



FRIEDA RIVER

Frieda River Limited

Sepik Development Project

Environmental Impact Statement

Attachment 1 – Environmental Management
Commitments

SDP-6-G-00-01-T-003-002



Environmental Impact Statement
Attachment 2 - Frieda River Project

EIS Section	Aspect	Final No.	Management Measure
8.2.3	Soils and landforms	MM001	Constructed landforms will be designed to cope with high surface water flows.
8.2.3	Soils and landforms	MM002	Appropriate diversion structures will be designed to channel surface water away from constructed landforms.
8.2.3	Soils and landforms	MM003	Ongoing monitoring and management of surface water flows and landform erosion during the duration of the Project will be implemented to identify areas that require maintenance.
8.2.3	Soils and landforms	MM004	Permanent constructed landforms (not including the limestone quarry and Ok Binai waste dumps) in the mountain and hill zones will be designed and constructed to form safe and stable landforms, recognising the locally steep terrain and high rainfall of the mine area. Specific rehabilitation measures to be considered in mountain and hill zones include: <ul style="list-style-type: none"> • Reprofilling the ground surface to original or stable and safe contours and surface drainage lines. • Applying brush matting, mulching or compost to all prepared surfaces to assist with moisture retention and erosion control. • Utilising quick-growing groundcovers to reduce the erosive impacts of rainfall and surface water flow in rehabilitation areas. • Conduct progressive rehabilitation.
8.2.3	Soils and landforms	MM005	Rehabilitate cleared areas to reduce erosion and runoff as soon as possible after clearance. Store and re-use suitable topsoil wherever practicable.
8.2.3	Soils and landforms	MM006	Limit the Project footprint during the design phase.
8.2.3	Soils and landforms	MM007	Restrict vehicles to only those areas that need to be accessed or trafficked.
8.2.3	Soils and landforms	MM008	Instigate ripping and soil reinstatement in disturbed areas prior to revegetation efforts where practicable.
8.2.3	Soils and landforms	MM009	Develop and implement an erosion and sediment control plan, including procedures for avoiding and minimising erosion of disturbed areas.
8.2.3	Soils and landforms	MM010	Implement control measures to minimise concentrated water flow and to protect the soil surface of disturbed areas, where practicable, which may include: <ul style="list-style-type: none"> • Applying vegetative debris (e.g., logs) or coarse material (e.g., rock armouring). • Diverting surface water around disturbed areas. • Progressively revegetating disturbed areas. • Applying erosion control matting.
8.2.3	Soils and landforms	MM011	Implement a risk based soil survey for individual disturbance areas prior to disturbance to identify potentially problematic surface and subsurface soils (i.e., ASS, PASS, dispersive soils). Where problematic soils are encountered, develop appropriate management controls.
8.2.3	Soils and landforms	MM012	Rehabilitation techniques will be designed to facilitate the application of salvaged soils to appropriate areas. Specific measures to be considered where soils can be used for progressive rehabilitation (i.e., in areas of flatter terrain) include: <ul style="list-style-type: none"> • Collect topsoil (e.g. the upper 0.2 m to 0.3 m of soil, including organic material). The steep terrain and limited access over much of the Project area is likely to restrict topsoil stripping to relatively small, accessible areas. • Retain vegetation material and coarse soil fragments with stripped surface soil material, where practicable, to minimise the risk of erosion when reused as a rehabilitation medium. • Strip surface material and place in stockpiles no greater than 2 m in height. • Respread stockpiled topsoils in rehabilitation areas as soon as practicable. • Avoid locating soil stockpiles in areas that will impede the natural drainage patterns. • Revegetate stockpiles either by seeding or natural colonisation as soon as possible. • Cover rehabilitated areas with salvaged surface topsoil material (where possible). • Rip surfaces of reconstructed landforms and rehabilitation areas to a depth of more than 0.5 m following topsoil application and reseed with native species.
8.2.3	Soils and landforms	MM013	Carry out pre-construction survey of work sites for weeds, exotic fauna and dieback using a risk-based approach to identify areas susceptible to invasion of exotic species. If dieback is recorded, testing for Phytophthora will be completed and if present, procedures for managing the spread of dieback will be developed.
8.2.3	Soils and landforms	MM014	Access to dieback infested areas will be restricted within the Project tenements.
8.2.3	Soils and landforms	MM015	Manage encountered ASS by: <ul style="list-style-type: none"> • Mixing the ASS material with a neutralising agent such as fine-ground lime that inhibits oxidation and increases pH. • Burying excavated ASS material at least 1 m below the permanent water table at a disposal site without prior treatment. • Stockpiling ASS material in a bunded area with a very low permeability base (e.g. acid-resistant liner or clay layer).
8.3.3	Landscape and visual	MM016	Landscape restoration (i.e., revegetation) will be undertaken on cut faces of hills where access roads are constructed, where practicable.
8.3.3	Landscape and visual	MM017	Landscape restoration (i.e., revegetation) will be undertaken at all disturbed areas associated with the Sepik River bridge and other river crossings.
8.3.3	Landscape and visual	MM018	Security lighting on the river ports and Vanimo Ocean Port will be designed to limit obtrusive light, including light spill and glare.
8.3.3	Landscape and visual	MM019	The form, materials and colour of built form associated with the river port facilities and Vanimo Ocean Port will be designed with consideration of the landscape within which it will sit.
8.4.3	Groundwater	MM020	Limit potential impacts to groundwater during all Project phases including: <ul style="list-style-type: none"> • Comply with the relevant statutory requirements and Australian standard AS 2243.10 (Standards Australia, 2004) for hazardous materials transportation, storage, handling and disposal. • Conduct leak detection during commissioning of pipelines and manage hydrotest water appropriately. • Develop and implement a waste minimisation, waste handling and disposal strategy.
8.4.3	Groundwater	MM021	Divert clean water upstream of the open-pit, where practicable, around the open-pit to avoid generating additional contact water (i.e., water making contact with the open-pit walls and therefore assumed to be contaminated).
8.4.3	Groundwater	MM022	Upon closure, the open-pit lake will be allowed to form over as short a period as possible and surface water from non-AMD contact areas around the open-pit will be diverted to: <ul style="list-style-type: none"> • Allow groundwater levels to return to static conditions/prescribed spill point levels as quickly as possible. • Reduce the amount of time that PAF materials in the open-pit wall below the final inundation level and floor are exposed to atmospheric conditions, therefore minimising the potential for acid generation and mobilisation of metals.
8.4.3	Groundwater	MM023	Design and operate the ISF to limit the potential for AMD including: <ul style="list-style-type: none"> • Store PAF materials subaqueously. • Manage potentially contaminated water from the open-pits. From Year 1 and during operations, treat open-pit contact water (using a high-density sludge lime treatment system) with treated water discharged to Ubai Creek which flows into the ISF. • Deposit the water treatment solids (sludge) within tailings in the ISF.
8.4.3	Groundwater	MM024	Design, construction and operation of the Project landfill in accordance with the Environmental Code of Practice for Sanitary Landfill Sites, PNG (2001).
8.4.3	Groundwater	MM025	Prior to excavation of open-pits or filling of the ISF, a groundwater monitoring program (quality and level) will be developed. The monitoring program will provide a baseline for monitoring impacts during operation of the Project.
8.5.2	Physical disturbance and hydrology	MM026	Install rip-rap or other forms of armouring for stabilisation around the base of bridges to avoid scour and river bed erosion.
8.5.2	Physical disturbance and hydrology	MM027	Mark the extent of vegetation to be cleared on technical drawings and mark in the field. Do not clear beyond design limits.

Environmental Impact Statement
Attachment 2 - Frieda River Project

EIS Section	Aspect	Final No.	Management Measure
8.5.2	Physical disturbance and hydrology	MM028	Do not place any infrastructure, permanent or temporary, in off-river waterbodies. These areas will be marked as 'No Go Zones' on relevant figures.
8.5.2	Physical disturbance and hydrology	MM029	Do not use ORWBs for waste disposal, including for domestic and industrial waste, or for discharge of treated or untreated waste waters.
8.5.2	Physical disturbance and hydrology	MM030	Locate, design and construct linear infrastructure to avoid impacts on the hydrology of ORWBs.
8.5.2	Physical disturbance and hydrology	MM031	Avoid wetland traverses as far as practicable by routing the road corridor across higher terrain, such as hill slopes and ridges, where present.
8.5.2	Physical disturbance and hydrology	MM032	Construct culverts in creeks and streams, as necessary during road construction, to allow the normal cross-flow of water.
8.5.2	Physical disturbance and hydrology	MM033	Maintain environmental flows downstream of the ISF embankment in the Frieda River at 50 m ³ /s except for a short period during initial impoundment.
8.5.2	Sediment transport	MM034	During the construction phase, where practicable, construct sediment ponds downstream of major sediment sources.
8.5.2	Sediment transport	MM035	Develop and implement erosion and sediment control plans for disturbance works.
8.5.2	Sediment transport	MM036	Mark boundaries along cleared areas to limit machinery movement outside the clearance area and ensure that only trees/vegetation within the defined zone are removed.
8.5.2	Sediment transport	MM037	Restrict watercourse crossings to designated crossing points where riparian vegetation clearing widths will be limited. Maintain riparian vegetation buffer zones elsewhere.
8.5.2	Sediment transport	MM038	In areas that will be rehabilitated, use land clearing techniques that preserve the rootstock of removed vegetation in the ground, where practicable.
8.5.2	Sediment transport	MM039	Divert runoff, to the extent practicable, around disturbed areas including roads.
8.5.2	Sediment transport	MM040	Use rip-rap, gabions and check dams to reduce velocity flow of water in constructed drainage channels where practicable.
8.5.2	Sediment transport	MM041	Apply the following principles during construction of benches and batters: <ul style="list-style-type: none"> • Construct benches that are graded to shed water so as to avoid erosion or batter slumping. • Retain vegetation at the top of cut batters and at the toe of fill batters where practicable in order to minimise erosion. Plant vegetation including shrubs/grasses/legumes on benches. • Install dikes and swales at the top of batters (where practicable) and divert runoff to a slope drain and into stabilised areas. • Stabilise batters using brush layers or geotextile/fibrous matting. • Install slope drainage such as cut-off trenches or horizontal drains at the top edge of the batter or slope. Construct adequate drainage at the toe of the bench/slope to ensure controls are not compromised with undercutting erosion.
8.5.2	Sediment transport	MM042	Treat open-pit water runoff using an engineered water treatment plant to mitigate poor water quality downstream. Discharge treated open-pit water to Ubai Creek where it will flow into the ISF for further dilution prior to entering the downstream environment. Discharge treatment residues to the bottom of the ISF.
8.5.2	Sediment transport	MM043	Conduct a risk assessment prior to commencing works in areas of steep terrain where sidecasting is to be undertaken to determine potential impacts downslope and identify appropriate controls.
8.5.2	Sediment transport	MM044	Where practicable, locate valley-bottom access alignments so as to provide a buffer strip of natural vegetation between the access ways and watercourses.
8.5.2	Water quality	MM045	Deposit tailings to the bottom of the ISF so that they follow the underwater beach slope and disperse radially out from the diffuser head deposition location, thereby reducing suspension of tailings solids in the ISF.
8.5.2	Water quality	MM046	Store tailings subaqueously via a pipeline with barge-dumped PAF waste rock in the ISF to limit the potential for formation of AMD.
8.5.2	Water quality	MM047	At closure of the FRCGP maintain a permanent water cover with a depth of approximately 40 m over the waste rock and tailings.
8.5.2	Water quality	MM048	Post-closure, treat water from the open-pit lake before release to Ubai Creek until closure criteria are met. Store water treatment solids within the open-pit lake.
8.5.2	Water quality	MM049	Where PAF materials are encountered within road and infrastructure cuts, conduct a risk based assessment to determine appropriate controls such as addition of limestone.
8.5.2	Water quality	MM050	Store, handle and transport hazardous substances in accordance with Australian Standards AS1940:2017 and AS3780:2008, and the PNG Environmental Code of Practice for Vehicle/Machinery Workshops and Petroleum Storage/Resale/Usage Sites.
8.5.2	Water quality	MM051	Manage sewage in an appropriate manner to limit environmental contamination.
8.5.2	Water quality	MM052	Provide appropriate spill response equipment for Project facilities, vehicles and vessels.
8.5.2	Water quality	MM053	Design and construct project facilities involving the storage, handling, or use of hazardous materials to intercept potentially contaminated water for treatment if required prior to discharge.
8.5.2	Water quality	MM054	Develop and implement oil spill prevention and response plans.
8.5.2	Water quality	MM055	Place only NAF material in the limestone quarry waste dump and in the Ok Binai waste dump.
8.5.2	Water quality	MM056	Minimise time of exposure for PAF waste rock prior to subaqueous deposition within the ISF impoundment.
8.6.3	Terrestrial biodiversity	MM057	Locate quarries, and temporary infrastructure in cleared areas, secondary and/or degraded forest as far as practicable.
8.6.3	Terrestrial biodiversity	MM058	Retain and manage vegetation between Project components, where practicable.
8.6.3	Terrestrial biodiversity	MM059	Spread excavated soil, mulch and discarded vegetation debris (including natural seed stock) on reclaimed or rehabilitated disturbed land surfaces to facilitate natural revegetation, where practicable.
8.6.3	Terrestrial biodiversity	MM060	Retain bird-of-paradise display tree and megapode mounds as far as practicable.
8.6.3	Terrestrial biodiversity	MM061	Retain large trees (including fig trees) likely to have hollows and other roosting sites for fauna at sites for temporary facilities such as vehicle parks, lay down areas, storage sites, bulk fuel storage, dumps and temporary camp where practicable and safe to do so.
8.6.3	Terrestrial biodiversity	MM063	Complete targeted pre-construction surveys of proposed transmission line tower and access track locations within intact primary forest to identify ecological values to be considered as part of the detailed design of the transmission line.
8.6.3	Terrestrial biodiversity	MM064	Ensure linear infrastructure in swampy lowland habitats is designed and constructed so as to maintain the original drainage patterns of the habitat as far as practicable.
8.6.3	Terrestrial biodiversity	MM065	Minimise the width of clearing required for linear infrastructure as far as practicable.
8.6.3	Terrestrial biodiversity	MM066	Retain trees along the edges of roads and pipeline routes so that the canopy gap is reduced where practicable and safe to do so.
8.6.3	Terrestrial biodiversity	MM067	Install fauna 'underpasses' and /or 'overpasses' at strategic locations along the infrastructure corridor to reduce vehicular fauna strike.
8.6.3	Terrestrial biodiversity	MM068	Develop pest and weed quarantine procedures (including for inbound foreign freight), a weeds management plan to limit the introduction of invasive weed or pest species, monitoring susceptible areas to detect new alien incursions, and protocols for reporting sightings of weed or pest infestations, and establish inspection and treatment standards and procedures for all freight types, including imported bulk materials. It will cover both Company and Contractors.
8.6.3	Terrestrial biodiversity	MM069	Prohibit transportation of live plants or seeds to Project sites unless part of an approved rehabilitation plan or approved community development program.
8.6.3	Terrestrial biodiversity	MM070	Establish and implement procedures to ensure soil and weed seeds are cleaned from plant and machinery brought into the Project area from overseas, logging areas or agricultural areas elsewhere in PNG prior to reaching the Project site (applies to Company and Contractors).
8.6.3	Terrestrial biodiversity	MM071	Establish procedures to prohibit Project workers/contractors from establishing gardens or introducing plants, seeds or animals, including fish species, within the Project area.
8.6.3	Terrestrial biodiversity	MM072	Control infestations of high priority weeds prior to commencement of construction.
8.6.3	Terrestrial biodiversity	MM073	Establish permanent chemical wash down point(s) to prevent weeds and pathogens being transported to work sites, where appropriate.

Environmental Impact Statement
Attachment 2 - Frieda River Project

EIS Section	Aspect	Final No.	Management Measure
8.6.3	Terrestrial biodiversity	MM074	Develop and implement fire management procedures for the construction phase of the FRCGP aimed at reducing the likelihood of fires starting in the FRCGP disturbance area to very low. The procedures will include observations for weather trends and forecasts and the requirement for a permit for burning of cleared vegetation and other fires, particularly in the hill environment in drought years.
8.6.3	Terrestrial biodiversity	MM075	Maintain the mine access road (south of Hotmin), link road and FRHEP access road as private roads.
8.6.3	Terrestrial biodiversity	MM076	Make Project roads and other linear infrastructure impassable to vehicles at closure where these are not required for ongoing environmental management and monitoring, or where third party agreement is reached to transfer roads at FRCGP closure.
8.6.3	Terrestrial biodiversity	MM077	Prohibit hunting, collecting, or harassing of wildlife, keeping wildlife as pets and/or the possession and/or transport of wildlife products by Project employees and contractors at Project sites.
8.6.3	Terrestrial biodiversity	MM078	Implement appropriate inductions and education to ensure staff comply with hunting and collecting regulations.
8.6.3	Terrestrial biodiversity	MM079	Include training in the recognition of endangered fauna in inductions of all staff and contractors. Encourage a precautionary approach "If in doubt - report it".
8.6.3	Terrestrial biodiversity	MM080	Enforce speed limits on Project roads, tracks, pipeline rights-of-way and transmission line corridors.
8.6.3	Terrestrial biodiversity	MM081	Prohibit the procurement or consumption of bush meat in Project sites including fly camps and exploration camps.
8.6.3	Terrestrial biodiversity	MM082	Prohibit non-security related Project employees and contractors from possessing firearms and/or bows and arrows while engaged in Project activities.
8.6.3	Terrestrial biodiversity	MM083	Prohibit keeping or temporary housing of pets or wild fauna at Project facilities other than trained animals under the control of a handler.
8.6.3	Terrestrial biodiversity	MM084	Maintain a 500 m buffer (prohibiting clearance and blasting) to any large flying fox camp (>1,000) animals and a 200 m buffer (prohibiting clearance and blasting) at camps having 500 to 1,000 animals.
8.6.3	Terrestrial biodiversity	MM085	Install markers visible to birds on the transmission line to reduce the likelihood of bird and bat strikes at high risk locations including near waterbodies.
8.6.3	Terrestrial biodiversity	MM086	Maintain unsealed mine and FRHEP access roads in a damp and compacted condition (when required and safe) to control dust.
8.6.3	Terrestrial biodiversity	MM087	Direct lights at facilities and camps to minimise shine into surrounding forest where practicable.
8.6.3	Terrestrial biodiversity	MM088	Limit disturbance in montane forest as far as practicable and do not place any temporary infrastructure in this habitat.
8.6.3	Terrestrial biodiversity	MM089	Do not place any temporary infrastructure in the peat forest or in areas that may affect its drainage.
8.6.3	Terrestrial biodiversity	MM090	Avoid, where practicable, placement of infrastructure in the Nena limestone karst area, and minimise disturbance to other karst areas.
8.6.3	Terrestrial biodiversity	MM091	As far as practicable place transmission line pylons in already cleared or degraded areas.
8.6.3	Terrestrial biodiversity	MM092	For roads required within riparian vegetation, utilise areas of disturbed riparian vegetation as far as practicable. Keep road alignment approaches to watercourses as close to right angles as practicable to limit disturbances to the banks of watercourses.
8.6.3	Terrestrial biodiversity	MM093	Preserve riparian vegetation to the greatest extent practical and create a buffer of natural vegetation between watercourses and construction areas, where practicable.
8.6.3	Terrestrial biodiversity	MM094	Stabilise cleared banks to facilitate regeneration of riparian vegetation.
8.6.3	Terrestrial biodiversity	MM095	Use local species, wherever practicable, where watercourse crossings are to be revegetated.
8.6.3	Terrestrial biodiversity	MM096	Conduct washing, servicing and refuelling of equipment, vehicles or machinery at designated, appropriately designed facilities, away from watercourses.
8.6.3	Terrestrial biodiversity	MM097	Minimise disturbance to forest on or close to the summit if facilities must be placed on hilltops.
8.6.3	Terrestrial biodiversity	MM098	Place suitable erosion control devices between tracks and upland torrential streams, where practicable.
8.6.3	Terrestrial biodiversity	MM099	Reduce sediment loading by reducing sidecasting above watercourses where practicable.
8.6.3	Terrestrial biodiversity	MM100	Prohibit disposal of domestic and industrial waste outside of designated waste storage and disposal areas.
8.6.3	Terrestrial biodiversity	MM101	Implement good industry-practice management of in-stream activities to limit the downstream extent of turbid water created by fords, trenching or bridge building as far as practicable.
8.6.3	Terrestrial biodiversity	MM102	Ensure that any limestone karst areas situated above RL 500 m and located within 2 km of Project components is surveyed for the presence of roosting populations of Bulmer's fruit bat (<i>Aproteles bulmerae</i>) prior to the development.
8.6.3	Terrestrial biodiversity	MM103	If Bulmer's fruit bat (<i>Aproteles bulmerae</i>) is located, develop a management plan that includes 1) avoidance of direct disturbance and encroachment by Project activities, 2) avoiding construction that would increase access to the roosting site, 3) monitor the population, 4) implement a local cultural awareness program with the objective of a local moratorium on hunting of cave roosting flying foxes.
8.6.3	Terrestrial biodiversity	MM104	Conduct a pre-clearance survey of infrastructure, including quarries, to determine presence of caves with bat colonies and where colonies are located within 100 m of infrastructure, establish procedures to reduce disturbance, where practicable. Procedures will include: • Limiting or controlling where practical, blasting within 150 m of known colonies of cave bats. • Avoiding quarry sites within 150 m of caves with protected bat species, as far as practicable.
8.6.3	Terrestrial biodiversity	MM105	Establish cave management protocols for worker and contractor inductions, to prohibit unnecessary disturbance of bat colonies by Project workers.
8.6.3	Terrestrial biodiversity	MM106	Establish a conservation program for fauna at risk of being overhunted to manage direct impacts and indirect impacts of immigration.
8.6.3	Terrestrial biodiversity	MM107	Develop a fauna relocation program for species of conservation concern to be implemented during clearing of relevant habitat.
8.6.3	Terrestrial biodiversity	MM108	Project workers or contractors to report sightings of the following species to the Project environment team: Long-beaked echidna (<i>Zaglossus</i> spp.), Telefomin cuscus (<i>Phalanger matanim</i>), black-spotted cuscus (<i>Spiloglossus rufoniger</i>) and any tree kangaroo.
8.6.3	Terrestrial biodiversity	MM109	Attempt to cultivate species of plants that are new to science and use them in revegetation where practicable.
8.6.3	Terrestrial biodiversity	MM110	Establish a project to identify the food plants of the new butterfly species so as to cultivate these plants and use them in revegetation.
8.6.3	Terrestrial biodiversity	MM111	Include threatened plant species, the food plants of listed butterfly species and fruiting plants that attract frugivores in revegetation plans where practicable.
8.7.3	Noise and vibration	MM112	Sensitive receptors within 800 m of the infrastructure corridor will be made aware of the times and duration of construction activities.
8.7.3	Noise and vibration	MM113	When a grievance has been received, investigate and conduct noise and/or vibration monitoring, if required.
8.7.3	Noise and vibration	MM114	Communicate the findings of a grievance investigation to construction site personnel.
8.7.3	Noise and vibration	MM115	Schedule construction works to avoid working in proximity of villages on religious and cultural holidays, where practicable.
8.7.3	Noise and vibration	MM116	Equipment and vehicles will be maintained regularly in accordance with manufacturers' specifications.
8.7.3	Noise and vibration	MM117	Construct enclosures, bunds and noise barriers for operation of equipment and fixed infrastructure that may result in an exceedance of the adopted Project noise guidelines, where practicable.
8.7.3	Noise and vibration	MM118	The export facility at Vanimo Ocean Port and the main access road and concentrate pipeline associated with the infrastructure corridor will consider noise impacts in the design layout.

Environmental Impact Statement
Attachment 2 - Frieda River Project

EIS Section	Aspect	Final No.	Management Measure
8.7.3	Noise and vibration	MM119	Train personnel and contractors, through site inductions, on potential noise and vibration impacts and appropriate management procedures (e.g., vehicle and truck drivers, earthwork machinery operators, dust suppression), including techniques to reduce noise emission.
8.7.3	Noise and vibration	MM120	Vehicle speed, the use of compression brakes and horn signals will be limited on roads close to villages.
8.7.3	Noise and vibration	MM121	Limit construction activities associated with the main access route, pipeline and Vanimo Ocean Port to daytime hours, or schedule significant noise generating activities during the daytime where possible. Should night-time works or noise generating activities be required in exceedance of the project noise limits, alternative arrangements would be made with relevant sensitive receptors. Schedule aircraft movements during the daytime period to minimise sleep disturbance and annoyance when practicable.
8.7.3	Noise and vibration	MM122	In quarry areas near villages, place large rocks in dump trucks rather than dropping them in.
8.7.3	Noise and vibration	MM123	Conduct a detailed noise assessment inclusive of background noise measurements of Vanimo Ocean Port area operations to confirm the extent of any noise impacts from the site.
8.7.3	Noise and vibration	MM124	Determine if additional blasting management measures are required once blasting locations and design parameters are confirmed (if blasting is going to be conducted near villages).
8.7.3	Noise and vibration	MM125	Sensitive receptors located within 415 m of the main access road and pipeline will be notified of scheduled blasting events that may affect them during construction of the main access road.
8.8.3	Air quality	MM126	During construction, nuisance dust will be managed using water sprays.
8.8.3	Air quality	MM127	General measures will be applied to the construction works, including: <ul style="list-style-type: none"> Limiting burning of vegetation or other waste materials on site. Limiting dust generating activities in windy conditions where practicable. Limiting the use of material stockpiles and minimising open stockpiles in areas prone to elevated wind erosion or close to sensitive receptors.
8.8.3	Air quality	MM128	Dust and exhaust emissions from trucks and other vehicles will be controlled by: <ul style="list-style-type: none"> Maintaining vehicles and machinery in accordance with the manufacturer's specifications. Establishing vehicle speed limits Ensuring vehicles keep to marked trafficable areas. Covering trucks carrying dusty or erodible materials when travelling on public roads. Covering the ROM stockpile at the mine, and the product stockpile at the Vanimo Ocean Port.
8.8.3	Air quality	MM129	Dust emissions from clearing and grading activities will be reduced by: <ul style="list-style-type: none"> Limiting cleared areas as far as practicable and retaining existing vegetation where possible. Stripping areas progressively and only where it is necessary for works to occur. Retaining root stock in the ground where practicable to reduce erosion and to facilitate rapid rehabilitation, e.g., trimming and retaining trees rather than removing them, where practicable. Employing stabilisation methods such as matting, grassing or mulch.
8.8.3	Air quality	MM130	Additional measures for sensitive receptors located within 800 m from road and construction activities include: <ul style="list-style-type: none"> Locate fixed and mobile equipment with consideration to potential impacts on local residents. Postpone, limit or relocate dust-generating activities in close proximity to villages in dry and windy (e.g., >5 m/s) conditions, where practicable. Ensure blasting is not conducted in windy (e.g., >5m/s) conditions when works are within the wind path of nearby villages.
8.8.3	Air quality	MM131	Proceed with clean up and restoration as soon as is practicable after works are completed to minimise the duration of exposure of disturbed areas.
8.8.3	Air quality	MM132	Consider discharge of emissions via appropriately designed stacks to limit downwash, wakes and eddy effects in the design of the waste incinerators and diesel generators.
8.9.3	Greenhouse gas	MM133	Limit the use of diesel fuel through the optimisation of on-site driving and measures such as: <ul style="list-style-type: none"> Establishing speed limits on site. Reducing gradients around site where possible.
8.9.3	Greenhouse gas	MM134	Develop and implement a greenhouse gas management system that accurately quantifies emissions on a regular basis to allow major sources of emissions and the effectiveness of adopted measures to be continually identified, measured and indexed.
8.10.3	Nearshore Marine	MM135	Limit, where practicable, disturbance of fringing reefs and seagrass during construction of the Vanimo Ocean Port.
8.10.3	Nearshore Marine	MM136	Minimise startling nearby marine fauna (e.g., larger fauna such as dolphins and turtles) by employing 'soft start' procedures (i.e., gradual increase from lower noise emissions to higher noise emissions) for pile driving during construction of the Vanimo Ocean Port.
8.10.3	Nearshore Marine	MM137	Ad hoc marine fauna observation will be reported to the Vanimo Ocean Port environment team and subsequent avoidance actions (e.g., wait or reduce thruster power), as practicable, until large fauna have moved from the area.
8.10.3	Nearshore Marine	MM138	Implement a quarantine management plan which will include requirements for Project vessels to comply with PNG and relevant International Maritime Organization guidelines and standards including ballast discharge, hull cleaning and antifouling requirements.
8.10.3	Nearshore Marine	MM139	Store on board any wastes produced by vessels that cannot be discharged under PNG and relevant International Maritime Organization guidelines and standards and transfer to an approved onshore facility for treatment, reuse, recycling or disposal.
8.10.3	Nearshore Marine	MM140	Implement a waste management plan (including hazardous and non-hazardous waste) as a component of the Sepik Infrastructure Project (Vanimo Ocean Port) EMMP.
8.10.3	Nearshore Marine	MM141	An emergency response plan (as part of the Sepik Infrastructure Project (Vanimo Ocean Port) EMMP) will be developed and implemented that will: <ul style="list-style-type: none"> Include a spill response plan for concentrate, oil and other hazardous substances. Provide for training of staff during the induction process to facilitate awareness of their responsibilities, ensure that they are able to identify all risks or sources of potential chemical and fuel spills, and can apply appropriate control measures.
8.10.3	Nearshore Marine	MM142	Implement containment facilities at the concentrate handling system to minimise spillage of concentrate. This may include: <ul style="list-style-type: none"> Windbreaks, water spray or mist systems. Enclosed transfer points, conveyor belts and loading boom. Telescopic loading chutes designed to limit spillage.
11	Natural Hazards and Incidental Events	MM143	Engage and involve parties potentially affected by ISF embankment failure to identify community view points and develop appropriate response and management strategies.
11	Natural Hazards and Incidental Events	MM144	Conduct awareness training of the alert and communications system procedures to all potentially affected communities, FRHEP employees and contractors in the unlikely event of an ISF emergency.
11	Natural Hazards and Incidental Events	MM145	Undertake surveillance monitoring by trained personnel to inspect the tailings pipeline for signs of leaks, ruptures and failures during operation. Shut down procedures will be implemented if such a failure occurs.

Environmental Impact Statement
Attachment 2 - Frieda River Project

EIS Section	Aspect	Final No.	Management Measure
11	Natural Hazards and Incidental Events	MM146	Engineering and design controls at Vanimo Ocean Port facilities and Vanimo Infrastructure Area include: <ul style="list-style-type: none"> • Locate the export facilities area and Vanimo Infrastructure Area above storm surge levels, with consideration for potential exposure to tsunamis. • Emergency containment of the concentrate facilities at Vanimo Ocean Port in accordance with the Marine Pollution (Preparedness and Response) Act 2013. • Use appropriate containment structures in accordance with Australian standards, such as AS1940 for the storage and handling of flammable and combustible goods.
11	Natural Hazards and Incidental Events	MM147	Suspend vessel transport operation should extreme weather conditions make operations unsafe. During such conditions, vessels will be moored in the nearest safe location until conditions are deemed safe enough to recommence operation.
11	Natural Hazards and Incidental Events	MM148	Design and operate airports to comply with the Civil Aviation Safety Authority of PNG requirements with respect to navigation equipment, security, maintenance and refuelling.
11	Natural Hazards and Incidental Events	MM149	Design and construct airstrips to take topographic constraints and weather conditions into consideration (such as areas prone to flooding and low-lying fog).
11	Natural Hazards and Incidental Events	MM150	Define engineering and terrain constraints as part of road design criteria to enhance road surface protection, taking design control measures such as camber, visibility, bunds and alignment into consideration.
11	Natural Hazards and Incidental Events	MM151	Conduct vehicle route risk assessments factoring in the type of vehicle used on the roads and watercourse crossings and install speed limits and signage to advise road users of safe operating speeds and conditions.
11	Natural Hazards and Incidental Events	MM152	Provide fatigue management training to drivers and vessel operators.
11	Natural Hazards and Incidental Events	MM153	Implement In-Migration Plan and Human Resources and Localisation Plan to minimise opportunistic migration into local areas.
11	Natural Hazards and Incidental Events	MM154	Develop and implement a Project security plan.
12.6.5	Water quality	MM155	FRL will prepare annual river health cards to communicate the results of the downstream environmental monitoring program to local villagers.
12.6.5	Water quality	MM156	FRL will establish an independent advisory committee to assist FRL in addressing the environmental and related social impacts of its mining activities upon the local and downstream communities.
9.3	Social Impact Assessment	SEM001	Implement vegetation clearance management and monitoring measures in the Project Biodiversity Management Sub-plans.
9.3	Social Impact Assessment	SEM002	Implement terrestrial fauna management and monitoring measures in the Project Biodiversity Management Sub-plans including the avoidance of areas with high biodiversity values and the management of disturbance to fauna, where possible.
9.3	Social Impact Assessment	SEM003	Implement water management and monitoring measures outlined in the Project EMMPs including diverting clean water away from disturbed areas, not washing machinery near watercourses, meeting discharge requirements described in environment permit conditions and documenting and investigating complaints about water quality.
9.3	Social Impact Assessment	SEM004	Develop and implement Resettlement Action Plans in collaboration with residents of villages to be resettled. Ensure that livelihood restoration measures are coordinated with other social management measures (e.g., in-migration management, recruitment strategy, lease boundary monitoring, provision of regional infrastructure and services) and are monitored for effectiveness.
9.3	Social Impact Assessment	SEM005	Implement weed, plant pathogen and pest management controls within the Project EMMPs.
9.3	Social Impact Assessment	SEM006	During road pre-construction surveys, identify construction water source locations that avoid impacting local community water supplies. If impact is unavoidable, implement measures to provide an alternate water supply.
9.3	Social Impact Assessment	SEM007	Provide briefings to local communities on when and where construction will occur, what potential construction impacts may occur, and the means of communicating with contractors and the Project around issues, including the use of the Project Grievance Management Procedure.
9.3	Social Impact Assessment	SEM008	Monitor fish and crocodile stocks and local harvest at select locations prior to construction, at regular intervals during construction, and six months post construction. Develop an operational response in the event that surveys indicate impairment of local harvest due to the Project.
9.3	Social Impact Assessment	SEM009	Ensure the Project has an active engagement process in villages downstream of the mine area to address concerns about the environmental integrity of the waterways on an ongoing basis.
9.3	Social Impact Assessment	SEM010	Implement and maintain erosion and sediment controls as per the Project EMMPs.
9.3	Social Impact Assessment	SEM011	Ensure that fair and equitable compensation is provided to parties affected by Project related impacts on subsistence resource use or existing income generating resources or activities
9.3	Social Impact Assessment	SEM012	Design, encourage and implement mechanisms (such as bank accounts) to capture a reasonable portion of direct monetary payments (royalties, compensation, resettlement) and encourage these funds to be re-invested for further wealth creation, including inter-generational.
9.3	Social Impact Assessment	SEM013	In partnership with stakeholders, design, encourage and implement wealth distribution systems across the range of benefit streams, including royalties, compensation, representative (RepCo) company dividends and equity participation, which ensure that monetary payments are made equitably and transparently to the nuclear family level.
9.3	Social Impact Assessment	SEM015	Implement the Business Development, Supply and Procurement Plan aligned with the designated preferential zones.
9.3	Social Impact Assessment	SEM016	Notify communities about proposed employment and commercial participation (business development, supply, procurement) policies and systems, including the designated preferential zones, and ensure that stakeholders have clear and regularly updated information on how to access employment and procurement opportunities.
9.3	Social Impact Assessment	SEM017	Implement pre-employment training for Zone 1 and Zone 2 landholders as far in advance of construction as possible.
9.3	Social Impact Assessment	SEM018	Contractor scope of works and contract conditions will include the development of plans and protocols to comply with Project employment, training and procurement policies. Contractor plans to be assessed and approved by FRL prior to contract award, and be subject to regular performance reporting and audit.
9.3	Social Impact Assessment	SEM019	Deliver income management training and advice to local employees and households to assist local people to manage the transition to higher incomes.
9.3	Social Impact Assessment	SEM020	Implement measures, based on an assessment of demonstrated need and local preference, to support the participation of women in training, employment and business development activities associated with the Project.
9.3	Social Impact Assessment	SEM021	Undertake a baseline assessment of settlement and livelihoods along road corridors prior to construction. Assess change post-construction as part of Social Management Plan monitoring.
9.3	Social Impact Assessment	SEM022	Manage transition from operation to closure through the progressive development and implementation of a closure plan that addresses key livelihood issues such as employment and service provision.
9.3	Social Impact Assessment	SEM023	Work with the PNG Government to assist in managing conflict associated with distribution of benefits.
9.3	Social Impact Assessment	SEM024	Establish benefit distribution agreements that encourage the adoption of a benefit stream sustainable wealth strategy which: <ul style="list-style-type: none"> • Includes measures to provide for future generations. • Favours long-term investment over immediate consumption. • Supports vulnerable group members. • Includes on-going feedback to landowning clan members.

Environmental Impact Statement
Attachment 2 - Frieda River Project

EIS Section	Aspect	Final No.	Management Measure
9.3	Social Impact Assessment	SEM025	Encourage the development of local procurement as per the Business Development, Supply and Procurement Plan.
9.3	Social Impact Assessment	SEM026	Encourage the development of non-mining related local enterprises, such as cash cropping, within Zones 1 and 2.
9.3	Social Impact Assessment	SEM027	Encourage coordination with the two Sepik provinces and other major impact project developers in the area of agriculture and industry, so that the Project supply and procurement systems, and potential community investment programs, support the broader regional development aspirations and plans.
9.3	Social Impact Assessment	SEM028	Promote employment from Zone 1, Zone 2 and Zone 3 to ensure that wages and benefits accrue to the Sepik regional and urban centres.
9.3	Social Impact Assessment	SEM029	Implement Cultural Heritage Management Sub-plan and associated Chance Finds Protocol.
9.3	Social Impact Assessment	SEM030	Include cultural heritage awareness briefings in workforce inductions, including briefing on individual obligations to protect cultural heritage in accordance with PNG law.
9.3	Social Impact Assessment	SEM031	Disseminate information derived from chance finds acquired during the Project to the custodians of cultural heritage and/or the public and National Museum and Gallery, where relevant.
9.3	Social Impact Assessment	SEM032	Support research programs which document cultural aspects of communities including traditional subsistence practices (e.g., hunting and gardening), language, capturing 'stories' and other cultural aspects.
9.3	Social Impact Assessment	SEM033	Conduct engagement with local communities regarding: <ul style="list-style-type: none"> • The content of the Project EMMPs. • The development of culturally appropriate methods for the practical management of cultural heritage values that are to be protected from impacts. • The development of appropriate management measures in relation to their oral tradition sites. Culturally appropriate responses to the management of sites and places that will be unavoidably impacted by Project activities may include avoidance, exhumation/relocation of the value and traditional ceremonies (that should precede the commencement of Project activities in that location).
9.3	Social Impact Assessment	SEM034	Implement site specific management measures as specified in the Project Cultural Heritage Management Sub-plans.
9.3	Social Impact Assessment	SEM035	Develop and implement the Project-Induced In-migration Management Strategy in collaboration with landowners and provincial and local governments. Ensure that integration with other measures contributing to the management of population movements (e.g., recruitment strategy, unauthorised occupation of mining tenements, contractor compliance with policy, provision of regional infrastructure and services) is coordinated and effective.
9.3	Social Impact Assessment	SEM036	Collaborate with the PNG Government and support government led processes to resolve land disputes if they arise.
9.3	Social Impact Assessment	SEM037	Implement the MQC to codify social and cultural criteria by which each of the three Zone 1 groupings (Telefol, Miyan and Paiyamo) identify membership and from this establish and maintain a database at the nuclear family and individual levels.
9.3	Social Impact Assessment	SEM038	Conduct new post-permitting land access in a manner that promotes transparency and the fair treatment of customary landowners in PNG and follows established protocols for landowner identification.
9.3	Social Impact Assessment	SEM039	Through a community capacity development program, collaborate with stakeholders and engage vulnerable groups in capacity building programs to develop youth leadership initiatives that support the active role of future generations.
9.3	Social Impact Assessment	SEM040	Implement air, noise and vibration management controls in the Project EMMPs.
9.3	Social Impact Assessment	SEM041	Establish Project Emergency Response and Fire Sub-plans including provisions for community awareness and coordination with District and Provincial authorities.
9.3	Social Impact Assessment	SEM042	Develop and implement (commencing with workforce induction training) a workforce code of conduct to guide workplace behaviour and respectful interaction with host communities. As a minimum, this code of conduct will cover: ethics; health; environment; safety; alcohol and drug use; workforce diversity; harassment; and cultural and social sensitivities of workers and communities.
9.3	Social Impact Assessment	SEM043	Develop and implement measures including driver education, community risk awareness, operational road traffic management protocols and appropriate physical safety measures (including vehicle-pedestrian separation) where required.
9.3	Social Impact Assessment	SEM044	Develop and implement measures which include vessel crew education, community risk awareness, operational vessel management protocols, and appropriate physical safety measures (such as visual and audible warnings) where required for construction and operations.
9.3	Social Impact Assessment	SEM046	Implement workforce health screening during the recruitment process; on-going workforce health education and awareness programs; and comprehensive employee health service provision in compliance with legislative requirements and company workplace health and safety policies.
9.3	Social Impact Assessment	SEM047	Construct and operate workforce accommodation and messing facilities in accordance with recognised standards for hygiene and safety.
9.3	Social Impact Assessment	SEM048	Educate workers on disease prevention and health promotion, and encourage workers to share their learnings with the community.
9.3	Social Impact Assessment	SEM049	Implement a Project-wide induction process that covers, as a minimum: ethics; health; environment; safety; alcohol and drug use; workforce diversity; harassment; and cultural and social sensitivities of workers and communities.
9.3	Social Impact Assessment	SEM050	Conduct background checks on security personnel and train them in the Voluntary Principles on Security and Human Rights.
9.3	Social Impact Assessment	SEM051	Implement infectious disease management programs for workers, incorporating worker education, to reduce potential for disease occurrence.
9.3	Social Impact Assessment	SEM054	In partnership with government and non-government health service providers implement health and education programs, and infrastructure development and delivery of health treatment and prevention services in communities surrounding Project facilities.
9.3	Social Impact Assessment	SEM056	Through the Project's community investment programs, actively support and promote initiatives aimed at law and order, community and government justice administration and conflict management initiatives.
9.3	Social Impact Assessment	SEM057	Provide access to an effective and transparent Grievance Management Procedure for communities, employees and contractors.
9.3	Social Impact Assessment	SEM058	Conduct conceptual closure planning as part of Project design to enable design consideration of post-closure sustainability of infrastructure and assets.
9.3	Social Impact Assessment	SEM059	Actively support the five year rolling District and Local Level Government plans within the Zone 1 and 2 host districts.
9.3	Social Impact Assessment	SEM060	Actively support the Sandaun Provincial Government's 'Growth Centre' strategy, and other provincial and regional development plans.
9.3	Social Impact Assessment	SEM061	Support government initiatives that aim to discourage settlement within road and transmission line easements.