## DEPARTMENT OF FORESTRY, FISHERIES AND THE ENVIRONMENT

**NO. 6808** **7 November 2025**

### NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998
### (ACT NO. 107 OF 1998)

### CONSULTATION ON THE INTENTION TO PRESCRIBE MINIMUM INFORMATION REQUIREMENTS FOR THE EXPLORATION AND PRODUCTION OF ONSHORE PETROLEUM USING FRACTURING TECHNOLOGY

I, Dion Travers George, Minister of Forestry, Fisheries and the Environment, hereby consult on the intention to prescribe Minimum Information Requirements for the Exploration and Production of Onshore Petroleum Using Fracturing Technology, Revision 0, October 2025 in terms of section 24(5)(h) of the National Environmental Management Act, 1998 (Act No. 107 of 1998). These draft Minimum Information Requirements are published simultaneously with, and are intended to support, the proposed Regulations for the Exploration and Production of Onshore Petroleum Using Fracturing Technology, 2025.

Members of the public are invited to submit written comments or input, within 30 days from the date of the publication of this notice in the Government *Gazette*, or a notification in a newspaper, whichever occurs last, to any of the following addresses:

By post to: Department of Forestry, Fisheries and the Environment
The Director-General
Attention: Mr Simon Moganetsi
Private Bag X447
**PRETORIA**
0001

By hand at: Reception, Environment House, 473 Steve Biko Road, Arcadia, Pretoria.
By e-mail: Smoganetsi@dffe.gov.za.
Any enquiries in connection with the notice can be directed to Mr Simon Moganetsi at 012 399 9309 or by mail at Smoganetsi@dffe.gov.za.

A hard copy of any notice or document associated with this Government *Gazette* can be requested from Ms M Masondo at email: mmasondo@dffe.gov.za or collected at the Department's physical address as indicated above. The documents can be downloaded from the Department's website at https://www.dffe.gov.za/projectprogrammes/environmental_management_instruments and the Government Notice can be downloaded from the Department's website at https://www.dffe.gov.za/legislation/gazetted_notices.

Comments or input received after the closing date may be disregarded.

The Department of Forestry, Fisheries and the Environment complies with the Protection of Personal Information Act, 2013 (Act No. 4 of 2013). Comments received and responses thereto are collated into a comments and response report which will be made available to the public as part of the consultation process. If a commenting party has any objection to his or her name, or the name of the represented company/ organisation, being made publicly available in the comments and responses report, such objection should be highlighted in bold as part of the comments submitted in response to this Government Notice.

**DR DION TRAVERS GEORGE**
**MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT**

## SCHEDULE

1. The Department of Forestry, Fisheries and the Environment has, through an inter-governmental drafting process, developed the draft Minimum Information Requirements for the Exploration and Production of Onshore Petroleum Using Fracturing Technology, Revision 0, October 2025 (MIRs for Exploration and Production) which supports the proposed Regulations for the Exploration and Production of Onshore Petroleum Resources Requiring Fracturing Technology.

2. The MIRs for Exploration and Production focusses on the onshore exploration and production of petroleum which requires the use of fracturing technology and has been developed with the following objectives, namely to-
   2.1. identify and consolidate the assessment and reporting requirements of all decision-making authorities into one document;
   2.2. facilitate the combination of the information prepared in line with these MIRs for Exploration and Production into one consolidated assessment report to inform decision-making by all relevant decision-making authorities;
   2.3. facilitate consultation with stakeholders on the consolidated assessment report, integrated operational monitoring plan and environmental management programme through one integrated public participation process; and
   2.4. facilitate the submission of the consolidated assessment report, integrated operational monitoring plan and environmental management programme to all decision-making authorities.

3. The MIR for Exploration and Production can be accessed at https://www.dffe.gov.za/projectprogrammes/environmental_management_instruments and the Government Notice can be downloaded from the Department's website at https://www.dffe.gov.za/legislation/gazetted_notices

forestry, fisheries & the environment

Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

## October 2025, Revision 0

# Minimum Information Requirements for the Exploration and Production of Onshore Petroleum Using Fracturing Technology

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## Definitions

**“animal”** means a particular kind of living organism, one that can move voluntarily and can find and digest food and includes birds and insects;

**“coalbed methane”** means natural gas extracted from coal beds;

**“consolidated assessment report”** means the report contemplated in regulation 8(9) of the NEMA Fracturing Regulations;

**“cumulative impact”** means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities;

**"designated Agency”** means the agency designated in terms of section 70 of the Mineral and Petroleum Resources Act, 2002;

**“Environmental Impact Assessment Regulations”** means the regulations published in terms of sections 24(5) and 44 of the Act;

**“environmental permissions”** means the relevant rights, permits, authorisations and licences that must be obtained by the developer prior to the exercising of an exploration or production right to which these minimum information requirements relate and includes:

(a) an exploration right issued in terms of section 80 of the Mineral and Petroleum Resources Development Act, 2002;
(b) A production right issued in terms of section 83 of the Mineral and Petroleum Resources Development Act, 2002;
(b) a heritage permit issued in terms of Chapter 2 of the National Heritage Resources Act, 1999, or a written approval issued in terms of Chapters 8 and 9 of the Kwa-Zulu Natal Amafa and Research Institute Act 2018 (Act No. 5 of 2018) where relevant;
(c) an environmental authorisation issued for activity 20 or 20A of Listing Notice 2 of the Environmental Impact Assessment Regulations, 2014;
(d) a water use licence issued in terms of the National Water Act, 1998 (Act No. 36 of 1998); and
(e) approval from the Minister responsible for mineral resources of the plans, reports and the determination of financial provision as contemplated in the Financial Provisioning Regulations.

**“exploration**" means any activity which includes onshore 2-D and 3-D seismic investigations which could include the drilling of exploration wells, with the intention of locating a petroleum reserve including coal bed methane and includes the use of stimulation technologies limited to fracturing and re-fracturing;

**"exploration well"** means a stratigraphic well drilled for the purpose of obtaining specific geological and geophysical information to prove, define and assess the existence and commerciality of a petroleum reserve;

**“Financial Provisioning Regulations”** means the Financial Provisioning Regulations published in terms of section 44(1)(aE), (aF), (aG), (aH) read with sections 24(5)(b)(ix), 24(5)(d), 24N, 24P, 24PA and 24R of the Act;

**“flow back”** means fracturing additives and other fluids that return to the surface after fracturing has been completed;

**“fracturing”** means an intervention performed on a well to increase production by improving the flow of petroleum including coal bed methane from the drainage area into the well bore and includes fracturing and re-fracturing;

**"fracturing fluid"** means the mixture of the base fluid and the fracturing additives used to stimulate the free flow of a petroleum reserve;

“**incidental activity**” includes all operations and activities reasonably necessary for undertaking an exploration and production activity using hydraulic fracturing;

**“Minimum Information Requirement for Baseline Monitoring for Onshore Exploration”** means the minimum information requirements for the baseline monitoring that is to be undertaken prior to fracturing operations being undertaken in an onshore exploration operation published in terms of section 24(5)(h) of the Act;

**“Minimum Information Requirements for the Exploration and Production of Onshore Petroleum using Fracturing Technology”** means the minimum information requirements for the impact assessment for onshore exploration and production using fracturing technology, published in terms of section 24(5)(h) of the Act;

**“national web based environmental screening tool”** means the online spatial application contemplated in the Environmental Impact Assessment Regulations available at https://screening.environment.gov.za/screeningtool;

“**petroleum”** has the meaning assigned to it in the Mineral and Petroleum Resources Development Act, 2002;

**“production operation”** means any operation, activity or matter that relates to the onshore exploration, appraisal, development and production of petroleum;

**“screening report”** means the report prepared by the national web based environmental screening tool accessible at https://screening.environment.gov.za;

**"seismic monitoring"** means the monitoring of seismic activity using a network of calibrated seismological equipment in order to produce readings on magnitude, depth, location, error and time of each seismic event;

**“site”** means the area within which the exploration or production operations will take place;

**“study area”** means the site within which the exploration or production operations will take place and includes the area beyond the site where the operations could impact the environment and which must be determined by the relevant specialist for each environmental theme with a focus on areas to be considered for fracturing and production operations; and

**“well engineer”** means an engineer in the field of petroleum engineering or a related geological field involved in either the design, construction, maintenance, completion and plugging of exploration or production wells, with a minimum of ten years’ experience in the field/discipline in question, who has the appropriate accreditation from the relevant institution.

**Abbreviations**

| | |
|---|---|
| 2-D | two dimensional |
| 3-D | three dimensional |
| CA | competent authority |
| $CH_4$ | Methane |
| CO | Cobalt |
| CV | curriculum vitae |
| $C_6H_6$ | Benzene |
| DA | designated agency |
| DMPR | Department of Mineral and Petroleum Resources |
| DWS | Department of Water and Sanitation |
| EAP | environmental assessment practitioner |
| EIA | environmental impact assessment |
| EIA Regulations | Environmental Impact Assessment Regulations |
| EMPr | environmental management programme |
| EWT | Endangered Wildlife Trust |
| $H_2S$ | Hydrogen sulphide |
| HIA | heritage impact assessment |
| I&APs | interested and affected parties |
| MIR | Minimum Information Requirement |
| NEMA | National Environmental Management Act, 1998 (Act No. 107 of 1998) |
| NEM:BA | National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) |
| NGO | non-governmental organisation |
| NHRA | National Heritage Resources Act, 1999 (Act No. 48 of 1999) |
| $NO_2$ | Nitrogen dioxide |
| NOx | Nitrogen oxides |
| NWA | National Water Act, 1998 (Act No. 36 of 1998) |
| $O_3$ | Ozone |
| PAHs | Polycyclic aromatic hydrocarbons |
| PASA | Petroleum Agency SA |
| Pb | Lead |
| $PM_{10}$ | Particulate matter includes particles less than 10 µm in diameter |
| $PM_{2.5}$ | Particulate matter includes particles less than 2.5 µm in diameter |
| SAHRA | South African Heritage Resources Agency |
| SACNASP | South African Council for Natural and Scientific Professions |
| SEA | strategic environmental assessment |
| $SO_2$ | Sulfur dioxide |
| SVOCs | Semi-volatile organic compounds |
| VOCs | Volatile organic compounds |

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|---|---|
| WGS84 | a reference system used by the satellite navigation systems like GPS and used in various mapping applications |

## i) Preamble

Petroleum exploration and production using fracturing technology is a complex, capital intensive process which can have a significant impact on the environment should the necessary environmental precautionary and management measures not be in place. In line with the complexity of the process, several government authorities are involved with the management of the associated environmental impacts through the various licence, permit and authorisation requirements, jointly referred to as environmental permissions of the respective decision-making departments.

Due to the number of environmental permissions required and the lengthy and complicated process to obtain such permissions, Cabinet, through the *National Development Plan* and Parliament, through the *Report of the High Level Panel on the Assessment of Key Legislation and the Acceleration of Fundamental Change*, called for a coordinated and synchronised approach to the issuing of the various environmental permissions to avoid overlaps and unnecessary duplication which leads to time delays and excessive costs for developers. Environmental authorisations,[1] water use licences,[2] heritage permits[3] and mining rights[4] were specifically identified as needing a coordinated effort.

The integration of environmental permissions is provided for in the National Water Act, 1998[5] (NWA), the National Environmental Management Act, 1998[6] (NEMA), the Mineral and Petroleum Resources Development Act, 2002[7] (MPRDA) the National Heritage Resources Act 1999 (NHRA)[8], and the Kwa-Zulu Natal Amafa and Research Institute Act 2018 (Act No. 5 of 2018) (KZNARI Act). Section 22(4) of the National Water Act, 1998, anticipates and promotes cooperative governance and arrangements with other organs of state to combine respective licencing requirements into a single licence requirement. In addition, section 41(5) of the NWA requires that the Minister responsible for water affairs align and integrate the process for consideration of water use license applications with the timeframes and processes applicable to applications for licenses, permits or rights for prospecting, exploration, mining and production in terms of the MPRDA and environmental authorisations in terms of NEMA. NEMA similarly envisages an integrated process. In terms of section 24C(12), applications required under NEMA or a specific environmental management Act (SEMA) must be submitted simultaneously to all relevant departments after the mining application has been accepted by the Department of Minerals and Petroleum Resources (DMPR)/ designated agency. In this regard it should be noted that the NWA is a SEMA. In addition, section 50A(2)(d) of NEMA requires that the Ministers responsible for mineral resources, water affairs and the environment must agree to synchronise timeframes for consideration and issuing of authorisations in terms of their respective legislation. Section 41(7) of the Environmental Impact Assessment Regulations, 2014 (EIA Regulations) indicates that where an environmental authorisation is required and an authorisation, permit or licence is required in terms of a specific environmental management Act, the public participation processes may be combined on condition that all relevant authorities agree to such combination of processes.

The MPRDA similarly promotes coordination. Sections 79(4)(a) and 83(4)(a) promote the coordination of consultation requirements. Section 79 of the MPRDA requires that, if the designated agency accepted the MPRDA application for an exploration right the designated agency must, within 14 days of the receipt of the application notify the applicant in writing to consult in the prescribed manner

[1] Issued in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998).
[2] issued in terms of the National Water Act, 1998 (Act No. 36 of 1998).
[3] issued in terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999).
[4] issued in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).
[5] The National Water Act, 1998 (Act No. 36 of 1998).
[6] The Nataional Environmental Management Act, 1998 (Act No. 107 of 1998).
[7] The Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).
[8] National Heritage Resources Act, 1999 (Act No. 25 of 1998)

with interested and affected parties on the application and to include result of the consultation in the NEMA Chapter 5 environmental reports, which were subjected to a 30-day public comment period. Integration is also anticipated under the NHRA. Section 38(8) of the NHRA provides for the heritage impact assessment required under section 38(2)(a) of the NHRA to be provided through the EIA process in terms of the EIA Regulations, where an environmental authorisation is required. Section 41(8) of the (KZNARI Act) makes similar provision for integration where an environmental authorisation is required related to a heritage resource in Kwa-Zulu Natal.

Over and above Cabinet's request for an integrated authorisation process, when lifting the moratorium on the exploration of shale gas in August 2012, a step-wise approach was agreed to with only normal exploration being allowed as a first phase and the use of fracturing being allowed only after a number of additional steps had been achieved.

In line with and in order to facilitate the step wise authorisation approach envisaged, amendments were made to the EIA Regulations, Listing Notices in June 2021, which split the authorisation process for exploration and production of petroleum resources[9] into three distinct phases, which are:

- Exploration which anticipates the use of fracturing technology (seismic surveys);
- Exploration which includes the use of fracturing technology; and
- Production of petroleum resources using fracturing technology.

The three phased authorisation process is intended to facilitate the collection of environmental information at each stage of the process and to assess and consider the cumulative environmental impacts to promote environmental protection and informed decision-making.

To respond to Parliament's request for a more coordinated approach to considering environmental permissions, the relevant decision-making authorities have agreed to develop a series of Minimum Information Requirements (MIRs) to achieve the objectives indicated below related to onshore exploration and production of petroleum intending to and utilising fracturing technology:

The objectives of the MIRs are to:

- Identify and consolidate the assessment and reporting requirements of all decision-making authorities for all phases of exploration and production into two minimum information requirements documents;
- Combine the information prepared for the exploration of petroleum anticipating fracturing into one consolidated assessment report and baseline monitoring plan which conforms to the first MIR in the series;
- Combine the information prepared for the phase of exploration utilising fracturing technology or for the production phase into a consolidated assessment report and environmental management programme which conform to the second MIR in the series;
- Facilitate consultation with stakeholders on the consolidated assessment report, integrated operational monitoring plan and environmental programme for each phase of exploration and production, through one integrated public participation process; and
- Facilitate the submission of the consolidated assessment reports, monitoring plans and programmes for each phase of exploration and production, which incorporates the information required by all decision-making authorities, to the relevant authorities for consideration and decision-making where relevant.

[9] In the context of this Minimum Information Requirement, petroleum resources include all hydrocarbons.

### ii) The Minimum Information Requirement series

The EIA Regulations include the requirement to apply MIR in instances where a Government Notice, gazetted by the Minister responsible for environmental affairs, provides for the application of such MIR. The respective provisions in the EIA Regulations which deal with the content requirements of an application for environmental authorisation, basic assessment report, specialist report, scoping report and environmental impact assessment report, include the ability of the Minister responsible for the environment to require compliance with MIR relevant to the application as identified and gazetted by such Minister in a Government Notice.

In addition, the NWA Water Use Licence Application and Appeals Regulations, 2017 (NWA Water Use Licence Regulations) and the draft *Regulations for the Use of Water for Exploration and Production of Onshore Naturally Occurring Hydrocarbons that Require Stimulation, Including Hydraulic Fracturing and Underground Coal Gasification, to Extract, and any Activity Incidental Thereto that may Impact Detrimentally on the Water Resource, 2021* (NWA Regulations for Naturally Occurring Hydrocarbons), both refer to providing information in relation to a MIR.

There are two MIRs in this series. This document represents the second MIR in the series and is entitled "*The Minimum Information Requirements for the Exploration and Production of Onshore Petroleum Using Fracturing Technology*". As the name implies, this MIR focuses on the exploration and production of onshore petroleum that require and use fracturing technology. The document guides the process required by each decision-making authority related to the:

- Identification of the environmental sensitivity of the site including the underground footprint, on which the exploration or production operations are proposed to take place;
- Identification of expected impacts related to the exploration or production operations relative to the environmental sensitivity of the site and the baseline monitoring conditions;
- Identification of the specialist impact assessments and reports that will be required to assess and mitigate potential impacts and risks including the prediction of cumulative impacts;
- Determination of risks, the likelihood, extent and severity of such impacts and risks occurring;
- Consideration of expected severity of impacts after mitigation and the acceptability of the residual impacts and risk;
- Proposed layout of the infrastructure and exploration or production wells in relation to the environmental sensitivity of the site and the principles of impact avoidance, management and mitigation; and
- Identification of ongoing monitoring, reporting and auditing requirements through the exploration or production operations.

This MIR does not set out or explain the regulatory procedures (i.e., application forms and information required at application) but rather deal with the project specific details, the social, cultural, environmental and technical information requirements which are to be consulted on and submitted in support of the applications for various required environmental permissions. For guidance on the regulatory steps and information required to submit applications to the decision-making authorities, the applicant must consult the various statutes or regulations and guidance documents.

This MIR relates to phases 2 and 3 of the onshore exploration and production process for petroleum using fracturing technology. These two phases are identified as follows in Listing Notice 2 of the EIA Regulations:

- The second phase of exploration which involves the use of fracturing technology which is listed as activity 20A of Listing Notice 2, as "An exploration operation which requires the use of fracturing

technology as well as any other applicable activity as contained in this Listing Notice, Listing Notice 1 of 2014 or Listing Notice 3 of 2014 required for such fracturing."; and
- The third phase is the production and is listed as activity 20 of Listing Notice 2 as "Any activity including the operation of that activity which requires a production right in terms of section 83 of the MPRDA, as well as any other applicable activity as contained in this Listing Notice, Listing Notice 1 of 2014 or Listing Notice 3 of 2014, required to exercise the production right.".

This MIR is also applicable to the applications for water use licenses for exploration and production, as a controlled activity, as contemplated in the NWA Regulations for Naturally Occurring Hydrocarbons.

Applicants must take note of the need to submit the applications simultaneously to the relevant decision-making authorities as required by section 24C(12) of NEMA in relation to exploration which requires the use of fracturing technology and which triggers activity 20A of Listing Notice 2, or after the application for a production right, contemplated in section 83 of the MPRDA has been accepted by the designated agency, to allow for an integrated public participation process.

The phasing of the applications, facilitating a step-wise authorisation procedure, has several advantages which include among others:
- Rationalising the ever-increasing amount of environmental data and reserve determination information being generated to inform the fracturing phase of exploration or production which allows for informed decision-making;
- Facilitating public participation on the baseline monitoring plan before decision-making in terms of different regulatory requirements;
- The execution of the baseline monitoring plan for a minimum of 24 months prior to any fracturing operations being implemented, should all the necessary authorisations be granted;
- The approval of the integrated operational monitoring plans prior to implementation; and
- The ability to consider cumulative impacts in a more realistic manner as ongoing monitoring data collected through the operations can be assessed against the pre-drilling and fracturing baseline conditions.

### iii) Introduction to the minimum information requirements for phases 2 and 3 of the onshore exploration and production of petroleum using fracturing technology

This MIR contains the prescribed assessment and report content for the technical documents required for environmental permissions relevant to onshore exploration and production of petroleum using fracturing technology. The assessment and report content for all relevant environmental permissions must comply with this MIR and failure to do so will result in the reports not being accepted by the relevant decision-making authority. The report requirements of this MIR must, among others, meet the requirements of the EIA Regulations, the technical requirements of the NWA Water Use Licence Regulations, 2017, the requirements of section 38(3) of the NHRA and section 41(3) of the KZNARI Act where relevant.

The MIR has been developed through the findings of the Strategic Environmental Assessment of Shale Gas Development in the Central Karoo, June 2017[10]; internal literature reviews; the requirements of the EIA Regulations and the NWA Water Use Licence Regulations; the knowledge of officials represented on the interdepartmental committee for the development of this MIR, the draft NEMA "Regulations for the Exploration and Production of Onshore Petroleum Resources Requiring Fracturing Technology, 2024", the MPRDA Regulations for Petroleum Exploration and Production of 3 June 2015,

[10] The Strategic Environmental Assessment of Shale Gas Development in the Central Karoo, June 2017 can be accessed at https://seasgd.csir.co.za/.

which were set aside by the Supreme Court of Appeal and stakeholders who contributed through the consultation process.

This MIR must be read with the draft NEMA Fracturing Regulations, prepared in terms of NEMA, the draft NWA Regulations for Naturally Occurring Hydrocarbons, sections 38(1), (3) and (8) of the NHRA and sections 41(1), (3) and (8) of the KZNARI Act where relevant and the EIA Regulations.

The experience, understanding and capability of the environmental assessment practitioner (EAP) and specialists to follow the requirements and to reach the intended outcomes of the MIR are crucial and must be demonstrated in the section on qualifications and experience in undertaking similar work as identified in Part 1 Chapter 2 and Part 2 Chapter 2 of this MIR.

### iv) Structure of the Minimum Information Requirement

In order to capture the required information and produce one draft combined assessment and operational monitoring plan which complies with the assessment requirements of all decision-making authorities, the MIR has been drafted in two parts.

Part 1 deals with the Plan of Study for Scoping and Part 2 deals with the impact that will result from the activities to be undertaken on the site through the continued 2-D and 3-D seismic investigations, the use of fracturing technology as well as production operations. These impacts and the severity thereof are to be determined by specialists through analytical methods where relevant. This section also deals with mitigation measures to be implemented through an environmental management programme and the operational monitoring requirements.

## PART 1 – SCOPING PROCESS

### 1. Chapter 1 – General Requirements

### 1.1 The scoping process

The exploration and production of petroleum utilising fracturing technology are both activities that require a-

- Right in terms of the MPRDA. For exploration, the right is required under section 80 of the MPRDA and for production, section 84 of the MPRDA;
- Environmental authorisation in terms of the EIA Regulations. For exploration of petroleum requiring the use of fracturing technology, an environmental authorisation is required under activity 20A of Listing Notice 2 and for the production of petroleum an environmental authorisation is required under activity 20 of Listing Notice 2;
- Water use licence in terms of the NWA Water Use Licence Regulations. The exploration or production of onshore naturally occurring hydrocarbons that requires stimulation, including hydraulic fracturing, or underground gasification, to extract, and any incidental activity that may impact detrimentally on the water resource has been declared as a controlled activity in terms of Government Notice 999 of 2015;[11] and
- Heritage permit in terms of Chapter 2 of the NHRA, or a written approval issued in terms of Chapters 8 or 9 of the KZNARI Act, should any significant[12] heritage resource need to be removed, moved or disturbed.

In terms of section 24C(12) of NEMA, once the designated agency has accepted the application for an exploration or production right in terms of the MPRDA the applicant must simultaneously apply for an environmental authorisation required in terms of NEMA and a licence, permit or authorisation in terms of a specific environmental management Act (SEMA).[13] Although not a SEMA, the need for a permit issued in terms of Chapter 2 of the NHRA, or a written approval in terms of Chapters 8 or 9 of the KZNARI Act, will be determined through the review of the heritage impact assessment which will be included in the assessments to be submitted in the consolidated assessment report. Therefore, as soon as the application in terms of the MPRDA has been accepted, the applicant must submit the applications for a WUL and environmental authorisation, and make contact with the relevant heritage resources agency (HRA) to determine their requirements.

In terms of the application for environmental authorisation, regulation 15 of the EIA Regulations, read with the Listing Notices, determine that the process to apply for an environmental authorisation for a Listing Notice 2 activity, is a *scoping and environmental impact reporting process*. The first step in this process is *scoping*, the outcome of which is a *scoping report* which includes a *plan of study* which sets out how the environmental impact assessment process will be undertaken and which specialist reports will be prepared (plan of study). The scoping report is submitted to the designated agency for review and submission to the competent authority for decision making. Should the competent authority accept the scoping report and approve the plan of study, the applicant can proceed with the second step in the process which is to implement the tasks approved in the plan of study. This part of the MIR deals with the objectives and the requirements for the scoping process and the content of the scoping report and plan of study.

[11] Government Notice No. 999, published in Government *Gazette* No. 39299 on 16 October 2015.

[12] Significant in this context means that the heritage resource has been determined by the HRA as being A Grade I, II or III resource.

[13] The National Water Act is a specific environmental management Act.

Once the designated agency has accepted the application for an exploration or production right, the applicant must-

- Submit the application for environmental authorisation to the designated agency;
- Submit the application for a water use license for the controlled activity related to the exploration or production of onshore hydrocarbons requiring stimulation;
- Engage with the relevant national or provincial HRA on the requirements in terms of the NHRA or the KZNARI Act; and
- Consult with interested and affected parties (I&APs) on the draft scoping report and the application for an exploration or production right.

Within the intervals contemplated in the EIA Regulations, the application, the draft scoping report, and the final scoping report which has been subjected to a 30 days public comment period and includes comment from the authorising authorities, must be submitted to the designed agency, for consideration and a recommendation to the competent authority on whether or not environmental authorisation should be granted.

### 1.2 The objectives of the scoping process

The scoping phase is a crucial step in the overall process and has several functions. Broadly, the objectives of the scoping phase are to-

- Notify I&APs of the applications lodged with the relevant decision-making authorities in terms of the relevant legislation;
- Provide a location for the proposed project;
- Describe and define the scope of the project;
- Motivate the need and desirability of the proposed project generally and in the context of the preferred site;
- Document the site selection process followed which must include a discussion on, and ranking of, the alternative sites considered, if relevant, and the reason for discarding them in the process to identify the preferred site;
- Provide a motivation for not considering alternatives sites, if none were considered (alternative site selection may not be relevant to exploration or production operations where a specific reserve is being investigated);
- Scope the opinion of the public in the study area to gain any insights from the public on any site-specific concern or sensitivity, for example cultural, religious or biodiversity aspects, that must be considered through the assessment process and to document them;
- Understand the oral history of the site and study area;
- Identify and confirm the preferred site on which the impact assessment will be undertaken;
- Identify and confirm the study area in which the public participation process is proposed to be undertaken;
- Identify the key issues to be assessed in the assessment phase;
- Confirm the proposed specialist assessments to be undertaken based on the activity impacts as identified in the screening report produced by the national web based environmental screening tool (screening tool) and on the site sensitivity verification;
- Confirm the requirements for the water use license application technical reports to be undertaken;
- Introduce the specialists to be utilised, including the expertise of the specialist and the methodology to be utilised to identify and assess the risks the activity will impose throughout the life of the operations;

- Document the proposed public participation process followed to finalise the scoping report, including the inputs received and the manner in which the inputs were considered; and
- Detail the further public participation process to be followed in the environmental impact report process.

The draft and final scoping report are to be compiled by the EAP based on information provided by the applicant, the professional knowledge of the EAP and inputs from specialists. Once the scoping report is consulted and accepted by the competent authority, the scope of the project will have been determined and agreed to by the competent authority. Although there is no equivalent scoping process in the procedures of other decision-making authorities, the draft scoping report and plan of study is to be submitted to all other decision-making authorities for their input, prior to finalisation.

Chapter 2 provides more detailed information on the content of the draft scoping report and final scoping report.

## 2. Chapter 2 – Content of the draft scoping report and final scoping report

### 2.1 General information

The content of the draft and final scoping report will be similar, however, the final scoping report will include the outcome of the public participation process that was undertaken on the draft scoping report and all sections in the final document will be updated with the outcomes of the scoping process that were found to be relevant. The supporting information in the final scoping report will be more comprehensive than those contained in the draft scoping report, in that the evidence of public participation will be included.

### 2.2 Summary for decision-makers

A summary for decision-makers is to be included in the draft and final scoping report. The summary must provide a concise project location and scope, the need and desirability of the project, a short description of the environmental sensitivity of the site and the proposed specialist assessments to be undertaken. In addition, the summary must include a short outline of process that is proposed to be followed to generate the consolidated assessment report and environmental management programme, including how the views and contributions of I&APs will be scoped and documented. The summary for decision-makers in the final scoping report must include a concise input on the outcome of the public participation process followed on the draft scoping report, highlighting any specific issues that the environmental impact assessment process needs to consider.

### 2.3 Project description, location and contact information:

The draft scoping report must include as a minimum, the following information related to project description, the location of the project and the contact details of the EAP who prepared the report:

- The name of the project;
- A short description of the project, including the anticipated duration of the operations;
- The proposed location of the project,[14] including the farm name or names with the relevant portion number or numbers and the relevant surveyor general's twenty-one-digit codes;[15]
- Details of the property owner or owners;

[14] The farm names and SG codes are available from the screening report produced by the screening tool.
[15] Coordinates of the project location will be provided in the screening tool report which will be attached to the draft and final scoping report and does not need to be duplicated.

- The relevant major river catchment in which the project is to be undertaken;
- The current land use on the site and the land uses of adjacent sites;
- The name and contact details of the applicant. The contact details should include relevant telephone and cell phone numbers, the business street and postal address;
- The experience that the applicant has with undertaking similar projects;
- The name and contact details for the appointed EAP and specialists, which must include a business contact as well as a personal cell phone number;
- The company details for the EAP and specialists including the physical and postal address; and
- An annotated location map showing the context of the proposed site including as a minimum, major road, towns, major topographical features, the 1;100-year flood lines, railroads, farming infrastructure if relevant, rivers and streams, main tourist features etc.

**2.4 Project scope:**

The EAP and the relevant specialist should jointly agree on the scope of the project to ensure that the requirements of each specialist is articulated in the scope as the scope will no longer be included in each specialist assessment report or study. The draft and final scoping report must include the following information related to project description and scope:

- A detailed description of the scope of the project, including any associated structures or infrastructure to be developed;
- The identified activity that will be triggered in relation to the EIA Regulations Listing Notices;[16]
- The water uses being applied for in terms of the NWA Water Use Licence Regulations;
- The scope of the heritage impact assessment as agreed with the relevant heritage resources agency in terms of section 38(3) of the NHRA or section 41(3) of the KZNARI Act;
- The right being applied for in terms of the MPRDA;
- The reserve being investigated;
- The technology to be used in the exploration or production activities;
- Need and desirability of the project;[17]
- The legislative and policy context including any strategies or plans within which the project is located and the manner in which the project responds to this context;
- A detailed description of the site selection process undertaken including the outcome of the site selection process which must have considered the following:[18]
    - the various alternative sites identified;
    - the environmental attributes associated with each site focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
    - the impacts and risk associated with each site including the nature, significance, consequence, extent, duration and probability of such identified impacts and risk occurring, including the degree to which the impacts may cause irreplaceable loss of resources;
    - the degree to which the impacts on the site can be avoided, managed, mitigated or reversed;
    - the methodology used in identifying and ranking the nature, significance, consequence, extent, duration and probability of the potential environmental impacts and risks associated with each site; and
    - the site selection matrix used.
- If no alternative sites have been considered the motivation for not considering alternatives sites (alternative site selection may not be relevant to exploration or production operations where a specific reserve is being investigated);

[16] For a mining activity the associated activities are incuded in the main mining activity and the associated activities are not to be seperatly identified.
[17] This information must be provided in accordance with DFFE's *Guideline on Need and Desirability, 2017*,
[18] Much of the information required on the site selection process can be taken from the final scoping report.

- The exploration or production technology proposed to be used as well as a discussion on any alternative exploration or production technologies that have been considered which must include-
  - the risks and impacts associated with each technology;
  - possible positive and negative impacts that the proposed technology could have on the environment and the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; and
  - possible mitigation measures that could be applied and the level of residual risk for each technology;
- If no alternative exploration or production technology has been considered, the motivation for not considering such alternatives;
- The intended use or management of the gas released through exploration; and
- Existing licenses, authorisations or rights which exist for the land within the project site.

**2.5 Supporting documentation**

The draft and final scoping report must be accompanied by supporting documents which attests to the information provided in specialist impact assessment reports for this section. The following supporting information must be included under this heading:

- The acceptance letter from the designated agency for the application for an exploration or production right;
- From the EAP and specialists who have undertaken the site sensitivity verification inspections and who are to undertake the relevant specialist impact assessments:
  - a short profile of the EAP and the EAP's company, where relevant;
  - a short profile of every specialist and specialist's company;
  - an abbreviated CV of the EAP and the identified specialists, including a short profile of similar work undertaken and the relevant years of experience;
  - declaration of independence of the EAP and specialists;
  - EAP and specialists' companies B-BBEEE certification;
  - power of attorney;
  - copy of the professional registration for the EAP and specialists; and
  - a signed declaration of independence from the EAP and specialists.

**3. CHAPTER 3 – Plan of Study for Scoping**

**3.1 Screening and specialist assessments**

As of 4 October 2019, it is compulsory that a screening report produced by the national environmental web based environmental screening tool (screening tool), as contemplated in regulation 16(1)(b)(v) of the EIA Regulations, must accompany all applications for environmental authorisation submitted to the competent authority. This requirement is also applicable to an application for onshore exploration operations which require the use of fracturing technology in terms of activity 20A of Listing Notice 2 of the EIA Regulations as well as an application for an environmental authorisation for a production right in terms of section 83 of the MPRDA. The requirement for screening is to ensure that sites with high environmental sensitivity, including sensitive water resources are identified and avoided where possible or where they cannot be avoided, impacts are mitigated to an acceptable level.

The screening report also identifies an initial list of specialist assessments to be undertaken based on the known impacts of the relevant activity applied for. The list of specialist assessments to be undertaken is to be finalised based on the outcome of the site sensitivity verification undertaken by either the EAP or specialist whichever is applicable for the specific environmental theme, the outcome of the pre-application meeting and site visit held with representatives of the DFFE, DWS and the

engagement with the relevant Heritage Resources Authority (HRA). The requirements for the site sensitivity verification inspection and the level of expertise required to undertake the site sensitivity verification inspection per theme are identified in relevant Government Notice 320 of March 2020,[19] and Government Notice 1150 of October 2020.[20] Once the environmental sensitivity of the site is confirmed or revised for each environmental theme under consideration, and the requirements of the DWS and the relevant HRA have been confirmed, the list of specialist impact assessments/compliance statements to be undertaken must be identified in the plan of study for impact assessment. Where the site sensitivity verification has identified that a specific specialist assessment identified in the screening report is not necessary, the EAP or specialist must motivate this to the relevant authorising authority and include the motivation in the plan of study for impact assessment under the relevant heading, including the supporting evidence.

**3.2 Specialist impact assessments identified**

Based on the environmental sensitivity of the preferred site, as identified in the screening report, the site sensitivity verification,[21] the requirements as identified by the DWS and the relevant HRA, as well as any additional desk top information or information obtained from the provincial authorities or state owned entities, the EAP is to provide the following information on the specialist impact assessments to be undertaken:

- The specialist impact assessments identified in the screening report related to the activity to be undertaken;
- A motivation, should any one of the assessments be regarded as not being necessary;
- The technical reports to be undertaken as identified in the NWA Water Use License Regulations including waste treatment and management options;
- A proposed list of specialist impact assessment reports to be undertaken must be provided, indicating the outline of such assessments, which must include a consideration of the measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored;
- The names of the specialists identified to undertake the relevant specialist assessments, including their expertise and record of previous work undertaken in the same field;
- The season in which the specialist assessment is to be undertaken where relevant;
- Contact details of the proposed specialist, including a street address and postal address if relevant of the specialist's company. The telephone and cell phone details for the specialist as well as the telephone details of the specialist's company;
- The proposed methodology to be used to undertake the specialist studies, including any guidelines or models that will be utilised to guide the field work or assessment; and
- Any gaps in knowledge.

The following preliminary list of impact specialist assessments have been identified for the exploration or production of petroleum requiring fracturing:

- Agricultural impact assessment;
- Terrestrial biodiversity impact assessment;
- Aquatic biodiversity impact assessment;
- Animal species impact assessment;
- Aquatic species impact assessment;

[19] Published under Government Notice 320 published in Government *Gazette* No. 43110 on the 20 March 2020.
[20] Published under Government Notice 1150 published in Government Gazette No. 43855 on 30 October 2020, as amended.
[21] The site sensitivity verification must be undertaken in line with the relevant prescribed site sensitivity verification requirements identified in Government Notice No. 320 published on 20 March 2020 where no specific protocol has been prescribed or in line with the specific prescribed protocol.

- Noise and artificial light impact assessment;
- Climate change impact assessment;
- Air quality impact assessment;
- Seismicity impact assessment;
- Socio-economic impact assessment;
- Cultural heritage and palaeontology impact assessment;
- Hydrology study;
- Hydrogeology study;
- Wetland and riparian delineation study;
- Traffic impact study (including the possibility of utilising rail); and
- Radio frequency interference study (SKA, defence, aviation and weather services);

Based on the specialist impact assessments, the EAP and specialists will prepare the following plans, programmes, well designs, and lists during the environmental impact assessment process:

- Water and waste water management plan (including stormwater management);
- Solid waste management plan;
- Emergency and spill contingency plan;
- Integrated operational monitoring plan;
- Financial provisioning plans, reports and calculations to secure financial provision;
- Proposed well layout;
- Proposed well design;
- List of fracturing fluids and additives; and
- Environmental management programme.

A copy of the screening report generated from the screening tool must be submitted as part of the supporting information for this section, and the assessments identified in the plan of study must be discussed in relation to the screening tool list.

**3.3 The proposed public participation process**

The plan of study for scoping must include the outline of the environmental impact reporting process that will be undertaken (specialist assessments) as well as a plan for the proposed public participation process that will be followed through the environmental impact assessment process. The content of the public participation plan within the draft and final scoping process will be the same, however, the public participation plan in the draft scoping report will focus on the proposed public participation process that will be followed through the environmental impact assessment phase, while the public participation plan in the final scoping report will include the outcome of the public participation process that was undertaken on the draft scoping report, including the comments and responses report indicating the manner in which the comments were considered.

**3.3.1 Public participation plan in the draft and final plan of study for the environmental impact assessment process**

The proposed public participation plan in the plan of study for the environmental impact assessment process as contained in the draft and final scoping report must include as a minimum the following information:

- Objectives of the public participation process;
- The identified study area for undertaking the public participation process, including the rational for its inclusion;
- The proposed database of I&APs to be engaged;

- An outline of the public participation process to be followed which must include the following:
  - Advertising that will be undertaken;
  - The locations where adverts/notice boards are to be placed;
  - Meetings to be held, giving detail about the time, the number, the language to be used, venues etc.;
  - The availability of a background information document, where and how such information will be made available, to whom and in what languages;
  - How I&AP registration will be undertaken including the location of registration desks to be set up, if relevant;
  - When consultation with the designated agency and other state owned entities will take place and the form of that consultation;
  - How documents will be circulated;
  - How I&APs will be informed of the availability of documents or other correspondence;
  - How information will be accessed, noting that some I&APs may not have access to emails.
- Intervals for public comment; and
- Dates and times of interactions other than public meetings.

### 3.3.2 The supporting information for the public participation process followed

The final scoping report must be accompanied by supporting documents which attests to the information provided in the final scoping report related to the outcome of the public participation on the draft scoping report. The following supporting information, as a minimum, must be included under this heading:

- Final list of I&APs;
- Copy of the background information document;
- Copies of adverts and posters if relevant;
- Photographs of posters, adverts or notices placed on site or at other venues where relevant;
- Comments and responses report, including an indication on how the inputs were considered or reasons for not considering them;
- Confirmation of registration of I&APs;
- Confirmation of arrangements around meetings;
- Attendance registers;
- Minutes of meetings or interactions including recorded inputs;
- Slides of presentations and any documentation circulated in support of the meetings;
- Presentations made at any public participation meetings; and
- Attendance registers of any meetings held on the draft scoping report.

## 3.4 Submission of the final scoping report

The final scoping report including the plan of study for the environmental impact assessment process which must have been subjected to a public participation process of 30 days[22] must be submitted to the designated agency (on behalf of the competent authority), together with the supporting documentation, within the intervals contemplated in the EIA Regulations.

After receipt of the final scoping report, the competent authority must, within the intervals contemplated in the EIA Regulations, accept the scoping report or refuse environmental authorisation

[22] Usually the consultation timeframe for a WUL application is 60 days in line with section 41(4) of the National Water Act, however, in line with the requirements of section 41(5) of the NWA, where a proposed operation also requires an application for a right or permit in terms of the MPRDA and an application for an environmental authorisation in terms of the NEMA, the Minister responsible for water affairs must align and integrate the process for consideration of the WUL with the application timeframes and processes for the NEMA application, which includes the timeframes for public participation processes.

if the proposed activity is in conflict with a prohibition in legislation or the scoping report does not comply with the requirements of the EIA Regulations, any applicable protocol or minimum information requirements and the applicant is unable or unwilling to comply with the relevant requirements within the prescribed timeframe. If the report is accepted the applicant may continue with the tasks identified in the plan of study.

## PART 2 – ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

### 1. General information

### 1.1 The objectives of the environmental impact assessment process

The decision-making authorities have agreed that one consolidated assessment report, which meets the requirements of this MIR, will be utilised by all decision-making authorities to ensure a streamlined and efficient process for the consideration of, and decision-making on, applications for environmental permissions. Therefore, the consolidated assessment report must include adequate information to support the application processes for environmental authorisation, exploration or production rights, WUL and the heritage impact assessment required by the relevant HRA. In addition, the public participation process will be an integrated process that meet the objectives of Chapter 6 of EIA Regulations, the public review requirements of the application and technical report for the WUL, and the consultation on the environmental reports, required in terms of the MPRDA. In order to achieve this alignment, it has been agreed that a 30-day comment period will be required on the draft consolidated assessment report.

Therefore, the process to be followed by the EAP, on behalf of the applicant, is as follows - once the final scoping report has been accepted by the competent authority, the draft consolidated assessment report must be submitted to the decision-making authorities and identified I&APs for consideration and comment for a period of 30 days. The environmental impact assessment report, which reflects the inputs of the public participation process must be submitted to the decision-making authorities for consideration and decision-making.

Should it be identified during the comment period that additional assessment work and significant changes to the consolidated assessment report are required, the EAP, on behalf of the applicant, must address the identified shortcomings and submit the revised consolidated assessment report to the decision-making authorities and the I&APs for a further 30-day public participation period. The revised document, which reflects the outcome of the additional public participation, must be submitted to the decision-making authorities for decision-making.

The environmental impact assessment process is the most time sensitive and protracted phase of the decision-making process as this phase includes field work, modelling and the preparation of detailed reports and plans. There are several specialist studies that must be undertaken to understand the social and cultural context of the study area, the site conditions including the environmental sensitivity of the site, the geohydrology of the site, the effects of the impacts on the environment including the water environment and the ability to mitigate and manage the identified impacts. It is important that the field work is planned well in advance, and in some cases undertaken prior to the finalisation of the scoping process to ensure that the work is undertaken within the season which will best reveal the attribute being considered.

Much of the information prepared for the scoping phase will be used in the general chapter of the consolidated assessment report, for example, the project description, scope and supporting documentation provided with respect to the EAP and the relevant specialists. The assessment process is to be undertaken in a consultative manner which is intended to enhance the understanding of impacts and determine the acceptability of proposed mitigation measures. In addition, the content of the draft and final consolidated assessment report will be similar, however, the final consolidated assessment report will include the outcome of the public participation process that was undertaken on the draft report and all sections in the final document will be updated with any outcomes of the public participation process that were found to be relevant. In addition, the supporting information in

the consolidated assessment report will be more comprehensive, in that the evidence of public participation will be included.

Broadly, the objectives of the environmental impact assessment process are to-

- Determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- Describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the approved site as contemplated in the accepted scoping report;
- Focus on confirming the environmental, cultural and social sensitivity of site for a number of environmental themes;
- Identify the possible impacts of activity on the environment;
- Identify possible alternatives where relevant;
- Identify and assess the significance of the impacts in relation to extent, duration and probability of occurrence of the possible impacts of the activity on the environment;
- Identify and discuss possible mitigation and management measures;
- Determine the residual impacts after mitigation;
- Determine the ability to mitigate and manage the impacts;
- Where relevant, consider the cumulative impacts;
- Provide a substantive statement on the acceptability or not of the exploration or production operation per environmental theme;
- Identify the ideal location which has the lowest level of environmental sensitivity for the proposed site having considered the mitigation hierarchy;
- Determine the management and mitigation measures that must be included in the environmental management programme, the water and waste water management plan, the solid waste management plan and the draft emergency and spill prevention plan;
- Identify the residual risk that need to be managed and monitored that are to be incorporated in the operational environmental monitoring plan; and
- Prepare the draft plans and report related to financial provisioning.

The draft consolidated assessment report and final consolidated assessment report is to be compiled by the EAP based on information provided by the applicant, the professional knowledge of the EAP and inputs provided by the specialists and engineers, and in the case of the final report, the inputs from the public participation process.

Paragraph 2 provides the detailed information required in the draft consolidated assessment report and final consolidated assessment report.

## 2. Content of the draft and final consolidated impact assessment report

### 2.1 General information

Within the intervals contemplated in the EIA Regulations, after the acceptance of the final scoping report and the plan of study for scoping, the applicant must submit to the decision-making authorities the consolidated assessment report with the following headings, and which includes the information under respective Chapter headings identified below:

- Chapter 1 - Summary for decision-makers
- Chapter 2 - Project description
- Chapter 3 - Scope of the project
- Chapter 4 - Public participation report
- Chapter 5 - Specialist assessment reports

- Section 5.1 - Agricultural impact assessment
- Section 5.2 - Terrestrial biodiversity impact assessment
- Section 5.3 - Aquatic biodiversity impact assessment and wetland and riparian delineation study
- Section 5.4 - Animal and plant species impact assessments
- Section 5.5 - Noise and artificial light impact assessment
- Section 5.6 - Climate change impact assessment
- Section 5.7 - Air quality impact assessment
- Section 5.8 - Seismicity risk assessment
- Section 5.9 - Socio economic impact assessment
- Section 5.10 - Heritage impact assessment
- Section 5.11 - Hydrology study (surface water)
- Section 5.12 - Hydrogeology study (groundwater)
- Section 5 13 - Traffic impact study (including the possibility of utilising rail)
- Section 5.14 - Radio frequency interference study (SKA, defence, aviation and weather services)

- Chapter 6 – Plans, layouts and designs
  - Section 6.1 - Water and waste water management plan
  - Section 6.2 - Solid waste management plan
  - Section 6.3 - Emergency and spill contingency plan
  - Section 6.4 - Operational monitoring plan
  - Section 6.5 - Well layout
  - Section 6.6 - Well design
- Chapter 7 - Environmental management programme
- Chapter 8 - Financial provisioning plans, reports and calculations
- Chapter 9 - Supporting information
  - Section 9.1 - EAP and specialist information
  - Section 9.2 - Public participation documentation
  - Section 9.3 - Impact assessments

### 2.2 Chapter 1 - Summary for decision-makers

The first chapter of the draft and final consolidated assessment report is the summary for decision-makers. The summary is to provide a concise project location and scope, the need and desirability of the project, a short description of the environmental sensitivity of the site[23] and the anticipated assessments to be undertaken to confirm the sensitivity. In addition, the summary must include the proposed process that will be followed to generate the consolidated assessment report and environmental management programme, including how the views and contributions of I&APs will be obtained and documented. The summary for the final consolidated assessment report must include an outline of the outcome of the public participation process followed in the draft consolidated assessment report, highlighting any specific issues that the environmental impact assessment process considered.

### 2.3 Chapter 2 - Project description

The second chapter of the draft consolidated assessment report and final consolidated assessment report is the detailed project description. This chapter must include the following information related to project description, the location of the project and the contact details of the EAP who prepared the report:

- The name of the project;

[23] This can be taken from the sensitivity identified in the screening report for the site.

- A short description of the project, including the anticipated duration;
- The proposed location of the project,[24] including the farm name or names with the relevant portion number or numbers and the relevant surveyor general's twenty-one-digit codes as well as the coordinates of the site;
- Details of the property owner/s;
- The relevant major river catchment in which the project is to be undertaken;
- The current land use and adjacent land uses;
- The name and contact details of the applicant. The contact details should include relevant telephone and cell phone numbers, the business street and postal address;
- The experience that the applicant has with undertaking similar projects;
- The name and contact details for the appointed EAP, which must include a business contact as well as a personal cell phone number;
- The company details for the EAP including telephone numbers, and physical and postal address; and
- An annotated location map, the land use context surrounding the proposed project, major roads, towns, major topographical features, the 1;100-year flood lines, railroads, and substations where relevant.

All supporting documentation related to the EAP or specialists must be provided in Chapter 9.

### 2.4 Chapter 3 - Project scope

Chapter 3 of the draft and final consolidated assessment report is the project scope. The project scope must provide a full understanding of the activities to be undertaken through all phases of the project and must include the following information:

- A detailed description of what activities are to be undertaken through the construction, operation and closure of the project, as well as any associated structures or infrastructure to be developed if any;
- The identified activity that will be triggered in relation to the EIA Regulations Listing Notices;[25]
- The water uses being applied for in terms of the NWA Water Use Licence Regulations;
- The scope of the heritage impact assessment as agreed with the relevant heritage resources agency in terms of section 38(3) of the NHRA or section 41(3) of the KZNARI Act;
- The right being applied for in terms of the MPRDA;
- Confirmation of acceptance of the scoping report and plan of study for the environmental impact assessment process;
- The reserve being investigated;
- A discussion on the technology to be utilised in the exploration or production activities including any alternative technologies considered if relevant;
- Need and desirability of the project;[26]
- The legislative and policy context including any strategies or plans within which the project is located and the manner in which the project responds to this context;
- Details of the preferred site as approved in the scoping report; and
- Existing licenses, authorisations or rights which exist for the land within the site area.

Any supporting documentation related to the project scope must be provided in Chapter 9.

[24] The farm names, SG codes and site coordinates are available from the screening report produced by the screening tool.
[25] For a mining activity the associated activities are included in the main mining activity and the associated activities are not to be separately identified.
[26] This information must be provided in accordance with DFFE's *Guideline on Need and Desirability, 2017*.

### 2.5 Chapter 4 - Public participation

Once the scoping report and plan of study for scoping have been accepted by the competent authority and discussed with the DWS and the relevant HRA, the public participation process on the draft consolidated assessment report can begin.

As indicated in the preamble, one of the objectives of the introduction of MIRs is to combine the information prepared to apply for environmental permissions, to develop a project which anticipates and then utilises fracturing technology, into one consolidated assessment document to allow for one combined public participation process. This will provide for an efficient and cost-effective public participation process and reduce stakeholder fatigue.

Providing the public with adequate opportunity to engage with the project and provide inputs is a crucial component of any project. It is widely acknowledged that the exploration and production of petroleum resources as well as the use of fracturing technology are highly complex and controversial topics. It is therefore vital for the applicant to carefully consider the extent and methods to be used in the public participation process.

When communicating information on complex or controversial projects, applicants should consider extending their efforts beyond the use of company stakeholder databases, commercial media, email communication, providing information on websites, site notices and single language background information documents. The approaches to stakeholder communication should be context specific to adequately inform stakeholders of the proposed project, and specific attention must be placed on reaching stakeholders in rural areas, which would include communities that may be affected and farmers, as petroleum exploration and production operations are often located in remote areas.

The applicant's approach to stakeholder engagement (to disseminate information and register stakeholders) through more accessible means could include among others:

- Community and commercial radio stations;
- Notifying local ward councillors and traditional leaders;
- Notifying national and local non-governmental organisations, community-based organisations, and farmers associations located within the study area;
- Providing a background information document;
- Placing these background information documents in strategic places frequented by stakeholders which could include community halls, churches, taverns and notice boards in malls/shopping centres;
- Affixing notice boards on the boundary fence of the site;
- Physically or in the form of registered delivery, inform adjoining and adjacent landowners of the project; and
- Using local and community news media.

Registration should then take place using accessible means which could include;

- Social media apps for example Facebook and WhatsApp;
- Email;
- Prepaid SMS; and
- Dedicated information desks set up at malls, filling stations, farmers cooperation's or shopping complexes in the affected community.

When registering stakeholders, the applicant must consider the protection of privacy of stakeholders. No personal details may be used for purposes other than the project under consideration in terms of

the Protection of Personal Information Act, 2013.[27] Once interested and affected parties have registered, innovative ways of distributing further information about the project which must be consulted on must be considered which could include among others;

- Free download SMS;
- Providing access to pre-paid or free download apps;
- Email;
- Locating documents in libraries, municipal offices and offices of community-based organisations or non-governmental organisations; and
- At the offices of the relevant national and provincial Departments or a municipal office.

In person meetings with affected community members could be held. Such meetings should be organised at accessible venues such as community halls or municipal offices, also catering for people with disabilities. The EAP must provide accessible information to allow stakeholders who have no experience with fracturing technologies and the impacts thereof to follow the discussions and for knowledge to be transferred.

Virtual meetings can be an effective means of communication for a selected audience who have access to internet but virtual meetings cannot be the only method of stakeholder consultation. The timing of meetings is important, stakeholders must be able to conveniently attend meetings, so planning meetings outside of worktime is suggested.

Consideration should be given to the appropriate use of language. Background information documents should include, but not be limited to, versions in the predominant language of the study area. Technical documents should include an executive summary in the predominant language of the study area, and slide presentations should also be translated. Allowing for interpreters at public meetings is important to allow stakeholders to express themselves without a language barrier. Where appropriate, recorded verbal inputs from illiterate stakeholders must be provided for.

### 2.5.1 Section 4.1- Public Participation Report

After acceptance of the scoping report and the approval of the final plan of study for the consolidated assessment report by the competent authority, the approved public participation process must be implemented. The outcome of the public participation process must be written up in a public participation report to be included as chapter 4 in the consolidated assessment report. This chapter in the draft consolidated assessment report will be the same as that identified in the approved plan of study for scoping in that it will outline the process to be followed, however the consolidated assessment report will include the outcome of the public participation process undertaken. The public participation report must, as a minimum, include the following information:

- Objectives of the public participation process;
- Identified study area of the project impact, including the rationale for the identification of the area;
- Identify the assumptions made and gaps in knowledge;
- An outline of the public participation process followed, indicating what actions were undertaken, venues, dates and times of interactions;
- How the actions undertaken aligned to that which was approved in the plan of study for scoping;
- The audience reached in relation to the identified study area of the project impact;
- The participants at any meeting, including attendance registers;
- Minutes of meetings or interactions, including recorded inputs;

[27] The Protection of Personal Information Act, 2013 (Act No. 4 of 2013).

- Objectives and outcomes of any information sessions held where relevant;
- Consultation undertaken with the local municipality, the site owners and site occupiers as well as adjacent site owners or occupiers;
- Which documents were consulted and how were the documents distributed and located;
- How persons without access to the internet access and transport were accommodated;
- How issues of language were considered; and
- Copies or photographs of all correspondence, documents, notices etc. distributed or erected;
- A summary of the issues raised by interested and affected parties and an indication of the manner in which the issues were incorporated or the reasons for not including the comments, in the form of a comments and responses report.

### 2.6 Chapter 5 – Impact assessment reports

Impact assessments prepared by specialists, provide the basis for the information provided in the consolidated impact assessment report. The EAP utilises the findings of the impact assessment reports to identify impacts related to specific environmental themes and together with the specialist, determine the significance, probability and duration of the impacts. In addition, the impact assessments identify possible mitigation measures, the residual impacts after mitigation and the general acceptability of the activity in relation to the specific environmental theme investigated. Noting that the EAP relies on these assessments, it is imperative that a specialist who undertakes the assessment is suitably qualified, undertakes the assessment utilising generally acceptable sector methodologies, models and guidelines, has undertaken the assessment within the season which would best highlight any impacts and has undertaken an independent assessment.

To support the final scoping report and plan of study, the specialist or EAP, would need to have undertaken a site sensitivity verification as identified in paragraph 3.2 of Chapter 3 of Part 1. This site sensitivity verification would have followed either the prescribed general requirements for a site sensitivity verification where no specific protocol has been prescribed or a specific site sensitivity verification as identified in the prescribed protocol for the specific environmental theme under discussion.[28] To support the environmental impact assessment process the specialists, would be required to undertake the specialist impact assessments as identified and approved in the plan of study.

The Minister responsible for environmental affairs has prescribed protocols for identified specialist assessments for specific environmental themes. Further protocols for additional environmental themes are being developed and will be developed in the future. Where a protocol has been prescribed for a specific theme this protocol must be used to undertake the assessment and inform the report content. Where no specific protocol has been prescribed, Appendix 6 of the EIA Regulations informs the general content requirements of a specialist impact assessment report. These requirements must include among others, the following:

- An indication of the scope and purpose for which the report was prepared;
- An indication of the age of the data used in support of the assessment;
- A description of the existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;
- The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;

[28] The general and specific prescribed site sensitivity verification requirements are identified in Government Notice No. 320 published 20 March 2020 and Government Notice No. 1150 published 30 October 2020 as amended by Government Notice No. 3717 published 28 July 2023.

- A description of the methodology adopted in undertaking the assessment including the equipment and modelling used where relevant;
- A map superimposing the activity including associated structures or infrastructure on the environmental sensitivities;
- Impacts identified, including the severity of impacts, significance and duration;
- Any mitigation measures that could be applied;
- The severity of impacts after mitigation;
- Mitigation to be applied through the construction and operational phase, for inclusion in the EMPr;
- An indication of any areas to be avoided due to sensitivity including any buffers;
- A discussion on any assumptions made and any uncertainties or gaps in knowledge which exist and could impact on the findings;
- A reasoned opinion on whether the activity should be authorised, and
- Any conditions that should be included in the environmental authorisation for the activity.

The final specialist impact assessment will be updated with any relevant inputs made by I&APs during the public participation process. The EAP will consider findings of each of the specialist impact assessments in the consolidated assessment report and will include any mitigation measures identified in the specialist assessment impact study, in the EMPr. Any conditions identified as being necessary by the specialist and which must be applied will also be identified in the consolidated assessment report. The specialist impact assessment and any supporting documents to be attached by the relevant specialist will be included in Chapter 9.

### 2.7 Section 5.1 – Agricultural agro-ecosystem impact assessment

#### 2.7.1 General

Exploration and production of petroleum generally takes place in undeveloped areas which would have an agricultural zoning and would be used for agricultural purposes, e.g. either crop production or animal grazing. The infrastructural requirements to support petroleum exploration or production also have the ability to fragment agricultural resources. As food security is fundamentally important, a major concern from an agricultural perspective is the possible loss of high potential agricultural land, the curtailment of agricultural activities or the fragmentation of agricultural land leading to further loss of agricultural productivity.

The aspects to be covered under this heading relate to the current status of the agricultural land and the impacts that the exploration or production activities would have on that status. The manner in which to consider these impacts have been included in the "*Protocol for the specialist assessment and minimum report content requirements for environmental impacts on agricultural resources*[29] and are therefore not repeated here. Having applied the requirements of the site sensitivity verification in the scoping phase, the agricultural specialist must apply the assessment requirements of the agricultural resources protocol.

#### 2.7.2 Content of the agricultural agro-ecosystem impact assessment report

The impacts on agricultural land must be reported on in line with the "*Protocol for the specialist assessment and minimum report content requirements for environmental impacts on agricultural resources"*. The agricultural agro-ecosystem impact assessment report must be signed off by the specialist and must be included in the consolidated assessment report to be submitted as part of the environmental authorisation and water use license application processes, for onshore petroleum

[29] Government Notice No. 320 published 20 March 2020.

exploration and production using fracturing technology. The operational monitoring requirements identified by the specialist must be included in the integrated operational monitoring plan to be included in section 6.4 of the consolidated assessment report. The operational monitoring requirements must include the continued monitoring requirements of the baseline monitoring to ensure that cumulative impacts can be monitored over time.

The findings of the agricultural agro-ecosystem impact assessment must contain –

- A reasoned opinion, based on the findings of the impact assessment, regarding the acceptability or not, of the development related to agricultural land and any conditions to be included in the environmental authorisation should the project be approved, if relevant; and
- A discussion on the application of the impact mitigation hierarchy and where areas of high agricultural potential cannot be avoided, the mitigation measures which must be implemented to mitigate the impacts of the exploration or production activities on agriculture. These mitigation measures must be transferred by the EAP into an environmental management programme to be included in Chapter 7.

### 2.8 Section 5.2 – Terrestrial biodiversity impact assessment

#### 2.8.1 General

Petroleum exploration and production operations can, among others, impact on terrestrial biodiversity through the loss of indigenous vegetation due to clearing, changes to the ecological functioning and processes, the establishment and spread of declared weeds and invader plants due to clearing and disturbance of vegetation, increased runoff and erosion due to the presence of hard surfaces and compaction that changes the infiltration and runoff properties of the landscape, the interference with ecological corridors, and the general disturbance of habitats. These impacts would be experienced during the construction and operational phases of petroleum exploration and production operations. The phased nature of production activities will also result in cumulative impacts which will be experienced throughout the production phase.

It is therefore necessary to consider these impacts and to avoid them or where avoidance is not possible to mitigate against such impacts. The manner in which to consider these impacts have been included in the "*Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity*[30]*"* and are therefore not repeated here. Having applied the requirements of the site sensitivity verification in the scoping phase, the biodiversity specialist must apply the assessment requirements of the terrestrial biodiversity protocol.

#### 2.8.2 Content of the terrestrial biodiversity impact assessment

The impacts on terrestrial biodiversity must be reported on in line with the "*Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity"*. The terrestrial biodiversity impact assessment must be included in the consolidated assessment report to be submitted as part of the environmental authorisation and water use license application processes for onshore petroleum exploration and production using fracturing technology. The operational monitoring requirements identified by the specialist must be included in the integrated operational monitoring plan required to be included in section 6.4 of the consolidated assessment report. The operational monitoring requirements must include the continued monitoring

[30] Government Notice No. 320 published 20 March 2020.

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requirements of the baseline monitoring to ensure that cumulative impacts can be monitored over time.

The findings of the terrestrial biodiversity impact assessment must contain –

- A reasoned opinion, based on the findings of the impact assessment, regarding the acceptability or not, of the development related to the impact of the project on biodiversity and any conditions to be included in the environmental authorisation should the project be approved, if relevant; and
- A discussion on the application of the impact mitigation hierarchy and where areas of high terrestrial biodiversity cannot be avoided, the mitigation measures which must be implemented to mitigate the impacts of the exploration or production activities on biodiversity. These mitigation measures must be transferred by the EAP into an environmental management programme to be included in Chapter 7.

## 2.9 Section 5.3 – Aquatic biodiversity impact assessment and wetland/riparian delineation study

### 2.9.1 General

Riparian areas and wetlands are crucial to deliver ecosystems services which include, among others, maintaining habitats for species and biota diversity, riverbank stability, erosion prevention and maintaining water quality. It is therefore important to identify these features in the environment, and to protect them from disturbance. Avoidance of the loss of wetlands and impacts to rivers and wetlands is a priority.

Impacts to wetlands and riparian areas could occur during the construction and operational phases of onshore petroleum exploration and production using fracturing technology. The phased nature of production activities could also result in cumulative impacts which will be experienced throughout the production phase.

In order to determine the potential impacts from the proposed onshore petroleum exploration and production operations on riparian areas and wetlands, and to ensure that these impacts are avoided, or where they cannot be entirely avoided, that adequate mitigation measures are proposed, it is necessary to conduct the following studies:

- A wetland and/or riparian delineation in accordance with DWAF guidelines[31] and utilising relevant indicators;[32]
- Determine the present ecological state of the wetland or riparian areas, and identify species of conservation concern and habitats that are found or could potentially be found on the site; and
- Assess the ecological importance and sensitivity of the wetlands and riparian zones identified.

Aspects to be considered in wetland delineation include the terrain unit indicator, the soil form indicator, the soil wetness indicator and the vegetation indicator.

In addition to the studies identified above, the biodiversity specialist must apply the assessment requirements identified in the "*Protocol for the specialist assessment and minimum report content requirements for environmental impacts on aquatic biodiversity*".[33]

[31] Guideline document, "A Practical Field Procedure for the Identification and Delineation of Wetlands and Riparian Areas", DWAF (2005).
[32] Updated Manual for the Identification and Delineation of Wetlands and Riparian Areas, (2008).
[33] Government Notice No. 320 published 20 March 2020.

### 2.9.2 Content of the aquatic biodiversity impact assessment and wetland/riparian delineation study

The impacts on aquatic biodiversity and the outcome of the wetland and riparian delineation study must be reported on in line with the "*Protocol for the specialist assessment and minimum report content requirements for environmental impacts on aquatic biodiversity".* In addition, the results of the wetland and riparian delineation studies must be presented in map format with a Google Earth overlay. The aquatic biodiversity impact assessment and wetland/riparian delineation study must be signed off by the specialist and must be included in the consolidated assessment report to be submitted as part of the environmental authorisation and water use license application processes for onshore petroleum exploration and production using fracturing technology. The operational monitoring requirements identified by the specialist must be included in the integrated operational monitoring plan required to be included in section 6.4 of the consolidated assessment report. The operational monitoring requirements must include the continued monitoring requirements of the baseline monitoring, to ensure that cumulative impacts can be monitored over time.

The findings of the aquatic biodiversity impact assessment and the wetland and riparian study must contain –

- A reasoned opinion, based on the findings of the impact assessment, regarding the acceptability or not, of the development related to the impact of the project on aquatic biodiversity and any conditions to be included in the environmental authorisation should the project be approved, if relevant; and
- A discussion on the application of the impact mitigation hierarchy and where areas of high aquatic biodiversity cannot be avoided, the mitigation measures which must be implemented to mitigate the impacts of the exploration or production activities on aquatic biodiversity. These mitigation measures must be transferred by the EAP into an environmental management programme to be included in Chapter 7.

## 2.10 Section 5.4 – Animal and plant species impact assessments

### 2.10.1 General

The species specialist impact assessments must consider animal and plant species of conservation concern. The aim of the specialist impact assessments is to determine the state of animal and plant habitats and animal and plant communities on the site, to determine the possible impact that activities related to onshore petroleum exploration and production operations will have on these species, to identify areas to be avoided and to provide recommendations to avoid, limit or mitigate impacts. Species of conservation concern are those species listed by conservation authorities as being on the IUCN 'Red List' of threatened species[34] at risk of extinction, or on the South African's National Red List website[35] as critically endangered, endangered or vulnerable or listed as nationally rare.

The specialist impact assessment is required to determine the potential for occurrence of species of conservation concern in the study area, the possible impact on populations of species of conservation concern and on overall species richness, genetic variability, population dynamics and habitats important for species of conservation concern. Impacts to species of conservation concern would relate to ecosystem functions which would include habitat fragmentation, disruption to ecological corridors, changes to abiotic environmental conditions, changes to disturbance regimes, impedance of movement of material or water and cumulative impacts as the impacts related to onshore

[34] https://www.iucnredlist.org/
35 http://speciesstatus.sanbi.org/

petroleum exploration and production operations will occur during the construction and operational phases.

In order to identify the impacts referred to above, the species specialists must apply the assessment requirements identified in the "*Protocol for the specialist assessment and minimum report content requirements for environmental impacts on animal species*[36] and the "*Protocol for the specialist assessment and minimum report content requirements for environmental impacts on plant species"*.

### 2.10.2 Content of the animal and plant species impact assessment report

The impacts on animal and plant species of conservation concern must be reported on in line with the "*Protocol for the specialist assessment and minimum report content requirements for environmental impacts on animal species"* and the *"Protocol for the specialist assessment and minimum report content requirements for environmental impacts on plant species".* The animal and plant species specialist impact assessment report must be signed off by the specialist and must be included in the consolidated assessment report, to be submitted as part of the environmental authorisation and water use license application processes for onshore petroleum exploration and production using fracturing technology. The operational monitoring requirements identified by the specialist must be included in the integrated operational monitoring plan required to be included in section 6.4 of the consolidated assessment report. The operational monitoring requirements must include the continued monitoring requirements of the baseline monitoring to ensure that cumulative impacts can be monitored over time.

The findings of the animal and plant species impact assessment must contain –

- A reasoned opinion, based on the findings of the impact assessment, regarding the acceptability or not, of the development related to the impact of the project on animal species and any conditions to be included in the environmental authorisation should the project be approved, if relevant; and
- A discussion on the application of the impact mitigation hierarchy and where areas of high animal species biodiversity cannot be avoided, the mitigation measures which must be implemented to mitigate the impacts of the exploration or production activities on animal species. These mitigation measures must be transferred by the EAP into an environmental management programme to be included in Chapter 7.

## 2.11 Section 5.5 – Noise and artificial lighting impact assessments

Exploration and production operations for petroleum resources are generally located in rural areas with low levels of noise and artificial light. These areas are also known to have an aesthetic visual quality. The change of land use associated with the exploration and production of petroleum has an industrial connotation that could interrupt the scenic characteristics and the "sense of place" value of these landscapes.

### 2.11.1 General

Increased noise and light could impact negatively on animal species through displacement and the interruption of breeding or feeding habits. On humans, the impact from increased noise and light and a change of "sense of place" can manifest through health and emotional impacts as well as impacts to tourism. As such, a noise and light specialist study is required, to determine the impacts of noise, light and visual impacts.

[36] Government Notice No. 1150 published 30 October 2020 and amended through Government Notice No. 3717 published 28 July 2023.

A "*Protocol for the specialist assessment and minimum report content requirements for noise impacts"* has been gazetted[37] and the specialist or EAP is required to undertake a noise assessment in accordance with this protocol.

During the onshore petroleum exploration and production using fracturing technology, artificial light will be required to provide for human safety and increased productivity. This light, however, when poorly designed and installed can be a nuisance and impact negatively on the health and wellbeing of humans and on animal species and the sense of place of the study area. The potential impacts of artificial light are related both to spill light, which is the illumination that is produced by a light source or combination of light sources at a point, and glare, which is associated with the brightness of light as experienced by an observer. As such the potential impacts of light on the study area is to be determined. In order to assess the light impact of the proposed operation, the following steps must be implemented:

- Review the applicable legislation, Regulations and guidelines that apply to the need for and restriction on artificial lighting;
- Identify the study area in which the light study is to be undertaken, including a rational;
- Prepare a draft artificial lighting layout based on the needs of the operation;
- Identify the artificial light that will be generated by the operation on the basis of the draft artificial lighting layout;
- Identify existing artificial light sources on the site and in the study area;
- Identify sensitive receptors both human and animal;
- Based on the draft artificial lighting layout, determine the potential generation of artificial light and glare from the operation and assess the impacts on human receptors, the identified animal species and the sense of place, against the baseline (new moon phase);
- Consider the impact of the additional artificial light from various lines of sight;
- Consider any mitigation measures which could be applied to reduce the impacts as well as any amendments that need to be made to the draft artificial lighting layout. Such mitigation measures could include-
    - switching off lights between certain times;
    - installing dimmers, timers, flashing rate and motion sensors;
    - mounting lights low and the lowest intensity lighting appropriate for the task to be undertaken;
    - using non-reflective, dark surfaces;
    - keeping bollard lights shielded as far as possible;
    - permanently direct pole mounted lighting downwards;
    - using amber lighting;
    - using long wavelength lights and LED lights to allow for lighting controls to be fitted;
    - remotely computer-controlled lighting;
    - only adding light for specific purposes;
    - considering planting screening vegetation;
- Identify the monitoring and auditing requirement that must be implemented.

### 2.11.2 Content of the noise and artificial lighting impact assessments report

The outcome of the noise impact assessment must be reported on in line with the "*Protocol for the specialist assessment and minimum report content requirements for noise impacts"*.

[37] Government Notice No. 320 published 20 March 2020.

The outcome of the artificial lighting assessment must be documented in a specialist impact assessment report which must include as a minimum the following aspects-

- Summary of findings;
- Detail the applicable legislation, Regulations or guidelines related to light impact assessment;
- Identify the site considered on a map, indicating-
  - the locations at which the existing night light from the site have been taken;
  - the location of the sensitive receptors;
  - the location of the existing lighting sources;
- Describe the methodology used to assess the additional light impact;
- Provide the dates on which the light assessment was undertaken;
- The weather conditions and any conditions that would impact on the results;
- Identify the methodology used to assess the existing light impacts;
- Mitigation measures to be included in the EMPr;
- Monitoring and auditing requirements; and
- Revised artificial lighting layout.

The noise and artificial lighting specialist impact assessment report must be signed off by the specialist and must be included in the consolidated assessment report to be submitted as part of the environmental authorisation and water use license application processes for onshore petroleum exploration and production using fracturing technology. The operational monitoring requirements identified by the specialist must be included in the integrated operational monitoring plan required to be included in section 6.4 of the consolidated assessment report. The operational monitoring requirements must include the continued monitoring requirements of the baseline monitoring to ensure that cumulative impacts can be monitored over time.

The findings of the noise and artificial lighting impact assessment must contain a reasoned opinion, based on the findings of the impact assessment, regarding the acceptability or not, of the development related to the impact of the project on sense of place and any conditions to be included in the environmental authorisation should the project be approved, if relevant.

## 2.12 Section 5.6 – Climate Change impact assessment

South Africa is a signatory to the Paris Agreement which is a global commitment to cut greenhouse gas (GHG) emissions in order to keep the rise in mean global temperature to well below 2 °C above preindustrial levels, and preferably limit the increase to 1.5 °C. GHG emissions are expressed as units of $CO_2$ equivalence ($CO_2$-eq). To meet this commitment, South Africa has pledged a nationally determined contribution to global mitigation efforts of limiting its GHG emissions to between 398 to 510 Mt $CO_2$-eq in 2025, reducing to between 350 and 420 Mt $CO_2$-eq in 2030, moving towards achieving the ultimate goal of net-zero $CO_2$-eq emissions by 2050. Net-zero means that emissions of $CO_2$-eq due to human activities, and removals of these gases, are in balance over a given period.

### 2.12.1 General

Exploration and production of operations for petroleum resources will contribute to GHG emissions through the materials used for the construction of the operations and infrastructure, through fugitive emission when extracting and transporting gas and through the use of the gas extracted. As such, part of the decision-making process for exploration and production operations, must determine the GHG contribution of the facility for all phases of the operations and consider the impact of these emissions on the cumulative GHG contributions of the country's GHG inventory. As gas has lower $CO_2$ emissions than coal and petroleum liquids the use of gas in the energy sector will reduce overall $CO_2$ emissions

from the sector, therefore there is no need to consider avoided emissions from the transition (where its used if for an Open Cycle Gas Turbine).

The objective of the climate change impact assessment is to –

- Identify the climate change policy and legislative context and to indicate conformance to such policy and legislation;
- Identify the proposed project's prospective contribution to climate change through the calculation of GHG emissions of all phases of the project;
- Consider how these GHG emissions will impact on the country's global GHG reduction commitments;
- Consider the impact on any carbon sinks; and
- Determine the possible impact of climate change on the project's core operations to identify appropriate measures to make the project resilient to these impacts.

Although the consequence of the project's GHG emissions on the regional environment have traditionally been considered in a climate change impact assessment, it is understood that the impacts of climate change are global in nature and that the GHG emissions from individual projects or source cannot be connected directly to any specific climate change impact. Therefore, rather than embark on a theoretical exercise to determine the impacts of the GHG emission from a specific exploration or production project on the regional environment, this guidance requires the consideration of how the GHG emissions from the project impact on the carbon budget set[38] for the relevant sector and the country as a whole. In addition, this guidance requires the determination of the project's potential to reduce its GHG emissions (including the emissions from the use of the gas extracted) in line with relevant national reduction targets, through efficiencies, alternatives, offsets or carbon sinks.

### 2.12.2 Content of a climate change impact assessment

The climate change impact assessment must be undertaken by a SACNASP registered professional in the field of atmospheric science or an equivalent field. The assessment must consider the information contained in the "Compendium of Greenhouse Gas Emissions Methodologies for the Natural Gas and Oil Industry 2021."[39] In order to meet the objectives of the climate change impact assessment the following steps must be followed as a minimum:

- Define the goal, scope and boundaries of the climate change impact assessment;
- Identify the GHG contributing sources and activities (GHG inventory);
- Decide on the GHG determination methodology to be used to calculate direct emissions, indirect emissions and emissions from the use of the gas produced;
- Collect the necessary calculation data;
- Calculate the emissions identified in the inventory per annum and over the life of the operations;
- Calculate the GHG emissions from the use of gas to be produced by the operation over the operational life;
- Identify sources of possible fugitive emissions (fugitive emission inventory);
- Determine the methodology to be used to determine potential fugitive emissions;

[38] It is acknowledged that carbon budgets for sectors are yet to be determined, however, consideration should be given to international best practice in this regard.
[39] Compendium of Greenhouse Gas Emissions Methodologies for the Natural Gas and Oil Industry 2021 prepared for the American Petroleum Institute which can be accessed at https://www.api.org/-/media/files/policy/esg/ghg/2021-api-ghg-compendium-110921.pdf.

- Calculate the potential fugitive emissions;
- Consider the significance of the cumulative emissions against the South African carbon budget and the sector emissions targets;
- Discuss alternatives if relevant (for exploration and production activities alternatives may not be feasible);
- Identify the impacts of climate change on the project;
- Identify climate change adaption measures for the project; and
- Identify possible climate change mitigation measures.

### 2.12.3 Content of the climate change impact assessments report

The outcome of the climate change impact assessment must be documented in a report under the following minimum headings-

- Summary of findings;
- GHG inventory for direct, indirect and fugitive GHG emissions for all phases of the operation for the life of the operation;
- The calculation methodology to be used to identify the direct, indirect and fugitive GHG emission for all phases of the operation as well as for the product extracted;
- Emissions calculations for direct, indirect and fugitive GHG emission for all phases of the operation as well as for the product extracted over the life of the operation;
- Significance of the emissions calculated in relation to the country's national determined commitments and the sector targets for all phases of the operation as well as the product extracted over the life of the operation;
- The impact on any carbon sinks;
- Alternatives and any mitigation measures considered;
- Adaption measures to be implemented;
- Monitoring and auditing requirements;
- Mitigation measures to be included in the EMPr; and
- Climate change specialists' statement on the acceptability of the proposed project in relation to climate change impacts.

The climate change impact assessment report must be signed off by the specialist and must be included in the consolidated assessment report to be submitted as part of the environmental authorisation and water use license application processes for onshore petroleum exploration and production using fracturing technology.

## 2.13 Section 5.7 – Air Quality impact assessment

The exploration and production of a petroleum resource utilising fracturing technology can impact on regional and local air quality through, among others, the increase of traffic related to supplying materials to and removing wastes from the operations, emissions from diesel-fired drilling equipment, leaking of gas from the drilling operations or related infrastructure, the well completion process, venting of gas to clear well heads, dust generation from the use of propellants, the handling of diesel and the storge and handling of waste products. Fracturing operations will also impact on worker's health and safety due to the increased levels of crystalline silica and VOCs on the site.

### 2.13.1 General

Due to the potential for the use of fracturing technology to increase ambient air pollution and to contribute to the deterioration of air quality on the site, it is necessary to undertake an air quality

impact assessment to evaluate the possible impact of the use of the technology on the environment and worker's health and safety. The air quality impact assessment must be undertaken by a SACNASP registered professional, registered in the field of atmospheric science or an equivalent field. The information gather through the modelling and impact determination must be considered as input data for use in the climate change impact assessment.

South Africa currently does not have national minimum emission standards for well heads, as such the possible impacts on air quality must be considered by undertaking continuous ambient air quality monitoring and point source emission monitoring at frequencies to be determined by the specialist impact assessment and worker health and safety monitoring as required by the Occupational Health and Safety Act.

### 2.13.2 Content of the air quality impact assessment

The main objectives of the air quality impact assessment are to quantify the extent to which existing site and ambient pollution levels will change as a result of the use of fracturing technology, to determine the significance of these changes to identify any management and mitigation measures and to prepare an operational monitoring plan to ensure the protection of workers and the environment.

The outcomes of the air quality impact assessment must be considered against the results of the baseline air quality monitoring study. Should any elevated emissions be detected during operations, the impacts on the respiratory health of the communities surrounding the site will need to be determined, through methodologies which could include health screening. The air quality impact assessment must be based on the commitment to eliminate gas venting to situations related to emergency, safety and operation upset only, and flaring of gas should not be used as a long-term management strategy.

The following steps as a minimum must be undertaken in the air quality impact assessment:

- Identify the scope of the project and study area including the rational for the determination of the study area;
- Identify the regulatory requirements for identified key pollutants against which compliance must be assessed and health risk screened;
- Identify the local and regional meteorology (weather and climate);
- Identify the local and regional topographical features;
- Identify the methodologies and models to be used when undertaking the assessment;
- identify possible point sources of emission from the various activities that will be undertaken through the operations as well as any infrastructure and quantify the associated emissions through a review of relevant literature which must include the "Compendium of Greenhouse Gas Emissions Methodologies for the Natural Gas and Oil Industry 2021"[40] and "A Voluntary Standard for Global Gas Flaring and Venting Reduction 2004;"[41]
- Identify potential air quality sensitive receptors in the study area;
- Determine the atmospheric dispersion potential of the study area taking account of the local and regional metrology and topography;

[40] Compendium of Greenhouse Gas Emissions Methodologies for the Natural Gas and Oil Industry 2021 prepared for the American Petroleum Institute which can be accessed at https://www.api.org/-/media/files/policy/esg/ghg/2021-api-ghg-compendium-110921.pdf.

[41] A Voluntary Standard for Global Gas Flaring and Venting Reduction 2004 prepared for the World Bank which can be accessed at https://www.google.com/search?client=safari&rls=en&q=A-voluntary-standard-for-global-gas-flaring-and-venting-reduction&ie=UTF-8&oe=UTF-8.

- Determine the quality of the receiving environment by considering the information obtained through the baseline monitoring;
- Compile a comprehensive emission inventory which must include operational phase activities (drilling, well pads etc.), mobile sources (truck traffic) and fugitive emissions (equipment leaks, dust etc.). Consider international literature to determine emissions where no emissions history is available in South Africa;
- Apply an atmospheric dispersion model to simulate impacts of the operations on ambient air pollutant concentrations;
- Consider cumulative impacts and the levels of acceptable change;
- Identify mitigation measures for inclusion in the environmental management programme;
- Determine compliance of criteria pollutants with the national ambient air quality standards, National Dust Control Regulations, 2013 and the standards contained in the Notice for the Listed Activities and Associated Minimum Emission Standards Identified in Section 21 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) where relevant, as well as international best practice for activities for which emission standards are not set in South Africa and occupation exposure with and without mitigation measures;
- Prepare an operational ambient air quality monitoring plan which must include as a minimum the following information:
    - Purpose of the plan;
    - Daily onsite weather conditions including temperature, wind direction and rainfall;
    - Sampling methodology to be used;
    - Laboratory to be used for analysis;
    - The location of air quality monitoring points;
    - The location of air quality monitoring station to allow for continuous ambient air quality monitoring;
    - The methodology to determine occupational exposure;
    - The monitoring parameters must as a minimum include: SO2, NOx, NO2, PM10, PM2.5, O3, C6H6, Pb, CO, CH4, VOCs, respirable crystalline silica and H2S if H2S is present in the gas;
    - Monitoring intervals for each parameter; and
    - The responsible person for the various tasks to be undertaken.

The air quality monitoring points must be identified on an annotated map and parameters and monitoring intervals included in an excel spread sheet. Both the map and the excel spread sheet must be included in the operational ambient air quality monitoring plan.

### 2.13.3 Content of the air quality impact assessment report

The outcome of the air quality impact assessment must be documented in a report under the following headings as a minimum-

- Summary of findings
- Study approach and methodologies used;
- Regional climatic conditions;
- Air quality impact assessment results;
- Significance rating of the identified impacts;
- Possible mitigation measures;
- Severity of impacts after mitigation;
- Cumulative impacts;
- Description of the assumptions and uncertainties or gaps in knowledge;

- Air quality specialist's statement on the acceptability of the proposed project in relation to air quality;
- Operational ambient air quality monitoring plan; and
- Management and mitigation measures to be included in the EMPr.

When considering the content of the operational ambient air quality monitoring plan, the applicant must consider international best practices for additional parameters of concern as well as the most up to date monitoring methodologies. The air quality impact assessment must be signed off by the specialist and must be included in the consolidated assessment report to be submitted as part of the environmental authorisation and water use license application processes for onshore petroleum exploration and production using fracturing technology. The operational monitoring requirements identified by the specialist must be included in the integrated operational monitoring plan required to be included in section 6.4 of the consolidated assessment report. The operational monitoring requirements must include the continued monitoring requirements of the baseline monitoring to ensure that cumulative impacts can be monitored over time.

### 2.14 Section 5.8 – Seismicity risk assessment

Although reports of fracturing causing felt earthquakes are extremely rare, in the oil and gas industry induced seismicity can occur. Induced seismicity is the increase of seismicity events which are larger in magnitude than what was observed historically. There is the potential that when fluids are injected into rock structures, the fluid may increase the pore pressure on a possibly active fault. This could cause a sudden slip that releases stored energy, generating seismicity and potentially an earthquake. Induced seismicity is most often associated with wastewater injection projects. Wastewater disposal wells typically operate for longer durations and inject much more fluid than is injected during the fracturing process, making them more likely to induce earthquakes. The draft NEMA Fracturing Regulations, which, once implemented, will manage the environmental impacts of fracturing technology on the environment, prohibits the disposal of fracturing fluids, process water or any other component of process water underground, including through the use of re-injection wells. Increased seismicity from wastewater injection is therefore not expected or possible.

Chapter 4 of the Strategic Environmental Assessment (SEA) which was undertaken between 2015-2017 to consider the opportunities and constraints with regard to shale gas development in the Karoo,[42] identified Southern Africa as a seismically quiet region by global standards as it is remote from the boundaries of tectonic plates.

#### 2.14.1 General

Noting that few seismic events of notable impact have taken place in South Africa historically and further noting that no re-injection of waste into wells is be allowed, it is unlikely that the use of fracturing technology will induce seismic events larger in magnitude than what was observed historically. However, in order to ensure that risks are minimized a seismic risk impact assessment is to be undertaken.

#### 2.14.2 Content of the seismic risk assessment

The seismic risk assessment must be undertaken by a SACNASP registered professional in the field of Geological Science or an equivalent field and the following steps as a minimum must be undertaken in the seismic risk assessment:

[42] Maps of known category 1, 2 and 3 heritage resources were provided in the Digital Addenda to the Chapter 15 of the SEA which can be accessed at https://seasgd.csir.co.za.

- Identify the regional and local geology;
- Identify from the baseline information and historical data, the historical seismic activity in the study area and the geology of the study area;
- Analyze and compare the seismic activity during the 24-month baseline data capturing with that of historical data for the study area;
- Identify dykes and faults in the geology of the site;
- Identify stressed and proximal faults which must be avoided in the fracturing process;
- Identify the fracture behaviour of targeted formations;
- Identify the potential and significance of the increase in seismic activity due to the fracturing operations;
- Consider any mitigation measures that can be employed to reduce risks;
- Prepare an operational seismic monitoring plan which must include as a minimum the following information:
    - purpose of the plan;
    - monitoring equipment to be used;
    - the location of the monitoring equipment as well as the location of the continuous monitoring station for seismic activity;
    - the location including the coordinates of historical buildings, other built structures and stone walls to be monitored including the frequency of monitoring; and
    - the location of any other infrastructure which is to be monitored for example pipelines, tailings dams and bridges etc. as well as the frequency of monitoring.

The monitoring and observation points must be identified on an annotated map and parameters and frequencies included in an excel spread sheet. Both the map and the excel spread sheet must be included in the operational seismicity monitoring plan and the points included in the baseline monitoring plan must be included for ongoing monitoring through the fracturing and production operations. The Council for Geoscience must be engaged for any inputs that may be relevant and not covered in these requirements as well as the potential impact on identified buildings and structures.

### 2.14.3 Content of the seismic risk assessment report

The outcome of the seismic risk impact assessment must be documented in a report under the following headings as a minimum-

- Summary of findings;
- Regional and local geological conditions;
- Study approach and methodologies used;
- Findings of the assessment;
- Possible mitigation measures;
- Severity of impacts after mitigation;
- Description of the assumptions and uncertainties or gaps in knowledge;
- Geological specialists' statement on the acceptability of the proposed project in relation to seismic activity;
- The operational seismic monitoring plan; and
- Management and mitigation measures to be included in the EMPr.

The outcome of the seismic risk assessment must be documented in a seismic risk assessment report which is to be signed off by the specialist and included in the consolidated assessment report to be submitted as part of the environmental authorisation and water use license application processes for onshore petroleum exploration and production using fracturing technology. The operational

monitoring requirements identified by the specialist must be included in the integrated operational monitoring plan required to be included in section 6.4 of the consolidated assessment report. The operational monitoring requirements must include the continued monitoring requirements of the baseline monitoring to ensure that cumulative impacts can be monitored over time.

### 2.15 Section 5.9 - Socio-economic impact assessment

Exploration and production operations for petroleum resources are generally located in rural areas which would generally be undeveloped areas with low population densities comprising unskilled or semiskilled labour. Areas targeted for exploration and shale gas development are likely to experience significant capital inflows leading to a major influx of activity into such areas which could provide development opportunities but could also disrupt the current social and economic fabric with negative social consequences. The negative impacts could include, among others, an increase in cost of living, an increase in crime, illness, shortage of housing, reduced tourism, increased traffic and traffic accidents, greater social inequality, unrest and conflict, as well as long term externality problems such as damages to roads, water provision and sewerage services, as well as long term risk posed by abandoned or decommissioned wells. It will be important that taxpayers are not burdened with potentially highly significant costs after abandonment of wells. Other externalities would include increased noise levels, social ills, land degradation, competition for and impact on water resources, visual impacts, etc.

#### 2.15.1 General

Baseline monitoring was undertaken through the seismic activities which were undertaken during the first two years of exploration. To support the EA process for the fracturing and production phases, a socio-economic impact assessment must be undertaken to assess the potential impact of the project on the socio-economic environment, to forecast, monitor and control prospective social and economic impacts.

#### 2.15.2 Content of a socio-economic impact assessment

The socio-economic impact assessment must be undertaken by suitably qualified professional in the field of psychology or an equivalent field. Socio-economic impacts can usually be divided into three broad categories which include, the physical intrusion of the project activities and the project-related infrastructure, the economic pull which is the area from which the project attracts job seekers or investors and indirect or induced impacts related to the project which could include increased rates and taxes etc. The following steps as a minimum must be undertaken in the socio-economic impact assessment:

- Identify the project scale;[43]
- Using the baseline as the foundation to determine the level of vulnerability in the social environment;
- Consider the impact on access to services including tourism services;
- Determine the potential influx and outflow of temporary workers;
- Identify if any relocation of individuals or families will be necessary;
- Identify if changes to racial and ethnic composition is expected and possible impacts of such changes if realized;
- Identify possible changes to land use patterns and the impacts of such change if realised;
- Identify possible changes to health and social wellbeing and the impact of such changes;

[43] Taken from the Department of Environmental Affairs and Tourism's Integrated environmental Management Information Series, 2005 – Socio-Economic Impact Assessment.

- Identify changes to the quality of the living environment including access to services and the capacity of local government to deliver the required services;
- Identify any cultural impacts which could include the loss of local language, experience of being culturally marginalised etc;
- Identify impacts to the family unit and community which could include possible impacts on community cohesions, social tension and violence etc.;
- Institutional and legal impacts;
- Gender relations;
- Determine the significance of the impacts;
- Identify any mitigation measures to be implemented; and
- Identify the parameters from the baseline monitoring plan to be taken through to the operational monitoring plan as well as additional aspects which must be monitored.

### 2.15.3 Content of a socio-economic impact assessment report

The outcome of the socio-economic impact assessment must be documented in a report under the following headings as a minimum-

- Regional and local socio-economic conditions;
- Study approach and methodologies used;
- Summary of findings of the assessment;
- Possible mitigation measures;
- Severity of impacts after mitigation;
- Description of the assumptions and uncertainties or gaps in knowledge;
- A specialist statement on the acceptability of the proposed project in relation to seismic activity;
- The operational monitoring plan; and
- Management and mitigation measures to be included in the EMPr.

The socio-economic impact assessment must be signed off by the psychologist who compiled the report and must be included in the consolidated assessment report to be submitted as part of the environmental authorisation and water use license application processes for onshore petroleum exploration and production using fracturing technology. The operational monitoring requirements identified by the psychologist must be included in the integrated operational monitoring plan required to be included in section 6.4 of the consolidated assessment report. The operational monitoring requirements must include the continued monitoring requirements of the baseline monitoring to ensure that cumulative impacts can be monitored over time.

## 2.16 Section 5.10 - Heritage impact assessment

South Africa has yielded fossils of some of the earliest known life forms on earth, as well as some of the earliest known dinosaurs, dating back at least 200 million years. Small pockets of high coverage indicate that important resources of all types can occur anywhere in the landscape but river valleys and the undulating uplands tend to be more sensitive than the open plains for some categories of heritage, largely because of access to water.

Heritage resources are distributed in variable densities throughout the country, but because of a generally low survey coverage, the actual distribution of heritage resources is poorly known, specifically in rural areas. As such, the value of all heritage resources in South Africa, including archaeology, shipwrecks, battlefields, graves, and structures over 60 years, living heritage and the collection of oral histories, historical settlements, landscapes, geological sites, palaeontological sites and objects must be assessed before development can occur on any site, other than in urban areas.

### 2.16.1 General

The South African Heritage Resources Agency and the Provincial Heritage Agencies (PHRAs) are the custodians of the country's archaeological and palaeontological resources and in that capacity have prepared two guidance documents which set the standard for the preparation of archaeological and palaeontological components of a heritage impact assessment. The first document is entitled "Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports". Part II of the document contains the Minimum Standards for the archaeological component of the impact assessment. The second document is entitled "Minimum Standards: Palaeontological Component of Heritage Impact Assessment reports". These documents can be found at https://sahris.sahra.org.za. The impact assessment on archaeological and paleontological resources must be undertaken by a registered archaeological and palaeontological specialist in line with these two Minimum Standards.

### 2.16.2 Content of the heritage impact assessment

The impacts on archaeological and palaeontological resources must be reported on in line with section 38(3) of the NHRA, section 41(3) of the KZNARI Act, the "Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports", Part II and the "Minimum Standards: Palaeontological Component of Heritage Impact Assessment Reports". Graves may not be moved without approval from the relevant Heritage Agency and all building over 60 years old must be assessed prior to alteration or demolition. The heritage impact assessment report must be completed and signed off by a heritage specialist and must be included in the consolidated assessment report to be submitted as part of the environmental authorisation and water use license application processes for onshore exploration and production of a petroleum resource using fracturing technology. The operational monitoring requirements identified by the specialist must be included in the integrated operational monitoring plan required to be included in section 6.4 of the consolidated assessment report. The operational monitoring requirements must include the continued monitoring requirements of the base line monitoring to ensure that cumulative impacts can be monitored over time.

A "Chance find protocol for cultural heritage, artefacts and palaeontological resources" must be prepared and included as an appendix to the environmental management programme to be included as Chapter 7.

## 2.17 Section 5.11 Hydrology impact study (surface water)

### 2.17.1 General

The exploration and production of an onshore petroleum resource using fracturing technology can impact on water resources through the use of water and the potential to pollute both surface and groundwater. The draft NEMA Fracturing Regulations, has prohibited, in areas where the rainfall is under 400 mm per annum, the extraction of water except from deep saline aquifers for use in fracturing operations as well as the discharge of process water into a water resource, or onto land through irrigation without treatment to water quality limits as contemplated in Appendix 4 of the Regulations. Notwithstanding, there is a possibility for surface water and groundwater to be impacted by fracturing fluids as well as by waste related to fracturing activities. Therefore, it is dependent on the impact assessment to evaluate the threat of fracturing and petroleum production to the water resource environment.

### 2.17.2 Content of the hydrology study

The possible impacts on surface water must be considered by undertaking a hydrology study and the possible impacts on groundwater by undertaking a hydrogeological study. These studies will rely on the baseline information collected through the initial seismic survey phase. The surface water study must be undertaken by a surface water specialist registered with SACNASP in the field of water resource science or an equivalent.

This chapter assesses the possible impact that exploration and production of onshore petroleum using fracturing technology can have on surface water and surface water quality and the following actions as a minimum must be undertaken:

- Identify the scope of the project (including associated infrastructure);
- Identify the study area and provide a motivation;
- Consider geographical setting which must include:
  - catchment description;
  - rainfall including rainfall intensity;
  - evaporation;
  - mean annual runoff;
  - peak flood flows at relevant locations within the study area;
  - topographical information and drainage patterns;
  - regional climatic conditions;
  - downstream surface water uses;
  - receiving water body for any potential pollution;
  - surface water resource quality objectives;
- Flood line determination must be conducted and the 1:50 and 1:100-year flood lines determined;
- Determine the proposed layout of the operations which must include the location of any possible pollutants for all phases of the operations;
- Identify the methodologies and models to be used when undertaking the assessment;
- Identify any watercourse alterations being considered;
- Identify the dirty footprint of the layout;
- Prepare an inventory of activities within the operations which can contribute to surface water pollution;
- Determine, through appropriate modelling, a water balance for the operations;
- Identify possible impacts to surface water from the operations;
- Quantify the impacts and the significance of the impacts;
- Identify possible mitigation measures that can be implemented and determine the impacts after mitigation;
- Determine the residual impacts after mitigation, through all phases of the operation;
- Consider the cumulative impacts on surface water resources through all phases of the operations;
- Prepare a storm water management plan, the content of which must include:
  - objectives of the storm water management plan;
  - delineation of the site into clean and dirty water areas;
  - identification of areas where structures or infrastructure affect surface hydrology;
  - preparation of a hydrological and hydraulic model;
  - preparation of a conceptual storm water management plan for the overall site and specific infrastructure and structures on the site including any stormwater management tanks required;
  - identify mitigation measures for inclusion in the EMPr;
- Prepare a surface water operational management and monitoring plan which must include as a minimum the following:

- water quantity - the flow rate where relevant or depth and extent of the feature;
- the locations for surface water monitoring through all phases of the operations which must include the baseline monitoring points;
- surface water monitoring parameters required to be monitored through all phases of the operations which must include as a minimum the following - field pH, electrical conductivity, temperature, dissolved oxygen, total dissolved solids; organics - VOCs, SVOCs and PAHs, BTEX compounds, T, macro elements, trace elements, NORM; stable isotopes including but limited to methane δ13C, methane δ13D, water δ13C, DIC δ13C, ethane δ13C and ethane δ13D; radioactive isotopes - uranium, thorium, radium and strontium as well as radioactivity - gross alpha radioactivity; gross beta radioactivity as well as stable isotopes including but not limited to C, H, O and N;
- the intervals for the monitoring of each feature;
- groundwater fed surface water features which could be impacted by groundwater contamination; and
- ecological status – species found in the water body including an estimate of the species abundance. Consideration must be given to in-stream, riparian and floodplain habitats. Any species of conservation concern must be identified and discussed in relation to the threat status, the national and provincial priority status.

- Identify the roles and responsibilities for undertaking the various tasks identified in the monitoring plan.

### 2.17.3 Content of the hydrology study report

The outcome of the hydrology study must be documented in a report under the following headings as a minimum:

- Local and regional information;
- Sources of potential pollution;
- Significance rating of the identified impacts;
- Risk assessment for potential pollution, including significance before mitigation;
- Cumulative impacts;
- Possible mitigation measures;
- Severity of impacts after mitigation;
- Description of the assumptions and uncertainties or gaps in knowledge;
- Storm water management plan; and
- Management and mitigation measures to be included in the EMPr.

The hydrology study report must be signed off by the specialist and must be included in the consolidated assessment report to be submitted as part of the environmental authorisation and water use license application processes for onshore petroleum exploration and production using fracturing technology. The report must include an annotated map identifying the features to be monitored and parameters and frequencies included in an excel spread sheet. Both the map and the excel spread sheet must be included in the operational surface water management and monitoring plan. The operational monitoring requirements identified by the specialist must be included in the integrated operational monitoring plan required to be included in section 6.4 of the consolidated assessment report. The operational monitoring requirements must include the continued monitoring requirements of the baseline monitoring to ensure that cumulative impacts can be monitored over time.

The findings of the hydrology study impact assessment must contain –

- A reasoned opinion, based on the findings of the impact assessment, regarding the acceptability or not, of the development related to the impact of the project on surface water and any conditions to be included in the environmental authorisation should the project be approved, if relevant; and
- A discussion on the application of the impact mitigation hierarchy and where areas of high surface water sensitivity cannot be avoided, the mitigation measures which must be implemented to mitigate the impacts of the exploration or production activities on surface water. These mitigation measures must be transferred by the EAP into an environmental management programme to be included in Chapter 7.

## 2.18 Section 5.12 – Hydrogeology study (groundwater)

### 2.18.1 General

Surface water is a scarce resource in the Karoo environment which places a high value and reliance on groundwater resources. The exploration and production of a petroleum resource using fracturing technology are undertaken at high pressure and can impact on groundwater if adequate protection measures are not in place. The possible impacts on groundwater must be considered by undertaking a hydrogeology study.

### 2.18.2 Content of the hydrogeology study

The ground water study must be undertaken by a ground water specialist registered with SACNASP in the field of water resource science or an equivalent field. This chapter is to assess the possible impact that fracturing and petroleum production can have on ground water quality and the following steps as a minimum must be followed:

- Identify the scope of the project (including the associated infrastructure) and study area;
- Identify the methodologies and models to be used when undertaking the site evaluation, impact assessment/evaluation and significance rating, these methodologies and models will include among others, desktop studies, hydrocensus, sampling and chemical analysis, geophysical survey, borehole drilling where necessary, recharge calculation, and groundwater modelling including a groundwater flow model and transport models;
- Identify and analyse previous groundwater studies undertaken in the study area, any available geological information such as published maps, satellite imagery, scientific papers and existing stratigraphic well or core information, where relevant;
- Determine the geographical setting by considering the following aspects:
  - topography and drainage;
  - climate;
- Determine the prevailing hydrogeological conditions by considering the following aspects:
  - local geology;
  - regional geology;
- Determine the groundwater setting by considering the following aspects;
  - unsaturated zone and saturated zone;
  - hydraulic conductivity;
  - dykes and faults as potential preferred pathways;
  - groundwater levels;
  - potential groundwater contaminants from the use of the proposed fracturing technology;
  - current groundwater availability and quality;
  - aquifer classification;
  - aquifer protection classification;
  - groundwater vulnerability;

- the depth of the target formation;
- Using groundwater modelling or other impact determination methodologies, determine/evaluate/predict the following:
  - groundwater elevation and gradient;
  - groundwater flow in both a regional and site-specific context;
  - source pathway receptor description;
  - predict the possible impacts that the use of fracturing technology may have on the groundwater regime both on the site and the study area, including during development, operations, decommissioning and post closure;
  - determine the significance rating of identified impacts;
- Identify management and mitigation measures and the severity of impacts after the implementation of mitigation measures;
- Identify management and mitigation measures to be included in the EMPr;
- Prepare an operational ground water monitoring plan which must include as a minimum the following;
  - monitoring network layout (source, pathway, receptor and background including the monitoring regime identified for baseline monitoring);
  - groundwater quantity including the depth and extent;
  - the groundwater quality parameters to be monitored through the various phases which must include as a minimum the following - field pH, electrical conductivity, temperature, dissolved oxygen, total dissolved solids; organics - VOCs, SVOCs and PAHs, BTEX compounds, T, macro elements, trace elements, NORM; stable isotopes including but limited to methane δ13C, methane δ13D, water δ13C, DIC δ13C, ethane δ13C and ethane δ13D; radioactive isotopes - uranium, thorium, radium and strontium as well as radioactivity - gross alpha radioactivity; gross beta radioactivity as well as stable isotopes including but not limited to C, H, O and N; and
  - ground water monitoring frequency for each feature.

### 2.18.3 Content of the hydrogeology study report

The outcome of the hydrogeology study must be documented in a hydrogeology study report for the various phases of the operations (construction, operations, decommissioning and post-decommissioning) under the following minimum headings-

- Project and site information:
  - Project scope and study area;
  - Methodologies and models used;
  - Climate;
  - Topography and drainage;
  - Local and regional geology;
  - Ground water setting and groundwater flow;
  - Potential impacts of groundwater, including the probability, duration and severity;
  - Possible management and mitigation measures;
  - Severity of possible impacts after mitigation;
  - Groundwater specialist statement on the acceptability of the proposed project in relation to groundwater;
- Assessed impacts on groundwater quantity;
- Assessed impacts on ground quality;
- Description of the assumptions and uncertainties or gaps in knowledge;
- Groundwater specialist's statement on the acceptability of the proposed project in relation to surface water;

- Mitigation measures to be included in the EMPr, during fracturing/production and post fracturing/production.

The hydrogeology impact assessment report must be signed off by the specialist and must be included in the consolidated assessment report to be submitted as part of the environmental authorisation and water use license application processes for onshore petroleum exploration and production using fracturing technology. The operational monitoring requirements identified by the specialist must be included in the integrated operational monitoring plan required to be included in section 6.4 of the consolidated assessment report. The operational monitoring requirements must include the continued monitoring requirements of the baseline monitoring to ensure that cumulative impacts can be monitored over time.

The report must include an annotated map identifying the features to be monitored and parameters and frequencies included in an excel spread sheet. Both the map and the excel spread sheet must be included in the groundwater operational monitoring plan.

## 2.19 Section 5.13 – Traffic impact assessment

### 2.19.1 General

Large volumes of materials which will include among others sand, water and chemicals will be transported to the fracturing site. In addition, a large volume of waste materials will be transported from the site. These materials and waste will be transported by road which will result in increased traffic volumes in the Central Karoo which could increase the risks and led to a detrimental impact on environmental and scenic quality.

### 2.19.2 Content of the traffic impact assessment

The traffic impact assessment must be undertaken by a civil engineer registered with the South African Institution of Civil Engineering or an equivalent field. This chapter assesses the possible impact of increased traffic resulting from fracturing activities, importantly including the cumulative impacts that the activity will have on the environment through exploration and production operations. The baseline study that was undertaken through the first phase of exploration, being the seismic survey, would have identified the road network that could be impacted on through fracturing and production operations as well as the current traffic patterns, maintenance programmes and road conditions.

The findings of the scientific assessment revealed that there were a number of risks which would result from the increased traffic volumes in the Central Karoo due to fracturing and production operations. These risk would be associated with among others:

- Vehicular emissions leading to decreased air quality;
- Spills from trucks transporting hazardous substances and waste to and from sites where fracturing is undertaken;
- Road strikes of fauna and landscape fragmentation affecting biodiversity and ecological functioning;
- Loss of regional visual scenic resources, increased ambient noise, decreased tourism activities and altered ‘sense of place’; and
- An incremental increase in the construction, upgrading and maintenance of road infrastructure.

Using the baseline conditions as the foundation, this traffic impact assessment must consider the impact of the increased risks and cumulative risks that fracturing and production operations will have on the area. The study is to:

- Identify the methodology to be used;
- Identify the guidelines or supporting documentation to be used;
- Establish the number of vehicle trips generated during the fracturing and production operations and decommissioning of the site;
- Determine the impacts including the cumulative impacts;
- Determine mitigation and/or management measures which could be implemented to reduce the effects of negative impacts. As part of the mitigation measures, the applicant is to consider the ability to utilise the existing freight rail infrastructure to reduce impacts;
- Identify any conditions or mitigation measures to be included in the EMPr;
- Identify the scope of the project (including the associated infrastructure) and study area; and
- Identify the methodologies and models to be used when undertaking the site evaluation, impact assessment/evaluation and significance.

### 2.19.3 Content of the traffic impact assessment report

The outcome of the traffic impact assessment must be documented in a specialist impact assessment report which must include as a minimum the following aspects-

- Summary of findings;
- Detail the applicable legislation, regulations or guidelines related to traffic impact assessment;
- Identify the road network that will be affected on a map;
- Describe the methodology used to assess the additional traffic impacts;
- Describe the scale of the increased traffic;
- Describe the impacts including cumulative impacts;
- Mitigation measures to be included in the EMPr, as well as the feasibility of utilising the existing freight rail infrastructure; and
- Monitoring and auditing requirements.

The traffic impact assessment report must be signed off by the specialist and must be included in the consolidated assessment report to be submitted as part of the environmental authorisation and water use license application processes for onshore petroleum exploration and production using fracturing technology. The operational monitoring requirements identified by the specialist must be included in the integrated operational monitoring plan required to be included in section 6.4 of the consolidated assessment report. The operational monitoring requirements must include the continued monitoring requirements of the baseline monitoring to ensure that cumulative impacts can be monitored over time.

## 2.20 Section 5.14 Radio Frequency Interference study

### 2.20.1 General

South Africa is home to the multinational 10 m Southern African Large Telescope (SALT) in Sutherland which, in 2017, was the largest optical telescope in the southern hemisphere and will host the international Square Kilometre Array (SKA) project, the first phase of which is under construction. These are multi-billion Rand investments and must be protected from increased levels of electromagnetic interference which can negatively impact on the observing environment.

The potential increase in interference resulting from activities associated with the onshore exploration and production of petroleum resources has been assessed, and buffers, referred to as “areas” have been identified to ensure there would be no detrimental impact on the SKA. The draft NEMA Fracturing Regulations has identified prohibitions and restrictions related to the Sutherland Central

Astronomy Advantage Area, the Karoo Central Astronomy Advantage Area 3, the corridors containing the Square Kilometer Array radio astronomy stations and the area located outside of the Karoo Central Astronomy Advantage Area 3, but within the boundaries of the Karoo Central Astronomy Advantage Area 1. The boundaries of these protection areas have been uploaded to the environmental screening tool, and any applicant applying for an environmental authorisation for onshore petroleum exploration or production will be aware if their site is falling within any of these prohibited or restricted areas. Should the proposed site for exploration or production operations fall within the prohibited areas, the application will not be accepted by the competent authority. Should the site fall within the area located outside of the Karoo Central Astronomy Advantage Area 3, but within the boundaries of the Karoo Central Astronomy Advantage Area 1, the applicant must seek the advice of the Astronomy Management Authority to determine the assessment requirements. These assessment requirements will differ from project to project depending on the activities to be undertaken. The application forms to have the developments considered and the contact details of the Astronomy Management Advantage Area Authority can be accessed at https://ama.dst.gov.za/AGAact/ or on e-mail at mere.kgampe@dst.gov.za.

Where the exploration or production activities are to take place in the area as identified as being restricted, a letter of approval from the Astronomy Management Advantage Area Authority must be included in the consolidated assessment report to be submitted with the environmental authorisation and water use license application for onshore petroleum exploration and production using fracturing technology.

### 2.21 Chapter 6 – Plans, layouts and designs

This chapter must include the relevant plans, layouts and designs that are required to be submitted with the application for environmental authorisation, for a water use license and the exploration or production right required in terms of the MPRDA. The content of these plans, layouts and designs will be informed by the baseline monitoring outcomes, the outcomes of the environmental impact assessments undertaken and specific input from additional specialists. These plans, layouts and designs although consulted with the consolidated assessment report must be presented as separate outputs as they will be implemented and monitored throughout the exploration and production operations.

#### 2.21.1 Section 6.1 – Integrated water and waste water management plan

The objective of the integrated water and waste water management plan is to compile a site specific, implementable, management plan addressing all the identified water use and waste water management related aspects (e.g. process water balances, storm water management, groundwater management, water re-use and reclamation, water conservation and demand management, waste minimization and recycling) to ensure water efficiency and water management. When preparing the integrated water and waste water management plan, it must be noted that the NEMA Fracturing Regulations has prohibited:

- In areas where rainfall is under 400mm per annum, the abstraction of water except from deep saline aquifers for use in the exploration or production operation other than for drinking, domestic use and the preparation of cement samples;
- The disposal of process water from the exploration or production operation without at least one reuse;
- The discharge or disposal of fracturing fluids, process water or any other component of process water–
    - into a water resource without treatment;

- onto land through irrigation without treatment;
- to a government waste water treatment works; or
- underground, including through the use of re-injection wells;

- The storage of process water for reuse or disposal in pits, retention dams or pollution control dams.

In addition, the baseline monitoring undertaken through the first phase of exploration was to identify the waste water recycling and reuse options as well as treatment and disposal facilities available in the broader study area, including the volumes of waste water that could be recycled, treated or disposed of. The study was also to identify gaps in the recycling, treatment, and disposal options available and to make recommendations on how to manage the liquid and solid waste that would be generated from the fracturing and production phases.

Building on this information, the following information as a minimum, must be identified or modelled for the fracturing and production phases of the operations:

- Identify the water requirements for each activity that is to be undertaken through the fracturing and/or production processes that will require water. These activities could include domestic use, drilling or fracturing operations, cement mixing, equipment cleaning etc, expressed as a monthly figure;
- Identify the water supply to be used noting that a source external to the site will need to be identified;
- Identify the amount of waste water to be produced per activity expressed as a monthly figure;
- The expected classification of the waste water determined in line with the National Norms and Standards for the Assessment of Waste for Landfill Disposal;[44]
- Model the amount of storm water that will need to be managed on site, expressed as a monthly figure, and located on a map to identify the nature of the water i.e., clean or dirty;
- Locate the clean and dirty waste storage facilities, on a map indicating the volumes of water that can be stored in each container;
- Identify water recycling goals and the methodology to achieve the requirements of the NEMA Fracturing Regulations;
- Identify a system for adhering to the waste manifest requirements of the National Waste Classification and Management Regulations;
- Identify roles and responsibilities for implementing the water and waste water management plan; and
- The anticipated management of the waste water which must include recycling and reuse options, treatment options and disposal options, providing detail on the options to be used and providing a copy of the relevant permits or authorisations for the companies to accept the waste.

The water and waste water management plan must be prepared by a ground water or surface water specialist registered with SACNASP in the field of water resource science or an equivalent field and the plan must be signed off by the EAP and specialist. The information on volumes must be included on a spreadsheet and the locations of storage facilities on an annotated map of the site which must be appended to the plan.

### 2.21.2 Section 6.2 - Solid waste management plan

The objective of the solid waste management plan is to ensure that all solid wastes that will be generated on the site, will be identified, classified and responsibly reused, recycled, treated, managed

[44] The National Norms and Standards for the Assessment of Waste for Landfill Disposal prepared under the National Environmental Management: Waste Management Act, 2008 (Act No 59 of 2008) and published under Government Notice 635 in Government Gazette No. 36784 on 23 August 2013.

or disposed of. When preparing the management plan, it must be noted that the NEMA Fracturing Regulations have prohibited:

- The disposal to landfill, of sludge with a moisture content of >40% or that liberates moisture under pressure in landfill conditions and which has not been stabilised by treatment; and
- The storage of drill cuttings, sludge and waste other than in above ground tanks or leakproof skips.

In addition, the baseline monitoring undertaken through the first phase of exploration was to identify the waste recycling and reuse options as well as treatment and disposal facilities available in the broader study area and the country, including the volumes of waste that could be recycled, treated or disposed of. The study was also to identify gaps in the recycling, treatment, and disposal options available and to make recommendations on how to manage the liquid and solid waste that would be generated from the fracturing and production phases.

Building on this information, the following information as a minimum, must be determined for the fracturing and production phases of the operations:

- An inventory of quantities of solid waste expected to be generated through all phases of the operations;
- The expected quantities of solid waste must be broken down per activity for example borehole drilling, fracturing, domestic waste generation, waste from maintaining the drilling machinery and vehicles etc. and tabulated in a spreadsheet;
- The expected classification of the wastes must be determined in line with the National Norms and Standards for the Assessment of Waste for Landfill Disposal;
- The expected moisture content of the wastes must be estimated;
- Onsite waste storage options and the locations of the waste storage;
- Identify a system for adhering to the waste manifest requirements of the National Waste Classification and Management Regulations;
- Identify roles and responsibilities for implementing the solid waste management plan; and
- The anticipated management of the waste which must include recycling and reuse options, treatment options and disposal options, providing detail on the options to be used and providing a copy of the relevant permits or authorisations for the companies to accept the waste.

The solid waste management plan must be prepared by a waste specialist who has as a minimum of 10 years' experience in the waste field and qualifications in either civil or process engineering or chemistry and the plan must be signed off by the EAP. The information on volumes must be included on a spreadsheet and the locations of storage facilities on an annotated map of the site which must be appended to the plan. As per the standard conditions of authorisation included as Appendix 3 of the NEMA Fracturing Regulations, the holder must ensure that the solid waste management plan is revised and resubmitted for approval by the competent authority within the first year of operations. The objective of the revision and resubmission is to revise the anticipated characteristics of the waste as well as the quantities with the known and measured/calculated waste characteristics and volumes.

### 2.21.3 Section 6.3 - Emergency and spill contingency plan

The activities related to fracturing and production of gas is undertaken with large quantities of water mixed with a number of chemicals and propellants at high pressure. In addition to the actual fracturing activities, large amounts of materials for the fracturing and production activities are transported to and from the site by truck which can produce spills and cause collisions and impact risks. In addition, the infrastructure related to the production of gas, for example, pipelines and compressor stations can increase exposure risks. Therefore, while occupational health and safety on site will be managed

under the Occupation Health and Safety Act, 1993[45] and blow out prevention equipment is installed at all wells, all other risks associated with the activities that will be undertaken on the site must be identified and mitigation measures and emergency procedures put in place to ensure that risks to human health and the environment are anticipated and that adequate management measures are put in place to avoid emergency situations. These risks must be identified through the preparation of an emergency and spill risk assessment, and the outcome of the management measures must be contained in an Emergency and Spill Contingency Plan.

The assessment must be undertaken by a group of specialists that must include a process engineer or chemical engineer, a risk assessment specialist and the EAP. The risks, including the direct and indirect risks must be determined for each activity and then a combination of activities. The significance rating of the risks occurring as well as the extent of impact must be determined and mitigation measures identified to reduce the occurrence of the risk through proactive measures as well as management measures. The plan must be signed off by all specialists that contributed to its generation as well as the EAP.

### 2.21.4 Section 6.4 - Integrated operational monitoring plan

The objective of the integrated operational monitoring plan is to ensure that impacts through the operational phase do not exceed those as identified in the environmental impact assessments. The monitoring plan must take into account the locations and parameters monitored through the baseline monitoring phase and must continue to monitor these locations and parameters as part of the operational monitoring plan to identify any deterioration in environmental quality through the operational phase.

The integrated operational monitoring plan is to be prepared by the EAP in consultation with the relevant specialists who have prepared impact assessments and must consolidate the requirements for operational monitoring identified in each of the impact assessment documents. The roles and responsibilities for implementation of the integrated monitoring plan must be identified. The integrated operational monitoring plan must be signed off by the EAP as well as the relevant specialists who identified monitoring requirements in their impact assessments.

### 2.21.5 Section 6.5 - Well layout

The well layout must be prepared by a well engineer in collaboration with the EAP and a number of specialists through the impact assessments undertaken for specific themes, which would include agriculture, terrestrial and aquatic biodiversity, animal and plant species, heritage, hydrology and hydrogeology. The well layout will consider the location of the petroleum reserve as well as the environmental sensitivities identified for the site. The layout must be included on an annotated map, and must include as a minimum the following:

- Any topographical features of interest;
- The location of existing farm dwellings and adjacent landowners;
- The location of any areas to be cordoned off during the operations;
- The location including the coordinates of the well including any identified buffer;
- The location including the coordinates of the well pad including the identified buffer;
- Number of the well and/or well pad;
- Laydown, operational areas and hard paved areas;
- The location of access roads;

[45] The Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).

- The location of any infrastructure associated with the operation including any electricity power lines or substations;
- The site office including ablutions, sick bays etc.; and
- Location of all storage areas (materials, water, waste water, solid waste, sand, vehicles, drill equipment, chemicals, generators etc.)

The layout plan must be signed off by the well engineer, the EAP and the relevant specialists who's work contributed to the layout.

### 2.21.6 Section 6.6 - Well design

The well design must be prepared by a well engineer and must conform to the well design and construction standards as identified in Appendix 1 of the NEMA Fracturing Regulations. Once completed and before inclusion into the consolidated assessment report, the well design must be subjected to a well examination undertaken by an independent well engineer. The design submitted for inclusion in the consolidated assessment report must include the endorsement and signature of the independent well engineer.

## 2.22 Chapter 7 - Environmental Management Programme

An environmental management programme plays a vital role in the implementation of consistent and continued environmental management practices during the life of the exploration and production operations.

An environmental management programme must be provided under this heading which satisfies the requirements of Section 24N of NEMA and Appendix 4 of the EIA Regulations which regulate and prescribe the content of any environmental management programme and specify the type of supporting information that must accompany the submission of the report to the decision-making authorities. This environmental management programme must include the setting up of the fracturing operations for exploration as well as the fracturing operations or the setting up and undertaking of the production operations, which ever phase is relevant.

The inputs provided by the specialists undertaking the impact assessments must be collated into a consolidated environmental management programme by an environmental assessment practitioner and all specialists must sign off of the completed environmental management plan to demonstrate that all their mitigation measures have been correctly captured and that each specialist takes responsibility for the adequacy of the mitigation measures.

The implementation of the environmental management programme is not an optional requirement. The environmental management programme is legally binding through NEMA and the environmental authorisation. The applicant must ensure that the environmental management programme forms part of all project tenders and exploration and production contracts to allow for costs of the mitigation and management measures to be included in the consideration of the viability of the project.

## 2.23 Chapter 8 - Financial provisioning plans, reports and calculations

The Financial Provisioning Regulations are binding on applicants or holders who apply for or who are issued with an environmental authorisation for activity 20A of the Environmental Impact Assessment Regulations and a right in terms of sections 79 and/or 83 of the MPRDA for exploration or production operations. Therefore, the application for a right in terms of section 79 of the MPRDA must be

accompanied by the completed "Rehabilitation Plan Template for Operations Mining Low-Risk Commodities" and the "Financial Provisioning Determination Spreadsheet and Master Rates" as contemplated in the proposed amendments to the Financial Provisioning Regulations, 2024. For activity 20A of the Environmental Impact Assessment Regulations and a right in terms of section 83 of the MPRDA, the application for the environmental authorisation or right must be accompanied by the "Annual Rehabilitation Plan for Operations", the "Final Rehabilitation, Decommissioning and Mine Closure Plan for Operations", and the "Environmental Risk Assessment Report" as contemplated in the proposed amendments to the Financial Provisioning Regulations, 2024.

### 2.24 Chapter 9 - Supporting documentation

Chapter 9 includes all supporting documentation related to the EAP and specialists, the public participation process and the specialist impact assessments.

#### 2.24.1 Section 9.1 - Environmental assessment practitioner and specialist information

With respect to the EAP and specialists the following information is to be provided in the draft impact assessment report and final impact assessment report which verify and validate the information provided in this section:

- The applicant's company environmental policy;
- From the EAP and specialists who have undertaken the site sensitivity verification and will undertake the relevant specialist assessments:
  - A short profile of the EAP and the EAP's company, where relevant;
  - A short profile of every specialist and specialist's company;
  - An abbreviated CV of the EAP and every specialist, including a short profile of similar work undertaken and the relevant years of experience;
  - Declaration of independence of the EAP and specialists;
  - EAP and specialists' company B-BBEEE certification;
  - Power of attorney;
  - Copy of the professional registration for the EAP and every specialist;
  - A signed declaration of independence from the EAP and every specialist; and
  - A screening report for the preferred site.

#### 2.24.2 Section 9.2 - Consultation documentation

With respect to the public participation process the following information is to be provided to support the section:

- Database of I&APs;
- Background information document if relevant;
- Copies of adverts/notices placed in the media and notice boards placed on site where relevant;
- Registration documentation;
- Attendance registers;
- Copies of presentations;
- Minutes of any meetings with authorities and I&APs including any recorded inputs if relevant;
- comments and responses report

#### 2.24.3 Section 9.3 – Impact Assessments

This section must contain the impact assessments prepared and signed off by the relevant specialists. The impact assessments must contain a description of the assumptions and uncertainties or gaps in

knowledge as well as a statement by the relevant specialist on the acceptability of the proposed project in relation to the theme considered.