



Hpakant/Lonkin Gems Tract Environmental Management Plan

Myanmar Gems and Jewellery Entrepreneurs Association

August 2017

Advisory Paper



Important Notice

This Hpakant/Lonkin Gems Tract – Environmental Management Plan (EMP) was compiled by Coffey Myanmar Limited and Valentis Services Company Limited for Myanmar Gems and Jewellery Entrepreneurs Association (MGJEA) at the request of the Myanmar Gems Enterprise (MGE) of the Ministry of Natural Resources and Environmental Conservation (MONREC) in their capacity as regulatory authority responsible for the regulation and marketing of jade and other gemstones in Myanmar.

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Hpakant/Lonkin Gems Tract – Environmental Management Plan

Advisory Paper

Prepared for
Advisory Group and key stakeholders

Prepared by
Coffey Myanmar Limited and Valentis Services Company Limited

In collaboration with
Estelle Levin Limited and Total Business Solutions Company Limited



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1 Background and context

Jade has been mined in the Hpakant/Lonkin area for decades. Historic artisanal and small-scale mining is being displaced by large-scale mining as alluvial jade has largely been mined out. Heavy machinery is required to expose and dig up the Uru Boulder Conglomerate which contains secondary jade deposits. The Uru Boulder Conglomerate lies between 5 m and 300 m below the surface necessitating large volumes of earth to be moved to expose the jade bearing formation. The impact of both artisanal and small-scale mining, and large-scale mining on the environment and communities in the Hpakant/Lonkin area has been profound. Erosion of exposed soils and sedimentation of rivers and creeks has changed the hydrology of the area, caused significant downstream impacts and increased the frequency and severity of flooding. A lack of mine design and planning has resulted in unstable landforms that pose significant risk to mine workers and communities. Landslides occur and have resulted in loss of life, property, and ecosystems.

The Myanmar Gems Enterprise (MGE) of the Ministry of Natural Resources and Environmental Conservation (MONREC) is responsible for the regulation and marketing of jade and other gemstones in Myanmar. MGE seeks to improve regulation and the environmental and social performance of the jade mining industry in Myanmar to address these issues. To achieve this, MGE has requested environmental management plans (EMPs) be prepared to improve environmental and social management of both existing and future jade mining.

Ten EMPs have been prepared, one for each of 10 zones identified by MGE. The EMPs include measures and procedures to manage the identified environmental and social impacts of jade mining in the Hpakant/Lonkin Gems Tract. The EMPs have been designed to be practical, implementable in the Myanmar context, and enforceable. The EMPs are comprehensive, applying to artisanal and small-scale mining and large-scale mining. Individual EMPs for each mine site do not need to be prepared by mining companies. The EMPs are good international practice and ready to be implemented by mining companies.

A number of issues were identified in preparing the EMPs that will affect how effectively they can be implemented. Table 1.1 sets out the issues, effects and possible solutions which are discussed in detail in this paper. The issues set out in this paper aim to provide key stakeholders and decision makers with information to facilitate ongoing reform of jade mining regulation and environmental and social management to achieve the desired outcomes.

Table 1.1 Summary of issues, their effects and possible solutions

Issue	Effect	Solution
Capacity to implement the EMP		
<ul style="list-style-type: none"> Lack of understanding and capacity of mining companies to implement EMP. Lack of experience, training and resources. New and unfamiliar environmental legislation. 	<ul style="list-style-type: none"> Inability to follow existing environmental laws, rules, guidelines and notifications. Inability to implement good international practice EMP. EMP not adopted and implemented. No improvement in environmental and social performance. 	<ul style="list-style-type: none"> Train mining companies in how to implement the EMP including mine closure and final rehabilitation. Use pilot companies as a case study on implementation of the EMP. Conduct final rehabilitation trial on mined-out area.

Issue	Effect	Solution
Capacity to enforce the EMP		
<ul style="list-style-type: none"> • Lack of understanding and capacity of MGE and ECD to enforce implementation of the EMP. • Lack of experience, training and resources. • Limited paper-based concession database with inaccurate co-ordinates. • Lack or limited involvement of local authorities in mining governance. • 	<ul style="list-style-type: none"> • Inability for Union Government and Kachin State Government to enforce laws, rules and EMP leads to non-compliance and complacency. • EMP not adopted and implemented. • No improvement in environmental and social performance. • Difficulty to enforce EMP when concession boundaries are not well defined. 	<ul style="list-style-type: none"> • Increase number of 'on-the-ground' resources of MGE and ECD. • Train ECD and MGE in enforcement of EMP. • Digitisation, database establishment and ground-truthing of concession boundaries. • Develop capacity of local authorities to contribute to mining governance.
Lack of exploration and planning at zone and mine levels		
<ul style="list-style-type: none"> • Lack of exploration for jade. • Lack of zone wide planning and co-ordination. • Lack of individual mine planning. • Lack of integrated landscape approaches to mining sector planning. • Risks to biodiversity and ecosystem services poorly understood. 	<ul style="list-style-type: none"> • Mining in areas with no or limited resource. • Unnecessary earthworks resulting in environmental impacts and additional cost. • Unstable mine faces. • Unstable waste rock dumps. • Landslides and loss of life, and property. • Loss of biodiversity, carbon sinks, and ecosystem services. 	<ul style="list-style-type: none"> • Conduct zone-wide exploration to delineate boundaries of jade bearing formations. • Make basic information on the distribution of jade bearing formations publicly available. • Require biodiversity, ecosystem services and cultural heritage studies to identify areas to be protected or managed. • Conduct zone-wide development planning to demarcate areas suitable for artisanal and small-scale and large-scale mining and associated infrastructure, buffer zones and protected areas. • Require mining companies to prepare and present mine plans for approval to mine before mining commences.
Legislative and governance limitations		
<ul style="list-style-type: none"> • Mechanism for requiring EMP. • Insufficient size of concessions for effective environmental management of mining. • Duration of jade production permits does not allow for mine closure and final rehabilitation. • Artisanal and small-scale mining is under-regulated. 	<ul style="list-style-type: none"> • EMP is not implemented as mechanism requiring implementation unclear. • Concession size limitation leads to amalgamation of concessions worsening environmental impacts and making it harder to hold mining companies accountable. • No mine closure laws, rules or planning. Mining companies 	<ul style="list-style-type: none"> • Review laws and rules to require implementation of EMPs or issue directive requiring implementation of the EMP. • Define resource and area required to effectively mine jade and manage environmental and social impacts. • Require mining companies to prepare mine closure and final

Issue	Effect	Solution
<ul style="list-style-type: none"> • Lack of formal coordination of mining where concessions are adjacent. • Insufficient regulations defining the support role of local authorities in mining governance. 	<ul style="list-style-type: none"> • walk away from concessions leaving legacy issues. • With artisanal and small-scale mining operating outside of the law, it is challenging to engage and empower miners to improve practices and manage their impacts. 	<ul style="list-style-type: none"> • rehabilitation plans for approval to mine. • Review laws and rules to allow larger concessions with longer terms. • Revise laws and rules to provide more clarity around artisanal and small-scale mining. • Require coordinated approach to mining of adjacent concessions.
Determining the effectiveness of the EMP		
<ul style="list-style-type: none"> • Mining companies lack the capacity to implement monitoring programs. • Ability of monitoring programs to adequately monitor individual mine impacts where concessions are adjacent. • Inability to differentiate impacts from upstream artisanal and small-scale gold and amber mining. 	<ul style="list-style-type: none"> • Environmental and social impacts not mitigated. • Limited or no understanding of effectiveness of management measures or capacity for improvement. • Complex monitoring networks to address adjacent or overlapping mining areas. • Limited or no understanding of baseline conditions. 	<ul style="list-style-type: none"> • Implement regional monitoring network. • Require discharge points for all mine sites. • Monitor discharge points and correlate with regional monitoring results.
Artisanal and small-scale miners and Yemasay		
<ul style="list-style-type: none"> • Artisanal and small-scale mining is being displaced by large-scale mining. • Unlicensed artisanal and small-scale mining of jade is being carried out in mined-out areas and outside concessions. • It is difficult for artisanal and small-scale miners to obtain concessions. • Artisanal and small-scale miners lack skills, knowledge and capacity to implement EMPs. • Artisanal and small-scale miners and Yemasay are exposed to exploitation and health and safety risks. 	<ul style="list-style-type: none"> • Ongoing impacts on the environment and communities. • No awareness of requirement to manage impacts or clean up their mine sites, leaving legacy issues. • Conflict with mining companies; frequent accidents leading to injury and death. • Miners get involved in drugs and crime to sustain livelihoods. • Miners operate outside the regulatory framework. 	<ul style="list-style-type: none"> • Implement arrangements for Yemasay to safely co-exist with mining company operations, including formal agreements for co-habitation and co-operation. • Promote the formalisation of artisanal and small-scale mining across all levels of government. • Require implementation of the EMP by artisanal and small-scale miners through awareness raising and training. • Investigate options for cost effective rehabilitation of artisanal and small-scale mine sites; for example the Frugal Rehabilitation Methodology to make rehabilitation viable and desirable for miners and the local communities.

2 Capacity to implement the EMP

The environmental audit found that there is no effective management of the environmental and social impacts of jade mining. Consistent with this observation, mining companies do not yet have the resources, training and experience to implement the EMP.

Without appropriate resources and training, the EMP will not be implemented or not properly implemented, and not achieve the outcomes expected by the Union Government, Kachin State Government and Myanmar people.

The EMP sets out the responsibilities for implementation of the EMP, and the minimum resources and training requirements for mining companies. These are:

- Making the mining company owners and mine manager responsible for implementation of the EMP.
- Engaging a mine environment and safety officer to manage implementation of the EMP.
- Training the following mining company workers in implementation of the EMP:
 - Mine owner or owners.
 - Mine manager.
 - Mine environment and safety officer.
 - Site supervisors (e.g., mine pit, workshops, worker accommodation, and administration office).

Training will comprise:

- Comprehensive training in implementation of the EMP.
- On-site training in the application of the EMP.
- Annual refresher training in implementation of the EMP.

Actual experience is invaluable in understanding what is required to implement an EMP. Two companies have agreed to voluntarily implement the EMP. These companies should be supported in the implementation of the EMP, as they will become demonstrations for other mining companies to follow in adopting and implementing the EMP.

3 Capacity to enforce the EMP

Effective implementation of EMPs is achieved through supervision, inspection and audit. The EMP requires mining companies to inspect and monitor their activities for compliance with the requirements of the EMP. They are required to report annually on their performance.

Compliance will be confirmed through inspections and audits conducted by MGE and/or ECD. MGE and ECD do not currently have the resources, training and experience to ensure compliance with the EMP.

On-site supervision is the most effective way to ensure compliance. MGE and ECD will need to increase their on-site resources to adequately regulate adoption and implementation of the EMP. Those resources will need to be trained in regulation of the EMP.

Training will comprise:

- Comprehensive training in implementation of the EMP.
- On-site training in the application of the EMP.
- Annual refresher training in implementation of the EMP.

The pilot companies offer a good opportunity for MGE, ECD and the mining companies to work together in building their respective capacity to implement and regulate the EMP.

The number of environment and safety officers required to adequately regulate implementation of the EMP will depend on the number and location of mines. Sufficient resources, not less than five officers, are recommended to enable each mine to be inspected monthly and audited annually.

4 Lack of exploration and planning at zone and mine levels

The location and depth of jade bearing formations – Uru Boulder Conglomerate – is currently based on experience gained from previous mining activities. No systematic exploration has been undertaken to determine the location, depth and thickness of the jade bearing formations and therefore the area required to extract jade. Additionally there is no consideration of natural resource management and sustainable development as a whole. This has significant issues for environmental management of jade mining, as:

- The area required to develop the mine is unknown or poorly understood, and hence there is often unnecessary disturbance of land, ecosystems, villages, settlements and farmland.
- The area required to effectively manage the environmental impacts of jade mining is unknown or poorly understood, resulting in offsite impacts to surrounding land uses.
- Important environmental assets (watercourses, sensitive vegetation, villages and settlements, cultural heritage sites) are not excluded from mining areas and so are not adequately protected.
- Responsibility for managing environmental and social impacts is unclear because concession boundaries and the obligations of mining companies are poorly defined.
- There is no requirement for mine planning leading to unstable landforms that can fail causing landslides that cause loss of ecosystems and property, and sometimes serious injury and death.
- There is no integrated approach to planning that incorporates identification and protection of sensitive ecosystems and natural (forest) resources.

These issues can be addressed by:

- Undertaking exploration to identify and evaluate the jade bearing formations.
- Undertaking baseline studies to identify the important environmental and social assets to be protected.
- Using the exploration results and baseline studies to define areas most suitable for mining.
- Allocating concessions of sufficient size to safely, and environmentally and socially responsibly extract jade.
- Accurately delineating concession boundaries to enable impacts to be managed onsite and monitored.
- Designing mine pits, waste rock dumps and mine infrastructure areas to be stable and properly managed to avoid or reduce environmental and social impacts.

The recommended solutions are discussed below.

Exploration

Delineation of the jade bearing formations will enable mine pits to be designed to optimise the area and volume of overburden to be removed to expose the formations and recover jade. This will potentially reduce the footprint of mines and the volume of overburden; thereby reducing environmental impacts and cost.

Modern geophysical techniques are capable of identifying the jade bearing formations providing valuable data for planning the orderly development of the Hpakant/Lonkin Gems Tract. Knowledge of the depth of the formations will inform the size of the pit required to mine the jade, the area required for waste rock dumps and mine infrastructure, the area required for environmental management and hence the size of the concession.

Exploration will also assist in differentiating the primary and secondary sources of jade to enable MGE to plan future jade mining areas. A combination of detailed mapping, modern geophysical techniques, test drilling, and production studies may be used to estimate the volume and mineability of the remaining jade.

Baseline studies

Baseline studies will determine the environmental, cultural and social values or assets and services to be protected, where practicable, noting that the jade bearing formations exist where they were laid down in early geological ages.

Defining mining areas (maws)

Knowledge of the areas to be excluded from mining will inform the delineation of maws or areas suitable for mining.

Defining concessions

Space is required to effectively manage the environmental impacts of mining. Space is required for the mine pit and associated surface water management system, waste rock dumps and associated surface water management system, topsoil storage, plant nurseries (if not provided by community-based organisations), mine infrastructure (administration offices, maintenance workshops, warehouses, fuel and explosive materials storage, and worker accommodation) and access roads. Knowledge of the space required for this infrastructure will inform the additional space required around the mine pit. Providing adequate space avoids or minimises offsite impacts; for example, land required for waste rock dumps. Knowledge of the size of the mine pit and area required for associated facilities and infrastructure will enable effective environmental management of mining. Importantly, it will inform the size of the concession required to maximise recovery of jade and minimise environmental and social impacts.

Concession boundaries

Poor delineation of concession boundaries leads to confusion about which mining company is responsible for the management and monitoring of environmental and social impacts of mining at that location. Concession boundaries should be delineated by GPS coordinates and marker posts with the concession number and name of the mining company. The marker posts should be spaced so that adjacent marker posts are visible. Where practicable, concession boundaries should be fenced.

MGE's records of concession boundaries should be digitised into a simple database which can then be added to MONREC's digital mining cadastre once built. Access to this database can be shared between MGE/ECD staff both in Naypyitaw and in Hpakant/Lonkin to avoid confusion between offices. The boundary records held by MGE should be checked against 'operational' boundaries of mining operations and any discrepancies rectified.

Mine design

Jade mines and quarries (road-making material) need to be designed and constructed as stable landforms that minimise the amount of overburden to be removed and disposed onsite or offsite. Waste rock dumps need to be designed and constructed as stable landforms to reduce risks to people and ecosystems. Mining companies will require training in mine design and planning, in addition to the training required to implement the EMP. Mine inspectors from the Department of Mines will need training in the relevant requirements of the EMP.

Zone wide planning

A pilot program which includes the required planning activities should be undertaken on one of the zones prior to the issuance of new concessions. A zone wide planning activity would include:

- Exploration – mapping, modern geophysical techniques and possible test drilling.
- Baseline studies and identification of sensitive environmental and cultural assets.
- Existing concession definition and database establishment.

The results of this zone wide planning would allow:

- Identification of areas most suitable for large scale mining and those more suitable for artisanal or small-scale mining activities.
- Planning of common infrastructure including mine haul roads, quarries (if required for road-making material), waste rock dumps, and common non-hazardous waste landfills.
- Identification of buffer zones around sensitive ecosystems, villages, settlements and farmland.
- Accurate identification of existing and future concession boundaries.

A conceptual representation of steps in zone-wide development planning is presented in the following figures which show:

- Probable extent of Uru Boulder Conglomerate based on regional geological mapping (Figure 4.1).
- Geological surveys to confirm extent of Uru Boulder Conglomerate (Figure 4.2).
- Baseline ecological, cultural and social surveys to define environment, cultural and social assets to be protected by buffers or other means (Figure 4.3).
- Geophysical surveys to define depth and extent of Uru Boulder Conglomerate (Figure 4.4).
- Mine plans to confirm the method (ASM or LSM) and space required to economically, and environmentally and socially responsibly recover jade (Figure 4.5).

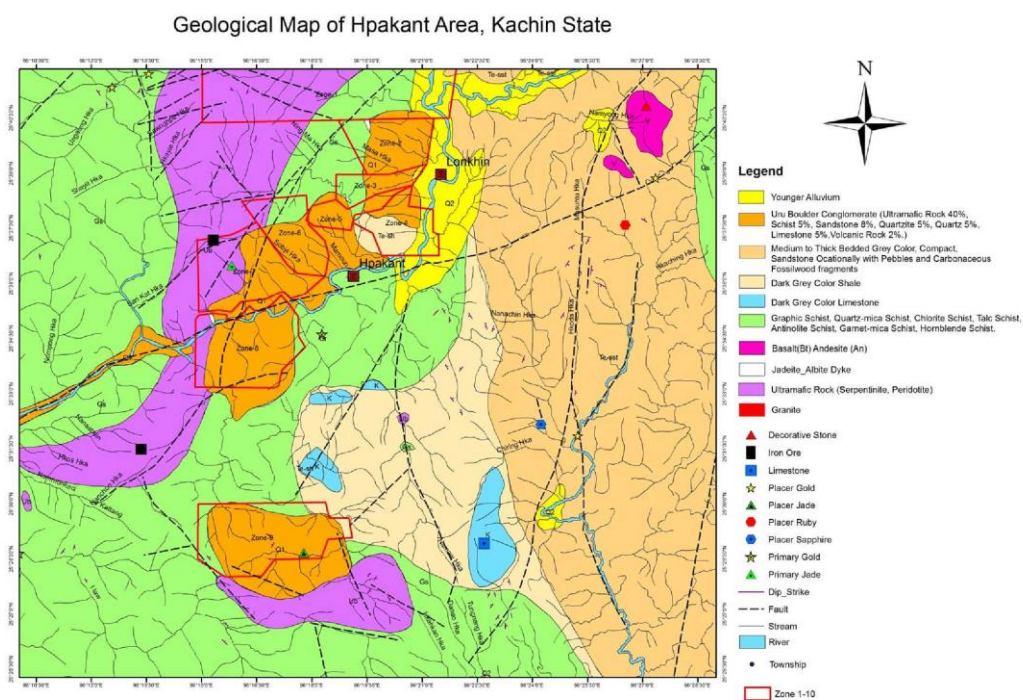


Figure 4.1 Regional-scale geological map showing probable extent of Uru Boulder Conglomerate

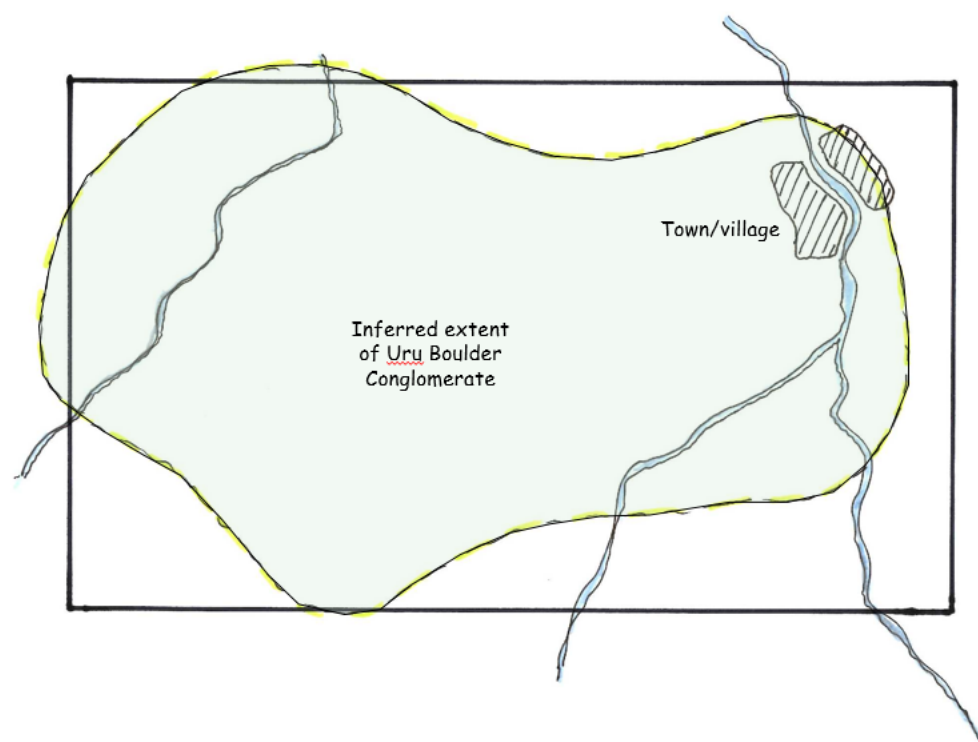


Figure 4.2 Confirm probable extent of Uru Boulder Conglomerate by geological survey

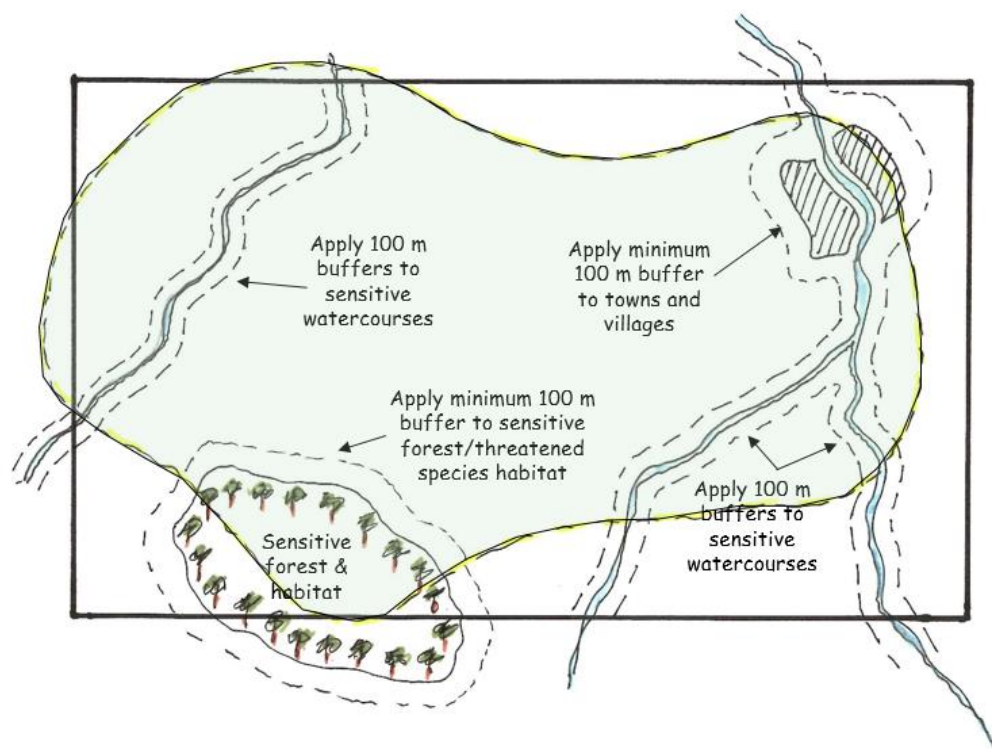


Figure 4.3 Identify sensitive environments by ecological, cultural and social surveys and apply buffers to protect sensitive areas and assets

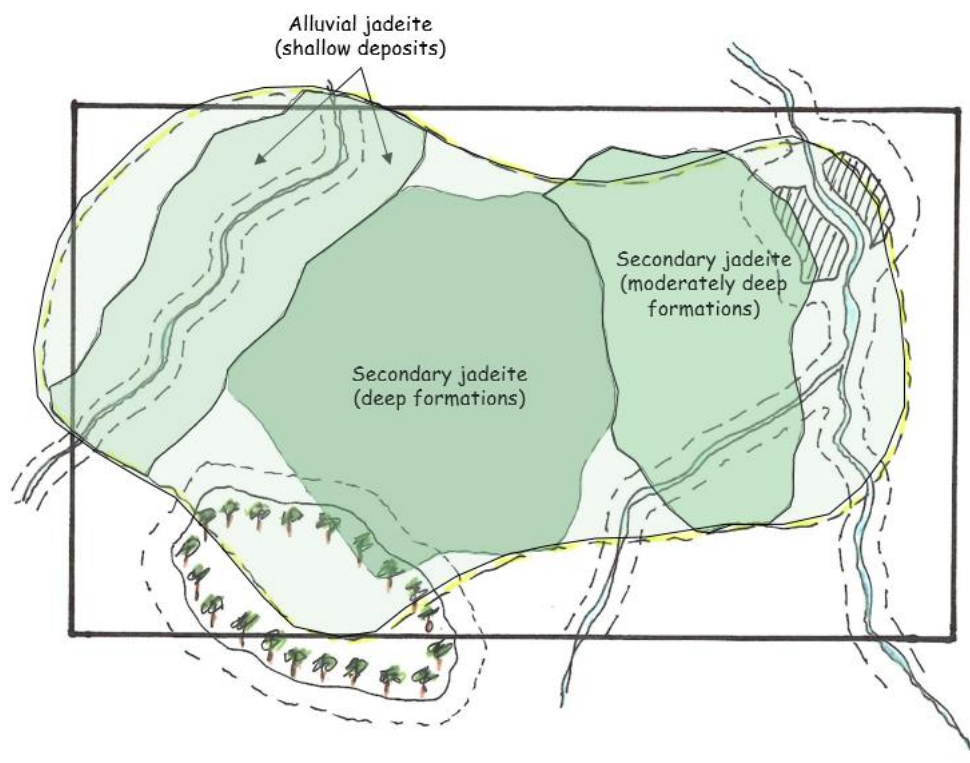


Figure 4.4 Define depth and extent of jade formations by geophysical surveys

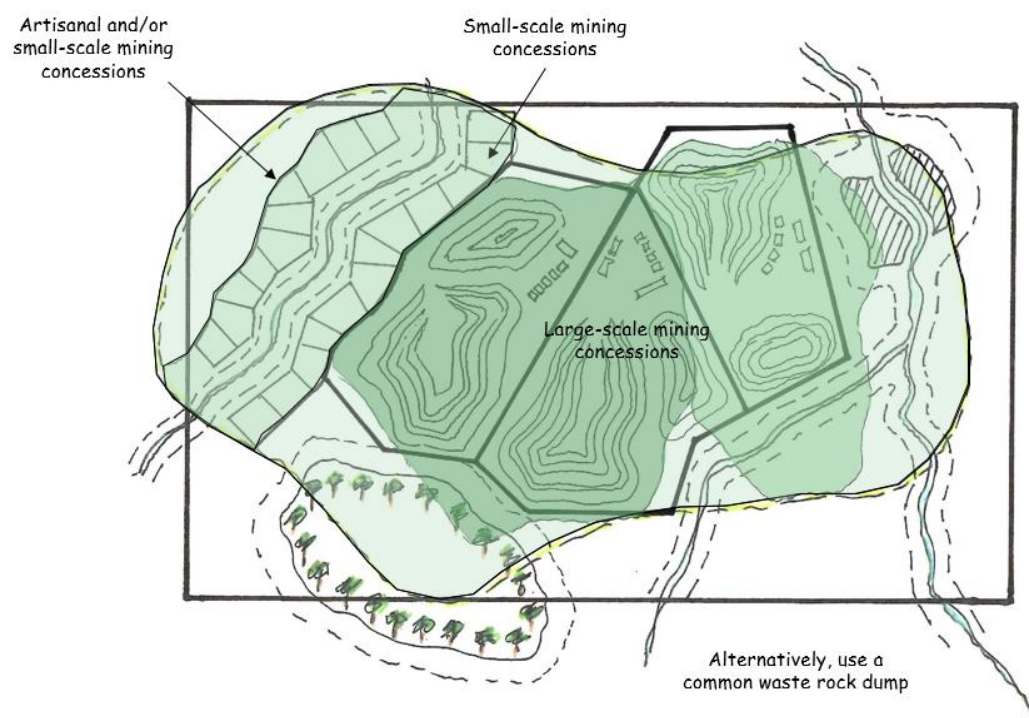


Figure 4.5 Prepare mine plan, define concession size and mark boundaries

5 Legislative and governance limitations

The size of concessions and duration of jade production permits, as currently proposed, do not allow for effective management of the environmental and social impacts of jade mining.

The Second Amending Law of the Myanmar Gemstone Law (2016) sets out the duration of jade production permits based on the anticipated production and mining method. The draft Myanmar Gemstone Law (2017) redefines the size of concessions and duration of production permits, and places a limitation on the depth of mining each year. The draft Myanmar Gemstone Law (2017) does not recognise large-scale mining. The concession sizes, durations of production permits and depths are set out in Table 5.1.

Table 5.1 Concession size, duration of permit and depth under Myanmar Gemstone Law

Production	The Second Amending Law of the Myanmar Gemstone Law (2016)		Draft Myanmar Gemstone Law (2017)		
	Size (acres)	Duration (years)	Size (acres)	Duration (years)	Depth per year (feet)
Large-scale	Not defined	10	Not permitted	Not permitted	Not permitted
Medium-scale	Not defined	5	3	3	150
Small-scale	Not defined	3	2	2	100
Subsistence	Not defined	1	Not defined	1	50

5.1 Size of concessions

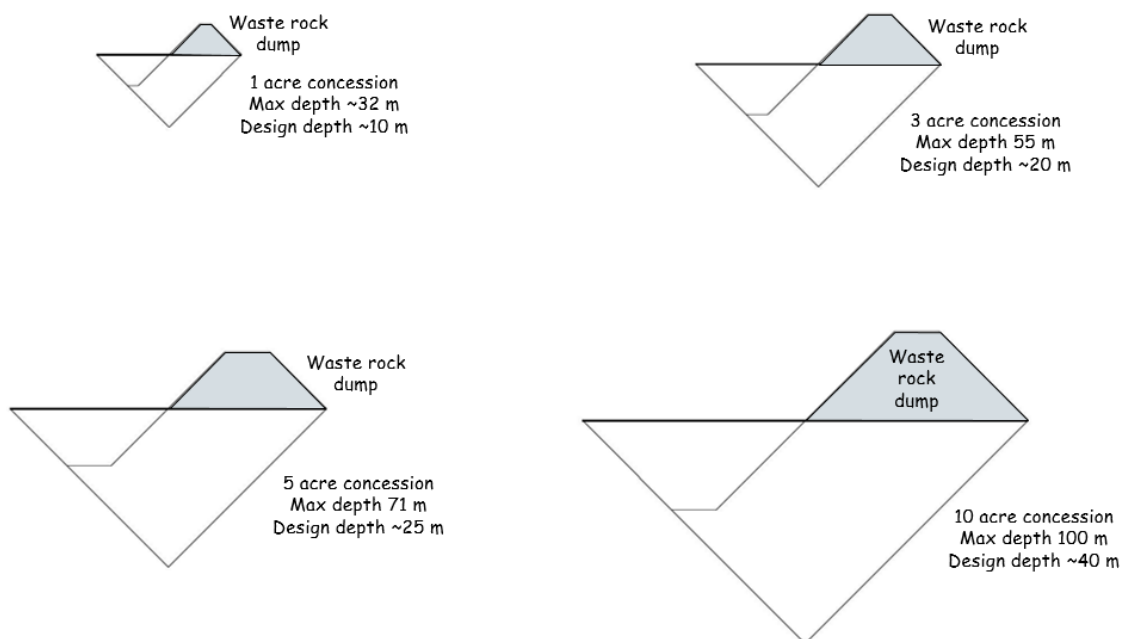
Mining tenure in other countries is determined by the space required to safely and economically mine the resource, and to effectively manage the environmental and social impacts of mining. The depth of the resource below ground level is a key factor in the selection of mining method and the delineation of the mining rights i.e., lease or concession.

The Uru Boulder Conglomerate occurs between 5 and 300 m below the ground surface depending on the topography and orientation of the formation. Alluvial jade occurs in the alluvial deposits of the Uru Creek floodplain and is typically found at shallow depth. Primary and secondary jade occurs in formations with varying depth below ground.

Figure 5-1 shows the maximum depth of excavation possible for the nominated concession sizes and what is considered a safe depth based on constructing stable mine batters i.e., design depth. The depths assume overall mine batter slopes of 45°. The design depth assumes the waste rock dump is located on the concession, which is preferred from an environmental management perspective. These diagrams do not include space for mine infrastructure (offices, worker accommodation, workshops, mining equipment parking areas, fuel storage, jade sorting areas) or surface water management systems.

Figure 5.1 shows that artisanal and small-scale mining of alluvial jade is possible with 1, 3 and 5 acre concessions. Deeper jade (greater than 50 m below ground) cannot be exposed in the 1, 3, 5 and 10 acre concessions. Figure 5.2 shows the space required to expose and extract secondary jade in formations up to 300 m below ground level. This equates to approximately 420 acres. Allowing for

mine infrastructure and surface water management systems would increase the area to approximately 450 acres.



Excludes allowance for mine infrastructure and surface water management

Figure 5.1 Maximum and design depth possible for existing concession sizes

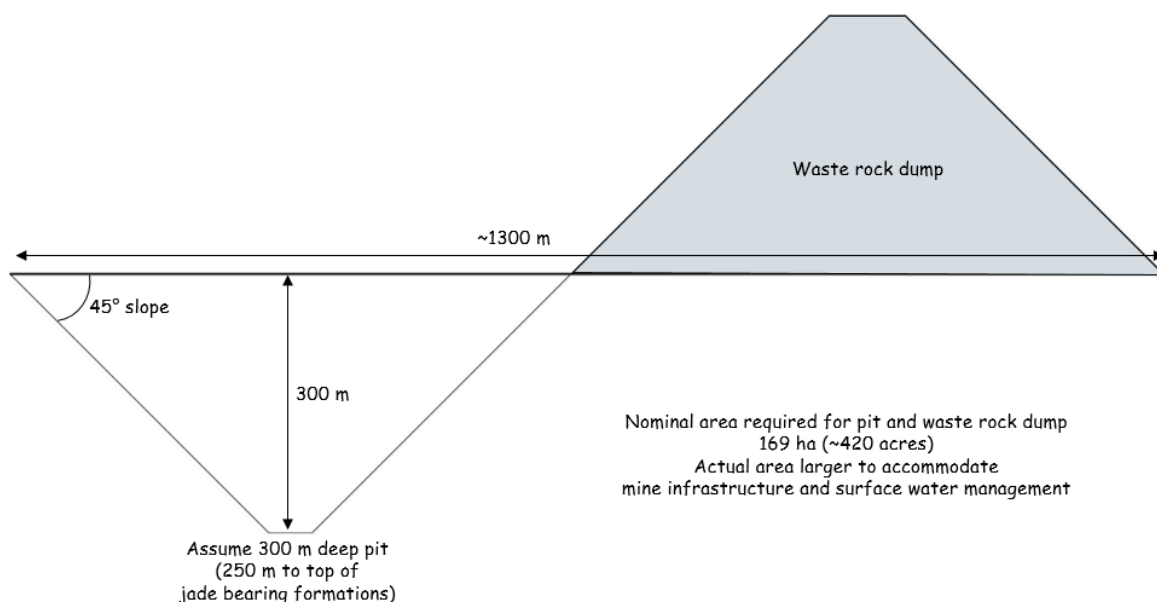


Figure 5.2 Maximum and design depth required to access deep jade formations

The proposed concession sizes will not allow jade bearing formations to be safely accessed in accordance with the requirements of the EMP (Mine Pit and Waste Rock Dump Management Plan). They do not provide sufficient space for waste rock dumps, mine infrastructure and surface water management. Importantly, they do not provide sufficient space to effectively manage the environmental and social impacts of jade mining.

Currently mining companies in Hpakant/Lonkin amalgamate concessions to enable access to the jade at depth. The current draft Myanmar Gemstone Law (2017) will incentivise companies to continue this practice of amalgamation. This practice makes it more difficult for MGE/ECD to enforce and regulate the EMP.

Figure 5.3 shows the space required to effectively manage a hard rock quarry in southern Australia. The concession size is 260 acres. The mine pits, waste rock dump, mine infrastructure and surface water management system are located within the concession, enabling the environmental impacts on this mining operation to be managed onsite.



Figure 5.3 Example of concession providing sufficient space for effective environmental management

In summary, the size of concessions must be large enough to enable jade to be mined economically and safely, maximise the recovery of jade, and to effectively manage the environmental and social impacts of jade mining. The current concession sizes do not allow sufficient space for effective environmental management of jade mining.

5.2 Duration of jade production permits

The duration of jade production permits is too short to allow for the full mine lifecycle of exploration, feasibility, planning and approvals, construction of mine infrastructure, removal of overburden, extraction of jade, and importantly, mine closure and final rehabilitation. At the mining rates proposed in the draft Myanmar Gemstone Law (2017), mining companies will only just reach and mine the deep jade bearing formations in the final year of their production permit. They currently have no rights or

obligations at the end of the production permit and mine closure and final rehabilitation will not be done. The duration of jade production permits needs to consider the time required to reach and mine the jade bearing formations, and the time required to properly plan and close the mine including carrying out final rehabilitation.

Preparation of an environmental impact assessment (by IEE or EIA) is typically done as part of the feasibility study. Completion of the environmental impact assessment and issue of an Environmental Compliance Certificate may extend the overall timeframe for the feasibility study and environmental approvals by one year i.e., three years overall. The duration of a permit for large-scale and small-scale jade production should consider the indicative timeframes set out in Table 5.2.

Table 5.2 Indicative timeframes for large-scale and small-scale jade mining

Activity	Large-scale production*	Small-scale production*
Exploration and approvals		
Exploration	1 year	Assume information available from investigations by large-scale mining companies
Feasibility study (prepare IEE or EIA and prepare mine plan)	2 year	1 year
Environmental approvals (finalise IEE or EIA and obtain ECC)	1 years	1 year
Total for exploration and approvals	4 years	2 years
Production		
Establish mine infrastructure and properly plan mine development	1 to 2 years	Up to 1 year
Remove overburden; duration dependent of depth of jade bearing formations	2 to 3 years	1 year
Extract jade ensuring recovery of all classes of jades is maximised	2 to 3 years	1 year
Close and rehabilitate mine including preparation of mine closure plan, collection of seed, removal of infrastructure, remediation of contaminated soil, reinstatement of stable landforms, and final rehabilitation.	2 to 5 years	1 to 2 years
Final rehabilitation warranty period to ensure final rehabilitation is successful	2 to 5 years%	2 to 3 years%
Total for production	9 to 18 years	6 to 8 years

* Timeframes assume works carried out in dry season (October to May)

% At least two growing (wet) seasons are required to determine final rehabilitation success.

Based on this assessment, up to 4 years may be required to properly explore for jade and obtain the necessary environmental approvals. The duration of a jade production permit should be up to 18 years (nominally 20 years) for large-scale mining and up to 8 years (nominally 10 years) for small-scale mining to provide sufficient time for proper planning and mine closure and final rehabilitation. Artisanal (subsistence) production permits will be shorter but not less than 3 to 5 years to enable proper mine closure and final rehabilitation.

Consideration should be given to adopting similar processes available under the Myanmar Mines Law (2015) and draft Myanmar Mines Rules (2017) for integrated permits that allow jade mining companies, subject to acceptable performance, to move from exploration to feasibility to production.

In summary, the proposed durations of production permits for jade mining are too short to enable mine closure and final rehabilitation, and demonstration of successful closure and rehabilitation.

5.3 Artisanal and small-scale mining

Artisanal and small-scaling mining is recognised in The Second Amending Law of the Myanmar Gemstone Law (2016) and a mechanism for granting production permits set out. Insufficient time has passed to see the effect of this recent amendment to the Myanmar Gemstone Law in providing opportunities for artisanal and small-scale miners.

The availability of artisanal (defined as subsistence mining in the law) and small-scale concessions and the production potential of those concessions will determine how effective the amendments are in formalising this form of mining, requiring environmental management and achieving the desired outcomes.

Unlicensed mining is expected to continue, as artisanal and small-scale miners pursue more viable opportunities in current or former large-scale mines. Effective environmental management will only be possible where those activities are integrated with landscape planning processes, and/or with large-scale mine planning and operations or formalised via some other mechanism. Section 8 presents international experience in the formalisation of artisanal and small-scale mining, including possible solutions to the issues at Hpakant/Lonkin Gems Tract.

6 Implementation of the EMP

The Hpakant/Lonkin Gems Tract is a unique situation where decades of mining has occurred without effective management or regulation of the environmental and social impacts of mining.

Implementation of the EMP may be achieved in several ways. Evolving environmental impact assessment and management laws, rules and procedures are delaying approval of EMPs.

The options for implementation of the EMP are discussed in this section along with recommended transitional arrangements.

6.1 EMP is fit for purpose and ready to implement

The EMP is a fit for purpose document that has been written to address the impacts arising from large-scale and artisanal and small-scale mining in the Hpakant/Lonkin Gems Tract. The EMP is ready to be adopted and implemented by mining companies. It is not a guideline or template for preparation of separate EMPs by mining companies. It is a comprehensive document that includes all of the measures and procedures required to improve the environmental and social performance of jade mining. To be effective, it must be implemented in its entirety, as a complete document by all mining companies.

6.2 Options for implementation of EMP

Jade mining is authorised and regulated by the Myanmar Gemstone Law (1995). The Second Amending Law of the Myanmar Gemstone Law (2016) requires the environmental and social impacts of jade mining to be managed.

Article 54 provides the powers necessary for the Ministry of Mines, the Department of Mines and the Myanmar Gems Enterprise to issue notifications, orders, directives and procedures. Article 54 states:

54. In implementing the provisions of this Law:

- a) The Ministry of Mines may issue rules, regulations and bye-laws with the approval of the Union Government;
- b) The Ministry of Mines may issue notifications, orders, directives and procedures;
- c) The Department of Mines and Myanmar Gems Enterprise may issue orders and directives with the approval of the Ministry of Mines.

The Environmental Impact Assessment (EIA) Procedure (2015) sets out the requirements for the environmental and social impact assessment of projects and their environmental management.

Annex 1 lists the activities for which environmental and social impact assessment is required and the type of impact assessment required for the activity. No 136 requires an Initial Environmental Examination (IEE) to be prepared for precious stone mining covering an area less than 20 ha and less than 50,000 tonnes per annum. An Environmental Impact Assessment (EIA) is required for precious stone mining covering an area greater than or equal to 20 ha or greater than or equal to 50,000 tonnes per annum.

Artisanal, small-scale and large-scale jade mining activities will trigger the need for an IEE where the activities cover less than 20 ha (approximately 50 acres). Based on the draft Myanmar Gemstone Law (2017) this will mean all mining operations, as the concession sizes in the draft law are less than

20 ha. Where amalgamation of concessions occurs and is greater than 20 ha or 50 acres, the mining operations will require an EIA. The requirement for an EIA would most likely be triggered by large-scale mining proposals.

An Environmental Management Plan (EMP) is required to be prepared as part of the impact assessment by IEE or EIA for new mines. Where mining activities were in progress before the introduction of the Environmental Conservation Rules, Article 8 of the EIA Procedure requires an EMP to be prepared and to be informed by an environmental and social audit.

The EMP and Environmental Compliance Certificate (ECC) issued by the Environmental Conservation Department apply to a specific mine.

The Ministry of Mines may issue rules, regulations and bye-laws with the approval of the Union Government. MGE and the Department of Mines may, with the approval of the Ministry of Mines, issue orders and directives. MGE has issued numerous notifications and letters to mining companies in the Hpakant/Lonkin Gems Tract requiring improved environmental and social performance. The Ministry of Mines, MGE or the Department of Mines could require the EMP to be implemented by existing and new jade mines by issuing an order or directive.

Figure 6.1 (Figure 4.1 from the EMP) shows the three ways in which the EMP could be implemented.

Currently, ECD is under resourced. Very few (if any) Environmental Compliance Certificates have been issued by ECD. The time necessary to require implementation of the EMP through the processes available under The Environmental Conservation Law (2012) is uncertain.

The EMP, once approved by ECD, could be implemented by a directive or order under Article 54 of The Second Amending Law of The Myanmar Gemstone Law (2016). The order could require the EMP to apply to all mining activities – large-scale and artisanal and small-scale mining. This would enable early intervention in effecting real change and addressing the high priority environmental and social risks at Hpakant/Lonkin Gems Tract.

6.2 Transitional arrangements

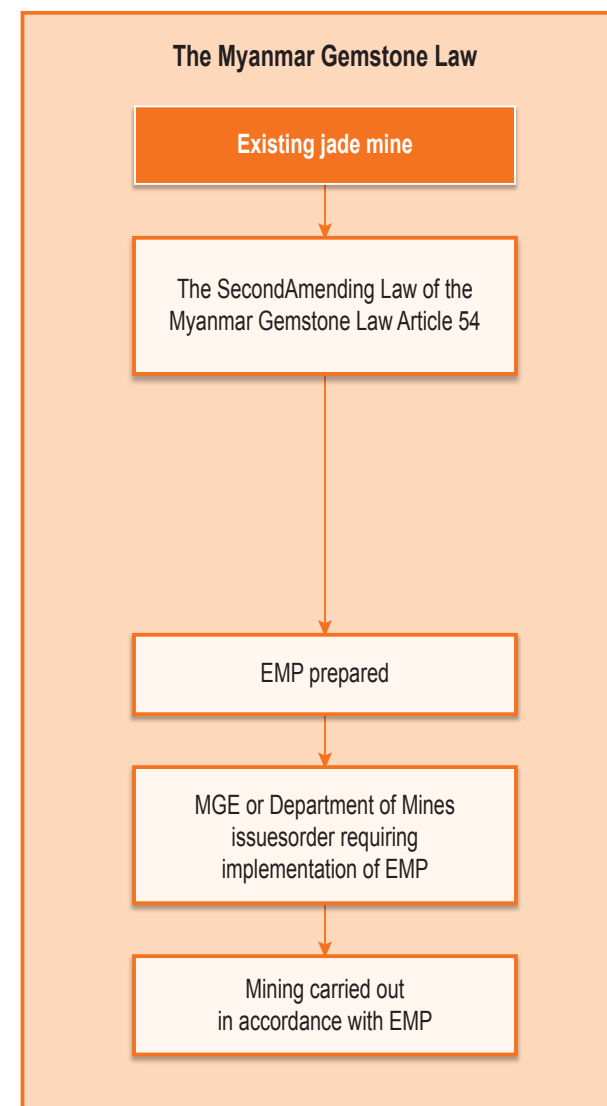
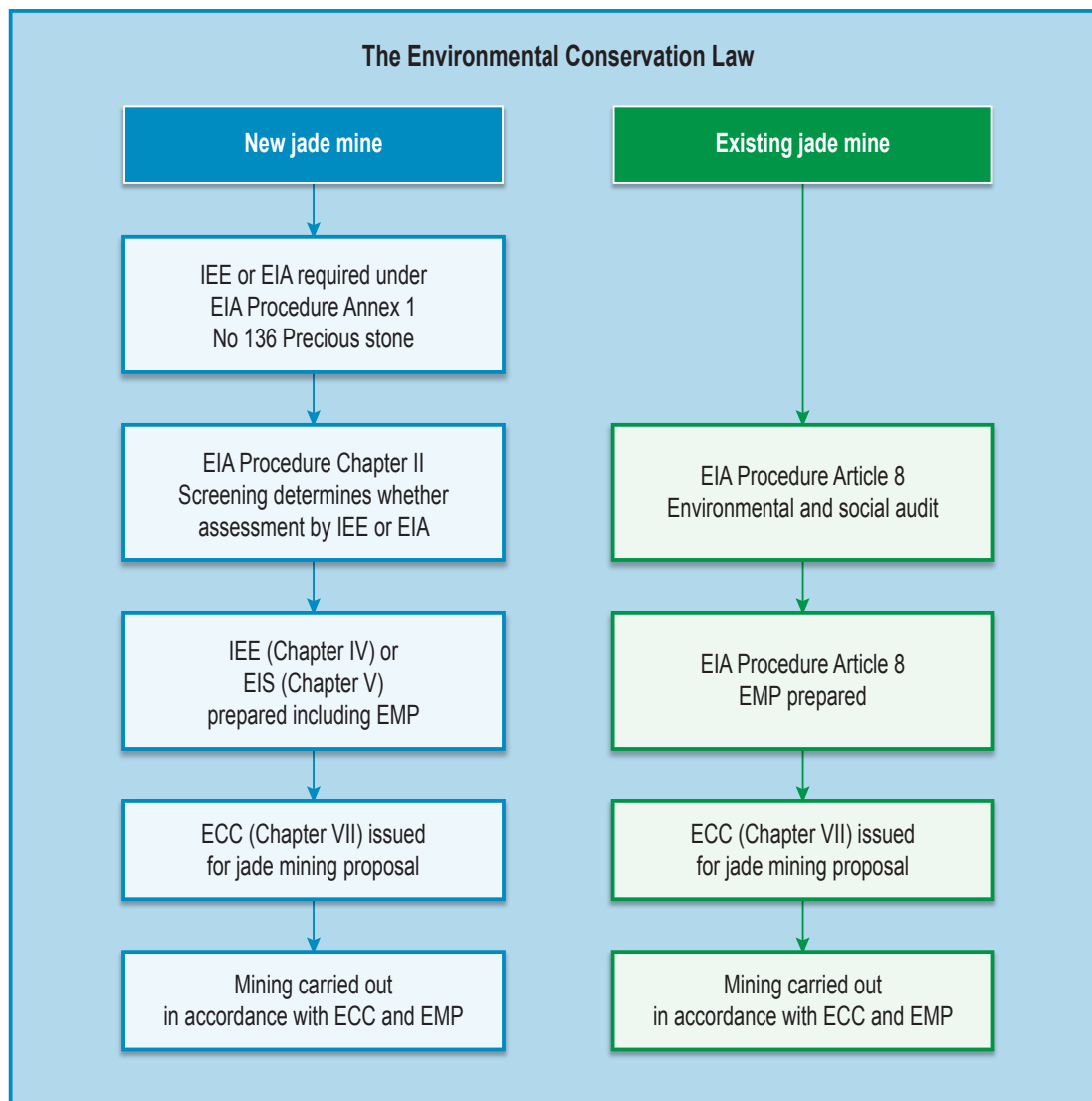
The EMP prepared by Coffey-Valentis is the first step towards improving the environmental and social performance of jade mining in the Hpakant/Lonkin Gems Tract. The EMP sets the minimum standards for managing the environmental and social impacts of large-scale jade mining and artisanal and small-scale jade and alluvial gold mining.

The EMP focusses on addressing the highest risks to the environment, communities and people. The EMP has been written in a user-friendly and practical way to allow ease of implementation. In this manner, the primary goal of effecting real change may be achieved.

It is critical that the Union Government ministries, departments and the MGE, the Kachin State Government ministries and departments, and importantly jade mining companies and their representative organisation – the MGJEA – receive the necessary resources and receive the necessary training and support to implement and regulate the EMP.

Accordingly, we recommend transitional arrangements for implementation and enforcement of the EMP as follows:

- Year 1 – establish framework for implementation including resources and training. Design and implement regional monitoring network.
- Years 2 to 5 – require implementation of the EMP.



- Year 6 – review mining company performance, regional monitoring and adequacy of EMP. Revise EMP to incorporate findings of regional monitoring and require full compliance with National Environmental Quality (Emission) Guidelines.
- Year 7 onwards – conduct five-yearly reviews of EMP.

Year 1 – establish framework for implementation of EMP

Procure the resources necessary to implement and regulate the EMP, and provide training.

For government ministries, departments and MGE the following resources are required:

- Environment officers based in Hpakant/Lonkin or Myitkyina to:
 - Conduct inspections, annual and ad hoc audits of mining operations.
 - Review annual reporting by mining companies and recommend action where environmental and social performance is not demonstrated.
 - Work with Community Reference Groups and mining companies to resolve community complaints and concerns.
- Mine inspectors to regulate jade and alluvial gold mining in accordance with the requirements of The Myanmar Gemstone Law (enacted law).

For mining companies, an environment and safety officer to:

- Implement the EMP.
- Train all workers in the management measures and procedures set out in this EMP.
- Advise the mining company and workers on good environmental practice by keeping informed of changing requirements including any required through notifications and directives issued under The Myanmar Gemstone Law.
- Carry out the inspection and monitoring requirements set out in the management plans and procedures of this EMP.
- Prepare annual reports demonstrating the mining company's environmental and social performance.
- Respond to, and take control of emergency situations in accordance with the requirements of this EMP.

Years 2 to 5 – implement the EMP

Implementation of the EMP will be a requirement for jade mining. The mechanism for requiring implementation of the EMP will be determined and communicated to all mining companies.

During this period, regional monitoring will be done to establish a comprehensive baseline from which to determine the adequacy of the management measures and procedures in the EMP for managing environmental and social impacts.

Year 6 – review performance and the adequacy of the EMP

The findings of regional monitoring, annual reporting by mining companies, incident reports and government and independent audits will be used to review the adequacy of the EMP.

The EMP will be revised to address any deficiencies and changed regulatory requirements. It will be revised to require full compliance with relevant National Environmental Quality (Emission) Guidelines and in their absence relevant international standards and good practice.

Year 7 onwards – five yearly review

The EMP will be reviewed every five years to determine its adequacy and need for revision.

7 Determining the effectiveness of the EMP

The effectiveness of the EMP in changing mining methods and improving the environmental and social performance of jade mining at Hpakant/Lonkin Gems Tract should be determined by monitoring.

Typically, monitoring is the responsibility of individual mining companies and done at the concession level. The nature of mining at Hpakant/Lonkin and overlapping activities (for example, common waste rock dumps) makes mine site monitoring problematic. There is a risk that environmental impacts extending beyond concession boundaries and cumulative impacts will not be effectively monitored and managed. A combination of mine site monitoring and regional monitoring is proposed to address these issues.

7.1 Mine site monitoring

The EMP requires mining companies to prepare a mine plan and a surface water management plan. They are required to nominate a discharge point for surface water draining from the mine site. The discharge will be monitored for compliance with the National Environmental (Emission) Guidelines – Total Suspended Solids water quality parameter. The focus being to manage erosion and sedimentation which has been identified as the key impact of large-scale and to a lesser extent small-scale jade mining.

7.2 Regional monitoring program

A regional monitoring program should be established to enable control/impact monitoring of mining activities in and downstream of the gems tract. The impacts of jade mining at Hpakant/Lonkin are already being experienced as far downstream as Uru Creek's confluence with the Chindwin River, and downstream of the confluence. Sedimentation of the lower Uru Creek could exacerbate flooding of the fertile agricultural land on its floodplain and along the Chindwin River. The regional monitoring program should encompass all zones and include the following as a minimum:

- Water quality monitoring in the Uru Creek catchment upstream and downstream of each zone, and downstream of the confluence of major tributaries. Monitor all parameters in the National Environmental (Emission) Guidelines Construction Materials Extraction (Section 2.7.1) and if heavy metals are indicated the parameters in Ore and Mineral Extraction (Section 2.7.2).
- Water quality monitoring in adjacent unaffected catchments to understand pre-mining conditions and to provide control sites for determining regional water quality. Monitor all parameters in the National Environmental (Emission) Guidelines Construction Materials Extraction (Section 2.7.1) and if heavy metals are indicated the parameters in Ore and Mineral Extraction (Section 2.7.2).
- Groundwater quantity and quality monitoring of wells and springs used by villages for drinking and domestic water sources. Monitor all parameters in the National Environmental (Emission) Guidelines Construction Materials Extraction (Section 2.7.1) and if heavy metals are indicated the parameters in Ore and Mineral Extraction (Section 2.7.2).
- Air quality sampling at three secure and representative locations in the gems tract, particularly in zones 1 to 9 to understand the ambient air environment and any airshed issues. Particulates (PM_{2.5} and PM₁₀) and dust deposition should be monitored, as well as local meteorology (temperature, wind speed and direction, rainfall and humidity).

- Biodiversity surveys to identify presence and habitat requirements of threatened flora, fauna and ecological communities. The surveys should focus on undeveloped areas in the zones and in the surrounding areas. The results of biodiversity surveys should be integrated with other biodiversity data in the region to provide appropriate context for the protection and management of biodiversity. For example, Indawgyi Lake Wildlife Sanctuary's catchment boundary is close to Zone 9. This site is a wildlife reserve tentatively listed on the World Heritage List and of international significance. Activities adjacent to the catchment boundary should protect the values listed in the World Heritage listing.

The regional monitoring program should be administered by ECD and funded by contributions from mining companies. The results of monitoring should be reviewed annually by suitably qualified experts and published by ECD.

8 Artisanal and small-scale mining and Yemasay

Artisanal and small-scale mining (ASM) although having been progressively replaced by large-scale mining (LSM) is still practiced in Hpakant/Lonkin Gems Tract as independent operations outside concessions, as independent operations in mined-out areas, and as integrated operations with LSM. Yemasay (stone pickers or scavengers) illegally work active and inactive concessions for opportunistic jade. This section presents international experience and advice on the management of ASM and initiatives that might address the issues relating to Yemasay.

8.1 Artisanal and small-scale mining

The activity of artisanal and small-scale miners (ASM) is presently a barrier to sound environmental management and the management of social issues in the Hpakant/Lonkin Gems Tract. Key issues include:

- While formal recognition of artisanal and small-scale mining has been included in the Myanmar Gemstone Law, only some small-scale mining operations are licensed. Most artisanal mining operations are unlicensed. Concessions are often amalgamated to enable mining by large-scale mining (LSM) companies or methods.
- Most ASM do not obtain licenses due to a lack of willingness or opportunity. In such cases, ASM operate unlicensed or with an informal agreement to operate on LSM company concessions. Accidents due to landslides, blasting or interactions with heavy machinery are frequent.
- Having so many ASM activities operating outside the legal framework makes it very difficult to promote and enforce environmentally responsible behaviour because:
 - 1) Miners are unaware of the need or unwilling to mine in an environmentally responsible way;
 - 2) they may not recognise the benefits of mining responsibly; and
 - 3) authorities and licensed concession holders have less leverage over them.
- ASM have significantly less capital than LSM, as well as less knowledge and technical capacity for environmental management.

Recognition of ASM and its inclusion in the regulatory framework will promote conditions that make environmentally and socially responsible ASM more possible and thus more likely.

The following sections detail several steps that could be taken by the Myanmar Government to address issues with the environmental impacts of ASM in Hpakant/Lonkin Gems Tract (and across the country). These are:

- Conducting a situational assessment.
- Developing an ASM strategy to progressively formalise the sector.
- Implementing the formalisation strategy, which would balance incentivising measures with regulatory and enforcement approaches.
- Introducing appropriate environmental mitigation tools at different phases of the ASM mining cycle in order to avoid, minimise, rehabilitate or compensate for impacts.

- Developing a small number of trials or pilots to demonstrate mitigation tools and the benefits of good practice. In particular, pilot frugal rehabilitation methods for ASM based on international experience.
- Supporting the ongoing development of the sector.

These steps apply to both legal and illegal miners. These recommendations are based on international experience with ASM in over 50 countries around the world, and the information gathered by the research team while in-field in Hpakant/Lonkin.

Situational assessment

Build a deeper understanding of the jade ASM sector as the basis for any subsequent strategy, through a situational assessment, building upon the initial findings of the present work. In addition to environmental factors this work should include consideration of social and economic factors in recognition that these are inextricably linked to managing the environmental impact of ASM. Key parameters would include:

- The risks and rewards associated with why the miners mine at all, why they mine where they mine, and why they mine the way they do.
- Categorisation of types of cooperation and cohabitation that occur between ASM and LSM.
- Mapping of the key gatekeepers and influencers that would impact any strategy for managing change in the sector.
- Recommendations relating to subsequent interventions and activities that should be pursued in a national ASM strategy.

Case study: ASM gold and diamond baseline assessments in Guinea

A situational analysis and baseline of the ASM gold and diamond sectors in Guinea was undertaken between 2016 and 2017. The outputs, which include an assessment of the technical characteristics of mining operations and the ASM workforce, the social and environmental impacts of the sector, its macro and micro-economic contribution and governance of the sector, have provided the government with a comprehensive picture of the current state of activity in the sector. The recommendations developed have been adjusted and prioritized with stakeholders through national workshops. The government now intends to use the study to develop and implement a road map for the sector.

ASM strategy development

Once there is deeper understanding of the motivations, modes and commercial and political parameters of ASM jade mining, the government is in a stronger position to develop an ASM strategy, either for improving environmental management specifically or improving sector performance generally based on the results of this situational assessment. This should seek to:

- Create incentives that make environmental and social performance priorities for ASM and other stakeholders. This may include determining how to deliver a net benefit for stakeholders whilst achieving the government's goal of improved environmental management, including how to address the priority issue(s) for each material stakeholder being the miners or those that influence them (financiers, buyers).

- Improve the legal and regulatory framework to make formalisation simpler for ASM, and increase the business case for operating in the formal rather than informal sector. Crucially, this applies to financiers and gem traders, as well as miners.
- Identify needs and opportunities for addressing the priority issues of ASM sector actors on the one hand (i.e. most probably, commercial performance) and the government's priorities on the other (i.e. environmental management).

Case study: Designing an ASM Strategy for the Government of Kenya (2017)

Kenya is presently redefining its approach to mineral sector governance. As part of this process the government has requested development of a national strategy. The output – the Kenyan Artisanal Mining Strategy (KAMS) – is a government driven document, based on international best practice and validated by stakeholders along and around the mineral value chain. The development of the strategy has been formative (improving government understanding of and capacity to manage the sector) and prescriptive (detailing the specific interventions it will undertake realise the progressive formalisation of the sector in line with its vision statement).

Developing a National Strategy for ASM is a cost-efficient and effective way to prioritise thematic areas important to the government and stakeholders so that they feature within national planning. A National Strategy can also help governments to think through the complex process of intervention, impact, dependencies and subsequent interventions. In doing so they serve to break down complex sectoral issues into manageable and actionable activities which contribute to efficient and effective use government resources. Finally, a National Strategy for ASM can be used by the government to demonstrate that it is serious about improving the sector and has a clear idea of how it is going to achieve this; the document is thus also indispensable to attract support of development partners.

Formalise ASM

Implement the ASM strategy through the following initiatives:

- Legalise ASM (put in place the appropriate legal framework) and make obtaining concessions and production permits accessible and affordable. Set the bar at an attainable level and demonstrate that legalisation and thus formalisation will confer tangible benefits for miners and other relevant ASM stakeholders, like traders, local authorities, and environmental authorities.
- Take an incentivising approach to ASM formalisation, enforcing consistent good practice only where the enabling conditions are in place to 1) access formality, and 2) benefit from formality.
- Take a progressive and ongoing approach to formalisation (financing, mining, mineral commercialisation, trading, export all must be formalised in time).
- Recognise that informality is not synonymous with illegality. Where ASM demonstrates an effort to formalise it is important to avoid punitive measures that will only serve to push the activity underground.
- Build trust by undertaking outreach programmes to ASM through local influencers (CSOs, religious organisations and leaders, etc.). ASM political economy is heavily influenced by informal, local and often traditional influencers. Building trust with ASM communities to demonstrate that the government is part of the solution and not part of the problem is an integral part of ASM management. Implementing programmes through these structures rather than working against them serves to 1) build trust and credibility 2) reduce the burden on the government – it is important to recognise that the government is one of many stakeholders in the formalisation process and cannot be expected to formalise the sector alone.

Concrete actions include:

- Include ASM in all laws, rules and guidelines that concern financing the jade mining business, jade mining and the commercialisation of jade.
- Delineate specific zones for ASM activities based on presence and mineability of jade, as identified during the strategic planning process.
- Simplify the concession licensing process through decentralisation of this process to the Kachin State Government. Set up mobile licensing units and involve local authorities. Reduce the requirements in terms of documentation and lower fees for obtaining production permits.
- Provide training to government officers, local authorities and mining companies about how to engage with ASM.
- Provide training to ASM about the licensing process and environmental management, increasing productivity and promoting safe working conditions.
- Reduce or facilitate payment of taxes for licensed ASM and provide easy access to information and tax authorities.
- Facilitate access to legal jade markets with greater price certainty.
- Establish a fund from which ASM can access loans to support their formalisation process, environmental management and rehabilitation, investment in improved and appropriate technologies and equipment or insurance.
- Consider the establishment of regional service centres for ASM who commit to formalising their operation and complying with regulations, such as provision of geological data and expertise, exploration services, mining extension services, environmental monitoring, mining equipment, transport and infrastructure, water and sanitation, and electricity.

Case study: *There is no single case study that illustrates all aspects of ASM formalisation, but there is a broad body of international experience and initiatives to draw upon for the different elements of formalisation, from Asia, Africa and America, as well as published strategies and visions, notably the Africa Mining Vision which specifically addresses ASM.*

Support ASM

Support ASM through the following initiatives:

- Build a positive attitude amongst regulators and enforcement agencies towards ASM, helping individuals self-identify as public servants helping govern the sector to support development, rather than as primarily law enforcers or tax collectors. In other words, focus on the ends rather than the means.
- Provide technical assistance to ASM sector actors to help them overcome the principal commercial barriers to success, as well as improve their social and environmental sustainability.

Table 8.1 lists factors that should be considered when planning technological interventions in ASM¹:

¹ Adapted from Villegas, C. et.al. 2012. *Artisanal and Small-Scale Mining in Protected Areas and Critical Ecosystems Programme (ASM-PACE): A Global Solutions Study*. Estelle Levin Limited and WWF. <http://www.asm->

Table 8.1 Factors for planning technological interventions in ASM

Factors to consider	Criteria for the evaluation of a technical solution
Psychological, social and cultural	<ul style="list-style-type: none"> • Is the solution useful for the miners? • Is it accepted and approved by the miners? • Does it take into account traditional methods in use in the specific ASM site? • Does it facilitate work or create more work? • Does the process allow for the miners to see and observe the process, thereby retaining visible control of their minerals? • Are any operative personnel required to perform the task available in required quality and quantity? • Does the equipment potentially interfere with customs, superstitions, or beliefs of the targeted group? • To work in practice, any new process should not require substantial organisational/structural changes (hierarchy, responsibilities, etc.).
Technical	<ul style="list-style-type: none"> • Does it increase yield? • Does it increase recovery? • Does it have low investment costs? • Does it have low operating costs? • Is any new individual equipment inter-compatible with existing equipment? • Do the solutions integrate well into the current processes? • Are elements of the new equipment/tools available in local markets? • Is local manufacture possible? • Is the new equipment easy to manage and maintain? • Is the equipment compatible with locally available energy sources? • Does the equipment have a long life?
Environmental	<ul style="list-style-type: none"> • Does the intervention lessen the environmental impact of ASM? • Does it improve environmental performance via little work and low cost? • Does it significantly increase worker safety? • Does it follow national environmental standards? • Any solution should enable miners to obtain legal certificates and environmental permits, not thwart that chance. • Any solution should lower future environmental costs.
Implementation of the project	<ul style="list-style-type: none"> • The solution improves both women and men's mining methods and reduces gender-specific negative health & safety impacts of mining. • The solution is aligned with the target group's reasons for mining, in terms of why they mine at all, or why in a certain way or place. • The application of the solution is accompanied with training of the targeted group. • Any tests/experiments should be done quickly in order to generate decisions. • The target group should participate in selection, experimentation, and adaption of solutions. • The solutions should be scalable for efficient diffusion in the target area.

pace.org/images/documents/GSS.pdf (13 July 2017), p. 51. Adapted from the table in Wotruba, H., Hentschel, T., Livan, K. et.al (1998, translated in 2002). In version 2002, see page 167.

Factors to consider	Criteria for the evaluation of a technical solution
	<ul style="list-style-type: none"> • The miners should approve of the solution concept before implementation. • The solution should be compatible with financial realities of artisanal miners.

Case study: Support to ASM can take many forms and there is no single case study that illustrates them all. The introduction of appropriate technology to ASM has been, and continues to be attempted and piloted at numerous locations, particularly in the area of ASM gold mining. Of particular significance are initiatives to promote mercury-free gold extraction in pursuance of the Minamata convention.

Improve the environmental performance of ASM

The poor environmental performance of ASM is a global environmental challenge and is one of the key factors hindering formalisation of ASM and mainstreaming of ASM into national economic development programs. Key problems include wasteful land use, due to absence of geological information or appropriate technology for exploration, or the absence of land use planning into which ASM can be integrated to enable the avoidance of unnecessary impacts. Another key problem is the near-systematic lack of rehabilitation post-mining, due to the absence of resources or technology within the reach of ASM mining operations. In between these two points, ASM miners are poorly equipped to minimise their impacts through the use of improved mining methods or appropriate technology offering greater yields for the lower impact. A range of contextual factors further inhibit better environmental performance by ASM, such as poverty, disempowerment and lack of effective representation, corruption and the involvement of organised crime in ASM operations.

Case study 1: Leveraging improved environmental performance of ASM through Frugal Rehabilitation Methodology, Mongolia

The Frugal Rehabilitation Methodology (FRM) was developed in Mongolia with funding from the ESECII project as a practical approach to rehabilitation that would be economically affordable, socially acceptable and ecologically viable. While focused on rehabilitation, FRM is much more than this – also serving as an entry point to better environmental governance of ASM, stakeholder engagement and even ASM formalisation. The FRM is structured around three main components: 1. Technical Rehabilitation; 2. Topsoil Management and 3. Biological Rehabilitation. The ESEC II project initiated the development of a systematic approach to frugal rehabilitation that would be informed by Mongolian context, application and demonstration. The siting, development, implementation and monitoring of 17 Frugal Rehabilitation Demonstration projects across 11 of Mongolia's 16 ecological zones ensured that the methodology was informed by a practical demonstration and assessment of results.

The FRM is designed to be implemented either as a response of ASM communities to environmental degradation resulting from their activities, or to assist other stakeholders in rehabilitating abandoned ASM alluvial or hard-rock deposits. However, some elements of the methodology could be applied at other mineral or energy deposits, or to rehabilitation efforts outside of the extractives sector. Frugal Rehabilitation is a series of comprehensive activities designed to improve value and productivity of degraded lands, to re-create acceptable living conditions for local residents and their livestock, and re-establish such lands on a route to ecological recovery and productivity. Success of the FRM initiative is demonstrated by the endorsement of relevant ministries, attachment to a statutory

regulation, uptake and demonstration by the ASM sector, successful rehabilitation of significant portions of land in Mongolia and acceptance by wider communities and stakeholders.

Case study 2: Improving ASM environmental performance through BEST-ASM (Biodiversity & Ecosystem Services Transformative ASM)

An ongoing initiative, rather than a fixed case study, BEST-ASM is a framework for piloting and promoting the improved environmental performance of ASM. Adopting the mitigation hierarchy (avoid-minimise-rehabilitate-compensate) as its guiding framework, and focusing particularly on biodiversity and ecosystem services (BES), BEST-ASM is an initiative or 'hub' bringing together multiple projects to develop, pilot and share tools for improved environmental performance of ASM, including frugal restoration mentioned above and the GIFF project (Gold & Illicit Financial Flows) which seeks to incentivise better environmental performance by disentangling ASM from corruption and organised crime. The BEST-ASM framework was recently presented to the UNEP/AMDC workshop on building capacity for environmental sustainability of ASM (Addis Ababa, 24-26 May 2017) and is recognised by the Africa Mining Development Centre as an initiative that will inform roll out of the Africa Mining Vision on ASM.²

8.2 Yemasay

Yemasay operate informally as individuals, as family units or as organised groups under the control of a boss or lawpan. They comprise Kachin people and immigrants from other states and regions of Myanmar. They scavenge jade by stone picking from operating and inactive mines and waste rock dumps, working outside mine operating hours (for example, during mining company meal breaks or at night). They seek wealth and a better life. They are exposed to many hazards including operating heavy machinery, unstable pits and waste rock dumps, blasting, exploitation and persecution. They have no investment, no mining rights and have no access to official jade markets. They typically deal with jade traders.

Resolving the Yemasay issue is complex, as their activities are not associated with having access to concessions or rights to mine those concessions. The primary focus of any intervention must therefore be on creating formal arrangements that promote a safe working environment while reform of jade mining practices reduces the availability of jade for stone picking. Reduced availability of jade through improved recovery facilitated by longer concessions is expected to be a primary driver in reducing Yemasay interest and activities.

² UNEP/AMDC, 2017. Workshop on building capacity for environmental sustainability of ASM. United Nations Economic Commission for Africa, Addis Ababa, 24-26 May 2017. African Minerals Development Centre, July 2017. 47 pp.

8.3 Proposed initiatives

The following initiatives are provided for consideration by law makers, regulators and mining companies:

- Set aside concessions for ASM at a reasonable price to encourage Yemasay to formalise as ASM. Use public ballot to award ASM concessions to ensure fairness and transparency, and require ASM concession holders to implement the EMP (ASM Management Plan).
- Incentivise and empower LSM to share environmental management responsibilities with ASM by entering into formal arrangements (access, support, profit sharing) with ASM for access to parts of the concession that are no longer or not required for LSM activities and allowing ASM activities until mine closure and final rehabilitation starts. ASM activities would be subject to the EMP (ASM Management Plan). ASM would be required to manage the impacts at their site using that plan.
- Incentivise and empower LSM to enter into formal arrangements (access, support, profit sharing) with Yemasay for access to low grade waste rock placed safely to facilitate easier recovery of jade. For example, construct waste rock dumps by successive lifts where low grade waste rock is placed on benches for Yemasay to work over during specified periods of the day.
- Seek advice from LSM, ASM and Yemasay on mutually agreeable terms and conditions of arrangements.
- Review the ASM Management Plan with ASM to identify any inconsistencies with how they operate and how they could manage the environmental impacts of their activities.
- Consider the benefits of Frugal Rehabilitation (building from the piloting and demonstration of this approach in Mongolia by The Asia Foundation) in the Myanmar context. Frugal Rehabilitation ensures rehabilitation is “economically affordable, socially acceptable and ecologically viable, with benefits for both ASM communities and affected stakeholders.”³

³ <https://www.eda.admin.ch/countries/mongolia/en/home/news/news.html/countries/mongolia/en/meta/news/2016/esec-closing>