Delta coal

Environmental Management System

Chain Valley Colliery

Benthic Communities Management Plan

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Authorised by:	Delta Coal
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1 Introduction

1.1 Purpose

The purpose of this Benthic Communities Management Plan (BCMP) is to minimize the impact on Benthic Communities through:

- outlining the required data to be collected on monitored benthic communities;
- identifying benthic community monitoring locations;
- identifying reporting requirements;
- detailing preventative management measures;
- identifying the requirements for incident or exceedances reporting;
- identifying the responsible persons for all required actions; and
- Identifying the review requirements for the BCMP .

A formal Environmental Management System (EMS) has been developed as a systematic and structured approach to managing environmental issues at the operation. This has been developed in general accordance with the requirements of the international standard ISO 14001. This BCMP is an element of the Chain Valley Colliery (CVC) Environmental Management System (EMS).

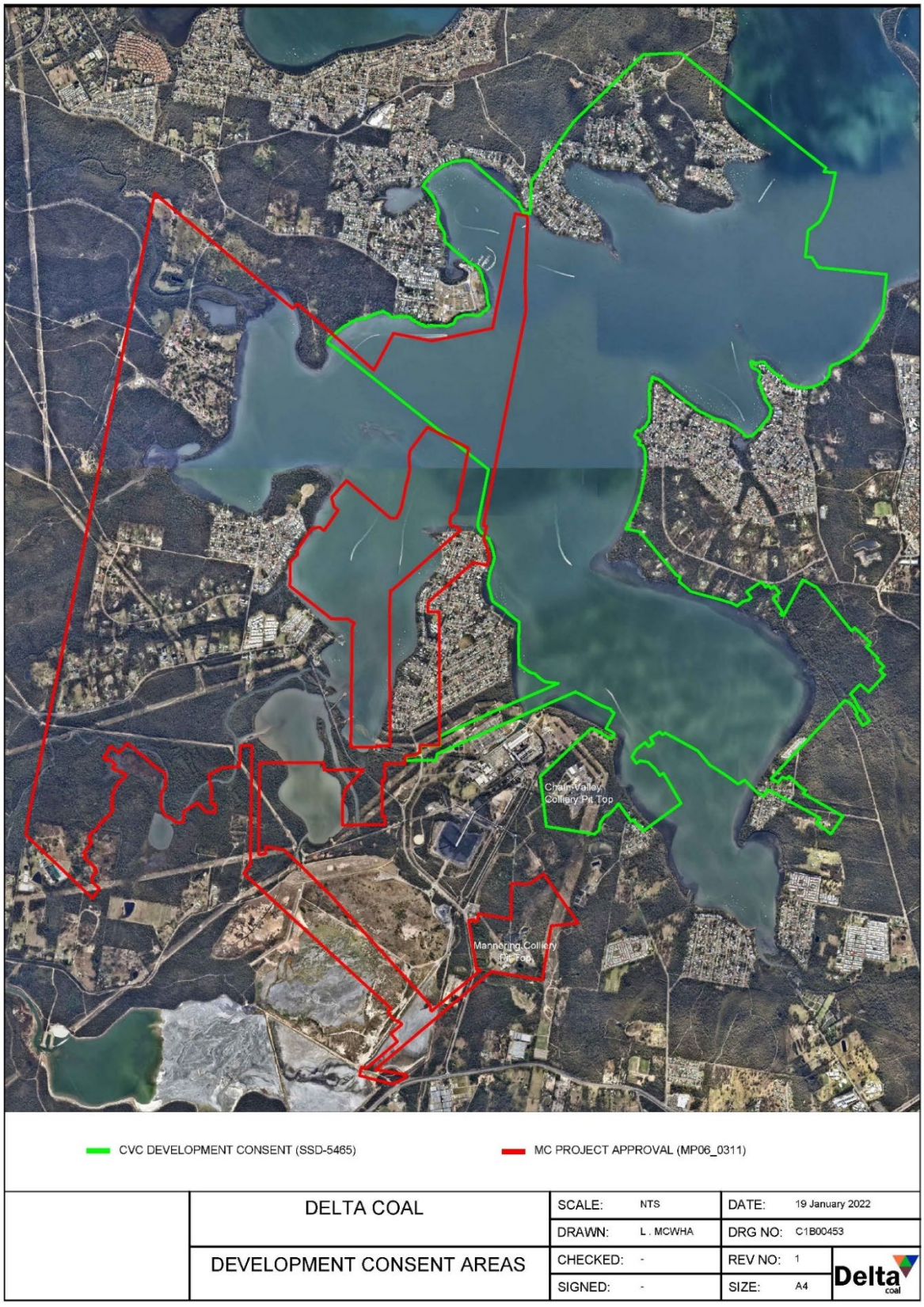
1.2 Background

Chain Valley Colliery (CVC) is an underground coal mine located on the southern side of Lake Macquarie approximately 60 km south of Newcastle and 80 km north of Sydney (see **Figure 1**). The pit-top is located approximately 1 km south-east of the township of Mannering park at the southern extent of Lake Macquarie, as shown on **Figure 1**.

Mining is currently undertaken at CVC, with the coal being transported underground to Mannering Colliery (MC) where the coal is crushed and screened and sent directly to Vales Point Power Station (VPPS).

In August 1960, J&A Brown and Abermain Seaham Collieries Ltd commenced clearing the present site with drift and shaft sinking starting a few months later. Production of coal from the Wallarah Seam, commenced with the first delivery to the adjacent Delta Electricity's Vales Point Power Station (VPPS) in April 1963. As of 1 April 2019, Great Southern Energy Pty Ltd, trading as Delta Coal (DC), own and operate the two underground coal mines, CVC and MC.

Figure 1 - Regional Context



1.3 Consultation

A copy of the BCMP review which includes an update for Miniwall S5 and Northern Mining Pillar extraction and SSD 5465 Modification 3 was provided to the stakeholders listed in the below table on 4 December 2020.

A summary of the comments received during this round of review, and amendments subsequently made to the document prior to finalisation are detailed in **Table 1**. Evidence of consultation is provided in **Appendix 1**. This plan was approved by DPIE on the 6 April 2021 as part of the Miniwall S5 and Northern Pillar Area extraction plan.

Delta Coal has reviewed and made minor amendments to this plan following the completion of an Independent Environmental Audit, and issued the plan to stakeholders for comment and approval on the 16th November 2022.

The Management Plan has been revised (version 9) in July 2023, to include recommendations of the biennial statistical review of the benthic communities monitoring results, indicating that the benthos of Lake Macquarie have not shown significant seasonal variation warranting monitoring twice annually.

Table 1: Consultation Summary

Stakeholder	Comments	Response/Action
NSW DPIE	Benthic Communities Management Plan(V9) approved 19 September 2023.	Noted.
NSW DPIE-BCD	1. Given the six-monthly monitoring program spanning 2012-2022 did not indicate any significant changes to benthic communities over time, the request to reduce monitoring is appropriate; 2. The selection of Autumn for the annual sampling is appropriate as it will avoid seasonal extremes; 3. The frequency of monitoring should be reviewed if future results indicate impacts to benthic assemblages attributed to CVC Operations.	1. Noted. 2. Noted. 3. Noted.
Lake Macquarie City Council (LMCC)	1. LMCC concurs with DPI-Fisheries comments and are also satisfied with the option of moving to annual monitoring. 2. Consideration of a BIOENV procedure to reveal the most important variables affecting the structure of benthic communities is required.	1. Noted. 2. Comments noted and recommendations will be included in the 2024 statistical analysis.
DPI Fisheries	4. DPI-Fisheries supports the proposal to reduce monitoring frequency from twice yearly to annual only. 5. DPI-Fisheries review of the BCMP and statistical analysis identified that data analysis in Table 4 of the BCMP does not entirely match up with text in Section 5.2, Table 4 notes BIOENV analysis will be undertaken 6. Remainder of DPE-Fisheries comments relates to improvements in the statistical analysis of benthic communities	1. Noted. 2. Comment included in Section 5.2 that BIOENV was not undertaken in 2022 modelling and will be captured in all future analyses. 3. Comments noted and recommendations will be included in 2024 Statistical analysis.

2 Statutory Requirements

2.1 Key Legislation, Policy and Guidelines

Both State and Commonwealth environmental legislation applies to DC's operation and activities. A number of legislative requirements, government policies and guidelines are applicable. Key items relevant to this management plan are:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- *Protection of the Environment Operations Act 1997* (POEO Act);
- *Environmental Planning and Assessment Act 1979* (EP&A Act);
- *Mining Act 1992*;
- *National Parks and Wildlife Act 1974*;
- *Biodiversity Conservation Act 2016*;
- Department of Primary Industries (2013), *Policy and guidelines for fish habitat conservation and management*; and
- ANZECC 2000, Australian *and New Zealand Guidelines for Fresh and Marine Water Quality*.

Delta Coal's operation is within the LMCC and Central Coast Council local government areas (LGAs).

2.2 Development Consent SSD-5465 Requirements

This BCMP has also been completed to satisfy the requirement of Condition 7(h), Schedule 4 of Development Consent SSD-5465 (Modification 4), which states:

"The Applicant shall prepare an Extraction Plan for all second workings on site, to the satisfaction of the Secretary. Each Extraction Plan must:

(h) include a Benthic Communities Management Plan, which has been prepared in consultation with BCD, LMCC and DPI Fisheries, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on benthic communities, and which includes:

- surveys of the lake bed to enable contours to be produced and changes in depth following subsidence to be accurately measured;
- benthic species surveys within the area subject to second workings, as well as control sites outside the area subject to second workings (at similar depths) to establish baseline data on species number and composition within the communities;
- a program of ongoing seasonal monitoring of benthic species in both control and impact sites;
- development of a model to predict likely impact of increased depth and associated subsidence impacts and effects, including but not limited to light reduction and sediment disturbance, on benthic species number and benthic communities' composition, incorporating the monitoring and survey data collected; and
- updating the model every 2 years using the most recent monitoring and survey data.

The relevant requirements from **Table 6** within Condition 2, Schedule 4 of SSD-5465 (Modification 3), including the relevant notes, are recreated in **Table 2**.

Table 2: Subsidence Impact Performance Measures

Biodiversity	
Benthic Communities	Minor environmental consequences, including minor changes to species composition and/or distribution

Notes:

- *The Applicant will be required to define more detailed performance indicators (including impact assessment criteria) for each of these performance measures in the various management plans that are required under this consent (see Condition 7 below).*
- *Measurement and/or monitoring of compliance with performance measures and performance indicators is to be undertaken using generally accepted methods that are appropriate to the environment and circumstances in which the feature or characteristic is located. These methods are to be fully described in the relevant management plans. In the event of a dispute over the appropriateness of proposed methods, the Planning Secretary will be the final arbiter.*
- *The requirements of this condition only apply to the impacts and consequences of mining operations, construction or demolition undertaken following the date of approval of this consent.*

Benthic related requirements of SSD-5465, including specific requirements that are to be addressed in this plan, and where they are addressed, are detailed in **Appendix 2**.

3 Benthic Communities Management

3.1 Baseline Data

Both species diversity and abundance are recorded as part of the benthic communities monitoring, which commenced in 2012.

The mud basin off Summerland Point, in Chain Valley Bay and Bardens Bay, was found to be inhabited by 21 species of organisms greater than 1mm in size. The soft sediment benthic communities within the monitoring area are dominated by polychaete worms and bivalve molluscs.

Bottom sediment in the study area was composed of a small fraction of black sand and shell fragments of various sizes. Most of the sediment was fine black or grey mud.

The sampling results of the benthos undertaken at six-monthly intervals between February 2012 and September 2022 revealed the following:

- the similar suite of organisms dominated each of the 22 sample stations. These were polychaete worms and bivalves;
- stations were distinguished by the relative abundance of the dominant species;
- water depth was not the key parameter in determining the species composition at a station; and
- physical variables such as salinity (conductivity), dissolved oxygen concentration and turbidity of the bottom water, measured only on the day the benthos was sampled, had little influence on the species composition of the benthos over the period sampled.

The results collated to date appear to support the notion that increasing the water depth by the predicted levels of subsidence has, to date, had no discernible effect on the composition and abundance of organisms making up the benthos of the mud basin.

3.2 Bathymetric Surveys

Bathymetric data from the NSW Office of Environment and Heritage (OEH) was obtained in draft format during 2012. DC was granted a license to use this OEH data for the purposes of monitoring changes in the bed of Lake Macquarie, and acknowledges the OEH's data which has enabled the subsidence comparison to be undertaken based on this 2010 data and data subsequently obtained in 2012 by Delta Coal. OEH notes that the data was obtained via use of differential GPS and a 200 kHz echosounder, which is noted to provide a general data accuracy of 0.1 m.

Delta Coal has commissioned a specialist provider to undertake a bathymetric survey over the areas of current and proposed secondary extraction workings. The primary purpose of bathymetric surveys are:

- to obtain accurate baseline data prior to any secondary extraction of an area; and
- to obtain relatively accurate time based subsidence assessments over areas where secondary extraction took place.

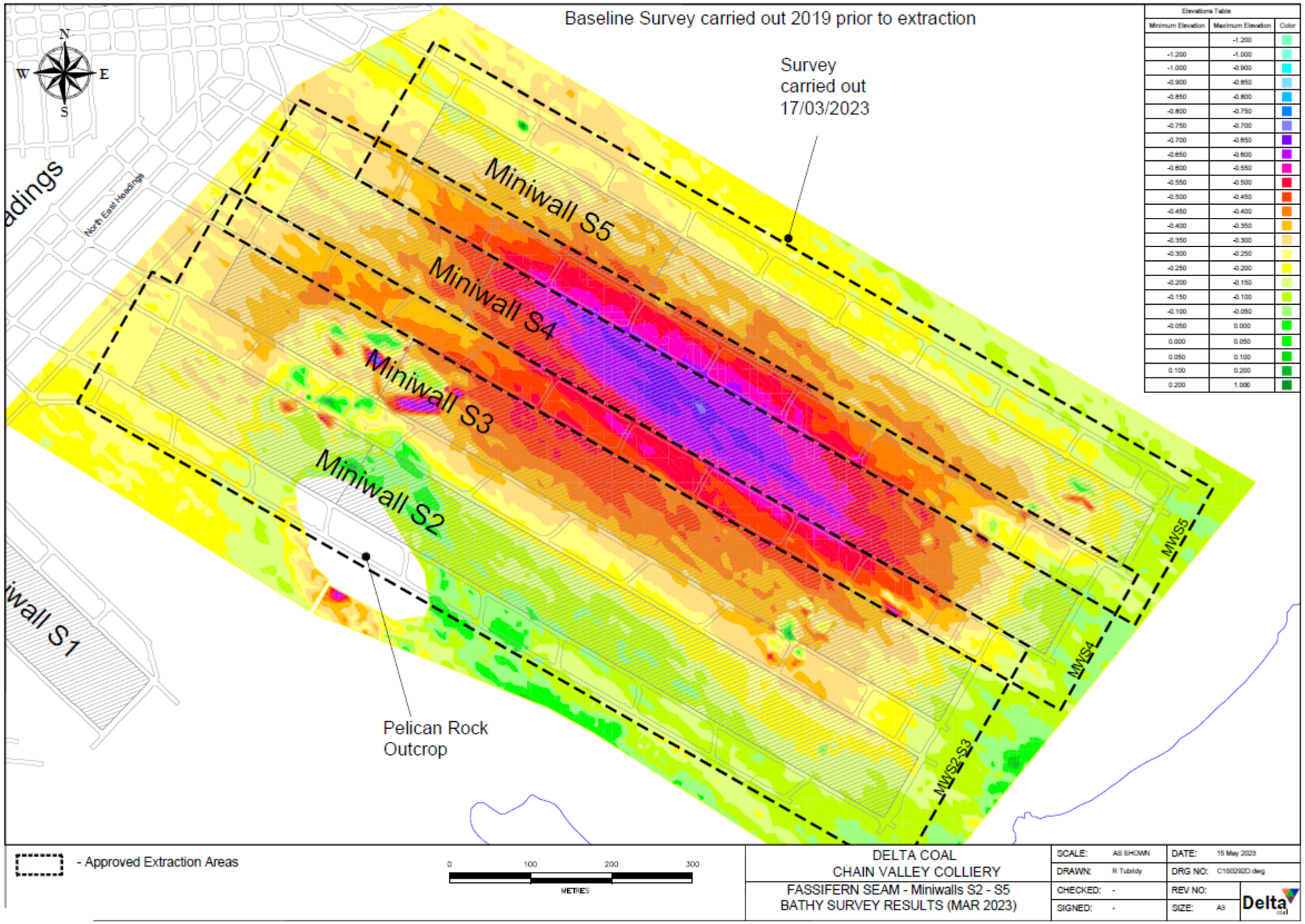
Prior to 2018, bathymetric surveys were conducted annually. Following an exceedance of the subsidence predictions over CVC's MW7-12 mining area in 2017, Delta Coal has committed to undertaking bathymetric surveys at six monthly intervals over areas of secondary extraction to understand the behaviour of subsidence over these mining areas. The latest bathymetric survey was undertaken in March 2023 (**Figure 2**).

The bathymetric surveys have shown that subsidence from the miniwall mining can be monitored with a useful level of accuracy and the surveys will be continued to cover future and completed secondary extraction areas.

3.3 Subsidence Predictions and Modelling

Subsidence predictions and modelling is undertaken by specialist geotechnical engineers for each extraction plan. The subsidence predictions and modelling assist the site technical services personnel in the mine design and planning process. The mine design and planning process is fundamental to controlling mine subsidence to consented limits.

Figure 2 - Bathymetric Scan March 2023 of Miniwalls S2-S5



3.4 Benthic Communities Trigger Action Response Plan

Delta Coal has developed a TARP for the management of benthic communities, TARP 00156. The TARP has been reproduced below.

	NORMAL	LEVEL 1 TRIGGER	LEVEL 2 TRIGGER
BENTHIC COMMUNITIES MONITORING	• No environmental impact recorded to benthic communities or changes in species composition and/or distribution.	• Minor environmental impact recorded, including minor changes to species composition and/or distribution.	• Significant environmental impact recorded, including significant changes to species composition and/or distribution.
Action / Response	• No response required. • Continue monitoring as detailed in the Benthic Communities Management Plan.	• Complete investigation to determine cause of impact to benthic communities • Continue monitoring as detailed in the Benthic Communities Management Plan.	• Notify relevant stakeholders of recorded impact to benthic communities as a result of mining induced subsidence. • Review of future mine workings to see if mitigation of impact to benthos; • Review of Benthic Communities Management Plan and determine if revisions are required to the plan.

4 Benthic Communities Monitoring Program

Based on contour mapping of Lake Macquarie and Delta Coal hydrographic surveys, it was identified that the mining operations are largely proposed to occur beneath areas of the Lake at water depths between 4-6 m which represent the general lake depths where subsidence is proposed and under which mining activities have been, will be or are proposed to occur. Accordingly, the monitoring program was designed to sample benthic invertebrate communities from these depths and to provide ongoing monitoring of the potential effects of subsidence. The methodology and monitoring details are presented in the following sections.

4.1 Sampling Locations

In order to analyse the community assemblages and determine potential impacts of subsidence over time, sampling are undertaken across two depth intervals from numerous site locations within three site types. The site types consist of:

- Impacted (site prefix “IM”): Sites which are currently, or were historically impacted upon by subsidence;
- Reference (site prefix “R”): Sites which are not currently impacted by subsidence but fall within the proposed future mining footprint. Following undermining, Reference sites are designated as Impacted sites; and
- Control (site prefix “C”): Sites which will not be impacted upon by subsidence.

The sampling locations are identified in **Table 3** and **Figure 3**.

Figure 3 - Benthic Sampling Locations

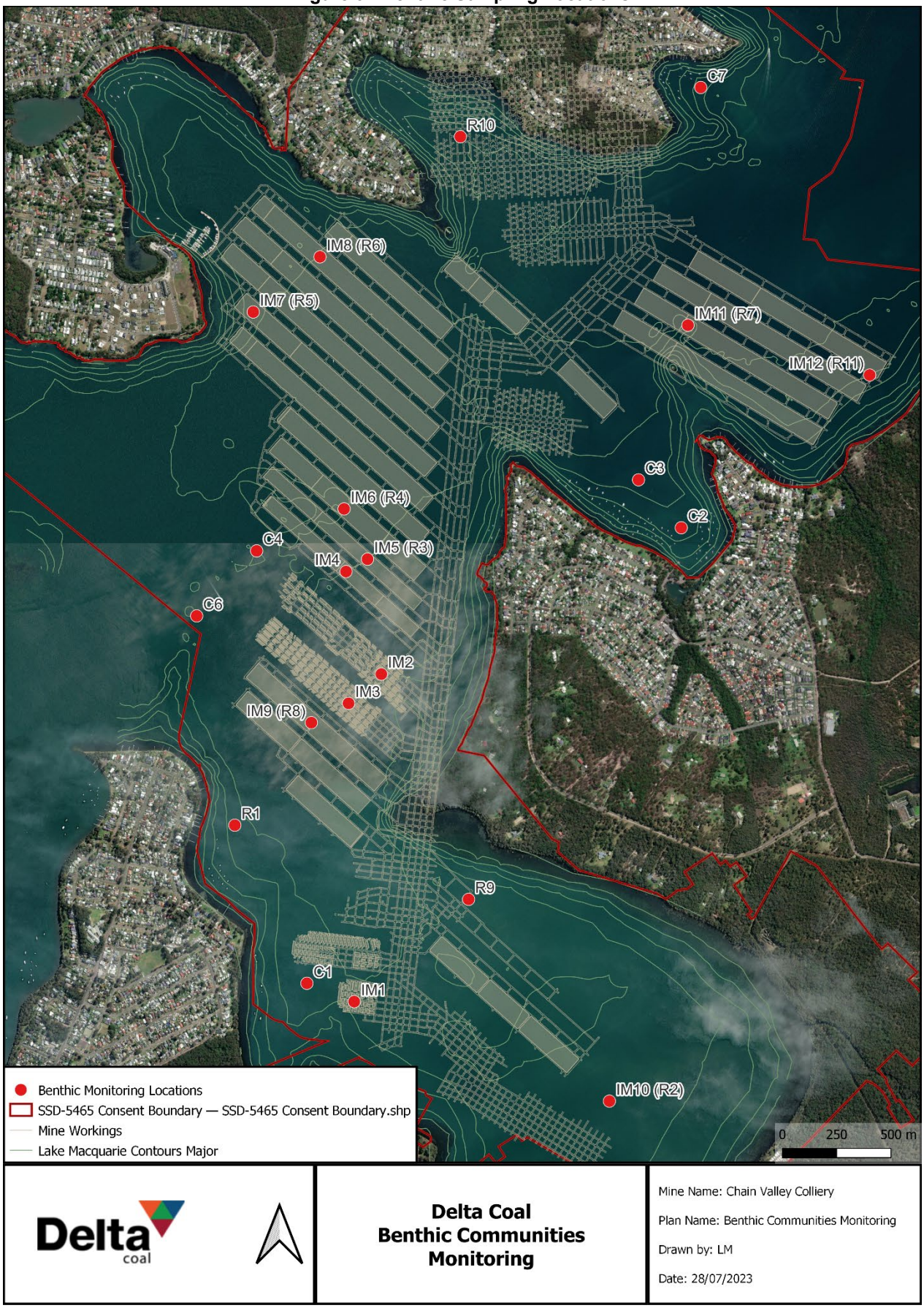


Table 3: Benthic Community Sampling Locations

Site Name	Sample Depth (m)	Easting	Northing
C1	-4.5	364519	6330815
C2	-4.5	366214	6332927
C3	-5.5	366014	6333144
C4	-6.0	364260	6332794
C5	-6.0	367701	6334310
C6	-5.5	363988	6332492
C7	-5.5	366276	6334947
R1	-4.5	364177	6331535
R9	-4.5	365258	6331210
R10	-5.5	365172	6334706
IM1	-4.5	364738	6330734
IM2	-4.5	364842	6332237
IM3	-5.5	364693	6332101
IM4	-6.0	364673	6332705
IM5 (previously R3)	-6.0	364771	6332763
IM6 (previously R4)	-5.5	364660	6332992
IM7 (previously R5)	-5.5	364229	6333889
IM8 (previously R6)	-6.0	364533	6334146
IM9 (Previously R8)	-5.5	364523	6332010
IM10 (Previously R2)	-4.5	365919	6330294
IM11 (previously R7)	-6.0	366232	6333856
IM12 (previously R11)	-6.0	367072	6333639

4.2 Sampling Methods

Each of the sites will be surveyed for biotic (benthic invertebrates) and environmental (water quality, benthic sediment) variables. The surveys will be undertaken during autumn.

4.2.1 Water Quality

General physico-chemical water quality variables will be measured at the sites during sampling. The water quality parameters will be measured at 0.5m below the surface and 0.5 m above the lakebed. The variables measured will include temperature (oC), pH, turbidity (NTU), conductivity (µS/cm), dissolved oxygen (mg/L and % saturation) and oxygen reduction potential (ORP) or photosynthetically active radiation (PAR).

4.2.2 Benthic Sediment

Sediment samples will be collected to a depth of 20 cm at each of the sites using 250 mL jars. The jars will be labelled and transported to the laboratory for analysis via settlement method.

4.2.3 Benthic Invertebrates

At each site, five replicate samples of benthic sediment will be collected by a diver using 200x200x100 mm sieve boxes with 1 mm mesh.

The samples will be sieved to remove sediment particles less than 1 mm in diameter. The residual material will then be transferred to a labelled 250 mL plastic jar and preserved with formaldehyde. Large fragments of shell will be removed from the sample at this time to ensure that the sample volume did not exceed 250 mL and the samples are retained for later inspection at the laboratory.

4.3 Laboratory Analysis

4.3.1 Benthic Sediment

The 250 mL sample of the entire sediment from each site will be transferred into a 500 mL clear glass measuring cylinder and the volume made up to 500 mL with seawater. The cylinder is then to be stoppered and shaken vigorously to suspend the sediment in the seawater. The sample will then be allowed to settle and the volumes of each fraction (shell and coarse sand, fine sand, mud and fine silt) calculated and recorded. Results are then determined relative to the initial volume of sediment collected in the 250 mL jar.

4.3.2 Benthic Invertebrate Identification

The contents of each jar are run through a 1mm mesh sieve and washed free of formalin and any remaining mud.

The washed material is then placed into two enamel dishes and portions of each sample placed in a 100 mm diameter petri dish for examination under a stereoscopic binocular microscope to detect and recover small organisms. Organisms and parts of organisms are removed, counted, identified and the results entered a spreadsheet. The benthic invertebrates are identified to genera and species where possible. This process is repeated until the debris of the entire sample had been examined. The results for each site are then entered an excel spreadsheet for summary and analysis. All shell remaining in the sample is kept for later examination.

4.4 Data Analysis

The biotic and environmental data will be analysed using a variety of univariate and multivariate analysis (**Table 4**). The statistical methods used to analyse the data were determined based on earlier monitoring data to provide the most statistically robust assessment of comparison between impacted and reference and control sites and environmental data. It must be noted that control and reference sites are the same until undermined.

Table 4: Data Analysis

Variable Type	Analysis	Description
Environmental: Water quality	ANZECC/ARMCANZ Guidelines (ANZECC Guidelines)	Trigger values for slightly – moderately disturbed ecosystems: Estuaries.
Biotic and Environmental	Univariate	Descriptive graphical statistics. Analysis of Variance and Similarity (2 way nested)
Biotic and Environmental	Multivariate	A square-foot transformation was performed on the data and Bray-Curtis Similarity matrices created. Cluster analysis was then performed for each site and dendrogram plots produced.
	Multidimensional Scaling Ordination	The analysis represents the sites as points in space so the relative distances between samples show similarities in community structure. Samples that are placed closer together are more similar than samples further apart.
	BIOENV	The analysis matches environmental variables against biotic data which have been measured at the same sites. This analysis enables analysis of the extent to which the physio-chemical data is related to the observed biological patterns. Correlations were performed for each site between the biotic and environmental factors using the BIOENV function in PRIMER5.

4.5 Monitoring Frequency

The baseline sampling program methods outlined in **Section 3** will form the basis for an annual monitoring program that will be undertaken during autumn each year to survey biotic (benthic invertebrates) and environmental variables (water quality and sediment). The program has been designed to enable analysis and reporting of the data to monitor the impacts of subsidence and effects, including but not limited to light reduction and sediment disturbance, on benthic species number and benthic communities' composition and distribution.

In addition to the above, annual lakebed bathymetric surveys will be undertaken prior to each survey. The annual bathymetric surveys will enable any change to the lake floor to be identified and addressed during the data analysis process.

4.6 Program Refinements

The survey methods will be reviewed every two years of sampling to refine the sampling program if required. Prior to each sampling event the sites will be reviewed against the mine plans to ensure that any reference sites that have become impacted upon by mining are reclassified as impact sites, and replacement reference sites are identified and sampled. This will result in additional reference sites being added to the program during the monitoring period. Provided that sites record no impact to benthic communities due to mining induced subsidence and subsidence levels do not exceed limits specified within Development Consent SSD-5465, Delta Coal will cease monitoring of impact sites following 3 years of monitoring undermined sites. Should monitoring indicate impact to monitoring sites due to mining

induced subsidence, or, subsidence exceeding limits, Delta Coal will determine monitoring requirements in consultation with stakeholders (DPE and BCD).

Statistical review of the benthic communities monitoring between 2012 and 2022 observed that subtidal benthic habitats, like those monitored in the Delta Coal benthic communities monitoring, that are not dominated by benthic primary producers (such as seagrass and/or microalgae), typically do not exhibit strong seasonal variation since the benthic species do not photosynthesise and are therefore largely unaffected by changing light levels. Additionally, benthic environments are often quite stable with respect to sediment conditions that do not change on a regular cyclical nature with the seasons. For these reasons and given the current absence of statistically relevant differences between benthic assemblages at the monitoring sites when compared to the reference and control sites, it was recommended that the benthic monitoring could be reduced to once per year. The recommended timing of annual monitoring was in March (autumn) to capture any variation in benthic assemblages that might occur following summer temperature extremes. The 2022 biennial statistical review report can be viewed on the Delta Coal website (https://www.deltacoal.com.au/environment/chain-valley-colliery/chain-valley-colliery-environmental-reporting).

5 Modelling to Monitor Potential Impacts

5.1 Model Background

Maximum subsidence for the proposed future mining activities is predicted to be 1230 mm, or 780 mm where no overlying workings exist. The analysis undertaken on the baseline data provides an initial assessment of biotic and environmental variables associated with the study area and forms the basis of the formation of the predictive modelling (JSA 2012). The results will be reported in biannual monitoring reports and the Annual Review.

The aim of the predictive modelling is to compare the condition of the baseline benthic community assemblages prior to mining to the benthic community assemblages after mining has occurred, to ensure that only minor environmental consequences occur due to mining activities. The effects of subsidence are required to result in only minor changes to species composition and/or distribution. As the environmental variables which affect benthic communities are complex, in order to determine whether community dynamics at reference sites are related to subsidence, seasonal biotic survey data will be analysed against environmental data and between impacted types. The analysis and modelling will be undertaken to determine whether:

- Overall community dynamics are related to seasonal and environmental variables and/or subsidence impacts;
- Abundance and diversity changes to community composition at reference sites that have been undermined are related to seasonal and environmental variables or subsidence impacts; and
- Changes identified in reference sites that have been undermined are considered minor.

5.2 Analysis

For the model to identify whether the environmental consequences of subsidence are considered minor (and therefore whether mitigation measures will be required) a series of statistical analysis will be undertaken and reported seasonally. Based on the expected timing of subsidence impacts, the analysis will model scenarios to determine:

- Changes in undermined reference sites with the baseline conditions at the same sites; and
- Similarity of impacted sites to control and reference sites at similar depths.

The modelling will be based on Multi-dimensional Scaling (MDS) Ordination, two-way ANOVAs (analysis of variation) and ANOSIM (analysis of similarity) techniques to identify any links in benthic community structure between sites at the same depth profiles. The modelling will be based on the existing benthic community structure, actual subsidence levels (determined from annual bathymetric surveys), predicted levels of increased subsidence and collection of seasonal data.

Figure 3 identifies the reference sites applicable to the project. The communities at the reference sites will be compared against control and reference sites at a similar depth profile. The determination of the level of impact of subsidence, once other environmental variables have been discounted by the model will be based on ANOVA/ANOSIM techniques.

Where ANOVA/ANOSIM results indicate that undermined reference site communities are changing at a rate of ANOVA/ANOSIM test of significance <5% then the impacts will be moderate or major mitigation measures to manage impacts will be required. The use of 5% (the p significance level of 0.05) is a standard statistical method of determining level of significance, another is p= 0.01. Because the data set used in the initial analysis represents a single sampling event the use of the conservative 5% significance rule has been applied to determine minor impacts (other methods such as ranking and scaling were applied to the data but did not provide adequate measurable results). The 5% significance will be applied to monitoring data and revisited regarding suitability based on data outcomes.

The options for mitigation measures to manage subsidence on the lake floor are largely limited to changes to mine design. If impacts are determined to be moderate or major, mine planning will be required to modify mine plans.

The benthic community results of surveys and annual monitoring undertaken have identified that while communities at some sites were defined by dominant species, the abundance and diversity of the communities did not identify clear links to location or impact type. Rather the analysis identified that natural environmental fluctuations in water quality, benthic substrate composition and natural depth intervals were influencing the communities (JSA 2013).

The results of sampling between February 2012 and September 2017 appear to support the notion that increasing the water depth by the predicted subsidence will have no discernible effect on the composition and abundance of organisms

making up the benthos of the mud basin (Laxton & Laxton, 2017). This is supported by the statistical modelling of results which is undertaken every 3 years.

In January 2018 Delta Coal engaged JSA environmental to undertake the 3 yearly statistical modelling of the sites Benthos data set. Detailed ANOSIM analysis of the benthic community data between un-impacted and impacted sites between 2012 and 2017 identified a significance p value of 24.1%. This value indicates that there had been no significant differences between the un-impacted and impacted sites over the last 5 years.

EMM Consulting undertook statistical modelling of the Benthic communities monitoring data between in April 2020 and in November 2022 with both analyses presenting the following conclusions, the results of statistical analysis of CVC's benthic monitoring data indicate that no exceedance of the BCMP subsidence impact performance measure of "minor environmental consequences, including minor changes to species composition and/or distribution" has occurred. Consequently, CVC is not required to implement any additional investigations of benthic communities within the project study area at this time and should continue the routine monitoring of benthic assemblages and biennial statistical analysis. The reports recommended that there was sufficient data to determine that the benthos of Lake Macquarie had not been significantly impacted by seasonal variation and as such, monitoring should be reduced from twice yearly to annually, in Autumn, only. It was noted that BIOENV modelling was not undertaken in the 2022 statistical analysis, it will be ensured that BIOENV analysis is captured in all future statistical modelling analyses.

the assessment of results from future analysis indicate that impacts are outside the defined trigger level Delta Coal will investigate the cause of incident and implement corrective actions where required as outlined in **Section 8**.

6 Reporting

6.1 Regular Reporting

In accordance with Schedule 6, Condition 13, the Delta Coal will provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of the development consent.

The benthic community monitoring results will be reviewed as survey reports are received to confirm compliance with the conditions specified in the Subsidence Impact Performance Measures specified in **Table 6** of Development Consent SSD-5465.

6.2 Annual Review

In accordance with Schedule 6, Condition 8, Delta Coal will review the environmental performance of the development to the satisfaction of the Secretary, by the end of March each year, or other timing as may be agreed by the Secretary.

The Annual Review will also include a summary of monitoring results during the past year, discussion with reference to the impact assessment criteria, and any relevant details related to comparisons between actual results and predictions in the Environmental Impact Statement. The Annual Review will be forwarded to the relevant authorities including DPE, and EPA. The Annual Review will also be forwarded to members of the Community Consultative Committee and local Councils (Central Coast and Lake Macquarie). It will also be placed on the company's website along with a summary of environmental monitoring results.

6.3 Incident or Non-Compliance Reporting

As detailed in Schedule 6, Condition 6 of SSD-5465, DPIE and other relevant agencies will be notified immediately after Delta Coal becomes aware of an incident via the appropriate reporting process. A written report will be provided to the DPE within 7 days of the date of the incident or being made aware of the incident.

If monitoring reveals that, because of mining activities, the criterion has been exceeded, then DC will investigate the cause of the non-compliance. Within 7 days of becoming aware of a non-compliance, DC will notify the Department of the non-compliance via the appropriate reporting process. DC will complete an investigation and provide a written report will be provided to the DPE.

DC will implement the recommendations of the investigation to address any potential future incidents. Any incidents or complaints will be recorded and fully investigated to find root causes and corrective actions implemented where necessary.

7 Stakeholder Management, Response and Training

7.1 Complaint Protocol

DC has a 24-hour telephone hotline (1800 687 260) through which members of the public can lodge complaints or concerns. This is operated as per the Delta Coal Environmental Management Strategy (ENV00001, Section 4.4).

7.1.1 Independent Review

As detailed in Condition 2, Schedule 5 of SSD-5465, an Independent Review can be requested by a landowner who considers the development to be exceeding the relevant environmental conditions:

If the Planning Secretary is satisfied that an independent review is warranted, then within 2 months of the Planning Secretary's decision the Applicant must:

(a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Planning Secretary, to:
- *consult with the landowner to determine his/her concerns;*
- *conduct monitoring to determine whether the development is complying with the relevant criteria in Schedule 3; and*
- *if the development is not complying with these criteria then identify the measures that could be implemented to ensure compliance with the relevant criteria; and*

(b) give the Planning Secretary and landowner a copy of the independent review.

7.1.2 Dispute Resolution

If any disputes are not adequately addressed by the complaints handling process then they will be handled by the Environmental Compliance Coordinator. If the response of CVC is not considered to satisfactorily address the concern of the complainant, a meeting may be convened with the complainant, Mine Manager (or his delegate) together with the Environmental Compliance Coordinator to determine any further options to reduce potential impacts.

Any actions agreed from the meeting will be implemented by CVC. After implementation of the proposed actions the complainant will be contacted and advice sought as to the satisfaction or otherwise with the measures taken.

If no agreed outcome is determined or the complainant is still not satisfied by the action taken, then an Independent Review may be requested by the complainant.

7.2 Training, Awareness and Competence

Training is an essential component of the implementation phase of this BCMP. The Environmental Compliance and Approvals Coordinator will ensure that training and awareness processes are implemented to manage, identify and minimise potential impacts of CVC and to ensure personnel are aware of their roles and responsibilities in terms of benthic management.

The Environmental Compliance and Approvals Coordinator is the contact point for any person that does not understand this document or their specific requirements and will provide guidance and training to any person that requires additional training regarding this BCMP.

8 Audit and Review

8.1 Review and Improvement

This document will be reviewed, and if necessary revised, within 3 months of the following:

- the submission of an Annual Review;
- the submission of an incident report related to this management plan;
- the submission of an independent environmental audit; and
- following any modification to the development consent.

As outlined in **Section 6.2**, the Annual Review will include a review of the monitoring program and mine plans to ensure that any reference sites that have been impacted by mining reclassified as impacted impact sites, and replacement reference sites identified and sampled. Survey methods will be reviewed every two years to refine the sampling program if required. Improvements identified during reviews or audits will be incorporated into the BCMP.

8.2 Auditing

Internal and external audits of this document will be carried out as described below. Internal and external audits will be objective and if possible be conducted by a person or organisation independent of the document being audited.

Audits will be carried out by personnel who have the necessary qualifications and experience to make an objective assessment of the issues. The extent of the audit, although pre-determined, may be extended if a potentially serious deviation from this document is detected.

Any audit non-conformances will have corrective and preventative actions implemented to avoid recurrence, these actions will be loaded into the site Incident Database to ensure the actions are assigned to the relevant people and completed.

Delta Coal will review any improvement opportunities and determine if it will implement any actions to address the improvement opportunity, these actions will be loaded into the site Incident Database to ensure the actions are assigned to the relevant people and completed.

An Independent Environmental Audit (IEA) was undertaken during June 2022. In accordance with SSD-5465 Schedule 6, Condition 9, IEA's will be scheduled for every three years thereafter (unless the Secretary directs otherwise) by an audit team whose appointment has been endorsed by the Secretary.

9 Records and Document Control

9.1 Records

The Environmental Compliance Coordinator (or delegate) will maintain all Environmental Management System records which are not of a confidential nature. Records that will be maintained include:

- monitoring data;
- environmental inspections and auditing results;
- environmental incident reports;
- the complaints register; and
- licences and permits.

All records will be stored so that they are legible, readily retrievable and protected against damage, deterioration and loss. Records will be maintained for a minimum of 4 years or as otherwise required under any legislation, licence, lease, permit or approval.

9.2 Document Control

This document and all others associated with the Environmental Management System shall be maintained in a document control system which is in compliance with the site Document Control Standard which is available to all site personnel. Any proposed change to this document will be via the Environmental Compliance & Approvals Coordinator.

A copy of this document is available on the DC website. Document revision details are provided in **Table 5**.

Table 5: Document Revision Details

Version	Date	Details of Revision	Company	Reviewed by/ Authorised by
1	May 2012	Version 1 Final	LakeCoal	Unknown
2	07/04/2014	Version 2 Final	LakeCoal	Chris Ellis
3	10/02/2017	Version 3 Final	LakeCoal	Wade Covey
4	14/05/2018	LakeCoal updated document to reflect the development consent requirements and to include monitoring locations for proposed mining areas that are referred to in Extraction Plan	LakeCoal	Wade Covey Adrian Moodie
5	17/06/2019	Updated for Miniwalls S2/S3	Delta Coal	Chris Armit
6	10/03/2020 12/05/2020	Updated document to reflect current S4 workings and consultation with stakeholders Updated document to reflect consultation with DPIE and 2020 statistics report	EMM Consulting / Delta Coal	Katie Weekes Chris Armit

Version	Date	Details of Revision	Company	Reviewed by/ Authorised by
7	04/12/20 18/01/21 19/03/2021 6/04/2021	Updated document for S5 and NMA pillar extraction areas and SSD5465 Modification 3 Updated for consultation Plan approval from DPIE	Delta Coal	Chris Armit
8	13/10/2022	Update following completion of 2022 Independent Environmental Audit	Delta Coal	Lachlan McWha
9	28/07/2023	Updated to include recommendations of statistical analysis of monitoring results (reduce monitoring from twice-yearly to annual frequencies.)	Delta Coal	Lachlan McWha

10 Roles and Responsibilities

All employees and contractors at CVC are responsible for environmental management. However, various positions in the organisation have roles, responsibilities and authorities for managing environmental aspects, action plans, programs and controls.

Roles and responsibilities specific to completing the requirements of this plan are identified in **Table 6**.

Table 6: Benthic Communities Management Plan Roles and Responsibilities

Role	Responsibilities
Manager of Mining Engineering (Mine Manager)	• Ensure that adequate financial and personnel resources are made available for the implementation of the BCMP • Maintain overall responsibility for environmental compliance with Mining Lease, EPL, development consent and other mining approvals as they pertain to the management of benthic communities • Provide adequate personnel to ensure that appropriate mining engineering and geotechnical engineering designs are undertaken to protect subsidence barriers and maintain compliance within subsidence limits • Make the required people available to be trained in their responsibilities in relation to this management plan and to minimise impacts to benthic communities
Environmental Compliance & Approvals Coordinator or delegate	• Co-ordinate benthic community monitoring • Review benthic community monitoring results • Develop management actions in consultation with regulatory agencies as/if required from the monitoring results • Compile the Annual Review (including a summary of the benthic community monitoring) • Respond to any potential or actual non-compliance and report these as required to regulatory bodies and other stakeholders • Undertake reviews of this document • Undertake or coordinate the required audits of this document • Notify relevant agencies if there are any exceedances in impact thresholds • Ensure complaint handling and response is undertaken, including determination of sources and potential remedial action to avoid recurrence
Technical Services Manager	• Maintain overall responsibility for environmental compliance with Mining Lease, EPL, development consent and other mining approvals as they pertain to the management of benthic communities • Ensure that appropriate mining engineering and geotechnical engineering designs are undertaken to protect subsidence barriers and maintain compliance within subsidence limits • Assist and enable the Environmental Compliance Coordinator.
Health, Safety and Training Manager	• Ensure that adequate training is provided to staff to understand their responsibilities in relation to this management plan • Ensure that adequate training is provided to staff to minimise impacts to benthic communities

Role	Responsibilities
Mine Surveyor	• Ensure mine layout and workings are set out as approved, taking into consideration protection barriers and subsidence predictions
All employees and contractors	• Comply with the requirements of this BCMP • Immediately notify Environmental Compliance Coordinator of possible incident

11 References

Documents referenced in the preparation of the BCMP are detailed in **Table 7**.

Table 7: References

Reference	Title
Australian Standards	AS/NZS ISO 14001:2004, *Environmental management systems – Requirements with guidance for use* AS/NZS ISO 14004:2004, *Environmental management systems – General guidelines on principles, systems and support techniques* ANZECC 2000, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*
Government Department	Department of Primary Industries (2013), *Policy and guidelines for fish habitat conservation and management* SSD-5465 Development Consent SSD-5465 (Modification 2), 16 December 2015 NSW EPA Environment Protection Licence: EPL 1770, 2 April 2019
Delta Coal documents	EMS Environmental Management Strategy.
External documents	JSA Environmental 2013, *Chain Valley Colliery Mining Extension 1 Project Marine Ecology Assessment,* Lake Coal JSA Environmental 2015*, Chain Valley Colliery Modification 2 Marine Ecology Assessment,* Lake Coal JSA Environmental 2018*, Chain Valley Colliery Benthos Statistical Analysis,* Lake Coal EMM Consulting 2020, Chain Valley Colliery Benthic Community Monitoring - Statistical Analysis Laxton 2020, *Benthic Communities Survey of Chain Valley Bay, Summerland Point and Crangan Bay, Lake Macquarie*, NSW Laxton and Laxton 2019, *Benthic Communities Survey of Chain Valley Bay, Summerland Point and Crangan Bay, Lake Macquarie*, NSW Laxton and Laxton 2018, *Benthic Communities Survey of Chain Valley Bay, Summerland Point and Crangan Bay, Lake Macquarie*, NSW Laxton and Laxton 2017, *Benthic Communities Survey of Chain Valley Bay, Summerland Point and Crangan Bay, Lake Macquarie*, NSW Laxton and Laxton 2016*, Lake Macquarie Benthos Survey Results No.10 September 2016.* J.H. & E.S. Laxton - Environmental Consultants P/L. Report for Lake Coal Pty Ltd Chain Valley Colliery Laxton and Laxton 2015, *Benthic Communities Survey of Chain Valley Bay, Summerland Point and Crangan Bay, Lake Macquarie*, NSW Laxton and Laxton 2014, *Benthic Communities Survey of Chain Valley Bay, Summerland Point and Crangan Bay, Lake Macquarie*, NSW Laxton & Laxton, 2013, *Lake Macquarie Benthos Survey Results of Sampling No. 4.* September 2013.

Reference	Title
	Laxton and Laxton 2012, *Benthic Communities Survey of Chain Valley Bay, Summerland Point and Crangan Bay, Lake Macquarie*, NSW O'Connor S et al 2007, Stone Construction on Rankin Island, Kimberley, Western Australia, Australian Archaeology, Number 64, PP: 15-22

12 Definitions

CVC Delta Coal - Chain Valley Colliery

DA Development approval

DC Delta Coal

DP&E Department of Planning & Environment (former)

DPIE Department of Planning, Industry and Environment

DPI Fisheries Department of Primary Industries – Fisheries NSW

DTIRIS Department of Trade, Investment, Regional Infrastructure and Services

EMS Environment Management System

EPA NSW Environment Protection Authority

EPL Environmental Protection License

EP&A Act *Environmental Planning and Assessment Act 1979*

LMCC Lake Macquarie City Council

POEO Act *Protection of the Environment Operations Act 1997*

OEH Office of Environment and Heritage

ROM Run-of-mine

Secretary Secretary of the Department of Planning and Environment, or nominee

SSD-5465 Development Consent SSD-5465 (for the Chain Valley Colliery Mining Extension 1 Project)

Appendix 1: Consultation

LMCC Consultation:

Hi Lachlan,

Council concurs with Fisheries' comments. We are also satisfied with the option of moving to annual monitoring. Our Natural Areas section provided the following comments:

> *Multivariate analysis of the benthic community data included non-metric multidimensional scaling (nMDS), analysis of similarities (ANOSIM) and similarity percentage analysis (SIMPER), correlated with environmental variables (water depth and grain size) using principal components analysis (PCA).*
>
> *The PCA analysis was restricted to the use of two environmental variables (water depth and sediment grain). The concluding remarks included that the site groupings evident in benthic community structure suggest that factors other than, or in addition to, sediment composition are driving the benthic structure.*
>
> *Additional environmental variables were collected during sampling included water temperature, conductivity, salinity, pH, DO, and turbidity which may lead to a more meaningful analysis of the impact of the development on benthic communities. These additional environmental variables should have been included in the PCA analysis. Log transformation is recommended for environmental variables.*
>
> *After a correlation matrix, significant environmental variables could be combined into a BIOENV procedure against macroinvertebrate data. BIOENV analysis can reveal the most important variables affecting the structure of benthic communities.*
>
> *Consideration of a BIOENV procedure to reveal the most important variables affecting the structure of benthic communities is required.*

Regards,
Geoffrey Keech
Senior Development Planner

LAKE MACQUARIE CITY

E gkeech@lakemac.nsw.gov.au
lakemac.com.au

From: Geoffrey Keech <gkeech@lakemac.nsw.gov.au>
Sent: Thursday, 8 December 2022 4:56 PM
To: Lachlan McWha <LMcWha@deltacoal.com.au>
Subject: RE: Chain Valley Colliery Benthic Communities Management Plan - Stakeholder Consultation

Hi Lachlan,

Council has reviewed the Benthic communities management plan and has no comments.

Regards,
Geoffrey Keech
Senior Development Planner

LAKE MACQUARIE CITY

T **M**
E gkeech@lakemac.nsw.gov.au
lakemac.com.au

DPI Fisheries Consultation

Thank you for referring Delta's Benthic Communities Management Plan (BCMP) V9 to DPI Fisheries for comment.

DPI Fisheries supports the proposal to reduce monitoring frequency from twice yearly to annual only.

We have reviewed the report and note that some statistical analyses of the benthic data don't reflect what is written in the BCMP, and that there are potential opportunities for improvement so that analyses are fit for purpose in future iterations of the monitoring program.
The issues we have identified with the BCMP and recent analysis of data by EMM can be summarised as follows:

- Data analysis Table 4 of the BCMP does not entirely match up with text in Section 5.2 of the BCMP. In Table 4, it is indicated that BIOENV would be done. This analysis matches environmental variables against biotic data enables analysis of the extent to which the physio-chemical data is related to the observed biological patterns. However, text about this analysis does not appear in Section 5.2. Further this analysis doesn't appear to have been done in the EMM report. It appears that EMM used a PCA with vectors as a substitute for BIOENV but the reasons for this change is not clarified or justified in the BCMP or the EMM report.
- The BCMP indicates that two-way ANOVAs (analysis of variance) and ANOSIM (analysis of similarity) techniques are to be used, yet the EMM report only uses ANOSIM. ANOVAs would offer more opportunity than ANOSIM to look at the time series in the data (see below). EMM justifies ANOSIM as an analogue for ANOVA but DPI Fisheries does not agree with this.
- The EMM '2 Methods' section indicates that a 2-way crossed design ANOSIM, sites within treatments, was used, yet the results indicate a 2-way nested design was used. We have assumed that the latter test was used.
- In the ANOSIM it appears that samples for years between 2016-2022 have been pooled for each treatment (control, reference, impact). It is not clear why this has been done when a time series of information is available. By averaging the treatments over the 6 year period, the sensitivity of testing for changes over time is lost.
- In the ANOSIM it appears that temporal changes in some sites have been interpreted by visualisation of the data in plots (ie section 3.7 of the EMM report) yet EMM have made some interpretation of these plots/data as "significant" or otherwise. Without statistical significance as determined through statistical testing, such terminology should not be used given it is misleading.
- It may be more appropriate to have undertaken the ANOSIM analyses, as well as any future analyses for the ongoing program, using 3-way multivariate ANOVA with three factors – Treatment, Year and Site. EMM uses the software Primer and this type of analysis can be done in Primer with a PERMANOVA add-on.
- The PCA (EMM fig 3.1) would be better done with a PCO (principle co-ordinates analysis, also in Primer).

Please get in touch if you have any further questions.

Kind regards,

Cherie
Cherie Colyer-Morris (she/her) | Fisheries Manager – Coastal Systems Unit
NSW Department of Primary Industries | Fisheries
Port Stephens Fisheries Institute | Taylors Beach Road, Taylors Beach, NSW 2316

NSW GOVERNMENT Department of Primary Industries

Our Ref: C23/83 21/02/2023

Your Ref: PAE-54772715

Department of Planning, Industry and Environment
c/o: Major Projects Portal

To Whom It May Concern,

Request for comments on Chain Valley Colliery, Benthic Communities Management Plan v8 (SSD-5465-PA-110)

Thank you for your referral seeking comments on the Chain Valley Colliery, Benthic Communities Management Plan v8 from DPI Fisheries, a division of NSW Department of Primary Industries.

DPI Fisheries is responsible for ensuring that fish stocks are conserved and that there is no net loss of key fish habitats upon which they depend. To achieve this, DPI Fisheries ensures that developments comply with the requirements of the *Fisheries Management Act 1994* (FM Act) (namely the aquatic habitat protection and threatened species conservation provisions in Parts 7 and 7A of the Act, respectively), and the associated *Policy and Guidelines for Fish Habitat Conservation and Management (2013)*. In addition, DPI Fisheries is responsible for ensuring the sustainable management of commercial, recreational and Aboriginal cultural fishing, aquaculture, marine parks and aquatic reserves within NSW.

DPI Fisheries has reviewed the Benthic Communities Management Plan v8 and has no comments to provide.

If you have any queries, please contact Cherie Colyer-Morris, Fisheries Manager, Coastal Systems (Central) at cherie.colyer-morris@dpi.nsw.gov.au.

Yours sincerely,

C. Colyer-Morris

Cherie Colyer-Morris
Fisheries Manager, Coastal System

DPE Consultation

Department of Planning and Environment

NSW GOVERNMENT

Our ref: SSD-5465-PA-121

Mr Lachlan McWha
Environmental Compliance Coordinator
Great Southern Energy Pty Ltd (t/as Delta Coal)
PO BOX 7115 Mannering Park NSW 2259

19/09/2023

Subject: Chain Valley Colliery (SSD 5465) Benthic Communities Management Plan Revision v9

Dear Mr McWha

I refer to the Chain Valley Colliery Benthic Communities Management (v9) submitted in accordance with Condition 7(h), Schedule 4 of Development Consent SSD-5465 (Modification 4) for the Chain Valley Colliery Extension Project. I note the plan:

- has been prepared in consultation with parties required to be consulted with;
- has been reviewed by Delta Coal and no issues have been raised with the Department;
- has been reviewed by the NSW Biodiversity Conservation Division, Lake Macquarie City Council and Department of Fisheries; and
- contains the information required by the conditions of approval.

The Department has carefully reviewed the document and is satisfied that it meets the requirements of the relevant conditions in Condition 7(h), Schedule 4 of Development Consent SSD-5465 (Modification 4).

Accordingly, as nominee of the Planning Secretary, I approve the Chain Valley Colliery Benthic Communities Management (v9) (July 2023).

You are reminded that if there are any inconsistencies between the plan and the conditions of approval, the conditions prevail. Please ensure you make the document publicly available on the project website at the earliest convenience.

If you wish to discuss the matter further, please contact Melissa Dunlop on 02 8229 2941 or melissa.dunlop@dpie.nsw.gov.au.

Yours sincerely

JEvans

Jessie Evans

Director, Resource Assessments
Resource Assessments

As nominee of the Planning Secretary

DPIE-BCD

NSW GOVERNMENT

Department of Planning and Environment

Your ref: SSD-5465
Our ref: DOC23/778475

Mr Lachlan McWha
Environmental Compliance & Approvals Coordinator
Delta Coal
Chain Valley Colliery
Off Construction Rd (Off Rutley's Rd)
Mannering Park NSW 2259

By email: LMcWha@deltacoal.com.au

Dear Mr McWha

Chain Valley Extension Project (SSD-5465) – Review of Benthic Communities Management Plan

I refer to the e-mail dated 31 July 2023, in which Biodiversity and Conservation Division (BCD) was invited to comment on the *Chain Valley Colliery: Benthic Communities Management Plan* (BCMP) with a request to consider reducing the monitoring frequency from twice-yearly (Spring and Autumn) to annual only (Autumn only).

BCD has reviewed the report and provides the following comments:

- Given that the six-monthly monitoring program spanning 2012 – 2022 did not indicate any significant changes to the benthic communities in the existing Zone A and B subsidence areas over time, the request to reduce the monitoring frequency is appropriate.
- The selection of *Autumn* for the annual sampling is appropriate as it will avoid seasonal extremes that may impact these communities (e.g., temperature).
- The frequency of monitoring should be reviewed however if future results indicate impacts to benthic assemblages attributed to Chain Valley Colliery operations. Delta Coal has developed a Trigger Action Response Plan for the management of benthic communities (TARP 00156), which states that if significant environmental impact is recorded, a review of the BCMP will be undertaken to determine if revisions are required. The advice is that this TARP is sufficient to manage the proposed changes in the survey frequency.

If you have any further questions about this issue, please contact Steven Crick, Senior Team Leader – Planning, on 02 4927 3248 or at huntercentralcoast@environment.nsw.gov.au.

Yours sincerely

Neil Kelleher
Senior Team Leader Water Floodplain Coast
Hunter Central Coast Branch
Biodiversity and Conservation Division

1 September 2023

Steven Crick

From: Steven Crick
Sent: Tuesday, 28 February 2023 6:06 PM
To: LMcWha@deltacoal.com.au
Cc: OEH ROD Hunter Central Coast Mailbox
Subject: RE: For Action - Major Projects – Proponent Request for Advice - Chain Valley Extension Project- SSD-5465 - Benthic Communities Management Plan_V8 (SSD-5465-PA-110) (Central Coast,Lake Macquarie City)

Hi Lachlan

BCD has reviewed the Benthic Communities Management Plan and has no comments.

Regards

Steven Crick
Senior Team Leader – Planning
Hunter Central Coast Branch
Biodiversity & Conservation Division
Department of Planning & Environment

6 Stewart Avenue, Newcastle, 2300
Locked Bag 1002, Dangar, 2309

Appendix 2: Development Consent Summary

Chain Valley Colliery Development Consent SSD-5465 Summary

This BCMP has been prepared in accordance to Schedule 4, Condition 7(h) of SSD-5465, which states the requirements of the BCMP and what it must address. **Table A2** outlines the requirements of the BCMP and where this document addresses these requirements.

Table A2: Requirements from Chain Valley Colliery Development consent SSD-5465

<table>
<tr><th>Condition No.</th><th>Requirement</th><th>Relevant section of this document</th></tr>
<tr><td></td><td>Schedule 2 Administrative Conditions</td><td></td></tr>
<tr><td>23</td><td>•
Staging, combining and updating strategies, Plan or Programs

With the approval of the Planning Secretary, the Applicant may: (a) prepare and submit any strategy, plan or program required by this consent on a staged basis (if a clear description is provided as to the specific stage and scope of the development to which the strategy, plan or program applies, the relationship of the stage to any future stages and the trigger for updating the strategy, plan or program); (b) combine any strategy, plan or program required by this consent (if a clear relationship is demonstrated between the strategies, plans or programs that are proposed to be combined); (c) update any strategy, plan or program required by this consent (to ensure the strategies, plans and programs required under this consent are updated on a regular basis and incorporate additional measures or amendments to improve the environmental performance of the development); and (d) combine any strategy, plan or program required by this consent with any similar strategy, plan or program required by an adjoining mining consent or approval, in common ownership or management.</td><td>Section 8</td></tr>
<tr><td></td><td>Schedule 3 Specific Environmental Conditions</td><td></td></tr>
<tr><td>2</td><td>Performance Measures- Natural Environment

The Applicant shall ensure that the development does not cause any exceedance of the performance measures in Table 6 to the satisfaction of the Planning Secretary.

Table 6: Subsidence Impact Performance Measures
<table>
<tr><td colspan="2">Biodiversity</td></tr>
<tr><td>Threatened species or endangered populations</td><td>Negligible environmental consequences</td></tr>
<tr><td>Seagrass beds</td><td>Negligible environmental consequences including:
• Negligible change in the size and distribution of seagrass beds;
• Negligible change in the functioning of seagrass beds; and
• Negligible change to the composition or distribution of seagrass species within seagrass beds.</td></tr>
</table></td><td>This document</td></tr>
</table>

	Benthic communities	*Minor environmental consequences, including minor changes to species composition and/or distribution*
	Mine workings	
	First workings under an approved Extraction Plan beneath any feature where performance measures in this table require negligible environmental consequences	*To remain long-term stable and non-subsiding.*
	Second workings	*To be carried out only in accordance with an approved Extraction Plan.*

Notes:

- *The Applicant will be required to define more detailed performance indicators (including impact assessment criteria) for each of these performance measures in the various management plans that are required under this consent (see Condition 7 below).*
- *Measurement and/or monitoring of compliance with performance measures and performance indicators is to be undertaken using generally accepted methods that are appropriate to the environment and circumstances in which the feature or characteristic is located. These methods are to be fully described in the relevant management plans. In the event of a dispute over the appropriateness of proposed methods, the Planning Secretary will be the final arbiter.*

The requirements of this condition only apply to the impacts and consequences of mining operations, construction or demolition undertaken following the date of approval of this consent

3	***Offsets*** *If the Applicant exceeds the performance measures in* **Table 6** *and the Planning Secretary determines that: (a) it is not reasonable or feasible to remediate the impact or environmental consequence; or (b) the remediation measures implemented by the Applicant have failed to satisfactorily remediate the impact or environmental consequence; then the Applicant must provide a suitable offset to compensate for the impact or environmental consequence to the satisfaction of the Planning Secretary. Note: Any offset required under this condition must be proportionate with the significance of the impact or environmental consequence.*	**Section 4**
7	***Extraction Plan*** ***(h)*** *include a Benthic Communities Management Plan, which has been prepared in consultation with BCD, LMCC, and DPI Fisheries, which provides for the management of*	**This document**

	the potential impacts and/or environmental consequences of the proposed second workings on benthic communities, and which includes: *• surveys of the lakebed to enable contours to be produced and changes in depth following subsidence to be accurately measured;* *• benthic species surveys within the area subject to second workings, as well as control sites outside the area subject to second workings (at similar depths) to establish baseline data on species number and composition within the communities;* *• a program of ongoing seasonal monitoring of benthic species in both control and impact sites;* *• development of a model to predict likely impact of increased depth and associated subsidence impacts and effects, including but not limited to light reduction and sediment disturbance, on benthic species number and benthic communities' composition, incorporating the monitoring and survey data collected; and* *• updating the model every 2 years using the most recent monitoring and survey data.* *The Applicant must implement the approved management plan as approved from time to time by the Planning Secretary.* *Notes:* *• To identify the underground mining areas approved under this consent referred to in this condition, see Appendix 3.* • *• This condition does not limit secondary extraction under a Subsidence Management Plan approved as at the date of this consent.* • • *The Applicant must implement the Extraction Plan as approved by the Planning Secretary.*	
8	*The Applicant must ensure that the management plans required under conditions 7(g)-(j) above include: (a) an assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since this consent; and (b) a detailed description of the measures that would be implemented to remediate predicted impacts*	**Section 4 and 6**