LEGEND

Pipe diameters

- Existing <= 110mm diameter pipes
- Existing > 110 <= 160mm diameter pipes
- Existing > 160 <= 225mm diameter pipes
- Existng > 225 <= 315mm diameter pipes
- Existing > 315 <= 400mm diameter pipes
- Existing > 400mm diameter pipes
- Existing rising main
- Existing manholes
- Existing pumping station
- Existing wastewater Treatment Plant (WWTP)
- Master plan item
- Future sewer system for existing stands
- Future sewer system (schematic)
- Future rising mains
- Future manholes
- Future pumping station
- Abandon pumping station
- Abandon rising mains

Future development areas

- Affordable housing
- Business/Commercial
- Caravan Park / resort
- Industrial
- Group housing
- Informal upgrade
- Informal relocated
- Mixed
- Parks and sportfields
- Public facilities
- Single residential 500
- Single residential 1000
- Single residential 2000
- Urban edge
- Railway line
- River

PROPOSED WORKS, COST ESTIMATES & PHASING - FUTURE SYSTEM

Item No.	MP item Type	Description	Estimated cost * (R-yr 2021/22 value)	Time Related Phasing	Comments	Project no.
Citrusdal WWTP drainage areas						
Distribution system items						
CCiS1.1	MP	90 m x 400 mm I Upgrade existing Gravity	528 000	2026	When overflow problems occur, modelled on 200 mm I and minimum slope.	PRJ-CCiS-001
CCiS1.2	MP	124 m x 250 mm I Upgrade existing Gravity	446 000	2026	When overflow problems occur, modelled on 200 mm I and minimum slope.	PRJ-CCiS-001
CCiS1.3	MP	315 m x 250 mm I Upgrade existing Gravity	962 000	2031	When overflow problems occur, modelled on 150 mm I and minimum slope	PRJ-CCiS-002
CCiS1.4	FM	543 m x 160 mm I New Gravity	1 128 000	2036	When future area CD26 develops	PRJ-CCiS-008
CCiS4.3	FM	487 m x 160 mm I New Gravity	1 016 000	2022	When future areas CD27 & CD28 develop	PRJ-CCiS-004
CCiS4.4	FM	1027 m x 160 mm I New Gravity	2 085 000	2022	New outfall sewer for unserviced erven in Citrusdal	PRJ-CCiS-005
CCiS5.2	FM	616 m x 160 mm I New Gravity	1 272 000	2026	When future areas CD21, CD22 & CD23 develop	PRJ-CCiS-008
CCiS5.3	FM	116 m x 160 mm I New Gravity	283 000	2041	When future areas CD24 & CD25 develop	PRJ-CCiS-008
Pumping stations & rising mains						
CCiS2.1	MPi	Upgrade existing Pump Station (Investigate first)	1 050 000	2026	Verify existing pump station capacity first, upgrade capacity to 13 L/s when existing pumps reaches capacity	PRJ-CCiS-006
CCiS2.2	MPi	376 m x 160 mm I Upgrade existing Rising (Investigate first)	624 000	2026	Verify existing diameter first (no data available regarding existing diameter)	PRJ-CCiS-006
CCiS3.1	FM	159 m x 160 mm I New Gravity	367 000	2036	Required to divert Heuwelsig PS drainage area to new bulk sewer	PRJ-CCiS-003
CCiS3.2	MPa	Abandon existing Pump Station	275 000	2022	Decommission PS	PRJ-CCiS-003
CCiS3.3	MPa	AbandonRising	10 000	2022	Decommission rising main	PRJ-CCiS-003
CCiS4.1	FM	New Pump Station	-	2022	When future areas CD27 & CD28 develop	PRJ-CCiS-004
CCiS4.2	FM	970 m x 110 mm I New Rising	1 096 000	2022	When future areas X1 & X2 develop	PRJ-CCiS-004
CCiS5.1	MPi	Upgrade existing Pump Station (Investigate first)	795 000	2046	Verify existing pump station capacity first, upgrade capacity to 20 L/s when existing pumps reaches capacity	PRJ-CCiS-007
Other						
CCiS.T1	MPi	Verify the capacities of pumping stations	60 000	2022	To verify the impact of the pump stations on the existing downstream Citrusdal sewer network.	
CCiS.T2	MP	Upgrade/install telemetry system	300 000			
Sub-total Citrusdal WWTP drainage areas			**12 297 000**			

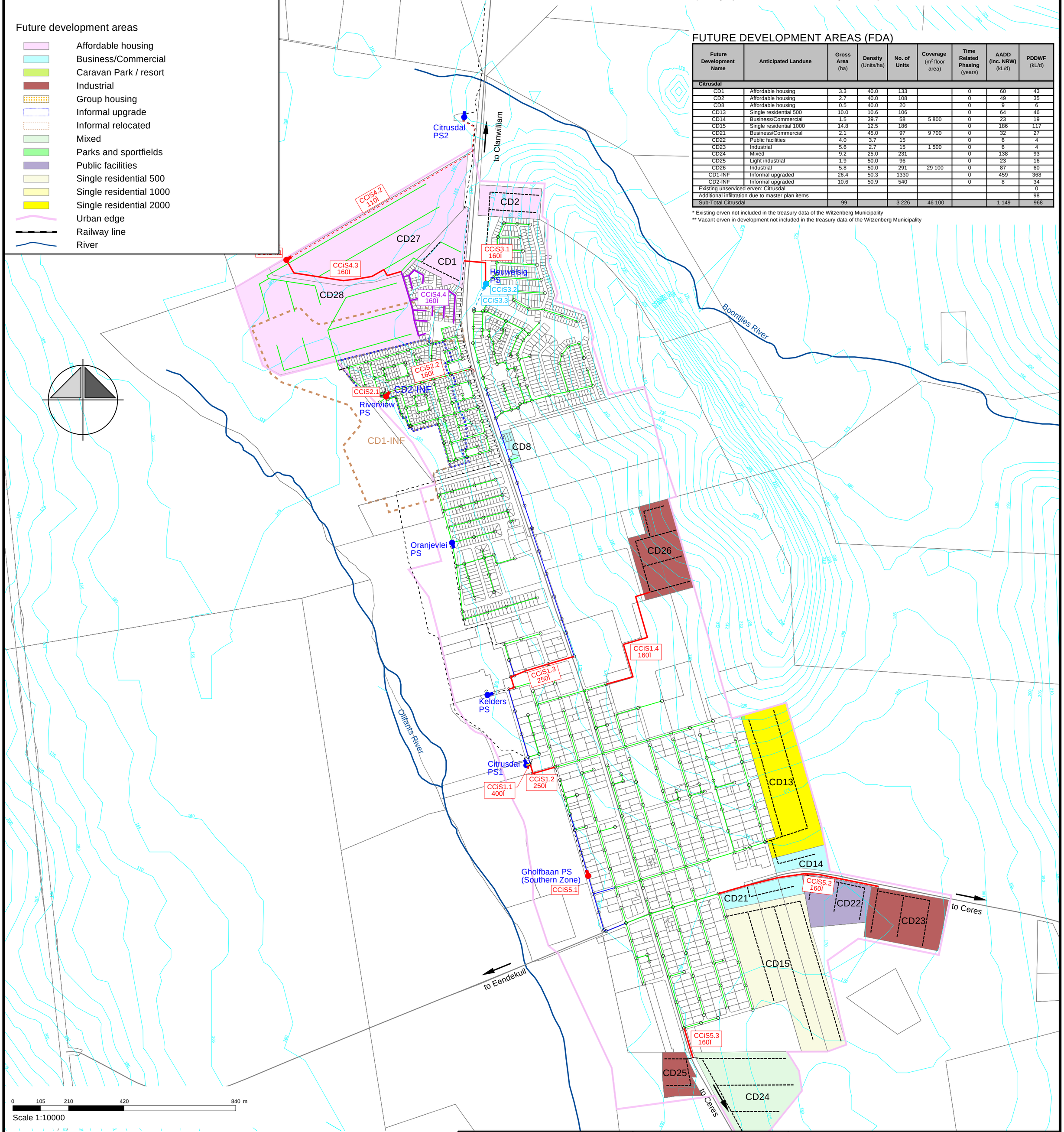
*** Costs include P&G's, Contingencies & Fees, but exclude EIA studies, registration of servitudes and/or land acquisition and VAT.**

Note :
- FM = Future main - New gravity outfall sewer, rising main, pump station, diversion structure or WWTP
- MP = Master Plan Items which reinforce the existing system
- MPa = Master Plan Items which are to be abandoned
- MPi = Master Plan items which require invesitgation first, as there is uncertainty over the actual parameters e.g. diameters, slopes or pump capacities.
- MPs = Master Plan Items of which the slope of the gravity sewer has to be verified first as the existing full flow velocity < 0,6 m/s

FUTURE DEVELOPMENT AREAS (FDA)

Future Development Name	Anticipated Landuse	Gross Area (ha)	Density (Units/ha)	No. of Units	Coverage (m^2 floor area)	Time Related Phasing (years)	AADD (inc. NRW) (kL/d)	PDDWF (kL/d)
Citrusdal								
CD1	Affordable housing	3.3	40.0	133		0	60	43
CD2	Affordable housing	2.7	40.0	108		0	49	35
CD8	Affordable housing	0.5	40.0	20		0	9	6
CD13	Single residential 500	10.0	10.6	106		0	64	46
CD14	Business/Commercial	1.5	39.7	58	5 800	0	23	19
CD15	Single residential 1000	14.8	12.5	186		0	186	117
CD21	Business/Commercial	2.1	45.0	97	9 700	0	32	27
CD22	Public facilities	4.0	3.7	15		0	6	4
CD23	Industrial	5.6	2.7	15	1 500	0	6	4
CD24	Mixed	9.2	25.0	231		0	138	93
CD25	Light industrial	1.9	50.0	96		0	23	16
CD26	Industrial	5.8	50.0	291	29 100	0	87	60
CD1-INF	Informal upgraded	26.4	50.3	1330		0	459	368
CD2-INF	Informal upgraded	10.6	50.9	540		0	8	34
Existing unserviced erven: Citrusdal								0
Additional infiltration due to master plan items								98
Sub-Total Citrusdal		99		3 226	46 100		1 149	968

* Existing erven not included in the treasury data of the Witzenberg Municipality
** Vacant erven in development not included in the treasury data of the Witzenberg Municipality



February 2023

Sewer Master Plan Cederberg

GLS Infrastructure planning

DBSA Development Bank of Southern Africa — Building Africa's Prosperity

Figure CMS 6.4a

Required works
- Citrusdal