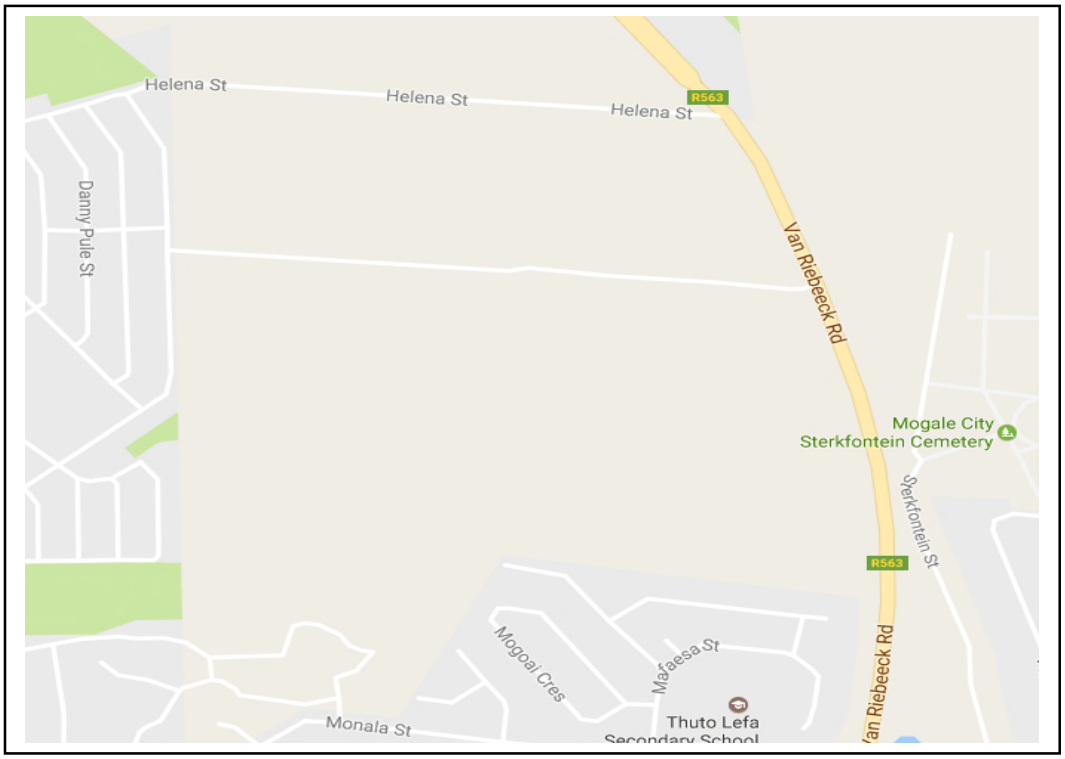
Munsieville Extension 10 Housing Development



OUTLINE SCHEME REPORT

PROPOSED DEVELOPMENT OF MUNSIEVILLE EXTENSION 10 (PORTIONS 26, 37, 40 & 41 OF FARM PAARDEPLAATS 177-IQ)

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UVUKO Civils Pty Ltd
Krugersdorp

28 JANUARY 2017

PROJECT DETAILS

PROJECT	:	COMPILATION OF OUTLINE SCHEME REPORT FOR THE PROPOSED DEVELOPMENT OF MUNSIEVILLE EXTENSION 10 HOUSING PROJECT
LOCATION	:	PORTIONS 26, 37, 40 AND 41 OF FARM PAARDEPLAATS 177-IQ, MUNSIEVILLE, KRUGERSDORP
REPORT STATUS	:	DRAFT
DATE	:	28 JANUARY 2017
CLIENT	:	UVUKO CIVILS MAINTENANCE AND CONSTRUCTION
REPRESENTED BY	:	URBAN DEVCO TOWN PLANNERS Manda Smit (Ms)
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1. INTRODUCTION

1.1 Background

Uvuko Civils Maintenance and Construction Pty Ltd appointed JAKO Consulting Engineers Pty Ltd to compile an Outline Scheme Report of the preliminary assessment of the potential capacity to provide engineering/municipal services for the proposed Munsieville Extension 10 Housing Development.

The development is earmarked on property Portions 26, 37, 40 and 41 respectively of Farm Paardeplaats 177-IQ, in Munsieville, Krugersdorp.

1.2 Developers and Implementing Agents

The Owners and Developers of the property are Uvuko Civils Maintenance and Construction Pty Ltd, and Erf 348 Monument CC respectively.

Urban Devco Town Planners are the appointed Town Planners for the development. The Town Planners are represented by Ms. Manda Smit.

The Outline Scheme Report is a requirement for the rezoning of the property.

1.3 Site visits and information gathered

Jonathan Ashilley of JAKO Consulting Engineers visited the site for the development on 20 and 23 January 2017 respectively. These visits were followed by a meeting with Mr. Hanno van Helsdingen of Urban Devco on 23 January 2017 for further briefing on the scope of services and information required for the compilation of the Outline Scheme Report.

The following officials from the Mogale City Local Municipality were consulted regarding the feasibilities, capacities and constraints of provision of engineering services infrastructure to the proposed development:

- Violet Beetha (Ms) and Thembi Ngcukana respectively of the Water and Sanitation Department, and
- Noko Makitla (Ms) and Abdulla respectively of the Roads Department.

1.4 Development location /Site Description

The size of the property is approximately 28.64 hectares, comprising Portions 26, 37, 40 and 41 respectively of Farm Paardeplaats 177-IQ, in Munsieville, Krugersdorp. The geographical coordinates are 26^{o} 3’ 57.11” South, and 27^{o} 45’ 24.9” East respectively.

The property is bounded by the following features:

- to the north by Helena Street which also borders the Sterkfontein Psychiatric Hospital;
- to the east by Van Riebeeck Road/R563 provincial road.
- to the west by Portions 31, 42 and 85 of Farm Paardeplaats 177-IQ, bordering Munsieville Extension 4; and
- to the south by Portion 1 of Farm Paardeplaats 177-IQ, adjoining Munsieville Extension 5.

Figure 1 shows layout of the proposed development site in relation to boundary features

Ownership and corresponding Title Deeds of the separate Portions of the Farm Paardeplaats 177-IQ are detailed below.

Table 1 shows Ownership of the Portions of the Property and their Title Deeds

Portion	Area (ha)	Ownership	Deed of Transfer
26	5.1364	Uvuko Civils Maintenance and Construction (Pty) Ltd	T41934-2014
37	5.1806	Uvuko Civils Maintenance and Construction (Pty) Ltd	T70326-2014
40	10.0743	Uvuko Civils Maintenance and Construction (Pty) Ltd	
41	8.2527	Erf 348 Monument CC	T70327-2014

1.5 Details of proposed development

The schedule of development tabulated below summarises outcome of the town planning scheme applicable to the Munsieville Extension 10 development.

The schedule summarises the following:

1.5.1 **Development Phase A**

- Residential development : Bond Housing (2 erven)
- Height zone : 4 storeys
- Number of Units : 536 (3,5734 hectares)
- Parks : 4 Erven (0.6460 hectare)

1.5.2 **Development Phase B**

- Residential development : Bond Housing (2 erven)
- Height zone : 4 storeys
- Number of Units : 468 (3.1198 hectares)
- Park : none

1.5.3 **Development Phase C**

- Residential development : Bond Housing (2 erven)
- Height zone : 4 storeys
- Number of Units : 501 (3,3377 hectares)
- Park : 1 Erven (0.5043 hectare)
- Crèche : 1 Erven (0.5429 hectare)
- Offices : 1 Erven, 2 storeys (0.2394 hectare)

1.5.4 **Development Phase D**

- Residential development : Bond Housing (2 erven)
- Height zone : 4 storeys
- Number of Units : 311 (2.0708 hectares)
- Park : none

1.5.5 **Development Phase E**

- Residential development : FLISP/SOCIAL housing (2 erven)
- Height zone : 4 storeys
- Number of Units : 298 (1.9883 hectares)
- Park : none

1.5.6 **Development Phase F**

- Residential development : FLISP/SOCIAL Housing (2 erven)
- Height zone : 4 storeys
- Number of Units : 543 (3.6184 hectares)
- Park : none

1.5.7 **Development Phase G**

- Type of development : Business (2 erven)
- Height zone : 3 storeys
- Total Area : 1.9966 hectares

1.5.8 **Development Phase H**

- Type of development : Commercial – Filling Station (2 erven)
- Height zone : 1 storey
- Total Area : 0.5414 hectare

1.5.9 **Development Phase I**

- Type of development : Educational (2 erven)
- Height zone : 4 storeys
- Total Area : 3.8493 hectares

2. TERMS OF REFERENCE

The purpose of the Outline Scheme assessment is to determine the feasibility and capacities of any bulk infrastructure services, existing or proposed with the view to servicing the proposed development.

The report therefore presents the findings of a preliminary investigation of the feasibility relating to bulk services, and by extension, further sets out the criteria and standards for the internal services.

The engineering services addressed in this report are the following:

- Potable water supply
- Sewage (or wastewater) collection and drainage
- Stormwater management, and
- Access Road(s) and Internal Streets

3. ENGINEERING DESIGN CRITERIA

The following design standards and guidelines were used as references for the capacity assessment of roads, stormwater drainage, water supply and sewage drainage for the development:

- *Guidelines for Human Settlement Planning and Design*, CSIR Building and Construction Technology, Boutek, “Red Book” latest edition;
- *Road Drainage Manual,* SANRAL, 5 Edition (October 2007);
- *Guidelines for Civil Engineering Works,* Dept of Public Works, PW 347-2004
- Standards and Specifications of Johannesburg Roads Agency Limited
- Standards, Specifications and Policies of Mogale City Local Municipality, MCLM.

2. BULK INFRASTRUCTURE SERVICES

4.1 Bulk Water Supply

4.1.1 Estimated Water Demand

The Annual Average Daily Demand (AADD) for the proposed development is calculated as follows:

Table 2 : Calculation of Annual Average Daily Demand

Development Type	No. of Units	AADD per Unit (l/day)	Total AADD (kl/day)
Low-rise multiple-dwelling unit (Residential II and III)	2,676	800.0	2,140.8
Parks		1.150 ha	15.0
Business and Offices		2.240 ha	89.6
Filling Station		0.5414 ha	21.7
Educational and Crèche		4.390 ha	30.0
TOTAL OF AADD			**2,297.10**

The peak flow assumes an Instantaneous Peak factor of 4.0 and a Summer Peak factor of 1.0 for the development.

The Peak Flow of Water Demand will therefore be 137 litres per second (137l/s), which is equivalent to 11.84MLD.

4.1.2 Reservoir Storage

The required reservoir storage is calculated as the sum of the following:

- Balancing volume : 48hr x AADD
- Fire flow requirements : High Risk – fire flow allowance provided for storage

The table below shows the calculation of required water storage:

Table 3: Calculation of Volume of required Water storage

Reservoir Storage Component	Volume (kl)
Balancing volume : 48hr x AADD	4,594.0
Fire flow (High Risk)	17.28
Total Storage required	**4,611.28**

4.1.3 Water Supply Infrastructure

Information gathered from the Water and Sanitation department of MCLM indicated that there is an existing 160mm diameter bulk water pipeline along the Van Riebeeck road servitude adjoining the development property.

However, the capacity of this pipeline is inadequate to supply the proposed development in addition to its current supply commitment.

Table 4: Sizing of Bulk Water Supply Pipeline

Design Input	Output
AADD (kl/day)	2,297.0
Assumed Peak Factor	1.5
Maximum Daily Demand (kl/day)	3,445.5
Maximum Daily Demand (m^3/s)	0.040
Assumed Diameter of Bulk Pipeline (mm)	255

The estimate of the targeted population on a fully developed and occupied property is approximately 17,000. This assumes a size of 6 persons per family unit for a high density development.

Preliminary estimates of total water demand would therefore require an additional ±255mm diameter bulkwater supply pipeline to be installed directly from the Dan Pienaar Water Reservoir and Elevated Tower over a distance of approximately 1km to the property.

4.2 Bulk Sewage

4.2.1 Estimated Sewage flow

The average daily sewage flow (ADF) is assumed to be approximately 80% of the AADD water demand which amounts to 640l/day per unit. For 2,676 units, the total average sewage flow from the development will therefore be 1,713kl/day or 0.020m^3/s.

The peak sewage flow assumes a peak factor of 2.5 and a 15% allowance for extraneous flow. For 2,676 units, the peak sewage flow will be approximately 4,925kl/day or 0.057m^3/s.

The average daily flow from the business, commercial and educational development is estimated to be 40kl/day. The peak flow from the business et al using a peak factor of 1.5 and same allowance for extraneous flow amounts to 69kl/day.

The total maximum flow from the property when fully developed is therefore 4,994.0kl/day which is 0.060m^3/s.

4.2.2 Bulk sewage Infrastructure

Assuming a full-bore velocity of 0.7m/s over a general natural slope, the size of outfall pipe required to discharge maximum sewage from the developed property is ±300mm OD diameter uPVC pipe.

4.2.3 Sewage pumping/Wastewater Treatment

The ±300mm diameter sewage outfall sewer pipeline designed under subsection 4.2.2 above will be installed from the lowest point of the property to discharge by gravity into the nearest Sewage Pumping Station. Direct sewage discharge to the nearest wastewater treatment plant will necessitate a measure of pumping.

The Sewage Pumping Station is located at the lowest point in Mayibuye Township about 1.4km away from the property along Helena Street. Sewage will then be pumped under pressure to the near wastewater treatment plant.

There is an existing 160mm diameter sewer collector pipeline running midway across the property from Munsieville Extension 5, discharging at a point within the road servitude along Van Riebeeck road.

Preliminary investigation did not reveal the existence of an outfall sewer pipe adjacent to the property to discharge flow into the Pumping Station. According to Water and Sanitation officials, municipal system data update with respect to recent water and sanitation infrastructure installation in the vicinity of the property is lagging.

4.3 Stormwater Management

The guiding principle underlying the stormwater management strategy is that, where possible, the peak runoff from the post-developed site should not exceed that of the pre-developed site for the range of storm return periods from 1: 10 to 1:50 years return periods.

Where possible, measures should be incorporated into the site development plan to attenuate the post-development flows to pre-development rates with reference to 1:25 year return periods.

The stormwater network will be designed to accommodate the minor storm event of 1 in 2 years in pipes or open channels.

The major storm (1 in 50 years) will be managed through controlled overland flows and above-ground attenuation storage, where possible.

Mogale City Municipality adopts standards and specifications of Johannesburg Roads Agency Limited for the planning and design of the municipal roads and stormwater management.

Preliminary investigation did not reveal the existence of any stormwater discharge pipeline within the vicinity of the property.

4.4 Access Roads and Traffic management

The main access to the development site is along Van Riebeeck road/R563 provincial road, a distance of approximately 7km from Krugersdorp.

With reference to the development planning layout, the proposed main access road (entrance and exit) to the property is at the intersection with Van Riebeeck road/R563 provincial road.

For a high density development, there is the probability that traffic congestion will be realized at this entrance and exit point.

In consultation with the municipal Roads department, a traffic signal for a 3-way intersection is recommended as a preliminary measure to mitigate the effect of congestion.

3. INTERNAL INFRASTRUCTURE SERVICES

5.1 Water reticulation

The design of the internal water supply system will comply with the following criteria:

- Annual Average Daily Demand (AADD) is 800 kl/d
- Internal pipes will be sized to cater for the instantaneous peak demand and fire flow. The applicable peak factor is dependent upon the number of units served
- Reticulation Network minimum pipe size is 75mm diameter
- Minimum residual pressure is 8m (peak flow) and 6m (peak +fire flow)
- Metered connection to each unit
- Pipe materials: Mains – uPVC or similar; Erf connections – 20mm class 16; Type 5 SABS 533 or polycop class 16 JASWIC or similar approved
- Pipe class (pressure rating): dictated by static water pressure (class 9)
- Isolating valves – position and type to comply with municipal standards.
- Fire flow:
    - Fire hydrant, spaced maximum 240m apart
    - Minimum flow rate = 8.33l/s per hydrant
    - Minimum residual head = 6m

5.2 Sewer reticulation

The sewerage system will be designed to comply with the following criteria:

- Pipe material is solid wall type uPVC
- Pipe sizes:
    - Network : 160mm diameter (minimum)
    - Erf connections : 110mm diameter (minimum)
- Minimum grades:
    - Drains : 1:60 (Erf connections)
    - Sewers : 1:180 for a 160mm diameter pipe
- Pipe lengths : 80m (maxi) between manholes
- Pipe cover : 1.2m below roadways/footways; 0.6m elsewhere

5.3 Stormwater reticulation

The Internal stormwater system will comply with the following criteria:

- Minor storms (1:2 year) managed through:
    - network of kerb inlets, grid inlets, open channels and below-ground pipes
    - channels and pipes to be designed to flow full (marginal freeboard allowance) with minimum self-cleansing velocity in the range of 0.75 – 1.0m/s.
- Major storms (1:25 and 1:50 year) to be managed through:
    - overland flow via internal streets, footways and attenuation storage within open and within internal street network as appropriate;
- Minimum pipe diameter is 450mm;
- Pipe material : concrete or spiral HDPE (subject to municipal approval)

- Maximum use of 5 different parks in the development will be used as detention systems including:
    - swales (open grass channels;
    - permeable surfacing;
    - water storage and re-use,
    - etc

5.4 Internal (Roads) Streets

The internal roads will comply with the following criteria:

- Minimum centreline radius : 15m (widening at bends where appropriate)
- Minimum kerb radius : 8-10m
- Longitudinal gradients : 0.5% (mini) and 25% (maxi)
- Vertical curve mini length : 20m
- Cross fall/camber : 2 – 4%
- Road width : 3m (mini)
- Surfacing : asphalt Premix or Block paving (subject to municipal approval);
- Layerworks : dictated by traffic loads, geotechnical investigation and municipal standards

6. COST ESTIMATES OF BULK SERVICES

Bulk Water and Sanitation services infrastructure required for this development and their cost estimates are:

- Installation of ±1200m of ±255mm diameter bulk water supply pipeline from Dan Pienaar Water Reservoir to the development site is R725,000.00.
- Installation of ±1400m of ±300mm diameter Outfall Sewer pipeline from developed property to the Sewage Pumping Station is R1,000,000.00.

Total cost estimate for installation of Water and Sewerage bulk services infrastructure is R1,725,000.00.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 The findings and conclusions in this report are based on the outcomes of site visits, meetings with the developer's representative, and municipal officials and preliminary engineering planning.

7.2 Water for the proposed development will be provided by installing a ±255mm diameter bulk supply pipeline directly from the nearest Reservoir approximately 1.2km away.

7.3 Bulk sewage flow from the proposed development will be drained through a proposed ±300mm diameter pipeline to be installed to discharge to the Sewage Pumping Station at Mayibuye Township, about 1.4km away.

7.4 Stormwater generated from the development site will be managed within the site to ensure the runoff rates for the full spectrum of design storms do not exceed the runoff rates for the pre-developed site, where feasible. The minor storms will be managed within the

formal stormwater system comprising inlets, channels, and pipes. The major storms will be conveyed and managed overland through internal streets and open spaces.

7.5 Access to and from the site will be along Van Riebeeck road/R563 provincial road. A 3-way traffic signal is therefore recommended as a measure to mitigate the effect of traffic congestion at the intersection.

APPENDICES

APPENDIX A

Layout Showing Proposed Development

APPENDIX B

Layouts Showing Existing Municipal Infrastructure in the vicinity of the Development Site

APPENDIX C

Layouts Showing JRA Roads and Stormwater Standard Drawings

APPENDIX D

Photos of Some of the Existing Features on the Development Site