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Government of Ireland

Historic Mines Services 2026 RFT

Appendix 1: Specification for Lot 1 Monitoring Services

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Version 1

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1 Introduction

The Department of Climate, Energy and the Environment (the Department) seeks service providers for Historic Mines Services. **This specification document relates to Lot 1 Monitoring only.** Please refer to separate specification documents for Lots 2 and 3.

The Department seeks under Lot 1 Monitoring a service provider to provide the following services:

Lot 1 Monitoring: Environmental, geotechnical and geoheritage monitoring of Avoca and Silvermines historic mine sites over the period 2026-2030. To include:

1. **Environmental monitoring.**
 - a. Twice annual environmental monitoring. Scope includes annual surface water, groundwater and dust (2026-2030)
 - b. Conceptual site model review. Review of conceptual site model, monitoring objectives and monitoring network integrity at Avoca and Silvermines based on recent understanding (existing monitoring reports) (2026-2027). Update the CSM after three years.
2. **Geotechnical monitoring** Annually 2026-2030.
3. **Geoheritage monitoring.** Annually 2026-2030.

There is an option to extend the contract by one year, twice, in order to continue the monitoring services if required in 2031 and 2032. Full details of the requirements are outlined in this document.

Monitoring has been undertaken regularly since 2012 for the purposes of gaining an understanding of the sites and monitoring their condition. The services being sought here are to continue and improve the existing monitoring so that the sites can be better understood and maintained ahead of full remediation in the long term.

2 Background information

2.1 Historic mines in Ireland

The Department currently undertakes management of abandoned mine sites, primarily where the minerals are State-owned and sites are identified as high risk. Management and planning for future rehabilitation is undertaken by the Historic Mines Rehabilitation Programme, a joint programme of the Geoscience Policy Section and Geological Survey Ireland.

The Historic Mine Sites – Inventory and Risk Classification Volume I study carried out by DCEE (then DCENR) and the Environmental Protection Agency (Stanley *et al.*, 2009) identified Avoca, Silvermines and Tynagh as Class I (the highest priority) historic mining sites in the country, in terms of their potential to affect human or animal health or to have an impact on the environment. Accordingly, responsibility for Avoca and Silvermines was taken by the government in 2005.

2.2 Avoca and Silvermines

A rehabilitation options assessment was carried out by SRK for Silvermines in 2002 (SRK, 2002) to identify a range of potential options to address human health and environmental impacts at the Silvermines sites. A feasibility study for the management and remediation of Avoca was completed for the Department in 2008 (CDM, 2008). Due to the financial downturn at the time, the Department was not in a position to fully implement the feasibility options.

Following a number of pollution incidents at Gortmore Tailings Management Facility in Silvermines, it was partially remediated between 2008 and 2010. The steepest banks were re-graded and buttressed. About 50% of the area was capped and a drainage system installed.

At Avoca, a programme of priority safety works was undertaken by the Department over the period 2014-2021. The completed priority safety works included:

- Stabilisation works to the railway embankment and rehabilitation works at the Deep Adit (undertaken in 2014).
- Capping works at open shafts and stopes (undertaken in 2014 – 2017).
- Rehabilitation and stabilisation works at the Tigroney Spoils Area (undertaken 2016 – 2017). The works involved capping/vegetation works with drainage diverted to the northeast and west of the site. Heritage structures including the 850 ore bins were conserved.
- Rehabilitation works to stabilise the 850 Adit (undertaken 2016 – 2017, 2019 – 2020).

Since 2012, monitoring and minor remedial works have been carried out at the sites.

Environmental and geotechnical monitoring has been carried out by consultants on behalf of the Department since 2012 to present, with the latest monitoring rounds carried out in spring 2026 (with a hiatus 2021-2023). Monitoring reports are available at the following link:

<https://www.gov.ie/en/department-of-climate-energy-and-the-environment/publications/historic-mines-rehabilitation/>.

Pending the renewal by DCEE of the feasibility studies and rehabilitation plans, the Historic Mines Rehabilitation Programme will continue to monitor the condition of the sites and to quantify and mitigate risk at the sites. To fulfil these objectives, the procurement of a new contract for monitoring services is now being undertaken.

2.3 Silvermines

2.3.1 Site description

The Silvermines area of north County Tipperary has been mined intermittently for over one thousand years for a range of commodities. Lead, zinc, copper, silver, barite and sulphur were exploited from a number of different sites, covering an area of approximately 2,300ha. The mining sites include Ballygown, Garryard, Gorteenadiha, Magcobar and Shallee South/East located approximately 10km to the southwest of Nenagh, Co. Tipperary (Silvermines aerial overview (from MKO, 2026a)Figure 1). The last working mine, a barite operation at Magcobar, closed in 1993. Just over a decade previously, the final base metal mine shut down, following the cessation of underground operations by Mogul Mines Ltd. (Mogul) at Garryard. The latter operation resulted in the generation of significant volumes of fine to coarse grained rock particles referred to as tailings. Tailings were deposited in a specially constructed tailings management facility (TMF) at Gortmore. The TMF is a c. 7m to 8m high flat-topped mound comprising 5Mm³ of tailings from the Mogul Mines processing plant at Garryard, 2km to the east. The perimeter is some 2.9km long, and the area some 58ha. Rehabilitation works have been undertaken at various localities including Gortmore TMF, with the site work administered by then North Tipperary County Council on behalf of the Department. To date this rehabilitation work has included partial capping and vegetating of the surface, drainage improvement, remedial works to wetlands at the TMF; fencing/capping of mine shafts and adits; and the filling of a pit at Ballygown.



Figure 1 Silvermines aerial overview (from MKO, 2026a)

2.3.2 Site conceptual model

A simple site conceptual model is shown in Figure 2 to convey current understanding of the **main** sources, pathways and receptors for environmental contamination at the site.

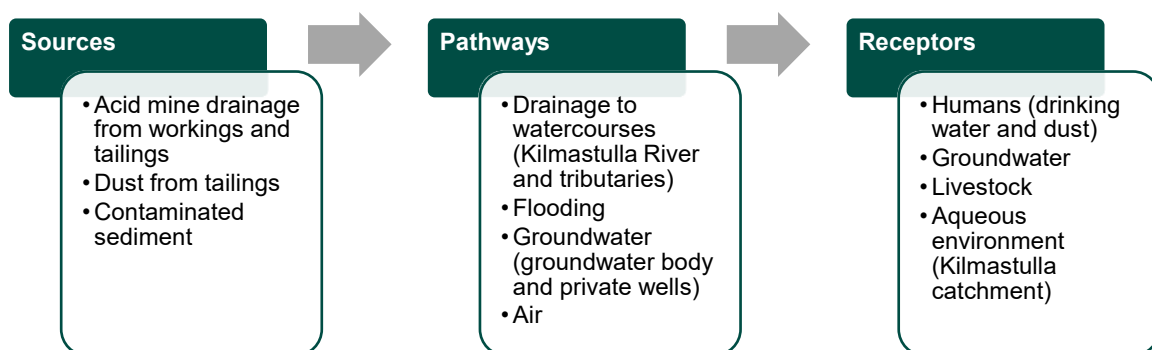


Figure 2 Conceptual site model for Silvermines

Of the above sources, pathways and receptors, the linkage between acid mine drainage and the aqueous environment is best characterised through comprehensive monitoring records.

The Kilmastulla River drains the Silvermines area, which rises in the Silvermines Mountain just south of Silvermines Village (called the Silvermines Stream) and flows north through the

Ballygown mining area. The river then flows west towards the Gortmore TMF, located to the north of the river. The river is located northwest of the other main areas of previous mining activity, including Shallee, Garryard, Gorteenadiha and Magcobar. Streams from Shallee and Garryard are tributaries to the Yellow River, which joins the Kilmastulla River at the south-eastern corner of Gortmore TMF. The river joins the River Shannon approximately 15 km downstream, just south of Parteen Weir. All parts of the former mining area contribute dissolved metals to the Kilmastulla River. The Kilmastulla Catchment has been monitored as part of the 2016 - 2021 WFD River Waterbodies Ecological Status. The Kilmastulla River water quality status is currently unsatisfactory and classified under Biological Quality Rating (Q Values) as 3-4 (poor to moderate conditions).

Understanding of groundwater conditions and impacts in relation to Gortmore TMF has been relatively poor over the last decade as there have been only two monitoring wells sampled outside the perimeter of the TMF. During summer 2026, additional monitoring wells have been installed within and along the toe of the TMF to allow for assessment of flow conditions and sampling at these wells as part of the monitoring programme. Additionally, there are 3 private domestic/farmyard wells directly adjacent to the northwestern boundary of the TMF that are being added to the monitoring programme.

Dust monitoring was carried out in the 1990 and 2000s in relation to dust blows off Gortmore TMF prior to capping works. It is now necessary to give renewed consideration to dust contamination pathways in order to determine the current integrity of TMF with respect to dust, to protect residents in the area from any dust and to establish a dust baseline ahead of future rehabilitation works. Dust monitoring is therefore being added to the monitoring programme.

Livestock is also a significant consideration in the Silvermines area as cattle in the past have been subject to lead poisoning, leading to guidance on farm management practices in order to limit livestock and food chain (milk and meat) exposure to lead (Silvermines Interagency Group, 2018).

The tenderer is being asked as part of the commencement of the new monitoring programme to undertake a renewed **desk study** of the conceptual site model in order to:

- Establish the continued suitability and representativeness of the monitoring programme,
- Identify data gaps in the sources, pathways and receptors; and
- To gain adequate understanding of the site to inform planning for full rehabilitation.

2.3.3 Environmental monitoring

The most recent environmental monitoring report for Silvermines, in respect of monitoring round undertaken in February 2026 (MKO, 2026a), showed that the overall impact to the aquatic environment from the former mining area is considerable and ongoing. Thirty-seven samples were collected: nineteen surface water samples, thirteen discharge/drainage samples, three seep samples, and two groundwater samples. Please see Appendix A Silvermines monitoring points maps for locations.

The main concerns are dissolved metals in surface and groundwater, especially zinc, nickel, lead and cadmium. One groundwater sample exceeded ecological criteria for dissolved oxygen, chromium and lead (TMF2 downgradient of the TMF). Three discharges (Shallee and two from Garryard) have a significant negative impact on the water quality of the Kilmastulla River due to high concentrations of dissolved metals. Dissolved metal concentrations exceed ecological and human health criteria for all metals except zinc at all Gortmore Seep locations. Dissolved metal concentrations in the Kilmastulla River are elevated and exceeded environmental quality standards (EQS). Highest zinc concentrations (6460 µg/L) were recorded at the Garryard location SW3-GAR. Concentrations of dissolved zinc, lead, nickel and cadmium often exceed ecological and/or drinking water criteria at the river locations in the Ballygown, Garryard, Shallee and Gortmore areas.

The report recommends urgent attention is given to the seepages at Gortmore and that investigations should be undertaken to allow a plan to be developed to manage this and wider issues to minimize impacts to the aquatic environment. The report includes the following recommendations, as well as continuing the monitoring programme:

- Install a permanent flow gauge downstream of Gortmore TMF or use an Acoustic Doppler Current Profiler (ADCP) to improve the accuracy of flow measurement. The Department will arrange this.
- Investigations at Gortmore TMF, e.g. to include water pressures and gradients, seepage rates, depth, soil strength and pore pressure of tailings material, and a range of geotechnical laboratory testing are recommended to address seeps and ensure stability, proper drainage, run-off, and discharge management. This has been undertaken in summer 2026.

2.3.4 Geotechnical monitoring

The most recent geotechnical reports from 2026 (GWP Consultants, 2026a, 2026b) identified the main physical hazards at Silvermines sites to be the stability of Gortmore TMF, the stability of embankments at Garryard tailings lagoon, high rock faces and open mine

workings at Shallee, along with collapsed mine workings, shafts, adits, buildings, and asbestos at Ballygown. Tenderers are referred to the detailed list and map of features contained in the most recent monitoring report GWP (2026a) (Table 1-3 and maps *Ballygown South/Garryard/Shallee Area Features dated 28.04.2026*). These are not provided here owing to their large size. The report is available directly at:

https://assets.gov.ie/static/documents/f89b1391/Silvermines_Geotechnical_Report_After_March_2026_Inspection.pdf

Some 47 observations were made on the physical condition of Gortmore TMF in the report following the inspection in March 2026 (GWP, 2026b). Tenderers are referred to the detailed list and map of features contained in that report (Table 1 and map *Gortmore TMF Area Features AVSILMON2604G dated 30.04.2026*). These are not provided here owing to their large size. The report is available directly at:

https://assets.gov.ie/static/documents/71e30d83/Gortmore_TMF_Geotechnical_Report_After_March_2026_Inspection.pdf

The Gortmore study concluded that “the site is in an unsatisfactory geotechnical condition. Should it fail, then a very serious pollution incident could occur and there may be fatal consequences with nearby houses being inundated with sludge”. It noted a lack of supporting information to assess the actual stability of the structure, and that “there are indications that the western end of the southern bank may be close to failure”. It made the following recommendations:

- Updated UAV survey following vegetation removal.
- Remedial works including capping, buttressing and repair of piping erosion.
- Site investigation to determine the geometry and construction of the berms; installation of new piezometers to monitor the hydrological conditions; cone penetration testing, sampling for shear strength.
- Stability analysis to determine the stability risks posed by the TMF.
- Treatment of contaminated water draining into the Kilamstulla River.
- Erection of hazard signage.

2.3.5 Site investigation at Gortmore TMF 2026

On the basis of findings and recommendations from the environmental and geotechnical reports as outlined above, a site investigation has been carried out at Gortmore during summer 2026 in order to characterise the physical, hydrological and chemical properties of the TMF. The investigation included drone 2D and 3D surveying, geophysical surveying, drilling and installation of wells, and has resulted in additional groundwater monitoring points

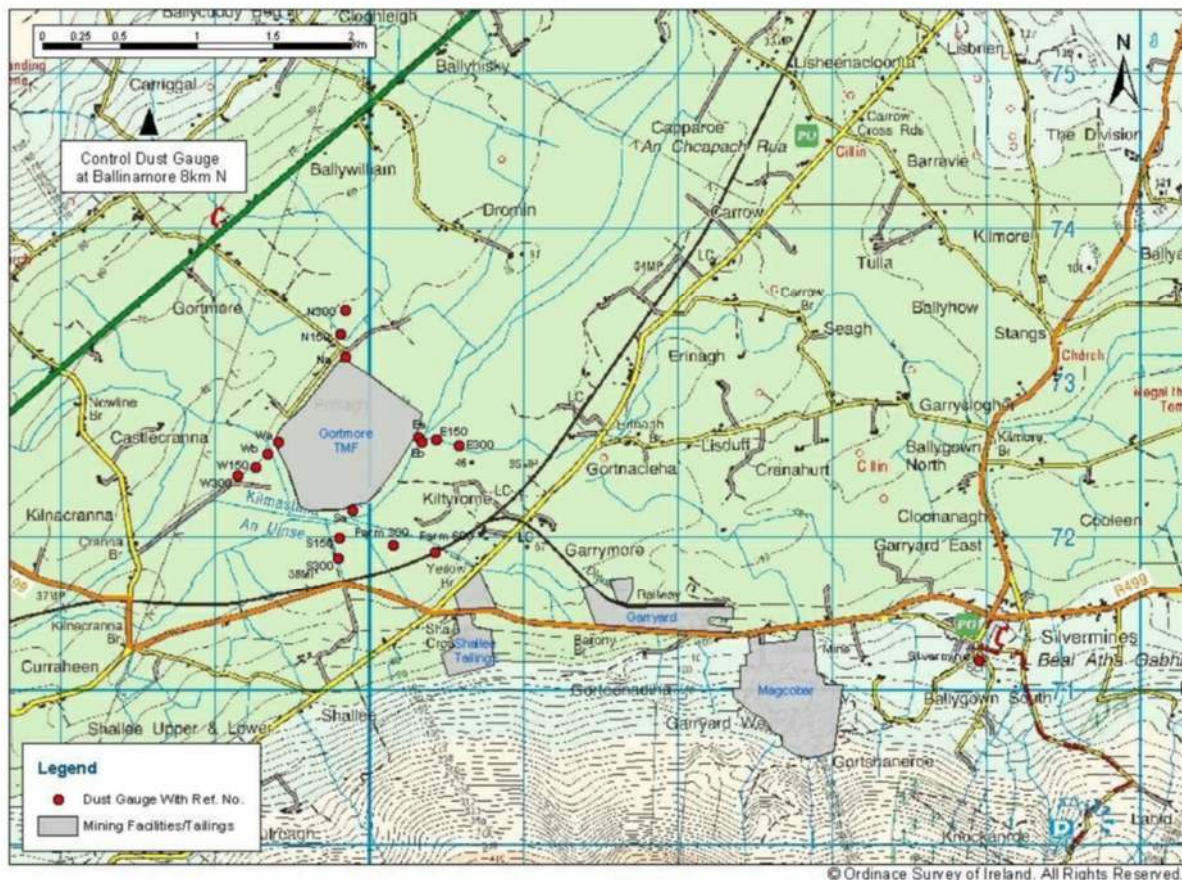
to be added to the environmental monitoring programme on top of and surrounding the TMF. It is to be followed by stability assessment in late 2026, which is the subject of Lot 2 of this RFT.

2.3.6 Dust monitoring at Gortmore TMF

Between 1984 and 1987, dust blows from the Gortmore TMF caused extensive dust contamination of surrounding agricultural grasslands, to the north of the TMF in summer, and to the west and south of the TMF in winter (SRK, 2002). Six severe dust blow events are documented (in addition to intermittent dust blows), with weather conditions noted for only two of the severe events: southern winds after prolonged dry spell (July 1984); and frost with eastern winds (February 1985). Rehabilitation works to establish a grass cover on the TMF were undertaken in 1987, which deteriorated throughout the 1990s.

Following cattle deaths from lead poisoning and ongoing local concern about dust, a dust deposition monitoring programme was undertaken between 1999 and 2004 (EPA, 2006). The monitoring was carried out at 12 locations at compass points at distances of between 15m and 300m the TMF perimeter (Figure 3). The analysis carried out on the dust samples collected was for total dust deposition reported in mg/m²/day and the concentration of heavy metals in the deposited dust in µg/m²/day. Eighteen Bergerhoff gauges were located around the perimeter of the TMF, one was located adjacent to the Silvermines National School and a control gauge was located eight kilometres north of the TMF. Results were compared to the German TA Luft Regulations of the time. The study concluded that the majority of exceedances for total dustfall and heavy metals occurred at gauges located on or close to the base of the Gortmore TMF in the east and the west. Lead and barium were the main exceedances of concern. Deposition rates for lead and barium tended to rapidly decline with increasing distance from the TMF. There was a downward trend in exceedances for all stations over time except the station in the east, which increased in exceedances over time. It recommended that dust deposition monitoring programme should continue to operate during, and for a short period after, the capping remediation works were completed; and ambient dust monitoring during remediation.

Capping works were completed to approximately 20 ha of the TMF 2008-2009 (placement of a geotextile, a 300mm stone capillary layer, soil and topsoil). Validation dust sampling results after capping works are not currently available; if these are located, they will be provided to the consultant. Current understanding is that dust monitoring was removed from the monitoring programme in 2012. Although no major dust blows have been since reported, local concerns about dust continue to be expressed. The uncapped areas, embankment crests and slopes remain poorly vegetated in places and are prone to erosion.



2.3.7 Geoheritage monitoring

The purpose of the geoheritage monitoring programme is to aid the preservation of mining heritage features pending full rehabilitation. The Silvermines district holds a rich legacy of mining activity dating back to at least the 13th Century and is recognised as one of Ireland's most historically significant former metal mining areas. Eight key sites within the Ballygown and Shallee former mining areas have been monitored since 2024, based on selected criteria including protected status, structural integrity, geoheritage significance, accessibility, and interpretive potential. The latest geoheritage monitoring report from the March 2026 inspection (MKO, 2026c) points out several vulnerabilities which threaten the long-term accessibility of the monitored features including vegetation intrusion, loss of mortar, loosening of brickwork, structural concerns. The recommendations are being addressed as part of the annual programme of maintenance works carried out on behalf of the Department by Tipperary County Council.

2.4 Avoca

2.4.1 Site description

The Avoca mining area is in the Wicklow Mountains, approximately 55 km south of Dublin. The site comprises the East and West Avoca mines and Shelton Abbey tailings management facility (TMF), which is situated 5 km downstream of the former mining area (Figure 4). The Avoca Mine site was worked intermittently for approximately 250 years with the extraction of 16Mt of copper and pyrite ore and on-site processing of concentrates. The mine closed in 1982. Mineral extraction has left an environmental legacy that comprises three open pits, over 70 shafts and adits, numerous spoil piles and 25 mine buildings/structures. The mine area was subdivided into a number of properties in the 18th and 19th centuries, each named after the townlands in which they were located. From northeast to southwest these were Connary, Cronebane, Tigroney on the eastern side of the river, and Ballygahan and Ballymurtagh on the western side (Figure 4).

The most hazardous features have been fenced off, or in the case of some of the shafts and adits, blocked off. The fences are breached regularly leading to unauthorized access to open pits, underground workings, etc. Spoil piles and Shelton Abbey TMF have elevated metal levels and are physically unstable with the potential to collapse. In addition, there is unstable ground which has the potential for subsidence.

The site also includes a Tailings Management Facility (TMF) at Shelton Abbey which is in the ownership of Wicklow County Council. It is located approximately 8 km south of the main site downstream on the bank of the Avoca River. The site is about 1,000m long by 450m wide, covering an area of c. 45ha, containing some 7,500,000m³ of tailings material. The embankment slopes are high, steep and heavily vegetated with mature trees. The site is currently in use seasonally by a gun club for pheasant rearing. The water discharges from the mine and TMF are acidic and metal laden. This has impacted on the water quality of the Avoca River.

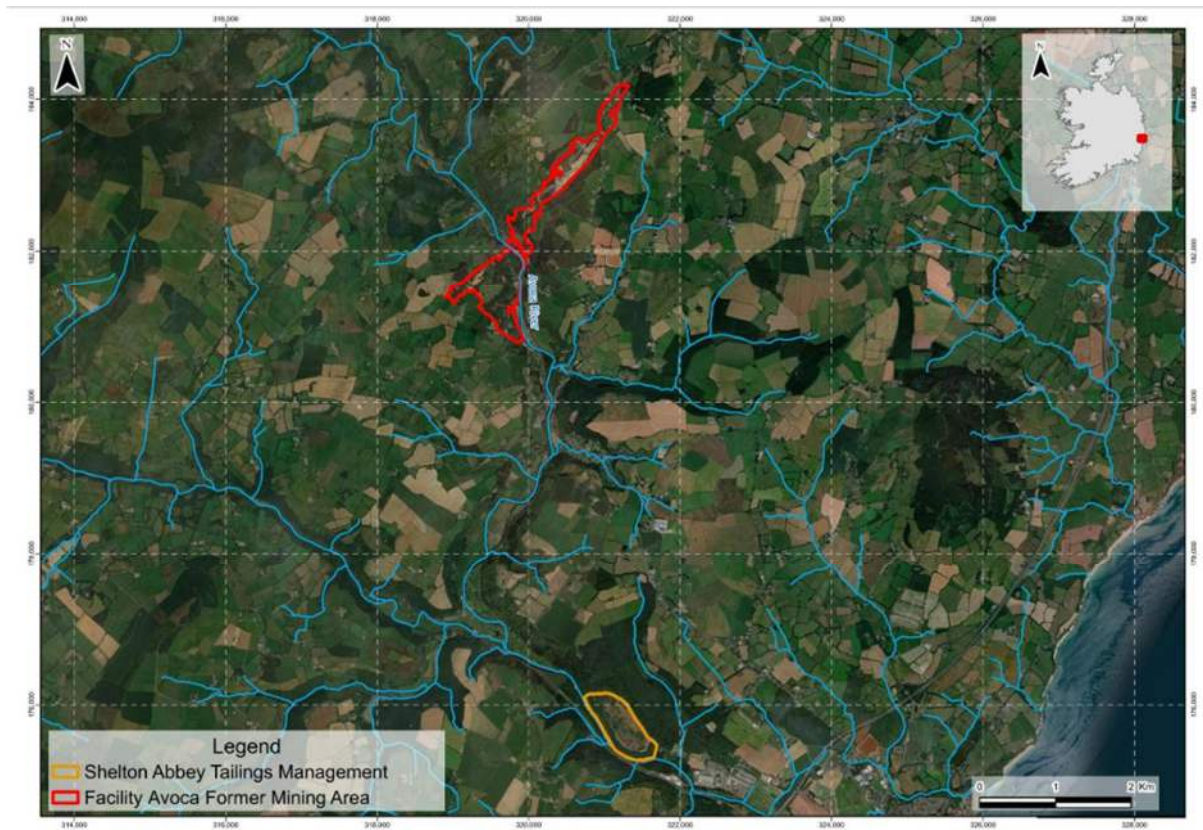


Figure 4 Avoca aerial overview (from MKO, 2026b)

2.4.2 Site conceptual model

A simple site conceptual model is shown in (Figure 5) to convey current understanding of the **main** sources, pathways and receptors for environmental contamination at the site.

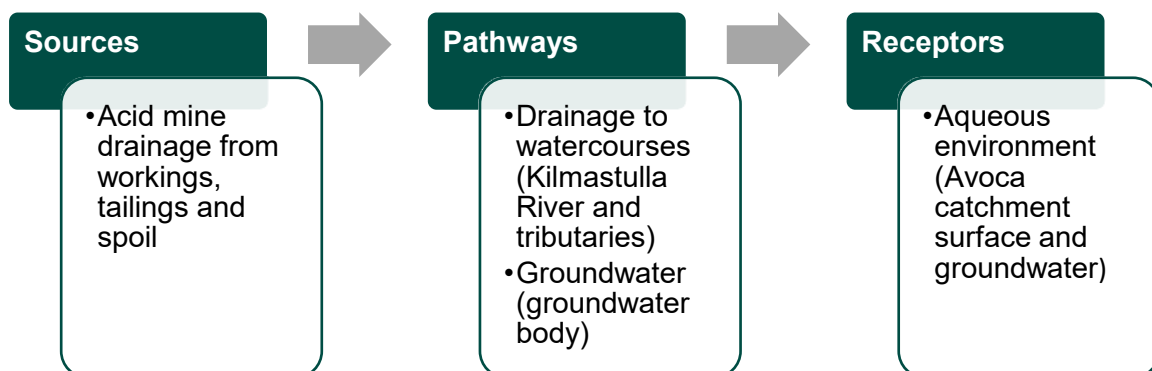


Figure 5 Conceptual site model for Avoca

The Avoca Mines are located within the 650 km² Avoca River Catchment. The East and West Avoca Mines are separated by the Avoca River. The river flows through the Vale of Avoca, a noted tourist attraction. To the north of the mines, the Avoca River is formed at the "Meeting of the Waters" by the confluence of the Avonbeg and Avonmore Rivers, while 6.5

km to the south, it is joined by the Aughrim River. It flows an additional 7.5 km to the sea at the fishing port of Arklow. Several smaller tributaries join the Avoca River close to the mine water discharges, including Sulphur Brook to the south of East Avoca Mines, and the Valeview and Red Road streams to the north and south respectively of West Avoca Mines.

The Avoca River divides the East and West Avoca mine sites and flows along the base of the TMF. The river continues southward entering the Irish Sea at Arklow, approximately 10 km downstream of the mining area.

Current understanding of the site conceptual model and flow dynamics of the Avoca system are outlined by MKO (2026b). Overall water movement comprises three primary pathways:

- Surface runoff (overland flow). Within the former mining area, surface drainage is influenced by the spoil piles and open pits on both sides of the river. The open pits collect rainwater (directly) and runoff (indirectly);
- Underground workings. The workings are an open hydrological system which take inputs from pits, runoff and groundwater and discharge through adits downgradient to the river.
- Interflow or transition zone (flow in subsoils and/or along the top of bedrock). Near the Avoca River, interflow will enter the alluvium and the Avoca River or emerge as seeps or springs. The transition zone may be only a few metres thick, and is regarded as being more permeable or transmissive than deeper bedrock; and
- "Deep" groundwater flow at Avoca occurs in discrete fractures or fracture zones which represent zones of enhanced permeability. Deep groundwater will also be intercepted by underground mine workings in the mine area. Near the Avoca River, deep groundwater will also enter the alluvium.

Positive hydraulic gradients from monitoring wells to the Avoca River, indicate a net gaining river and show that the spoil and alluvial areas contribute contaminant loads (especially evident for zinc) to the river. Past tracer studies indicate that the diffuse load due to groundwater contamination of zinc ranges from approximately 30% to 60% depending upon the exact river segments. The point sources (adit discharges and drainages) typically contribute the major metal loads over most of the Avoca River. The results indicate that both diffuse and point sources need to be addressed to achieve acceptable water quality status in the Avoca River. Water Framework Directive status for the Avoca River 2019-2024 was Poor.

The tenderer is being asked as part of the commencement of the new monitoring programme to undertake a renewed **desk study** of the conceptual site model in order to:

- Establish the continued suitability and representativeness of the monitoring programme;
- Recommend updates to the programme;
- Identify data gaps in the characterisation of sources, pathways and receptors;
- To gain adequate understanding of the site to inform planning for full rehabilitation.

2.4.3 Environmental monitoring

The monitoring programme was designed in 2017 and has not significantly changed since then. There are currently 8 groundwater well and 21 surface water and adit discharge monitoring locations (Figure 6). Some monitoring points have become unsafe to sample or obsolete for scientific or technical reasons since the commencement of the programme.

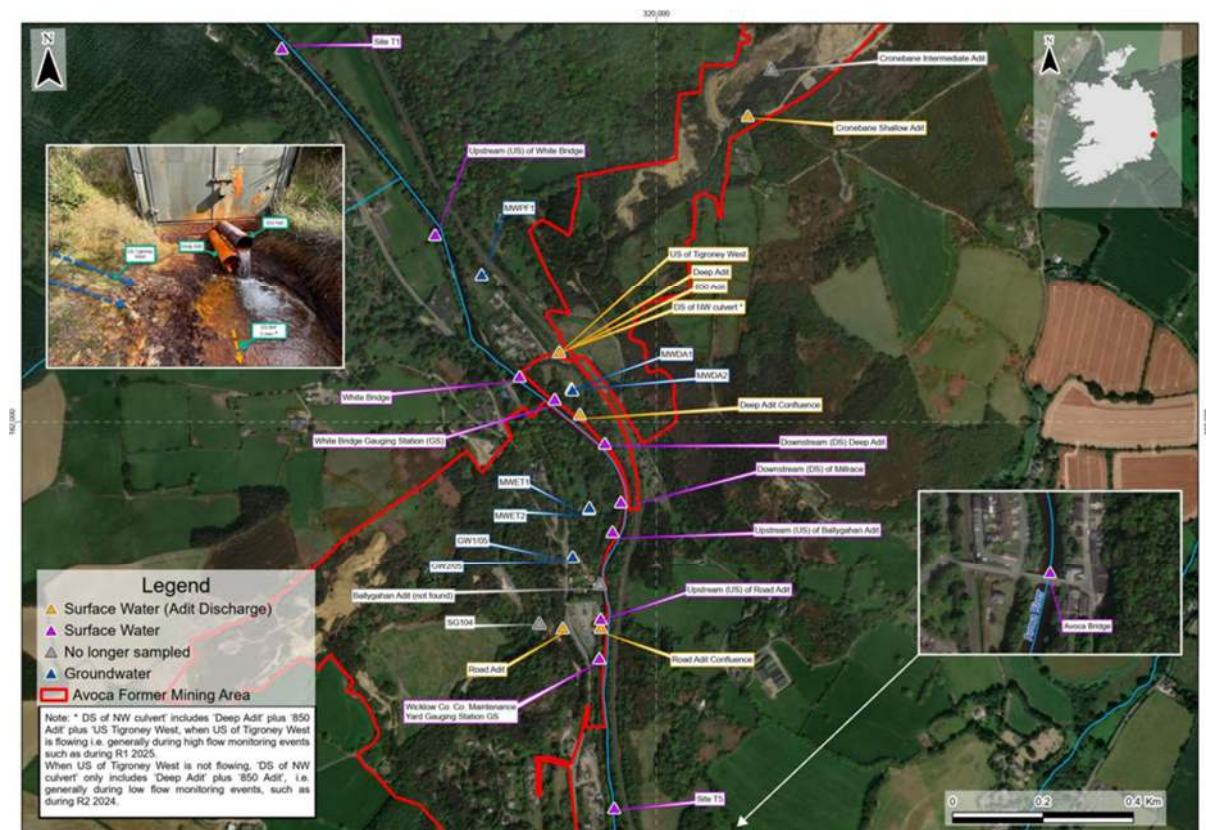


Figure 6 Avoca main site monitoring locations (from MKO, 2026b)

The most recent environmental monitoring round was completed for Avoca in February 2026 as described in the monitoring report (MKO, 2026b). For the February 2026 monitoring event 29 locations were sampled: eight groundwater monitoring wells, 13 surface water and eight adit discharge/drainage locations. Flow rate was measured at one location on the Avoca

River, and the flow rate was projected and estimated for the other 12 locations. Flow was also measured at seven adit discharge/drainage locations and projected and estimated at one.

The main findings were as follows. Further detail is available in MKO (2026b).

- **Changes in flow regime from the underground workings have occurred.** The flow from the 850 adit has dramatically increased over time, while flows have decreased from the Deep Adit in the last decade. Flows from the Cronebane Shallow Adit have increased, causing a downgradient overland flow.
- **Dissolved metal concentrations were elevated** in all the monitoring wells (except in the upgradient control well), and at all the adit discharges/drainages. There are many exceedances of ecological criteria and/or human health criteria, particularly for dissolved aluminium, arsenic, cadmium, cobalt, copper, iron, lead, manganese, nickel and zinc. Sulphate levels also significantly exceeded the criteria for human health in seven of the eight monitoring wells and in all eight adit discharges.
- **Dissolved metal concentrations in the Avoca River** were low in comparison to the groundwater and adit discharges/drainages; however, there were exceedances of the ecological and/or human health criteria for many locations.
- **There is generally a positive hydraulic gradient** between groundwater and the river. The results of the ongoing monitoring emphasise the significance of positive hydraulic gradients and indicate movement of metals from the alluvium to the river during the monitoring period and 91% of the time over the one-year period February 2025 – February 2026. Spoil and alluvial areas were identified as substantial contributors to contaminant loads, particularly for zinc and lead.
- **Shelton Abbey TMF impacts.** Metal loadings increase slightly downstream of Shelton Abbey TMF, suggesting impacts from the TMF on the Avoca River.

Recommendations focus on improving the quality of monitoring data and updating understanding of the underground flow and adit discharges at the site:

- **Improve flow measurement at adit discharges.** The bucket-and-stopwatch method is typically used to measure discharge at the adits. Installation of permanent flow gauges with telemetry is recommended, including engagement with relevant specialists and stakeholders, to improve data reliability and availability.
- **Improve flow measurement on Avoca River.** The float method is typically used to measure flow at two locations on the Avoca River (Avoca Bridge and Shelton Abbey)

but this is not practical during high flows. Installation of an Acoustic Doppler Current Profiler is recommended at these locations to improve flow measurement.

- **Understand changes in underground workings flow conditions.**

Urgent investigation is required to re-establish site understanding. This should include repeat tracer testing, enhanced flow and water level monitoring and inspection of the adit system where feasible, to try and identify why changes are occurring in flow patterns in the 850 and Deep Adits.

- **Replacement of automatic loggers in the monitoring wells**, as the existing loggers are at the end of their functional life.
- **A range of safety works** to improve monitoring point access and safety.

The safety works to the monitoring points are being addressed by the ongoing programme of maintenance works carried out at the site by Wicklow County Council under Grant Agreement from this Department. The other recommendations are incorporated into the specification for this Lot.

2.4.4 Geotechnical monitoring

The geotechnical report from 2026 (GWP Consultants Ltd, 2026c) identified the main physical hazards at Avoca sites to be high rock faces and shafts; along with collapsed mine workings, adits, buildings, tips and lagoons, some of which pose a severe safety risk. GWP prepared a separate report on the geotechnical condition of Shelton Abbey (GWP Consultants Ltd, 2026d). The scope of the inspection was five areas in the main site (Conary, Cronebane and Mount Platt, East Avoca, Tigroney and West Avoca), the TMF at Shelton Abbey and an underground inspection of the 850 adit. Tenderers are referred to the detailed lists and maps of features contained in the most recent monitoring report GWP (2026c) (Table 1-7 and accompanying maps documenting observations on shafts, adits, structures, fences, rockfaces, tips, lagoons at Avoca. These are not provided here owing to their large size. The report is available directly at:

https://assets.gov.ie/static/documents/fe499ecd/Avoca_Geotechnical_Report_After_March_2026_Inspection.pdf.

The main physical hazards of the Shelton Abbey site relate to the physical integrity of the lagoon banks. Like Gortmore TMF, the Shelton Abbey has not been properly capped, which is allowing water to percolate through the tailings, seep out into the adjacent watercourses and cause stability concerns. Although there is a better understanding of the construction and hydrology of Shelton Abbey due to the availability of construction records, the reports recommend carrying out further studies to establish the full depth of the TMF and the nature

of the underlying materials and to undertake a stability analysis. The report points out that “should the TMF slopes fail, then there could be many thousands of cubic meters of toxic tailings deposited in the Avoca River. There is a risk that such an event could occur due to either elevated water pressures, or erosion of the riverbank”.

Eleven observations were made on the physical condition of Shelton Abbey TMF in the report following the inspection in March 2026 (GWP, 2026d). Tenderers are referred to the detailed list and map of features contained in that report (Table 1 and accompanying map).

These are not provided here owing to their large size. The report is available directly at:

https://assets.gov.ie/static/documents/3cca49e0/Shelton_Abbey_TMF_Geotechnical_Report_After_March_2026_Inspection.pdf.

2.4.5 850 adit inspection 2025

The 850 adit has been inspected annually since it was rehabilitated in 2020. The scope **includes underground inspection** to examine the effectiveness of the rehabilitation works of the first 85m of the adit carried out in June 2020 and to examine the remaining 620m of the adit for ground stability, deteriorating supports and/or additional water inflows.

On foot of the 2025 inspection, maintenance and minor remediation tasks were identified as necessary to maintain the integrity of the rehabilitation works, improve drainage and to make it safer to inspect (LTMS, 2025). Before another inspection can take place, the Department will arrange the completion of the following works.

- Zone 1 (0-11m): installation of a sandbag barricade to prevent overflow during heavy rainfall and drilling of holes in sidewalls to relieve hydrostatic pressure;
- Zone 2 (11-33m): confirm source of additional flows through tracer sets and consider piping flow to drainage system at Tigroney; sealing of steelwork;
- Timber frame dam at 78m: to be replaced with a designed wall anchored dam and associated works;
- Flooded raise at 390 level (shaft to Deep Adit) to be sealed off.

2.4.6 Site investigation at Shelton Abbey TMF 2026

On the basis of findings and recommendations from the environmental and geotechnical reports as outlined above, a site investigation has been carried out at Shelton Abbey TMF during summer 2026 in order to characterise the physical, hydrological and chemical properties of the TMF. The investigation included drone 2D and 3D surveying, geophysical surveying, drilling and installation of wells, and has resulted in additional groundwater monitoring points to be added to the environmental monitoring programme on top of and

surrounding the TMF. It is to be followed by stability assessment in 2027, which is the subject of Lot 2 of this RFT.

2.4.7 Geoheritage monitoring

The purpose of the geoheritage monitoring programme is to aid the preservation of mining heritage features pending full rehabilitation. Avoca is one of Ireland's most historically significant mining landscapes, reflecting over two centuries of mineral extraction and industrial development. The area is particularly notable for the remnants of 19th Century mining infrastructure that includes engine houses, chimneys, processing floors, and open pits. Twelve key sites in 4 former mining zones (West Avoca, Connary, Tigroney East, and Tigroney West) have been monitored since 2024, based on selected criteria including protected status, structural integrity, geoheritage significance, accessibility, and interpretive potential. The latest geoheritage monitoring report from the March 2026 inspection (MKO, 2026d) points out several vulnerabilities which threaten the long-term integrity and accessibility of the monitored features including vegetation intrusion, loss of mortar, loosening of brickwork, structural concerns and public safety. The recommendations are being addressed as part of the annual programme of maintenance works carried out on behalf of the Department by Wicklow County Council.

3 Monitoring requirements

The objectives of Lot 1 are to:

- Review the conceptual site models for Avoca and Silvermines and identify data gaps that limit sufficient characterisation of the sites.
- Review the monitoring network integrity for the Avoca and Kilmastulla Rivers; and Avoca adits.
- Recommend improvements to the monitoring network to characterise the site for better flow measurement, geochemical and geotechnical purposes.
- Check the status of the sites including any remediation works to ensure that they continue to remain fit for purpose and that no unexpected conditions have arisen.
- Perform environmental, geotechnical and geoheritage monitoring, comprising the collection of high quality, representative samples/measurements/observations.
- Prepare reports on the results of the monitoring programme, including the interpretation of monitoring data and making recommendations to the Department on any actions that might be required.

The services required as part of this contract will comprise:

1. Project management
2. Environmental monitoring; including:
 - a. Twice annual environmental monitoring
 - b. Conceptual site model review
3. Geotechnical monitoring
4. Geoheritage monitoring

The consultant must demonstrate, with clear evidence, in their proposal that they have the required competence and experience to carry out all the above-listed tasks.

General information:

- Landowner contact details and keys are available for all monitoring points. DCEE and the relevant local authorities will assist with land access.
- The total land area for each site is not available, please refer to reference maps and reports for site extents and monitoring points.

3.1 Service 1 Project Management

The tenderer should propose their methodology for project management to oversee the tasks and specifications contained within this RFT. **This will be scored in Award Criterion 1 in the RFT document.** The methodology for project management should specifically address the following requirements.

3.1.1 Project team

The project team should be identified in the tender in the form of an organisational chart. Key personnel such as the project manager are critical, and the Department expects that those identified persons will be involved and fill the role outlined in the organisational chart for the duration of the project. However, unexpected circumstances can arise and we therefore request alternatives to be identified in the tender submission.

The submission should provide the following information:

- The name of the person who will be the Project Manager for the contract. Please provide an up-to-date CV for the Project Manager.
- The names of the persons who will be working on the project and their specific role in the project. Please provide the names of alternates in the event that the first named persons are not available. Provide CV for both the first named and alternate persons.

For each person, please also provide a statement of their current areas of responsibility and expertise.

- An estimate of the number of person days that each named person will spend on the project.

3.1.2 Project Meetings

An initial meeting will take place between the Department and the successful tenderer, ahead of fieldwork commencing. Thereafter, project meetings will be held twice yearly on delivery of the monitoring round results, unless specific issues arise which require additional meetings with the Department or other relevant bodies. These meetings will be primarily so that the consultant can report on progress and highlight any problematic issues. The project meeting schedule is to be specified in a project Gantt chart.

3.1.3 Reporting

The following reports will be required as part of the contract:

- **Monitoring rounds:** Reports on the environmental, geotechnical and geoheritage monitoring undertaken, and an annual consolidated executive summary of the findings across the three thematic areas for each site.
- **Conceptual site model review:** Reports on review of the CSM and update after 3 years.

3.1.4 Health and Safety plan

The Contractor is responsible for assessing and mitigating all risks associated with fieldwork and associated activities for its personnel. Ensuring the health and safety of personnel working on this project is of great importance, given that there are physical and chemical risks at the sites. The Client requires comprehensive risk assessments with mitigation measures and risk matrices, plus statements and policies written on the safe system of working in relation to each of the activities described in this RFT, **to be produced in draft as part of the project plan**. Such assessments must make very specific reference to the components of the work. If there is a failure to complete this, then the Client will not permit the Contractor to begin fieldwork and the contract may be suspended. The Client requires that the Contractor report all accidents and near-misses including, but not limited to, any matter where the emergency services are respondents to any of its personnel, vehicles, or field accommodations for any reason. Notification must be with 4 hours of the incident and to be followed by a formal report within 24 hours in writing. The Client will agree a reporting format with the Contractor ahead of fieldwork commencing. Any significant health and safety

risk identified by the consultant in the course of environmental monitoring at either Avoca or Silvermines should be communicated to the Department immediately.

3.1.5 Green Procurement

Tenderers are required to provide evidence of commitment to environmentally friendly practices that reduce emissions, resource use and waste (as they relate to specific proposals in the tender response), in support of Government Green Procurement objectives. The tenderer should include in their proposal metrics for demonstrating green commitments over the lifetime of the contract.

3.1.6 Deliverables, reporting and timelines

The deliverables for each service are summarised in Table 1.

Deliverable	Content	Timing
Service 1 Project Management		
1. Project plan	Project plan including: (i) Methodology (ii) Draft Health & Safety plan (iii) Timelines for deliverables and billing	2 weeks post contract award
	Consolidated executive summaries on monitoring rounds	Annually
Service 2 Environmental Monitoring		
2a. Environmental monitoring rounds reports on Avoca and Silvermines	Summary of works completed, findings and recommendations from monitoring rounds, including: - Digital photographs; - Laboratory certificates of analysis; - Sample chain of custody information; - Tabulated analytical, field measurement and flow measurement data.	Autumn and spring each year, reports 1 month post field work completion
2b. Conceptual site models review	Report and update report.	12 months post contract award. Update after 3 years.
Service 3 Geotechnical Monitoring		
3. Geotechnical monitoring rounds reports on Avoca And Silvermines	Summary of visual inspection completed, findings and recommendations from monitoring rounds, including digital photographs, maps and databases.	Spring annually, report 1 month post field work completion

Service 4 Geoheritage monitoring		
4. Geoheritage monitoring rounds reports on Avoca and Silvermines	Summary of works completed, findings and recommendations from monitoring rounds, including digital photographs, maps and databases.	Spring annually, reporting 1 month post field work completion

Table 1 Services and deliverables for Lot 1

The tenderer should propose a draft payment schedule based on the services and deliverables in Table 1.

All rights and interest in the data shall vest in the Department. All monitoring data collected by the successful tenderer should be treated as confidential and shall not be disclosed to any other party without written permission from the Department.

3.2 Service 2a Environmental monitoring

3.2.1 General requirements

The tenderer must outline their approach to environmental monitoring in three media (surface water, groundwater and dust), to meet the following general and site-specific requirements. **This will be scored in Award Criterion 2a in the RFT document.** The consultant will also be responsible for designing and supervising specific works to improve the integrity and safety of the monitoring network as part of this contract, as indicated in the detailed requirements.

The main aim of the environmental monitoring is to obtain high-quality, representative samples and chemical analyses. All field personnel must be aware of the factors that can affect the quality of samples and ensure that the correct procedures are followed with respect to sample collection, preservation, handling, storage, shipping, etc., so that the overall objective of collecting quality, representative samples is realised. During sample collection, considerable care must be taken to minimize sample disturbance, avoid sample exposure to air (in the case of groundwater samples), avoid extraneous contamination and to preserve sample integrity.

The consultant shall check the quality of decontamination, collection and handling procedures by collecting additional Quality Control samples (blanks and duplicates). These must be sent “blind” to the laboratory, marked in such a way as to disguise the sampling location, but should remain known to the field technician who collected the sample.

The consultant shall also ensure that all samples are stored in appropriate conditions prior to leaving the field. All processed samples shall be sent to the laboratory without delay so that they arrive within the required analytical times. It is necessary for quality assurance reasons to be able to identify every person who had custody of the samples. To achieve this, every container with samples enclosed must contain a Chain-of-Custody data sheet.

Tenderers should propose Standard Operating Procedures which outline their proposed methodology for surface water, groundwater and dust sampling and quality control procedures.

It is imperative that a continuous record of environmental monitoring is maintained for Avoca and Silvermines. Therefore, as soon as possible after the award of the contract in autumn 2026, it will be necessary to carry out a sampling round.

3.2.1.1 Surface Water Sampling

It is expected that the sampler(s) will have previous experience of collecting surface water and groundwater samples, be familiar with ISO 5667 “Water Quality – Sampling” and have sufficient hydrogeological and hydrological experience to understand and apply this standard to water sampling.

For this tender, surface water includes water occurring in streams, adit discharges, run-off from solid waste and that which is ponded at seepage locations. Wherever possible, grab samples of surface water should be collected from well-mixed portions of a stream, discharge, etc. If flow conditions allow it, samples should be collected from the middle or close to the middle of streams.

Filtered water samples are to be collected at each site in a 1 x 100ml trace element-free bottle (or equivalent). The filtered water sample should be appropriately preserved in accordance with laboratory requirements for dissolved ion and trace element analysis.

All filtered water samples should be collected using a 0.45 micrometer (µm) pore size disposable filter. Consultants should provide in their tenders, detailed information on how they propose to collect and process the filtered water samples.

All water samples must be placed without contamination (e.g. from hands, etc), into appropriately labelled, new containers. Following collection and processing, water samples should be stored in a cool box or refrigerator, maintained at 4°C or less, without freezing, until analysed by the laboratory. All samples shall be sent to the laboratory on the day of their collection, so that the risk of sample deterioration is minimized. Field notes on site conditions, sampling issues and general site observations that could impact on the sample

quality should be recorded. So as to avoid cross contamination of samples, it is essential that all sampling equipment is cleaned and decontaminated between each sampling event.

3.2.1.2 Field Measurements at water sampling sites

In addition to collecting surface and groundwater samples for laboratory analysis, a multi-parameter instrument should be used to measure the following field parameters:

- pH
- Temperature
- Dissolved oxygen (DO)
- Specific conductivity
- Oxidation-reduction potential (ORP).

At each sampling site, the instrument should be carefully cleaned and the sensor calibration verified in line with the manufacturer's guidelines. Field measurements should be recorded prior to water samples being collected for laboratory analysis. Before recording a 'final' field measurement, care must be taken to ensure that values on the instrument display have stabilized. Samplers should ensure that they have spare equipment and sampling containers, which can be used if some of the equipment fails or sampling containers get damaged. Consultants should indicate in their tenders what multi-parameter instrument they intend using to determine field parameters along with information on how and when it will be calibrated.

Surface water sampling sites should be photographed and information recorded on any site-specific conditions that could impact on the quality of field measurements/water samples collected. Where possible, the physico-chemical field parameters should be measured directly in the flowing surface water. Antecedent daily rainfall conditions for the week before measurement should also be noted.

At each groundwater sampling site, water levels should be determined using a portable electronic water level recorder or other such suitable equipment. Water levels should be recorded prior to well purging and sample collection. Avoca sites may be installed with automatic groundwater level recorders that should be downloaded by the consultant at time of sampling. Field physico-chemical parameters should ideally be measured using a flow-through cell, following purging of the borehole. Monitoring of field measurement values is required towards the end of well purging to indicate when the water being withdrawn represents fresh water from the surrounding strata, such that sample collection can commence. Consultants should include in their tender, information on the methodology and

equipment they propose to employ in measuring field parameters. Provision of such equipment will be the responsibility of the successful tenderer.

3.2.1.3 Flow measurements and improvements

At a number of sites the consultant is required to obtain flow measurements using an appropriate method, either by a physical method (e.g. flow meter, field flumes, calibrated containers, etc.) or estimated from the closest gauged location, pending improvement of flow measurement instrumentation. The choice of method shall be chosen by the consultant based on the quantity of flow to be measured and safety considerations.

Flow measurements for the autumn 2026 monitoring round are to be completed using the existing methods pending new flow measurement instrumentation required to be installed as recommended in the latest monitoring reports.

3.2.1.4 Groundwater Sample Collection

Prior to collecting groundwater samples, the consultant shall take appropriate measures to ensure that the water being sampled is representative of the formation, rather than stagnant water from within the borehole and the packing material (by purging). Prior to sample collection, field measurements should have stabilised for three consecutive measurements. Following purging, filtered groundwater samples should be collected, using low flow (approximately 100mL/minute) sampling methods.

The consultant should include in their tender detailed information on their proposed methodology for purging the boreholes and collecting and processing groundwater samples. All groundwater samples should be placed in appropriately labelled, new, chemically inert containers before being stored in a cool box or refrigerator, maintained at 4°C or less, without freezing. Samples should be sent to the laboratory on the day of their collection, so that they may be analysed as soon as possible. All groundwater sampling equipment (e.g. bailers, tubing, pump, flow through cells, water level probe, etc) must be cleaned and decontaminated between sampling events.

3.2.1.5 Laboratory Analyses – aqueous samples

The Consultant must ensure that the laboratory to which the samples are sent has the appropriate accreditation and that the detection levels used for the analytes are able to satisfy relevant EU and EPA Water Quality Standards, and are consistent with or better than those achieved in the last monitoring round. For quality control purposes, field, equipment and temperature blanks, replicate samples, matrix spikes and appropriate certified reference materials should be submitted blind to laboratories along with the water samples.

Appropriate statistical assessments are to be carried out by the consultant in order to demonstrate accuracy, precision and repeatability for the results. The laboratory should verify that all samples were received in proper condition, at the correct temperature, and that holding times were not exceeded.

Samples are to be analysed for pH, ammoniacal nitrogen as N, anions, cations, and dissolved metals (Al, Sb, As, Ba, Cd, Cr, Co, Cu, Fe, Pb, Mn, Mo, Ni, V and Zn). River samples are also to be analysed for total organic carbon (TOC) and calcium (Ca) to permit assessment of bioavailable concentrations of metals.

Analytical data is to be presented in tabulated form with relevant assessment criteria. Statistical summaries of determinands for different sample media are to be provided. Appropriate trend analysis is to be performed to identify any long-term trends compared to historical data, which will be made available to the contractor.

3.2.1.6 Contaminant loadings

Mass loads (g/day) are to be calculated for the monitoring locations where flow and concentration data is available.

3.2.1.7 Invasive species

Occurrences of relevant varieties of invasive species e.g. Japanese knotweed, Himalayan knotweed and buddleia should be noted in the monitoring reports.

3.2.1.8 Environmental monitoring reports

Separate environmental monitoring reports on Avoca and Silvermines should be submitted twice a year, in spring and autumn, in digital format (Word document and PDF). The first monitoring round shall be autumn 2026. Each report should include the following:

- An executive summary (300 words maximum) comprising a brief description of the works completed, the findings and the recommendations;
- Sampling/processing methodologies employed, including field QA/QC measures implemented;
- Brief description of analytical methods including QA/ QC measures;
- Tabulated field and laboratory data for all sampling sites (this data should additionally be submitted as a digital spreadsheet with relevant spatial information), including:
 - Groundwater level and flow measurement information downloaded from automatic recorders;

- Field physico-chemical parameters (pH, temperature, DO, etc) collated for each individual sampling site in Excel spreadsheet format.
- Data analysis and interpretation, carried out by suitably qualified persons. Appropriate tools and techniques should be employed for interpretation, to include comparison to relevant acceptance criteria, trend analysis, water flow and loading analysis, groundwater levels analysis, groundwater-surface water interactions, groundwater gradients and statistical summaries.
- An appraisal of whether Department-funded remediation works remain fit for purpose.
- Recommendations on any further actions required (e.g. necessary maintenance works, alterations to monitoring programme).
- Any other relevant information.

A key objective of this project is to provide the Department with high-quality, representative sample analyses and field data. All laboratory analyses including QA/QC data, shall be delivered as an Excel spreadsheet within one month of completing sampling. Laboratories should report the limit of detection values for each determinant analysed and the analysis method used to determine the determinant concentration.

Photographic records will be a key element of the reports. The consultant is required to comprehensively photograph all surface water sampling sites, any signs of Acid Rock Drainage (ARD), instability or vegetative die-back at the Gortmore TMF site, any damage to security fencing/gates and any evidence of unauthorised access to either the Avoca or Silvermines sites.

3.2.2 Silvermines monitoring locations

3.2.2.1 Flow measurement locations

Surface water flow measurement locations, flow levels and methods used for the last monitoring round in February 2026 at Silvermines are shown in Table 2 for reference. Flow is to be measured at these points by the consultant, along with any observations on the drainage channels to ensure they are free-draining.

Site Name	Area	Easting	Northing	Sample site notes	Field Parameters & Chemical Analysis	Current flow measurement method
SW1-SM	BG	184066	170707	Site on Silvermines Stream (upstream of Ballygown mine workings).	Yes	Flowmeter
SW3-SM	BG	184245	171445	Site on Silvermines Stream (downstream of main Ballygown workings, but upstream of North Adit)	Yes	Flowmeter
SW2-SM-South	BG	184244	171584	Discharge from Southern Adit.	Yes	Bucket Stopwatch
SW5-SM	BG	184296	171708	Site on Silvermines Stream (downstream of main Ballygown workings and of North Adit)	Yes	Flowmeter
SW6-SM	BG	184117	172064	Site on Silvermines Stream (downstream of main Ballygown workings and of North Adit)	Yes	Flowmeter
SW4-SM-GA	BG	183951	172485	Site on Silvermines Stream (downstream of all Ballygowan mine workings)	Yes	Flowmeter
SW6-MAG	MG	182776	171402	Foilborrig Stream diverted around Magcobar Pit. The sampling site is just south of the R499 road.	Yes	N/A
SW1-GAR	GA	182124	171315	Stream south of R499 road (south of old Mogul Yard). Upstream of Garryard Mine.	Yes	Flowmeter
SW5-GAR	GA	181932	171422	Discharge from the Knight Shaft	Yes	Not accessible due to metal grate
SW7-GAR	GA	181523	171493	Discharge from smaller settlement pond	Yes	Bucket and stopwatch
SW12-GAR	GA	181791	171569	Combined run-off from Knight Shaft and the eastern part of Mogul Yard was sampled north of the railway and upgradient of the tailings lagoon.	Yes	Flow Meter
SW10-GAR	GA	181644	171749	Discharge from Garryard tailings lagoon	Yes	Flow Meter

Site Name	Area	Easting	Northing	Sample site notes	Field Parameters & Chemical Analysis	Current flow measurement method
SW3-GAR	GA	181313	171654	Stream site containing drainage flows from both the Garryard tailings lagoon and the western part of the Mogul Yard.	Yes	Flow Meter
DS-Gorteenadiha	GTD	180737	171787	Stream downgradient of Gorteenadiha and Garryard	Yes	Flow Meter
US-SHAL	ShS	180715	171798	Yellow River upstream of ShS (and downstream of Garryard and Gorteenadiha)	Yes	Flow Meter
SW4-SHAL	ShS	180328	171088	Watercourse west of 'Drum Dump' and Shallee South workings.	Yes	Bucket Stopwatch
SW12-SHAL	ShS	180674	171174	Stone lined drainage channel SSW of the reservoir	Yes	Bucket Stopwatch
SW5-SHAL	ShS	180606	171326	Water course west of the fenced-off area enclosing King's House and core sheds. Further west, this same feature runs along the toe of the drum dump.	Yes	Flume Method
SW6-SHAL	ShS	180591	171331	Stream emanating from the flooded Field Shaft	Yes	Flow Meter
SW9-SHAL	ShS	180566	171499	Stream occurring immediately east of the southernmost Shallee tailings impoundment. Sample site is south of R499 road.	Yes	Flow Meter
SW13-SHAL	ShS	180722	171752	Stream draining the eastern section of the tailing's impoundment (adjacent to SW1-Shal in northern most corner)	Yes	Flow Meter
SW1-SHAL	ShS	180703	171778	Watercourse that runs parallel to R500. Sampling site occurs close to northern-most corner of Shallee tailings impoundment. Downstream of Shallee workings.	Yes	Flow Meter
DS-SHAL	ShS	180636	171839	Yellow River downstream of Shallee, Gorteenadiha and Garryard	Yes	Flow Meter
SW17-GORT	GM	180538	173059	Site located on Kilmastulla River, upstream of TMF	Yes	N/A
SW18-GORT	GM	179770	172652	Site of discharge from the main pond on the TMF	Yes	N/A

Site Name	Area	Easting	Northing	Sample site notes	Field Parameters & Chemical Analysis	Current flow measurement method
SW19-GORT	GM	180081	172971	Discharge to TMF wetlands. DS of decant.	Yes	Flume Method
SW10-GORT-US	GM	180212	172410	Immediately upstream of the outfall on the Kilmastulla River	No	N/A
SW10-GORT-Discharge	GM	180206	172395	Wetland discharge prior to outfall	Yes	Flow Meter
SW10-GORT-DS	GM	180191	172368	20m downstream of the outfall, on the Kilmastulla River	Yes	N/A
SW12-GORT-Discharge	GM	179551	172193	Sample of wetland discharge prior to outfall	Yes	Bucket Stopwatch
SW12-GORT-DS	GM	179535	172140	20m downstream of the outfall, on the Kilmastulla River	Yes	N/A
SW14-GORT	GM	179343	172167	Site located on Kilmastulla River, downstream of TMF, Yellow River and Silvermines Stream	Yes	N/A
DS-GORT	GM	178499	171868	Site located on Kilmastulla River, downstream of TMF, Yellow River and Silvermines Stream	Yes	Float method
TMF Seep 1	GM	179912	172201	Seeps at the southern edge of TMF, discharging to wetlands	Yes	N/A
TMF Seep 2	GM	179797	172190	Seeps at the southern edge of TMF, discharging to wetlands	Yes	N/A
TMF Seep 3	GM	179489	172781	Seeps at the northwestern edge of TMF discharging to drainage around TMF	Yes	N/A

Table 2 Silvermines sampling and flow monitoring locations

3.2.2.2 Groundwater sampling locations

Groundwater sampling locations in Silvermines are at Gortmore TMF. The consultant is required to measure groundwater levels in all wells; and take physico-chemical parameters and samples only in wells outside the TMF. There are nine existing groundwater monitoring points are located at Gortmore TMF and details of these are given in Table 3.

Borehole Id	Easting	Northing	Water Level	Field Parameters & Chemical Analysis	Depth	Screen Interval
					(m bgl)	(m bgl)
TMF1(D)/SRK/01 (TMF1)	179826	173165	No	Yes	23	22-23
TMF2(D)/SRK/01 (TMF2)	179445	172307	Yes	Yes	18	-
BH1A-GORT-06	180181	172490	Yes	No	8.8	5.5 - 8.8
BH2A-GORT-06	180216	172855	Yes	No	10	7.0 - 10
BH3A-GORT-06	179835	173126	Yes	No	10	7.0 - 10
BH4A-GORT-06	179570	172826	Yes	No	10	7.0 - 10
BH5A-GORT-06	179537	172312	Yes	No	10	7.0 - 10
BH6A-GORT-06	179868	172212	Yes	No	10	7.0 - 10
BH6B-GORT-06	179867	172225	Yes	No	5	3.0 - 5.0

* bgl: below ground level

Table 3 Silvermines existing groundwater sampling locations

New monitoring wells were installed on and at Gortmore TMF during summer 2026. Details of the well locations, depths and other specifications will be supplied to the consultant. **The tenderer should budget and plan to measure water levels in up to 6 new wells (3 located on TMF, 3 located on perimeter) and to undertake sampling on 3 new wells located on the perimeter.**

Additionally, three private domestic wells at residences closest to the Gortmore TMF are to be added to monitoring programme. **Consultants should budget and plan to sample from the three wells** preferably from the well head (or kitchen tap as appropriate to the setting). The Department and Tipperary County Council will provide contact details and engage with residents in order to facilitate the commencement of sampling.

3.2.2.3 Dust monitoring at Gortmore TMF

A dust monitoring network is to be designed, commissioned and monitored by the consultant for Gortmore TMF as soon as possible following commencement of the contract. The tenderer should propose a suitable monitoring station design, sampling method and frequency, analysis specification and QC arrangements for Gortmore TMF, with due regard for the current condition of the site, climatic and meteorological factors and the location of human and livestock receptors, with particular regard for residents living closest to the site.

3.2.3 Avoca monitoring locations

3.2.3.1 Surface water flow and sampling locations

Surface water flow measurement locations, flow levels and methods used for the last monitoring round in February 2026 at Avoca are shown in Table 4. **The consultant is required to measure physico-chemical properties and to sample these watercourses/adit discharges.** Flow measurements should be determined at the same time that water samples and field measurements are collected, along with any observations on the drainage channels to ensure they are free-draining.

Sample ID	Easting	Northing	Sample for lab analysis	Field parameters measured	Sample Site Description	Current Flow Measurement Method
Site T1	319235	182795	Yes	Yes	Avoca River Location (Upstream of White Br.)	Equal to flow recorded at White Bridge GS
Upstream (US) of White Bridge	319575	182384	Yes	Yes	Avoca River Location (between Site T1 and White Br.)	Equal to flow recorded at White Bridge GS
White Bridge	319762	182069	Yes	Yes	Avoca River Location (at White Br.)	Equal to flow recorded at White Bridge GS
White Bridge Gauging Station (GS)	319840	182019	Yes	Yes	Avoca River Location (90m downstream of White Br.)	Automatic recorder - White Bridge GS (Data from EPA)
Downstream (DS) Deep Adit	319951	181922	Yes	Yes	Avoca River Location (Downstream of Deep Adit confluence on the Avoca River)	Equal to flow recorded at White Bridge GS (plus Deep Adit confluence)
Downstream (DS) of Millrace	319986	181793	Yes	Yes	Avoca River location (Downstream of contaminated Millrace area)	Equal to flow recorded at White Bridge GS (plus Deep Adit confluence)
Upstream (US) of Ballygahan Adit	319936	181633	Yes	Yes	Avoca River Location (Upstream of Ballygahan Adit discharge)	Equal to flow recorded at White Bridge GS (plus Deep Adit confluence)
Upstream (US) of Road Adit	319942	181532	Yes	Yes	Avoca River Location (Upstream of Road Adit Discharge on the Avoca River)	Equal to flow recorded at White Bridge GS (plus Deep Adit confluence)
Wicklow Co. Co. Maintenance Yard Gauging Station (GS)	319939	181445	Yes	Yes	Avoca River Location	Equal to flow recorded at White Bridge GS (plus Deep Adit confluence and Road Adit confluence)

Sample ID	Easting	Northing	Sample for lab analysis	Field parameters measured	Sample Site Description	Current Flow Measurement Method
Site T5	319972	181114	Yes	Yes	Avoca River Location (Abandoned Coal Yard)	Equal to flow recorded at White Bridge GS (plus Deep Adit confluence and Road Adit confluence)
Avoca Bridge	320372	179932	Yes	Yes	Avoca River (Upstream of Avoca Bridge)	Float Method
Upstream (US) Shelton Abbey	319942	175933	Yes	Yes	Avoca River (US of Shelton Abbey)	Equal to flow recorded at DS Shelton Abbey
Downstream (DS) Shelton Abbey	322178	174956	Yes	Yes	Avoca River (DS of Shelton Abbey)	Float Method
Road Adit	319858	181512	Yes	Yes	Adit Discharge (at portal)	In-situ permanent flow meter
Road Adit Confluence	319942	181513	Yes	Yes	Adit Discharge (before entering Avoca River)	OTT (MF Pro) Flow meter
Upstream (US) of Tigroney West	319850	182123	No	No	Runoff from East Avoca Track – upgradient of Tigroney Capped Area	Dry
850 Adit	319850	182123	Yes	Yes	Adit Discharge (outside Deep Adit box culvert)	Bucket and Stopwatch
Deep Adit	319850	182123	Yes	Yes	Adit Discharge from pipe at front of box culvert	Bucket Stopwatch
D/S of NW culvert*	319850	182123	Yes	Yes	Outside Deep Adit portal just downstream of NW culvert under railway confluence with Deep Adit + 850 Adit	OTT (MF Pro) Flow meter
Deep Adit Confluence	319896	181986	Yes	Yes	Adit Discharge (before entering Avoca River)	OTT (MF Pro) Flow meter
Cronebane Shallow Adit	320268	182646	Yes	Yes	Adit Discharge	Bucket and Stopwatch

Table 4 Avoca surface water monitoring points (from MKO, 2026b). Note: 'D/S of NW culvert plus Deep Adit plus 850 Adit' has been renamed to 'DS of NW Culvert'. This sampling location includes US of Tigroney West if it is flowing (generally in high flows).

3.2.3.2 Groundwater sampling locations

Groundwater monitoring points are given in Table 5. **The consultant is required to measure groundwater levels, physico-chemical parameters and to sample these wells.**

New automatic data loggers are to be provided by the Department to the consultation for installation and commissioning into main Avoca site wells. **The consultant should budget and schedule for the installation and commissioning work for the new data loggers.**

New monitoring wells were installed on and at Shelton Abbey TMF during summer 2026. Details of the well locations, depths and other specifications will be supplied to the consultant. **The tenderer should budget and plan to measure water levels in up to 6 new wells.**

Sample ID	Easting	Northing	Water Level	Field Parameters	Sample for Lab Analysis	Owner	Total Depth (m bgl)	Screen Interval (m bgl)
MWDA1	319877	182043	Yes	Yes	Yes	Dept.	12	9.0 – 12
MWDA2	319879	182039	Yes	Yes	Yes	Dept.	24.9	21.9 – 24.9
MWET1	319916	181778	Yes	Yes	Yes	Dept.	10.9	7.8 – 10.6
MWET2	319917	181781	Yes	Yes	Yes	Dept.	21	17 – 20
MWPF1	319678	182296	Yes	Yes	Yes	Dept.	10	4.7 – 7.7
MWSA2	321566	175292	Yes	Yes	Yes	Dept.	12.6	8.0 – 11
GW1/05	319880	181673	Yes	Yes	Yes	WCC	31	25.0 – 31
GW2/05	319880	181673	Yes	Yes	Yes	WCC	10	4.0 – 10
SG104	319806	181523	No	No	No	WCC	26.8	-
Samples are no longer collected from monitoring well SG104 as the borehole has been dry for several years.								

m bgl = metres below ground level

Table 5 Avoca groundwater monitoring points (from MKO, 2026b).

3.2.3.3 Tigrone remedial works inspection

The consultant is additionally required to inspect the remediated area at Tigrone West to ensure no deterioration.

- Inspection of new trees, new vegetation, topsoil and cap;
- Inspection of pipes carrying 850 Adit flow (including silt trap at the entrance) and Deep Adit flow (within the box culvert) for any build-up of precipitates, and making arrangements for removal of precipitate build-up if required;
- Inspection of channels (concrete and concrete canvas) – settlement, joints, etc.;
- Inspection of sediment traps at four locations and making arrangements for removal of sediment build-up if required.

3.3 Service 2b Site conceptual model review

A site conceptual model for Avoca was last done by CDM (2008); and for Silvermines by SRK (2002). Contaminant pathways for Silvermines were previously considered by the EPA (2004) for different environmental media and receptors.

The tenderer shall propose a modern, best practice, catchment-based framework for understanding sources, pathways and receptors for contamination at both sites with reference to monitoring data. **This will be scored in Award Criterion 2b in the RFT document.**

The consultant will be required to complete a **desk study and report** detailing an updated conceptual site model. The purpose of the work is to address changes that have occurred to the conceptual model over time that impair understanding of the sites. It is imperative that the Department is able to identify, monitor and address contaminant sources, pathways and receptors to address ongoing risks at the site pending preparation for full rehabilitation.

The consultant is required to propose a suitable time frame for this service, taking into account seasonal considerations, however the service should be completed within one year of commencement of the contract.

The report should include:

- **Source-pathway-receptor characterisation** for the Avoca and Silvermines mine districts in their respective catchments, with regard to settlement patterns and main land use.
- **Evidence of hydrological connectivity** between and within individual sites in the Avoca and Silvermines districts.
- Summary of the evidence of **pressures and impacts** from individual sources and sites.
- Summary of **key trends and changes** to sources, pathways and receptors that have occurred over the last decade.
- Summary of **data gaps** which impair understanding at the sites and recommendations for addressing them.
- **Specification for investigations to address changes** in flow pathways and volumes in Avoca underground workings.
- Recommendations for **improvements** to the monitoring network.

The consultant shall review the CSM after three years and report on same.

Risk assessment and catchment flow modelling are **not required** as part of this contract. It is anticipated that that risk assessment and catchment flow modelling will be carried out as part of a new feasibility study for full remediation as part of a separate contract.

3.4 Service 3: Geotechnical monitoring

3.4.1 General requirements

The tenderer must outline their approach to geotechnical monitoring, to meet the following general and site-specific requirements. **This will be scored in Award Criterion 3 in the RFT document.**

The tenderer shall propose a programme of geotechnical monitoring to include inspection of the most significant geotechnical aspects of the sites, in particular those giving rise to physical hazards such as shafts, adits, cliff faces, stockpiles, lagoons, unstable infrastructure and areas of subsidence. A hazard appraisal shall be completed for such sites. Sites with views and/or access hampered by vegetation are to be flagged to the Department as well as those with breached or damaged fencing or signage. Areas where there is low confidence on the existence or condition of physical features, and the reason for same (e.g. poor supporting information, overgrowth of vegetation, unsafe conditions etc) should be clearly documented for the Department.

A visual walk-over inspection is to be carried out annually. A report providing photographs, observations and recommendations is to be provided which addresses the condition of the following physical features.

- **Physical hazards:** Including shafts, adits, cliff faces, stockpiles, lagoons, unstable infrastructure and areas of subsidence.
- **Vegetation integrity:** signs of poor grass growth or die back including areas of potential dust generation.
- **Fencing and site security:** The condition of fences and protection areas around open pits, shafts, adits, signage, etc. shall be inspected and photographed.
- **Signs of instability in spoil and tailings.**

Reports should include the following:

- An executive summary (300 words maximum) comprising a brief description of the works completed, the findings and the recommendations.

- A hazard and risk assessment for all relevant features including mine workings, rock faces, shafts, adits, crown holes, buildings, tips, lagoons, settlement ponds, seepages, embankments, fences and signage.

3.4.2 Silvermines geotechnical monitoring requirements

The tenderer is required to propose a methodology which provides for the inspection of all relevant geotechnical observation points as per GWP (2026a and b); the removal of those no longer relevant and the addition of any new observation points as required on foot of each annual inspection.

3.4.2.1 Gortmore TMF

Particular attention should be paid to the following features:

- **The condition of embankments** with respect to stability including evidence of seepages from side walls/toes, erosion of crest/side walls, piping/runouts, collapse features, bulges.
- **The integrity of the drainage system** including the condition of the drainage channels, piping, outflows, wetlands, settlement ponds and discharge points; blockages of same.
- **Vegetation on tailings:** Any areas of poor grass growth or die back including areas of potential dust generation. Areas of overgrowth of gorse or trees.

3.4.2.2 Other Silvermines sites

Particular attention should be paid to the following features:

- **The condition of the pond and lagoon embankments at Garryard** with respect to stability including evidence of seepages from side walls/toes, erosion of crest/side walls, piping/runouts, collapse features, bulges.
- **The integrity of the drainage system at Garryard** including the condition of the drainage channels, piping, outflows, wetlands, settlement ponds and discharge points; blockages of same.
- **Vegetation on spoil areas at the Calamine Pit, Ballygown and tailings dump at Shallee:** Any areas of poor grass growth or die back including areas of potential dust generation. Areas of overgrowth of gorse or trees.

3.4.3 Avoca geotechnical monitoring requirements

The tenderer is required to propose a methodology which provides for the inspection of all existing geotechnical observation points as per GWP (2026c and d); the removal of those no longer relevant and the addition of any new observation points as required on foot of each annual inspection.

3.4.3.1 Aerial survey of East Avoca and Cronebane pits

The consultant shall carry out an annual survey, using an Unmanned Aerial Vehicle (UAV) to provide high resolution digital terrain models (DTM) and oblique images of the following areas where there has been significant ground movement such as rockfalls, slope failures or subsidence. These areas have not been safe to inspect in close proximity on foot.

- East Avoca pit (NB northern wall)
- Cronebane Pit (NB northwest face)
- Mount Platt spoil pile.
- Conary depressions.

Imagery should be compared to previous years' surveys in order to monitor the stability of these features. The Conary site has not been flown before, so a baseline DTM should be established for that site.

3.4.3.2 Spoil pile inspections

The main spoil piles/tips to be monitored are Mount Platt and smaller piles around the Cronebane pit, the Northeastern Tip (at Cronebane/Mount Platt), rehabilitated areas of Tigroney tips and several in West Avoca for erosion, rockfall, gullying, washout of detritus and any evidence of instability.

3.4.3.3 850 adit inspection

Repair repairs and remediation to the 850 adit are due to be carried out by the Department. Once the repairs have been completed, annual inspections and reports on same are to be completed by the consultant.

3.4.3.4 Shelton Abbey TMF

The tenderer shall propose an approach to monitoring the most significant geotechnical features at the Shelton Abbey TMF.

Particular attention should be paid to the following features at Shelton Abbey.

- **The condition of embankments** with respect to stability including evidence of erosion by the Avoca River, seepages from side walls/toes, erosion of crest/side walls, piping/runouts, collapse features, bulges, leaning of trees etc.
- **Human activities** on the site that may be damaging the surface or embankments.
- **The integrity of the drainage system** including the condition of the drainage channels and any surface ponding.
- **Vegetation on tailings:** Any areas of poor grass growth or die back including areas of potential dust generation.

3.5 Service 4: Geoheritage monitoring

The tenderer is required to propose a methodology that provides for the effective observation of the most significant geoheritage features for the features given in Table 6.

This will be scored in Award Criterion 4 in the RFT document. The features are to be assessed in relation to their intrinsic geoheritage value, vulnerabilities and susceptibility to degradation and potential for public use using a suitable scheme.

District	Site	Feature
Avoca	West Avoca	Tramway Arch Western Whim Engine House and Chimney Twin Shaft Engine House and Chimney (North) Twin Shaft Engine House (South) Tramway Engine House Chimney Ballygahan Engine House and Chimney North Lode Open Pit
	Connary	Waggon Shaft Engine House Chimney
	Tigroney East	Baronet's Engine House and Chimney Knocking Floor
	Tigroney West	Williams Engine House and Chimney Ore Bins
Silvermines	Ballygown	Ballygown Engine House and Chimney Ballygown Furnace House Ballygown Minor (Crushing) Engine House
	Shallee	Shallee Engine House

Table 6 Geoheritage features to be monitored at Avoca and Silvermines.

On an annual basis, the consultant shall submit two separate geoheritage inspection reports after visual inspection of sites at Silvermines and Avoca. Each report should include the following:

- An executive summary (300 words maximum) comprising a brief description of the works completed, the findings and the recommendations.
- Activities completed and findings in respect of the monitoring round, including photographic evidence.
- Recommendations for future monitoring and any actions to be taken in relation to the preservation of geoheritage at the sites.

4 References

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- EPA (2006) Draft Report on the Dust Deposition Monitoring Programme for Silvermines Area, County Tipperary. Period – March 1999 to December 2004. Unpublished. *Available as an attachment to this RFT.*
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MKO (2026d) Geoheritage Monitoring of the Avoca Former Mining Area. Available at:
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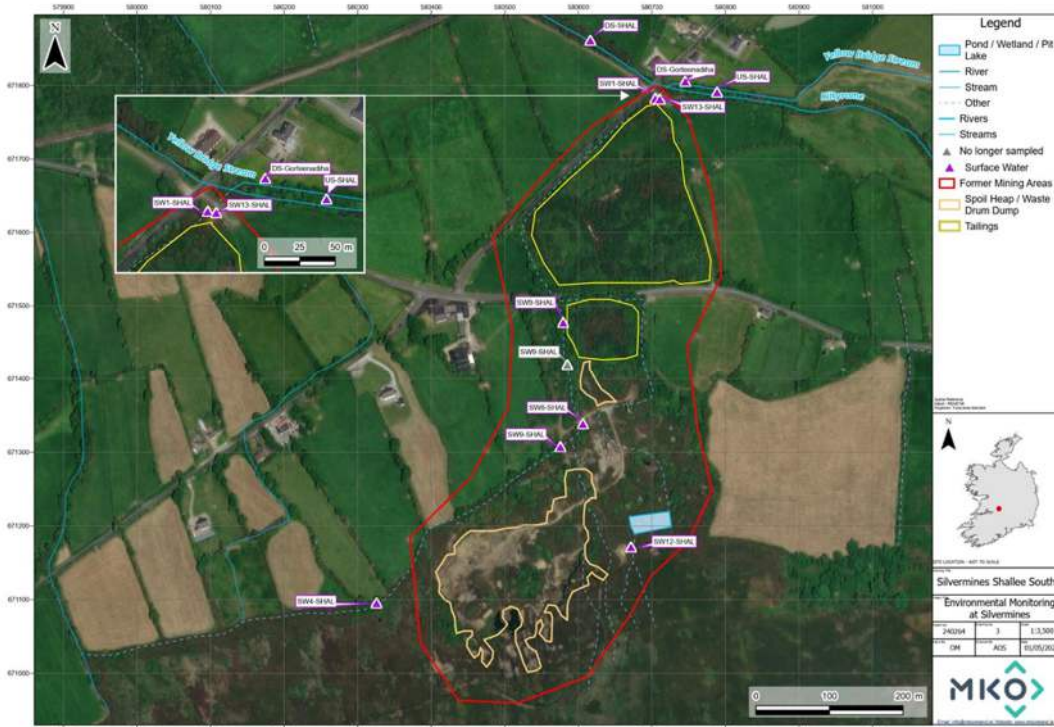
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Appendix A Silvermines environmental monitoring points maps



Gortmore TMF monitoring points (MKO, 2026a)



Shallee monitoring points (MKO, 2026a)

