contact names and phone numbers.

A detailed visual inspection of the dewatering dikes is performed by AEM once a month, except for the structures in permafrost (Vault Dike, South Camp Dike, Saddle Dams 1 to 5, NCIS, RF1- RF2, and Stormwater Dike; having a frozen foundation on the upstream side), which are inspected monthly from May to September only. More frequent routine inspections are conducted as required by the OMS manual depending on the Trigger Action Response Plan (TARP) level. The monthly inspection reports were reviewed as part of the annual inspection. Most of the instruments on East Dike, South Camp Dike, and Bay-Goose Dike are connected to a system that automatically collects and transmits data every three hours. Instrument data can be found in the VDV software and are checked regularly (every three days at a minimum) by the mine environment team. A review of instrumentation data for the Meadowbank dewatering dikes is presented in the following sections. During the year, monthly instrumentation reviews on the dewatering dikes are conducted by mine personnel and findings and internal recommendations are compiled in a follow-up file. Access to instrumentation data in VDV was provided by AEM for all structures on site for WSP's review. Continued monitoring and review of instrumentation data is recommended. In the case of significant variation in instrumentation data, the designer should be notified according to the OMS manual. A significant variation is defined by a change compared to usual seasonal trends and the evolution of the event should be monitored to identify its causes and consequences, as well as appropriate actions to be taken.

Figure A1 shows a plan view of East Dike, Figure A2 shows a plan view of South Camp Dike and Bay-Goose Dike, and Figure A3 shows a plan view of Vault Dike. Figures A1 to A3 indicate locations of the photographs taken and observations noted during the inspection.

3.1 East Dike

East Dike is located on the east side of Portage Pit and isolates the northwestern arm of Second Portage Lake. Dewatering of the northwestern arm of Second Portage Lake allowed for the development of Portage Pit and the construction of the TSF. At the time of inspection, East Dike served as an access road to the northern portion of Bay-Goose Dike and has not been used as a haul road since 2011.

East Dike is approximately 800 m in length and was constructed within Second Portage Lake prior to dewatering. It consists of a wide rockfill shell with downstream filters and a soil bentonite (SB) cut-off wall that extends to bedrock up to 8 m below lake level.

3.1.1 Field Observations during Inspection

At the time of the 2024 inspection, no new deformation was observed. No signs of sloughing or settlement were observed on the structure or in the downstream area. No sign of internal erosion was noted in the turbidity measurements (Section 3.1.2.5).

Three seepage zones were identified in the past near the downstream toe of East Dike (at Sta. 60+247, 60+498, and 60+575). The zones at about Sta. 60+247 and Sta. 60+498 each have a seepage collection sump with a pump connected to a year-round pumping system. At the time of inspection, the seepage was being captured within these sumps. According to AEM, the zone at about Sta. 60+575 has visually more water than usual in the spring, but with small ponding water in summer and no flow observed during the inspection. No sign of new seepage on the ground surface or downstream was observed.

An unusual seepage event was observed in winters 2021 and 2023 (seepage drained to the surface of the downstream toe accompanied by a pressure rise in nearby instruments of South Channel), providing some historical background evidence for the repeated occurrence. No visual sign of unusual seepage was observed during the inspection in July 2024. In 2023, seepage appeared to report to a different area after the first observations and bypassed the collection trench previously built by AEM, which seemed to convey water successfully until that point. Instrumentation data continued to show predictable reactions of piezometric pressure to pathway restrictions and clearing (snow and ice removal). This suggests evolving seepage daylight locations are likely due to continuing restrictions of seepage pathways with freezing foundations.

From the visual inspection, the performance of East Dike is satisfactory since:

- no visual signs of slope instability or erosion were observed on the upstream and downstream rockfill slopes
- no visual signs of significant cracking or settlement were observed on the dike and along the cut-off wall alignment, besides minor desiccation cracks
- freeboard is adequate

3.1.2 Geotechnical Instrumentation Data Review

Instrumentation was installed within East Dike and includes piezometers, thermistors, inclinometers, and flow meters (Tables 1 and 2 in Appendix I). The inclinometer at Sta. 60+195 was destroyed in the past and not replaced. Replacing the instrument is not necessary; however, East Dike should continue to be monitored and if anomalous conditions are observed, inclinometer replacement should be re-evaluated.

The following subsections present a summary of the data collected between September 2023 and August 2024. Previous annual geotechnical inspection reports contain additional information regarding instrumentation data collected prior to September 2023.

3.1.2.1 Piezometers

Three arrays of multilevel vibrating wire piezometers (VWPs) are installed within East Dike:

- South Channel (Sta. 60+190)
- North Channel (Sta. 60+490)
- North Shallows (Sta. 60+700)

At each location, multilevel VWPs were installed:

- Upstream side of the cut-off wall, approximately 2 m from the centreline.
- Immediately downstream of the cut-off wall, approximately 2 m from the centreline.
- Farther downstream of the cut-off wall, approximately 10 m from the centreline.

Single VWPs were also installed downstream of the cut-off wall near the contact area (base of cut-off wall and top of the bedrock surface). VWP-400-C have followed seasonal trends, with a decrease over the last 3 years (a decrease of 3 m when compared with 2023 data). In 2024, the VWP followed the historical trend.

Since 2022, VWP-440-C, VWP-500-C, and VWP-510-C started to exhibit similar trends and should continue to be monitored. VWP-440-C cooled slowly in recent years and recorded temperatures close to 0°C during summer 2024. During the winter of 2021 and 2023, ponding water and seepage have been observed associated with a yearly pressure increase in the South Channel (Section 3.1.2.2). The VWP 440-C also registered head fluctuation in April and December 2024.

Some piezometers installed in the East Dike are broken or malfunctioning, probably due to freezing (Table 1 in Appendix I). These instruments give either no data or erratic data. Pore water pressure values in VWP-550-C varied between 126.9 m and 214.3 m between 2014 and 2021, and the piezometer was flagged as partially functional. Since 2021, data inconsistencies have decreased, the pore water pressure recorded was between 134.7 m and 137.7 m, and the piezometer is considered fully functional.

Piezometer data show that, in general, pore water pressure was stable compared to past recorded values with a trend of slow increase possibly related to freeze-back of the pit walls.

Specific observations were made for the three piezometric arrays located at Sta. 60+190, Sta. 60+490, and Sta. 60+700.

Sta. 60+190

At Sta. 60+190, observed levels are consistent with expectations for a functioning cut-off wall. There is a consistent drop in the hydraulic head across the cut-off. The general trend in piezometric readings was steadily increasing since 2014 and the increase is accelerating since 2019 in P1 instruments. In February 2021, a large pressure increase (up to 2.5 m) was observed in lines P1 and P2 of piezometer 60+190; while in the field, water was observed ponding at the downstream dike toe and freezing in place. The increasing pressure trend continued at a slower pace until June 2021. Temporary pressure releases were observed after ice and snow were removed from the dike toe, allowing water to flow until it froze again and suggesting ice blockage at the dike toe contributed to the observed pressures. This trend is interpreted to be associated with restriction of the seepage pathway downstream of the dike. The identified cause was confirmed, most likely after discussions between WSP, AEM, and the Meadowbank Dike Review Board members during the Meadowbank Dike Review Board meeting held in November 2021. Following this event, the seepage collection system was amended to improve water collection near the surface.

In the winter of 2023, a similar behaviour was observed with slightly less effects and a significant temporary pressure release was recorded in April 2023. Similar to 2021, warmer temperatures were correlated with slower pressure increases. The onset of freshet with temperatures above freezing led to complete dissipation of the pressure anomaly and return to normal piezometric levels in all instruments, which confirms this repeating seepage pattern is consistent with processes assumed in 2021.

As with other sections of East Dike, the increasing pressure is associated with progressive freeze-back of the foundation. At Sta. 60+190, the thermal sensors still indicate thawed conditions except for the P1 line, which was frozen from mid-April to July 2024. In 2023, pressures in P1 sensors exceeded P2 sensors, indicating a continuation of the seepage pathway restriction. Deep instruments (A and B series) are still showing a cooling trend, and shallower instruments (C series) are still showing consistent yearly trends. In 2024, the same trend was observed, with less pronounced peaks, but a switch in the pressures recorded by P1 and P2 was registered, i.e., P1 exceeded P2 pressures.

As observed in past years, in 2024 no instrument froze in the winter (except for the P1 line, which is starting to freeze seasonally with no sign of damage) and the temperature data indicate the presence of seepage. Since temperature fluctuations at 190-P1-C do not show seasonal variations correlated to air temperature in contact with the ground surface, it is highly probable that seepage water from the upstream side of the dike is responsible for the thermal behaviour. In 2022, the recorded piezometric pressure was decreasing towards the downstream side and with elevation, which seemed to indicate that flow was occurring towards the pit. This was not observed in 2023 given the recorded piezometric pressure at the P1 line is slightly higher than the one recorded at the P2 line, likely linked to freezing of the foundation rather than seepage increase. Given hydraulic head response is consistent with the expectations of a functioning cut-off wall, it is reasonable to assume that seepage water is originating from a different part of the dike. Foundation freeze-back appears to affect the seepage pathways and the area will require continued close monitoring in the future as new pressure build-up episodes are likely to happen in winter. In 2024, as occurred in 2023, the recorded piezometric pressure at the P1 line is slightly higher than the one recorded at the P2 line. P3 shows higher pressures then P1 and P2 for all period of 2024 inspection.

Sta. 60+490

At Sta. 60+490, flow through the dike is observed since the piezometric pressure is very similar before and after the cut-off wall (490-P3-B versus 490-P2-B in particular). There is one spike increase in the hydraulic head in the spring (490-P1-C and 490-P2-C, on 2024-07-10). These spikes are usually attributed to pumping interruptions from maintenance or discharge changes from the lake to the pit. Signs of seepage are also observed in thermal instrumentation data associated with the piezometric array. The general trend in piezometric readings of the bedrock has been steadily increasing from 2014 to 2022. In 2023, no particular annual increase was noted. Notably, 2024 has seen a resurgence in the increasing trend. At Sta. 60+490, the thermal sensors indicate still unfrozen conditions, although 490-P1-C is approaching freezing seasonally. The Piezometers P-470, P-472, P-480, P-500 and P-510 shown a stable range of temperatures comparing to previous years.

There is a correlation between lake temperature variations and those recorded by the piezometric array at this location, and the temperature data follow the same trend with very little time offset. Piezometric and thermal trends correspond to the seepage zone observed at Sta. 60+498. The recorded piezometric pressure decreases towards the downstream side and with elevation, which is indicative of flow occurring towards the pit.

Sta. 60+700

P1-A and C are no longer operational since November 2022 and P1-B since November 2023. P3, located at upstream shows higher temperatures then P2, at downstream. P3-A displays positive temperatures all long the year, while P3-B is partially frozen, following seasonal temperatures trends. General trend in piezometric readings has been steadily increasing since 2014 and the increase seems to be accelerating since 2019 and should be monitored. Freeze-back of the foundation observed at Sta. 60+700 (P3- B) is likely causing the rise in pressure, from June to October approximately.

Temperature data are consistent with observations noted during previous years and indicate mostly frozen conditions.

3.1.2.2 Thermal Regime

Five thermistor strings with 16 nodes at 1 m intervals are installed at East Dike. Instrumentation data for the September 2023 to August 2024 period are consistent with historical trends by having slow long-term cooling trends. Specific observations of each instrument for the period analyzed are provided.

In addition to thermistors, thermal sensors of piezometers installed in the cut-off wall and bedrock along the centreline at 60+550, 60+600, and 60+650.

Sta. 60+092 and Sta. 60+842

Thermistors installed at Sta. 60+092 and Sta. 60+842 are located on the southern and northern abutments. The thermistor at Station 60+092 was non-functional since September 2020. Additionally, thermistors at Station 60+842, which were not shown in VDV in 2023, are now available but appear to be malfunctioning. The upper 1 m of the dike of the northern abutment is still in the active layer and there was typically little to no change in the ground thermal regime over past years. Since the dike is still in operation for several years and the abutment is subject to develop and aggregate ice lenses, it is recommended to replace those strings of thermistors to monitor the thermal regime until the post-closure phase of the mine.

Sta. 60+185

The thermistor string installed in the South Channel at Sta. 60+185 (bedrock about 6 m below water surface at elevation [El.] 127 m) recorded the following temperature variations, similar to previous years:

- The upper layer of the cap material (from El. 136 m to El. 134 m) was thawed in September 2023 and frozen during the winter period (active layer, from Feb. 2024 to July 2024), from July to August 2024 it became thawed again. The active layer shows significant fluctuations in temperature, from 1.8°C to -9.6°C. The material between El. 134 m and 132 m remains frozen the most part of the time, from Dec. 2023 to Apr. 2024 some positive temperatures, with maximum about 0.5 °C). Note that during the inspection of 2023 it remained frozen (i.e., maximum temperatures of 0°C).
- The cut-off wall below El. 132 m remained thawed all year with a maximum temperature of 2.9°C. This result concurs with potential seepage inferred from the thermal behaviour at 190-P1-C at Sta. 60+190. However, 190-P1-C is farther downstream from the dike and the lag between maximum 190-P1-C and the data seem to suggest that water is originating from a different part of the dike structure closer to Sta. 60+490.
- In general, the thermistor (Sta. 60+185) displays a temperature rise of +0.5°C compared to the values found in the 2023 inspection for upper layer of the cap material (From El. 136 m to El. 134 m) and cut-off wall layers.
- The bedrock portion of the dike (below El. 126 m) remained thawed. The bedrock had a temperature variation between 1.1°C and 2.7°C (difference of +0.1°C when compared with 2023 inspection).

Seepage is observed downstream and collected in a seepage station, which was amended in 2021 and 2022 following the newly observed seepage at the downstream toe surface. To better understand the behaviour of the South Channel area and detailed seepage pathway restriction, additional thermistors were installed downstream of the South Channel in May 2022, between Sta. 60+232 and 60+267, at a distance from the toe (32 to 145 m from the centreline). Thermistors at 60+232 and 60+233 showed that the till and bedrock were frozen during the period of 2024 inspection. The thermistor at 60+267, which is farthest from the dike, showed the till remained frozen and the bedrock marginally thawed below El. 114.5 m (up to 0.15°C) during the winter 2023-2024. A cooling trend seems present (after May 2024) as expected but should be confirmed with additional years of monitoring. The same thawing trend was detected during the 2023 inspection.

Sta. 60+485

The thermistor string at Sta. 60+485, installed within the North Channel (bedrock at approximately El. 126 m, 7 m below lake level), indicated the following temperature variations similar to previous years:

- The upper portion of the cut-off wall located in the lake (from El. 136 m to El. 132 m) was in an active zone. Significant temperature fluctuations were recorded (10.0°C to -16.1°C).

- The cut-off wall below El. 132 m and the bedrock remained thawed during the year with significant variations in temperature (between 11.9°C and 0°C).

Thermal variation observed within the cut-off wall below El. 132 m and in the bedrock is significant, with fluctuations between above 11.9°C and slightly above 0°C. From September 2023 to August 2024, there was a positive correlation between recorded temperatures and upstream lake temperatures, indicating advective flow through the dike (i.e., recorded temperature changes are primarily a result of temperature changes in water flowing through this area). The delay between changes in recorded temperatures within the lake and within the cut-off wall is minimal. Temperature responses recorded in piezometer at Sta. 60+480 is also significant. Temperatures in piezometers at Sta. 60+190 P1-C, Sta. 60+450, Sta. 60+490 P1/P3 and Sta. 60+500 also react with lower amplitudes. At the edge of the seepage area, temperature sensors in piezometer 400-C show cooling trends in the foundation, suggesting the seepage is getting more constrained as foundation freeze-back occurs. Seepage is observed downstream, collected in the sump and removed via the pumping system.

Sta. 60+695

The thermistor string installed in the North Shallow at Sta. 60+695 (bedrock at approximately El. 128.5 m, 4.5 m below upstream lake level) recorded the following temperature variations:

- The thermistor beads from El. 136 m to 134 m indicate the upper portion of the cut-off wall thawed between July and August 2024 and froze during the winter (active layer), similar to previous years. The recorded temperature variations were between 7.6°C and -17.1°C.
- The thermistor beads from El. 134 m to 127 m indicate the cut-off wall and till between these elevations remained frozen throughout the monitoring period, with temperature fluctuations between 0°C and -7.8°C. The frozen depth was steadily increasing from 2018 to 2023, indicating continuous strong freezing trends. In 2024 a decreasing in freezing was observed.
- The temperature recorded in the bedrock was positive during the period of 2024 inspection (varied between 0°C and 0.8°C increasing with depth.

In addition to thermistor data, piezometer thermal sensors confirm the general cooling trend observed between Sta. 60+550 and 60+650. At Sta. 60+700, central piezometers (P2 lines) are entirely in permafrost, while the upstream line (P3) remains seasonally thawed in contact with lake water. Downstream piezometer P1 is nonfunctional.

3.1.2.3 Inclinometers

Two inclinometers are installed at East Dike at Sta. 60+495 and 60+705 (Table 2 in Appendix I). Inclinometer displacements are referenced along Axis A and Axis B. Axis A is perpendicular to the cut-off wall alignment (positive displacements are towards the Pit side), while Axis B is parallel to the cut-off wall (positive displacements are towards the increasing chainage), and perpendicular to Axis A.

Recorded displacements for both inclinometers are small, with a maximum cumulative displacement of 35 mm along the AA axis at the crest, towards the pit side. From 2023 to 2024, no significant movement was observed for any inclinometer, which were all relatively stable since 2014. The recorded displacements are well within tolerable displacements for the structure and are not a concern.

3.1.2.4 Seismograph

No peak particle velocity measurements (measured by the peak vector sum) were taken in 2024 for East Dike since no blasts occurred in the vicinity of East Dike.

3.1.2.5 Flow Meters

Downstream toe flow is measured using the flow meter installed at the outlet of the two seepage collection sumps downstream of East Dike. Both stations are connected; the flow meters were non-functional from November 2023 to June 2024. The average flow measured during the available period (June to December 2024) was around 12 m^3/h. Winter flow is considered more representative of the seepage, with no incidence of precipitation and snowmelt. It was hypothesized in 2023 that changes to the seepage collection system potentially caused more volume pumping from the seepage compared to previous years, without the general rate increasing. This will be confirmed with a longer period of monitoring.

Since the winter of 2020/2021, annual field observations and recorded pressure increases in the instruments at East Dike suggest the establishment of a new seepage pathway. This prompted the amendment of seepage collection stations and flow meters to improve seepage monitoring and rate measurement. WSP still recommends installing a flow meter at each seepage collection station to measure seepage rates independently, along with measuring turbidity at each station instead of only sampling total volume to provide more information on turbidity origins during change events. AEM measured turbidity at each station during freshet of 2022 and found similar values at both sampling stations, but did not repeat the procedure in 2023 and should continue in the future to detect change.

During 2023, water quality in the sump was monitored by the environmental department every week during freshet and the summer season. According to procedures, water was pumped in Portage Pit instead of being sent to Second Portage Lake when total suspended solids criteria were exceeded (occurred on April 29, 2023). Over the past years, total suspended solids were usually acceptable during the winter until the freshet

The performance of East Dike is satisfactory based on instrumentation data such as:

- Seepage rates, while higher than anticipated in the design (expected to be between 300 and 600 m^3/d), are stable compared to historical winter seepage values and are controlled by the pumping system in place. The total suspended solids criterion is usually low enough (usually below 10mg/L in 2024) for water to be released in Second Portage Lake, except during freshet and summer. In 2023, discharge was switched to the pit in April due to a damaged diffuser. According to AEM, the diffuser was fixed, and lake discharge is ongoing since October 2024 (after the 2024 annual inspection).
- Piezometric, thermal, seepage, and inclinometer data do not show deteriorating conditions.
- Unusual seepage observations occurring yearly since 2021 are well documented and investigated at each occurrence, and processes identified from the AEM and WSP analyses are not likely impacting East Dike performance. The confidence in the interpreted processes increased after observing similar behaviour in the instruments in 2024. No changing seepage pathway was noticed during the 2024 inspection.

A photographic log and record of inspection for East Dike is provided in Appendix A1.

3.2 South Camp Dike

South Camp Dike is located south of the plant site area and is used to connect the mainland to South Camp Island. South Camp Dike, in conjunction with Bay-Goose Dike, isolates a portion of Third Portage Lake (Bay-Goose Basin) that allowed the development of Goose Island Pit and the southern portion of Portage Pit. It covers a narrow channel, approximately 60 m wide, with shallow water depths ranging from 0.5 m to 1.0 m.

South Camp Dike has a broad rockfill shell with bituminous geomembrane liner installed on the upstream side. Compacted granular material mixed with bentonite was placed above the toe of the liner. The liner was installed on native frozen (permafrost) till material in a trench approximately 3 m to 5 m below the lakebed surface. At the time of inspection, South Camp Dike was used as an access road to connect the southern part of Bay-Goose Dike and the contractor garage area with the mine facilities.

3.2.1 Field Observations During Inspection

An ultramafic waste rock stockpile about 10 m high is located 20 m away from the downstream dike toe. The distance between South Camp Dike and the waste rock dump is sufficient to allow complete visual inspection of the downstream area of the dike. It is recommended to continue clearing the downstream dike toe to facilitate inspection. The downstream toe and slope area were in good condition.

Water was ponding on the downstream side of South Camp Dike but no flow was observed. Limited variations are observed in the amount of water over time depending on weather conditions, and the situation has remained stable for several years.

No geotechnical issues or seepage were observed during the inspection.

A photographic log and record of inspection form for South Camp Dike is provided in Appendix A2.

3.2.2 Geotechnical Instrumentation Data Review

Two thermistor strings are installed on the upstream side of South Camp Dike. SD-10 is located near the liner toe. SD-09-A is located approximately 20 m farther upstream within Third Portage Lake. Based on thermistor data, no signs of seepage are evident, and recorded values follow historical trends.

The following summarizes observations regarding the thermal regime at these locations:

- The SD-09-A is not functional since November 2022. Temperature profile at SD-09-A on the upstream side of the dike in 2022 showed soils located beneath the dike foundation and liner remained frozen (permafrost) below El. 127 m. An unfrozen interval is observed between El. 127 and 129 m. An active layer is present between El. 131 m and 133 m.
- The temperature profile at SD-10 shows the dike foundation below the thermal cap remained frozen all year.

3.3 Bay-Goose Dike

Bay-Goose Dike is located within Third Portage Lake on the southern side of Portage Pit and encompasses Goose Island Pit. Bay-Goose Dike, in conjunction with South Camp Dike, isolates a portion of Third Portage Lake (Bay-Goose Basin).

Bay-Goose Dike is approximately 2,200 m long and consists of a wide rockfill shell with downstream filters and a cut-off wall. For the majority of the dike, the cut-off wall extends to bedrock and consists of SB and/or cement-soil bentonite (CSB). For portions of the dike where the cut-off wall was not constructed to bedrock, jet grouting of the soil between the base of the cut-off wall and the bedrock was performed, which extended the low permeability element of the dike to the bedrock surface. The water depth beneath the dike is up to 9 m, with a maximum depth to bedrock below lake elevation upwards of 20 m.

Instruments to monitor and assess dike performance are installed on Bay-Goose Dike, including piezometers, stopwatch and a plastic bucket to measure flow rate, thermistor strings, and inclinometers. Every blast in the vicinity of the dike was monitored for blast vibration during mining of the Meadowbank pits, but monitoring has terminated since blasting activity has ended.

The crest of Bay-Goose Dike was resurfaced with fine ultramafic rockfill in 2023 to restore the crest after past deformations. Two depressions were observed in the crest but not interpreted to be associated with dike deformation since this was due to coarse material under and fine material on top of the rolling surface.

3.3.1 Field Observations during Inspection

Tension cracks observed in 2013 and 2014 on the upstream side within the thermal cap (between approximately Sta. 32+100 and 31+750) were no longer visible during the 2024 inspection after the crest of the dike was resurfaced in 2023. Around Sta. 31+430, old cracks and depression (3 m long, 5 mm wide) are still detectable but less visible after the resurfacing. This followed a recommendation from past years and will allow better detection of any new deformation. The crest surface was in good condition. These areas should still continue to be monitored to detect if additional signs of deformation develop.

Seepage channels and water accumulation were observed at the dike toe during the inspection (North Channel, Central Channel, Central Shallows, and Channel 3). There is currently no downstream seepage collection system at the downstream dike toe since the amount of seepage arriving downstream is currently too small to require such a system. Part of the seepage seems to drain to the pit. Flow from these channels is monitored by various stations. At the time of the inspection, stations 6 and 7were active and no turbidity was observed in the water at the downstream toe. Section 3.3.2.5 provides flow rate measurements. Visually, the area downstream of the dike appeared similar to previous years (averages).

Water was observed flowing in the North Channel during the inspection at Sta. 30+420 m. The flow was low and not measurable. According to AEM, water was observed ponding at the toe during the year. Due to the topography, it is possible that water is ponding in this area from a nearby seepage channel (i.e., near the northern abutment). It is recommended to regularly inspect this area, monitor the flow of water, and be aware of signs of seepage from the dike toe and in Pit E4.

Water flow was observed in the Central Shallow seepage channel during the inspection at Sta. 30+625 and Sta. 30+655. The flow was low and within the within the trend of past years.

A water pond formed by the Central Channel seepage was observed downstream at Sta. 31+165. The mine pumps this pond several times in the summer, and piezometers showed a response to the pumping. Inflow was not monitored in this area since 2015. It is recommended to keep measuring water inflow when pumping the water pond formed at the Central Channel.

Water flow was observed at Channel 3 during the inspection at about Sta. 31+500 m. The flow was low and within the trend of past years. A drainage channel dug in the ring road nearby allows water to flow freely into the pit. According to AEM, water has entered the pit from this location through a drainage ditch for years.

A water pond was observed downstream at Sta. 31+750 between Channel 2 and Channel 1, between the toe of the dike and the pit access road, this pond has been observed multiple years.

Downstream of Channels 1 and 2 no water was observed at the time of the inspection. Water accumulation was observed farther downstream against Goose Pit ring road. According to AEM, water is observed downstream in that area during freshet season and naturally drains to Goose Pit without reaching the dike toe. Instrumentation near Sta. 32+000 (Channel 1) indicates a potential seepage zone in that area. It is probable that seepage occurs at this location but drains directly to the pit. Instrumentation at this location should be closely monitored for changing trends.

Due to Goose Pit being mostly flooded, water inflow through the wall is no longer visible except at the top of the walls. Previously observed water inflows near Channels 1, 2, and 3 are not being monitored because the pit is not accessible anymore.

From the visual inspection, the performance of Bay-Goose Dike is satisfactory since:

- No visual signs of slope instability or erosion were observed on the upstream and downstream rockfill slopes.
- Previously observed settlement and sloughing in the thermal cap and in the upstream side of the crest is no longer visible and no new deformation was observed.
- Freeboard is adequate.

A photographic log and the record of inspection is provided in Appendix A2.

3.3.2 Geotechnical Instrumentation Data Review

Instruments were installed on Bay-Goose Dike to monitor dike performance following construction, during dewatering and operation, and into closure. Instruments include piezometers, thermistors, and inclinometers (standard type and time domain reflectometer cable). At the time of inspection, all piezometers and thermistors on Bay-Goose Dike had an automatic data collection and transmission system to the VDV database. The following subsections present a summary of data collected between September 2023 and August 2024.

The current instrumentation of Bay-Goose Dike was designed for performance monitoring from dewatering to closure based on the expected operation duration of about 10 years. In-pit tailings deposition implies that the dike will be in operation for another decade. The review of available instrumentation and its spatial distribution by AEM and WSP show that coverage is still adequate. Routine monitoring of the instruments should continue and focus particularly on areas with SB/CSB contact, areas with seepage, and areas where instruments exhibit a trend different from previous observations or unexpected variations.

3.3.2.1 Piezometers

Arrays of multilevel VWPs were installed within Bay-Goose Dike (Table 4 in Appendix I).

At each location, multilevel VWPs were installed:

- upstream of the cut-off wall, approximately 2 m from the centreline

- immediately downstream of the cut-off wall, approximately 2 m from the centreline
- farther downstream of the cut-off wall, approximately 14 m from the centreline

In addition, single VWPs were installed immediately downstream of the cut-off wall near the contact area (base of cut-off wall and top of bedrock surface) at several stations.

Some installed piezometers on Bay-Goose Dike are broken or malfunctioning, probably from freezing (Appendix I). Those instruments provide either no data or erratic data. A piezometer that has frozen at some point is unreliable since freezing water could damage the piezometer diaphragm causing a large shift in the zero-pressure reading. Therefore, it is recommended to identify potentially damaged piezometers and consider possible errors during data interpretation, correlating trends from unfrozen piezometers when possible.

From 2012 to 2024, a general trend was observed in pore water pressure measurements of most non-frozen piezometers located along the dike (upstream and downstream side). An increase in pore water pressure is observed in some instruments (Sta. 31+815 and 31+885). Historically, rising trends were attributed to ice build-up at the downstream dike toe and decreasing trends were attributed to ice melting.

A cooling trend starting in July 2012 was observed in all piezometers installed on Bay-Goose Dike. Instruments located farther on the downstream side generally record lower temperatures than instruments closer to the dike and lake. As a result, instruments on the upstream side of the dike are generally the last ones to freeze and the ones farthest on the downstream side are the first to freeze. In some sectors, most piezometers are in frozen condition while in others almost no piezometers are frozen. There seems to be a correlation between the sector in which seepage was historically observed and the number of frozen instruments. In sectors where freeze-back is occurring, pressures are generally on a slow and steady rise.

Generally, there is a drop in the hydraulic head across the cut-off wall and within the grouted bedrock in the downstream direction, and piezometer data are similar to historical trends.

In addition to the seasonal trends described above, specific trends can be observed for various dike areas, which generally coincide with seepage channels since the majority of piezometers are frozen in non-seepage channel areas.

The OMS manual provides necessary procedures to be followed in the event of significant or rapid pore water pressure increases or decreases. The designer should be advised in the event of unusual variations.

North Portion (Sta. 30+158 to Sta. 30+516.5)

The piezometric level has been stable since 2015 with cyclical variation. At Sta. 30+378.5, piezometers in P1, P2 and P3 lines measured a rapid drop in heads of about 0.9 m in August 2024, except for P1C. Piezometers P2 and P3 have progressively returned to normal levels since then. P1B registered an increase of about 2.5 m in between June and October 2024, possibly due to instrument freezing (temperatures varied from -0.6° to -0.9°). In 2023, the pore water pressure data recorded by P1-C showed an increase of 13.6 m from February to July 2023, possibly due to instrument freezing as indicated by the temperature probe (temperatures varied from -0.6 to -2.0°). In 2024, historic heads have been restored but the piezometer has remained frozen since last year. Large-scale variations are seen in pore water pressures recorded in all piezometers, with fluctuation being more pronounced on the downstream side.

Variations in pore water pressure are occurring in the zone associated with the North Channel seepage and monitored by seepage stations 8 and 9. In the past, pore water pressure typically increased in magnitude until freshet and then suddenly decreased from mining activity and rock wall depressurization in Pit E5. However, with pit walls freezing back, pressure is progressively prevented from dissipating by drainage through the wall face. Equalization of water pressures on both sides of the wall at Sta. 30+378.5 m suggest a progressive blockage of the seepage pathway downstream of the dike at this location, rather than an increase in seepage rates based on the observed decrease in visible seepage. It is possible that seepage will overtop the blockage and relocate nearby where the pathway is still open. Routine inspection will aid in detecting any new seepage locations.

The temperature recorded by the piezometers indicates a general stable trend. Section 3.3.2.2 provides details on thermal regime.

Central Shallows (Sta. 30+645.5 to Sta. 30+804)

The majority of piezometers installed in Central Shallows area have remained frozen and provide erratic data since 2023. Seepage station 7 is nearby, which was active during the summer of 2024.

As mentioned before, readings from piezometers that have frozen might not be reliable due to possible damage to the piezometer diaphragm. Visual inspections should be performed in areas where large variations in piezometric heads are measured following the thawing or piezometers that had been temporarily frozen.

Central Channel (Sta. 31+020 to Sta. 31+220)

There is a seepage zone with ponding water observed downstream associated with Central Channel. The majority of piezometers in this area are not frozen.

Since 2012, maximum and minimum recorded pore water pressures for the downstream piezometers followed usual trends, with a slight increase in the past four years. General trends levelled since mining and blasting operations ended. At Sta. 31+165, there is generally a pressure build-up from the winter onset to the freshet in June the following year. In 2024, pressure fluctuation was similar to previous years. Pressures measured downstream of the dike (P2 line) exceeded the upstream water head during the winter for several years. This is not correlated with any field observations but is linked to freezing instruments. Currently, flow rates within the usual trend exclude increased seepage at this location. As with the North Channel, a seepage pathway change is possible in the future.

On a smaller scale, pore water pressure data tend to fluctuate more during freshet than during winter. This behaviour seems to be consistent with the explanation that recorded pore water pressures are influenced by pumping of the water pond located downstream.

Channel 3 (Sta. 31+565 to Sta. 31+700)

There is a seepage zone monitored by station 6 associated with Channel 3. There is a drainage channel excavated into the ring road in the area to allow water to flow freely in the pit. The piezometric array in this area is mostly frozen and a cooling trend can be observed in recorded temperatures since 2011.

From 2018 to 2022, pore water pressure was slowly and steadily increasing, with a decrease in seasonal variation amplitudes. All piezometers show that minimum pressures have slightly increased since 2018 (0.5 m per year). This trend was not observed in 2023 when pore water pressures showed a decrease of 0.2 m since the 2022 freshet before increasing by 0.4 m, which was a greater seasonal variation compared to the previous year. In 2024 the trend was the same observed from 2018 to 2022. The head in 31+600 P1-A2, in bedrock, has been decreasing, which is similar to pressures measured in June 2022. 31+600 P1-A1 (bedrock) exhibits an increasing trend in pore water pressure, with levels approaching those of P2-A1 and P3-A1, likely due to instrument freezing (temperatures about -0.5°C). Typically, this instrument records lower pressures.

Piezometers at Sta. 31+600 located downstream now read the same values or slightly higher values than upstream instruments. This could indicate a rise in the downstream pressure due to freeze-back of the surrounding area since normal seepage rates measured in 2024 exclude an increase in the seepage at this location.

Channels 1 and 2 (Sta. 31+815 to Sta. 32+105)

No seepage was observed at the dike toe in 2024, but there is a water pond in this location that naturally drains to Goose Pit through a constructed drainage channel. Most piezometers are not frozen in this area. Water transfer from Pit A to Goose Pit in October 2023 seems to indicate a direct link between the instruments of channel 1 and some of the instruments in Channel 2 with the Goose Pit water elevation.

Recorded pore water pressures in piezometers located in Channels 1 and 2 have registered about +1.5 m increase in October 2023. The increase was due to Goose Pit water level raise, according to AEM. A rapid pressure rise trend observed in 2018 in this area (and not observed in 2023) was observed in Pz 31+815 and Pz 31+885 during 2024 inspection. During this increase, P2 water pressures exceed the upstream levels in deep bedrock, suggesting blockage of the seepage pathway similar to other seepage locations experiencing freezing. This suggests the seepage pathway may be blocked at another location where it normally flows, which was assumed for the 2018 pressure rise and subsequent smaller events. All piezometers in the area are on a steady increase since 2018, with pressure rising to 0.50 m in 2023.

Thermal data at Sta. 31+815 might indicate some sign of seepage since the thermal cooling is less pronounced and there is a wider fluctuation of temperatures recorded at this location than in other thermistors nearby.

3.3.2.2 Thermal Regime

Thirty-three thermistors (from T1 to T30 and T3’ to T5’) were installed on Bay-Goose Dike. The following observations were made from September 2023 to August 2024.

In addition to thermistors, piezometer thermal sensors installed show a general cooling trend and freeze-back of instruments over the years.

Sta. 30+134 (T1), Sta. 30+827 (T14), and Sta. 32+140 (T30) – Abutements

The three thermistors installed at Sta. 30+134 (T1), Sta. 30+827 (T14), and Sta. 32+140 (T30) are located on the northern abutment, Goose Island, and western abutments. The first node of these thermistors is about 1 m below the dike crest. The dike and its foundation have remained entirely frozen since 2011 on the northern abutment (T1), Goose Island abutment (T14), and western abutment (T30).

Piezometers at Sta. 30+158 confirm this trend with all three lines (P1, P2, P3) frozen all year long.

Sta. 30+185 (T2), Sta. 30+489.5 (T9), Sta. 30+553.25 (T10), Sta. 30+621.5 (T11), Sta. 30+650 (T12), Sta. 30+713 (T13), Sta. 31+080 (T15), Sta. 31+134.5 (T16), Sta. 31+170 (T17), Sta. 31+352 (T18), Sta. 31+752.5 (T21), and Sta. 31+820 (T22) – SB Wall

Twelve thermistors were installed in the SB portion of the cut-off wall. The main observations are:

- The wall is mostly frozen all year and followed the 2023 trends below El. 134 m, with the exception of a few nodes in T2 (El. 129 m), T9 (El. 131 m), T12 (El. 131 to 133 m), T13 (El. 131 m), T16 (below 130 m), T17 (El. 129, 131, and 133 m) and T22 (El. 131 m and below 129 m).

- The bedrock is generally frozen down to El. 119 m (T2, T13 and T18). Thermistors T09, T10, T11, T12, T15, T21 registered similar trends and show intermittent frozen trends below El. 118 m. At T16 and T22 the bedrock remained entirely unfrozen and at T17 bedrock was partially unfrozen (from 115 to 126 m).
- All thermistors except T22 show the frozen front is progressing deeper every year, with some retraction or stabilization during 2024. T22 appears to remain stable, which is to be confirmed over time.
- T18 (31+352) indicates the wall and bedrock have remained frozen.
- Piezometers at Sta. 30+645.5, located between T11 and T12, show that P1, P2 and P3 lines are frozen most of the year, with some peaks of about 7°C (April and August 2024). The piezometers also registered a temperature of about -30°C in January 2024.
- Piezometers at Sta. 31+165, located between T17 and T18, show that the P1 andP2 lines are frozen during all year, while P3 line shows temperatures from 0°C to 0.7°C.
- Piezometers at Sta. 31+815, located between T21 and T22, show that the upper three sensors in the P1 line are now in permafrost while the deeper bedrock and the P2 and P3 lines remain unfrozen.

Sta. 30+260 (T3), Sta. 30+261.5 (T3’), Sta. 30+272 (T4), Sta. 30+273.5 (T4’), Sta. 30+288.5 (T5), Sta. 30+290 (T5’), Sta. 30+330.5 (T6), and Sta. 30+827 (T14) – CSB / SB Wall

This portion of the dike contains a cut-off wall where settlement could occur due to CSB (a rigid material) sitting on top of SB (a soft material). The thermistor nodes configuration for T3 (Sta. 30+260), T4 (Sta. 30+272), and T5 (Sta. 30+288.5) involves nodes located very close together to monitor the interface between the CSB and SB materials as noted below. Thermistors T3, T4, and T5 were not installed to the designed depths, but were installed below the interface and monitor bedrock contact. T3’ (30+261.5), T4’ (Sta. 30+273.5), and T5’ (Sta. 30+290) provide readings across the CSB/SB interface.

T3 shows that the SB wall and bedrock temperature fluctuate between above and below 0°C, with the exception of a few nodes remaining frozen (El. 125.8, 126.4, 127.3) and above 129.1 m. T5 shows the SB wall is fully frozen, and the bedrock remains unfrozen at two nodes only (El. 126.4 and 127.3 m). T4 remains fully frozen all year.

Thermistor T6 indicates the SB and foundation have remained completely unfrozen below El. 130 m. From El. 130 to 133 m, the CSB wall temperature fluctuates above and below 0°C, while the dike remained frozen from El. 133 to 135 m.

No seepage directly downstream of this portion of the dike was observed; however, based on the topography, it is anticipated that seepage from the area could drain to a lower point within the North Channel (i.e., Sta. 30+360). The thermistors (T06 and T07) show the till and bedrock remained unfrozen from September 2023 to August 2024 (see details below).

Piezometers at Sta. 30+276.5, located in bedrock between T4’ and T5, show that the P1 and P2 lines are now in permafrost, while P3 line is mostly unfrozen with temperatures close to 0°C.

T14 (30+827) indicates the wall, and the bedrock have remained frozen all year.

Sta. 30+386 (T7), Sta. 30+417.5 (T8), Sta. 31+595 (T19), Sta. 31+605 (T20), Sta. 31+850 (T23), Sta. 31+880 (T24), Sta. 31+960 (T25), Sta. 31+995 (T26), Sta. 32+030 (T27), Sta. 32+060 (T28), and Sta. 32+100 (T29) – Jet-Grouted Section

Eleven thermistors were installed in areas where the bottom of the cut-off wall was jet grouted. These thermistors show the maximum frozen layer depth was above 113 m to 130 m between September 2023 and August 2024. The majority of rockfill remained frozen all year and the till and bedrock were unfrozen all year except at T19 (jet-grout was frozen), T20, and T29. A general cooling trend is observed, which is relatively slow in all instruments except in T19, T20, and T29, where it is faster.

At T19, the frozen front has reached the depth of the grouted sections (about El. 113 m).

At T20, the jet-grouted and grouted sections have been continually frozen since 2023.

Piezometers at 31+600 (located between T19 and T20) and piezometers at 32+105 (located near T2) displayed frozen conditions during 2024.

Piezometers at 32+000 between T26 and T27 show the upper two sensors (in till) in the P1 line are in permafrost, while the bedrock (most of the P2 and the P3 line) remain unfrozen.

Piezometers Thermal Sensors in Seepage Channels

North Channel (Sta. 30+158 to Sta. 30+516.5)

Temperature probes in Piezometers at Sta. 30+453.5 show progressive freezing, with the P1 line and upper sensors in the P2 line (P2C and P2B in bedrock) now frozen. Most piezometers at Sta. 30+378.5 remain unfrozen all year, except for upper sensors in the P1 line (P1C and P1B in the bedrock) that are frozen all year long and upper sensor in the P2 line (P2C at the bedrock interface), which froze for the first time between July and November 2023. A continued cooling trend is observed in the North Channel.

Channel 1 and 2 (Sta. 31+815 to Sta. 32+105)

Piezometers at 31+885 are unfrozen all year and temperatures are stable. Piezometers at 32+000 are still unfrozen except upper instruments on the P1 and P2 lines (P1B1/B2 in till and P2B2/C in till) that are frozen. Similarly, piezometers at 32+065 remain unfrozen; however, the upper sensors in the P1 and P2 line (P1B3 in till and bedrock, P2C in till) are now frozen, showing the progression of the freezing front from the abutment. A cooling trend is observed near the surface in piezometers at Sta. 32+000 and 32+065.

3.3.2.3 Inclinometers

Seven standard inclinometers were functional during 2024 inspection on Bay-Goose Dike (Tables 5 and 6 in Appendix I). Inclinometer displacements are referenced along Axis A and Axis B. Axis A is perpendicular to the cut-off wall alignment (positive displacement towards the pit side) while Axis B is perpendicular to Axis A, parallel to the cut-off wall (positive displacements towards the increasing stationing). Cumulative displacement in Axis A varied from about 23 mm towards the pit side (INC 32+065) to 45 mm towards the lake side (INC 31+180). Cumulative displacement values for Axis B varied about 32 mm towards the increasing stationing (INC 31+885) and about 25 mm towards the decreasing stationing (INC 30+390). The larger displacements happened in collar and thermal cap layers. Recorded displacements are mainly small and within tolerable displacements for the structure.

No significant movement was observed for other inclinometers from September 2023 to August 2024, which remained relatively stable since 2014. Measurement offsets were previously linked to reel replacement.

3.3.2.4 Seismograph

Seismograph monitoring of blast vibrations on the crest of Bay-Goose Dike was done for every blast at Goose Pit and Pit E4/E5. AEM analyzed monitored blast vibrations after each event. The maximum allowable peak vector sum for all dikes is set at 50 mm/s per designer recommendations. No blast was done in the reported period since mining activities were terminated at the Meadowbank site.

3.3.2.5 Seepage stations

In 2024, the total average flow of all active monitored seepage stations 6 and 7 due to seepage from the dike toe was estimated at a maximum of 4.7 m^3/d (compared to 14.8 m^3/d in 2023 and much higher values in early years of operations). Seepage rate measurements available for review in 2024 were for the month of July, and values were only slightly lower than in previous years at the same time. The measured flow does not account for inflow water from the pond at Central Channel since it had not been measured since 2015 (61 m^3/d in 2013 and 2014). Overall, seepage is relatively stable and less than anticipated and therefore not a concern.

The North Channel is being monitored by stations 8 (Sta. 30+420) and 9 (Sta. 30+380). Both stations were inactive in 2024. It is the fourth year that no measurable seepage is observed at these seepage stations, which could be linked to progressive freezing of the area.

The Central Shallow seepage channel is being monitored by station 7 and had an average flow of 3.5 m^3/d compared to 5.8 m^3/d in 2023. This is consistent with historical trends with 2024 being a drier year than 2023.

Channel 3 is monitored by station 6, which recorded an average of 1.3 m^3/d compared to 5.8 m^3/d in 2023 and is consistent with historical trends with 2024 being a drier year than 2023.

Flows observed in 2024 are considered lower than compared to previous years, with a decrease when compared with 2023 data. It is recommended to continue monitoring the evolution of the seepage at the dike toe and to continue measuring water inflows from the pond at Central Channel.

Based on instrumentation data, the performance of Bay-Goose Dike is satisfactory since piezometric, thermal, seepage, and inclinometer data do not show concerning deteriorating conditions. Although, the evolution of the North Channel and Channels 1 and 2 must be monitored.

3.4 Vault Dike

Vault Dike is located across a shallow creek connecting Wally Lake and Vault Lake at the Vault Pit area. Vault Dike was designed and constructed as a zoned rockfill dam with filter zones and an impervious upstream liner consisting of a bituminous membrane. The dike has an upstream key trench made of aggregate mixed with bentonite.

3.4.1 Field Observations during Inspection

No geotechnical concerns were identified, and Vault Dike was in good condition.

A photographic log and record of inspection form for Vault Dike is provided in Appendix A3.

3.4.2 Geotechnical Instrumentation Data Review

Four thermistor strings were installed on Vault Dike and are operation. The instrumentation is indicating the dike foundation is frozen all year long and the structure is behaving as expected with data following historical trends. Given that the remaining instruments indicate a frozen state as expected, it is considered unnecessary to replace the broken instrument.

The following thermal regime observations can be made:

- Instrumentation shows the entire foundation of Vault Dike (till and bedrock) is frozen with instruments at the centre of the dike (TH-06 and -07) showing a decrease in active layer thickness over the years (permafrost rising in the dike material). The TH-08, located in upstream area also shows that the foundation and till are frozen, with a stable active layer above 136 m.
- Upstream toe liner tie-in remained generally frozen all year long. However, the thermistor installed above the liner (TH-05) has shown positive temperatures at elevations up to 138 m since the end of August 2024, likely related with water infiltration into the key trench, according to AEM. No adverse condition resulted from this temporary thaw, but temperatures in this bead should continue to be monitored to assess this pattern.
- Active layer in the rockfill was up to 3.5 m thick in summer 2024, showing lower temperatures when compared with the summer of 2023.

4.0 WHALE TAIL MINE DEWATERING AND WATER MANAGEMENT DIKES

The dewatering and water management dikes at the Whale Tail Mine site include: WTD, WRSF Dike, IVR Dike, and Mammoth Dike. WTD has been in operation since the dewatering of Whale Tail North Pond in March 2019. The commissioning of WRSF Dike and Mammoth Dike began with freshet 2019 onset when water reached the toe of the structures. The IVR Dike was built in early 2021 and fully commissioned in 2022.

The most current version of the OMS manual (AEM 2024c) is dated January 2024 for the Whale Tail Mine dewatering dikes. The most current version of the overall Emergency Response Plan (AEM 2023) is dated September 2023. It is good practice to review these documents each year to maintain updated information, particularly the 24-hour contact name and phone number. In 2022, AEM modified some dike inspection frequencies (AEM 2022) to be incorporated into OMS manual.

A detailed visual inspection of the dewatering dikes is performed by AEM once a month except for Mammoth dike and WRSF dike, which is inspected monthly from May to September due to its presence in permafrost and stability. More frequent routine inspections are conducted as required by the OMS manual depending on the TARP level. All instruments at WTD, IVR Dike, WRSF Dike, and Mammoth Dike are connected to a system that automatically collects and transmits data every three hours. Data for all instruments can be visualized in VDV software.

A review of the instrumentation data for the Whale Tail Mine dewatering dikes is presented in the following sections. During the year, regular instrumentation reviews of the dewatering dikes is done by mine personnel, and observations and recommendation are compiled in a follow-up file. Access to instrumentation data in VDV was provided by AEM for all on-site structures for WSP's review. Continued monitoring and reviewing instrumentation data is recommended. If significant variations in instrumentation data occur, the designer should be notified according to the OMS manual. A significant variation is defined as a change compared to usual seasonal trends and the evolution of the event should be monitored to identify causes and consequences, as well as appropriate actions to take.

Figure C3 shows a plan view of WTD, Figure C1 shows a plan view of WRSF Dike, and Figure C4 shows a plan view of Mammoth Dike. These figures indicate locations of photographs taken and observations noted during the inspection.

4.1 Whale Tail Dike

WTD is a structure to isolate the Whale Tail Pit from Whale Tail Lake. The WTD is located on a shallow plateau of the lake floor with an approximate 2 m depth of water. The plateau is located between deeper sections of the lake with water depths of about 12 m. WTD is a zoned rockfill dike with a core composed of a dynamically compacted fine filter. The low permeability element of this structure is a cement-bentonite cut-off wall consisting of secant piles drilled through the densified fine filter core and anchored into the bedrock. The elevation of the cut-off wall is 157 m and covered by a 2 m thick rockfill thermal cover with a crest at elevation of 159 m. The bedrock foundation was curtain grouted to a depth of 10 m along the western section of the dike in 2018 to 2019. The foundation along the eastern section of the dike was not initially curtain grouted as it was frozen at the time of construction. The dike has an average height of 9 m and a 13 m wide crest. Upstream and downstream rockfill platforms with a crest elevation of 154 m are present, although the upstream platform is submerged by water.

The downstream side of the dike was dewatered between March and September 2019 and the Whale Tail South (WTS) Lake level upstream side of the dike is limited by discharge through the SWTC. Significant seepage was observed at the dike toe from the summer of 2019. Based on OMS V4 (January 2024) the structure presents yellow TARP level. According to the last weekly inspection report of AEM, from July 2024, the seepage is about 87 m^3/h in V-Notch. Surface seepage is collected in a trench from Sta. 0+720 to Sta. 0+300 and monitored by a V-notch weir installed in a winter-resistant shelter at the trench outlet. About 35 visible streams from the downstream toe are identified at the crest of the trench. Another 20 are identified directly at the dike toe. Two other streams in the two bays downstream of Sta. 0+430 are also observed. A sand boil area was reported by AEM at the beginning of the dike's operation at Sta. 0+365 as well as an additional visible flow area at Sta. 0+277. According to AEM following the grout injection programs, flow is about 200 to 250 m^3/h (compared with 500 m^3/h at the beginning of dike operations). The seepage is not visible but flows through the bedrock. Both visible and underground seepage appear to report to the Attenuation Pond and Whale Tail Pit (through the south wall) by gravity.

To mitigate the seepage, a grouting remediation campaign was conducted from November 2019 to March 2020 to inject a grout blanket at the interface between the fractured bedrock and secant piles, directly downstream of the cut-off wall between Sta. 0+750 and Sta. 0+176. The effectiveness of this campaign is confirmed by instrument data and observed reduction in the seepage flow rates (Section 4.1.2). AEM also constructed an esker and rockfill thermal capping at both abutments on the upstream side of the dike in 2023 to promote foundation freezing.

In 2024, AEM built a new rockfill buttress on the downstream side of WTD, at the East abutment, to mitigate thaw-induced deformations in the area. The buttress was built to the crest elevation. AEM indicated the constructed buttress is similar to that provided by SNC Lavalin as part of the original design for the dike.

4.1.1 Field Observations during Inspection

No immediate geotechnical concern was observed with WTD during the inspection. The dike is currently closed to all traffic. The thermal capping areas and the new rockfill buttress were in good condition, although with an uneven surface. According to AEM, the crest of the dike was regraded in September 2024.

Near the east abutment, movement first observed in 2021 was still visible. Visually, the deformation seemed similar to that observed in 2023, although this should be confirmed by survey. Some tension cracks (20 mm wide, a few metres long) are still visible, although less pronounced than previous years. Settlement on the downstream side of the crest near the east abutment is still visually apparent, around 500 to 700 mm. The previously observed displacement of the downstream toe (by about 700 mm in the downstream direction) was no longer visible due to the addition of the buttress. Movement still only appears downstream of the cut-off wall. Instrumentation data indicates thawing of the foundation is occurring and therefore it is interpreted that deformations are likely thaw-induced. The effect of the addition of the upstream thermal cap on the thermal regime of the foundation in this area will need to be monitored over time. According to AEM, following the construction of the thermal berm/buttress on the downstream side, movement was confirmed to be inactive. AEM will continue to monitor the area.

Three small depressions (150 mm in diameter) were observed on the downstream platform surface at approximately Sta. 0+225 and 0+350. No cracks or signs of settlement were observed around these features.

During the inspection, some water was observed flowing out of the rockfill at the downstream dike toe around Sta. 0+170, where flow was observed in 2022, and a wet area was seen in 2023. The location seems to be above the WTS water level and has no obvious correlation with runoff or nearby water discharge. Water origins were investigated by AEM in 2022 and surveyed at El. 156 m, above the lake level. The observations are consistent with previous years and the water is likely coming from ice melting in the backfill in summer, rather than seepage.

At the time of inspection in July 2024, the V-notch weir measuring seepage at the collection channel outlet in a winter-resistant shelter with instrumentation was functional with the latest reading being 73.4 m^3/h. The channel was in good condition. According to AEM, seepage rates were stable compared to previous years, about 60 to 100 m^3/h. Seepage water was clear and the pH in the seepage channel was around 9 to 10. According to AEM, laboratory values have consistently shown a pH below 8 since 2023, with only two higher values from field data in the last two years; also, the water quality has been relatively constant since fall 2019. The seepage interception system has now been dismantled. The seepage water is drained towards the Attenuation Pond for treatment.

Water discharge from the water treatment plant in WTS was located upstream of the dike at approximately Sta. 0+700 through the diffusers (Section 11.2).

4.1.2 Geotechnical Instrumentation Data Review

Piezometers, thermistors, and a seepage monitoring station are installed at the WTD (Appendix I) and have showed evidence of seepage through the bedrock since installation.

4.1.2.1 Piezometers

In general, P1 and P2 piezometers (downstream of the cut-off wall) react to pumping of the Attenuation Pond, suggesting a connection through the bedrock. The P3 instruments (upstream of the cut-off wall) show higher pressures than the downstream side. At Sta. 0+260, the P1 line farther downstream indicates higher pressure than the P2 line, closer to the wall. Sta. 0+360 is the only case near the surface of the foundation (piezometers C). This trend is not observed at Sta. 0+440, where P1 pressures are lower than P2 pressures. In general, gradients are consistent with observed seepage areas and directions. An upstream to downstream and downward vertical gradient is observed across the wall (P2-P3 lines). Lower pressure at Sta. 0+360 in the P2 line compared to corresponding piezometers at Sta. 0+260 and Sta. 0+440 suggests a lateral gradient towards the location, which is consistent with the potential seepage flow path identified by the geophysical survey.

Piezometers mostly stabilized around the beginning of August 2019 after dewatering of the downstream side and are now on a stable trend. The series of P3 piezometer generally show a link to the downstream pond level at depth (piezometers A and B) and to the lake water level within the embankment (piezometers C). The exception to this trend is PZ 0+440 P3, where all piezometers followed the lake water level trend before they stopped working in 2022. At Sta. 0+260, deeper P3 instruments (A and B), P2 instruments as well as P1A (in the bedrock) react slightly to lake level variations.

Additional piezometers were installed in the spring of 2021 at Sta. 0+550 and Sta. 0+701 and appear to have stabilized following installation and indicate a functioning cut-off wall.

In addition to the general trends, the following observations were made:

- PZ 0+260 P1C resumed a seasonal rapid increase in pressure (+1.7 m) at the end of August in 2023 and the pressure was dissipated in May 2024. Similar behavior was observed in 2020 and 2021. The large drop in pressure (about 9 m) observed in May 2022 that later returned to normal did not repeat. The process is not understood despite the instrument being confirmed functional and it must continue to be monitored. PZ 0+260 P1B also had a sharp pressure increase in February of 2024 (+1.7 m), general trend observed in 2021, 2022 and 2023 but with lower amplitude, which then slowly dissipated by May 2024. The variations do not seem linked to water level fluctuations in the Attenuation Pond or WTS lake. Of the piezometers at 0+260, only P1C froze (-0.5°C) and therefore the increase cannot widely be attributed to freezing around the instruments.

According to AEM, it was due to seepage pathway freezing and caused an ice blockage at the end of the seepage channel near the Attenuation Pond, gradually freezing the seepage channel up to the dike toe.

- PZ 0+260 P3A and B exhibit a yearly pressure rise between September and November (+0.3 m in 2023 and 2024), which then dissipates. Variations do not appear linked with Attenuation Pond level fluctuations. No piezometers at 0+260 P3 are frozen and therefore the increase cannot be attributed to freezing around the instruments.
- PZ 0+360 P1C was flagged as unreliable due to unrealistic data trends showing an excessively high increase in pressure. However, it has a unique consistent trend that seems to be seasonal for several years where a large pressure increase occurs in December (about +44 m in 2022) followed by a partial dissipation in April (about -41 m in 2023) and another spike in May (about +21 m in 2023). The pressure returned to below lake level by November. No other variation observed in other instruments is visible in PZ 0+360 P1C. The instrument is not frozen and should continue to be monitored. The same trend was registered in 2024. PZ 0+360 P1B exhibited an increase in pressure in spring 2023 and 2024 (+0.8 m), which dissipated by August. The increase was slightly delayed compared to the lake level increase at that time and may not be linked to WTS fluctuations.
- PZ 0+440: P1B is on a yearly slow rising trend between August and November (+0.8 m in 2023 and 2024), and then pressure dissipates slowly by December 2024. A new peak seems to have started also in December 2024. P2C follows the same trend, but the amplitude has remained the same since 2023. No correlation with WTS or Attenuation Pond levels is observed, and the presence of ice at the downstream toe was not observed in the winter. These instruments were noted having local trends in the past, which could indicate an unknown process could potentially involve flow across the cut-off wall; but this is not supported by thermal data. They are also exhibiting more small-scale variations (instrument noise) than other piezometers at this location. PZ 0+440 P1A does not usually react strongly to lake variations. However, its long-term slow decreasing trend was interrupted in May 2023 with a sharp increase (+0.5 m) to the same level as PZ 0+360 P1B and has dissipated in February 2024, with the pressure remaining stable after that.
- PZ 0+701 P1C and P2D showed high pressure fluctuations in the past. PZ 0+701 P1C did not exhibit this pressure increase in 2023 and showed a small decrease in 2024, and PZ 0+701 P2D showed the same behavior of past years with a large pressure increases between July and November 2024. The pressure increase was starting to dissipate at the time of drafting this report, as in previous years. AEM confirmed both instruments are functional. The trend could be linked to confined pressure with frost, but the pressure dissipating before freshet requires further investigation.

Some piezometers were flagged as frozen over the past years (PZ 0+260 P1C, PZ 0+360 P2A, PZ 0+440 P2C, and P3C) with temperatures around 0°C to -0.5°C. Readings appear normal for all these instruments, and do not suggest any apparent sensor damage. Data must be interpreted with caution.

4.1.2.2 Thermistors

Eight thermistor strings have beads showing capacitance effects. Additional relevant observations are:

- West abutment (0+110, 0+130, 0+142): in permafrost condition until August 2020 when the bedrock thawed entirely and rapidly at TH 0+142, reaching the lake temperature and suggesting seepage is currently flowing through the upper bedrock in this area. This section of the bedrock was not injected during the grouting campaign since it was still frozen. Cooling seems to be occurring in the deep bedrock after the initial thawing, and seasonal freezing below El. 148 m continued in 2023. In 2024 the trend couldn’t be confirmed because the 0+142 string displays a blank patch below El. 148 m due to capacitance effect (AEM 2024d). At the edge of the abutment (0+110 and 0+130), the bedrock is still frozen and forms the limit of permafrost.

- 0+260, 0+425, 0+475, 0+596, 0+635, 0+645: bedrock remains thawed at these locations with seemingly little amplitude in the seasonal variations. Thermistors have followed the same trend in 2024.
- 0+210, 0+240, 0+310, 0+360, 0+380, 0+453, 0+530, 0+550 (blank patches), 0+580: rapid warming in summers in the upper bedrock, similar to INC-0+560, suggesting lake connection through fractured upper bedrock in this zone. The yearly warming seems to follow the same trend of previous years. During the 2024 inspection, TH 0+360 and 0+550 have displayed some blank patches in thermal graphs.
- 0+500 and 0+520: strong seasonal variations linked to lake temperatures in summer. A potential explanation is that water may flow along the grout curtain stopping at 0+516 and seeping through the bedrock (potential seepage location). In 2024, according to AEM, a warming trend was observed in bedrock. It was not possible to verify the trend below 130 m because TH 0+520 data below this depth were considered unreliable and removed from the plot. In 2023, the deep bedrock seemed to be starting to freeze again below El. 130 m after April 2020, with cooling continuing, possibly as a result of bedrock grouting operations.
- 0+407: strong reactivity in the cut-off wall and at the bedrock interface that decreased over the years, likely as a result of grouting operations. The bedrock had been thawed since instrument installation. The beads in deep bedrock were considered unreliable and removed from the plot. In 2024, the beads are still not functional, and the trend could not be assessed.
- 0+665, 0+675, 0+685, 0+695, 0+707, 0+740: temperature variations are mainly located within the wall and in upper bedrock (warming trend is more evident in TH 0+695 and 0+707), suggesting less connectivity of the bedrock to the lake at this location. A warming trend in the wall is observed mainly in TH 0+695 and TH 0+707. This might suggest a potential defect within the wall and a seepage location within heavily fragmented bedrock. TH 0+607 was not functional from 130 m to 145 m (bedrock layer) in the 2024 inspection. Below 130 m this instrument registered thawed condition in 2024. The beads in deep bedrock still indicate unfrozen bedrock, with seasonal variation observed.
- 0+720: temperature variations seem to be mostly above the interface bedrock- fine filter, with little variations in the thawed upper bedrock (between 0°C and 3°C), following the same trend during 2024. A warming trend is observed in upper bedrock.
- Most thermistors installed upstream of the cut-off wall (0+190, 0+260, 0+336, 0+710) indicate the temperature trend within the bedrock follows lake water seasonal temperature variations since July 2019, suggesting bedrock is fractured and connected to the lake in these areas. Several beads are no longer functional on these instruments along TH 0+190 and some of them along TH 0+710.
- Upstream thermistor at 0+750: bedrock was originally in a permafrost state below El. 148 m (until 2020). However, bedrock above El. 143 m thawed after August 2020 and the thawing seems to be on an increasing trend since reacting to seasonal lake temperature variations, suggesting seepage is happening through upper bedrock in this area. This section of bedrock was not injected during the grouting campaign because it was still frozen.
- East abutment (0+790): all bedrock is in a permafrost state. All bedrock and the wall up to El. 154.5 m were in permafrost at 0+772 in 2023, but the thermistor did not provide data in 2024, while TH 0+790 showed that bedrock is entirely frozen in 2024.

- Downstream instruments (0+340, 0+618): instruments were installed away from the downstream toe to monitor foundation freeze-back. At 0+340, In 2023, bedrock remained thawed all year below El. 137 m. In 2024, the bedrock is entirely frozen, indicating a freezing back in the area. At 0+618, bedrock has remained frozen since the winter of 2022.

Based on temperature profiles and geophysical surveys conducted in 2019, AEM identified the most conductive zones (less latency and mostly following lake temperature trend), ranked as follows: 0+520, 0+453, 0+310, 0+210, and 0+675. The less thermally reactive zones (from TH 260-360-407-607) confirmed the potential seepage zone at 0+360 shown by geophysical surveys was not backed by thermal analysis, perhaps because it is in deep bedrock. However, 0+210 showed a seepage zone. In summary, likely seepage zones were identified by thermistors at:

- 0+210
- 0+500 to 0+600
- 0+650 to 0+750

These areas were targeted by the bedrock grouting campaign. Several areas showed freezing of previously thawed bedrock in 2023. In 2024, temperatures are comparable to those found in 2023. On the other hand, some areas previously in permafrost experienced a rapid thawing in 2020 (0+142, 0+750 upstream), and the trend appears be increasing for TH 0+750 (TH 0+142 was not operational below 148 m during 2024). This is likely due to seepage flow concentrating linked to the decrease in conductivity in grouted zones. For the east abutment, this correlates with observed tension cracking due to thaw-induced settlement, although the permafrost at Sta. 0+772 registered in 2023 indicate that the movement is not likely to progress indefinitely. In 2024 the instrument was not providing data, so it was not possible to confirm the trend. The seepage relocation and continued thawing of the foundation has the potential to increase the seepage rates, hence it is recommended to keep monitoring the areas and restore/replace thermistors that are not functioning, as the information is important to confirm the grouting program was successful.

In the spring of 2023, AEM constructed a rockfill capping layer on both abutments of WTD on the upstream side (east and west abutment covers). The objective of these covers is to promote permafrost aggradation within the abutment foundations. Thermistors were installed in these new areas to monitor thermal performance of the covers. As of September 2024, bedrock and overburden were frozen under the new cover at Sta. 0+130 and 0+781.

Some areas show strong reactivity to lake water temperature variations correlating with the identified seepage pathways. Thermal trends were stable for several years. In 2024, TH 0+750 registered an increasing thawed trend in bedrock. It was not possible to confirm the trend for TH 0+142 below 148 m due to a non-operational beads.

4.1.2.3 Inclinometers

Four shape-array accelerometers (inclinometers) are installed in the cut-off wall of WTD. Displacements observed are within OMS manual values (less than 50 mm cumulative displacement). Movements with an amplitude of 2 to 3 mm on the longitudinal axis of the dike were observed at some other locations but are within the instrument precision limit. The X-axis is toward downstream of the dike, while the Y-axis is east to west.

There is a seasonal cooling and warming trend observed in the inclinometer thermistors that are within the cut-off wall, and the same is observed on both the piezometer temperature and thermistor strings. The following observations were made for the different inclinometers:

- INC-0+205: the cut-off wall has moved slightly towards the downstream side (about 5 mm) and towards the west (about 3 mm). No significant movement was recorded in 2024. The thermistor suggests the upper bedrock is thermally connected to the lake temperature, which is confirmed by nearby thermistor TH 0+210, although the inclinometer started freezing for the first time over the winter of 2021 and shows a stable seasonal freezing trend since then.
- INC-0+366: above the platform at El. 154 m, the cut-off wall was moving slightly towards the downstream side (maximum of about 5 mm from baseline) and towards the west (maximum of about 3 mm). No significant movement was recorded in 2024. This area seems thermally connected to the lake as well through the bedrock since the thermistor shows seasonal variations in the bedrock. Progression of the freezing front is observed in the dike over the years. In 2024 the trend was stable, and no significant increase of freezing front was identified.
- INC-0+560: the portion of the cut-off wall above the platform at El. 152 m was moving towards the downstream side and the west (about 4 to 5 mm). No significant movement was recorded in 2024. The thermal regime is stable in this instrument with the bedrock fully thawed and seasonal warming at the base of the cut-off wall the freezing front varying between elevation of El. 151 and 155 m.
- INC-0+726: above El. 152 m, the cut-off wall has moved mostly towards the upstream and west with observed displacements of about 5 mm. No significant movement was recorded in 2024. The bedrock had been thawed since 2019, but started to freeze during the winter of 2021 above El. 147 m. In 2024 the instrument registered the same trend of previous years.

4.1.2.4 Flow Meters

The seepage flow that daylights at the downstream dike toe is collected into a trench where two V-notch weirs are installed (one in a box, one in a culvert). Some areas of seepage are not collected but only visually assessed, accounting for about 100 m^3/h in 2020, and stable since then according to AEM. In 2024, according to AEM, the flow not captured by the trench is estimated to be around 25 m^3/h, and the total seepage is about 100-125 m^3/h, including what is captured by V- Notch.

In 2024, the flow rate estimated by V-Notch readings was around 80 m^3/h, with a maximum during freshet of 112.8 m^3/h in the culvert V-notch weir. The minimum rate was estimated at 43.3 m^3/h in April 2023. These rates are within the same order of magnitude, but lower, than previous estimates based on pumping rates. Pumping rates were used to estimate the seepage rate in the past when the V-notch weir was not functional and AEM previously estimated a maximum of 100 to 150 m^3/h with this method; however, it is not as precise or consistent as the V-notch weir due to other inflows into the attenuation pond. The observed difference is therefore deemed normal and reasonable. It is important to keep a functional seepage rate measurement all year.

Grouting operations seem to have significantly decreased the seepage rate compared to 2019. Even though the impact on the non-visible seepage flowing through the bedrock is unknown and it is possible that seepage could drain to different areas of the downstream side and not be measured, inflows to the Attenuation Pond and Whale Tail Pit are reportedly steady since grouting operations and seem to confirm seepage reduction. It is recommended to keep monitoring the areas to detect any new visible seepage, such as the abutments, especially the thawing east abutment where thermal data suggest water may be flowing. Monitoring of the pumping flow within the pit alone is not considered accurate due to several water inflows from surface and other inflows from the pit wall, except in winter where no surface runoff occurs. The use of a water balance with lake level data, as AEM has done since 2023, is considered a better approach.

4.2 Waste Rock Storage Facility Dike

The WRSF Dike is a water retention infrastructure designed to prevent contact water from the Whale Tail WRSF pond from draining to Mammoth Lake. The water collected in the WRSF pond located upstream of the dike is pumped to the Attenuation Pond and treated prior to being discharged. An area of approximately 109 ha drains toward the WRSF pond. The WRSF Dike is located south of the Whale Tail WRSF. This structure is a zoned rockfill dike with a filter system. The low permeability element of the dike consists of a bituminous geomembrane installed on the upstream face up to El. 157.8 m anchored in a key trench with fine filter amended with bentonite. The key trench is excavated in frozen fluvioglacial sand and gravel type material or bedrock.

In the summer of 2019, seepage was observed at the downstream toe of the WRSF Dike along with tension cracks and settlement in the crest surface. The upstream pond was pumped out to control seepage. The origin of seepage, although not confirmed, was suspected by AEM to be linked with thawing of the foundation below the upstream toe liner tie-in and/or a defect in the liner.

During the winter of 2020, a thermal berm was built on the upstream side of the dike to promote freezing of the key trench and foundation. The thermal berm is composed of compacted sand and gravel, which was amended with bentonite up to El. 156 m and covered with a rockfill protection layer on the crest and upstream slope. A sump was excavated at the upstream toe of the thermal berm around Sta. 0+300 to pump out upstream pond water as needed to maintain the water level at the operational level at El. 154 m.

4.2.1 Field Observations during Inspection

The WRSF Dike was in good condition at the time of the inspection.

Some water was observed ponding at the downstream dike toe (approximately at Sta. 0+240 and Sta.0+300), as in previous years. No sign of flow indicating seepage was observed. The dike and upstream thermal berm were performing well. The crest rolling surface was uneven due to seasonal runoff water ponding and rutting.

A pipeline was present at the upstream toe for upstream pond level water management; the pumping system installed in the upstream sump pumps water as required but was not activate the time of the inspection due to the low water level in the sump.

No pumping was occurring in the downstream sump at the time of the inspection, and AEM indicates that it had not been required in 2024.

During the 2024 inspection, depressions (about 300 mm deep) were found upstream of thermal berm crest at approximately Sta. 0+080. According to AEM, the area was resurfaced in 2023 and depressions are likely caused by differential settlement in the aggregates due to thawing frozen material.

4.2.2 Geotechnical Instrumentation Data Review

Only thermistors are monitoring WRSF Dike. There are nine thermistor strings installed within the WRSF Dike, showing that:

- The upstream liner tie-in (TH-01) is almost entirely frozen, some positive temperatures were measured between July and September 2024 to El. 156.5 m. TH-03 is entirely frozen, which confirms the effectiveness of mitigation measures implemented to promote freezing of the tie-in.

- The exposed rockfill (TH-02, TH-04) reacted to seasonal variations (active layer above El. 155 m, showing a stable trend over time. The rockfill covered by the thermal berm (TH-03, TH-06, TH-07) remained frozen during the monitored period in 2024. TH-03 did not provide data up to El. 154 m in 2024 due to capacitance effect (AEM 2024d).
- The foundation overburden (frozen at the time of construction) remained frozen under the thermal berm between September 2023 and August 2024 (TH-06, TH-07). The overburden was still frozen under the dike at the time of inspection in August 2024 (TH-04). The upper meter of foundation under the dike seems to no longer have episodic thawing after summer 2021. The overburden upstream of the dike at 0+135 is in the active zone (TH-05). The underlying bedrock in these areas remains frozen.
- The foundation bedrock remains frozen during the entire year.
- Thermistors installed in the upstream thermal berm (TH-08 and TH-09) show the rockfill is in the active zone but most of the esker (below El. 156.5 m), as well as underlying materials, remained frozen between September 2023 and August 2024, indicating the thermal berm is performing as intended. The active zone is similar in depth in 2024 as in 2023 (El. 156.5m).

4.3 IVR Dike

IVR Dike D-1 (IVR Dike) is a water-retaining infrastructure built to prevent water from the IVR Attenuation Pond from flowing towards the Amaruq main camp area. This structure is a zoned rockfill dike with a filter system and an upstream thermal berm. The low permeability element of the dike consists of a linear low-density polyethylene (LLDPE) installed on the upstream face up to El. 165.5 m and anchored in a central key trench with fine filter amended with bentonite. The key trench is excavated in frozen glacial till or bedrock. The liner is covered with a granular material as a protective layer. IVR Dike is equipped with an emergency spillway at El. 164.8 m. Additional rockfill was placed on top of the crest near the abutments to increase thermal insulation where dike height is the lowest. The dike was built in the winter of 2021 and the till foundation outside the key trench was only prepared by removing organic materials at the surface.

4.3.1 Field Observations during Inspection

No major geotechnical concern was observed during the 2024 inspection. At the time of inspection, IVR Dike was fully commissioned, with the IVR Attenuation Pond reaching part of the upstream dike toe. The downstream area was mostly dry. Two areas with a small exfiltration of water were noted at approximately Sta. 0+320. The area is usually wet during the summer season and located farther east than the limits of the Attenuation Pond in contact with IVR Dike. These seepage zones are likely related to runoff exiting the rockfill dike rather than seepage through or under the dike. However, it is recommended to monitor the evolution of these flows and correlate the variations with changes in the Attenuation Pond level and precipitation to confirm this interpretation.

Similar to previous years, relatively small areas of settlement (300 to 500 mm) were observed on the north abutment, upstream of the thermal rockfill berm, and seemed inactive. A large area of the dike between Sta. 0+100 and 0+340 show settlement (up to about 300 mm), roughly in the footprint of the former water channel. Tension cracks were still present in the rockfill near the downstream and upstream edges of the crest in the southeastern part of the dike (southeast of Sta. 0+240). Deformations visually seem to be similar to 2023; however, this should be confirmed with detailed survey of the dike crest, which is in progress by AEM.

Deformations are likely due to settlement in the esker material upstream of the liner and rockfill after thawing during the first summer season the dike was fully commissioned, especially in the former water channel area. Instruments show the foundation is still frozen. As a result, these deformations are not a concern at the moment but must continue to be monitored to detect structural degradation. It is recommended to continue surveying the area at least yearly and follow-up on the settlement over time to confirm the understanding of the movement. No repairs are required for the current conditions from a geotechnical performance point of view, but AEM plans to restore the dike crest to its design elevation in the near future. This is a good practice to better observe new or continued deformations.

Pipes are passing along the downstream toe of IVR Dike at the time of inspection, partially blocking the emergency spillway outlet. These objects must be raised on a support at the spillway outlet to prevent blockage and to ensure spillway hydraulic capacity. If lifted on concrete blocks, the blocks should be placed outside of the spillway outlet and a horizontal support should be placed between them so that no obstruction is left within the spillway. The existing wooden support for the cables does not provide sufficient clearance and pipes are still on the ground.

4.3.2 Geotechnical Instrumentation Data Review

Only thermistors are monitoring IVR Dike. There are seven thermistor strings installed within IVR Dike.

Instruments show the following trend since first year of operation of IVR Dike:

- The rockfill dike remained frozen below El. 163 m (IVR-TH-04) with temperatures ranging from -25°C (Feb. 2024) to 0°C.
- The key trench remained frozen below El. 163.5 m (IVR-TH-01, IVR-TH-05). Temperatures in the key trench show seasonal variation with the warmest period being in winter due to the time delay but remained below 0°C all year (below -4°C at the bottom of the key trench). The coarse filter (from El. 160 m to 162 m) remined frozen during the summer of 2024 (IVR-TH-02).
- The foundation till and bedrock remained frozen (IVR-TH-02, IVR-TH-03, IVR-TH-04) with temperatures ranging from -11.3°C to -1.9°C in the till, and -7.3°C to -5.0°C in the bedrock, warmer than temperatures ranges found in 2023.
- The upstream thermal berm remained frozen below El. 163.5 m (IVR-TH-03).
- The overburden and bedrock at the downstream edge of the dike footprint remained mostly frozen in 2024 (IVR-TH-06) with temperatures ranging from -9.5°C to 0.4°C (during August 2024) under the rockfill. This layer remained frozen during 2023. Upstream of the dike (IVR-TH-07) remained frozen below El. 160 m, while the exposed upper layer of overburden thawed like in previous years.

4.4 Mammoth Dike

Mammoth Dike is a water-retaining infrastructure built to isolate Whale Tail Pit from Mammoth Lake. Mammoth Lake receives water from WTS Lake through the SWTC, treated water from the Attenuation Pond, and from the Northeast Sector. Mammoth dike is located across the northeast finger of Mammoth Lake. This structure is a zoned rockfill dike with a filter system. The low permeability element of the dike consists of a bituminous geomembrane installed on the upstream face up to El. 153.5 m and anchored in a key trench with fine filter amended with bentonite. The key trench is excavated in frozen glacial till or bedrock. The liner is covered in a granular material protection layer.

4.4.1 Field Observations during Inspection

No geotechnical concern was observed during the inspection. Water was ponding about 20 m away from the downstream toe in the low topographical point. No sign of flow indicating seepage was observed.

The crest of the dike is slightly uneven due to seasonal runoff water ponding, and it was dry at the time of inspection. It is recommended to resurface the dike as a good practice to better allow for detection of any deformation.

4.4.2 Geotechnical Instrumentation Data Review

Only thermistors are monitoring Mammoth Dike. There are three thermistor strings (TH-01, TH-02, and TH-03) installed within Mammoth Dike.

The instruments show that the foundation bedrock remains frozen underneath the dike, with an active layer above El. 152 to 153 m. The upstream liner tie-in is entirely frozen.

5.0 TAILINGS STORAGE FACILITY

The TSF is located within the dewatered portion of the northwestern arm of Second Portage Lake and consists of North Cell and South Cell. South Cell comprises Central Dike, Saddle Dam 3, Saddle Dam 4, and Saddle Dam 5, all built to El. 145 m. North Cell comprises peripheral structures, Saddle Dam 1, Saddle Dam 2, RF1, and RF2. North Cell was internally raised with the construction of the NCIS to a variable elevation ranging from 152 to 154 m. Stormwater Dike is an internal structure separating North Cell from South Cell. A plan view of the TSF is shown in Figure 1.

A retention basin and a series of diversion ditches surround the catchment basin of the North Cell. These structures are designed to convey surface water runoff away from the TSF. Since 2014, Western Diversion Ditch water was collected within a retention basin prior to being pumped within the North Cell when water quality was inadequate due to turbidity problems from side slope erosion. Three temporary retention basins and one ditch are constructed within the North Cell at the downstream toe of the NCIS to collect seepage and runoff from the structure. Section 10.2 provides details on the inspection of these diversion structures.

North Cell is being progressively closed in sections. Closure cover placement (capping) was temporarily suspended in 2019 through 2023 for the resumption of tailings deposition within the NCIS area. As of 2024, capping has progressed, including a small portion near the eastern end of SWD and along the North Cell Dikes. The South Cell capacity in 2024 is about 800,000 m^3according to AEM. Water is transferred as needed from North Cell to South Cell to control the water elevation of North Cell, and excess water from South Cell is pumped to Pit A. The OMS manual for the TSF includes alert criteria based on reservoir levels and clear responsibilities to manage rising water level situations to avoid overtopping of the structures.

In the summer of 2014, an engineered tailings barrier was constructed along RF1 and RF2 to mitigate migration of tailings through RF1 and RF2. Progressive closure cover placement has included this area and RF1 and RF2 thermal capping were placed in 2023. Section 10.3 provides details of the inspection of these structures.

The most current version of the TSF OMS manual (AEM 2024a) is dated January 2024 and the most current version of the overall Emergency Response Plan for the mine (AEM 2023) is dated September 2023. An update is in progress by AEM, which is good practice to maintain updated information annually, particularly the 24-hour contact names and phone numbers.

An inspection of the TSF is performed once a month by AEM. Instruments are automatically read every three hours, since 2017. Monthly inspection reports were reviewed as part of the annual inspection and provided satisfactory information about the evolution of the structures. A summary of instrumentation data obtained from the TSF is presented in Section 5.1.2 and Section 5.7.2. Access to VDV for instrumentation data was provided to WSP for review. Continued monitoring and review of instrumentation data is recommended. In the case of a significant variation in instrumentation data, the designer should be notified according to the OMS manual. Significant variation is defined by a change compared to usual seasonal trends and the evolution of the event should be monitored to identify its causes and consequences, as well as appropriate actions to take.

Figure B1 shows a plan view indicating the location of the pictures and general observations related to North Cell and South Cell, as well as the NCIS. Figure B2 contains a plan view showing the location of photographs and observations noted on Stormwater Dike. Figure B3 contains a plan view showing the location of photographs and observations noted on Saddle Dam 1, Saddle Dam 2, and Saddle Dam 3. Figure B4 contains a plan view showing the location of photographs and observations noted on Central Dike, Saddle Dam 5, and Saddle Dam 4.

5.1 General Observations of the Tailings Facility

5.1.1 Field Observations during Inspection

Consistent with the TSF design and standard operating practices captured in the OMS manual, a tailings beach must always be present against all peripheral structures; except Saddle Dam 3, which has a modified design to allow water ponding.

At the time of inspection, ponded water in the North Cell was limited and located toward the facility centre, and there was a tailings beach against the peripheral structures to protect from ice in the winter and prevent water migration out of the TSF (Figure 1 provides an approximate location of the tailings beach). Tailings elevation in North Cell varied between approximately El. 149.5 m and 152.1 m and pond elevation was at El. 146.5 m. Tailings beaches against the structures of North Cell were adequate. The NCIS is built partially on North Cell tailings and partially on rockfill cover placed over the last few years for closure operations. Tailings deposition was completed in the TSF in 2023. Tailings deposition is now occurring within the pits. No water was observed channeling close to the dikes.

At the time of inspection, tailings elevation in the South Cell had decreased by about 0.7 to 1 m since 2021 when the surface varied between approximately El. 132 and 144.6 m due to consolidation. South Cell Pond was kept low, with a pond elevation of El. 138.8 m. As a result, water in South Cell was no longer ponding against the south part of the downstream toe of Stormwater Dike, and a tailings beach was present against all the Stormwater Dike. This is a favourable point for South Cell closure and environmental concern given Stormwater Dike foundation presents some open windows of exposed fractured bedrock that may contribute to feeding seepage at Central Dike. A tailings beach developed against Central Dike and Saddle Dams 4 and 5. At the time of inspection, no tailings deposition occurred at South Cell since it was inactive for several years; however, AEM considers resuming deposition there in the future to enhance the landform for closure and optimize the residual capacity that increased with tailings consolidation.

At the time of inspection, Saddle Dams 3, 4, and 5 were operational, with no water ponding against the erosion protection of Saddle Dam 3 and adequate tailings beaches against Saddle Dams 4 and 5. Permanent sumps were not yet installed on the downstream side of Saddle Dam 4 and Saddle Dam 5, and water accumulation is pumped as required. A permanent sump is in operation on the downstream side of Saddle Dam 3. Due to the thick tailings coverage, it is no longer deemed credible that rising water levels on the downstream side could cause geomembrane uplifting, however pumping of the toe is a good practice for visual inspections. In general, the TSF was observed to be as dry as in previous years following pond drawdown.

No depressions in the tailings were observed this year during the inspection, nor reported by AEM, beyond normal settlement features due to water drawdown. The small sand boil-like features with limited surrounding depression observed in the tailings surface of North Cell between Stormwater Dike and the rockfill capping around Sta. 11+100 and 10+650 in 2022 were no longer visible due to the area being capped with rockfill. Part of the North Cell tailings are still unfrozen, mostly at depth and towards the reclaim pond, and are subject to consolidation under the weight of the capping.

Photographs of North Cell and South Cell of the TSF are provided in Appendices B1 to B7.

5.1.2 Geotechnical Instrumentation Data Review

The nine active thermistors installed in the North Cell tailings of the TSF (Table 12 in Appendix I) indicate the tailings are not entirely frozen, including in the talik area where the reclaim pond remained during operation.

1) NC-T1 (NC-16-01) registered data from June 2018 to July 2021. During this period, the instruments showed a thawed bedrock with a range of temperatures from 1.5°C to 2.6°C. In 2021, unfrozen conditions were attributed to the supernatant water pond close to the instrument as it was always beneath the supernatant pond during tailings deposition.

2) NC-T2 (NC-16-02) shows the tailings and bedrock have remained unfrozen below El. 121.5 m, with temperatures ranging between 0.6°C and 0.8°C. Unfrozen conditions were attributed to the instrument being directly beneath the supernatant water pond. Between El. 124.5 m and 145.5 m, tailings remained frozen. An active layer is present in the tailings above El. 145.5 m.

3) NC-17-01 shows the tailings and bedrock have remained frozen since 2023, with temperatures ranging between 0°C and -6.8°C.

4) NC-17-02 shows the tailings and bedrock did not freeze in 2024 below El. 134.6 m, with temperatures ranging between 0°C and 0.4°C. Unfrozen conditions were attributed to the supernatant water pond near the saddle dams close to the instrument. Between El. 134.6 m and 146.6 m, tailings remained frozen. The depth of the frozen layer is slowly increasing over the years.

5) NC-17-03 shows similar data to NC-17-02 with the same cooling trend near the surface. Unfrozen conditions were attributed to the supernatant water pond between RF1 and RF2 close to the instrument.

6) NC-17-04 shows the bedrock and tailings have remained frozen in 2024 below El. 144.5 m, with temperatures ranging between 0°C and -6°C. An active layer was observed in tailings above El. 146 m in 2023; in 2024, the trend cannot be confirmed as data from the beads were removed above this elevation.

7) NC-17-05 shows the tailings and bedrock has remained entirely frozen. No active layer was observed in the tailings.

8) NC-17-06 shows the tailings and bedrock have remained frozen below El. 145 m, with temperatures ranging between -9.7°C and -2.4°C. An active layer is observed in the tailings above El. 145 m. Some beads are not functional since 2022. The need to obtain thermal information should be reviewed and a replacement thermistor installed, if deemed necessary.

9) NC-17-07 shows the tailings and bedrock have remained frozen below El. 146 m, with temperatures ranging between -16.8°C and 0°C. An active layer is observed in the tailings above El. 146 m.

10) NC-17-08 shows the tailings and bedrock did not freeze in 2024 below El. 137.5 m, with temperatures ranging between 0°C and 2°C. Unfrozen conditions were attributed to the instrument being directly within the supernatant water pond. Tailings remained entirely frozen above El. 137.5m in 2024.

The temperature profile measured in thermistor SWD-01 is discussed in Section 5.5.2.

5.2 Saddle Dam 1 – North Cell

Saddle Dam 1 is located in the northwestern corner of the TSF and forms one of the North Cell perimeter structures intended to retain tailings and supernatant fluid during the operation and closure of the TSF. Saddle Dam 1 crosses a depression between the northwestern arm of Second Portage Lake and Third Portage Lake.

Saddle Dam 1 is a rockfill embankment with a 3H:1V upstream slope and a 1.3H:1V downstream slope. This structure has inverted base filters, upstream graded filters, and a LLDPE geomembrane liner on the upstream dike face. The geomembrane liner is placed between an upper and lower non-woven geotextile layer for protection, and is covered by approximately 0.3 m of granular material up to El. 140 m. No granular layer was placed above El. 140 m and the liner is exposed above that elevation. According to the design, a tailings beach must be maintained on the face of the structure to reduce the potential for ice damage to the liner. Abutments are founded on bedrock, while the central portion of the dike is founded on ice-poor soil. Till and/or crushed aggregate mixed with dry bentonite powder were placed above the liner toe.

In 2023, the downstream toe area was capped with rockfill to reduce water accumulation as part of the progressive closure of the TSF.

5.2.1 Field Observations during Inspection

During the inspection, it was observed that Saddle Dam 1 is performing well and does not show any geotechnical concern. An adequate tailings beach was observed along the upstream face of Saddle Dam 1. A stockpile of fine filter material was present on the north part of the dike since 2011 and poses no geotechnical concern. Liner damage observed in 2023 had been repaired.

A permanent dewatering pump is installed downstream within a sea-can container. Water was not observed ponding near the sump since the foundation was backfilled in 2023 to reprofile the toe area and improve drainage. Water was observed flowing through the rockfill platform while pumping was not active. Pumping is done during freshet and as necessary during summer. The environment department is monitoring water quality during the year and the information is shared with the water management team. Water quality results indicate the water is not seepage from North Cell. Given the foundation of Saddle Dam 1 is now frozen and therefore the weight of tailings will preclude any liner heave, it will be possible at a later stage to remove this pumping station and rely on the backfilled surface to promote natural drainage of the water towards Third Portage Lake. However, water quality should continue to be monitored and reported, until such time it is deemed unnecessary as part of the closure works and legal requirements.

A photographic log and record of inspection form for Saddle Dam 1 is provided in Appendix B2.

5.2.2 Geotechnical Instrumentation Data Review

Instrumentation on Saddle Dam 1 comprises thermistors as detailed in Table 9 of Appendix I. Four thermistor strings (T1, T2, T3, and T4) are installed on Saddle Dam 1 and automatically read every few hours following the installation of dataloggers in 2017. Three thermistors (T1, T2, T3) are installed to monitor the thermal condition within the structure and its foundation. The fourth thermistor string (T4) is installed along the upstream face of the dam to monitor the thermal condition of the tailings.

Thermistor data (T1 and T2) from within the structure indicate the dike foundation has remained frozen since 2009.The thermistor T3 has not provided data since 2020. The foundation soil and bedrock remained in a frozen state. The majority of the rockfill shell remained frozen during the reported year as the active layer was 2 m above El. 147 m indicated by Thermistor T4. Instrumentation indicates the structure is behaving as expected with data following historical trends.

No sign of seepage or thawing of foundation soil can be observed from instrumentation data, and so the structure is performing as expected.

5.3 Saddle Dam 2 – North Cell

Saddle Dam 2 is located along the western side of the TSF and connects to the western corner of Stormwater Dike. Along with Saddle Dam 1, this dike forms one of the North Cell perimeter structures of the TSF that retain tailings and supernatant fluid during the operation and closure of the TSF. Saddle Dam 2 crosses a depression between the northwestern arm of Second Portage Lake and Third Portage Lake.

The upstream foundation of the dike and abutments are primarily founded on bedrock; however, some portions of the structure, underneath the inverted filter, are founded on ice-poor soil. During construction, a thin layer of low permeability till was placed and compacted along the toe liner tie-in connection with bedrock. A thin layer of crushed aggregate (0 to 22 mm) mixed with dry bentonite powder was also placed under the thin layer of low-permeability till in areas where open fractures were observed within the bedrock. The toe liner tie-in was then covered with till.

In 2023, the capping of tailings near Saddle Dam 2 began, and this process has continued into 2024 as part of the progressive closure.

5.3.1 Field Observations during Inspection

During the inspection, it was observed that Saddle Dam 2 is performing well and does not show any geotechnical concern. An adequate tailings beach was observed against the upstream side of the structure. Punctures on the liner were observed along the previously noted drag marks around Sta. 20+520, probably from moving pipes. Additional small holes were observed in the liner at the top of the slope, around Sta. 20+370. The holes should be repaired before placement of the closure cover in that area.

Placement of granular filter on the liner slope was done during the inspection as a preparation for capping in that area. It is recommended to make sure that the liner repairs are complete before finishing the granular cover.

Some tension cracks are observed in the crest and downstream berm (at Sta. 20+110 and 20+500), which is made of uncompacted rockfill. This does not pose any geotechnical issue at the moment.

During the inspection, some ponding water was observed on the downstream side within the rockfill embankment (between approximately Sta. 20+275 and Sta. 20+475), which was observed since the 2015 annual inspection, and the instrumentation indicates the foundation remains frozen. Per AEM, water was ponding at that location for a long time. The water is runoff water and is tested by the environmental team regularly during open water season.

A photographic log and record of inspection form for Saddle Dam 2 is provided in Appendix B3.

5.3.2 Geotechnical Instrumentation Data Review

Instrumentation on Saddle Dam 2 comprises thermistors as detailed in Table 10 of Appendix I. Four thermistor strings (T1, T2, T3, and T4) were installed at Saddle Dam 2 to monitor the thermal condition within the structure and its foundation. T4 has not provided date since 2021.

Thermistor data from within the structure indicates the dike foundation remained frozen from September 2023 to August 2024 with temperatures ranging from -3.8°C to -7.8°C. At the upstream dike toe, the semi-pervious backfill remained frozen during the year. The rockfill mostly remained frozen with an active layer above El. 146.75 m. Instrumentation indicates the structure is behaving as expected with data following historical trends.

No signs of seepage or thawing of the foundation soil were observed, and so the structure is performing as expected.

5.4 North Cell Internal Structure – North Cell

The NCIS is located within the northern section of the TSF North Cell and is built over existing North Cell tailings with the rockfill cover placed over the last years for closure operations.

The NCIS is designed and constructed as a permeable zoned rockfill dam with filter zones, built on the top surface of North Cell dried tailings and on the existing rockfill cover. The bulk part of the NCIS consists of coarse rockfill material. The upstream face is designed at a 3H:1V slope and the downstream face is designed at 1.5H:1V slope. The NCIS upstream face comprises two granular filter zones designed to prevent tailings migration and internal erosion, while allowing water to flow through the embankment. A system of ditches and sumps at the downstream toe of the structure is designed to collect seepage and runoff water.

In 2023, AEM completed a NCIS extension at its western extremity to connect the structure to the periphery of the North Cell and allow tailings deposition in that area. Construction was done following the original design cross-section of the dike.

5.4.1 Field Observations during Inspection

The last tailings deposition at the NCIS occurred in 2021. As of 2024, capping has progressed, including a small portion near the eastern end of SWD and along the North Cell Dikes. Channel features in the tailings indicate supernatant water mostly flowed well towards the west side of Stormwater Dike where water is transferred into the South Cell, and no more water channelling was observed at the upstream toe of the eastern part of the dike due to a rockfill capping placed along the toe of the dike in this area. The area was dry at the time of inspection. Most of the tailings surface was dry at the time of inspection.

In the eastern area where the rockfill capping was placed at the toe of the dike, the fine filter slope had also been repaired and the dike was in good condition. It is expected that the capping will act as a stabilization buttress and prevent additional toe settlement and slope cracking.

Tension cracks (up to 20 mm wide) were still observed in the fine filter slope in part of the east sector of the dike, mostly outside of the capped area, and in the newly built slope of the western extension. The coarse filter is not exposed at the moment and the filter system is still functional. It is recommended to monitor crack development and repair the fine filter again, if the coarse filter is exposed, to ensure appropriate filter system performance; especially prior to any additional tailings deposition in this North Cell area to optimize the landform.

Some traces of old deformations from 2019 outside of the repaired sector remained visible but appeared stable.

In a few locations along the dike, the fine filter was previously eroded from the top of the slope in a vertical washout scar, likely by water being discharged from a pipe on the crest or from spring runoff. All these features were repaired prior to the 2024 inspection and no new sign or erosion was noted. If water discharge resumes from the crest of the dike, a sacrificial liner could be placed on the filter slope at the discharge location to protect the filter from wash out.

Small tension cracks were observed in the upstream slope of the collection ditch at the western extremity of the dike. This is not yet an issue, but the situation should be monitored, and the slope repaired if material starts to slough into the ditch to ensure flow capacity. Pumping stations on the downstream side of the dike are in place and working as needed. AEM indicated incoming water is from runoff and not seepage. North Cell capacity to store the inflow design flood must be ensured continuously during tailings deposition.

A photographic log and record of inspection form for the NCIS is provided in Appendix B1.

5.4.2 Geotechnical Instrumentation Data Review

Four vertical thermistor strings were installed on the NCIS crest, with three operational as detailed in Table 8 of Appendix I. NCIS-01, NCIS-02, NCIS-03, and NCIS-04 show frozen tailings and an active layer within the rockfill (above El. 149 m). All thermistor graphs currently display blank patches. While the graphs for NCIS-03 and NCIS-04 remain readable, those for NCIS-01 and NCIS-02 are significantly affected. According to AEM (AEM 2024d), the instrumentation review during the summer 2024 revealed certain thermistor beads exhibited a capacitance effect. Consequently, the beads were removed from the plots. No signs of seepage or thawing foundation soil were observed. Functional beads do indicate frozen foundation and tailings. If deemed necessary by AEM to restore full monitoring capabilities of the NCIS, new thermistor strings could be installed, which would address blank patches in the data and ensure a comprehensive data set across all thermistor graphs.

Sixteen prisms are installed on the NCIS crest. Prisms were not read in 2024. According to AEM (AEM 2024e) the prisms have not been monitored for some time. AEM has opted for drone surveying during the summer months, which provides much greater coverage. The latest surveys are still being processed internally. It is recommended that control points be defined and GPS-surveyed regularly to support processing of the unnamed aerial vehicle survey as well as provide a means to check the survey accuracy. The existing prisms could be used for this purpose.

5.5 Stormwater Dike

Stormwater Dike is an internal structure subdividing the TSF into North Cell and South Cell within the dewatered northwestern arm of Second Portage Lake. Stormwater Dike can no longer be considered a temporary structure since it is not projected to fill South Cell to the same elevation as North Cell. Therefore, an elevation difference between tailings elevations on both sides will remain. For this reason, it is recommended to review design basis criteria accounting for the actual dike configuration and construction and whether it will continue to behave in a satisfactory manner in post-closure conditions. The work could be carried out by the Engineer of Record but should be reviewed by the dike designer.

In this document, the North Cell side is taken as upstream and the South Cell side as downstream.

Stormwater Dike is a rockfill embankment structure. The upstream slope is approximately 3H:1V and the downstream slope is about 1.3H:1.0V. A bituminous geomembrane liner was installed above graded filters on the upstream dike face. Low permeability till was placed and compacted along the upstream dike toe as liner tie-in.

The majority of the dike is seated on dense till from the former lakebed within the talik, with lakebed sediments still present in some areas, while abutments are generally founded on bedrock.

According to AEM, closure capping reached the eastern portion of the Stormwater Dike in 2023 (approximately from Sta. 10+550 to Sta. 11+100 m) and in 2024 the capping placement adjacent to SWD continued (approximately from Sta. 10+550m to Sat. 10+450 m)

5.5.1 Field Observations during Inspection

Since 2016, tension cracks and signs of settlements were noticed on the Stormwater Dike crest in a repeated pattern over the years. The most probable cause of the movement was settlement due to soft sediment thawing from ponding water rising in South Cell through the Stormwater Dike foundation. To mitigate possible foundation failure, a rockfill buttress support was constructed at the downstream toe of Stormwater Dike in South Cell (from approximatively Sta. 10+300 to Sta. 10+700). After the movement had stopped during each episode, the cracks were filled with bentonite. This is a good practice to limit water infiltration within the cracks.

The structure was in good condition during the inspection. Some new cracks (about 5 mm wide, 4 to 5 m long) were observed on Stormwater Dike at the time of inspection in 2024, in the same area as previous years. It is possible these new cracks are desiccation cracks; however, it should be monitored for change over time. Old cracks and settlement areas were still visible but appeared inactive.

Several seams in the exposed liner, between Sta. 10+100 and 10+600, appear to be deteriorating and are opening. The degree of damage to the welds under the liner surface, where the panels overlap, is not known. The faulty seams should be repaired if the closure concept requires to maintain the hydraulic barrier at Stormwater Dike. Large rocks were also seen on the liner around Sta. 10+350 and should be removed, liner respected and repaired if required before placing granular material on the liner for continuation of the capping.

During the annual inspection, the downstream dike toe was not visible since it was entirely covered by tailings. The tailings surface was very uneven against Stormwater Dike. According to AEM, the hummocky tailings surface at the SWD toe is attributed to settlement and melting of entrapped ice. Closure capping reached the eastern portion of SWD in 2023 (approximately from Sta. 10+550 to 11+100). In 2024, capping continued adjacent to the SWD (approximately from Sta. 10+550 to 0+450). The liner and tailings are entirely covered, and no more ponding water is visible except at the edge of capping around Sta. 10+450 to 10+500. No sand boil-like features were visible in the exposed tailings from the dike, which was previously the case in the tailings along the eastern part of the dike, now capped.

A photographic log and record of inspection form for Stormwater Dike is provided in Appendix B4.

5.5.2 Geotechnical Instrumentation Data Review

Three thermistors, two piezometers, and 20 prisms are monitoring Stormwater Dike (Table 13 in Appendix I). Previously installed extensometers and crack meters were disconnected, but AEM reconnected some in summer 2022 for monitoring purposes.

SWD-01 is installed on the upstream side of Stormwater Dike within the North Cell tailings. This thermistor shows a stable trend at all depths and indicates that tailings and bedrock did not freeze between September 2023 and August 2024 below El. 133 m, with temperatures ranging between 0°C and 2.0°C. Unfrozen conditions were attributed to the supernatant water pond being close to the instrument and the Talik zone beneath the previous lake. Temperature readings indicated the tailings between El. 133 m and 148 m remained frozen throughout the year. No active layer was observed since 2020. SWD-02 is not providing data since 2019.

SWD-03 is installed on the downstream side of Stormwater Dike (approximately Sta. 10+690 m) within the stabilization buttress and is covered by the South Cell reclaim pond. This thermistor shows lakebed sediments, till, and bedrock have been entirely unfrozen all year since 2021, indicating Talik condition present in this area before construction has returned. This could be explained by the water and tailings overtopping the rockfill buttress, which previously allowed cold air convection in winter to cool the foundation but is now insulated from outside air variations. No visible deformations are associated with thawing of the foundation, but it must be closely monitored for deteriorating conditions. Beads at El. 114 and 119 m were not displayed, possibly due to capacitance effect (AEM 2024d).

The piezometers show a trend in pore water pressure that followed water levels in the South Cell reclaim pond but the head pattern has disconnected from pond levels since March 2020. In 2024, instruments showed the same behaviour of previous years, with pressure appearing disconnected from South Cell but still reacting to freshet inflows with a sharp pressure increase. A second, smaller increase happened later in the summer. In 2021 and

2022, the increase dissipated around October. In 2023, the pressure increase was similar to previous years, about 13 m in PZ-SWD-03-A and 11.5 m in PZ-SWD-03-B, with the first partial dissipation observed in June. Following the usual trend, pressures increased again in August. In 2024 the trend was similar to 2021 and 2022. Since installed, the two instruments were at 0°C but remained thawed since summer 2020 during a slow warming trend, which is continuing in 2024.

Prisms were not read in 2024 (Section 5.4.2). AEM (2024e) informed prisms were not monitored for some time. AEM has opted for drone surveying during the summer months, which provides much greater coverage. The latest surveys are still being processed internally. AEM reports that unmanned aerial vehicle surveys are supported by fixed control points surveyed using a GPS to validate the accuracy of the drone survey.

5.6 Saddle Dam 3, Saddle Dam 4, and Saddle Dam 5 – South Cell

The TSF South Cell consists of four perimeter structures: Central Dike, Saddle Dam 3, Saddle Dam 4, and Saddle Dam 5. Saddle Dam 3 is located in the northwestern corner of South Cell and is merged into Saddle Dam 2. Saddle Dam 4 is located in the southwestern corner of South Cell and is merged into Saddle Dam 5, which merges with the southern end of Central Dike.

Saddle Dams 3, 4, and 5 are designed and constructed as zoned rockfill dams with filter zones, low-permeability upstream liners, and upstream toe liner tie-in key trenches. Cross-sections of Saddle Dams 3, 4, and 5 consist of a rockfill embankment constructed from run-of-mine waste rock, placed in lifts, and compacted. Upstream faces are designed at a 3H:1V slope and the downstream faces are designed at a 1.5H:1V slope. The upstream faces of Saddle Dams 3, 4, and 5 are composed of two granular filter zones and a LLDPE liner extending along the upstream foundation. The filter zones are meant to maintain tailings inside the facility in case the liner punctures, but mainly acts as appropriate bedding for the liner. An upstream liner tie-in key trench excavated to bedrock and filled with compacted till is located along the upstream area of the structures.

5.6.1 Field Observations during Inspection

At the time of inspection, all dikes were operational. The water level of South Cell was below the upstream toe of the erosion protection cover of Saddle Dam 3. No geotechnical issues were observed with these structures. A section of pipe was present on the liner in the upstream slope of Saddle Dam 4 and should be removed to avoid damaging the liner. One hole was noted at the top of the lined slope near the eastern extremity of the dike. In this area, water is regularly discharged over the upstream toe-liner tie-in of Saddle Dam 4. In 2023 and 2024, discharged water channelling started eroding the granular material against the liner. It is recommended to move the discharge point to keep it farther away from the dike to avoid washing out the protective material.

During the inspection, water was observed ponding in some areas of the downstream side of Saddle Dam 4 and Saddle Dam 5. Since the downstream toe is higher than the South Cell Pond along Saddle Dam 4 and Saddle Dam 5, this water does not originate the TSF. In the sump on the downstream side of Saddle Dam 3, water is ponding at a level below the South Cell elevation.

A photographic log and record of inspection forms for Saddle Dams 3 and 4 are provided in Appendix B5 and Appendix B6, respectively. A photographic log and record of inspection form for Saddle Dam 5 is provided in Appendix B7.

5.6.2 Geotechnical Instrumentation Data Review

Five thermistors are installed at Saddle Dam 3 with three of them operational in 2024 (Table 14 in Appendix I). These thermistors are mostly in permafrost with the bedrock frozen all year and show stable trends. It is important to maintain performance of the structure since Saddle Dam 3 is operational for containing supernatant water. Additional instrumentation should be installed for closure.

Four thermistors are installed at Saddle Dam 4, with one fully operational in 2024 (Table 15 in Appendix I). These thermistors are mostly in permafrost condition with the bedrock frozen all year. The beads in the bedrock for SD4-04are not working, a new string should de installed, if this data is deemed necessary.

Three thermistors were installed at Saddle Dam 5 (Table 16 in Appendix I). SD5-T4 shows frozen bedrock and rockfill up to El. 142 m, while SD5-T2 farther downstream indicates the bedrock and rockfill are frozen up to El. 140 m. SD5-T3 indicates the bedrock and tie-in compacted till are almost completely frozen.

5.7 Central Dike – South Cell

Central Dike is located along the eastern side of the TSF and crosses a depression within Second Portage Lake. Along with Saddle Dam 4 and Saddle Dam 5, Central Dike forms one of the perimeter structures of South Cell.

Central Dike design includes a compacted rockfill embankment with an upstream seepage barrier, granular filters, and a key trench along the dike centreline transitioning on the upstream toe near both abutments. Foundation soils include lakebed sediments and till overlying bedrock. Soft and ice-rich soils were removed from the Central Dike footprint during construction.

5.7.1 Field Observations during Inspection

During the inspection, water was observed ponding at the downstream dike toe between approximately Sta. 0+300 and the southern access road at Sta. 0+830. Seepage into the basin at the downstream toe of Central Dike was observed since 2014 when tailings deposition was transferred from the TSF North Cell to the TSF South Cell. The seepage rate increased proportionally to the rise of the pond level of South Cell. Field investigations coupled with seepage-stability analyses indicated the seepage is mainly controlled by bedrock openings, and the dike is physically stable. The decrease of the South Cell water level and use of tailings to seal the bottom of the cell reduced the seepage rate, which was 76.8 m^3/h at the time of inspection and stable (Section 5.7.2). The South Cell water level was very low at the time of the inspection (El. 138.8 m) with pumping volumes similar to previous years, corresponding to precipitation only. AEM also reported the seepage rate decreased to about 15.2 m^3/h during winter, which is within the previous year stable trends. There is a possibility the seepage could flow below the instrumented zone at Central Dike and flow directly to Portage Pit downstream.

During the spring, water in the downstream pond was reported orange with high turbidity, similar to previous years. This event is monitored by AEM and was attributed to precipitation of iron oxide from bacterial processes (AEM 2017).

Central Dike is in good condition. At the time of inspection, there was a tailings beach against the entire length of the structure including the southern part, after the South Cell water level was drawn down. In 2024, tailings were being discharged into the South Cell. The geomembrane appeared in good condition.

Angular granular material (fine filter) was observed in direct contact with the LLDPE liner at Sta. 0+095, overspilling from the deposition point. The geomembrane should be cleaned to avoid puncture risk if tailings deposition resumes in South Cell (e.g., to optimize the landform for closure), or before closure cover placement.

A photographic log and record of inspection form for Central Dike and Saddle Dam 5 is provided in Appendix B7.

5.7.2 Geotechnical Instrumentation Data Review

Instruments were installed on Central Dike to monitor dike performance during construction, operation, and closure. At the time of inspection, instrumentation on Central Dike consisted of a total of 56 piezometers and 21 thermistor strings installed in 18 boreholes (Table 17 in Appendix I). Two new instruments in P3 line (0+620 and 0+725) have been installed in October 2024 for monitoring the till unit below the West Road as the water level progressively rises in Pit A. (AEM 2024e).

The following presents a summary of the data collected from September 2023 to August 2024 for the piezometers and the thermistors.

5.7.2.1 Thermistors

Thermistors were showing similar trends as in the past, with the following observations:

- Throughout the year, temperature variations up to 1°C can be observed for each bead, except in rockfill near the surface (up to 10 m deep, as shown in 580-P1 and 700-P1) where the amplitude is larger.
- **P1 line (instruments installed along the central key trench):**
  - The majority of instruments show thawed conditions within rockfill, till, and bedrock (from El. 110 m to 65 m), typically with temperatures stable, ranging between about 1°C and 2°C.
  - A cooling trend is visible in 580-P1R, which shows a freezing front is progressing downward in the rockfill reaching the till interface for the first time in winter 2023 and remained stable in 2024. It is the first instrument in the P1 line to exhibit a clear cooling trend. Another cooling trend is observed in rockfill starting from El. 70 m to 73 m (595-P1).
  - In 815-P1R a cooling trend has been observed from El. 80 m to 98 m since 2022. In 2024 this portion remained entirely frozen (with a temperature range from 0°C to -4°C.
- **P2 line (instruments installed along the downstream toe of the Central Dike footprint for a final crest elevation of 150 m):**
  - A cooling trend is visible at the dike extremities. The bedrock at 545-P2 was almost entirely frozen above El. 62 m when the instrument stopped working in 2021. At 875-P2, the base of rockfill and till are in permafrost, while the freezing front is slowly progressing at depth in the bedrock, reaching El. 96 m in 2023 and has remained stable in 2024. The deep bedrock is stable with temperatures of up to 1°C.
  - At 800-P2, the rockfill, till, and bedrock remain thawed, and temperatures were stable (1.1°C to 1.6°C in till and bedrock). 650-P2 shows a similar situation (between 0°C and 0.85°C in till and bedrock).
- **P3 line (downstream of Central Dike):**
  - Thermistors 465-P3 and 1050-P3 show stable permafrost conditions in bedrock. Slow cooling in the upper bedrock is visible at 1050-P3 until 2022. No available data for this instrument in 2024 (blank patches above El. 130 m).

- Thermistor 650-P3 remains in mostly frozen condition. Between 2020 and 2023, the instrument seemed to indicate thawing from El. 60 m to 75 m and close to 90 m, which could have been related to water and tailings deposition in nearby Portage Pit. However, since 2023, the thermistor has registered freezing trends and no thawing was observed. Several beads on this instrument now indicate a capacitance effect in 2024. The new thermistor installed in October 2024 (620-P3) also measures frozen condition within the bedrock, till, and rockfill; with temperature variations between -2°C and -1°C until El. 119 m, and -0.4°C and 0°C above El. 119m. The 725-P3 thermistor also shows similar trends.
- Thermistor 800-P3 is mostly stable, with till and bedrock unfrozen below El. 105 m. The upper till is only partly frozen. A very slow cooling of the bedrock and till layer is observed.
- Thermistor 875-P3 shows a cooling trend in till and bedrock layers. The 975-P3 installed near Portage Pit showed bedrock remained unfrozen below approximately El. 99 m, with temperatures ranging from 0°C to 1°C. A freezing trend is observed in these two instruments and seems to indicate permafrost conditions has developed in part of the Portage Pit wall.
- The thermistor installed in West Road (745-P3) indicated rockfill remained frozen between El. 121 m and 123 m, which is similar to previous years. The rockfill and dense till below El. 121 m are no longer monitored (no available data since 2016) since beads are either broken or a capacitance effect was detected.

These observations tend to confirm the visual observation of seepage downstream since the dike foundation (till and bedrock) directly on the downstream side are unfrozen all year. A cooling trend is slowly starting on the edges of the dike but did not yet reach the middle where seepage is located. Till and bedrock temperature tend to decrease farther from the downstream side and piezometers near Portage Pit show permafrost conditions.

No thermal information is available in the Portage Pit wall. Since the pit is filling with tailings and water, it is possible the frozen wall will thaw, or has already begun thawing, which could reopen some pathways for the South Cell water to seep through. This would be undetected in the Central Dike instruments installed higher in the bedrock. The new instruments installed in October 2024 (0+620-P3 and 0+725-P3) will aid in following trends over the next years.

Supplemental instrumentation might be required to monitor closure and post-closure conditions, specifically in locations where flooding of Pit A could change conditions and impact mine structures.

5.7.2.2 Piezometers

The general piezometric trend is stable.

Piezometers located in boreholes at Sta. 0+595, 0+650, 0+700, 0+810, 0+825, 0+850, and 0+975 are strongly reacting to the pond water level downstream of Central Dike. In those boreholes, piezometers that are not frozen or in suction (currently or previously) are recording piezometric heads around El. 115 m, which is the downstream pond level. Piezometers between Sta. 0+595 and Sta. 0+975 located in the rockfill, till, and bedrock are reacting similarly, which seems to indicate a hydraulic connection between the downstream pond, till, and bedrock. The piezometric elevation recorded in the till and bedrock between Sta. 0+595 and Sta. 0+875-P2 is generally slightly higher than the elevation of the downstream pond, indicating excess pore water pressure or higher seepage flow. Piezometer 650-P2-A, installed in bedrock, was on the rise since December 2015 with a reduction of the increase rate after 2018. In 2024, the head was about 155 m, which is higher than heads measured at 650-P2-B and 650-P2-C, also in bedrock, indicating an upward hydraulic gradient in that area with higher heads compared to the adjacent piezometers installed in 875-P3. Piezometers 875-P3-A and B appear not to be following the South Cell water level trend observed in recent years, which seemed to indicate a hydraulic connection with the South Cell Pond. The pore water pressure recorded in piezometer 875-P3-B decreased from133.2 m to 125.2 m between September 2023 and August 2024, while the pore water pressure in piezometer 875-P3-A remained relatively constant decreasing only by 0.7 m over the same period, from 129.0 m to 128.7 m. During preparation of this report, pore water pressure in piezometer 875-P3-B continued to decrease and has registered lower levels than piezometer 875-P3-A. It is possible the development of the permafrost condition in part of the Portage Pit wall observed since 2023 decreased the hydraulic connection between South Cell and the piezometers at 875-P3, or the decrease in hydraulic gradient in South Cell reduced this connection. It is recommended to closely monitor this new decreasing trend over the next years to identify possible links with the pit water level and foundation thermal regime.

Piezometers located at Sta. 465 and Sta. 580 are not reacting to the downstream pond water level or the South Cell elevation indicating much lower piezometric elevations. Piezometer 580-P1R-B located in the till horizon showed a rapid increasing head of about 22 m (between January and March 2024); continuing monitoring is required to access this trend in 2025.

Piezometer 825-P1-E did not follow the slow increasing trend for the first time since 2017 and the pore water pressure remained at the same relative level in 2024 (El. 126.8 m) with similar yearly fluctuations. Although the reported pressure is still high, the trend shows signs of stabilization. Piezometer 825-P1-E does not seem to react to South Cell or downstream pond variations.

Generally, a downward hydraulic gradient in part of the bedrock and the till can be interpreted in piezometers located in the same boreholes. Small upward gradients in the till or upper bedrock can also be observed in some boreholes, such as 595-P1 and 815 P1R. Significant upward pressure gradients in the bedrock are observable in hole 850-P1 and 875-P2, which means several previously observed upward gradient locations advanced toward pressure equalization between the instruments. The gradient between deep and shallow bedrock in hole 815-P1R continues to decrease steadily. The upward pressure gradient observed in hole 580-P1R is in the sand layer beneath the bedrock and remains significant even though it is decreasing rapidly towards pressure equalization (580-P1R-A and C), while 580-P1R-B registered a sudden increasing in January 2024 (from 95 m to 120m) during preparation of this report (pore water pressure in piezometer 875-P3-B has remained almost at 120 m). It is not possible to observe a generalized upward hydraulic gradient trend indicating pressurized bedrock is transmitting pore water pressure to the till. The piezometric head in bedrock is often similar to or lower than recorded in some parts of the till layer. However, due to topography, it is possible water is flowing from higher bedrock and induces excess pore water pressure on foundation soil located lower below.

The TARP levels developed for Central Dike have two instrumentation-based criteria related to foundation failure and backward erosion in the foundation till layer, respectively. While all piezometers in the till are within the normal range for foundation failure (Green level), it is noted that 650-P2C is often in the Yellow alert level for backward erosion (pressure head between 115.5 and 117.8 m in P2 sensors). However, due to the largely reduced hydraulic gradient through Central Dike and the stable conditions for several years, WSP considers that the risk associated with backward erosion in the till foundation is significantly lower than it was when the TARP were developed for a full South Cell water pond. Therefore, it is reasonable to transfer the dike TARP level from Yellow to Green, as AEM intends.

Some instruments were broken or malfunctioning (Table 17 in Appendix I), which provide either no data or erratic data. A once-frozen piezometer cannot be relied upon even if thawed since freezing generally damages the piezometer diaphragm. WSP recommends identifying these piezometers to compare trends with data from unfrozen piezometers. Instruments in borehole 545-P2 did not record pore water pressure or temperature data since 2019 and are therefore non-functional. It is recommended to replace instruments 545-P2, or at least the thermistor, to keep monitoring the thermal regime in the foundation in this sector where cooling was observed before losing data.

As in previous years, piezometers were observed to be recording negative pressure (suction). VWPs are not designed to measure negative pore water pressure; therefore, attempting to interpret this data is not considered valuable.

5.7.2.3 Flow Meters

At the time of inspection, a seepage flow of approximately 76.8 m^3/h was pumped to maintain the downstream pond between El. 114.8 and 115.1 m. The seasonal maximum recorded was 176.1 m^3/h in June 2024, within the normal trend. Water inflow from this location was pumped back to the pits (A and E) in 2024 to maintain the downstream seepage pond operational water level. Pumping water from South Cell combined with an adapted tailings deposition plan effectively reduced the amplitude of the seepage over the last years, and the seepage appears stable since 2020. AEM indicated the flow decreased to 15.2 m^3/h in winter 2024 based on pumping data, which remains within the stable trend of the past few years.

5.7.2.4 Seismograph

No blasting occurred in the reported period since mining activities were terminated at the Meadowbank site.

5.7.2.5 Turbidity and Water Quality

Water turbidity in the downstream pond has been monitored since 2015. The turbidity of the downstream pond usually increases with pump speed. Turbidity was above the threshold value of 15 mg/L for environmental discharge during 2023 summer season. During 2024 inspection the turbidity has remained almost the same, with values between 15 mg/L and 16 mg/L.

In the freshet of 2024, similar to previous years since 2017, a change in water coloration was observed in the downstream pond during inspection. The water turned orange and back to normal several times throughout the cycles. An orange sludge was observed on surfaces below the water level. No change in pH was measured but turbidity increased during the summer. Per AEM, available results from chemical analyses indicate no tailings were present in the downstream pond and coloration was linked to natural bacterial processes (AEM 2017). This situation is stable.

6.0 ALL-WEATHER ACCESS ROAD

The AWAR, formerly referred to as All-Weather Private Access Road, was built in 2007 to 2008 to connect the hamlet of Baker Lake to the Meadowbank Mine site. The road is approximately 107 km long with nine bridge crossings and culverts installed at a total of 39 locations. Each structure along the AWAR, designated names, approximate locations, and observations noted during the inspection are provided in Appendix D1.

The road design is based on a general rockfill sub-base and crushed granular rockfill surfacing with a combined minimum thickness of 1 m over thawed stable soil and 1.2 m over thawed susceptible soil.

No sign of permafrost thermal degradation was observed on the road during the inspection. It should be noted that signs of thermal degradation may not necessarily be observed due to regular road maintenance performed by AEM. During the inspection, most water levels and flow velocities at the crossings were normal for the time of year.

Fill material that comprises the majority of the road provides no significant barrier to low gradient water flow due to its coarse nature. During higher flow and runoff periods, water may flow through portions of the road fill. Water was observed flowing through the rockfill at some culvert locations during the inspection and signs that water flowed under the road were observed at some other locations during the inspection. This could also be due to the inlet or outlet of some culverts having been installed too high or too low, which did not promote water flow through the culvert until a certain water level had been reached.

During the year, AEM conducts regular and event-based visual inspections of the fish-bearing water crossing locations along the access road. Data should continue to be compiled by AEM to confirm hydraulic function of the crossings, adequacy of crossing locations with respect to watercourses, and minimal impact to fish habitat.

It is understood that the AEM monitoring program includes an assessment of sedimentation and potential erosion issues at the major bridge crossings. Consideration should be given to expanding the AEM monitoring program to include all culverts and bridges along the road to assess whether they are providing adequate capacity during the freshet and following large precipitation events.

6.1 Culverts

Culverts were generally in good condition at the time of inspection. No significant degradation of culvert conditions was observed when compared to past inspections. Most culverts were unobstructed with no signs of erosion or damage. Many sections of the road not equipped with culverts showed water accumulation on road sides.

Culverts discussed below, and in the photographic log, are identified by name (e.g., R-24) for consistency with as-built drawings provided by AEM. Each culvert is also identified by its approximate kilometre location (e.g., km 98+250) along the road alignment.

Signs indicating minor erosion were observed at the inlet of PC-17A (8+830) and at the outlet of R-14 (km 67+840) and R-24 (km 98+100). No action is recommended for culverts showing signs of erosion since the situation seems stable. Culvert erosion progression should be monitored at freshet.

During the inspection, water flowing under the road was observed at some locations, which is generally due to culvert inlets or outlets installed too high or too low preventing water flow until reaching a certain level. This condition can promote erosion and risk of washout under the road and should be monitored. The situation was observed in the past and appears stable since no signs of deteriorating conditions were observed. The condition was observed at PC-17A (8+830), PC-11 (39+552), R-14 (67+840), R-18B (82+500), R-20 (85+490), R-23 (93+600), and R-24 (98+100). PC-17A, R-20, and R-23 showed water flow during the inspection. Flows at PC-17A and at R-14 were stable after having shifted locations over the past years. No sign of erosion was noted. The progression of the situation should be monitored at freshet.

Obstructed and damaged culverts were observed at some locations during the inspection. In many cases, obstructions were related to inlets and/or outlets becoming partially or completely obstructed by accumulated rockfill and road material. There was no substantial increase in the number of significantly damaged culverts observed during the 2021 inspection when compared to last year. The following culverts were too damaged and obstructed to function properly: R-00A (2+550), PC-14 (4+260), unnamed culvert at 5+700, PC-10 (36+865). The PC-16 (54+950) is not observed since 2021. If insufficient capacity to handle the flow is observed at locations where culverts are obstructed or damaged, it is recommended to clear the obstructions or repair the culvert.

The observations and descriptions for each culvert at the time of inspection as well as recommendations can be found in Appendix D1. For example, for some culverts, it is recommended to monitor the water level upstream and the flow through the culvert during high flow events (e.g., freshet season). A photographic log of the culverts is included in Appendix D2.

6.2 Bridges

Nine bridges are located along the AWAR: four Acrow Panel bridges and five Rapid Span bridges. A structural and/or mechanical assessment of the bridges was not conducted and is beyond the scope of this geotechnical inspection. A description of observations of the bridges made during the inspection is presented in Appendix D1. A photographic log of the bridges is included in Appendix D3.

The bridges were identified in sequence, increasing in number along the road from Baker Lake to Meadowbank (e.g., from Bridge 1 to Bridge 9). The name of each bridge (e.g., R02) is consistent with as-built drawings of the AWAR provided by AEM. Each bridge is also identified by its approximate kilometre location (e.g., km 8+750).

Due to low-lying terrain between Baker Lake and Meadowbank, water flow typically occurs in broad areas and not in well-defined channels. The majority of water crossings spanned by bridges increased channelization of flow due to embankment fill at the crossing location. No significant signs of embankment erosion were observed at the time of inspection since they are generally constructed with coarse rockfill.

Bridges and embankments were in good geotechnical condition at the time of inspection. Signs of settlement were observed at Bridge R05 and conditions should continue to be monitored. Some bridges showed limited surficial erosion of the granular material on abutments, but none posed geotechnical concern or indicated degrading conditions. The following observations were made for each bridge during the inspection and are listed in Appendix D1:

- **Bridge R02 at about km 8+750**: normal flow was observed at the time of the inspection. No signs of erosion or turbidity were noted. Both abutments show deformation of the corrugated steel bins under the weight of the bridge. In 2011, two additional culverts of 1,800 mm in diameter were installed nearby to increase drainage capacity during high flow events and prevent the road and bridge from washing out. It is understood that AEM removes snow and ice before freshet at this location and other bridges and will continue this practice in the future.
- **Bridge R05 at about km 17+600**: minor damage to the bin wall of both abutments was observed; it is likely a result of past snow removal activities. No reparation is required yet. No evidence of erosion was observed, but some deformation is present in uncompacted granular material on the abutments' surface. The bridge was observed to dip slightly to the west. The streambed consists primarily of cobbles, gravel, and a few boulders towards the perimeter of the channel.

- **Bridge R06 at about km 23+100**: construction of the bridge has concentrated flow in this area. Some tension cracks in granular material on abutments were observed. No signs of turbidity were observed, and the bridge was in good condition at the time of inspection.
- **Bridge R09 at approximately km 48+500**: construction of the bridge has concentrated flow in this area. Water is flowing under the northeast abutment, but no signs of turbidity or erosion were observed at the time of inspection and the bridge was in good condition.
- **Bridge R13 at about km 62+060**: at the time of inspection, the bridge was in good general condition. Minor tension cracks are present on the northeast and south abutments.
- **Bridge R15 at about km 69+200**: this bridge was replaced in 2023 and is in good condition. The metal bin on the North side damaged, likely due to snow removal activity, but this is not an issue yet.
- **Bridge R16 at about km 73+800**: no signs of erosion or turbidity noted at the base, despite some flow being usually observed under the north abutment (dry in 2024). Bridge construction concentrated the flow in this area. Limited surficial erosion of the granular material was observed at the top of the southeast abutment.
- **Bridge R18 at about km 79+500**: the bridge is generally in good condition. A boulder field is located under the bridge and no flow was observed at the time of inspection.
- **Bridge R19 at about km 83+150**: steel plates with pipe anchors are installed along both embankments of the bridge. Some damage (bending) to the steel containment plates was observed, which may be associated with snow removal activities. The damage is minor and does not impact the geotechnical integrity of the bridge or embankment since the surrounding pipes seem to hold the metal sheet in place (protecting the abutment backfill). A series of minor tension cracks were observed in the top surface of the north and southwest abutments. Progress should be monitored. No turbidity or erosion was observed at the time of the inspection.

7.0 WHALE TAIL HAUL ROAD

The WTHR was built between 2016 and 2019 to connect the Meadowbank Mine site to the Whale Tail Mine site under development. The road is 64 km long with eight bridge crossings and culverts installed at a total of 290 locations. Each structure along WTHR, designated names, approximate locations, and observations noted during the inspection are provided in Appendix E1.

The road design is based on a general rockfill from quarries or sand and gravel from esker burrow pit sub-base and crushed granular rockfill surfacing with a combined minimum thickness of 1.0 m over thawed stable soil and 1.2 m over thawed susceptible soil.

The road surface at the time of inspection was in good general condition. Erosion is minimal and limited to the side slopes between 160+430 and 176+000, with no hazard posed to traffic or road stability. It is recommended to monitor for further signs of erosion along the high sandy side slopes along the road and backfill potential erosion at the toe of bridges immediately. A photographic log of the inspected road is provided in Appendix E2.

No other sign of permafrost thermal degradation was observed on the road during the inspection. It should be noted that as with the AWAR, signs of thermal degradation may not necessarily be observed in the future due to the regular road maintenance performed by AEM. During the inspection, water levels and flow velocities at the crossings were normal for the time of year.

Fill material comprising the majority of the road provides no significant barrier to low gradient water flow due to its coarse nature. During higher flow and runoff periods, water may flow through portions of the road fill. Water was observed flowing through the rockfill near some culverts during the inspection, and signs that water flowed under the road were observed at some locations during the inspection. This could also be due to the inlet or outlet of some culverts being installed too high or low, preventing water flow until a certain water level was reached.

As with AWAR, AEM is conducting regular and event-based visual inspections of the fish-bearing water crossing locations along the access road during the year. This data is compiled by AEM to confirm the hydraulic function of the crossings, adequacy of the crossing locations with respect to watercourses, and minimal impacts to fish habitat.

It is understood that the AEM monitoring program includes an assessment of sedimentation and potential erosion issues at the major bridge crossings. Consider expanding the AEM monitoring program to include all culverts and bridges along the road to assess whether they are providing adequate capacity during freshet and following large precipitation events.

Monitoring of bridge abutment erosion and quarry drainage is recommended following Regulator comments.

7.1 Culverts

Culverts with a diameter larger than 900 mm were thoroughly inspected. Culverts less than 900 mm in diameter were checked from the road surface. Culverts not observed should be considered possibly buried.

Culverts were generally in good condition at the time of inspection. Most culverts were unobstructed with no signs of erosion or damage. Culverts observed to be buried last year were mostly still buried. A slow progression of the number of buried culverts is noted over the years since granular material is regularly pushed from the road during resurfacing operations.

Many culverts seem to have been installed rather high, depending on the permeability of the road to freshet flow, therefore possibly posing a risk of road washout. The worst condition would be a continuous boulder field under the sand and gravel road foundation without a rockfill layer at the base of the road.

Culverts discussed below are identified using the assigned numbers from the list provided by AEM. Each culvert is also identified by its approximate kilometre location (e.g., km 132+324) along the road alignment, starting at Vault Pit.

No signs of erosion were observed during the inspection.

During the inspection, signs of water flowing under the road were observed at some locations. This is generally due to the inlet and outlet of culverts being installed high above the original natural ground surface, preventing the flow of water through the culvert until a certain water level is reached. This condition can promote erosion and risk washout under the road and should be monitored. The progression of the situation should be monitored at freshet.

Obstructed and damaged culverts were observed at some locations during the inspection. In many cases, obstructions are related to inlets and/or outlets becoming partially or completely obstructed by accumulated rockfill and road material or blocks. The following culverts were completely obstructed or had at least one collapsed extremity: #7 (118+013), #7-2 (118+016), #8 (118+125), #12 (4+179 to 4+186; 3 outlets out of 5), #13 (120+615), #15 (120+850), #27-2 (123+300), #35 (124+581), #37 (125+035), #38 (125+049), #45 (125+710), #48 (127+203), #54 (128+388), #57 (128+635), #61 (129+050), #64 (129+920), #65 (130+924), #66 (132+324), #67 (132+689), #69 (133+784), #70 (133+837), #82 (136+143), #83 (136+300), #85 (136+671), #86 (136+740), #87 (136+810), #88 (136+861), #89 (137+180), #97 (138+436), #99 (138+830), #101 (139+025), #111 (142+461), #112 (142+630), #113 (142+736), #114 (142+810), #115 (142+865), #116 (142+940), #118 (143+433), #119 (143+777), #133 (148+141), #137 (148+940), #138 (149+000), #150 (152+171 to 152+179), #156 (153+506), #163 (156+474), #167 (157+843), #185 (162+404), #217 (166+790), #226 (168+935 to 168+937), #234 (170+385), #241 (171+235), #243 (171+593), #244 (171+625), #256 (173+350), #260 (174+185), #268 (175+774), #278 (177+870), and #281 (178+350).

If insufficient capacity to handle the flow is observed at locations where culverts are obstructed or damaged, it is recommended to clear the obstructions or repair the culvert. It is still recommended to monitor culverts #167 (41+843) and #232 (53+928) for signs of water flowing below.

Observations and descriptions for each culvert at the time of inspection, as well as recommendations, are provided in Appendix E1. For example, it is recommended to monitor the water level upstream and the flow through the culverts during high flow events for some culverts (e.g., freshet season).

7.2 Bridges

Eight bridges are located along WTHR. A structural and/or mechanical assessment of the bridges was not conducted and is beyond the scope of this geotechnical inspection. A description of bridge observations from the inspection is presented in Appendix E1. A photographic log of the bridges is included in Appendix E2.

The bridges were identified by their approximate kilometre location (e.g., km 132+000) along the road alignment, starting at Vault Pit.

Due to low-lying terrain between Meadowbank and the Whale Tail Mine site, water flow typically occurs in broad areas and not in well-defined channels. The majority of water crossings spanned by bridges increased channelization of flow due to the embankment fill at the crossing location. Embankments are generally constructed with coarse rockfill.

Bridges and embankments were in good geotechnical condition at the time of inspection. No signs of erosion or turbidity were observed. Only limited surficial erosion of the granular material behind the concrete wall on some of the abutments of bridges 132 (132+000), 136 (136+000), 139 (139+900), 148 (148+300) and 160 (160+800) was noted, which does not pose a geotechnical problem but may create turbidity in the stream during freshet. It is recommended to repair the abutment at bridge 160 (160+800) to limit the progression of erosion. Water is flowing under the West abutment of bridge 136 (136+000) but no erosion is observed at the toe of the abutment. The southwest abutment of bridges 132 (132+000) and 142 (142+100) seemed to settle but no bridge deformation is observed yet and should be monitored. Bridge 119 (119+400) showed minor tension cracks on the southwest abutment.

8.0 QUARRIES AND ESKERS

8.1 Quarries along the All-Weather Access Road

Twenty-two quarries were developed in the past along AWAR to provide material for its construction. An additional quarry was developed near the airstrip at Meadowbank to provide further construction material. All quarries were inspected as part of the geotechnical inspection. A summary of the observations and recommendations made during the 2024 inspection for the structures along AWAR, including the quarries, is provided in Appendix E1. In accordance with the as-built drawings, quarries were numbered sequentially from 1 to 22 starting near Baker Lake and increasing towards Meadowbank. The airstrip quarry is referred to as Quarry 23 and is used to store miscellaneous items such as drill core on racks, diamond drill contractor drill rigs, sea can containers, pipes, and culverts.

The closure and reclamation plan requires that all quarries and borrow sources developed during AWAR construction is reclaimed following use. The closure plan further requires that all quarry slopes be left at an angle of 45° to 50°. During the inspection, slope remediation was observed to be partly completed but not totally reclaimed. Most quarries were clean although some walls needed scaling. Most quarry walls were free of loose blocks and granular material, but these materials were placed at the toe of the walls. At the time of inspection, most of the quarries were dry.

During the inspection, Quarries 4, 13, and 14 were observed flooded. These quarries were flooded for a couple of years and AEM is evaluating how to eliminate water ponding. Quarries 15 and 23 contained minor water accumulation. Quarries containing significant amounts of ponded water should be monitored to assess whether ponding persists and, if necessary, whether ditches should be developed to facilitate the water drainage.

Unstable blocks and loose rocks along steep walls remain in Quarries 3, 7, 9, 10, 16, 18, and 23. The west wall of Quarry 3 and south wall of Quarry 18 also contain falcon nests preventing access and maintenance. Falcons were seen in several other quarries. It is recommended that workers be cautious in these quarries, be aware of the potential hazard, and stay at a minimum of 20 m from the walls.

Quarry 2 has gravel piles with a high, steep slope which could become unstable and pose a hazard to workers. It is recommended to reprofile the slopes of the stockpiles.

A photographic log of the quarries along AWAR is included in Appendix F.

8.2 Eskers and Quarries along Whale Tail Haul Road

Seven eskers and five rock quarries were developed along WTHR to provide material for its construction. Most of them are still active. All eskers and quarries were inspected as part of the geotechnical inspection, although some of them were done so from the entrance due to accesses being closed. A summary of observations and recommendations made during the 2024 inspection for the structures along WTHR, including the eskers and quarries, is presented in Appendix E1. In accordance with the as-built drawings, eskers were numbered sequentially from 1 to 6 starting at Meadowbank and increasing towards the Whale Tail Mine site. The quarries are not numbered and were identified for the inspection by their approximate location along WTHR.

The closure and reclamation plan requires all quarries and borrow sources developed during WTHR construction be reclaimed following use. The closure plan further requires that all quarry slopes be left at an angle of 45° to 50°. At the time of inspection, all quarries and eskers were dry except esker 2 and rock quarry 168, which contained a small accumulation of water. Rock quarry 165 was dry at the time of inspection, but the concave shape of its floor suggests probably floods at freshet.

Unstable loose rocks along steep walls and unstable soil slopes were observed in all eskers and quarries, except eskers 3, 5, and 6. It is recommended that workers be cautious in these locations and are aware of the potential rockfall hazard.

9.0 BULK FUEL STORAGE FACILITIES

This section contains observations made during the 2024 annual inspection of the Baker Lake, Meadowbank, and Whale Tail Mine tank farm facilities (Main Camp only).

9.1 Baker Lake Tank Farm

The Baker Lake tank farm consists of eight large-capacity tanks (10 million litres each) and 20 Jet-A fuel tanks (100,000 L each) constructed within five bermed areas (containment cells). Tanks 1 and 2 are located within the first containment area, which is located on the western side of the fuelling area. Tanks 3 and 4 are located within a second containment area adjacent to the first. A central berm is located between the two containment areas. Tanks 5 and 6 are within the third containment area located north and upslope of Tanks 3 and 4. Tanks 5 and 6 are situated within an entirely separate containment cell sub-excavated into the hill slope above the initial tank farm area. Tanks 7 and 8 are located within a separate containment area built north and upslope of Tanks 5 and 6. Twenty Jet-A fuel tanks were installed in 2013 in a containment area located northwest of Tanks 5 and 6, over 0.5 m-thick granular base fill material.

Each containment area was lined with a 1.5 mm high-density polyethylene (HDPE) geomembrane to provide secondary containment, except the Jet-A fuel tank areas that are lined with bituminous geomembranes.

Visual inspection of the majority of the liner in the containment areas for Tanks 1 to 6 was not possible since it is covered with protective granular fill material, which was eroded due to wave actions in some areas, exposing the geomembrane. This condition was observed all along the south and northern side of Tank 1, south side of Tanks 3 and 4, and on the south side of Tanks 5 and 6. A folded section of exposed geomembrane was observed at the northeastern corner of Tank 4. It is also recommended to cover the exposed areas with geotextile and fill material to re-establish liner protection and prevent damage to the liner. The hole in the exposed geomembrane (300 mm diameter hole) observed since 2022 on the southwestern corner of Tank 3 at the slope toe was repaired and covered with geotextile and granular material. Another rip in the liner was observed at the top of the slope south of Tank 3. Large holes (about 1 m in diameter) in the HDPE liner were observed in the middle of the slope on the east and south side of Tank 6, as well as the west side of Tank 5. It is recommended to repair the liner and restore the granular cover. An investigation should also be conducted to identify the origin of the damage and put appropriate procedures in place to avoid similar events in the future.

Some animal burrows were observed on the south side of Tanks 4, 6 and 8 this year. It is recommended to assess whether geosynthetics were damaged. AEM expressed concern about possible damage to the geomembrane during granular cover removal. WSP considers this verification should still be performed at least once to ensure recurring burrows are not causing damage to the geomembrane. This verification should be documented to mitigate a potential resolution.

Some ponded water was observed on the southern side of containment areas around Tanks 2, 3, 4 and 6. Water ponding in these areas was observed over the years; however, the amount of water ponding is minimal compared to average from previous years. No sump or pump was visible during the site visit, although AEM indicates containment areas were pumped dry in the spring. It is recommended to keep water accumulation at a minimum near the tank foundation. Signs of high-water levels being present in this area in the past were noted during the inspection.

Following several reported fuel leaks in the past few years, no sign of damage to the containment area from the leak was observed. However, the geomembrane is covered in granular fill over most of the tank containment area and damage (e.g., melting of the geomembrane) might been undetected. It is recommended to expose the geomembrane near the leak locations and inspect the liner for any sign of degradation, and repair if needed, before reapplying the covering.

The embankments around the containment areas were stable. The northern slope of the containment area of Tanks 5 and 6 are steep and the sand and gravel cover may be prone to erosion. Tension cracks observed in the fine filter surface on top of the slope and on the crest in 2020 were no longer.

The geomembrane of the containment cell of the 20 Jet-A fuel tanks remains uncovered around the tanks. Two holes in the liner (100 mm wide) on the southwest corner of the containment area were previously repaired with a patch of geomembrane. However, the repairs seem to have detached from the bituminous geomembrane, which seem to be still partially open at these locations in 2024. The liner must be repaired in a timely manner to restore containment since it could potentially leak directly into the environment in this current state. Two other small tears were found near the top of the slope on the south and north side of the containment area, which should also be repaired. The bituminous geomembrane no longer shows signs of melting. The melting of the bitumen that occurred in the past may have damaged it in such a way that contaminated water could seep into the environment.

The fuelling station on the western side of the tank farm consists of two containers and a pumping system. The fuelling area is covered by granular road base material. The fuelling station was in good geotechnical condition.

A photographic log of the Baker Lake tank farm and a plan view showing the location of the photographs and observations are included in Appendix G1.

9.2 Meadowbank Tank Farm (Main Camp)

The Meadowbank Main Camp tank farm consists of two large-capacity tanks (5.6 million litres) constructed within an area sub-excavated to provide secondary containment. The area was lined with a 1.5 mm HDPE geomembrane. The second tank was built in 2023.

At the time of inspection, the tank backfill foundation pad was in good condition. Minor tension cracks were seen in the granular material north of both tanks. The liner was still well covered with granular fill material for protection.

Some water was observed ponding within the northern side of the containment area around Tank 1 and the eastern side of the containment area around Tank 2, although still less than average from previous years. Signs of high-water levels in this area in the past were noted during the inspection. Pumping of ponded water is considered good practice and should continue in both containment areas.

A fuelling station is located on the northern side of the tank farm. The fuelling area is covered by granular road base material and a geomembrane liner is installed below the refuelling area.

Since the tank farm area was sub-excavated, runoff from the tank farm is not anticipated to occur. The side slopes in the tank area are shallow and appear stable, with the exception of minor tension cracks in the granular material cover of the liner on the northern side of both tanks. It is recommended to monitor the deformation and repair the granular cover if needed in the future.

A photographic log and a plan view showing the location of the photographs and observations noted at the Meadowbank tank farm is provided in Appendix G2.

9.3 Whale Tail Mine Tank Farm

The permanent Whale Tail Mine tank farm is located north of the main camp.

At the time of inspection, the tank farm was in good condition. No sign of instability was observed during the inspection. The bituminous geomembrane was largely exposed but in good condition. Some water was observed ponding within the embankment on the southeastern and southwestern sides of the tank. An exposed anchor was observed at northeast corner of the tank.

The use of bituminous geomembrane, as with the other tank farms, can be environmentally problematic if a jet fuel spill melts the material after prolonged exposure, causing a breach in the containment system. Any fuel leak must be detected early enough to be removed to ensure integrity of the barrier.

A photographic log is contained in Appendix G3.

10.0 OTHER MEADOWBANK FACILITIES

This section contains observations made for the other Meadowbank facilities visited during the 2024 geotechnical inspection such as site roads, Diversion Ditch and Sediment and Erosion Protection Structure, Baker Lake ditch, rock storage facility (RSF) till plug, landfill, Contaminated Soil Storage and Bioremedial Landfarm facility, Stormwater Management Pond, airstrip, and crusher retaining wall. Figure H1 shows the locations of the photographs taken during the inspection for the other Meadowbank facilities.

10.1 Site Roads

The following roads were inspected:

- East Road: former haul road between North Portage Pit and East Dike.
- West Road: haul road between North Portage Pit and the plant.
- Site roads around the TSF dikes and pits.
- Vault Road: haul road between North Portage Pit and the Vault deposit.
- RF1: starts near the northern abutment of Stormwater Dike and follows the eastern perimeter of the TSF North Cell and the southwestern side of the Portage RSF.
- RF2: starts at the end of RF1 and follows the western side of the Portage RSF.

10.1.1 Field Observations during Inspection

These roads were of adequate width and had appropriate berms at the time of the inspection. The haul road leading up the ramp to the crusher was not inspected during this inspection for safety reasons due to heavy traffic of long-haul trucks. No geotechnical concerns were identified with the site roads.

Three culverts are installed beneath Vault Road at coordinates 640 964 E / 7 217 466 N. They were slightly collapsed in the middle and showed signs of erosion at the inlet. The inlet of the northern culvert was out of the water. This condition was observed since 2012. No action is required since the condition is stable, and the culverts appear to function well. These culverts need to be monitored during freshet to ensure they provide sufficient capacity, and that erosion is not occurring.

Two other culverts are located at 639 214 E / 7 216 189 N on Vault Road, between NP1 and NP2 lakes. These culverts are in good working condition even though water flows below the culverts on the NP1 Lake side when the water level is low. Despite being damaged at both ends, these culverts are still fully open, not collapsed under the road, and free of obstruction. No sign of instability of the road or erosion was noted during the inspection around these culverts. They have been performing well for years and are observed to be in a stable condition. No repair is deemed need at this time. It is recommended to keep observing this area at freshet and clear obstructions if insufficient capacity to handle the flow is observed.

RF1 and RF2 were inspected in 2024 however closure capping has now reached the crest all long these structures and their upstream slope is no longer exposed. Visual inspections of the crest are recommended to continue at regular intervals; however a special attention should be placed on the instrumentation to assess these structures' performance.

Temporary roads developed for construction purposes were not inspected.

Photographs of the Vault Road culverts are provided in Appendix H1.

10.1.2 Geotechnical Instrumentation Data Review

Four thermistors were installed to monitor the temperature of RF1 and RF2 (which delineates the northeastern side of the TSF North Cell) (Table 1 of Appendix I).

Three thermistors are installed on RF1 (RF1-01, RF1-02 and RF1-3). Thermistor RF1-01 showed frozen conditions all year. RF1-02 is non-functional and has not provided any data since 2021. Thermistor RF1-03 also showed frozen conditions for most of the year, with an exception above elevation 147.8 m, where the temperature reached 0.02°C during November and December 2023.

One thermistor is installed on RF

2 and indicates the RF2 foundation is in a permafrost state, with similar range of temperatures of RF1-01 (about -4.5°C to -5.8°C).

10.2 Diversion Ditches and Sediment and Erosion Protection Structure

A retention basin and series of diversion ditches (western and eastern) surround the catchment basin of the North Cell. These structures are designed to convey surface water runoff away from the TSF.

Since 2014, the Western Diversion Ditch was directing water to a retention basin, which was then pumped to the TSF due to a turbidity problem caused by ditch erosion. Discharge is now complete in South Cell to avoid water management issues in North Cell. Rehabilitation work was done in 2016 to address the situation. The Eastern Diversion Ditch discharges to Lake NP-2, then Lake NP-1, and then to Dog Leg Lake. Sediment barriers and erosion protection structures are installed at the outlet of the diversion ditch in Lake NP-1, Lake NP-2, and Second Portage Lake (Dog Leg Lake).

During the inspection, it was observed that the diversion ditches around the TSF western and eastern extensions were in good condition. The tension cracks (about 2 to 3 m long) observed since 2022 and granular material on the southern slope of the diversion ditch, north of the North Cell capping, have evolved and the material is sloughing. However, the material has not fallen into the ditch, which remains clear of obstruction. In order to avoid the progression of the deformation, it is recommended to repair the slope by recompacting the material. The erosion protection structure and sediment barriers were also in good condition at the time of inspection. They should be inspected during freshet after snow melts, allowing for visual assessment. The Western Diversion Ditch will need to be amended for closure to drain water accumulation in its northern part, although AEM already capped most of the ponding area with rockfill in 2024 as part of the progressive closure plan.

Photographs of the diversion ditch and its sediment and erosion protection structure are provided in Appendix H2.

10.3 Baker Lake Ditch

A new derivation ditch was built by AEM at the Baker Lake tank farm and barge area to limit the ingress of runoff water on site. The ditch is composed of four segments: Ditch 1A, Ditch 1B, Ditch 2 and Ditch 3. Ditches 1A and 1B have an outlet West of the site, whereas Ditches 2 and 3 convey water through the barge area and have an outlet on the south side of the site.

Ditch 1 shows signs of overflowing before the outlet due to high water levels and a permeable berm. It is recommended to amend the ditch by impermeabilizing the downstream side (e.g. with a liner) or improving the slope to ensure a controlled flow towards the outlet.

Photographs of the Baker Lake ditch are provided in Appendix G1.

10.4 Rock Storage Facility Till Plug

The RSF till plug is located on the upstream side of the diversion ditch access road between the Portage RSF and Lake NP2. The till plug is a zoned low-permeability earth fill structure intended to prevent seepage from the RSF to reach Lake NP2 and to facilitate seepage collection on the upstream side.

The till plug was constructed in summer 2013 and consisted of a layer of till with 1 m minimum thickness placed on a foundation excavated to permafrost, which was then covered by 1 m of fine ultramafic rockfill. The materials were compacted with an excavator bucket.

No sign of erosion or geotechnical issues were identified with this structure during the inspection. A pump equipped with an automatic switch was installed within the pond contained by the plug to redirect water to Pit A. The pond was currently dry at the time of the inspection from recent pumping, with some inflow visible. Since chemical monitoring in NP2 did not shown signs of contamination in recent years, till plug performance is considered adequate.

Appendix H3 contains photographs of the till plug.

10.5 Landfill

The Meadowbank landfill is located on the northeastern side of the TSF within the Portage RSF area. It is being progressively constructed and filled. Waste material is being dumped within a bermed area on a pad built using waste rock from the Portage RSF. The waste is then covered with a thin layer of rockfill to reduce windblown debris. No geotechnical concerns were identified with the landfill. At the time of inspection, the landfill area was in operation at the base of the RSF, away from the ponding water. Photographs of the landfill are provided in Appendix H4.

10.6 Contaminated Soil Storage and Bioremedial Landfarm Facility

The Meadowbank Contaminated Soil Storage and Bioremedial Landfarm Facility is currently located north of Central Dike, within South Cell. A 1 m thick till pad was placed for the landfarm foundation. A berm surrounds the landfarm to contain fluid/runoff, preventing lateral movement. Contaminated soils are stored within this cell to promote biodegradation until the soil meets environmental criteria before being disposed within the Portage RSF.

The active area lies over a natural steep slope covered by rockfill as a pad for landfarm operation. The west slope of the rockfill pad is at an angle of repose (seemingly 1.1 to 1.3H:1V). This rockfill was probably placed without lifts or compaction and extends into South Cell. The slope is considered at risk for high deformation to slope failure. In 2024, some tension cracks were observed in the berm in the northeast sector, towards Central Dike. It is recommended to monitor these cracks for evolution and progression of the movement. Given that the berm downstream toe is accessible to workers in this area, it is recommended to close the area or add a stabilization buttress if the movement progresses to manage the instability risk.

Photographs of the Meadowbank Contaminated Soil Storage and Bioremedial Landfarm Facility are provided in Appendix H5.

10.7 Stormwater Management Pond

The Stormwater Management Pond is located near the main camp and is being used to store various site waters and sewage. No pond runoff was observed at the time of inspection. No geotechnical concerns were identified with Stormwater Management Pond and the nearby crusher ramp. At the time of inspection, due to a high-water level, Stormwater Management Pond was pumped out into the pit. Due to the proximity of the crusher ramp to the pond, it is recommended that regular geotechnical inspections of the crusher ramp be conducted. The ramp surface was not inspected on safety grounds.

10.8 Airstrip

There are several small channels dug adjacent to the airstrip to divert water into small excavations or ponds. The channels and ponds are unlined, and the ponds have no designed outlet structure. In general, these ponds serve to collect water and allow suspended sediments to settle out before water overflows into other vegetated areas and/or infiltrates them, depending on the thermal state of the soils.

The runway was built to allow a Boeing 737-200 to land at the Meadowbank site. The northwestern boundary of the airstrip extends approximately 20 m within the lake and was constructed in two phases. Rockfill was placed 1 m above water during Phase 1 and the rockfill was constructed to its final elevation during Phase 2. The rockfill slopes for Phase 2 have a side slope of 1.5H:1.0V. The rockfill of Phase 2 is surrounded by a 17 m wide bench from the toe of Phase 2 to the crest edge of Phase 1. The Phase 1 rockfill surface and visible side slope were built with coarse boulders to protect the embankment against waves and ice action. Airstrip construction within the lake is considered appropriate. Since 2023, an extension of the airstrip was built on the Portage Pit side, within the West Road footprint.

The slopes were profiled along a portion of the airstrip to a 3H:1V slope to prevent settlement.

No geotechnical concerns were identified with this structure during the inspection.

10.9 Crusher Retaining Wall

No geotechnical concerns were identified with this structure during the inspection. A photographic log of the Meadowbank crusher retaining wall is provided in Appendix H6.

11.0 OTHER WHALE TAIL MINE FACILITIES

11.1 Attenuation Ponds and Jetties

The Whale Tail attenuation pond is located within the former footprint of Whale Tail Lake, which was dewatered for the development of Whale Tail Pit. It receives contact water pumped over the Whale Tail Mine site, and water is treated by the water treatment plant for environmental discharge in WTS Lake or Mammoth Lake.

IVR Attenuation Pond is located within the former lake A53, which was partially dewatered and converted into an attenuation pond for the development of the IVR Pit. Similar to the Whale Tail attenuation pond, it receives contact water pumped over the Whale Tail Mine site, and water is treated by the water treatment plant for environmental discharge in WTS Lake or Mammoth Lake. IVR Attenuation Pond was operational for a year and at the time of inspection, water is now reaching the IVR Dike.

A jetty and a pump pad were constructed at each attenuation pond to install the reclaim pump that transfers water from the attenuation pond to the water treatment plant. At the Whale Tail attenuation pond, the primary jetty was built in winter with run-of-mine non-acid generating rockfill on the frozen foundation. Due to thaw-induced settlement and space required for piping lines, the jetty was rebuilt and widened in summer 2019. A secondary jetty, also built with rockfill, leads to the pump pad from the ring road south of the pit. The IVR attenuation pond jetty was built in several steps since the dewatering of lake A53 in 2020.

No geotechnical concerns were identified with the Whale Tail and IVR attenuation ponds and jetties during the inspection. The water level in the Whale Tail attenuation pond was low during the inspection and no active channelling issue was observed. Channelling can happen during the year and does not pose any geotechnical hazard but increases the turbidity in the reclaim water.

Photographs of the Whale Tail attenuation pond and jetty are provided in Appendix H7. Photographs of the IVR attenuation pond and jetty are provided in Appendix H8.

11.2 Mammoth Lake and Whale Tail South Diffusers

Three diffusers are installed in Mammoth Lake for discharge of non-contact and treated water into the environment. The diffusers appear to be installed well and functioning normally, although AEM indicated that one of the Mammoth Lake diffusers got ripped by ice earlier in the season.

Additional diffusers are installed in WTS Lake and appeared to be functioning well.

Photographs of the Mammoth Lake and WTS diffusers are provided in Appendix H9.

11.3 South Whale Tail Channel

The SWTC is built between WTS Lake and Mammoth Lake and conveys water from WTS to Mammoth Lake. Its purpose is to limit the water level in WTS to reduce the hydraulic head at WTD. The SWTC current inlet elevation at WTS is 154.85 m, following slight settlement, and built with a fan shape to reduce risks of blockage by ice or debris. The channel is excavated in the natural ground and covered in granular transition layers, geotextile, and riprap. Figure C5 shows a plan view of the SWTC.

No geotechnical concerns were identified with this structure during the inspection. Water was flowing in the SWTC. Some settlement was observed in the rockfill berm and slope above and within the riprap in some locations, with limited sloughing around Sta. 0+850. The channel is still clear of obstruction and flowing well. The movement is not currently deemed a concern. The riprap surface at the bottom of the channel was slightly uneven in some areas but poses no issue. Turbidity barriers were in place at the outlet in Mammoth Lake.

Photographs of the SWTC are provided in Appendix H10.

11.4 Underground Waste Rock Storage Facility Saline Ditch

The Underground WRSF Saline Ditch is a water collection ditch built in the periphery of the underground WRSF, located northeast of Whale Tail Pit. Due to the underground operations in permafrost, large quantities of calcium chloride are used and retained in the waste rock. The purpose of the saline ditch is to collect saline water runoff from the facility, and redirect it by gravity into the Groundwater Storage Pond (GSP) 1 for recirculation. Figure C6 shows a plan view of the Saline Ditch.

The ditch outlet towards GSP-1 (former AP5 Lake), from a culvert under the road, was obstructed by boulders and a plank. The culvert under the WRSF ramp was also blocked by a boulder. It is recommended to clear these culverts to ensure flow capacity and prevent water flowing out of the ditch.

The Underground WRSF Saline Ditch was previously slowly backfilled with mud and gravel along the road from the road maintenance, pushed into the ditch by snow removal operation in winter, and surface grading in summer. The ditch has been cleaned regularly since 2022 and a series of boulders are present along the road to reduce the amount of material being pushed into the ditch in the future. There is still a small amount of mud in the ditch, likely coming from excavated material placed on the upstream side of the ditch that is being washed back over time. This extra material in the ditch should be cleared regularly to maintain its hydraulic capacity and respect the design freeboard.

Limited sloughing and erosion of the granular cover material was observed between Sta. 0+230 and 0+300, exposing the liner locally. It is recommended to repair these features to protect the liner.

Photographs of the Underground WRSF Saline Ditch are provided in Appendix H11.

11.5 Underground Ore Stockpile Saline Ditch

The Underground Ore Saline Ditch is a water collection ditch built in 2022 in the periphery of the underground ore stockpile, located northeast of the former Whale Tail Pit near Tramp Metal Removal Facility (now dismantled). Due to the underground operations in permafrost, large quantities of calcium chloride are used and retained in the ore, similar to the waste rock. The purpose of the saline ditch is to collect saline water runoff from the facility and redirect it by gravity into GSP-1 for recirculation. Figure C6 shows a plan view of Underground Ore Stockpile Saline Ditch.

During inspection, Underground Ore Stockpile Saline Ditch was dry. No signs of deformation or erosion were observed. The ditch outlet toward GSP-1, from a culvert under the road, was clear. Some boulders are present in the ditch, as well as sediments and grout residues towards the outlet, which should be cleaned up to avoid accumulation and impact of the flow.

Several rips in the exposed liner were observed at the top of the slope in the southern part of the ditch, similarly to previous years. The liner should be repaired and the granular cover restored for protection.

The minor tension cracks observed in the west slope of the ditch in its northern section in 2022 are no longer visible.

Photographs of Underground Ore Stockpile Saline Ditch are provided in Appendix H12.

11.6 Sumps and Non-contact Water Management Infrastructures

A number of water collection sumps and non-contact water pumping stations are present on the Whale Tail Mine site. No geotechnical concerns were observed with these structures. Water that meets environmental quality criteria is discharged into Mammoth Lake, otherwise it is collected in the attenuation pond and treated before discharge.

A seepage interception system composed of a series of four pumping stations (P1 to P4) is present at the downstream toe of WTD but is not currently in operation and AEM does not plan on resuming its use.

11.7 Site Roads

Site roads and culverts at the Whale Tail Mine site were mostly in good condition during inspection. These roads were of adequate width and had appropriate berms at the time of inspection.

Haul roads around the ore stockpile were not inspected for safety reasons. Temporary roads developed for construction and dewatering purposes were not inspected.

11.8 Landfill

The Whale Tail Mine landfill is located at the top the Whale Tail WRSF area. It is being progressively constructed and filled. Waste material is being dumped within a bermed area on a pad built using waste rock from the open pit. The waste will later be covered with a thin layer of rockfill to reduce windblown debris. No geotechnical concerns were identified with the landfill. Photographs of the landfill are provided in Appendix H4.

11.9 Contaminated Soil Storage and Bioremedial Landfarm Facility

Whale Tail Contaminated Soil Storage and Bioremedial Landfarm Facility is currently located on Pad K, west of IVR Attenuation Pond. A pad surrounded by a containment berm was built in 0 to 20 mm granular material in 2022. Contaminated soils are stored within this cell to promote biodegradation until the soil meets environmental criteria before being disposed within one of the site WRSFs. The facility was in operation during the inspection and in good condition with no water ponding.

Photographs of Whale Tail Contaminated Soil Storage and Bioremedial Landfarm Facility are provided in Appendix H5.

11.10 IVR Diversion Channel

IVR Diversion Channel was built north of IVR Pit and the purpose was to collect and divert runoff water from the northeast watershed into Nemo Lake to avoid water flow into IVR Pit. The channel is excavated in natural ground and covered in granular material, geotextile, and riprap. An access built with esker material is adjacent to the channel. Figure C8 shows a plan view of IVR Diversion Channel.

No geotechnical concerns were identified with this structure during the inspection. Water was ponding in some locations along the channel due to continued settlement leading to an uneven riprap surface at the bottom, but the water is still flowing well though the channel. As in previous years, minor tension cracks and holes were observed in the lateral slope of the access road, which is less than about 1.5 m high, due to esker material deforming in the slope. Deformation was less pronounced than in 2023. No immediate action is required, but it is recommended to repair the access road if deformations prevent maintenance equipment access.

Photographs of IVR Diversion Channel are provided in Appendix H13.

11.11 Tramp Metal Removal Facility Retaining Wall

A retaining wall was previously built at the Whale Tail Tramp Metal Removal Facility site, north of Underground Ore Stockpile. This structure was dismantled since 2023.

12.0 INSTRUMENTATION MONITORING PROGRAM REVIEW

WSP conducted a detailed instrumentation analysis based on historical data in 2022 at AEM's request to develop a monitoring program with a series of automated alarms, which were customized for each instrument on the various structures. The purpose of this program was to assist in instrumentation monitoring by detecting any anomalous variation between scheduled reviews. As part of the annual geotechnical inspection and instrumentation data review, program performance is assessed and recommendations regarding program implementation are re-evaluated.

In 2023, AEM started implementation of the alarm program on all the Whale Tail Mine dewatering dikes in a progressive process. According to AEM, the alarm program worked well as of summer 2024 and the instrument selection for the structures and alarm thresholds were adjusted to optimize the monitoring effort in combination with regular data review by the AEM team. This is a good practice since the program is designed to be iterative and adaptive in nature. In 2024, no additional recommendation was deemed necessary after the inspection.

AEM indicated the program would continue to be progressively deployed to the other geotechnical structures. The program will continue to be assessed during deployment and re-evaluated yearly.

13.0 SUMMARY AND RECOMMENDATIONS

Table 2 presents a summary of the key findings and recommendations from the 2024 geotechnical inspection, as well as progress observed compared to the previous inspection. General recommendations not requiring a specific action are not reiterated in the table for clarity purposes. It is important that a timeline be defined for recommendations under the different priority levels to be addressed, and to avoid leaving recommendations unaddressed for several years.

Table 2: Summary of Recommendations and Priority Levels from 2024 Geotechnical Inspection

Year of Recommendation	Priority Level	Recommended Action	Future Follow-Up
Meadowbank Dewatering Dikes			
Bay-Goose Dike			
2021	P-4	Dike crest deformation, observed immediately after thermal cap placement several years ago, affected visual inspection since it is now difficult to observe movement on the uneven surface. It is recommended to fill past deformation to flatten the surface to allow for better visual observation. Filling work should be completed during the summer to avoid snow in backfill material that would later thaw and generate additional deformation.	**Resolved in 2024:** the crest has been resurfaced with fine rockfill.
East Dike			
2019	P-4	General trend in piezometric readings was steadily increasing since 2014 and seems to accelerate in 2019 and should be monitored.	Still the case in 2024, to be monitored closely due to new seepage pathway.
2021	P-4	The two thermistors strings located at both abutments are no longer functioning. Since the dike remains in operation for several years and the abutment is subject to develop and aggregate ice lenses, it is recommended to replace thermistor strings to monitor thermal regime until the post-closure phase of the mine.	Still the case in 2024.
Whale Tail Mine Dewatering and Water Management Dikes			
Whale Tail Dike			
2021	P-3	The following piezometers show unexplained trends and should continue to be monitored, and the area should be visited during the regular Annual Geotechnical Inspection. ▪ PZ 0+260 P1C, P3A, and B exhibit a yearly pressure rise in the fall. PZ 0+260 P1B has a similar behaviour starting in the winter. ▪ PZ0+360 P1 B and C exhibits a unique high-pressure trend that seems to be seasonal. ▪ PZ 0+701 P2D had high-pressure fluctuations between the summer and following fall in 2023.	Still the case in 2024 for instruments listed.

Table 2: Summary of Recommendations and Priority Levels from 2024 Geotechnical Inspection

Year of Recommendation	Priority Level	Recommended Action	Future Follow-Up
2024	P-3	The settlement at the east abutment associated with foundation thawing has progressed and lateral movement towards the downstream side is observed, although most deformation features appear inactive and AEM has built a stabilization buttress on the downstream side. It is recommended to repair the crest to design elevation to better monitor any new or continuing deformation.	In 2024, the buttress was built to the crest elevation.
IVR Dike			
2021	P-3	Raise piping present in the lower part of the emergency spillway to free the spillway outlet. Raise to prevent obstruction in the spillway (e.g., concrete blocks outside of the spillway outlet and a horizontal support in between).	Still the case during the inspection in 2024.
2022	P-3	A large area of the dike between Sta. 0+100 and 0+300 shows settlement (up to about 300 mm), likely due to shallow foundation settlement in the footprint of the former water channel. It is recommended to survey the area and follow-up on the settlement over time to better understand the cause.	**2024:** Movement seems to have stabilized visually; confirm with survey. AEM plans to restore the crest surface to design elevation.
2024	P-2	Two zones of apparent seepage with very little flow are present at the downstream toe of the dike around Sta. 0+320 m. This area is above the IVR Attenuation Pond level during the 2024 inspection and may have runoff water draining from the rockfill. It is recommended to confirm the origin of the water by monitoring the evolution of these seepage zones to correlate with pond level variations and weather conditions.	
Tailings Storage Facilities			
Stormwater Dike			
2018	P-4	An assessment should be conducted to evaluate whether the design criteria will still be met with a different final tailings elevation on both sides of the dike. This can be done by the Engineer of Record but should be reviewed by the design engineer. Tailings surface differential elevation could also impact seepage flow, which may impact the thermal regime and affect cell freeze back.	Still the case in 2024: discussions in progress by AEM about closure planning and concept.
2020	P-4	Monitor piezometers PZ-SWD-03-A and B since they are starting to show large and unexplained variations in pressure readings.	Still the case in 2024 and being monitored: trend seems to be seasonal, confirm cause.

Table 2: Summary of Recommendations and Priority Levels from 2024 Geotechnical Inspection

Year of Recommendation	Priority Level	Recommended Action	Future Follow-Up
2024	P-2	A faulty, open seam in the bituminous geomembrane liner is observed around Sta. 10+600, and it is recommended to repair the seam by welding it closed before tailings deposition resumes in North Cell.	**2024:** several seams in the exposed liner (between Sta. 10+100 and 10+400) appear to be deteriorating and are opening. They should be repaired if the closure concept requires to maintain the hydraulic barrier at Stormwater Dike.
North Cell Internal Structure			
2020	P-3	Linear erosion features were observed at several locations in the upstream surface, where fine filter started to wash out from the crest to the toe of the upstream toe. This was likely caused by significant volumes of water draining from the crest during freshet since no water discharge was occurring in the areas. Monitor for aggravation and possibly repair if needed.	**Resolved in 2024:** fine filter slopes were repaired.
2022	P-3	Tension cracks (10 to 20 mm wide) in the fine filter slope of the east sector of the dike are recommended to be monitored for crack evolution; repair the fine filter if coarse filter is exposed to ensure good performance of the filter system.	**2024:** tension cracks of similar dimensions are still observed in some parts of the east sector, as well as the recently built western extension. However, much of the east part is now stabilized with a rockfill buttress and no longer shows signs of movement.
2023	P-3	Channeling of water at the toe of the filter slope is observed in a large part of the eastern sector. It is recommended to direct supernatant and runoff water away from the dike when resuming tailings deposition to discharge from this area.	**Resolved in 2024:** addition of rockfill buttress protected the toe of the filter slope from water.
Central Dike			
2022	P-2	Gravel is present on the geomembrane around Sta. 0+950 and 0+700. If tailings deposition resumes in South Cell, it is recommended to first clean the liner to avoid puncture.	Still the case in 2024 at Sta. 0+950. To clean before placement of the closure cover or additional deposition.

Table 2: Summary of Recommendations and Priority Levels from 2024 Geotechnical Inspection

Year of Recommendation	Priority Level	Recommended Action	Future Follow-Up
Saddle Dams 1, 2, 3, 4, and 5			
2021	P-2	A section of pipe with a metal connector and a metal rod are present on the liner of SD4 and should be removed to avoid damaging the liner.	**2024:** metal rod was removed but pipe is still present. It is reiterated that the pipe should be lifted off the liner and not pulled to avoid ripping the liner.
2023	P-3	Water was discharged on the granular cover of the SD4 east tie-in, causing channelling against the liner and fine filter and protective till material to erode. It is recommended to move the discharge point farther towards South Cell, over the rockfill section of the granular cover, to avoid channelling and erosion.	Still the case in 2024.
2023	P-3	The liner is ripped under one of the piles of granular material on SD1 at the top of the slope. It is recommended to repair the liner and inspect for possible further damage under the material.	**Resolved in 2024:** liner was repaired.
2024	P-2	Holes in the liner are observed near the top of the slope of SD2, close to the East abutment, as well at Sta. 20+350 and 20+425. The holes should be repaired before placement of the closure cover in that area.	
2024	P-3	A small hole in the liner is observed at the top of the slope of SD4. While it is not in the slope, it is recommended to repair it before placement of the closure cover.	
All-Weather Access Road			
2018	P-4	The erosion of the culverts is stable. The progression of the erosion of culverts PC-17A (8+830), PC-11 (39+552), R14 (67+840), R18-B (82+500), R-20 (85+490), R-23 (93+600), and R24 (98+100) should be monitored at freshet for any signs of progression or washout since signs of water flowing under the road were observed at these locations.	Still the case in 2024.
2018	P-4	For some culvert locations, monitoring is recommended to investigate whether flow occurs through the culvert (i.e., during the freshet). If insufficient capacity to handle flows is observed, or water circulates under the road, it is recommended to clear obstructions or repair the culverts. Particularly monitor R-00A (2+550), PC-14 (4+260), unnamed culvert at 5+700, PC-10 (36+865), and PC-16 (54+950).	Still the case in 2024.

Table 2: Summary of Recommendations and Priority Levels from 2024 Geotechnical Inspection

Year of Recommendation	Priority Level	Recommended Action	Future Follow-Up
Whale Tail Haul Road			
2019	P-3	Obstructed and damaged culverts were observed at some locations: #5 (117+525), #7 (118+013), #7-2 (118+016), #13 (120+615), #27-2 (123+300), #45 (125+710), #48 (127+203), #54 (128+388), #55 (128+440), #64 (129+920), #65 (130+924), #83 (136+300), #85 (136+671), #86 (136+740), #88 (136+861), #89 (137+180), #93 (138+100), #97 (138+436), #98 (138+482), #101 (139+025), #105 (140+555), #112 (142+630), #113 (142+736), #115 (142+865), #116 (142+940), #117 (143+173), #118 (143+433), #133 (148+141), #150 (152+171 to 152+179), #151 (152+562), #160 (155+966), #163 (156+474), #192 (163+190), #234 (170+385), #241 (171+235), #268 (175+774), #278 (177+870), #283 (178+965), and #284-2 (179+072). If insufficient capacity to handle the flow is observed at locations where culverts are obstructed or damaged, it is recommended to clear the obstructions or repair the culvert. It is still recommended to monitor culverts #167 (41+843) and #232 (53+928) where there are signs of water flowing below the culverts.	Still the case in 2024 for #7 (118+013), #7-2 (118+016), #8 (118+125), #12 (4+179 to 4+186; 3 outlets out of 5), #13 (120+615), #15 (120+850), #27-2 (123+300), #35 (124+581), #37 (125+035), #38 (125+049), #45 (125+710), #48 (127+203), #54 (128+388), #57 (128+635), #61 (129+050), #64 (129+920), #65 (130+924), #66 (132+324), #67 (132+689), #69 (133+784), #70 (133+837), #82 (136+143), #83 (136+300), #85 (136+671), #86 (136+740), #87 (136+810), #88 (136+861), #89 (137+180), #97 (138+436), #99 (138+830), #101 (139+025), #111 (142+461), #112 (142+630), #113 (142+736), #114 (142+810), #115 (142+865), #116 (142+940), #118 (143+433), #119 (143+777), #133 (148+141), #137 (148+940), #138 (149+000), #150 (152+171 to 152+179), #156 (153+506), #163 (156+474),

Table 2: Summary of Recommendations and Priority Levels from 2024 Geotechnical Inspection

Year of Recommendation	Priority Level	Recommended Action	Future Follow-Up
			#167 (157+843), #185 (162+404), #217 (166+790), #226 (168+935 to 168+937), #234 (170+385), #241 (171+235), #243 (171+593), #244 (171+625), #256 (173+350), #260 (174+185), #268 (175+774), #278 (177+870), and #281 (178+350).
Quarries and Eskers			
2018	P-4	Presence of unstable blocks and loose rocks along steep walls and unstable slopes was observed in Quarries 3, 7, 9, 10, 12, 16, 18, and 23, as well as all eskers and quarries along Whale Tail Haul Road except Esker #5. It is recommended that workers be cautious in these quarries and are aware of the potential hazard.	Still the case in 2024 with Quarries 3, 7, 9, 10, 16, 18, and 23, as well as with all eskers and quarries along Whale Tail Haul Road except eskers #3, #5, and #6.
Bulk Fuel Facilities			
Baker Lake Tank Farm			
2018	P-3	The granular fill material protecting the geomembrane was eroded due to wave/ice action in some areas, exposing the geomembrane. This condition was observed along the south side of Tanks 3 and 4 and on the west side of Tank 1. A folded section of exposed geomembrane was observed at the northwestern corner of Tank 2 and the northeastern corner of Tank 4. It is recommended to cover the exposed area with geotextile and fill material to re-establish liner protection. Liner is exposed on the northern side of Tank 5. Since this condition appears above the elevation of the southern berm, the liner protection with granular material is not considered as important as in other areas; however, it remains good practice and provides protection against animal damage.	**Partially resolved in 2024:** some areas of exposed liner were covered with granular material. Still exposed geomembrane on the north and south side of Tanks 1 to 4, in the northeastern corner of Tank 4, and on the south side of Tanks 5 and 6.

Table 2: Summary of Recommendations and Priority Levels from 2024 Geotechnical Inspection

Year of Recommendation	Priority Level	Recommended Action	Future Follow-Up
2018	P-2	A hole in the exposed geomembrane (300 mm diameter hole) was observed on the south-southwestern corner of Tank 3 at the toe of the slope. The hole in the geomembrane should be repaired to ensure good performance of the retention basin. It is also recommended to cover the exposed area with geotextile and fill material to re-establish liner protection.	**Resolved in 2024:** liner was repaired and covered with geotextile and granular material.
2018	P-3	Animal burrows were observed near the southern corner of Tank 2. It is recommended to assess whether geosynthetics were damaged under the granular cover for, at least, one location.	Still the case in 2024: animal burrows were observed on south side of Tanks 4, 6, and 8.
2020	P-2	A hole in the liner was observed on the southwestern corner of the containment cell of the 20 Jet-A fuel tanks. The hole in the geomembrane should be repaired to ensure good performance of the retention basin. Repairs done on two holes in this area in the past did not hold and the geomembrane is open In 2023, two additional small rips were observed on top of the slope in the same sector and on the northern side.	Still the case in 2024: faulty patches still visible.
2021	P-2	A fuel leak was reported by AEM in 2020 from one of the old fuel tanks. The geomembrane could be damaged by prolonged fuel contact under the granular cover. The geomembrane should be exposed for visual inspection in the leak area, repaired if needed, and covered again.	Still the case in 2024.
2023	P-2	A leak of diesel fuel from tote containers temporary stored between Tanks 5 and 6 was observed in the containment area. The spill must be cleaned and the granular backfill replaced as needed.	**Resolved in 2024:** spill was cleaned, and no leak was observed in 2024.
2023	P-3	A rip in the exposed HDPE liner was observed at the top of the slope south of Tank 3. It is recommended to repair the liner and restore the protective granular cover.	Still the case in 2024.
2024	P-3	Large holes (1 m in diameter) in the HDPE liner are observed in the middle of the slope on the east and south side of Tank 6, as well as the west side of Tank 5. It is recommended to repair the liner and restore the granular cover. An investigation should also be conducted to identify the origin of the damage and put appropriate procedures in place to avoid similar events in the future.	

Table 2: Summary of Recommendations and Priority Levels from 2024 Geotechnical Inspection

Year of Recommendation	Priority Level	Recommended Action	Future Follow-Up
Other Meadowbank Structures			
Meadowbank Site Roads			
2018	P-4	Three culverts were installed on Vault Road (coordinates 640 964 E / 7 217 466 N). As previously observed in past annual inspections, the three culverts were partially collapsed in the middle and showed signs of erosion at the inlet. This is currently not a significant issue, but it is recommended to monitor the culverts at freshet to ensure they provide sufficient capacity, and that erosion is not occurring.	**Condition continues to be stable in 2024. Recommendation is considered closed.**
Western Diversion Ditch			
2024	P-3	Sloughing is occurring in the riprap layer on the southern side of the ditch. It is recommended to repair the slope by recompacting the material to avoid further deformation and eventual obstruction of the ditch.	
Baker Lake Ditch No.1			
2024	P-3	The diversion ditch is newly built and shows signs of overflowing before the outlet due to high water levels and a permeable berm. It is recommended to amend the ditch by impermeabilizing the downstream side (e.g. with a liner) or improving the slope to ensure a controlled flow towards the outlet.	
Other Whale Tail Mine Structures			
Underground WRSF Saline Ditch			
2021	P-3	Blocks and debris are present in the ditch close to the south culvert (ditch outlet) and should be cleared to avoid water flowing out of the ditch.	**Partially resolved in 2023:** most debris was cleaned but a boulder still blocks the outlet of the culvert under the WRSF ramp. **2024:** same status.
2022	P-3	The outlet of the ditch towards Groundwater Storage Pond 1, from a culvert under the road, was obstructed at its outlet by a wooden plank placed by AEM in the winter to avoid snow accumulation inside the culvert. It is recommended to clear the culvert.	**2024:** culvert completely blocked by a plank and backfill material.
Underground Ore Stockpile Saline Ditch			
2022	P-2	Numerous debris from the stockpile and crusher pad is present in the ditch and must be removed to ensure ditch capacity.	**2024:** presence of some debris and boulders in ditch.
2023	P-3	The liner is exposed and ripped in several locations at the top of the slope in the South part of the ditch. It is recommended to repair the liner and restore the granular protection.	Still the case in 2024.

Table 2: Summary of Recommendations and Priority Levels from 2024 Geotechnical Inspection

Year of Recommendation	Priority Level	Recommended Action	Future Follow-Up
2024	P-3	Sediments and grout are present in the ditch, especially in the west section. It is recommended to clean the ditch regularly to avoid accumulation of sediments that can cause water to pond behind culverts.	

WRSF = waste rock storage facility; HDPE = high-density polyethylene.

In addition to the recommendations presented in Table 2, the following considerations are provided based on review of the instrumentation data:

- WSP recommends performing visual inspections in areas at Bay-Goose Dike (Central Shallows) where large variations in piezometric heads are measured following thawing or piezometers that were temporarily frozen.
- WSP recommends conducting periodic identification and replacement of non-functioning thermistors or strings that only have a few working beads since temperature data are essential for confirming trends observed in previous years.
- WSP recommends continuing to monitor the areas at Whale Tail Dike near chainages 0+142 and 0+750, which were in permafrost before the 2019 grouting program and were not grouted at that time. Those areas experienced fast and complete thawing after 2020, probably related to redistribution of flow paths and seepage concentration. Although the 2019 grouting program was successful in reducing seepage rates and AEM has been able to manage current seepages, WSP recommends assessing the benefit of grouting those areas (0+142 and 0+750) to reduce groundwater flows and promote faster freeze back of the bedrock to conditions similar to what was observed before 2020.
- WSP recommends inspecting the location of TH 745-P3 (Central Dike) and continuing to monitor this area closely. TH 745-P3 appears to be recording unrealistic warm temperatures compared to other thermistors nearby and temperatures measured by other piezometers in the vicinity (the issue is confirmed by AEM 2024 instrumentation review). Also, WSP recommends replacing instruments 545-P2, or at least the thermistor, to keep monitoring thermal regime in the foundation in this sector where cooling was observed before losing data.

WSP recommends drone surveys be calibrated based on at least five ground control points, which should be GPS-surveyed. In addition, WSP recommends drone surveys be conducted by the same contractor and data processing methods be consistent over multiple years. AEM indicated using drone surveys for monitoring deformations of the Stormwater Dike, which would replace conventional ground-based survey of monuments. Although the use of drone survey can be quicker and cover much larger areas, the accuracy of this method is highly dependent on the data processing and the existence of ground control points.

Signature Page

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The original is signed and sealed.

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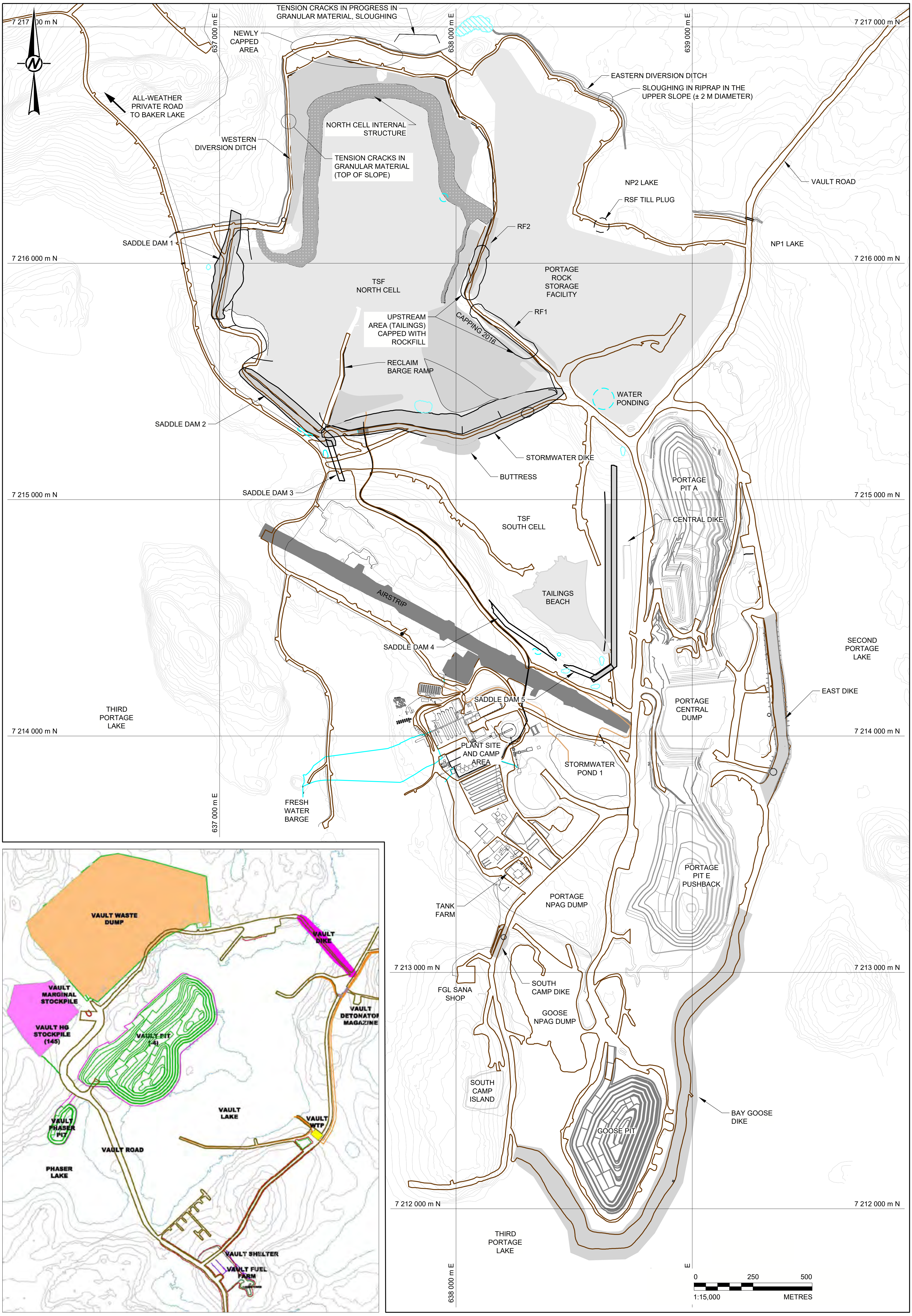

LEGEND

TOPOGRAPHIC CONTOUR

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

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CLIENT

AGNICO EAGLE

CONSULTANT

WSP

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PREPARED	M. Habersetzer
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REVIEW	M. Habersetzer
APPROVED	F. Esford

PROJECT

2024 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

MEADOWBANK MINE SITE DURING THE ANNUAL INSPECTION OF 2024

PROJECT No.	PHASE	Rev.	FIGURE
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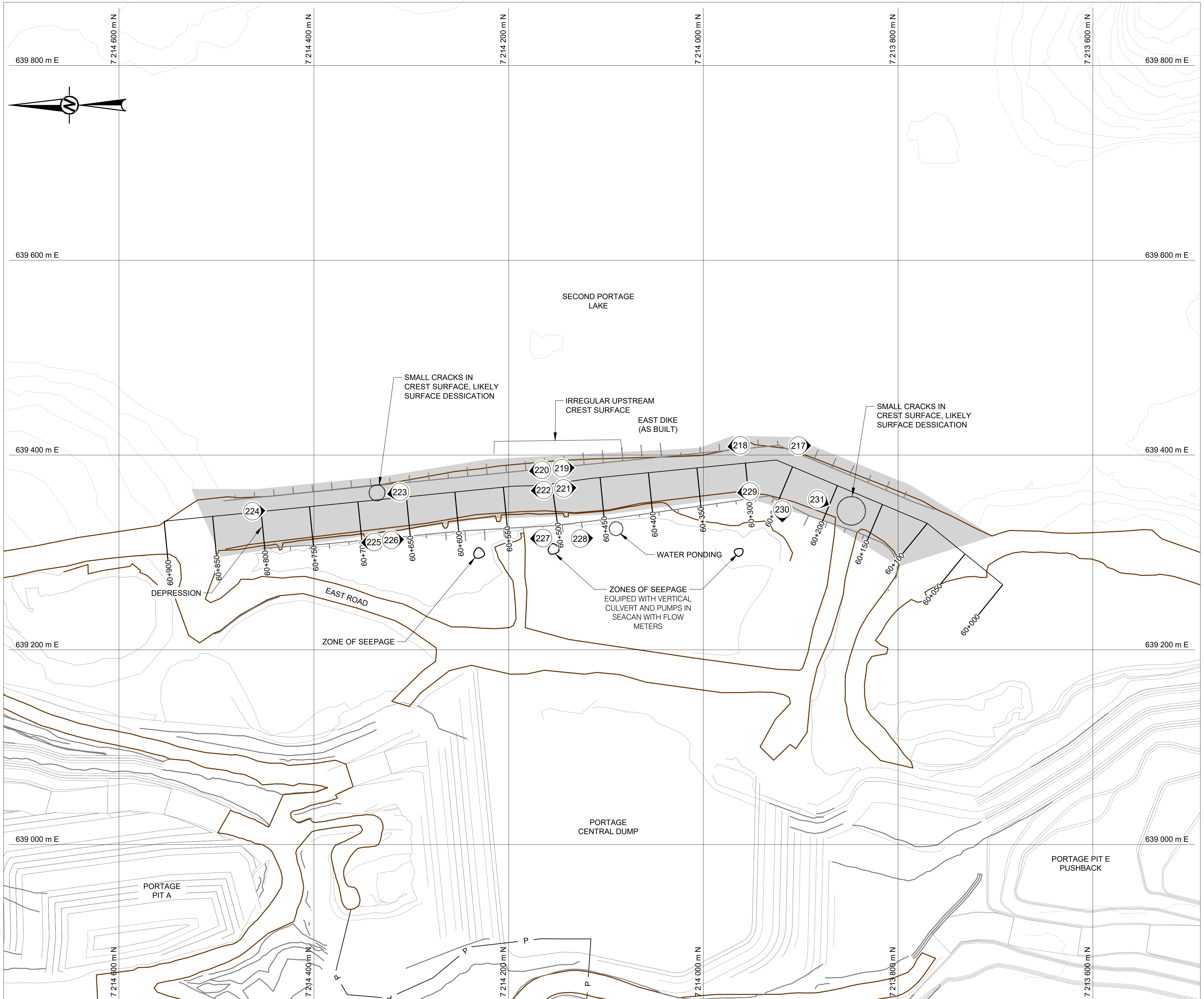

LEGEND

TOPOGRAPHIC CONTOUR

1 — IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2024

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

DRAWING BASE PROVIDED BY AEM LTD., MEADOWBANK DIVISION IN "MBK Site map updated JULY 2014.dwg" DATED JULY 8, 2014.

0 100 200

1:4 000 METRES

CLIENT

AGNICO EAGLE

PROJECT

2024 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

EAST DIKE DURING THE ANNUAL INSPECTION OF 2024

CONSULTANT

wsp

YYYY-MM-DD	2024-07-22
PREPARED	M. Habersetzer
DESIGN	B. N'daho
REVIEW	M. Habersetzer
APPROVED	F. Esford

PROJECT No.	PHASE	Rev.	FIGURE
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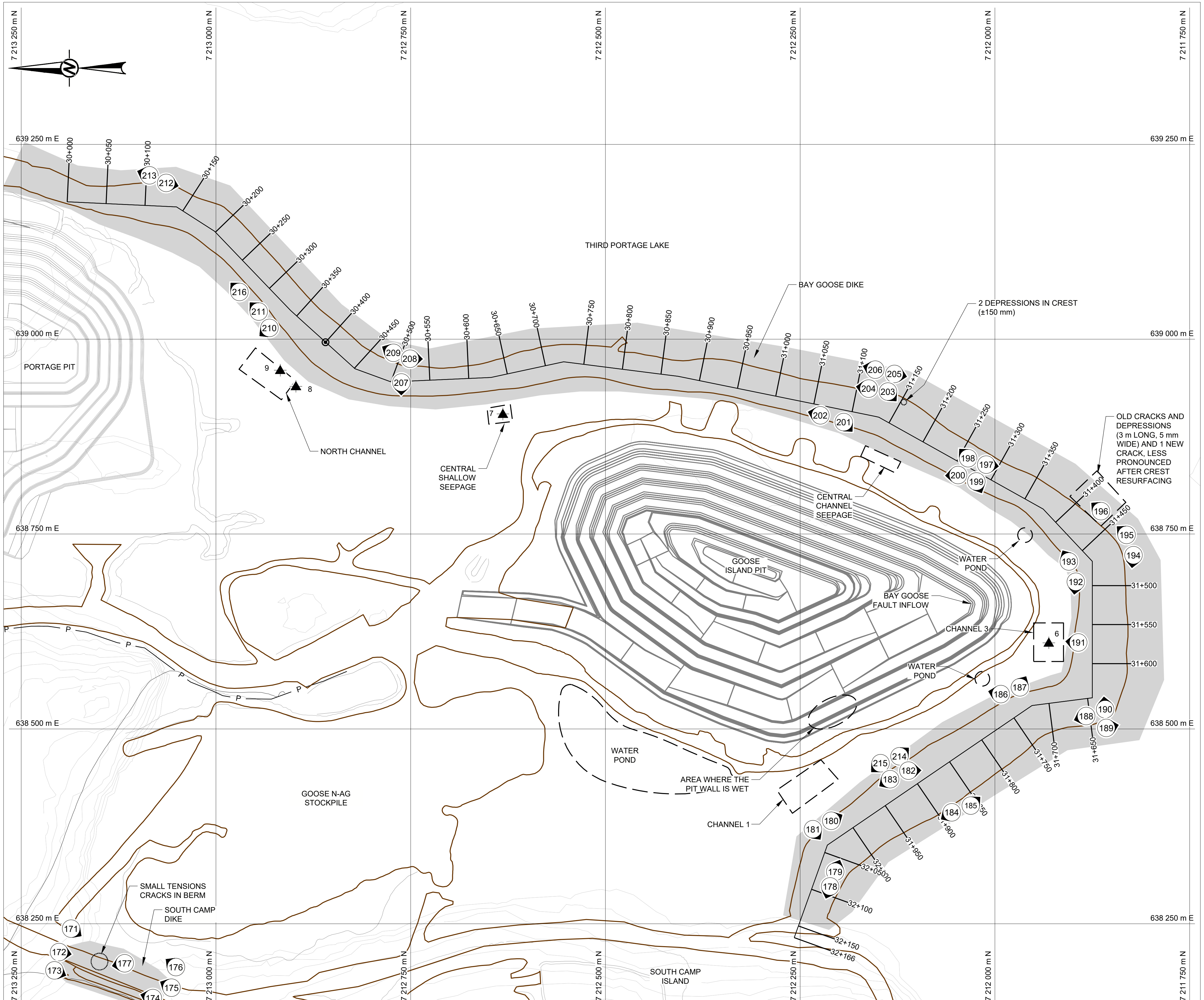


LEGEND

	TOPOGRAPHIC CONTOUR
1	IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2024
▲	MANUAL MONITORING FLOW STATION
△ 1	WATER ACCUMULATION. NO SIGN OF FLOW.

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

DRAWING BASE PROVIDED BY AEM LTD., MEADOWBANK DIVISION IN "MBK Site map updated JULY 2014.dwg" DATED JULY 8, 2014.

0 100 200

1:5 000 METRES

CLIENT

AGNICO EAGLE

PROJECT

2024 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

BAY-GOOSE AND SOUTH CAMP DIKES DURING THE ANNUAL INSPECTION OF 2024

CONSULTANT

wsp

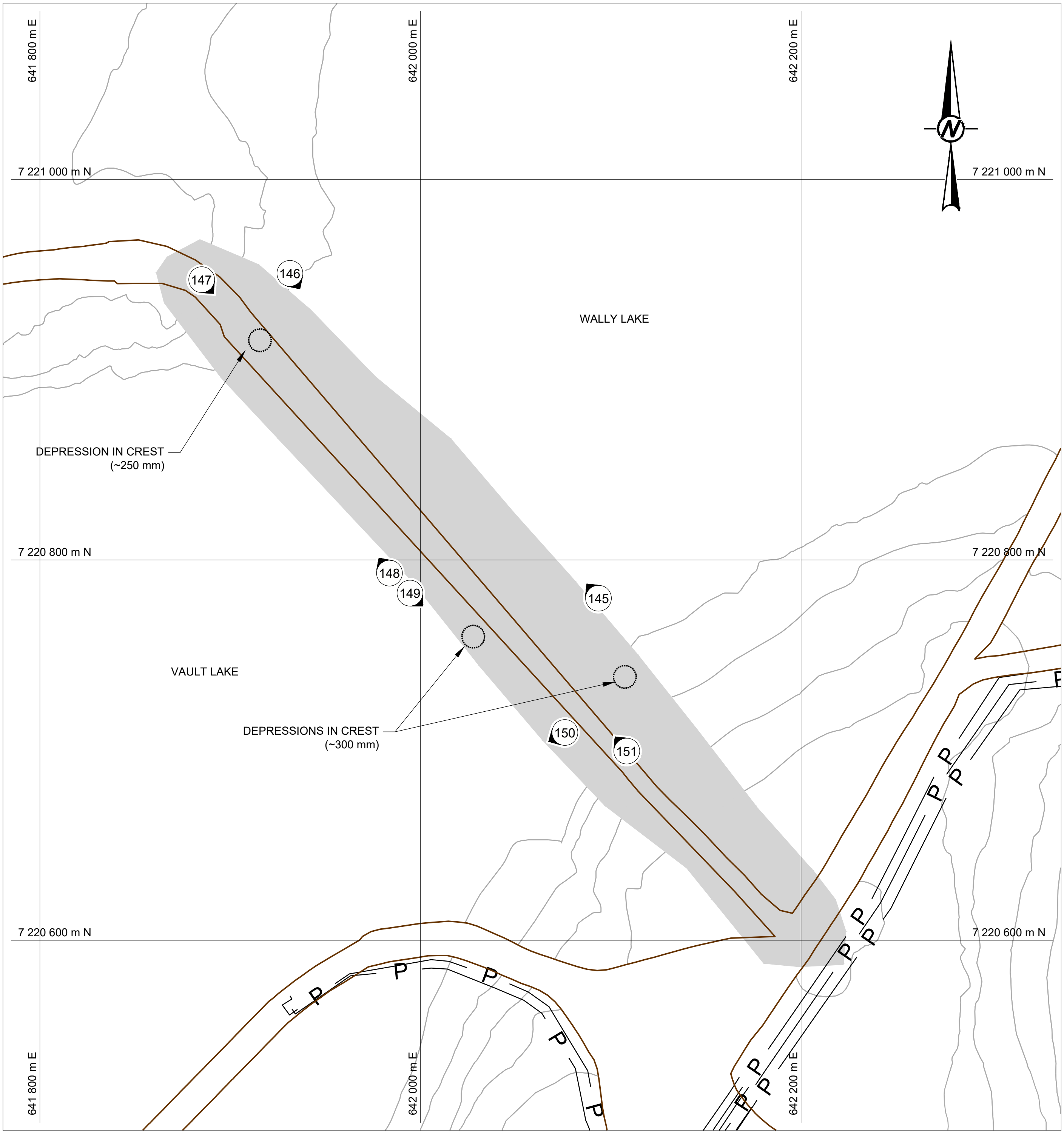
YYYY-MM-DD	2024-07-22
PREPARED	M. Habersetzer
DESIGN	B. N'daho
REVIEW	M. Habersetzer
APPROVED	F. Esford

PROJECT No.	PHASE	Rev.	FIGURE
CA0038946.6657	5000		A2

25 mm

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

Path: \\corp.pbwan.net\CA\CAMTR800\SIG\CAD\PROJETS\AGNICO-EAGLE\MEADOWBANK\PRODUCTION\CA0038946.6657\5000\ | File Name: CA0038946.6657-5000-01.dwg



LEGEND

TOPOGRAPHIC CONTOUR

1 IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2024

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

DRAWING BASE PROVIDED BY AEM LTD., MEADOWBANK DIVISION IN "MBK Site map updated JULY 2014.dwg" DATED JULY 8, 2014.

0 12.5 25
1:750 METRES

CLIENT

AGNICO EAGLE

CONSULTANT

wsp

YYYY-MM-DD	2024-07-22
PREPARED	M. Habersetzer
DESIGN	B. N'daho
REVIEW	M. Habersetzer
APPROVED	F. Esford

PROJECT

2024 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

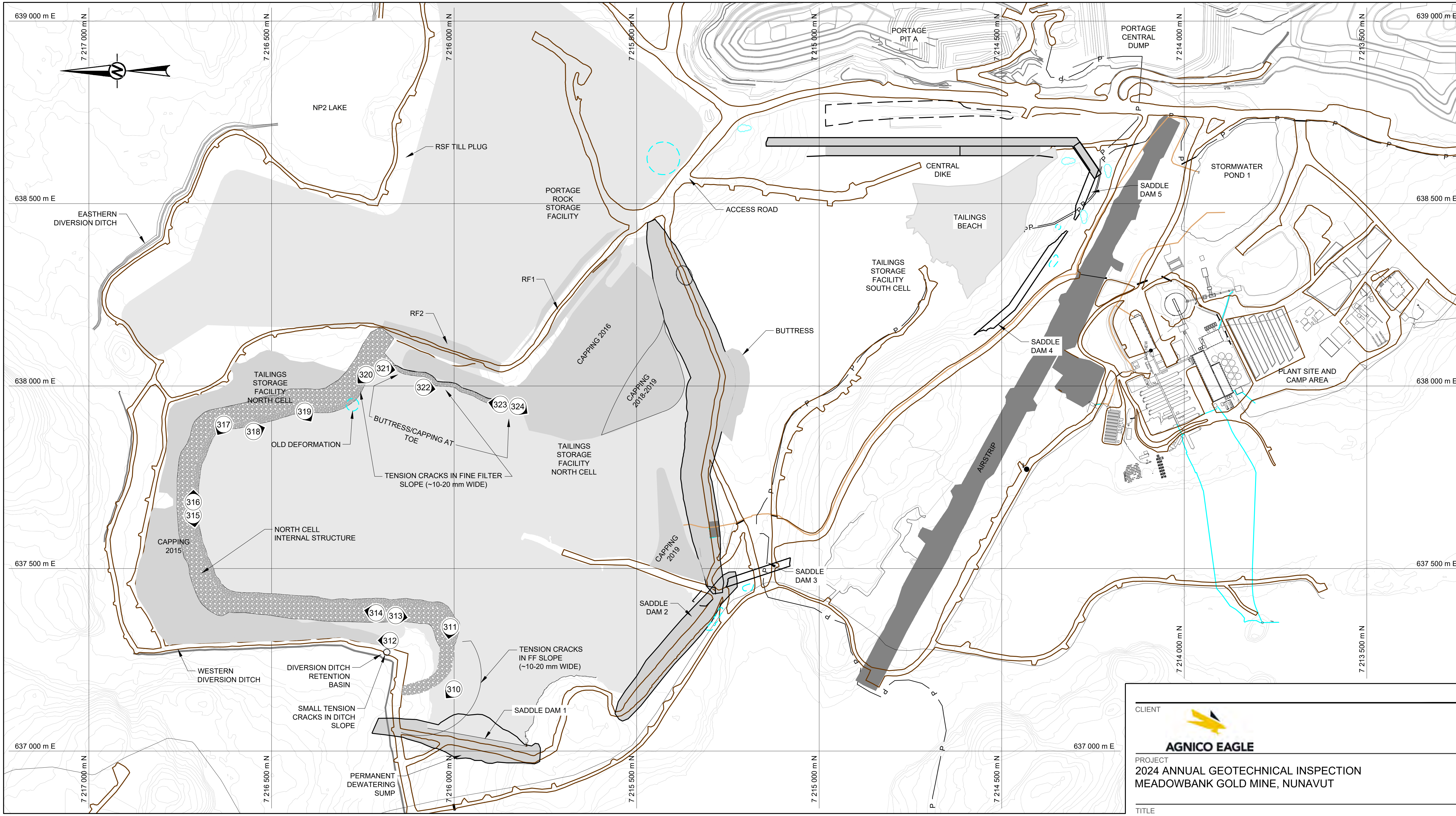
VAULT DIKE DURING THE ANNUAL INSPECTION OF 2024

PROJECT No.	PHASE	Rev.	FIGURE
CA0038946.6657	5000	0	A3

Path: \\corp.pbwan.net\CA\CAMTR800\SIG\CAD\PROJETS\AGNICO-EAGLE\MEADOWBANK\PRODUCTION\CA0038946.6657\5000\ | File Name: CA0038946.6657-5000-01.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

25 mm
0



LEGEND

———	TOPOGRAPHIC CONTOUR
(1)	IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2024

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

DRAWING BASE PROVIDED BY AEM LTD., MEADOWBANK DIVISION IN "MBK Site map updated JULY 2014.dwg" DATED JULY 8, 2014.

0 250 500
1:10 000 METRES

CLIENT

AGNICO EAGLE

PROJECT

2024 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

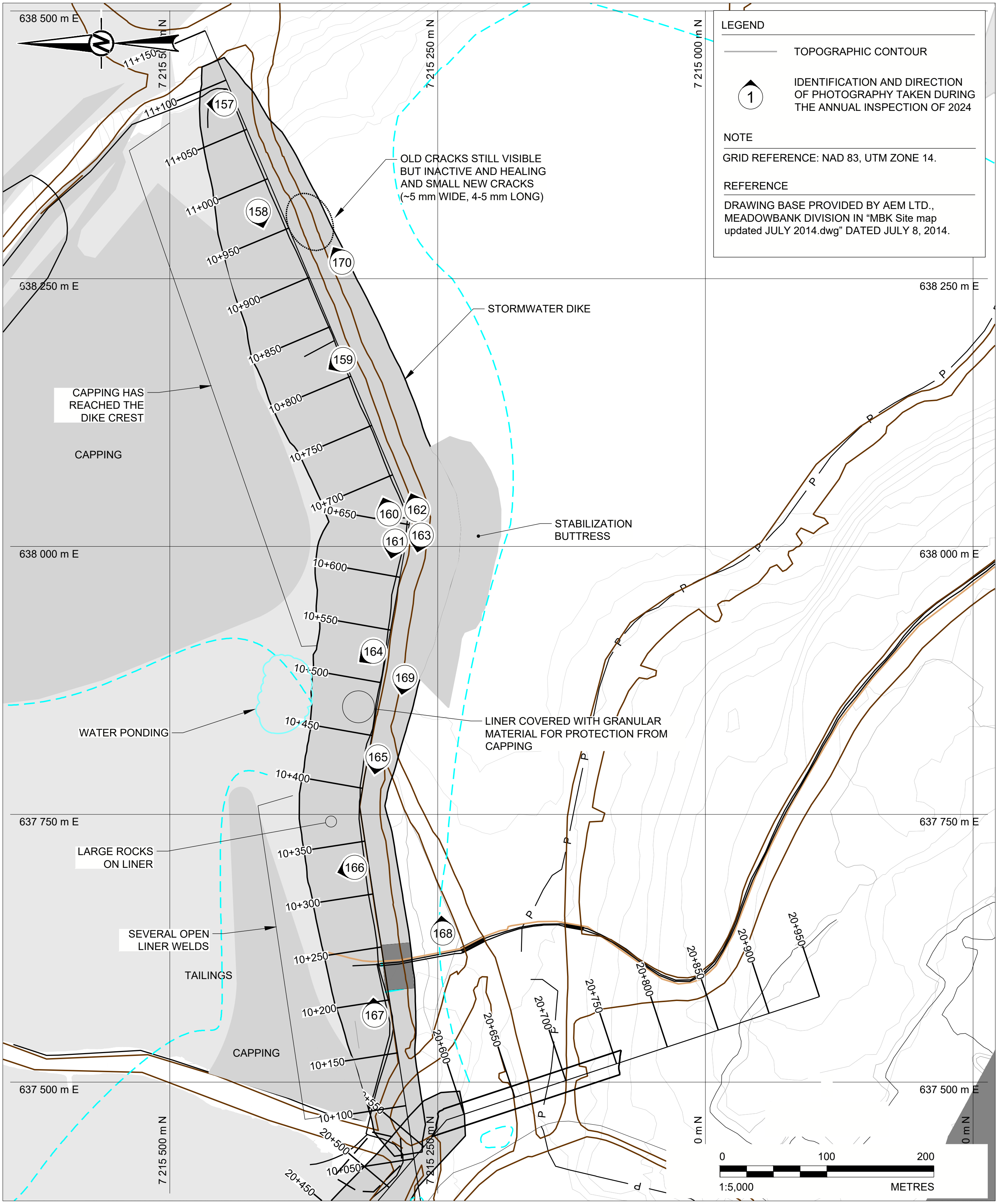
GENERAL VIEW OF TAILINGS STORAGE FACILITY DURING THE ANNUAL INSPECTION OF 2024

CONSULTANT

wsp

YYYY-MM-DD	2024-07-22
PREPARED	M. Habersetzer
DESIGN	B. N'daho
REVIEW	M. Habersetzer
APPROVED	F. Esford

PROJECT No.	PHASE	Rev.	FIGURE
CA0038946.6657	5000	0	B1



CLIENT

AGNICO EAGLE

CONSULTANT

wsp

YYYY-MM-DD	2024-07-22
PREPARED	M. Habersetzer
DESIGN	B. N'daho
REVIEW	M. Habersetzer
APPROVED	F. Esford

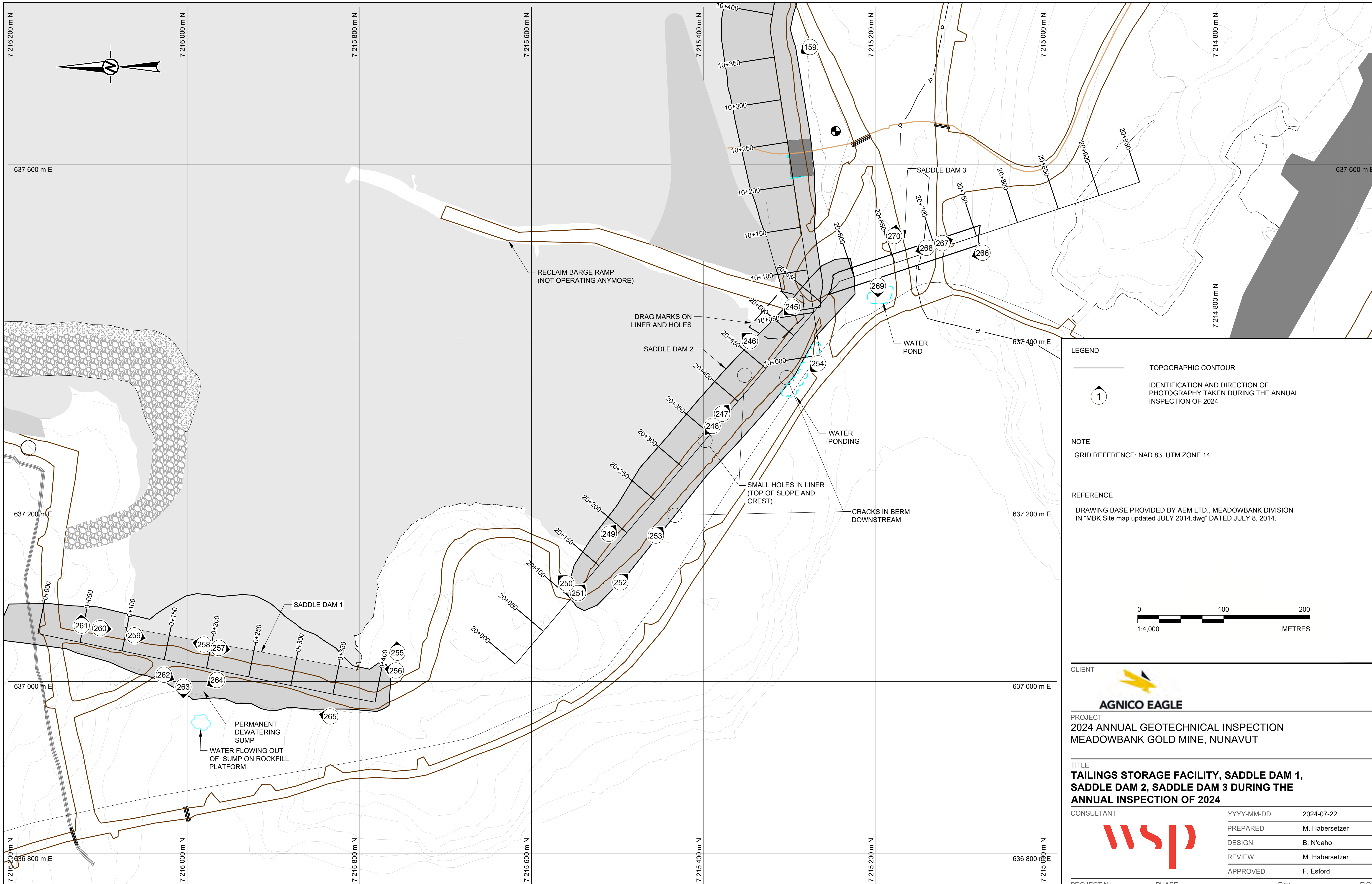
PROJECT

2024 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

STORMWATER DIKE DURING THE ANNUAL INSPECTION OF 2024

PROJECT No.	PHASE	Rev.	FIGURE
CA0038946.6657	5000	0	B2



LEGEND

TOPOGRAPHIC CONTOUR

IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2024

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

DRAWING BASE PROVIDED BY AEM LTD., MEADOWBANK DIVISION IN "MBK Site map updated JULY 2014.dwg" DATED JULY 8, 2014.

0 100 200

1:4,000 METRES

CLIENT

AGNICO EAGLE

PROJECT

2024 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

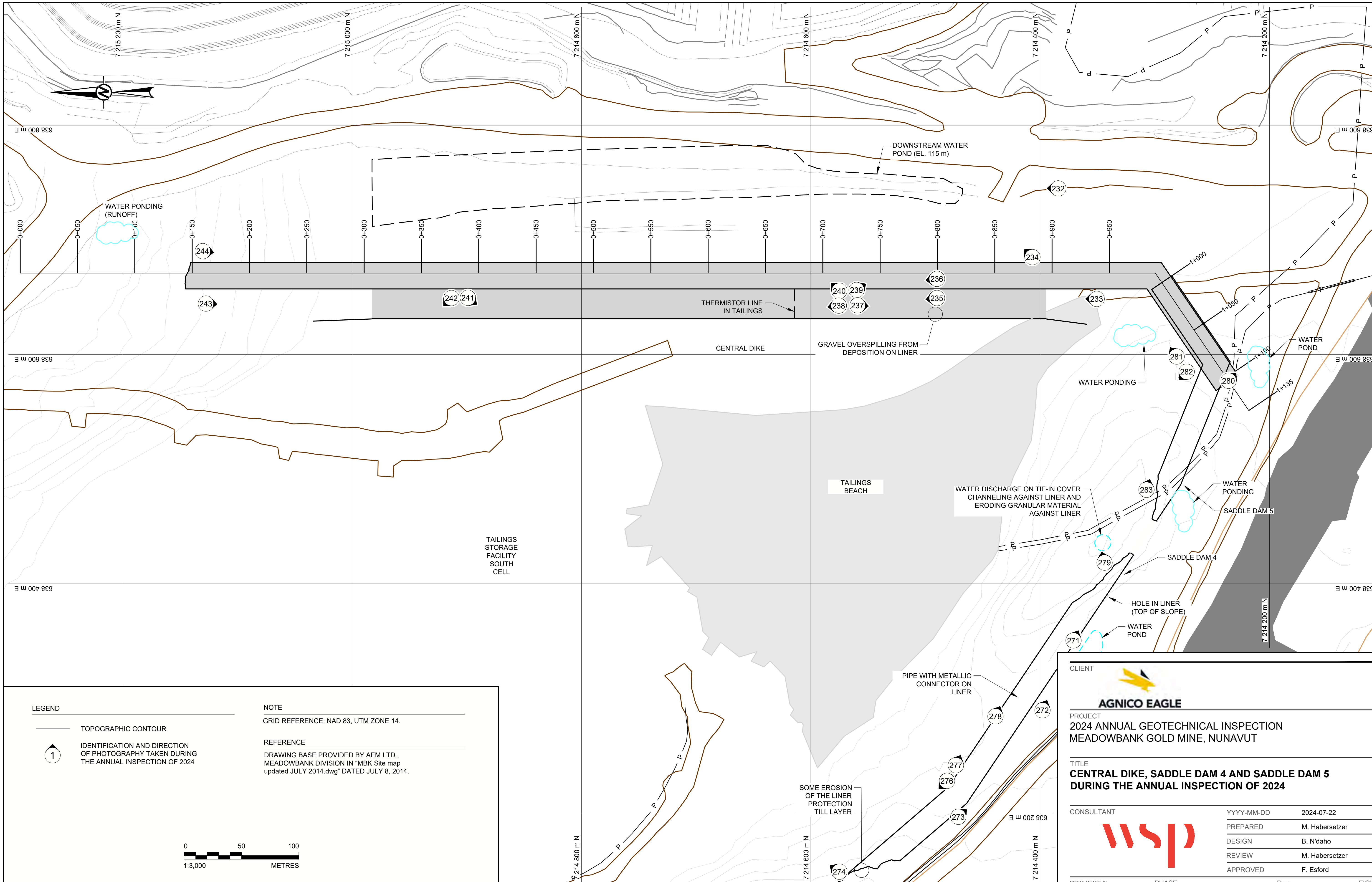
TAILINGS STORAGE FACILITY, SADDLE DAM 1, SADDLE DAM 2, SADDLE DAM 3 DURING THE ANNUAL INSPECTION OF 2024

CONSULTANT

wsp

YYYY-MM-DD	2024-07-22
PREPARED	M. Habersetzer
DESIGN	B. N'daho
REVIEW	M. Habersetzer
APPROVED	F. Esford

PROJECT No.	PHASE	Rev.	FIGURE
CA0038946.6657	5000	0	B3



LEGEND

TOPOGRAPHIC CONTOUR

1 IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2024

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

DRAWING BASE PROVIDED BY AEM LTD., MEADOWBANK DIVISION IN "MBK Site map updated JULY 2014.dwg" DATED JULY 8, 2014.

0 50 100

1:3,000 METRES

CLIENT

AGNICO EAGLE

PROJECT

2024 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

CENTRAL DIKE, SADDLE DAM 4 AND SADDLE DAM 5 DURING THE ANNUAL INSPECTION OF 2024

CONSULTANT

YYYY-MM-DD	2024-07-22
PREPARED	M. Habersetzer
DESIGN	B. N'daho
REVIEW	M. Habersetzer
APPROVED	F. Esford

PROJECT No.	PHASE	Rev.	FIGURE
CA0038946.6657	5000	0	B4

25 mm

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

Path: \\corp.pbwan.net\CA\CAMTR800\SIG\CAD\PROJETS\AGNICO-EAGLE\MEADOWBANK\PRODUCTION\CA0038946.6657\5000\ | File Name: CA0038946.6657-5000-01.dwg

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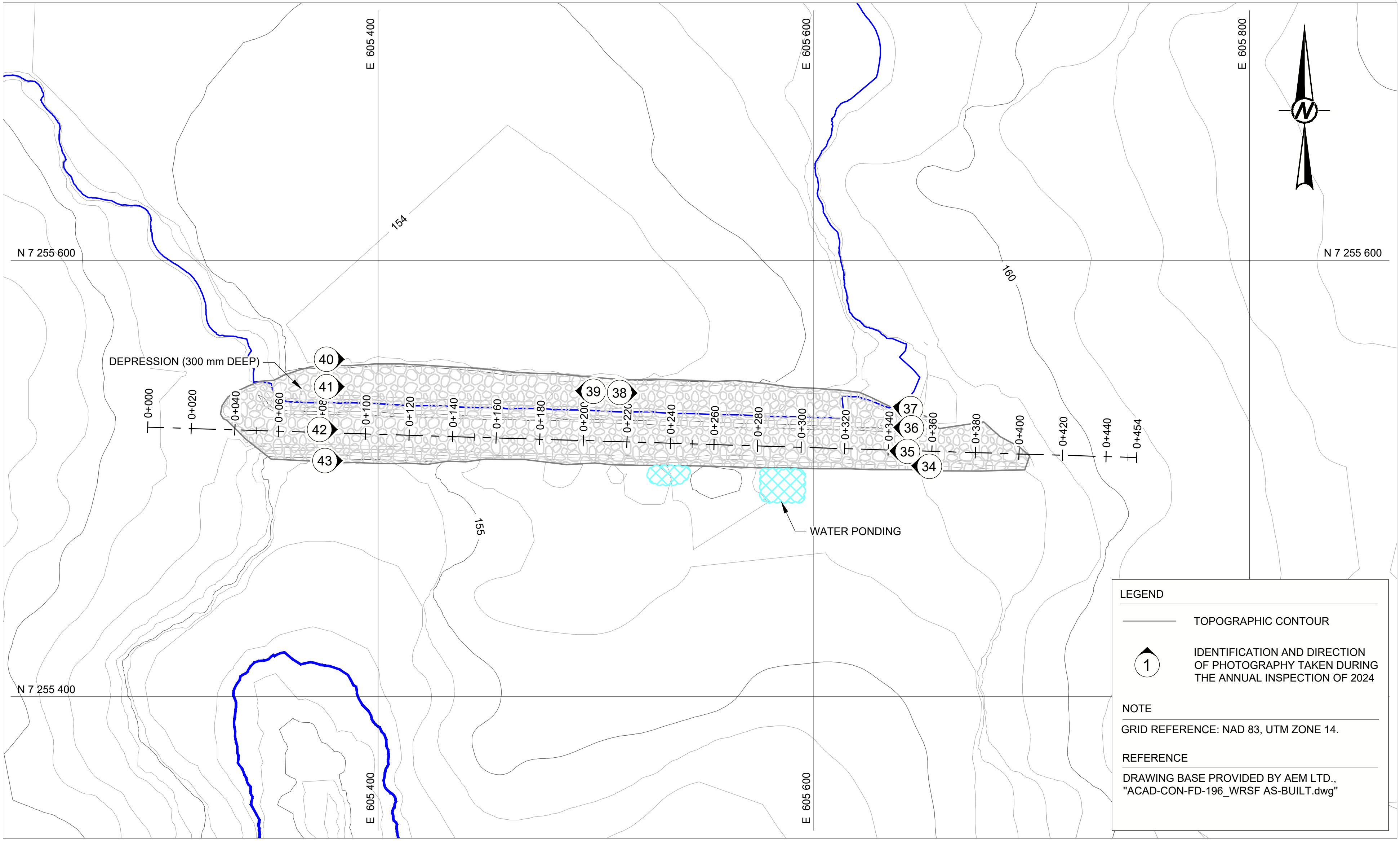
Path: \\corp.pbwan.net\CA\CAMTR800\SIG\CAD\PROJETS\AGNICO-EAGLE\MEADOWBANK\PRODUCTION\CA0038946.6657\5000\ | File Name: CA0038946.6657-5000-01-C.dwg



0 50 100

1:2 500 METRES

CLIENT

AGNICO EAGLE

CONSULTANT

wsp

YYYY-MM-DD	2024-07-20
DESIGNED	B. N'daho
PREPARED	M. Habersetzer
REVIEWED	M. Habersetzer
APPROVED	F. Esford

PROJECT
2024 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

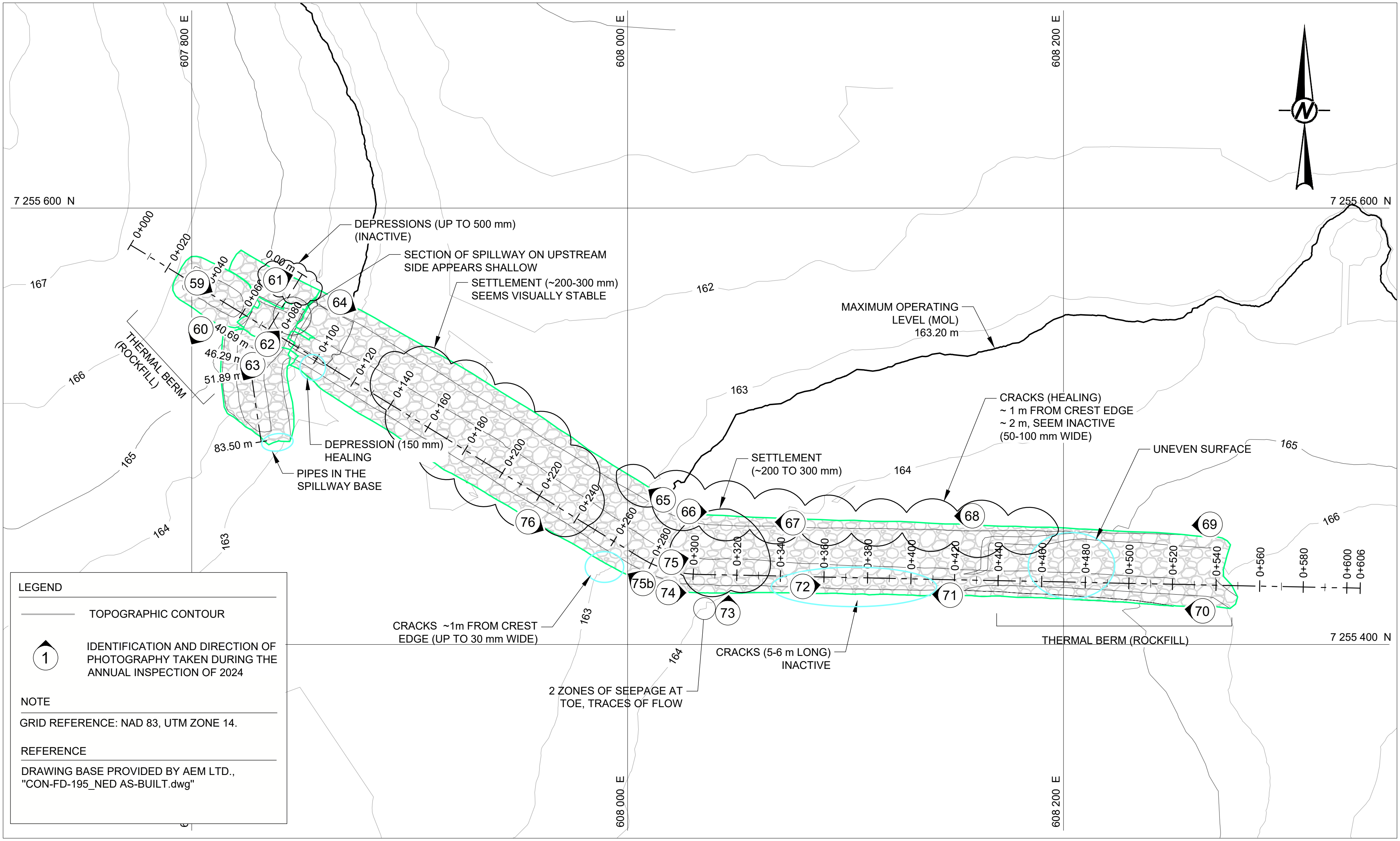
TITLE
WRSF DIKE DURING THE ANNUAL INSPECTION OF 2024

PROJECT NO.	PHASE	REV.	FIGURE
CA0038946.6657	5000	0	C1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

25 mm

Last Edited By: cabn129331 Date: 2024-09-24 Time:4:17:52 PM | Printed By: CABN129331 Date: 2024-11-22 Time:3:48:00 PM
Path: \\corp.pbwan.net\CA\CAMTR800\SIG\CAD\PROJETS\AGNICO-EAGLE\MEADOWBANK\PRODUCTION\CA0038946.6657\5000\ | File Name: CA0038946.6657-5000-01-C.dwg



LEGEND

TOPOGRAPHIC CONTOUR

IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2024

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

DRAWING BASE PROVIDED BY AEM LTD., "CON-FD-195_NED AS-BUILT.dwg"

0 50 100
1:2 500 METRES

CLIENT
AGNICO EAGLE

CONSULTANT
wsp

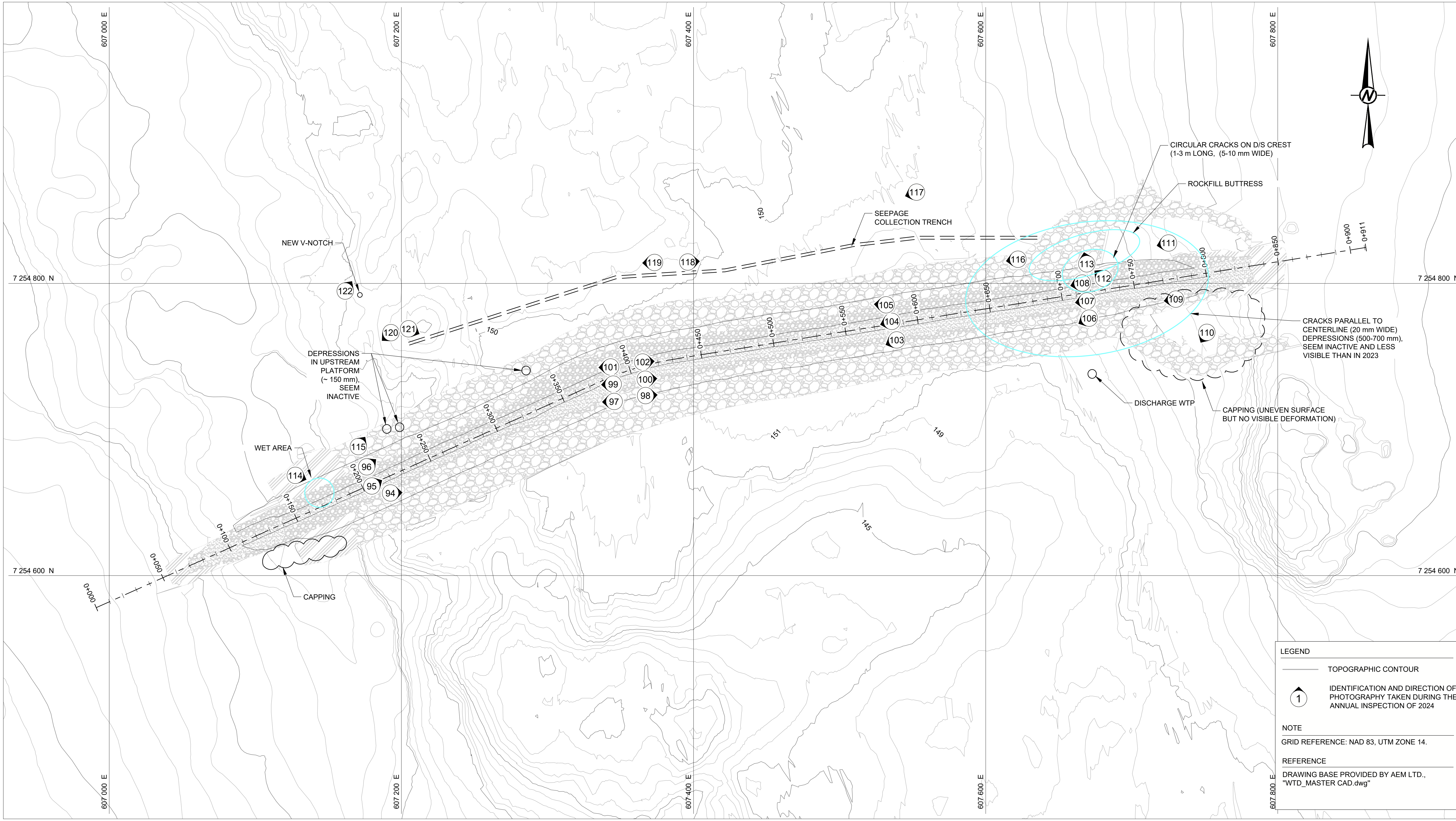
YYYY-MM-DD	2024-07-27
DESIGNED	B. N'daho
PREPARED	M. Habersetzer
REVIEWED	M. Habersetzer
APPROVED	F. Esford

PROJECT
2024 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE
IVR D1 DIKE DURING THE ANNUAL INSPECTION OF 2024

PROJECT NO.	PHASE	REV.	FIGURE
CA0038946.6657	5000	0	C2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
25 mm
0



CLIENT

AGNICO EAGLE

CONSULTANT

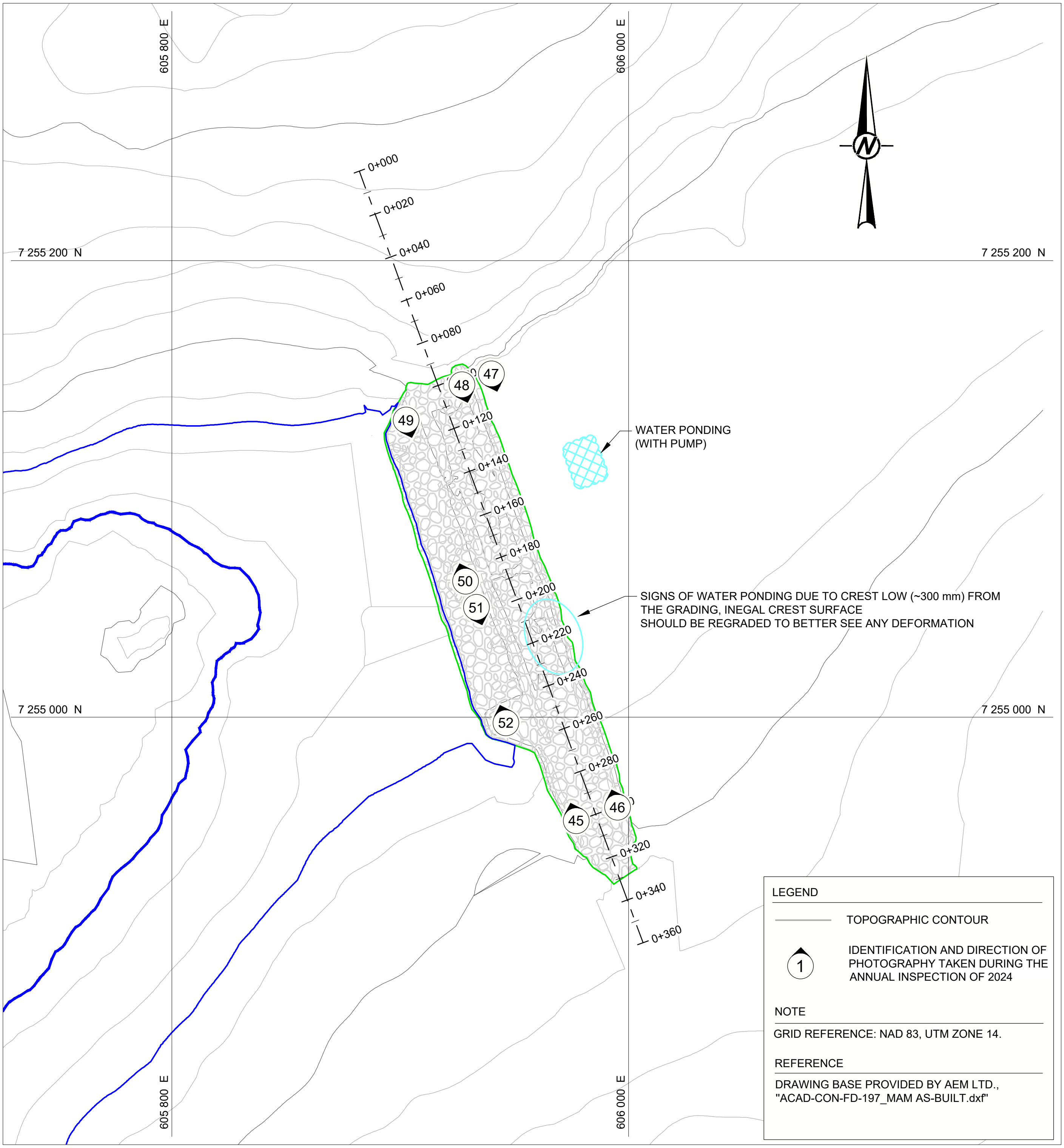
wsp

YYYY-MM-DD	2024-07-21
DESIGNED	B. N'daho
PREPARED	M. Habersetzer
REVIEWED	M. Habersetzer
APPROVED	F. Esford

PROJECT
2024 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE
WHALE TAIL DIKE DURING THE ANNUAL INSPECTION OF 2024

PROJECT NO.	PHASE	REV.	FIGURE
CA0038946.6657	5000	0	C3



50 100

1:2 500 METRES

CLIENT

AGNICO EAGLE

CONSULTANT

wsp

YYYY-MM-DD	2024-07-20
DESIGNED	B. N'daho
PREPARED	M. Habersetzer
REVIEWED	M. Habersetzer
APPROVED	F. Esford

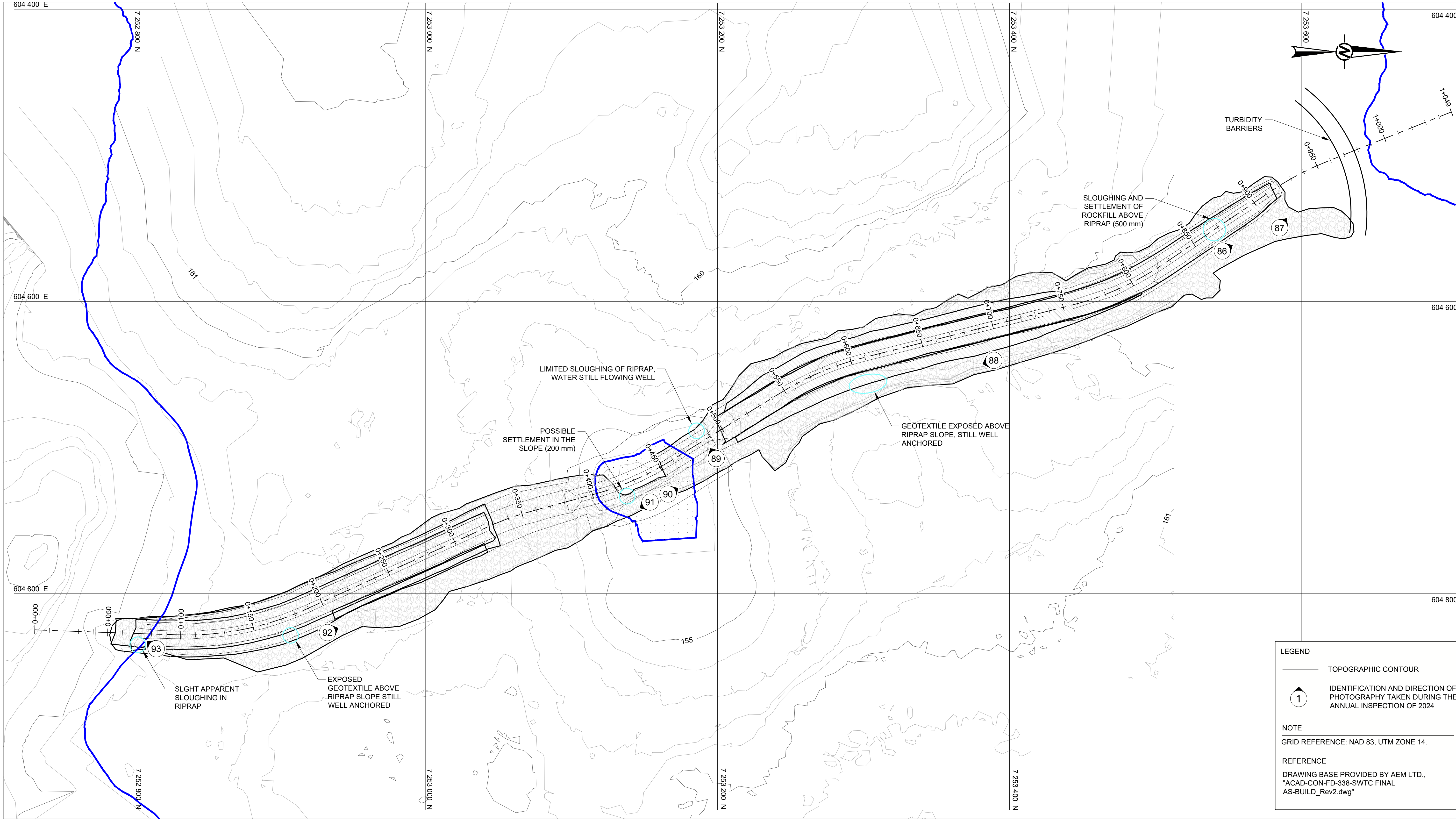
PROJECT

2024 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

MAMMOTH DIKE DURING THE ANNUAL INSPECTION OF 2024

PROJECT NO.	PHASE	REV.	FIGURE
CA0038946.6657	5000	0	C4



CLIENT

AGNICO EAGLE

CONSULTANT

wsp

YYYY-MM-DD	2024-07-20
DESIGNED	B. N'daho
PREPARED	M. Habersetzer
REVIEWED	M. Habersetzer
APPROVED	F. Esford

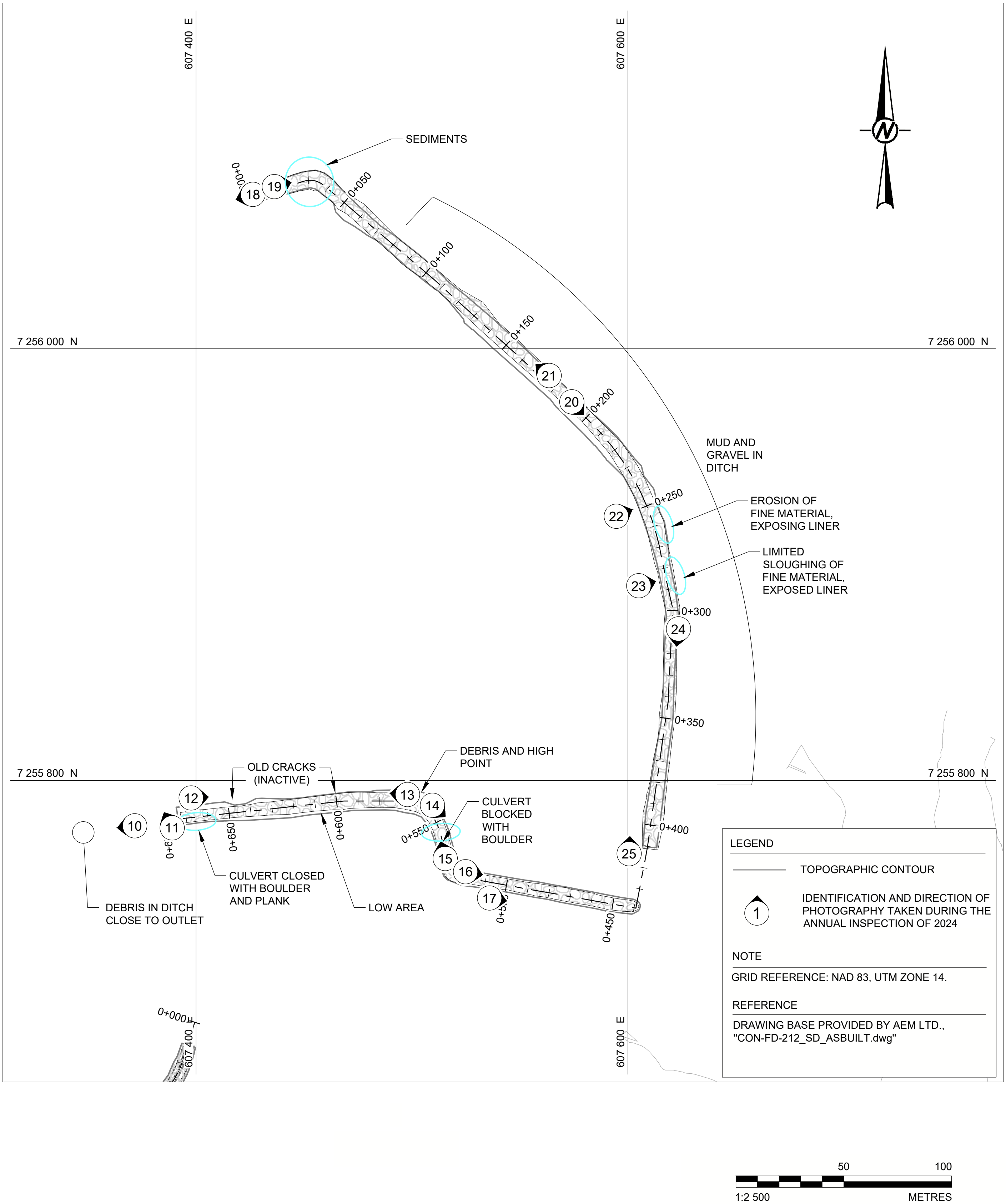
PROJECT

2024 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

SOUTH WHALE TAIL CHANNEL DURING THE ANNUAL INSPECTION OF 2024

PROJECT NO.	PHASE	REV.	FIGURE
CA0038946.6657	5000	0	C5



CLIENT

AGNICO EAGLE

PROJECT
2024 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

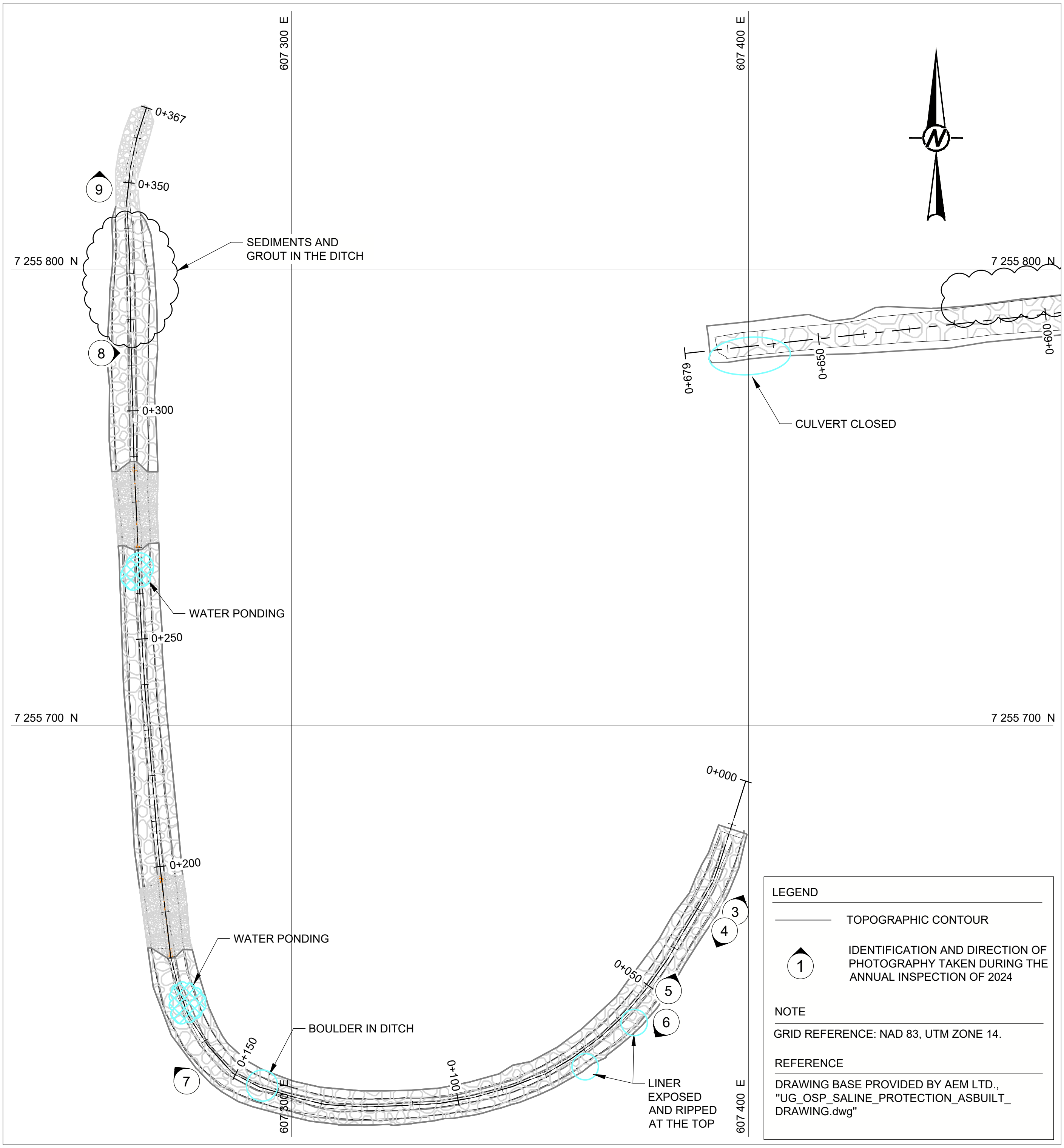
CONSULTANT

wsp

YYYY-MM-DD	2024-07-20
DESIGNED	B. N'daho
PREPARED	M. Habersetzer
REVIEWED	M. Habersetzer
APPROVED	F. Esford

TITLE
UNDERGROUND WRSF SALINE DITCH DURING THE ANNUAL INSPECTION OF 2024

PROJECT NO.	PHASE	REV.	FIGURE
CA0038946.6657	5000	0	C6



LEGEND

TOPOGRAPHIC CONTOUR

1 IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2024

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

DRAWING BASE PROVIDED BY AEM LTD., "UG_OSP_SALINE_PROTECTION_ASBUILT_ DRAWING.dwg"

0 25 50

1:1 250 METRES

CLIENT

AGNICO EAGLE

CONSULTANT

wsp

YYYY-MM-DD	2024-07-20
DESIGNED	B. N'daho
PREPARED	M. Habersetzer
REVIEWED	M. Habersetzer
APPROVED	F. Esford

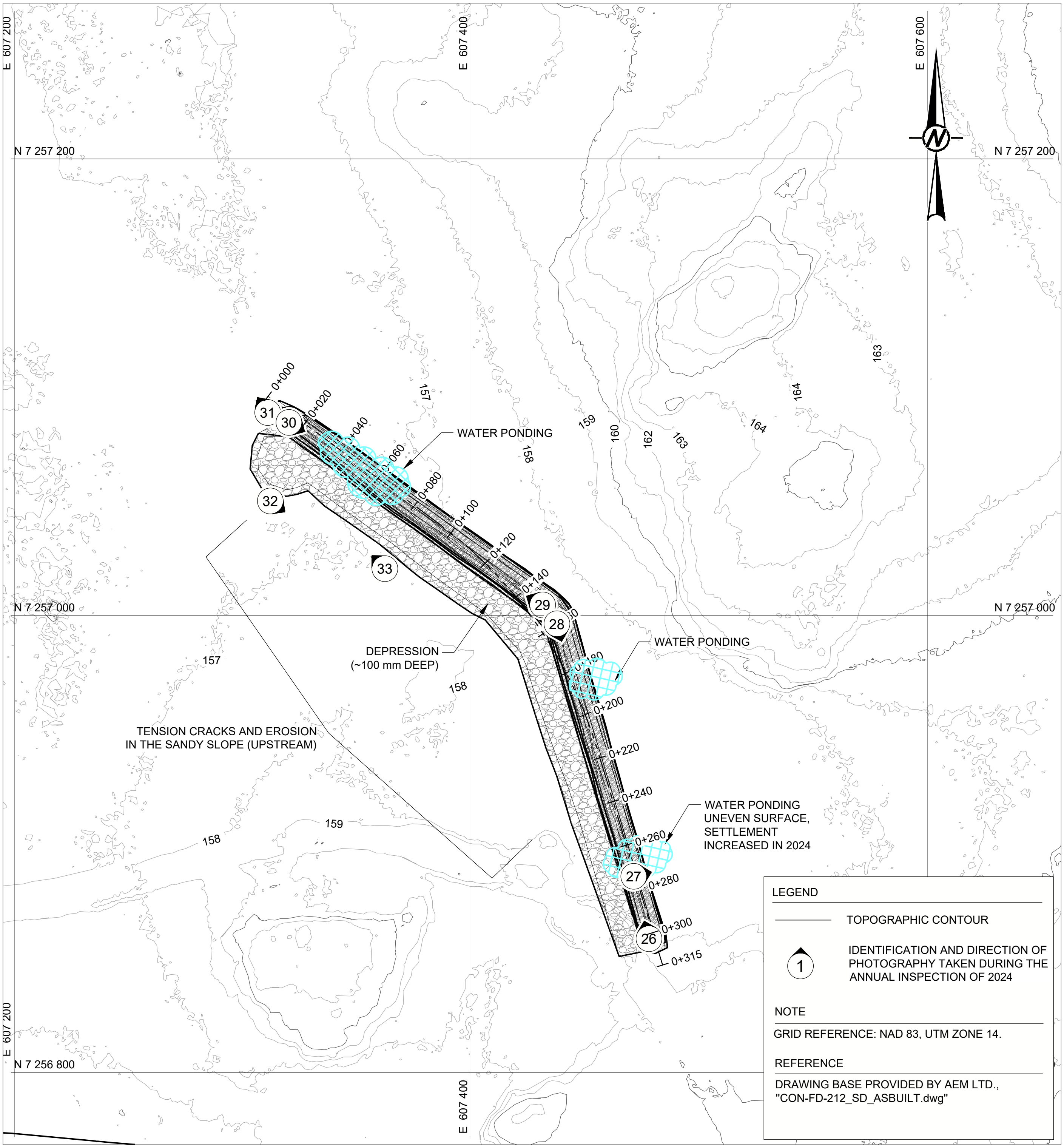
PROJECT

2024 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

UNDERGROUND ORE STOCKPILE SALINE DITCH DURING THE ANNUAL INSPECTION OF 2024

PROJECT NO.	PHASE	REV.	FIGURE
CA0038946.6657	5000	0	C7



50 100
1:2 500 METRES

CLIENT

AGNICO EAGLE

CONSULTANT

wsp

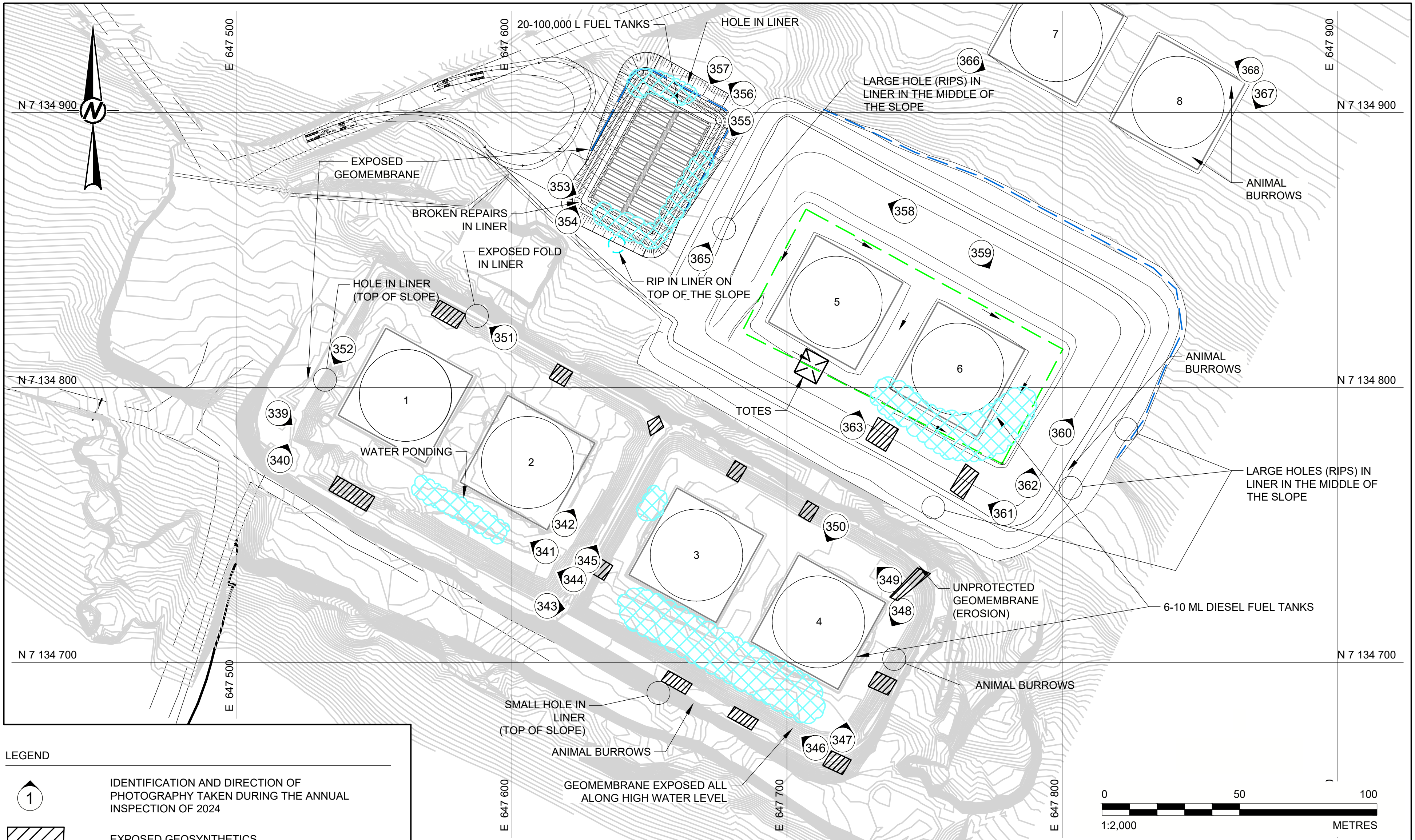
YYYY-MM-DD	2024-07-20
DESIGNED	B. N'daho
PREPARED	M. Habersetzer
REVIEWED	M. Habersetzer
APPROVED	F. Esford

PROJECT
2024 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE
IVR DIVERSION CHANNEL DURING THE ANNUAL INSPECTION OF 2024

PROJECT NO.	PHASE	REV.	FIGURE
CA0038946.6657	5000	0	C8

Path: \\corp.pbwan.net\CA\CAMTR800\SIG\CAD\PROJETS\AGNICO-EAGLE\MEADOWBANK\PRODUCTION\CA0038946.6657\5000\ | File Name: CA0038946.6657-5000-01.dwg



LEGEND

1	IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2024
(hatched)	EXPOSED GEOSYNTHETICS
(cross-hatched)	WATER PONDING

NOTE

1. GRID REFERENCE: NAD 83, UTM ZONE 14.
2. THE LOCATION AND DIMENSIONS OF TANKS 7 AND 8 AND THE SURROUNDING TOPOGRAPHY ARE APPROXIMATE AND FOR ILLUSTRATION PURPOSES ONLY. NO AS-BUILT DATA WAS AVAILABLE FOR THIS SECTOR.

REFERENCE

BASE PLAN PROVIDED BY AEM LTD. IN "PORTAGE_GOOSE_VAULT_END2019_LOM2013_V4D-WITH LABEL.dwg, RECEIVED OCTOBER 7, 2013

CLIENT

AGNICO EAGLE

CONSULTANT

wsp

YYYY-MM-DD	2024-07-24
PREPARED	F. L. Bolduc
DESIGN	R. Gravel
REVIEW	F. L. Bolduc
APPROVED	Y. Boulianne

PROJECT

2024 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

BAKER LAKE TANK FARM DURING THE ANNUAL INSPECTION OF 2024

PROJECT No.	PHASE	Rev.	FIGURE
CA0038946.6657	5000	0	G1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

25 mm

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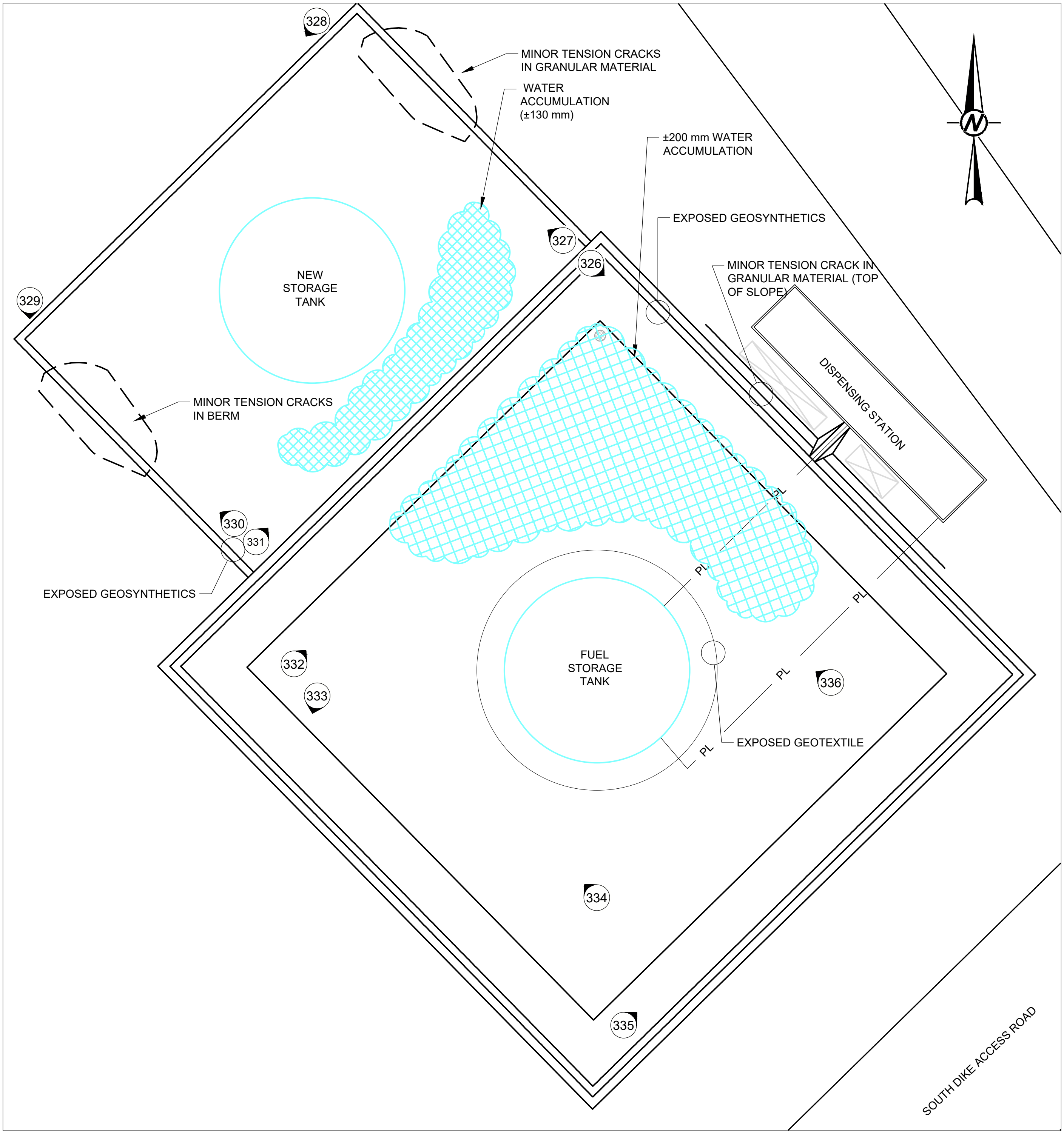


LEGEND

IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2024

REFERENCE

BASE PLAN INFORMATIONS IS PROVIDED BY CUMBERLAND DATED FEBRUARY 03, 2008

0 12.5 25
1:750 METRES

CLIENT
AGNICO EAGLE

CONSULTANT
wsp

YYYY-MM-DD	2024-07-24
PREPARED	M. Habersetzer
DESIGN	B. N'daho
REVIEW	M. Habersetzer
APPROVED	F. Esford

PROJECT
2024 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

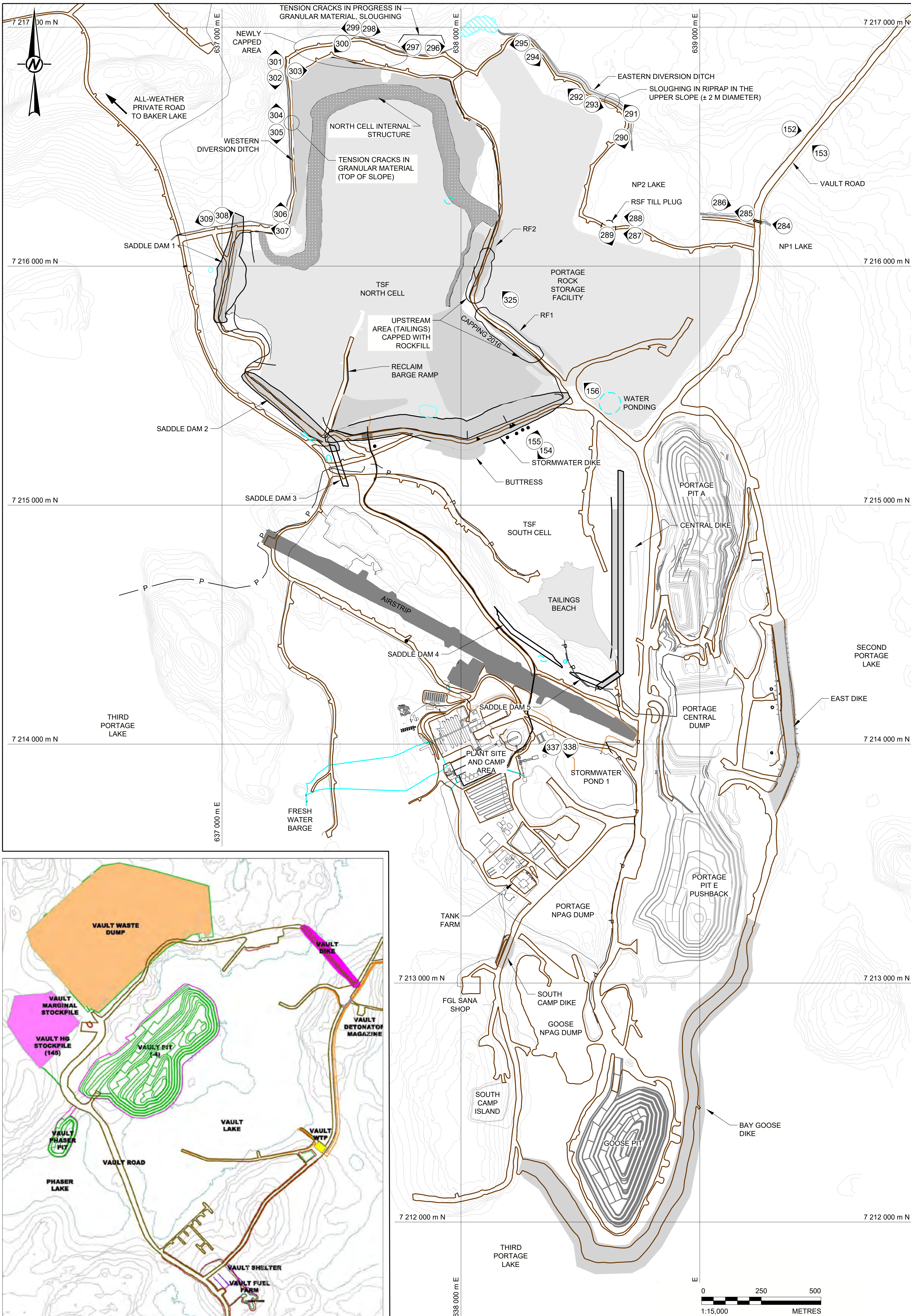
TITLE
MEADOWBANK TANK FARM DURING THE ANNUAL INSPECTION OF 2024

PROJECT No.	PHASE	Rev.	FIGURE
CA0038946.6657	5000	0	G2

Path: \\corp.pbwan.net\CA\CAMTR800\SIG\CAD\PROJETS\AGNICO-EAGLE\MEADOWBANK\PRODUCTION\CA0038946.6657\5000\ | File Name: CA0038946.6657-5000-01.dwg

25 mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

Path: \\corp.pbwan.net\CA\CAMTR800\SIG\CAD\PROJETS\AGNICO-EAGLE\MEADOWBANK\PRODUCTION\CA0038946.6657\5000\ | File Name: CA0038946.6657-5000-01.dwg



LEGEND

TOPOGRAPHIC CONTOUR

IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2024

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

DRAWING BASE PROVIDED BY AEM LTD., MEADOWBANK DIVISION IN "MBK Site map updated JULY 2014.dwg" DATED JULY 8, 2014.

CLIENT

AGNICO EAGLE

CONSULTANT

wsp

YYYY-MM-DD	2024-07-23
PREPARED	M. Habersetzer
DESIGN	B. N'daho
REVIEW	M. Habersetzer
APPROVED	F. Esford

PROJECT

2024 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

MEADOWBANK MINE SITE DURING THE ANNUAL INSPECTION OF 2024

PROJECT No.	PHASE	Rev.	FIGURE
CA0038946.6657	5000	0	H1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

APPENDIX A

Dewatering Dikes

Appendix A1 East Dike

Client:	AEM	**By:**	Marion Habersetzer/Vanessa Andrade
Project:	Meadowbank	**Date:**	July 22, 2024
Location:	East Dike	**Reviewed:**	Fiona Esford

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with a soil bentonite cut-off wall and downstream filters		
Weather Conditions:	Sunny	**Temperature:**	25°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		219, 220, 221, 222, 223, 224	
1.1 Crest elevation	136.5 m Cut-off 136.1m		Design thermal cap crest revised in 2011 to El. 136.5 m (Golder 2011)
1.2 Upstream lake level	132.9 m (2PL)		
Current freeboard	3.2 m		Design 2 m.
1.3 Distance to tailings pond (if applicable)	Not applicable		
1.4 Surface cracking	Yes.	223, 231	Small cracks in crest surface, likely surface desiccation (Approx. Sta. 60+175, 60+220 and 60+675)
1.5 Unexpected settlement	None		
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	Yes	219, 220	Irregular Upstream crest surface (approx. from Sta. 60+500).

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2. UPSTREAM SLOPE		217, 218, 219, 220	
2.1 Slope angle	Approx. 1.6H:1V		
2.2 Signs of erosion	Stable		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Not applicable		
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE		221, 222, 229, 231	
3.1 Slope angle	Approx.1.6H:1V		
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	Not apparent		
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4. DOWNSTREAM TOE AREA		225, 226, 227, 228, 229, 230	
4.1 Seepage from dam	Yes, presence of 3 zones		Zone of seepage downstream near Sta. 60+247. A sump is installed (pumping system located in container on the photo). No additional seepage observed at the surface of the ground during 2024 inspection. Pumping collection system started on April 4, 2012. Flow is being monitored since July 2013.
			Zone of seepage downstream near Sta. 60+498. A sump is installed (pumping system located in container on the photo). Ponded water nearby. No additional seepage observed at the surface of the ground during the 2024 inspection. Pumping collection system started on April 4, 2012. Flow is being monitored since July 2013.
			Seepage zone near Sta. 60+575. According to AEM, this zone was practically dry all year. Small water ponding was observed during 2024 inspection but no flow was noticed.
4.2 Signs of erosion	Not observed		
4.3 Signs of turbidity in seepage water	Not observed		
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions	Water ponding on the downstream side of the dyke around Sta. 60+450.		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR			
6.1 Stability of slopes	Stable		Low relief region, stable upstream and downstream of dike. Portage Pit is on the downstream side of the dike. Portage Lake is on the upstream side of the dike.
6.2 Distance to nearest slide (if applicable)	None observed		
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other unusual conditions	None		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE			
7.1 Surface condition	No spillway or outlet structure exists, only dewatering pump		
7.2 Signs of erosion	Not applicable		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7.3 Signs of movement (deformation)	Not applicable		
7.4 Cracks	Not applicable		
7.5 Settlement	Not applicable		
7.6 Presence of debris or blockage	Not applicable		
7.7 Closure mechanism operational	Not applicable		
7.8 Slope protection	Not applicable		
7.9 Instability of side slopes	Not applicable		
7.10 Other unusual conditions	Not applicable		
8. INSTRUMENTATION			
8.1 Piezometers	Yes		See Section 3.1.2.1 of the report.
8.2 Settlement cells	No		
8.3 Thermistors	Yes		See Section 3.1.2.2
8.4 Settlement monuments	Not anymore		They have been removed in the past.
8.5 Seismograph	Periodic – none in 2024		See Section 3.1.2.4 of the report.
8.6 Inclinometer	Yes		See Section 3.1.2.3 of the report
8.7 Weirs and flow monitors	Yes		See Section 3.1.2.5. Flow meters are installed for the two pumping systems downstream. The flow of the seepage zone at Sta. 60+575 is measured using a pipe.
8.8 Data logger(s)	Yes		The piezometers and thermistors on East Dike have automatic data collection since June 2012 (data transmitted every 3 hours).
8.9 Other			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	January 2024		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	September 2023		
10. NOTES			

Inspector's Signature	Vanessa Andrade	**Date:**	July 22, 2024

Photograph A1-01 East Dike

Date: July 22, 2024 **Photo Number: 217**

Description: From approximately Sta. 60+250 upstream, looking south at the upstream slope.

Photograph A1-02 East Dike

Date: July 22, 2024 **Photo Number: 218**

Description: From Sta. 60+300 upstream, looking north at the crest and upstream slope.

Photograph A1-03 East Dike

Date: July 22, 2024 **Photo Number: 219**

Description: From approximately Sta. 60+500 upstream, looking south at the upstream slope. Irregular upstream crest surface is observed in this area.

Photograph A1-04 East Dike

Date: July 22, 2024 **Photo Number: 220**

Description: From approximately Sta. 60+500 upstream, looking north at the crest and upstream slope. Irregular upstream crest surface is observed in this area.

Photograph A1-05 East Dike

Date: July 22, 2024 **Photo Number: 221**

Description: From approximately Sta. 60+500, looking south at the crest.

Photograph A1-06 East Dike

Date: July 22, 2024 **Photo Number: 222**

Description: From approximately Sta. 60+500, looking north at the crest.

Photograph A1-07 East Dike

Date: July 22, 2024 **Photo Number: 223**

Description: From approximately Sta. 60+650, looking north at the upstream slope. Small cracks in crest surface, likely surface desiccation.

Photograph A1-08 East Dike

Date: July 22, 2024 **Photo Number: 224**

Description: From approximately Sta. 60+810, looking south at the crest and upstream slope.

Photograph A1-09 East Dike

Date: July 22, 2024 **Photo Number: 225**

Description: From approximately Sta. 60+560, looking north at the downstream slope and toe.

Photograph A1-10 East Dike

Date: July 22, 2024 **Photo Number: 226**

Description: From approximately Sta. 60+560, looking south at the downstream slope and toe.

Photograph A1-11 East Dike

Date: July 22, 2024 **Photo Number: 227**

Description: From approximately Sta. 60+500, looking north at the downstream slope and toe.

Photograph A1-12 East Dike

Date: July 22, 2024 **Photo Number: 228**

Description: From approximately Sta. 60+475, looking south at the downstream slope and toe.

Photograph A1-13 East Dike

Date: July 22, 2024 **Photo Number: 229**

Description: From approximately Sta. 60+300, looking north at the downstream side and toe.

Photograph A1-14 East Dike

Date: July 22, 2024 **Photo Number: 230**

Description: From approximately Sta. 60+250, looking west at the downstream side and toe.

Photograph A1-15 East Dike

Date: July 22, 2024 **Photo Number: 231**

Description: From approximately Sta. 60+, looking southwest at the crest. Small cracks in crest surface is observed, likely surface desiccation.

Appendix A2 South Camp Dikes

Client:	AEM	**By:**	Marion Habersetzer/ Vanessa Andrade
Project:	Meadowbank	**Date:**	July 22, 2024
Location:	South Camp Dike	**Reviewed:**	Fiona Esford

GENERAL INFORMATION			
Dam Type:	Rockfill shell with upstream filter, a bituminous geomembrane liner and protective cover.		
Weather Conditions:	Sunny	**Temperature:**	25°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		172, 175	
1.1 Crest elevation	El. 136.6 m (rockfill) El. 134.7 m (liner)		
1.2 Reservoir level	U/S El. 133.6 m (3PL)		
Current freeboard	2.95 m (rockfill crest) 1.05 m (liner crest)		
1.3 Distance to tailings pond (if applicable)	Not applicable		
1.4 Surface cracking	None at the time of inspection		
1.5 Unexpected settlement	None at the time of inspection		
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2. UPSTREAM SLOPE		173,174	
2.1 Slope angle	Approx. 1.3H: 1V		Adequate
2.2 Signs of erosion	None observed		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Liner not visible at the time of the inspection		Bituminous geomembrane liner. Compacted granular material mixed with bentonite was placed above the liner, followed by a thermal cap layer covering the entire liner face.
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE		172, 175	
3.1 Slope angle	Approx. 1.4H:1V		Adequate
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		Small tension cracks in berm.
3.5 Seepage or wet areas	None observed.		
3.6 Vegetation growth	No		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA		171, 176, 177	
4.1 Seepage from dam	Accumulation of run-off water.		Some water ponding. No sign of flow. Stockpiled material downstream of dam toe is blocking drainage of water.

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.2 Signs of erosion	None observed		
4.3 Signs of turbidity in seepage water	None		
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions	None		
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR – THIRD PORTAGE LAKE			
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide (if applicable)	Not applicable		
6.3 Estimate of slide volume (if applicable)	None observed		
6.4 Floating debris	None		
6.5 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists		
8. INSTRUMENTATION			
8.1 Piezometers	No		
8.2 Settlement cells	No		
8.3 Thermistors	Yes		Section 3.2.2 of the report describes the thermal condition.
8.4 Settlement monuments	No		
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and flow monitors	No		
8.8 Data logger(s)	Yes		
8.9 Other	No		
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	January 2024		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	September 2023		
10. NOTES			
Inspector's Signature	Vanessa Andrade	**Date:**	July 22, 2024

Photograph A2-01 South Camp Dike

Date: July 22, 2024 **Photo Number**: 171

Description: From the north abutment, looking south at the downstream slope.

Photograph A2-02 South Camp Dike

Date: July 22, 2024 Photo Number: 172

Description: From the north abutment, looking south at the crest.

Photograph A2-03 South Camp Dike

Date: July 22, 2024 **Photo Number: 173**

Description: From the north abutment, looking south at the upstream slope and thermistors instrumentation set-up.

Photograph A2-04 South Camp Dike

Date: July 22, 2024 **Photo Number: 174**

Description: From the south abutment, looking north at the upstream slope and the thermistors instrumentation set-up.

Photograph A2-05 South Camp Dike

Date: July 22, 2024 **Photo Number: 175**

Description: From the south abutment, looking north at the crest.

Photograph A2-06 South Camp Dike

Date: July 22, 2024 **Photo Number**: 176

Description: From the south abutment, looking north at the downstream slope. There is some water ponding, from run-off.

Photograph A2-07 South Camp Dike

Date: July 22, 2024 **Photo Number**: 177

Description: Around the middle of the dike, looking northeast at the downstream slope.

Appendix A3 Bay-Goose Dike

Client:	AEM	**By:**	Marion Habersetzer/Vanessa Andrade
Project:	Meadowbank	**Date:**	July 22, 2024
Location:	Bay-Goose Dike	**Reviewed:**	Fiona Esford

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with a cut-off wall (soil-bentonite, cement-soil-bentonite and jet grouting columns) and downstream filters		
Weather Conditions:	Sunny	**Temperature:**	25°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		178, 179, 184, 185, 188, 189, 190, 194, 195, 196, 197, 198, 203, 204, 207, 208, 209	
1.1 Crest elevation	+/-138 cut-off 136.1m		Thermal cap completed in May 2013.
1.2 Upstream water level (Third Portage Lake)	133.6 m (3PL)		Downstream side dewatered since mid-November 2011.
Current freeboard	2.45 m		Design 2.0 m.
1.3 Distance to tailings pond (if applicable)	Not applicable		
1.4 Surface cracking	Yes		The tension cracks observed in 2013 on the upstream side within the thermal cap placed during winter 2013 are still partly visible but had been mostly repaired by resurfacing operations.

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1.5 Unexpected settlement	Yes		Tension cracks observed in 2013 and 2014 on the upstream side within the thermal cap (between approximately Sta. 32+100 and 31+750) were no longer visible during the 2024 inspection after the crest of the dike was resurfaced in 2023. Around Sta. 31+430, old cracks and depression (3 m long, 5 mm wide) are still detectable but less visible after the resurfacing.
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	Yes		Two depressions in crest (~150 mm) near to Sta. 31+150.
2. UPSTREAM SLOPE		178, 179, 184, 185, 188, 189, 190,194, 195,196, 197, 198, 203, 204, 205, 206, 208, 209, 212, 213	
2.1 Slope angle	Approx. 1.6H:1V		Rockfill
2.2 Signs of erosion	Stable		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None		
2.5 Face liner condition (if applicable)	Not applicable		
2.6 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
3. DOWNSTREAM SLOPE		180,181, 182, 183, 186, 187,191, 192, 193, 199, 200, 201, 202, 207, 210, 211, 214, 215, 216	
3.1 Slope angle	Approx.1.6H:1V		
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	Not apparent		
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA		181, 182, 184, 185, 189, 190, 191, 196, 197, 202, 203, 205, 206, 209, 210, 211	
4.1 Seepage from dike	Yes		Seepage zone observed as well as water pond. The seepage is being monitored by the mine and does not show signs of aggravation.

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
	North Channel		Monitored by stations 8 (30+420).Water flowing was observed during the inspection.
	Central Shallow		Presence of 2 seepage channels at 30+650 and 30+625. Flow was observed during inspection at 30+655. Monitored by station 7.
	Central Channel		Presence of a seepage channel at Sta. 31+165. Water ponding was observed at the time of the inspection. It was pumped once after freshet only.
	Channel 3		Light flow observed during inspection at Sta 31+500 m. Monitored by station 6.
	Channel 1		This seepage channel was not flowing at the time of the inspection.
	Water Ponds		Presence of water pond with no sign of seepage. Located at 31+750. between Channels 1 and 2.
4.2 Signs of erosion	None observed		
4.3 Signs of turbidity in seepage water	No.		
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.6 Other unusual conditions	Yes		Inflow of water on pit wall in 2023.Probably due to the Bay-Goose fault and rock quality. In the vicinity of Channels 1, 2 and 3. Not monitored anymore. In 2024, due to Goose Pit being mostly flooded, water inflow through the wall is no longer visible except at the top of the walls.
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR – THIRD PORTAGE LAKE		178, 179, 184, 185, 188, 189, 194, 195, 196, 205, 206, 208, 209, 212, 213	
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide (if applicable)	None observed		
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists, only dewatering pump.		Not applicable.
8. INSTRUMENTATION			
8.1 Piezometers	Yes		See Section 3.3.2 of the report.
8.2 Settlement cells	No		
8.3 Thermistors	Yes		See Section 3.3.2 of the report.
8.4 Settlement monuments	No		Survey monuments removed in the past.
8.5 Seismograph	Periodic – none in 2024		See Section 3.3.2 of the report.
8.6 Inclinometer	Yes		See Section 3.3.2 of the report.
8.7 Weirs and flow monitors	Yes		Seepage monitoring system installed at seepage channel to monitor flow.
8.8 Data logger(s)	Yes		The piezometers and the thermistors have automatic data transmission (every 3 hours).
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	January 2024		
9.2 Emergency Preparedness Plan (EPP)			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	September 2023		
10. NOTES			

Inspector's Signature	Vanessa Andrade	**Date:**	July 22, 2024

Photograph A3-01 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 178

Description: From approximately Sta. 32+025 (south abutment) looking west at the upstream slope.

Photograph A3-02 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 179

Description: From approximately Sta. 32+025 (south abutment) looking east at the crest and upstream slope.

Photograph A3-03 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 180

Description: From approximately Sta. 32+030 looking southeast at the crest and downstream slope.

Photograph A3-04 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 181

Description: From approximately Sta. 32+030 looking southeast at the Channel 1, downstream toe.

Photograph A3-05 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 182

Description: From approximately Sta. 31+920, looking south at the crest.

Photograph A3-06 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 183

Description: From approximately Sta. 31+920, looking northwest at the downstream slope and toe.

Photograph A3-07 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 184

Description: From approximately Sta. 31+870, looking northwest at the crest and upstream slope.

Photograph A3-08 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 185

Description: From approximately Sta. 31+870, looking southeast at the crest and upstream slope.

Photograph A3-09 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 186

Description: From the crest at approximately Sta. 31+740, looking north at downstream slope and toe, note the water pond at Sta. 31+750.

Photograph A3-10 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 187

Description: From the crest at approximately Sta. 31+740. Looking southeast at downstream slope and toe towards Channel 3.

Photograph A3-11 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 188

Description: From approximately Sta. 31+645, looking northwest at the upstream slope.

Photograph A3-12 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 189

Description: From approximately Sta. 31+640, looking southeast at the upstream slope.

Photograph A3-13 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 190

Description: From approximately Sta. 31+645, looking east at the crest.

Photograph A3-14 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 191

Description: From approximately Sta. 31+570, looking north toward Channel 3 at downstream slope and toe.

Photograph A3-15 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 192

Description: From approximately Sta. 31+475, looking west at the crest and the downstream slope and toe, towards Channel 3.

Photograph A3-16 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 193

Description: From approximately Sta. 31+475, looking east at the crest and the downstream slope and toe.

Photograph A3-17 Bay Goose Dike

Date: July 22, 2024 **Photo Number:** 194

Description: From approximately Sta. 31+475, looking west at the upstream slope.

Photograph A3-18 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 195

Description: From approximately Sta. 31+475, looking northeast at the upstream slope.

Photograph A3-19 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 196

Description: From approximately Sta. 31+430 looking northeast at the crest. Old cracks and depression (3 m long, 5 mm wide). The cracks are less pronounced after crest resurfacing.

Photograph A3-20 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 197

Description: From approximately Sta. 31+280, looking south at the crest.

Photograph A3-21 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 198

Description: From approximately Sta. 31+280, looking northeast at the crest.

Photograph A3-22 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 199

Description: From approximately Sta. 31+280 on the crest, looking southwest at the downstream slope and toe.

Photograph A3-23 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 200

Description: From approximately Sta. 31+280 on the crest, looking north at the downstream slope and toe area.

Photograph A3-24 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 201

Description: From approximately Sta. 31+080 on the crest, looking southwest at the Central Channel area, downstream slope and toe.

Photograph A3-25 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 202

Description: From approximately Sta. 31+080 on the crest, looking north at the downstream slope and toe.

Photograph A3-26 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 203

Description: From approximately Sta. 31+130, looking southwest at the crest. Two depressions are observed in crest (~150 mm).

Photograph A3-27 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 204

Description: From approximately Sta. 31+130, looking north at the crest.

Photograph A3-28 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 205

Description: From approximately Sta. 31+130, looking south at the upstream slope.

Photograph A3-29 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 206

Description: From approximately Sta. 31+130, looking north at the crest and upstream slope.

Photograph A3-30 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 207

Description: From Sta. 30+500, looking west at the downstream slope and toe.

Photograph A3-31 Bay Goose Dike

Date: July 22, 2024 **Photo Number:** 208

Description: From Sta. 30+500, looking south at the crest and the downstream slope.

Photograph A3-32 Bay Goose Dike

Date: July 22, 2024 **Photo Number:** 209

Description: From Sta. 30+500, looking northeast at the crest and the downstream slope.

Photograph A3-33 Bay Goose Dike

Date: July 22, 2024 **Photo Number:** 210

Description: From approximately Sta. 30+340, looking northwest at the north seepage channel.

Photograph A3-34 Bay Goose Dike

Date: July 22, 2024 **Photo Number:** 211

Description: From approximately Sta. 30+340 on the crest, looking northeast at the dam downstream slope and toe.

Photograph A3-35 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 212

Description: From approximately Sta. 30+120 (north abutment) looking southwest at the crest and upstream slope.

Photograph A3-36 Bay Goose Dike

Date: July 22, 2024 **Photo Number:** 213

Description: From approximately Sta. 30+120 (north abutment), looking north at the crest and upstream slope.

Photograph A3-37 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 214

Description: From approximately Sta. 31+920, looking southeast at the downstream toe and slope.

Photograph A3-38 Bay Goose Dike

Date: July 22, 2024 **Photo Number**: 215

Description: From about Sta. 31+920, looking northwest at the downstream toe toward Channel 1 monitoring station.

Photograph A3-39 Bay Goose Dike

Date: July 22, 2024 **Photo Number:** 216

Description: From approximately Sta. 30+300, looking northeast at the crest and downstream slope.

Appendix A4 Vault Dikes

Client:	AEM	**By:**	Marion Habersetzer/ Vanessa Andrade
Project:	Meadowbank	**Date:**	July 22, 2024
Location:	Vault Dike	**Reviewed:**	Fiona Esford

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with filter zones, impervious upstream liner (bituminous membrane) and an upstream key trench (aggregate mixed with bentonite)		
Weather Conditions:	Sunny	**Temperature:**	25°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		147, 148, 149, 150, 151	
1.1 Crest elevation	142.4 m		
1.2 Reservoir level	139.5 m (Wally lake)		
Current freeboard	2.94 m		
1.3 Distance to tailings pond (if applicable)	Not applicable		
1.4 Surface cracking	No		
1.5 Unexpected settlement	No		
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	Yes		Surficial depressions in crest (~250 mm and ~300 mm). Surficial material readjustment due to snow melt, likely, not a concern.

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2. UPSTREAM SLOPE		145, 146	
2.1 Slope angle	Approx. 1.5H:1V		
2.2 Signs of erosion	Stable		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	No		
2.5 Face liner condition (if applicable)	Not applicable		
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE		148, 149	
3.1 Slope angle	Approx.1.5H:1V		
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	No		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	Not apparent		
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA		146	
4.1 Seepage from dam	None		
4.2 Signs of erosion	Not observed		
4.3 Signs of turbidity in seepage water	No		
4.4 Discoloration/staining	No		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions	None		
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR		150	
6.1 Stability of slopes	Good conditions		
6.2 Distance to nearest slide (if applicable)	None observed		
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists, only dewatering pump.		
8. INSTRUMENTATION			
8.1 Piezometers	No		
8.2 Settlement cells	No		
8.3 Thermistors	Yes		See Section 3.4.2 of the report.
8.4 Settlement monuments	No		
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and flow monitors	No		
8.8 Data logger(s)	No		
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	January 2024		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.2.3 Date of last revision	September 2023		
10. NOTES			

Inspector's Signature	Vanessa Andrade	**Date:**	July 22, 2024

Photograph A4-1 Vault Dike

Date: July 22, 2024 **Photo Number**: 145

Description: From the upstream side, looking northwest at the upstream slope.

Photograph A4-2 Vault Dike

Date: July 22, 2024 **Photo Number**: 146

Description: From the downstream side, looking southeast at the downstream slope.

Photograph A4-3 Vault Dike

Date: July 22, 2024 **Photo Number:** 147

Description: From the west abutment, looking southeast at the crest.
Presence of a surficial depressions in the crest (diameter around 250 mm).

Photograph A4-4 Vault Dike

Date: July 22, 2024 **Photo Number:** 148

Description: From the downstream side, looking northwest at the crest.

Photograph A4-5 Vault Dike

Date: July 22, 2024 **Photo Number**: 149

Description: From downstream, looking southeast at the downstream toe. Presence of surficial depressions in the crest (diameter around 300 mm).

Photograph A4-6 Vault Dike

Date: July 22, 2024 **Photo Number**: 150

Description: From the downstream side, looking southwest towards Vault Pit.

Photograph A4-7 Vault Dike
Date: July 22, 2024 **Photo Number**: 151

Description: From the east abutment, looking northwest at the crest.

Appendix A5 Whale Tail Dike

Client:	AEM	**By:**	Marion Habersetzer/Vanessa Andrade
Project:	Whale Tail Project	**Date:**	July 21, 2024
Location:	Whale Tail Dike	**Reviewed:**	Fiona Esford

GENERAL INFORMATION			
Dam Type:	Rockfill shell with cement-bentonite secant pile cut-off wall enclosed in fine and coarse filter layers. 10 m deep grout curtain in the bedrock in the western section of the dike. Downstream grout blanket at bedrock interface all along the dike.		
Weather Conditions:	Sunny	**Temperature:**	25°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 112	
1.1 Crest elevation	El. 159 m (rockfill) El. 157 m (cut-off wall)		A 2 m rockfill thermal cap covers the cut-off wall (cement-bentonite secant piles)
1.2 Reservoir level	U/S El.154.8 m (Whale Tail South)		Operational water level: 155.5 m
Current freeboard	3.9 m (rockfill crest) 1.9 m (cut-off wall)		
1.3 Distance to tailings pond (if applicable)	Not applicable		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1.4 Surface cracking	Yes	109, 112	Associated to foundation thawing. Cracks parallel to center line (20 mm wide) depressions (500-700 mm) with some perpendicular to center line. Seem inactive and less visible than 2023. Circular cracks in crest at Sta. 0+725 and 0+775 (1-3 m long, 5-10 mm wide)
1.5 Unexpected settlement	Some at the East abutment		Associated to foundation thawing
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	None		
2. UPSTREAM SLOPE		94, 95, 97, 98, 99, 100, 103, 104, 106, 107, 109, 110	
2.1 Slope angle	1.5H:1V(dike) 1.3H:1V (U/S berm)		Adequate
2.2 Signs of erosion	None observed		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Not applicable		
2.6 Other unusual conditions	Yes		Uneven surface but no visible deformation
3. DOWNSTREAM SLOPE		96, 101, 102, 105 108, 111, 112, 113, 116, 114, 115	

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
3.1 Slope angle	1.5H:1V(dike) 1.3H:1V (D/S berm)		Adequate
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	None observed		
3.6 Vegetation growth	No		
3.7 Other unusual conditions	Yes	96, 115	Depression in downstream plataform (~150 mm), seems inactive
4. DOWNSTREAM TOE AREA		111, 116, 117, 118, 119, 120, 121, 122	
4.1 Seepage from dam	Yes		Collected in a trench from Sta. 0+430 to 0+720. Seepage interception system pumping water compose of 4 pumping stations and monitored by a V-notch weir installed in a winter-resistant shelter at the trench outlet. In 2024, a new rockfill buttress was built on the downstream side of WTD, at the East abutment, to mitigate thaw-induced deformations in the area. Sta. 0+150, seepage in the road fill from the dyke toe (flow).
4.2 Signs of erosion	None observed		
4.3 Signs of turbidity in seepage water	None		All seepage water is clear
4.4 Discoloration/staining	No		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions	None		
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		In 2024, a new rockfill buttress was built on the downstream side of WTD, at the East abutment, to mitigate thaw-induced deformations in the area. The buttress was built to the crest elevation
6. RESERVOIR		94, 97, 98, 103, 106, 109, 110	
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide (if applicable)	Not applicable		
6.3 Estimate of slide volume (if applicable)	None observed		
6.4 Floating debris	None		
6.5 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists		
8. INSTRUMENTATION			
8.1 Piezometers	Yes		9 piezometer holes with each 3 instruments. See Section 4.1.2 of the report
8.2 Settlement cells	No		
8.3 Thermistors	Yes		16 piezometers in the dike. See Section 4.1.2 of the report.
8.4 Settlement monuments	No		
8.5 Seismograph	No		
8.6 Inclinometer	Yes		4 shape array accelerometers. See Section 4.1.2 of the report.
8.7 Weirs and flow monitors	Yes		1 V-notch weirs (0+430). The V-notch at Sta. 0+560 is not present anymore.
8.8 Data logger(s)	Yes		
8.9 Other	No		
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	January 2024		
9.2 Emergency Preparedness Plan (EPP)			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	September 2023		
10. NOTES			
Inspector's Name	Vanessa Andrade	**Date:**	July 21, 2024

Photograph A5-1 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 94

Description: From approx. Sta. 0+220 (west abutment), looking northeast at the upstream slope.

Photograph A5-2 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 95

Description: From approx. Sta. 0+200 (west abutment), looking northeast at the crest.

Photograph A5-3 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 96

Description: From approx. Sta. 0+200 (west abutment), looking northeast at the downstream slope and downstream platform. Depressions are observed in downstream platform (~150 mm, seem inactive).

Photograph A5-4 Whale Tail Dike

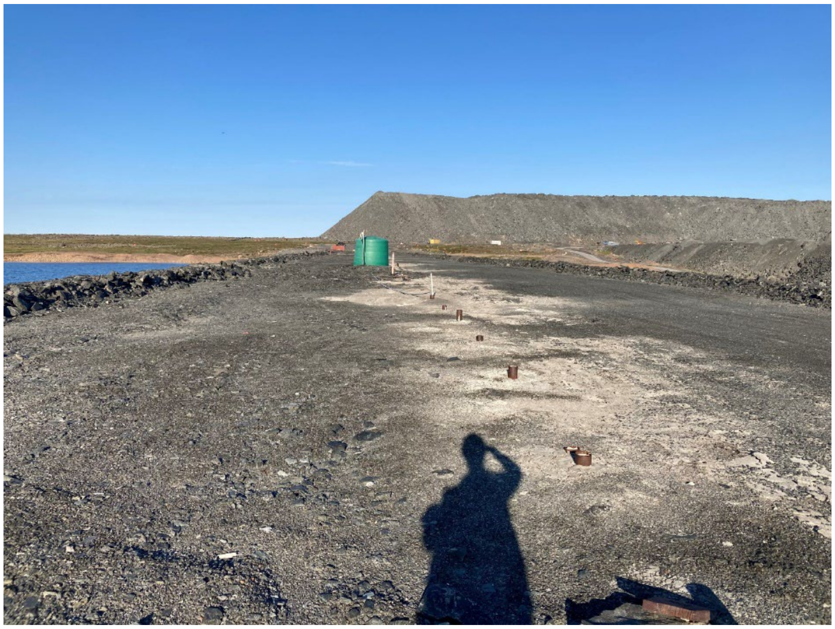
Date: July 21, 2024 **Photo Number**: 97

Description: From approx. Sta. 0+380, looking west at the upstream slope.

Photograph A5-5 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 98

Description: From approx. Sta. 0+400, looking east at the dam crest and upstream slope.



Photograph A5-6 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 99

Description: From approx. Sta. 0+380, looking west at the crest.

Photograph A5-7 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 100

Description: From approx. Sta. 0+400, looking east at the crest.

Photograph A5-8 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 101

Description: From approx. Sta. 0+400, looking west at the downstream slope and downstream platform.

Photograph A5-9 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 102

Description: From approx. Sta. 0+410, looking east at the downstream slope and downstream platform.

Photograph A5-10 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 103

Description: From approx. Sta. 0+580, looking west at the upstream slope.

Photograph A5-11 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 104

Description: From approx. Sta. 0+580, looking west at the crest.

Photograph A5-12 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 105

Description: From approx. Sta. 0+580, looking west at the downstream slope and downstream platform.

Photograph A5-13 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 106

Description: From approx. Sta. 0+725 (east abutment), looking southwest at the upstream slope.

Photograph A5-14 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 107

Description: From approx. Sta. 0+725 (east abutment), looking west at the crest.

Photograph A5-15 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 108

Description: From approx. Sta. 0+725 (east abutment), looking west at the downstream slope.

Photograph A5-16 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 109

Description: From approx. Sta. 0+775 upstream, looking west at the crest platform where tension cracks are visible

Photograph A5-17 Whale Tail Dike

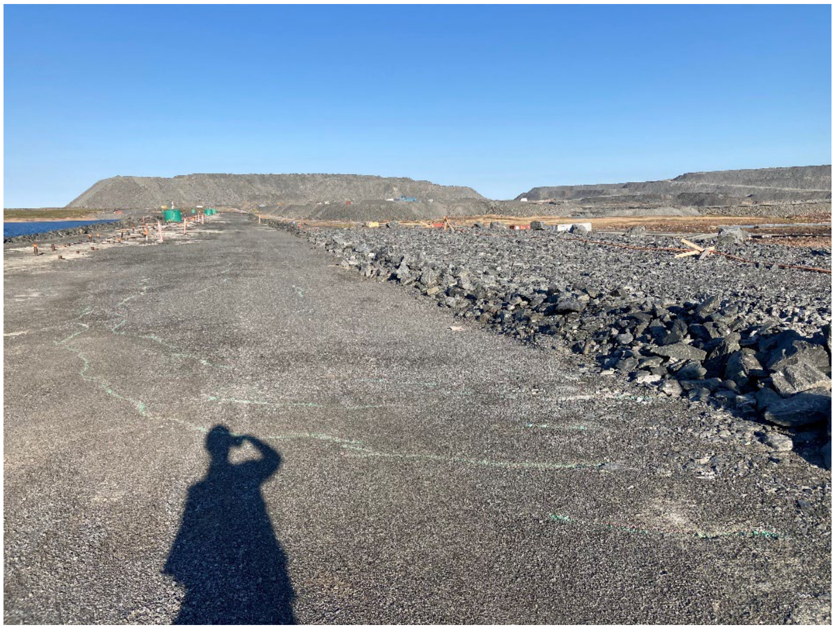
Date: July 21, 2024 **Photo Number**: 110

Description: From approx. Sta. 0+775 upstream, looking southwest at the capping. Uneven surface is observed, but no visible deformation.

Photograph A5-18 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 111

Description: From approx. Sta. 0+775 downstream, looking west at the downstream rockfill buttress.



Photograph A5-19 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 112

Description: From approx. Sta. 0+725 downstream, looking northwest at the downstream side of the crest where tension cracks are visible.

Photograph A5-20 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 113

Description: From approx. Sta. 0+725 looking downstream at the rockfill buttress.

Photograph A5-21 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 114

Description: From approx. Sta. 0+160 downstream, looking east at the downstream slope and platform. Wet area observed at previous location of water resurgence.

Photograph A5-22 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 115

Description: From approx. Sta. 0+200 on the downstream platform, looking northeast at the downstream slope and platform. Depressions are observed in downstream platform (~150 mm, seem inactive).

Photograph A5-23 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 116

Description: From approx. Sta. 0+675 downstream, looking west at the downstream slope and platform.

Photograph A5-24 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 117

Description: From approx. Sta. 0+600 downstream, looking southwest at the rebuilt seepage collection trench.

Photograph A5-25 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 118

Description: From approx. Sta. 0+450 downstream, looking east at the seepage collection trench and downstream toe.

Photograph A5-26 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 119

Description: From approx. Sta. 0+430 downstream, looking west at the seepage collection trench.

Photograph A5-27 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 120

Description: From approx. Sta. 0+250 downstream (P4 pumping station), looking southwest. A large amount of water is ponding.

Photograph A5-28 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 121

Description: From approx. Sta. 0+250 downstream (P4 pumping station), looking southeast. Seepage collection trench in good condition.

Photograph A5-29 Whale Tail Dike

Date: July 21, 2024 **Photo Number**: 122

Description: From approx. Sta. 0+250 downstream of the dike. V-Notch installation in winterized shelter.

Appendix A6 IVR Dike D-1

Client:	AEM	**By:**	Marion Habersetzer/ Vanessa Andrade
Project:	Whale Tail Project	**Date:**	July 20, 2024
Location:	IVR Dike	**Reviewed:**	Fiona Esford

GENERAL INFORMATION			
Dam Type:	Rockfill shell with a LLDPE geomembrane liner tied in a fine filter amended with bentonite key trench and an upstream thermal berm.		
Weather Conditions:	Sunny	**Temperature:**	25°C

INSPECTION ITEM	**OBSERVATIONS DATA**	**PHOTO**	**COMMENTS & OTHER DATA**
1. DAM CREST		59, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75,75b, 76	
1.1 Crest elevation	El. 165.5 m (rockfill and liner)		
1.2 Reservoir level	El. 160.2m to 161.9m (IVR att. Pond)		IVR Attenuation Pond
Current freeboard	4.19 m (rockfill crest and liner)		Max. operational water level: 163.2m
1.3 Distance to tailings pond (if applicable)	Not applicable		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1.4 Surface cracking	Yes	65, 66, 67, 68, 71,72. 75, 75b.	Presence of inactive old tension cracks (30mm-100mm wide and up to 5 m long). Tension cracks were still present in the rockfill near the downstream and upstream edges of the crest in the southeastern part of the dike (southeast of Sta. 0+240). Deformations visually seem to be similar to 2023; however, this should be confirmed with detailed survey of the dike crest, which is in progress by AEM.
1.5 Unexpected settlement	Yes	59	Likely related to rockfill, esker and shallow foundation thawing after winter construction. Settlement of about 300 to 500 mm (2023). A large area of the dike between Sta. 0+100 and 0+340 show settlement (up to about 300 mm), roughly in the footprint of the former water channel.
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	None		
2. UPSTREAM SLOPE		61, 64, 65, 66, 67, 68, 69	
2.1 Slope angle	2H: 1V		Adequate
2.2 Signs of erosion	None observed		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Not observed		Liner covered in a fine filter protection layer.

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE		60, 62, 63, 70, 71, 72, 73, 74, 75, 75b, 76,	
3.1 Slope angle	2H:1V		Adequate
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	None observed.		
3.6 Vegetation growth	None		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA		60, 70, 71, 72, 73, 74, 75, 75b, 76	
4.1 Seepage from dam	Yes		Traces of flow. Two potential zones of seepage at toe likely related to runoff exiting the rockfill. It is recommended to monitor the evolution of these flows.
4.2 Signs of erosion	None observed		
4.3 Signs of turbidity in seepage water	None		
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	None		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR			
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide (if applicable)	Not applicable		
6.3 Estimate of slide volume (if applicable)	None observed		
6.4 Floating debris	None		
6.5 Other unusual conditions	None		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE		59, 60, 62, 63	
7.1 Surface condition	Good		
7.2 Signs of erosion	None		
7.3 Signs of movement (deformation)	None		
7.4 Cracks	None		
7.5 Settlement	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7.6 Presence of debris or blockage	Yes, piping in the lower spillway		
7.7 Closure mechanism operational	None		
7.8 Slope protection	None		
7.9 Instability of side slopes	None		
7.10 Other unusual conditions	Yes		Section of spillway on upstream side appears shallow.
8. INSTRUMENTATION			
8.1 Piezometers	No		
8.2 Settlement cells	No		
8.3 Thermistors	Yes		See Section 4.3.2 of the report.
8.4 Settlement monuments	No		
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and flow monitors	No		
8.8 Data logger(s)	Yes		
8.9 Other	No		
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	January 2024		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	September 2023		
10. NOTES			
Inspector’s Name	Vanessa Andrade	**Date:**	July 20,2024

Photograph A6-1 IVR Dike D-1

<u>Date: July 20, 2024</u> **<u>Photo Number</u>**: 59

<u>Description</u>: From approx. Sta. 0+030 (west abutment), looking southeast at the crest. Presence of settlement in the rockfill surface.

Photograph A6-2 IVR Dike D-1

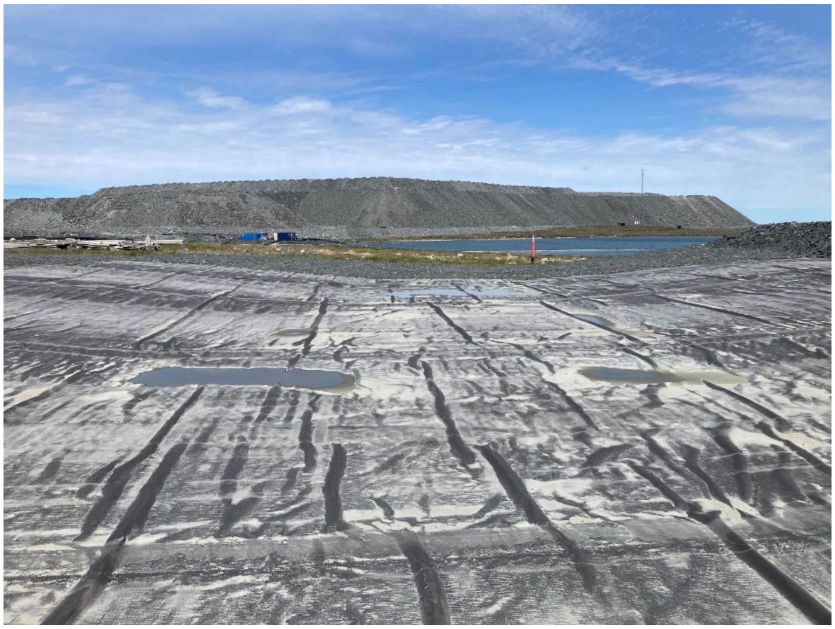
<u>Date: July 20, 2024</u> **<u>Photo Number</u>**: 60

<u>Description</u>: From approx. Sta. 0+050, looking south at the spillway. Presence of piping at the outlet of the spillway.

Photograph A6-3 IVR Dike D-1

Date: July 20, 2024 **Photo Number**: 61

Description: From approx. Sta. 0+070, looking northeast at the crest and attenuation pond.



Photograph A6-4 IVR Dike D-1

Date: July 20, 2024 **Photo Number**: 62

Description: From approx. Sta. 0+080, looking northeast at the upstream side emergency spillway on the Upstream side. The spillway section appears shallow.

Photograph A6-5 IVR Dike D-1

<u>Date: July 20, 2024</u> **<u>Photo Number</u>**: 63

<u>Description</u>: From approx. Sta. 0+070, looking southwest at the emergency spillway.

Photograph A6-6 IVR Dike D-1

<u>Date: July 20, 2024</u> **<u>Photo Number</u>**: 64

<u>Description</u>: From approx. Sta. 0+070, looking southeast at the crest and downstream slope.

Photograph A6-7 IVR Dike D-1

Date: July 20, 2024 **Photo Number**: 65

Description: From approx. Sta. 0+430, looking west at the crest and upstream slope. Presence of tension cracks (inactive).

Photograph A6-8 IVR Dike D-1

Date: July 20, 2024 **Photo Number**: 66

Description: From approx. Sta. 0+300, looking east at the crest and upstream slope. Presence of tension cracks (inactive).

Photograph A6-9 IVR Dike D-1

Date: July 20, 2024 **Photo Number**: 67

Description: From approx. Sta. 0+350, looking west at the crest and upstream slope. Presence of tension cracks (inactive).

Photograph A6-10 IVR Dike D-1

Date: July 20, 2024 **Photo Number**: 68

Description: From approx. Sta. 0+420 (east abutment), looking west at the crest (thermal cap) and upstream slope. Presence of tension cracks (50 to 100 mm wide, seems inactive) approximately 2 m from the crest.

Photograph A6-11 IVR Dike D-1

Date: July 20, 2024 **Photo Number**: 69

Description: From approx. Sta. 0+540 (east abutment), looking west at the crest (thermal cap) and upstream slope.

Photograph A6-12 IVR Dike D-1

Date: July 20, 2024 **Photo Number**: 70

Description: From approx. Sta. 0+540 (east abutment), looking west at the crest (thermal cap) and downstream slope.

Photograph A6-13 IVR Dike D-1

Date: July 20, 2024 **Photo Number**: 71

Description: From approx. Sta. 0+430, looking west at the crest and downstream slope. Presence of tension cracks (inactive).

Photograph A6-14 IVR Dike D-1

Date: July 20, 2024 **Photo Number**: 72

Description: From approx. Sta. 0+350, looking east at the crest and downstream slope. Presence of tension cracks (5-6 m long, inactive).

Photograph A6-15 IVR Dike D-1

Date: July 20, 2024 **Photo Number**: 73

Description: From approx. Sta. 0+320, looking north at the crest and upstream slope. Traces of flow. Presence of two zones of seepage at toe likely related to runoff exiting the rockfill.

Photograph A6-16 IVR Dike D-1

Date: July 20, 2024 **Photo Number**: 74

Description: From approx. Sta. 0+300, looking east at the crest and downstream slope. Traces of flow. Presence of two zones of seepage at toe likely related to runoff exiting the rockfill.

Photograph A6-17 IVR Dike D-1

Date: July 20, 2024 **Photo Number**: 75

Description: From approx. Sta. 0+290, looking east at the crest and downstream slope. Presence of tension cracks.

Photograph A6-18 IVR Dike D-1

Date: July 20, 2024 **Photo Number**: 75b

Description: From approx. Sta. 0+300, looking northwest at the crest and downstream slope. Presence of tension cracks (up to 30mm wide) approximately 1m from the crest edge.

Photograph A6-10 IVR Dike D-1

Date: July 20, 2024 **Photo Number**: 76

Description: From approx. Sta. 0+220, looking southeast at the crest and downstream slope.

Appendix A7 Waste Rock Storage Facility Dike

Client:	AEM	**By:**	Marion Habersetzer/ Vanessa Andrade
Project:	Whale Tail Project	**Date:**	July 20, 2024
Location:	WRSF Dike	**Reviewed:**	Fiona Esford

GENERAL INFORMATION			
Dam Type:	Rockfill shell with a bituminous geomembrane liner tied in a fine filter amended with bentonite and a protective cover. Upstream thermal berm composed of esker partially amended with bentonite and a rockfill protection cover.		
Weather Conditions:	Sunny	**Temperature:**	25°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		34, 35, 36, 37, 38, 39, 40, 41, 42, 43	
1.1 Crest elevation	El. 158.4 m (rockfill) El. 157.8 m (liner)		
1.2 Reservoir level	El. 151.2m to 153.0m (WRSF Pond)		WRSF Pond
Current freeboard	> 6 m (rockfill crest) 4.15 m (liner)		Operational water level: 154 m
1.3 Distance to tailings pond (if applicable)	Not applicable		
1.4 Surface cracking	No		Old cracks are no longer visible (2023).
1.5 Unexpected settlement	No		
1.6 Lateral movement	Not apparent		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1.7 Other unusual conditions	Yes	41	Depression (300 mm deep) at upstream thermal berm crest.
2. UPSTREAM SLOPE		37, 38, 39, 40, 41	
2.1 Slope angle	2H: 1V		Adequate
2.2 Signs of erosion	None observed		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Not observed		Liner covered by thermal berm.
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE		34, 35, 42, 43	
3.1 Slope angle	1.5H:1V		Adequate
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	None observed.		
3.6 Vegetation growth	No		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA		34, 43	
4.1 Seepage from dam	None observed		Water ponding at the toe approx. at Sta. 0+240 and 0+300. No flow observed.
4.2 Signs of erosion	None observed		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.3 Signs of turbidity in seepage water	None		
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions	None		
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR			
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide (if applicable)	Not applicable		
6.3 Estimate of slide volume (if applicable)	None observed		
6.4 Floating debris	None		
6.5 Other unusual conditions	None		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists		
8. INSTRUMENTATION			
8.1 Piezometers	No		
8.2 Settlement cells	No		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
8.3 Thermistors	Yes		9 thermistors. See Section 4.2.2 of the report.
8.4 Settlement monuments	No		
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and flow monitors	No		
8.8 Data logger(s)	Yes		
8.9 Other	No		
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	January 2024		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	September 2023		
10. NOTES			
Inspector's Name	Vanessa Andrade	**Date:**	July 20, 2024

Photograph A7-1 WRSF Dike

Date: July 25, 2024 **Photo Number**: 34

Description: From approx. Sta. 0+350 (east abutment), looking west at the dike crest and downstream slope.

Photograph A7-2 WRSF Dike

Date: July 20, 2024 **Photo Number**: 35

Description: From approx. Sta. 0+350 (east abutment), looking west at the dike crest.

Photograph A7-3 WRSF Dike

Date: July 20, 2024 **Photo Number**:36

Description: From approx. Sta. 0+350 (east abutment), looking west at the upstream thermal berm crest.

Photograph A7-4 WRSF Dike

Date: July 20, 2024 **Photo Number**: 37

Description: From approx. Sta. 0+350 (east abutment), looking west at the upstream thermal berm slope and dewatering ramp.

Photograph A7-5 WRSF Dike

Date: July 20, 2024 **Photo Number**: 38

Description: From approx. Sta. 0+210, looking east at the thermal berm and dewatering ramp.

Photograph A7-6 WRSF Dike

Date: July 20, 2024 **Photo Number**: 39

Description: From approx. Sta. 0+210, looking west at the thermal berm.

Photograph A7-7 WRSF Dike

Date: July 20, 2024 **Photo Number**: 40

Description: From approx. Sta. 0+080 (west abutment), looking east at the upstream thermal berm slope and the upstream toe.

Photograph A7-8 WRSF Dike

Date: July 20, 2024 **Photo Number**: 41

Description: From approx. Sta. 0+080 (west abutment), looking east at the upstream thermal berm crest. Presence of depressions (approx. 300mm), likely from a drill rig or equipment.

Photograph A7-9 WRSF Dike

Date: July 20, 2024 **Photo Number**: 42

Description: From approx. Sta. 0+080 (west abutment), looking east at the dike crest.

Photograph A7-10 WRSF Dike

Date: July 20, 2024 **Photo Number**: 43

Description: From approx. Sta. 0+080 (west abutment), looking east at the downstream toe.

Appendix A8 Mammoth Dike

Client:	AEM	**By:**	Marion Habersetzer/ Vanessa Andrade
Project:	Whale Tail Project	**Date:**	July 20, 2024
Location:	Mammoth Dike	**Reviewed:**	Fiona Esford

GENERAL INFORMATION			
Dam Type:	Rockfill shell with a bituminous geomembrane liner tied in a fine filter amended with bentonite and a protective cover.		
Weather Conditions:	Sunny	**Temperature:**	25°C

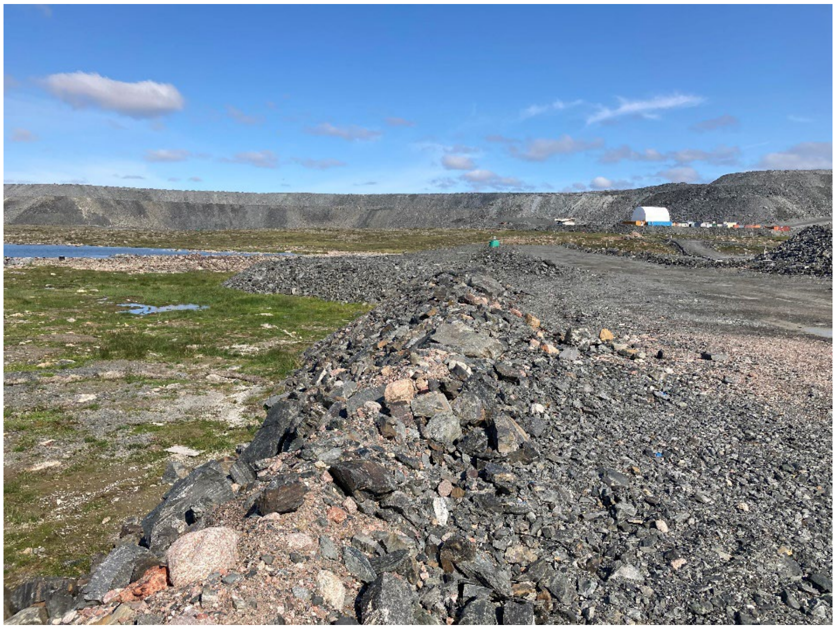
INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		45, 46, 47, 48, 49, 50, 51, 52	
1.1 Crest elevation	El. 155 m (rockfill) El. 153.5 m (liner)		
1.2 Reservoir level	El.152.4 m (Mammoth Lake)		
Current freeboard	2.55 m (rockfill crest) 1.05 m (liner)		Operational water level: 152.5 m
1.3 Distance to tailings pond (if applicable)	Not applicable		
1.4 Surface cracking	Not apparent		
1.5 Unexpected settlement	Not apparent		
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	Lower crest		Around Sta. 0+220. Lower crest (approx. 300mm), likely from insufficient regrading of the material. Water ponding in the depression when wet (2023).In 2024, irregular surface was observed, should be regraded to better identify any deformation.

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2. UPSTREAM SLOPE		49, 50, 51, 52	
2.1 Slope angle	2H: 1V		Adequate
2.2 Signs of erosion	None observed		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Not observed		Liner covered by thermal berm.
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE		46, 47, 48	
3.1 Slope angle	1.5H:1V		Adequate
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	None observed.		
3.6 Vegetation growth	No		
3.7 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4. DOWNSTREAM TOE AREA		46, 47	
4.1 Seepage from dam	Water pond		Water ponding about 20 m away from the downstream toe in the low topographical point. No sign of flow indicating seepage was observed.
4.2 Signs of erosion	None observed		
4.3 Signs of turbidity in seepage water	None		
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions	None		
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR		45, 49, 50, 51, 52	
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide (if applicable)	Not applicable		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
6.3 Estimate of slide volume (if applicable)	None observed		
6.4 Floating debris	None		
6.5 Other unusual conditions	None		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists		
8. INSTRUMENTATION			
8.1 Piezometers	No		
8.2 Settlement cells	No		
8.3 Thermistors	Yes		3 thermistors. See Section 4.4.2 of the report.
8.4 Settlement monuments	No		
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and flow monitors	No		
8.8 Data logger(s)	Yes		
8.9 Other	No		
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	January 2024		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	September 2023		
10. NOTES			
Inspector’s Name	Vanessa Andrade	**Date:**	July 20, 2024



Photograph A8-1 Mammoth Dike

Date: July 20, 2024 **Photo Number**: 45

Description: From approx. Sta. 0+300 (south abutment), looking north to the crest and upstream liner tie-in.

Photograph A8-2 Mammoth Dike

Date: July 20, 2024 **Photo Number**: 46

Description: From approx. Sta. 0+300 (south abutment), looking north to the crest and downstream slope.

Photograph A8-3 Mammoth Dike

Date: July 20, 2024 **Photo Number**: 48

Description: From approx. Sta. 0+100 (north abutment), looking south to the crest.

Photograph A8-4 Mammoth Dike

Date: July 20, 2024 **Photo Number**: 47

Description: From approx. Sta. 0+100 (north abutment), looking south downstream slope and downstream area.

Photograph A8-5 Mammoth Dike

Date: July 20, 2024 **Photo Number**: 49

Description: From approx. Sta. 0+110 (north abutment), looking south to the upstream liner tie-in.

Photograph A8-6 Mammoth Dike

Date: July 20, 2024 **Photo Number**: 50

Description: From approx. Sta. 0+180, looking north to the upstream liner tie-in.

Photograph A8-7 Mammoth Dike

Date: July 20, 2024 **Photo Number**: 51

Description: From approx. Sta. 0+180, looking south to the upstream liner tie-in.

Photograph A8-8 Mammoth Dike

Date: July 20, 2024 **Photo Number**: 52

Description: From approx. Sta. 0+250, looking north to the upstream liner tie-in.

APPENDIX B

Tailings Storage Facility

Appendix B1 North Cell Internal Structure

Client:	AEM	**By:**	Marion Habersetzer/ Vanessa Andrade
Project:	Meadowbank	**Date:**	July 23, 2024
Location:	North Cell Internal Structure	**Reviewed:**	Fiona Esford

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with upstream filters built inside the existing North Cell		
Weather Conditions:	Sunny	**Temperature:**	25°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		315, 316, 318, 320, 321, 322, 323, 324	
1.1 Crest elevation	152 to 154 m		Design 154 m
1.2 Reservoir level	Tailings: El. 148.5 masl (near NCIS extension) to 152.1 masl (north side)		
Current freeboard	1.9 m to 2.5 m -tailings 5.98 m to 7.98 m - water		Design 2 m water, 0.5 m tailings
1.3 Distance to tailings pond (if applicable)	>100 m		Tailings beach all along the NCIS
1.4 Surface cracking	None observed		
1.5 Unexpected settlement	None observed		
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2. UPSTREAM SLOPE		310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324	
2.1 Slope angle	Approx. 3H:1V		Rockfill
2.2 Signs of erosion	Yes		Localized erosion features on upstream slope due to water discharge from the crest. Some erosion on the fine filter in 2023. Not observed in 2024.
2.3 Signs of movement (deformation)	None		
2.4 Cracks	Yes	310,319	Surface repaired in 2021. Tension cracks in fine filter slope (up to 20 mm wide).
2.5 Face liner condition (if applicable)	In good condition		
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE			
3.1 Slope angle	Approx.1.2H or 1.3 H:1V variable		Rockfill
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	None observed		
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4. DOWNSTREAM TOE AREA		312	
4.1 Seepage from dam	Yes		Pumping stations are in place downstream of the structure and in operation as needed.
4.2 Signs of erosion	None observed		
4.3 Signs of turbidity in seepage water	Not applicable		
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions	Yes		Small tension cracks in ditch slope
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR			
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide	None observed		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other unusual conditions	No		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists, only dewatering pump.		
8. INSTRUMENTATION			
8.1 Piezometers	No		
8.2 Settlement cells	No		
8.3 Thermistors	Yes		See Section 5.4.2 of the report.
8.4 Settlement monuments	Yes		16 prisms installed. See Section 5.4.2 of the report.
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and flow monitors	No		In 2024, seepage collection ditch was constructed on the downstream side of the structure (along the downstream toe) to collect contact water/seepage from the TSF. The ditch directs the water to a sump, which transfers the contact water to the South Cell Reclaim Pond.
8.8 Data logger(s)	Yes		
8.9 Other			
9. DOCUMENTATION			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	January 2024		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	September 2023		
10. NOTES :			
Inspector's Name	Vanessa Andrade	**Date:**	July 23, 2024

Photograph B1-01 Tailings Storage Facility

Date: July 23, 2024 **Photo Number**: 310

Description: From the North Cell Internal Structure, looking west at upstream slope. Tension cracks in fine filter slope (~ 0- 20 mm wide).

Photograph B1-02 Tailings Storage Facility

Date: July 23, 2024 **Photo Number**: 311

Description: From the North Cell Internal Structure, looking west at the NCIS extension.

Photograph B1-03 Tailings Storage Facility

Date: July 23, 2024 **Photo Number**: 312

Description: From the North Cell Internal Structure, looking north toward the diversion ditch. Small tension cracks in ditch slope.

Photograph B1-04 Tailings Storage Facility

Date: July 23, 2024 **Photo Number**: 313

Description: From the North Cell Internal Structure, looking south toward the upstream slope and the North Cell.

Photograph B1-05 Tailings Storage Facility

Date: July 23, 2024 **Photo Number**: 314

Description: From the North Cell Internal Structure, looking northeast toward the upstream slope and the North Cell.

Photograph B1-06 Tailings Storage Facility

Date: July 23, 2024 **Photo Number**: 315

Description: From the North Cell Internal Structure, looking west at the North Cell and upstream slope.

Photograph B1-07 Tailings Storage Facility

Date: July 23, 2024 **Photo Number**: 316

Description: From the North Cell Internal Structure, looking east at the North Cell and upstream slope.

Photograph B1-08 Tailings Storage Facility

Date: July 23, 2024 **Photo Number**: 317

Description: From the North Cell Internal Structure, looking west at the upstream slope.

Photograph B1-09 Tailings Storage Facility

Date: July 23, 2024 **Photo Number**:318

Description: From the North Cell Internal Structure, looking south at the upstream slope.

Photograph B1-10 Tailings Storage Facility

Date: July 23, 2024 **Photo Number**:319

Description: From the North Cell Internal Structure, looking southwest at the upstream slope. Presence of tension cracks in fine filter slope (~10 -20 mm wide).

Photograph B1-11 Tailings Storage Facility

Date: July 23, 2024 **Photo Number**: 320

Description: From the North Cell Internal Structure, looking northwest at the upstream slope. Presence of tension crack on upstream slope (approx. 10-20 mm wide).

Photograph B1-12 Tailings Storage Facility

Date: July 23, 2024 **Photo Number**: 321

Description: From the North Cell Internal Structure, looking south at the upstream slope. Presence of tension crack on upstream slope (approx. 10-20 mm wide), water channeling at the toe.

Photograph B1-7 Tailings Storage Facility

<u>Date</u>: July 23, 2024 **<u>Photo Number</u>**: 322

<u>Description</u>: From the North Cell Internal Structure, looking south at the upstream slope.

Photograph B1-13 Tailings Storage Facility

<u>Date</u>: July 23, 2024 **<u>Photo Number</u>**:323

<u>Description</u>: From the North Cell Internal Structure, looking northeast at the upstream slope and water channelling at the toe.

Photograph B1-14 Tailings Storage Facility

Date: July 23, 2024 **Photo Number**: 324

Description: From the North Cell Internal Structure, looking southwest at the upstream slope and TSF North Cell.

Appendix B2 Saddle Dam 1

Client:	AEM	**By:**	Marion Habersetzer/ Vanessa Andrade
Project:	Meadowbank	**Date:**	July 23, 2024
Location:	Saddle Dam 1	**Reviewed:**	Fiona Esford

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with inverted filter on base, upstream filters, a geomembrane liner tied in a toe till plug and protective cover.		
Weather Conditions:	Sunny	**Temperature:**	25°C

INSPECTION ITEM	**OBSERVATIONS DATA**	**PHOTO**	**COMMENTS & OTHER DATA**
1. DAM CREST		255, 256, 257, 258, 259, 260, 261	
1.1 Crest elevation	150 m		Design 150 m
1.2 Reservoir level	148.8 m – tailings (now capped)		
Current freeboard	0.4 m -tailings		Design 2 m water, 0.5 m tailings
1.3 Distance to tailings pond (if applicable)	>300 m		Tailings beach all along SD1
1.4 Surface cracking	None at time of inspection		
1.5 Unexpected settlement	None observed		
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2. UPSTREAM SLOPE		256, 257, 258, 259, 260	
2.1 Slope angle	Approx. 3H:1V		Rockfill
2.2 Signs of erosion	None observed		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	In good condition		
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE		262, 263, 264, 265	
3.1 Slope angle	Approx.1.2H or 1.3 H:1V variable		Rockfill
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	None observed		
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4. DOWNSTREAM TOE AREA		262, 263, 264, 265	
4.1 Seepage from dam	Uncertain	263, 264, 265	A dewatering sump is installed downstream. Water flowing out of sump on rockfill platform was observed ponding in that area.
4.2 Signs of erosion	None observed		
4.3 Signs of turbidity in seepage water	Not applicable		
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions			
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR		175, 180	
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide	None observed		
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other unusual conditions	No		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists, only dewatering pump.		
8. INSTRUMENTATION			
8.1 Piezometers	No		
8.2 Settlement cells	No		
8.3 Thermistors	Yes		See Section 5.2.2 of the report.
8.4 Settlement monuments	No		
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and flow monitors	No		Per the design, a seepage collection and pump back system is built.
8.8 Data logger(s)	Yes		
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	January 2024		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.2.3 Date of last revision	September 2023		
10. NOTES :			
Inspector's Name	Vanessa Andrade	**Date:**	July 23, 2024

Photograph B2-01 Saddle Dam 1

Date: July 23, 2024 **Photo Number**: 255

Description: From the south abutment looking east at the upstream slope and the North Cell.

Photograph B2-02 Saddle Dam 1

Date: July 23, 2024 **Photo Number**: 256

Description: From the south abutment looking north at the upstream slope. Adequate tailings beach against SD1.

Photograph B2-03 Saddle Dam 1

Date: July 23, 2024 **Photo Number**: 257

Description: From approximately Sta. 0+195 upstream, looking south at the upstream slope. Adequate tailings beach against SD1.

Photograph B2-04 Saddle Dam 1

Date: July 23, 2024 **Photo Number**: 258

Description: From approximately Sta. 0+195 upstream, looking north at the upstream slope. Adequate tailings beach against SD1.

Photograph B2-05 Saddle Dam 1

Date: July 23, 2024 **Photo Number**: 259

Description: From approximately Sta. 0+120 upstream, looking south at the upstream slope.

Photograph B2-06 Saddle Dam 1

Date: July 23, 2024 **Photo Number**: 260

Description: From approximately Sta. 0+055, looking south at the crest and upstream slope.

Photograph B2-07 Saddle Dam 1

Date: July 23, 2024 **Photo Number**: 261

Description: From approximately Sta. 0+050 upstream, looking east at the North Cell.

Photograph B2-08 Saddle Dam 1

Date: July 29, 2022 **Photo Number**: 262

Description: From approximately Sta. 0+175 downstream, looking southwest at the crest and downstream slope.

Photograph B2-09 Saddle Dam 1

Date: July 29, 2023 **Photo Number**: 263

Description: From Sta. 0+150 looking west at the downstream face. Notice the sea-can container where a sump is installed. Presence of water flowing out of sump on rockfill platform.

Photograph B2-10 Saddle Dam 1

Date: July 23, 2024 **Photo Number**: 264

Description: From Sta. 0+150 looking northwest at the downstream face. Notice the sea-can container where a sump is installed.

Photograph B2-11 Saddle Dam 1

Date: July 23, 2024 **Photo Number**: 265

Description: From the south abutment (Sta. 0+350) looking north at the downstream face. Notice the sea-can container where a sump is installed.

Appendix B3 Saddle Dam 2

Client:	AEM	**By:**	Marion Habersetzer/ Vanessa Andrade
Project:	Meadowbank	**Date:**	July 23, 2024
Location:	Saddle Dam 2	**Reviewed:**	Fiona Esford

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with inverted filter on base, upstream filters, a geomembrane liner tied in a toe till plug and upstream till blanket.		
Weather Conditions:	Sunny	**Temperature:**	25°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		245, 247, 248, 249, 251	
1.1 Crest elevation	150 m		Design 150 m
1.2 Reservoir level	148.5 m – tailings (now capped)		
Current freeboard	0.4 m - tailings		Design 2 m water, 0.5 m tailings
1.3 Distance to tailings pond (if applicable)	>200 m		Adequate tailings beach
1.4 Surface cracking	None at time of inspection		
1.5 Unexpected settlement	None observed		
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	None		
2. UPSTREAM SLOPE		245, 246, 250, 251	
2.1 Slope angle	Approx. 3H:1V		Rockfill
2.2 Signs of erosion	None observed		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Good	245, 247	Drag marks and small holes in liner (top of slope and crest) at approx. Sta. 20+370 and 20+520
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE		247, 248, 254	
3.1 Slope angle	Approx.1.2H or 1.3H:1V variable		Rockfill
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	Yes	253, 254	Cracks in berm at approx. 20+110 and 20+500, likely uncompacted rockfill
3.5 Seepage or wet areas	None observed on slope		
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA		251, 252, 253, 254	
4.1 Seepage from dam	No		
4.2 Signs of erosion	None observed		
4.3 Signs of turbidity in seepage water	Not applicable		
4.4 Discoloration/staining	No		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions	Yes	254	Limited water pond within the rockfill embankment at Sta. 20+500 approximately.
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR		250	
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide (if applicable)	None observed		
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other unusual conditions	No		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists, only dewatering pump.		
8. INSTRUMENTATION			
8.1 Piezometers	No		
8.2 Settlement cells	No		
8.3 Thermistors	Yes		See Section 5.3.2 of the report.

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
8.4 Settlement monuments	No		Construction drawings show displacement monitoring on Stage 2 crest.
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and flow monitors	No		
8.8 Data logger(s)	Yes		
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	January 2024		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	September 2023		
10. NOTES :			

Inspector's Name	Vanessa Andrade	**Date:**	July 23, 2024

Photograph B3-01 Saddle Dam 2

Date: July 23, 2024 **Photo Number**: 245

Description: From Saddle Dam 2 (approximately Sta. 20+520) upstream, looking northwest at the upstream slope of Saddle Dam 2. Presence of drag marks and holes on the liner.

Photograph B3-02 Saddle Dam 2

Date: July 23, 2024 **Photo Number**: 246

Description: From approximately Sta. 20+475, looking northeast at the upstream slope.

Photograph B3-03 Saddle Dam 2

Date: July 23, 2024 **Photo Number**: 247

Description: From approximately Sta. 20+370 looking southeast at the crest and the downstream slope. Small holes on the top of slope and crest are observed.

Photograph B3-04 Saddle Dam 2

Date: July 23, 2024 **Photo Number**: 248

Description: From approximately Sta. 20+370 looking northwest at the crest.

Photograph B3-05 Saddle Dam 2

Date: July 23, 2024 **Photo Number**: 249

Description: From approximately Sta. 20+175, looking southeast at the crest and upstream slope.

Photograph B3-06 Saddle Dam 2

Date: July 23, 2024 **Photo Number**: 250

Description: From Saddle Dam 2 (approximately Sta. 20+110) upstream, looking northeast at the North Cell. The tailings beach against SD2 is adequate.

Photograph B3-07 Saddle Dam 2

Date: July 23, 2024 **Photo Number**: 251

Description: From Saddle Dam 2 (approximately Sta. 20+110) looking southeast at the crest and upstream slope.

Photograph B3-08 Saddle Dam 2

Date: July 23, 2024 **Photo Number**: 252

Description: From Saddle Dam 2 (approximately Sta. 20+110) looking southeast at the crest and downstream slope.

Photograph B3-09 Saddle Dam 2

Date: July 23, 2024 **Photo Number**: 253

Description: From Saddle Dam 2 (approximately Sta. 20+110) looking southeast at the crest and downstream slope. Cracks in berm are observed.

Photograph B3-10 Saddle Dam 2

Date: July 23, 2024 **Photo Number:** 254

Description: From Saddle Dam 2 (approximately Sta. 20+500) downstream, looking northwest at the downstream toe and slope of Saddle Dam 2. Presence of water ponding at the toe and small cracks on the berm.

Appendix B4 Stormwater Dike

Client:	AEM	**By:**	Marion Habersetzer/ Vanessa Andrade
Project:	Meadowbank	**Date:**	July 22, 2024
Location:	Stormwater Dike	**Reviewed:**	Fiona Esford

GENERAL INFORMATION			
Dam Type:	Rockfill embankment, upstream filters and a bituminous geomembrane liner. Compacted till placed above liner at toe, prior to tailings deposition.		
Weather Conditions:	Sunny	**Temperature:**	25°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		157, 159, 160, 161, 162, 163,164, 165, 167,170	
1.1 Crest elevation	150 m		Design 150 m
1.2 Reservoir level	143.9 m – tailings (South Cell side) 148.9 m - tailings (North Cell side)		
Current freeboard	11.2 m – water 6.1 m - tailings (South Cell) 0.5 m – tailings (North Cell)		Design 2 m in operation and 1 m at closure for water and 0.5 m for tailings.
1.3 Distance to tailings pond (if applicable)	Adequate (North Cell)		Adequate beach in place all along the dike on North Cell. Some shallow water ponding against dike in some places. Water and tailings have reached the toe of the structure in the South Cell.
1.4 Surface cracking	No	170	

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1.5 Unexpected settlement	No		Old tension cracks (mostly around 10+300) are inactive and are disappearing. They have since been filled with bentonite. Presence of small new cracks (~ 5mm wide, 4-5 m long) in 2024.
1.6 Lateral movement	No		
1.7 Other unusual conditions	Yes	157, 158, 159, 160, 161	Capping has reached the dike crest (from approx. 10+525 to 11+100)
2. UPSTREAM SLOPE		157, 158, 159, 160, 161, 164, 165, 166, 167	
2.1 Slope angle	Approx. 3H:1V		Rockfill
2.2 Signs of erosion	None observed		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Good conditions.		
2.6 Other unusual conditions	Yes	164, 165, 166	Large rocks on liner and several open liner welds from approx. 10+100 to 10+600). Water ponding at approx. 10+550
3. DOWNSTREAM SLOPE		165, 168, 169, 170	
3.1 Slope angle	Approx.1.2H or 1.5 H:1V variable		Rockfill
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
3.5 Seepage or wet areas	None observed on slope		
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA	Not visible	170	Downstream toe and berm is submerged by the South Cell pond. The berm was constructed at the downstream toe to stabilize the movement and cracks observed in 2016. Small new cracks (~ 5mm wide, 4-5 m long) at downstream slope at approx. 11+000 Sta.
4.1 Seepage from dam	Not visible		
4.2 Signs of erosion	Not visible		
4.3 Signs of turbidity in seepage water	Not visible		
4.4 Discoloration/staining	Not visible		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions	Not visible		
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
5.5 Other unusual conditions	None		
6. RESERVOIR			
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide (if applicable)	None observed		
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other unusual conditions	No		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists, only dewatering pump		
8. INSTRUMENTATION			
8.1 Piezometers	Yes		See Section 5.5.2
8.2 Settlement cells	No		
8.3 Thermistors	Yes		See Section 5.5.2
8.4 Settlement monuments	Yes		See Section 5.5.2
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and flow monitors	No		
8.8 Data logger(s)	No		
8.9 Other	None		
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	January 2024		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	September 2023		
10. NOTES :			

Inspector's Name	Vanessa Andrade	**Date:**	July 22, 2024

Photograph B4-01 Stormwater Dike

Date: July 22, 2024 **Photo Number**: 157

Description: From the east abutment (11+100 approximately), looking north at the upstream face and the rockfill cover of the North Cell. Capping has reached the dike crest.

Photograph B4-02 Stormwater Dike

Date: July 22, 2024 **Photo Number**: 158

Description: From the east abutment (10+975 approximately), looking west at the upstream slope. Capping has reached the dike crest.

Photograph B4-03 Stormwater Dike

Date: July 22, 2024 **Photo Number**: 159

Description: From the east abutment (10+800 approximately), looking northwest at the upstream slope. Capping has reached the dike crest.

Photograph B4-04 Stormwater Dike

Date: July 22, 2024 **Photo Number**: 160

Description: From Sta. 10+650 looking east at the crest and upstream slope. Capping has reached the dike crest.

Photograph B4-05 Stormwater Dike

Date: July 22, 2024 **Photo Number**: 161
Description: From Sta. 10+650 looking west at the crest and upstream slope. Capping has reached the dike crest.

Photograph B4-06 Stormwater Dike

Date: July 22, 2024 **Photo Number**: 162
Description: From approximately Sta. 10+650 looking east at the crest.

Photograph B4-07 Stormwater Dike

Date: July 22, 2024 **Photo Number**: 163

Description: From approximately Sta. 10+650 looking west at the crest and upstream slope.

Photograph B4-08 Stormwater Dike

Date: July 22, 2024 **Photo Number**: 164

Description: From approximately Sta. 10+550 looking northwest. The liner was covered with granular material for protection from capping. Presence of water pond.

Photograph B4-09 Stormwater Dike

Date: July 22, 2024 **Photo Number**: 165

Description: From approximately Sta. 10+575 looking northwest at upstream slope. Presence of large rocks on liner.

Photograph B4-10 Stormwater Dike

Date: July 22, 2024 **Photo Number**: 166

Description: From approximately Sta. 10+575 looking northwest. Presence of open liner welds.

Photograph B4-11 Stormwater Dike

Date: July 22, 2024 **Photo Number**: 167

Description: From Sta.10+175, looking east at the upstream slope. The tailings beach is adequate.

Photograph B4-12 Stormwater Dike

Date: July 22, 2024 **Photo Number**: 168

Description: From Sta.10+250, looking east at the downstream slope and the South Cell.

Photograph B4-13 Stormwater Dike

Date: July 22, 2024 **Photo Number**: 169

Description: From approximately Sta. 10+500 looking west towards the downstream slope.

Photograph B4-14 Stormwater Dike

Date: July 22, 2024 **Photo Number**: 170

Description: From the east abutment (10+900 approximately), looking northeast at the downstream slope. Old cracks still visible (seems inactive and healing). Presence of small new cracks (~ 5mm wide, 4-5 m long.

Appendix B5 Saddle Dam 3

Client:	AEM	**By:**	Marion Habersetzer/ Vanessa Andrade
Project:	Meadowbank	**Date:**	July 23, 2024
Location:	Saddle Dam 3	**Reviewed:**	Fiona Esford

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with inverted filter on base, upstream filters, a geomembrane liner tied in a toe till plug and upstream till blanket.		
Weather Conditions:	Sunny	**Temperature:**	25°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		266, 267, 268	
1.1 Crest elevation	145 m		Designed to be able to be raised up to El. 150 m
1.2 Reservoir Level	138.2 m – Pond level		Visually 0.7 m of settlement in tailings since 2022
Current Freeboard	6.2 (water)		Water is in contact with the structure (against erosion protection cover).
1.3 Distance to Tailings Pond (if applicable)	NA		Water is close to the structure but no tailings are planned to be in contact with the structure.
1.4 Surface Cracking	None at time of inspection		
1.5 Unexpected Settlement	None observed		
1.6 Lateral Movement	Not apparent		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1.7 Other Unusual Conditions	None		
2. UPSTREAM SLOPE		270	
2.1 Slope angle	3H:1V		
2.2 Signs of Erosion	None observed		
2.3 Signs of Movement (Deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Good		
2.6 Other Unusual Conditions	None		
3. DOWNSTREAM SLOPE		266, 269	
3.1 Slope angle	1.5H:1V		
3.2 Signs of Erosion	None observed		
3.3 Signs of Movement (Deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or Wet Areas	None observed on slope		
3.6 Vegetation Growth	None observed		
3.7 Other Unusual Conditions	None		
4. DOWNSTREAM TOE AREA		,266, 269	
4.1 Seepage from Dam	No		
4.2 Signs of Erosion	None observed		
4.3 Signs of Turbidity in Seepage Water	Not applicable		
4.4 Discoloration/staining	No		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other Conditions	Yes	269	A sump was constructed on the downstream side to collect the ponding water, so its level does not exceed the elevation of the granular layer of the upstream toe liner tie-in. Water pond at approx. 20+625 in downstream area.
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of Erosion	None observed		
5.3 Excessive Vegetation	No		
5.4 Presence of Rodent Burrows	None observed		
5.5 Other Unusual Conditions	None		
6. RESERVOIR			
6.1 Stability of Slopes	Stable		
6.2 Distance to Nearest Slide (if applicable)	None observed		
6.3 Estimate of Slide Volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other Unusual Conditions	No		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists, only dewatering pump.		
8. INSTRUMENTATION			
8.1 Piezometers	No		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
8.2 Settlement Cells	No		
8.3 Thermistors	Yes		See Section 5.6.2 of the report.
8.4 Settlement Monuments	No		
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and Flow Monitors	No		
8.8 Data logger(s)	Yes		
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	January 2024		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	September 2023		
10. NOTES :			
Inspector's Name	Vanessa Andrade	**Date:**	July 23, 2024

Photograph B5-01 Saddle Dam 3

Date: July 23, 2024 **Photo Number**: 266

Description: From Sta. 20+750, looking northwest at the downstream slope and toe.

Photograph B5-02 Saddle Dam 3

Date: July 23, 2024 **Photo Number**: 267

Description: From Sta. 20+700, looking southeast at the crest and upstream slope.

Photograph B5-03 Saddle Dam 3

Date: July 23, 2024 **Photo Number**: 268

Description: From Sta. 20+700, looking northwest at the crest and upstream slope.

Photograph B5-04 Saddle Dam 3

Date: July 23, 2024 **Photo Number**: 269

Description: From Sta. 20+610, looking west at the downstream slope and sump. Presence of water pond.

Photograph B5-05 Saddle Dam 3

Date: July 23, 2024 **Photo Number**: 270

Description: From Sta. 20+610, looking south at the upstream slope.

Appendix B6 Saddle Dam 4

Client:	AEM	**By:**	Marion Habersetzer/ Vanessa Andrade
Project:	Meadowbank	**Date:**	July 23, 2024
Location:	Saddle Dam 4	**Reviewed:**	Fiona Esford

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with inverted filter on base, upstream filters, a geomembrane liner tied in a toe till plug and upstream till blanket.		
Weather Conditions:	Sunny	**Temperature:**	25°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		271, 272, 273	
1.1 Crest elevation	145 m		Designed to be able to be raised to El. 150 m
1.2 Reservoir Level	142.7 m - tailings		Visually 0.7 m of settlement in tailings since 2022
Current Freeboard	6.2 m - water 1.1 m - tailings		
1.3 Distance to Tailings Pond (if applicable)	Approx. 100 m		
1.4 Surface Cracking	None at time of inspection		
1.5 Unexpected Settlement	None observed		
1.6 Lateral Movement	Not apparent		
1.7 Other Unusual Conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2. UPSTREAM SLOPE		274, 276, 277, 278, 279	
2.1 Slope angle	3H:1V		
2.2 Signs of Erosion	Yes	274	Some erosion of the liner protection till layer
2.3 Signs of Movement (Deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Good	279	Presence of small holes in the liner close to eastern abutment.
2.6 Other Unusual Conditions	None		
3. DOWNSTREAM SLOPE		271, 272, 273	
3.1 Slope angle	1.5H:1V		
3.2 Signs of Erosion	None observed		
3.3 Signs of Movement (Deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or Wet Areas	None observed on slope		
3.6 Vegetation Growth	None observed		
3.7 Other Unusual Conditions	None		
4. DOWNSTREAM TOE AREA		271, 272, 273	
4.1 Seepage from Dam	No		
4.2 Signs of Erosion	None observed		
4.3 Signs of Turbidity in Seepage Water	Not applicable		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other Conditions	Yes	271, 272	Runoff water accumulate at the downstream side of the structure. It is pumped out so that the water level does not exceed the elevation of the granular layer of the upstream toe liner tie-in.
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		Highly fractured bedrock observed at the western abutment.
5.2 Signs of Erosion	None observed		
5.3 Excessive Vegetation	No		
5.4 Presence of Rodent Burrows	None observed		
5.5 Other Unusual Conditions	None		
6. RESERVOIR		276	
6.1 Stability of Slopes	Stable		
6.2 Distance to Nearest Slide (if applicable)	None observed		
6.3 Estimate of Slide Volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other Unusual Conditions	None		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists, only dewatering pump.		
8. INSTRUMENTATION			
8.1 Piezometers	No		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
8.2 Settlement Cells	No		
8.3 Thermistors	Yes		See Section 5.6.2 of the report
8.4 Settlement Monuments	No		
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and Flow Monitors	No		Construction drawings indicate a seepage collection system is to be constructed.
8.8 Data logger(s)	Yes		
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	January 2024		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	September 2023		
10. NOTES :			
Inspector's Name	Vanessa Andrade	**Date:**	July 23, 2024

Photograph B6-01 Saddle Dam 4

Date: July 23, 2024 **Photo Number**: 271

Description: Looking southeast at the downstream slope and toe. There is some water ponding at the toe.

Photograph B6-02 Saddle Dam 4

Date: July 23, 2024 **Photo Number**: 272

Description: From the crest looking southeast at the crest and the downstream slope and toe. There is some water ponding at the toe.

Photograph B6-03 Saddle Dam 4

Date: July 23, 2024 **Photo Number**:273

Description: From the crest, looking southeast at the the downstream slope and toe.

Photograph B6-04 Saddle Dam 4

Date: July 23, 2024 **Photo Number**: 274

Description: Looking northeast at the upstream slope. Some erosion of the liner protection till layer.

Photograph B6-05 Saddle Dam 4

Date: July 23, 2024 **Photo Number**:276

Description: Looking northwest at the upstream slope and the South Cell.

Photograph B6-06 Saddle Dam 4

Date: July 23, 2024 **Photo Number**: 277

Description: Looking southeast at the crest and the upstream slope.

Photograph B6-07 Saddle Dam 4

Date: July 23, 2024 **Photo Number**: 278

Description: Looking southeast at the upstream slope. Presence of a pipe on the liner.

Photograph B6-08 Saddle Dam 4

Date: July 23, 2024 **Photo Number**: 279

Description: From the eastern abutment, looking northeast at the upstream toe area. Water discharged on the liner tie-in are eroding the tailings but the granular materials of the tie-in cover are in good condition. Some holes in the liner.

Appendix B7 Central Dike Saddle Dam 5

Client:	AEM	**By:**	Marion Habersetzer/ Vanessa Andrade
Project:	Meadowbank	**Date:**	July 22, 2024
Location:	Central Dike and Saddle Dam 5	**Reviewed:**	Fiona Esford

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with inverted filter on base, key trench, upstream filters, a geomembrane liner tied in a toe till plug and protective cover.		
Weather Conditions:	Sunny	**Temperature:**	25°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		235, 236, 237, 238, 239, 240, 243, 244, 280	
1.1 Crest Elevation	Cofferdam Crest = 110 m Rockfill crest = 145 m		
1.2 Reservoir Level	144.0 m - tailings		
Current Freeboard	6.2 m - water 1.1 m - tailings		
1.3 Distance to Tailings Pond (if applicable)	Variable		Adequate tailings beach against Central Dike. No more water ponding south of Sta. 0+850 against the Central Dike and Saddle Dam 5.
1.4 Surface Cracking	None at time of inspection		
1.5 Unexpected Settlement	None observed		
1.6 Lateral Movement	Not apparent		
1.7 Other Unusual Conditions			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2. UPSTREAM SLOPE		233, 235, 237, 238, 241, 242, 243, 283	
2.1 Slope angle	3H:1V up to El. 130 m and 2H:1V above		
2.2 Signs of Erosion	None observed		
2.3 Signs of Movement (Deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)			Liner covered by a granular protection layer up to El. 128 m and well protected underneath deposition fingers. Presence of gravel on the liner at Sta. 0+750 m and of a cable with a metallic plug at Sta. 0+900 m. Gravel overspilling from deposition point on liner.
2.6 Other Unusual Conditions	None		
3. DOWNSTREAM SLOPE		280, 232, 234, 244	
3.1 Slope angle	1.5H		
3.2 Signs of Erosion	None observed		
3.3 Signs of Movement (Deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or Wet Areas	Yes		Presence of water pond at approx. 1+100 Sta.
3.6 Vegetation Growth	None observed		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
3.7 Other Unusual Conditions	None		
4. DOWNSTREAM TOE AREA		232, 234	
4.1 Seepage from Dam	Yes	232, 234	Presence of a water pond formed by seepage on the downstream side between the downstream toe and West Road (0+300 to 0+830 approximately). The pond is pumped back to the South Cell and maintained at El. 115 m. The pumping rate was 150 m^3/h at the time of the inspection. Presence of water pond approx. 0+100 Sta (runoff).
4.2 Signs of Erosion	None observed		
4.3 Signs of Turbidity in Seepage Water	Yes		High turbidity events observed in the pond and an orange coloration was observed periodically.
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other Unusual Conditions			
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of Erosion	None observed		
5.3 Excessive Vegetation	No		
5.4 Presence of Rodent Burrows	None observed		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
5.5 Other Unusual Conditions	None		
6. RESERVOIR			
6.1 Stability of Slopes	Stable		
6.2 Distance to Nearest Slide	None observed		
6.3 Estimate of Slide Volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other Unusual Conditions	None		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists, only dewatering pump.		
8. INSTRUMENTATION			
8.1 Piezometers	Yes		See Sections 5.6.2 and 5.7.2 of the report.
8.2 Settlement Cells	No		
8.3 Thermistors	Yes		See Section 5.7.2 of the report.
8.4 Settlement Monuments	No		
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and Flow Monitors	No		
8.8 Data logger(s)	Yes		
8.9 Other			
9. DOCUMENTATION			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	January 2024		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	September 2023		
10. NOTES :			

Inspector's Name	Vanessa Andrade	**Date:**	July 22, 2024

Photograph B7-01 Central Dike and Saddle Dam 5

Date: July 22, 2024 **Photo Number**: 232

Description: From approximately Sta. 0+900 downstream, looking north at the downstream water pond.

Photograph B7-02 Central Dike and Saddle Dam 5

Date: July 22, 2024 **Photo Number**: 233

Description: From approximately Sta. 0+950, looking south at the upstream slope.

Photograph B7-03 Central Dike and Saddle Dam 5

Date: July 22, 2024 **Photo Number**: 234

Description: From approximately Sta. 0+875, looking northeast at the downstream slope, toe and water pond.

Photograph B7-04 Central Dike and Saddle Dam 5

Date: July 22, 2024 **Photo Number**: 235

Description: From approximately Sta. 0+800, looking north at the crest and the upstream slope. Gravel overspilling from deposition on liner.

Photograph B7-05 Central Dike and Saddle Dam 5

Date: July 22, 2024 **Photo Number**: 236
Description: From approximately Sta. 0+800, looking north at the crest.

Photograph B7-06 Central Dike and Saddle Dam 5

Date: July 22, 2024 **Photo Number**: 237
Description: From approximately Sta. 0+720 looking south at the crest and the upstream slope.

Photograph B7-07 Central Dike and Saddle Dam 5

<u>Date</u>: July 22, 2024 **<u>Photo Number</u>**: 238

<u>Description</u>: From approximately Sta. 0+720 looking north at the crest and the upstream slope.

Photograph B7-08 Central Dike and Saddle Dam 5

<u>Date</u>: July 22, 2024 **<u>Photo Number</u>**: 239

<u>Description</u>: From approximately Sta. 0+720 looking southeast at the crest.

Photograph B7-09 Central Dike and Saddle Dam 5

Date: July 22, 2024 **Photo Number**: 240
Description: From approximately Sta. 0+720 looking northeast at the crest.

Photograph B7-10 Central Dike and Saddle Dam 5

Date: July 22, 2024 **Photo Number**: 241
Description: From approximately Sta. 0+400 (deposition point) looking southwest at the crest and upstream slope. Adequate tailings beach against the south section of the structure.

Photograph B7-11 Central Dike and Saddle Dam 5

Date: July 22, 2024 **Photo Number**: 242
Description: From approximately Sta. 0+400 (deposition point) looking northwest at the upstream slope and South Cell. Adequate tailings beach against the south section of the structure.

Photograph B7-12 Central Dike and Saddle Dam 5

Date: July 22, 2024 **Photo Number**: 243
Description: From approximately Sta. 0+150 at north abutment looking south at upstream slope.

Photograph B7-13 Central Dike and Saddle Dam 5

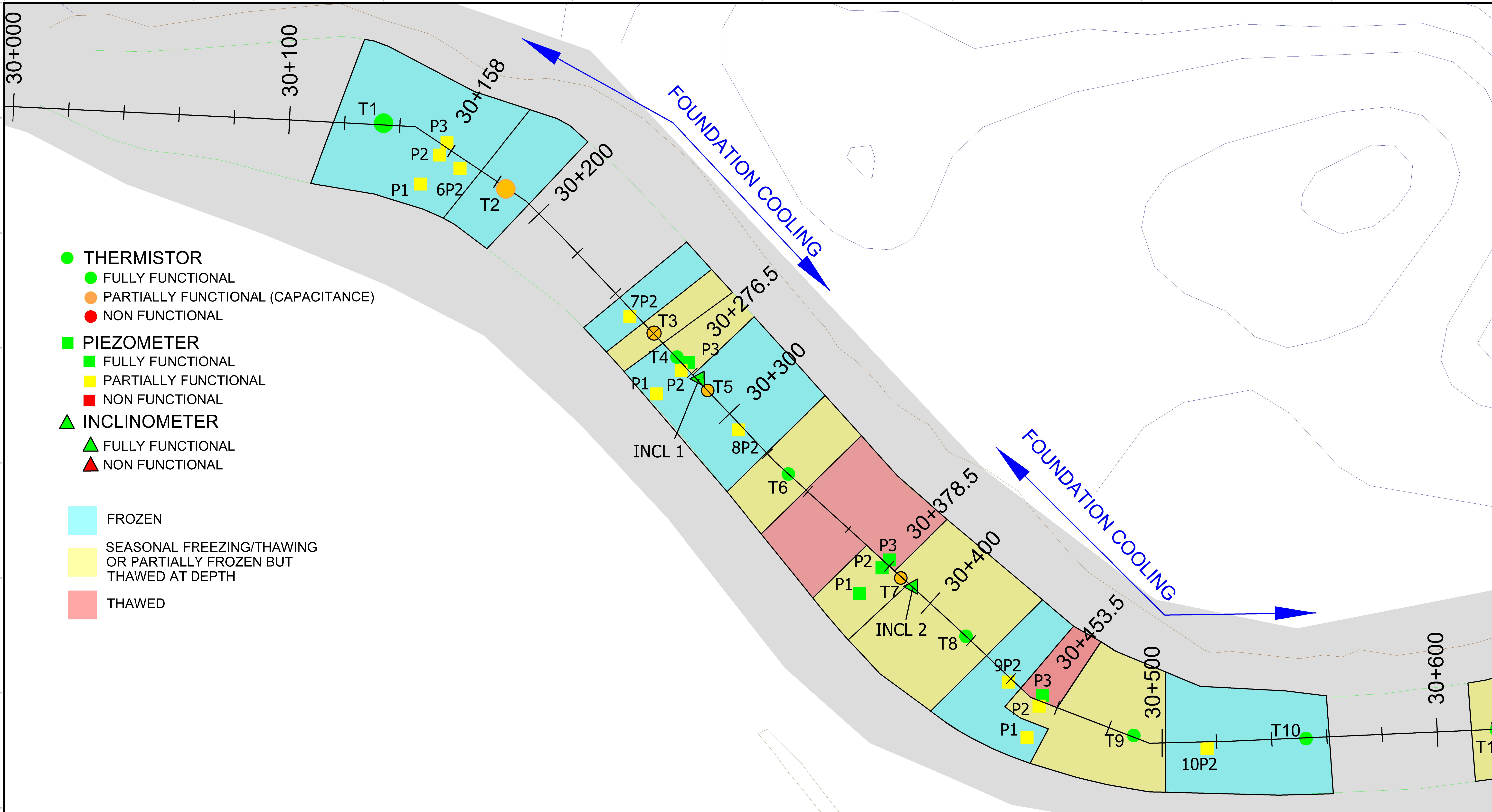
Date: July 22, 2024 **Photo Number**: 244

Description: From approximately Sta. 0+150 at north abutment looking south at downstream slope and toe.

APPENDIX C

Instrumentation Thermal Maps

FORMAT ANSI B – LANDSCAPE



DRAWN BY G.BARIL/T.DAHM	DATE AUG_2022		
SURVEY CHECK	DATE		
GEOLOGY CHECK	DATE		
ENGINEERING CHECK	DATE		
UPDATED BY M.SADLER	DATE DEC_2024		

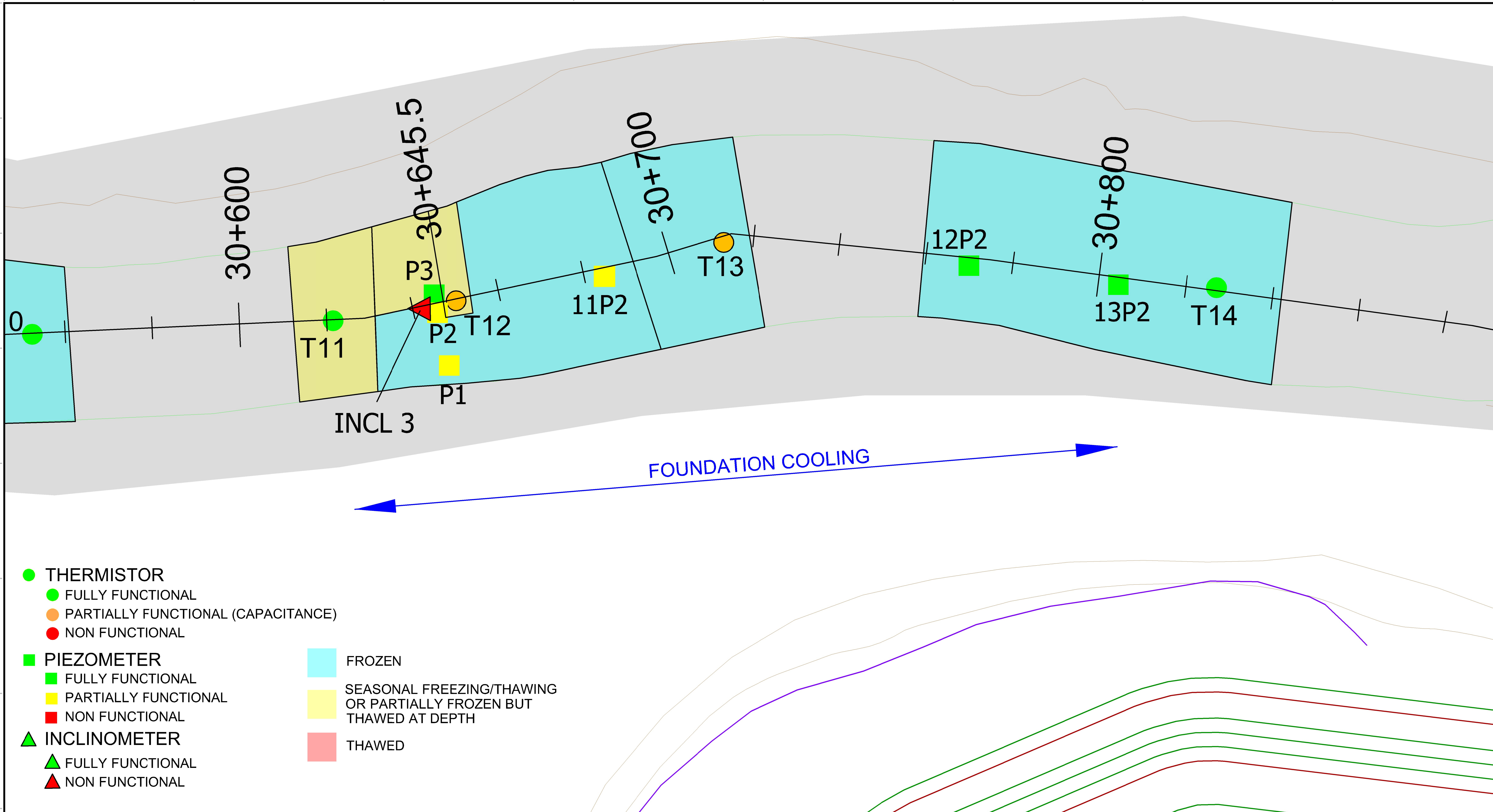
MEADOWBANK_COMPLEX

ENGINEERING

BAY_GOOSE_INSTRUMENTATION
30+158_TO_30+517
NORTH_CHANNEL

SCALE	DATE	FILE CAD

FORMAT ANSI B – LANDSCAPE



DRAWN BY G.BARIL\T.DAHM	DATE AUG_2022
SURVEY CHECK	DATE
GEOLOGY CHECK	DATE
ENGINEERING CHECK	DATE
UPDATED BY M.SADLER	DATE DEC_2024

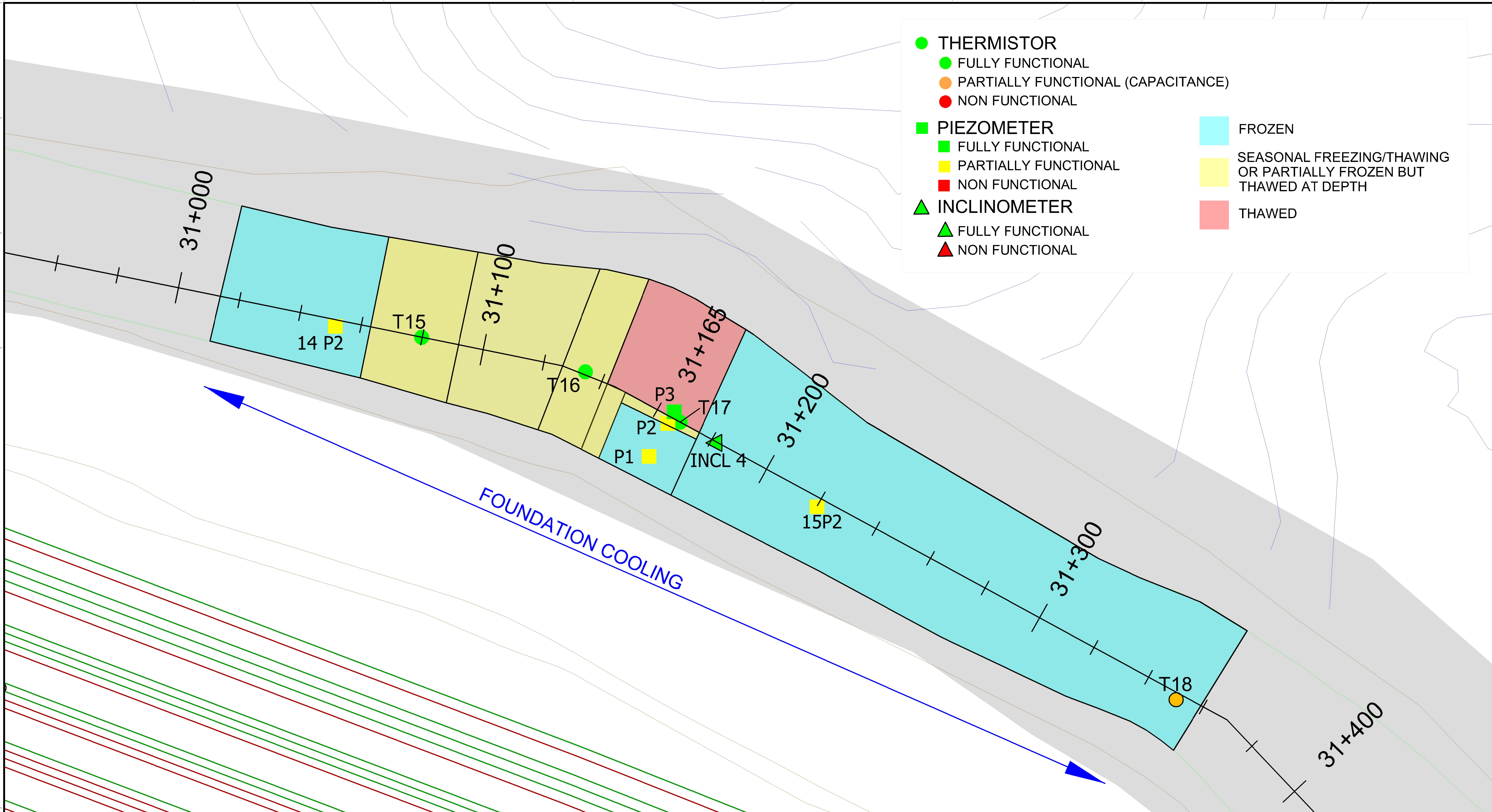
MEADOWBANK_COMPLEX

ENGINEERING

BAY_GOOSE_INSTRUMENTATION
30+645_TO_30+804
CENTRAL_SHALLOWS

SCALE	DATE	FILE CAD

FORMAT ANSI B – LANDSCAPE



DRAWN BY	DATE
G.BARIL/TDAHM	AUG_2022
SURVEY CHECK	DATE
GEOLOGY CHECK	DATE
ENGINEERING CHECK	DATE
UPDATED BY M.SADLER	DATE DEC_2024

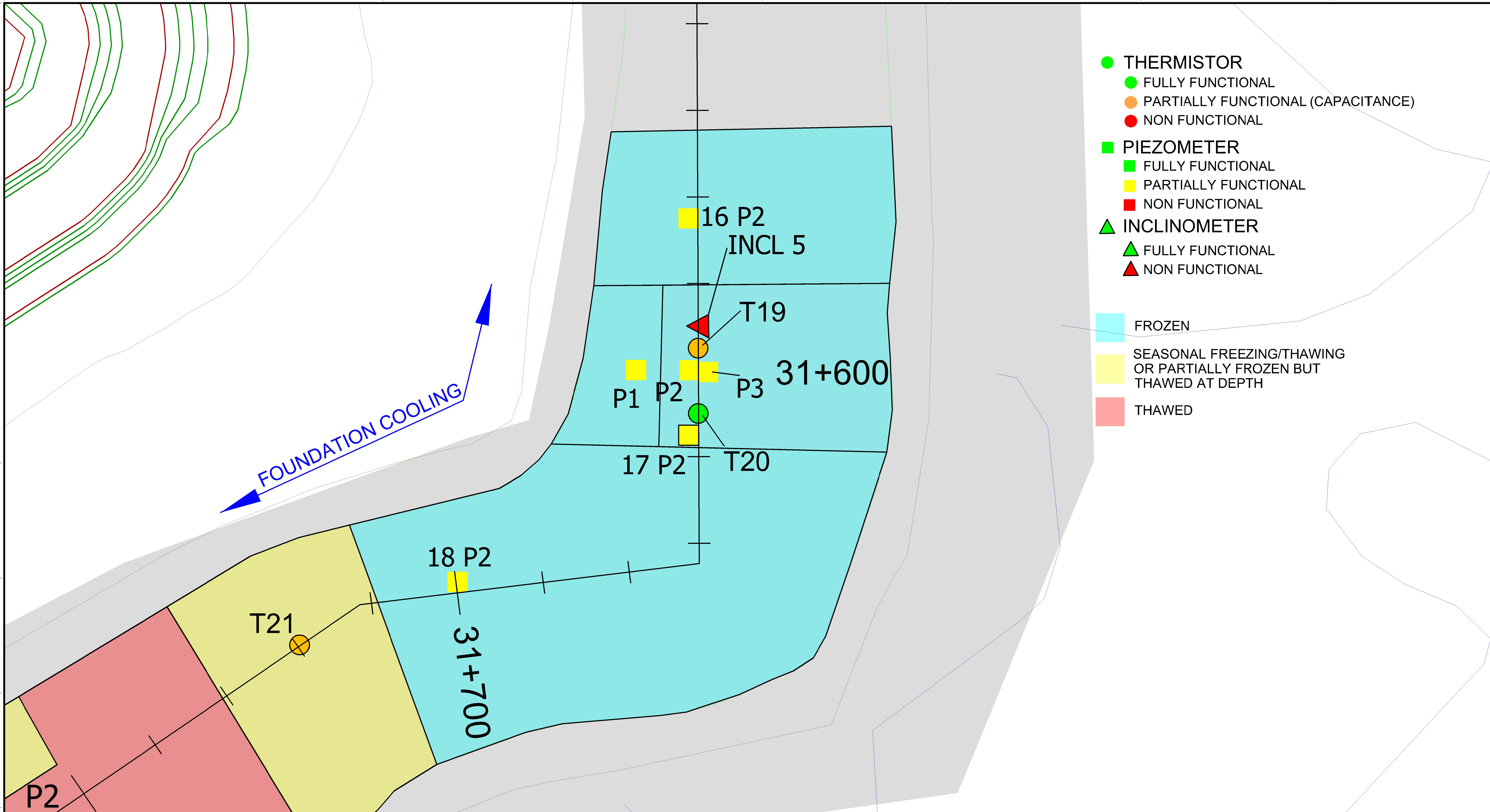
MEADOWBANK_COMPLEX

ENGINEERING

BAY_GOOSE_INSTRUMENTATION
31+020_TO_31+220
CENTRAL_CHANNEL

SCALE	DATE	FILE CAD

FORMAT ANSI B – LANDSCAPE



DRAWN BY	G.BARIL/T.DAHM	DATE	AUG_2022
SURVEY CHECK		DATE	
GEOLOGY CHECK		DATE	
ENGINEERING CHECK		DATE	
UPDATED BY	M.SADLER	DATE	DEC_2024

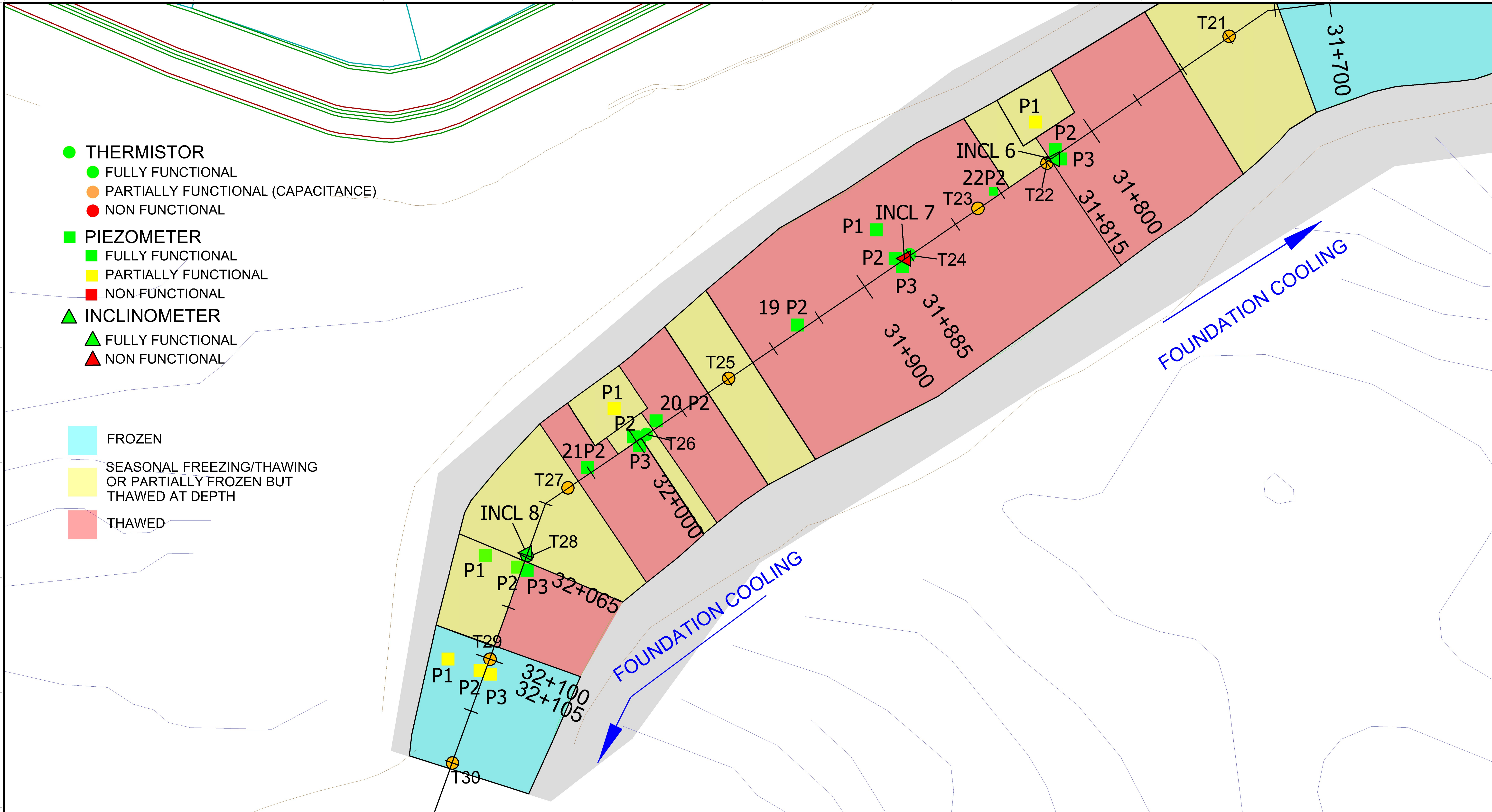
MEADOWBANK_COMPLEX

ENGINEERING

BAY_GOOSE_INSTRUMENTATION
31+565_TO_31+700
CHANNEL_3

SCALE | DATE | FILE CAD

FORMAT ANSI B – LANDSCAPE



DRAWN BY G.BARIL/T.DAHM	DATE AUG_2022
SURVEY CHECK	DATE
GEOLOGY CHECK	DATE
ENGINEERING CHECK	DATE
UPDATED BY M.SADLER	DATE DEC_2024

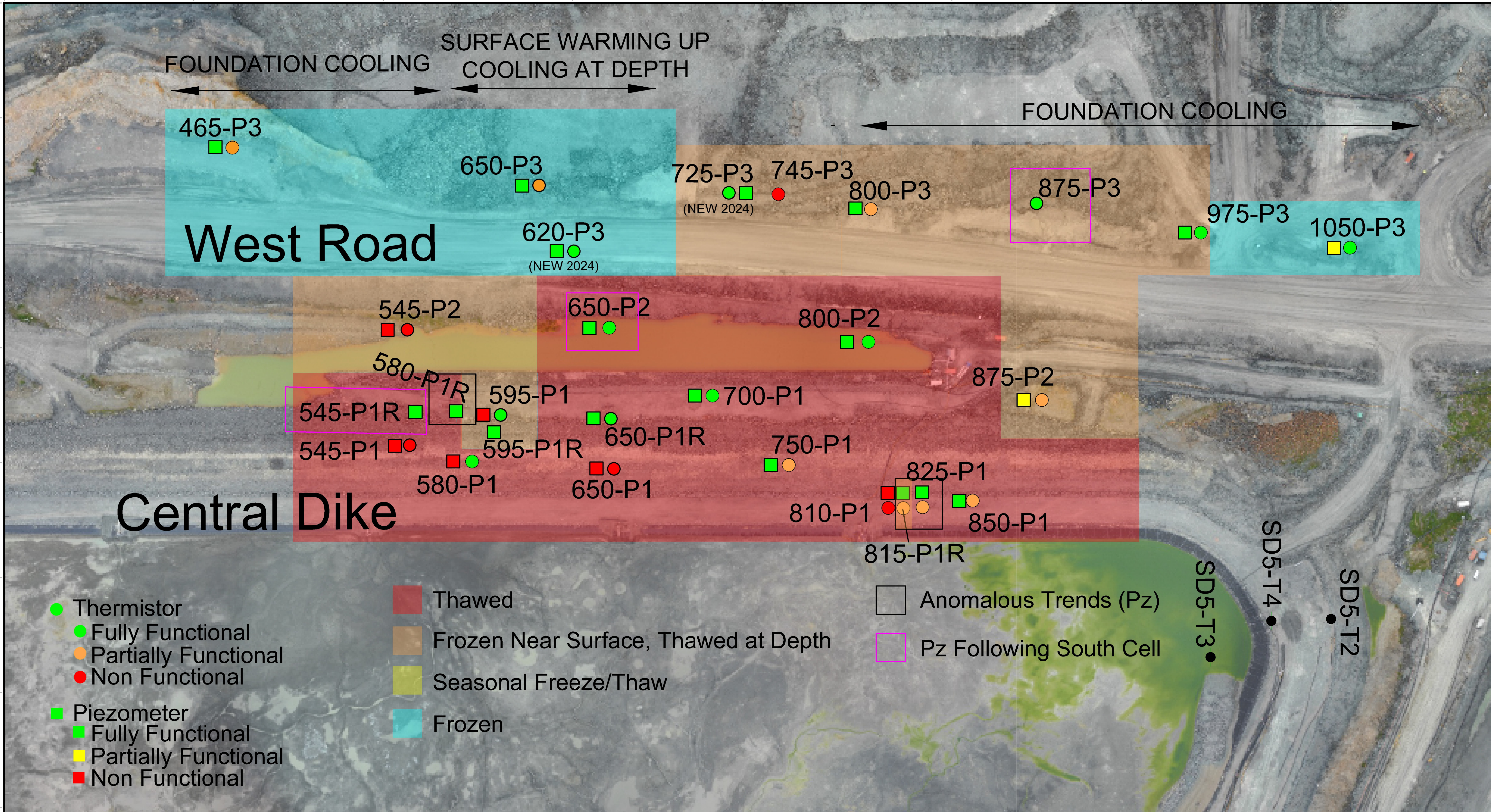
MEADOWBANK_COMPLEX

ENGINEERING

BAY_GOOSE_INSTRUMENTATION
31+815_TO_32+105
CHANNEL_1_&_2

SCALE	DATE	FILE CAD

FORMAT ANSI B – LANDSCAPE



DRAWN BY M.SADLER	DATE DEC 2024	CHECKLIST	INITIALS
SURVEY CHECK	DATE		
GEOLOGY CHECK	DATE		
ENGINEERING CHECK	DATE		

MEADOWBANK DIVISION

ENGINEERING

CENTRAL DIKE

0+400 TO 1+100

SCALE N.T.S. | DATE | FILE .DWG

\\Cambfs01\groups\Engineering\05–Geotechnic\03–TailingsDams\8– Central Dike\5– Instruments\1– Instruments Summary\1– Instrumentation Maps\CD Georeferenced with instruments_MS_Dec2024.dwg, 13 Dec 2024

Central Dike - Instrumentation 2024

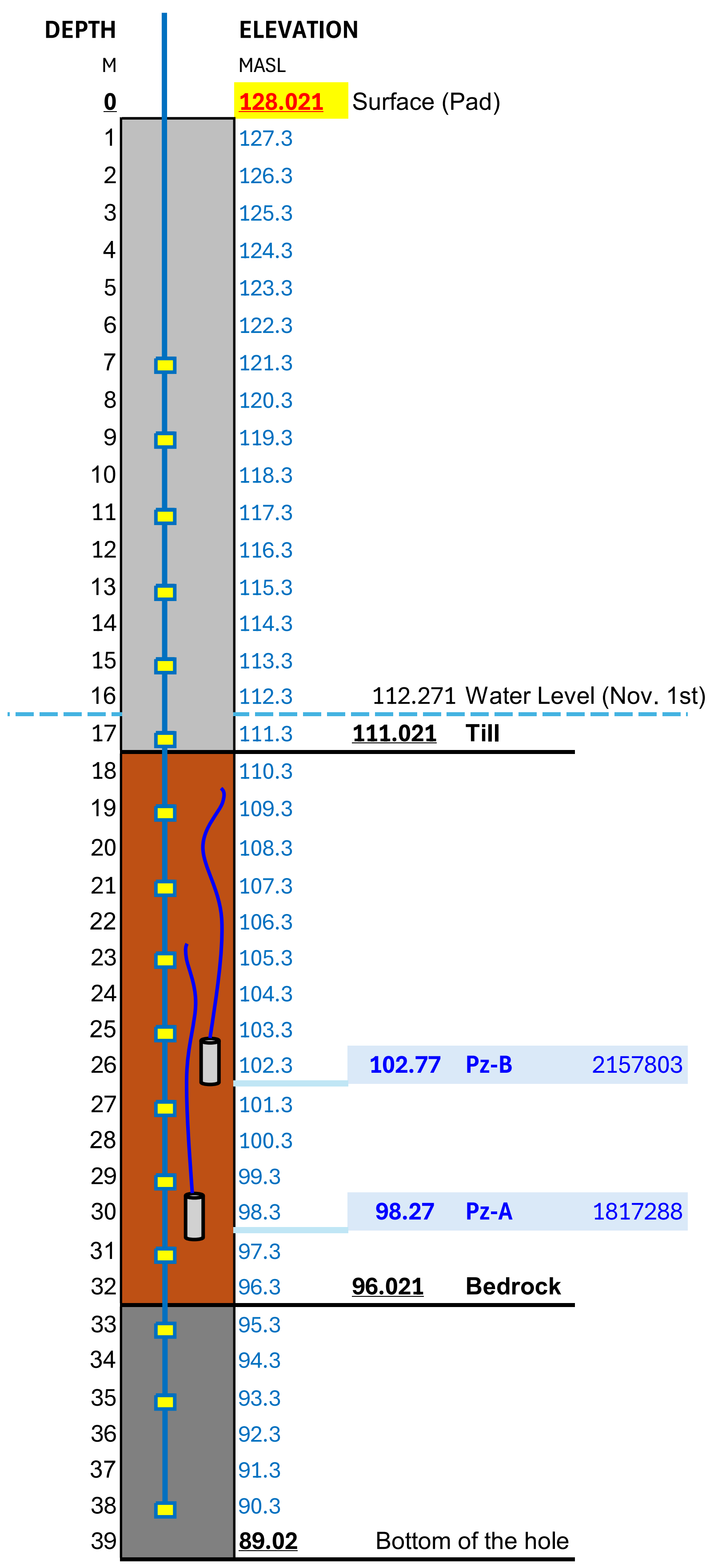
CD-P3 Replacement 2024

725-P3

String # : Geokon #2 (2017)

Drill Hole Coordinates

Northing	7214566.1960
Easting	638824.0580
Elevation	128.021



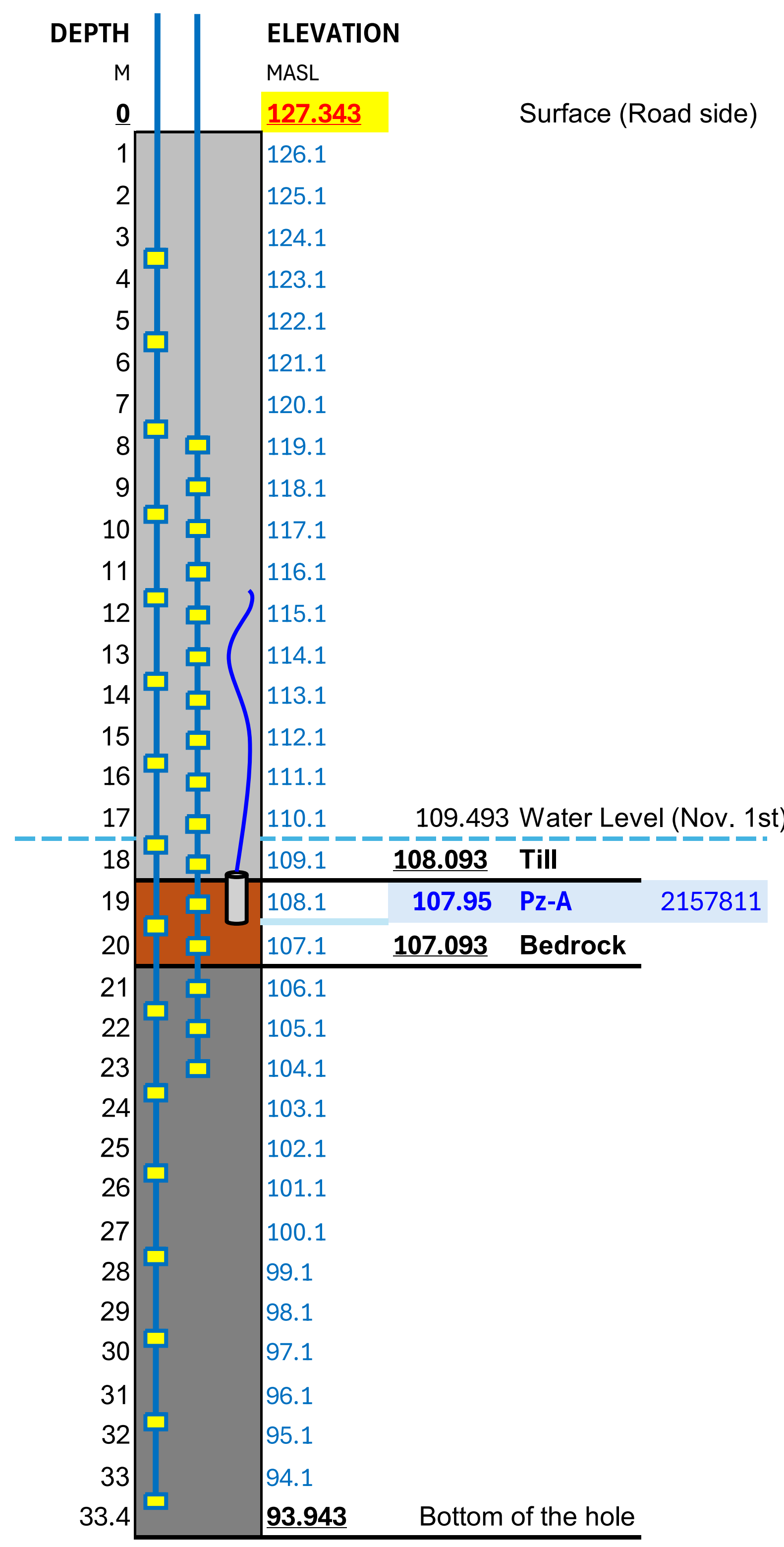
0 to 17.0m	Rockfill
17.0 to 32.0m	Till
32.0 to 38.75m	Bedrock
15.75	Water depth in DH. Nov.01 '24

620-P3

String # : TS-5330 TS-5171

Drill Hole Coordinates

Northing	7214669.0000
Easting	638792.5960
Elevation	127.343



0 to 18m	Rockfill
18 to 20.4	Till
20.4 to 34.25	Bedrock
17.85	Water depth in DH. Nov.01 '24

TH-Geokon #2 (2017) — DH-725-P3

Bead	B #1	B #2	B #3	B #4	B #5	B #6	B #7	B #8	B #9	B #10	B #11	B #12	B #13	B #14	B #15	B #16
Elev. (m)	121.27	119.27	117.27	115.27	113.27	111.27	109.27	107.27	105.27	103.27	101.27	99.27	97.27	95.27	93.27	90.27
Depth (m)	6.75	8.75	10.75	12.75	14.75	16.75	18.75	20.75	22.75	24.75	26.75	28.75	30.75	32.75	34.75	37.75

TS-5171 — DH-620-P3

Bead	B #1	B #2	B #3	B #4	B #5	B #6	B #7	B #8	B #9	B #10	B #11	B #12	B #13	B #14	B #15	B #16
Elev. (m)	124.05	122.05	120.05	118.05	116.05	114.05	112.05	110.05	108.05	106.05	104.05	102.05	100.05	98.05	96.05	94.05
Depth (m)	3.29	5.29	7.29	9.29	11.29	13.29	15.29	17.29	19.29	21.29	23.29	25.29	27.29	29.29	31.29	33.29

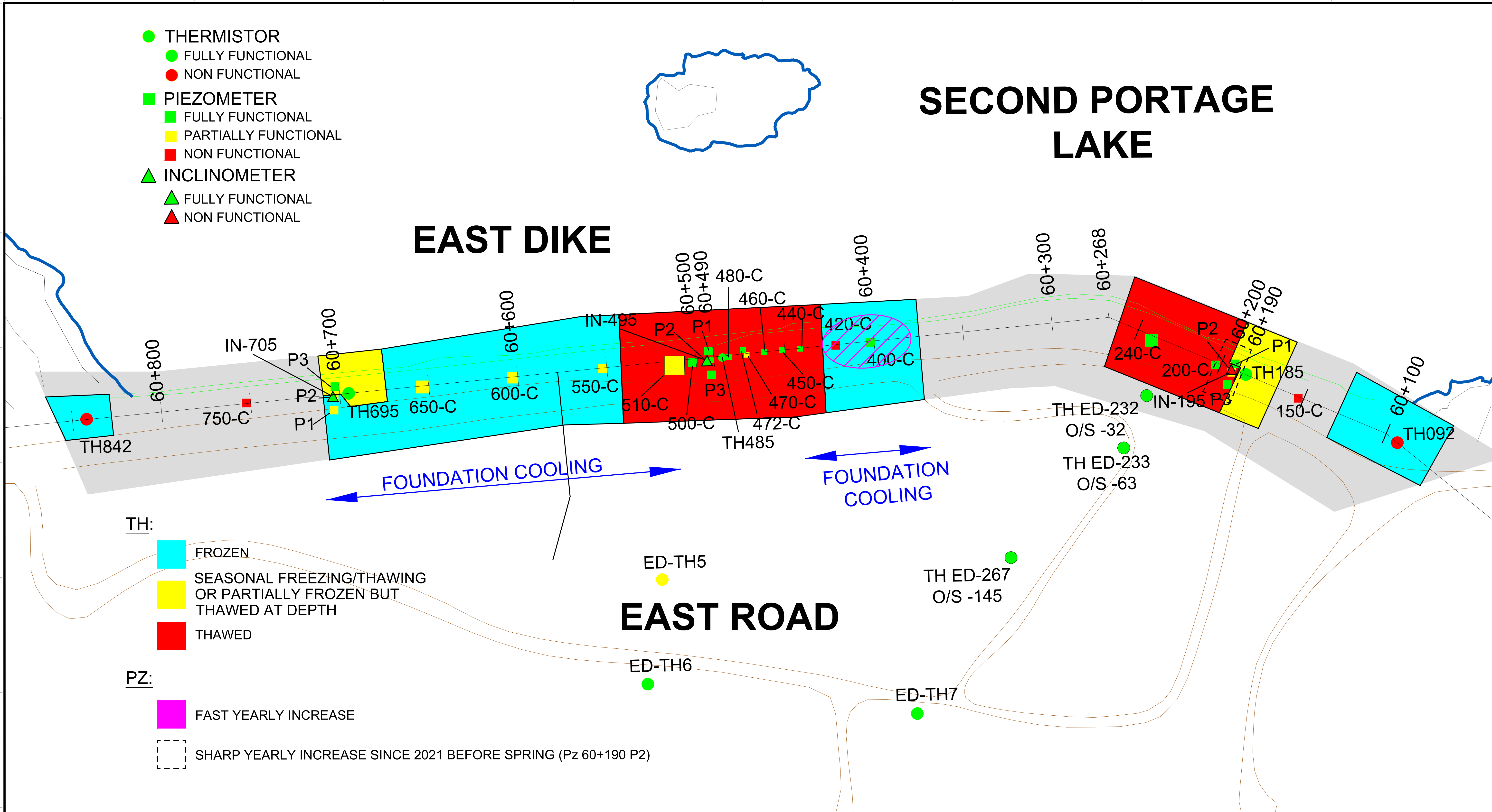
TS-5330 — DH-620-P3

Bead	B #1	B #2	B #3	B #4	B #5	B #6	B #7	B #8	B #9	B #10	B #11	B #12	B #13	B #14	B #15	B #16
Elev. (m)	118.80	117.80	116.80	115.80	114.80	113.80	112.80	111.80	110.80	109.80	108.80	107.80	106.80	105.80	104.80	103.80
Depth (m)	8.54	9.54	10.54	11.54	12.54	13.54	14.54	15.54	16.54	17.54	18.54	19.54	20.54	21.54	22.54	23.54

Serial number	Sensor Type	Supplier	Model	Range	Linear	Polynomial		Units	K (units/°C)
					G	A	B		
2157803	Pz	Geokon	4500S-GS	350 kPa	-0.1215	-2.5690E-07	-0.1178	kPa	-0.001028
1817288	Pz	Geokon	4500S-GS	350 kPa	-0.11190	-3.2710E-08	-0.11140	kPa	-0.109800
2157811	Pz	Geokon	4500S-GS	350 kPa	-0.1171	-8.0840E-08	-0.1090	kPa	0.04039

Instrument ID	Sensor Type	Supplier	Model	Range	Output	Color	Common	Nb of wires	Length (m)	TH Bead Positions (m)	Bead Covering Lenght (m)	Bead Spacing
TS-5333	TH	RST	10k	-50 to 150°C	KOhms	ORG (ORG/WHT)	WHT (ORG/WHT)	26	45	30.0	**15**	**15**
						PUR (PUR/WHT)	WHT (ORG/WHT)			31.0		**14**
						YEL (YEL/WHT)	WHT (YEL/WHT)			32.0		**13**
						BLK (BLK/WHT)	WHT (YEL/WHT)			33.0		**12**
						BLU (BLU/WHT)	WHT (BLU/WHT)			34.0		**11**
						GRN (GRN/WHT)	WHT (BLU/WHT)			35.0		**10**
						RED (RED/WHT)	WHT (RED/WHT)			36.0		**9**
						GRY (GRY/WHT)	WHT (RED/WHT)			37.0		**8**
						BRN (BRN/WHT)	WHT (BRN/WHT)			38.0		**7**
						PNK (PNK/WHT)	WHT (BRN/WHT)			39.0		**6**
						ORG (PUR/ORG)	WHT (PNK/WHT)			40.0		**5**
						PUR (PUR/ORG)	WHT (PNK/WHT)			41.0		**4**
						ORG (YEL/ORG)	WHT (TAN/WHT)			42.0		**3**
						YEL (YEL/ORG)	WHT (TAN/WHT)			43.0		**2**
						TAN (TAN/WHT)	WHT (BLK/WHT)			44.0		**1**
						WHT (PUR/WHT)	WHT (BLK/WHT)			45.0		**0**
TS-5171	TH	RST	10k	-50 to 150°C	KOhms	ORG (ORG/WHT)	WHT (ORG/WHT)	26	52	-30.0	**30**	**30**
						PUR (PUR/WHT)				-28.0		**28**
						YEL (YEL/WHT)	WHT (YEL/WHT)			-26.0		**26**
						BLK (BLK/WHT)				-24.0		**24**
						BLU (BLU/WHT)	WHT (BLU/WHT)			-22.0		**22**
						GRN (GRN/WHT)				-20.0		**20**
						RED (RED/WHT)	WHT (RED/WHT)			-18.0		**18**
						GRY (GRY/WHT)				-16.0		**16**
						BRN (BRN/WHT)	WHT (BRN/WHT)			-14.0		**14**
						PNK (PNK/WHT)				-12.0		**12**
						ORG (PUR/ORG)	WHT (PNK/WHT)			-10.0		**10**
						PUR (PUR/ORG)				-8.0		**8**
						ORG (YEL/ORG)	WHT (TAN/WHT)			-6.0		**6**
						YEL (YEL/ORG)				-4.0		**4**
						TAN (TAN/WHT)	WHT (BLK/WHT)			-2.0		**2**
						WHT (PUR/WHT)				0.0		**0**
String # 2 (2017)	TH	Geokon	3k	-50 to 150°C	KOhms	Black Stripe/White	Black	17	165	**134.0**	*** 38 modified to 31m ***	**31**
						Orange Stripe/White				**136.0**		**29**
						Brown Stripe/White				**138.0**		**27**
						Yellow Stripe/White				**140.0**		**25**
						Blue Stripe/White				**142.0**		**23**
						Green Stripe/White				**144.0**		**21**
						Red Stripe/White				**146.0**		**19**
						Grey				**148.0**		**17**
						Violet				**150.0**		**15**
						Orange				**152.0**		**13**
						Brown				**154.0**		**11**
						Yellow				**156.0**		**9**
						Blue				**158.0**		**7**
						Green				**160.0**		**5**
						White				**162.0**		**3**
						Red				**165.0**		**0**

FORMAT ANSI B – LANDSCAPE



DRAWN BY T.DAHM	DATE AUG_2022
SURVEY CHECK	DATE
GEOLOGY CHECK	DATE
ENGINEERING CHECK ENGINEERING	DATE ENG_DATE

MEADOWBANK_COMPLEX

ENGINEERING

EAST_DIKE_INSTRUMENTATION

SCALE | DATE | FILE CAD

C:\Users\BRUNO~1.LES\AppData\Local\Temp\AcPublish_10812\East Dike Updated Cad_BL2024.dwg, 20 Feb 2024

APPENDIX D

All-Weather Private Road

Appendix D1 All Weather Access Road Observation

Station	Name	Structure Description	Comments
0+430	PRC1	1x600 mm CSP	Culvert owned by the town and not AEM. Minor damage to outlet. Minor obstruction of the outlet. Still in good condition. No action required.
0+470	PRC2	2x600 mm CSP	Culvert owned by the town and not AEM. Good condition.
1+380	PRC3	1x600 mm CSP	Culvert owned by the town and not AEM. Good condition.
2+550	R-00A	1x600 mm CSP	No sign of any flow. Inlet partially collapsed; outlet entirely collapsed with signs of obstruction from road material.
4+260	PC-14	2x600 mm CSP	These 2 culverts are too damaged to function any longer. If needed, new culvert should be installed further north.
5+200	Quarry 1		Rocks walls are generally clean and stable.
~5+700	unnamed	1x600 mm CSP	The inlet is buried in gravel. The outlet is half-buried.
8+750	R02 Centre Bridge	30m Acrow Panel Bridge	In general good condition. The two corrugated steel bins at both abutments show deformation under the weight of the bridge.
8+830	PC-17A	2x1800 mm CSP	Sign of erosion beneath the inlet and flow of water occurring beneath the culvert. The 1800 CSP were installed too high. While conditions are not perfect, they have proven stable over the past years. No sign of degradation from last year on both the inlet and outlet sides. Flow was observed beneath the culvert in the past, but in 2019 the flow moved further south (5-10 m from culvert). Stable, to keep monitoring for evolution.
8+850	PC-17	2x1200 mm CSP	The inlet is damaged but functional.
9+952	PC-1	1x600 mm CSP	In good condition
10+580	R-03	1x600 mm CSP	In good condition

Station	Name	Structure Description	Comments
12+050	R-04	1x1200 mm CSP	In good condition
12+745	PC-13	1x600 mm CSP	In good condition but inlet slightly bent.
13+250	Quarry 2		The wall is mostly clean. One steep area is unstable and would require cleaning if operations resume. Presence of high gravel piles with unstable slopes, to monitor and inform workers.
13+405	PC-2	1x600 mm CSP	In good condition. Block present in front of inlet.
13+685	PC-3	1x600 mm CSP	In good condition
13+950	unnamed	1x600 mm CSP	In good condition
14+910	PC-4	1x600 mm CSP	In good condition
15+745	R-05A	1x1200 mm CSP	In good condition
17+600	R05 Center Bridge	30m Acrow Panel Bridge	In good condition. Minor damage to the bin wall of both abutments as a result of past snow removal activities. No reparation required yet. Bridge slightly dipping west. Deformation in uncompacted granular material on abutments surface
18+280	PC-5	1x600 mm CSP	In good general condition, but inlet slightly damaged.
18+900	PC-6	1x600 mm CSP	In good condition
20+240	PC-7A	2x600 mm CSP	In general good condition. The outlet of the northern culvert is getting buried, with the gravel getting washed out.
20+250	PC-7	1x600 mm CSP	The outlet of the culvert is partly buried and to be cleaned.
23+100	R06 Center Bridge	30 m Acrow Panel Bridge	In good condition. Some tension cracks in granular material on abutments.
23+700	Quarry 3		No entry due to falcons nesting.
25+900	R-07	1x1200 mm CSP	In good condition
29+420	PC-8	1x600 mm CSP	In good condition
31+300	Quarry 4		Quarry flooded. In good condition.
34+650	Quarry 5		Rock walls are in good and stable condition, except for a small portion on the east side.

Station	Name	Structure Description	Comments
35+690	PC-9	1x600 mm CSP	In good condition.
36+470	Quarry 6		The remaining rock walls are clean and stable.
36+865	PC-10	1x600 mm CSP	The inlet is buried, the outlet is half buried.
39+552	PC-11	1x600 mm CSP	In good condition. The inlet is too high and water is flowing underneath it. Not much flow observed, outlet was not visible, possibly buried.
39+800	Quarry 7		The quarry walls are in unstable condition with loose rocks. Scaling is recommended before resuming activities. Presence of water ponding in the springtime.
41+300	PC-12	1x600 mm CSP	In good condition, almost submerged.
42+950	Quarry 8		Walls are generally stabilized with rockfill berm but some others are in loose unstable condition (South wall).
44+600	Quarry 9		Presence of unstable loose rocks and boulders along the steepest and highest wall section. Some walls are in unstable condition with loose rocks. Presence of falcons.
48+500	R09 Center Bridge	12m Rapid Span Bridge	In good general condition. Some water is flowing under the northeast abutment, but no sign of erosion.
48+900	Quarry 10		The steep west rock wall is unstable.
53+500	Quarry 11		Rock walls are clean and stable.
54+950	PC-16	1x600 mm CSP	Not observed since 2021.Probably buried.
58+300	Quarry 12		In general good, stable condition.
62+060	R13 Center Bridge	12 m Rapid Span Bridge	In general good condition. Tension cracks on SE, SW and NE abutments.
62+350	Quarry 13		Loose blocks were observed in some portions of the rock wall, but the quarry is in general good condition. Some water ponding.
65+700	Quarry 14		Quarry flooded. Loose blocks were observed in some portions of the rock wall, but in general good condition. Access closed.
67+600	Quarry 15		Steep rock wall in relatively stable condition. Some water ponding.
67+840	R-14	3x1200 mm CSP	Middle and northern culverts show small sign of erosion at the outlet and have been damaged (collapsed) inside, below the road, but it is anticipated that they will continue to perform well. The South outlet is partly buried in gravel. All of them were installed too high but function well. Water is flowing under the road between the culverts, but no sign of erosion. No action required.

Station	Name	Structure Description	Comments
69+200	R15 Centre Bridge	30 m Acrow Panel Bridge	. New bridge, in good condition. North metal bin damaged due to snow removal, but not an issue.
70+400	Quarry 16		Presence of unstable loose rocks and boulders but in general good condition. Some water ponding.
72+800	Quarry 17		Steep rock wall in stable conditions.
73+800	R16 Centre Bridge	12m Rapid Span Bridge	In good condition. Flow usually observed under the North abutment, but no sign of erosion at the toe (dry in 2024).Surficial erosion of the granular material on the SE abutment.
77+440	R-17	1x1200 mm CSP	In good condition
79+500	R18 Centre Bridge	12 m Rapid Span Bridge	In good condition.
80+200	Quarry 18		In general good condition, south wall is high (about 8 m) with some loose blocks. Access closed due to falcons.
80+950	R-18A	3x1200 mm CSP	In good condition.
	R-18B	1X600 mm CSP	In good condition, installed above ground surface (water can flow below culvert).
83-150	R19 Centre	12m Rapid Span Bridge	Some damage to the steel containment plates and to one pile was observed, which may be associated with snow removal activity. The damage is minor and does not affect the geotechnical integrity of the bridge. Minor tension cracks in the top surface on the north and southwest abutments. To monitor.
84+300	Quarry 19		Rock walls are in good condition.
85+490	R-20	1x1200 mm CSP	Outlet of the culvert is slightly twisted. The middle of the culvert is slightly collapsed. The inlet is installed above the ground surface and water is able to flow beneath the culvert. No follow-up required, in stable conditions.
87+300	R-21	2x1200 mm CSP	Both culverts are slightly collapsed in the middle. Should have been installed lower to avoid erosion issue. In stable condition.
89+550	Quarry 20		Quarry walls are in good condition. Active at the time of the inspection with material loading.
93+400	Quarry 21		Quarry walls are in good condition.

Station	Name	Structure Description	Comments
93+600	R-23	1x1200 mm CSP	Minor damage near the top, but still in good condition. The culvert is installed too high and as a result there is a low flow of water through the road rockfill. The situation has been under control over the past years.
98+100	R-24	2x1200 mm CSP	Both outlets are installed too high. The outlet of the southern culvert still shows small signs of erosion, but this has been under control over the past years. Both culvert show deformation in the upper part.
99+200	Quarry 22		In relative stable condition.
101+950	R-25	2x600 mm CSP	One culvert is angling up toward the downstream end and natural drainage by gravity does not occur. A second culvert alongside is well installed and should drain water for the remainder of the season. No sign of erosion observed during the inspection.
	Western diversion ditch	2x1200 mm CSP	Outlet in good condition and inlet slightly bent but still in good condition.
104+400	R-26	3x1200 mm CSP	In good condition
	Quarry 23		This is an active quarry used to store rock cores and other things. Because of the presence of loose rocks on top of steep wall, the workers who need access to the quarry should be aware of rockfall potential and stay at a minimum of 20 m away from the wall. Most of the unstable wall areas are bermed off. Areas of the quarry are flooded.
	Culvert along Western Diversion Ditch	2x 1200 mm CSP	Outlet in good condition and inlet slightly bent but still in good condition.

Appendix D2 Culvert Photographic Log

Photograph D2-01: PC-17A km 8+830

Date: July 24, 2024 **Photo Number**: 384

Description: View of the culverts. No sign of degradation and the flow is stable south of the culverts (5-10 m away).

Photograph D2-02: PC-11 km 39+552

Date: July 24, 2024 **Photo Number**: 389

Description: View of the culvert inlet. Installed high but in good condition.

Photograph D2-03: R-14 km 67+840

Date: July 24, 2024 **Photo Number**: 395

Description: View of the culvert outlets. Water is flowing beneath the road between the culverts, but no sign of erosion.

Appendix D3 Bridges Photographic Log

Photograph D3-1 Bridges 1 – R02 km 8+750

Date: July 24, 2024 **Photo Number**: 382
Description: Looking at the north abutment. The corrugated steel bin shows deformation under the weight of the bridge.

Photograph D3-2 Bridges 1 – R02 km 8+750

Date: July 24, 2024 **Photo Number**: 383
Description: Looking at the south abutment. The corrugated steel bin shows deformation under the weight of the bridge.

Photograph D3-3 Bridges 2 – R05 km 17+600

Date: July 24, 2024 **Photo Number**: 385**Description**: Looking at the north abutment. Deformation in uncompacted granular material on abutments surface.

Photograph D3-4 Bridges 2 – R05 km 17+600

Date: July 24, 2024 **Photo Number**: 386
Description: Looking at the south abutment. Minor damage to the bin wall. Deformation in uncompacted granular material on abutments surface.

Photograph D3-5 Bridges 3 – R06 km 23+100

Date: July 24, 2024 **Photo Number**: 387
Description: Looking at the north abutment. Some tension cracks in granular material on abutments.

Photograph D3-6 Bridges 3 – R06 km 23+100

Date: July 24, 2024 **Photo Number**: 388
Description: Looking at the south abutment. Some tension cracks in granular material on abutments.

Photograph D3-7 Bridges 4 – R09 km 48+500

Date: July 24, 2024 **Photo Number**: 390
Description: Looking at the north abutment. In good general condition. Some water flowing under the northeast abutment, but no sign of erosion.

Photograph D3-8 Bridges 4 – R09 km 48+500

Date: July 24, 2024 **Photo Number**: 391
Description: Looking at the south abutment. In good general condition. Some water flowing under the northeast abutment, but no sign of erosion.

Photograph D3-9 Bridges 5 – R13 km 62+060

Date: July 24, 2024 **Photo Number**: 392
Description: Looking at the north abutment. In general good condition. Tension cracks on southeast, southwest and northeast abutments.

Photograph D3-10 Bridges 5 – R13 km 62+060

Date: July 24, 2024 **Photo Number**: 393
Description: Looking at the south abutment. In general good condition. Tension cracks on south and northeast abutments.

Photograph D3-11 Bridges 6 – R15 km 69+200

Date: July 24, 2024 **Photo Number**: 396
Description: New bridge, in good condition. North metal bin damaged due to snow removal, but not an issue.

Photograph D3-12 Bridges 6 – R15 km 69+200

Date: July 24, 2024 **Photo Number**: 397
Description: New bridge, in good condition. North metal bin damaged due to snow removal, but not an issue.

Photograph D3-13 Bridges 7 – R16 km 73+800

Date: July 24, 2024 **Photo Number**: 398
Description: Looking at the north abutment. In good condition. The flow usually observed under the north abutment has dry in 2024. No sign of erosion at the toe.

Photograph D3-14 Bridges 7 – R16 km 73+800

Date: July 24, 2024 **Photo Number**: 399
Description: Looking at the south abutment. In good condition.

Photograph D3-15 Bridges 8 – R18 km 79+500

Date: July 24, 2024 **Photo Number**: 400
Description: Looking at the north abutment. In good condition.

Photograph D3-16 Bridges 8 – R18 km 79+500

Date: July 24, 2024 **Photo Number**: 401
Description: Looking at the south abutment. In good condition.

Photograph D3-17 Bridges 9 – R19 km 83+150

Date: July 24, 2024 **Photo Number**: 402
Description: Looking at the north abutment. Minor damage to steel plate due to snow removal activity. Minor tension cracks in the top surface on the north and southwest abutments. To monitor.

Photograph D3-18 Bridges 9 – R19 km 83+150

Date: July 24, 2024 **Photo Number**: 403
Description: Looking at the south abutment. Minor damage to steel plate due to snow removal activity. Minor tension cracks in the top surface on the north and southwest abutments. To monitor.

APPENDIX E

Whale Tail Haul Road

Appendix E1 Whale Tail Haul Road Observations

Station	Name	Structure Description	Comments	Photo
116+449	#1	450 mm	Not observed, seems to be under Vault Pad.	-
116+675	#2	300 mm		-
117+133	#3	900 mm	In good condition.	-
117+137	#3-2	900 mm		
117+325	#4	800 mm	In good condition.	-
117+525	#5	600 mm	In good condition	-
117+799	#6	600 mm	Not observed.	-
118+013	#7	900 mm	Inlet in good condition, outlet totally buried.	-
118+016	#7-2	900 mm		
118+125	#8	900 mm	In good condition, outlet totally buried.	-
118+127	#8-2	900 mm		
118+659	#9	600 mm	Inlet in good condition, outlet damaged and pinched.	-
119+400	Bridge 3.4		In good condition. Tension cracks at southwest.	142: south 143: north 144: Southwest
119+264	#10	600 mm	Inlet in good condition, outlet damaged and pinched.	-
119+850	#11	300 mm	In good condition.	-
120+183	#12	900 mm	Inlets in good condition. 3 outlets are buried.	-
120+181	#12-2	900 mm		
120+179	#12-3	900 mm		
120+184	#12-4	900 mm		
120+186	#12-5	900 mm		
120+615	#13	300 mm	Inlet in good condition, outlet not observed as it is buried.	-
120+756	#14	600 mm	In good condition.	-
120+850	#15	900 mm	In good condition, outlet buried.	-
121+050	#16	300 mm	Not observed.	-
121+161	#17	800 mm	In good condition, outlet damaged.	-
121+330	#18	700 mm	In good condition.	-
121+574	#19	900 mm	In good condition.	-
121+931	#20	900 mm	In good condition.	-
121+929	#20-2	900 mm		
122+310	#21	300 mm	Not observed.	-
122+423	#22	600 mm	In good condition.	-
122+442	#23	600 mm	In good condition.	-
122+493	#24	600 mm	Not observed.	-
122+530	#25	600 mm	In good condition.	-

Station	Name	Structure Description	Comments	Photo
123+216	#26	800 mm	In good condition.	-
123+218	#26-2	800 mm		
123+275	#27	600 mm	In good condition.	-
123+300	#27-2	600 mm	Outlet is buried.	
123+325	#27-3	600 mm	In good condition.	-
123+349	#28	600 mm	In good condition.	-
123+375	#28-2	600 mm	In good condition.	-
123+779	#29	900 mm	Not observed.	-
123+781	#29-2	900 mm	Not observed.	-
123+968	#30	900 mm	In good condition.	-
123+970	#30-2	900 mm		
124+005	#31	900 mm	Not observed.	-
124+383	#32	900 mm	Not observed.	-
124+405	#33	900 mm	In good condition.	-
124+426	#34	900 mm	In good condition.	-
124+428	#34-2	900 mm		
124+581	#35	700 mm	In good condition, outlet buried.	-
125+000	#36	700 mm	In good condition.	-
125+035	#37	900 mm	In good condition, outlet buried.	-
125+049	#38	900 mm	Inlet in good condition, outlet buried.	-
125+193	#39	900 mm	In good condition.	-
125+195	#39-2	900 mm		
125+291	#40	900 mm	In good condition.	-
125+388	#41	600 mm	In good condition.	-
125+416	#42	600 mm	In good condition, outlet buried.	-
125+460	#43	600 mm	Not observed.	-
125+490	#44	300 mm	Not observed.	-
125+710	#45	600 mm	In good condition, inlet buried.	-
126+500	Quarry 10.5		Unstable wall, loose rocks. Workers should stay away from the wall.	140
126+700	Bridge 10.7	600 mm	In good condition.	138: south 137: north
127+020	#46	900 mm	In good condition.	141
127+101	#47	900 mm	In good condition.	-
127+103	#47-2	900 mm		
127+104	unnamed	1000 mm		
127+105	#47-3	900 mm		
127+107	#47-4	900 mm		
127+203	#48	900 mm	The inlet is 3/4 buried.	-

Station	Name	Structure Description	Comments	Photo
127+411	#49	450 mm	Not observed.	-
127+748	#50	600 mm	In good condition.	-
127+905	#51	300 mm	Not observed.	-
128+195	#52	700 mm	Inlet in good condition, outlet buried.	-
128+240	#53	700 mm	In good condition.	-
128+388	#54	600 mm	Inlet is buried.	-
128+440	#55	600 mm	In good condition.	-
128+485	#56	600 mm	In good condition.	-
128+635	#57	450 mm	In good condition, outlet buried.	-
128+740	#58	900 mm	In good condition.	-
128+760	#59	900 mm	In good condition.	-
128+775	#60	900 mm	In good condition.	-
129+050	#61	600 mm	Inlet in good condition, outlet buried.	-
129+265	#62	600 mm	In good condition.	-
129+390	#63	300 mm	In good condition.	-
129+920	#64	600 mm	In good condition, inlet buried.	-
130+924	#65	800 mm	In good condition but inlet is buried.	138
132+000	Bridge 16		The southwest abutment bin seems to be deforming under the weight of the bridge, but the bridge is still horizontal. No sign of instability, likely settling foundation. Slight superficial erosion at southwest abutment.	138: southwest 139: north
132+324	#66	600 mm	In good condition but inlet is buried.	-
132+689	#67	600 mm	In good condition, outlet buried.	-
132+750	#68	600 mm	In good condition.	-
133+000	Esker #1		Active (gravel and rock). Presence of loose rock on the steep wall, risk of sloughing.	-
133+250	#68-A	600 mm	In good condition. Above water.	-
133+500	#68-B	600 mm	In good condition.	-
133+784	#69	600 mm	In good condition, outlet buried.	-
133+837	#70	600 mm	In good condition, inlet damaged.	-
134+580	#73	1200 mm	In good condition.	-
134+559	#74	900 mm	In good condition.	-
134+610	#74-2	900 mm		
134+861	#75	600 mm	In good condition.	-
134+916	#76	450 mm	In good condition.	-
134+998	#77	450 mm	In good condition.	-
135+092	#78	300 mm	Not observed.	-

Station	Name	Structure Description	Comments	Photo
135+092	#78-2	300 mm		
135+495	#79	700 mm	In good condition.	-
135+659	#80	450 mm	In good condition.	-
135+841	#81	600 mm	In good condition.	-
136+000	Bridge 20		In good condition. Surface erosion, water flowing under (west abutment).	136: south 137: north
136+143	#82	300 mm	Inlet in good condition, outlet buried.	-
136+300	#83	600 mm	Inlet is bent, still working.	-
136+527	#84	700 mm	In good condition.	-
136+671	#85	600 mm	Inlet in good condition, outlet is buried.	-
136+740	#86	600 mm	In good condition but outlet buried.	-
136+810	#87	600 mm	In good condition, outlet buried.	-
136+881	#88	300 mm	In good condition, the outlet is almost completely blocked.	-
	Quarry 21 (Q141)		Not inspected.	-
137+180	#89	450 mm	In good condition, the outlet is high above ground.	-
137+295	#90	800 mm	In good condition.	-
137+297	#90-2	800 mm		
137+770	#91	600 mm	In good condition.	-
137+040	#92	600 mm	In good condition.	-
138+100	#93	450 mm	Inlet in good condition.	-
138+147	#94	900 mm	In good condition.	-
138+149	#94-2	900 mm	In good condition.	-
138+150	#94-3	900 mm	In good condition.	-
138+161	#95	900 mm	In good condition.	-
138+162	#95-2	900 mm	In good condition.	-
138+353	#96	600 mm	In good condition.	-
138+436	#97	600 mm	In good condition.	-
138+482	#98	600 mm	In good condition.	-
138+830	#99	600 mm	In good condition, outlet buried.	-
138+936	#100	600 mm	In good condition.	-
139+025	#101	600 mm	Totally buried.	-
139+265	#102	600 mm	In good condition.	-
139+562	#103	600 mm	In good condition.	-
139+595	#104	600 mm	In good condition.	
139+900	Bridge 23.9		In good condition, some erosion at west side.	134: south 135: north

Station	Name	Structure Description	Comments	Photo
140+555	#105	600 mm	In good condition.	-
140+700	#106	600 mm	In good condition, outlet buried.	-
140+961	#107	900 mm	In good condition. Outlet buried (culvert #107)	-
140+982	#107-2	900 mm		
140+984	#107-3	900 mm		
141+000	Esker #2		In general good condition, but the small walls are steep and in loose conditions. Risk of rockfalls near the walls.	-
141+551	#108	600 mm	In good condition.	-
141+905	#109	800 mm	Not observed.	-
142+100	Bridge 26.1		In good condition. Southwest abutment bin wall appears tilted toward the West. No sign of instability, likely settling foundation.	132: north 133: south
142+350	#110	450 mm	Not observed.	-
142+461	#111	300 mm	In good condition.	-
142+630	#112	300 mm	Outlet collapsed and inlet totally buried.	-
142+736	#113	450 mm	In good condition but inlet is buried.	-
142+810	#114	450 mm	In good condition, inlet buried.	-
142+865	#115	450 mm	In good condition but outlet is buried.	-
142+940	#116	450 mm	In good condition but outlet is buried.	-
143+173	#117	700 mm	In good condition.	-
143+433	#118	450 mm	In good condition but inlet is half blocked.	-
143+777	#119	300 mm	In good condition, inlet is buried.	-
144+125	#120	300 mm	In good condition, but inlet buried.	-
144+300	#121	900 mm	In good condition.	-
144+302	#121-2	900 mm		
144+304	#121-3	900 mm		
144+414	#122	900 mm	In good condition.	-
144+416	#122-2	900 mm		
144+418	#122-3	900 mm		
144+575	#123	800 mm	In good condition.	-
144+710	#124	300 mm	In good condition.	-
145+040	#125	800 mm	In good condition.	-
145+240	#126	800 mm	Installed oblique to the road, but in good condition.	-
146+409	#129	1200 mm	In good condition.	-

Station	Name	Structure Description	Comments	Photo
146+180	Quarry 30.5		The quarry was cleaned and is in good condition. Some walls still show some loose blocks.	
	30+540	600 mm	Not observed.	-
146+812	#130	600 mm	Not observed.	-
147+041	#131	600 mm	Not observed.	-
147+540	#132	600 mm	In good condition.	-
148+141	#133	300 mm	In good condition but inlet is buried.	-
148+300	Bridge 32.3		In good condition. Some erosion of the granular material behind the concrete wall at the Southwest abutment, no stability issue. More erosion then observed in 2023.	129: south 130: southwest 131: north
148+389	#134	300 mm	Not observed.	-
148+567	#135	300 mm	In good condition.	-
148+905	#136	300 mm	Not observed.	-
148+940	#137	300 mm	In good condition but inlet buried.	-
149+000	#138	300 mm	In good condition but inlet is buried.	-
149+214	#139	900 mm	In good condition.	-
149+216	#139-2	900 mm		
149+218	#139-3	900 mm		
149+256	#140	900 mm	In good condition.	-
149+258	#140-2	900 mm		
149+260	#140-3	900 mm		
149+727	#141	900 mm	In good condition.	-
149+728	#141-2	900 mm		
149+730	#141-3	900 mm		
149+732	#141-4	900 mm		
149+734	#141-5	900 mm		
150+160	#142	450 mm	In good condition.	-
150+291	#143	600 mm	In good condition.	-
150+319	#144	1000 mm	In good condition.	-
150+395	#145	300 mm	Not observed.	-
150+660	#146	1200 mm	In good condition.	-
150+855	#147	600 mm	In good condition.	-
151+173	#148	600 mm	Not observed.	-
151+000	Rock quarry 35 (Q150)		Active quarry. In general good condition but the western wall (4-5 m high) is in unstable condition.	-
151+670	#149	900 mm	In good condition.	-

Station	Name	Structure Description	Comments	Photo
152+171	#150	900 mm	In good condition but 1 outlet is buried and the rest is half buried.	-
152+173	#150-2	900 mm		
152+175	#150-3	900 mm		
152+177	#150-4	900 mm		
152+179	#150-5	900 mm		
152+562	#151	600 mm	Not observed.	-
152+933	#152	900 mm	Not observed.	-
153+027	#153	600 mm	In good condition. Blocks on top of the culverts.	-
153+028	#153-2	600 mm		-
153+030	#153-3	600 mm		-
153+032	#153-4	600 mm		-
153+033	#153-5	600 mm		-
153+261	#154	450 mm	Not observed.	-
153+470	#155	600 mm	In good condition.	-
153+506	#156	450 mm	Not observed, outlet buried.	-
154+028	#157	600 mm	In good condition.	-
154+490	#158	900 mm	In good condition.	-
154+491	#158-2	900 mm		
154+493	#158-3	900 mm		
155+768	#159	700 mm	In good condition.	-
155+966	#160	600 mm	Not observed.	-
156+051	#161	600 mm	Not observed.	-
156+238	#162	600 mm	In good condition.	-
156+474	#163	300 mm	Not observed.	-
156+790	#164	300 mm	In good condition.	-
156+964	#165	600 mm	In good condition.	-
157+610	#166	900 mm	In good condition.	-
157+843	#167	900 mm	Not observed.	-
158+342	#168	600 mm	In good condition.	-
158+765	#169	300 mm	In good condition.	-
159+340	#170	800 mm	In good condition.	-
159+500	Bridge 43.5		In good condition.	124: south 125: north
159+568	#170-A	900 mm	In good condition.	-
159+577	#170-B	900 mm		
159+587	#170-C	900 mm		
159+815	#171	600 mm	In good condition.	-
160+431	#173	1000 mm		-

Station	Name	Structure Description	Comments	Photo
160+433	#173-2	1000 mm	In good condition. The 2 southern culverts are installed below ground surface and water is flowing.	
160+435	#173-3	1000 mm		
160+470	#174	600 mm	In good condition.	-
160+640	#175	450 mm	In good condition.	-
160+800	Bridge 44.8		In good condition. Erosion at west abutment. It's recommended to re-fill the abutment.	123: south 122: north
161+055	#176	600 mm	In good condition.	-
161+065	#177	600 mm	In good condition.	-
161+170	#178	600 mm	In good condition but inlet half buried.	-
161+485	#179	700 mm	In good condition.	-
161+803	#180	600 mm	In good condition.	-
161+935	#181	600 mm	In good condition.	-
162+000	Esker #3		Not active. The slopes appear stable. Access closed.	-
162+126	#182	800 mm	In good condition.	-
162+185	#183	800 mm	In good condition.	-
162+187	#183-2	800 mm	In good condition.	-
162+230	#184	600 mm	In good condition.	-
162+404	#185	300 mm	In good condition.	-
162+541	#186	450 mm	In good condition.	-
162+570	#187	600 mm	In good condition.	-
162+595	#188	600 mm	In good condition.	-
162+870	#189	700 mm	In good condition.	-
162+985	#190	900 mm	In good condition.	-
163+046	#191	300 mm	Not observed.	-
163+190	#192	600 mm	In good condition but outlet is buried.	-
163+360	#193	600 mm	In good condition.	-
163+660	#194	600 mm	In good condition.	-
163+808	#195	700 mm	Inlet extremity is torn off, but culvert is still in good condition. Culvert exposed on top on inlet side.	-
163+961	#196	300 mm	In good condition.	-
164+120	#197	600 mm	In good condition.	-
164+222	#198	450 mm	In good condition.	-
164+383	#199	900 mm	In good condition. Water is flowing below the culverts. No sign of erosion.	-
164+385	#199-2	900 mm		
164+387	#199-3	900 mm		
164+389	#199-4	900 mm		

Station	Name	Structure Description	Comments	Photo
164+457	#201	900 mm	Installed below the ground level.	-
164+800	#203	600 mm	In good condition.	-
164+840	#204	600 mm	In good condition.	-
165+108	#206	450 mm	In good condition.	-
165+310	#207	600 mm	In good condition.	-
165+431	#208	900 mm	In good condition.	-
165+433	#209	900 mm	In good condition.	
165+435	#210	900 mm	In good condition.	
165+550	#211	450 mm	In good condition.	-
165+640	#212	600 mm	In good condition.	-
165+795	#213	300 mm	Not observed.	-
165+915	#214	800 mm	In good condition.	-
166+135	#215	300 mm	In good condition.	-
166+510	#216	600 mm	Not observed.	-
166+600	Quarry Q165		In good condition. Dry but concave: probably flooded at freshet.	-
166+790	#217	450 mm	In good condition but outlet buried.	-
167+233	#218	900 mm	In good condition.	-
167+235	#218-2	900 mm		
167+237	#218-3	900 mm		
167+239	#218-4	900 mm		
167+460	#219	300 mm	In good condition.	-
167+883	#221	900 mm	In good condition.	-
167+885	#221-2	900 mm		
167+887	#221-3	900 mm		
168+000	Rock quarry 52		Active. In good and clean condition, partially flooded. The northern wall may pose a rockfall hazard (loose blocks and cobbles) which workers need to be aware of.	-
168+315	#222	600 mm	In good condition.	-
168+650	#223	600 mm	In good condition.	-
168+705	#224	600 mm	In good condition.	-
168+715	#225	450 mm	In good condition.	-
168+935	#226	700 mm	In good condition, outlet half buried.	-
168+937	#226-2	450 mm		
168+970	#227	600 mm	In good condition.	-
168+995	#228	700 mm	In good condition.	-
169+245	#229	300 mm	Not observed.	-
169+363	#230	700 mm	In good condition.	-

Station	Name	Structure Description	Comments	Photo
169+659	#231	300 mm	Not observed.	-
169+928	#232	300 mm	Not observed.	-
170+240	#233	450 mm	In good condition.	-
170+385	#234	450 mm	In good condition but outlet is buried.	-
170+500	#235	600 mm	In good condition.	-
170+625	#236	450 mm	In good condition.	-
170+655	#237	600 mm	In good condition.	-
170+850	#238	600 mm	In good condition.	-
171+060	#239	600 mm	In good condition.	-
171+164	#240	600 mm	In good condition.	-
171+235	#241	600 mm	In good condition.	-
171+329	#242	600 mm	In good condition.	-
171+593	#243	600 mm	Outlet in good condition but inlet is damaged and obstructed.	-
171+625	#244	450 mm	In good condition, outlet partially buried.	-
171+735	#245	600 mm	In good condition, outlet partially buried.	-
172+005	#246	600 mm	In good condition.	-
172+065	#247	700 mm	In good condition.	-
172+220	#248	700 mm	In good condition.	-
172+435	#249	600 mm	In good condition.	-
172+610	#250	800 mm	In good condition.	-
172+745	#251	300 mm	In good condition.	-
172+900	#252	900 mm	In good condition.	-
172+965	#253	900 mm	In good condition.	-
172+967	#253-2	900 mm	In good condition.	-
172+969	#253-3	900 mm	In good condition.	-
173+125	#254	600 mm	In good condition.	-
173+195	#255	600 mm	In good condition.	-
173+350	#256	600 mm	In good condition but outlet buried.	-
173+525	#257	600 mm	Not observed.	-
173+875	#258	600 mm	Not observed.	-
173+985	#259	900 mm	In good condition.	-
174+185	#260	300 mm	In good condition, half buried with sand.	-
174+350	#261	450 mm	In good condition.	-
174+410	#262	450 mm	In good condition.	-
174+885	#263	450 mm	In good condition.	-

Station	Name	Structure Description	Comments	Photo
174+922	#264	600 mm	In good condition.	-
174+967	#265	450 mm	In good condition.	-
175+024	#266	300 mm	In good condition.	-
175+720	Esker #5		Active (gravel). In good condition. Partially flooded. Closed. There was a barrier in the moment of inspection.	-
175+720	#267	900 mm	In good condition.	-
175+774	#268	600 mm	In good condition but inlet is half buried.	-
175+860	#269	600 mm	In good condition.	-
176+000	#270	600 mm	In good condition.	-
176+050	#271	600 mm	In good condition.	
176+087	#272	600 mm	In good condition.	
176+649	#273	300 mm	In good condition.	-
176+815	#274	600 mm	In good condition.	-
177+022	#275	600 mm	In good condition.	-
177+170			Added pipe to drain area of accumulated water. This is a good practice.	-
177+282	#276	600 mm	In good condition.	
177+622	#277	450 mm	In good condition.	-
177+870	#278	1200 mm	Damaged, but still working.	-
178+307	#279	300 mm	Not observed.	-
178+416	#280	900 mm	In good condition.	-
178+350	#281	600 mm	In good condition but outlet buried.	-
178+500	Esker #6		In good condition. Storage of broken pieces. Access closed.	-
	Esker #7		Not observed. Possible not yet developed.	-
178+965	#283	450 mm	Not observed.	-
179+070	#284	900 mm	In good condition.	-
179+072	#284-2	900 mm		
179+074	#284-3	900 mm		
179+429	#287	600 mm	Not observed.	-
179+530	#288	600 mm	In good condition.	-
179+733	#289	600 mm	Deformed but still in good condition.	-
179+900	Unnamed		Set of 3 culverts installed below ground level for fish. Pipes present in some of the culverts.	-
179+975	#290	600 mm	Not observed.	-

Appendix E2 Bridge Photographic Log

Photograph E2-20 Bridges 9 – km 160+800

Date: July 23, 2024 **Photo Number**: 123

Description: Looking at the south abutment. Surficial erosion of the granular material behind the concrete wall.

Photograph E2-19 Bridges 9 – km 160+800

Date: July 23, 2024 **Photo Number**: 124

Description: Looking at the north abutment.

Photograph E2-18 Bridges 8 – km 159+500

Date: July 23, 2024 **Photo Number**: 125

Description: Looking at the south abutment.

Photograph E2-17 Bridges 8 – km 159+500

Date: July 23, 2024 **Photo Number**: 126

Description: Looking at the north abutment.

Photograph E2-15 Bridges 7 – km 148+300

Date: July 23, 2024 **Photo Number**: 129

Description: Looking at the south abutment.

Photograph E2-16 Bridges 7 – km 148+300

Date: July 23, 2024 **Photo Number**: 130

Description: Looking at the southwest abutment. Surficial erosion of the granular material behind the concrete wall.


Photograph E2-14 Bridges 7 – km 148+300

Date: July 23, 2024 **Photo Number**: 131

Description: Looking at the north abutment.


Photograph E2-12 Bridges 6 – km 142+100

Date: July 23, 2024 **Photo Number**: 132

Description: Looking at the south abutment.

Photograph E2-13 Bridges 6 – km 142+100

Date: July 23, 2024 **Photo Number**: 133

Description: Looking at the north abutment.

Photograph E2-11 Bridges 5 – km 139+900

Date: July 23, 2024 **Photo Number**: 134

Description: Looking at the south abutment.

Photograph E2-10 Bridges 5 – km 139+900

Date: July 23, 2024 **Photo Number**: 135

Description: Looking at the north abutment. Surficial erosion of the granular material behind the concrete wall.

Photograph E2-8 Bridges 4 – km 136+000

Date: July 23, 2024 **Photo Number**: 136

Description: Looking at the south abutment. Surficial erosion of the granular material behind the concrete wall.

Photograph E2-9 Bridges 4 – km 136+000

Date: July 23, 2024 **Photo Number**: 137

Description: Looking at the north abutment.

Photograph E2-7 Bridges 3 – km 132+000

Date: July 23, 2024 **Photo Number**: 138

Description: Looking at the southwest abutment.

Photograph E2-6 Bridges 3 – km 132+000

Date: July 23, 2024 **Photo Number**: 139

Description: Looking at the north abutment. Surficial erosion of the granular material behind the concrete wall

Photograph E2-5 Bridges 2 – km 126+700

Date: July 23, 2024 **Photo Number**: 140

Description: Looking at the south abutment.

Photograph E2-4 Bridges 2 – km 126+700

Date: July 23, 2024 **Photo Number**: 141

Description: Looking at the north abutment.

Photograph E2-2 Bridges 1 – km 119+400

Date: July 23, 2024 **Photo Number**: 142

Description: Looking at the south abutment.

Photograph E2-1 Bridges 1 – km 119+400

Date: July 23, 2024 **Photo Number**: 143

Description: Looking at the north abutment.

Photograph E2-3 Bridges 1 – km 119+400

Date: July 23, 2024 **Photo Number**: 144

Description: Looking at the southwest abutment. Minor tension cracks are observed.

APPENDIX F

Quarries

Photograph F-01: Quarry 13 – km 62+350

Date: July 24, 2024 **Photo Number**: 394

Description: View of north and west walls. Water ponding in the quarry.

APPENDIX G

Bulk Fuel Facilities

Appendix G1 Baker Lake Tank Farm Photographic Log

Photograph G1-01 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 339

Description: Looking at the southwestern corner of Tank 1.

Photograph G1-02 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 340

Description: From the south side of Tank 1, looking southeast at Tanks 1, 2, 3, and 4.

341244 Photograph G1-03 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 341

Description: Looking northwest toward Tank 2. Presence of water ponding.

Photograph G1-04 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 342

Description: Looking northeast toward the south wall of the tank farm.

Photograph G1-05 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 343

Description: From the southwestern corner of Tank 3 looking southeast.

Photograph G1-06 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 344

Description: From the southeastern corner of Tank 2 looking west.

Photograph G1-07 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 345

Description: From the southwestern corner of Tank 3 looking northeast. Presence of water ponding.

Photograph G1-08 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 346

Description: From the south portion of the site looking northwest at the south side of Tank 3 and 4. View of exposed geosynthetics.

Photograph G1-09 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 347

Description: From the south portion of the site looking northeast.

Photograph G1-10 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 348

Description: From the northeastern corner of Tank 4 looking southwest.

Photograph G1-11 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 349

Description: From the northern side of Tank 4, looking northwest toward Tanks 4, 3, 2, and 1.

Photograph G1-12 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 350

Description: From the northern side of Tank 4, looking southwest toward Tanks 3 and 4.

Photograph G1-13 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 351

Description: Looking northwest at the northern and side of Tank 1. Exposed fold in liner.

Photograph G1-14 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 352

Description: From the west side of Tank 1, looking southwest. Depressions in liner, at the top of slope.

Photograph G1-15 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 353

Description: From the southwestern corner of the Jet A fuel tanks looking east. Presence of exposed geomembrane and water ponding.

Photograph G1-16 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 354

Description: From the southwestern corner of the Jet A fuel tanks looking northeast. Presence of exposed geomembrane and water ponding.

Photograph G1-17 Baker Lake Tank Farm

<u>Date</u>: July 24, 2024 **<u>Photo Number</u>**: 355

<u>Description</u>: From the northeastern corner of the Jet A fuel tanks looking south.

Photograph G1-18 Baker Lake Tank Farm

<u>Date</u>: July 24, 2024 **<u>Photo Number</u>**: 356

<u>Description</u>: From the northeastern corner of the Jet A fuel tanks looking west.

Photograph G1-19 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 357

Description: From the northeastern corner of the Jet A fuel tanks looking southwest. There is a small hole in the liner.

Photograph G1-20 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 358

Description: Looking west at the crest on the northeastern side of Tank 5.

Photograph G1-21 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 359

Description: Looking southeast at the northeastern side of Tank 6.

Photograph G1-22 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 360

Description: From the eastern corner of Tank 6, looking northeast. Large rips in liner in the middle of the slope.

Photograph G1-23 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 361

Description: From the southern corner of Tank 6, looking northeast at the southern side of Tanks 5 and 6. Presence of water ponding.

Photograph G1-24 Baker Lake Tank Farm

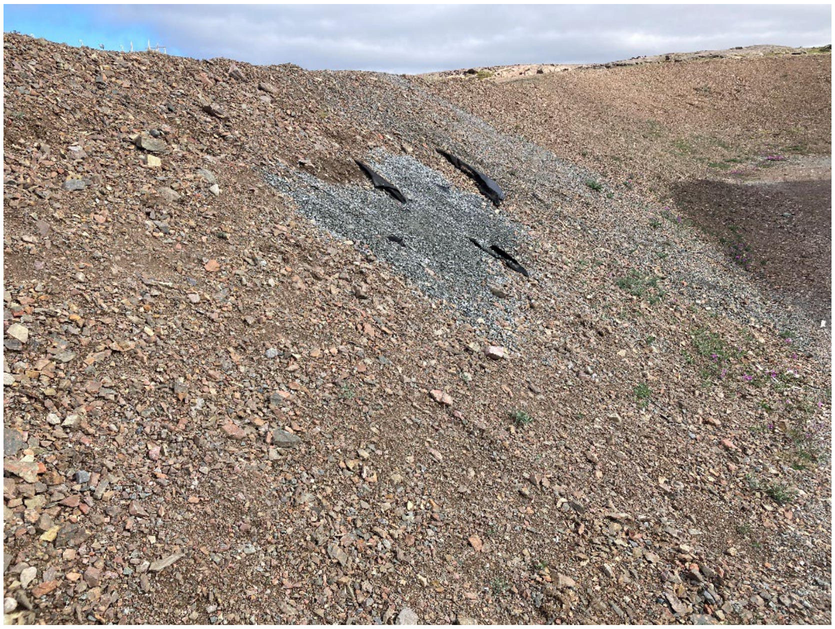
Date: July 24, 2024 **Photo Number**: 362

Description: From the eastern corner of Tank 6, looking northeast. Rips in the liner, in the middle of the slope. Presence of water ponding.

Photograph G1-25 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 363

Description: Looking northeast between Tanks 5 and 6. Exposed liner at the top of slope.



Photograph G1-26 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 365

Description: Looking northeast between Jet A fuel Tank and Tank 5.Large rips in the liner in the middle of the slope.

Photograph G1-27 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 366

Description: From the southwestern corner of Tank 7, looking east.

Photograph G1-28 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 367

Description: From the northeastern corner of the Jet A fuel tanks looking west.

Photograph G1-29 Baker Lake Tank Farm

Date: July 24, 2024 **Photo Number**: 368

Description: Looking northwest at Tank 8 and Tank 7.

Photograph G1-30 Baker Lake Ditch

Date: July 24, 2024 **Photo Number**: 369

Description: From Ditch 3, looking southwest at existing culvert.

Photograph G1-31 Baker Lake Ditch

Date: July 24, 2024 **Photo Number**: 370

Description: From approximately Sta. 0+ 030, looking southwest at splash PAD 2.

Photograph G1-32 Baker Lake Ditch

Date: July 24, 2024 **Photo Number**: 371

Description: From splash PAD 2 (approximately Sta. 0+ 010), looking northeast at existing culvert.

Photograph G1-33 Baker Lake Ditch

Date: July 24, 2024 **Photo Number**: 372

Description: From Ditch 2, looking northeast.

Photograph G1-34 Baker Lake Ditch

Date: July 24, 2024 **Photo Number**: 373

Description: From Ditch 2, looking southeast at splash PAD 1B.

Photograph G1-35 Baker Lake Ditch

Date: July 24, 2024 **Photo Number**: 374

Description: From Ditch 1B (approximately Sta. 0+ 085), looking northeast.

Photograph G1-36 Baker Lake Ditch

Date: July 24, 2024 **Photo Number**: 375

Description: From Ditch 1B (approximately Sta. 0+ 060), looking west.

Photograph G1-37 Baker Lake Ditch

Date: July 24, 2024 **Photo Number**: 376

Description: From Ditch 1A (approximately Sta. 0+ 085), looking east.

Photograph G1-38 Baker Lake Ditch

Date: July 24, 2024 **Photo Number**: 377

Description: From Ditch 1A (approximately Sta. 0+ 085), looking west.

Photograph G1-39 Baker Lake Ditch

Date: July 24, 2024 **Photo Number**: 378

Description: From Ditch 1A (approximately Sta. 0+ 010), looking west.

Photograph G1-40 Baker Lake Ditch

Date: July 24, 2024 **Photo Number**: 379

Description: From Ditch 1A (approximately Sta. 0+ 150), looking west.

Photograph G1-41 Baker Lake Ditch

Date: July 24, 2024 **Photo Number**: 380

Description: From Ditch 1A (approximately Sta. 0+ 380), looking southwest at curvert 1A.

Photograph G1-42 Baker Lake Ditch

Date: July 24, 2024 **Photo Number**: 381

Description: From Ditch 1A (approximately Sta. 0+ 380), looking west at culvert 1A.

Appendix G2 Meadowbank Tank Farm Photographic Log

Photograph G2-01 Meadowbank Tank Farm

Date: July 23, 2024 **Photo Number**: 326

Description: Looking southeast from the northern side of the fuel storage tank. Presence of water ponding.

Photograph G2-02 Meadowbank Tank Farm

Date: July 23, 2024 **Photo Number**: 327

Description: Looking northwest from the northern side of the fuel storage tank. Presence of water accumulation (~130 mm).

Photograph G2-03 Meadowbank Tank Farm

Date: July 23, 2024 **Photo Number**: 328

Description: Looking southwest from the northern side of the new storage tank.

Photograph G2-04 Meadowbank Tank Farm

Date: July 23, 2024 **Photo Number**: 329

Description: Looking south from the western side of the new storage tank. Presence of minor tension cracks in the berm.

Photograph G2-05 Meadowbank Tank Farm

Date: July 23, 2024 **Photo Number**: 330

Description: Looking northwest from the southern side of the new storage tank.

Photograph G2-06 Meadowbank Tank Farm

Date: July 23, 2024 **Photo Number**: 331

Description: Looking northeast from the southern side of the new storage tank.

Photograph G2-07 Meadowbank Tank Farm

Date: July 23, 2024 **Photo Number**: 332

Description: From the western corner of the fuel storage tank, looking northeast.

Photograph G2-08 Meadowbank Tank Farm

Date: July 23, 2024 **Photo Number**: 333

Description: From the western corner of the fuel storage tank, looking southwest.

Photograph G2-09 Meadowbank Tank Farm

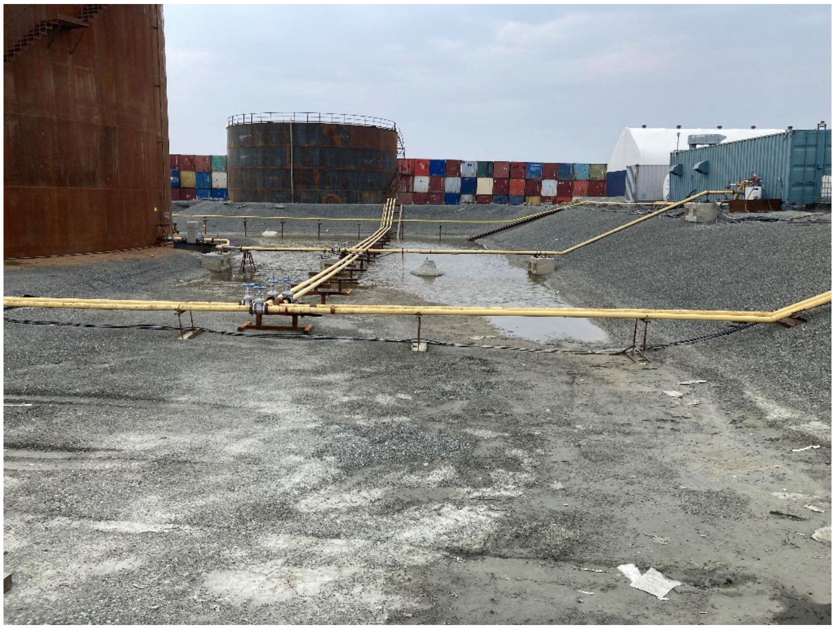
Date: July 23, 2024 **Photo Number**: 334

Description: From the southern corner of the fuel storage tank, looking northeast.

Photograph G2-10 Meadowbank Tank Farm

Date: July 23, 2024 **Photo Number**: 335

Description: Looking northeast from the southern corner of the fuel storage tank.



Photograph G2-11 Meadowbank Tank Farm

Date: July 23, 2024 **Photo Number**: 336

Description: Looking northwest from the southeastern side of the tank.

Appendix G3 Whale Tail Mine Tank Farm Photographic Log

Photograph G3-01 Whale Tail Project Site Tank Farm

Date: July 20, 2024 **Photo Number**: 53

Description: From the southeast corner, looking north at the Tank Farm. Presence of water ponding.

Photograph G3-02 Whale Tail Project Site Tank Farm

Date: July 20, 2024 **Photo Number**: 54

Description: From the northeast corner of the tank, looking south.

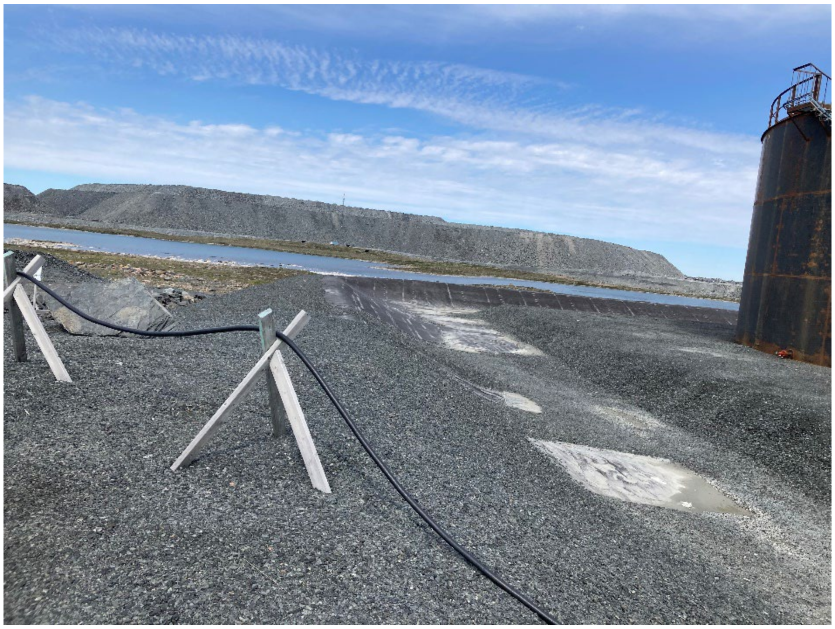
Photograph G3-03 Whale Tail Project Site Tank Farm

Date: July 20, 2024 **Photo Number**: 55

Description: From the northeast corner of the tank, looking west. An exposed anchor is observed.

Photograph G3-04 Whale Tail Project Site Tank Farm

Date: July 20, 2024 **Photo Number**: 56**Description**: From the northwest corner of the tank, looking south.



Photograph G3-05 Whale Tail Project Site Tank Farm

Date: July 20, 2024 **Photo Number**: 57

Description: From the southwest corner of the tank, looking north.

Photograph G3-06 Whale Tail Project Site Tank Farm

Date: July 20, 2024 **Photo Number**: 58

Description: From the southwest corner of the tank, looking east. Presence of water ponding.

APPENDIX H

Other Facilities

Appendix H1 Vault Culvert Photographic Log

Photograph H1-01 Vault Road Culverts

Date: July 22, 2024 **Photo Number**: 08

Description: From the inlet side of the three culverts located on Vault Road at 640964E/7217466N. The culverts are slightly deformed on top in the middle.

Photograph H1-02 Vault Road Culverts

Date: July 22, 2024 **Photo Number**: 09

Description: Looking at the outlet of the three culverts located on Vault Road at 640964E/7217466N. All of them are deformed in the middle.

Appendix H2 Tailings Storage Facility Diversion Ditch Photographic Log

Photograph H2-01 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 284

Description: Looking west toward toward the oulet of the culverts beneath the road.

Photograph H2-02 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 285

Description: Looking west toward NP2 lake.

Photograph H2-03 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 286

Description: Looking east toward the inlet of the culverts beneath the road.

Photograph H2-04 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 290

Description: From the eastern diversion ditch looking southeast toward Lake NP2.

Photograph H2-05 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 291

Description: From the eastern diversion ditch looking northwest. Sloughing in riprap into upper slope (~ 2m diameter).

Photograph H2-06 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 292

Description: From the eastern diversion ditch, looking northwest.

Photograph H2-07 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 293

Description: From the northern diversion ditch looking southeast.

Photograph H2-08 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 294

Description: From the eastern diversion ditch, looking southeast.

Photograph H2-09 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 295

Description: From the northern diversion ditch looking west.

Photograph H2-10 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 296

Description: From the northern diversion ditch looking east. Presence of tension cracks in progress in granular material, sloughing.

Photograph H2-11 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 297

Description: From the northern diversion ditch looking west. Presence of tension cracks in progress in granular material, sloughing.

Photograph H2-12 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 298

Description: From the northern diversion ditch looking east.

Photograph H2-13 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 299

Description: From the northern diversion ditch looking west.

Photograph H2-14 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 300

Description: From the northern diversion ditch looking southwest towards the newly capped area.

Photograph H2-15 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 301

Description: From 637281E/7216790N, looking north. View of the western diversion ditch.

Photograph H2-16 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 302

Description: From 637281E/7216790N, looking south at the western diversion ditch.

Photograph H2-17 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 303

Description: From the northern diversion ditch looking west toward newly capped area.

Photograph H2-18 Diversion Ditch and its Sediment and Erosion Protection Structure

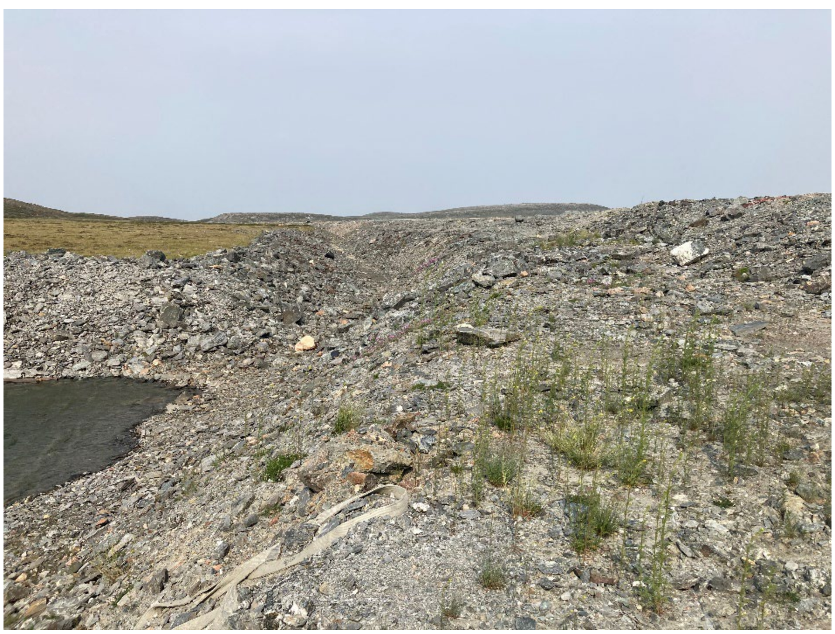
Date: July 23, 2024 **Photo Number**: 304

Description: From the western diversion ditch looking north.

Photograph H2-19 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 305

Description: From the western diversion ditch looking south.



Photograph H2-20 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 306

Description: From 637251E/7216171N, looking north at the western diversion ditch.

Photograph H2-21 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 307

Description: From 637251E/7216171N, looking southwest at the western diversion ditch and its retention basin.

Photograph H2-22 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 308

Description: From 637074E/7216157N, looking east at the western diversion ditch.

Photograph H2-23 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2024 **Photo Number**: 309

Description: From 637074E/7216157N, looking west at the western diversion ditch.

Appendix H3 Rock Storage Facility Till Plug Photographic Log

Photograph H3-01 RSF Till Plug

Date: July 23, 2024 **Photo Number**: 287

Description: From the south side of NP2 Lake (south of the diversion ditch) looking west at the RSF till plug.

Photograph H3-02 RSF Till Plug

Date: July 23, 2024 **Photo Number**: 288

Description: From the south side of NP2 Lake (north of the diversion ditch) looking east at the lake.

Photograph H3-03 RSF Till Plug

Date: July 23, 2024 **Photo Number**: 289

Description: From the south side of NP2 Lake (south of the diversion ditch) looking southeast at the RSF till plug.

Appendix H4 Landfills Photographic Log

Photograph H4-2 Whale Tail Project Landfill

Date: July 20, 2024 **Photo Number**: 44

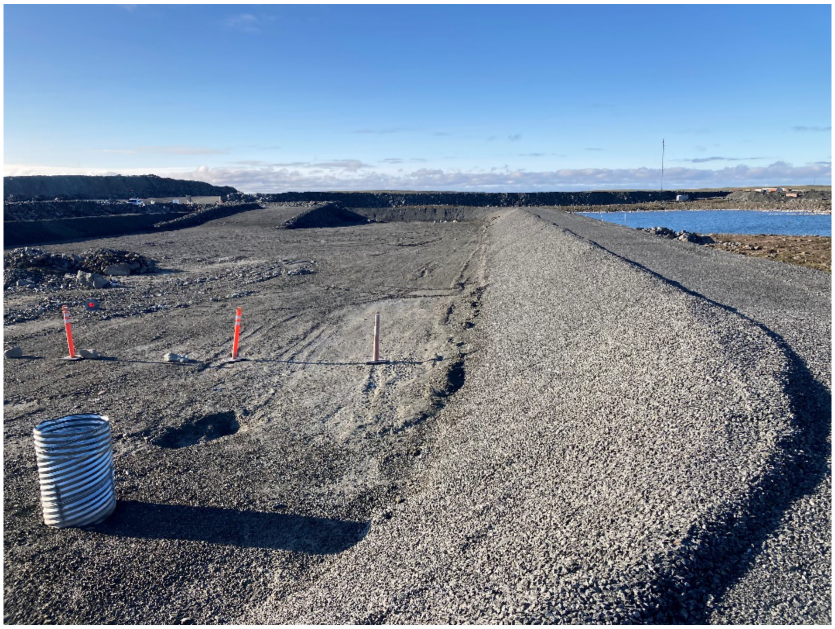
Description: From the landfill location within the Whale Tail WRSF.

Appendix H5 Lanfarms Photographic Log

Photograph H5-01 Meadowbank Contaminated Soil Storage and Bioremedial Landfarm Facility

Date: July 20, 2024 **Photo Number**: 1

Description: From the southeast, looking north at the Contaminated Soil Storage and Bioremedial Landfarm Facility.



Photograph H5-02 Meadowbank Contaminated Soil Storage and Bioremedial Landfarm Facility

Date: July 20, 2024 **Photo Number**: 2

Description: From the eastern side of the Contaminated Soil Storage and Bioremedial Landfarm Facility, looking south. Some water ponding at pond side, but landfarm dry. Presence of rainwater.

Appendix H6 Retaining Walls Photographic Log

Photograph H6-01 Meadowbank Crusher Retaining Wall

Date: July 23, 2024 **Photo Number**: 337

Description: From the base of the wall, looking southeast.

Photograph H6-02 Meadowbank Crusher Retaining Wall

Date: July 23, 2024 **Photo Number**: 338

Description: From the base of the wall, looking southeast.

Appendix H7 Whale Tail Attenuation Pond Jetty Photographic Log

Photograph H7-01 Whale Tail Mine Site Attenuation Pond Jetty

Date: July 20, 2024 **Photo Number**: 78

Description: From the pump pad, looking north at the primary attenuation pond jetty.

Photograph H7-02 Whale Tail Mine Site Attenuation Pond Jetty

Date: July 20, 2024 **Photo Number**:79

Description: From the pump pad, looking west at the jetty and Attenuation Pond.

Photograph H7-03 Whale Tail Mine Site Attenuation Pond Jetty

Date: July 20, 2024 **Photo Number**: 80

Description: From the pump pad, looking east at the Attenuation Pond.

Appendix H8 IVR Attenuation Pond Jetty Photographic Log

Photograph H8-01 IVR Attenuation Pond Jetty

Date: July 20, 2024 **Photo Number**: 81

Description: From the pump pad, looking south at the Attenuation Pond and jetty.

Photograph H8-02 IVR Attenuation Pond Jetty

Date: July 20, 2024 **Photo Number**: 82

Description: From the pump pad, looking east at the Attenuation Pond.

Photograph H8-03 IVR Attenuation Pond Jetty

Date: July 20, 2024 **Photo Number**: 83

Description: From the pump pad, looking south at the northern slope of the pump pad.

Photograph H8-04 IVR Attenuation Pond Jetty

Date: July 20, 2024 **Photo Number**: 84

Description: From the pump pad, looking northwest at the northern slope of the pump pad.

Appendix H9 Whale Tail Mine Diffusers Photographic Log

Photograph H9-01 Whale Tail South Diffuser

Date: July 20, 2024 **Photo Number**: 85

Description: From the east abutment of Whale Tail Dike, looking south. The diffuser is present and working normally.

Photograph H9-02 Mammoth Lake Diffuser

Date: July 20, 2024 **Photo Number**: 110

Description: From the access road, looking west. Three diffusers are present and working normally.

Appendix H10 South Whale Tail Channel Photographic Log

Photograph H10-01 South Whale Tail Channel

Date: July 20, 2024 **Photo Number**: 86

Description: From approx. Sta. 0+850, looking northwest. Sloughing and settlement of rockfill above riprap (~500 mm).

Photograph H10-02 South Whale Tail Channel

Date: July 20, 2024 **Photo Number**: 87

Description: From the outlet into Mammoth Lake, looking northwest.

Photograph H10-03 South Whale Tail Channel

Date: July 20, 2024 **Photo Number**: 88

Description: From approx. Sta. 0+675, looking southeast.

Photograph H10-04 South Whale Tail Channel

Date: July 20, 2024 **Photo Number**: 89

Description: From approx. Sta. 0+485, looking west. Limited sloughing of riprap, water still flowing well.

Photograph H10-05 South Whale Tail Channel

Date: July 20, 2024 **Photo Number**: 90

Description: From approx. Sta. 0+450 (Lake A45 area), looking northwest.

Photograph H10-06 South Whale Tail Channel

Date: July 20, 2024 **Photo Number**: 91

Description: From approx. Sta. 0+450 (Lake A45 area), looking southeast.

Photograph H10-07 South Whale Tail Channel

Date: July 20, 2024 **Photo Number**: 92

Description: From approx. Sta. 0+200, looking northwest.

Photograph H10-08 South Whale Tail Channel

Date: July 20, 2024 **Photo Number**:93

Description: From the Whale Tail South Lake inlet, looking southwest. Slight apparent sloughing in riprap.

Appendix H11 Underground Waste Rock Storage Facility Saline Ditch Photographic Log

Photograph H11-01 Saline Ditch

Date: July 20, 2024 **Photo Number**: 10

Description: From approx. Sta. 0+670, looking east. Debris in ditch close to outlet.

Photograph H11-02 Saline Ditch

Date: July 20, 2024 **Photo Number**: 12

Description: From the southwestern extremity of the Saline Ditch, looking east.

Photograph H11-03 Saline Ditch

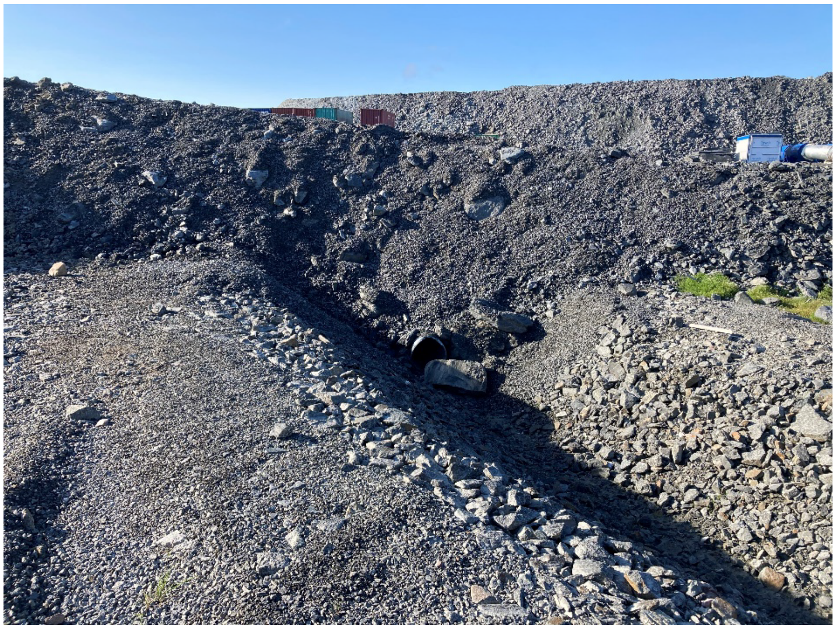
Date: July 20, 2024 **Photo Number**: 13

Description: From approx. Sta. 0+560, looking west.

Photograph H11-04 Saline Ditch

Date: July 20, 2024 **Photo Number**: 14

Description: From approx. Sta. 0+560. Looking southeast.



Photograph H11-05 Saline Ditch

Date: July 20, 2024 **Photo Number**: 15

Description: From approx. Sta. 0+530. Culvert obstructed by blocks and debris.

Photograph H11-06 Saline Ditch

Date: July 20, 2024 **Photo Number**: 16

Description: From approx. Sta. 0+530, looking east.

Photograph H11-07 Saline Ditch

Date: July 20, 2024 **Photo Number**: 18

Description: From the northern extremity of the Saline Ditch, looking west. The culvert is damaged, but functional.. Mud is accumulating in front of the inlet.

Photograph H11-08 Saline Ditch

Date: July 20, 2024 **Photo Number**: 19

Description: From the northern extremity of the Saline Ditch, looking east. Sediments are present in the ditch.

Photograph H11-09 Saline Ditch

Date: July 20, 2024 **Photo Number**: 20

Description: From approx. Sta. 0+180, looking southeast. Presence of mud and gravel in the ditch.

Photograph H11-10 Saline Ditch

Date: July 20, 2024 **Photo Number**:21

Description: From approx. Sta. 0+180, looking southeast.

Photograph H11-11 Saline Ditch

Date: July 20, 2024 **Photo Number**: 22

Description: From approx. Sta. 0+250, looking east. Erosion of fine material, exposing liner underneath. Limited sloughing of fine material.

Photograph H11-12 Saline Ditch

Date: July 20, 2024 **Photo Number**: 23

Description: From approx. Sta. 0+250, looking west. Erosion of fine material, exposing liner underneath. Limited sloughing of fine material.

Photograph H11-13 Saline Ditch

Date: July 20, 2024 **Photo Number**: 24

Description: From approx. Sta. 0+300, looking south. Presence of gravel in the ditch.

Photograph H11-14 Saline Ditch

Date: July 20, 2024 **Photo Number**: 25

Description: From approx. Sta. 0+410, looking north.

Appendix H12 Underground Ore Stockpile Saline Ditch Photographic Log

Photograph H12-1 UG Ore Stockpile Saline Ditch

Date: July 20, 2024 **Photo Number**: 3

Description: From the southeastern extremity of the UG Ore Stockpile Saline Ditch, looking northeast. Exposed liner in some points.

Photograph H12-2 UG Ore Stockpile Saline Ditch

Date: July 20, 2024 **Photo Number**: 4

Description: From the southeastern extremity of the UG Ore Stockpile Saline Ditch, looking southwest.

Photograph H12-3 UG Ore Stockpile Saline Ditch

Date: July 20, 2024 **Photo Number**: 5

Description: From the southeastern extremity of the UG Ore Stockpile Saline Ditch, looking northeast. Exposed and ripped liner.

Photograph H12-4 UG Ore Stockpile Saline Ditch

Date: July 20, 2024 **Photo Number**: 6

Description: From approx. Sta. 0+050, looking southwest. Presence of debris in the ditch.

Photograph H12-5 UG Ore Stockpile Saline Ditch

Date: July 20, 2024 **Photo Number**:7

Description: From approx. Sta. 0+150, looking northwest.

Photograph H12-6 UG Ore Stockpile Saline Ditch

Date: July 20, 2024 **Photo Number**:8

Description: From approx. Sta. 0+300, looking east.

Photograph H12-7 UG Ore Stockpile Saline Ditch

Date: July 20, 2024 **Photo Number**:9

Description: From approx. Sta. 0+340, looking north.

Appendix H13 IVR Diversion Channel Photographic Log

Photograph H13-1 IVR Diversion Channel

Date: July 20, 2024 **Photo Number**: 26

Description: From the south extremity of the IVR Diversion Channel, looking northwest.

Photograph H13-2 IVR Diversion Channel

Date: July 20, 2024 **Photo Number**: 27

Description: From around Sta. 0+280, looking northeast. Water is entering the channel from the natural topography, increasing settlement.

Photograph H13-3 IVR Diversion Channel

Date: July 20, 2024 **Photo Number**: 28

Description: From around Sta. 0+160, looking southeast.

Photograph H13-4 IVR Diversion Channel

Date: July 20, 2024 **Photo Number**: 29

Description: From around Sta. 0+160, looking northwest.

Photograph H13-5 IVR Diversion Channel

Date: July 20, 2024 **Photo Number**: 31

Description: From around Sta. 0+000, looking northwest at the outlet. Water is flowing well towards the lake.

Photograph H13-6 IVR Diversion Channel

Date: July 20, 2024 **Photo Number**: 30

Description: From around Sta. 0+020, looking southeast. Presence of water pounding.

Photograph H13-7 IVR Diversion Channel

Date: July 20, 2024 **Photo Number**: 32

Description: From around the access road Sta. 0+020, looking southeast. Tension cracks and erosion in the sandy slope (upstream).

Photograph H13-8 IVR Diversion Channel

Date: July 20, 2024 **Photo Number**: 33

Description: From around the access road Sta. 0+080, looking northwest. Tension cracks and erosion in the sandy slope (upstream).

APPENDIX I

Dikes Details and Instrumentation

1.0 MEADOWBANK DEWATERING DIKES

1.1 East Dike

East Dike was constructed in the summer of 2008; grouting of the foundation and bedrock occurred in 2008 and during the first quarter of 2009.

Instrumentation has been installed within East Dike and includes piezometers, thermistors, inclinometers, and flow meters. Survey monuments were removed from East Dike in the past as they have never been used. The inclinometer at Sta. 60+195 was destroyed in the past and has not been replaced. Replacement of this instrument is not considered necessary; however, monitoring of East Dike should continue and, if anomalous conditions are observed, then replacing this inclinometer should be re-evaluated.

Instrumentation within East Dike was installed in the spring of 2009 to monitor the dike's performance following construction and during dewatering, operation, and into closure. Additional instrumentation was added in 2009 and 2010 to increase coverage across the dike. Since June 2012, all piezometers and thermistors on East Dike have been connected to an automatic data collection and transmission system (VDV database).

Instrumentation within East Dike was installed in the spring of 2009 to monitor the dike's performance following construction and during dewatering, operation, and into closure. Additional instrumentation was added in 2009 and 2010 to increase coverage across the dike. Since June 2012, all piezometers and thermistors on East Dike have been connected to an automatic data collection and transmission system (VDV database). Two inclinometers are installed on East Dike at Sta. 60+495 and 60+705. An inclinometer was installed at Sta. 60+195, but was destroyed in July 2010 and has not been replaced.

In 2022, three new thermistors have been installed downstream of the dike in the South Channel area to cover the inferred seepage pathway area.

Table 1 and Table 2 below detail instrumentation on East Dike.

Table 1: List of Piezometers and Thermistors on East Dike (Source: AEM)

DH-ID	STA	Instrument_ID	Stratigraphic_Unit	OP Status	Frozen Status	Elevation
150C	60+150	Pz150C	Interface	O broken		127.35
190P1A	60+190	Pz190P1A	Bedrock	P		116.7
190P1B		Pz190P1B	Bedrock	P		121.7
190P1C		Pz190P1C	Interface	P		126.7
190P2A		Pz190P2A	Bedrock	P		116.34
190P2B		Pz190P2B	Bedrock	P		121.34
190P2C		Pz190P2C	Bedrock	O broken	Frozen	129.34
190P3A		Pz190P3A	Bedrock	P		116.63
190P3B		Pz190P3B	Bedrock	P		121.63
200C	60+200	Pz200C	Interface	P		127.71
240C	60+240	Pz240C	Interface	P		128.71
400C	60+400	Pz400C	Interface	P	Frozen	126.76
420C	60+420	Pz420C	Interface	O broken	Frozen	125.32
440C	60+440	Pz440C	Interface	P		124.66
450C	60+450	Pz450C	Interface	P		127
460C	60+460	Pz460C	Interface	P		125.15

Table 1: List of Piezometers and Thermistors on East Dike (Source: AEM)

DH-ID	STA	Instrument_ID	Stratigraphic_Unit	OP Status	Frozen Status	Elevation
470C	60+470	Pz470C	Interface	O temp only		127.76
472C	60+472	Pz472C	Interface	P		126.87
480C	60+480	Pz480C	Interface	P		125.44
490P1A	60+490	Pz490P1A	Bedrock	P		114.12
490P1B		Pz490P1B	Bedrock	P		119.12
490P1C		Pz490P1C	Interface	P		125.81
490P2A		Pz490P2A	Bedrock	P		115.07
490P2B		Pz490P2B	Bedrock	P		120.07
490P2C		Pz490P2C	Interface	P		126.76
490P3A		Pz490P3A	Bedrock	P		114.62
490P3B		Pz490P3B	Bedrock	P		119.62
500C	60+500	Pz500C	Interface	P		125.78
510C	60+510	Pz510C	Interface	P		126.06
550C	60+550	Pz550C	Interface	O temp only	Frozen	129.85
600C	60+600	Pz600C	Interface	O temp only		128.6
650C	60+650	Pz650C	Interface	O temp only	Frozen	125.48
700P1A	60+700	Pz700P1A	Bedrock	O temp only	Frozen	118.81
700P1B		Pz700P1B	Bedrock	O temp only	Frozen	122.92
700P1C		Pz700P1C	Interface	O broken		130.5
700P2A		Pz700P2A	Bedrock	P	Frozen	118.08
700P2B		Pz700P2B	Bedrock	O temp only	Frozen	123.08
700P2C		Pz700P2C	Interface	O temp only	Frozen	129.77
700P3A		Pz700P3A	Bedrock	P		117.93
700P3B		Pz700P3B	Bedrock	P	Frozen	122.93
750C	60+750	Pz750C	Interface	O broken	Frozen	128.16

STA	DH-ID	Working Beads	Reliable Beads	Total Beads	Top Bead Elevation	Bottom Bead Elevation
60+092	TH092	0	0	16	136	119
60+185	TH185	16	16	16	136	119
60+485	TH485	16	16	16	136	119
60+695	TH695	16	16	16	136	119
60+842	TH842	3	3	16	136	119
60+232 D/S	TH ED-232	13	13	13	134.5	122.5
60+233 D/S	TH ED-233	13	13	13	129.7	117.7
60+267 D/S	TH ED-267	16	16	16	128.3	113.3

Table 2: Inclinometers on East Dike (Source: AEM)

Location	Instrument ID	Operational (✓)/Not operational (×)	Manual/Automatic	Elevation interval in meters (top/bottom)
60+195	ED-IN-195	×(Damaged)	-	-
60+495	ED-IN-495	✓	Manual	136.6/124.1
60+705	ED-IN-705	✓	Manual	137.1/126.1

1.2 South Camp Dike

South Camp Dike was constructed between April and June of 2009. Additional thermal capping material and rockfill for the haul road was added to the dike in the winter of 2009-2010.

Table 3 below details instrumentation on South Camp Dike.

Table 3: List of Thermistors on South Camp Dike (Source: AEM)

Hole	ID	Operational /Not Operational	Manual/Automatic	Total Beads	Elevation in Metres (top/bottom)
38-3	SC-09-A	O broken	Manual	16	133.03/110.03
38-5	SC-10	O broken	Manual	16	132.40/109.40

1.3 Bay-Goose Dike

Construction of Bay-Goose Dike started in the summer of 2009. The earthworks component for the northern portion of the dike was mostly completed by early October 2009 and by October 2010 for the southern portion. Grouting of the foundation and bedrock occurred between March 2010 and July 2011. Jet grouting occurred in selected portions of the dike between October 2010 and May 2011. The first phase of dewatering Bay-Goose Basin was completed by mid-November 2011 and the second phase was completed in August 2012.

Instruments were installed on Bay-Goose Dike in the summer of 2011 to monitor the dike's performance following construction, during dewatering and operation, and into closure. Survey monuments were removed from Bay-Goose Dike as they have never been used. Additional boreholes have been drilled in the North Channel sector in 2017 to install TDR reflectometers and inclinometers in order to monitor the dike's reaction to nearby blasting in Pit E5.

Table 4, Table 5 and Table 6 below detail instrumentation on Bay-Goose Dike.

Table 4: List of Piezometers and Thermistors on Bay-Goose Dike (Source: AEM)

DH-ID	STA	Instrument ID	Stratigraphic Unit	OP Status	Frozen Status	Elevation
1P1A	30+158	Pz01P1A	Bedrock	O temp only	Frozen	117.15
1P1B		PZ01P1B	Bedrock	O temp only	Frozen	120.89
1P1C		Pz01P1C	Bedrock	O temp only	Frozen	127.69
1P2A		Pz01P2A	Bedrock	O temp only	Frozen	117.92

Table 4: List of Piezometers and Thermistors on Bay-Goose Dike (Source: AEM)

DH-ID	STA	Instrument ID	Stratigraphic Unit	OP Status	Frozen Status	Elevation
1P2B		Pz01P2B	Bedrock	O temp only	Frozen	121.38
1P2C		Pz01P2C	Bedrock	O temp only	Frozen	127.36
1P3A		Pz01P3A	Bedrock	O temp only	Frozen	116.43
1P3B		Pz01P3B	Bedrock	O temp only	Frozen	121.61
6P2	30+167	Pz06P2	SB	O temp only	Frozen	128.67
7P2	30+249.5	Pz07P2	SB	O temp only	Frozen	129.97
2P1A	30+276.5	Pz02P1A	Bedrock	O temp only	Frozen	119.64
2P1B		PZ02P1B	Bedrock	O temp only	Frozen	123.94
2P1C		Pz02P1C	SB	O temp only	Frozen	130.53
2P2A		Pz02P2A	Bedrock	P	Frozen	119.68
2P2B		Pz02P2B	Bedrock	O temp only	Frozen	124.36
2P2C		Pz02P2C	SB	O temp only	Frozen	130.43
2P3A		Pz02P3A	Bedrock	P		119.97
2P3B		Pz02P3B	Grouting	P		125.09
8P2	30+306.5	Pz08P2	SB	O temp only	Frozen	129.77
3P1A	30+378.5	Pz03P1A	Bedrock	O temp only		112.68
3P1B		PZ03P1B	Bedrock	O temp only	Frozen	118.9
3P1C		Pz03P1C	Jet Grouting	O temp only	Frozen	124.83
3P2A		Pz03P2A	Bedrock	P		114.63
3P2B		Pz03P2B	Bedrock	P		119.47
3P2C		Pz03P2C	Jet Grouting	P		125.31
3P3A		Pz03P3A	Bedrock	P		114.37
3P3B		Pz03P3B	Bedrock	P		119.26
9P2	30+440	Pz09P2	CSB	O temp only	Frozen	127.53
4P1A	30+453.5	Pz04P1A	Bedrock	O temp only	Frozen	117.04
4P1B		PZ04P1B	Bedrock	O temp only	Frozen	119.21
4P1C		Pz04P1C		O temp only	Frozen	125.12
4P2A		Pz04P2A	Bedrock	P		115.28
4P2B		Pz04P2B	Bedrock	P		120.24
4P2C		Pz04P2C	Interface	O temp only	Frozen	126.25
4P3A		Pz04P3A	Bedrock	P		115.46
4P3B		Pz04P3B	Bedrock	P		120.59
10P2	30+516.5	Pz10P2	CSB	O temp only	Frozen	130.56
5P1A	30+645.5	Pz05P1A	Bedrock	O temp only	Frozen	112.68
5P1B		PZ05P1B	Bedrock	O temp only	Frozen	118.9
5P1C		Pz05P1C	Interface	O temp only	Frozen	124.83

Table 4: List of Piezometers and Thermistors on Bay-Goose Dike (Source: AEM)

DH-ID	STA	Instrument ID	Stratigraphic Unit	OP Status	Frozen Status	Elevation
5P2A		Pz05P2A	Bedrock	O temp only	Frozen	114.63
5P2B		Pz05P2B	Bedrock	O temp only	Frozen	119.47
5P2C		Pz05P2C	Interface	O temp only	Frozen	125.31
5P3A		Pz05P3A	Bedrock	P		114.37
5P3B		Pz05P3B	Bedrock	P		119.26
11P2	30+684.5	Pz11P2	SB	O temp only	Frozen	130.87
12P2	30+770	Pz12P2	SB	O temp only	Frozen	132.16
13P2	30+804.5	Pz13P2	SB	O temp only	Frozen	130.05
14P2	31+052	Pz14P2	SB	O temp only	Frozen	131.47
23P1A	31+165	Pz23P1A	Bedrock	O temp only	Frozen	118.8
23P1B		PZ23P1B	Bedrock	O temp only	Frozen	123.51
23P1C		Pz23P1C	Bedrock	O temp only	Frozen	127.454
23P2A		Pz23P2A	Bedrock	P		117.07
23P2B		Pz23P2B	Bedrock	P	Frozen	122.15
23P2C		Pz23P2C	Bedrock	O temp only	Frozen	128.018
23P3A		Pz23P3A	Interface	P		115.46
23P3B		Pz23P3B	Grouting	P		126.75
15P2	31+220	Pz15P2	SB	O temp only	Frozen	130.73
16P2	31+565	Pz16P2	Bedrock	O temp only	Frozen	131.048
24P1A1	31+600	Pz24P1A1	Bedrock	O no data for temp	Frozen	111.3
24P1A2 C		PZ24P1A2	Bedrock	O no temp., pressure above dike	Frozen	116.3
24P1B1		Pz24P1B1	Bedrock	O temp only	Frozen	121.8
24P1B2		Pz24P1B2	Interface	O temp only	Frozen	124.3
24P2A1		Pz24P2A1	Bedrock	P		110.15
24P2A2		Pz24P2A2	Bedrock	P	Frozen	116.15
24P2B1		Pz24P3B1	Interface	O temp only	Frozen	120.65
24P2B2		Pz24P2B2	Jet Grouting	P	Frozen	123.15
24P2C		Pz24P2C	Jet Grouting	O temp only	Frozen	124.64
24P3A1		Pz24P3A1	Bedrock	P		110.64
24P3A2		Pz24P3A1	Bedrock	P	Frozen	115.64
24P3B1		Pz24P3B1	Grouting	O temp only	Frozen	121.16
17P2	31+615	Pz17P2	CSB	O temp only	Frozen	129.398
18P2	31+700	Pz18P2	CSB	O temp only	Frozen	130.387
25P1A1	31+815	Pz25P1A1	Bedrock	P		117.02
25P1A2		PZ25P1A2	Bedrock	O temp only	Frozen	122.02

Table 4: List of Piezometers and Thermistors on Bay-Goose Dike (Source: AEM)

DH-ID	STA	Instrument ID	Stratigraphic Unit	OP Status	Frozen Status	Elevation
25P1B1		Pz25P1B1	Bedrock	O temp only	Frozen	127.52
25P1B2		Pz25P1B2	Interface	O temp only	Frozen	129.52
25P2A1		Pz25P2A1	Bedrock	P		113.82
25P2A2		Pz25P2A2	Bedrock	P		118.82
25P2B1		Pz25P3B1	Bedrock	P		124.32
25P2B2		Pz25P2B2	SB	P		126.32
25P2C		Pz25P2C	SB	P		127.32
25P3A1		Pz25P3A1	Bedrock	P		115.1
25P3A2		Pz25P3A2	Bedrock	P		120.1
25P3B1		Pz25P3B1	Bedrock	P		123.1
25P3B2		Pz25P3B2	Bedrock	P		125.1
22P2	31+842	Pz22P2	Grouting	P		116.8
26P1A1	31+885	Pz26P1A1	Bedrock	P		104.44
26P1A2		PZ26P1A2	Bedrock	P		109.44
26P1B1		Pz26P1B1	Grouting	P		114.94
26P1B2		Pz26P1B2	Jet Grouting	P		117.94
26P2A1		Pz26P2A1	Bedrock	P		106.77
26P2A2		Pz26P2A2	Bedrock	P		111.77
26P2B1		Pz26P3B1	Jet Grouting	P		117.27
26P2B2		Pz26P2B2	Jet Grouting	P		120.27
26P2C		Pz26P2C	CSB	P		123.27
26P3A1		Pz26P3A1	Bedrock	P		104.743
26P3A2		Pz26P3A2	Bedrock	P		111.36
26P3B1		Pz26P3B1	Bedrock	P		117.46
26P3B2		Pz26P3B2	Bedrock	P		120.27
19P2	31+928	Pz19P2	CSB	P		127.873
20P2	31+990	Pz20P2	CSB	P		125.09
27P1A1	32+000	Pz27P1A1	Bedrock	P		113.25
27P1A2		PZ27P1A2	Bedrock	P		118.25
27P1B1		Pz27P1B1	Jet Grouting	P	Frozen	123.75
27P1B2		Pz27P1B2	CSB	O temp only	Frozen	125.75
27P2A1		Pz27P2A1	Bedrock	P		112.61
27P2A2		Pz27P2A2	Bedrock	P		117.61
27P2B1		Pz27P2B1	Interface	P		123.61
27P2B2		Pz27P2B2	Jet Grouting	P		123.11
27P2C		Pz27P2C	CSB	P	Frozen	125.11
27P3A1		Pz27P3A1	Bedrock	P		126.61

Table 4: List of Piezometers and Thermistors on Bay-Goose Dike (Source: AEM)

DH-ID	STA	Instrument ID	Stratigraphic Unit	OP Status	Frozen Status	Elevation
27P3A2		Pz27P3A2	Bedrock	P		111.72
27P3B1		Pz27P3B1	Bedrock	P		116.72
27P3B2		Pz27P3B2	Grouting	O		122.22
21P2	32+020	Pz21P2	Jet Grouting	P		124.24
28P1A1	32+065	Pz28P1A1	Bedrock	P		102.99
28P1A2		PZ28P1A2	Bedrock	P		107.99
28P1B1		Pz28P1B1	Interface	P		112.99
28P1B2		Pz28P1B2	Jet Grouting	P		115.99
28P2A1		Pz28P2A1	Bedrock	P		105.02
28P2A2		Pz28P2A2	Bedrock	P		110.02
28P2B1		Pz28P3B1	Jet Grouting	P		115.02
28P2B2		Pz28P2B2	Jet Grouting	P		118.02
28P2C		Pz28P2C	CSB	P	Frozen	124.02
28P3A1		Pz28P3A1	Bedrock	P		105.91
28P3A2		Pz28P3A2	Bedrock	P		110.91
28P3B1		Pz28P3B1	Interface	P		115.91
28P3B2		Pz28P3B2	Jet Grouting	P		122.22
28P3B3		Pz28P3B3	Jet Grouting	P		118.63
29P1A1	32+105	Pz29P1A1	Bedrock	P	Frozen	115.32
29P1B1		PZ29P1B1	Bedrock	P	Frozen	120.32
29P1B2		Pz29P1B2	Jet Grouting	O temp only	Frozen	125.32
29P1B3		Pz29P1B3	Jet Grouting	O temp only	Frozen	127.32
29P2A1		Pz29P2A1	Bedrock	P		114.99
29P2B1		Pz29P3B1	Bedrock	P		119.99
29P2B2		Pz29P2B2	Jet Grouting	P	Frozen	124.99
29P2B3		Pz29P2B3	Jet Grouting	O		126.99
29P2C		Pz29P2C	Jet Grouting	O temp only	Frozen	129.99
29P3A1		Pz29P3A1	Bedrock	P		115.91
29P3B1		Pz29P3B1	Bedrock	P		120.91
29P3B2		Pz29P3B2	Jet Grouting	P	Frozen	125.74
29P3B3		Pz29P3B3	Jet Grouting	O		127.89

STA	DH-ID	Working Beads	Reliable Beads	Total Beads	Top Bead Elevation	Bottom Bead Elevation
30+134	T01	15	15	16	135	115
30+185	T02	13	11	16	135	115
30+260	T03	13	13	16	130	125.5

STA	DH-ID	Working Beads	Reliable Beads	Total Beads	Top Bead Elevation	Bottom Bead Elevation
30+260	T03-1	16	16	16	139.97	116.97
30+272	T04	16	16	16	13	125.5
30+272	T04-1	16	16	16	139.97	116.97
30+388.5	T05	13	13	16	130	125.5
30+388.5	T05-1	16	16	16	139.97	116.97
30+330.5	T06	14	14	16	135	115
30+386	T07	15	14	16	135	115
30+417.5	T08	16	16	16	135	115
30+489.5	T09	13	13	16	135	115
30+553.25	T10	15	15	16	135	115
30+621.5	T11	16	16	16	135	115
30+650	T12	13	13	16	135	115
30+713	T13	12	11	16	135	115
30+827	T14	16	16	16	135	115
31+080	T15	16	16	16	135	115
31+134.5	T16	15	15	16	135	115
31+170	T17	13	13	16	135	115
31+352	T18	15	14	16	135	115
31+595	T19	14	14	16	135	108
31+605	T20	13	13	16	135	115
31+752.5	T21	14	12	16	135	115
31+820	T22	14	13	16	134	115
31+850	T23	16	15	16	133.5	108
31+880	T24	12	12	16	135	108
31+960	T25	14	13	16	135	115
31+995	T26	14	13	16	135	115
32+030	T27	14	13	16	133.5	108
32+060	T28	13	13	16	135	108
32+100	T29	14	13	16	134	115
32+140	T30	16	15	16	134	115

Table 5: List of Inclinometers on Bay-Goose Dike (Source: AEM)

Location	Instrument ID	Operational /Not operational	Manual/Automatic	Elevation in Meters (top/bottom)
30+282	BG-IN-30+282	P	Manual	139.3/124.8
30+390	BG-IN-30+390	P	Manual	140.0/119.0
30+640	BG-IN-30+640	P	Manual	138.8/124.3
31+180	BG-IN-31+180	P	Manual	139.0/124.5
31+590	BG-IN-31+590	O	Manual	139.5/115.0
31+815	BG-IN-31+815	P	Manual	139.2/119.7
31+885	BG-IN-31+885	P	Manual	138.8/113.3
32+065	BG-IN-32+065	P	Manual	139.1/116.6

Table 6: List of TDR Reflectometers on Goose Pit wall (Source: AEM)

Location of hole	DL #	Instrument ID	Inclination (°)	Length (m)	Casing elevation (m)	Crimps
31+255	9	TDR-11	60	70	134.4	Every 25 m
31+153	9	TDR-12	60	180	133.5	Every 25 m
31+058	9	TDR-15	60	180	134.3	Every 25 m
31+035	9	TDR-17	60	206.35	134.9	Every 25 m
30+937	9	TDR-18	60	180	135.6	Every 25 m
30+960	9	TDR-20	60	200	136.5	Every 25 m

1.4 Vault Dike

The construction of Vault Dike was done in the winter of 2013 to keep its foundation frozen.

Five thermistor strings were originally installed on Vault Dike following its construction in the winter of 2013 and four are still operational. TH3 is installed in the deepest channel downstream, TH5 is installed under the liner, TH6 is installed upstream of the liner, TH7 is installed east of the deepest channel, and TH8 is installed upstream in the deepest channel outside of the key trench. One thermistor (TH-3, on the side of Vault Lake) had been damaged by sloughing in previous year and stopped working in October 2015.

Table 7 below details instrumentation on Vault Dike.

Table 7: List of Thermistors on Vault Dike (Source: AEM)

Hole	ID	Operational /Not Operational	Manual/Automatic	Total Beads	Elevation in Meters (top/bottom)
71-2	VD-TH5	P	Manual	16	142.50/136.10
94-2	VD-TH6	P	Manual	16	140.50/121.50
96-1	VD-TH7	P	Manual	16	140.50/119.50
96-2	VD-TH8	P	Manual	16	140.50/119.50

2.0 TAILINGS STORAGE FACILITY

The TSF was commissioned in conjunction with the mill start-up in February 2010, with tailings being deposited within the North Cell of the facility. The North Cell and structures Saddle Dam 1, Saddle Dam 2 and Stormwater Dike were constructed to El. 150 m in two stages from 2009 to 2011.

The construction of the South Cell started in 2012 with Central Dike, thereby closing the eastern portion of the South Cell. The beginning of the tailings deposition in the South Cell started at the end of 2014. From 2012 to 2018, Central Dike was raised to El. 145 m in six stages. To increase the capacity of the South Cell, additional peripheral structures (Saddle Dam 3, Saddle Dam 4 and Saddle Dam 5) were constructed to El. 145 m in three stages from 2015 to 2018. The South Cell is designed to be able to be raised to El. 150 m. The construction of subsequent portions of the South Cell could occur in the future in the unlikely case of additional capacity being required.

2.1 North Cell Internal Structure – North Cell

The North Cell Internal Structure was built in 2018 to El. 152 m from Sta. 1+100 m to 1+660 m and from 2+750 m to 3+200 m, and to El. 154 m from Sta. 1+660 m to 2+750. This stage is an intermediate phase and the structure could be raised and lengthened to provide additional capacity if required. The tailings deposition from the North Cell Internal Structure started in August 2018.

Tailings deposition was transferred from the North Cell to the South Cell at the end of 2014. Tailings deposition occurred during the summer of 2015 within the North Cell and resumed in the South Cell in October 2015. Progressive closure of the North Cell started in the winter of 2015 with the construction of a non-acid generating rockfill capping over the tailings and continued in the winter of 2016.

A rockfill berm was constructed in 2016 at the toe of Stormwater Dike in the South Cell (from Sta. 10+300 to Sta. 10+750) to mitigate the crest and downstream slope movement observed in this sector at the end of August 2016. Following an investigation and instrumentation program, the movements observed are inferred to be caused by the soft sediment foundation thawing and settling due to the South Cell water pond reaching the dike foundation during the summer. Water ponding against Stormwater Dike is part of the tailings deposition plan and is acceptable, as Stormwater Dike is not a peripheral structure. Having direct ponding water within Stormwater Dike foundation is geotechnically acceptable. For South Cell closure and environmental aspects, given that it is inferred that the Stormwater Dike foundation presents some open windows of exposed fractured bedrock that may contribute to feeding the seepage at Central Dike, it is recommended that a beach be put in place along Stormwater Dike downstream slope to seal the foundation before the end of the deposition activities.

Four vertical thermistor strings were installed on the crest of the North Cell Internal Structure in August 2018 (NCIS-01, NCIS-02, NCIS-03 and NCIS-04). NCIS-01, NCIS-02 and NCIS-04 are installed on the upstream side of the dike whereas NCIS-02 is installed on the downstream side.

Table 8 below details instrumentation on the North Cell Internal Structure.

Table 8: List of Instruments on the North Cell Internal Structure (Source: AEM)

Hole	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
NCIS-T1	NCIS-18-01	Thermistor	✓	Automatic (DL55)	-	-	16	140/110
NCIS-T2	NCIS-18-02	Thermistor	No data X	Automatic (DL55)	-	-	16	134/119
NCIS-T3	NCIS-18-03	Thermistor	✓	Automatic (DL56)	-	-	16	149/132.84
NCIS-T4	NCIS-18-04	Thermistor	✓	Automatic (DL57)	-	-	16	148/118
PSM	NCIS1 TO NCIS16	Prism	✓	Manual	-	-	-	-

According to AEM (AEM 2024e), the prisms have not been monitored for some time. AEM has opted for drone surveying during the summer months, which provides much greater coverage. The latest surveys are still being processed internally.

2.2 Saddle Dam 1 – North Cell

Stage 1 of Saddle Dam 1 was constructed in the fall of 2009 to a height of 10 m (crest elevation of 141 m) and a length of 250 m. Stage 2 was constructed in 2010 to an overall height of 20 m (final crest elevation of 150 m) and length of about 400 m.

Three thermistors (T1, T2, T3) are installed to monitor the thermal condition within the structure and its foundation; they were installed in 2009 and early 2010 as part of Stage 1. The fourth thermistor string (T4) was installed in 2009 and extended in 2010 along the upstream face of the dam to monitor the thermal condition of the tailings. The SD1-T1 thermistor string is installed in the centre of the upstream face of the dike immediately beneath the geomembrane liner to monitor temperatures within the deposited tailings. A thin layer of protective granular material exists above the geomembrane liner at this location. The SD1-T2 thermistor string is installed vertically through the upstream Stage 1 crest in the centre of the dike at El. 140 m. The SD1-T3 thermistor string is installed vertically through the upstream Stage 2 crest in the centre of the dike at El. 150 m. The SD1-T4 thermistor string is installed vertically through the upstream toe of the dike near the centre of the dike.

TH-T3 stopped working on November 2020, will be repaired in 2022.

Table 9 below details instrumentation on Saddle Dam 1.

Table 9: List of Thermistors on Saddle Dam 1 (Source: AEM)

Hole	ID	Operational /Not operational	Manual/Automatic	Total Beads	Elevation in Meters (top/bottom)
SD1-T1	SD1-T1	P	Automatic (DL14)	16	149.0/132.84
SD1-T2	SD1-T2	P	Automatic (DL14)	16	140.0/110.0
SD1-T3	SD1-T3	O	Automatic (DL14)	16	
SD1-T4	SD1-T4	P	Automatic (DL14)	16	134.0/119.0

2.3 Saddle Dam 2 – North Cell

Saddle Dam 2 was constructed in one stage in 2011 to a crest elevation of 150 m. Saddle Dam 2 has a maximum height of about 10 m and a crest length of 460 m.

TH-T4 stopped working on July 2021.

Table 10 below details instrumentation on Saddle Dam 2.

Table 10: List of Thermistors on Saddle Dam 2 (Source: AEM)

Hole	ID	Operational /Not Operational	Manual/Automatic	Total Beads	Elevation in Meters (top/bottom)
SD2-T1	SD2-T1	P	Automatic (DL14)	16	148.5/145.31
SD2-T2	SD2-T2	P	Automatic (DL14)	16	148.0/118.0
SD2-T3	SD2-T3	P	Automatic (DL14)	16	
SD2-T4	SD2-T4	O	Automatic (DL14)	16	144.0/129.0

2.4 RF1/RF2 – North Cell

Four thermistors were installed in 2012 to monitor the temperature of RF1 and RF2 (which delineates the northeastern side of the TSF North Cell).

Table 11 below details instrumentation on RF1 and RF2.

Table 11: List of Thermistors on RF1 and RF2 (Source: AEM)

Hole	ID	Operational /Not Operational	Manual/Automatic	Total Beads	Elevation in Meters (top/bottom)
121-1	121-RF1-1	P	Manual	16	136.0/90.0
73-6	73-6-RF1-2	O	Manual	16	149.5/133.0
RF1-3	RF1-3	P	Manual	11	148.0/144.0
122-1	122-1RF2	P	Manual	16	137.0/90.0

2.5 North Cell Tailings

Five thermistors are installed in the tailings of the North Cell of the TSF (SWD-1, SD2-1, 90-1, NC-TH-1 and NC-TH-2). These thermistors were installed from 2012 to 2016. Thermistor 90-1 was installed in 2012 in the tailings of the North Cell near Saddle Dam 1. Thermistor NC-T1 and NC-T2 were installed in April 2016 in the tailings of the North Cell in the location of the former reclaim pond. Nine additional thermistors were installed in February 2017 in the tailings of the North Cell (SWD-01, NC17-01, NC-17-02, NC-17-03, NC-17-04, NC-17-05, NC-17-06, NC-17-07, NC-17-08).

Table 12 below details instrumentation in the North Cell tailings.

Table 12: List of Thermistors in the North Cell tailings (Source: AEM)

Hole	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
NC-T1	NC-T1	Thermistor	✓	Manual	-	-	16	146.6/86.6
NC-17-01	NC-17-01	Thermistor	✓	Automatic (DL20)	-	-	16	148/112
NC-17-02	NC-17-02	Thermistor	✓	Automatic (DL21)	-	-	16	147.6/102
NC-17-03	NC-17-03	Thermistor	✓	Automatic (DL22)	-	-	13/16	147.6/102.6
NC-17-04	NC-17-04	Thermistor	✓	Automatic (DL23)	-	-	16	148.5/122
NC-17-05	NC-17-05	Thermistor	✓	Automatic (DL24)	-	-	16	146.6/112.6
NC-17-06	NC-17-06	Thermistor	✓	Automatic (DL25)	-	-	16	148/112
NC-17-07	NC-17-07	Thermistor	✓	Automatic (DL26)	-	-	16	148/112
NC-17-08	NC-17-08	Thermistor	✓	Automatic (DL27)	-	-	15/16	146/99

2.6 Stormwater Dike – Divider Dike

Stormwater Dike was progressively constructed. Stage 1 was constructed in 2009 to a height of 10 m (crest elevation of 140 m) and a length of 860 m. Stage 2 was primarily constructed in 2010 to an overall height of 18 m (crest elevation of 148 m) and length of about 1,060 m. A horizontal bench is present along the upstream face of the structure due to the connection of the 2009 and 2010 portions of the structure. The junction between the bituminous liner of Stormwater Dike and the LLDPE liner of Saddle Dam 2 was completed in 2011. The crest of Stormwater Dike was raised to 150 m in 2013.

The majority of the dike is seated on dense till from the former lakebed within the talik while the abutments are generally founded on bedrock. The foundation preparation of Stage 2 was completed in winter conditions. It was generally done above water except in an area where water ponding was present (between Sta.10+500 and 10+750 approximately). This pond was located where the topography suggests that the soft lakebed sediment thickness may be greater than at other locations along the dike. Due to the presence of water, the ice crust was cracked with the excavator and only minimal foundation preparation was possible. As a result, most of the lakebed sediment probably remained in place in this area.

A single deep thermistor (T147-1) and a piezometer string (VWP 13265) were installed at the downstream toe of Stormwater Dike (within the South Cell). These instruments were broken in September 2016 during the construction of the buttress at the toe of Stormwater Dike within the South Cell. Three new thermistors (TH-SWD-01, TH-SWD-02, TH-SWD-03) and piezometers (PZ-SWD-02-A, PZ-SWD-03-A, PZ-SWD-03-B) were installed since then. SWD-01 is installed on the upstream side of Stormwater Dike within the North Cell tailings. SWD-02 is installed on the downstream side of Stormwater Dike (approx. Sta. 10+650 m) within the stabilization buttress. SWD-03 is installed on the downstream side of Stormwater Dike (approx. Sta. 10+690 m) within the stabilization buttress.

PZ-SWD-02-A and TH-SWD-02 are now broken, while the other piezometers are frozen but still transmit data.

In August 25, 2016, two wireline extensometers, four crack monitoring stations and three prisms were installed on the crest of Stormwater Dike in the area showing movements (between Sta. 10+500 and 10+750 approximately). According to AEM 9 (AEM 2024e), the prisms have not been monitored for some time. AEM has opted for drone surveying during the summer months, which provides much greater coverage. The latest surveys are still being processed internally.

Following the MDRB recommendations, AEM installed additional instruments in 2017 to monitor the response of Stormwater Dike during tailings deposition in the South Cell. In 2018, an additional prism and 3 crackmeters were added, leading to a total of 3 piezometers, 3 thermistors, 4 extensometers, 3 crackmeters and 20 prisms installed on Stormwater Dike.

Table 13 below details instrumentation on Stormwater Dike.

Table 13: List of Instruments on Stormwater Dike (Source: AEM)

Hole	ID	Operational /Not Operational	Manual/Automatic	For Pz		Operational/ Total Beads	Elevation in Meters (top/bottom)
				El. (m)	Stratigraphic Unit		
SWD-01	SWD-01	P	Automatic (DL19)			15/16	148.0/118.0
SWD-02	PZ-SWD-02-A	O	Automatic (DL19)	62.0	Bedrock		127.0/117.0
	TH-SWD-02	O	Automatic (DL19)				
SWD-03	PZ-SWD-03-A	P	Automatic (DL19)	110.0	Bedrock		
	PZ-SWD-03-B	P	Automatic (DL19)	122.0			
	TH-SWD-03	P	Automatic (DL19)			9/16	125.0/111.0

2.7 Saddle Dam 3, Saddle Dam 4 and Saddle Dam 5 – South Cell

Stage 1 of Saddle Dam 3 and 4 was constructed in 2015. Stage 1 of Saddle Dam 5 was constructed in 2016. During Stage 1, Saddle Dam 3 and 4 were constructed to El. 140 m and Saddle Dam 5 to El. 137 m. Stage 2 of Saddle Dam 3, 4 and 5 was constructed to El. 143 m in 2016. Stage 3 of Saddle Dam 4 and 5 was constructed to El. 145 m in 2017. Stage 3 of Saddle Dam 3 was constructed partially to El. 145 m in 2017, with the installation the geomembrane and the construction of the liner erosion protection cover completed in 2018. These structures are designed to be able to be raised to El. 150 m and the final crest elevation of these structures is subject to review by AEM. At the end of Stage 3, the decision was made by AEM to close the abutments of these structures, as no further raise was planned at the moment. If these structures are to be raised higher, it will be necessary to re-open the abutments. The completed crest length is approximately 245 m for Saddle Dam 3, 365 m for Saddle Dam 4, and 255 m for Saddle Dam 5.

Five thermistors are installed at Saddle Dam 3. Three of these thermistors are located along the axis of the faulted zone that was encountered during the construction of Saddle Dam 3 (around Sta. 20+650). Along this axis, two thermistors are installed on the crest (SD3-T3 around the centerline and SD3-T2 on the upstream edge), and the other (SD3-T4) is installed on the upstream toe liner tie-in. Another thermistor is installed at Sta. 20+720 within the upstream toe liner tie-in (SD3-T5). One thermistor (SD3-T6) was installed in 2018 on the crest towards the junction with Saddle Dam 2.

Table 14 below details instrumentation on Saddle Dam 3.

Table 14: List of Thermistors on Saddle Dam 3 (Source: AEM)

Hole	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
SD3-T2	SD3-02	Thermistor	✓	Automatic (DL16)	-	-	16	139.1/123.1
SD3-T3	SD3-03	Thermistor	✓	Automatic (DL16)	-	-	15	138.6/121.6
SD3-T4	SD3-04	Thermistor	× (since June 2019)	Automatic (DL16)	-	-	0/15	137.3/122.3
SD3-T5	SD3-05	Thermistor	× (since Dec 2019)	Automatic (DL16)	-	-	16	138.4/122.4
SD3-T6	SD3-06	Thermistor	✓	Automatic (DL16)	-	-	16	143.9/113.9

Four thermistors are installed at Saddle Dam 4 near Sta. 40+300. One thermistor (SD4-T2) is installed on the upstream edge crest while another (SD4-T4) is installed in the upstream toe line tie-in, and another one (SD4-T1) is in the centre of the upstream face of the dike immediately on top of the geomembrane liner to monitor the thermal regime of the tailings in contact with the structure. One thermistor (SD4-T3) was installed on the middle of the crest in January 2018.

Table 15 below details instrumentation on Saddle Dam 4.

Table 15: List of Thermistors on Saddle Dam 4 (Source: AEM)

Hole	ID	Operational /Not Operational	Manual/ Automatic	Operational/ Total Beads	Elevation in Meters (top/bottom)
SD4-01	17-SD4-01	P	Automatic (DL17)	11/15	139.0/139.0
SD4-02	17-SD4-02	P	Automatic (DL17)	16/16	144.0/129.0
SD4-03	17-SD4-03	P	Automatic (DL17)	16/16	137.3/127.8
SD4-04	17-SD4-04	P	Automatic (DL17)	5/16	143.4/139.6

Three thermistors were installed at Saddle Dam 5 in 2018 near Sta. 40+680. One thermistor (SD5-T2) is installed on the downstream edge crest, one (SD5-T4) around the middle of the crest, and another (SD5-T3) is installed in the toe liner tie-in.

Table 16 below details instrumentation on Saddle Dam 5.

Table 16: List of Thermistors on Saddle Dam 5 (Source: AEM)

Hole	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
SD5-02	SD4-02	Thermistor	✓	Automatic (DL58)	-	-	16(cap)	144/129
SD5-03	SD3-03	Thermistor	✓	Automatic (DL58)	-	-	16	141/126
SD5-04	SD4-04	Thermistor	✓	Automatic (DL58)	-	-	16(cap)	144/129

2.8 Central Dike – South Cell

Construction of Central Dike started in 2012 (stage 1) at the El. 110 m with a key trench located underneath the centreline. In 2013 (Stage 2), the footprint of Central Dike was widened for a crest elevation of 150 m, the structure was raised to El. 115 m and the key trench was relocated at the upstream toe. In 2014 (Stage 3), the key trench was relocated at the upstream toe and constructed to El. 132 m. Central Dike was raised to El. 137 in 2015 (Stage 4), to El. 143 m in 2016 (Stage 5), and to El. 145 m in two steps in 2017 and 2018 (Stage 6). Central Dike is designed to be able to be raised to El. 150 m and the final crest elevation is subject to review by AEM. The completed crest length is approximately 900 m at El. 145 m.

Desktop studies were undertaken by Golder in 2015 to estimate the seepage flows and pore water pressures, verify the dike stability, and attempt to predict the eventual flow volume that would report to the downstream toe for higher pond elevation. The seepage pathway used in the Golder 2015 model was through a layer of fine material in the till layer of the foundation as it was deemed the most critical scenario for the structure stability. The main recommendation from this desktop study was to maintain beaches adjacent to Central Dike and to maintain a 'back pressure' on the downstream side of Central Dike in order to reduce the hydraulic gradient by holding the downstream pond at El. 115 m. Willowstick was also hired to carry out electromagnetic surveys to detect seepage paths. The geophysical campaign led to additional recommendations and identified possible seepage path locations. Following the geophysical campaign, an investigation was conducted by SNC-Lavalin (SNC) and AEM in December 2015 at station CD-595, and between CD-810 and CD-850. Highly altered and fractured bedrock was encountered, and high hydraulic conductivity was measured from Packer testing. Instrumentation of the four boreholes with piezometers and thermistors was done at the same time. A study has been completed in 2017 by Golder to update the seepage modelling with a seepage flow through the bedrock, and allowed for updating of the Emergency Preparedness Plan as well as the Operation, Maintenance, and Surveillance Manual. The summer 2017 investigation and instrumentation campaign shows that the seepage pathway was most probably mainly controlled by the bedrock.

Instruments were installed on Central Dike to monitor the dike's performance during its construction, operation, and closure. Nine boreholes were drilled on three rows corresponding to the central key trench (545-P1, 580-P1, 650-P1 and 750-P1), the final downstream toe (545-P2 and 650-P2) and the Portage Pit limit (465-P3, 650-P3, 875-P3 and WR-P3). Four additional boreholes were drilled and instrumented in 2016 during the seepage field investigation in the key trench alignment (595-P1, 810-P1, 825-P1 and 850-P1). Two thermistor strings were also installed on the upstream face to monitor the temperature within the tailings of the South Cell.

Seven additional boreholes were drilled and instrumented in 2017 (700-P1, 745-P3, 800-P2, 800-P3, 875-P2, 975-P3 and 1050-P3).

In October 2020, four additional boreholes were drilled and instrumented to replace broken instruments (545-P1R, 595-P1R, 650-P1R, 815-P1R).

In October 2024, two new instruments in P3 line (0+620 and 0+725) have been installed for monitoring the till unit below West Road as the water level progressively rises in Pit A. (AEM 2024e).

Table 17: List of Piezometers and Thermistors on Central Dike (Source: AEM)

DH-ID	STA	Instrument_ID	Stratigraphic_Unit	OP Status	Frozen Status	Elevation
465-P3	0+465	465-P3-A	Bedrock	P	Frozen	65
465-P3	0+465	465-P3-B	Bedrock	P	Frozen	85
545-P1R	0+545	545-P1R-A		O	Frozen	
545-P1R	0+545	545-P1R-B		O	Frozen	
545-P1R	0+545	545-P1R-C		O	Frozen	
545-P1R	0+545	545-P1R-D		O	Frozen	
545-P2	0+545	545-P2-A	Bedrock	O	Frozen	65
545-P2	0+545	545-P2-B	Bedrock	O	Frozen	85
545-P2	0+545	545-P2-C	Bedrock	O	Frozen	11
545-P2	0+545	545-P2-D	Rockfill/till	O	Frozen	104
580-P1R	0+580	580-P1R-A	Sand	O		69.5
580-P1R	0+580	580-P1R-B	Bedrock	O		75.5
580-P1R	0+580	580-P1R-C	Bedrock	O		79
580-P1R	0+580	580-P1R-D	Bedrock	O		
580-P1R	0+580	580-P1R-E	Bedrock	O		
595-P1R	0+595	595-P1R-A		P		
595-P1R	0+595	595-P1R-B		P		
595-P1R	0+595	595-P1R-C		P		
595-P1R	0+595	595-P1R-D		O		
595-P1R	0+595	595-P1R-E		O		
620-P3	0+620	620-P3-A	Till			107.95
650-P1R	0+650	650-P1R-A		O		
650-P1R	0+650	650-P1R-B		O		
650-P1R	0+650	650-P1R-C		O		
650-P1R	0+650	650-P1R-D		O		
650-P2	0+650	650-P2-A	Bedrock	P		65
650-P2	0+650	650-P2-B	Bedrock	P		85
650-P2	0+650	650-P2-C	Bedrock	P		99.5
650-P2	0+650	650-P2-D	Rockfill/till	P		103.5
650-P3	0+650	650-P3-A	Bedrock	P	Frozen	65
650-P3	0+650	650-P3-B	Bedrock	P	Frozen	85
700-P1	0+700	700-P1-A		P		
700-P1	0+700	700-P1-B		P		
700-P1	0+700	700-P1-C		P		
700-P1	0+700	700-P1-D		P		
700-P1	0+700	700-P1-E		O		
725-P3	0+725	725-P3-A	Till	P		102.77
725-P3	0+725	725-P3-B	Till	P		98.27
750-P1	0+750	750-P1-A	Bedrock	P		65
750-P1	0+750	750-P1-B	Bedrock	P		76

Table 17: List of Piezometers and Thermistors on Central Dike (Source: AEM)

DH-ID	STA	Instrument_ID	Stratigraphic_Unit	OP Status	Frozen Status	Elevation
750-P1	0+750	750-P1-C	Dense till	P		80
750-P1	0+750	750-P1-D	Dense till	P		88
750-P1	0+750	750-P1-E	Rockfill	P		100
800-P2	0+800	800-P2-A	Bedrock	P		70.07
800-P2	0+800	800-P2-B	Bedrock	P		85.7
800-P2	0+800	800-P2-C	Bedrock	P		95.07
800-P2	0+800	800-P2-D	Rockfill/till	P		105.07
800-P3	0+800	800-P3-A	Bedrock	P		62.95
800-P3	0+800	800-P3-B	Bedrock	P		82.95
800-P3	0+800	800-P3-C	Till	P		96.45
810-P1	0+810	810-P1-A	Bedrock	O		67.7
810-P1	0+810	810-P1-B	Bedrock	O		79.9
810-P1	0+810	810-P1-C	Dense till	O		86.9
810-P1	0+810	810-P1-D	Dense till	O		93.9
815-P1R	0+815	815-P1R-A		P		
815-P1R	0+815	815-P1R-B		P		
815-P1R	0+815	815-P1R-C		P		
825-P1	0+825	825-P1-A	Bedrock	P		74.15
825-P1	0+825	825-P1-B	Bedrock	P		93.5
825-P1	0+825	825-P1-E	Till (casing)	P		101
850-P1	0+850	850-P1-A	Bedrock	P		72
850-P1	0+850	850-P1-B	Bedrock	P		93.7
850-P1	0+850	850-P1-E	Rockfill	P		106
875-P2	0+875	875-P2-A	Bedrock	P		65.08
875-P2	0+875	875-P2-B	Bedrock	P		85.08
875-P2	0+875	875-P2-C	Bedrock	O temp only	Frozen	105.38
875-P2	0+875	875-P2-D	Till	O temp only	Frozen	107.58
875-P3	0+875	875-P3-A	Bedrock	P		65
875-P3	0+875	875-P3-B	Bedrock	P		85
975-P3	0+975	975-P3-A	Bedrock	P		64.53
975-P3	0+975	975-P3-B	Bedrock	P		84.53
1050-P3	0+1050	1050-P3-A	Bedrock	P	Frozen	66.37
1050-P3	0+1050	1050-P3-B	Bedrock	P	Frozen	86.37

DH-ID	STA	Instrument ID	Working Beads	Reliable Beads	Total Beads	Top Bead Elevation	Bottom Bead Elevation
465-P3	0+465	465-TH-P3	10	10	13	105	69
545-P1	0+545	545-TH-P1	0	0	13	111	63
545-P2	0+545	545-TH-P2	13	13	13	105	51
580-P1R	0+580	580-TH-P1R	16	16	16	120.5	65.5

595-P1	0+595	595-TH-P1	16	16	16	114.6	69.6
620-P3	0+620	TS-5171	13	13	13	124.05	100.05
620-P3	0+620	TS-5330	13	13	13	118.80	106.80
650-P1R	0+650	650-TH-P1R	0	0	13	107.2	95.2
650-P2	0+650	650-TH-P2	13	13	13	105	51
650-P3	0+650	650-TH-P3	13	10	13	105	51
700-P1	0+700	700-TH-P1	16	16	16	118.4	63.4
725-P3	0+725	TS-Geokon#2 (2017)	13	13	13	121.27	97.27
745-P3	0+745	745-TH-P3	8	8	16	125.08	102.08
750-P1	0+750	750-TH-P1	13	12	13	111	63
800-P2	0+800	800-TH-P2	16	16	16	120.07	70.07
800-P3	0+800	800-TH-P3	14	13	14	118.95	62.95
810-P1	0+810	810-TH-P1	0	0	16	134.84	114.84
815-P1R	0+815	815-TH-P1R	13	10	13	98.5	80.5
825-P1	0+825	825-TH-P1R	16	15	16	131.25	71.25
850-P1	0+850	850-TH-P1	16	15	16	133.02	73.02
875-P2	0+875	875-TH-P2	14	14	16	120.08	63.08
875-P3	0+875	875-TH-P3	13	11	13	105	51
975-P3	0+975	975-TH-P3	16	16	16	131.12	64.12
1050-P3	1+050	1050-TH-P3	16	15	16	134.77	65.77
650 US	0+650	CD-US-0+650	19	19	32	143	111.06

Table 18: List of Piezometers Recording Suction on Central Dike

Name of Piezometer	Installation Unit	Observation
545-P2 B	Bedrock	Suction. Broken.
545-P2-C	Bedrock	Suction. Broken.
545-P2-D	Till	Suction. Broken.
650-P2-D	Till	Suction. Frozen.
650-P3-B	Bedrock	Suction. Frozen.
750-P1-(B,C)	Bedrock, till	Suction.

3.0 WHALE TAIL PROJECT DEWATERING DIKES

3.0 Whale Tail Dike

The construction of Whale Tail Dike started on July 2018 and ended in February 2019.

The instruments installed on Whale Tail Dike are summarized in Tables 19 and 20 below and consist of:

- 4 inclinometers in the cut-off wall;
- 35 thermistors in the dike;

- 3 thermistors in the upstream lake;
- 2 thermistors in the downstream area;
- 2 thermistors in the abutment capping areas;
- 15 piezometer holes having each 3 to 4 instruments (50 piezometers in total).

Thermistors are mostly located downstream of the cut-off wall with the temporary thermistors installed just downstream of the secant wall to gain more data on potential wall defects that would exhibit warm up in the cut off wall. The piezometers have 2 holes downstream (P1 & P2) of the wall and 1 upstream (P3) for a given section. All the instruments except for the temporary thermistors are connected to an automated data acquisition system that gathers data every 3 hours.

Table 19: List of Piezometers and Thermistors on Whale Tail Dike (Source: AEM)

DH-ID	STA	INSTRUMENT_ID	Stratigraphic unit	OP Status	Frozen Status	Elevation
PZ-1	0+260	WTD_260_P1_A	Bedrock	P		138.5
		WTD_260_P1_B	Bedrock	P		145.5
		WTD_260_P1_C	Interface	P	Frozen	151.5
PZ-2	0+260	WTD_260_P2_A	Bedrock	P		138.5
		WTD_260_P2_B	Bedrock	P		145.5
		WTD_260_P2_C	Interface	Broken		150.5
PZ-3	0+260	WTD_260_P3_A	Bedrock	P		138.32
		WTD_260_P3_B	Bedrock	P		145.32
		WTD_260_P3_C	Interface	P		149.82
PZ-4	0+360	WTD_360_P1_A	Bedrock	P		132
		WTD_360_P1_B	Bedrock	P		139
		WTD_360_P1_C	Interface	P		145.53
PZ-5	0+360	WTD_360_P2_A	Bedrock	P		132
		WTD_360_P2_B	Bedrock	P		137
		WTD_360_P2_C	Interface	P		142
PZ-6	0+360	WTD_360_P3_A	Bedrock	P		132
		WTD_360_P3_B	Bedrock	P		139
		WTD_360_P3_C	Interface	P		142.8
PZ-7	0+440	WTD_440_P1_A	Bedrock	P		137
		WTD_440_P1_B	Bedrock	P		144
		WTD_440_P1_C	Interface	P		139
PZ-8	0+440	WTD_440_P2_A	Bedrock	P		137.19
		WTD_440_P2_B	Bedrock	P		144.19
		WTD_440_P2_C	Interface	P	Freezing	149.19
PZ-9	0+440	WTD_440_P3_A	Bedrock	Broken		136.35
		WTD_440_P3_B	Bedrock	Broken		143.35
		WTD_440_P3_C	Interface	Broken		148.35
PZ-10	0+550	WTD_550_P1_A	Bedrock	P		141.15
		WTD_550_P1_B	Bedrock	P		146.15
		WTD_550_P1_C	Interface	P		149.85
PZ-11	0+550	WTD_550_P2_A	Bedrock	P		141.30
		WTD_550_P2_B	Bedrock	P		146.30
		WTD_550_P2_C	Interface	P		149.80
PZ-12	0+550	WTD_550_P3_A	Bedrock	P		141.32
		WTD_550_P3_B	Bedrock	Broken		146.32
		WTD_550_P3_C	Interface	P	Near zero	149.82
PZ-13	0+710	WTD_701_P1_A	Bedrock	P		139.95
		WTD_701_P1_B	Bedrock	P		144.95
		WTD_701_P1_C	Interface	P		147.95

Table 19: List of Piezometers and Thermistors on Whale Tail Dike (Source: AEM)

DH-ID	STA	INSTRUMENT_ID	Stratigraphic unit	OP Status	Frozen Status	Elevation
PZ-14	0+710	WTD_701_P2_A	Bedrock	P		140.03
		WTD_701_P2_B	Bedrock	P		145.03
		WTD_701_P2_C	Interface	P		148.03
		WTD_701_P2_D	Fine Filter	P		151.03
PZ-15	0+710	WTD_701_P3_A	Bedrock	P		140.10
		WTD_701_P3_B	Bedrock	P		145.10
		WTD_701_P3_C	Interface	P		148.10
		WTD_701_P3_D	Fine Filter	P		151.10
Pz-DS	-	WTD_Pz_US	Water	P		141.882
Pz-US	-	WTD_Pz_US	Water	P		146.856

STA	DH-ID	New	Working beads	Reliable beads	Total beads	Top bead elevation	Bottom bead elevation
0+110	TH 0+110	x	14	14	16	156.4	141.4
0+142	TH-1		13	11	13	156.8	144.8
0+190	TH-12		12	10	13	157.4	140.4
0+210	TH-2		16	16	13	157.2	142.2
0+240	TH 0+240	x	13	13	13	158.1	128.1
0+260	TH-3		13	11	13	157.0	127.0
0+276	TH-LAKE		13	13	13	157.3	145.3
0+290	TH-LAKE-US-290		13	13	13	157.0	142.0
0+310	TH-4		13	13	13	157.0	127.0
0+336	TH-US-0+336	x	13	13	13	156.4	142.4
0+360	TH-5		13	11	13	157.0	127.0
0+380	TH 0+380	x	13	13	13	157.1	127.1
0+407	TH-6		13	9	13	157.0	127.0
0+425	TH 0+425	x	13	13	13	158.6	128.6
0+453	TH-7		13	13	13	156.9	126.9
0+475	TH 0+475_T	x	13	13	13	161.0	146.0
0+500	TH-500	x	16	15	16	157.1	142.1
0+520	TH-8		13	12	13	157.0	127.0
0+530	TH-530		13	13	13	159.0	147.0
0+550	TH 0+550	x	13	13	13	158.0	128.0
0+580	TH-580		13	13	13	158.0	143.0
0+596	TH 0+596	x	13	13	13	157.8	127.8
0+607	TH-9		13	10	13	157.0	127.0
0+635	TH-635		13	13	13	158.3	143.3
0+645	TH 0+645	x	13	13	13	158.6	128.6
0+665	TH-LAKE-US-665		13	13	13	157.0	142.0
0+665	TH-665		13	13	13	158.3	143.3
0+675	TH-10		13	13	13	157.0	142.0
0+685	TH-685		13	13	13	157.5	145.5
0+695	TH-695		13	13	13	158.0	146.0
0+707.5	TH-707.5		13	13	13	158.0	143.0
0+710	TH-13		16	15	16	157.1	142.1
0+720	TH-720		13	13	13	157.0	145.0
0+740	TH-740		13	13	13	161.0	146.0
0+475	TH-475		13	13	13	159.0	147.0
0+750	TH-14		16	15	16	157.0	142.0
0+772	TH-11		13	0	13	157.0	142.0
0+790	TH 0+790	x	16	16	16	157.2	142.2
0+618	D/S East		9	9	16	152.0	137.0
0+340	D/S West		16	16	16	148.6	134.6
0+130	TH WAC 0+130 (West)	x	16	16	16	159.25	144.25

0+781	TH EAC 0+781 (East)	x	16	16	16	158.35	143.35

Table 20: List of Inclinometers on Whale Tail Dike (Source: AEM)

STA	DH-ID	Working Beads	Reliable Beads	Total Beads	Top Bead Elevation	Bottom Bead Elevation
0+205	INC_1	29	29	29	158.1	144.1
0+366	INC_2	37	37	37	157.9	139.9
0+560	INC_3	33	33	33	157.7	141.7
0+726	INC_4	31	31	31	157.3	142.3

3.1 WRSF Dike

The construction of WRSF Dike occurred from January to February 2019 to maintain the frozen condition of the foundation. Thermistors TH-01 to 03 were installed in March 2019. Four additional thermistors were installed in early October 2019 to monitor more precisely the temperature trends in WRSF Dike in order to study the seepage mechanism after water had been seeping through the dike since August 2019. Two additional thermistors (Th-08 and TH-09) were installed in the constructed upstream thermal berm in 2020.

Table 21 below details instrumentation on WRSF Dike.

Table 21: List of Thermistors on WRSF Dike (Source: AEM)

Station	Instrument ID	Drawing Name	Type	Status	Readings	For PZ		For TH	
#	ID		PZ/TH	Operational (✓) / Not operational (×)/Frozen (F)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in m (top/bottom)
0+120	WRSF-19-01	TH-01	TH	✓	Automatic (DL105)			13/13	139/123
0+120	WRSF-19-02	TH-02	TH	✓	Automatic (DL105)			13/13	159/147
0+120	WRSF-19-03	TH-03	TH	✓	Automatic (DL105)			13/13	155/143
0+093	WRSF-19-04	TH-04	TH	✓	Automatic (DL105)			13/13	158/142
0+135	WRSF-19-05	TH-05	TH	✓	Automatic (DL105)			13/13	154/142
0+135	WRSF-19-06	TH-06	TH	✓	Automatic (DL105)			13/13	156/143
0+172	WRSF-19-07	TH-07	TH	✓	Automatic (DL105)			13/13	155/142

Station	Instrument ID	Working Beads	Reliable Beads	Total Beads	Top Bead Elevation	Bottom Bead Elevation
0+120	WRSFD-TH-01	13	13	13	105.0	69.0
0+120	WRSFD-TH-02	13	13	13	111.0	63.0
0+120	WRSFD-TH-03	13	13	13	105.0	51.0
0+093	WRSFD-TH-04	16	16	13	120.5	65.5
0+135	WRSFD-TH-05	12	12	13	114.6	69.6
0+135	WRSFD-TH-06	13	13	13	124.1	100.1
0+172	WRSFD-TH-07	13	13	13	118.8	106.8
0+090	WRSFD-TH-08	8	8	16	159.9	144.9
0+130	WRSFD-TH-09	15	15	16	160.0	145.0

3.2 Mammoth Dike

The construction of Mammoth Dike occurred from February 2019 to March 2019 to maintain the frozen condition of the foundation.

There are three thermistor strings installed within Mammoth Dike.

Table 22 below details instrumentation on Mammoth Dike.

Table 22: List of Thermistors on Mammoth Dike (Source: AEM)

Station	Instrument ID	Drawing Name	Type	Status	Readings	For PZ		For TH	
#	ID		PZ/TH	Operational (✓) / Not operational (×)/Frozen (F)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in m (top/bottom)
0+143	MD-19-01	TH-01	TH	✓	Automatic (DL106)			13/13	139/123
0+143	MD-19-02	TH-02	TH	✓	Automatic (DL106)			13/13	155/143
0+143	MD-19-03	TH-03	TH	✓	Automatic (DL106)			13/13	154/142

3.3 IVR Dike

The construction of IVR Dike occurred from February 2021 to May 2021 to maintain the frozen condition of the foundation.

There are seven thermistor strings installed within IVR Dike.

Table 23 below details instrumentation on IVR Dike.

Table 23: List of Thermistors on IVR Dike (Source: AEM)

DH-ID	STA	Instrument ID	Working Beads	Reliable Beads	Total Beads	Top Bead Elevation	Bottom Bead Elevation
Liner	0+180	IVR-TH-01	16	16	16	164.5	159.5
	0+150	IVR-TH-02	16	16	16	165	150
	0+150	IVR-TH-03	16	16	16	165	150
	0+150	IVR-TH-04	16	16	16	165	150
Horizontal in key trench	0+145 to 0+220	IVR-TH-05	13	13	13	159	159
	0+150	IVR-TH-06	10	10	13	162	150
	0+150	IVR-TH-07	13	13	13	162	150

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