



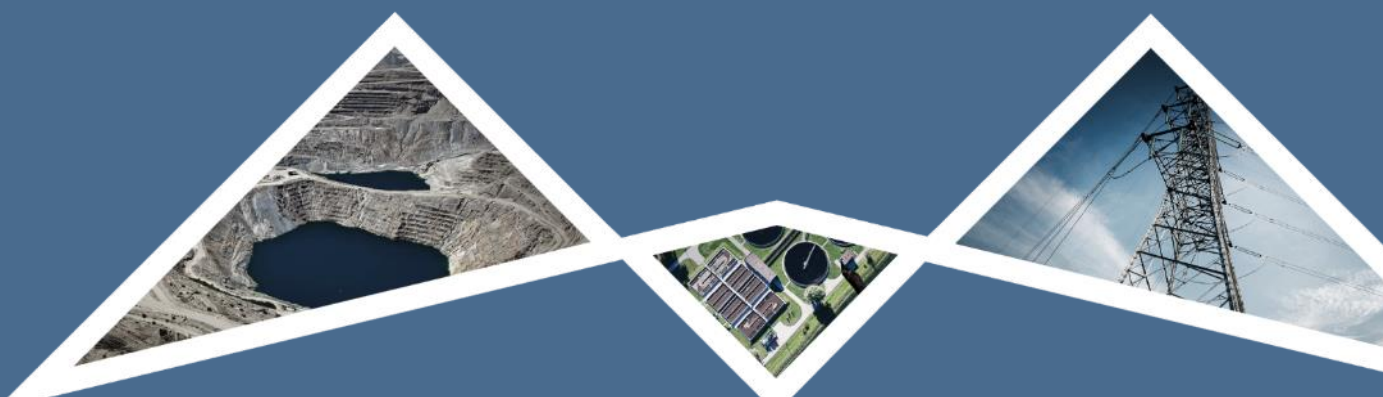
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SIX – MONTHLY / ANNUAL ENVIRONMENTAL AUDIT REPORT – MAY 2022

TETRA4 CLUSTER 1 GAS PRODUCTION PROJECT

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List of Abbreviations

Abbreviation	Item
AIDS	Acquired Immune Deficiency Syndrome
BID	Background Information Document
COVID-19	Coronavirus Disease 2019
CLF	Community Liaison Forum
CLO	Community Liaison Officer
CNG	Compressed Natural Gas
DHSWS	Department of Human Settlements, Water and Sanitation (Previously DWS)
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EIR	Environmental Impact Assessment Report
EIMS	Environmental Impact Management Services (Pty) Ltd
EMPr	Environmental Management Programme
EMPR	Environmental Management Programme Report
EMS	Environmental Management System
EO	Environmental Officer
EPCM	Engineering, Procurement and Project Management
HDD	Horizontal Directional Drilling
HIV	Human Immunodeficiency Virus,
I&AP	Interested and Affected Party
ID	Identification Document
IFC	International Finance Corporation



Abbreviation	Item
LNG	Liquified Natural Gas
MSDS	Material Safety Data Sheet
NEMA	National Environmental Management Act, Act 107 of 1998
NOx	Oxides of nitrogen, especially as atmospheric pollutants.
PASA	Petroleum Agency of South Africa
Pr. Sc. Nat	Professional Natural Scientist in terms of the South African Council of Natural Scientific Professionals
SAHRA	South African Heritage Resources Agency
SANRAL	South African National Roads Agency
SLP	Social and Labour Plan
SMS	Short Message Service
VOC	Volatile Organic Compound



EXECUTIVE SUMMARY

Environmental Impact Management Services (Pty) Ltd (EIMS) was appointed by Tetra4 (Pty) Ltd to undertake the six-monthly Environmental Audit of the Environmental Authorisation (EA) and Environmental Management Programme (EMPr) for the Tetra4 Cluster 1 Gas Production Project (PASA Ref:12/4/007). Condition 5.4.8 of the EA requires that Environmental Audit Reports must be submitted to the Petroleum Agency South Africa (PASA) twice a year, and the EMPr requires that Environmental Audit Reports be submitted to PASA on an annual basis. This Environmental Audit Report is the fourth six – monthly Environmental Audit Report for the Tetra4 Cluster 1 Gas Production Project and fulfils the requirements of the annual and six-monthly Environmental Audit Reports, as per the requirements of the EA and EMPr. The audit is undertaken in accordance with Regulation 34 and Appendix 7 of the National Environmental Management Act, Act 107 of 1998 (NEMA) Environmental Impact Assessment (EIA) Regulations, 2014. Regulation 34 states:

- 1) *“The holder of an environmental authorisation must, for the period during which the environmental authorisation and EMPr, and where applicable the closure plan, remain valid-*
 - (a) *Ensure that the compliance with the conditions of the environmental authorisation and the EMPr, and where applicable the closure plan, is audited; and*
 - (b) *Submit an environmental audit report to the relevant competent authority.”*

The **scope** of the audit is to assess compliance of the Cluster 1 Gas Production Project with the conditions of the EA and EMPr and to confirm the continued adequacy of the EMPr. The **purpose** of the audit is to ensure compliance with the requirement of the EA and EMPr and the NEMA EIA Regulation 34 to undertake scheduled compliance audits. The **objectives** of the audit are to determine:

- The level of performance against and compliance of the project with the provisions of the requisite EA and EMPr; and
- The ability of the measures contained in the EMPr, to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity.

The compliance evaluations of the EA and EMPr have been described in Table 2 and Table 3 and is based on the evaluation criteria described in section 4.2 of this report.

A total of 51 conditions (commitments) were identified in the EA that were evaluated. Nine (9) of these conditions were considered not applicable to the current phase of the project. Of the applicable conditions a total of 41 commitments were noted to be fully compliant, 1 partially complaint and 0 were non-compliant.

A total of 108 commitments were identified in the EMPr that were evaluated. Sixteen (16) of these conditions were considered not applicable to the current phase of the project. Of the applicable conditions a total of 90 commitments were noted to be fully compliant, 2 partially complaint and 0 were non-compliant. The level of compliance for each commitment was calculated according to the methodology described in section 4.2. Utilising this scoring system, **a total compliance score of 98.81% was obtained for the EA and 98.91 for the EMPr**. From the compliance evaluation, three non-compliances were raised against the requirements of the EA/EMPr as described in Table 4. These NCs were also raised during the monthly ECO audits but were not yet fully addressed at the time of the NEMA Audit. Three observations or areas of concern were raised and are described in Table 5.

Based on the audit, the EMPr is considered mostly adequate and effective to manage and mitigate the significant impacts for the current activities of this project. It was determined that the mitigation measures for the exploration activities were not in line with certain international best practice guidelines. The current shortcomings in the EMPr related to GHG emissions, gas flaring, wastewater pits, solid removal systems for drill cuttings and fluids and alternative disposal methods for disposal of drill cuttings and fluids. Tetra4 is in the process of doing an EIA for the expansion of the gas gathering project (Cluster 2) in line with the NEMA requirements. The international standards, such as the Draft IFC EHS Guidelines for Oil and Gas Development, 2017, will be considered with the amendment of the EMPr during the EIA process. If the Cluster 2 project do not received approval, the current Cluster 1 EMPr must be amended in line with the recommendations of this Audit



Report. In the meantime, it is recommended that the current Tetra4 drilling procedure be updated in line with the international best practise guidelines to ensure that all efforts are taken to limit the impact on the environment during the drilling operations.



1 INTRODUCTION

Molopo South Africa Exploration and Production (Pty) Ltd (now Tetra4 (Pty) Ltd) conducted an Environmental Impact Assessment (EIA) and submitted the EIA and Environmental Management Programme (EMPr) in support of their Production Right application for natural gas on 09 December 2010. The EMPr (Ref: 12/4/1/07/2/2) was approved by the Petroleum Agency South Africa (PASA) on the 30th of June 2011. The Production Right application area stretches from Welkom and Virginia in the north-east to the west of Theunissen in the south. In 2016, an EIA was undertaken for an Environmental Authorisation (EA) Application to extend gas production operations within the existing Production Right, to amend the existing EMPr and include the combined helium and LNG plant and any activities not previously authorised to the gas production development. Furthermore, the issued Production Right makes provision to undertake site specific EMPrs within the Production Right area where the area is delineated as of medium to high environmental sensitivity. The EMPr (Cluster 1) audited here is, in effect, the first of these site specific EMPrs. This EMPr therefore serves to amend and replace the EMPr approved in 2010 for the Cluster 1 area. Tetra4 received Environmental Authorisation (PASA Ref:12/4/007) for the Cluster 1 Gas Production Project on 29 September 2017 and the 2017 EIA and EMPr forms part of this approval. Amendments to the EA and EMPr were approved on 30 August 2019 and 4 September 2020 and these amendments were considered during this Audit. As such, the 2019 EMPr, that was approved in 2020, is the currently approved EMPr for the development.

Condition 5.4.8 of the EA requires that Environmental Audit Reports must be submitted to the PASA twice a year, and the EMPr requires that Environmental Audit Reports be submitted to PASA on an annual basis. **This Environmental Audit Report is the 6th six – monthly Environmental Audit Report for the Tetra4 Cluster 1 Gas Production Project and fulfils the requirements of the annual and six-monthly Environmental Audit Reports, as per the requirements of the EA and EMPr.** The audit was undertaken in accordance with Regulation 34 and Appendix 7 of the National Environmental Management Act, Act 107 of 1998 (NEMA) Environmental Impact Assessment (EIA) Regulations, 2014: Regulation 34 states:

- 2) *“The holder of an environmental authorisation must, for the period during which the environmental authorisation and EMPr, and where applicable the closure plan, remain valid-*
 - (c) *Ensure that the compliance with the conditions of the environmental authorisation and the EMPr, and where applicable the closure plan, is audited; and*
 - (d) *Submit an environmental audit report to the relevant competent authority.*
- 3) *The environmental audit report contemplated in sub-regulation (1) must-*
 - (a) *be prepared by an independent person with the relevant environmental auditing expertise;*
 - (b) *provide verifiable findings, in a structured and systematic manner, on*
 - i) *The level of performance against and compliance of an organisation or project with the provisions of the requisite environmental authorisation or EMPr and, where applicable, the closure plan; and*
 - ii) *The ability of the measures contained in the EMPr, and where applicable the closure plan, to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity;*
 - (c) *Contain the information set out in [Appendix 7](#); and*
 - (d) *Be conducted and submitted to the competent authority at intervals as indicated in the environmental authorisation”.*



1.1 DETAILS OF THE HOLDER

Details of the holder are summarised in Table 1 below.

Table 1: Details of the holder.

Company Name	Tetra4 (Pty) Ltd
Company Registration	2005/012157/07
Head Office Physical Address	1 Bompas Road, Dunkeld West, Johannesburg, 2196
Head Office Telephone Number	010 045 6010
Head Office Fax Number	010 045 6001
Head Office Contact Person	Russell Broadhead (russell@renergen.co.za)
Operations Physical Address	Mond van Doornrivier RE/38, Theunissen District, 9414
Operations Contact Person	Vusumuzi Dlamini (vusi.dlamini@renergen.co.za)
Environmental Manager	Gerhard Muller (gerhard@renergen.com)

1.2 BRIEF PROJECT DESCRIPTION

The Cluster 1 gas production operations is located approximately 20 km southwest of the town of Virginia, within the Matjhabeng and Masilonyana Local Municipalities, in the Free State Province. Although the production area is extensively disturbed by various land use activities such as crop cultivation, mining and urban development, sensitive sites occur within the production area that include pockets of pristine vegetation, ridges, and drainage lines, which may still have high ecological value. The geology of the area is comprised of predominantly Karoo, Ventersdorp and Witwatersrand Supergroup lithologies complete with younger dolerite intrusions. Major fault systems associated with closely spaced zones of fractures and joints provide a preferential pathway for a combination of abiogenic and biogenic gas to reach the surface. As such, the gas at the surface or close to the surface, is a direct emission from the linked fault system.

Tetra4 adopted a phased production approach where natural gas will be extracted from various existing and planned gas wells within the production field and sent via pipelines to the compressors for compression and distribution. The phased approach will span over a period of approximately 25 years. The production method entails the drilling of gas wells via a combination of diamond and percussion drilling to depths more than 300m below the surface. The drilling is aimed at intercepting major and minor faults that act as preferential pathways for gas to flow to the surface.

Tetra4 have identified 13 existing wells that will be utilised for initial production activities. These 13 wells and the supporting infrastructure required for production related activities is referred to as Cluster 1 and comprises the first gas field for development within the approved Production Right area. The final product of the gas processing includes helium and LNG, both of which will be temporarily stored in tankers and trucked away via trailer to be sold to end users. In addition to gas production and processing activities, further exploration wells will be drilled in accordance with the Production Right and, if successful, the exploration wells will be converted into production wells to be added to the Cluster 1 network. **The EA indicates drilling of up to 6 exploration wells. This might, however, be an error due to the fact that the EIA/EMPr indicates that more wells will be drilled, additional to the 6 identified wells. An amendment to the EA should be considered as it contradicts the project description in the EIA/EMPr.** Layout maps of the Cluster 1 Gas Extraction Project area illustrating the existing and proposed gas extraction wells, the EIA approved construction corridor, proposed gas pipelines and the identified wetland areas are provided in Figure 1 to Figure 6.

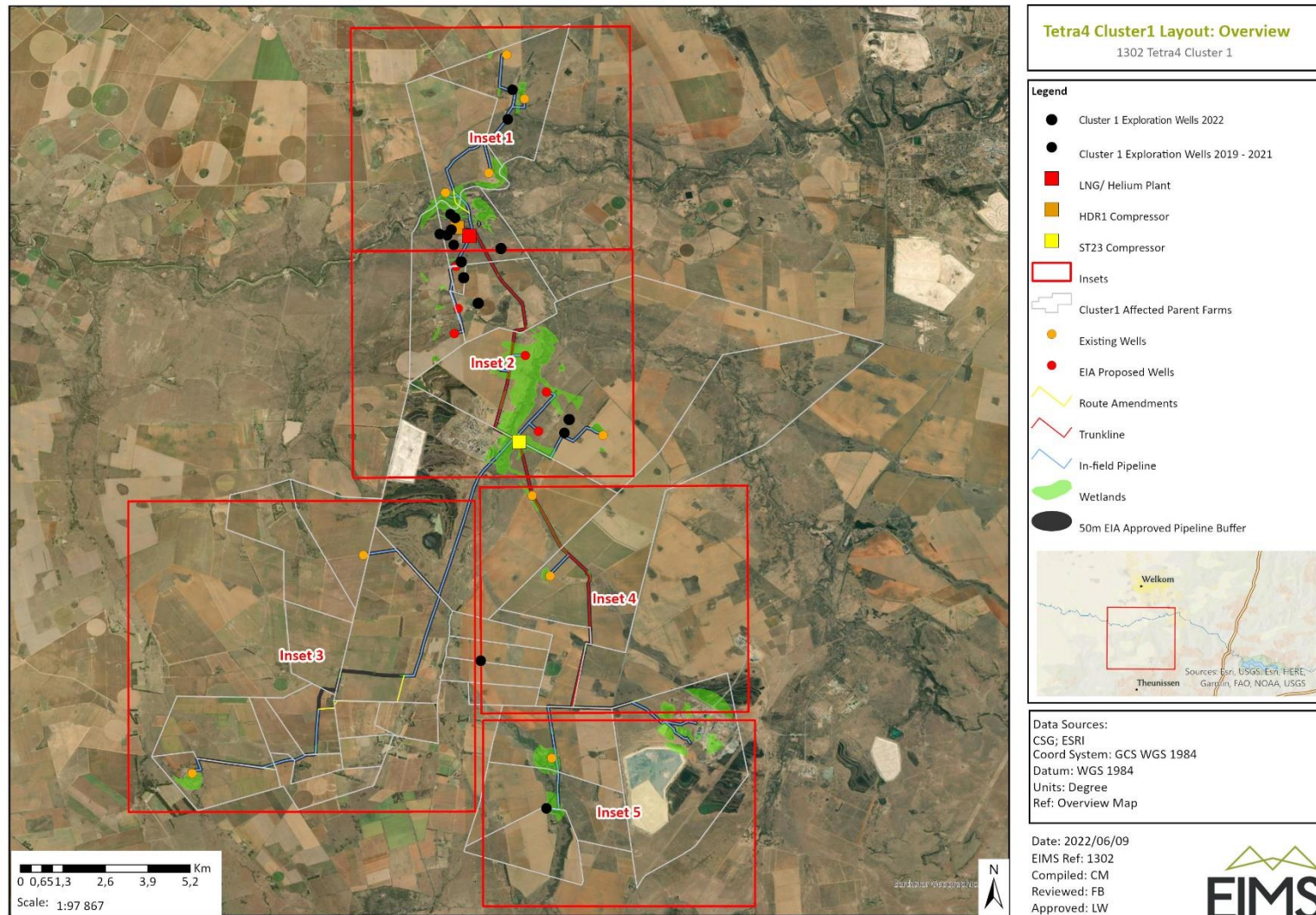


Figure 1: Layout Map of the Cluster 1 Gas Production Project area (Overview)¹.

¹ The layout map includes the wells and pipelines that were included in the EIA. Not all the infrastructure will be constructed during this phase of the development.

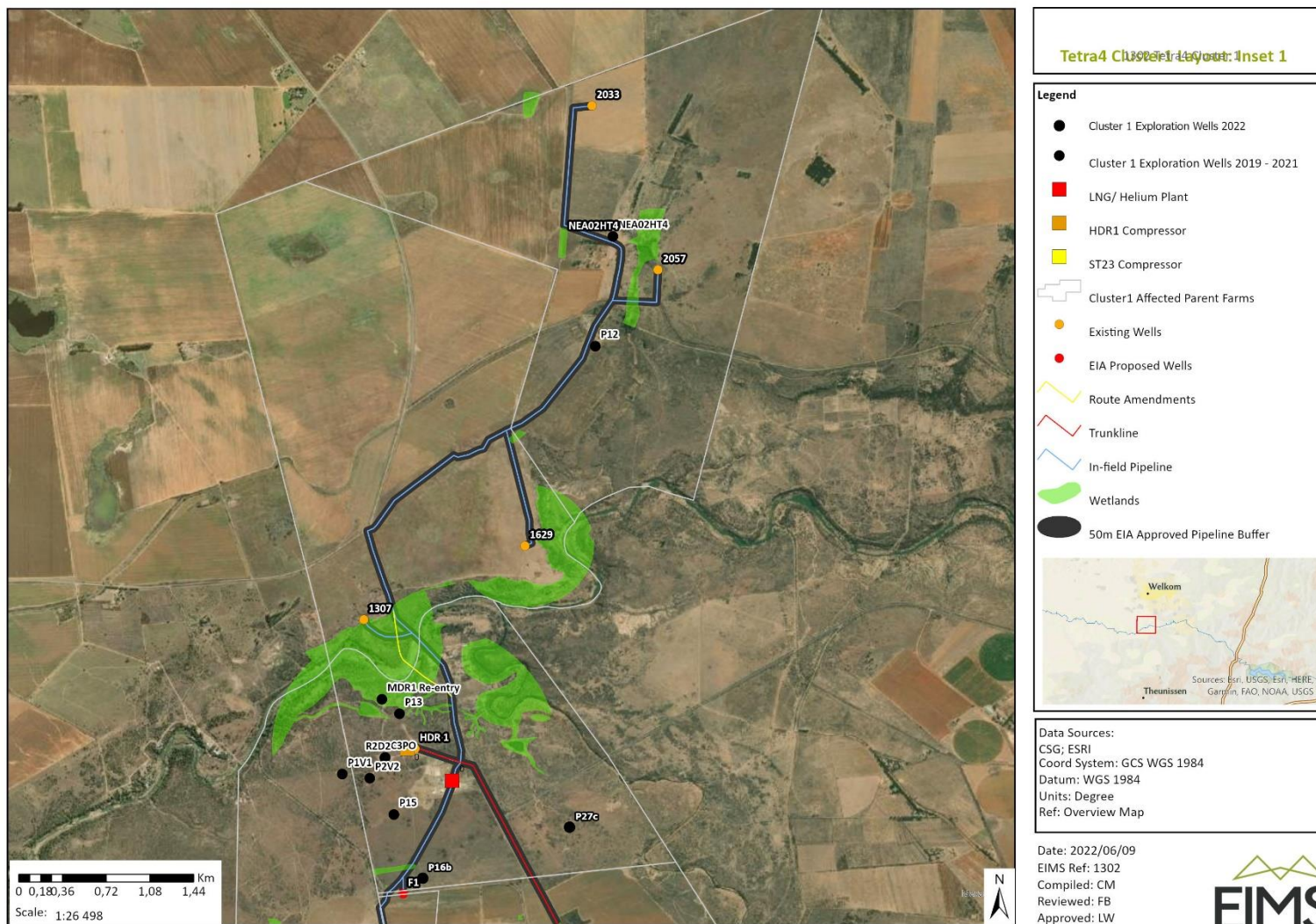


Figure 2: Layout Map of the Cluster 1 Gas Production Project area (Inset 1)².

² Wells 2033 and 1629 will not be tied in during this phase of the development.

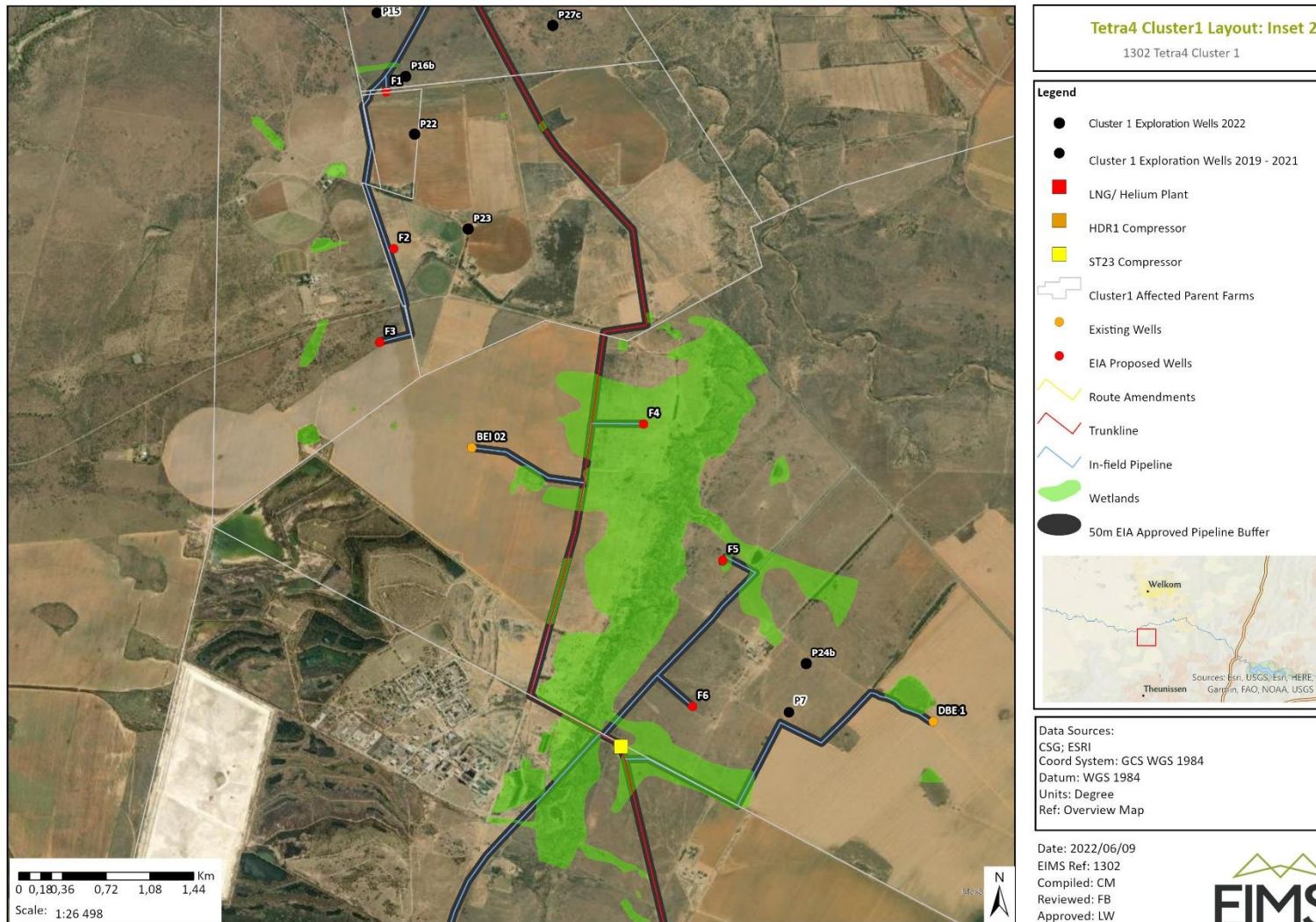


Figure 3: Layout Map of the Cluster 1 Gas Production Project area (Inset 2).³

³ Wells F1 to F6 will not be drilled and tied in during this phase of the development.

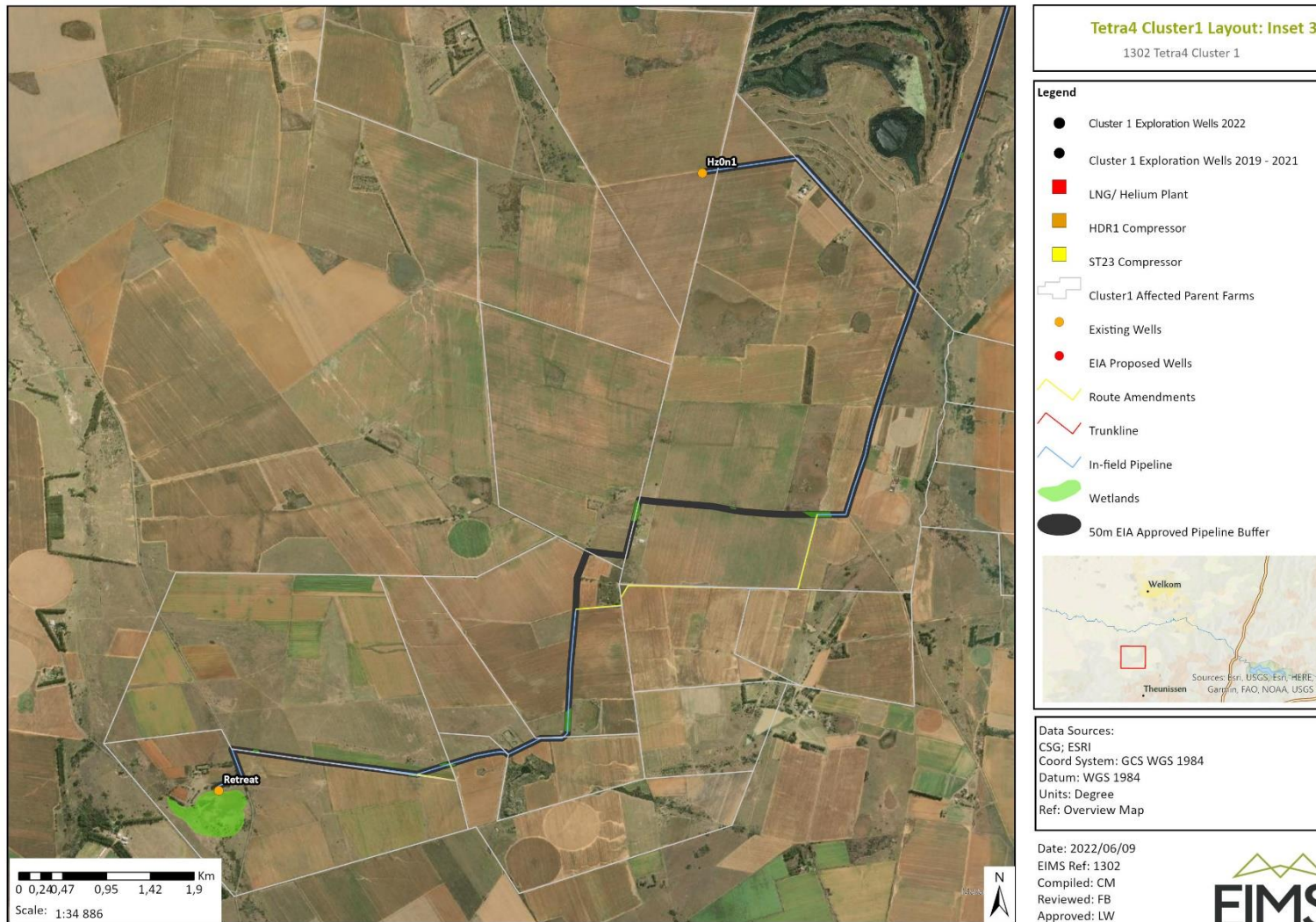


Figure 4: Layout Map of the Cluster 1 Gas Production Project area (Inset 3).

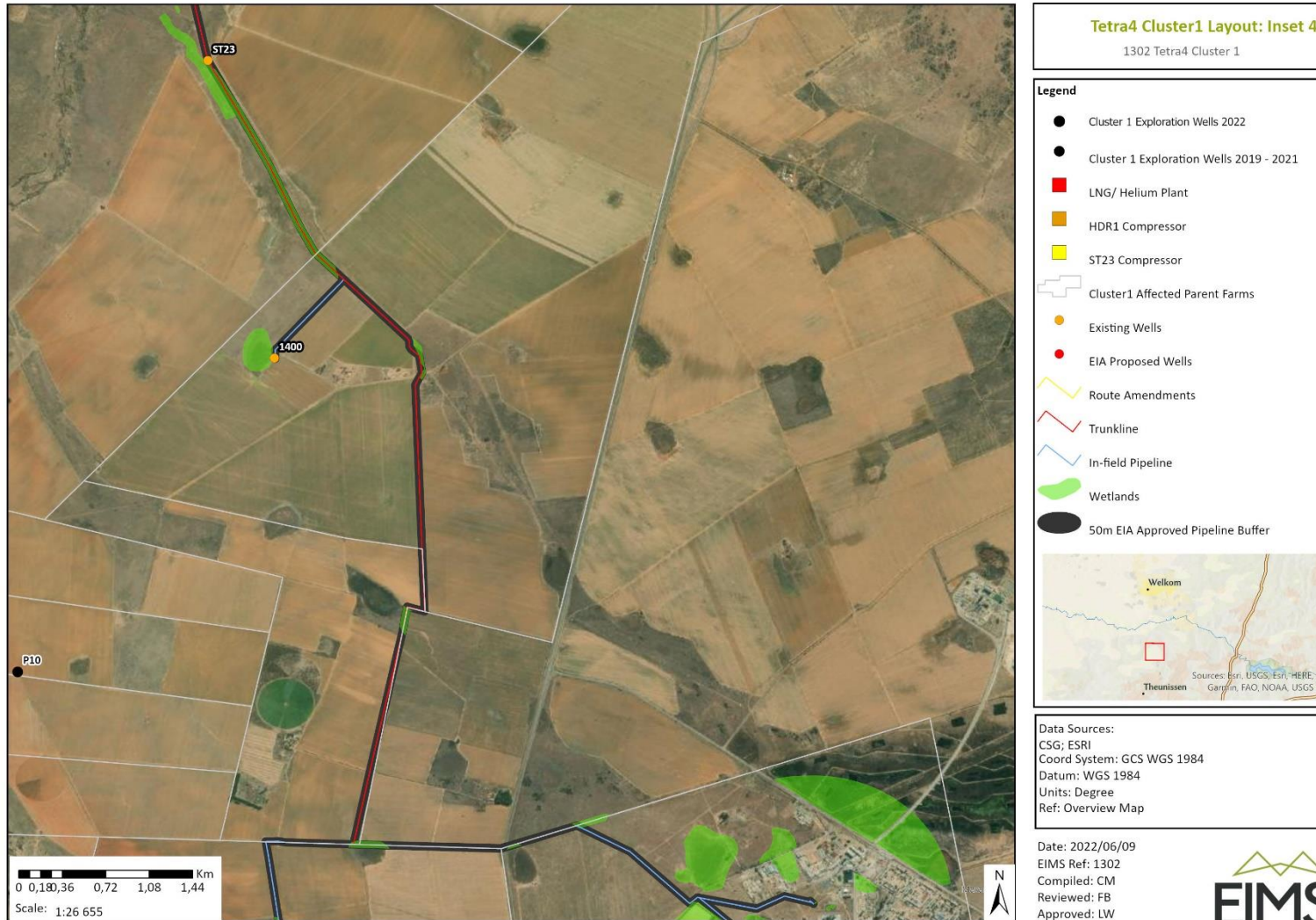


Figure 5: Layout Map of the Cluster 1 Gas Production Project area (Inset 4).⁴

⁴ The project is not planning to tie in at the mine on Leeuwbult No. 52 during this phase of the development.

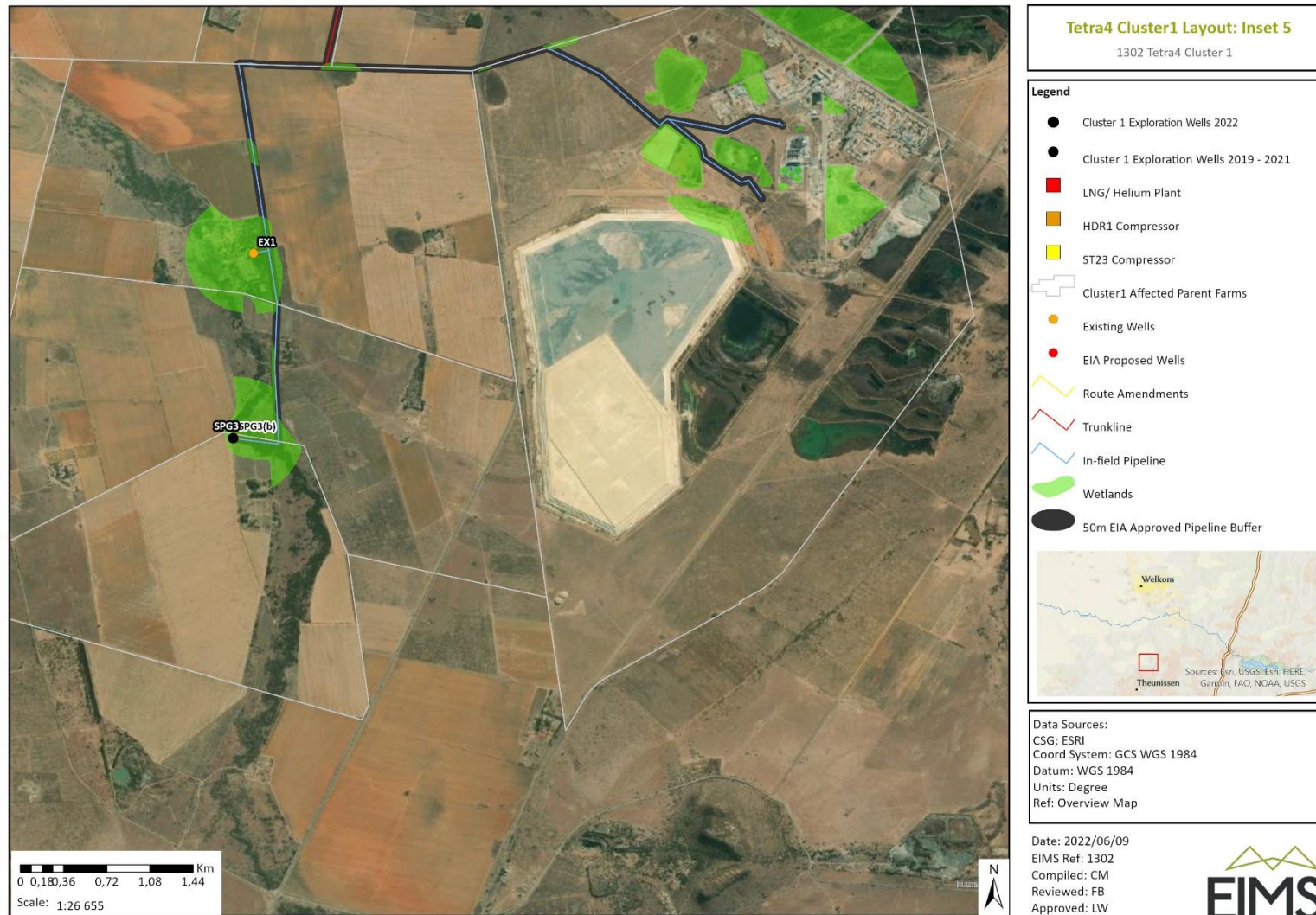


Figure 6: Layout Map of the Cluster 1 Gas Production Project area (Inset 5).⁵

⁵ The project is not planning to tie in at the mine on Leeuwbult No. 52 during this phase of the development.



1.3 SUMMARY OF ACTIVITIES UNDERTAKEN DURING THE REPORTING PERIOD

The main contractor commenced with the preparation works for the Cluster 1 construction activities at the end of 2019 with the preparation of the construction camp. Establishment of the well platforms was the first construction activities to commence with the excavation and installation of the pipeline undertaken generally from wells Retreat, SPG03 and 2057 toward HDR1 and the proposed Helium/ LNG plant. At the time of the audit, the construction of the gas gathering production wells and pipeline was completed and commissioned together with Compressor Station A (ST23) and Compressor Station B (HDR1). Construction of the Helium/ LNG Plant commenced in July 2020 and was nearing completion during the audit. Based on the progress reports provided, as well as the site visit, the following activities were applicable to the audit:

- Compressed Natural Gas (CNG) plant operations where the extraction of gas from HDR01 and MDR05 continues.
- Monitoring of the rehabilitation of the constructed pipeline sections continued.
- BOP construction of the Helium and LNG Plant continued.
- Exploration drilling was completed at well R2D2, C3PO, P15b and P16b.
- Exploration drilling continued at P24b, P27c and P22 and P23.
- Site preparation of exploration drilling commenced at P24c.



Figure 7: Exploration drilling at well P24b continued.



Figure 8: Exploration drilling commenced at well P23.



Figure 9: Exploration drilling continued at well P22 continued.



Figure 10: A roof was placed over the process water treatment plant at the BOP.



2 DETAILS OF THE AUDITOR

The environmental audit was undertaken by Francois Barnard from EIMS. Francois' details are described in section 2.1.

2.1 EXPERTISE OF THE AUDITOR

Francois is an environmental scientist offering environmental management, auditing, monitoring, training, rehabilitation, and project management services. He is a registered Professional Natural Scientist who holds a BSc Honours degree in environmental sciences from the North-West University in Potchefstroom and is a trained environmental auditor (Aspects International, 2012). The auditing training included all aspects of environmental auditing as well as EMS auditing in terms of ISO14001. In addition, he is trained on the ISO14001:2015 environmental standard and has completed the EMS lead auditor training in terms of ISO14001:2015. He has over 14 years' experience in the environmental management and environmental and social auditing field on numerous projects and facilities in the energy, mining, infrastructure development and conservation management sectors. He is conversant with the South African environmental legislation as well as sustainability auditing, including Equator Principles, IFC Performance Standards and World Bank EHS guidelines. Francois has a thorough understanding of the environmental and social assessment and permitting processes and is experienced in the review, compilation and implementation of environmental and social management plans, procedures, and method statements in line with best practice standards and systems. A detailed CV can be provided on request.

2.2 DECLARATION OF INDEPENDENCE

I, Francois Barnard, declare that –

- *I act as the independent Environmental Auditor;*
- *I will perform the work relating to the environmental audits in an objective manner, even if this results in views and findings that are not favourable to the Client;*
- *I declare that there are no circumstances that may compromise my objectivity in performing such work;*
- *I have expertise in conducting environmental audits, including knowledge of the environmental Acts, regulations and any guidelines that have relevance to the audited operations;*
- *I will comply with the relevant Acts, regulations, and all other applicable legislation;*
- *I have no, and will not engage in, conflicting interests in the audit process;*
- *I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the NEMA; and*
- *I do not have and will not have any vested interest (either business, financial, personal, or other) in the audit other than remuneration for work performed.*

3 SCOPE, PURPOSE AND OBJECTIVE OF THE AUDIT

The **scope** of the audit is to assess compliance of the Cluster 1 Gas Production Project with the conditions of the approved EA and EMPr and to confirm the continued adequacy of the EMPr. The **purpose** of the audit is to ensure compliance with the requirement of the EA and EMPr and the NEMA EIA Regulation 34 to undertake scheduled compliance audits. The **objectives** of the audit are to determine:

- The level of performance against and compliance of the project with the provisions of the requisite EA and EMPr; and
- The ability of the measures contained in the EMPr, to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity.



4 AUDIT METHODOLOGY

4.1 PROCEDURE FOR THE AUDIT

Initial documentation was obtained and reviewed in preparation for the audit. A checklist was prepared based on the requirements of the EA and EMPr for the pre-construction, construction, operational and closure phases. Following the initial checklist preparation and documentation review, a site visit was undertaken on 18 May 2022 to determine compliance with the EA and EMPr. Compliance with the requirements was evaluated using the pre-determined scoring criteria as described in Section 4.2 and the results of the audit are described in Section 5 of this report.

The report provides recommendations for improvement based on general findings and site observations. The Environmental Audit is primarily a Compliance Audit against the conditions of the approved EA and EMPr. Findings from the audit and site inspection that did not relate to an EMPr condition did not contribute to the audit score. However, where deficiencies have been identified that do not necessarily correspond to EMPr conditions, these findings have been used to provide recommendations for improvement.

Various documentation and records were required during the audit to confirm compliance with the requirements. Where possible, documentation and records were made available electronically for review prior to the site visit. The rest of the information required for verification of compliance was provided during and after the site inspection.

There is wide variety of South African environmental legislation and Tetra4 is required to comply with all relevant legislation. Whilst consideration was given to the relevant environmental legislation, a full comprehensive legal compliance audit is beyond the scope of this audit. Where reference is made to legislation or other statutory provisions in this report, the original legislation or other statutory provisions will always take precedence and the reader is directed to revert to the original legislation or statutes.

4.2 EVALUATION CRITERIA USED DURING THE AUDIT

The evaluation criteria for compliance scoring were based on a pre-determined scoring system. Each condition of the EA and EMPr was weighted equally to determine a compliance score. The scoring criteria used during the audit are as follows:

- Fully Compliant: Indicating that the condition was fully complied with and provided with a compliance score of 4.
- Partially Compliant: Indicating that the condition has not been fully complied with and that additional measures are required to obtain full compliance. Partial compliances were provided with a compliance score of 2.
- Non-Compliant: Indicating that the condition has not been complied with and provided with a compliance score of 0.
- Not Applicable (N/A): Indicating that the condition is not currently applicable. Not applicable conditions were removed from the total number of conditions from which the compliance score was calculated during this reporting period.

4.3 CONSULTATION PROCESS UNDERTAKEN

The findings of this assessment are based on visual inspection of the relevant construction, exploration and production areas, interviews, as well as documentation reviewed. No physical testing or chemical analysis was performed during the assessment and information provided by employees was verified by inspection and review only. The Project representatives that were interviewed and assisted with the audit was:

- Gerhard Muller - Tetra4 Environmental Manager (EM); and
- Chandre Kok– Tetra4 Environmental Officer (EO).



As per the Regulation 34 of the EIA Regulations, 2014, all potential and registered interested and affected parties should be notified of the submission of the report to the authorities and the report should be made available to anyone on request and it should be made available on a publicly accessible website, where the holder has such a website. The previous 6-Monthly NEMA Audit Report that was undertaken in November 2021 and was submitted to PASA via email on 4 January 2022. A notification was sent to the landowners affected by the Cluster 1 activities on 25 May 2022, but it could not be confirmed if all potential and registered Interested an Affected Parties (I&APs) were notified as per the requirement of the regulations. The previous NEMA Audit Reports are available on the Renergen website at: <https://www.renergen.co.za/renergen-governance/environment/>.

5 RESULTS OF THE AUDIT

The results of the audit have been described in this section of the report. The results include a summary of compliance with the requirements of EA and EMPr, the results of the compliance evaluation, summary of findings as well as a discussion on the continued adequacy of the EMPr within sections 5.1, 5.2, 5.3 and 5.5 respectively.

5.1 COMPLIANCE SUMMARY

A total of 51 conditions (commitments) were identified in the EA that were evaluated. Nine (9) of these conditions were considered not applicable to the current phase of the project. Of the applicable conditions a total of 41 commitments were noted to be fully compliant, 1 partially compliant and 0 were non-compliant.

A total of 108 commitments were identified in the EMPr that were evaluated. Sixteen (16) of these conditions were considered not applicable to the current phase of the project. Of the applicable conditions a total of 90 commitments were noted to be fully compliant, 2 partially compliant and 0 were non-compliant.

The level of compliance for each commitment was calculated according to the methodology described in section 4.2. Utilising this scoring system, **a total compliance score of 98.81% was obtained for the EA and 98.91 for the EMPr**. A summary of the number of conditions of the EA and EMPr rated as Fully Compliant, Partially Compliant and Non-Compliant are presented Figure 11 and Figure 12 respectively.

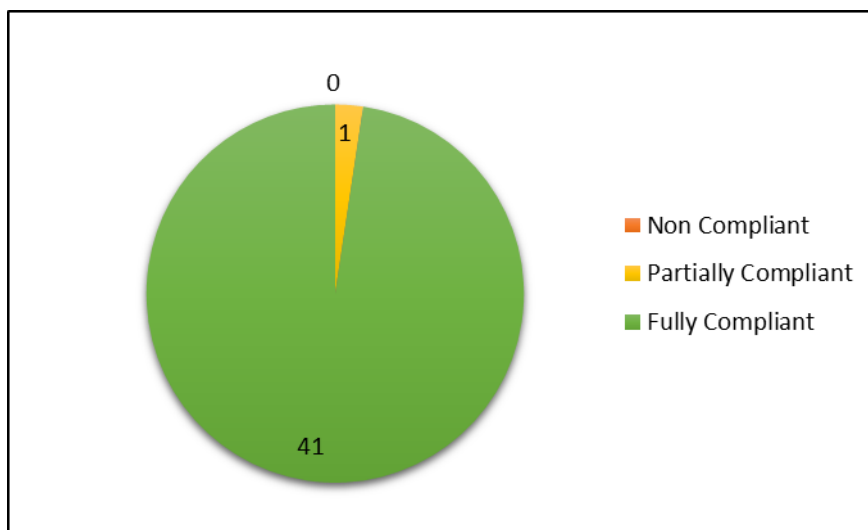


Figure 11: Distribution of compliance ratings for EA conditions.

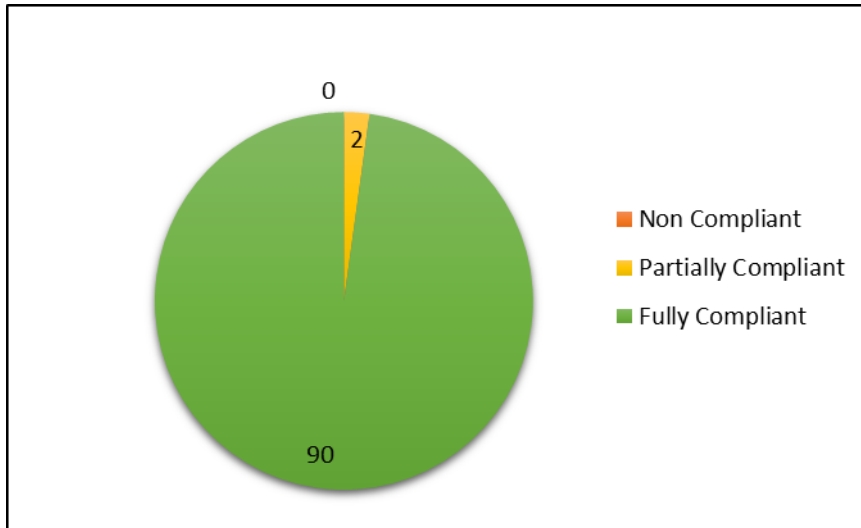


Figure 12: Distribution of compliance ratings for EMPr conditions.



5.2 COMPLIANCE EVALUATION

The compliance evaluation of the EA and EMPr are provided in Table 2 and Table 3. The conditions were rated according to the compliance evaluation criteria described in 4.2. The text highlighted in **blue** shows the amendments of the EA that was approved on 30 August 2019 and the text highlighted in **green** shows the amendments of the EMPr on 1 September 2020.

Table 2: Compliance evaluation of the EA conditions.

Ref #	Condition	Compliance Rating	Comments/ Verification
5,1	Scope of the Authorisation		
5.1.1	This authorisation authorises the holder to undertake all the activities prescribed under section 3 above. The location alternatives HP1 located next to the HDR1 well and HP2 located at Sibanye Shaft 1 for the combined helium and LNG plant are approved. Furthermore, the preferred pipeline route alternatives P2 and P4 which connect all the existing and new wells to HP1 and HP2 respectively (as described in the EIR) are also approved.	2	The pipelines and facilities follow the IEA approved route corridor as far as possible. The EA indicates drilling of up to 6 exploration wells. This may however be an error due to the fact that the EIA/EMPr indicates that more wells will be drilled, additional to the 6 identified wells. An amendment to the EA should be considered as it contradicts the project description in the EIA/EMPr. The surface footprint of exploration well P16b, P22, P23, P24b and P27c exceeds the prescribed area of 30m x 30m indicated in Section 3.1 of the EA with surface footprints of 50m x 50m each instead.
5.1.2	The authorised activities must only be carried within the application area specified in section 4 above and appendix 2. (Also See EA Amendment regarding Portion 2 of Boschluispruit 278 and Portion RE of the Farm Retreat 118 and Boschluispruit 278)	4	The current activities are located within the application area.
5.1.3	The holder of this authorisation (hereafter referred to as the holder) is responsible for ensuring compliance with the conditions of this authorisation, and recommendations made in the Environmental Impact Assessment Report (EIR) and Environmental Management Programme Report (EMPR) dated 03rd of May 2017.	4	The applicant has appointed an Environmental Officer and ECO that is monitoring the implementation of the EA, EIA and EMPr.
5.1.4	Any person(s) acting on behalf of the holder, inclusive of contractor(s), subcontractor(s), consultant, and employee are also subject to the conditions of this authorisation. This condition however does not exonerate the holder from its accountability and responsibility to ensure compliance with the conditions of this environmental authorisation.	4	The EMPr was supplied to the relevant contractors and monitoring of the implementation is being undertaken by the EO and ECO. The EMPr was included as part of the EPCM contract and were included as part of the basis of design provided to the exploration drilling contractor (Torque Africa). An agreement letter was signed by WSCE indicating the



			acknowledgement of receipt and understanding of the Environmental Requirements.
5.1.5	Any changes to, or deviations from, and amendments to the proposed activities, conditions of this authorisation, and recommendations in the S&EIR and EMPR must be approved, in writing, by the Department before such changes or deviations are affected. The Department reserves the right to request the submission of information deemed necessary to assess and evaluate the significance and impacts such changes, deviations and amendments before such changes, deviations and amendments are authorised or not. Any changes, deviations and amendments may be subject to provisions of Chapter 5 of the EIA Regulations, 2014 pertaining to the amendments of the authorisation and EMPR.	4	Amendment to the EA was made and approved on 29 August 2019 and the EMPR was approved on 1 September 2020.
5.1.6	This authorisation does not absolve the holder from complying with any other statutory obligations that may be applicable to the proposed activities.	-	The holder is aware of the requirement to comply with other statutory obligations. An EO was appointed to monitor compliance with environmental legislation, where applicable. Storage of hazardous drilling waste might trigger Waste Management Licence if stored for longer than 90 days. The EA covers storage of hazardous waste, but only for the knockout water, and not for drilling waste in lagoons.
5.1.7	The holder of this authorisation must apply for an amendment of this authorisation in the case of a change of ownership of transfer of rights and/or obligations.	4	Tetra 4 is still the holder of the authorisation. Renergen is the holding company of Tetra4.
5.2	Notification and Appeal of Authorisation		
5.2.1	The holder must, in writing, within fourteen days of the date of this amended authorisation, notify all registered interested and affected parties (I&APs) of the outcome of the application.	4	The EA was signed by DMR on 21 September 2017 and by PASA on 29 September 2017. The notification (Letters, emails, faxes) went out on 3 October 2017.
5.2.2	The notification contemplated above must amongst other issues:		
5.2.2.1	Stipulate the date of the decision, and the date of the issue of the amended authorisation.	4	The notification letter included the date of the authorisation.



5.2.2.2	Provide reasons for the decision, included in Appendix 1 of this amended authorisation.	4	The notification letter included the reasons for the decision.
5.2.2.3	Inform registered I&APs of the Appeals Procedure provided for in terms of the National Environmental Management Act, 1998: National Appeals Regulations (GN R 993 of 08 December 2014).	4	The notification letter included the appeals procedure.
5.2.2.4	Draw the attention of the I&APs to the manner in which they may access the decision, including obtaining the copy of the authorisation.	4	The notification letter included the way they may access the decision and where they can obtain the authorisation.
5.3	Commencement of the Activity(s)		
5.3.1	The authorised activities shall not commence within 20 days of the date of this authorisation, pending potential lodgement of appeal(s).	4	The 2017 EMPR for Cluster 1 replaces the 2010 EMPR within Cluster 1. No additional activities /cluster 1 activities took place within 20 days of the issuing of the 2017 EA.
5.3.2	Where an appeal is lodged against the decision by any party, the amended authorisation or any provision or condition of the amended authorisation will be suspended in accordance with section 43(7) of the National Environmental Management Act, 1998; and as such you may not commence with any activity, unless authorised in writing by the competent authority and/or the decision on the appeal has been taken.	4	No appeal was lodged for the Cluster 1 EA. No Cluster 1 activity commenced before the EA was issued.
5.3.3	A thirty (30) day written notice must be given to the Petroleum Agency SA prior to the commencement of any of the authorised production activities located within the boundary of Cluster 1 .	4	Notice of construction commencement was sent on 18 April 2019.
5.3.4	The authorised activities must commence within a period of 5 years from the date of issue of this authorisation. If commencement of the authorised activities does not occur within the said period, the authorisation lapses, and where the holder still intends undertaking the authorised activity(s), a new application for authorisation in terms of the EIA Regulations, 2014 must be obtained.	4	The Authorisation is dated 21 September 2017 and the 5-year period will be applicable on 20 September 2022. The authorised activities commenced in December 2019.
5.3.5	Any requests for extension of the commencement period of this authorisation should be lodged with the competent authority before the expiry of the environmental authorisation in accordance with amendments to Regulation 28(1) of EIA Regulations, 2014.	N/A	Extension is not applicable as the activities commenced within 2019 and within the timeframe.



5,4	Management, Monitoring and Auditing of Operations Including Reporting Requirements		
5.4.1	The Environmental Management Programme (EMPR) submitted with the Environmental Impact Assessment Report (EIR) is hereby approved. It is hence mandatory for the holder to implement all recommendations and management measures stipulated in the Cluster 1 EMPR throughout all the phases of the proposed production activities within Cluster 1 .	4	The EMPR is being implemented. The EO and ECO were appointed to monitor and ensure compliance to the EMPR.
5.4.2	Any non-compliance with the EMPR constitutes non-compliance with this authorisation, and any non-compliance with this authorisation may result in its suspension and may render the holder guilty of offence in terms of section 49A of NEMA, and may, if convicted, liable for penalties contemplated in Section 49B(1) of NEMA.	N/A	Statement. Noted.
5.4.3	Should there be changes in the operation and management of the authorised activities, the EMPR must be amended to accommodate those changes and submitted to the competent authority for approval before implementation takes place. The amendment(s) to the EMPR must be done in accordance with Regulations 36 and 37 of the EIA Regulations: 2014.	4	Amendment to the EA and EMPR were made and were done in accordance with the applicable EIA Regulations.
5.4.4	The holder of the authorisation must implement necessary measures to ensure that operators, contractors and subcontractors have full awareness of the recommendations on the EMPR before commencing with any authorised activity.	4	Awareness of the requirements of the EMPR was done with Tetra 4 and contractor employees. Supervisors signed that they received and understand the requirements of the EMPR. Requirements of the EMPR are conveyed to site personnel via procedures and toolbox talks. The EMPR is included as part of the basis of design provided to the exploration drilling contractor and an acknowledgement and understanding of the environmental requirements was signed by WSCE.
5.4.5	The EMPR must be included in all contractual documentation entered thereto between the holder and contractor(s). Furthermore, a copy of the EMPR must be kept at the site office at all times .	4	The EMPR is referred to in the contractual documentation and provided to the contractors. The EMPR is available at the client and contractor EOs.
5.4.6	The holder must before the commencement of the authorised activities, appoint an independent and experienced Environmental Control Officer (ECO) who will ensure that the conditions of this authorisation and provisions of the EMPR are implemented and adhered to.	4	EIMS was appointed as the independent ECO for the Cluster 1 project. Monthly compliance inspections are undertaken, and reports prepared.



5.4.7	The appointed ECO must, at drilling and construction stages (trenching and laying of pipelines and construction of the helium and LNG plant and associated infrastructure) submit monthly reports to the Petroleum Agency SA. Submission of quarterly environmental monitoring reports is also mandatory during production operations.	4	Monthly ECO reports are submitted to PRASA currently during drilling and construction. The 33rd monthly ECO report (April 2022) for Cluster 1 was submitted to PASA on 13 May 2022).
5.4.8	The holder must submit an environmental audit report to the Petroleum Agency SA biannually (twice a year) carried out by an independent and qualified environmental practitioner in accordance with Appendix 7 of the EIA Regulations, 2014. At a minimum, the audit report must evaluate compliance with the conditions of this authorisation and provisions of the EMPR; identify and assess any new impacts and risks from undertaking the authorised activities; identify shortcomings in the EMPR; and identify if findings of the previous audit were addressed including opinion on the effectiveness of preventive and corrective actions implemented.	4	The first biannual audit was done in December 2019 during the 6 th monthly ECO audit. The report was submitted to PASA in February 2020. The 2 nd biannual audit was undertaken in June 2020 and the report submitted to PASA in August 2020. The 3 rd bi-annual audit was undertaken on 14 December 2020 and submitted on 7 April 2021. The 4 th bi-annual audit was undertaken on 1 July 2021 and submitted on 5 August 2021. The November 2021 audit is the 5 th 6-monthly audit and was submitted on 4 January 2022. This May 2022 Audit was submitted to the authorities on 13 July 2022. The audits were undertaken by an independent environmental practitioner from EIMS in line with Regulation 34 and Appendix 7 of the EIA Regulations, 2014 and in line with this condition (5.4.8) of the EA.
5.4.9	Where shortcomings in terms of Regulation 34(4) are identified, the holder must submit recommendations to amend the EMPR in order to rectify any shortcomings that may have been identified in the audit report contemplated in 5.4.8 above.	4	During the May 2021, it was determined that the mitigation measures for the exploration activities may not be adequate to mitigate the impact on the natural environment as it were not entirely aligned with international best practice. Mitigation measures from international standards and guidelines, such as the Draft IFC EHS Guidelines for Oil and Gas Development, 2017, should be considered with regards to GHG emissions, gas flaring, wastewater pits, solid removal systems for drill cuttings and fluids, alternative disposal methods for disposal of drill cuttings and fluids. Tetra4 is currently busy with an EIA for the Cluster 2 exploration and production activities. As part of the EIA process, the EMPr will be amended to include mitigation measures in-line with international best practise. The new Cluster 2 EMPr will replace the current Cluster 1 EMPr. If the Cluster 2 EIA does not get approved, then the Cluster 1 EMPr will have to be amended instead.
5.4.10	The holder of this authorisation must keep all records relating to monitoring and auditing and make them available for inspection to any relevant and competent authority in respect of this development.	4	Records relating to monitoring and auditing are kept and can be made available on request.



5,5	Specific Conditions		
5.5.1	The holder or the appointed ECO must within 30 days prior to the commencement of the authorised production activities, distribute notifications to all affected land owners informing them of the operational plans. The said notification must among other issues include the commencement and anticipated completion date(s) of each of the proposed activities, details of the contractors including subcontractors, sketch plan showing the operation areas, and procedure to lodge complaints and report any environmental and safety matters arising from the operations.	N/A	It is uncertain if this condition refers only to production activities. A community meeting was however undertaken to introduce the communication procedures with the stakeholders. Pre-commencement assessments are done before a property is entered and before any work is done on a property. These assessments are done in conjunction with the landowners to ensure that they are aware and are provided to detail any special conditions for access. A community liaison officer was appointed who correspond with the landowners on any concerns raised.
5.5.2	If the final positions of the new wells and compressor site(s) as described in the EIR are altered, the new and final positions must be placed within the assessed Cluster 1 area, and must (where practically possible) avoid environmentally sensitive areas, including areas of historical/ cultural/ heritage significance.	4	The known infrastructure was placed in the assessed Cluster 1 area.
5.5.3	Drilling fluids and muds must strictly be water-based and biodegradable. In this regard, the holder is required to submit Material Safety Data Sheets for drilling fluids to the Petroleum Agency SA at least 60 days before drilling operations commence.	4	It was confirmed that the drilling fluid is water based and biodegradable and a copy of the MSDS was sent to PASA.
5.5.4	Any excavations exceeding a depth of 3 meters, traversing the potentially sensitive alluvial deposits at Boschluispruit and Sand Rivers and unweathered sedimentary Bedrock, must be done under the supervision of an independent and qualified Palaeontologist.	4	A palaeontologist monitored excavations at the Sand River and Boshluispruit.
5.5.5	The holder must obtain land use and access agreements prior to commencement of the proposed activities, and submit copies of such to the Petroleum Agency SA at least 30 days before the commencement of the authorised activities. Furthermore, in order to avoid conflict of interests with the current land-use activities, the applicant must consult on an ongoing basis with the affected surface landowners and keep them informed of the project development.	4	Land use and access agreements were finalised for the Cluster 1 Pipelines and Wells. Access agreements are in place with landowners where wells are currently located. The agreements that are in place were submitted to the PASA on 17 April 2019. Ongoing consultation with landowners continues.



5.5.6	The holder must develop a grievance mechanism and claims procedure and share the content thereof with affected landowners before the authorised operations commence. A copy of the grievance mechanism and claims procedure, including proof of communication with affected landowners must be submitted to the Petroleum Agency SA at least 30 days before the commencement of the authorised activities.	4	Grievance mechanism and claims procedure are in place and the information was shared with the relevant stakeholders. The grievance mechanism was sent on the 17th of April 2019 and the proof of communication with affected parties was sent on the 24th of April 2019 to PASA.
5.5.7	The holder must undertake an asset and infrastructure baseline study, in consultation with all affected landowners, before the authorised activities commence, and submit the report in question to the Petroleum Agency SA at least 30 days before authorised activities commence.	4	An infrastructure baseline study assessment was done and submitted to PASA on 18 April 2019.
5.5.8	The holder must convene a special meeting with landowners and communities before operations commence to ensure that they understand the technical and safety aspects of the proposed operations. Periodic feedback meetings with affected landowners and relevant regulatory authorities on the progress of operations, compliance status and to address stakeholders' issues concerning the project must take place.	4	A landowner and community forum (kick-off meeting) was held 17 November 2019 and included the contractor. Ongoing consultation with landowners continues.
5.5.9	The holder must develop a traffic safety plan especially for the turn-offs from the R30 in consultation with the relevant Roads Authority in order to ensure that the safety of road users is not compromised.	4	For the construction phase, a draft Traffic Safety Plan (Work Instruction) was developed by the contractor. A meeting was held with the regional traffic safety manager within February 2020 to advise on the road signage that was required and that was installed. It was reported that the wayleave for the access road to the HDR1 site did not require a Traffic Management/Safety Plan. A new wayleave was applied for the main access to the LNG plant. Approval of the wayleave was not yet provided, and construction of the access was on hold during the audit.
5.5.10	Appropriate notification signs, warning the communities about the hazards around sites including the presence of heavy vehicles, must be erected at construction and operational sites.	4	Road signage (speed limits, directions, no entry) was erected along the local access routes to the well sites and construction areas where activities were being undertaken and more permanent signage was established at the entrance to the HDR1 and construction camp area. Additional signage was obtained for the new access to the LNG plant.



5.5.11	Wastewater produced during drilling operations and gas processing operations must be stored in above ground storage containers or tanks, and must be tested and, where necessary, treated before disposal at an appropriate or licensed disposal facility.	4	The wastewater and drill cuttings from the drilling sites were stored in sumps and re-used until the end of the drilling process. The excess water and drill cuttings are placed in skips and slops tanks provided by professional registered waste management service providers whereafter it is collected and disposed at a hazardous waste disposal facility with proof of disposal certificates readily available Water tests were conducted initially to determine the final disposal of the wastewater and drill cuttings I.E. Hazardous Waste. The main process plant was not yet fully operational, and the wastewater management will be reported on during subsequent audits.
5.5.12	An integrated waste management approach based on waste minimization must be implemented and must incorporate waste avoidance, reduction, recycling, treatment, re-use and disposal where appropriate. The holder must therefore develop an integrated waste management plan for implementation during operations. The said must be submitted to the Petroleum Agency SA at least 60 days before authorised activities commence.	4	The waste management plan and IWWMP was submitted to PASA on 18th of March 2019. It was indicated that a separate waste management plan will be submitted to PASA 60 days before operation.
5.5.13	Waste storage sites must have impermeable and chemical resistant floors and must be covered or roofed to prevent direct sunlight or rain water from getting in contact with the waste.	4	It is assumed that this condition relates to more permanent operational areas as it is not feasible to have impermeable and chemical resistant floors at temporary work fronts all along the Right of Way. The waste storage area at the HDR1 site has impermeable concrete floors and the containers were provided with lids that were closed at the time of use. The main plant waste area was still being constructed.
5.5.14	The storage of hydrocarbons and/or chemicals and any operating equipment with hydrocarbons and/chemicals must have bund walls with adequate capacity to contain maximum volume that is stored or contained.	4	The hydrocarbon storage areas inspected had bund walls or alternative spill containment measures to contain the maximum volume stored at these facilities. The chemical storage area at HDR1 had metal containment facilities in place to contain spillages from these chemicals. The fuel bowser and diesel storage facility at the construction camp had a concrete bund. The hazardous storage area at the main laydown area had a bund wall. Drip trays are used under equipment that has the potential of spillage to ground.
5.5.15	The holder must develop a storm water management plan for the combined helium and LNG plant, and must submit such to the Petroleum Agency SA at least 60 days before the operation of the plant commences.	N/A	It was reported that the plan was developed and that it will be submitted to the PASA 60 days before the operational phase commence.



5.5.16	Potentially occurring protected plant species such as <i>Merwillia plumbea</i> and <i>Crinum bulbispermum</i> and protected tree species such as <i>Acacia erioloba</i> must not be removed or disturbed unless necessary permission is granted by the relevant departments i.e. Department of Environmental Affairs and Department of Agriculture, Fisheries and Forestry.	4	Search and rescue operations takes place before a new activity commence, the protected plant species are identified, and the relevant permits are applied for before removal/relocation.
5.5.17	The holder must develop and implement sound groundwater monitoring programme(s) that will ensure that potential impacts of gas production on ground water levels and quantity are prevented and/or managed. The programme to be developed must be submitted to the Agency at least 60 days before authorised activities commence.	N/A	It was confirmed that a comprehensive baseline groundwater monitoring programme was undertaken. The baseline monitoring reports that include the monitoring programme was submitted to PASA on 5 March 2019. The operational monitoring programme will be submitted to PASA 60 days before the operational phase.
5.5.18	The integrity of the pipelines is crucial in preventing gas leakage or explosions. The holder must develop inspection mechanisms for the proposed production pipelines and submit such to the Petroleum Agency SA at least 30 days before production operations (gas extraction and transportation to the production plant) commence.	N/A	It was reported that a plan was being prepared and will be submitted 30 days before operations.
5.5.19	Emergency incidents must be addressed and reported to the Petroleum Agency SA in accordance with section 30 of NEMA. In addition, the holder is required to notify the Petroleum Agency SA within 24 hours of the occurrence of an emergency incident.	4	During the reporting period (May 2022) no incidents were reported to the authorities.
5.5.20	The holder must develop emergency preparedness and response plans for responding to potential emergency incidents and submit such to the Petroleum Agency SA, at least 60 days before commencement of the authorised activities.	4	The EPRP for the construction phase has been submitted to PASA on 17 April 2019. The ERP for the operational phase should be submitted to PASA 60 days before operation.
5.5.21	All recommended mitigation measures included in the EIR dated 03 rd of May 2017 are deemed to be the conditions of the EA and must therefore be adhered to.	4	The mitigation measures from the EIR were included in the EMPR. Compliance with the EMPR is being monitored monthly by the EO and ECO.
5,6	General		
5.6.1	A copy of the authorisation and the EMPR must be kept onsite to ensure appropriate implementation of the mitigation measures.	4	A copy of the EA and EMPR is available at the HDR1 office and construction camp.
5.6.2	The Department shall not be responsible for any damages or losses suffered by the holder in an instance where the operation is	N/A	Statement. Noted.



	temporarily stopped for reasons of non-compliance with the conditions as set out herein.		
5.6.3	In view of the above, and having taken into consideration environmental management principles as set out in section 2 NEMA, and information presented in the EIR and EMPr, and subject to compliance with conditions of the EA and recommendations of the EMPr, the Department is satisfied that the proposed activities will not be in conflict with the objectives of the Integrated Environmental Management set out in Chapter 5 of NEMA and will not result in any detrimental risks to the environment and public. The authorisation is accordingly granted.	N/A	Statement. Noted.

Table 3: Compliance evaluation of the EMPr commitments.

Ref #	Impact/ Aspect	Condition	Compliance Rating	Comments/ Verification
1	Water quality baseline	The pre-production condition of the water resources must be utilised as the target for post-production closure objectives. All necessary measures must be taken to ensure that the post-production water quality as the same as pre-production baselines levels. In order to achieve this relevant water pre-construction water sampling must be undertaken to determine the baseline.	4	The baseline conditions were determined.
2	Management of sensitive areas	Any drill sites or infrastructure routes located inside medium, high or very high sensitive sites on the sensitivity /constraint map require a site-specific pre-commencement assessment. The pre-commencement assessment must address the sensitive aspects on site, as identified in the overall sensitivity / constraint map. The pre-commencement assessment must be compiled by the site Environmental Officer (EO) with a suitable environmental qualification and experience. All recommendations of the pre-commencement assessment must be implemented on site. The completeness and adequacy of the pre-commencement assessment in respect of identifying and managing on site	4	Pre-construction assessments were being undertaken for all new drill sites and infrastructure routes by the Tetra4 Environmental Officer during the reporting period. The environmental officer has suitable environmental qualifications and experience. The pre-construction assessments for the exploration wells P7, P10, P12, P13, R2D2/C3PO, P15, P16, P22, P23, P24c, P27 were reviewed and considered adequate in identifying and managing on-site environmental sensitivities.



		sensitivities must be included in the monthly ECO reports and annual independent audit.		
3	Impacts on land-use	Infrastructure routes should follow existing servitudes and farm boundaries wherever possible. Where necessary pipelines should be laid underground below plough ripping level. In the event that surface pipelines are to be utilised, written approval must first be obtained from the relevant landowner. Pipelines that will be buried at a minimum of 1.5m below surface which is deeper than the rip-depth to ensure that the farmer has full utilization of their land.	4	Based on the alignment sheets, the pipeline routes follow existing servitudes as far as possible. Recommendations on the route alignment were also made by the specialist to reduce the impact of the pipelines. The pipeline was being placed underground and is below 1.5m in agricultural areas.
4	Environmental and safety practices	All pipelines and facilities will be designed and constructed in accordance with best practices and international gas standards.	4	It was reported that the designs of the pipelines and facilities are done by professional engineers and according to international gas standards. The requirements are included in the contracts of the contractors and a local authority confirms these designs to international codes. Design standards include ASME VIII on pressure vessels and ASME B31.3 and B31.8 for piping and process lines, respectively. It was reported that designs were reviewed, and certified and third-party authorisation can be viewed in the quality packs.
5	Impacts on land-use	The identified drill site should, where possible, not infringe on the landowners' surface activities. Irrigation Pivot points should remain unaffected by infrastructure and must be deviated around or buried to allow for continued pivot irrigation operation.	4	The well sites visited at the time of the audit did not infringe on the landowner's surface activities.
6	Public safety	A hazardous installation risk assessment must be conducted prior to construction.	4	A MHI risk assessment was undertaken for the CNG plant (HDR1 site) in September 2016 and for the pipelines, helium plant, proposed CNG plant and trailer a MHI risk assessment was done in February 2017, and for the LNG Plant in June 2019.
7	Impacts of Infrastructure	The location of any servitudes or third-party infrastructure must be identified prior to commencement at a specific site and the necessary approvals obtained. This specifically includes the necessary consents for the location of pipes and	4	The servitudes and third-party infrastructure have been identified and the necessary approvals obtained. A third-party infrastructure register has been prepared by Tetra 4.



		compression stations when located in proximity to local, provincial and national roads.		
8	Impacts on Traffic Safety	SANRAL will only allow pipelines to be laid outside the road reserve and boundary and should preferably not be located within 10 metres of such boundaries. All pipes within a distance of 60 metres from the National Road reserve will require SANRAL approval as this fall within the building restriction area of the National Road.	4	The Cluster 1 pipelines did not impact on SANRAL Roads, only Provincial roads. Pipelines are mostly located outside of the road reserve and a wayleave was obtained for road crossings from the Provincial Department of Police, Roads and Transport. Way Leave Ref: P29/3/184/P1/2, 25 June 2020.
9	Management of sensitive areas	Once prospective drilling sites are identified, a suitably trained EO must undertake a site-specific pre-commencement assessment to assess the site for any potential environmental sensitivities prior to commencement. Should environmental sensitivities be identified, the relevant Tetra4 Response or Action Plan Procedures must be adhered to.	4	A pre-commencement inspection and report gets compiled before any new activity commence or new area is disturbed, and this includes the exploration drilling activities.
10	Access roads	Existing roads should be used where possible. Decisions regarding the siting/location of new roads should be done with agreement of the landowner. Fence lines should be followed as far as practical. No trees shall be removed unless authorised by a suitably qualified environmental professional. Protected tree species may not be removed, unless relocation is deemed viable by the specialist ecologist and relevant permits are obtained. Construction of drill sites and associated access roads on steep gradients shall be avoided as far as possible. In case of new access roads, adequate drainage and erosion protection in the form of off-cut berms or trenches should be provided where necessary. Access routes across rivers, streams and wetland areas should be avoided as far as possible. Where such crossings are unavoidable, the relevant authorisations must be obtained, if applicable. Minimise the frequency of vehicle travel on unsurfaced roads where possible.	4	Existing roads are used as far as possible. Landowners are being consulted with regards to location of new roads. Fence lines are followed as far as possible. Currently, no protected trees were removed. No drill sites or access roads on steep gradients were noted in the areas inspected at the time of the audit. No erosion concerns were noted on the access roads at the time of the audit. New access roads across wetlands/watercourses are avoided as far as possible. If access on unsurfaced roads is required, dust suppression is required to be done by the contractor.
11	Management of sensitive areas	After any site specific assessment, the Environmental Management Programme must be amended to include any site specific requirements. The site assessment must include a survey of the preferred footprint area (including	4	No additional mitigation measures were identified that had to be included in the approved EMPr yet. The pre-commencement assessments are considered extensions of the EMPr and includes a survey of the



		access routes) to identify any potential sensitive/ red data species (flora and fauna).		footprint and the access routes. The assessments aim to identify potential sensitive and red data species.
12	Impacts on land-use	The location of the drilling site should be done so as to impact minimally on the daily activities of the landowner. The location of the site should be consulted with the landowner. Drilling site should not be situated near visually sensitive areas or residential areas. Steep areas should be avoided.	4	The location of the sites is consulted with the landowners during the pre-commencement assessments undertaken and during the landowner agreement negotiation to ensure that they do not infringe on the landowner's surface activities.
13	Disturbance/ destruction of sacred natural sites	Once final production drilling footprints are determined and confirmed for implementation, a public participation process should be undertaken during which the I&APs are invited to come forward and state whether they are aware of any sacred water sites (secret or not) located within a 500 m radius area from each proposed drilling position. Care must be taken during the public participation to ensure that the cartographic and location information presented to the I&APs contains clear enough information for them to confidently recognise the positions of such proposed drilling site(s) should these be located anywhere in proximity to the properties and landscapes they have knowledge of (English, Afrikaans and Sesotho). Should an I&AP state that such a sacred site is indeed located within 500 m of a proposed drilling position, an experienced team comprising a heritage specialist and geohydrologist must accompany the I&AP to the sacred site for confirmation purposes. The heritage specialist and geohydrologist must compile a letter to indicate the findings of their fieldwork (i.e. whether such a sacred site was indeed identified within 500 m from the proposed drilling position). All aspects relating to the location of the sacred site must be kept strictly confidential. At no stage will any information regarding the position of the sacred site (GPS coordinates, property description etc.) be contained in the letter, or in any other report, or document. The confidential manner in which this mitigation will be approached and undertaken with regards to the	4	A public participation process was undertaken from 10 January 2019 to 20 February 2019. One potential sacred natural site was identified but it was located outside of the final footprints of the Cluster 1 area.



		locations of Sacred Natural Sites, must be clearly communicated to the I&AP from the outset. Any development (including exploration drilling) within 500 m of a confirmed Sacred Natural Site should adhere to the recommended groundwater, surface water and wetlands mitigation measures.		
14	Consideration of additional production footprints on heritage sites	The relevant heritage screening in accordance with Section 38 of the NHRA, must be completed by a suitably trained EO for all new drill sites and pipeline routes if heritage features are observed or suspected to be on site as part of a site specific pre-commencement assessment. If the proposed activity exceeds the NHRA Section 38 thresholds, a Phase 1 HIA must be completed. The EO must undergo training by a suitably qualified heritage specialist / archaeologist in the identification of potential heritage sensitivities occurring within this study area. Pre-commencement records must be kept as well as the resulting action plans.	4	A pre-commencement inspection and report gets compiled before any new activity commence or new area is disturbed.
15	Loss of watercourse habitat	Locate pipeline/ trunkline alignments/ compressors outside of buffered watercourses (sensitive watercourse habitat) as far as possible. Buffered watercourses within proximity to the construction footprints should be demarcated on site for the entire construction process to help indicate sensitive areas and prevent unauthorised access. Unavoidable crossings should ideally be located perpendicular to the direction of flow at the shortest possible crossing distances. Long crossings along the length of wetlands, rivers and drainage lines should be avoided as far as practically possible. Aboveground pipeline watercourse crossings that are suspended on plinths are recommended as opposed to the excavation, lowering and infilling of pipelines in watercourses. Tetra 4 should make provision in the design phase for permanent access tracks/ roads that will be required for the maintenance of the pipeline. A construction method statement should be prepared by the contractor with	4	A Water Use Licence was obtained on 22 January 2019 (08/C42K/CL/8861) for construction within wetlands/watercourses where it could not have been avoided. The wetlands within proximity of the pipeline construction areas were demarcated. A construction method statement was prepared for the wetland and watercourse crossings and input from a watercourse specialist/ hydrologist was provided.



		input from a watercourse specialist prior to the start of construction.		
16	Destruction/ damage to archaeological sites	An archaeological watching brief (monitoring of excavation during construction) must be implemented for TET 9 along the banks of the river. Should any additional development footprints within 1 000 m of the Sand River be proposed, archaeological field surveys of the proposed development footprint areas should be undertaken to identify any tangible remains of the battle of Zand River and the Old Diamond Mine at Welgegun. This must include the associated heritage impact assessment to address any perceived significant impacts on this battle and old diamond mine and its associated tangible remains. A heritage specialist must be appointed to undertake the archaeological field surveys as well as the compilation of a heritage impact assessment report, which must be implemented.	4	An archaeologist was present during the excavations for the drilling at the sand river.
17	Flora and fauna direct and indirect mortality	Search and rescue of species of concern. Obtain permits for disturbance/destruction of any listed/protected species found on site. Where possible, undertake activities in previously disturbed areas and/or habitats with lower sensitivity. Where possible, locate activities on the boundaries of existing disturbance. Use existing access roads as much as possible.	4	Pre-commencement assessments are undertaken by the EOs to identify potentially listed/protected species and obtain permits, when applicable. Activities are planned on boundaries of existing disturbance and existing roads are used as far as possible.
18	Reducing groundwater available to existing users.	A hydrocensus must be undertaken within a 500m radius around each future gas production target to confirm the presence of private boreholes that have not already been identified as part of the 2016 hydrocensus. All private boreholes inside this zone must be visited and inspected. The information gathered must be used to plan for, and implement, groundwater management measures. A photo must be taken of each private borehole within the 500m radius for future record. Where possible, the sustainable yields of private boreholes that fall within the zones of impact above must be determined prior to Tetra4 commencing with any groundwater abstraction. Complete a pumping test on the boreholes within the	4	It is understood that no additional wells were drilled that were not included in the 2016 hydrocensus. A comprehensive baseline groundwater study was undertaken, and groundwater monitoring continues for the production activities at HDR1.



		<p>zones of impact. The testing requirements for each borehole should be evaluated based on field conditions. A sound groundwater monitoring programme must be implemented in the hydrocensus boreholes that will be affected, as well as in the newly drilled monitoring boreholes and in the gas production wells. Should the results of the monitoring programme indicate a negative impact on private groundwater users as a result of Tetra4's activities, alternative arrangements must be negotiated with the affected parties. Tetra4 must apply for a water use license in the event that groundwater abstraction for the project triggers the requirements of the National Water Act (Act 38 of 1996).</p>		
19	Loss of agricultural land	<p>Ensure that as much of the infrastructure as possible is sited away from agricultural lands. Utilize servitudes, farm roads and any other routes to avoid sensitive areas. Ensure that pipelines are buried at sufficient depth (>1 m minimum) to avoid interference with arable agriculture activities.</p>	4	<p>The infrastructure locations are determined in consultation with the landowners and are located outside of agricultural areas as far as possible. The pipeline is buried below 1.5m.</p>
20	Disruption of watercourse hydrology	<p>Pipeline crossings through wetlands and other watercourses should ideally be raised aboveground on plinths to prevent preferential flow along their length. In areas where this is not possible, trench breakers with a low hydrological conductivity should be used to reduce water movement in bedding and padding material along the buried pipeline in wetlands and other watercourses. Long and/or steep approaches that border watercourses (specifically wetlands) should receive trench breakers that will help to restrict the desiccation impact on wetlands due to preferential drainage. It is recommended that input be obtained from a geotechnical specialist or geohydrologist regarding the use and positioning of trench breakers along buried sections of the pipeline. Other crossings through depression (pan) and flat wetland require trench-breakers or other forms of underground barriers/plugs to</p>	4	<p>Trench breakers were installed in wetland and watercourse areas.</p>



		prevent preferential drainage along the pipeline/trunkline alignment.		
21	Decrease in surface water quality	Design and implement a site-specific stormwater management plan for the compressor and helium/LNG plant that will enable dispersed release of runoff at outlets, with outlets located outside (upslope) of buffered watercourses (where possible). Ensure separation of clean and dirty water and provide for adequate dirty water containment. Ensure that sufficient ablution facilities are available on site and that septic tanks are located outside of buffered watercourses. Stabilise new channels that form as a result of headcut erosion or other forms of erosion once they are recorded.	4	The construction of the plant has not yet been completed. No erosion or stormwater concerns were noted at the HDR1 site and at the compressor stations. Septic tanks are located outside of the buffered watercourses. Adequate ablution facilities were available in the areas inspected at the time of the audit.
22	Improvement of numerical modelling results	A groundwater monitoring programme must be implemented. On-site rainfall must be measured at the Helium Plant on a daily basis. Tetra4 must undertake geophysical surveys at the remainder of the gas production wells in a similar fashion to what has been completed to date. These surveys must be used to identify additional groundwater monitoring borehole drilling targets as the project progresses. Pumping tests and/or slug tests can also be considered on private boreholes within the zones of influence discussed above that are not already equipped, provided that the geological logs are available for the boreholes (21A, 21B, 21D, 22A, 22B, 4A, 11C, 15E, 17E, 22D, 23D, 24D, 25A, 25B, 25D, OB, OC, ZA). The hydrocensus boreholes can only be tested after permission was obtained from landowners. The information obtained from the activities listed above must be interpreted and incorporated into the existing conceptual model for the project. This data as well as the results of the groundwater monitoring programme must be used to update and re-calibrate the numerical groundwater flow and contaminant transport model for the project on an annual basis.	4	A comprehensive groundwater monitoring programme is being undertaken and the information will be considered for the update of the numerical groundwater model currently being updated. The site visit for the 2022 update was undertaken during the February 2022 sampling event, but the report is still being prepared. The 2021 update was provided during previous audits. A weather station was also established at the HDR1 site.
23	Influx of people looking for economic opportunities	Communication to stakeholders about the nature and extent of economic opportunities should be undertaken.	4	Pre-commencement stakeholder engagement took place in 2019 and included the nature and extent of



		No unrealistic expectations should be created and the recruitment policy giving preference to local labour should be communicated from the beginning of the project. The local area of influence should be agreed with stakeholders early on in the process.		economic opportunities to ensure that no unrealistic expectations are created. The procurement policy giving preference to local employment was communicated. Ongoing engagement with the landowners and affected communities continues and is reported within the Weekly/Monthly CLO reports. The local area of influence was defined as Welkom and Virginia.
24	Stray gas migration affecting groundwater quality	Well design to be undertaken according to designs developed by a qualified well engineer. The existing production boreholes should be assessed and where relevant retrospectively amended to ensure suitable integrity to align with the design objectives of the MPRDA Regulations. The recommended gas well construction configuration is such that the upper 300 – 450m of the geological succession is cased off using a combination of telescopic drilling, steel casing and cementation between the well annulus and the casing towards isolating the shallow Karoo potable aquifer from the deep-seated gas production zone and the saline formation water associated with the production zone. In the unlikely event that produced water has to be extracted from gas production wells, this water should be stored in sealed containers, removed from site and disposed of to a suitable environment/waste management facility. A groundwater monitoring programme (to monitor gas pressure and potential leaks) must be implemented in the gas well, as well as in the monitoring and hydrocensus boreholes to detect dissolved methane and ethane gas. Well construction according to the relevant standards and regulations.	4	The new well designs are based on the design prepared by a well engineer, Eliot Johnson. It was reported that the well design was sent and approved by PASA. Casings are in place for the new wells, and these are confirmed during well CBL logging. Groundwater monitoring continues to determine if there are any leaks and associated contamination from the production wells at HDR1 and the monitoring programme will be expanded as more wells are connected to the network for production. Groundwater monitoring at the exploration drilling sites drilled from December 2020 to May 2022 were not yet implemented. These wells will be included in the monitoring network once they are connected for production. As per the EMPr, the groundwater monitoring programme are updated annually during the annual update of the Numerical Groundwater Model.
25	Enviro-legal compliance	Holder to obtain all necessary permits to comply with all legislative requirements.	-	The EA covers re-use, treatment, and storage of hazardous waste (Categories: B2, B4 and C2), but only for the knockout water, and not for the storage of drilling waste in lagoons. Currently the project aims to remove drilling waste within 90 days to be in line with the requirements.



26	Enviro-legal compliance	The relevant heritage screening in accordance with Section 38 of the NHRA, must be completed by a suitably trained EO for all new drill sites and pipeline routes, if heritage features are observed or suspected to be on site as part of a site specific pre-commencement assessment. If the proposed activity exceeds the NHRA Section 38 thresholds, a Phase 1 HIA must be completed. The EO must undergo training by a suitably qualified heritage specialist / archaeologist in the identification of potential heritage sensitivities occurring within this study area. Pre-commencement records must be kept as well as the resulting action plans.	4	Pre-commencement assessments are undertaken by the EO to screen if any heritage features are observed or suspected to be on site. The resultant action plans are kept and implemented.
27	Impacts of cultural and heritage features	The relevant heritage screening in accordance with Section 38 of the NHRA, must be completed by a suitably trained EO for all new drill sites and pipeline routes if heritage features are observed or suspected to be on site as part of a site specific pre-commencement assessment. If the proposed activity exceeds the NHRA Section 38 thresholds, a Phase 1 HIA must be completed. The EO must undergo training by a suitably qualified heritage specialist / archaeologist in the identification of potential heritage sensitivities occurring within this study area. Pre-commencement records must be kept as well as the resulting action plans.	4	Pre-commencement assessments are undertaken by the trained EO to screen if any heritage features are observed or suspected to be on site. The resultant action plans are kept and implemented.
28	Landowner Consultations	Landowners must be consulted and all reasonable requests complied with. A written landowner agreement should be negotiated and concluded prior to commencement. Should this not be possible, a record should be kept of reasonable negotiations with the land owners.	4	Landowner agreements are concluded before any work is allowed to be undertaken on a property.
29	Temporary construction camps, laydowns, offices.	The camp and office site shall be sited and fenced (where necessary) in consultation with the landowner and tenants. No camp and office site shall be situated closer than 100 meters from any stream, spring, dam or pan, and 100 meters from any residential area or farm homestead. In the event that any infrastructure is located closer than 100m from any residential area or homestead	4	The construction of the construction camp commenced in December 2019. The camp is located on the property owned by Tetra 4 and the activities currently complies to these requirements.



		<p>then written consent must be obtained from the relevant landowner/ occupier. The area required for the camp and site office shall be kept to a minimum, as to reduce the impact on surrounding ecology. Activities should be restricted to the agreed or fenced area. In the case where water will be required, the water supply pipelines laid down should be done in accordance to the agreement with the landowner and tenants, in such a manner that the surface and natural vegetation are not unduly disturbed (where necessary). Only legal water supplies may be utilised. An approved chemical toilet service supplier should be used to supply and maintain chemical toilets for the duration of the proposed activity on the site. Portable toilets (preferred) should be used and sited on the campsite in such a way that they do not cause water pollution, odour or other forms of pollution. Any impact such as noise, dust, bright lights etc. that may cause disturbance to landowners or tenants, will be kept to a minimum. No structures older than 60 years are to be impacted on without the necessary permits.</p>		
30	Management of sensitive species	<p>If sensitive species occur within the preferred footprint, the first option should be to relocate the proposed footprint followed by the alternative of preparing a relocation plan (prepared by a suitably qualified specialist).</p>	4	<p>Pre-commencement assessments are undertaken by the EOs to identify potentially listed/protected species and obtain permits, when applicable.</p>
31	Loss of heritage features	<p>The relevant heritage screening in accordance with Section 38 of the NHRA, must be completed by a suitably trained EO for all new drill sites and pipeline routes, if heritage features are observed or suspected to be on site as part of a site specific pre-commencement assessment. If the proposed activity exceeds the NHRA Section 38 thresholds, a Phase 1 HIA must be completed. The EO must undergo training by a suitably qualified heritage specialist / archaeologist in the identification of potential heritage sensitivities occurring within this study area. Pre-commencement records must be kept as well as the resulting action plans.</p>	4	<p>A heritage assessment was undertaken for the HDR1 site when it was established. A HIA was included as part of Cluster 1 EIA undertaken in 2017 for the Cluster 1 pipeline routes and wells. Pre-commencement assessments are undertaken by the EO to screen if any heritage features are observed or suspected to be on site. The resultant action plans are kept and implemented.</p>



32	Impacts on land-use	The pipelines will be buried in accordance with the schedule as agreed upon with landowners to minimise disturbance to farming operations.	4	Access was negotiated and agreed with landowners before access.
33	Impacts on Traffic Safety	A consulting engineer with a transportation background should be consulted in order to ensure that access features along roads are acceptable to SANRAL, and allow for the consideration and approval of safety to motorists and the general public.	4	Formal approval was obtained from SANRAL for the access to the HDR1 Plant and the new construction camp. An application for approval of the main access to the LNG/Helium has been submitted and is awaiting approval.
34	Landowner Consultations	Landowners should be notified of the intention to carry out production activities at the identified drilling sites. Assess routes should be planned in consultation with relevant landowners. Areas to be disturbed or cleared (for access, pipelines and drill sites) should be communicated to the landowner prior to clearing. The relevant construction and operation scheduling must be communicated to applicable landowners. Landowners should be consulted regarding the position of the production site footprint. Agreement should be obtained from landowners, for the use of the land, water, power and final rehabilitation outcome.	4	Pre-commencement assessments are done in consultation with landowners before any activities on the properties.
35	Management of topsoil	Topsoil should be removed from areas that are to be cleared and stockpiled separately for later use during rehabilitation. Topsoil should be stockpiled for the minimal amount of time and should not exceed 1.5m in height, or have a slope steeper than 1:2. Stockpiles should ideally not stand for longer than a period of 12 months.	4	During the construction of the pipeline, the topsoil over the pipeline trench was stripped, stockpiles and used for rehabilitation. Topsoil was stripped in the areas where soil will be excavated for use during rehabilitation. The topsoil for the LNG/Helium Plant were given away. Topsoil will have to be imported for final rehabilitation at the end of the operational phase, if relevant.
36	Water pollution and waste management	To mitigate the effluent from long term drilling sites (>3 years): Separation pits (sumps) for wastewater and grease and oil polluted fluids should be excavated and constructed to treat wastewater; Where excavating these pits, topsoil and subsoil should be stored separately; Sump areas should be lined with PVC to prevent seepage; In order to contain non-biodegradable oil and fuel spills, drip pans or PVC lining should be provided for mobile pans and drip pans; For stationary	4	The exploration drill sites visited during the audit complied with the requirement of the EMPr.



		<p>drill rigs, thin concrete slabs and/or with PVC lining should be installed before the stationary drill rigs are erected; Sump areas must be designed to accommodate the 1:100 year flood event. Clean and dirty water streams must be separated. The location and design of the sumps must be in accordance with the applicable GN 704 conditions; and Sump areas should be constructed in such a way that clean water (stormwater) is diverted away from these areas. To mitigate effluent from short term drillings sites (<3 years): The topsoil layer of the surface area required for the drill should be excavated and stored according to accepted topsoil management practices; A contiguous impervious PVC layer (e.g. large silage sheets) is placed under the drill (within the excavated area) to collect any spills; Spills of hazardous substances should be collected and disposed of according to the approved EMPR requirements at a suitably licensed facility; Collected spills from the drill must not be allowed to contaminate the soils and/or the closed water system utilised for the drilling fluids; and It is recommended that where possible, closed, above ground tanks are utilised for future drilling as opposed to sumps/pits.</p>		
37	Stormwater control and management	<p>All clean water should be diverted away from the site. Minimize the area that is disturbed during production activities in order to minimize the potential stormwater disturbance and to reduce the sediment loads to receiving water courses. Adequate drainage and erosion protection in the form of cut-off berms or trenches should be provided where necessary.</p>	4	No drainage or erosion concerns were noted in the areas inspected at the time of the audit.
38	Noise, vibration, visual and dust impacts	<p>The contractor must prevent labourers from loitering in the area and causing noise disturbance. Ensure that all equipment is in a good working condition to ensure that no additional noise is admitted from them. Light impact should be kept to a minimum (e.g. use of full cut-off lighting fixtures if necessary). Retain vegetation where possible to maintain its natural noise and visual screening</p>	4	No noise and visual nuisance concerns were noted at the time of the audit. No complaints were received relating to noise, vibration, visual or dust impacts.



		function. Reduce speed limit on gravel roads to reduce noise generation.		
39	Fugitive emissions (dust) from exploration/production drilling	In controlling vehicle entrained particulate matter, it is recommended that water (at an application rate of 2 litre/m ² -hour), be applied on all unpaved road sections to ensure a minimum of 50% control efficiency (CE). In addition, binding agents or chemical suppressants should be considered for application on all unpaved road sections. The need for dust control to be informed by the ECO.	4	Evidence of dust control was noted, and no dust concerns were noted in the areas inspected at the time of the audit. Dust monitoring continued for the active construction and exploration areas within the zone of influence (200m) to determine any dust impacted near sensitive receptors.
40	Loss of farm labour to the Cluster 1 project	If any farm labourers apply for positions at Tetra 4 or one of its contractors, Tetra 4 or the contractor must ensure that the labourer is aware that the position may only be temporary and what the long term consequences of taking the position are.	4	Stakeholder awareness sessions were undertaken to inform stakeholders of employment processes and opportunities.
41	Potential for conflict between local residents and newcomers about economic opportunities.	Preference for employment should be given to the local community. The recruitment policy must be communicated openly and made available to the public if requested.	4	Stakeholder awareness sessions were undertaken to inform stakeholders of employment processes and opportunities initially in 2019. Local employment is being monitored and reported on. The procurement policy gives preference to local procurement from Welkom and Virginia.
42	Loss / destruction of natural habitat	Where possible, locate infrastructure in previously disturbed places and/or habitats with a lower sensitivity score. Rehabilitate disturbed areas as soon as possible. Control alien plants.	4	The alignment of the pipelines and location of the facilities are mostly located in previously disturbed areas, as far as possible. Rehabilitation of the pipeline was taking place concurrently. Alien plants were being controlled.
43	Disturbance/ destruction of graves (including possible stillborn and unmarked graves)	Where construction activities are closer than 50m from a demarcated grave site adequate warning signage or barricading must be installed to prevent inadvertent disturbance of the site and where applicable within the buffer. For destruction of possible stillborn and unmarked graves the following mitigations apply: written notification to SAHRA that reconnaissance excavation (digging by hand to a depth of approximately half a metre by a heritage specialist within and up to a buffer of 25m from the identified historic to recent farm worker accommodation) will be undertaken; reconnaissance	4	Known heritage features were demarcated during construction in the vicinity of these features.



		excavation of the structures undertaken to assess whether any graves are indeed located on site; should evidence for graves be found, a comprehensive grave relocation procedure must be implemented; and ensure that a suitably accredited heritage specialist is appointed to undertake the necessary mitigation work, where applicable.		
44	Disturbance/ destruction of cemeteries	The placement of the development footprints for the six proposed well positions at F1, F2, F3, F4, F5 and F6 as well as the proposed compressor site at ST23 must be done in such a way that a buffer area of at least 50m is allowed between these development footprints and the heritage sites identified, where possible. Should any construction be required closer than 50m of a cemetery, a heritage specialist should be consulted to monitor the excavation during construction and necessary permission from SAHRA obtained, where necessary.	4	The ST23 compressor site and recent exploration wells are located more than 50m from the heritage sites identified. Pre-construction assessments were undertaken for the new exploration wells to confirm the proximity to known heritage features and to identify any additional heritage features.
45	Disturbance/ destruction of Stone Age sites	Ensure that the placement of the development footprints of the six proposed well positions as well as the one compressor site at ST23 are done in such a way that a buffer of undeveloped space of at least 50m is maintained between the development footprints and these sites, where possible. Where construction activities are closer than 50m from a demarcated historic site, adequate warning signage or barricading must be installed to prevent inadvertent disturbance of the site and where applicable within the buffer. For destruction/disturbance of archaeological sites the relevant permissions and permits must be obtained from SAHRA prior to commencement of destruction activities.	4	The ST23 compressor site and recent exploration wells are located more than 50m from the heritage sites identified. Pre-construction assessments were undertaken for the new exploration wells to confirm the proximity to known heritage features and to identify any additional heritage features.
46	Disturbance/ destruction of historic sites and structures	For destruction/disturbance of historic sites the relevant permissions and permits must be obtained from SAHRA prior to commencement of destruction activities. This may include recording of site by way of measured drawings, photographs, and qualitative descriptions. Compilation of Phase 2 Heritage Report containing the recorded data. Submission of permit application to	N/A	Destruction or disturbance of heritage features were not required.



		SAHRA/Free State Heritage to allow for the disturbance to the site. A Phase 2 Heritage Report must accompany the permit. Ensure that necessary monitoring is undertaken well in advance of the actual construction, where applicable. An archaeological watching brief (monitoring of excavation during construction) must be implemented for the identified heritage feature TET 9 (a concrete drift and adjacent bridge) along the banks of the Sand River at Blaauwdrift.		
47	Disturbance/ destruction of palaeontological sites	Two areas have been identified where a pipeline route will traverse potentially sensitive alluvial deposits ranging in thicknesses between 4 m and 15 m at the Boschluispruit (GPS coordinates 28°11'4.46"S 26°43'54.24"E) and the Sand River (GPS coordinates S 28° 7' 4.33" E 26° 43' 9.88"E). Any excavation exceeding a depth of 1m into these overbank deposits will require monitoring by a palaeontologist during the construction phase of the pipelines. It is advised that a palaeontologist is brought in once to monitor trench excavations into the overbank sediments at the Boschluispruit and Sand River crossings before the pipeline is installed. The palaeontologist must apply for a valid permit from SAHRA for the collection/removal of fossils encountered during the excavations. For the proposed surface infrastructure, it is advised that a palaeontologist is brought in on one occasion to train the ECO of the project to identify potential fossil remains in the unlikely event of fossil exposure. If fossils are encountered and reported, a palaeontologist must be appointed to remove the fossils after applying for a valid collection permit from SAHRA.	4	A palaeontologist was appointed and monitored the excavations at the Sand River and Bosluispruit.
48	Disruption of aquatic communities	Ideally, no vehicle access tracks/roads should transect through watercourses. Access tracks/roads should be designed in such a way to minimise overlap with watercourses. Use existing access roads/tracks as far as possible. Construction and unavoidable access tracks/roads through wetlands, rivers and other	4	Vehicle access was limited in the watercourses inspected at the time of the audit. An access track was constructed over a trench created by the mine towards a pigging station within the wetland area at the Bosluispruit. Additional access tracks might have to be created within the Bosluispruit wetland to allow access



		<p>watercourses must provide habitat connectivity between upstream and downstream reaches (e.g., flume pipes and/or culverts) and to reduce the risk of scour erosion and channel incision within the watercourse. No unauthorised driving should be allowed through watercourses. Driving can only occur on specially designed tracks/roads that minimised the risk of erosion and surface flow concentration. No perched flumes should be present in temporary construction running tracks and/or permanent access tracks. In the case of aboveground pipelines, the pipeline should not be located 'flush' along the surface profile of the watercourse with no gap between the natural ground level and the pipeline. Aboveground pipelines should rather be suspended on plinths of a sufficient height that will allow the free movement of indigenous fauna present within the study area, such as tortoises, as recorded in the Boschluispruit channel near existing well SPG3.</p>		<p>to the pigging stations and low point drains during the wet seasons.</p>
49	Watercourse erosion	<p>Prevent the use of only one or two flume pipes in access/running tracks located in watercourses, specifically unchanneled valley bottom wetland and seep wetlands where concentrated flows can result in headcut development and the formation of a channel. Surface flows should also be spread out in channelled watercourse crossings through the use of several flume pipes to prevent channel incision and scour erosion. Access tracks should be maintained during the entire construction process and removed once construction is completed. Flume pipes should be monitored and kept free of blockages. Construction in watercourses should ideally occur during the dry season. Any new erosion features identified should be stabilised during the construction process (soft interventions such as hay bales, rock packs, runoff control berms and 'bio-socks' are recommended). Erosion control features should be maintained. Keep vegetation clearing to a minimum on</p>	4	<p>No erosion was noted in the watercourse inspected at the time of the audit. Dewatering and uncontrolled runoff were not noted in the areas inspected at the time of the audit. Shaping of certain sections of the Boschluispruit wetland was undertaken to reinstate the natural flow path of the wetland and prevent future erosion.</p>



		<p>the adjacent slopes to prevent erosion on approaches bordering watercourses. Small temporary contour berms may be used to help control runoff on approaches should it be required. Drainage furrows that may be required to create dry working conditions should ideally be avoided as they can easily erode during high flow events. Development of a watercourse monitoring plan before the onset of the construction phase, and the development and implementation of a watercourse rehabilitation plan during the latter half of the construction phase to ensure the eroded wetlands and other watercourses are stabilised and rehabilitated. Dewatering discharges at construction sites should be done in a silt bay to prevent erosion and sedimentation in adjacent watercourses. Runoff from the construction footprint should be controlled on site to prevent concentrated point releases of water into downslope watercourses. Care needs to be taken not to initiate or aggravate erosion in watercourses.</p>		
50	Noise impacts from construction activities	<p>The use of smaller/quieter equipment when operating near receptors. Ensuring that equipment is well maintained and fitted with the correct and appropriate noise abatement measures. Engine bay covers over heavy equipment could be pre-fitted with sound absorbing material. Heavy equipment that fully encloses the engine bay should be considered, ensuring that the seam gap between the hood and vehicle body is minimised. Where possible only undertake construction activities during the day. If night-time activities are required, do not operate closer than 500m from any sensitive receptors. Ensure a good working relationship between the developer and all potentially noise-sensitive receptors. Communication channels should be established to ensure prior notice to the sensitive receptor if work is to take place close to them (especially if work is to take place within 500m from them at night). Information that should be provided to potentially</p>	4	<p>No excessive noise nuisance was noted at the time of the audit and construction is taking place during the day. A designated Community Liaison Officer is appointed with open lines of communication between the project and the landowners and the communities.</p>



		sensitive receptor(s) includes: Proposed working dates, the duration that work will take place in an area, and working times; The reason why the activity is taking place; The construction methods that will be used; and Contact details of a responsible person where any complaints can be lodged should there be an issue of concern. When simultaneous noise emitting activities are to take place close to potential noise-sensitive receptors, co-ordinate the working time with periods when the receptors are not at home.		
51	Potential opportunity for education, skills development, and training	Tetra 4 should liaise with local training institutions or service providers to determine whether there are any opportunities to offer internships and practical experience for their students. Tetra 4 must ensure that skills development requirements form part of their contracts with sub-consultants as prescribed in the SLP. The skills development requirements and bursaries for local learners as discussed in their Social and Labour Plan (SLP) must be implemented.	-	It was reported that the SLP has been approved on 15 July 2021 and is governed by PASA and other authorities. Compliance with the SLP was excluded from the scope of the audits.
52	Increase in social pathologies such as prostitution, sexually transmitted diseases, teenage pregnancies and alcohol and substance abuse	Toolbox talks should include talks about the impact of promiscuous behaviour as well as HIV/AIDS and Tuberculosis (TB), in accordance with existing Tetra4 Human Resources (HR) Policy. A workforce code of conduct should be developed to maximise positive employee behaviour in the local community and optimise integration.	4	Tetra4 implements an HR Policy and relevant awareness training.
53	Establishment of informal settlements close to the project area	No informal settlers should be allowed on private property within the development area. If any person erects an illegal structure the landowner and police should be informed immediately and asked to remove the structure.	N/A	No informal settlers were noted in the areas inspected at the time of the audit.
54	Safety aspects associated with open trenches (people and animals)	Open trenches to be fenced or barricaded where necessary, and should be clearly demarcated. The time that any trench remains open should be limited. Access to areas with open fences should be controlled. There must be a protocol on how to rescue a stranded animal from a trench.	4	Open trenches were barricaded, where applicable and the project aims to limit open trenches as far as possible. A protocol was in place to fill the open trench with hay bales if it had to stay open through the night to prevent animals from falling into the trench. If an animal had to be rescued from a trench, the



				Environmental Officer or Environmental Manager would advise on the correct procedure to follow to remove the animal depending on the type of animal and nature of the situation.
55	Increase sediment loads	Progressive rehabilitation of disturbed land should be carried out to minimize the amount of time that bare soils are exposed to the erosive effects of rain and subsequent runoff. Traffic and movement over stabilised areas should be controlled (minimised and kept to certain paths), and damage to stabilised areas should be repaired timeously and maintained. The total footprint area to be cleared for drilling should be kept to a minimum by demarcating the drilling areas and restricting removal of vegetation to these areas only.	4	Progressive rehabilitation was noted in the areas inspected. The drilling areas were demarcated to limit the clearance of vegetation outside of these areas.
56	Spillage of oils, fuel and chemicals	The placement of drip trays under the drilling rigs should be implemented and recorded to minimize the contamination of waste oil from the drilling rig. Drilling fluids should be biodegradable and should be kept in a lined mud pit or surface container. Proper rehabilitation and off-site removal of excess fluids should take place. Oil recovered from the drilling rigs and any vehicle on site should be collected, stored and disposed of at licenced facilities or provided to accredited vendors for recycling.	4	<p>Drip trays are placed under drilling rigs and associated mobile infrastructure such as generators and compressors to assist in capturing waste oil or other hydrocarbons during the drilling operations. Drilling water with sludge was contained in PVC lined mud sumps and reused during the drilling process. Good rehabilitation was noted at historic drill sites and the excess fluid are placed in waste skips and slops tanks for removal by a waste management contractor and disposed at a registered hazardous waste disposal facility. The drilling fluid additives used include:</p> <ol style="list-style-type: none"> 1. AMC Bentonite Pellets R30. 2. AMC Ezee Mix SDFC. 3. AMC Floc DD. 4. AMC Guar Gum. 5. AMC HV Foam. <p>AMC Ezee Mix is regarded as biodegradable and AMC Floc DD is regarded as persistent. No information on the degradability was available on the MSDS' for the substances.</p>
57	Increased soil erosion	Ensure that topsoil (0-30 cm approx.) and subsoil (30 cm +) are stored separately during excavation, so they can be replaced in the correct order. Ensure that pipeline route	4	Topsoil was stripped and stored at the infrastructure areas and the construction camp. During pipeline construction and exploration, the topsoil was stripped



		is re-vegetated as soon as possible after construction and that soil surface is in good condition.		over the trench and excavated areas and stockpiled separate from the subsoil for use during rehabilitation. Good rehabilitation efforts were noted in numerous areas along the pipeline route.
58	Loss/ management of heritage features	Should any artefacts, fossils or graves be uncovered during the production activity, the Applicant, the relevant SAHRA authority and SAPS (in the case of a grave) should be notified immediately and necessary permitting procedures followed. All activities within this area should be stopped immediately until permitted to proceed by the EAP/ECO.	N/A	No artefacts, fossils or graves were discovered in the areas disturbed at the time of the audit.
59	Spill response and pollution clean-up	All necessary measures should be taken to prevent spills from occurring on site. However, should a spill occur, the following procedure must be followed: A spill response kit should be available on site at all times. Where potential contaminants are transported along access roads, emergency containment and mitigation measures must be developed to minimize impacts should accidental spills occur. Any spillage will be investigated and immediate action must be taken. In the event of a significant spill (>35 litres) of any hazardous substance, these must also be recorded and reported to the PASA, DWA and the local/provincial authority where necessary. Depending on the nature and the extent of the spill, contaminated soil must be either excavated or treated on-site. The EO should determine the exact method of treatment. Clean up should be immediate and to the satisfaction of the EO. A register of the treatment method and clean up close out report must be kept and be made available reviewed by the ECO during independent audits. Treatment could include the use of absorbent material or hydrocarbon-digesting substances. It is therefore, recommended that a spill kit and hydrocarbon digesting substance should be kept on site at all times. Clean up should be immediate and to the satisfaction of the ECO. Excavation of contaminated soil must involve careful	4	Spill prevention measures were implemented in the areas inspected at the time of the audit. Drip trays were readily available and in use in the construction and operational areas.. Spills were identified withing the Tetra4 Emergency Preparedness and Response Plan and would include any spills on project access roads. Spills are investigated and recorded within spill registers and tracked for corrective action. No reportable incidents/spills were recorded on the Cluster 1 project. In case of spillages, contaminated material is removed and placed in the hazardous waste skip for collection by the waste management contractor and disposed at a licenced hazardous waste disposal facility. A spill register is kept which include information as per the requirement of the condition. The spill register is provided to the ECO monthly. It was decided that the on-site treatment of spills will not be undertaken on the project and only removal and disposal. Spill kits are readily available within the construction, drilling and operational areas. No concerns were noted with regards to the spill clean-up and response.



		removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site. Materials used for the remediation of spills must be used according to product specification and guidance for use. A record of all spills and actions taken to remediate the spills should be kept at all times. Proper and frequent maintenance should be done to minimise spillage risk.		
60	Fire safety	The contractor must take all reasonable measures to ensure that fires are not started as a result of operational activities on site, and shall also ensure that their operations comply with the Occupational Health and Safety Act (Act No. 85 of 1993). The following measures will be taken to reduce the risk of fires: No open fires are permitted on site; Every possible precaution shall therefore be taken when working with potential flammable equipment or liquids near potential sources of combustion. Such precautions include having an approved fire extinguisher immediately available at the site of any such activities; The contractor shall ensure that there is basic firefighting equipment available on site at all times. The contractor shall appoint a member of his staff to be responsible for the installation and inspection of this equipment; and the contractor is to ensure that he/she has the contact details of the nearest fire station in case of an emergency. <i>A fire and safety officer must be appointed as legally required. Firebreaks must also be implemented.</i>	4	All reasonable measures are taken to prevent fires started on site. A dedicated safety department was established to ensure that the OHSA is being implemented and adhered to. Firefighting equipment is available, and a designated safety officer and firefighting officers were appointed for the contractors. Regular inspection and annual servicing of the firefighting equipment have been implemented. Tetra4 has appointed and trained a dedicated veld firefighting team lead by the security manager. Fire breaks were being implemented. The contact details of the nearest fire station were included on the emergency plan posters.
61	Movement on site	Reduce speed limits (especially on gravel roads) to reduce dust emissions and accident risk. Keep the amount of vehicle movement on site as minimal as possible. Gates should be kept closed (unless otherwise agreed to in writing with the relevant landowner). Newly constructed access roads should be well maintained.	4	No concerns were noted with regards to dust and use of access roads at the time of the audit. No complaints regarding dust and roads were reported.
62	Blockage of floral and faunal seasonal and dispersal movements	Where possible, undertake activities in previously disturbed areas and/or habitats with lower sensitivity. Where possible, locate activities on the boundaries of	4	The current activities are undertaken in previously disturbed areas as far as possible. Existing access roads



		existing disturbance. Use existing access roads as much as possible. Rehabilitate disturbed areas as soon as possible.		are used as far as possible and disturbed areas are rehabilitated.
63	Pollution of wetland habitats	Control all waste sources emanating from proposed activities. Maintain minimum distances from aquatic and wetland habitats, where possible. Undertake activities in previously disturbed areas and/or habitats with lower sensitivity.	4	Waste is adequately controlled at the areas where activities are taking place. Distances from aquatic and wetland habitats are maintained as far as possible.
64	Decrease in surface water quality in watercourses	Store all hazardous materials (Incl. hydrocarbons) in a bunded area, outside of buffered watercourses. Stripped and excavated subsoil and topsoil stockpiles should be stored outside of buffered wetland areas and be protected from erosion. This may not be possible for long wetland crossings in seep and other wetlands, in which case topsoil can be stored on low berms within the wetland on geotextile material. Topsoil and subsoil should however be protected from erosion. Approaches that border watercourses, particularly those along steep and long slopes, should receive runoff control measures to prevent siltation and concentrated flow into watercourses. Inspect vehicles for leaks and repair all leaks immediately. Any generators used in watercourses should be used with a functional drip tray. Ensure that sufficient ablution facilities are available on site and that they are located outside of buffered watercourses. Stabilise new channels that form as a result of headcut erosion or other forms of erosion once they are recorded. Sediment deposition should be prevented in watercourses and especially watercourse channels through the following measures: Implementing stormwater control measures around construction areas; and Dewatering during excavation activities in watercourses should be released in a silt bay with sufficient capacity that filters and retains sediment before the water is released into the watercourses. Sediment deposition events into watercourses should be evaluated by an experienced ECO/ wetland specialist and	4	It is assumed that this condition refers to activities within wetland and watercourse areas. The wetlands were demarcated within and near construction areas. Potentially polluting substances were kept outside of the wetland areas. Erosion of the pipeline trench near CSA were being repaired.



		based on the magnitude of the impact recommendations can be made regarding the removal of deposited material.		
65	Potential health risks to people and animals if waste (including sewage) is not managed properly (pests e.g. rodents)	Tetra 4 must develop a waste management strategy and employ an EO/ECO that oversees all the environmental aspects of the project, especially during the construction phase. There must be a formal procedure in place on how to report incidents to ensure grievances are recorded. Education about waste management must be shared during Toolbox talks. In areas where there are lots of animals, plastic safety ribbons (hazard tape) should not be used. There should be enough portable toilets during the construction phase to ensure that the contractors do not use the bush as a toilet facility.	4	A Tetra 4 waste management procedure was developed. An EO and ECO was appointed to monitor and ensure compliance to the requirements of the EMPR. An incident procedure and grievance mechanism are in place and implemented. Waste was not adequately managed at the main waste storage area at the BOP and should be monitored during future ECO inspections. Chemical toilets were provided at the active works fronts at the time of the audit.
66	Health and Safety	All personnel should be aware of the procedures to follow in the case of a health or environmental emergency such as in the case of an accidental injuries or spills. Workers should be advised on sexual transmitted diseases and preventative measures against sexual transmitted diseases should be put in place-for example provision of condoms in camp site. Personnel should be provided with safety clothing and no person should be allowed to enter construction site without prior authorization by site manager. The construction site should be surrounded with danger tape and/or other suitable safety signage in order to alert pedestrians and vehicles about the construction activity. The drill rig should be provided with necessary hazard protection systems (e.g. a gas blowout prevention system; or Washington well head).	4	Emergency Response Procedures are in place and employees were made aware of these procedures. A designated safety team is appointed to implement and audit the safety requirements. No safety concerns were noted at the time of the audit.
67	Security	Landowners should be notified prior to accessing their land. Workers should be easily identifiable by clothing and Identity Document (ID) badges with clear ID photographs. No workers allowed on site without adequate supervision and identification, as stipulated in the Tetra4 Contractors Agreement. Workers may not receive any visitors while they are within the production	4	No security concerns were noted during the audit. It was noted that employees and workers were provided with identifiable clothing and ID badges were rolled out. Supervisors were present at the work fronts. Access gates at the work fronts were kept closed, where required. A grievance mechanism with complaints register is available. Project vehicles were



		<p>area. No worker will be allowed to sleep or overnight within the active construction area, except for minimal security personnel and only if communicated to the applicable landowner. Workers will not be allowed to keep or use alcohol, recreational drugs, traditional or modern weapons, snares or otherwise dangerous objects onsite, or to enter the sites while on the influence of alcohol or drugs. Workers will not be allowed to keep (or have in their possession at any point in time) any animals, including livestock, poultry, wildlife or pets. Although field workers conducting initial geological surveys will be allowed to cover large and unpredictable tracts of land (in principle the entire production area), workers should be restricted to access roads/tracks and drilling sites and will not be allowed to wander off into the rest of the property or surrounding land. Disturbance should be limited to the minimum and agreed upon footprint, and no vehicle turning, parking or access, or other form of disturbance e.g., vegetation clearance, soil compaction or excavation will be allowed outside these areas. All access gates should be kept closed if desired by the landowner. A complaints register should be maintained to log complaints by landowners, occupants and other Interested and Affected Parties, and response to such complaints. The complaints register should be provided to PASA on an annual basis, and at any point in time if requested by the PASA. Relevant farm access protocols must be complied with.</p>		<p>clearly identifiable. The grievance register was provided to PASA on 14 April 2021.</p>
68	<p>Handling, storage, and disposal of hazardous waste and effluent</p>	<p>All hazardous chemicals should be stored on an impermeable bunded surface. All relevant legislation regarding hazardous chemical transport, handling, storage, use and disposal should be adhered to. Any effluent containing oil, grease or other industrial substances should be collected in a suitable receptacle and removed from site, either for resale or for appropriate disposal at a recognized appropriately licensed facility. The contents of drips/ sumps/ drip pans</p>	4	<p>Hazardous chemicals at the HDR1 site and the construction camp were stored within designated hazardous chemical storage areas on impermeable, bunded surfaces. No concerns were noted with regards to hazardous chemical transport, handling, storage use and disposal. Industrial effluent from the operations is collected in containers and appropriately disposed by third party waste management contractor at licenced waste disposal facilities. Drip trays are</p>



		should be disposed of at a recognized appropriately licensed facility. Records should be kept of the disposal of all hazardous waste.		readily available at the construction areas for use and the contents of these are decanted into containers for collection and disposal. Records are kept for the safe disposal of waste and a register of all waste disposed are kept by Tetra4.
69	Generation and disposal of general waste	Non-biodegradable refuse such as glass bottles, plastic bags, scrap metal etc., should be stored in a container at a collection point and collected on a regular basis and disposed of at a recognised waste disposal facility. Biodegradable refuse generated in the production area, vehicle yard storage area or any other area should either be handled as above (as in the case of non-biodegradable waste). Sufficient drums/containers should be place on site for the disposal of general waste. No littering is to take place on the site or surrounding areas by the Contractor and staff. Waste disposal drums should be emptied on regular bases. The drums should be water and scavenger proof. Precautions shall be taken to prevent any refuse from spreading on and from the drill site. No waste is allowed to be burned on site.	4	The waste skips were overflowing during the audit. The waste skips were not adequately covered and mixing of waste took place at the BOP. The waste management should be monitored by the ECO during the monthly inspections.
70	Damage to farm roads and existing infrastructure	If private roads are affected by project activities it is the responsibility of Tetra 4 to maintain these roads as long as they use it. Tetra 4 should engage with the relevant farmers about road maintenance, as some of landowners have preferential ways in which the roads must be maintained. The road maintenance agreements must be formalised before construction commences. It is recommended that construction be planned for the dry season. Tetra 4 must provide all the affected landowners with a construction schedule to ensure that they know when construction will take place on their properties. Any changes to the construction schedule must be communicated to the farmers at least a week in advance. Before the project commences Tetra 4 should compile an asset and infrastructure baseline of any landowner infrastructure that may be affected by the project. Photographs and GPS co-ordinates of the infrastructure	4	Pre-commencement assessments are undertaken before any new activity commence or new area are impacted. This includes notification of landowners and agreement with landowners. No complaints were recorded with regards to access road use at the time of the audit. An infrastructure register was developed before the commencement of construction. Damage to infrastructure gets reported as an incident and tracked for corrective action.



		<p>must be included in the baseline. A copy of the baseline affecting their property should be given to each landowner, who should sign off the document to ensure that it is accurate. Tetra 4 should keep the master document. If any damage occurs it should be reinstated to its pre-project status. If the infrastructure must move, it must be done at Tetra 4's cost. Tetra 4 must ensure that the construction team has a copy of the asset and infrastructure baseline to guarantee that no infrastructure will be damaged due to ignorance during the construction phase of the project. Notice of any service interruptions must be given at least 24 hours before the interruption takes place – a SMS or e-mail system can be used for this purpose.</p>		
71	Displacement of faunal species	<p>Where possible, undertake activities in previously disturbed places and/or habitats with a lower sensitivity score. Rehabilitate disturbed areas as soon as possible.</p>	4	<p>The activities were being undertaken in previously disturbed areas as far as possible and rehabilitation was being undertaken concurrently.</p>
72	Increase in poaching incidents	<p>If areas are fenced, the fences must be checked for snares on a daily basis for the duration of the construction period. All incidences must be reported to the closest police station. Anti-poaching toolbox talks should form part of the induction process of all the fencing teams. Any contractor or employee caught poaching should be removed from site.</p>	4	<p>Limited fencing was undertaken during construction period as the entire RoW was not fenced. The areas that were fenced included, inter alia, the Balance of Plant Area, Compressor Stations, Wells and Pigging Stations and it was mainly for the operational phase. No snares were noted on the installed fences. Although, no fencing teams were relevant to the project, snares and poaching was addressed in the Tetra4 Biodiversity Toolbox Talk. No concerns relating to poaching were noted at the time of the audit.</p>
73	Safety of all road users compromised as a result of access points on the R30	<p>Tetra 4 should compile and implement a traffic safety plan specifically for the turn-offs from the R30. This plan should form part of the Health and Safety requirements for all contractors. Appropriate road signage must be used at the entry and exit points to the site. Although Tetra 4 cannot take responsibility for all road users, they should include road safety toolbox talks. Tetra 4 should liaise with the responsible roads authority to ensure road signs are updated and maintained.</p>	4	<p>During pipeline construction a journey management plan was prepared by the contractor to manage travels and traffic to the relevant construction areas, and it included access from the R30. New signage was placed at the entrance to the camp and offices from the R30. A Traffic Management Plan was developed for the new turnoff from the R30 and new road signage was procured. The implementation of the plan was not verified as the construction of this access has not yet commenced.</p>



74	Loss/change of sense of place due to visual impacts and project activities	Re-vegetation of exposed areas as soon as possible. Dust suppression methods applied where necessary to reduce visual impact of dust. Lighting on site should be pointed downwards and away from oncoming traffic and nearby residents. Create a community liaison forum (CLF) that communicates the mitigation and monitoring measures to the affected parties. This forum can also act as a platform to discuss environmental issues. The CLF can meet twice a year to discuss all the concerns about the project and to share new project information. It can be an important aspect assisting Tetra 4 with obtaining a social license to operate. Successful rehabilitation will go a long way in recreating a rural sense of place.	4	Good rehabilitation efforts were noted in construction areas. No dust concerns were noted due to dust suppression. No lighting concerns were noted at the time of the audit. A community liaison officer was appointed, and the stakeholder engagement continues. Regular liaison is undertaken with landowners.
75	Watercourse erosion	Use existing access roads as far as possible. Unavoidable new permanent access roads/tracks in watercourses should be designed to prevent erosion downstream of the crossings by using several flume pipes, preferably culverts, or other structures, such as concrete fords. All temporary and permanent vehicle access tracks/roads in watercourses will require approval from DWS in the form of a Water Use License. New permanent access roads/tracks should be located along existing infrastructure footprints as far as possible and at areas that will enable the shortest crossing distance through watercourses. Long crossings along the length of watercourses (parallel to its flow direction) should be avoided. Remnant erosion features that remain after the rehabilitation phase should be addressed until full rehabilitation and closure is achieved. Rehabilitation interventions should be considered with care and not worsen erosion once implemented. Identified permanent access tracks should be maintained during the entire operational phase of the project and blockages should be removed, while erosion features should be repaired once observed. Concrete fords (low water bridges) are preferred as crossing structures in larger watercourse channels, compared to culverts and flume	4	A Water Use Licence was obtained for Section 21 c and i activities within wetlands and watercourses. New access roads might have to be constructed at the Bosluispruit wetland. No erosion concerns were noted in the watercourse areas inspected at the time of the audit.



		pipes, which are more likely to result in erosion and require more regular maintenance. The Helium plant should receive stormwater mitigation measures at its outlets that will prevent concentrated flow. Stormwater mitigation measures and flow outlets should be located outside of buffered watercourses.		
76	Increase in social licence to operate due to management of nuisance impact	Tetra 4 should appoint a dedicated person, community liaison officer (CLO) to communicate with the landowners. The person must have enough authority and access to management to ensure that he can assist with dealing with everyday issues. Tetra 4 should establish a CLF that meets at least twice a year. The forum can be used to share information and give feedback on general and environmental issues. Before the project commences, the construction programme must be shared with the affected parties.	4	A CLO was appointed, and pre-commencement meetings were held with stakeholders in April 2019 and Nov 2019. Six-monthly CLF meetings were postponed due to COVID-19, although regular liaison continued and open lines of communication were kept between the project, landowners and the communities. Land-owner forum meetings were held in September 2021 and November 2021 to introduce the landowners to the proposed Phase 2 of the gas gathering project.
77	Pollution prevention and usage of water sources	All contaminated water and spillage will be drained from the containment area into primary and secondary fully lined sumps. Drilling water should be kept in closed circuit and re-circulated to the drilling machine. Water condensate from the gas polishing process (Dehydration) should be treated to remove volatile compounds before evaporation. Make up water will be introduced when required. All domestic effluent water from the site should be collected and disposed of in an appropriate and legal manner such as a French drain system which is situated not closer than 100 metres from any streams, rivers, pans, dams or boreholes. Do not exceed the water abstraction permit and General Authorisation (GA) limits for water use for drilling activities. All LNG processing facilities and storage vessels must include adequate (at least 110% containment volume) secondary liquid containment areas (e.g. bunds).	4	The management, storage and disposal of contaminated water and condensate were managed appropriately. Drilling water is generally kept in a closed circuit and re-circulated to the drilling machine. The sewage systems at the new offices and construction camp are closed systems. The Helium/LNG plant complex will have a wastewater treatment facility.
78	Social issues	All areas posing risk to interface communities during the site establishment phase of the proposed development need to be properly marked and visible to reduce accidents. The health and safety of the interface	4	It is understood that this requirement relates to the operational phase of the project. The only area that are in the production phase is HDR1. Access to the



		<p>communities and workers should not be compromised in any way. All gates on the landowners' property (and where relevant adjacent properties traversed) are to be closed if found closed and left open if found open. Contact with the affected parties shall be courteous at all times. The rights of the affected parties shall be represented at all times. Any impact such as noise, dust, bright lights etc. that may cause disturbance to landowners or tenants, will be kept to a minimum. Damage to infrastructure shall not be tolerated and any damage shall be rectified immediately by the contractor. A record of all damage and remedial actions shall be kept on site. Access to the production area should be strictly controlled. Labour should be transported to and from site to discourage loitering in adjacent areas and to prevent possible increase in crime or disturbance. Workers should be easily identifiable by clothing and ID badges (with clear ID photographs). Workers should carry with them at all times a letter from the applicant/employer, stating their identity, role/task description, and landline number which the landowner may phone to confirm ID and other information given by the worker. The drill site shall be fenced, where necessary to prevent any loss or injury to persons or livestock during the production phase. Fires will only be allowed in facilities or equipment specially constructed for this purpose. If required by applicable legislation, a firebreak shall be cleared around the perimeter of the camp and office sites. Sufficient ablution facilities should be made available. The applicant must take reasonable measures to prevent any disruption to the landowners use of the properties (e.g. farming). Landowners/tenants should be compensated for loss of arable land.</p>		<p>production site is restricted. Limited workers are employed at the Production Site.</p>
79	<p>Safety and nuisance impacts where trench has to be opened to repair faults</p>	<p>Affected landowners should be informed if it is necessary to open the trench for repair work. They must be given at least 24 hours' notice, unless it is an emergency. They must be notified on what date and time the trenches will</p>	<p>N/A</p>	<p>The main Cluster 1 production activities have not yet commenced.</p>



		be re-opened, how big a team will be on their property and what kind of equipment will be used. Open trenches to be fenced or barricaded where necessary and should be clearly demarcated. Access to areas with open fences should be controlled. If any damage is done to the property or harvest of the landowner, they must be compensated for their losses.		
80	Public perceptions about safety associated with gas production	Awareness must be undertaken with the stakeholders (including local community members and workers) explaining the process and potential risks of gas production in laymen terms. This should be distributed in and round the affected farms and communities in the form of site notices including in the representative local languages where possible.	N/A	The main Cluster 1 production activities have not yet commenced.
81	Pollution of soil profile due to leakage/spillage	Ensure that any possible source of leakage/spillage is contained and that bulk storage facilities are isolated from surrounding soils, especially wetlands. Geotechnical assessment must be undertaken to inform the pipeline design.	N/A	It is assumed that this condition is an operational phase requirement and not yet applicable.
82	Contamination from leakage and spillage	The pipeline needs to be inspected regularly to find and fix any leakages. A water quality monitoring plan needs to be produced and implemented to determine any changes in the water quality. Any water (Incl. condensate) generated at the conventional and unconventional well heads need to be captured in some form of dirty water storage facility. This water can be tested and treated (if needed) and used for irrigation or discharge into the environment if found to be suitable. Should the water be found to be unsuitable for irrigation or discharge into the environment, the contaminated water will be disposed of at a suitable licenced facility.	N/A	It is assumed that this condition is an operational phase requirement and not yet applicable.
83	Pollution of habitats	Control all waste sources emanating from operations activities. A defined waste management system must be implemented according to the hierarchy of waste management (avoid, reduce, reuse, recycle, dispose). All wastes generated must be stored and disposed of according to relevant legal requirements.	4	Waste management was appropriately management in the operational areas (HDR1) inspected at the time of the audit.



84	Interruption in services	Notice of any planned service interruptions must be given at least a day before the interruption takes place – a SMS or e-mail system can be used for this purpose.	N/A	No planned service interruption was applicable for the reporting period.
85	Contamination from leakage and spillage	All wells should be capped to prevent the spilling of contaminated groundwater. The water quality monitoring plan should be implemented in this phase to monitor any deterioration of the water quality.	N/A	The decommissioning and closure phase is not yet applicable.
86	Post construction decommissioning activities	Rehabilitate area to its original landform or as agreed to by the landowner, tenants and authorities. Rip compacted surfaces where necessary as part of the rehabilitation. Re-vegetation should be done where required. The use of indigenous species to the specific area should be promoted. Weed species should be eradicated at all disturbed areas. This must be monitored for a period following rehabilitation to ensure that alien invasive plants do not establish themselves. Re-vegetation of cleared areas should occur directly after production activities are completed. Disturbed areas should be correctly compacted, ripped and graded/sloped. Regular inspections should be carried out during the entire rehabilitation process and ongoing maintenance must be implemented until the area is fully rehabilitated.	2	Most of the gas gathering construction areas have rehabilitated and vegetation established. Weed control was required in certain rehabilitated areas. As per the ECO reports, certain sections of the exploration well 2057 area were not rehabilitated. The heap of topsoil was still available. The plastic liner placed under the JoJo tanks and excess pipes were not removed. This finding was raised as a concern during the November 2021 NEMA Audit and was subsequently escalated to a Non-Compliance.
87	Final closure decommissioning	Rehabilitate area to its original landform or as agreed to by the landowner, tenants and authorities. Rehabilitation should be carried out in accordance with the approved rehabilitation plan prepared prior to commencement (where possible). Rip compacted surfaces where necessary as part of the rehabilitation. Re-vegetation should be done where required. The use of indigenous species to the specific area should be promoted. Weed species should be eradicated at all disturbed areas. This must be monitored for a period of time following rehabilitation to ensure that alien invasive plants do not establish themselves. Re-vegetation of cleared areas should occur directly after production activities are completed. Boreholes should be properly sealed after	N/A	The final decommissioning and closure phase is not yet applicable.



		<p>production activities have ceased in order to prevent potential dewatering of shallow aquifers as well as to avoid creating potential pathways for the transport of contaminants into aquifers. Inactive gas holes should be sealed off at least 1.5 meter below surface and covered with soil. Active gas discharge stacks should be fenced off in as small as practical areas. The production footprint area and all other areas impacted on by production and other activities, should be suitably rehabilitated (where necessary) to re-attract faunal species to the area, to provide suitable habitat for their re-establishment, and to prevent the loss of land use capacity. Disturbed areas should be correctly compacted, ripped and graded/sloped. Regular inspections should be carried out during the entire rehabilitation process. Landowners/tenants should be compensated for loss of arable land, where applicable. All pipelines and other infrastructure must be removed (unless permitted under the specific approved closure plan) and the sites rehabilitated as per the closure requirements. In the event that the landowner wishes to utilise the infrastructure this must be agreed to and handed over in writing. Provision should be made in instances where a farmer wants to retain a borehole or section of pipeline for water supply. Written agreement must be obtained in such cases.</p>		
88	Well casing and/or cementation failure affecting groundwater quality	<p>Well abandonment and plugging to comply with the requirements of the approved rehabilitation plan and accepted best practice. Tetra4 to implement well-specific plugging requirements protect the shallow potable Karoo aquifers at closure. Well design to be done by a qualified engineer who will take corrosion, pressures, temperatures, exposure times, production life and well rehabilitation into consideration. The cement seals to be pumped as a water-cement slurry down the casing to the bottom of the well, leaving a sheath of cement to set and harden. The integrity of the seals should, where</p>	4	<p>Exploration well P1V1 (SWM06IT4 and T4WHM) were abandoned. As per the well abandonment report, dated March 2021, the well casing was cemented, cut 1.5 below the surface and rehabilitated. It could not be confirmed yet if a groundwater and gas monitoring programme were implemented at this abandoned exploration well.</p>



		<p>applicable, be pressure tested before the next phase of drilling commences. If the well fails the pressure test, the casing will be recemented before drilling continues. Testing to be implemented to ensure that the plug is placed at the proper level and provides adequate protection of permeable zones, for example the fracture zones from which gas was produced and the overlying Karoo aquifers. These tests should include tagging the top of the plug. Pressure testing should be undertaken on the seal but care should be taken not to damage the seal during pressure testing. Swabbing can be undertaken to remove fluids from the well. Upon completion of the rehabilitation of the well, a surface casing vent flow test should be considered to determine whether gas or liquid or a combination thereof is escaping from the casing. If gas is detected during this test, additional seals should be designed and implemented. A groundwater and gas monitoring programme to be implemented at each well to serve as an early detection mechanism.</p>		
89	Environmental Awareness	<p>All personnel should undergo environmental awareness and induction training. A register should be kept of all attendees. Toolbox talks should be scheduled to ensure continuous environmental awareness training. Emergency procedures should be communicated and displayed prominently on the site. A copy of the EMPr should be available on the work site at all times. Appointed sub-contractors must be made aware of their obligations under this EMPr.</p>	4	<p>Environmental awareness, induction training and toolbox talks are done, and attendance registers are kept. Emergency procedures are in place and communicated. The EMPr is available on site and the appointed sub-contractors are made aware of their obligations under the EMPr.</p>
90	Emergency Response	<p>Emergency procedures should be displayed prominently on site. Ensure that all emergency response protocols are in place and that all workers are aware of the procedures.</p>	4	<p>Emergency procedures are displayed, and workers are aware of the procedures.</p>
91	Management of flora and fauna	<p>Vegetation should be retained as far as possible. Establish an alien invasive plant eradication programme for the control of weed species. This must be monitored for a period of time following rehabilitation to ensure that alien invasive plants do not establish themselves. Unnecessary damage or disturbance to vegetation</p>	4	<p>Vegetation is retained as far as possible, and an alien invasive plant eradication programme is being implemented. A fauna relocation register is kept. Wetland and no-go areas are demarcated.</p>



		should be prevented. No trees or shrubs should be felled or damaged for the purpose of obtaining firewood, unless otherwise agreed to with the landowner. Areas outside the footprint (including all infrastructure) should be considered as no-go areas. No faunal species are allowed to be purposefully killed. Any potential protected or sensitive areas should be clearly demarcated and noted as no-go areas.		
92	Damage to private property	All piped, lines and other utility infrastructure and servitudes should be identified prior to construction. Any damage to public or private property, including roads, stormwater systems, fences, gates, buildings and other structures, pipes, lines and other utilities or infrastructure and movable properties, should be repaired, replaced or otherwise compensated for as agreed with the affected person.	4	An asset register was developed, and utilities and servitudes were considered during the pipeline layout planning. Pre-commencement assessments are done before a new area is disturbed. Property damage incidents are recorded and tracked for corrective action.
93	Water abstraction	The necessary DWS permits should be obtained if it is expected that DWS abstraction limits will be triggered before water abstraction is undertaken. Obtain agreement from landowner to abstract water from existing boreholes. If required, abstraction of water should be kept within the permit limits as issued to the landowner by DWA. Water may only be obtained from approved sources.	4	The water use is determined and monitored to ensure it is below the GA limits and it is done in consultation and under agreement with the landowners. Water that will be used in the helium plant will be obtained from a municipal water source.
94	Interference with existing land uses/livelihoods	Tetra 4 must appoint a CLO that deals with the affected landowners throughout the life of the project. If existing activities will be affected negatively Tetra 4 must enter into negotiations with the affected parties as soon as reasonably achievable to ensure the affected parties are compensated fairly or can make additional arrangements. Interference with existing livelihoods should be avoided if possible. If any new activities are planned for a property, Tetra 4 must consult with the landowner and take reasonable steps to obtain his consent to execute the activity on his/her land. A system to arrange access to properties must be devised and formalised. All reasonable efforts must be taken to	4	A CLO was appointed that deals with the affected landowners throughout the life of the project and ongoing stakeholder engagement continues. Before any activities are undertaken on landowners' properties, landowner agreements are negotiated. All agreements with landowner's access agreements are formally recorded. Interference with livelihoods is avoided as far as possible, or otherwise the landowners are compensated accordingly. During construction/exploration access is arranged for a specific timeframe and any additional access will be arranged on an ad-hoc basis. The CLO remains the primary contact with the landowners to arrange access



		<p>obtain agreement on the system with the landowners and it must be formalised. Access must be arranged at least 24 hours prior, except in emergencies, when the landowners should also be informed immediately. If routine access is required, the landowners must be provided with a roster indicating dates and approximate times that access will be required. Tetra 4 must compensate the landowners for any damage to property or goods if it was due to behaviour of their contractors. Sub-contractors must be made aware of this and a clause spelling out their liability should be included in their contracts. All contractors should sign a code of conduct as part of their induction process. Induction must explicitly include aspects such as closing gates and littering. Toolbox talks must be designed to include social and environmental aspects. A fining system must be put in place for any transgressions affecting the landowners.</p>		<p>at least 24hours prior, when possible. No unauthorised access is allowed. A stakeholder engagement procedure is in place to governs the conduct of the contractors with regards to landowners which the contractors must comply with. A complaints register is implemented to record any grievances from the landowners. Non-compliances with the requirements of the EMPr are managed according to the contract and a fining system was not implemented.</p>
95	Interference with existing land uses/livelihoods	<p>If a farmer reports any invasion of alien species as a result of Tetra 4, immediate action must be taken to ensure the invasion does not spread further. If any damage was done as a result of their activities, Tetra 4 should carry the cost of rehabilitation and compensate the farmer for his losses. If needed an external mediation process should be followed. There must be a formal procedure in place on how to report incidents and a claims procedure to ensure records of all grievances are kept. Environmental incidents must be reported to the CLO, who must inform the EO. In order to receive compensation, the claim forms must be submitted to the Tetra 4 CLO. Compensation should follow the IFC principles, which states that market related prices should be paid, and if anything is restored, it must be to the same or better standards than before. A water census should be conducted before the project commences and each affected party should be given the records affecting their property. Tetra 4 should keep records of all the properties. If any decline in the volume or quality of</p>	4	<p>A grievance mechanism is in place. A CLO was appointed, and a CLF was established. Groundwater quality monitoring is taking place and includes water level monitoring.</p>



		water occurs that can be linked to Tetra 4 activities, Tetra 4 should provide the affected parties with water of equivalent or better quality (depending on use) until such a time that the quality and availability is restored to pre-project levels. Create a CLF to communicate the mitigation and monitoring measures to affected parties as well as to discuss environmental issues and assist Tetra 4 with obtaining a social license to operate.		
96	Nuisance factor due to increase in ambient dust and noise levels	Waste management measures to be adhered to in order to minimise waste and associated nuisances from affecting neighbouring receptors. Complaints or grievance register kept on site indicating nature of complaint and how complaint was addressed. Create a CLF that communicates the mitigation and monitoring measures to the affected parties. Any alarm systems to be used must be designed to avoid nuisance to surrounding landowners as far as practically and reasonably possible.	4	No dust or noise nuisance was noted during the audit. A formal grievance mechanism is in place to ensure that any nuisance can be reported and addressed.
97	Local travel patterns (longer travelling times and need to change routes due to increase in traffic)	Before construction commences Tetra 4 must meet individually with each applicable landowner to discuss their movement patterns and needs. Tetra 4 must provide all the affected landowners with a construction schedule to ensure that they know when construction will take place on their properties. It is important to inform the affected stakeholders about the possibility of changed travel patterns (as previously agreed) as soon as possible. It is recommended that construction be done outside the peak planting and harvesting seasons. Any changes to the construction schedule must be communicated to the farmers at least a week in advance. As far as possible obstruction of access routes and sensitive areas must be avoided. If it cannot be avoided both parties must agree on alternative routes, and Tetra 4 should carry the cost of implementing the alternatives. Industrial vehicles should not travel during peak traffic times. If practical and required by the landowner, access routes to land/infrastructure should be reinstated in the	4	A pre-commencement assessment is done before a new area is entered or disturbed. Formal landowner agreements are put in place before construction starts.



		decommissioning phase. This must be done in conjunction with the landowners.		
98	Greenhouse gas emissions including odour nuisance and health impacts	The use of low-NOx burners should be considered for operation of the Helium and LNG plant. Products, liquid fuels and chemicals should be stored in areas where there are provisions for containment of spills. Implementing vapour recovery systems to control losses of VOCs for storage tanks and other applicable units should be considered. A suitable and effective gas leak detection system must be designed and implemented to monitor gas leaks from the pipelines and other production infrastructure. A suitable boil off gas recovery system must be installed. Automatic shutdown systems and pressure release valves must be implemented where appropriate.	N/A	The LNG/ helium plant is still under construction. The requirements of this conditions are not yet applicable.
99	Fugitive emissions (dust) including health impacts	Vehicle speeds on unpaved roads should be keep as low as reasonably possible. Unnecessary travelling of vehicles on untreated roads should be avoided. In controlling vehicle entrained particulate matter, it is recommended that water (at an application rate of 2 litre/m ² -hour), be applied on all unpaved road sections to ensure a minimum of 50% control efficiency (CE). In addition, binding agents or chemical suppressants should be considered for application on all unpaved road sections. During construction and rehabilitation phases, stockpiles of fine or erodible material should be treated regularly with water sprayers to reduce their potential for erosion.	4	No dust concerns were noted, and the areas inspected at the time of the audit.
100	Employment opportunities	Contractors should be required to make use of a certain proportion of local labour - it is acknowledged that not all skills will be available locally. Jobs should be advertised in a way that is accessible to all members of society and labour desks (labour registration stations) should be in accessible areas. No unrealistic expectations should be created and the recruitment policy giving preference to local labour should be communicated from the beginning of the project. The local area of influence should be agreed with the stakeholders early on in the process.	4	Local labour is being used as far as possible. The contractor was tracking the employment figures.



101	Habitat fragmentation and edge effects	Undertake activities in previously disturbed areas and/or habitats with lower sensitivity where possible. Locate activities on the boundaries of existing disturbance where possible. Use existing access roads as much as possible. Rehabilitate disturbed areas as soon as possible.	2	Extensive damage to the natural environment continued while accessing P15 and P16. No mitigation or corrective action measures were implemented since the ECO audit undertaken on 16 February 2022.
102	Loss of watercourse habitat/ Alterations of the river banks and river bed	Locate pipeline/trunkline alignments outside of buffered watercourses (sensitive watercourse habitat) as far as possible. Buffered watercourses should be demarcated on site for the entire construction process to help indicate sensitive areas and prevent unauthorised access. Mitigation for pipeline construction primarily includes the avoidance of watercourse crossings. Where crossings are unavoidable, crossings should be located along existing infrastructure features, such as roads, dam walls and existing pipelines. Unavoidable crossings should ideally be located perpendicular to the direction of flow at the shortest possible crossing distances. Long crossings along the length of wetlands, rivers and drainage lines should be avoided as far as practically possible. Horizontal directional drilling is recommended for the Sand River and Boschluispruit crossings, as opposed to the clearing, temporary damming, excavation, lowering and infilling of pipelines in these river watercourses. Vegetation clearing, topsoil stripping, trenching and infilling to bury the pipeline, are considered to be an acceptable approach in other types of watercourse crossings. The construction servitude should however not remain bare (stripped for longer than a month at a time), while trenches should not remain open for more than five days. It is therefore recommended that the pipeline be completely constructed in sections, rather than removing all of the topsoil and creating open trenches across the entire study area for prolonged periods of time. The servitude width should be restricted in watercourse crossings to reduce the footprint of the impact. Topsoil material should only be stripped in the	4	The pipeline routes were planned to avoid watercourses as far as possible. The mitigation measures were being implemented in the areas inspected at the time of the audit. Horizontal directional drilling was implemented to reduce the impact of construction on the Sand River and Boschluispruit watercourses.



		<p>area where trench excavation is required, while the surrounding area in the servitude is only cleared of vegetation. Limited topsoil stripping is conditional on the prevention of soil compaction by heavy motorised vehicles (HMs) through the use and maintenance of running tracks. Examples of running tracks include bogmats or rock aggregate combined with geotextile fabric and flume pipes. Alternatively, topsoil across the entire width of the construction servitude (often referred to as the right of way) can be stripped and stored separately outside of buffered watercourses. Removed topsoil and subsoil should be sorted separately in stockpiles and protected from erosion when required. Additional erosion protection measures should be implemented for stockpiles that are to be stored for an extended duration.</p>		
103	Loss of watercourse habitat/ Alterations of the river banks and river bed	<p>A construction method statement should be prepared by the contractor prior to the start of construction. Conditions stated in the water use licence should also be implemented. The use of old and new quarry sites for bedding and padding material, as well as other needs (e.g. the discard of spoil material) should not be located within wetlands and other watercourse types. Watercourse crossings and construction methods affecting watercourse must comply with the approved water use licence and associated DWS approved method statements. The use of sites outside the study area will also be subject to environmental authorisation. Provision should be made in the design phase for permanent access tracks/roads that will be required for the maintenance of the pipeline. After completion of the construction phase, the reinstatement of the original topography of the watercourse (its geomorphological template) should be undertaken followed by re-vegetation activities. The following mitigation measures are recommended: Limit the construction activities to the smallest area possible; Reinstatement the</p>	4	<p>Construction method statements were prepared by the contractor for the wetland/watercourse crossings. The water use licence gets audited separately by an independent auditor on an annual basis. The previous WUL Audit was undertaken in March 2022. These annual audit reports get submitted to the DWS once finalised. The project has procured material from commercial sources which were licenced for the relevant mining activities. No quarries were established for the project. Only two water crossings were crossed using open trenching techniques in line with the Water Use Licence and Method Statements. These include the watercourses at well SPG3 and well 1057. The watercourses at the Boshluisspruit and Sandspruit were crossed via horizontal directional drilling. One operational access track had to be created to access a pigging station at the Blesbokspruit. Good rehabilitation efforts were noted at the two watercourse crossings at the time of the audit. The profile of the watercourses was re-established, biojute applied and the areas were seeded with <i>Eragrostis teff</i>.</p>



		<p>geomorphological template of the watercourse crossing using subsoil material, followed by topsoil material on top. This should be done as soon as possible after completion of construction activities; During the reinstatement of watercourse profiles to the pre-construction profile, entrenched gullies and channels may have to be cut back to create a lower gradient that will not be susceptible to erosion; Once the crossing has been shaped and topsoil reintroduced to stripped areas, biojute can be applied according to specification to avoid rill formation and undercutting below biojute material. During the start of the growing season the annual grass <i>Eragrostis tef</i> can be introduced through manual broadcasting on reinstated watercourse surfaces. Rehabilitated areas within watercourse boundaries must be protected from overgrazing. Protection methods must be identified in consultation with the respective landowners.</p>		<p>No overgrazing or erosion were noted at these two watercourse crossings.</p>
104	Impacts on local economy	<p>Comply with the prescripts of the mining charter, B-BEE codes and the Social and Labour Plan.</p>	N/A	<p>This condition was removed as part of the amendment that was approved in September 2020.</p>
105	Contamination of alluvial and sand aquifers	<p>Implement good housekeeping practices, regular inspections as well as sound environmental training. An emergency response protocol must be implemented at the operations that are aimed at early detection and swift reaction speed. Where possible and reasonable daily inspections (focused on detecting leaks and spills) of drilling pads, pipelines, compressors and the helium plant must be implemented. An on-site communication system must be put in place to ensure that instructions are given and carried out with efficiency. In the event of a spill occurring, a method statement must be completed that describes how, where and when clean-ups will be undertaken. The on-site communication system must make provision for continual review and improvement of spill management. The necessary equipment and personal protection equipment (PPE) must be kept on site to clean spills up and leaks. Tetra4 personnel must</p>	N/A	<p>No potential impact of alluvial and sand aquifers is applicable at this stage of the project. Pollution is overall well managed in all areas.</p>



		<p>receive adequate training on the use of the equipment and the disposal of waste material generated during a spill. All such wastes must be treated as hazardous. The waste must be placed in a dedicated sealed container on site, which must be disposed of to a licensed facility. All on-site vehicle and equipment maintenance must be undertaken within an area of secondary containment, such as a bund or over a drip tray, to prevent accidental soil contamination. Oil and diesel stored on site must be placed within a suitably sized bund. The dispensing of hydrocarbons must be undertaken with due care to prevent or contain spills. All hazardous waste generated must be contained and stored in suitably sealed, banded and protected areas to avoid spills and leaks. Waste must be collected and disposed of off site in a responsible manner so as to prevent groundwater contamination off site.</p>		
106	<p>Secondary economic opportunities e.g. transport, domestic services, catering, etc.</p>	<p>Procurement targets to be in line with the existing Social Labour Plan (SLP).</p>	4	<p>Based on the SLP (2021-2026) the following BBEE procurement targets were applicable for 2021/2022:</p> <ol style="list-style-type: none"> 1) Capital Goods – 15%. 2) Services – 89.1%. 3) Consumables – 100%. <p>Based on the Annual SLP Procurement Spend Report (July 2021 to July 2022) the following were achieved:</p> <ol style="list-style-type: none"> 1) Capital Goods – 59%. 2) Services – 58%. 3) Consumables – 98%. <p>Although, not completely in-line with the targets set in the SLP, it was confirmed that the overall target was exceeded as it was observed that the Capital Goods spend was almost 5 times the Services spend and almost 100 times the consumables spend.</p>
107	<p>Impacts on safety and security of local residents due to presence of unfamiliar people in the area</p>	<p>Tetra 4 should work with the existing farmers’ security groups (Sector 4 Security group/ AgriSec) and farmers’ associations (Virginia and Theunissen) to create a farm access protocol for everybody that need to access the properties, and a safety plan. Tetra 4 should also become</p>	4	<p>No security concerns were noted in the areas inspected at the time of the audit. Tetra4 and the contractor meets with each individual landowner before different stages off access requirements, to discuss access arrangements and routes, this is</p>



		<p>a member of these forums, and an existing WhatsApp group. Farms that are equipped with alarms are all connected to a central point at AgriSec, and this is a good point of departure for Tetra 4 to consider security arrangements for their own assets and to link in and work with existing systems. Pictures, make and registration numbers of all vehicles used by Tetra 4 on site should be provided to the farmer's security group and distributed to all affected landowners to ensure that they will be able to identify these vehicles if they access their properties. Consider using an electronic vehicle tracking system (e.g., TeleMatrix) that can identify drivers and send electronic alerts (e-mail/SMS) to assist with knowing the whereabouts of drivers and informing affected parties when vehicles enter and exit property (geo-fencing). Tetra 4 should give a roster to the farmers stating dates and approximate times that contractors will be on the farms. All access arrangements should as far as possible be made at least 24 hours before access is required. Tetra 4 must meet with the landowners before the construction phase commences and formalise security arrangements in writing and where appropriate include the existing forums. All contractors and employees need to wear photo identification cards. Vehicles should be marked as construction vehicles and should have relevant logos clearly exhibited. Entry and exit points of the site should be controlled. Areas where materials are stockpiled must be fenced, where appropriate. If a security company is used, their schedules should be communicated to the farmers, especially to those farmers that have Tetra 4 infrastructure. It must be considered that guards changing shifts contribute to the impact of strangers accessing properties, and therefore a system that considers the safety of both the Tetra 4 infrastructure and the safety of the landowners must be implemented. Under no circumstances should anyone be allowed to erect a dwelling for security forces on any of</p>	<p>captured in the access form. Vehicles and personnel are clearly visible and identifiable, and the contractor have printed access cards for site personnel. Open lines of communication are available and regular liaison takes place between the CLO, contractor and the landowners. Most of the current work is undertaken on properties owned by Renergen/Tetra4.</p>
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		the farms. The necessary sanitation facilities must be made available, and some form of shelter from the elements. Health and safety officer to be appointed on site.		
108	Encroachment/ invasion of alien plants (specifically into watercourses)	Restrict the clearing of watercourse vegetation as far as possible. Areas that have been cleared should be re-vegetated with indigenous species or other suitable plant species, such as <i>Eragrostis tef</i> , after construction and initial rehabilitation work (reinstatement of the geomorphological template) is completed. Compile and implement an alien plant control program with a particular focus on alien control in watercourses (including wetlands) during the rehabilitation phase of the project. Rehabilitate disturbed areas as soon as possible. Restrict new footprints to disturbed areas as far as possible. Regular monitoring should be undertaken in the watercourses to check any possible invasion by alien vegetation so that they can be weeded out before they grow and spread out.	4	During the construction through the watercourse crossings, the clearing was limited and rehabilitation undertaken as soon as possible with the help of seeding <i>Eragrostis teff</i> . Good rehabilitation efforts were noted at the watercourse crossings inspected. No concerns were noted with regards to alien vegetation within the wetlands/watercourse inspected at the time of the audit. Regular inspections of the wetlands and watercourses were undertaken to ensure that alien vegetation do not establish.







5.3 FINDINGS OF THE AUDIT

From the compliance evaluation, three non-compliances were raised against the requirements of the EA/EMPr as described in Table 4. These NCs were also raised during the monthly ECO audits but were not yet fully addressed at the time of the NEMA Audit. Three observations or areas of concern were raised and are described in Table 5. These findings should be addressed to ensure compliance with the relevant legislative requirements and EA/EMPr as well as to reduce the impact to the natural resources during the implementation of the project.

Table 4: List of Non-compliances raised during the audit.

No.	Requirement	Description	Recommendation
NC1	<u>EMPr Condition 86</u> : Rehabilitate area to its original landform or as agreed to by the landowner, tenants and authorities. Rip compacted surfaces where necessary as part of the rehabilitation. Re-vegetation should be done where required. The use of indigenous species to the specific area should be promoted. Weed species should be eradicated at all disturbed areas. This must be monitored for a period following rehabilitation to ensure that alien invasive plants do not establish themselves. Re-vegetation of cleared areas should occur directly after production activities are completed. Disturbed areas should be correctly compacted, ripped and graded/sloped. Regular inspections should be carried out during the entire rehabilitation process and ongoing maintenance must be implemented until the area is fully rehabilitated.	Certain sections of the exploration well 2057 area were not completely rehabilitated. The heap of topsoil was still present and not yet spread out. The plastic liner placed under the JoJo tanks were not all removed.	It was recommended that the material must be removed, compacted area ripped, and topsoil spread to allow for adequate rehabilitation. The finding was raised during the November 2021 Audit as a concern/observation, but not effectively corrected. A Non-Compliance finding was subsequently raised.
Photographic Record			



No.	Requirement	Description	Recommendation
		<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>November 2021</p> </div> <div style="text-align: center;">  <p>February 2022</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  <p>November 2021</p> </div> <div style="text-align: center;">  <p>February 2022</p> </div> </div>	
NC2	<p><u>EMPr Condition 101</u>: Undertake activities in previously disturbed areas and/or habitats with lower sensitivity where possible. Locate activities on the boundaries of existing disturbance where possible. Use existing access roads as much as possible. Rehabilitate disturbed areas as soon as possible.</p>	<p>Substantial damage was caused while accessing the exploration wells P15 and P16 with exploration equipment and vehicles during the rainy season. No effort was made to address the concern since the concern was raised in February 2022. Subsequently, the concern was escalated to a Non-Compliance finding.</p>	<p>It is recommended that temporary access roads be upgraded or constructed to allow access of vehicles and equipment during the rainy season with limited damage to the natural vegetation. The excessive damage should be rehabilitated.</p>



No.	Requirement	Description	Recommendation
Photographic Record			
			
February 2022			
			
March 2022			



No.	Requirement	Description	Recommendation
NC3	<p><u>EA Condition 5.1.1:</u> This authorisation authorises the holder to undertake all the activities prescribed under section 3 above:</p> <p>3.1 Drilling:</p> <p>The surface footprint of each well is approximately 30m x 30m.</p>	The surface footprint of exploration well P16b, P22, P23, P24b and P27c exceeds the prescribed area of 30m x 30m.	The surface area of the exploration wells should be limited to the area as prescribed by the EA/EMPr.



Photographic Record:




Table 5: List of areas of concern/observations raised during the audit.

No.	Requirement	Description	Recommendation
C1	<p>EMPr Condition 69: Non-biodegradable refuse such as glass bottles, plastic bags, scrap metal etc., should be stored in a container at a collection point and collected on a regular basis and disposed of at a recognised waste disposal facility. Sufficient drums/containers should be placed on site for the disposal of general waste. No littering is to take place on the site or surrounding areas by the Contractor and staff. Waste disposal drums should be emptied on regular bases. The drums should be water and scavenger proof. Precautions shall be taken to</p>	<p>Insufficient waste skips were available to ensure adequate waste management at the BOP. The waste skips were overflowing with waste and mixing of waste between the receptacles was noted. The hazardous waste skips were not covered with waterproof covers to prevent water ingress.</p>	<p>The waste skips should be serviced more regularly, or additional skips should be provided to ensure appropriate management of the waste. The hazardous waste skips should be covered to prevent water ingress.</p>



No.	Requirement	Description	Recommendation
	prevent any refuse from spreading on and from the drill site. No waste is allowed to be burned on site.		
Photographic Record:			
			
C2	EMPR Condition 86: Rehabilitate area to its original landform or as agreed to by the landowner, tenants and authorities. Regular inspections should be carried out during the entire rehabilitation process and ongoing maintenance must be implemented until the area is fully rehabilitated.	Subsidence was noted over the installed pipeline at the low point drain at Retreat Well.	The subsidence should be repaired.
			



No.	Requirement	Description	Recommendation
C3	EMPr Condition 105: Oil and diesel stored on site must be placed within a suitably sized bund.	The bund wall at the BOP laydown area bulk fuel storage area was damaged. Repair of the bund wall commenced, but not yet adequately completed.	The repair of the bund wall should be completed to ensure the bund is impervious.
<p>Photographic Record:</p> 			

5.4 STATUS OF FINDINGS OF THE PREVIOUS AUDIT

During the previous NEMA Audit undertaken in November 2021, two findings were raised. The status of close-out of these findings are provided in Table 6.

Table 6: Status Non-compliances raised during the previous audit.

No.	Requirement	Description	Recommendation	Status
1	<u>EMPR Condition 86</u> : Rehabilitate area to its original landform or as agreed to by the landowner, tenants and authorities. Rip compacted surfaces where necessary as part of the rehabilitation. Re-vegetation should be done where required. The use of indigenous species to the specific area should be promoted. Weed species should be eradicated at all disturbed areas. This must be monitored for a period following rehabilitation to ensure that alien invasive plants do not establish themselves. Re-vegetation of cleared areas	Certain sections of the exploration well 2057 area were not rehabilitated yet and the heap of topsoil was still available. The plastic liner placed under the JoJo tanks and excess pipes was not removed.	It is recommended that the material must be removed, compacted area ripped, and topsoil spread to allow for adequate rehabilitation as soon as possible.	In-Progress – The finding was not completely closed out during the reporting period. Refer to NC1 in Table 4.



No.	Requirement	Description	Recommendation	Status
	should occur directly after production activities are completed. Disturbed areas should be correctly compacted, ripped and graded/sloped. Regular inspections should be carried out during the entire rehabilitation process and ongoing maintenance must be implemented until the area is fully rehabilitated.			
2	<u>EMPR Condition 68</u> : All hazardous chemicals should be stored on an impermeable bunded surface.	A valve was not installed on the pipe at the bund for the transformer on the North-eastern corner of the LNG/Helium plant.	A valve should be installed in the bunded area for the relevant transformer before the transformer becomes operational.	Closed – A plug was installed to render the bunded area functional.



5.5 CONTINUED ADEQUACY OF THE EMPr

The continued adequacy of the EMPr is discussed in this section of the report. A EMPr amendment application was submitted to PASA and approved in September 2020. The amendment application included, *inter alia*, the change from Compressed Natural Gas (CNG) to Liquefied Natural Gas (LNG) and various other amendments to the EMPr that would address inaccuracies, clarify vague requirements and to ease the implementation of the requirements of the EMPr.

5.5.1 NEW IMPACTS IDENTIFIED

Based on the areas inspected during the audit, no new impacts were identified.

5.5.2 EFFECTIVENESS OF THE EMPr

Based on the information review, and areas inspected during the audit, the EMPr is mostly considered adequate and effective to manage and mitigate the significant impacts of the current activities of the project.

5.5.3 SHORTCOMINGS IN THE EMPr

During the May 2021, it was determined that the mitigation measures for the exploration activities were not in line with certain international best practice guidelines. Shortcomings in the EMPr related to GHG emissions, gas flaring, wastewater pits, solid removal systems for drill cuttings and fluids and alternative disposal methods for disposal of drill cuttings and fluids. The recommendations in Section 5.5.4 should be considered.

5.5.4 RECOMMENDATIONS

Tetra4 is in the process of doing an EIA for the expansion of the gas gathering project (Cluster 2) in line with the NEMA requirements. The international standards, such as the Draft IFC EHS Guidelines for Oil and Gas Development, 2017, will be considered with the amendment of the EMPr during the EIA process. If the Cluster 2 project do not received approval, the current Cluster 1 EMPr must be amended in line with the recommendations of this Audit Report. In the meantime, it is recommended that the current Tetra4 drilling procedure be updated in line with the international best practise guidelines to ensure that all efforts are taken to limit the impact on the environment during the drilling operations.

Additionally, the project should continue to undertake the site-specific pre-commencement assessments for new exploration areas. The pre-commencement assessments and the associated site-specific mitigation measures should be considered an extension of the EMPr and compliance with these mitigation measures should continue to be enforced.

6 CONCLUSION

EIMS was appointed by Tetra4 to undertake the sixth, six - monthly Environmental Audit to assess compliance with the conditions of the EA and EMPr. Based on the evaluation criteria described in Section 4.2, **a total compliance score of 98% was obtained for the EA and 98% for the EMPr. Three non-compliance findings and two areas of concern were raised from the compliance evaluation and are described in Table 4 and Table 5 of Section 5.3.** Based on the audit, the EMPr is considered mostly adequate and effective to manage and mitigate the significant impacts for the current activities of this project. It was determined that the mitigation measures for the exploration activities were not in line with certain international best practice guidelines. The current shortcomings in the EMPr related to GHG emissions, gas flaring, wastewater pits, solid removal systems for drill cuttings and fluids and alternative disposal methods for disposal of drill cuttings and fluids. Mitigation measures from international standards and guidelines, such as the Draft IFC EHS Guidelines for Oil and Gas Development, 2017, should be considered (Refer to section 5.5.4).

Tetra4 should be reminded of the requirements of Regulations 34 of the EIA Regulations, 2014 with regards to findings of the adequacy of the EMPr and access to the audit report. Regulation 34 states:

- 4) *“Where the findings of the environmental audit report contemplated in sub-regulation (1) indicate-*
- a) *insufficient mitigation of environmental impacts associated with the undertaking of the activity; or*



b) insufficient levels of compliance with the environmental authorisation or EMPr and, where applicable the closure plan;

the holder must, when submitting the environmental audit report to the competent authority in terms of sub-regulation (1), submit recommendations to amend the EMPr or closure plan in order to rectify the shortcomings identified in the environmental audit report.

- 5) When submitting recommendations in terms of sub-regulation (4), such recommendations must have been subjected to a public participation process, which process has been agreed to by the competent authority and was appropriate to bring the proposed amendment of the EMPr and, where applicable the closure plan, to the attention of potential and registered interested and affected parties, including organs of state which have jurisdiction in respect of any aspect of the relevant activity and the competent authority, for approval by the competent authority.*
- 6) Within 7 days of the date of submission of an environmental audit report to the competent authority, the holder of an environmental authorisation must notify all potential and registered interested and affected parties of the submission of that report, and make such report immediately available-*
 - a) to anyone on request; and*
 - b) on a publicly accessible website, where the holder has such a website.”*

The previous 6-Monthly NEMA Audit Report that was undertaken in November 2021, was submitted to PASA via email on 4 January 2022. A notification was sent to the landowners affected by the Cluster 1 activities on 25 May 2022, but it could not be confirmed if all potential and registered interested and affected parties were notified as per the requirement of the regulations. The previous NEMA Audit Reports are available on the Renegeren website.

7 ASSUMPTIONS, LIMITATIONS AND GAPS IN KNOWLEDGE

The following assumptions, limitations and gaps in knowledge apply to the audit:

- The information contained in this report was sourced from information and data supplied by third parties that is assumed to be complete, valid and true.
- This report is based on information available at the time of the assessment. The information, data, observations and evidence on what this report is based is beyond the control of EIMS and may change without notice. EIMS will not be liable for any loss or damage which may arise directly or indirectly because of such changes.
- Where reference is made to legislation or other statutory provisions in this report the original legislation or other statutory provisions will always take precedence and the reader is directed to revert to the original legislation or statutes.