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# DRAFT BASIC ASSESSMENT REPORT

## DC28/0005/2021: KZN/EIA/0001542/2021

**The Proposed Upgrading of Nkandla Weir Within Mhlathuze River Catchment(Quaternary Catchment W12A), Nkandla Local Municipality, King Cetshwayo District, KwaZulu-Natal.**

**APRIL 2021**

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**Emvelo Quality and Environmental Consultant (PTY) Ltd.**

**Prepared for:**

**Mariswe (Pty) Ltd.**

**On Behalf of:**

**King Cetshwayo District Municipality**

| | |
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## LIST OF ACRONYMS

| | |
|---|---|
| BAR | Basic Assessment Report |
| CFP | Chance Finds Procedure |
| DWS | Department of Water and Sanitation |
| DEDTEA | Department of Economic Development, Tourism and Environmental Affairs |
| DOT | Department of Transport |
| EMPr. | Environmental Management Programme |
| ECO | Environmental Control Officer |
| EIA | Environmental Impact Assessment |
| HGM | Hydrogeomorphic |
| MSDS | Material Safety Data Sheet |
| NEMA | National Environmental Management Act 107 (Act 107 of 1998) |
| NEMPAA | National Environmental Management: Protected Areas, 2003 (Act 57 of 2003) |
| I&AP | Interested and Affected Parties |
| EAP | Environmental Assessment Practitioner |
| GA | General Authorisation |
| SCADA | Supervisory Control and Data Acquisition |
| SCC | Species of Conservation Concern |

## GLOSSARY OF ITEMS

**DEVELOPMENT**: the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity, but excludes any modification, alteration or expansion of such a facility, structure or infrastructure and excluding the reconstruction of the same facility in the same location, with the same capacity and footprint.

**BIODIVERSITY**: The variety of life in an area, including the number of different species, the genetic wealth within each species, and the natural areas where they are found.

**BASIC ASSESSMENT**: The process of collecting, organizing, analyzing, interpreting and communicating information that is relevant to the consideration of the application, in terms of Listing Notice 1 (GNR 327 and 324 of 2017) of NEMA (as amended).

**DEVELOPMENT FOOTPRINT**: any evidence of physical alteration because of the undertaking of an activity.

**CONTRACTOR**: companies and or individual persons appointed on behalf of the client to undertake activities, as well as their sub-contractors and suppliers.

**ENVIRONMENTAL CONTROL OFFICER (ECO)**: an individual nominated through the client to be present on-site to act on behalf of the client in matters concerning the implementation and day to day monitoring of the EMPr and conditions stipulated by the authorities as prescribed in NEMA.

**ENVIRONMENT**: in terms of the NEMA (as amended), the "environment" means the surroundings within which humans exist and that are made up of: the land, water, and atmosphere of the earth; micro-organisms, plant and animal life; any part or combination of (i) of (ii) and the interrelationships among and between them; the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

**ENVIRONMENTAL IMPACT**: the change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services.

**HYDROLOGICAL SYSTEM**: water bodies and their connectivity to the welfare of an ecosystem.

**MITIGATION**: the measures designed to avoid reduce or remedy adverse impacts.

**ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)**: a detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive environmental impacts and limiting or preventing negative environmental impacts are implemented during the lifecycle of the project. This EMPr focuses on the construction phase, operation (maintenance) phase and decommissioning phase of the proposed project.

**POLLUTION**: NEMA defines pollution to mean any change in the environment caused by the substances; radioactive or other waves; or noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people or will have such an effect in the future.

**WATER POLLUTION**: the National Water Act, 1998 (Act 36 of 1998) defines water pollution to be the direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it less fit for any beneficial purpose for which it may reasonably be expected to be used; or harmful or potentially harmful (a) to the welfare, health or safety of human beings; (b) to any aquatic or non-aquatic organisms; (c) to the resource quality, or (d) to property.

**REHABILITATION**: rehabilitation is defined as the return of a disturbed area to a state which approximates the state (wherever possible) which it was before the disruption.

**WATERCOURSE**: can be a) a river or spring; b) a natural channel or depression in which water flows regularly or intermittently; c) a wetland, lake or dam into which, or from which, water flows; and/or d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998) and a reference to a watercourse includes, where relevant, its bed and banks.

**WETLAND**: the land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and

which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

**INDIGENOUS VEGETATION**: refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.

**GENERAL WASTE**: waste that does not pose an immediate hazard or threat to health or the environment, and includes domestic waste; building and demolition waste; bbusiness waste; and inert waste.

**HAZARDOUS WASTE**: hazardous waste means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.

**GENERAL WASTE LANDFILL SITE**: a waste disposal site that is designed, managed, permitted and registered to allow for the disposal of general waste.

**ARCHAEOLOGICAL RESOURCES**: includes (a) material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artifacts, human and hominid remains and artificial features and structures; (b) rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation; wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, 1994 (Act 15 of 1994), and any cargo, debris or artifacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation; features, structures and artifacts associated with military history which are older than 75 years and the site on which they are found.

**INTERESTED AND AFFECTED PARTY (I&AP)**: for the purposes of Chapter 5 of the NEMA and in relation to the assessment of the environmental impact of a listed activity or related activity, an interested and affected party contemplated in Section 24(4) (a) (v), and which includes (a) any

person, group of persons or organization interested in or affected by such operation or activity; and (b) any organ of state that may have jurisdiction over any aspect of the operation or activity.

## EXECUTIVE SUMMARY

The King Cetshwayo District Municipality proposed the upgrading of the existing Weir at Mhlathuze River within (Quaternary Catchment W12A) in Nkandla Local Municipality, of the King Cetshwayo District.

The construction activities involve: The expansion of an existing weir by 24m (addition of 5m length on the left bank, and 19m length on the right bank); Filling the eroded bank downstream of the weir with mass concrete and plums up to the level of the water line in the plunge pool; Construction of a concrete slab at the left bank within a weir and a gabion slipway to cater for larger flood events at the edge of right bank.

The proposed upgrade of the Weir will take place within Mhlathuze River approximately 12km North-East of Nkandla Town.

Emvelo Quality and Environmental Consultant have been appointed by Mariswe (Pty) Ltd. on behalf of King Cetshwayo District Municipality (the applicant), as the independent Environmental Assessment Practitioner (EAP), to facilitate the Basic Assessment Processes required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for this application.

The NEMA, and the Environmental Impact Assessment (EIA) Regulations (2014) as amended in 2017, govern the process of applying for environmental authorization for certain developments. A provision in the EIA Regulations is made for two forms of assessment: Basic Assessment and Scoping & EIA, depending on the scope of the activity. The EIA regulations specify that: Activities identified in Listing Notice 1 and 3 (GNR 327 and 324 of 2017) requires a Basic Assessment while activities identified in Listing Notice 2 (GNR 325 of 2017) are subject to a Scoping and EIA. This application will follow a Basic Assessment. The listed activity associated with the proposed development is Listing Notice 1, Activity 19.

The Public Participation Process (PPP) has, to date, included: displaying onsite notices, placing of an advertisement in the Ilanga Newspaper (isiZulu newspaper), and distribution of Background Information Documents (BIDs).

## 1 INTRODUCTION

Emvelo Quality and Environmental Consultant has been appointed by Mariswe (Pty) Ltd, on behalf of King Cetshwayo District Municipality, to undertake an Environmental Impact Assessment (EIA) for the proposed Upgrading of Nkandla Weir at Mhlathuze River within (Quaternary Catchment W12A) in Nkandla Local Municipality, of the King Cetshwayo District.

This will include the facilitation of the Basic Assessment Processes as required in terms of the NEMA for this application.

## 2 PROJECT TITTLE

The Proposed Upgrading of Nkandla Weir Within Mhlathuze River Catchment (Quaternary Catchment W12A), Nkandla Local Municipality, King Cetshwayo District, Kwazulu-Natal.

## 3 PROJECT DESCRIPTION

The proposed development is for the upgrade of the existing Weir at Mhlathuze River within (Quaternary Catchment W12A) in Nkandla Local Municipality, of the King Cetshwayo District.

The construction activities entails: The expansion of an existing weir by 24m (addition of 5m length on the left bank, and 19m length on the right bank); Filling the eroded bank downstream of the weir with mass concrete and plums up to the level of the water line in the plunge pool; Construction of a concrete slab at the left bank within a weir and a gabion slipway to cater for larger flood events at the edge of right bank.

The proposed upgrade of the Weir will take place within Mhlathuze River approximately 12km North-East of Nkandla Town.

## 4 PROJECT LOCALITY

The Nkandla Weir is situated at Ward 5 of Nkandla Local Municipality at Catchment Quaternary Catchment W12A, within the jurisdiction of King Cetshwayo District in Kwa-Zulu Natal.

The site is situated at approximately 12km North-East of Nkandla Town.

Figure 1 provides the geographical context of the proposed development site, in relation to major towns or cities within the municipality.

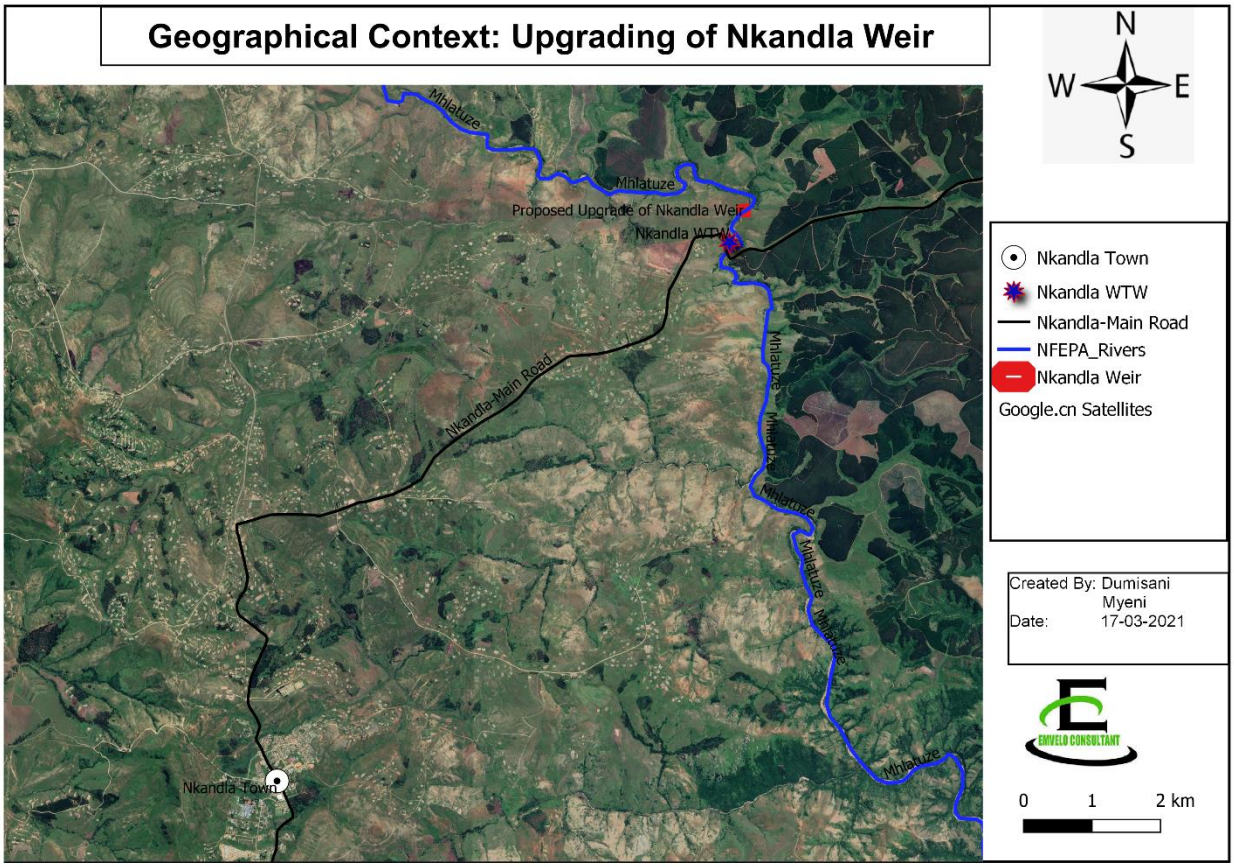


**Figure 1: Geographical Context for Upgrading of Nkandla Weir**

***Table 1*** provides the Global Positioning System (GPS) co-ordinates for the proposed development site.

**Table 1: Co-ordinates**

| **Upgrade of Nkandla Weir** | | | |
|---|---|---|---|
| **Latitude & Longitude** | Degrees | Minute | Seconds |
| South | 28° | 29' | 16.94'' |
| East | 31° | 08' | 21.48'' |

***Table 2*** provides the 21-digits Surveyor General Code (SGC)

**Table 2: 21-digits Surveyor General Code**

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N | O | G | U | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 8 | 3 | 9 | 0 | 0 | 0 | 0 | 0 |

The (***Figure 2***) below is the locality map for development. The site (Nkandla Weir) is within Mhlathuze River approximately 500m north of Nkandla Water Treatment Works (WTW).

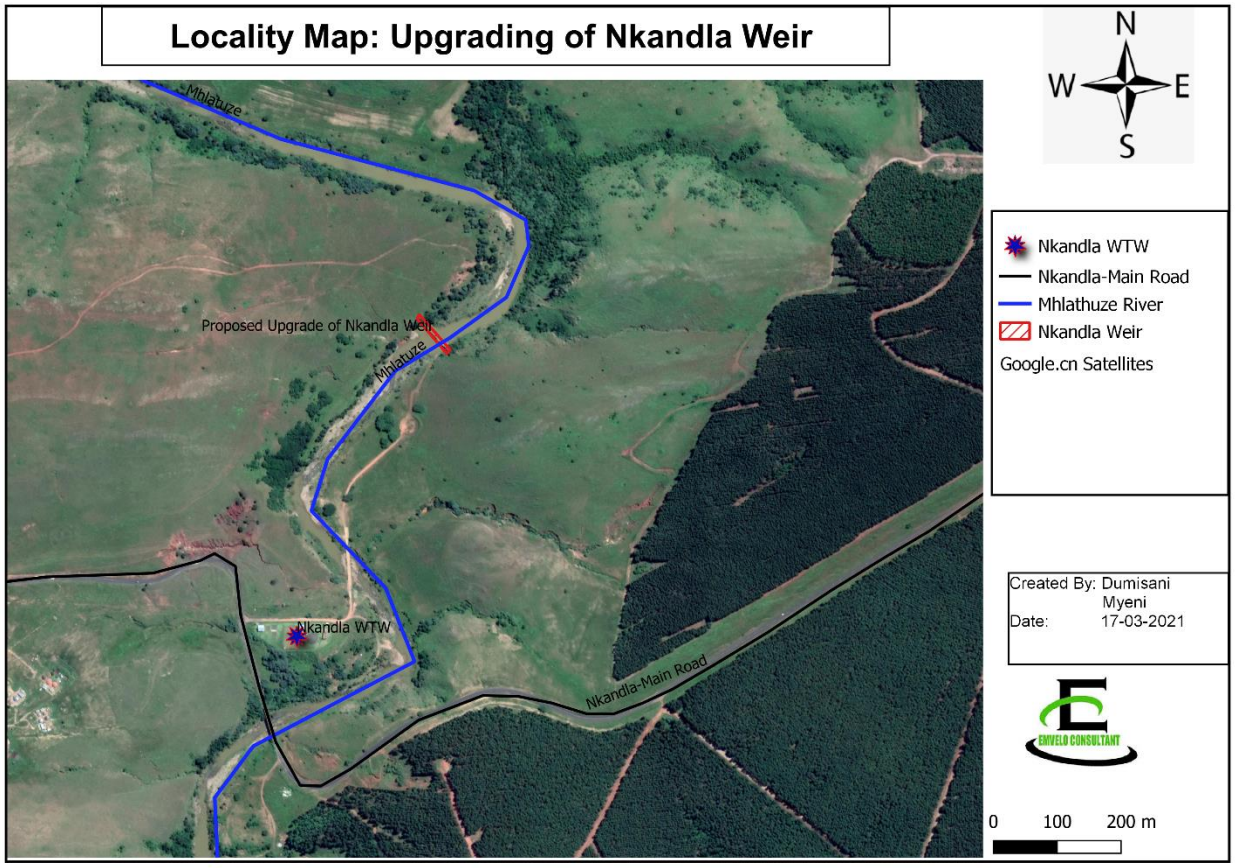


**Figure 2: Locality map of the project area**

## 5 SITE ACCESS

The site can be accessed via R68 from Melmoth to Nkandla. From R66 at Melmoth for 3.4KM turn left to R68 and continues with R68 for 20 KM, continue straight with Nkandla Main Road en-route to Nkandla until the Mhlathuze River, turn right after the bridge onto Nkandla Water Treatment Works (WTW), pass through the WTW and drive straight to the site (Nkandla Weir).

## 6 ACTIVITY MOTIVATION

The current condition of Nkandla Weir, is marked by damage to mechanical equipment and erosion of the banks. Therefore, this would affect the damming up of water at the weir, thus water abstraction and sustainable water supply to Nkandla Town and surrounding areas.

## 6.1 The need

The Nkandla Weir was commissioned in March 2003 and has been in operation for more than 17 years. During this period, it is likely that flood events have occurred resulting in the weir being overtopped. This has resulted in the erosion on both flanks as well as damage to the penstocks which most likely resulted from large trees striking the pedestals during flood events. The damage caused by these events is compromising the integrity of the weir and gives rise to an increased level of maintenance. Therefore, the weir urgently needs refurbishment to prevent total failure.

As a result, the left bank of the Nkandla Weir has been eroded away around the end of the weir wall thereby reducing the operational freeboard by approximately half a metre on the left. Also, there is an erosion of the left bank downstream of the weir. The eroded bank has left the outlet pipe (300mm diameter steel pipe encased in concrete originally buried in the left bank) exposed and bridging a gap of some 18m. Whilst the right bank has been severely eroded exposing the right weir wall, as a result the erosion has reduced the operational freeboard on the right by more than one metre and the remaining earth embankment behind the weir is at risk of being washed away entirely. This would lower the impounded water level to below weir notch level and reduce, if not completely eliminate, the abstraction of water for the Water Treatment Works (WTW) downstream.

Also, the pedestals of all three sluice gates have been damaged and are inoperable. These have no doubt been damaged by large floating debris, such as tree trunks, brought down river during flood events.

Therefore, based on the above-mentioned factors, the proposed development is needed by the affected community, as this would affect the water supply to Nkandla Town and surrounding areas.

## 6.2 Desirability

The upgrade of Nkandla Weir will see the efficient damming up the Mhlathuze River to allow for the abstraction of water to the nearby Water Treatment Works. While the function of the Nkandla Weir is not be affected by the higher flood events and erosion of the banks around

the weir structure, and in the process protecting the riverbanks at the weir site. Therefore, efficient functioning of Nkandla Weir will provide much needed damming and water yield for sustainable water supply within Nkandla Region.

Furthermore, it is also noted that, the site is situated within a rural settlement faced with high unemployment. Therefore, the inclusion of local labour during the construction period will create the much-needed temporary employment opportunities and transfer of skills to local community.

# 7 DESIGN CRITERIA

The existing weir is a reinforced concrete broad crested weir structure. The weir is made up of 2 sections. The first section (weir notch) has a level of 867.3m and is 3m wide. The second section has a level of 867.6m and is 37.2m wide. This section is split by the scour sluice gate tower. The right bank wing wall has a top level of 870.0m and the left bank wing wall has a level of 870.5m. For these valuations it can be concluded that the weir was designed to safely accommodate the 1:2-year flood event. It is also been discovered that the founding conditions of the weir are sufficient to cope with the 1:10-year flood event predicted to overtop the weir by 640mm. However, refurbishing the weir to its current design level will not provide any additional protection against flood damage and will most probably require repairs again in the near future. For this reason some additional protection against flood damage would be prudent.

Therefore, the new improvements in the existing weir design based on the predicted water surface elevation (***Table 3***) will include the following: The maximum flow of 285m³/s before being overtopped to accommodate for recurrence intervals between the 1:2-year flood event (177.94m³/s) and the 1:5-year flood event (313.20m³/s); Raising the abutment walls by 1m would allow the 1:10-year flood event to pass safely over the weir without overtopping.

## 7.1 Predicted Water Surface Elevations

The following are the predicted run-off and various return period flood peaks that may be experienced at the location of the weir, and they determine the new design:

**Table 3: Predicted Water Surface Elevations (To determine new design)**

| Return Period | Water Level (m) | Depth Above Wing Wall (870.00 m) |
|---|---|---|
| 1:2-year | 869.360 | -0.650 m |
| 1:5-year | 870.140 | 0.140 m |
| 1:10-year | 870.640 | 0.640 m |
| 1:20-year | 870.970 | 0.970 m |
| 1:50-year | 871.410 | 1.410 m |
| 1:100 year | 871.760 | 1.760 m |
| Regional Maximum Flood (RMF) | 874.480 | 4.480 m |

## 7.2 Weir design

Based on the results of the evaluation of the peak flood reported above, the following design is required to restore the weir to an acceptable level of operation and be able to withstand flood events up to 1:10 years.

### 7.2.1 Left-wing wall design

Extend the left-wing wall by 5m and raise the new extension by 2m to a top level of 872.5m. Raising the new extension by 2m will prevent further overtopping up to approximately the 1: 50-year return period flood.

### 7.2.2 Right-wing wall design

Extend the right-wing wall by 19m and raise the new extension by 1m to a top level of 871.0m. Raising the new extension by 1m will prevent further overtopping up to approximately the 1: 10-year return period flood.

# 8 SITE ALTERNATIVE

The Department of Environmental Affairs provides guidelines on the assessment of alternatives, to which the impact assessment be considered DEAT (2004a) and DEAT (2006). These alternatives are: location (site), activity (project), site layout, design, scale, routing, scheduling, process, demand, input and no-go alternatives. It is, however, important to note that the regulation and guidelines specifically state that only 'feasible' and 'reasonable' alternatives should be explored. It also recognizes that the consideration of alternatives is an iterative process of feedback between the applicant and the appointed Environmental Assessment Practitioner (EAP), which in some instances culminates in a single preferred project proposal.

After weighing all project alternatives for this project, the design alternative was adopted to consider the major development alternative that would meet the stated need for and purpose of the project, by providing proper mitigation measures.

## 8.1 Alternative A (Preferred Design Alternative)

This project merely looks at upgrading the weir design in order to withstand the extreme events such as, flood events up to 1:10 years. Therefore, Design alternative for this project, involve looking at the impact likelihood and providing engineering to mitigate those impacts.

This preferred Design alternative proposes that in other to maintain the damming up of water at the weir for the adequate water yield and abstraction for water supply the existing weir design should be redesigned to provide some additional protection against flood damage, and refurbishment to prevent total failure (***Refer to Section 7***).

Therefore, the aforementioned highlights alternative A (Design Alternative) as the only best suitable alternative for this project, as it is the only alternative that would meet the stated need for and purpose of the project.

## 8.2 Alternative B (No-Go Alternative)

In the absence of the proposed development, the purpose for the water supply within Nkandla Local Municipality would be derailed. This would affect the water supply to Nkandla Town and surrounding areas in a near future, as the erosion on both flanks as well as damage caused by extreme events is compromising the integrity of the weir and gives rise to an increased level of maintenance and this may result in total weir failure(***refer to section 6.1 & 6.2***). Therefore, projects that are proposed on public land and/or for the public good should consider the major development alternatives that would meet the stated need for and purpose of the project (DEAT, 2004a).

Access to adequate safe drinking water is a national priority in promotion of local economic development and one of the key elements of a decent standard of living for all South Africans (NPC, 2012). The EAP is therefore of the view that the NO-GO option is undesirable in the face of social and economic needs of this community and South Africa's National Development Plan 2030 objectives.

# 9 APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

In terms of the Environmental Regulations promulgated under the NEMA, an EIA must be conducted for any development or activity that requires an Environmental Authorisation. The listed activities in the NEMA, relevant to this project, that triggers the need for an Environmental Authorisation are listed below:

**Table 4: Environmental Statutory Framework**

| Legislation | Relevance |
|---|---|
| Constitution of the Republic of South Africa, (No. 108 of 1996) | ➢ Chapter 2 – Bill of Rights.<br>➢ Section 24 – Environmental Rights. |

| | | |
|---|---|---|
| National Environmental Management Act (NEMA) (No. 107 of 1998) | ➢ Section 24 – Environmental Authorisation (control of activities which may have a detrimental<br>➢ effect on the environment).<br>➢ Section 28 – Duty of care and remediation of environmental damage.<br>➢ Environmental management principles.<br>➢ Authorities – Department of Environmental Affairs (DEA) (national) and Department of Economic Development Tourism and Environmental Affairs (provincial). | |
| GN No. 326 (7 April 2017) | ➢ Purpose - regulate the procedure and criteria as contemplated in Chapter 5 of NEMA relating to the preparation, evaluation, submission, processing, and consideration of, and decision on, applications for environmental authorisations for the commencement of activities, subjected to EIA, in order to avoid or mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters pertaining thereto. | |
| ➢ Purpose – to identify activities that would require environmental authorizations prior to commencement of that activity and to identify competent authorities in terms of sections 24(2) and 24D of NEMA.<br>➢ The investigation, assessment, and communication of the potential impact of activities must follow the procedure as prescribed in regulations 19 and 20 of the EIA Regulations published in terms of section 24(5) of the Act. However, according to Regulation 15(3) of GN No. 327, Scoping and an Environmental Impact Report (S&EIR) must be applied to an application, if the application is for two or more activities as part of the same development for which S&EIR must already be applied in respect of any of the activities.<br>➢ Activities under Listing Notice 1 that are relevant to this project. | | |
| GNR No. 327 (7 April 2017) **Listing Notice 1.** | Activities under Listing Notice 1 that are relevant to this project are as follows; | |
| | **Listed activity 19:** The The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or | For this project upgrade of Nkandla Weir will take place within a watercourse (Mhlathuze River) and will involve |

| | | |
|---|---|---|
| | moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from — (i) a watercourse; | excavation and removal of soil of more than 10 cubic metres within the river banks, for the expansion of Nkandla Weir within Mhlathuze river.<br><br>It is estimated that more than 20 cubic metres of soil will be removed from the riverbanks, in order to secure an alignment for the weir foundation footing. |
| National Water Act (Act No. 36 of 1998) | ➢ Chapter 3 – Protection of water resources.<br>➢ Section 19 – Prevention and remedying effects of pollution.<br>➢ Section 20 – Control of emergency incidents.<br>➢ Chapter 4 – Water use.<br>➢ Authority – Department of Water and Sanitation (DWS). | |
| National Environmental Management Air Quality Act (Act No. 39 of 2004) | ➢ Air quality management<br>➢ Section 32 – Dust control.<br>➢ Section 34 – Noise control.<br>➢ Authority – EDTEA. | |
| National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) | ➢ Management and conservation of the country's biodiversity.<br>➢ Protection of species and ecosystems.<br>➢ Authority – EDTEA. | |
| Occupational Health & Safety Act | ➢ Provisions for Occupational Health & Safety<br>➢ Authority – Department of Labour. | |

| | |
|---|---|
| (Act No. 85 of 1993) | |
| National Heritage Resources Act (Act No. 25 of 1999) | ➢ Section 34 – protection of structure older than 60 years.<br>➢ Section 35 – protection of heritage resources.<br>➢ Section 36 – protection of graves and burial grounds.<br>➢ Authority – KwaZulu-Natal Amafa and Research Institute |
| National Road Traffic Act 1996 (Act No. 96 of 1996) | ➢ Authority – KwaZulu-Natal Department of Public Works, Roads and Infrastructure. |

## 10 DESCRIPTION OF THE PROJECT AREA

This section provides a general description of the status quo of the receiving environment in the project area. This serves to provide the context within which the Basic Assessment exercise was conducted. It also allows for an appreciation and identification of sensitive environmental features and possible receptors of the effects of the proposed project.

### 10.1 Climate

The Southern African region is divided into three climatic regions; Wet, dry and moderate, and the region of the KwaZulu Natal encompasses both, with categories such as humid subtropical (Cfa), oceanic climate (Cfb), hot semi-arid climates (BSh) and tropical savanna climate (Aw), but the most prevalent ones are Cfa and Cfb (Climate-Data.org).

The study region of King Cetshwayo District at Nkandla has a warm and temperate climate with winters being very mild and summers that can be hot and humid, with mostly precipitation received during the summer season. Nkandla region lies on 1105m above mean-sea level, its climate falls under the *Cfb* by Köppen and Geiger, and is classified as warm and temperate, with the mean annual temperature of 17.2 °C, and mean annual precipitation of 982 mm which is mostly experienced during summer season. The driest month is June with mean

precipitation of 18 mm, and most precipitation of more than 143 mm falls within January (Ezemvelo KZN Wildlife, 2014; Climate-Data.Org).

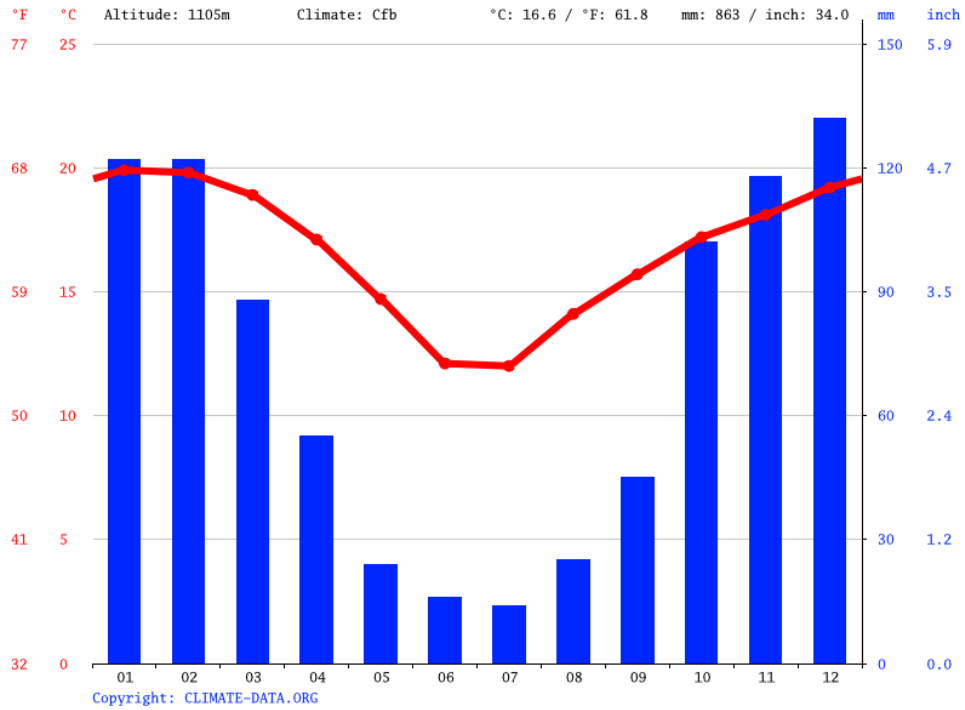


**Figure 3: Nkandla climate graph [Source: Climate-Data.Org]**

Moreover, within the study area the closest rainfall station to the site (SAWS Station No. 0303127 W) recorded the mean annual precipitation of 861 mm. Also, the catchment lies within a summer rainfall mostly precipitation received between October to March, and the period between April to September considered a driest season within the catchment.

### 10.1.1 Potential impact

The project deeply relies on climate and seasonal stream discharge, since the weir upgrade will take place within the river at the river banks. However, the construction is proposed to take place during dry season when the river will be at lowest discharge level. Also, due various return periods and extreme events on the river associated with wet period and site terrain (***refer to section 11.3***), these conditions are likely to exacerbate surface run-off and erosion at river banks within the weir site. However, the proposed new weir design and

refurbishments, involve looking at the impact likelihood and providing engineering to mitigate those impacts.

The measures to reduce the project's carbon footprint will be considered further in the EMPr.

## 10.2 Hydrology

The hydrological system of King Cetshwayo District form part of primary which is drained through several major rivers at the South-Western part of this region and central region. The South-Western region is coupled with seasonal small fast flowing streams due to undulating topography, joining and pouring to Thukela River which form the South-Western border of King Cetshwayo District. Whereas, central and coastal areas of the District lie within a large primary catchment and is drained through several major rivers. Furthermore, the region is also in other components of hydrological system, such as wetlands mostly in coastal plains (Ezemvelo KZN Wildlife, 2014; Nkandla IPD, 2019-2020).

The Nkandla Weir is located within quaternary catchment (W12A) within Pongola- Mtamvuma Water Management Area (WMA).

### 10.2.1 Rivers and dams

The Bordered by Thukela River at the South-West border and Mfolozi River at the North-Eastern border, the river systems in King Cetshwayo District are conglomerated within the central and coastal areas, with major rivers within the region, include; Nseleni, Matigulu, Mhlathuze, Mlalazi, Mfule, Nyalazi, Mzingwenya, Mfolozi River (Ezemvelo KZN Wildlife, 2014).

At the project area the site is located within Mhlathuze River at a point approximately 35km downstream of the source. The Mhlathuze River flows another 145km from this point until eventually terminating at the Indian Ocean, near Richards Bay, and is classified as National Freshwater Ecosystem Priority Area (NFEPA) Rivers (***Figure 4***).

The region also have the Goedertrouw dam which is an augmentation of Thukela-Mhlathuze Transfer Scheme and the only major dam within King Cetshwayo District, situated at approximately 44km downstream of Nkandla Weir and approximately 11km north of Eshowe.

### 10.2.2 **Wetlands**

Major wetlands at King Cetshwayo District are mainly formed at the coastal plain situated at the south-eastern and south-western parts, namely; Mhlathuze wetland systems which host Cubu lake. The Greater Mhlathuze Wetland System to the south of Richards Bay is integrated to Mhlathuze River system (Ezemvelo KZN Wildlife, 2014).

There are number of isolated wetlands landscape dispersed across the project region recognised as National Freshwater Ecosystem Priority Areas (NFEPA) as Wetland FEPA's (***Figure 4***).

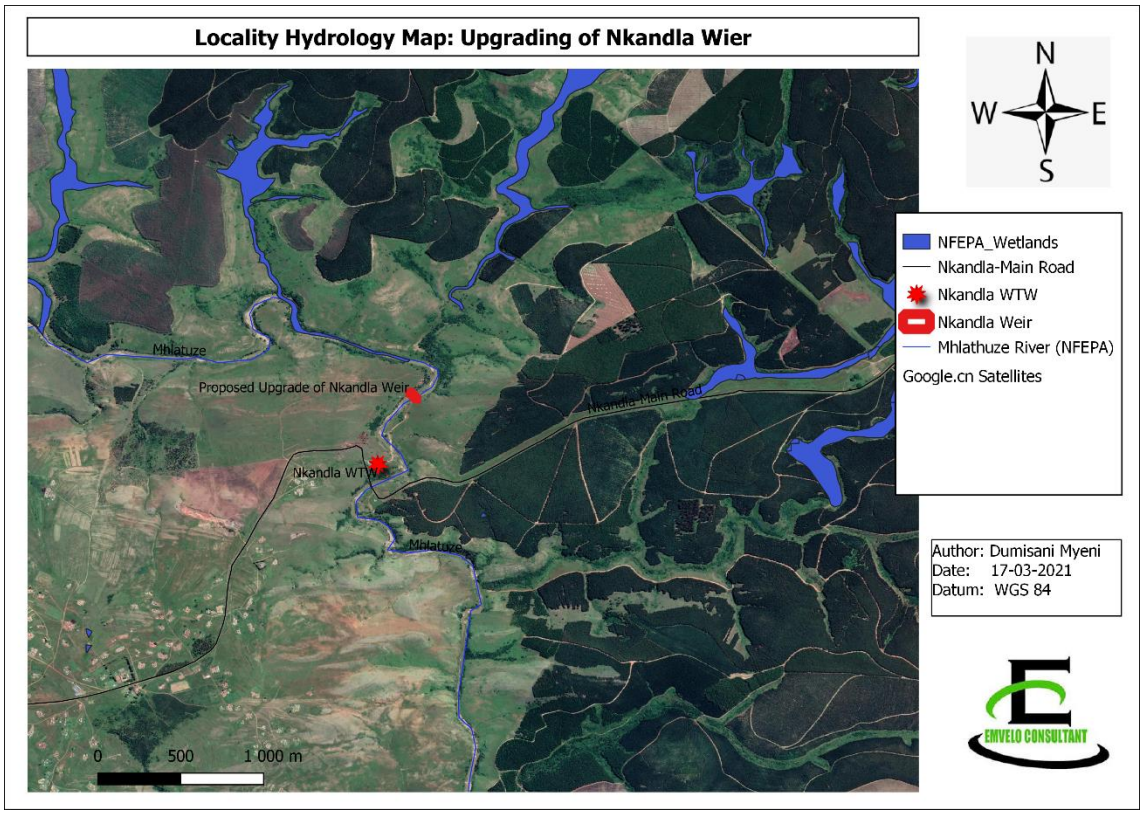


**Figure 4: Map showing the hydrological features within and around the project area**

However, the proximity of the Nkandla weir site comprised watercourse units, which have not been identified as Wetland FEPA's, but rather FEPA's River. Also, although there is wetland unit upstream within 500m buffer, this wetland unit is not in close proximity to the Nkandla Weir where the proposed upgrade will take place. The Wetland FEPA's coverages in relation to 500m buffer of the study area are shown in (***Figure 5***) below.

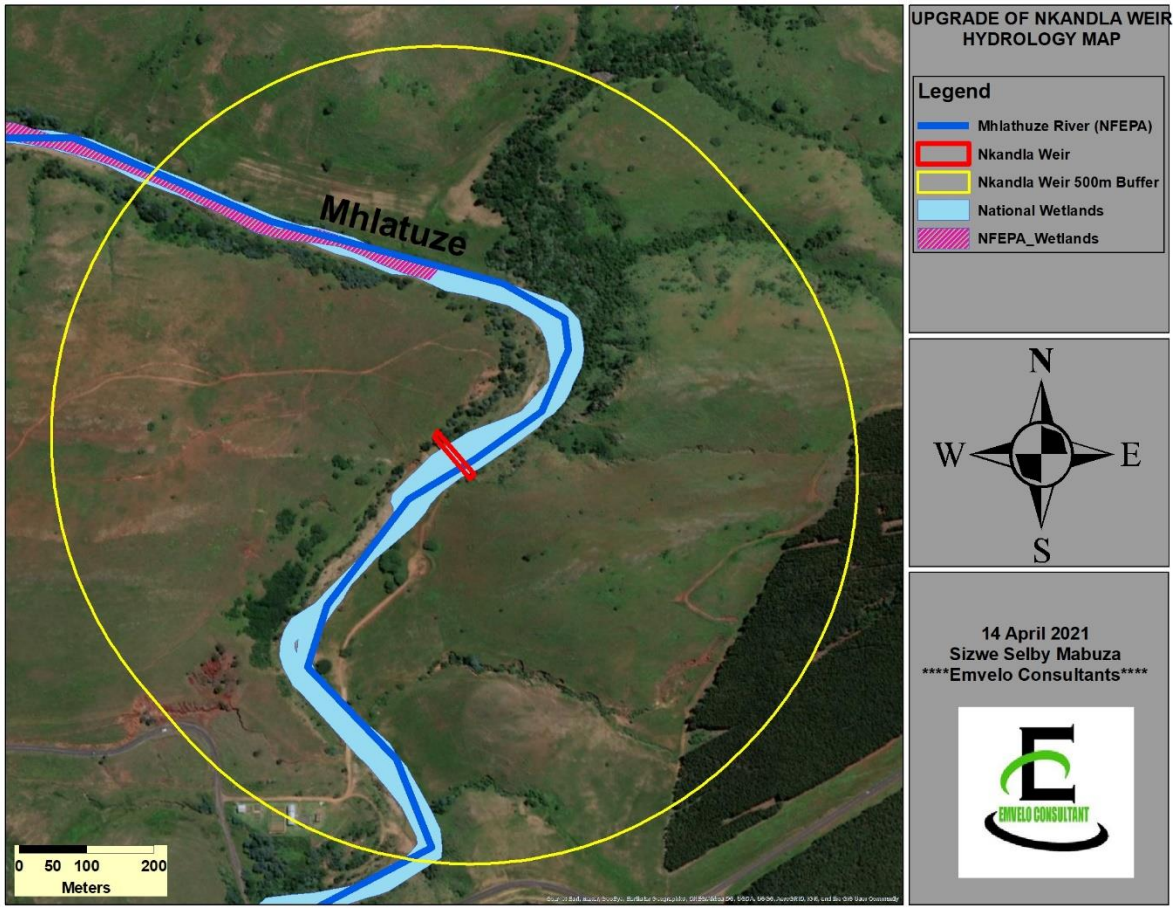


**Figure 5: Map showing Wetland FEPA's within 500m buffer of the study area**

### 10.2.3 Potential impacts of the project hydrological features

The weir upgrade will take place within the watercourse at Mhlathuze River. This could result water pollution as a result of siltation and debris and other foreign objects jetting into waterbody during construction and excavation of river banks. The recommendations by the EMPr must be adhered to minimise any impacts that may arise.

## 10.3 Topography

The King Cetshwayo District has a varied topography that extends from the flat coastal plains to inland hilly areas and steep valleys, each with vegetation endemicity supplementary to its geographical location. In these aspects, the flat coastal region of approximately 450m above mean sea-level comprises of the Natal Coastal Belt and Zululand Coastal Plain. Whereas, the north-western region is characterised of more extreme terrain, as a result of steeply incised valleys with altitudes between 900m and 1 400m above mean sea-level. (Ezemvelo KZN Wildlife, 2014).

Moreover, the study area is characterised of undulating terrain of incised valley at Mhlathuze River with altitudes ranging between 860m and 1020m above mean sea-level, with the high altitudes observed towards north-eastern of the study area (***Figure 6***).

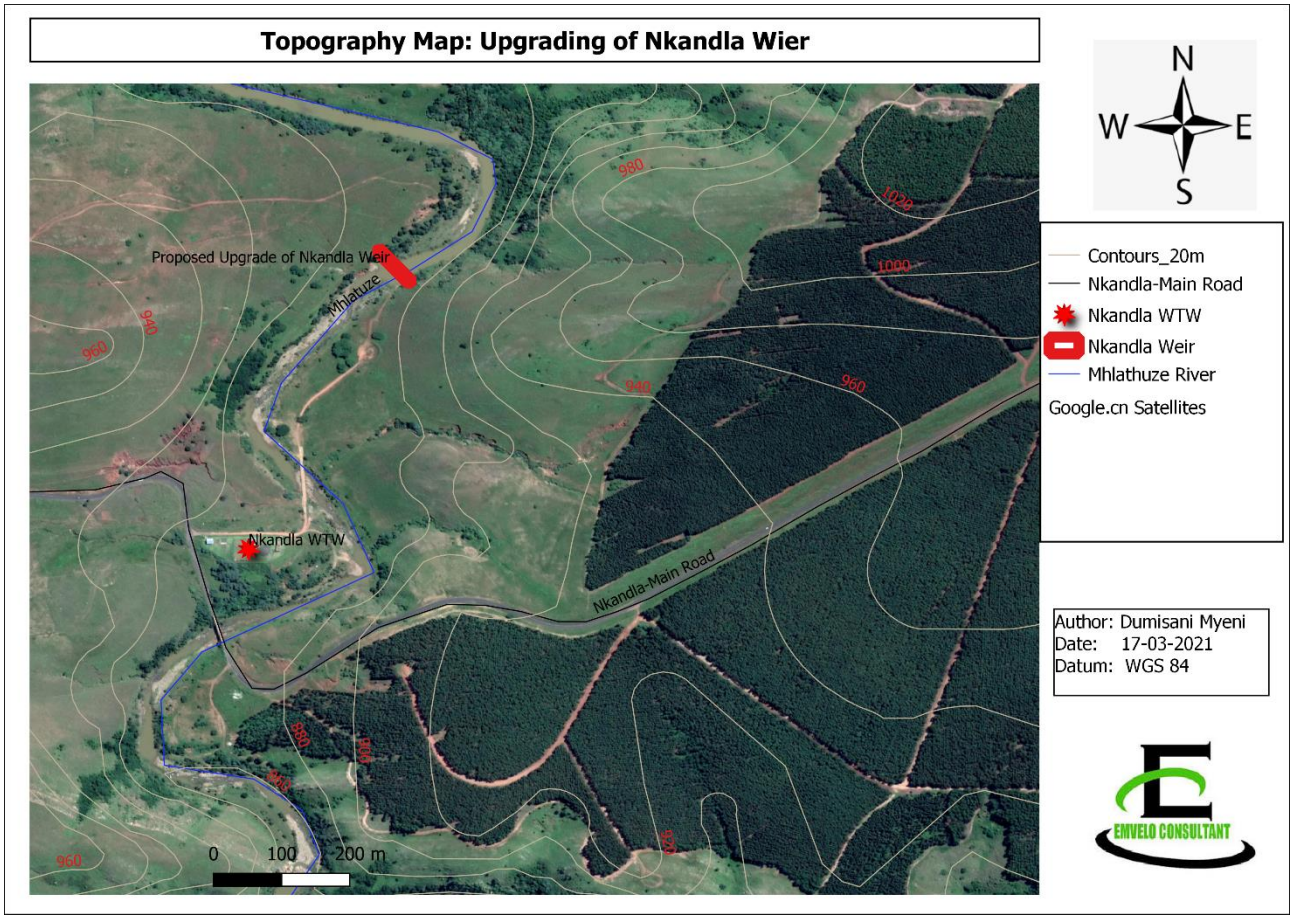


**Figure 6: Contour Map showing elevations within the project area**

### 10.3.1 Potential impacts

The steep terrain at incised valley can have surface run-off propensity at the river banks within the weir topography and will result in potential erosion problems from surface run-off. However, proper mitigation can be achieved by the implementation of the proposed design (refer to section 7) and stormwater management plan through efficient drainage, also through carefully implementation of recommendations given by Hydrological Specialist and the EMPr.

## 10.4 Geology

The King Cetshwayo District's geological features are stratified across the region. The coastal region of King Cetshwayo District which is south-west and south-east is characterised of flat plains, which narrows towards south and widened towards north. This part of the District is underlain by Cainozoic and recent geomorphological series which include sand stones, shales and mudstones. Whereas, the western region characterised of complex undulating terrain underlain by Table Mountain series, gneiss and granite of the Natal Monocline. The granite derived soils in western region vary considerably but significantly susceptible to erosion at slope areas (Ezemvelo KZN Wildlife, 2014).

The study area lies on the western region of King Cetshwayo District, with extreme topography a result of the underlying Table Mountain Series and gneiss, also a granite of the Natal Monocline geological. Moreover, the locality geological formation of the study area comprises of Greenstone Groups Formation (***Figure 7***).

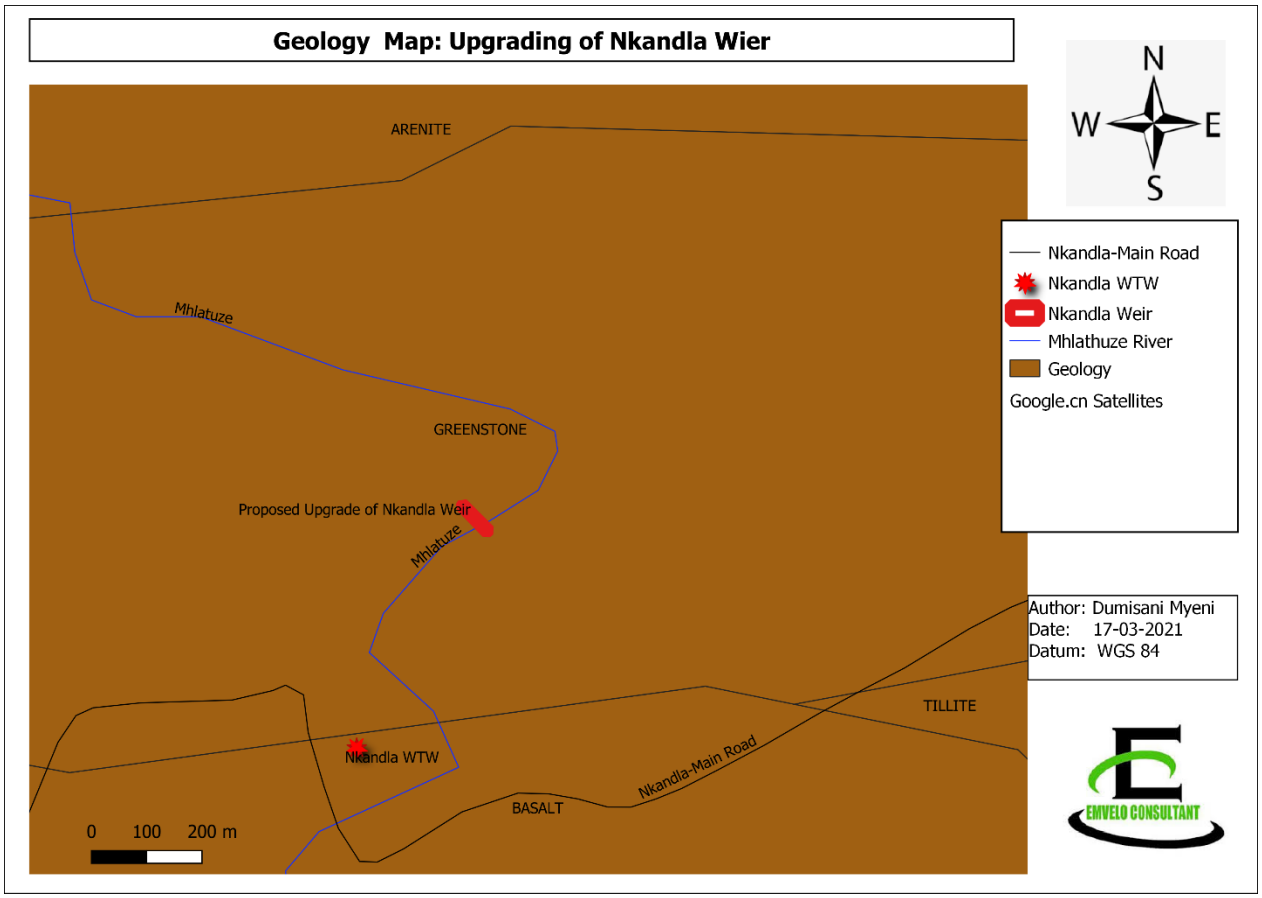


**Figure 7: Map showing a dominance geological formation within the study area**

### 10.4.1 **Potential impacts**

The scope of weir upgrade include excavation of river banks for extension of weir in either wings of the weir. This activity may have impact on geological stability of the riverbanks within the weir. The geology and topography will exacerbate potential erosion problems and surface run-off. Therefore, the mitigation measures given by the EIA, Geotechnical Assessment and EMPr must be adhered to minimise any potential significant impacts that may arise.

## 10.5 Biomes

The King Cetshwayo District traverses eight (8) biomes, namely; Azonal Forest, Forest, Savanna, Fynbos, Grassland, Indian Ocean Coastal Belt, Wetlands and Open Water. (Ezemvelo KZN Wildlife, 2014).

Moreover, the locality of the study area falls under the Savanna Biome, with dominantly Midland Mistbelt Grassland (***Figure 8***).

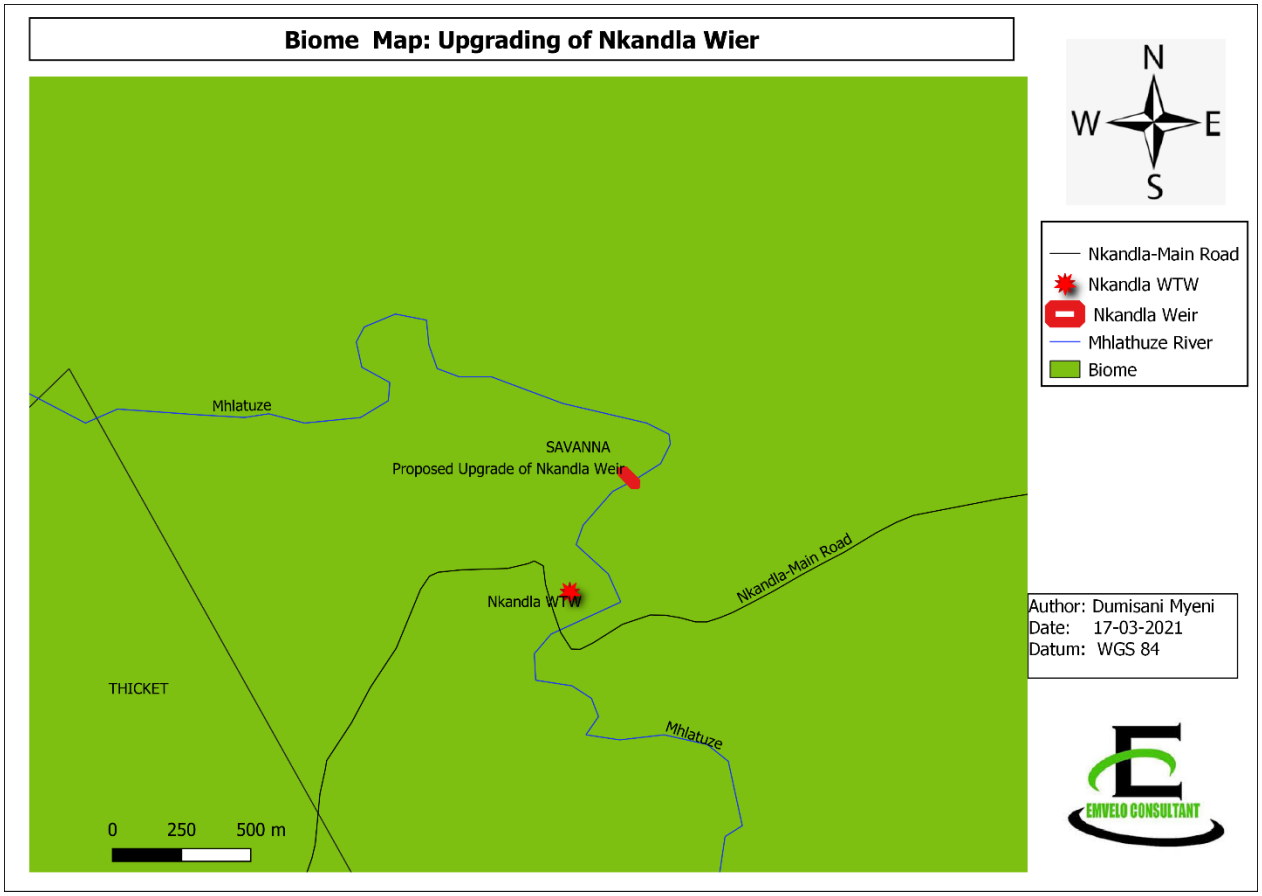


**Figure 8: Map Showing the biome within the study area**

## 10.6 Flora

The King Cetshwayo District has a very rich vegetation endemic from stratified biomes (***Section 10.5***), Namely: Complex forest biome of vegetation endemic to geographical and climatic conditions; Savanah biome; Wetland biome and contains 47 vegetation types. Also, the Nkandla Municipality region host the Nkandla Forest which falls within a grassland and

forest biome with a conservation status classified as "***Vulnerable***" (Ezemvelo KZN Wildlife, 2014). As mentioned above the vegetation within locality of the study is dominantly the Midland Mistbelt Grassland (Gs 9) (***Figure 9***) with a conservation status classified as "***Endangered*"** and with a 23% conservation target (Mucina and Rutherford 2006).

The field investigation within the study locality observed that the study area riparian zone has a mix open grassland and alien thicket vegetation. The indigenous vegetation were mainly dominated by *Sporobolus africanus sp.* (Rat's tail grass), *Aristida junciformis sp.* (Ngongoni grass), *Hyparrhenia hirta sp*. (Thatching grass), *Sporobolus pyramidalis sp.* , and *Themeda triandra* sp. (Red grass), as well as a moderate to high abundance of alien trees and shrubs, namely, *mearnsii*, *dealbata* and *Lantana camara*, also the weed species of *Conyza*.

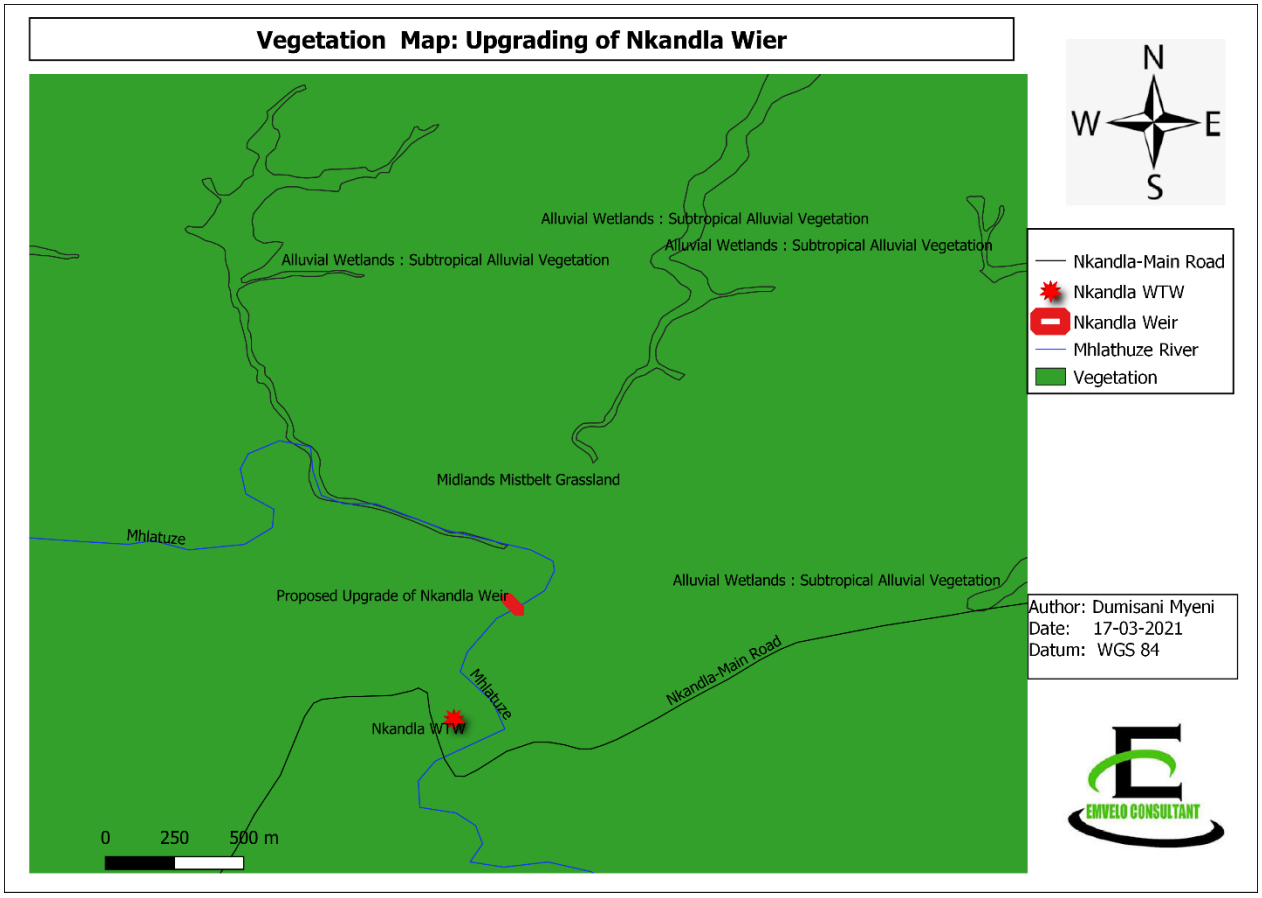


**Figure 9: Map showing the vegetation types within the study area**

### 10.6.1 Potential Impacts

Potential impacts to vegetation could result from the construction of the proposed development which involves the clearance of vegetation in accordance to clearance along the river banks within the weir and construction site camp.

## 10.7 Protected Areas

The KwaZulu-Natal Biodiversity Plan outline two main categories of areas that are required to meet conservation targets for the province. These two main categories include Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). The CBAs represent the crucial for supporting biodiversity features and ecosystem functioning and are required to meet biodiversity and/or process targets including corridors. While the ESAs represent the Functionality but not necessarily entirely natural areas that are required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within Critical Biodiversity Areas (Ezemvelo KZN Wildlife, 2016).

The King Cetshwayo District maintain sizable number of protected areas, mainly forest reserves, the estuarine reserve, community conservation areas and game ranches. Within the study region at Nkandla Municipality lies the Nkandla Forest Complex, which consist a number of forest reserves with species endemicity rare found in South Africa (Ezemvelo KZN Wildlife, 2014).

Upon interrogation of the KZN Biodiversity Conservation Plan (KZNBCP) for terrestrial areas KZN Biodiversity Plan, it was determined that no CBAs or ESAs are located within close proximity to the proposed weir upgrade. However, ***CBA: Optimal*** areas were located within 500m west and south of the proposed weir upgrade (***Figure 10***). The ***CBA: Optimal*** sites reflect the negotiable sites with a low Irreplaceability Score.

**Table 5: Subcategories of CBA and ESAs [Source: Ezemvelo KZN Wildlife,2016]**

| | |
|---|---|
| Critical Biodiversity Areas (CBAs) **– Crucial for supporting biodiversity features and ecosystem functioning and are required to meet biodiversity and/or process targets** | |
| **Critical Biodiversity Areas: Irreplaceable** | Areas considered critical for meeting biodiversity targets and thresholds, and which are required to ensure the persistence of viable populations of species and the functionality of ecosystems. |
| **Critical Biodiversity Areas: Optimal** | Areas that represent an optimised solution to meet the required biodiversity conservation targets while avoiding high cost areas as much as possible (Category driven primarily by process, but is informed by expert input). |
| Ecological Support Areas (ESAs) – **Functional but not necessarily entirely natural areas that are required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within Critical Biodiversity Areas.** | |
| **Ecological Support Areas** | Functional but not necessarily entirely natural terrestrial or aquatic areas that are required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within the Critical Biodiversity Areas. The area also contributes significantly to the maintenance of Ecosystem Services. |
| **Ecological Support Areas: Species Specific** | Terrestrial modified areas that provide a critical support function to a threatened or protected species, for example agricultural land or dams associated with nesting/roosting sites. |
| **Ecological Support Areas: Buffers** | Terrestrial areas identified as requiring land-use management guidance not necessarily due to biodiversity prioritisation, but in order to address other legislation/ agreements which the biodiversity sector is mandated to address, e.g. WHS Convention, Triggers Listing Notice criteria, etc. |

However, the study area mainly falls under the “Biodiversity Area” which is a natural and/or near natural environmental area not identified as a critical biodiversity area. Also, there were no species of conservation concern (SCC) that were found on the site during the field survey.

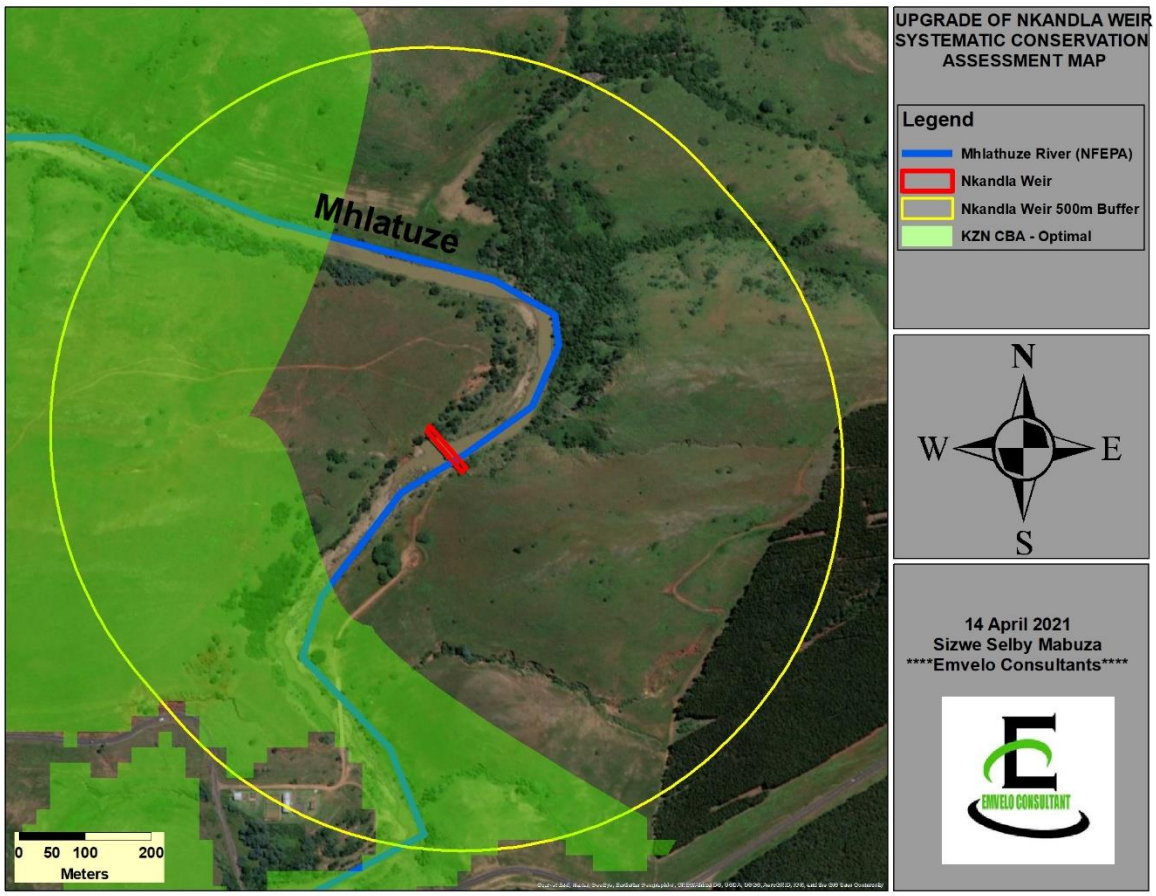


**Figure 10: Map showing KZN Biodiversity Spatial Planning within the study area**

### 10.7.1 Potential Impacts

Intensive vegetation clearance at project site can lead to fragmentation, reduction, and loss of habitat as well as the migration of animals away from the area, in particular the bird species that forage around the project area. However, the clearance will be within project footprint within the weir.

## 10.8 Fauna

The King Cetshwayo region has endemic fauna which are "***Critical Endangered***", one example is the *Trachycystis placenta sp*. (Discus Pinwheel snails) which are endemic to Nkandla Forest which is a protected area. Also, Nkandla Forest Complex surrounds contributes 37% of the conservation target for *Orachrysops ariadne* (butterfly) species, 60% for *Pagopedilum martini* (grasshopper), 42% and over 100% respectively for Aloe *saundersiae* classified as "***Endangered***" and *Asclepias woodii* the "***Endangered***" species of the Milkweed

family), over 100% for *Sheldonia burnupi* (Mollusc), and 55% for *Bradypodion tilburyi* (Tilbury's dwarf chameleon), and the south of Nkandla forest contributes several millipede and mollusc species which are endemic central KZN, (Ezemvelo KZN Wildlife, 2014). In addition, when the study region is interrogated against Quarter Degree Square (2831CA) obtained from Fitzpatrick Institute of African Ornithology Virtual Museum, the region also confirms the availability of *Columba delegorguei sp*. (Eastern bronze-naped pigeon) with conservation status classified as "***Endangered***".

The site aquatic investigation did not identify the documented fish species namely, *Enteromius gurneyi sp*. and *Oreochromis mossambicus sp*., which are likely to occur within similar habitats within the general study area with conservation status listed as Vulnerable on the IUCN Red List, (IUCN, 2021). However, three fish species were sampled downstream through standard sampling method using an Electroshocker, namely, *Labeobarbus natalensis sp.* (KwaZulu-Natal Yellow fish), *Enteromius trimaculatus sp*. (Threespot Barb) and *Tilapia sparrmanii sp*. (Banded Tilapia). The *L. natalensis sp*. is moderately intolerant to physico-chemical and flow modifications, *E. trimaculatus sp*. is tolerant to physico-chemical modifications and moderately tolerant to change in flow modifications whilst the *T. sparrmanii sp*. is tolerant to both changes in physico-chemical and flow modifications (DWS, 2014).

### 10.8.1 **Potential Impacts**

Vegetation clearance within the river bank at weir area for the expansion of weir as well as construction activities within the watercourse can slightly modify the watercourse natural integrity, hence locality fauna disturbance might occur and could led to fragmentation, reduction, and loss of habitat as well as the migration of animals away from the area, in particular, the bird species who might forage around the project area.

Although, there were only three fish species encountered during the Environmental Study, the site is suitable for development, as these fish species are tolerant to physico-chemical and flow modifications. However, further threat to this fish species could be minimised provided that the recommendations given by the Aquatic Ecological Assessment adhered to.

## 10.9 Visual environment and land use character

Subject to the direct visual influence of the proposed project, the zone of visual influence can be experienced at different scales by receptors located at various distances from the site. The viewshed area and zone of visual influence for new developments is classified as follows:

- High visibility - Visible from a large area (several square kilometres, >5km radius)
- Moderate visibility - Visible from an intermediate area (several hectares, 2.5 – 5 km radius).
- Low visibility - Visible from a small area around the project site (<1km radius).

Therefore, Since the proposed development is for the upgrade weir, the development is considered to have no negative visual impacts or only during the construction can be considered "***low visibility***" as it can visible from a small area around the project site (<1km radius).

### 10.9.1 Potential Impacts

The proposed development is for upgrade of weir, the development will have no negative visual impacts, provided that dust and other visibility aspects are managed through proper implementation of recommendation provided by EMPr.

## 10.10 Heritage and cultural aspects

Nkandla Municipality offers a window on history as it is the one of the places whereby the ancient san cave painting can be found at Gonzaga Romans Mission (Nkandla Local Municipality,2014). Also, the Nkandla Forest Complex within Nkandla Municipality intrigued many historians as it has the sites which premised from Late Iron Age in the immediate surroundings of the forest complex, and forest its self has living heritage values and features in to the early history of the Zulu Kingdom (Ezemvelo KZN Wildlife, 2015).

No Stone Age settlements, structures, features, assemblages or artefacts were recorded around the site during the survey. Also, there were no visible material remains pertaining to heritage resources occur within the proposed development footprint. However, the inquiry has

been lodged with AMAFA to ascertain whether there are any cultural and heritage sites within the study area. Findings will be incorporated into the final Basic Assessment Report.

### 10.10.1 Potential Impacts

The scope of weir upgrade include excavation of river banks for extension of weir in either wings of the weir could have negative impacts on cultural resources that might be buried underground along the river banks, also to rocks of paleontologically significant that may be around vicinity of the site. During the excavation activities, heritage elements that might be buried on the underground may be affected. Although, this project is an upgrade of an existing weir therefore it will have a limited chance of encountering such archaeological artifacts. Therefore, precautionary measures must be practiced during construction activities e.g. excavations and impacts can be mitigated provided that the recommendation by the Heritage Impact Study and EMPr are adhered to.

## 10.11 Social and economic aspects

Nkandla Local Municipality host 22 463 households which is made up of formal residential, traditional residential and collective living quarters, with the combined population of 114 284 to which the majority of population (110 313) are within the traditional (rural) setting (Nkandla IDP, 2019-2020). Also, the project (Nkandla Weir) which is the source of Nkandla Supply Scheme supplies the rest of Nkandla Municipality and is within rural setting, hence the project will take place within the traditional (rural setting). As discussed in (***Section 6***), also by Nkandla IDP (2019-2020) and KCDM IDP (2021), the Nkandla Weir become integral water source in addressing the water service backlogs of 32.21% in Nkandla Municipality, to which estimated 7 032 population has no access to piped (safe drinking) water, and those with access experience water-cuts, as a result the water infrastructure within Nkandla Municipality require upgrading.

Nkandla Municipality is a rural based municipality with government becoming the main employer, also the Expanded Public Works Programme (EPWP) and Community Work Programme (CWP)programme has employed a substantial number of youths to address the youth unemployment. The unemployment rate at 2011 was estimated to be 43.9%, to which more than half of the youth (53.5%) were unemployed (Nkandla IDP, 2019-2020).

### 10.11.1 Potential Impacts

In light with above (***Section 10.11***) explained situational analysis within Nkandla Municipality, it is expected that the local community benefits through jobs during the construction, operation and maintenance phase, which will enable the transfer of skills and boost the local economy, in the process alleviate poverty and decrease dependency ratio. Also, to note that projects have economic multiplier effects whereby the money will circulate within the local economy in the process creates more jobs in terms of local businesses.

# 11 WASTE, EFFLUENT, AIR POLLUTION AND ATMOSPHERIC EMISSIONS

Construction activities, like other operations, also leads to pollution of air, land and water bodies, due to the general and hazardous waste emanating from the activities.

## 11.1 General waste management: construction phase

Some of the possible solid and liquid waste during the construction and assembling of the pipelines and associated infrastructure include general waste (plastic, paper, food scraps, etc.), hazardous waste (chemicals, oil, diesel, resins, drilling fluids, sewage, etc.), medical waste from onsite injuries (bandages, swabs, medication, needles, etc.) and building rubble (cement, steel, wood, etc.)

## 11.2 Effluent

No effluent will be generated during the construction phase of the project. Proper measures will be put in place to contain any spillages (oil spills) occurring during construction, as prescribed by EMPr.

## 11.3 Ambient air pollution and atmospheric emissions

The proposed development itself will not have direct impact on air pollution and atmospheric emission. However, certain activities during construction could have a minor impact on the ambient air as a result of emissions from the onsite equipment, machinery and vehicles. These include dust emanating from construction activities and fumes (carbon monoxide) released by

construction vehicles and machinery. These minor impacts can be mitigated through adherence to the EMPr.

The activity will, therefore, have an indirect but minor effect on the release of emissions. The release of significant emissions from any source will be controlled under the National Environment Management: Air Quality Act 39 of 2004

### 11.4 Noise management

The project sites will emit different levels of noise due the various construction activities, movement of heavy construction vehicles, use of machinery as well as from large number of workers on site. However, noise impacts are expected to be of short duration and only during certain times of the construction phase, which is likely to only have impacts to the immediate environment. The potential noise pollution impacts will be mitigated provided that the EMPr is adhered to.

## 12 WATER USE

The water to be used during construction will be supplied by the King Cetshwayo District Municipality, with the provision of existing water within the project locality. This includes the metered water from the existing water supply. The water use will include water consumption for drinking, cleaning and hygiene as well as dust suppression where required.

## 13 THE PUBLIC PARTICIPATION PROCESS

Section 24 (4) (a) (v) of NEMA, provides that the procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment, must ensure, with respect to every application for an Environmental Authorisation, the public information and participation procedures which provide all interested and affected parties, including all organs of state in all spheres of government that may have jurisdiction over any aspect of the activity, with a reasonable opportunity to participate in those information and participation procedures.

## 13.1 Background

Public Participation Process (PPP) is part of the EIA process which is governed under the principles of NEMA as well as the EIA regulations. It is defined as the process by which an organization consults with all interested or affected parties (I&APs) which include organizations, government entities, affected communities, non-governmental organisations (NGOs), etc. It is a two-way communication process and collaborative problem solving with the goal of achieving better and more acceptable decisions.

The PPP also provides all the stakeholders including the community with a platform to raise their environmental concerns before the Competent Authority can make a final decision regarding the issuing of the Environmental Authorization. This prevents and minimizes disputes before they become unsolvable. Chapter 6 of the EIA regulations emphasize that the information related to the proposed project must be made available to I&APs, prior to a final decision. Therefore, this process will allow I&APs to have access to the information relating to this project. The application was conducted according to Chapter 6 of the EIA Regulations 2017.

## 13.2 Objectives of public participation

The objectives are as follows:

- To inform and involve the community and the stakeholders about the proposed upgrading of Nkandla Weir;
- To identify and address the community and stakeholder's environmental concerns regarding this activity;
- To provide opportunities for the community, relevant government departments, surrounding businesses, the residents and other stakeholders to raise their environmental concerns, suggest solutions and identify priorities or issues;
- To protect the environmental rights of the local community; and
- To optimise on local and indigenous knowledge of the area.

### 13.3 Notification of the Interested and Affected Parties (I&APs)

Section 41 of Chapter 6 of the EIA regulations have listed the different options, to be used when notifying the I&APs. The PP process for this project was conducted, as detailed in Table 5 and indicated by the green blocks.

**Table 6: Public Participation Processes**

| ***All the Interested and Affected parties were notified of the application by-*** | | |
|---|---|---|
| Fixing a notice board at the place conspicuous to and accessible by the public at the boundary, on the fence, or along the corridor of any alternative sites. | **YES** | ~~**NO**~~ |
| Any alternative site also mentioned in the application | ~~**YES**~~ | **NO** |
| *Has a written notice been given to-* | | |
| Landowner or person in control if the applicant is not in control of the land | **YES** | ~~**NO**~~ |
| The municipal councillor of the Ward in which the site and alternative site of the proposed activity. | **YES** | ~~**NO**~~ |
| The municipality which has jurisdiction in the area and other organs of state | **YES** | ~~**NO**~~ |
| *Placing an advertisement in-* | | |
| Local newspaper (isiZulu News Papers) | **YES** | ~~**NO**~~ |
| Any official Gazette that is published specifically for providing public notice of applications | ~~**YES**~~ | **NO** |
| One provincial newspaper, any official Gazette that is published with the purpose of providing public notice of applications. | ~~**YES**~~ | **NO** |

### 13.4 Comments from the registered Interested and Affected Parties (I&APs).

Section 43 of Chapter 6 of NEMA (EIA Regulations 2017) indicates that all I&APs are entitled to comment in writing on all reports produced by the applicant during the EIA process. This will bring the concerns raised to the attention of the applicant.

The I&APs were provided with the opportunity to raise their concerns and comments regarding the proposed development project. Firstly, a Background Information Document (BID) was sent to all relevant I&APs. The onsite notices in isiZulu were posted onsite on 28th October 2020. Notices were displayed in strategic positions in the project area in order to enhance accessibility from the public. Following, the posting of onsite notices, the newspaper advert in isiZulu was published by Ilanga News Paper (*10-12 December 2020 edition*). The public

participation meeting (community meeting) was held at Kwa-Jazi Area on the 15th February 2021. Currently the PP process is at the stage of the circulation of the Draft Basic Assessment Report, of which all I&APs had 30 days to comment or provide their inputs.

All comments and concerns raised are to be recorded on the I&APs Commenting Report, and to be attached in Appendix E.

## 14 IMPACT ASSESSMENT AND MITIGATION MEASURES

The Environmental Impact Assessment (EIA) conducted for the construction phase and the operational phase for the site, are discussed in (***section 15.1***) below.

Each impact identified is assessed in terms of probability (likelihood of occurring), scale (spatial scale), magnitude (severity) and duration (temporal scale). To effectively implement the adopted scientific approach in determining the significance of the environmental impact, a numerical value was linked to each rating scale.

The following criteria will be applied to the impact assessment for the proposed development:

**Occurrence**

- Probability - the probability of the impact describes the likelihood of the impact actually occurring.
- Impact duration - the duration of the impact describes the period of time during which an environmental system or component is changed by the impact.

**Severity**

- Magnitude – refers to the 'degree of disturbance' to biophysical systems and components which expresses the change in the health, functioning and/or role of the system or component as a result of an activity.
- Scale/extent - the extent of the impact generally expresses the spatial influence of the effects produced by a disturbance to an environmental system or component.

The following ranking scales were used:

| *Probability = P* | *Duration = D* |
|---|---|
| 5 – Definite (More than 80 % chance of occurrence) | 5 – Permanent - The only class of impact that will be non-transitory (indefinite) |
| 4 – Probable (Between 60-80% chance of occurrence) | 4 - Long-term - The impact and its effects will continue or last for the entire operational life of the development (15 - 50years) |
| 3 – Possible (Between 40-60% chance of occurrence) | 3 - Medium-term - The impact and its effects will continue or last for some time after the construction phase (5 - 15 years) |
| 2 – Fairly Unlikely (Between 20-40% chance of occurrence | 2 – Medium-short - The impact and its effects will continue or last for the period of a relatively long construction period and/or limited recovery time after this construction period (2 - 5 years) |
| 1 – Unlikely (Less than 20% chance of occurrence) | 1 – Short Term - Likely to disappear with mitigation measures or through natural processes which span shorter than the construction phase (0-2 years) |
| *Scale = S* | *Magnitude = M* |
| 5 – International (beyond 200km) | 5 - High |
| 4 – Regional (50-200km radius) | 4– Medium High |
| 3 – Local (2-50km radius) | 3 – Medium |
| 2 – Surrounding area (within 2km) | 2 – Medium Low |
| 1 – Site (within100m) | 1 – Low |
| *Status of Impact* | |
| *+ Positive / -Negative or 0-Neutral* | |

The overall impact significance score/points (SP) for each identified impact is calculated by multiplying magnitude, duration, and scale by the probability of all this happening.

The range of possible significance scores is classified into seven rating classes (***refer to section 15.1***).

**SP = (Magnitude +Duration +Scale) x Probability**

The impacts status can either be positive, negative or neutral as depicted in table below.

| Significance | Environmental Significance Points | Colour Code |
|---|---|---|
| **Negligible** | 0-10 | N |
| **Very low** | 11-20 | VL |
| **Low** | 21-30 | L |
| **Medium** | 31-40 | M |
| **Medium-High** | 41-50 | MH |
| **High** | 51-60 | H |
| **Very high** | 61-75 | VH |

## 14.1 Impact Analysis (Preferred Design Alternative)

| Potential impact | Impact Significance without Mitigation | Proposed Mitigation Measures | Impact Significance with mitigation |
|---|---|---|---|
| **Project Planning** | | | |
| **Unnecessary damage and disturbance to natural vegetation due to poor planning:**<br><br>Erosion due to poor planning and design such as, clearing of vegetation, topsoil removal, degradation of indigenous vegetation and sensitive plant communities and associated habitats due to excavation for upgrade of weir (extension of weir walls) as a result of poor construction planning for clearance along the weir project footprint (i.e. inappropriate utilization of sensitive systems). In addition, current the condition of the project site has been eroded by stream high flow condition, hence the upgrade is required. | **High**<br>**(60)**<br><br>**SP= (M + D + S) × P**<br>**SP= (5 + 5 + 2 × 5**<br><br>**SP =60** | ➢ Since the construction is for upgrading of existing weir, the vegetation clearance will be minimal to the river banks within the project site, and only clearing areas along the weir expansion as demarcated and approved by project plans.<br>➢ Erosion be mitigated by proper implementation of storm-water management plan.<br>➢ An ECO must be appointed to oversee construction activities.<br>➢ A plan to actively rehabilitate the construction area post-construction needs to be developed. | **Negligible**<br>**(10)**<br><br>**SP= (M + D + S) × P**<br>**SP= (2 + 2 + 1) × 2**<br>**SP =10** |
| **Loss of plant Species of Conservation Concern (SCC):**<br>Poor planning and construction may result in the permanent loss of various plant species of conservation concern (SCC). No CBAs within project proximity. However, ***CBA: Optimal*** areas were located within 500m west and south of the | **High**<br>**(55)**<br><br>**SP= (M + D + S) × P**<br>**SP= (5 + 3 + 3) × 5**<br>**SP =55** | ➢ Minimize vegetation clearance by only clearing areas as demarcated and approved by project plans.<br>➢ Site camp must be established at already disturbed site.<br>➢ An ECO must be appointed to oversee construction activities. | **Negligible**<br>**(10)**<br><br>**SP= (M + D + S) × P**<br>**SP= (1 + 1 + 3) × 2**<br>**SP =10** |

| Potential impact | Impact Significance without Mitigation | Proposed Mitigation Measures | Impact Significance with mitigation |
|---|---|---|---|
| **Project Planning** | | | |
| proposed weir upgrade. Also, the plant SCC predicted to occur on Midland Mistbelt Grassland (Gs 9) were not encountered during the field study at the project site. | | | |
| **Degradation of freshwater habitat as a result of poor planning.**<br>Poor design and / or implementation of the planned infrastructure associated with the weir upgrade likely to result in degradation of watercourse habitat include (i) undertaking bulk earthworks along the banks(ii) placing infrastructure within watercourses, and (iii) dewatering of the construction area. These activities will lead to removal of instream and riparian vegetation, flow regime alteration as well as the alteration of the natural topography of the watercourse. | **Very High (65)**<br>**SP= (M + D + S) × P**<br>**SP= (5 + 4 + 4) × 5**<br>**SP = 65** | ➢ All work to be done within sensitive riparian and instream habitats should be carried out at low flow season (winter to early spring).<br>➢ Detailed method statement for working within the watercourse must be compiled by the contractor prior to the commencement of the project.<br>➢ Conceptual riverine rehabilitation and monitoring plan with a focus on erosion and alien vegetation management, be compiled.<br>➢ An ECO must be appointed to oversee construction activities. | **Low (21)**<br>**SP= (M + D + S) × P**<br>**SP= (3 + 2 + 2) × 3**<br>**SP = 21** |

| Potential impact | Impact Significance without Mitigation | Proposed Mitigation Measures | Impact Significance with mitigation |
|---|---|---|---|
| **Construction Phase** | | | |
| **Loss of indigenous vegetation during construction:**<br>The development is an upgrade of existing weir, will result in minimal obliteration of vegetation on site for the purpose of construction except where necessary within expansion of weir within the river banks. Also, through uncontrolled construction activities beyond the required footprint of the project area. | **Medium**<br>**(33)**<br>**SP= (M + D + S) × P**<br>**SP= (5 + 3 + 3) × 3**<br>**SP =33** | ➢ Vegetation clearance must be minimal only to areas as demarcated and approved by project plans.<br>➢ Only the approved existing access road must be used, and vehicles must not traverse virgin land.<br>➢ The project boundary must be demarcated and vegetation clearing as well as topsoil removal must be limited to site only. | **Negligible**<br>**(10)**<br>**SP= (M + D + S) × P**<br>**SP= (2 + 1 + 1) × 2**<br>**SP =8** |
| **Loss of plant species of conservational concern:**<br>No plant SCC were located onsite. It is likely that there will be plant species of conservational concern that were not encountered for during the field survey, and might be found during the construction phase. Also, the CBA: ***Optimal areas*** were located within 500m west and south of the proposed weir upgrade. However, there were no CBAs within proximity of the project site. | **Medium-High**<br>**(44)**<br>**SP= (M + D + S) × P**<br>**SP= (5 + 4 + 2) × 4**<br>**SP = 44** | ➢ The project site must be surveyed prior to construction for identification of plant SCC.<br>➢ Establish buffer to section with plant SCC and declare it a no-go area.<br>➢ All plant species of conservation concern must not be removed, or disturbed.<br>➢ If needed, approval must be obtained from the ECO, before any disturbance or removal of plant species identified as of conservational concern. | **Negligible**<br>**(8)**<br>**SP= (M + D + S) × P**<br>**SP= (2 + 1 + 1) × 2**<br>**SP = 8** |

| Potential impact | Impact Significance without Mitigation | Proposed Mitigation Measures | Impact Significance with mitigation |
|---|---|---|---|
| **Construction Phase** | | | |
| **Degradation of freshwater (aquatic) habitat as a result of construction activities.**<br>Construction activities within a watercourse are likely to result in degradation of watercourse habitat include (i) undertaking bulk earthworks associated with implementing the weir upgrade, (ii) placing infrastructure within watercourses, and (iii) dewatering of the construction area. Also, during construction activities it is highly likely that upstream flows will have to be diverted around the working area through the utilisation of coffer dams. Moreover, poor construction processes could lead to stream siltation and further sedimentation of existing weir.<br>Moreover, the aquatic species (fish species) are likely to be affected by the construction activities as a result of weir upgrade. | **Very High (65)**<br>**SP= (M + D + S) × P**<br>**SP= (5 + 4 + 4) × 5**<br>**SP = 65** | ➢ All work to be done within sensitive riparian and instream habitats should be carried out during a low flow season(winter to early spring).<br>➢ The use of heavy machinery (excavator) within the watercourse should be avoided as far as practically possible. The excavator be only position as far as possible within a river banks.<br>➢ All clearance and excavation along the weir expansion must be limited to areas as demarcated and approved by project plans.<br>➢ In the case that coffer dams are used to divert flow for construction purposes, these structures should be temporary in nature and be removed from the river immediately after the required construction has been completed.<br>➢ No construction of an artificial channel outside of the watercourse habitats for water diversion purposes will be permitted. Therefore, the dewatering process from the coffer dams should involve piping the water | **Low (21)**<br>**SP= (M + D + S) × P**<br>**SP= (3 + 2 + 2) × 3**<br>**SP = 21** |

| Potential impact | Impact Significance without Mitigation | Proposed Mitigation Measures | Impact Significance with mitigation |
|---|---|---|---|
| **Construction Phase** | | | |
| | | directly to the active channel downstream of the site as, or if, required<br>➢ Sediment barriers must be installed in areas sensitive to erosion to prevent stream siltation.<br>➢ Disturbed watercourse habitat must be rehabilitated as soon as construction in an area is complete or near complete and not left until the end of the project to be rehabilitated. | |
| **Disturbance of terrestrial species habitat as a result of construction activities**<br>The construction activities may result in the loss of habitat and permanent loss of unidentified animal SCC. Also, this might encourage migration of species. Furthermore, the animals with limited mobility are often the first to be affected by habitat fragmentation due to the effects on population viability. Reptiles and small mammals may be separated into distinct populations. However, the construction will only be minimal to riverbanks within a project site. | **Medium (33)**<br>**SP= (M + D + S) × P**<br>**SP= (5 + 3 + 3) × 3**<br>**SP =33** | ➢ The project area must be surveyed for potential animal SCC prior to construction in order to locate, capture and relocate any animal SCC.<br>➢ All construction activities must take place within an area demarcated for the development.<br>➢ An ECO must be appointed to oversee construction activities. | **Negligible (8)**<br>**SP= (M + D + S) × P**<br>**SP= (2 + 1 + 1) × 2**<br>**SP =8** |

| Potential impact | Impact Significance without Mitigation | Proposed Mitigation Measures | Impact Significance with mitigation |
|---|---|---|---|
| **Construction Phase** | | | |
| **Disturbance to surrounding wildlife and fauna:** During the construction, vehicle movements, noise and habitat destruction will disturb animals in the area. As a result, the proposed construction activities are likely to result in the migration of species which are endemic to the project area or a loss of animal species currently found on site. | **Medium (40)**<br>**SP= (M + D + S) × P**<br>**SP= (4 + 3 + 3) × 4**<br>**SP = 40** | ➢ Construction activities must be limited to the designated development footprint.<br>➢ During site preparation, special care must be taken during the clearing of the works area in order to minimize damage or disturbance of roosting and nesting sites.<br>➢ No faunal species are to be disturbed, trapped, hunted or killed during the construction phase.<br>➢ All construction and maintenance vehicles must stick to properly demarcated and prepared roads. Driving on virgin land is strictly prohibited.<br>➢ No fires should be allowed at the site.<br>➢ No dogs or other pets should be allowed at the site | **Very Low (14)**<br>**SP= (M + D + S) × P**<br>**SP= (2 + 3 + 2) × 2**<br>**SP = 14** |
| **Soil erosion due to loss of vegetation cover:** Erosion and degradation of habitats is likely to occur due to poor construction process during clearing of vegetation, topsoil removal and excavation works at river banks at a weir site. Therefore, excavation at riverbanks is considered highly sensitive as it may | **High (60)**<br>**SP= (M + D + S) × P**<br>**SP= (5 + 5 + 2 × 5**<br>**SP =60** | ➢ Vegetation clearance should be kept as minimal as possible to areas as demarcated by the project plans and to make use of natural erosion suppressors such as good grassland cover. Do not wait for construction to finish in order to start rehabilitation. | **Very Low (12)**<br>**SP= (M + D + S) × P**<br>**SP= (2 + 1 + 1) × 3**<br>**SP = 12** |

| Potential impact | Impact Significance without Mitigation | Proposed Mitigation Measures | Impact Significance with mitigation |
|---|---|---|---|
| **Construction Phase** | | | |
| result in stream sedimentation. Furthermore, the disturbed soils are prone to surface run-off. | | ➢ No work within sensitive riparian should be carried out during wet period or peak flow season. | |
| **Encroachment of Alien Invasive Species:**<br>The project site is within the watercourse and the riparian has grassland with alien thicket vegetation, namely, *mearnsii sp*., *dealbata sp*. and *Lantana camara sp*., also the weed species of Conyza. Therefore, the vegetation clearance within a riparian would likely cause percolation of alien and weed plant species. | **Medium**<br>**(40)**<br>**SP= (M + D + S) × P**<br>**SP= (4 + 4 + 2) × 4**<br>**SP = 40** | ➢ Prevent large scale clearance, and only clear the areas as demarcated by approved project plans.<br>➢ The control and eradication of a listed invasive species must be carried out during and post construction within the project site.<br>➢ All sites disturbed by construction activities should be monitored for colonization by exotics or invasive plants and be regular removed. | **Negligible**<br>**(8)**<br>**SP= (M + D + S) × P**<br>**SP= (2 + 1 + 1) × 2**<br>**SP = 8** |
| **Potential loss of wetland habitat:**<br>Any construction works within a wetland and aquatic environment is considered highly sensitive.<br>In this case, the project involves upgrading of the weir. Therefore, the anticipated project footprint remains within Mhlathuze River which is NFEPA River. However, there were no NFEPA wetlands identified within the weir proximity, the NFEPA | **Low**<br>**(22)**<br>**SP= (M + D + S) × P**<br>**SP= (5 + 3 + 3) × 2**<br>**SP = 22** | ➢ The project site servitude must be clearly demarcated to avoid unnecessary disturbances to adjacent areas.<br>➢ At the river banks the excavation must be minimal, only done to areas demarcated for the expansion the weir<br>➢ Disturbed watercourse habitat must be rehabilitated as soon as construction in an area is complete or near complete and not | **Negligible**<br>**(10)**<br>**SP= (M + D + S) × P**<br>**SP= (3 + 1 + 1) × 2**<br>**SP = 10** |

| Potential impact | Impact Significance without Mitigation | Proposed Mitigation Measures | Impact Significance with mitigation |
|---|---|---|---|
| **Construction Phase** | | | |
| wetland is located further upstream north (more than 500m away). | | left until the end of the project to be rehabilitated. | |
| **Alteration of flow regimes and fluvial systems:** The excavation of trenches on the banks at weir proximity for construction of 5m length on the left bank and 19m length on the right bank, for the proposed upgrades will likely results in alteration of flow regime as water may be diverted as a result of excavations. | **High (60)** **SP= (M + D + S) × P** **SP= (5 + 5 + 2) × 5** **SP = 60** | ➢ Best use of engineering designs to prevent alteration of flow regime within the weir site.<br>➢ To only use temporary cofferdams to divert flow for construction purposes.<br>➢ Stormwater management measures should be implemented in order to minimise diverted flows as the result of rains and prevent the siltation and sedimentation of nearby watercourse also minimise the impacts of the disturbed areas. | **Negligible (10)** **SP= (M + D + S) × P** **SP= (3 + 1 + 1) × 2** **SP = 10** |
| **Deterioration in water quality as a result of construction activity:** Potential for increased sediments to enter the system through surface water dispersion causing siltation and other water pollution. Water pollution as a result of dispersing of water from dewatering process from the coffer dams. Water pollution as a result of hydrocarbon spills from construction machinery during excavation for weir extension walls. Also, water pollution during weir upgrade. | **Very High (65)** **SP= (M + D + S) × P** **SP= (5 + 5+ 3) × 5** **SP = 60** | ➢ Excavation at riparian should not be undertaken during wet (rainy) periods or peak flow period.<br>➢ The dewatering process from the coffer dams should involve piping the water directly to the active channel downstream of the site as, or if, required.<br>➢ Place topsoil at disturbed area along the riverbanks at a weir proximity and revegetated immediately, to prevent run-off and siltation. | **Very Low (12)** **SP= (M + D + S) × P** **SP= (3+ 1 + 2) × 2** **SP = 12** |

| Potential impact | Impact Significance without Mitigation | Proposed Mitigation Measures | Impact Significance with mitigation |
|---|---|---|---|
| **Construction Phase** | | | |
| | | ➢ No construction machinery must be operated direct into the water. The use construction machinery must be limited only to riverbanks, only if necessary.<br>➢ The use of cofferdams to prevent concrete spills into watercourse.<br>➢ Stockpiles must not be more than 2m in height, and stored 32m away from the watercourse.<br>➢ Machinery must be parked 32m away from the watercourse and only parked on the designated bunded areas and dip trays must be placed under the machinery, when not used to capture any possible hazardous substance leaks. | |
| **Ground water contamination as a result of:**<br>There is a potential for leaks of hazardous substances from equipment on site. Such hazardous substances have the potential to enter the soil and wetland systems during construction and the operational phases of the project. | **High**<br>**(52)**<br>**SP= (M + D + S) × P**<br>**SP= (5 + 4 + 4) × 4**<br>**SP = 52** | ➢ Suitable storage facilities for handling and storage of oils, paints, grease, fuels, chemicals, and any hazardous materials to be used, must be provided to prevent the migration of spillage into the ground and possible ingress into the groundwater regime. | **Negligible**<br>**(8)**<br>**SP= (M + D + S) × P**<br>**SP= (4+ 2+ 2) × 1**<br>**SP = 8** |

| Potential impact | Impact Significance without Mitigation | Proposed Mitigation Measures | Impact Significance with mitigation |
|---|---|---|---|
| **Construction Phase** | | | |
| | | ➢ Machinery must be parked on the designated bunded areas and dip trays must be placed under the machinery, when not used to capture any possible oil leaks.<br>➢ Portable clean-up kits must be available on site to undertake immediate clean-up, should a spill occur. | |
| **Soil erosion and geological degradation within the riparian at weir site:**<br>The *in-situ* material erodibility is considered to be moderate at the Nkandla Weir site. Also, owing to the inclined riverine forming a gorge within a weir site the excavation works will likely exacerbate erosion and geological degradation. Therefore, excavation at riverbanks is considered highly sensitive as it is prone to erosion due to run-off and sedimentation from wet period. Also the exposed riverbanks are prone to erosion during peak flow events. | **High**<br>**(55)**<br>**SP= (M + D + S) × P**<br>**SP= (5 + 5 + 1) × 5**<br>**SP = 55** | ➢ Excavation for weir extension should be only be carried at the riparian and be limited to development area as approved by project plans. Also be carried out in a manner to promote stable development of the site. It is recommended that excavation be carried out along the guidelines given in SANS 1200 (current version).<br>➢ Excavation at riparian should not be undertaken during wet (rainy) periods or peak flow period.<br>➢ Construct storm water system and make provision for erosion protection.<br>➢ Excavations must not be left open for a long duration and must not be undertaken until | **Very Low**<br>**(5)**<br>**SP= (M + D + S) × P**<br>**SP= (3 + 1 + 1) × 1**<br>**SP = 5** |

| Potential impact | Impact Significance without Mitigation | Proposed Mitigation Measures | Impact Significance with mitigation |
|---|---|---|---|
| **Construction Phase** | | | |
| | | such time that all required materials are available on-site.<br>➢ Density control of placed fill material should be undertaken at regular intervals during fill construction.<br>➢ After every rainfall event, the contractor must check the site for erosion damage and immediately repair any damage recorded.<br>➢ Sediment barriers (gabions) must be installed in areas sensitive to erosion such as near water supply points, slopes, and actively eroding river banks. | |
| **Disturbance of Burial Grounds and Graves:**<br>The proposed weir upgrade will use existing access road. Therefore, the are no chances that the grave be encountered within the river banks and access. It must be noted that the project is within a rural settlement, and the study area has no communal burial site. However, there are no evidence of isolated graves within the project including along the road reserve of an access road. | **Very Low (12)**<br>**SP= (M + D + S) × P**<br>**SP= (5 + 5 + 2) × 1**<br>**SP = 12** | ➢ Excavation for weir extension should be only be carried at the riparian and be limited to development area as approved by project plans.<br>➢ Construction vehicles must only use the approved access roads. All construction machinery must be parked at designated areas.<br>➢ Monitoring must take place during site clearance for possible infant and still-born burials and implement the Chance Finds | **Negligible (5)**<br>**SP= (M + D + S) × P**<br>**SP= (3 + 1 + 1)× 1**<br>**SP =5** |

| Potential impact | Impact Significance without Mitigation | Proposed Mitigation Measures | Impact Significance with mitigation |
|---|---|---|---|
| **Construction Phase** | | | |
| | | Procedure (CFP) if any such finds are uncovered.<br>➢ If any human remains, graves, archaeological and historical residues are discovered, the KwaZulu-Natal Amafa and Research Institute Act (5/2018) and the National Heritage Resources Act, No 25 of 1999. requires that operations should cease immediately pending an evaluation by the relevant heritage authorities. | |
| **Loss of archaeological and paleontological resources:**<br>During the construction phase, activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects. Furthermore, the excavations at the river banks as results of extension of weir walls could uncover the following: stone foundations; ash middens associated with the farmsteads and homesteads that can contain bone, | **Low (24)**<br>**SP= (M + D + S) × P**<br>**SP= (5 + 5 + 2) × 2**<br>**SP = 24** | ➢ Excavation for weir extension should be only be carried at the riparian and be limited to development area as approved by project plans<br>➢ Measures must be taken to avoid any geological structure from being eroded and collapsing, and in the process causing loss of archaeological and paleontological resources.<br>➢ Regular Archaeological Watching Briefs should be carried out during construction in case any chance findings are made. | **Negligible (5)**<br>**SP= (M + D + S) × P**<br>**SP= (3 + 1 + 1) × 1**<br>**SP = 5** |

| Potential impact | Impact Significance without Mitigation | Proposed Mitigation Measures | Impact Significance with mitigation |
|---|---|---|---|
| **Construction Phase** | | | |
| glass and clay ceramics; ash; metal objects such as spoons, knives, tools and other artefacts.<br>However, there are no archaeological sites within the project site. | | ➢ Should any artefact or heritage resource be encountered, the contractor is advised to stop the operation immediately, inform the ECO who must refer the matter to KwaZulu-Natal Amafa and Research Institute attention. | |
| **Destruction of heritage resources:**<br>The excavation works, particularly in within the river banks are most likely to cause disturbance or destruction of non-renewable heritage resources. However, the surrounding area is a sparsely rural settlement with cultivated and ranch lands, with no evidence of heritage resources within the locality of the project site. | **Low (22)**<br>**SP= (M + D + S) × P**<br>**SP= (5 + 4 + 2) × 2**<br>**SP = 22** | ➢ Excavation for weir extension should be only be carried at the riparian and be limited to development area as approved by project plans.<br>➢ A CFP should be implemented where possible heritage finds are uncovered/ discovered.<br>➢ Should any artefact or heritage resource be encountered, the contractor is advised to stop the operation immediately, report to the ECO who must refer the matter to KwaZulu-Natal Amafa and Research Institute for attention. Therefore, a heritage practitioner / archaeologist must be engaged in the event that any possible heritage resources or artefacts are identified. | **Negligible (5)**<br>**SP= (M + D + S) × P**<br>**SP= (3 + 1 + 1)× 1**<br>**SP =5** |
| **Air pollution, dust and emissions:**<br>Dust could be generated during construction as a result of earthworks and stockpiles for the weir | **Medium (36)** | ➢ Apply dust suppression to exposed soil and stockpiles. All transported and stored fine | **Negligible (7)** |

| Potential impact | Impact Significance without Mitigation | Proposed Mitigation Measures | Impact Significance with mitigation |
|---|---|---|---|
| **Construction Phase** | | | |
| upgrading construction. The major dust sources could emanate from the movement of vehicles on access road transporting material and equipment to the working areas. Furthermore, transportation and storage of fine sand, spoils and cement could result in dust. Emissions from construction vehicles, especially those poorly maintained will result in air pollution. | **SP= (M + D + S) × P**<br>**SP= (5 + 1 + 3) × 4**<br>**SP = 36** | product must be covered to prevent spills and been blown by wind.<br>➢ Excavated material is to be stockpiled along the trench within the working servitude for later backfilling, of not more than 1.5m in height.<br>➢ Limit on-site vehicle speed to 40 km/h or lower due to driving conditions.<br>➢ All fine products must be covered during transportation.<br>➢ Minimise gas emission through regular servicing of construction vehicles to meet minimum emission requirements. | **SP= (M + D + S) × P**<br>**SP= (3 + 1 + 3) × 1**<br>**SP =7** |
| **Aesthetic / visual Impact:**<br>The viewshed area and zone of visual influence for the proposed weir upgrade is considered ***"low visibility"*** as it can be visible from a small area around the project site (<1km radius). As this project is an upgrade on an existing weir. Therefore, this proposed upgrade will be streamlined with the existing local environment.<br>However, during the construction phase, residents who live in close proximity to or overlook the proposed project site will experience a change in | **Very Low**<br>**(12)**<br><br>**SP= (M + D + S) × P**<br>**SP= (3 + 1 + 2) × 2**<br>**SP = 12** | ➢ Concentrate the construction activity and temporary infrastructure in a designated place. In this regard the site camp, must be constructed close enough to the construction area to avoid high visibility of construction activities.<br>➢ The contractor should maintain good housekeeping on-site to minimise waste generation and avoid litter.<br>➢ Dust suppression is important to reduce the visibility of the development. | **Negligible**<br>**(4)**<br><br>**SP= (M + D + S) × P**<br>**SP= (1+ 1 + 2) × 1**<br>**SP = 4** |

| Potential impact | Impact Significance without Mitigation | Proposed Mitigation Measures | Impact Significance with mitigation |
|---|---|---|---|
| **Construction Phase** | | | |
| their existing views as residents will have a view of the construction site characterized by exposed earth and machinery. | | ➢ Excavated material is to be stockpiled along the trench within the working servitude for later backfilling, of not more than 2m in height.<br>➢ Avoid the use of floodlight at site camp. Also, the light must not face the neighboring homesteads and oncoming traffic on the rural access roads. | |
| **Noise pollution:**<br>The main sources of noise associated with the proposed construction activities include the following: construction activities and equipment delivery. Construction activities are likely to be confined to daytime and the noise levels will only affect the adjacent areas for a relatively short period of time. | **Medium**<br>**(40)**<br>**SP= (M + D + S) × P**<br>**SP= (5 + 1 + 2) × 5**<br>**SP = 40** | ➢ In recognition of the inherently noisy and temporary nature of construction activities, specify standard construction hours during which the usual fixed noise limits do not apply.<br>➢ Ensure that operating hours as determined by the EA are adhered to. Where not defined, development must be limited to daylight hours.<br>➢ All vehicles must be maintained in accordance with manufacturer's specifications to avoid excessive noise. | **Very Low**<br>**(15)**<br>**SP= (M + D + S) × P**<br>**SP= (2+ 1 + 2) × 3**<br>**SP = 15** |
| **Traffic impact:**<br>During construction for the weir upgrade, it is likely that the traffic could be disturbed, as a results of trucks transporting materials turning from the main road to access road to site, vice versa. | **Medium**<br>**(40)**<br>**SP= (M + D + S) × P**<br>**SP= (5 + 1 + 2) × 5** | ➢ Appropriate temporary signage, traffic control signals, delineators, message boards, must be used for traffic accommodation in the work zone, truck turning points and shall be visible by motorists and pedestrians. | **Negligible**<br>**(10)**<br>**SP= (M + D + S) × P**<br>**SP= (2 + 1 + 2) × 2** |

| Potential impact | Impact Significance without Mitigation | Proposed Mitigation Measures | Impact Significance with mitigation |
|---|---|---|---|
| **Construction Phase** | | | |
| In addition, there will also be an increase in construction vehicles in and around the proposed site. However, it will be of temporary duration as it will only last for the construction duration of the project.<br>Local community members (especially children) and stock animals (cattle, goats), could be exposed to vehicle risks during construction activities and the movement of vehicles and equipment into and out of the project sites | **SP = 40** | ➢ Establish speed limits at an approach to construction vehicle turning point where the road conditions dictate, vehicles must be driven slower and with an awareness of potential risks.<br>➢ Limit on-site vehicle speed to 40 km/h or lower due to driving conditions. | **SP =14** |
| **Waste emanating from construction activities:**<br>As in other such operations, the general, health care and hazardous wastes are more likely inherited from construction activities. | **Medium-High (50)**<br>**SP= (M + D + S) × P**<br>**SP= (5 + 2 + 3) × 5**<br>**SP = 50** | ➢ Educate of workers on pollution prevention practices. Training programmes must provide information on material handling and spill prevention and response.<br>➢ Have sufficient and separate bins for general, medical and hazardous waste disposal by implementing the Integrated Waste Management approach: segregation of waste into separate bins and clearly marked for each waste type.<br>➢ Refuse must be removed regularly to licensed landfill sites. | **Negligible (8)**<br>**SP= (M + D + S) × P**<br>**SP= (2 + 1 + 1) × 2**<br>**SP = 8** |

| Potential impact | Impact Significance without Mitigation | Proposed Mitigation Measures | Impact Significance with mitigation |
|---|---|---|---|
| **Construction Phase** | | | |
| | | ➢ Hazardous waste must be stored in a secured waste receptacle and disposed of at a registered waste disposal site.<br>➢ Adequate sanitary facilities and ablutions on the project site must be provided for all personnel throughout the project area.<br>➢ All waste manifest and disposal certificates must be kept on record | |

| Potential Impacts | Impact Significance without Mitigation | Proposed Mitigation Measures | Impact Significance with mitigation |
|---|---|---|---|
| **Operation Phase** | | | |
| **Soil erosion and geological degradation:**<br>Continuation in withering of gneiss rock in cut-face at sloping areas , in the process resulting in run-off and erosion.<br>Also, the degradation of geological and structures for low-level culvert, causing slits along the causeway edges, in event of high precipitation and peak flow period. | **Medium-High (50)**<br>**SP= (M + D + S) × P**<br>**SP= (5 + 3 + 2) × 5**<br>**SP = 50** | ➢ Construct storm water system and make provision for erosion protection<br>➢ Installation of gabion baskets and mattresses, energy dissipaters and grass lined drains<br>➢ Stormwater management through regular inspection for evidence of sediment and debris build-up during wet season. | **Negligible (10)**<br>**SP= (M + D + S) × P**<br>**SP= (5 + 3 + 2) × 1**<br>**SP =10** |

| | | | |
|---|---|---|---|
| **Impact on flow regime of the Mhlathuze River within proximity of Nkandla Weir as a result of weir extension:**<br>Given that the upgrades to the weir primarily involve the extension of weir's width by addition of 5m length on the left bank and 19m length on the right bank, proposed upgrades will likely also result in changes to the backwater effect of the weir presence across the river. | **Medium-High**<br>**(50)**<br><br>**SP= (M + D + S) × P**<br>**SP= (5 + 3 + 2) × 5**<br>**SP = 50** | ➢ Engineering design to mitigate extremely events from inundation upstream of the weir.<br>➢ The ***design alternative*** that was opted for this project caters for such events, hence the hydraulic model confirmed the slight changes on existing river condition at the weir locality with regard to extremely event of 1:50 years and 1:00 years flood events. Therefore, for 1:50 years flood events are expected to change from existing 871.10 to 871.71m (0.61m difference), while for 1:100 years flood events will only change from existing 871.33 to 872.01m (0.68m difference). | **Negligible**<br>**(10)**<br><br>**SP= (M + D + S) × P**<br>**SP= (5 + 2 + 3) × 1**<br>**SP = 10** |
| **Overall Mean significance:**<br>Nature of a project without mitigation | **Medium-High**<br>**(50)** | Nature of a project post mitigation | **Very Low**<br>**(13)** |

## 15 CUMULATIVE IMPACT ASSESSMENT AND MITIGATION MEASURES

In terms of the EIA Regulations, the cumulative impact is considered from the holistic point of view. It means that the impacts of an activity are considered from the past, present and foreseeable future, together with the impact of activities associated with that activity. The activity itself may not be significant, but when combined with the existing and reasonably foreseeable impacts eventuating from similar or diverse activities may result in a significant change. “Cumulative impacts can be: additive, synergistic, time crowding, neutralizing and space crowding” (DEAT, 2004b;14).

**Table 7: Cumulative Impacts**

| Impact | Description | Mitigation |
|---|---|---|
| **Deterioration of water quality in nearby water courses** | Potential for increased sediments to enter the system through surface water dispersion causing siltation and other water pollution, as a result of excavation at riparian and areas. The potential for hydrocarbon spills from construction machinery during excavation at the stream crossing, during construction phase. | All clearance and excavation along the weir expansion must be limited to areas as demarcated and approved by project plans.<br><br>Excavation at riparian should not be undertaken during wet (rainy) periods or peak flow period.<br><br>Vegetation at riparian should remain intact where possible, to limit high surface flows and mobilisation of sediments.<br>Excavation at riverbank must not to be done during wet period or peak flow period.<br><br>An ECO must oversee the implementation of the EMPr during the construction phase of the project, with riparian, and streams areas as a priority.<br>Also, the monitoring plan should be developed in order to quantify the impact on the watercourses. |

| | | |
|---|---|---|
| **Soil erosion and geological degradation** | The project site is largely affected by the erosion on both banks, which subsequently eroded both flanks of the weir. Therefore, excavation at the river banks within the site locality for the purpose of weir extension might further exacerbate erosion. | Construct storm water system and make provision for erosion protection.<br><br>Vegetation clearance should be kept as minimal as possible to areas as demarcated by the project plans and to make use of natural erosion suppressors such as good grassland cover.<br><br>No work within sensitive riparian should be carried out during wet period or peak flow season.<br><br>Excavation for weir extension should be only be carried at the riparian and be limited to development area as approved by project plans. Also be carried out in a manner to promote stable development of the site. It is recommended that excavation be carried out along the guidelines given in SANS 1200 (current version). |

## 16 RECOMMENDATIONS BY SPECIALISTS

There were five specialist studies undertaken for this Environmental Assessment, namely:

- Aquatic Ecological Impact Assessment;
- Hydrological Impact Assessment; and
- Heritage Impact Assessment

### 16.1 Recommendations by an Aquatic Ecological Specialist

The Aquatic Ecological Impact Assessment was conducted by Afzelia Environmental Consultants (Pty) Ltd. and the following recommendations were made:

### 16.1.1 Working within watercourses

The SQR, within which the site is located, has been identified as a River FEPA in terms of the NFEPA coverage. River FEPAs are sub-quaternary catchments with good condition rivers (A or B Ecological Category) that achieve biodiversity targets for ecosystems and threatened or near-threatened fish species. A field investigation has determined that the study area comprised watercourse units, however, these watercourses have not been identified as Wetland FEPA's on the national coverage.

a) All work to be done within sensitive riparian and instream habitats should be carried out at a time of low flow conditions (winter to early spring). It is prudent however to be prepared for increased flows by scheduling work according to the weather forecast and to be adequately prepared for unexpectedly large runoff from a sudden storm.

b) The use of heavy equipment and other vehicles within the watercourse should be avoided as far as practically possible.

c) Disturbed watercourse habitat must be rehabilitated as soon as construction in an area is complete or near complete and not left until the end of the project to be rehabilitated.

d) A detailed method statement for working within the watercourse must be compiled by the contractor prior to the commencement of the project. The method statement must be in line with mitigation measures proposed in this report.

e) A conceptual riverine rehabilitation and monitoring plan with a focus on erosion and alien vegetation management, should be compiled in order to manage the rehabilitation of the affected watercourse after the implementation of proposed upgrades.

f) Any abstraction from the riverine unit for construction purposes must be approved by the Department of Water and Sanitation (DWS).

### 16.1.2 Construction Footprint Limit and Demarcation

a) All construction activities must be limited to the construction servitude.

b) The demarcation fence must be signed off by the Environmental Control Officer (ECO). And maintained throughout the construction phase.

c) Prior to commencement of construction, the construction footprint within proximity to the watercourse must be demarcated using wooden pegs and an orange safety net to

ensure that no excessive intrusion of vehicles into nearby watercourse habitat or additional unnecessary clearing activities takes place.

d) Laydown, site offices and other storage areas must be clearly demarcated and located at least 30m from the boundary of any nearby watercourse habitat, ideally on flat surfaces.

e) The use of existing access routes to the construction site must be prioritised as far as possible.

### 16.1.3 Potential Use of coffer dams

a) In the case that coffer dams are used to divert flow for construction purposes, these structures should be temporary in nature and be removed from the river immediately after the required construction has been completed. The dewatering process from the coffer dams should involve piping the water directly to the active channel downstream of the site as, or if, required.

b) The construction of an artificial channel outside of the watercourse habitats for water diversion purposes is not permitted, as this could lead to unnecessary erosion.

### 16.1.4 Soil erosion and sedimentation control measures

a) Sediment barriers must be installed in areas sensitive to erosion such as near water supply points, slopes, and actively eroding river banks. These measures include but are not limited to - the use of sand bags, geotextiles such as soil cells used in the protection of slopes, hessian sheets, rock gabions, silt fences and retention or replacement of vegetation. These erosion control measures must also be used during progressive rehabilitation of the site, where necessary, during and after construction activities.

b) After every rainfall event, the contractor must check the site for erosion damage and immediately repair any damage recorded.

c) Unnecessary clearing of natural areas should be kept as minimal as possible to make use of natural erosion suppressors such as good grassland cover.

d) During the operation phase it is recommended that disturbed watercourse habitat and rehabilitated areas are monitored for potential erosion. This should initially take place immediately after construction, thereafter quarterly for two years and thereafter annually.

### 16.1.5 Soil management

a) Prior to commencing with earthworks, the topsoil must be stripped and stockpiled separately from subsoil, if necessary.

b) Topsoil must be kept for use during rehabilitation of disturbed areas.

c) Topsoil must be stockpiled in stockpiles not exceeding 2m in height.

d) All stockpiles must be kept free of weeds and invasive alien plants.

e) If at risk of being eroded, all stockpiles must be secured with sandbags around the base of the soil stockpile.

f) All stockpiles must be established on flat ground at least 30m from the boundary of any watercourse habitat.

### 16.1.6 Pollution prevention measures

a) Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using suitable licensed solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed, and the affected area rehabilitated immediately. A spill response plan must be drafted and communicated to all onsite staff in this regard.

b) Chemical toilets must be placed at least 30m away from any watercourse habitat.

c) Fuel must be stored in a bunded structure with a roof. The bund must be able to contain at least 110% of the volumes of fuel.

d) Mixing and/or decanting of all chemicals and hazardous substances must take place on a tray, shutter boards or on an impermeable surface.

e) Drip trays should be utilised at all dispensing areas.

f) A chemical spill kit must be present onsite at all times and once used it must be disposed of at a registered hazardous landfill site.

### 16.1.7 Invasive Alien Plant control

a) The control and eradication of a listed invasive species from the construction footprint, including the site camp must be carried out using methods that are appropriate for the species concerned and the environment within which it occurs.

b) The methods employed to control and eradicate a listed invasive species must also be directed at the new growth, propagating material and re-growth of such invasive species in order to prevent such species from producing offspring, forming seed, regenerating or re-establishing itself in any manner.

c) Mechanical control methods such as digging, hoeing, pulling out of weeds and invasive plants are recommended.

## 16.2 Recommendations by a Hydrologist

The hydrological investigations were conducted by Sustainable Drop Projects (Pty) Ltd. and the following recommendations were made:

### 16.2.1 Planning (Design) and construction phase

It is also anticipated that during construction, there is likely to be introduction of sediments into the river channel as well as eroding of the banks. Moreover, following the upgrades, the changes in the flow regime will likely manifest as increased velocities immediately downstream and raise the risk of scouring if not appropriately mitigated.

a) Best practice weir design and construction practices to be followed to provide good drainage and prevent erosion.

b) The new weir design must take consideration of sediments loads into the river channel as well as eroding of the banks during construction, as well as changes in flow regime to mitigate the risk of scouring downstream (***Note****: The proposed upgrades as presented in the designs have been taken into account by the design engineers.*)

c) A detailed method statement consistent with the best practice weir design and construction be developed by the engineering consultants prior to the commencement of the project and that their supervision of the contractor during construction ensures compliance by the contractor with best practice.

d) The design of the storm water system must make provision for erosion protection. In this case where the stormwater system consists primarily of the Mhlathuze river and the weir across it, the areas that are prone to erosion will be within the weir's vicinity including the watercourse immediately downstream of the weir as well as the ends of the weir that suffer scour. To mitigate against this appropriate erosion control measures that include a combination of stone pitching, gabion baskets and mattresses, energy dissipaters and grass lined drains are essential. (***Note****: Design engineers have taken these into account and incorporated this into the upgrade designs*.)

### 16.2.2 Operation phase

The proposed upgrades will have the impact of minimizing the flow that gets the site via the eroded banks and will instead ensure all flow through the site goes over the weir and through the sluice gates when open. The proposed upgrades will likely also result in changes to the backwater effect of the weir presence across the river.

a) Develop and implement the maintenance plan for the weir and associated infrastructure to ensure sediment build-up at the weir and erosion are checked and where necessary addressed whenever through dredging and backfilling as and when the sediment build-up and scouring reach critical levels.

b) The weir be maintained on a regular basis. This includes inspection for evidence of sediment and debris build-up. This be undertaken on a regular basis during the wet season and after any rainfall events during the dry season.

c) Ongoing maintenance and monitoring regimes be implemented for the stormwater management system.

## 16.3 Recommendation by Heritage Specialist

The Heritage Impact Assessment was conducted by Tsimba Archaeological Footprints (Pty) Ltd. and the following recommendations were made:

a) It is the reasoned opinion of the Heritage Specialist that no visible material remains pertaining to heritage resources occur within the proposed development footprint. Therefore, the proposed development may proceed as there is no objection from a

heritage perspective. Subject to adherence of the recommendations and approval by Amafa Research Institute the proposed development may be allowed to continue under the following conditions

b) Should skeletal or archaeological remains be exposed during development and construction phases, all activities must be suspended and the relevant heritage resources authority contacted.

c) Section 36 (6) of the National Heritage and Resources Act, 25 of 1999, also states that should culturally significant material be discovered during the course of the said development, all activities must be suspended pending further investigation by a qualified archaeologist.

## 17 RECOMMENDATIONS FROM THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

In light with the current status quo of Nkandla Weir including inevitable high flow events within Mhlathuze River at Nkandla Weir, these scenarios impose the future threat to water supply within Nkandla Municipality as stipulated in (***Section 6***). Therefore, the proposed upgrade (Weir design) will maintain the Nkandla Weir structure and its associated hydrological flow regime, thus continue to provide the communities of within Nkandla Local Municipality with adequate supply of water that is safe, reliable and sustainable to the benefit of the public for the realisation of the Sustainable Development Goal 6 and the NDP objectives through this project.

The National Web-Based Environmental Screening Tool (NWBEST) was used to generate the environmental sensitivity report of the proposed development site. Additionally, an Initial Site Sensitivity Verification study was undertaken to confirm or dispute the environmental sensitivity as identified by the NWBEST was conducted.

The EAP is of the view that the Environmental Authorization should be granted on certain conditions that are outlined in this section. After an Authorization has been granted, it is the applicants' responsibility to ensure that all recommendations outlined in this report as well as in the EMPr are properly implemented.

## 17.1 Construction phase

The EAP recommends the authorization of this application. However, the following conditions and mitigation measures are recommended and should be considered in any authorization that may be granted by the competent authority in respect of the application.

### 17.1.1 Erosion and sediment loads control

It is anticipated that the vegetation clearance and excavation during construction within the riparian zone will likely exacerbate sediment loads or erosion of the Mhlathuze River banks and channel at the weir vicinity.

a) All work to be done within sensitive riparian and instream habitats (Nkandla Weir upgrade) should be carried out at low flow season between April and early September (winter to early spring).

b) Detailed method statement for working within the watercourse must be compiled by the contractor prior to the commencement of the project.

c) Demarcate the site servitude for the development and the demarcation fence must be signed off by the Environmental Control Officer (ECO).

d) No clearance and excavation must be done outside site servitude. The site clearance and excavation for weir extension should be only be carried at the riparian and be limited to development area (construction servitude) as approved by project plans. Also, make use of natural erosion suppressors such as progressive rehabilitation using good grassland cover. Do not wait for construction to finish in order to start rehabilitation.

e) Site clearance and excavation at riparian should not be undertaken during wet (rainy) periods or peak flow period.

f) Construct storm water system and make provision for erosion protection.

g) Excavations must not be left open for a long duration and must not be undertaken until such time that all required materials are available on-site.

h) Density control of placed fill material should be undertaken at regular intervals during fill construction.

i) All stockpiles must be established, ideally on flat ground not exceeding 2m height at least 30m from the watercourse.

j) Sediment barriers must be installed in areas sensitive to erosion to prevent stream siltation.

k) After every rainfall event, the contractor must check the site for erosion damage and immediately repair any damage recorded.

### 17.1.2 Preventing the deterioration of river water quality

It is anticipated that construction activities for the purpose of Nkandla Weir upgrade will likely have impact on Mhlathuze River within the locality of the downstream of Nkandla Weir.

a) Detailed method statement for working within the watercourse with provision for spillage and construction debris management must be compiled by the contractor prior to the commencement of the project.

b) ECO to conduct monthly water quality monitoring. Or regular water quality monitoring after major construction activity taking place direct within a watercourse, such as exaction of riverbanks, dewatering of water from coffer dams, and pouring of concrete for wall expansion.

c) No construction machinery must be operated direct into the water. The use construction machinery must be limited only to riverbanks, only if necessary.

d) Make use of coffer dams to prevent concrete spills into watercourse.

e) Stockpiles must not be more than 2m in height, and be stored on ideally flat area 32m away from the watercourse.

f) It is highly recommended that site camp be developed at already disturbed site, on ideal flat surface area which is at least 100m away from the watercourse. Also, the construction machinery must be parked only at site camp on the designated bunded areas and dip trays must be placed under the machinery, when not used to capture any possible hazardous substance leaks.

## 17.2 Operation and maintenance

The EAP recommends the authorization of this application. However, the following conditions and mitigation measures are recommended and should be considered in any authorization that may be granted by the competent authority in respect of the application.

### 17.2.1 Stormwater management

As a result of the current status quo for Nkandla Weir, the run-off and banks erosion within Nkandla Weir vicinity is inevitable. Therefore, the stormwater management is critical to mitigate the run-off and banks erosion.

a) Best practice weir design and construction practices to be followed to provide good drainage and prevent erosion.

b) The project design must take into consideration stormwater management. The design of the storm water system must make provision for erosion protection (***Note****: Design engineers have taken these into account and incorporated this into the upgrade designs*)

c) Develop and implement the stormwater management plan throughout the construction and operational phase.

d) Ongoing maintenance and monitoring regimes be implemented for the stormwater management system. Such as inspection for evidence of sediment and debris build-up, particularly on a regular basis during the wet season and after any rainfall events during the dry season.

### 17.2.2 Management of the flow regime and backwater effect

It is anticipated that expansion of weir walls from both flanks of the Nkandla Weir and backfilling of the eroded areas to the sides of the existing structure as well as the higher elevations of the extensions would result in the change of flow regime and increased area upstream of the weir that would be inundated for any given flood peak.

a) Construction best practice that follows engineering designs to mitigate the upstream inundation as a result of Nkandla Weir upgrade, on all determined stream peak flow periods.

b) Development and implementation of a maintenance plan for the weir and associated infrastructure to ensure sediment build-up upstream within a weir vicinity and erosion are checked.

## 18 CONCLUSION

The decision to grant or refuse authorisation in terms of Section 24 of NEMA must be made in the light of the provisions of NEMA. Section 24 provides that, in order to give effect to the general objectives of integrated environmental management laid down in NEMA, the potential impact on the environment of listed activities must be considered, investigated, assessed and reported on to the Competent Authority charged by the Act with deciding applications for environmental authorisation. A Basic Assessment Report (BAR) concerning the impact of the proposed activity and alternative activity options on the environment, has been compiled and submitted as prescribed and authorisation may only be issued after consideration of such report.

We submit that the environmental process undertaken thus far complies with these requirements and that this report covers the full suite of potential environmental issues related to the proposed development. All potential impacts have been evaluated and responded to by either complete avoidance where possible, or by recommendation of the most appropriate and feasible mitigation measures. The preferred/mitigated development proposal presented in this report is responsive to the integrated results of the assessment of potential impacts made by the various specialists on the project team.

Based on comparative evaluation of the various alternatives, including the No-Go option, it is evident that the preferred Design Alternative for the upgrading of Nkandla Weir can meet the required objections to offset the No-Go option (subject to the implementation of recommended development mitigation measures). This Draft BAR (DBAR) therefore, concludes that the proposed development has been considered via a balanced approach, mindful of cumulative impacts, need and desirability of the project and that the overall negative environmental impacts will be of very low significance. As such, the project can be considered for environmental authorisation subject to implementation of the recommended phased approach and specialist mitigation measures as specified in the EMPr.

This DBAR is available for a review and comment period of 30 days, extending from ***21th of April 2021 to the 28th of May 2021***. Comments and submissions received in response to this report will be submitted to the competent authority.

*Written submissions must be addressed to:*

**Emvelo Quality and Environmental Consultant (Pty) Ltd**

Attention: **Ms Phumzile Lembede**

PO Box 101672, Meerensee, 3901

Tel: 035 789 0632 Fax: 086 577 5220

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# APPENDICES

## APPENDIX A. DECLARATION OF INFORMATION

I, the undersigned **Phumzile Lembede**, on behalf of **Emvelo Quality and Environmental Consultant**, hereby declare that the information provided in this application is correct and true.

| | |
|---|---|
| | 20th April 2021 |
| Signature | Date |
| **EAP** | **Emvelo Quality and Environmental Consultant** |
| Position | Company |

## APPENDIX B. ENVIRONMENTAL MANAGEMENT PLAN(EMPR)

# APPENDIX C. SITE PHOTOGRAPHS AND LOCALITY MAPS

## C-1: Case Images

# C-2: Locality Map

# APPENDIX D. SITE LAYOUT AND DESIGNS

# APPENDIX E. PUBLIC PARTICIPATION PROCESS

## E-1: Onsite notices

## E-2: Newspaper advert

# E-3: Register of I&APs

## E-4 I&APs Involvement and Comments

# E-5: Background Information Document (BID)

## E-6: Minutes of the Pre-Application meeting

## APPENDIX F. EAP'S CV(S)

# APPENDIX G. SPECIALIST STUDIES

# G-1: Aquatic Ecological Impact Assessment

# G-2: Hydrological Impact Assessment

## G-3: Heritage Impact Assessment

# APPENDIX H: WEB-BASED ENVIRONMENTAL SCREENING REPORT