CRDC ASSMANG
CATO RIDGE DEVELOPMENT COMPANY
Reg. No. 1956/002268/06

PRE-FEASIBILITY REPORT FOR THE PROVISION OF CIVIL STORMWATER MANAGEMENT SERVICES FOR THE PROPOSED DEVELOPMENT OF PROPERTIES IN CATO RIDGE FOR THE CATO RIDGE DEVELOPMENT COMPANY

MAY 2023

K&T PROJECT REFERENCE: 20207/ SWM O

REVISION 1

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Details of this report

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0	04/04/2023	Issued for Review
1	29/05/2023	Amendments to the Report

This report has been prepared by Kantey & Templer (Pty) Ltd, with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.

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For and on behalf of

Kantey & Templer (Pty) Ltd

Approved by: Kevin Hohls

Signed: 

Position: Professional Engineer

Date: 29 May 2023

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1. EXECUTIVE SUMMARY

Kantey & Templer PTY LTD has been appointed by the Cato Ridge Development Company (CRDC) to compile a Pre-Feasibility Engineering Services Report in order to obtain preliminary approval from the service authorities for the proposed bulk service provision for the new Cato Ridge Development. This report documents the Proposed Stormwater Management Plan for the Proposed Development.

The greater Cato Ridge area has been considered for a number of years as a major metropolitan industrial growth node within eThekwini as well as fulfilling the role of “back of port” logistics along the N3 [SIP2] logistics corridor between Gauteng and Durban

The proposed development has been programmed to be implemented in 3 Priority Phases

Due to the future road upgrades required and planned upgrade of the bulk trunk water and sewer lines by the eThekweni Municipality in 2031/2032 this proposed development will be unlocked in an incremental approach as follows:-

PHASE 1

Phase 1 is programmed to be unlocked within the next 18 months and will be phased in over the next 10 year period as and when the demand arises.

PHASE 2

Phase 2 will be implemented over the next 11 to 20 years

PHASE 3

Phase 3 will be implemented over the next 21 to 25 years

2. INTRODUCTION

Kantey & Templer PTY LTD was appointed by the Cato Ridge Development Company (CRDC) to compile a Pre-Feasibility Engineering Services Report in order to obtain preliminary approval from the service authorities for the proposed bulk service provision for the new Cato Ridge Development in KwaZulu-Natal in support of the Environmental Impact Assessment Application update as per the Executive Summary. This report provides details of the Proposed Stormwater Management Plan for the proposed development

2.1 Location & Access

The proposed development is 351 hectares in extent and is located in Cato Ridge which is located on a greenfields site.

The site locality plan is attached in Annexure A of this document.

The development has been programmed to be implemented in three (3) Phases. The co-ordinates (centre) of each Phase are as follows:

Table 1: Phase 1, 2 & 3 co-ordinates

Phases	Y- CORDINATES	X- CORDINATES
Phase 1	+37 068	+3 289 114
Phase 2	+36 175	+3 286 829
Phase 3	+37 224	+3 290 057

Access to the development is via the R103 and Eddie Hagen Road.

3. DEVELOPMENT PHASING

The Cato Ridge Development is divided into three (3) separate development phases.

The timeframes above is dependent on a fluctuating economy, market trends and property demands which may change.

Due to the future road upgrades required and planned upgrade of the bulk trunk water and sewer lines by the eThekweni Municipality in 2031/2032 this proposed development will be unlocked in an incremental approach as follows:-

3.1 PHASE 1

Phase 1 is 131 Ha and is programmed to be unlocked within the next 18 months and will be phased in over the next 10 year period as and when the demand arises which will be carried out as follows:-

1) The lower section of Phase 1 along the R103 and up to the Assmang turnoff along Eddie Hagan Drive is to be phased in over the next 5 years.
2) The upper section of Phase 1 from the Assmang Turn-off upto the Macro Turn-off along Eddie Hagan Drive is to be phased in over the next 5 to 10 years.

3.2 PHASE 2

The total proposed area for Phase 2 is 174 Ha.

It is proposed to develop Phase 2 into two sections which are as follows:-

1) The first section of Phase 2 will include up to the high point of the site, which is approximately 400metres of the southern section of Phase 2.

    - As there is sufficient water supply in the area it is proposed that this southern section of Phase 2 is developed in conjunction with Phase 1.
    - This first section of Phase 2 is programmed to be unlocked within the next 18 months and will be phased in over the next 10 years

2) The second section of Phase 2 will include the balance of Phase 2 from the high point northwards which will only be unlocked after the service infrastructure has been completed in the Cato Ridge Area. This planned implementation is as follows:-

    - The eThekweni Municipality is currently programming to upgrade the bulk water & sewer reticulation in 2031/ 2032. It will not be economically viable to develop the northern portion of Phase 2 prior to the upgrade of the bulk water & sewer being carried out by Municipality.
    - The roads and electrical reticulation will need to be upgraded.

    As a result the northern portion of Phase 2 will only be implemented over the next 11 to 20 years.

3.3 PHASE 3

There has been interests from the surrounding land owners to purchase land in close proximity to their existing properties and they will therefore be responsible to install their own services.

The remaining land for development is relatively minor and has been considered within this report.

Phase 3 will be implemented over the next 21 to 25 years

3.4 General

The proposed development is zoned as follows:-

1) Phase 1 & 2 are presently zoned “General Industry 2”
2) Phase 3 is presently zoned “Residential Small Holding 3”

The Bulk & Internal services will be designed according to accepted engineering specifications and principles as well as acceptable environmental requirements and specifications, as provided in approved environmental scoping and impact assessment reports. The following engineering services for the development of the area are proposed and are based on the following assumptions:-

a) The level of service will cater for light industry logistics and warehouses, on the proposed development site.
b) Where possible, the services will be designed to connect to the existing and proposed new Municipal, SANRAL & Department of Transport services infrastructure.
c) The provision of services to the proposed development will be designed to ministerial norms and standards and generally in accordance with the “Guidelines for the Provisions of Engineering Services and Amenities in Residential Townships” (Red Book).

4. BULK INFRASTRUCTURE

4.1 Existing Road & Stormwater Infrastructure

Existing Roads

The present road network to the site and within the site is via the R103 and Eddie Hagan Road

Existing Stormwater

The existing R103, Eddie Hagan Drive, District Road 1022 and other minor existing roads do have existing stormwater that discharges into low points and valley lines.

5. PROPOSED BUILDING DEVELOPMENT

5.1 Cato Ridge Phased Development

The table below indicates the three (3) Phases for the proposed development**.**

Table 2 Warehouse/ Industrial Net Land Area

Phases	Warehouse Nett land area (HA)	Industrial Nett Land Area (HA)
Phase 1	60.305	60.305
Phase 2	74.015	74.015
Phase 3	19.31	19.31
TOTAL	**153.63**	**153.63**

Please refer to Paragraph 3 for the Development Phasing which is on page 3 of this report which provides details of Phase 1, Phase 2 & Phase 3 for the proposed development

6. NEW INFRASTRUCTURE

6.1 Road Network

Roads will be constructed to:-

1) Red Book - Guidelines for Human Settlement Planning and Design

2) SANS 1200 – Standardized Specification for Civil Engineering Construction

3) Local Municipal Standards

A Traffic Impact Assessment was carried out by David McFarlane and Associates which is attached in Annexure D (Revision 5 dated 13 March 2023) and is summarised as follows:-

6.2 Phasing of Road Infrastructure

There is an opportunity to make an initial start of developing the first few sites as the current road network does have spare capacity so the development could start without any initial interventions.

Between the initial start of developing the first sites and full development there is clearly opportunity to phase in the required infrastructure to match the take-up of the development. The potential sequence of events is as listed below for the upgrades to the R103 and Eddie Hagan:-

a) The current road network has spare capacity, so the development could make a start with no initial interventions.
b) The N3 Cato Ridge Interchange will need to be signalised as the capacity is reached.
c) Once the N3 Cato Ridge Interchange reaches capacity then the N3 KwaXimba Interchange will need to be constructed which will occur around 40% of the full development of this project.
d) The identified upgrades to Eddie Hagen Drive could also be phased in to match the progress on the development. The upgrade of Eddie Hagan Drive to 2 + 2 lanes could be as far as Eddie Hagan/ Assmang intersection as the first phase of the development, which can then be extended further north for phase 2 of the project.

6.3 Internal Roads

The design criteria will generally be based on the design standards of the Guidelines for the Provision of Engineering Services and Amenities in Residential Township Development.

The following criteria will be used in the geometric design of the roads.

Main Street Roads	:	7.0 m wide
Design Speed	:	Between 40 to 60 km/h
Crossfall	:	2.5%
Min. K Value	:	4
Min V L length	:	20 m
Right of Way Servitude width		15.24m
Cut slopes in-situ soil	:	1:1,5
Cut slopes in bedrock	:	1:0,1 (almost vertical depending on specific bedrock characteristics)
Fill slopes	:	1:1,5 (maximum)

Longitudinal gradient Close to natural ground (maximum 10%)

6.4 Road Recommendations

Our recommendation [from a traffic impact view point only] is that the proposed development be allowed to proceed, provided the various mitigation measures identified are timeously

6.5 Stormwater piping & Attenuation Ponds

1) The stormwater pipes vary in size from 450 Diameter to 900 diameter which will be constructed as per drawing No 20207 –DSW 01 Revision I

2) Please refer to the attached stormwater pipe size & length of pipe spreadsheet which is attached in Annexure E.

3) The Stormwater attenuation ponds are indicated on drawing No 20207- DSW 01 Rev I

7. STORMWATER MANAGEMENT SYSTEM

7.1 Introduction

The stormwater design concept for the proposed development in Cato Ridge must comply to all Environmental and eThekweni Municipality requirements and specifications.

The traditional design of storm water drainage systems collects and confines storm water runoff as rapidly as possible to a suitable location where it can be discharged. This traditional design can however result in drainage and flooding problems downstream unless erosion protection measures are implemented.

The road network stormwater management system will be designed to accommodate both the 351 hectare development footprints and the roads.

7.2 Objective

The objective of a storm water management plan should be to manage the storm water resources of the collective watersheds to:

- Prevent erosion and flood damage
- Preserve the natural and beneficial functions of the natural drainage system
- Preserve and enhance storm water quality.

The storm water management strategy will be to collect all surface runoff, pass it through an attenuation detention system before discharging the water into the natural drainage systems.

The storm water drainage network system will be kept separate from the waste water.

7.3 Stormwater Design

The stormwater management principles applied to the proposed Cato Ridge development to accommodate the stormwater run-off is separated into two sections which are as follows:-

7.3.1 All developable Erf/ Sites to be responsible for their own stormwater design and attenuation infrastructure.

A standard condition will be incorporated in all Purchase or Rental Agreements for each erf/stand that the Developer/ Landowner/ Tenant will be responsible to submit a stormwater management plan to the eThekweni Municipality for approval. This shall include:-

a) a stormwater design to attenuate the infrastructure into attenuation ponds or attenuation within the hardstands/ parking area. Other local on-site attenuation may be considered which includes grass-lined drains and swales, storm water infiltration systems undulations, landscaping etc. The attenuation volume will be designed for a 1 in 50 year event.

b) A throttling manhole will be designed and sized accordingly at the attenuation outlet to cater for the pre and post stormwater flows with an appropriately sized outlet pipe (refer to Annexure I for the throttling pipe size and outlet pipe size).

c) stormwater reticulation pipelines, channels, energy dissipation measures etc.

d) Erosion protection where required.

e) Details of the stormwater discharge tie into point into the bulk Municipal road stormwater system

f) All internal stormwater pipes will be gravity reticulated via the sub-catchments across the site.

7.4 Roads Stormwater

7.4.1 Stormwater inlet at attenuation ponds

The bulk stormwater has been designed for a minimum 1 in 50 year event

Storm water from the roads and surface channels will be collected through inlets and piped across or parallel to the roads, which shall be within the road reserve, to points where the water will be discharged into attenuation ponds in an efficient, safe and environmental acceptable manner. Please refer to Drawing no 20207-DSW 01 Revision I in Annexure B for details of the stormwater reticulation system and proposed attenuation ponds.

Each attenuation pond will be designed accordingly and constructed with throttling manholes at the outlets to restrict the outlet flow in the event of a heavy storm. The design will cater for the pre and post stormwater flows from the roads prior to discharging into the valleys and low lying areas.

The attenuation ponds will be dry and will only be a temporary storage in the event of heavy rainfall. The discharge from the attenuation pond will be restricted by the throttling manhole.

The velocity and energy of the stormwater discharge will be reduced when entering the stormwater attenuation ponds by carrying out the following:-

1) Constructing the inlet headwall with dissipator blocks.
2) Gabion baskets/ rip rap at the inlet to prevent erosion.
3) vegetating around the entire pond.

7.4.2 Stormwater discharge points at attenuation pond outlets:-

Where the stormwater outlets discharge into the drainage line or wetland buffer they will be managed with the construction of a headwall with dissipater blocks, a gabion structure to dissipate the flow (Please see detail Annexure C for details).

This is highlighted in more detail in the Method Statement for Construction Activities for the Proposed Development of Properties in Cato Ridge. Please refer to Annexure F for details.
Additional erosion protection measures will be required where necessary.

7.4.3 Environmental sensitive Area

There are 6 specific areas in the table below which describe the storm water runoff and sewer crossing that discharge within the watercourse that require a Method Statement:-

Point Number	Description	Watercourse
1	Stormwater discharge point , plus stormwater pipeline	S6
2	Stormwater discharge point , plus stormwater pipeline	S11
3	Effluent Discharge Point	Within R3 drainage line
4	Stormwater discharge point , plus stormwater pipeline	R3 and R4 drainage line and within the 33m drainage buffer
5	Stormwater discharge point , plus stormwater pipeline	R2 and drainage buffer
6	Stormwater discharge point , plus stormwater pipeline	R2 Drainage line

The 6 specific areas are indicated in blocks on the attached Master Layout of the Water Uses associated with the project which is attached in Annexure G.

7.4.3.1 Sewer Outlet

There is one sewer outlet that requires a method statement as it discharges within the R3 drainage line.

Please refer to the Civils Sewer Services Report for the headwall detail and erosion protection.

As indicated above the storm water runoff and sewer will be discharged via 6 outlets into the watercourses or wetland buffer zones. Where possible, these discharge points will be further managed with the construction of swales that will retain, sink and spread the storm water runoff. This construction work will be undertaken within the wetland buffer and drainage lines.

Please refer to Annexure H for the delineated wetlands and low impact mixed use combined watercourses.

7.5 Method Statement for Construction Activities

Please refer to Annexure F for the Method Statement for Construction Activities for the Proposed Development of Properties in Cato Ridge for the 5 stormwater discharge outlets that require a method statement.

7.6 Additional Erosion Protection Measures

In addition to paragraph 7.4.3 Environmental sensitive Area the following additional erosion protection measures will be implemented where required:-

1) Grass lined open drains will be installed which will assist in retaining sediment and reduce the velocity of the flows.

2) Where applicable concrete channels or concrete pipes will be installed from the attenuation pond outlets which will be directed within the existing road network to avoid further impact on the environment. This will reduce the registration of servitudes through tribal authority areas. Road Servitudes will be registered where required in the remaining disturbed areas.

3) The drains and stormwater pipe network will prevent flooding of houses and reduce the safety risk within the area.

4) Where there are no structures or erf/stands the outlet will discharge directly onto the site with erosion protection where deemed necessary.

5) The design measures incorporated will take measures into account to reduce the impact on disturbing the biodiversity in the area. Where possible, stormwater discharge points will be directed to follow areas that have already been disturbed by the existing road footprint.

7) Where possible, the stormwater will discharge into an open area to allow water to dissipate before entering into the river systems.

8) It is essential that appropriate erosion control measures be taken into consideration at the various storm water discharge points located throughout the site to limit erosion on the receiving environment e.g. at headwalls and culverts.

9) Steep water courses may require additional protection from erosion through the use of lined channels, controlled drops etc. in order to dissipate flow energy.

10) Road intersections should be designed to prevent localised flooding
The storm water system must be kept separate from the wastewater (sewer) drainage system

11) Suitable erosion protection measures will be installed at all discharge points. At each attenuation pond dissipator blocks with a gabion retaining structure (see attached detail in Annexure C) will be constructed after each throttling manhole/headwall outlet to reduce the stormwater velocity at the outlet which will reduce erosion.

12) On completion of the construction work, the site will be contoured to ensure free flow of runoff and to prevent ponding of water. Drainage will be controlled to ensure that runoff from the site will not culminate in off - site pollution or result in damage to properties downstream of any storm water discharge.

13) During final design stages erosion protection will be designed to comply to Municipal standards. Special precautions will be carried out to ensure that a designed storm water discharge route is approved to prevent erosion or flooding in the valleys and low lying areas which also have residential houses in areas.

14) The attenuation ponds are a temporary storage facility and will only fill up in the event of heavy rainfall event.

7.7 Stormwater pipe specifications & standards

The standards for the storm water infrastructure to be installed with the proposed road development can be summarised as follows:

- Flood occurrence interval : 50 years
- Pipe Material : Concrete
- Pipe class : Minimum 75D in road reserve and 100D at road crossings. Each Site Developer will be responsible for their own stormwater within the sites to be developed

- Pipe diameters : minimum 450ϕmm diameter within the road reserve and discharging form the road reserve. Each developer will be

responsible for their own stormwater within the sites to be developed

- Bedding : Class C
- Inlets : Manhole
- Junctions : Points of deflections on pipelines
- V-drains : Concrete lined open channels
- Cut-off drains : Grass lined channels and berms

7.8 Planning Construction

In the planning for the design phase, cognizance is taken of the following reference documents:-

1) Red Book - Guidelines for Human Settlement Planning and Design

2) SANS 1200 – Standardized Specification for Civil Engineering Construction

3) Local Municipal Standards

KANTEY AND TEMPLER CONSULTING ENGINEERS

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ANNEXURES

ANNEXURE A – SITE LOCALITY PLAN

ANNEXURE B – STORMWATER LAYOUT DRAWING

ANNEXURE C – STORMWATER GABION DETAIL AND STANDARD DETAILS

ANNEXURE D – TRAFFIC IMPACT ASSESSMENT

ANNEXURE E – STORMWATER PIPE SIZES AND STORMWATER PIPE LENGTHS

ANNEXURE F – METHOD STATEMENT FOR CONSTRUCTION ACTIVITIES FOR THE PROPOSED DEVELOPMENT OF PROPERTIES IN CATO RIDGE

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