

SERINA KAOLIN (PTY) LTD.

PORTION 5 OF CAPE FARM 1387 ADDITIONAL OFFICES AND AMENDED RESTAURANT IN NOORDHOEK

CIVIL ENGINEERING REPORT BULK AND INTERNAL SERVICES Revision 3

November 2017

Civil and Structural Engineers, Project Managers

Icon Consulting Engineers (PTY) LTD Reg. No. 2009/015534/07

Phone: 086 117 2774 **Fax:** 086 504 1050 **Email:** info@iconeng.co.za **Web:** www.iconeng.co.za **Address:** 3rd Floor, Castle Mews, 16a Newmarket Street, Cape Town 8001

Directors | Brennan Rutherford (Pr Eng, MBA, MSAICE, SACPCMP) | Nichol Jordaan (BTech Civil)

CONTENTS:

SECTION	DESCRIPTION	PAGE
1	Introduction	3
2	Professional Team	3
3	Terms of Reference	3
4	Level of Service	3
5	Location of the Planned Development	4
6	Topographical Information	4
7	Geotechnical Information	4
8	Land Use	4
9	Bulk Services	5
10	Internal Services	7
11	Conclusion	11

1. Introduction

Brennan Rutherford, a Professionally Registered Engineer (PrEng), and a Director with Icon Consulting Engineers was instructed by their client, Serina Kaolin (Pty) Ltd to prepare a Civil Engineering Services Report for the proposed additional Offices and amended Restaurant at Portion 5 of Cape Farm 1387 in Noordhoek.

It is hereby confirmed that the directors and staff of Icon Consulting Engineers, and the company itself has no connection with any portion of the development, whether privately or personally, except for the purposes of preparing the civil engineering services report.

2. Professional Team:

Function:	Company:	Contact Person:
Developer	Serina Kaolin (Pty) Ltd	Sybrand van der Spuy
Civil Engineer	Icon Consulting Engineers	Brennan Rutherford
Electrical Engineer	PJ Technologies	Jurgens Daniel
Traffic Engineer	ITS Engineers (Pty) Ltd	Pieter Arangie
Town Planner	Planning Partnership	Mauritz van den Heever
Architect	Mike Shaw Architects	Mike Shaw
Environmental Consultant	Doug Jeffrey Environmental Consultants	Doug Jeffrey

3. Terms of Reference:

The terms of reference for the Civil Engineering Services Report can be summarized as follows:

- Obtain all services information relating to the proposed development.
- Liaise with the City of Cape Town to identify the availability of roads and services.
- Provide a Civil Engineering Services Report.

4. Level of Service:

The design parameters used to determine the level of service for the Civil Engineering Services Report are in accordance with the following:

- The requirements of the City of Cape Town.
- The guidelines for Human Settlement Planning and Design, Volume 1 and 2, compiled under the patronage of the Department of Housing by CSIR Building and Construction Technology.
- City of Cape Town's policy for the management of urban stormwater.

5. Location of the Planned Development

Portion 5 of Cape Farm 1387 Noordhoek, is located on the northern side of Chapman's Peak Drive and is situated at the start of Chapman's Peak Drive. The proposed development is also situated west of the existing Noordhoek Village retail development and the De Goede Hoop Estate.

6. Topographical Information

A topographical survey of the proposed development has been undertaken by David Hellig Abrahamse.

1:50 000 Topographical Survey Maps and 1:10 000 Ortho Photos of the area are also available. The available contours are 20m and 5m respectively.

7. Geotechnical Information:

A detailed geotechnical investigation of proposed development has been undertaken by M van Wieringen and Associates. Geotechnical information is also available on the 1:250000 Geological Survey Mapping.

8. Land Use:

The following land uses, and approximate areas have been approved for the larger development on Portion 5 of Cape Farm 1387:

Use	Approved Extent
Residential Plots	28 No
Restaurant (with wine tasting and sales)	700 m ² GLA
Winery (with wine tasting and sales, farms offices and ancillary uses)	± 1821 m ²
Function Venue	300 guests (± 1151m ²)

It is now proposed to omit 1 residential erf and the 300 seat function venue and to add the following land uses or additional areas to the development:

Use	Additional Proposed
Existing Restaurant	225 m ² GLA
New Offices (Ph. 1)	930 m ² GLA
New Offices (Ph. 2)	3064 m ² GLA

The total development for Portion 5 of Cape Farm 1387 will therefore consist of the following:

Use	New Total Extent
Residential Plots	27 No
Restaurant (with wine tasting and sales)	925 m ² GLA
Winery (with wine tasting and sales, farms offices and ancillary uses – of which 254m ² are farms offices)	1740 m ²
Offices (Phase 1)	930 m ² GLA
Offices (Phase 2)	3064 m ² GLA

The areas mentioned above are approximate and are subject to change.

9. Bulk Services:

Bulk services investigations have been undertaken for a previous development proposal at Portion 5 of Cape Farm 1387 with the City of Cape Town. The existing development approval is for a larger development on the property which included the development of a winery, wine tasting room and sales, function room, farm offices, restaurant and residential units. The City has provided confirmation of the bulk services availability for the proposed development, in their report of the 26 May 2017. It must be noted that the servicing impact of the proposed development is similar to the allowances made for the existing approval.

9.1 Water:

The previous Serina Kaolin mining operation at Portion 5 of Cape Farm 1387 in Noordhoek obtained its water via an existing 40mm diameter water connection from the 110mm municipal watermain at the intersection of Chapman's Peak Drive and Avondrust Circle Road.

The City of Cape Town has confirmed that the elevation of the proposed development will provide water pressure problems and they have advised that a water storage facility and booster system be installed to provide the required pressure for the entire development.

The City of Cape Town has further confirmed that no bulk water pipelines or infrastructure under the control of the City of Cape Town's Bulk Water Branch is directly affected by the proposed development, and that the bulk supply system has sufficient water resource, treatment, and bulk storage and conveyance capacity to supply the estimated annual average daily demand of 61.0kℓ/d for the proposed development.

The existing 40mm connection would need to be abandoned and a new 160mm connection would need to be provided to service the entire site. This connection would be taken from the 160mm watermain at Avondrust Circle Road. The water storage facility and booster system would be located alongside the restaurant parking area.

The maximum water pipe size will be 160mm diameter.

9.2 Sewer:

The previous Serina Kaolin mining operation at Portion 5 of Cape Farm 1387 in Noordhoek operated off an existing conservancy tank system. The City of Cape Town has confirmed that a sewer masterplan for the area has been established but that the required pipe network may only be installed in a couple of years' time.

The City of Cape Town has further confirmed that the sewer discharge expected to be generated from the proposed development will have to be pumped to the 250mmØ sewer main at the intersection of Noordhoek and Silvermine Road. This collector sewer as well as the existing downstream network has sufficient capacity to accommodate the proposed development.

The City of Cape Town has also confirmed that the anticipated wastewater flow from the proposed development has been calculated at 49.5kl/d, and that their Wildevoelvlei Wastewater Treatment works has sufficient unallocated spare capacity to accommodate the development.

The required pipe network for the proposed development must be installed and pumped via a sewer pump station and rising main to the intersection of Silvermine Road and Noordhoek Drive, where the City of Cape Town has confirmed that capacity for the development exists. During the previous Serina mining operation, two 200mm pipelines were installed between their Noordhoek and their Fish Hoek mines. One of these pipelines will be utilized for the sewer rising main described above, as this existing pipeline crosses the sewer connection point at the intersection of Silvermine Road and Noordhoek Drive.

The maximum sewer pipe size will be 160mm diameter.

9.3 Roads:

Access to the development will be by way of the existing road access point off Chapman's Peak Drive. The evaluation of the traffic impact of the development on this road is being undertaken by ITS under separate cover.

The City of Cape Town will require access up to the development's Entrance Feature at all times for maintenance of roads and services and for refuse collection. Access will also be required within the development for emergency vehicles (ambulance, fire brigade, police etc). Any form of access control at the proposed Entrance Feature will have to consider this.

The Entrance Feature at the proposed development will be designed to allow entry and exit lanes. The access roads will allow comfortable movement of passenger, bus, municipal refuse and emergency vehicles. An adequate stacking distance at the proposed Entrance Feature entry lanes will be provided to minimise traffic congestion at Chapman's Peak Drive.

9.4 Stormwater:

The City of Cape Town has confirmed that new developments must adhere to the City of Cape Town's Management of Urban Stormwater Impacts Policy (Version 1.1 May 2009), which for this development would require;

- a. An 80% reduction in suspended solids and a 45% reduction in total phosphorous of the post development annual stormwater pollutant load, discharged from the site. This is based on a ½ year recurrence interval and a 24 hour storm. Typically, a swale, detention pond or permeable paving solution will achieve these parameters.

- b. Protect the stability of downstream channels. This would require a 24 hour extended detention of the 1 year storm.
- c. Protect downstream properties from fairly frequent nuisance floods. This would require that up to the 10 year peak flow must be reduced to the pre-development level.
- d. Protect floodplain developments and floodplains from adverse impacts of extreme floods. This would require that up to the 50 year peak flow be reduced to existing development levels. Evaluate the effects of the 100-year storm event on the stormwater management system, adjacent property, and downstream facilities and property. Manage the impacts through detention controls and / or floodplain management. The stormwater can be attenuated by means of a typical detention pond, a swale, permeable paving or some other suitable means.

We can confirm that all stormwater flow in excess of the 2 year pre-development flow will be accommodated on the proposed development in the form of detention ponds and a permeable paved system at the restaurant parking area, before it is allowed to exit the proposed development. Where required, berms and channels will be installed around the proposed development where stormwater flows need to be redirected towards the proposed ponds and permeable paved system.

The City of Cape Town has also confirmed that the existing 600mm diameter stormwater connection to the proposed site can be utilized as the development stormwater connection. The stormwater flow from the residential development proposed on a portion of the same site, which was previously approved, will also connect to the existing 600mm stormwater connection, but it will not influence the proposed restaurant and offices stormwater flow.

The pond and permeable paving system will be provided to reduce the stormwater run-off to the pre-development flows. In this manner erosion and stormwater damage can be minimised and the existing ground water system can be recharged.

The stormwater pipe sizes will be a maximum of 375mm diameter.

9.5 Electrical:

The evaluation of the developments electrical requirements has been undertaken by Jurgens Daniel of PJ Technologies under separate cover.

10. Internal Services:

The normal civil services will be provided for this development and will include surfaced roads with kerbs on both sides and under ground water, sewage and stormwater reticulation systems. These services will connect to the bulk services as detailed above.

10.1 Water:

The internal water pipes will be sized to cater for the development's peak water demand and fire requirements and will be constructed to the City of Cape Town's minimum acceptable standards. The developer will provide the entire water network including all pipes, valves, hydrants and bends.

10.1.1 Design Standards:

The water reticulation will consist of 110mmØ and 160mmØ uPVC Class 16 pipes.

10.1.2 Water Demand:

The water required for the proposed development is based on the following water demand and floor areas;

Use	Floor Area/No	Water Demand	Annual Average Daily Demand (AADD)	Peak Flow (PF=4)
Residential	27 No	1250 l/unit/d	0,3906 l/s	1.5624 l/s
Restaurant	925 m ²	550 l/100m ² /d	0,0589 l/s	0,2356 l/s
Winery	1740 m ²	550 l/100m ² /d	0,1108 l/s	0,4432 l/s
Offices (ph 1)	930 m ²	350 l/100m ² /d	0,0377 l/s	0,1508 l/s
Offices (ph 2)	3064 m ²	350 l/100m ² /d	0,1241 l/s	0,4964 l/s
Total			0,7221 l/s	2.8884 l/s

The AADD for the proposed development has been calculated at 0,7221 l/s with a Peak Flow of 2.8884 l/s. Together with the fire fighting requirement of 15 l/s, a fire flow duration of 4 hours, a minimum residual head of 15m and hydrants spaced at 120m, the main supply pipe will be sized to cater for 17.8884 l/s.

In previous applications for Portion 5 of Farm 1387, the proposed development's water demand was estimated at an AADD of 0,689 l/s with a peak flow of 2.756 l/s. The proposed additional offices and amended restaurant therefore has a slight increase in the water demand. It must be remembered that the water demand will occur at varying times due to their different operating times, and the total AADD or peak flow will rarely occur.

Although a potable water supply can be provided by the City of Cape Town to provide these water flows, it is the intention to develop alternative water resources at Chapmans Peak Estate, which would include rainwater harvesting, recycling of water, additional storage capacity (rainwater tanks and existing dam on site), and installing water saving devices within the proposed buildings. Treatment of this water will be undertaken to achieve acceptable potable water standards.

The storage capacity required for the booster flow is 500000 litres or 500 kilolitres. Separate fire storage tanks will have to be provided to cater for the offices and restaurants fire requirements.

10.1.3 Residual Pressures:

The minimum residual pressure designed for, under instantaneous peak demand, will be 25m. The maximum residual pressure designed for under zero flow conditions will be 90m.

10.1.4 Fire Flow:

The fire fighting requirements have been based on a design flow of 15 l/s at 15m residual head.

10.1.5 Proposed Connection to the Bulk Services:

The water connection for the proposed development will be taken from the proposed water storage tanks and booster pump system, which will be fed by the proposed new 160mm water connection from Avondrust Circle Road.

10.2 Sewer:

The sewer pipes for the proposed development will be sized to cater for the development's peak flow conditions. The sewer system will comprise of a waterborne sewer system and all proposed areas of the development will be served with sewer connections.

10.2.1 Design Standards:

The sewer reticulation will consist of 110mmØ and 160mmØ class 34 heavy duty uPVC solid wall pipes.

10.2.2 Estimated Sewerage Flow:

The sewer that will be generated from the proposed development is based on the following flows and floor areas;

Use	Floor Area	Sewer Generated	Daily Dry Weather Flow (DDWF)	Instantaneous Peak Wet Weather Flow (IPWWF)
Residential	27 No	875 ℓ/unit/d	0,2734 ℓ/s	0,8202 ℓ/s
Restaurant	925 m ²	385 ℓ/100m ² /d	0,0412 ℓ/s	0,1236 ℓ/s
Winery	1740 m ²	385 ℓ/100m ² /d	0,0775 ℓ/s	0,2325 ℓ/s
Offices (ph 1)	935 m ²	245 ℓ/100m ² /d	0,0265 ℓ/s	0,0795 ℓ/s
Offices (ph 2)	3064 m ²	245 ℓ/100m ² /d	0,0869 ℓ/s	0,2607 ℓ/s
Total			0,5055 ℓ/s	1.5165 ℓ/s

The daily dry weather flow (DDWF) calculated for the proposed development is 0,5055 ℓ/s, with an instantaneous peak wet weather flow (IPWWF) of 1.5165 ℓ/s. This peak design flow rate makes allowance for 70% water usage, 20% extraneous flow and a peak factor of 2,50.

In previous applications for Portion 5 of Farm 1387, the proposed sewer generated on the development was estimated at a DDWF of 0,483 ℓ/s with an instantaneous peak wet weather flow of 1.450 ℓ/s. The proposed offices and restaurant therefore has a slight increase in the total sewer generated. It must be remembered that the amount of sewer generated will occur at varying times due to their different operating times, and the total DDWF and IPWWF will rarely occur.

10.2.3 Proposed Connection to Bulk Services:

Due to the elevations on the proposed development and surrounding areas, the internal sewer mains will have to connect to the bulk main at the Silvermine and Chapman's Peak Drive intersection via a sewer pumpstation.

10.3 Roads:

10.3.1 Roads:

The proposed internal roads to the development will be surfaced and will be in accordance with the theme of the development.

10.3.1.1 Road Widths:

All of the internal roads will be a minimum of 5,5m wide. The minimum lane width between parking areas will be 7m.

10.3.1.2 Pavement Design:

The proposed pavement design internal to the proposed development will be as follows;

Type	Surfacing	Bedding	Sub Base	Sub Grade
Roads	75mm Block Paving	20mm Sand Material	200mm G5 Material	150mm G7 in-situ Material
Parking	75mm Block Paving	20mm Sand Material	125mm G5 Material	150mm G7 in-situ Material

The surfacing options mentioned above are preliminary and are subject to change.

10.3.1.3 Road Design:

The proposed road areas will have a typical cross-fall cross section with mountable kerbing on the lower side to channel the stormwater runoff towards the stormwater outlets.

10.4 Stormwater:

The proposed development comprises of a number of open space areas, roads and parking areas that can be used for the ponds and permeable paved system for the 50 year storm event. The ponds and permeable paved system will also assist in the recharging of the underground water system. All stormwater generated on the proposed development will be managed and discharged into the ponds and the permeable paving system, before exiting any portion of the site.

10.4.1 Design Standards:

The stormwater reticulation will consist of 160mmØ and 200mmØ class 34 uPVC pipes and 300mmØ, 375mmØ and 450mmØ class 100D stormwater pipes.

10.4.2 Stormwater Flow:

The proposed stormwater system will be designed to accommodate the increased surface water runoff.

The sizing of the underground piped stormwater system will be designed to accommodate the 2-year storm event and the increased 50-year run-off will be accommodated in a series of detention ponds and a permeable paved system.

For the total proposed development (residential, offices, winery and restaurant), the 2 year pre-development flow has been calculated at 0.676m³/s, the 50 year pre development flow at 2.258m³/s and the 50 year post development flow at 1.697m³/s. The permeable paved system would need to accommodate a storage volume of 1000m³ and the detention ponds would need to accommodate a storage volume of 3000m³.

10.4.3 Proposed Connection to Bulk Services:

The City of Cape Town has confirmed that the existing 600mm diameter stormwater connection to the proposed site can be utilized as the stormwater connection.

10.5 Electrical:

The evaluation of the developments electrical requirements has been undertaken by Jurgens Daniel of PJ Technologies under separate cover.

10.6 Telkom:

The Telkom network will be designed by Telkom SA. Telkom SA will require the developer to install the entire underground pipe network according to their specifications and designs. Telkom SA will install and commission the Telkom cable network upon application by the erf owner or operator for a telephone service.

11. Conclusion:

The civil services report for the proposed additional Offices and amended Restaurant at Portion 5 of Cape Farm 1387 in Noordhoek confirms that the proposed development can be adequately serviced with external and internal services. The City has provided confirmation of the bulk services availability for the proposed development, in their report of the 26 May 2017.



Brennan Rutherford
Icon Consulting Engineers

16 November 2017

Date