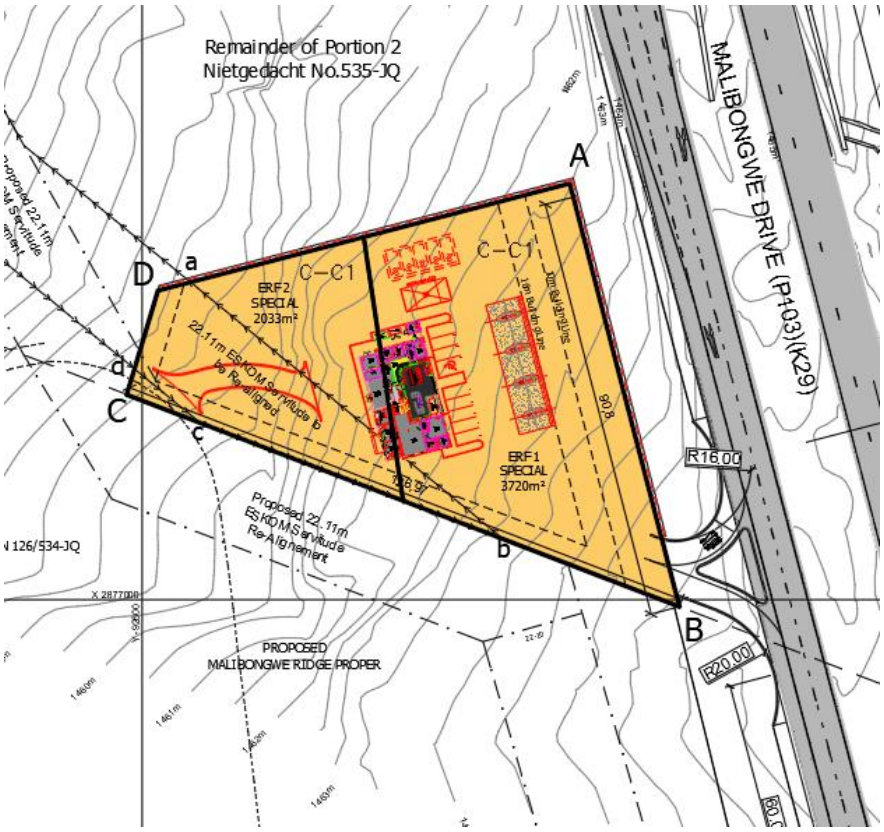
OUTLINE SCHEME REPORT FOR THE PROVISION OF MUNICIPAL SERVICES FOR:

COSMO CITY X55

WATER & SANITATION



Prepared for: Johannesburg Water 17 Harrison Street Marshalltown Johannesburg	**Prepared by:** Civil Engineering Developments PO Box 674 Newlands 0049	**Client:** Cosmopolitan Projects Building F Hertford Park Bekker Street Midrand 1685

Report no: 1130X55-W&S-OSR-R0	**Revision:** 0	**Status:** Approval	**Date:** November 2021

DOCUMENT SUMMARY SHEET

Document Number:	**Electronic Reference:**	**Status:**	**Date:**
1130X55-OSR-W&S-R0	1130-55-Reports/W & S	For Approval	November 2021
Document Title:	OUTLINE SCHEME REPORT – COSMO CITY EXTENSION 55		
Synopsis	Civil Engineering Developments was appointed by Cosmopolitan Projects to compile an Outline Scheme report for the provision of municipal services to Cosmo City Extension 55. The purpose of this report is to address the comments and requirements of Johannesburg Water regarding the provision of municipal services to Cosmo City X55. It will also enable the reader to determine the level and extent of services to be provided.		
Contact Person:	E Beetge (082 579 9587 eben@cedholdings.co.za)		
Prepared For:	Client Name: Cosmopolitan Projects Contact Person: Herman Terblanche Address: Building F Hertford Park Bekker Street Midrand 1685 Tel: (011) 541 3800		

Quality Verification

Civil Engineering Developments is a multidisciplinary consulting civil engineering firm. CED is committed to quality by ensuring complete client satisfaction through the provision of innovative and cost effective engineering services.

	Name	**Signature**	**Date**
Compiled By:	E Beetge		04-11-2021
Reviewed By:	C Pretorius		04-11-2021

CONTENTS

Item **Page No.**

APPENDICES

1. INTRODUCTION

Civil Engineering Developments was appointed by Cosmopolitan Projects to compile an Outline Scheme report for the provision of municipal services to Cosmo City Extension 55.

The purpose of this report is to address the comments and requirements of Johannesburg Water regarding the provision of municipal services. It will also enable the reader to determine the level and extent of services to be provided.

This report consists of three (3) main sections, discussed in detail below, namely:

- Paragraph 2 General Information
- Paragraph 3 Water Supply
  Paragraph 4 Sewer Drainage

2. GENERAL INFORMATION

2.1. Description of the Proposed Development

Cosmo City X55 is situated on part of portion 2 of the farm Nietgedacht 535-JQ, with total area measuring approximately 0.5735 hectares.

2.2. Locality

Cosmo City X55 is bound by portion 2 of the farm Nietgedacht 535-JQ on the northern and western boundary. The K29 Malibongwe Drive forms the eastern boundary, and the southern bounday are defined by erf 4 Malibongwe Ridge Proper township.

Figure 1: Locality Plan –Cosmo City x55

Access to the site is obtained through Malibongwe Drive. The property slopes in a north-western direction towards the R114 Old Pretoria Road.

The Cosmo City X55 development consists of the following erven:

ZONING	LAND USE	AREA (Ha)	NUMBER OF ERVEN
SPECIAL	PUBLIC GARAGE	0.5753	2

* FAR of 0.15 applied for.

Refer to Appendix A for the proposed Township Layout Plan.

3. WATER SUPPLY

3.1. General Information and Status Quo

The Lion Park Development (which includes Cosmo City X55 (previously X21)) was added to the spatial development framework of Johannesburg Water under the Cosmo City reservoir region in July 2008. The latest GLS Masterplan (Boschkop Honyedew Randpark Ridge & Cosmo City Reservoir Water Sub-Districts, Dated October 2016, Ref: JWAT-1206-03-41-1016) makes provision for a bulk waterline will from the Cosmo City reservoir to the proposed Lion Park reservoir. Recently as part of the Lion Park Development (Cosmo City X33 to X49) this 900ND bulk waterline had been extended from South Africa Drive up to the existing 450mm dia. steel pipe road crossing at Malibongwe Drive, unlocking water supply to the Lion Park development.

3.1.1. Existing Water Network and current Master plan

The proposed Cosmo City X55 Township falls within the Cosmo City Reservoir Lion Park PRV Zone with a direct supply connection from the recently constructed 900ND bulk waterline. The adjacent Malibongwe Ridge Proper development also falls within the Cosmo City Reservoir Lion Park PRV Zone and already constructed a 250mm diameter water supply line from the 900ND bulk pipeline.

3.1.2. Design Methodology

The design of the water reticulation network will be done according to the latest edition of the design guidelines for water reticulation and supply issued by the Water and Sanitation Division of Johannesburg Water. *(Johannesburg Water (Pty) Ltd Guidelines and Standards for the design and maintenance of water and sanitation services (July 2016*)

The water reticulation will be designed by computer assisted “Wadiso” programmes, as an integrated part of the Johannesburg water network. The base information was obtained from Johannesburg Water regarding water supply, with design criteria as summarised in paragraph 3.2.

3.2. Water Design Criteria

The following Table lists the service and design standards to be applied for the proposed development:

	Design Standards	
1	Average annual daily demand (AADD) • Garages	0.4 kl / 100m² floor area / day
2	Peak hour demand • Peak hour factor (PHF) • Peak hour demand	 4.0 PHF x AADD
3	System Heads • Maximum static head (no demand) • Minimum residual head under peak conditions	 90 m 25 m
4	Fire criteria (Industrial High Risk) • Flow at any one hydrant • Minimum pressure at fire • Maximum spacing of fire hydrants	 25 l/s 20 m 180 m
5	Linear pipeline velocity Maximum under peak domestic conditions Maximum under peak fire conditions	 1.5 m/s 2.0 m/s
6	Pipe material	mPVC Class 16
7	Boundary roughness	0.1 mm
8	Flow Formula	D'Arcy Weissbach

3.3. Calculated Water Demand

According to the Design criteria provided in paragraph 3.2 above, the Average Annual Daily Demand (AADD) for the proposed township is calculated as follow:

Proposed AADD:

Public Garage:

862.95 (5753m² X 0.15) m² floor area @ 0.4 kl / 100m² / day = **3.45 kl / day (0.04 l/s)**

Peak flow = 0.16 l/s

3.4. Water Reticulation

As per paragraph 3.1.1 water supply towards Cosmo City X55 will be obtained through the extension of the existing 250mm diameter water supply pipeline installed for the adjacent Malibongwe Ridge Proper development. A new 200mm diameter water pipeline linking up with the existing 250mm dia. waterline inside Sky Avenue, will be constructed inside Sky Avenue Road reserve up to the northern boundary of Malibongwe Ridge Proper. This line will have sufficient capacity for future water connections to the business stands (Erf 4) located adjacent to Cosmo City X55.

A new 3m wide servitude will be registered across the northern business stand (Erf 4 Malibongwe Ridge Proper) from Sky Avenue towards the north-western corner of Cosmo City X55 with a dedicated 160mm diameter waterline from the 200mm diameter line to service Cosmo City X55.

Refer to Appendix B for the proposed Water Layout Drawing.

4. SEWER DRAINAGE NETWORK

4.1. General Information and Status Quo

The Lion Park Development was added to the spatial development framework of Johannesburg Water in July 2008. The latest GLS Masterplan (Western Klein Jukskei (Pumped), Dated October 2016, Ref: JWAT-1206-03-41-1016) indicates that Cosmo City X55 falls within the Zandspruit pump station basin, with gravity lines draining through Malibongwe Ridge Proper towards the pump station.

4.1.1. Existing Sewer Network and Sewer Masterplan

The nearest existing 160mm dia municipal sewer is located inside Sky Avenue (in Malibongwe Ridge Proper) approximately 300m from Cosmo City X55, draining towards the Zandspruit outfall sewer and Zandspruit pumpstation as per the latest Master Plan.

4.1.2. Design Methodolgy

The sewer design will be done according to the design guidelines for sewer mains and sewer drainage systems in the Johannesburg Water area. *(Johannesburg Water (Pty) Ltd Guidelines and Standards for the design and maintenance of water and sanitation services (January 2013*).

The sewer reticulation will be designed by computer assisted "Modelmaker and Pipemaker" programmes, as an integrated part of the Johannesburg sewer network. The base information was obtained from Johannesburg Water regarding sewer supply, with design criteria as summarised in paragraph 4.2.

4.2. Sewer Design Criteria

The following Table lists the service and design standards to be applied for the proposed development:

	Design Standards	
1	Sewerage outflow per day • Garages	0.22 kl / 100m² floor area / day
2	Peak factor	2.3
3	Sewer capacity	Pipes Shall be designed to run at 67% full, measured in terms of flow depth
4	Provision of stormwater infiltration	15%
5	Flow formula	Manning n = 0.013
6	Minimum velocities in sewers	0.70 m/s at full flow
7	Minimum pipe size for reticulation	160 mm internal diameter
8	Minimum gradients 160mm dia 1:140 200mm dia 1:200	
9	Fall through manholes	80 mm
11	Maximum manhole spacing	80m
14	Pipe material	Structured wall uPVC pipes SABS 1601 Class 400 up to 400 mm diameter.
15	Sewer manholes	Manhole concrete rings for manhole depths up to 3m shall be 1000mm dia

4.3. Calculated Sewer Demand

Proposed AADD:

Public Garage:

862.95 (5753m² X 0.15) m² floor area @ 0.22 kl / 100m² / day = **1.9 kl / day (0.02 l/s)**

Peak flow = 0.046 l/s

4.4. Sewer Reticulation

As the invert level of the existing municipal sewer line inside Sky Avenue road reserve is located at a higher elevation than the low point of the Cosmo City X55 development area, a new internal sewer pump station will be constructed inside the development area with a new 110mm sewer rising main pumping to the existing sewer.

A new 3m wide water and sewer servitude will be registered across Erf 4 Malibongwe Ridge Proper to accommodate the new water and sewer services for Cosmo City x55

Refer to Appendix C for the proposed Sewer Layout Drawing.

5. CONSTRUCTION COST ESTIMATES

Description	Unit	Qty.	Rate	Amount (R)	Totals (R)
Pipelines, excavations, fittings, etc.					
200mm dia uPVC/Class 16 pipes complete	m	527	R 700.00	R 368 900.00	
160mm dia uPVC/Class 16 pipes complete	m	97	R 550.00	R 53 350.00	
Valves, etc:					
Isolating Valves	no.	2	R 5 500.00	R 11 000.00	
Valve Boxes	no.	2	R 1 000.00	R 2 000.00	
Watermeter	no.	1	R 20 000.00	R 20 000.00	R 455 250.00
Sewer pipelines, excavations, etc:					
110mm dia sewer rising main in trenches	m	300	R 550.00	R 165 000.00	
Other elements:					
Sewer pumpstation	no.	1	R 300 000.00	R 300 000.00	
Connect to Existing Sewer Network	no.	1	R 5 000.00	R 5 000.00	R 470 000.00
Sub-Total for Water					R 925 250.00
Plus:					
Preliminaries & General @ 12.5%					R 115 656.25
Profesional fees @ 10%					R 92 525.00
Total Estimated Water Cost for Cosmo City X55 (Excl. VAT)					**R 1 133 431.25**

6. SUMMARY AND CONCLUSION

Review of the existing Joburg Water services master plans indicated that the proposed Cosmo City X55 development can be accommodated within the existing water (250mm dia. pipeline inside Sky Avenue) and sewer (160mm diameter sewer line Sky Avenue) network.

APPENDIX A:

PROPOSED TOWNSHIP LAYOUT PLAN.

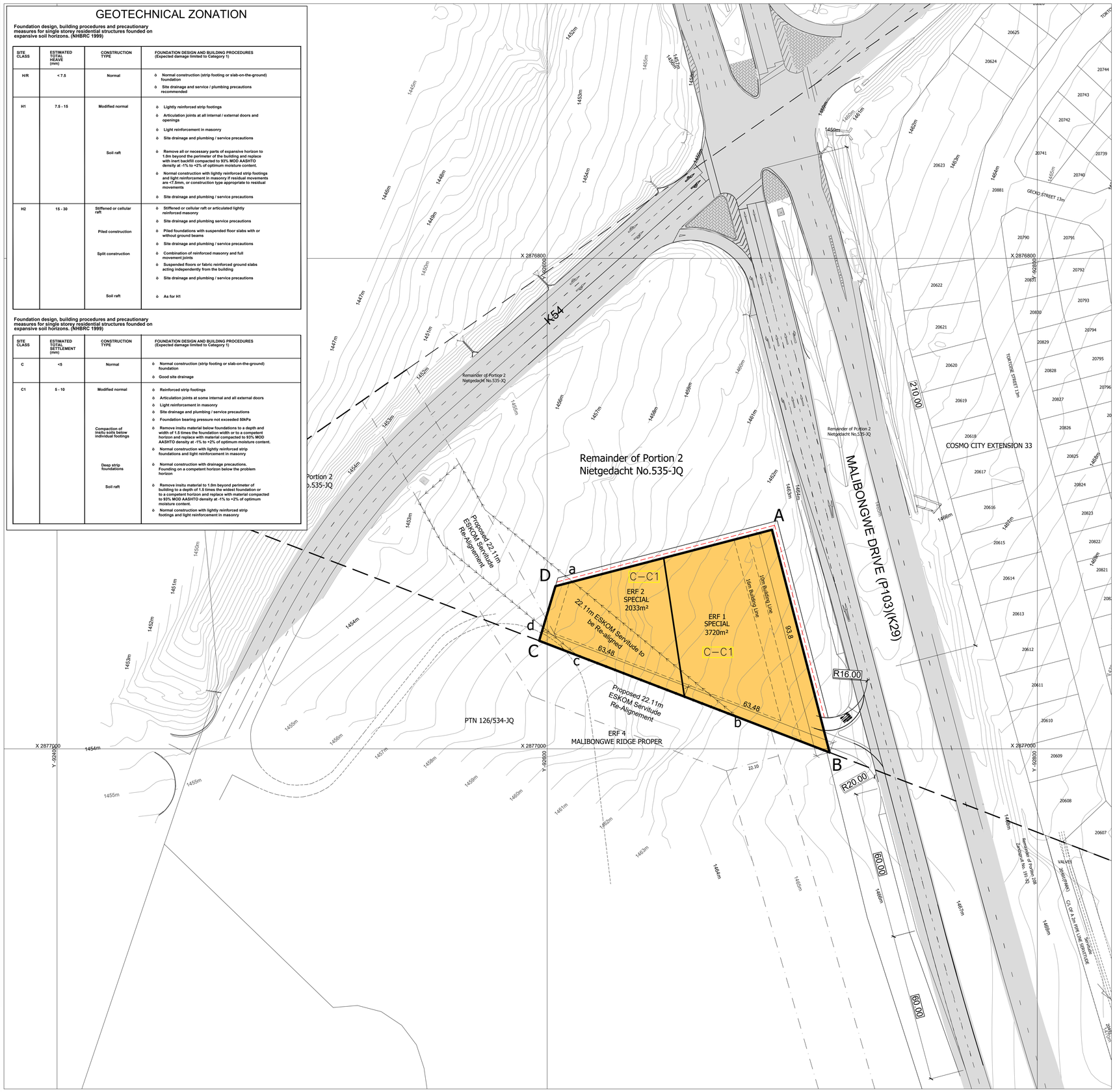
GEOTECHNICAL ZONATION

Foundation design, building procedures and precautionary measures for single storey residential structures founded on expansive soil horizons. (NHBRC 1999)

SITE CLASS	ESTIMATED TOTAL HEAVE (mm)	CONSTRUCTION TYPE	FOUNDATION DESIGN AND BUILDING PROCEDURES (Expected damage limited to Category 1)
H/R	< 7.5	Normal	◊ Normal construction (strip footing or slab-on-the-ground) foundation ◊ Site drainage and service / plumbing precautions recommended
H1	7.5 - 15	Modified normal	◊ Lightly reinforced strip footings ◊ Articulation joints at all internal / external doors and openings ◊ Light reinforcement in masonry ◊ Site drainage and plumbing / service precautions
		Soil raft	◊ Remove all or necessary parts of expansive horizon to 1.0m beyond the perimeter of the building and replace with inert backfill compacted to 93% MOD AASHTO density at -1% to +2% of optimum moisture content. ◊ Normal construction with lightly reinforced strip footings and light reinforcement in masonry if residual movements are <7.5mm, or construction type appropriate to residual movements ◊ Site drainage and plumbing / service precautions
H2	15 - 30	Stiffened or cellular raft	◊ Stiffened or cellular raft or articulated lightly reinforced masonry ◊ Site drainage and plumbing service precautions
		Piled construction	◊ Piled foundations with suspended floor slabs with or without ground beams ◊ Site drainage and plumbing / service precautions
		Split construction	◊ Combination of reinforced masonry and full movement joints ◊ Suspended floors or fabric reinforced ground slabs acting independently from the building ◊ Site drainage and plumbing / service precautions
		Soil raft	◊ As for H1

Foundation design, building procedures and precautionary measures for single storey residential structures founded on expansive soil horizons. (NHBRC 1999)

SITE CLASS	ESTIMATED TOTAL SETTLEMENT (mm)	CONSTRUCTION TYPE	FOUNDATION DESIGN AND BUILDING PROCEDURES (Expected damage limited to Category 1)
C	<5	Normal	◊ Normal construction (strip footing or slab-on-the-ground) foundation ◊ Good site drainage
C1	5 - 10	Modified normal	◊ Reinforced strip footings ◊ Articulation joints at some internal and all external doors ◊ Light reinforcement in masonry ◊ Site drainage and plumbing / service precautions ◊ Foundation bearing pressure not exceeded 50kPa
		Compaction of insitu soils below individual footings	◊ Remove insitu material below foundations to a depth and width of 1.5 times the foundation width or to a competent horizon and replace with material compacted to 93% MOD AASHTO density at -1% to +2% of optimum moisture content. ◊ Normal construction with lightly reinforced strip foundations and light reinforcement in masonry
		Deep strip foundations	◊ Normal construction with drainage precautions. Founding on a competent horizon below the problem horizon
		Soil raft	◊ Remove insitu material to 1.0m beyond perimeter of building to a depth of 1.5 times the widest foundation or to a competent horizon and replace with material compacted to 93% MOD AASHTO density at -1% to +2% of optimum moisture content. ◊ Normal construction with lightly reinforced strip footings and light reinforcement in masonry



GENERAL NOTES

1. TOWNSHIP BOUNDARY
A-B-C-D-A

2. ROADS

Reserve widths of all internal streets are indicated on the plan. Splays on all Class 5 streets are 10mx10m.

Maximum slope on roads is 1: 20
Minimum slope on roads is 1: 200

3. CONTOUR LINES

The Contour lines are based on standards laid down in Regulation 21(2) of the Town Plannign and Townships Ordinance (TVL) 25 of 1965 as amended.

....
Xan Swart Date

4. CO-ORDINATES

The Co-ordinate reference is based on Lo 29 WGS84 system. Baseplan mapping was done by:

....
Xan Swart Date

5. FLOODLINES

It is hereby certified that in terms of the provisions of section 144 of the National Water Act (Act 36 of 1998) that the township is not affected by any floodlines.

Specialist Engineer: Eben Beetge
Firm: CIVIL ENGINEERING DEVELOPMENTS CC

....
Signature Date

6. GEOLOGICAL

It is hereby certified that the layout of the township complies with the recommendations and requirements set out in the Geotechnical Report no. 04/814/2, dated 16 June 2005.

Engineering Geologist: NINO WELLARD
Firm: MOORE SPENCE JONES (Pty) Ltd.

7. All dimensions shown on the plan are approximate, scaled in meters and subject to final survey

SERVITUDE NOTES

1. a b c d a represents an existing Eskom Servitude that will be re-aligned as illustrated.

DRAFT PROPOSED TOWNSHIP

COSMO CITY EXTENSION 55

SITUATED ON PART OF PORTION 2
OF THE FARM
NIETGEDAGCHT NO. 535 - JQ

CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY

N

LOCALITY PLAN SCALE 1 : 50 000

SCHEDULE OF ERVEN

ZONING	LAND USE	± ha	%	NUMBERS	QUANTITY
SPECIAL	PUBLIC GARAGE	0.5753	100	1 - 2	2
TOTAL		0.5753	100		2

NOTES

- OUTSIDE BOUNDARY OF TOWNSHIP
- FARM BOUNDARY
- GEOTECHNICAL ZONES
- 1:50 YEARS FLOODLINE
- 1:100 YEARS FLOODLINE
- LINE OF NO ACCESS

OWNERSHIP:
COSMOPOLITAN PROJECTS
JOHANNESBURG (PTY) LTD

DESIGN AND DRAWN:
A MATHEY

DATE	AMENDMENT

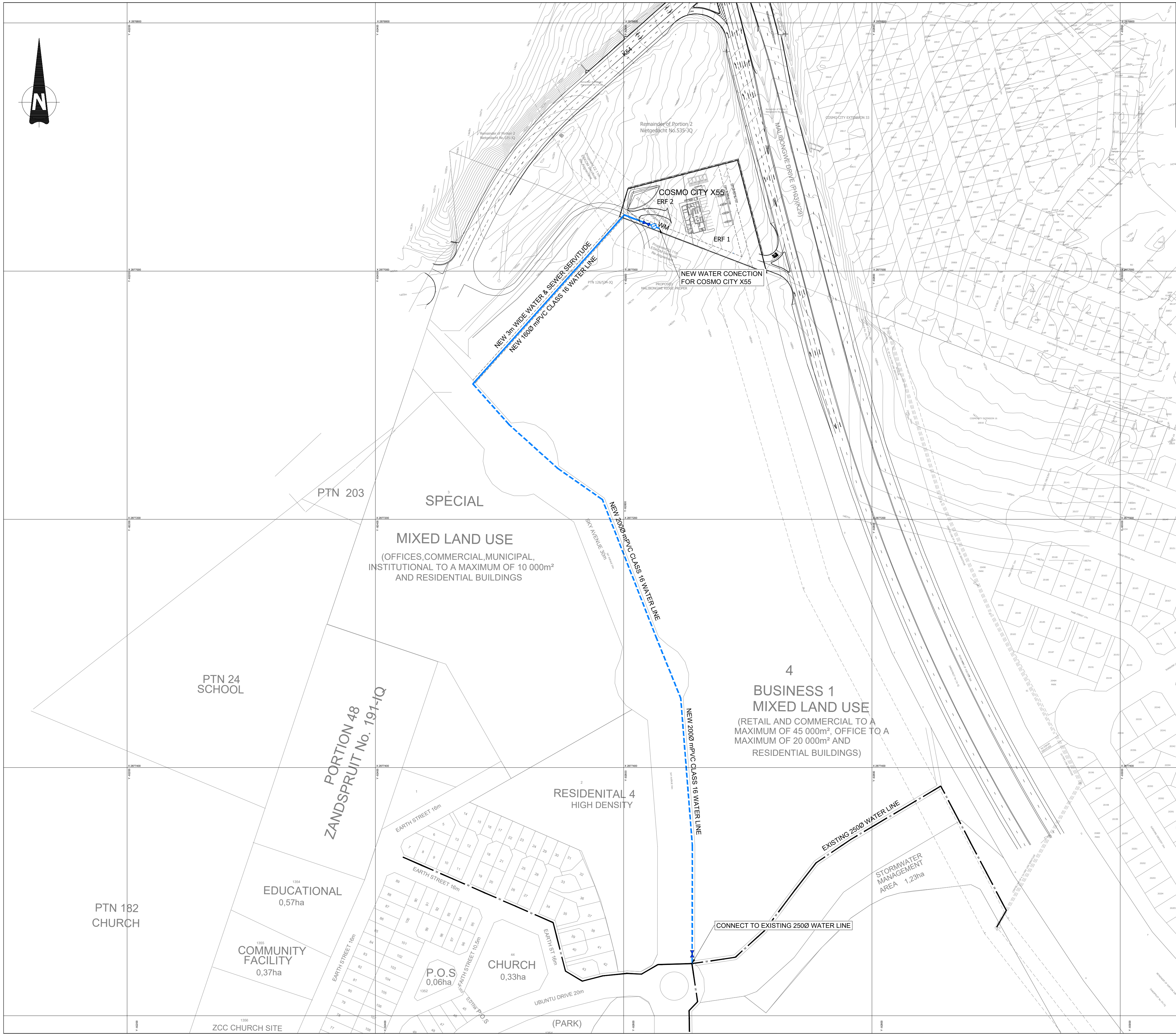
cosmopolitan consult

P.O. Box 754
Auckland Park
Tel: (011) 541-3800

Date:	NOVEMBER 2021
Scale:	1 : 5 500
PLAN No:	COSMOCITYX55_001

APPENDIX B:

PROPOSED WATER LAYOUT



LEGEND

W	EXISTING WATER SERVICES
	NEW 160mmØ mPVC CLASS 16 WATER PIPE
	NEW 110mmØ mPVC CLASS 16 WATER PIPE
	NEW WATER VALVE
WM	NEW WATER METER
FH	NEW FIRE HYDRANT

Notes:
1. THE COPYRIGHT ON THIS DRAWING, INCLUDING THE DESIGN AND DETAILS SHOWN HEREON, IS RESERVED BY THE CONSULTING ENGINEERS.
2. ALL MATERIAL AND WORKMANSHIP MUST COMPLY WITH THE REQUIREMENTS OF THE LATEST RELEVANT SABS REQUIREMENTS.
3. ALL DIMENSIONS ARE IN METERS. (UNLESS OTHERWISE SPECIFIED)
4. NO SCALING OF DIMENSIONS FROM DRAWINGS ALLOWED.
5. ALL DIMENSIONS AND LEVELS ARE TO BE VERIFIED ON SITE BY THE CONTRACTOR BEFORE COMMENCING ANY WORK.
6. ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR MUNICIPAL CIVIL ENGINEERING WORKS, THIRD EDITION 2005 AND THE STANDARD DRAWINGS.
7. THESE DRAWINGS MUST BE READ IN CONJUNCTION WITH THE ARCHITECT'S DRAWINGS. (IF APPLICABLE)

GENERAL NOTES:

No	Date	Details	Checked
A	2021-10-22	FOR SERVICES REPORT	E.B.

Revisions

CONCEPT DRAWING	NAME / SIGNATURE	DATE
TENDER DRAWING	NAME / SIGNATURE	DATE
APPROVED FOR CONSTRUCTION DRAWING	NAME / SIGNATURE	DATE
AS BUILT DRAWING	NAME / SIGNATURE	DATE

80mm ON ORIGINAL DRAWING

ORIGINAL DRAWING SIZE A1

Client

COSMOPOLITAN PROJECTS

CED CIVIL ENGINEERING PROJECT MANAGEMENT

Block F Unit 6 | Hatfield Gardens | 333 Grosvenor Street | Hatfield | Pretoria
Tel: (012) 342 9200 | Fax: 012 342 9216 | Web: www.cedholdings.co.za

Project Title

COSMO CITY X55

Drawing Title

PROPOSED EXTERNAL WATER LAYOUT

Designed	Drawn	Checked
Eben Beetge	Hugo Strydom	
Scale: 1:1500	Date: 2021-10-22	

Project No	Drawing No.	Rev.
1130	1130-55-4SR-001	A

APPENDIX C:

PROPOSED SEWER LAYOUT DRAWING

LEGEND	
SE	EXISTING SEWER LINE
	NEW 160mmØ uPVC CLASS 400 SEWER LINE
	NEW SEWER PUMPSTATION

Notes:
1. THE COPYRIGHT ON THIS DRAWING, INCLUDING THE DESIGN AND DETAILS SHOWN HEREON, IS RESERVED BY THE CONSULTING ENGINEERS.
2. ALL MATERIAL AND WORKMANSHIP MUST COMPLY WITH THE REQUIREMENTS OF THE LATEST RELEVANT SABS REQUIREMENTS.
3. ALL DIMENSIONS ARE IN METERS. (UNLESS OTHERWISE SPECIFIED)
4. NO SCALING OF DIMENSIONS FROM DRAWINGS ALLOWED.
5. ALL DIMENSIONS AND LEVELS ARE TO BE VERIFIED ON SITE BY THE CONTRACTOR BEFORE COMMENCING ANY WORK.
6. ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR MUNICIPAL CIVIL ENGINEERING WORKS, THIRD EDITION 2005 AND THE STANDARD DRAWINGS.
7. THESE DRAWINGS MUST BE READ IN CONJUNCTION WITH THE ARCHITECT'S DRAWINGS. (IF APPLICABLE)

GENERAL NOTES:

No	Date	Details	Checked
A	2021-10-22	FOR SERVICES REPORT	E.B.

Revisions

CONCEPT DRAWING (●)	NAME / SIGNATURE	DATE
TENDER DRAWING	NAME / SIGNATURE	DATE
APPROVED FOR CONSTRUCTION DRAWING	NAME / SIGNATURE	DATE
AS BUILT DRAWING	NAME / SIGNATURE	DATE

80mm ON ORIGINAL DRAWING

ORIGINAL DRAWING SIZE A1

Client

COSMOPOLITAN PROJECTS

CED CIVIL ENGINEERING PROJECT MANAGEMENT
Block F Unit 6 | Hatfield Gardens | 333 Grosvenor Street | Hatfield | Pretoria
Tel: (012) 342 9200 | Fax: 012 342 9216 | Web: www.cedholdings.co.za

Project Title

COSMO CITY X55

Drawing Title

PROPOSED EXTERNAL SEWER LAYOUT

Designed	Drawn	Checked
Eben Beetge	Hugo Strydom	
Scale	Date	
1:1500	2021-10-22	

Project No	Drawing No.	Rev.
1130	1130-55-3SR-001	A