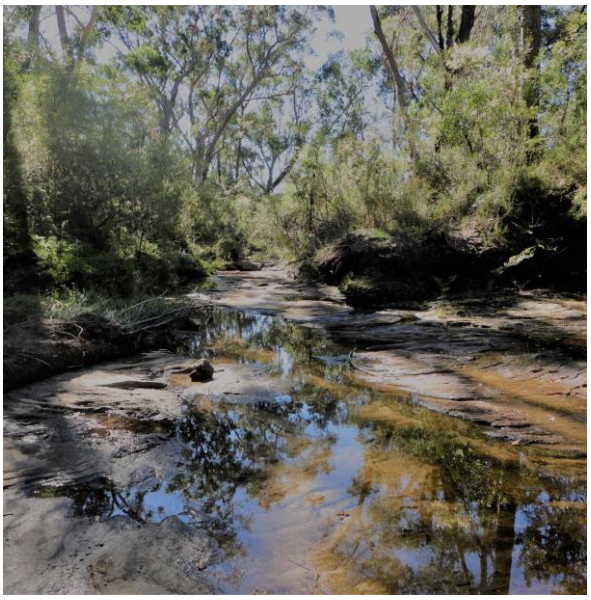
ATTACHMENT 1

H2ONESTLY

Review of Dendrobium Mine Extension Project SSI-33143123 EIS

Peter Dupen

Engaged by Environmental Defenders Office (EDO)
on behalf of Protect Our Water Catchment, June 2022



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LIMITATION: This report is subject to the provisions of the expert evidence provisions (Part 31 Division 2 and Schedule 7) of the Uniform Civil Procedure Rules 2005 (NSW).

Client	Engaged by Environmental Defenders Office (EDO) on behalf of Protect Our Water Catchment
Prepared in accordance with (proposal & PO)	Expert Brief from EDO dated 01/06/2022
Prepared by	Peter Dupen, H2onestly
Version & Date	H2o010_R01 – 13 June 2022
Previous versions, key information changes	None

1. EXECUTIVE SUMMARY

Under engagement by EDO, H2onestly has reviewed the water-related sections and attachments of the Dendrobium Mine Extension Project SSI-33143123 (Extension Project) Environmental Impact Statement (EIS), and offers the following comments:

- A key component of this proposal is the agreement to pay offsets at retail rates for water volumes "taken" from the water supply catchments, and a key question is how these offsets are to be calculated to ensure the best outcome for the water supply and catchments. H2onestly is familiar with all of the currently available methodologies for computing this offset, and the most robust of these was used to estimate a water supply offset requirement in the order of $160M over the life of the mine. The quantum of offset currently proposed by IMC is not disclosed in the EIS.
- There are a number of other aspects of this EIS and broader governance processes which are being conducted with little to no transparency, including:
    - The nature of the licensing amendment which is to be performed to allow the proponent to become licensable for past and future surface water takes has not been made public, despite years of discussion behind closed doors.
    - The most valuable information that state agencies could provide to make the decision-making process open and clear is to identify what they consider are acceptable and unacceptable mine-specific and cumulative impact limits for Sydney's water supply and other key values of the Special Areas, preferably incorporating stakeholder views. For example, there is no clarity on what the Department of Planning and Environment (DPE) or WaterNSW would consider an unacceptable individual-mine or cumulative loss of drinking water due to mining.

Overall, this Extension Project promises to continue to further desiccate the "protected" catchments of the Special Areas, and will likely result in permanent reductions in the drinking water quantity and quality available for Sydney's rapidly expanding population. For this reason, I recommend that the application should be rejected.

2. INTRODUCTION

2.1 Qualifications

My experience and qualifications for providing this advice are detailed in my CV (Attachment A).

I am a hydrogeologist with over 30 years' experience in environmental regulator and consulting roles. Between 2015 and 2019 I was the Mining Manager for WaterNSW. During this period my team and I examined underground mining (including Dendrobium Mine) impacts on catchments in greater depth than anyone else in Australia.

I am currently working outside government, researching methods of improving environmental outcomes and resource decision-making with better analytical approaches.

I also run a consultancy (H2onestly Pty Ltd) which specialises in providing independent advice on environmental geoscience matters to government and community groups.

2.2 Scope of Advice

I have been briefed by the Environmental Defenders Office (EDO), acting on behalf of Protect Our Water Catchment, to provide expert advice in relation to aspects of the Dendrobium Mine Extension Project (SSI - 33143123) (the Extension Project) environmental impact statement (EIS) by Illawarra Coal Holdings Pty Ltd (ICH).

I have prepared this review report in conformance with Part 31 Division 2 and the Expert Witness Code of Conduct in Schedule 7 of the *Uniform Civil Procedure Rules 2005*, and I am willing to be bound by them.

In the brief dated 1 June 2022, EDO has asked me to review relevant parts of the Extension Project's EIS and to provide a report addressing issues relating to any hydrogeological impacts arising as a result of the Project/

My responses to the brief are set out in the following report.

2.3 Contextual setting of Dendrobium Extension Project

2.3.1 Special Areas

Under the provisions of the *Water NSW Act 2014*, Sydney's drinking water catchments are 'Declared Catchment Areas', and are managed by WaterNSW. The Upper Nepean and Woronora catchments, located south of Sydney, were proclaimed a 'Declared Catchment Area' which includes the catchments of the Cataract, Cordeaux, Avon, Nepean and Woronora Rivers, which collectively make up the Metropolitan and Woronora Special Areas (Figure 1). The only Special Areas in NSW have been declared for the purposes of protecting the quality of stored drinking water and for maintaining the ecological integrity of the land used to harvest and store Sydney's drinking water.

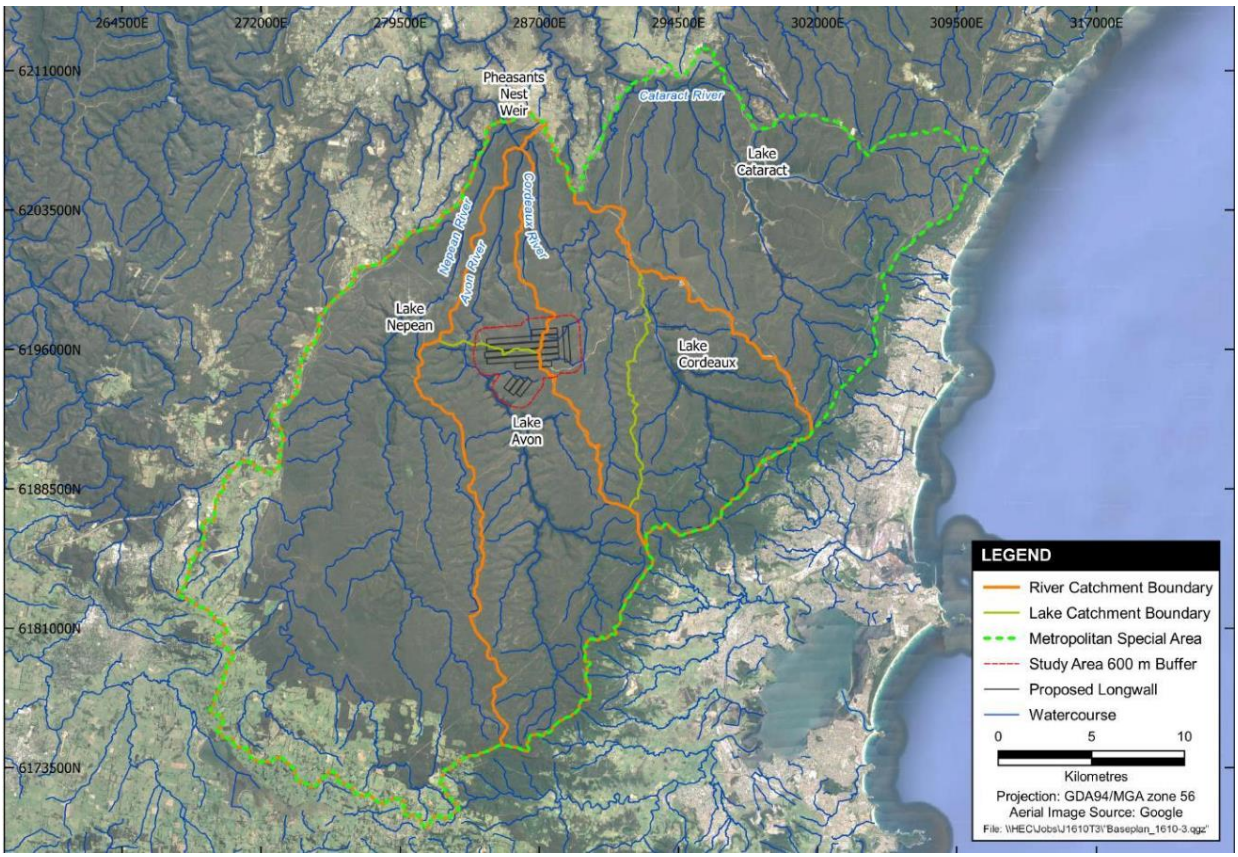

Figure 1. Catchments within Metropolitan Special Area (from Fig.4 in EIS Attachment C)

Concerns over Sydney's water supply have led to two Commissions of Inquiry to examine the risks posed by mining, numerous investigations by agencies and community groups, and were the primary reason that IPC decided not to approve the previous Dendrobium Mine Extension (State Significant Development application (SSD) 8194) which included a proposed Area 6 that is not considered in the current proposal.

2.3.2 Status of Special Areas

The condition of these Special Areas has been degrading over the past few decades for a range of reasons. The most recent Catchment Audit (EcoLogical, 2019) concludes that;

> *"…despite substantial improvements in catchment management since 1999, overall risks to catchment health are increasing because of climate change. Monitoring records since the 1940s indicate a long-term trend of reduced rainfall. The drought experienced over the audit period reduced water availability (surface and groundwater flows) across the Catchment and increased risks to water quality, biodiversity and human settlements." and;*

"Similar with previous audits, the primary issue of concern raised by the community related to environmental impacts from coal mining within the Special Areas of the Catchment. The community provided positive responses to the appointment of the Independent Expert Panel on Mining in the Catchment in 2018. The community also expressed support for jointly funded programs to protect and improve riparian corridors through weed and erosion control, revegetation and managing stormwater."

2.3.3 Dendrobium Mine

The Dendrobium Mine proponent in their 2000 EIS predicted that there would not be substantial losses to Sydney's catchment due to undermining. The planning approval consequently included a condition that the Dendrobium Mine have a "no more than negligible impact on Sydney's water supply". What transpired was a much greater set of impacts and consequences than were predicted, but these exceedances were able to be largely ignored due to the ambiguity of "less than negligible" (i.e. qualitative) conditions. The current EIS is much more truthful, reflecting the knowledge gained over the past decade about the Dendrobium Mine's impacts.

The change in narrative may be attributed to the extent of the Dendrobium Mine's damage to the catchments becoming impossible to hide or deny over the past decade. The key recognition of major water losses from the drinking water catchment began when detailed evidence presented by Dr Peter Turner convinced Minister Stokes in 2015 to order further investigations into catchment impacts. These enquiries led first to independent consultants' deep analysis of existing geotechnical and hydrogeological data (Pells Sullivan & Meynink, 2017) and subsequently to formation of the Independent Expert Panel for Mining in the Catchment (IEPMC) in 2018.

The NSW Government, represented by the then Department of Planning, Industry and Environment (DPIE), received final reports from the IEPMC in October 2019. These reports contained a range of observations about the unanticipated extent of impacts that are now understood at Dendrobium and Metropolitan Mines, and made 50 consequent recommendations. The current status of the government's responses to these recommendations was updated in April (DPE, 2022), and primarily comprise the not inexpensive formation of a standing expert body, the Independent Advisory Panel for Underground Mining (IAPUM) from which the NSW Government can seek advice if it chooses.

South32's (IMC) original Dendrobium Extension Project application (SSD 8194) was refused by the NSW Independent Planning Commission (IPC) in February 2021. The IPC concluded that the extent of consequences and residual risks, "particularly on the integrity of a vital drinking water source for the Macarthur and Illawarra regions, the Wollondilly Shire and metropolitan Sydney" was not in the public interest. The Minister for Planning subsequently declared that South32's proposal to extend the Dendrobium Mine a State Significant Infrastructure (SSI) project, which set the scene for the subsequent submission of the current mining application (SSI 33143123).

2.4 Cumulative Impacts at Dendrobium Mine

As a result of their unique geological and topographical situation, Sydney's southern drinking water supply catchments have been progressively undermined from the escarpment (orange-shaded areas in Figure 2) for over a century. Until the 1970's, mining was done by bord and pillar and these workings have not fully subsided. Since the introduction of longwall methods, higher consequences on groundwater levels and catchment flows have been observed.

Following the IEPMC reports, it is now clear that surface to seam cracking has been experienced over most of the existing Dendrobium Mine's footprint. In other words, the unfractured or

"constrained" zone which was hypothesised to provide ample protection to the overlying catchments (EcoEngineers, 2000) is not present over most of the existing Dendrobium Mine longwalls. Although the fracturing is not predicted to be quite as continuous at Area 5, there will almost certainly be increased bulk permeability caused by longwall subsidence which will lead to water exiting streams and storages and moving towards the mine.

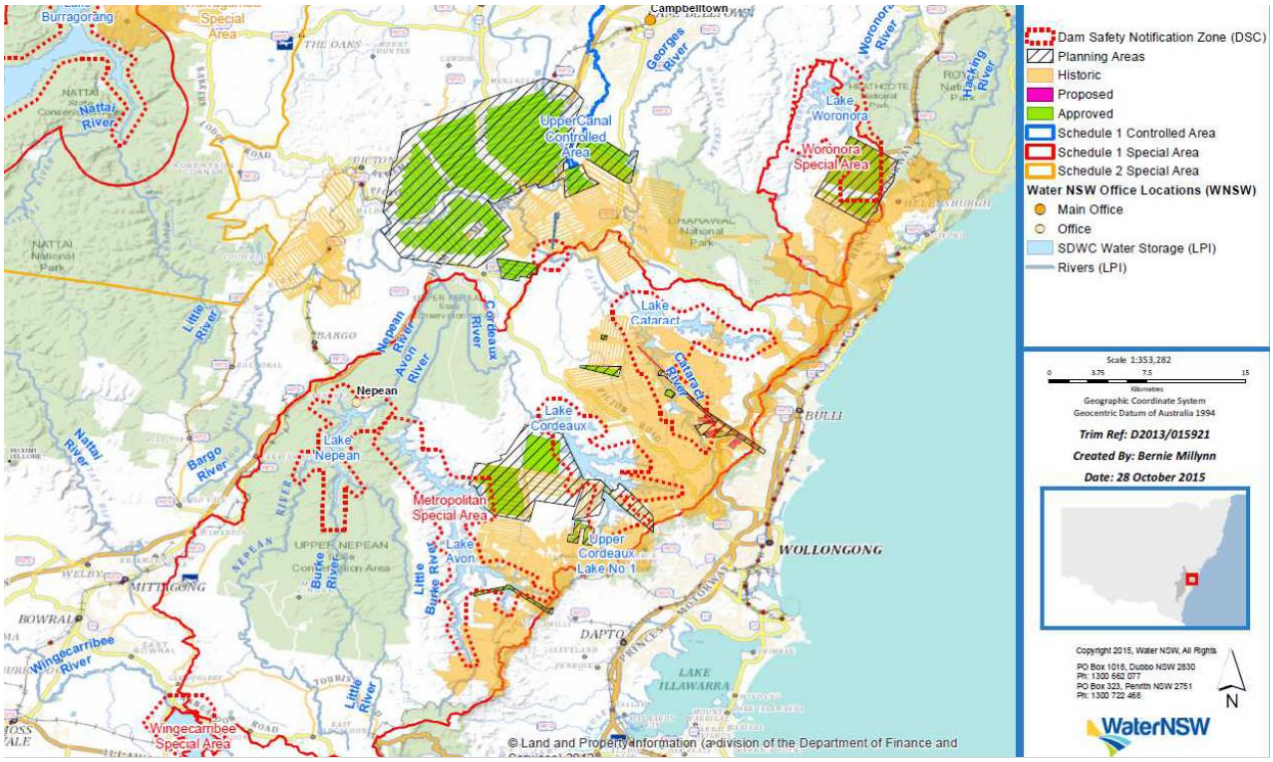

Figure 2 – Reservoirs (blue), mining footprints (orange) in Metropolitan and Woronora Special Areas. Source – WaterNSW 1st submission to IEPMC (2018)

Rather than a shallow groundwater system now recovering, as suggested by HydroGeo (2022), my interpretation of the presented data is that the groundwater levels over Dendrobium Mine are still subsiding unevenly, and there are numerous locations where perched and recovering groundwater levels have been found near others which have been desaturated (Watershed HydroGeo, 2022). Where there is no regional water table to support the subsidence-affected streams, water is intercepted by the extensive surface cracking network and is diverted downwards into the formations beneath the streams and swamps. As a result, many of the streams and swamps, and their supporting catchments underlain by longwalls, are still in the process of drying out.

The consequences of Dendrobium Mine subsidence effects are widespread in the Avon, Cordeaux and Wongawilli catchments, comprising kilometers of dry and drying streambeds and hectares of drying swamps and catchments (IEPMC, 2019a). The ecological implications of this broad landscape desiccation may not be known for decades.

The groundwater level reductions and surface water losses from the Special Area catchments overlying Dendrobium's wide longwalls (e.g. IEPMC 2019a; 2019b) are in my view likely to be permanent. Eventually new equilibriums will be established, accompanied by the return of iron-laden springs emerging when groundwater levels finally return to their reduced post-mining equilibrium conditions.

I predict that this equilibrium in groundwater levels in the shallower aquifers will be established much lower (perhaps hundreds of vertical meters lower) than pre-mining levels. Without groundwater providing baseflow and with the stream surfaces connected to deep cracking, surface flows over the mined regions are unlikely to ever return to functional streams again. Swamps will slowly dry and lose their ecosystem diversity.

3. PREDICTED IMPACTS TO SURFACE WATER SUPPLIES

3.1 Stream volumetric losses

The streams which overlie the proposed Area 5 longwalls are shown in Figure 3.

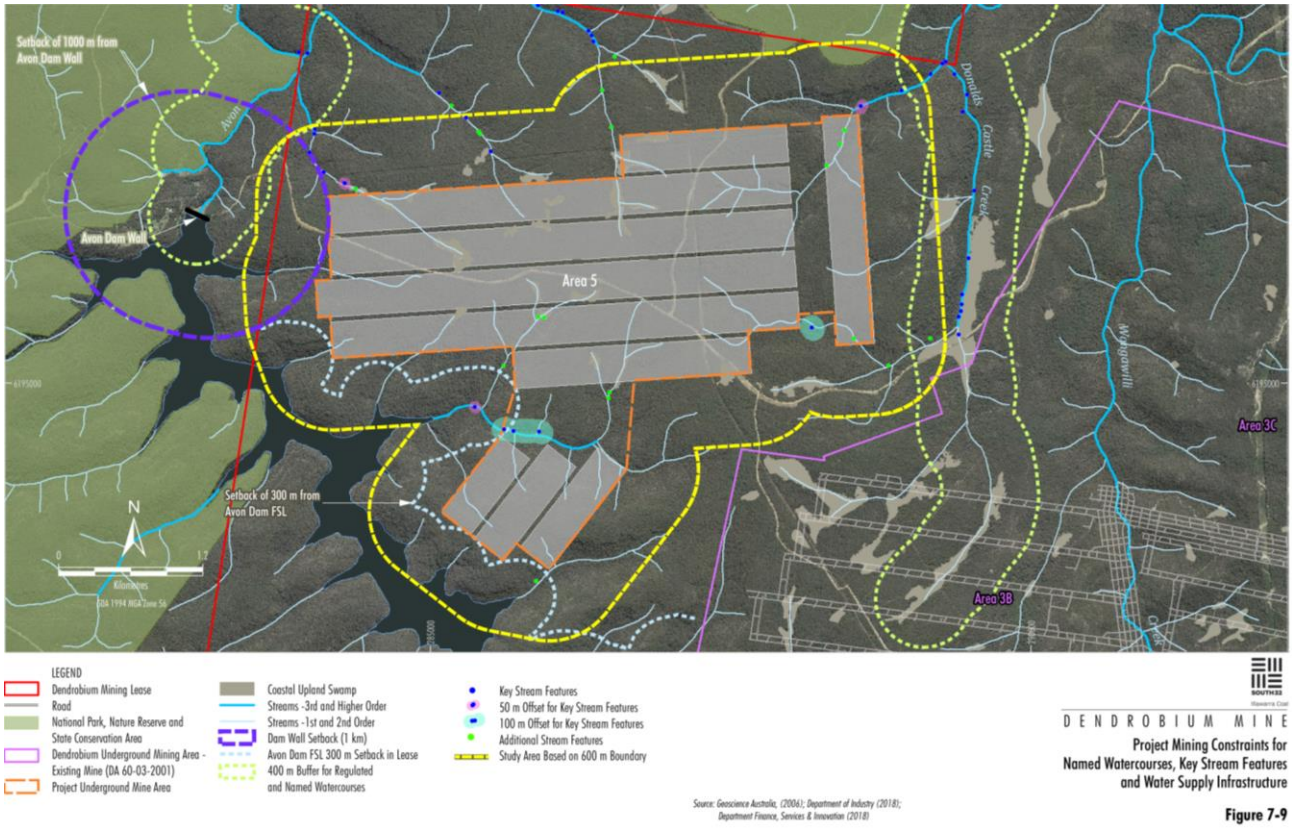

Figure 3 – Streams and key stream features overlying Area 5 longwalls. Source – EIS Figure 7-9.

Analyses performed by Dendrobium's surface water consultants (HEC, 2022) suggest that these stream lengths will be affected by subsidence, and most of the streams and catchments overlying the Area 5 longwalls will become cracked and dry as have the Areas 1, 2 and 3 longwalls to date.

The volumes of cumulative losses from the reservoir catchments for three modelled time periods are detailed in Table 6-9 of the groundwater-focused Attachment B to the EIS (Watershed HydroGeo, 2022). These consultants predict potential surface water losses from streams and catchments of up to approximately 1.2 ML/day (428 ML/annum) due to the Extension Project. The rate of loss is temporally dependent on catchment weather conditions and availability of water in the streams, but ultimately must add up to the volume of the void created, plus the total water volume pumped out over the life of the mine (Section 6.1.3).

IMC's modelling, which includes an evaluation of the water losses from swamps, catchments, baseflow and other flow components, further suggests that the maximum wet year loss from the catchment to Pheasants Nest Weir (Figure 1) due to the Dendrobium Mine as a whole would be

in the order of 1,500 ML/yr (4 ML/d). The Area 5 increment is predicted to be 428 ML/yr (equivalent of 1.2 ML/d).

These estimated reductions in mean daily inflow rates to Lake Avon and Pheasants Nest Weir supply points, are considered by IMC as low, and likely to be indistinguishable from natural variability in catchment conditions (HEC, 2022).

H2onestly does not agree that the volumes which will be diverted from the surface catchments attributable to Area 5, which we predict will total around 80 GL (refer Section 6.1.3), are “low”. The only reason that they form a small proportion of the Pheasants Nest Weir and Avon storages is because their catchments are so large, as shown in Figure 1.

3.2 Stream ecosystems losses

Table 21 of Watershed HydroGeo (2022) presents the short-term and longer-term reductions in baseflow associated with the Project. These baseflow reductions associated with Area 5 mining are likely to result in distinguishable effects on flows in watercourses, particularly when flow rates are less than approximately 1 ML/d (HEC, 2022).

As well as the impacts of the baseflow reductions, MSEC (2022) predicts that fracturing of bedrock would occur along the sections of the first and second order streams that are located directly above and adjacent to the proposed longwalls. They therefore acknowledge the potential for partial or complete loss of pool holding capacity to occur at these locations, and lesser impacts in the zone up to approximately 400 m from the proposed longwalls.

MSEC (2022) also predicts that approximately 15% of the stream controlling features (i.e. rockbars, steps and other controlling features) located within 400 m of the proposed longwalls could experience Type 3 impacts, described as fracturing in a rockbar or upstream pool resulting in reduction in standing water level. These effects are likely to occur in five of the stream rockbars, and these streams may thus also incur partial or complete loss of pool holding capacity.

As a result, the riparian ecosystems which fringe the streams over the project area will be significantly and permanently altered.

3.3 Swamp and broader catchment ecological impacts

There are 22 upland swamps located within 600 m of the Area 5 longwalls, as shown in Figure 8 of HEC (2022). Of the 22 upland swamps within the Study Area, 16 are within 60 m of the proposed longwalls and the other six are located outside the immediate extents of the proposed longwalls.

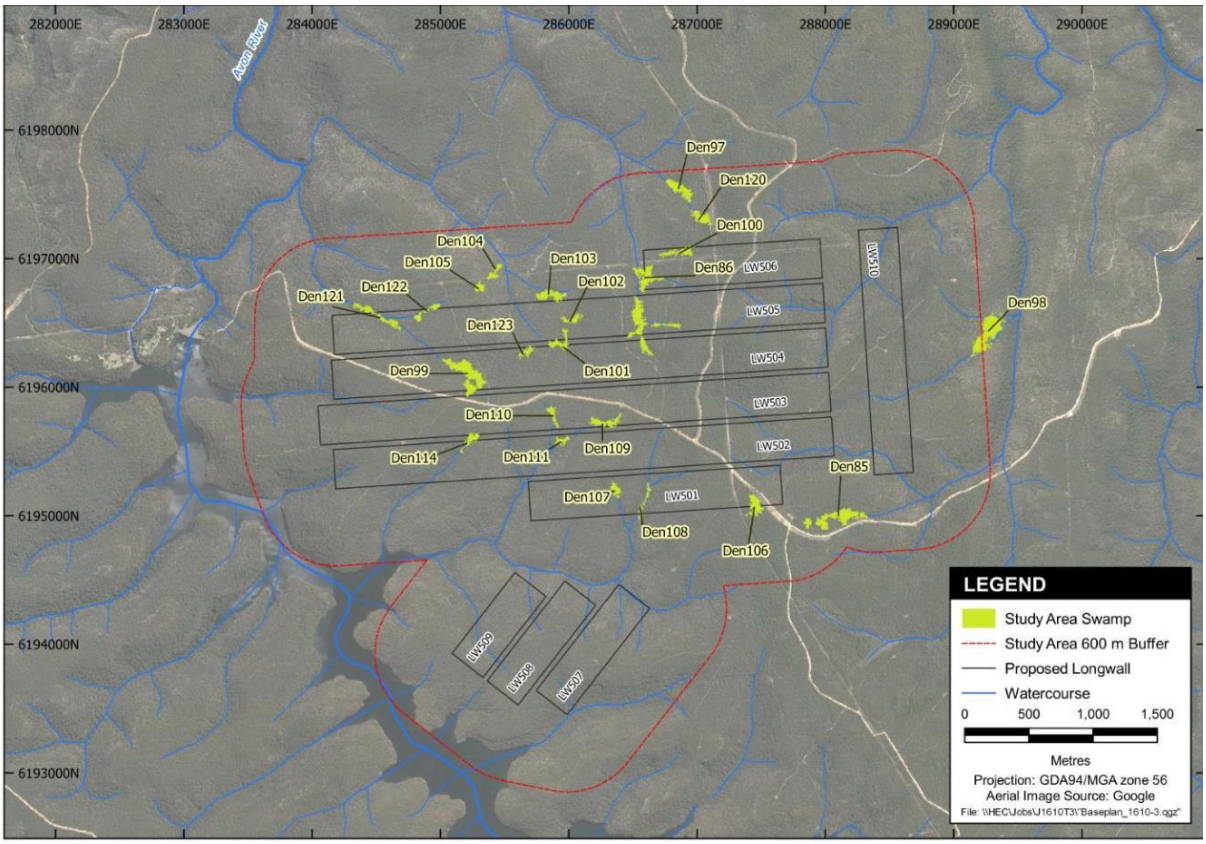

Figure 8 **Area 5 Swamp Locations**

HYDRO ENGINEERING & CONSULTING PTY LTD 121165-03.r1d

Figure 4 – Upland swamps within 600 m of Area 5 longwalls. Source Fig.8 of HEC, 2022

The evaluations of the risks to these upland swamps make much of the fact that floristic characteristics of undermined swamps are often not greatly changed some years after their superficial groundwater recession rates are altered by surface fracturing over the Dendrobium longwalls. As the ecological consultants (Niche, 2022) acknowledge, this may reflect the very significant time lag which it takes for a drying environment to adjust to its new circumstances:

> "*While no strong links between subsidence effects and vegetation response have been identified, the time between the impact and vegetative response may not be immediate and, therefore, not yet detected*."
>
> *"Notwithstanding, persistent changes to the hydrological regime of an upland swamp has the potential to affect the composition and extent of swamp vegetation and a precautionary approach is required."*
>
> *"A "partial loss" scenario for upland swamps within 60 m of longwalls has been applied to account for any change in vegetation, which is supported by the monitoring data completed."*

As well as the swamp ecosystems eventually drying and changing with significant impacts on threatened species and other biota, the surrounding catchments will also be affected by cracking of rock and soil surfaces and by diversion of overland flows into subsurface ones.

3.4 Water quality impacts

Visible evidence of water quality impacts is common in streams overlying subsided mine areas, including over Dendrobium, Metropolitan and Tahmoor Mine longwalls. These are frequently observed as orange gelatinous iron "floc" or precipitates which form when diverted surface waters reappear from cracked creekbeds into the oxygenated surface environment. The prevailing

wisdom, championed for example by Professor Chris Fell AM in a discussion paper for the Office of the NSW Chief Scientist and Engineer (OSCE, 2014), is that the metals in these discharges (iron, manganese, aluminum, and potentially arsenic and other metals and salts) are naturally found at lower concentrations in stream waters and tend to be rapidly diluted and "disappear" in receiving streams and storages (HEC, 2022).

A key issue raised in IEPMC (2019) is whether recovering groundwater following cessation of pumping at Dendrobium Mine will lead to outbreaks of "iron springs". As the proponent points out (IMC, 2022), vertical upwelling is an unlikely phenomenon given Dendrobium's effects on the hydrogeological system, but where shallow groundwater levels do recover it is likely that such springs will break out in overlying streambeds. IMC's consultants state that "the flushing of shallower fracture networks is more likely to cause water quality effects within the Special Area and would occur in a shorter timeframe after mining" (Watershed Hydrogeo, 2022). These consultants suggest that such discharges of metallic compounds will only be temporary, but the basis for this assumption is not provided. Experience at many mines in the Metropolitan Special Areas is that these springs persist for decades and may well be discharging elevated metals (relative to natural concentrations) for centuries. It should also be noted that groundwater which recharges reservoirs below the visible water level will also carry unmeasured increased metals into the drinking water storages.

Dissolved iron and manganese tend to precipitate on re-entry to oxygenated environments, and thus tend to accumulate in sediments. The hydrochemical behavior of many trace metals, e.g. aluminum and arsenic, is more complex. The relatively low concentrations of these metals measured within the water stored water columns and at supply intakes near the dam walls is used to infer that the additional metals contributed by diverted surface waters through cracked rock channels is not a significant problem. However, the true volumes accumulating in sediments on the reservoir beds have never been properly studied, and the potential for these metals and salts to slowly migrate down the reservoir channels is not currently known by the companies or the agencies.

The IEPMC report (2019) notes that "there is no evidence that mining in the Special Areas is currently compromising the ability of WaterNSW to meet raw water supply agreement standards". Whilst this remains true, it does not confirm that there is no toxic metal legacy accumulating within the sediments of the receiving storages (particularly Avon, Cordeaux and Woronora Reservoirs). The possibility that the metals from the impacted streams are settling and adsorbing to sediments and colloids remains a very plausible but largely untested hypothesis. If there are such metal-laden sediments accumulating, there of course remains a risk that these will eventually compromise drinking water quality (health or aesthetics) and will require expensive and ongoing treatment for future generations of Sydney and Illawarra residents to pay for.

The EIS essentially suggests that, as the metals being discharged from cracked streambeds are not being detected at high concentrations in the stored waters below, no compensation is required to offset future treatment costs and drinking water quality degradation. H2onestly believes that these are big assumptions that need to be tested by a comprehensive analysis of what metals are accumulating at what concentrations in the reservoir sediments and what potential pathways (e.g. colloidal transport following wet periods) may ultimately present risks to Sydney's water quality.

4. PREDICTED GROUNDWATER IMPACTS & CONSEQUENCES

Groundwater drawdown caused by the dewatering and subsidence is predicted to be similar to those observed in other parts of Dendrobium Mine, with pressures declining 200-300 m in the Bulli Coal seam and adjacent strata (Watershed Hydrogeo, 2022). These consultants predict progressively reducing drawdowns of 50-100 m in the Bulgo Sandstone, and tens of meters in the near-surface Hawkesbury Sandstone aquifer. Consultants further suggest that the levels in the Hawkesbury Sandstone will recover over time, but this conclusion is based on some selective observations and may not be correct for the broader longwall footprints, or correct only for the periods where recharge significantly exceeds vertical drainage towards the lower desaturated zones.

Since the commencement of Longwall 9 in Area 3B, total groundwater inflow to the Dendrobium Mine (combined total from Areas 1, 2, 3A and 3B) has varied between 4 and 12 megaliters per day (ML/day), with an average of 6.7 ML/day (Watershed HydroGeo, 2022). Groundwater inflows to Area 5 are predicted by Watershed HydroGeo (2022) to peak at approximately 5.5 ML/day in 2031 to 2034, averaging approximately 3.8 ML/day.

The total inflow for the Extension Project and the Dendrobium Mine is predicted to peak at approximately 16 ML/day in 2034-2038 (after Area 5 and in the latter stages of Area 3C), averaging approximately 13.8 ML/day for the period 2026-2038, of which approximately 10 ML/day is due to inflows from Areas 1 to 3C (Watershed HydroGeo, 2022).

What these predictions don't highlight is that ultimately all of these inferred groundwater takes will be reflected by surface water takes (Section 6.1.3), as there is an unstable depressurisation induced by pumping at seam level which must ultimately be filled from infiltrating surface waters above. The groundwater takes from Area 5 alone will average around 4 ML/day between 2026 and 2038, and the total groundwater which needs to be pumped to keep Area 5 open will average around 14.5 ML/day. Based on the figures presented in the EIS, H2onestly calculates that the total volume of groundwater, and ultimately by surface water from overlying catchments, taken in order to mine Area 5 will be around 80 GL using a volumetric conservation estimation method (Section 6.1.3.).

5. PROPOSED LICENSING, MONITORING AND MITIGATION

Section 7.5.5 of the EIS (IMC, 2022) sets out the proposed licensing, mitigation measures and monitoring actions which would be used to adaptively manage the Area 5 longwalls if unpredicted impacts occur. I am broadly supportive of the proposals, but am concerned about the lack of transparency and oversight described in the EIS. I will briefly summarise my concerns about the technical aspects of the proposed measures below, and will discuss my concerns about the overall lack of transparency in Section 7.

5.1 Water Licensing Issues

For a variety of historical and geographical reasons, IMC does not hold the necessary surface water licences that it requires to take the surface water that it knows that it is already taking. The additional volumes which will be removed from the catchments if Area 5 is approved will only exacerbate this issue.

As noted in Section 7.5.5 of the EIS, IMC holds sufficient water licences to cover the groundwater takes, but the very limited number of licences available in the relevant surface water licensing zone effectively prevents IMC from purchasing sufficient entitlement to account for catchment losses.

IMC further reports that "the NSW Government has notionally approved a special amendment to the existing licensing regime to account for Dendrobium's surface water losses from the Special Areas." The nature, rationale and legal plausibility of this agreement has yet to be publicly disclosed, but IMC advise that "it is expected the surface water licensing regime, once implemented, would be applied to the Project."

The sensitivity of the water licensing situation, which has arisen primarily through historical licensing ambiguities which changed when the water resource legislation changed, are acknowledged.

The need for the agreement to be publicly disclosed at the time that this Extension Project application is in my opinion a higher priority than an expedient process for the proponent, however. The general lack of transparency over this agreement, which was mooted but never disclosed at the last application, is troubling and should be resolved by government urgently.

5.2 Monitoring Issues

Recommendations for improvements and expansions to the surface water monitoring system are presented in EIS attachment (HEC, 2022), and groundwater monitoring system recommendations are provided in Watershed Hydrogeo (2022). If the Extension Project is approved, H2onestly supports both sets of recommendations, including the urgent inclusion of arsenic in surface water monitoring suites.

There remains a question about whether platypi may be present, and it would seem sensible to include eDNA testing for these as the technique is now widely deployed.

5.3 Mitigation Measures

The Extension Project proposal is notable for the quantum of offsets that IMC is required to provide.

For ecological impacts, the quite extensive bush clearing and disturbance will be offset according to the State's complex offset requirements.

The ecological consultants (Niche, 2022) have completed a Biodiversity Development Assessment Report and assessed the need for a specified number of offset credits. However, the NSW Biodiversity Assessment Method (BAM) process could not be applied due to the specific species being excluded, and so the Commonwealth Biodiversity Offset process was followed, and a plan for meeting these proposed offsets set out in the EIS (Niche, 2022)

There is no mitigation nominated or realistically available for mitigating groundwater levels/volume, and no prediction of groundwater quality issues being a concern.

The mitigation for surface water volumetric and quality impacts is to offset them, using a metric nominated by the IEPMC as "net beneficial". Whilst avoidance of the impacts would clearly be preferable, the commitment to apply a net beneficial lens to water offsets which are required, provided it is done transparently, is welcomed.

The proposed method for calculating the offset is the most important part of the transparent process, and the options and recommendations are discussed in Section 6.1.3.

One aspect which is largely absent from the EIS is discussion of what mitigation measures would be applied if it is found that metallic discharges do eventually degrade the water supplies in the underlying offtake points. My recommendation is that long-overdue investigations be completed into the current stability and position of deposited metals in the reservoir floor sediments, and the risks evaluated after this. Alternatively, a causal inference approach could be used to identify the

environmental controls and this information could be used to assess the risks and the need for further investigations.

6. PROPOSED WATER VOLUME OFFSET CALCULATIONS

Sydney's water supply is finite and precious, especially the high-quality, gravity-fed water sourced from the Illawarra Plateau Special Areas. These Special Areas feature extraordinarily well-preserved bushland, and their ecological integrity and natural filtering capacity are highly valued by many.

In stark contrast to the approach used to seek approval of the original Dendrobium Mine EIS in 2000, in which it was claimed that shallow aquifers would be sustained and overlying catchments would not be significantly affected, the current application acknowledges that these impacts will indeed occur but that the company will compensate the NSW Government for them. H2onestly applauds the change to a more honest appraisal paradigm, but seeks clarity on the basis on which these offset compensations will be calculated.

The methodology which will be used to calculate the volume of surface water losses for which compensation will be paid to the NSW Government by IMC is not revealed in the EIS, but is suggested to be similar to the previous application methodology. The proposed quanta of offsets were discussed in that application, but the actual methodology for calculating the offsets was not publicly disclosed during the EIS or IPC review processes. IMC (2022) provides the following statements about the offset arrangement they hope to make:

- …that the NSW Government proposed an agreement, the terms of which were accepted by IMC, that would require IMC to make payments to offset water quantity and quality impacts during and post-mining.
- This agreement with Government was developed consistent with the recommendations of the IEPMC to provide a "net beneficial" effect to Sydney's drinking water supplies.
- The terms of the proposed agreement with Government were outlined in the draft conditions of consent for the previous application and included:
    - during mining – annual payments based on actual surface water loss taken (as modelled or estimated annually) due to the Project for each water year (annual payments priced at the actual Independent Pricing and Regulatory Tribunal [IPART] retail price for that water year and varied over time to reflect inflation and drought/non-drought year prices); and
    - post-mining – up-front payment made upon approval of the first Extraction Plan for the Project to account for predicted post-mining surface water losses (value of payment based on the present value of modelled post-mining losses and IPART prices).
- IMC would seek to enter a similar agreement with the NSW Government to offset water quantity and quality impacts during and post-mining for the Project.
- The agreement would allow the Minister for Water, Property and Housing to spend these funds (as required) on priority water projects to result in a net benefit to Sydney's drinking water supply with intergenerational benefits (IMC, 2022).

As the intention of the agreement is to generate revenue to pay for "net benefit water" and as Greater Sydney's population is predicted to increase by another million people by 2035 (DPIE,

2021), it is important that the full offset is calculated, paid and spent wisely by the government on sustainable water supply resilience measures for current and future generations. Current and emerging methodologies which may potentially be suitable for calculating the offset are discussed in the next section.

6.1 Potential methodologies for calculating offsets

6.1.1 Groundwater modelling

A great deal of reliance is placed by IMC on the predictions made by the very complex groundwater model which was originally developed for the Area 3B extraction application (Coffeys, 2012) and modified several times to its current version (Watershed Hydrogeo, 2022). One of the simplest ways to design the offset calculation for water lost from the catchment surface would be to ask Watershed Hydrogeo to predict it using this model, perhaps then calibrating against surface flow measurements.

The issue with using the groundwater model to predict surface water losses is that it is capable of finding a wide range of answers, as discussed in my previous Dendrobium Extension SSD submission. Although it has been peer-reviewed and scored a "just-passable" calibration metric (termed the Root Mean Square error), the "null hypothesis space" (i.e. the degree to which a change in the output could be attributable to a wide combination of parameter changes) of this complex model remains large and rubbery. Having spent much of my career examining such models, my strong recommendation is that they are too manipulable and too difficult for an outsider to audit to be a suitable method for transparently and robustly calculating offsets.

6.1.2 Surface flow interpretations

An alternative, which could be used in conjunction with the groundwater model, is to interpret changes in flow measurements. The Special Area streams are steep and narrow sandstone-based with little sediment until the lower parts of the valleys. A great deal of effort and growing proficiency has been spent over the past decades in gauging these streams and understanding their flow behaviors (HEC, 2022).

Despite the growing proficiency and instrument accuracy, the ability of these natural and constructed weir gauges to detect changes in flow regimes remains fair to poor. This was confirmed by Emeritus Professor Tom McMahon in Metropolitan Mine (2019), and exhibited for example at the WC21 gauge which continued to show steady conditions for many months after the creek was progressively dehydrated by Area 3B longwalls, and at the Eastern Tributary gauge where little change can be discerned between the pre-mining period when this stream flowed freely and post-mining where 2-3 km is now through subsurface flow.

Due to its lack of sensitivity as well as ambiguities in their interpretation, flow modelling is not a good basis for calculating the offsets. They are certainly useful for providing a first order annual approximation of interpreted losses to verify annual payments however.

6.1.3 Volumetric analysis

The 2016 Catchment Audit, a periodic independent review of WaterNSW's performance in managing the Special Areas, highlighted the "emerging issue of unquantified loss of surface flows associated with the cumulative impacts of underground coal mining activities."

The most recent Catchment Audit report (EcoLogical, 2019) offers the following advice about WaterNSW's progress in addressing these concerns:

> *WaterNSW has been working with several stakeholders to improve understanding of the volumes of surface water being diverted from the Special Area by mining. In 2018, in collaboration with Dr Paul Tammetta (a leading groundwater hydrologist), WaterNSW completed an assessment of two independent methods aimed at calculating water losses in undermined catchments.*
>
> *This research report (Tammetta 2018) was peer-reviewed by a UNSW academic and provided promising results but required further analysis to reduce the considerable uncertainties. The Independent Expert Panel for Mining in the Catchment (IEPMC), formed partly in response to the 2016 Catchment Audit, completed its Final Report in late 2019 and recommended that WaterNSW 'continue its program of work towards determining the significance for the Greater Sydney water supply of different thresholds of surface water loss due to mining'.*
>
> *As such, WaterNSW has been focusing on implementing both assessment methods to quantify cumulative impacts incurred by both longwall and pillar extraction mining in the Metropolitan and Woronora Special Areas. The results of this assessment are close to being finalised and will be subject to peer review and review by the IEPMC.*

Perplexingly, the subsequent IEPMC report did not reference Mr Tammetta's work with WaterNSW on quantifying surface water losses directly. Importantly for this major mine extension application, it did note that:

> *The significance of any water loss from the Special Areas depends on whether, when and to what extent the loss impacts on long-term predictions of Greater Sydney's reliable water supply and any compensatory measures required. WaterNSW presented to the Panel a proposed approach towards assigning a level of significance to thresholds of cumulative water loss. The development and refinement of this approach has the potential to provide a more objective basis for proposing acceptable cumulative loss thresholds and a basis for seeking consensus on thresholds both for cumulative and mine-specific losses among relevant agencies.*

As highlighted in H2onestly's previous submission on the Dendrobium Extension SSD project (H2onestly, 2020), no progress on those efforts to quantify the cumulative and mine-specific volumetric significance thresholds has been reported (DPIE, 2022). For this reason, the current proposal has no objective set of agency or community expectations of acceptable or unacceptable limits to compare the predicted impacts against. As noted in my previous submission (H2onestly 2020), limits were proposed and broadly discussed by agencies, mining companies and community groups during the passage of the Standardised Assessment Framework for Mining, yet the proposed limits remain unpublished.

The surface water loss methodology report (Tammetta, 2018) has also not been published by WaterNSW. The methodology was however, able to be accessed through a National Parks Association application through the *Government Information (Public Access) Act 2009*. I have applied this approach in very approximate terms to the information provided in the Extension Project EIS documents and conclude that:

- The approximate volume of surface water which will be taken from Sydney's harvested drinking water catchments as a result of Area 5 mining is around 80 GL.
- Assuming a conservative retail rate of approximately $2M/GL of drinking water, this equates to a required offset of around $160M.

A much greater volume of water has already been or will yet be removed from Sydney's drinking water catchments due to Dendrobium Mine's existing longwalls, contradicting the original mine application's assertions that there would be no more than negligible impact on Sydney's drinking water supply. No compensation is apparently sought by the NSW Government for these losses, but every effort should be made to at least ensure that any losses approved in the future are appropriately calculated and offset.

I believe that the Tammetta volumetric conservation methodology will prove to be the most robust and suitable for use in calculating the offsets at this time, and could be readily amortised over the life of the mine without needing further yearly verification. H2onestly welcomes a transparent and scientifically-based discussion to decide what is the most appropriate means of calculating this critically important offset payment.

We further recommend that the ideal means of objectively deciding the best way to spend the offset is to use Causal Inference (Pearl and Mckenzie, 2018), a newly emerged paradigm for quantitatively comparing the outcomes of potential interventions (Section 6.1.4).

6.1.4 Causal analysis

A new and much more powerful methodology for analysing and understanding complex systems, such as those which control for example the transport of metallic contaminants through the various water and sediment compartments of a steeply dipping, narrow valley reservoir, is now available in Causal Science (Pearl, 2009). Rather than attempt to understand systems using conventional correlational methods, the causal inference paradigm pioneered by Judea Pearl (2009) allows us to hunt down the causal relationships which are acting in a system directly. Once the causal laws operating on the system are known, it becomes a relatively simple process to predict what will happen under varying conditions. As causal predictions are made mechanistically and not probabilistically, the levels of uncertainty relative to current methods such as the groundwater and surface water modelling discussed above can be greatly reduced.

The causal inference method has recently been operationalised for the first time by Epistemology Pty Ltd, and H2onestly strongly recommends that this approach should be used for future analysis and verification of all system aspects of the Dendrobium Mine extension if it is approved, including the apportionment of collected offset funds to the optimal actions which will result in the most "supply positive" improvements as recommended by the IEPMC.

7. TRANSPARENCY OF PROCESS & OVERSIGHT

One of the most disturbing aspects of the Extension Project proposal is that so much of it is being agreed and administered without transparency.

There is a fundamental question at the heart of this mining proposal: how much economic wealth which this operation may bring (as long as the world continues to use metallurgical coal - an evolving question in a heating world) would justify the predicted long-term impacts it will cause to Sydney's drinking water supply and the Special Area ecosystems? The basis for evaluating how this trade-off is to be decided is not set out in the EIS.

In some ways the more honest portrayal (relative to previous Dendrobium applications) of the likely impacts in this EIS are encouraging, but there remains an overarching disregard for due process throughout the EIS and governance documentation. The lack of transparency and proposed integrity oversight portrayed in at least the water parts of the application is disturbing, as attested by the following examples:

- The Department of Planning recommended, and at times in the IPC deliberations appeared to actively champion, the previous Dendrobium Extension proposal which predicted more than twice the impacts of this version, so DPE's position on the merits of the proposal appears already clear. Their independence to oversee and review this proposal is nevertheless assumed.
- There are numerous references made in the EIS (IMC 2022 - Sections 5.2.11, 7.5, 7.6, and A7.6) to unpublished agreements which have been made between IMC and unspecified entities (presumably DPE and WaterNSW) to forgive and correct current water licence irregularities.
- The nature of the offset compensation agreement for surface water losses is not explained in the EIS, other than an intention to compensate for water diverted (only by the Area 5 longwalls, all previous losses are to be ignored) from the NSW drinking water collection system at retail rates (IMC, 2022). No information is provided in this or the previous EIS about the methodology chosen to calculate the volume of these losses during and after mining. It is inferred from Section 2.5 of the EIS (IMC, 2022) that loss calculations are to be annually modelled by IMC by a currently undisclosed method (perhaps a form of groundwater modelling or streamflow interpretation?), and somehow agreed behind closed doors with DPE.
- In recent years, the NSW Government has wound back previous licence requirements that End of Panel and other interpretative monitoring reports must be regularly published on company websites, greatly limiting public scrutiny of the impacts which are being reported.
- The rationale for winding back these public reporting requirements was justified by the additional oversight which the IAPUM was meant to provide. Despite its hefty taxpayer funding, the government's arbitrarily appointed group of experts acts in secrecy, without meetings being recorded, without any minutes, budgets or annual expenditures being published, and frequently without publishing its findings.
- Despite all the effort which WaterNSW expended in trying to determine exactly what the agencies and people of NSW thought should be acceptable losses (detailed in H2onestly's previous submission on the Dendrobium Extension SSD proposal), there remains no inclusion of such targets, nor discussion of how they can or will ever be quantified. This is despite the following advice in the IEPMC (2019) report:

  > *The significance of any water loss from the Special Areas depends on whether, when and to what extent the loss impacts on long-term predictions of Greater Sydney's reliable water supply and any compensatory measures required. WaterNSW presented to the Panel a proposed approach towards assigning a level of significance to thresholds of cumulative water loss. The development and refinement of this approach has the potential to provide a more objective basis for proposing acceptable cumulative loss thresholds and a basis for seeking consensus on thresholds both for cumulative and mine-specific losses among relevant agencies.*

- The subsequent silence (DPIE, 2022) on the risk quantification initiative has been remarkable, and suggests a perplexing lack of interest in public or even agency discussion about what limits should be placed on mining in the catchments. The Secretary's Environmental Assessment Requirements (SEARs) do not ask the

company to nominate acceptable and unacceptable impact levels and the EIS therefore provides no clarity on this, other than a continuation of the current trigger-action-response plans.

- As a consequence, and apparently a deliberate one, there is no significant improvement in the Minister's capacity to make an objectively informed decision on the acceptability of this or other mining proposals. A further consequence is that a lack of concrete targets remains entrenched in the proposed approval conditions, which continues to apply unenforceable qualitative conditions hinging on "no more than negligible" impacts on critical receptors.

8. CONCLUSIONS & RECOMMENDATIONS

Based on my knowledge of the extensive impacts which the Dendrobium Mine has already inflicted on the catchments and drinking water resources of the Special Areas, I recommend that this proposal should be rejected and that which remains of these critical natural resources be conserved.

If the Extension Project is approved, I hope that the operational decision-making is conducted with appropriate transparency and oversight, to give the public who collectively own these natural resources the ability to verify that their faith in regulatory oversight is well placed. In particular, I support the IEPMC's recommendation that the surface water offset be calculated and spent appropriately, in a way that provides a net-benefit to catchments and drinking water supplies.

The current proposal and oversight system provides little confidence in this outcome, unfortunately. For the public benefit to be demonstrated, the offset for surface water losses must be credibly calculated and openly reported. I am familiar with all of the methodologies which are discussed in the EIS plus some that aren't (Section 6.1.3), and in my opinion the most scientifically defensible and accurate methodology for calculating this offset at this time is the Tammetta volumetric conservation method developed for WaterNSW (Tammetta, 2018).

The proposed additional monitoring is supported if the Extension Project is approved, with the addition of doing eDNA analysis to check for the presence of platypi in the catchments.

9. REFERENCES

Coffey, 2012. *Groundwater Study, Area 3B Dendrobium Coal Mine, Numerical Modelling*. Prepared for BHP Billiton, October 2012.

Department of Planning, Industry and Environment (DPIE), 2021. Draft Greater Sydney Water Strategy; Water for a resilient Sydney.

Dubikova M, Dupen P, Marshall L, Tammetta P, 2019. Quantifying surface water losses from mining-subsided catchments. Proceedings, NCGRT/IAH Australasian Groundwater Conference 2019. http://agc2019.m.agc.currinda.com/schedule/session/64/abstract/487

Ecological, 2019. Sydney Drinking Water Catchment Audit 2019 – Volume 1. https://www.waternsw.com.au/__data/assets/pdf_file/0008/161369/12363-Catchment-Audit-Vol1-v5.pdf

IAPUM, 2020. *Independent Advisory Panel for Underground Mining Advice re: Dendrobium extension project*. SSD-8194, October 2020.

H2onestly, 2020. Report to the Independent Planning Commission by Peter Dupen; Issues associated with Dendrobium Underground Mine Extension Project. Engaged by Environmental Defenders Office (EDO) on behalf of Protect Our Water Alliance December 2020.

Hydro Engineering and Consulting, 2022. *Dendrobium Mine Extension Project – Surface Water Assessment*.

IEPMC. 2019a. *Independent Expert Panel for Mining in the Catchment Report: Part 1. Review of Specific Mining Activities at the Metropolitan and Dendrobium Coal Mines*. Report by the Independent Expert Panel for Mining in the Catchment for the NSW Department of Planning, Industry and Environment, 14 October 2019

IEPMC, 2019b. *Report of the Independent Expert Panel for Mining in the Catchment: Part 2 Coal Mining Impacts in the Special Areas of the Greater Sydney Water Catchment*. Report by the Independent Expert Panel for Mining in the Catchment for the NSW Department of Planning, Industry and Environment, 14 October 2019

Illawarra Metallurgical Coal (IMC), 2022. Environmental Impact Statement, Dendrobium Mine Extension Project.

Metropolitan Coal, 2019. Woronora Reservoir Impact Strategy Stage 2 Report; Longwall mining near and beneath Woronora Reservoir. Hebblewhite, McMahon & Kalf. https://www.peabodyenergy.com/Peabody/media/MediaLibrary/Operations/Australia%20Mining/New%20South%20Wales%20Mining/Metropolitan%20Mine/WORONORA-STRATEGY-STAGE-2-REPORT-(Final,-7-June-19).pdf

MSEC, 2022. *Dendrobium Mine Extension Project – Subsidence Prediction Assessment.* Mine Subsidence Engineering Consultants.

NSW Department of Planning and Environment, 2022. *Mining in the catchment action plan; Status of actions implemented by the interagency taskforce*.

Pearl, Judea. 2009. Causality: Models, Reasoning, and Inference. Cambridge, U.K. ; New York: Cambridge University Press.

Pearl & Dana Mckenzie. 2018. The Book of Why. Basic Books. https://www.basicbooks.com/titles/judea-pearl/the-book-of-why/9780465097616/.

Tammetta, P. 2013. Estimation of the height of complete groundwater drainage above mined longwall panels. Groundwater, 51(5), 723-734

Tammetta, P., 2018. Preliminary Assessment of Methods for Estimating Streamflow Losses in the Special Areas. Report prepared for WaterNSW, 9 November 2018 and referenced in WaterNSW's Second Submission to IEPMC and its Water Monitoring Guidelines for Underground Mining Activities in the Special Areas, 2021. https://www.waternsw.com.au/__data/assets/pdf_file/0010/217468/Water-Monitoring-Guidelines-for-Underground-Mining-Activities-in-the-Special-Areas.pdf

Watershed HydroGeo, 2022. *Dendrobium Mine Extension Project – Groundwater Assessment*.

ATTACHMENT A: PETER DUPEN CV

I am an experienced impact evaluator, systems analyst, causal thinker, hydrogeologist, program co-developer and relationship builder, with almost 40 years in environmental analysis, policy and regulation.

Prior to starting my consultancy and PhD I was Mining Manager for WaterNSW, where I delivered several outstanding policy and technical achievements and innovations. I have spent the past three years researching engagement design, collaborative sense-making technologies and causal inference approaches for improving environmental governance.

Qualifications

- Part-time candidate, Doctor of Philosophy by Research, University of Technology Sydney, School of Engineering & IT, Sydney (2019-2024).
- Master of Applied Science (Environmental Hydrogeology), University of New South Wales, Sydney (1991).

Expertise

- Evaluation analyst on policy, strategy and institutional decision-making through nuanced stakeholder engagement and causal evidentiary analysis.
- Partnership-building with a wide variety of stakeholders through respectful curiosity, integrity and an open and collaborative operational style.
- Evidential decision-support analysis and synthesis of complex datasets and analytical systems. Familiarity with a wide variety of environmental analysis methodologies, including Causal Science, to assess and limit impacts on water, ecological and social systems.
- Stakeholder engagement design, including expert elicitation, model-supported human learning systems, justified decision-making and transparent reporting.
- Targeted research design and evaluation of impacts and outcomes.
- Advocacy on behalf of agencies, regulators, NGO's and Councils regarding water impacts from various developments.
- Developing innovative approaches and tools to meet environmental and resource challenges.
- Integration of stakeholder engagement and big data analytics in surface water, catchment and groundwater management.
- Geo-environmental pollution, resource impact and risk assessment.

Key Skills

- Environmental scientist with almost 40 years professional experience in a variety of technical and management roles, primarily in water/groundwater resource evaluation and developing policies for the protection of these resources from over-exploitation and pollution.
- Extensive experience in developing and implementing innovative regulatory solutions to complex environmental and resource-sharing challenges.
- Strong technical leadership, strategic policy development, advocacy and collaborative communications skills developed in a wide variety of settings, primarily as a regulator or consultant.

Recent Professional History

August 2019 - Present **Director, H2onestly**

H2onestly provides expert, ethical and independent advice to government agencies, NGOs and community stakeholders. The consultancy is led by Pete Dupen, who networks with selected technologists, experts and stakeholders to develop nuanced, practical solutions to complex challenges. I offer proven expertise in investigating water resource issues with expert and other stakeholders to evaluate environmental and resource projects and policies. I am proficient in critically examining datasets, models and impact predictions using modern data interrogation, analysis and visualisation approaches. I also operate as a broker between regulators and leading data technologists, assisting agencies to navigate innovative technologies within existing regulatory systems and institutions.

August 2019 - Present **PhD Candidate, UTS**

I am in the midst of a part-time PhD, evaluating engagements and linking their records to knowledge-building and decision-making processes. The Records of Engagement and Decision-making (RoEDs) I design will allow future practitioners and researchers to access and evaluate key elements and to find and evaluate the evidentiary information used to justify the decisions made. A unique element in the research is its causal science epistemological setting, seeking to identify why outcomes were achieved or not in a case study examination of the Lake Taupo Protection Project in New Zealand. The study will be linked to a strategy analysis about current questions facing stakeholders in the case study.

Feb 2015 - July 2019 **Mining Manager, WaterNSW**

As Mining Manager, I led a team investigating and assessing mining impacts on Sydney's water supply catchments. The role required a challenging mix of scientific innovation, consultation and advocacy. A key requirement was to analyse a wide array of environmental investigation data, and evaluating this relative to approved (and ambiguous) impact predictions. My primary achievements during this period were developing an innovative methodology for estimating water losses due to undermining and a robust framework for categorising hydrological and ecological risks to catchments.

Environmental Defenders Office

1 June 2022

Mr Peter Dupen
H2onestly

By email: Peter.Dupen@student.uts.edu.au

CONFIDENTIAL AND PRIVILEGED

Dear Peter

Brief to Expert – Dendrobium Mine Extension Project SSI – 33143123

1. We act for Protect Our Water Catchment (**POWC**) in relation to the proposed Dendrobium Mine Extension Project (SSI - 33143123) (**Project**) by Illawarra Coal Holdings Pty Ltd (**Applicant**), a subsidiary of South32 Limited.

2. The Project is an extension of the Applicant's existing underground coal mine located around 8 km west of Wollongong in the Southern Coalfield of New South Wales (**NSW**). The Applicant is seeking development consent to extract up to 5.2 million tonnes per annum (Mtpa) of ROM coal, through underground mining operations within Area 5 (location of the Project) until approximately 2035, in extending the life of Dendrobium Mine until 2041. The Project is a redesign of the Applicant's previous Significant State Development (**SSD**) application (Dendrobium Extension Project, SSD 8194).

3. Our client intends to make a submission on the Project which is currently being publicly exhibited to ensure the decision-maker has independent expert advice on the Project.

4. We seek to engage you on behalf of our client to review the environmental impact statement (**EIS**) for the Project and prepare an independent expert report in relation to your area of expertise, groundwater / hydrogeology, in accordance with the *Uniform Civil Procedure Rules 2005* (UCPR) and the Expert Witness Code of Conduct.

Background

5. On 5 February 2021, the Applicant's SSD application (Dendrobium Extension Project, SSD 8194) for the Project was refused by the Independent Planning Commission (**IPC**). The

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Applicant appealed the IPC's decision, which is currently the subject of a judicial review proceedings in the Land and Environment Court of New South Wales.

6. On or around December 2021, the Applicant submitted a scoping report for the re-designed SSD Project in support of the application for the Project to be assessed as 'State significant infrastructure' (**SSI**).

7. On 2 December 2021, the Project was declared SSI by the Minister for Planning and Public Spaces.

8. On 23 December 2021, the Department of Planning, Industry and Environment (now the Department of Planning and the Environment) issued the Planning Secretary's environmental assessment requirements (SEARs) for the Project.

9. On 4 May 2022, the Project application, EIS and accompanying documents were placed on public exhibition.

Purpose of your expert report

10. We note as a preliminary matter that our primary purpose in briefing you to prepare your report is to provide independent expert advice in your area of expertise. We do not ask you to be an advocate for our client/s. You are requested to prepare an independent report that is clear and well-written.

11. In this respect, we draw your attention to Part 31 Division 2 of the *Uniform Civil Procedure Rules 2005* (NSW) (**UCPR**) and the Expert Witness Code of Conduct (**Code of Conduct**) which govern the use of expert evidence in NSW Courts (**attached**). The SSI public exhibition process is not a Court proceeding; however, we are of the view that the same Code of Conduct should be adhered to in this instance.

12. In particular, clause 2 of the Code of Conduct states that:

> *"An expert witness is not an advocate for a party and has a paramount duty, overriding any duty to the party to the proceedings or other person retaining the expert witness, to assist the court impartially on matters relevant to the area of expertise of the witness."*

13. Your expert report must contain an acknowledgment that you have read the Expert Witness Code of Conduct and that you agree to be bound by it.

14. Your expert report will be used as evidence in chief of your professional opinion. Information of which you believe the decision maker should be aware must be contained in your expert report.

15. In providing your opinion to the decision maker you must set out all the assumptions upon which the opinion is based. This may include, for example, facts observed as a result of fieldwork or 'assumed' facts based on a body of scientific opinion. If the latter, you should provide references which demonstrate the existence of that body of opinion.

16. Your expert report must also set out the process of reasoning which you have undertaken in order to arrive at your conclusions. It is insufficient for an expert report to simply state your opinion or conclusion reached without an explanation as to how this was arrived at. The purpose of providing such assumptions and reasoning is to enable the decision maker and experts engaged by other parties to make an assessment as to the soundness of your opinion.

Overview of work requested

17. We request that you undertake the following work:
    a. review the documents listed below;
    b. prepare a written expert report that addresses the issues identified below ('Issues to address in your expert report'); and
    c. ensure that the work is prepared in accordance with independent expert advice as indicated above.

Documents

18. We enclose the Code of Conduct and Part 31 Division 2 of the UCPR.

19. If you have previously reviewed relevant EIS documents for the previous SSD application (Dendrobium Extension Project, SSD 8194) you may wish to review your previous expert advice.

20. Full Project documentation is available at the following website:
    a) NSW Government Planning Portal: https://www.planningportal.nsw.gov.au/major-projects/projects/dendrobium-mine-extension-project-0

21. The following documents relating to the Project are provided for your particular consideration:

    Environmental Impact Statement

    Executive Summary,
    https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSI-33143123%2120220427T061031.074%20GMT

    Section 1 – Introduction,
    https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSI-33143123%2120220427T061031.900%20GMT

    Section 4 – Project Description,
    https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSI-33143123%2120220429T025120.565%20GMT, pp. 4-34 to 4-37

    Section 7 – Environmental Assessment,
    https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSI-33143123%2120220427T061037.452%20GMT, pp. 7-5 to 7-13, 7-18 to 7-50, 7-55 to 7-64

EIS Att 8 – Aquifer Interference & Water Licensing, https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSI-33143123%2120220427T061056.264%20GMT

Appendix A – Subsidence Assessment, https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSI-33143123%2120220427T061043.537%20GMT

Appendix B – Groundwater Assessment, https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSI-33143123%2120220427T061045.250%20GMT

Appendix C – Surface Water Assessment, https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSI-33143123%2120220427T061046.806%20GMT

Appendix S – Geotechnical Assessment, https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSI-33143123%2120220427T061053.541%20GMT

22. IMC (2020). Illawarra Metallurgical Coal. Dendrobium Area 3B Watercourse Impact Monitoring, Management and Contingency Plan. https://www.south32.net/docs/default-source/illawarra-coal/dendrobium/subsidence-management-plans---longwalls-14-19/attachment-s-dendrobium-area-3-environmental-performance.pdf?sfvrsn=18df35db_4

23. Other documents relating to the SSD application that may be of relevance include:

    a) Dendrobium Extension Project SSD 8194 – Project Area (see attached).

24. You are not limited to the above documents, if there is other material relevant to your expert report, you may wish to refer to this material.

Issues to address in your expert report

25. We ask that your report addresses the following issues in regard to any impacts arising as a result of the Project:

    a. In your opinion, what are the likely hydrogeological impacts of the Project and what will the surface expression of any changes be?
    b. The proponent claims that the design of the Project (revised from the earlier refused application) “includes avoidance of key surface features, which would reduce potential impacts to aquatic habitat [and] upland swamp”, and that the revised longwall layout (Area 5) “has been designed to minimise the likelihood that stream feature[s] will be physically damaged by subsidence impact[s]”. In your opinion, are these justifiable and accurate statements?
    c. Mining subsidence can have deleterious effects on local water resources and infrastructure. In your opinion, have the risks of subsidence been evaluated appropriately as to their potential to harm local water resources—quantity or quality?
    d. The Project proposal indicates that the proponent will continue to conduct water resource monitoring under ‘Mitigation Measures and Monitoring’ (see IMC 2020). In

your view is the monitoring sufficiently rigorous and robust to meet its aims, track deleterious environmental changes, and inform mitigation activities, if required?

e. In your opinion, is the volume of water predicted to be taken by the Project appropriate, given the location of the Project in the Sydney drinking water catchment Special Area?
f. Provide any further observations or opinions which you consider to be relevant.

26. We request that you provide us with a draft of your report for review before finalising it. We emphasise that the purpose of this is not to influence the conclusions or recommendations you make but to ensure that the language and expression of the report is clear and complies with the formal legal requirements of an expert report.

Key dates

27. The Project application, EIS and accompanying documents are on public exhibition from Wednesday 4 May 2022 until 14 June 2022.

28. We kindly request a draft of your expert advice by no later than **Wednesday 8 June 2022**.

29. Please provide your final expert advice by no later than **Monday 13 June 2022**.

Duty of confidentiality

30. Please treat your work as strictly confidential, unless authorised otherwise by us. Please mark all documents prepared for the purposes of this brief as "Privileged & Confidential".

Fees and Terms

31. Thank-you for agreeing to provide your advice in this matter for a capped fee of $3,500 (inc GST). EDO relies on experts such as you to assist in matters with very little financial compensation.

32. Please note the following terms:

    a. your work will only be used by EDO to relation to this matter;
    b. Either EDO or our client may choose to make your expert advice publicly available. Any public release of your report may result in disclosure of any works in your report over which you may claim copyright;
    c. EDO will take all reasonable steps to prevent your work being used for purposes other than that mentioned above, but we accept no responsibility for the actions of third parties;
    d. regardless of the above points, EDO may choose not to use your work; and
    e. you will not be covered by the EDO's insurance while undertaking the above tasks.

33. If you would like to discuss this brief further, please contact t Jayme Cooper via email jayme.cooper@edo.org.au (cc: matthew.floro@edo.org.au and edward.butler@edo.org.au).

We are grateful for your assistance in this matter.

Yours sincerely,
Environmental Defenders Office

Jayme Cooper
Solicitor

Reference number: s 3326

NSW GOVERNMENT | NSW legislation

Uniform Civil Procedure Rules 2005

Current version for 1 December 2021 to date (accessed 25 May 2022 at 13:36)

Division 2 Provisions applicable to expert evidence generally

Note—

The provisions of this Division replace those of former Divisions 2 and 3, as in force immediately before 8 December 2006. The numbering of the individual provisions of this Division varies considerably from that of the provisions of the former Divisions. The following Table identifies the new rules corresponding to former rules 31.17–31.35.

Table

Former rule	New rule
Rule 31.17	Rule 31.18
Rule 31.18	Rule 31.28
Rule 31.18A	Rule 31.29
Rule 31.19	Rule 31.30
Rule 31.20	Rule 31.31
Rule 31.21	Rule 31.32
Rule 31.22	Rule 31.33
Rule 31.23	Rule 31.27
Rule 31.24	Rule 31.34
Rule 31.25	Rules 31.24 and 31.26
Rule 31.26	Rule 31.35
Rule 31.27	Rule 31.36
Rule 31.28	Rule 31.18
Rule 31.29	Rule 31.46
Rule 31.30	Rule 31.23
Rule 31.31	Rule 31.49
Rule 31.32	Rule 31.51
Rule 31.33	Rule 31.52
Rule 31.34	Rule 31.53
Rule 31.35	Rule 31.54

Subdivision 1 Preliminary

31.17 Main purposes of Division (cf Queensland *Uniform Civil Procedure Rules 1999*, rule 423; United Kingdom *Civil Procedure Rules 1998*, rule 35.1)

The main purposes of this Division are as follows—

(a) to ensure that the court has control over the giving of expert evidence,

(b) to restrict expert evidence in proceedings to that which is reasonably required to resolve the proceedings,

(c) to avoid unnecessary costs associated with parties to proceedings retaining different experts,

(d) if it is practicable to do so without compromising the interests of justice, to enable expert evidence to be given on an issue in proceedings by a single expert engaged by the parties or appointed by the court,

(e) if it is necessary to do so to ensure a fair trial of proceedings, to allow for more than one expert (but no more than are necessary) to give evidence on an issue in the proceedings,

(f) to declare the duty of an expert witness in relation to the court and the parties to proceedings.

31.18 Definitions (cf SCR Part 36, rules 13A and 13C; DCR Part 28, rule 8; LCR Part 23, rule 1D)

In this Division—

court-appointed expert means an expert appointed pursuant to rule 31.46.

expert, in relation to any issue, means a person who has such knowledge or experience of, or in connection with, that issue, or issues of the character of that issue, that his or her opinion on that issue would be admissible in evidence.

expert witness means an expert engaged or appointed for the purpose of—

(a) providing an expert's report for use as evidence in proceedings or proposed proceedings, or

(b) giving opinion evidence in proceedings or proposed proceedings.

expert's report means a written statement by an expert (whether or not an expert witness in the proceedings concerned) that sets out the expert's opinion and the facts, and assumptions of fact, on which the opinion is based.

hospital report means a written statement concerning a patient, made by or on behalf of a hospital, that the party serving the statement intends to adduce in evidence in chief at the trial.

parties' single expert means an expert engaged pursuant to rule 31.37.

Subdivision 2 Expert witnesses generally

31.19 Parties to seek directions before calling expert witnesses

(1) Any party—

(a) intending to adduce expert evidence at trial, or

(b) to whom it becomes apparent that he or she, or any other party, may adduce expert evidence at trial,

must promptly seek directions from the court in that regard.

(2) Directions under this rule may be sought at any directions hearing or case management conference or, if no such hearing or conference has been fixed or is imminent, by notice of motion or pursuant to liberty to restore.

(3) Unless the court otherwise orders, expert evidence may not be adduced at trial—

(a) unless directions have been sought in accordance with this rule, and

(b) if any such directions have been given by the court, otherwise than in accordance with those directions.

(4) This rule does not apply to proceedings with respect to a professional negligence claim.

31.20 Court may give directions regarding expert witnesses

(1) Without limiting its other powers to give directions, the court may at any time give such directions as it considers appropriate in relation to the use of expert evidence in proceedings.

(2) Directions under this rule may include any of the following—

(a) a direction as to the time for service of experts' reports,

(b) a direction that expert evidence may not be adduced on a specified issue,

(c) a direction that expert evidence may not be adduced on a specified issue except by leave of the court,

(d) a direction that expert evidence may be adduced on specified issues only,

(e) a direction limiting the number of expert witnesses who may be called to give evidence on a specified issue,

(f) a direction providing for the engagement and instruction of a parties' single expert in relation to a specified issue,

(g) a direction providing for the appointment and instruction of a court-appointed expert in relation to a specified issue,

(h) a direction requiring experts in relation to the same issue to confer, either before or after preparing experts' reports in relation to a specified issue,

(i) any other direction that may assist an expert in the exercise of the expert's functions,

(j) a direction that an expert who has prepared more than one expert's report in relation to any proceedings is to prepare a single report that reflects his or her evidence in chief.

31.21 Expert evidence in chief to be given by way of experts' reports

Unless the court otherwise orders, an expert witness's evidence in chief must be given by the tender of one or more expert's reports.

31.22 Expert witness to provide details of contingency fees or deferred payment schemes

(1) A person who is engaged as an expert witness in relation to any proceedings must include information as to any arrangements under which—

(a) the charging of fees or costs by the expert witness is contingent on the outcome of the proceedings, or

(b) the payment of any fees or costs to the expert witness is to be deferred,

in, or in an annexure to, any report that he or she prepares for the purposes of the proceedings.

(2) If a report referred to in subrule (1) indicates the existence of any such arrangements, the court may direct disclosure of the terms of the engagement (including as to fees and costs).

31.23 Code of conduct (cf SCR Part 39, rule 2; DCR Part 28A, rule 2; LCR Part 38B, rule 2)

(1) An expert witness must comply with the code of conduct set out in Schedule 7.

(2) As soon as practicable after an expert witness is engaged or appointed—

(a) in the case of an expert witness engaged by one or more parties, the engaging parties, or one of them as they may agree, or

(b) in the case of an expert witness appointed by the court, such of the affected parties as the court may direct,

must provide the expert witness with a copy of the code of conduct.

(3) Unless the court otherwise orders, an expert's report may not be admitted in evidence unless the report contains an acknowledgment by the expert witness by whom it was prepared that he or she has read the code of conduct and agrees to be bound by it.

(4) Unless the court otherwise orders, oral evidence may not be received from an expert witness unless the court is satisfied that the expert witness has acknowledged, whether in an expert's report prepared in relation to the proceedings or otherwise in relation to the proceedings, that he or she has read the code of conduct and agrees to be bound by it.

31.24 Conference between expert witnesses (cf SCR Part 36, rule 13CA; DCR Part 28, rule 9D; LCR Part 23, rule 1E)

(1) The court may direct expert witnesses—

(a) to confer, either generally or in relation to specified matters, and

(b) to endeavour to reach agreement on any matters in issue, and

(c) to prepare a joint report, specifying matters agreed and matters not agreed and reasons for any disagreement, and

(d) to base any joint report on specified facts or assumptions of fact,

and may do so at any time, whether before or after the expert witnesses have furnished their experts' reports.

(2) The court may direct that a conference be held—

(a) with or without the attendance of the parties affected or their legal representatives, or

(b) with or without the attendance of the parties affected or their legal representatives, at the option of the parties, or

(c) with or without the attendance of a facilitator (that is, a person who is independent of the parties and who may or may not be an expert in relation to the matters in issue).

(3) An expert witness so directed may apply to the court for further directions to assist the expert witness in the performance of his or her functions in any respect.

(4) Any such application must be made by sending a written request for directions to the court, specifying the matter in relation to which directions are sought.

(5) An expert witness who makes such an application must send a copy of the request to the other expert witnesses and to the parties affected.

(6) Unless the parties affected agree, the content of the conference between the expert witnesses must not be referred to at any hearing.

31.25 Instructions to expert witnesses where conference ordered before report furnished

If a direction to confer is given under rule 31.24(1)(a) before the expert witnesses have furnished their reports, the court may give directions as to—

(a) the issues to be dealt with in a joint report by the expert witnesses, and

(b) the facts, and assumptions of fact, on which the report is to be based,

including a direction that the parties affected must endeavour to agree on the instructions to be provided to the expert witnesses.

31.26 Joint report arising from conference between expert witnesses (cf SCR Part 36, rule 13CA; DCR Part 28, rule 9D; LCR Part 23, rule 1E)

(1) This rule applies if expert witnesses prepare a joint report as referred to in rule 31.24(1)(c).

(2) The joint report must specify matters agreed and matters not agreed and the reasons for any disagreement.

(3) The joint report may be tendered at the trial as evidence of any matters agreed.

(4) In relation to any matters not agreed, the joint report may be used or tendered at the trial only in accordance with the rules of evidence and the practices of the court.

(5) Except by leave of the court, a party affected may not adduce evidence from any other expert witness on the issues dealt with in the joint report.

Subdivision 3 Experts' reports and expert evidence

31.27 Experts' reports (cf SCR Part 36, rule 13C; DCR Part 28, rule 9C; LCR Part 23, rule 1D)

(1) An expert's report must (in the body of the report or in an annexure to it) include the following—

(a) the expert's qualifications as an expert on the issue the subject of the report,

(b) the facts, and assumptions of fact, on which the opinions in the report are based (a letter of instructions may be annexed),

(c) the expert's reasons for each opinion expressed,

(d) if applicable, that a particular issue falls outside the expert's field of expertise,

(e) any literature or other materials utilised in support of the opinions,

(f) any examinations, tests or other investigations on which the expert has relied, including details of the qualifications of the person who carried them out,

(g) in the case of a report that is lengthy or complex, a brief summary of the report (to be located at the beginning of the report).

(2) If an expert witness who prepares an expert's report believes that it may be incomplete or inaccurate without some qualification, the qualification must be stated in the report.

(3) If an expert witness considers that his or her opinion is not a concluded opinion because of insufficient research or insufficient data or for any other reason, this must be stated when the opinion is expressed.

(4) If an expert witness changes his or her opinion on a material matter after providing an expert's report to the party engaging him or her (or that party's legal representative), the expert witness must forthwith provide the engaging party (or that party's legal representative) with a supplementary report to that effect containing such of the information referred to in subrule (1) as is appropriate.

31.28 Disclosure of experts' reports and hospital reports (cf SCR Part 36, rule 13A; DCR Part 28, rule 8; LCR Part 23, rule 3)

(1) Each party must serve experts' reports and hospital reports on each other active party—

(a) in accordance with any order of the court, or

(b) if no such order is in force, in accordance with any relevant practice note, or

(c) if no such order or practice note is in force, not later than 28 days before the date of the hearing at which the report is to be used.

(2) An application to the court for an order under subrule (1) (other than an order solely for abridgment or extension of time) may be made without serving notice of motion.

(3) Except by leave of the court, or by consent of the parties—

(a) an expert's report or hospital report is not admissible unless it has been served in accordance with this rule, and

(b) without limiting paragraph (a), an expert's report or hospital report, when tendered under section 63, 64 or 69 of the *Evidence Act 1995*, is not admissible unless it has been served in accordance with this rule, and

(c) the oral expert evidence in chief of any expert is not admissible unless an expert's report or hospital report served in accordance with this rule contains the substance of the matters sought to be adduced in evidence.

(4) Leave is not to be given as referred to in subrule (3) unless the court is satisfied—

(a) that there are exceptional circumstances that warrant the granting of leave, or

(b) that the report concerned merely updates an earlier version of a report that has been served in accordance with subrule (1).

31.29 Admissibility of expert's report (cf SCR Part 36, rule 13B)

(1) If an expert's report is served in accordance with rule 31.28 or in accordance with an order of the court, the report is admissible—

(a) as evidence of the expert's opinion, and

(b) if the expert's direct oral evidence of a fact on which the opinion was based would be admissible, as evidence of that fact,

without further evidence, oral or otherwise.

(2) Unless the court otherwise orders, a party may require the attendance for cross-examination of the expert by whom the report was prepared by notice served on the party by whom the report was served.

(3) Unless the court otherwise orders, such a requirement may not be made later than—

(a) in the case of proceedings for which the court has fixed a date for trial, 35 days before the date so fixed, or

(b) in any other case, 7 days before the date on which the court fixes a date for trial.

(4) The parties may not by consent abridge the time fixed by or under subrule (3).

(5) If the expert's attendance for cross-examination is required under subrule (2), the report may not be tendered under section 63, 64 or 69 of the *Evidence Act 1995* or otherwise used unless the expert attends or is dead or the court grants leave to use it.

(6) The party using the report may re-examine the expert if the expert attends for cross-examination pursuant to a requirement under subrule (2).

(7) This rule does not apply to proceedings in the District Court or the Local Court or to proceedings on a trial with a jury.

31.30 Admissibility of expert's report in District Court and Local Court (cf DCR Part 28, rule 9; LCR Part 23, rule 2)

(1) This rule applies to proceedings in the District Court or the Local Court.

(2) If an expert's report is served in accordance with rule 31.28 or in accordance with an order of the court, the report is admissible—

(a) as evidence of the expert's opinion, and

(b) if the expert's direct oral evidence of a fact on which the opinion was based would be admissible, as evidence of that fact,

without further evidence, oral or otherwise.

(3) Unless the court orders otherwise—

(a) it is the responsibility of the party requiring the attendance for cross-examination of the expert by whom an expert's report has been prepared to procure that attendance, and

(b) the party requiring the expert's attendance must notify the expert at least 28 days before the date on which attendance is required.

(4) Except for the purpose of determining any liability for conduct money or witness expenses, an expert does not become the witness for the party requiring his or her attendance merely because his or her attendance at court has been procured by that party.

(5) A party who requires the attendance of a person as referred to in subrule (2)—

(a) must inform all other parties to the proceedings that the party has done so at least 28 days before the date fixed for hearing, and

(b) must pay to the person whose attendance is required (whether before or after the attendance) an amount sufficient to meet the person's reasonable expenses (including any standby fees) in complying with the requirement.

(6) If the attendance of an expert is required under subrule (2), the report may not be tendered under section 63, 64 or 69 of the *Evidence Act 1995* or otherwise used unless the expert attends or is dead or the court grants leave to use it.

(7) The party using an expert's report may re-examine an expert who attends for cross-examination under a requirement under subrule (2).

(8) This rule does not apply to proceedings on a trial with a jury.

31.31 Fees for medical expert for compliance with subpoena (cf SCR Part 36, rule 13BA)

(1) If a subpoena is served on a medical expert who is to give evidence of medical matters but is not called as a witness, the expert is, unless the court orders otherwise, entitled to be paid, in addition to any other amount payable to the expert, the amount specified in item 2 of Schedule 3.

(2) The amount payable under subrule (1) must be paid to the expert by the issuing party within 28 days after the date for the expert's attendance.

(3) A party that requires an expert's attendance under rule 31.29(2), but subsequently revokes it, must pay to the issuing party any amount paid by the issuing party under subrule (2), but otherwise such an amount is not recoverable by the issuing party from any other party unless the court so orders.

(4) In this rule, ***issuing party*** means the party at whose request a subpoena is issued.

31.32 Service of subpoena on medical expert (cf SCR Part 36, rule 13BB)

(1) Service of a subpoena on a medical expert may be effected, at any place at which the expert's practice is carried on, by handing it over to a person who is apparently engaged in the practice (whether as an employee or otherwise) and is apparently of or above the age of 16 years.

(2) If a person refuses to accept a subpoena when it is handed over, the subpoena may be served by putting it down in the person's presence after he or she has been told of its nature.

(3) If a subpoena requires a medical expert to attend court on a specified date for the purpose of giving evidence on medical matters, it must be served on the expert not later than 21 days before the date so specified unless the court orders otherwise.

(4) The parties may not by consent abridge the time fixed by or under subrule (3).

31.33 Subpoena requiring production of medical records (cf SCR Part 36, rule 13BC)

(1) A subpoena for production may require a medical expert to produce medical records or copies of them.

(2) A person is not required to comply with a subpoena for production referred to in subrule (1) unless the amount specified in item 3 of Schedule 3 is paid or tendered to the person at the time of service of the subpoena or a reasonable time before the date on which production is required.

(3) Rule 33.6 (Compliance with subpoena) does not apply to a subpoena to which subrule (1) applies.

(4) Rule 33.7 (Production otherwise than on attendance) applies to the photocopies in the same way as it applies to the records.

(5) If, after service of a subpoena for production referred to in subrule (1), the party who requested the issue of the subpoena requires production of the original medical records without the option of producing copies of them, the party must request the issue of, and serve, another subpoena requiring production of the original medical records.

31.34 Supplementary reports by expert witness (cf SCR Part 36, rule 13C; DCR Part 28, rule 9C; LCR Part 23, rule 1D)

(1) If an expert witness provides a supplementary report to the party by whom he or she has been engaged, neither the engaging party nor any other party having the same interest as the engaging party may use—

(a) the supplementary report, or

(b) any earlier report affected by the supplementary report,

unless all of those reports have been served on all parties affected.

(2) For the purposes of this rule, ***supplementary report***, in relation to an earlier report provided by an expert witness, includes any report by the expert witness that indicates that he or she has changed his or her opinion on a material matter expressed in the earlier report.

(3) This rule does not apply to a report prepared by a court-appointed expert.

31.35 Opinion evidence by expert witnesses (cf *Federal Court Rules*, Order 34A, rule 3)

In any proceedings in which two or more parties call expert witnesses to give opinion evidence about the same issue or similar issues, or indicate to the court an intention to call expert witnesses for that purpose, the court may give any one or more of the following directions—

(a) a direction that, at trial—

(i) the expert witnesses give evidence after all factual evidence relevant to the issue or issues concerned, or such evidence as may be specified by the court, has been adduced, or

(ii) the expert witnesses give evidence at any stage of the trial, whether before or after the plaintiff has closed his or her case, or

(iii) each party intending to call one or more expert witnesses close that party's case in relation to the issue or issues concerned, subject only to adducing evidence of the expert witnesses later in the trial,

(b) a direction that, after all factual evidence relevant to the issue, or such evidence as may be specified by the court, has been adduced, each expert witness file an affidavit or statement indicating—

(i) whether the expert witness adheres to any opinion earlier given, or

(ii) whether, in the light of any such evidence, the expert witness wishes to modify any opinion earlier given,

(c) a direction that the expert witnesses—

(i) be sworn one immediately after another (so as to be capable of making statements, and being examined and cross-examined, in accordance with paragraphs (d), (e), (f), (g) and (h)), and

(ii) when giving evidence, occupy a position in the courtroom (not necessarily the witness box) that is appropriate to the giving of evidence,

(d) a direction that each expert witness give an oral exposition of his or her opinion, or opinions, on the issue or issues concerned,

(e) a direction that each expert witness give his or her opinion about the opinion or opinions given by another expert witness,

(f) a direction that each expert witness be cross-examined in a particular manner or sequence,

(g) a direction that cross-examination or re-examination of the expert witnesses giving evidence in the circumstances referred to in paragraph (c) be conducted—

(i) by completing the cross-examination or re-examination of one expert witness before starting the cross-examination or re-examination of another, or

(ii) by putting to each expert witness, in turn, each issue relevant to one matter or issue at a time, until the cross-examination or re-examination of all of the expert witnesses is complete,

(h) a direction that any expert witness giving evidence in the circumstances referred to in paragraph (c) be permitted to ask questions of any other expert witness together with whom he or she is giving evidence as so referred to,

(i) such other directions as to the giving of evidence in the circumstances referred to in paragraph (c) as the court thinks fit.

31.36 Service of experts' reports in professional negligence claims (cf SCR Part 14C, rules 1 and 6; DCR Part 28, rule 9B)

(1) Unless the court orders otherwise, a person commencing a professional negligence claim (other than a claim against a legal practitioner) must file and serve, with the statement of claim commencing the professional negligence claim, an expert's report that includes an opinion supporting—

(a) the breach of duty of care, or contractual obligation, alleged against each person sued for professional negligence, and

(b) the general nature and extent of damage alleged (including death, injury or other loss or harm and prognosis, as the case may require), and

(c) the causal relationship alleged between such breach of duty or obligation and the damage alleged.

(2) In the case of a professional negligence claim against a legal practitioner, the court may order the plaintiff to file and serve an expert's report or experts' reports supporting the claim.

(3) If a party fails to comply with subrule (1) or (2), the court may by order made on the application of a party or of its own motion dismiss the whole or any part of the proceedings, as may be appropriate.

(4) Without limiting subrule (1) or (2), the court may, on the application of any of the parties, give directions as to the expert evidence to be adduced at trial.

(5) Directions under subrule (4) may be sought at any directions hearing or case management conference or by notice of motion.

(6) Unless the court otherwise orders, no party may adduce any expert evidence at trial unless the evidence—

(a) has been filed and served under subrule (1) or (2), or

(b) has been served pursuant to directions given under subrule (4).

Subdivision 4 Parties' single experts

31.37 Selection and engagement

(1) If an issue for an expert arises in any proceedings, the court may, at any stage of the proceedings, order that an expert be engaged jointly by the parties affected.

(2) A parties' single expert is to be selected by agreement between the parties affected or, failing agreement, by, or in accordance with the directions of, the court.

(3) A person may not be engaged as a parties' single expert unless he or she consents to the engagement.

(4) If any party affected knows that a person is under consideration for engagement as a parties' single expert—

(a) the party affected must not, prior to the engagement, communicate with the person for the purpose of eliciting the person's opinion as to the issue or issues concerned, and

(b) if the party affected has previously communicated with the person for that purpose, he or she must notify the other parties affected as to the substance of those communications.

31.38 Instructions to parties' single expert

(1) The parties affected must endeavour to agree on written instructions to be provided to the parties' single expert concerning the issues arising for the expert's opinion and concerning the facts, and assumptions of fact, on which the report is to be based.

(2) If the parties affected cannot so agree, they must seek directions from the court.

31.39 Parties' single expert may apply to court for directions

(1) The parties' single expert may apply to the court for directions to assist the expert in the performance of the expert's functions in any respect.

(2) Any such application must be made by sending a written request for directions to the court, specifying the matter in relation to which directions are sought.

(3) A parties' single expert who makes such an application must send a copy of the request to the parties affected.

31.40 Parties' single expert's report to be sent to parties

(1) The parties' single expert must send a signed copy of his or her report to each of the parties affected.

(2) Each copy must be sent on the same day and must be endorsed with the date on which it is sent.

31.41 Parties may seek clarification of report

(1) Within 14 days after the parties' single expert's report is sent to the parties affected, and before the report is tendered in evidence, a party affected may, by notice in writing sent to the expert, seek clarification of any aspect of the report.

(2) Unless the court orders otherwise, a party affected may send no more than one such notice.

(3) Unless the court orders otherwise, the notice must be in the form of questions, no more than 10 in number.

(4) The party sending the notice must, on the same day as it is sent to the parties' single expert, send a copy of it to each of the other parties affected.

(5) Each notice sent under this rule must be endorsed with the date on which it is sent.

(6) Within 28 days after the notice is sent, the parties' single expert must send a signed copy of his or her response to the notice to each of the parties affected.

31.42 Tender of reports and of answers to questions

(1) Subject to rule 31.23(3) and unless the court orders otherwise, the parties' single expert's report may be tendered in evidence by any of the parties affected.

(2) Unless the court orders otherwise, any or all of the parties' single expert's answers in response to a request for clarification under rule 31.41 may be tendered in evidence by any of the parties affected.

31.43 Cross-examination of parties' single expert

Any party affected may cross-examine a parties' single expert, and the expert must attend court for examination or cross-examination if so requested on reasonable notice by a party affected.

31.44 Prohibition of other expert evidence

Except by leave of the court, a party to proceedings may not adduce evidence of any other expert on any issue arising in proceedings if a parties' single expert has been engaged under this Division in relation to that issue.

31.45 Remuneration of parties' single expert

(1) The remuneration of a parties' single expert is to be fixed by agreement between the parties affected and the expert or, failing agreement, by, or in accordance with the directions of, the court.

(2) Subject to subrule (3), the parties affected are jointly and severally liable to a parties' single expert for his or her remuneration.

(3) The court may direct when and by whom a parties' single expert is to be paid.

(4) Subrules (2) and (3) do not affect the powers of the court as to costs.

Subdivision 5 Court-appointed experts

31.46 Selection and appointment (cf SCR Part 39, rule 1; DCR Part 28A, rule 1; LCR Part 38B, rule 1)

(1) If an issue for an expert arises in any proceedings the court may, at any stage of the proceedings—

(a) appoint an expert to inquire into and report on the issue, and

(b) authorise the expert to inquire into and report on any facts relevant to the inquiry, and

(c) direct the expert to make a further or supplemental report or inquiry and report, and

(d) give such instructions (including instructions concerning any examination, inspection, experiment or test) as the court thinks fit relating to any inquiry or report of the expert or give directions concerning the giving of such instructions.

(2) The court may appoint as a court-appointed expert a person selected by the parties affected, a person selected by the court or a person selected in a manner directed by the court.

(3) A person must not be appointed as a court-appointed expert unless he or she consents to the appointment.

(4) If any party affected knows that a person is under consideration for appointment as a court-appointed expert—

(a) the party affected must not, prior to the appointment, communicate with the person for the purpose of eliciting the person's opinion as to the issue or issues concerned, and

(b) if the party affected has previously communicated with the person for that purpose, he or she must notify the court as to the substance of those communications.

31.47 Instructions to court-appointed expert

The court may give directions as to—

(a) the issues to be dealt with in a report by a court-appointed expert, and

(b) the facts, and assumptions of fact, on which the report is to be based,

including a direction that the parties affected must endeavour to agree on the instructions to be provided to the expert.

31.48 Court-appointed expert may apply to court for directions

(1) A court-appointed expert may apply to the court for directions to assist the expert in the performance of the expert's functions in any respect.

(2) Any such application must be made by sending a written request for directions to the court, specifying the matter in relation to which directions are sought.

(3) A court-appointed expert who makes such an application must send a copy of the request to the parties affected.

31.49 Court-appointed expert's report to be sent to registrar (cf SCR Part 39, rule 3; DCR Part 28A, rule 3; LCR Part 38B, rule 3)

(1) The court-appointed expert must send his or her report to the registrar, and a copy of the report to each party affected.

(2) Subject to rule 31.23(3) and unless the court orders otherwise, a report that has been received by the registrar is taken to be in evidence in any hearing concerning a matter to which it relates.

(3) A court-appointed expert who, after sending a report to the registrar, changes his or her opinion on a material matter must forthwith provide the registrar with a supplementary report to that effect.

31.50 Parties may seek clarification of court-appointed expert's report

Any party affected may apply to the court for leave to seek clarification of any aspect of the court-appointed expert's report.

31.51 Cross-examination of court-appointed expert (cf SCR Part 39, rule 4; DCR Part 28A, rule 4; LCR Part 38B, rule 4)

Any party affected may cross-examine a court-appointed expert, and the expert must attend court for examination or cross-examination if so requested on reasonable notice by a party affected.

31.52 Prohibition of other expert evidence (cf SCR Part 39, rule 6; DCR Part 28A, rule 6; LCR Part 38B, rule 6)

Except by leave of the court, a party to proceedings may not adduce evidence of any expert on any issue arising in proceedings if a court-appointed expert has been appointed under this Division in relation to that issue.

31.53 Remuneration of court-appointed expert (cf SCR Part 39, rule 5; DCR Part 28A, rule 5; LCR Part 38B, rule 5)

(1) The remuneration of a court-appointed expert is to be fixed by agreement between the parties affected and the expert or, failing agreement, by, or in accordance with the directions of, the court.

(2) Subject to subrule (3), the parties affected are jointly and severally liable to a court-appointed witness for his or her remuneration.

(3) The court may direct when and by whom a court-appointed expert is to be paid.

(4) Subrules (2) and (3) do not affect the powers of the court as to costs.

31.54 Assistance to court by other persons (cf SCR Part 39, rule 7; DCR Part 28A, rule 7; LCR Part 38B, rule 7)

(1) In any proceedings, the court may obtain the assistance of any person specially qualified to advise on any matter arising in the proceedings and may act on the adviser's opinion.

(2) Rule 31.53 applies to and in respect of a person referred to in subrule (1) in the same way as it applies to and in respect of a court-appointed witness.

(3) This rule does not apply to proceedings in the Admiralty List of the Supreme Court or to proceedings that are tried before a jury.

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Current version for 1 December 2021 to date (accessed 25 May 2022 at 13:36)

Schedule 7

Schedule 7 Expert witness code of conduct

(Rule 31.23)

1 Application of code

This code of conduct applies to any expert witness engaged or appointed—

(a) to provide an expert's report for use as evidence in proceedings or proposed proceedings, or

(b) to give opinion evidence in proceedings or proposed proceedings.

2 General duties to the Court

An expert witness is not an advocate for a party and has a paramount duty, overriding any duty to the party to the proceedings or other person retaining the expert witness, to assist the court impartially on matters relevant to the area of expertise of the witness.

3 Content of report

Every report prepared by an expert witness for use in court must clearly state the opinion or opinions of the expert and must state, specify or provide—

(a) the name and address of the expert, and

(b) an acknowledgement that the expert has read this code and agrees to be bound by it, and

(c) the qualifications of the expert to prepare the report, and

(d) the assumptions and material facts on which each opinion expressed in the report is based (a letter of instructions may be annexed), and

(e) the reasons for and any literature or other materials utilised in support of each such opinion, and

(f) (if applicable) that a particular question, issue or matter falls outside the expert's field of expertise, and

(g) any examinations, tests or other investigations on which the expert has relied, identifying the person who carried them out and that person's qualifications, and

(h) the extent to which any opinion which the expert has expressed involves the acceptance of another person's opinion, the identification of that other person and the opinion expressed by that other person, and

(i) a declaration that the expert has made all the inquiries which the expert believes are desirable and appropriate (save for any matters identified explicitly in the report), and that no matters of significance which the expert regards as relevant have, to the knowledge of the expert, been withheld from the court, and

(j) any qualification of an opinion expressed in the report without which the report is or may be incomplete or inaccurate, and

(k) whether any opinion expressed in the report is not a concluded opinion because of insufficient research or insufficient data or for any other reason, and

(l) where the report is lengthy or complex, a brief summary of the report at the beginning of the report.

4 Supplementary report following change of opinion

(1) Where an expert witness has provided to a party (or that party's legal representative) a report for use in court, and the expert thereafter changes his or her opinion on a material matter, the expert must forthwith provide to the party (or that party's legal representative) a supplementary report which must state, specify or provide the information referred to in clause 3(a), (d), (e), (g), (h), (i), (j), (k) and (l), and if applicable, clause 3(f).

(2) In any subsequent report (whether prepared in accordance with subclause (1) or not), the expert may refer to material contained in the earlier report without repeating it.

5 Duty to comply with the court's directions

If directed to do so by the court, an expert witness must—

(a) confer with any other expert witness, and

(b) provide the court with a joint report specifying (as the case requires) matters agreed and matters not agreed and the reasons for the experts not agreeing, and

(c) abide in a timely way by any direction of the court.

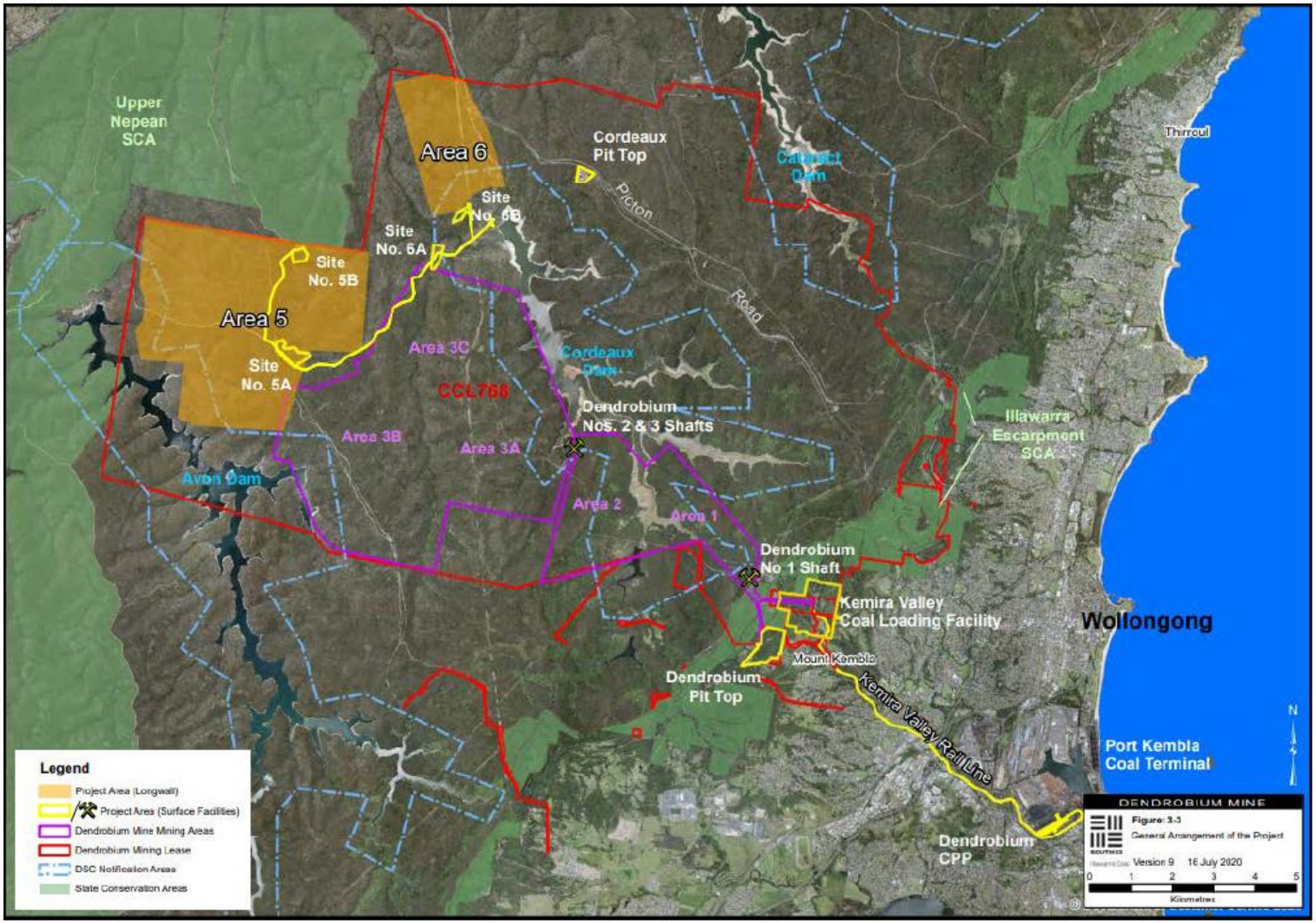
6 Conferences of experts

Each expert witness must—

(a) exercise his or her independent judgment in relation to every conference in which the expert participates pursuant to a direction of the court and in relation to each report thereafter provided, and must not act on any instruction or request to withhold or avoid agreement, and

(b) endeavour to reach agreement with the other expert witness (or witnesses) on any issue in dispute between them, or failing agreement, endeavour to identify and clarify the basis of disagreement on the issues which are in dispute.

Figure 2 - Local Context & General Arrangement (Source: Amendment Report)



This map shows the spatial extent (Areas 5 & 6) of the Applicant's previous Significant State Development (**SSD**) application (Dendrobium Extension Project, SSD 8194), refused by the Independent Planning Commission.