CRDC ASSMANG
CATO RIDGE DEVELOPMENT COMPANY
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METHOD STATEMENT FOR CONSTRUCTION ACTIVITIES FOR THE PROPOSED DEVELOPMENT OF PROPERTIES IN CATO RIDGE

FOR THE CATO RIDGE DEVELOPMENT COMPANY

MAY 2023

K&T PROJECT REFERENCE: 20207/ M1

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KANTEY & TEMPLER
CONSULTING ENGINEERS
Engineering African Development

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For and on behalf of

Kantey & Templer (Pty) Ltd

Approved by: Kevin Hohls

Signed: 

Position: Professional Engineer

Date: 24 May 2023

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METHOD STATEMENT FOR CONSTRUCTION ACTIVITIES FOR THE PROPOSED DEVELOPMENT OF PROPERTIES IN CATO RIDGE FOR THE CATO RIDGE DEVELOPMENT COMPANY

1. 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 services provision for the new Cato Ridge Development in KwaZulu-Natal in support of the Environmental Impact Assessment Application.

The proposed Industrial & Warehouse Development in Cato Ridge is situated on a 351 Ha greenfields site which will completed in 3 phases 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 10 to 20 years

PHASE 3

Phase 3 will be implemented over the next 20 to 25 years

This report will provide Technical information on the proposed project, with a Method Statement that is triggered due to the construction activities for the 6 No specific areas, where the stormwater runoff and sewer crossings discharge outlets falls within a watercourse.

2. Location & Access

The site locality plan is attached in Annexure A of this document.
The co-ordinates (centre) of each of the 3 Phases are as follows:

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. Scope of Works

Please refer to the attached drawing in Annexure C for the stormwater layout drawing 20207-DSW 01 Revision I

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

Phases	Warehouse Bulk (HA)	Industrial Bulk (HA)
Phase 1	60.305	60.305
Phase 2	74.015	74.015
Phase 3	19.31	19.31
TOTAL	**153.63**	**153.63**

The scope of works for the services will include the construction of:-

1) Roads
2) Water reticulation, which includes an elevated tank
3) Sewer reticulation which includes a rising main
4) 4 x Sewer collection sumps with pump stations
5) Mini Wasterwater Treatment Works
6) Roads
7) Stormwater reticulation
8) Stormwater attenuation ponds
9) Electrical which includes a substation, overhead lines and underground lines
10) Warehousing & Industrial.

This technical note covers the design and construction considerations and parameters for the construction activities for The Proposed Development of Properties in Cato Ridge for the Cato Ridge Development Company.

In the Project Development certain construction activities will have an impact on the wetlands and these items are covered as Construction Methodology activities within the Project 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 C.

Stormwater Outlets

Where the stormwater outlets flow 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 and erosion protection measures which are highlighted in more detail in this report.

Ponds 5, 9, 10, 11 & 12 flow into the drainage line or wetland buffer area. Please refer to Annexure D for the proposed throttling and outlet pipe sizes.

Sewer Outlet

There is one sewer outlet which is from the Mini Wastewater Treatment Works that requires a method statement as it falls within the R3 drainage line. The flow rate is only around 52 litres/second and will be managed in the same manner as the stormwater outlets with the construction of a headwall with dissipater blocks and a gabion structure with suitable stone pitching and erosion protection measures where required.

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

4. 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. SABS 1200 – Standardized Specification for Civil Engineering Construction; and
3. Local municipal standards.

Due to the environmental sensitivity the impact on water quality, potential flooding and erosion needs to be considered in the planning phase. The planning would consider:

The proposed 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 is designed to accommodate both the 351 hectare development footprints and the actual roads.

4.1 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.

4.2 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:-

4.2.1 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 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 area will be designed for a 1 in 50 year event.
- A throttling manhole will be designed and sized accordingly at the attenuation outlet to cater
- for the pre and post stormwater flows.
- stormwater reticulation pipelines, channels, energy dissipation measures etc.
- Erosion protection where required.
- Details of the stormwater discharge tie into point into the bulk Municipal road stormwater system
- All internal stormwater pipes will be gravity reticulated via the sub-catchments across the site.

4.2.2 Roads Stormwater

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, 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 development 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 due to:-

1) the volume of the pond which must be vegetated.
2) dissipator blocks at the inlet headwall.
3) Gabion baskets/ rip rap at the inlet to prevent erosion.

At discharge points :-

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

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. The 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. The 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

4.2.3 Erosion Protection

The following recommendations are suggested:

1. It is essential that appropriate erosion control measures need to 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.
2. Steep water courses may require additional protection from erosion through the use of lined channels, controlled drops etc. in order to dissipate flow energy.
3. Road intersections should be designed to prevent localised flooding.
4. The storm water system must be kept separate from the wastewater (sewer) drainage system.
5. 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 E) will be constructed after each throttling manhole/headwall outlet to reduce the stormwater velocity at the outlet which will reduce erosion.
6. For the design of the swale the philosophy of “Slow it, Spread it and Sink it” will be followed so that the velocity of the stormwater runoff is slowed down and spread laterally to mitigate erosion while sink it will assist in recharge of ground water.
7. Appropriate and adequate protection of the banks will be incorporated into the design.
8. Swales will be designed to accommodate both dry conditions and storm flow conditions.
9. For high intensity, the water will overtop the berm and suitable bank protection in the form of vegetation will be implemented to prevent erosion during these events.
10. Headwall details will be as per the eThekweni Municipality or Department of Transport standard specifications depending on which is applicable.
11. Suitable stone pitching and/or reno-mattress and gabion protection structure will be constructed to obviate any erosion that may be prone to occur at these points.
12. A sediment fence will be erected on the wetland buffer boundary to demarcate the edge of the wetland buffer. In addition, this fence will intercept and detain small amounts of sediment from disturbed areas during construction operations and reduce runoff velocity down a slope.

5. Construction Methodology

5.1 The typical construction sequence is summarized hereunder:

- The engineer in consultation with the Environmental Assessment Practitioner / Environmental Control Officer will confirm the nature of the drainage line being considered and ensure adequate control measures are allowed for in the drawings, tender and site instructions.
- Appointed contractor to submit a Method Statement for the construction activities for review and approval by appointed Safety Agent , Environmental Assessment Practitioner / Environmental Control Officer and Engineer
- Site Handover and briefing meeting with the contractor to highlight environmental sensitivity and confirm construction methods.
- Regular meetings and inspections from Environmental Assessment Practitioner / Environmental Control Officer and Engineer to confirm agreed method statement is being followed.
- Before final handover, inspections and snag list are compiled to ensure all necessary protection has been undertaken as per engineers design.

5.2 Typical general measures that should be implemented are

- The area of disturbance should be kept to a minimum to allow clearing of the construction right of way, excavation, layer works, construct works, backfill, to restore the construction right of way. This should not exceed the construction footprint width and must be kept to a minimum, for the wetland;
- Construction should be immediately followed by rehabilitation;
- Soil surfaces should not be left open for lengthy periods to prevent erosion;
- Sods must be stored and placed back immediately after trenches have been backfilled;
- Where possible, construction should take place during the dry season;
- Weather forecasts from the South African Weather Bureau of up to three days in advance must be monitored on a daily basis to avoid exposing soil or building works during a storm event. Appropriate action must be taken in advance to protect construction works should a storm event be forecasted;
- Appropriate erosion and sediment control measures should be implemented;
- Sediment barriers should be constructed across the entire construction site where necessary to prevent sediment flow into the wetland;
- Vegetation and soil should be retained in position for as long as possible, and should only be removed immediately ahead of construction / earthworks in any specific area;
- Remove only the vegetation where essential for the continuation of construction of services. 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.
- During final design stages erosion protection will be designed to comply to Municipal & Department of Transport 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.
- The attenuation ponds are a temporary storage facility and will only fill up in the event of heavy rainfall event.

5.3 Typical Plant and Resources required:

- Excavators;
- TLB;
- Dozer;

- Bob Cat;
- Tipper trucks for the delivery of bedding material and road fill material to be placed over the pipes;
- Small Compaction equipment for pipe bedding and restricted fill around the pipe culvert;
- Heavy compaction equipment for compaction of the bulk fill for roads and hardstands;
- Equipment for the construction of the brick headwalls as detailed;
- Equipment and labour for the positioning and packing of gabion and reno-mattress baskets or stone pitching, as appropriate and as agreed with the Environmental Assessment Practitioner / Environmental Control Officer, to control and obviate any erosion;
- Light equipment and labour to dress backfill, topsoil and re-vegetate all exposed areas.

5.4 Construction Methods:

- Remove topsoil and stockpile for later use.
- Excavate trench for pipe or culvert to the design level
- Construct storm water diversion berms where required.
- Place temporary diversion pipe if required to divert water
- Place bedding, lay pipes, place and compact selected fill over the pipeline.
- Backfill to specification.
- Construction of gabions
- Construction of headwalls
- Construction of swales
- Dress backfill, topsoil and re-vegetate all exposed areas.
- Stockpiles of construction materials must be clearly separated from soil stockpiles in order to limit any contamination of soils.
- The stockpiles may only be placed within demarcated stockpile areas, which must fall within the demarcated construction area. The contractor should avoid stockpiling materials in vegetated areas that will not be cleared. The slope and height of stockpiles must be limited to 2 m to avoid collapse.
- Stockpiled soils are to be kept free of weeds and are not to be compacted. The stockpiled soil must be kept moist using some form of spray irrigation on a regular basis as appropriate and according to weather conditions.

5.5 Storage

- No construction materials may be stored or disposed of within the delineated wetland or within the buffer zone of 30 m from the wetland.
- No concrete batching may take place within the delineated wetland or within the buffer zone of 30 m from the wetland.
- No refuelling may take place within the delineated wetland or within the buffer zone of 30 m from the wetland.
- Contamination of the soil and groundwater by construction liquid waste should be prevented by using drip trays or appropriate containment receptacles and bunding. Appropriate containment receptacles and bunding. Construction liquid waste, including toxic liquid waste, should be stored in leak-proof containers and taken to the closest authorised waste and recycling centre.

5.6 Rehabilitation

In areas where construction activities have been completed and no further disturbance is anticipated, rehabilitation and re-vegetation should commence as soon as possible.

- Profile the banks over the disturbed areas to an acceptable slope and replace topsoil;
- Plant indigenous sedge and grass material from the adjacent areas;

- Water plants thoroughly immediately after planting and continue to water every three days in the absence of more than 10 mm of rainfall until plants are established;
- Re-vegetation of disturbed areas must be undertaken with indigenous species and in accordance with the instructions issued by the Environmental Control Officer;
- Replanting activities should be undertaken at the end of the dry season (middle to end September) to ensure optimal conditions for germination and rapid vegetation establishment;
- Should plants not successfully establish within two growing seasons after the first planting, new plant material should be provided;
- Any weed or alien species that germinates during the contract period should be cleared by hand before flowering;
- Any erosion channels developed during the construction period should be appropriately backfilled (and compacted where relevant) and the areas restored to a condition similar to the condition before the construction erosion occurred.

6. Maintenance

- After construction the temporary sediment fence to be removed and replaced with a permanent fence;
- Fence to be regularly checked and maintain to ensure functionality;
- All storm water pipes and outlets to be checked for blockages;
- Swale to be checked to ensure no sediment and silts collect in the trench;
- All litter to be removed from storm water systems including swale and that no general waste is dumped in the wetlands;
- Lined and sealed VIPs to be fitted with an effluent overflow, the wet sludge can be removed by ordinary vacuum tankers. These tankers are the same as those used for emptying septic tanks.

7. Conclusion

All design and construction work will be carried out in accordance with the relevant construction specifications and in compliance with the Construction Health and Safety Specifications as well as the Construction Environmental Management Programme.

KANTEY AND TEMPLER CONSULTING ENGINEERS

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Pr. Eng. 20060264
ASSOCIATE DIRECTOR

ANNEXURE A

Site Locality Plan

ANNEXURE B

Stormwater Layout Drawing

ANNEXURE C

Master Layout of the Water Uses associated with the project

ANNEXURE D

Throttling Pipe sizes and outlet pipe sizes

ANNEXURE E

Stormwater Gabion Structure & Standard Details