

Mining Operational Plan
For the
T&T Marine Sand Mine
(Ifafa River)



October 2020

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1 INTRODUCTION

This Mining Operational Plan (MOP) has been developed for the proposed 4,09ha T&T Marine Sand Mine along a portion of the Ifafa River in Southern KwaZulu-Natal. This Report aids in determining the most suitable method and approach to the establishment of the planned mining activities on the area indicated in this application.

2 MINING LOCATION

The site of the proposed TT Marine Sand Mine ('the Mine') is located along a portion of the Ifafa River, situated 500m west from the Ifafa Marina, within the Umdoni Local and Ugu District Municipalities respectively (**Figure 1**).

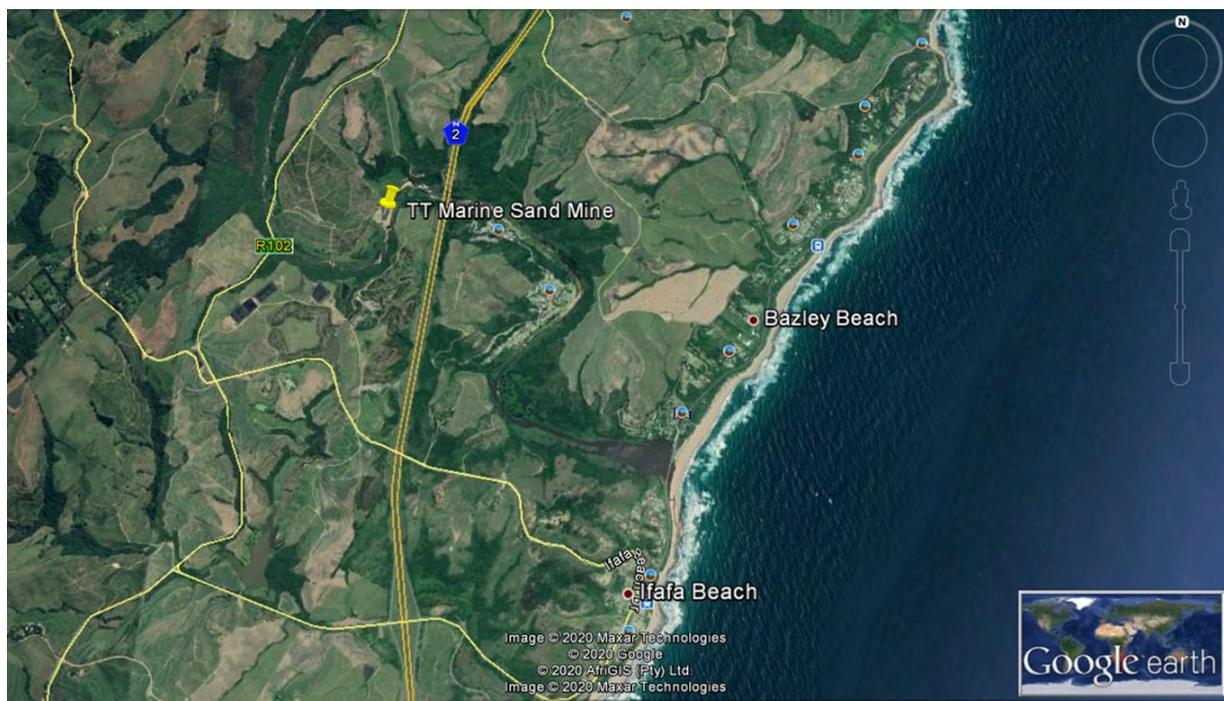


Figure 1: Regional location of proposed T & T Marine Sand Mine

3 SITE CHARACTERISTICS

The proposed Mine site is located 2,8km inland from the coast and approximately 27m above sea level. The mining site is completely surrounded by agricultural activities, mostly consisting of macadamia plantations and sugarcane. On the property exists worker accommodation as well as a roofed storage building for farming equipment. This building will be utilised for the storage of fuel where required. The N2 freeway is located about 160m downstream from the proposed mining site and the nearest settlement is the Ifafa Marina which is located on the other side of the N2 freeway. The proposed mining site is already significantly disturbed due to previous mining and agricultural activities which have historically taken place for decades.

A single vegetation community, the riparian vegetation community, is associated with the mine extent. Riparian vegetation associated with the Ifafa River has been transformed as a result of decades of anthropogenic activities. Disturbance as a result of agricultural and sand mining activities has resulted in the loss of indigenous riparian vegetation and in the proliferation of alien and invasive species within the riparian zone.

4 SAND DEPOSIT

The portion of the Ifafa River associated with the mine extent is a lower foothill river characterised by a lower gradient, mixed-bed alluvial channel with sand and gravel dominating the bed. The active channel of the river is approximately 40-60m wide and is characterised by extensive areas of sediment deposition. During the dry season, flow is often confined to shallow, narrow, braided channels running through sand bars which have developed on the riverbed and banks. However, the Ifafa River is a flood driven system and flow is usually spread across the entirety of the channel during flood events and high rainfall periods.

5 MINING METHODS TO BE UTILISED

The mining is intended to take on two distinct forms during the period of the permit validity and these are based on the methods used for the previous mining permit which recently expired.

(1) Mechanical Mining Method

The Mechanical method of mining will be utilised during the dry season and/or when the sand bar is exposed and accessible from the proposed entrance ramp to the Ifafa River. The mechanical mining method involves the use of various earth moving equipment configurations and this will be used for so long as the exposed sand deposits are accessible by such equipment. The excavator will be positioned into the sand bar that is exposed and lift the sand and place it into an articulated dump truck (ADT). The ADT will traverse a fixed pathway along the sand bar and exit the river along an existing access ramp that conjoins the deposited sand bar. The sand will then be deposited in the designated stockpiling area for collection and selling off site by customers.

The use of mechanical diesel driven equipment on the exposed sand banks will require the strictest possible equipment maintenance regime to ensure that absolutely no fluids associated with typical earthmoving equipment are leaked into the river system. The daily and shift check procedures will disqualify any unit of equipment from being deployed onto the sandbar should any leakages or other mechanical deficiency give rise to the possibility of fluids being deposited into the river system. The exhaust fumes generated by the mining equipment will be limited by ensuring that all OEM scheduled services are completed in accordance with the supplier's recommendations and the observation of any excessive exhaust fumes will be grounds for removing such equipment from service.

(2) Hydraulic Mining Method

Whenever the sand bar is not accessible from the demarcated entrance ramp or during the flood season, a floating barge system will be utilised as shown by way of example in **Image 1**. This as heavy vehicle movement within the active river channel will pose not only a safety risk to the mining workers, but may have significant impacts on the local environment.

This sand mining process uses a floating barge system to which is attached a del pipe of 8 inch HDPE (plastic) with a 8 inch steel suction pipe for pumping sand from the river to the stockpile area for settling. The pipe is kept buoyant above the river bed and floated above the surface by means of a series of floats connecting from the floating barge to the outlet area (stockpile area). The pipe length itself and the laying thereof, therefore, causes no negative impact or disturbance of the river bed, the river flow, or the river bank.

The head of the pipe contains a jet and suction mechanism which jets out approximately 35 m³ of water an hour to agitate the sand, which is then simultaneously sucked back into the pipe at 450 m³ per hour, thereby negating any possible silt plume and/or consequential siltation effects downstream.

The pipe therefore floats on the river surface, before reaching the river's edge and banks, where it traverses until it reaches the stockpile area where the water and sand is gravitationally seepage drained, before stockpiling and distribution. The wet sand is allowed to settle through the creation of temporary sand berm, and the residue water allowed to seep back into the sand and/or channelled (gravity fed) back under the berm into the river.

The laying of the pipe has no negative impact on the river, the river bed, the river bank and the stockpile area, and the quality of the water re-entering the river from the stockpile area, having been naturally filtered through the clean sand is, therefore, of a better quality than it was when first pumped from the river (**Image 2 and 3**).



Image 1: Example of floating barge system (the system to be utilised at the T&T Marine site will be smaller in scale than in the image shown)



Image 2: Example of the pipe leaving the water and river bank to traverse to the stockpile area



Image 3: Example of the pipe outlet into stockpile area (will be on a smaller scale)

6 STOCKPILING AREA

The stockpiling of sand will occur within a designated and demarcated stockpiling area (**Image 4**), where it will be temporarily stored before being transported off site by customer vehicles for sale at the local market. The stockpiling area is already in existence per previous departmental authorisation and permission, and thus no further riparian vegetation will be lost in the stockpiling process.



Image 4: Existing T&T Marine stockpiling area to be utilised during mining operations (please note the existing vegetated berm in the background which acts as a buffer and filter between the stockpile area and the Ifafa River)

7 EROSION AND STORMWATER PROTECTION

The Mine will utilise existing erosion and stormwater protection measures from previous mining operations on site.

(1) Stormwater Control:

It must be noted that the proposed stockpiling area is already in existence (previously authorised) and is located on a relatively flat gradient. Furthermore, the stockpiling area is relatively small in size and surrounding riparian vegetation will not be disturbed or removed. It is thus not envisioned that stormwater runoff will be of any consequence. There is an existing berm on the periphery of the stockpiling area that protects the Ifafa River from Bank erosion and uncontrolled runoff. Portions of this berm are populated by extensive riparian vegetation, which assists in stabilising the berm. The Applicant must maintain this berm and ensure it is well vegetated. Any areas of the sand berm which are currently unvegetated and unstable must be stabilised and seeded with an indigenous grass seed

mix. This berm will offer the greatest protection to the Ifafa River and banks and will ensure stormwater does not enter the watercourse.

The Freshwater Specialist has recommended silt traps as an additional measure to control erosion and stormwater runoff to capture sediment laden runoff on areas where this is a significant problem. Silt traps must be utilised in conjunction with the berm on the stockpiling site where necessary and applicable.

Silt traps measures to be implemented must include:

- Install silt traps where applicable.
- Remove sediment from silt fences/traps on a weekly basis.
- Sediment traps should not be removed immediately after the completion of rehabilitation.
- Sediment traps should only be removed once at least 80% indigenous vegetation cover has re-established on disturbed, bare soils.

(2) Erosion control:

Measures must be undertaken to control erosion, and stabilise areas at risk of erosion with 'soft' stabilization techniques as determined upon consultation with a suitably qualified specialist (e.g. geotextiles, fibre mats / nets / blankets / bags, brush mattresses, live staking etc.). Furthermore, revegetation of disturbed areas must take place as soon as possible after the stabilizing of soils. Indigenous grass plugs can be used in combination with an indigenous grass seed mix for revegetation.

8 TRANSPORT OF SAND TO LOCAL MARKET

There are historically existing agricultural tracks in good condition leading to the proposed mining site, therefore no new access or exit roads will be required. These access tracks will be maintained to ensure they can sustain the regular movement of heavy vehicles and machinery.

9 THE LOCAL MARKET

The operation aims to provide high quality building sand at a reasonable price to local customers while creating jobs, assisting small businesses and encouraging development in the local community. A substantial market currently exists for building sand - locally, provincially and nationally. This market, based on forecasts by SAMI (South Africa's Mineral Industry), is expected to experience sustained growth over the next 10 years. The sand from the T&T Marine Sand Mine will be used by local construction development in the area.

10 OPERATION OF THE MINE

The mine will operate for a period of two years from the time of issuing of a mining permit, and thereafter will become renewable for three further consecutive one-year periods, which totals a maximum five year operational period.

11 TECHNICAL SKILLS AND EXPERTISE

The proposed T&T Marine Sand Mine will employ the following workers:

- A Mine Manager (a highly skilled Manager);
- Machine and heavy vehicle operators (containing the appropriate driving licenses and operating certificates);
- General Labourers (low skilled persons); and
- Security (as required).

Employment will be sourced from the local community as a priority, which policy rule will be endorsed as a pre-condition, as described in the Environmental Management Plan (EMP).