

AGFORCE SUBMISSION

Consultation draft UWIR 2021 for the Surat CMA – November 2021

The logo for AgForce, featuring a stylized white and yellow shape resembling a drop or a leaf, with the word "AGFORCE" in yellow capital letters below it.

AGFORCE

Key Points

1. AgForce supports the use of objective scientific information to guide water and land resource management decisions. We welcome the Office of Groundwater Impact Assessment's (OGIA) release of updated scientific information about the effects of Coal Seam Gas (CSG), conventional oil and gas and coal mining production on underground water and lands in the Surat Cumulative Management Area (CMA) as an important tool in helping protect the natural environment and preserve Queensland's sustainable agriculture industry.
2. AgForce has several land use protection principles which should be considered by government in managing resource sector impacts in the Surat CMA. It is vital that permanent negative impacts are avoided and a precautionary approach is taken. Potentially affected landholders must be empowered to negotiate effectively with other parties who seek access to their land, including the ability to have a Conduct & Compensation Agreement (CCA) and rights to fair compensation, access to the Land access Ombudsman when negotiating agreements and to be confident in government's compliance management and enforcement.
3. In relation to agricultural land protection, many of our members remain most concerned about water resources impacts, land not being effectively rehabilitated, regulatory compliance and current legislation and regulatory frameworks.
4. Turning to the draft consultation report, OGIA indicates the CSG production footprint continues to grow towards a forecast 22,000 wells with more bores identified in the long-term affected area (LAA), bringing real challenges for affected agricultural land managers, bore owners and their communities – how are OGIA's findings being used by government to proactively develop policy measures to address these increasing and cumulative challenges?
5. Impacts of significant water declines are reported to be concentrated in the CSG target formations with lesser impacts on surrounding aquifers and no impacts on agricultural water quality are predicted, which is a positive outlook.
6. A welcome inclusion to the 2021 report, coal mines use less than 2% of associated water in the Surat basin, noting local impacts can be significant and must be avoided where possible
7. Progress on impacted bore assessments and securing make-good agreements continues to be slow, with just 134 of the previously identified 233 Immediately Impacted Area (IAA) bores covered by make good agreements. A further 108 bores are identified in this report that are expected to be impacted by more than 5-metre declines in the next 3 years. This make-good issue was also identified by AgForce for the 2019 report and must be addressed.
8. AgForce supports ongoing efforts by OGIA, the Department of Environment & Science and others to clarify which bores are eligible for make-good and that this eligibility recognises all rights to groundwater access, or its replacement, held by agricultural landowners.
9. Following our past support for further investigations, the report clearly confirms CSG-induced land subsidence is occurring within gas production areas. AgForce has serious concerns about the potential for subsidence associated impacts on cropping production, both irrigated and dryland and advocates for a precautionary approach that avoids negative legacy effects on natural resources including soil and water.

We call on the state government to clearly prioritise agriculture on priority agricultural and strategic cropping areas in managing this issue. OGIA's scientific work should, as a matter of urgency, investigate how subsidence can be 'made good' in these circumstances and if that is not technically possible, then CSG developments should not proceed on those areas. Subsidence as a now clearly identified risk must be included into requirements for proactive baselines, impact avoidance and monitoring, conduct and compensation and make-good systems where make-good is shown to be feasible.

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10. Objective, robust scientific information to guide water resource decisions is vital in balancing the positive and negative elements of resource sector developments and AgForce supports ongoing investment in the production of these impact reports, their continuous improvement and the application of their findings more broadly by government to firstly avoid impacts and, if avoidance is not possible, to fairly and proactively make good any impacts on agricultural water and land natural capital assets.
11. Building on the valuable work to date, AgForce support OGIA doing further work on:
 - a. including in the final 2021 report a map of the distribution of long-term impacts across the Condamine Alluvium; clarification as to why inSAR data from 2006 to 2015 was not used/presented (or alternatively to include it); a subsidence by period of development map to clarify the relative rate of change in ground surface over time; and a clearer definition of the 'initial development stages' within which high rates of subsidence are expected
 - b. discrepancies between water volumes metered at wells and subsequent water processing facility water balances
 - c. continuing to refine the methodology for estimating groundwater use for both stock and domestic (S&D) and non-S&D purposes
 - d. development of effective 'stop work' triggers for resource activities in situations where actual groundwater or land surface impacts trend towards exceeding expected or approved levels
 - e. providing a publicly available record of the proportion of types of 'make good' being provided previously and into the future, to better inform OGIA modelling of make good outcomes
 - f. the capacity of alternative water sources (such as the Hutton sandstone aquifer) to be a certain source of alternative supplies under potential future water replacing 'make-good' arrangements as further LAA bores are progressively impacted
 - g. further clarification of bores eligible under the 'make-good' system, delivering greater certainty than is currently available under a 'case by case' approach
 - h. an independent process, with close agricultural and resource sector involvement, to comprehensively review the make-good system so that it is timely, effective and fair
 - i. how subsidence can practically be 'made good' on cropping lands
 - j. objectively examining surface flows and impacts on watercourses in the area of interest, using available baseline flood modelling and additional measurement and water flow modelling work
 - k. impacts on brine management and storage under predicted subsidence as well as under potential changes to surface water flows resulting from it
 - l. ongoing measurement and monitoring of land surface subsidence due to CSG-related activities at a property-relevant scale
 - m. the expected evenness of subsidence at a paddock, farm and district level across time to test OGIA's assumption that overlapping CSG drawdown will produce relatively uniform subsidence



- n. OGIA using a range of mediums, including communication videos and podcasts, to support public understanding of CSG-related issues and their work.

Further detail

OVERARCHING AGFORCE LAND USE PROTECTION PRINCIPLES

- Recognising that regulation and management of resource sector impacts does not fall under the remit of OGIA, AgForce supports a number of principles when it comes to alternative land uses on agricultural land as follows:
 - AgForce requires that alternative and potentially impacting land uses ensure:
 - There is a recognition that natural capital has inherent value
 - Human health and well-being must not be sacrificed
 - A precautionary approach that avoids negative legacy effects on natural resources including air, soil, water and biodiversity
 - There are no negative impacts on existing or future sustainable agricultural opportunities.
 - Before
 - Recognise that resources are finite
 - All projects are assessed on environmental, social and economic criteria
 - There is a formal mechanism for agriculture to be involved in assessment
 - Projects should not be assessed in isolation and cumulative impacts assessed
 - Potential impacts need to be objectively and accurately quantified rigorously and independently reviewed
 - Agricultural landholders to have equal representation, available resources and bargaining power.
 - During
 - All projects must have comprehensive monitoring and transparent reporting
 - Non-compliance will trigger cease work
 - Enforcement is primarily the responsibility of government, but landholders must have a right to compel action
 - Industry and Government must proactively identify and manage cumulative impacts, both individual project cumulative impacts and multiple projects cumulative impacts.
 - After
 - Land needs to be rehabilitated to pre-existing natural conditions
 - Financial assurance needs to be adequate for rehabilitation.

SURVEY OF AGFORCE MEMBER CONCERNS

- AgForce’s Land Use Protection Committee surveyed the membership of AgForce in March 2020 in relation to the protection of agricultural land uses
- The Committee received responses from 74 primary producer members. Three quarters of respondents had cattle, 22% grain and 11% sheep and 8% mixed enterprises. Of the respondents, 7 in 8 had been farming for over 20 years.
- 85% of respondents had concerns with land use competition impacting their business from the coal mining, gas, conservation, urban development or renewable energy industries and 15% did not have concerns.



- Those with concerns rated the issues of greatest concern as water resources impacts (8 in 10 very concerned), land not being effectively/genuinely rehabilitated (7 in 10 very concerned), regulatory compliance (7 in 10 very concerned) and legislation and regulatory frameworks (two thirds very concerned).
- These issues are all relevant to the 2021 Report and the state government's response to it.

MORE RECENT AGFORCE POLICY POSITIONING IN RELATION TO CSG DEVELOPMENT:

- AgForce seeks the State Government to expand the jurisdiction of the Land Access Ombudsman to enable access to the Ombudsman that includes properties (owners and lessees) where no Conduct and Compensation Agreement or Make-Good Agreement exists for proposed or current directionally drilled CSG wells
- AgForce seeks Government to reinstate protections providing landholders neighbouring CSG development with a legislated right to be compensated for compensable effects
- AgForce seek Government improve communication between Departments administering the CSG industry and improve data systems to integrate and match information on CSG activities to reduce non-compliance
- AgForce seek Government implement visible and pro-active resource company CSG compliance program to improve landholder outcomes and confidence in Government and the resource industry
- AgForce seek Government ensure that the drilling of directional or vertical wells underneath a landholder's property only be authorised with the appropriate protections of a Conduct and Compensation Agreement.

UWIR ISSUE: EXPANSION OF CSG DEVELOPMENT ACTIVITY AND RESOURCE SECTOR IMPACTS

- The consultation draft UWIR report 2021 (the report) indicates that the existing and planned CSG production area has increased by 8% since 2019, with current development projections increased by 5% to a total of about 22,000 CSG wells (this is within past UWIR estimates), of which about 8,600 are already in place. The number of wells has increased by about 1,800 since the 2019 UWIR. Such a significant expansion brings with it a range of real challenges for landholders and their communities including biosecurity risk management, transport infrastructure capacity limitations, additional infrastructure requirements for further CSG fields and their associated ecological and residual impacts. How are OGIA's findings being applied to proactively address these cumulative issues?
- Current actual associated water extraction is about 54,000 ML/year (marginally higher than in 2019 UWIR) with predicted extraction in the next three years likely to be around 80,000 ML/year, trending towards a peak of about 120,000 ML/year in around 2027.
- The draft report (p135) notes discrepancies between water volumes metered at wells and water processing facility water balances. We support OGIA investigating the reason for these discrepancies to ensure accurate estimates of water use are obtained and used. The Rural Water Futures project at the Department of Regional Development, Manufacturing and Water is investigating measurement and metering approaches, including pattern approved meter and telemetry use, and their findings are of relevance to this issue.
- Groundwater levels within CSG production areas are predicted by OGIA to take more than 1,000 years to fully recover. Such impacts can be considered permanent – unlike the lifetime of this CSG industry – and potentially affecting the state's capacity to produce high quality food and fibre for generations to come. This is very concerning.

- A total of 702 water bores are predicted to be impacted in the long-term and may potentially require make good arrangements, of which 108 are predicted to be impacted in the next three years (ie, Immediately Affected Area (IAA) bores) – AgForce sees this as a significant challenge for those affected bore owners. IAA bores require follow-up make good arrangements and there are deficiencies in that system that need to be addressed (more on that below).
- Of these potentially affected bores – 516 physically exist (476 S&D, 35 agriculture) and are usable water bores, while 186 have now been decommissioned or proactively entered into make good agreements.
- According to OGIA, the maximum CSG development scenario only increases the number of potentially affected LAA bores by 3%. AgForce appreciates the inclusion of the ‘full development scenario’ in the report, which we requested in our feedback to the UWIR 2019.

UWIR IDENTIFIED GROUNDWATER IMPACT LOCATIONS

- Within the area of interest (active development area plus a 15km buffer zone), there are about 8,000 water bores and the current total estimated groundwater use in the area of interest is about 59,000 ML/year, of which about a third is from the GAB.
- AgForce supports further research into refining the methodology for estimating groundwater use for both S&D and non-S&D purposes, where this involves bore owners voluntarily using meters to record their water take as part of a project. AgForce does not support mandated metering of grazing livestock water takes as this is limited by the carrying capacity of the land.
- Predicting over a 100-year period from the start of the CSG production, OGIA proposes most groundwater extracted will be from the Walloon Coal Measures, and only about 8% from surrounding aquifers. The majority of the impact area in the Walloon Coal Measures will experience maximum impacts of about 200 to 425 metres in the short term and 275 to 450 metres in the longer term.
- OGIA concluded and has reaffirmed that there was a low level of connectivity between the Condamine Alluvium and the Walloon Coal Measures and drawdown impacts in the Condamine Alluvium will be less than 1 metre, with no LAA or IAA bores identified in the Condamine Alluvium at this stage.
- The report notes that there are variations in flows expected between the eastern and western Condamine Alluvium. Given the demonstrated existence of subsidence and increase in estimated water loss from the CA compared to the 2019 report, OGIA should provide a map in the final 2021 report of the distribution of long-term impacts on the Condamine Alluvium as provided in the 2019 report (APX-50).
- Due to the movement of water into the target formations from adjacent aquifers, OGIA predicts that there is unlikely to be any impact on water quality of water bores used for agricultural purposes. This is positive news.
- The report has many qualifications on impacts such as ‘at this stage’. An example quote ‘*As is the case for the Walloon Coal Measures, there is significant observed drawdown in the Bandanna Formation. Although monitoring data is unavailable prior to production, observed drawdown since production are in excess of 400m. Many of these locations are in close proximity to the interpreted contact zones and therefore ongoing monitoring in these areas is important to assess connectivity.*’ Does this monitoring include stop work triggers for when impacts trend towards exceeding what is reasonable for the best interests of society and future food production?

UWIR INCLUSION OF COAL MINING

- In 2019 AgForce supported the inclusion of coal mines or other significant resource activity into the Surat CMA and their calling in to prepare a UWIR where impacts on underground water are expected to, or have, occurred.
- AgForce welcomes the inclusion of coal mines in this report and providing a cumulative picture of impacts of resource developments on underground water resources
- The results suggest that the total 2020 associated water use by coal mines (8 existing and proposed open cut mines) in the Surat Basin is less than 1,000 ML, which is less than 2% of the total associated water extraction in the Surat Basin.
- Local impacts (within a few kilometres of the mine) can be very significant however, with the predicted cumulative impacts from coal mining up to 55 m in some localised areas, such as at the New Acland mine, but generally less than 10 to 20 m. Impacts on local landholders should be avoided wherever possible.

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ISSUE: DEFICIENCIES IN THE CURRENT 'MAKE-GOOD' SYSTEM

- Permanent resource sector impacts on groundwater resources must be avoided and only if they are unavoidable, but acceptable to a well-informed society should groundwater impacts be allowed. The large majority of 'make-good' agreements see financial settlements and bore decommissioning and questions arise about the capacity of alternative water sources (such as the Hutton sandstone) to be a sure and certain source of alternative supplies. The risk of providing a viable and secure alternative water supply should not rest with those affected landholders who want water in preference to financial restitution.
- In all cases, an agreement between a resource holder and water bore owner should be put in place to ensure the resource tenure holder proactively and pre-emptively 'makes good' on any impacts to the bore.
- Of the 108 water bores newly identified in the 2021 UWIR as IAA bores (predicted to be impacted by more than five metres in next three years, 2021–2024) 104 are stock and domestic bores and 89 of these 108 IAA bores are assigned to Arrow for follow-up impairment assessment and make good arrangements.
- IAA bores are progressively identified in each UWIR for make-good purposes and there are now a net total of 341 water bores that have been effectively determined as IAA bores since 2011.
- Of the 233 IAA bores from the previous pre-2021 UWIRs, make-good has apparently been secured for 134 bores and there are 46 water bores for which make-good is currently under negotiation. 170 bore assessments have been completed as a first step in make-good negotiations and 45 bore assessments are outstanding. A total of 117 water bores have so far been decommissioned or agreed to be decommissioned through make-good negotiations. Tenure holders have also advised that in addition to IAA bores, agreements for make-good measures have been proactively entered into with the owners of approximately 100 water bores.
- The shortfall in finalised agreements indicates further improvements are required so that the 'make-good' system is timely, effective and fair. The government is requested to establish an independent process, with close agricultural and resource sector involvement, to comprehensively review the make-good system so that these characteristics are achieved consistently and landholders have confidence in their water supplies into the future.

- Information also suggests that only about 8 alternate water bores are now completed into the Hutton Sandstone as a result of make-good arrangements, though this may be an underestimate.
- As commented in our feedback to the 2019 draft UWIR, it is important that the feasibility and outcome of relocation of the take of water associated with 'make-good' arrangements is understood, including the resultant reductions in opportunities for further expansion of agricultural water uses. This trade-off and longevity of alternate supplies is worthy of further investigation by OGIA and inclusion in future reports. This could include providing a publicly available record of the proportion of types of 'make-good' being provided, such as cash settlement, bore infrastructure modifications, or alternatively the location and volume of a new relocated take if it involves a replacement water supply, to better inform OGIA modelling. This information would also inform landholders and help support confidence in the system.

ISSUE: CLARIFICATION OF BORES ELIGIBLE FOR MAKE-GOOD

- AgForce supports the inclusion of additional information on water bores, their location, groundwater takes and management in Chapter 3, as important context for resource sector water take and use and in Chapter 8, outlining impact management details and processes.
- AgForce welcomes efforts by OGIA and others to clarify which bores are eligible for the purpose of make-good arrangements and supports a definition that encompasses all rights to take underground water for agricultural purposes that are, or could reasonably be, exercised.
- OGIA defines that a water bore is considered a water bore *'unless there is sufficient information to demonstrate that it either was not authorised for construction, was dry when constructed, or has insufficient yield for at least domestic purposes'*.
- We support recognition of the approval or construction requirements applying at the time a bore was constructed and the use of 'deemed authorisations' for bores where requirements are unclear.

ISSUE: LAND SUBSIDENCE

- The report includes a risk-based assessment of land subsidence impacts on natural values that may have already occurred and are likely to occur in the future from CSG activities – including changes to surface water flows, impairment of aquifer integrity and changes to ground slopes (with implications for cropping lands).
- AgForce supports the inclusion by OGIA of comprehensive modelling of CSG-induced subsidence (including a focus on flatter areas such as the floodplains over the Condamine Alluvium), its engagement of potentially affected landholders, and development and testing of monitoring methods for subsidence including field surveys and remote-sensing data, and identifying existing areas of subsidence.
- Observations from satellite data indicate that up to about 90mm of CSG-depressurisation-induced subsidence has occurred since 2015 within the CSG fields near the Condamine Alluvium. It is unclear why, if inSAR data is available from 2006, only data from 2015 onwards is presented in the report? Eg, Figure 7-3. Given an anecdotal report that in CSG areas that are well established that perceptible subsidence has not occurred, there may be value in presenting a subsidence x period of development map to clarify the actual relative rate of change in ground surface over time.

- OGIA notes natural movement of up to 25mm/year is also observed away from CSG fields and ground levels also vary by up to 25mm within a distance of 100m due to soil moisture content changes. Land uses such as cultivation will likely influence this level of natural variability at a paddock level and evenness across distance, reinforcing the need to have monitoring occurring at an appropriate scale.
- The report also notes tenure holders were forecasting ground surface subsidence of 80mm to 280mm in publications from 2012 and 2013 – which begs the question why did it take so long for this factor to be identified to landholders and included as an impact for inclusion by DES and OGIA? Future work should extend beyond environmental value implications and include the implications for agriculture and its operations.
- OGIA’s regional level modelling of subsidence predicts that most of the cropping area around the Condamine Alluvium is likely to experience less than 100 mm of subsidence to the year 2060 and up to about 200mm in heavily developed CSG fields. It predicts a maximum change in slope for most areas of less than 0.001% (10mm per km), but up to 0.004% (40mm per km) for some areas, particularly around and north of Cecil Plains.
- It should be recognised that paddock level changes may vary from these area-level predictions and it is good that OGIA has recognised the potential for impacts on farming practices and environmental values in Section 7.6.
- The rate of subsidence is initially high, even over as little as a 5-year period, with implications for impacts on cropping operations, but OGIA predicts subsidence will stabilise over the next 3 to 7 years. It would be useful to have a clearer definition of the ‘initial development stages’ within which these high rates of subsidence could be expected.
- AgForce members on the Condamine Alluvium have raised concerns about the impacts of land subsidence on their farming businesses, its measurement and ongoing monitoring, how it could possibly be remediated or managed and how those without CSG infrastructure on-property can access the protections of a CCA and greater ability to negotiate on monitoring requirements. It is noted that management actions in response to subsidence are currently beyond the remit of OGIA, but must be a priority for the government to address properly.
- The report discounts material impacts on surface flows to watercourses due to subsidence and OGIA’s modelling predicts negligible compaction in aquifers surrounding the Walloon Coal Measures. Significant irrigation infrastructure is located within a property that is dependent on existing surface water flows – such as water harvesting systems and ring tanks. AgForce strongly supports objectively examining surface flows and impacts on watercourses in the area of interest using available baseline flood modelling and additional measurement and water flow modelling work.
- Impacts on cropping land at the paddock level is a key consideration whereas the modelling deals in averages over larger areas. Levelling of irrigation paddocks has a tolerance of +/- 20mm to 40mm so subsidence of the magnitude identified may have a significant impact on intensive irrigation paddocks and their management, particularly where the subsidence is uneven. Previously unlevelled dryland cropping paddocks could also be greatly impacted.
- It has been identified in the report that variation in change to the slope and aspect of the land at the farm scale affecting surface water drainage with implications for irrigation and other farming practices is of greatest concern. Like the siting of CSG wells, ‘shadow’ effects of localised subsidence propagating across an entire paddock (eg, strip-cropping systems) also need to be considered. This is in line with feedback from affected AgForce members. Have the impacts on CSG brine management and storage also been considered under subsidence and its impacts on surface water flows?

- There are approximately 730 directional or horizontal wells in 352 clusters – 314 in the Bowen Basin and 38 in the Surat Basin. In the Surat CMA, directional drilling is becoming common around the Condamine Alluvium, intended to minimise surface impact in prime agricultural land. Neighbouring landholders with directional drilling under their properties should be eligible for a CCA and access to the Land Access Ombudsman to deliver confidence in subsidence and other impacts will be fairly managed.
- AgForce calls on the Queensland government to assess and include this subsidence risk into impact avoidance, conduct and compensation and make good systems. OGIA may have a contributing role in modelling these impacts but a wider response is indicated.

MEASUREMENT AND MONITORING OF GROUND MOVEMENT

- AgForce supports OGIA in effectively baselining cropping land slopes within the area of potential influence (using aerial LiDAR surveys and satellite data where applicable) and then ongoing measurement and monitoring of land surface subsidence due to CSG-related activities to include proactive management of negative effects. This needs to involve the landholder, be at a property-relevant scale for accurate measurement of any impacts on operations and of a quality that will be acceptable as a robust evidentiary base should a matter end up in court.
- We support the first survey occurring prior to the commencement of CSG production to provide a robust baseline, making the trend data and analysis available to stakeholders and the public and requiring additional monitoring where the trend in ground movement shows a drop of more than 10mm/year over a 12-month period where CSG production is occurring nearby. In line with the precautionary principle, clear cease work triggers should be in place where subsidence diverges from expected and acceptable levels.
- A focus on continuous improvement in measurement and monitoring is also welcomed.
- Further scientific work on the expected evenness of subsidence at a paddock, farm and district level over time is indicated to test OGIA's assumption that overlapping CSG drawdown will produce relatively uniform subsidence within the active gas fields. Uneven placement of CSG wells across the landscape (varying from 1.2 to 1.7 wells per km² in the Surat basin, and 0.8 to 1.5 wells per km² in the Bowen basin – section 2.3.4), timing of the commencement of depressurisation in each well, and propagation through uneven depth of coal seams and overlying geology would all seem capable of contributing to paddock level and temporal variations in subsidence experienced. As impacts are greatest in early years of depressurisation this needs to occur urgently.

BORE MONITORING NETWORK EXPANSION

- AgForce supports the upkeep and expansion of the existing operating groundwater level (617 points) and chemistry (90 points) monitoring points to assist with impact identification, model calibration and ongoing improvement of the model and effectiveness of impact management strategies.
- Objective, robust scientific information to guide these water resource management decisions is vital to making good decisions that balance up the positive and negative elements of resource developments for the local communities and for the wider community.

OTHER ISSUES

- AgForce supports further work by OGIA on its regional-level models and sub-regional models in defined areas of interest, improvement of understanding of subsidence and in further developing collaborations with the agricultural and CSG industries, scientists and other stakeholders.
- AgForce supports OGIA producing clear, publicly available annual summaries of changes to the list of IAA bores and inferred CSG-induced subsidence and perspectives on groundwater and ground level impacts from associated water extraction. The precautionary principle should be applied where irreversible changes to agricultural land and water resources is a real risk.
- We also support publication of findings and research outcomes as they become available, including in journal articles to add to the body of scientific knowledge available to inform government policy and impact management decisions
- AgForce strongly supports OGIA using a range of mediums, including communication videos and podcasts, to support understanding of CSG-related issues and their work.

CONCLUSION

- Landholders need confidence that their interests will be protected in both the short and long-term and the best way to deliver that confidence is for independent scientific information and recommendations, such as from OGIA, to be used proactively by government and industry as well as precautionary conditions being applied to resource projects, along with a transparent and robust monitoring and compliance program to be in place prior to works commencing.