



MAQUASSI HILLS LOCAL MUNICIPALITY

**UPGRADING OF OUTFALL SEWER IN
WOLMARANSSTAD EXTENSIONS**

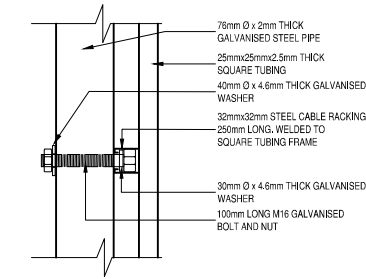
**TENDER DRAWINGS
VOLUME 2**

CONTRACT NUMBER: MHLM/WSIG/01/2024/25

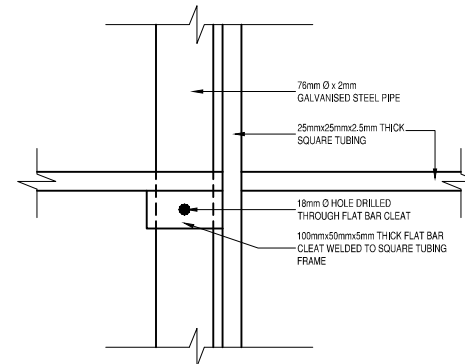
APRIL 2025



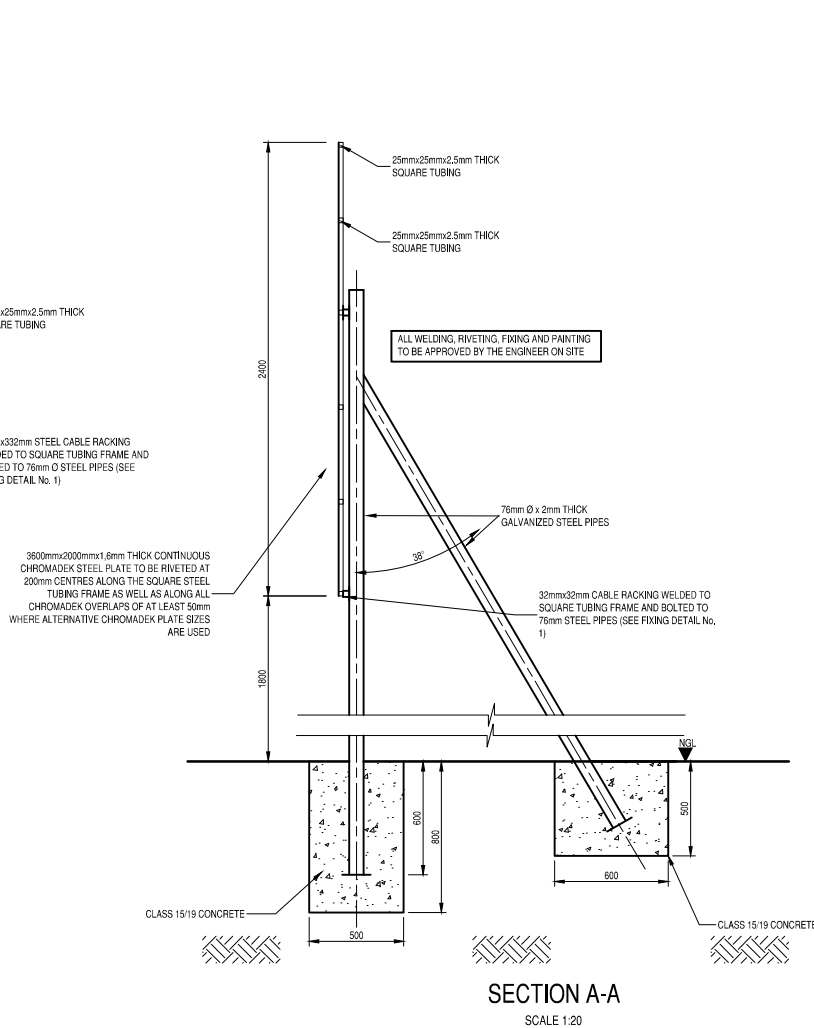
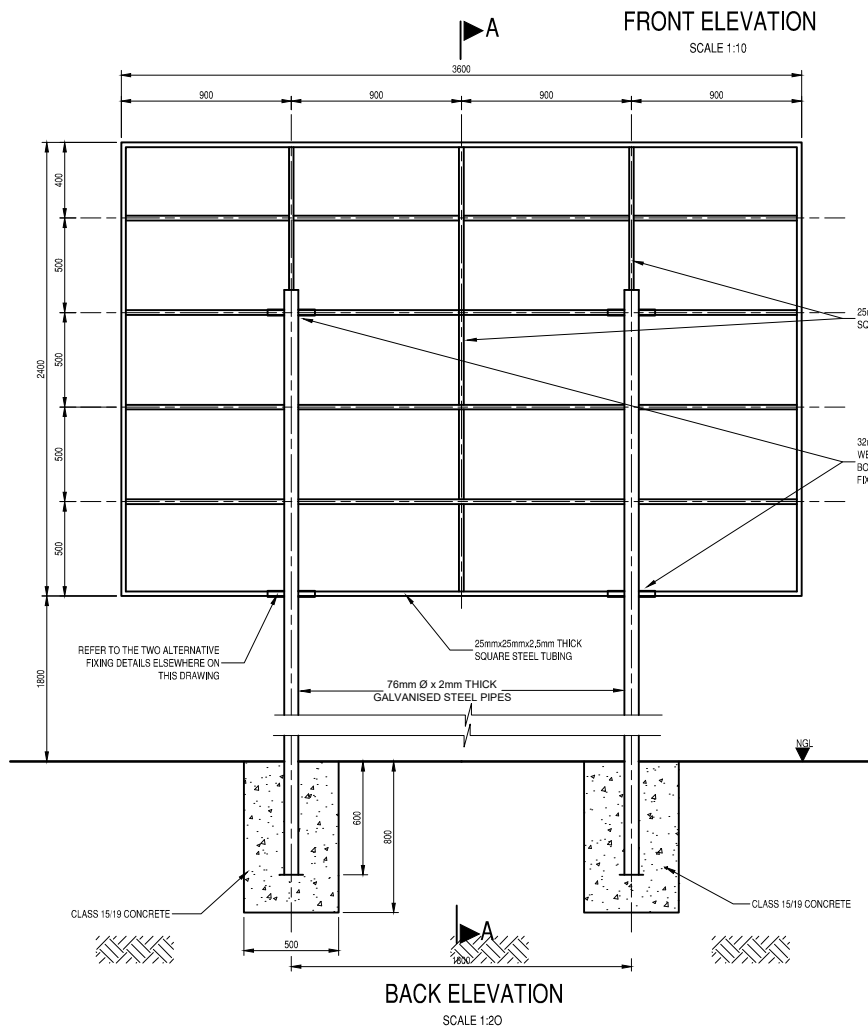
		MAQUASSI HILLS LOCAL MUNICIPALITY	
PROJECT NAME: UPGRADING OF OUTFALL SEWER IN WOLMARANSSTAD EXTENSIONS			
CONTRACT NUMBER: MHLM/WSIG/01/2024/25		PROJECT AMOUNT: -	
	FUNDING AGENT		
	XXXXXXXXXXXXXXXXXXXX		
	CONSULTING ENGINEERS		
	TSELA TSWEU CONSULTING ENGINEERS		
	CONTRACTOR		
	CONTRACTOR NAME		



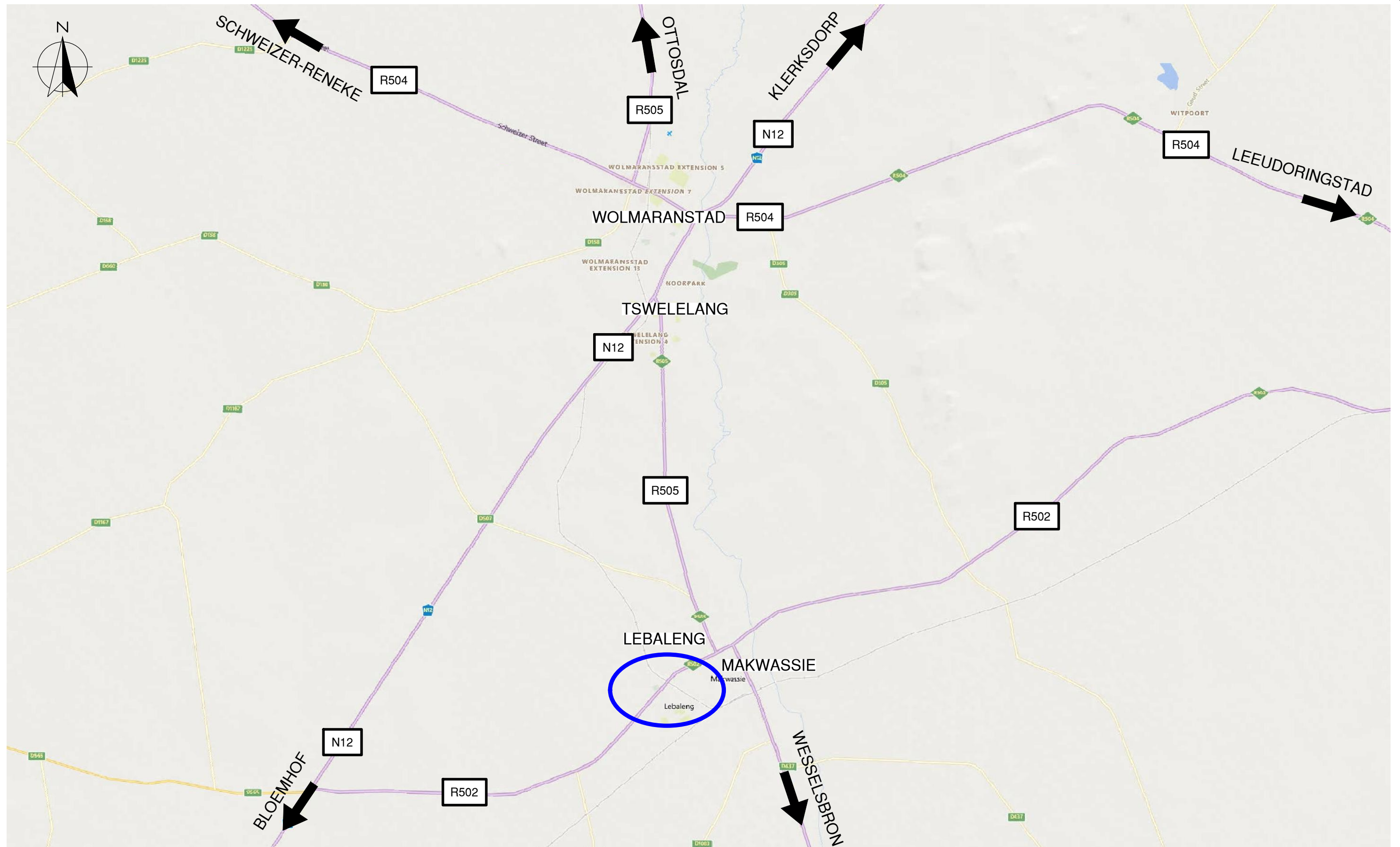
FIXING DETAIL No. 1
SCALE 1:5



FIXING DETAIL No. 2
SCALE 1:5
ALTERNATIVE FIXING DETAILS



REVISIONS			
No.	DATE	BY	DESCRIPTION
NOTES			
1. Description in <i>Italics</i> must be adjusted to suit project details.			
2. Type face to be used shall be Helvetica Medium Colour of lettering <i>AS INDICATED</i> .			
3. LETTERS TO BE CAPITALISED.			
4. Background of board to be <i>WHITE</i> . ALL borders & lines to be <i>MIDDLE BLUE</i> . Colour for logos to be <i>AS PER RESPECTIVE</i> .			
5. All paint used should match Ref. 290 Acrylic Road Sign Paint.			
6. All lettering to be painted on. Stick-on labels will NOT be permitted.			
REFERENCE DRAWINGS			
PLAN No.	DESCRIPTION		
APPROVED:			
ENGINEER:	DATE:		
APPROVED:	DATE:		
CLIENT:	DATE:		
PRINT ISSUED ON			
			
Mobile: + 27 (0)83 265 1524 329 Stateway Chambers, Stateway, Welkom, PO Box 2600, Welkom, 9460, South Africa			
CLIENT MAQUASSI HILLS LOCAL MUNICIPALITY			
PROJECT UPGRADING OF OUTFALL SEWER IN WOLMARANSSTAD EXTENSIONS			
IMPLEMENTING AGENT: MAQUASSI HILLS LM			
DRAWING TITLE PROJECT NAME BOARD			
DESIGN	DATE	DRAWN	DATE
-	JUN 2023	-	JUN 2023
SURVEYED	DATE	CHECKED	DATE
-	-	J.BATEMAN	JUN 2023
SCALE as shown			
DRAWING No. 2023-02-G/D/001			
REVISION No.			
1.0			



NOTES	APPROVED:
ENGINEER:	
DATE:	
CLIENT:	APPROVED:
DATE:	

REFERENCE DRAWINGS	
PLAN Nr.	DESCRIPTION



Tsela Tsweu
CONSULTING ENGINEERS
Mobile: + 27 (0)83 265 1524
329 Stateway Chambers, Stateway, Welkom,
PO Box 2600, Welkom, 9460, South Africa



CLIENT
**MAQUASSI HILLS
LOCAL MUNICIPALITY**
IMPLEMENTING AGENT
MAQUASSI HILLS LM

PROJECT
**UPGRADING OF OUTFALL SEWER IN
WOLMARANSSTAD EXTENSIONS**

DRAWING TITLE
LOCALITY MAP

PRINT ISSUED ON			
REVISIONS			
No.	DATE	BY	DESCRIPTION
SCALE: 1:100 000			

DESIGN	DATE	DRAWN	DATE
-	-	-	-
SURVEYED	DATE	CHECKED	DATE
-	-	J.BATEMAN	JUN 2023
DRAWING No. 2023-02-G/P/001			
REVISION No.			
1.0			

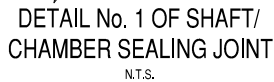
2023-02-S/D/001



- ## NOTES: MANHOLES
1. BLINDING LAYER:
CONCRETE CLASS 10MPa/19.
 2. MANHOLE BASE SLAB:
CAST IN-SITU CONCRETE CLASS 25MPa/19mm.
DIAMETER AND THICKNESS AS PER TABLE A.
 3. BENCHING:
CONCRETE CLASS 20MPa/19 WITH MIN. 20mm THICK 1:3 CEMENT MORTAR FINISH.
 4. BRICKWORK:
230mm THICK APPROVED STOCK BRICK WALLS WITH BRICK FORCE EVERY LAYER. HEIGHT AS PER TABLE A.
 5. PRECAST MANHOLE
 - PRECAST CONCRETE MANHOLES AND SLABS ARE TO COMPLY WITH SABS 1294.(1993).
 - PIPE SECTIONS AND SLABS ARE TO BE BEDDED ON A 2:1 CEMENT MORTAR GROUT TO FORM A COMPACTED WATER TIGHT JOINT OF APPROXIMATELY 5mm.
 - MANHOLE SHAFTS ARE TO BE PLACED OVER THE LARGEST LANDING ON THE DOWN STREAM SIDE.
 - STEPS TO BE LOCATED OVER LARGEST LANDING ON DOWN STREAM SIDE.
 - MANHOLE COVER AND FRAMES TO BE HEAVY DUTY PRECAST CONCRETE COVER WITH STEEL LIP RING AND FRAME.
 - THE MAXIMUM PROTRUSION OF PIPES INTO MANHOLES TO BE 50mm.
 - CHANNEL INSERTS BETWEEN STANDARD FITTINGS TO BE 100mm MINIMUM.
 - THE VERTICAL DISTANCE BETWEEN STEP IRONS IS 250 mm + or - 12mm.
 - THE HORIZONTAL DISTANCE BETWEEN THE CENTRES OF THE TREADS IS 150mm + or - 12mm.
 - ALL PIPES AND FITTINGS TO BE uPVC HEAVY DUTY CLASS 34 AND COMPLY WITH SABS 791.
 6. BACKFILL - SELECTED FILL AROUND MANHOLES IN LAYERS NOT EXCEEDING 150mm THICKNESS COMPACTED TO 90% MOD AASHTO DENSITY.
 7. WHERE REQUIRED COMPACTION OF ROAD LAYERS TO ENGINEERS SPECIFICATIONS.

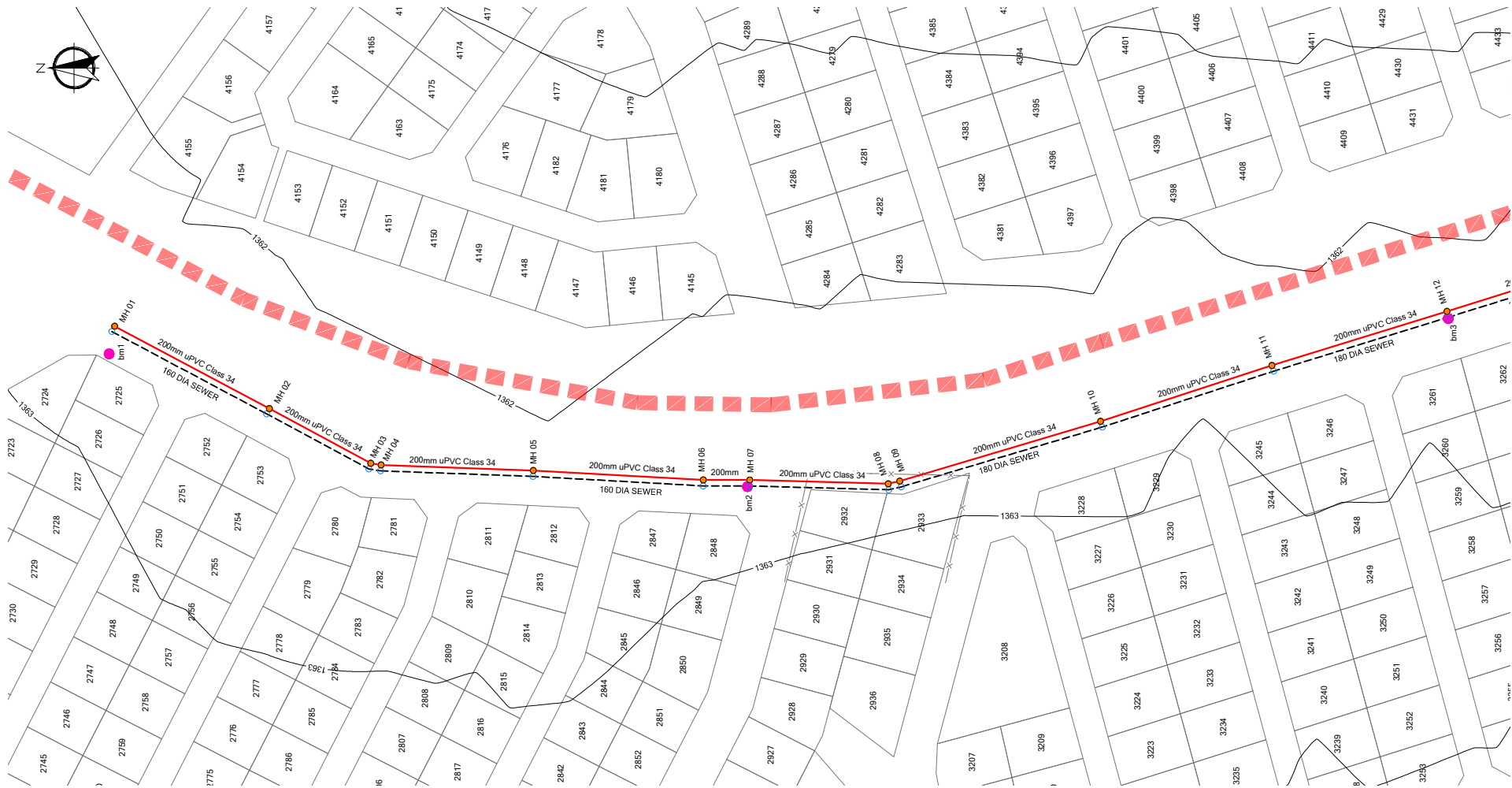
NOTES ON MANHOLES AND ACCESSORIES

- ### 1. Manholes of Precast Concrete Sections :
- a) All concrete, benching and sealers to comprise of Dolomite aggregate and shall comply with SABS 1200 G as applicable.
- b) Precast concrete sections to comply with SABS 1294.
- c) Classes of concrete :
i) Precast concrete sections : 30MPa/15mm
ii) All other concrete : 20MPa/15mm
- d) Channels in manholes to be laid in wet concrete floor and the first precast concrete section to be placed and the benching completed within 24 hours after casting the concrete floor. No driers will be permitted for the benching. Benchng to be steel trowel led to a smooth finish.
- ### 2. Manholes of Brickwork :
- a) Bricks shall be sound, hard, thoroughly burned throughout and are to comply with the requirements of SABS 227, conforming to Table 1, as to size and Grade M or better, as to crushing strength.
- b) Brickwork shall be laid in cement mortar mixed in the proportion of 1 part cement to 4 parts sand by volume. Joints shall not exceed 10mm nor be less than 5mm. All bricks shall be bedded solid and all joints shall be flushed up solid at every course. The joints on internal and other exposed faces shall be struck to form a smooth, flat surface except where manholes are to be plastered.
- c) All bricks shall be moistened prior to laying. In addition, the courses of bricks last laid shall be moistened by sprinkling before the next course is laid thereon. One brick wall shall be laid in English bond consisting of alternate courses of headers and stretchers. Where required, one and a half brick wall shall be laid in English bond consisting of alternate courses of headers and stretchers on each face of the wall, with header course staggered.
- d) Every course shall be laid fair and level by line. All brickwork shall be plumb, square, true to the dimensions given on the drawings. All brickwork shall be built tightly against pipes, foundations and other structural parts. No bats shall be used except for bond.
- e) Step irons shall be built in as brickwork proceeds.
- f) Where brickwall manholes are constructed in wet ground or where ordered by the Engineer, their exterior face shall be plastered. The joints in such external brickwork shall be raked out to a depth of 12mm before plastering. In all cases, manholes shall be watertight and shall be tested for water-tightness before slabs shall be 25MPa concrete. Brick manhole sizes shall not be less than the dimensions shown in SABS 1200 LD.
- ### 3. Penetrations :
- All pipes entering manholes shall be flush with the inside walls of the structure and all pipes entering at an angle shall be suitably cut to remove any projection into the manhole area, unless otherwise shown on the drawings or directed by the Engineer. All rough or ragged ends of pipes that have been cut by means of reaping wires shall be smoothed off neatly so as to prevent any possibility of blockage or injury to persons.
- ### 4. Benchng :
- a) Benchng for manholes shall consist of concrete Class 20/19, steel trowel led to a smooth, impervious finish.
- b) The inverts of manholes shall be provided with half round channeling of the same diameter of the outgoing pipe. The benchng shall be carried up vertically from the channel to the level of the soffit of the higher pipe from where it shall be sloped upwards at a slope of 1:6 to the walls. An aris of not less than 25mm shall be provided between the vertical side of the channel and the sloping benchng. Upon completion of trowelling, the benchng shall be cured by being kept wet for one week.
- ### 5. Accessories :
- a) Cast iron manhole covers and frames to comply with SABS 558.
- b) Step irons to be galvanised and to comply with BS 1247.



DIMENSION	SEWER MANHOLE SPECIFICATIONS
A	PIPE DIAMETER (mm)
B	PRECAST MANHOLE CHAMBER DIAMETER (mm)
C	CONCRETE BASE DIAMETER (mm)
D	CONCRETE BASE THICKNESS (mm)
E	HEIGHT OF BRICK WALL (mm)

[illegible]



OUTFALL SEWER LAYOUT
MH 01 - MH 12
SCALE 1:1000

TOTAL LENGTHS OF PIPING	
MH Centre to MH Centre	
Diameter (mm)	Length (m)
450mm uPVC Class 34	1817.49
355mm uPVC Class 34	679.49
200mm uPVC Class 34	927.88
Total :	3424.85

COORDINATE LIST		
WG 25		
Wolmaransstad Outfall		
MH No.	YLo	XLo
Constant	-90000.000	3000000.000
MH 01	-5757.605	10884.823
MH 02	-5729.959	10936.807
MH 03	-5711.617	10970.873
MH 04	-5711.061	10974.324
MH 05	-5709.205	11025.459
MH 06	-5706.013	11082.587
MH 07	-5705.996	11098.188
MH 08	-5704.729	11144.696
MH 09	-5705.627	11148.554
MH 10	-5725.677	11216.020
MH 11	-5744.431	11273.592
MH 12	-5762.573	11332.411
MH 13	-5780.885	11391.101
MH 14	-5799.214	11449.319
MH 15	-5817.445	11507.426
MH 16	-5837.166	11569.764
MH 17	-5857.094	11631.957
MH 18	-5878.949	11701.778
MH 19	-5900.804	11770.998
MH 20	-5919.915	11830.699
MH 21	-5942.559	11900.517
MH 22	-5963.342	11960.435
MH 23	-5982.041	12019.087
MH 24	-5999.253	12076.227
MH 25	-6016.181	12134.242
MH 26	-6034.706	12196.205
MH 27	-6052.164	12249.072
MH 28	-6071.006	12303.555
MH 29	-6088.347	12361.159
MH 30	-6105.687	12418.763
MH 31	-6140.779	12409.653
MH 32	-6199.263	12391.432
MH 33	-6275.579	12368.325
MH 34	-6301.702	12347.890
MH 35	-6341.001	12383.461
MH 36	-6380.299	12219.032
MH 37	-6419.598	12154.603
MH 38	-6489.564	12197.278
MH 39	-6526.506	12119.015
MH 39A	-6557.602	12119.989
MH 40	-6618.479	12121.829
MH 41	-6710.452	12124.642
MH 42	-6754.791	12058.572
MH 43	-6796.130	11999.503
MH 44	-6876.771	11946.429
MH 45	-6945.300	11905.344
MH 46	-7044.978	11861.937
MH 47	-7056.004	11861.852
MH 48	-7089.869	11862.050
MH 49	-7158.616	11840.818
MH 50	-7227.364	11819.586
MH 51	-7246.836	11820.051
MH 52	-7310.885	11778.249
MH 53	-7377.194	11778.460
MH 54	-7460.700	11778.149
MH 55	-7540.282	11778.429
MH 56	-7616.215	11779.764

NOTES

- MH # NEW MANHOLE
 NEW OUTFALL SEWER PIPE
 EXISTING MANHOLE
 EXISTING OUTFALL SEWER PIPE
bm# BENCHMARK
 EXISTING RAILWAY LINE
 N12 NATIONAL ROAD

Benchmarks				
Name	Desc	Y	X	Elevation
bmcf	h/c	-96617.578	3013925.630	1359.888
bm1	h/c	-95748.317	3010882.977	1362.739
bm2	h/c	-95703.779	3011097.406	1362.926
bm3	h/c	-95760.185	3011332.839	1362.314
bm4	h/c	-95834.789	3011569.895	1361.990
bm5	h/c	-95887.724	3011775.952	1361.551
bm6	h/c	-95980.288	3012019.612	1361.837
bm7	h/c	-96088.957	3012288.230	1361.749
bm8	h/c	-96267.278	3012372.094	1358.652
bm9	h/c	-96525.901	3012114.921	1354.373
bm10	h/c	-97377.478	3011780.033	1341.732
bm11	h/c	-97615.840	3011783.095	1339.186

REFERENCE DRAWINGS

PLAN No.	DESCRIPTION

APPROVED: _____ DATE: _____
ENGINEER: _____
APPROVED: _____ DATE: _____
CLIENT: _____

PRINT ISSUED ON



Mobile: + 27 (0)83 265 1524
329 Stateway Chambers, Stateway, Welkom,
PO Box 2600, Welkom, 9460, South Africa



UPGRADING OF OUTFALL SEWER
IN WOLMARANSSTAD EXTENSIONS

IMPLEMENTING AGENT:

MAQUASSI HILLS LM

DRAWING TITLE

OUTFALL SEWER LAYOUT
AND LONGSECTION
MH 01 - MH 12

DESIGN	DATE	DRAWN	DATE
	JUN 2023		JUN 2023
SURVEYED	DATE	CHECKED	DATE
		J.BATEMAN	JUN 2023

SCALE AS SHOWN

DRAWING No. 2023-02-S/L/001

REVISION No.									
1.0									

--- EGL
--- HGL
--- PIPE
--- NGL

SCALES:
Horizontal 1:1000
Vertical 1:100
Datum : 1358m

DEPTH TO INVERTS
INVERT LEVEL
GROUND LEVEL
CHAINAGE (m)
PIPE GRADES
PIPE DETAILS
HYDRAULICS
DESIGN: Q (l/s) V (m/s) MAX.(0.83D): Q (m/s) V (m/s)

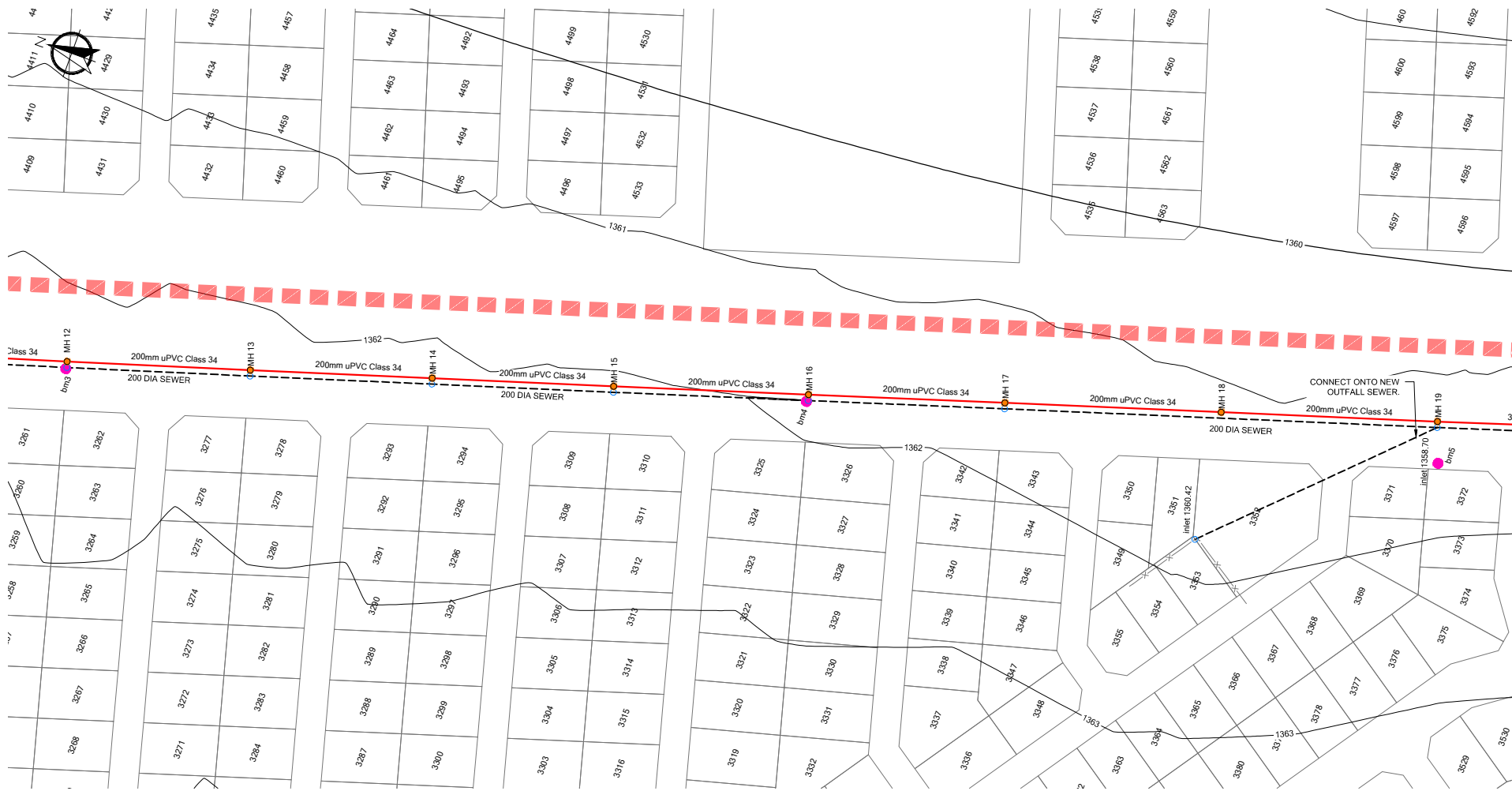
MH - MH	Distance (m)	Diam. (mm)
Wolmaransstad Outfall		
MH 01 - MH 02	58.878	200mm uPVC Class 34
MH 02 - MH 03	38.691	200mm uPVC Class 34
MH 03 - MH 04	3.495	200mm uPVC Class 34
MH 04 - MH 05	51.169	200mm uPVC Class 34
MH 05 - MH 06	57.217	200mm uPVC Class 34
MH 06 - MH 07	15.601	200mm uPVC Class 34
MH 07 - MH 08	46.525	200mm uPVC Class 34
MH 08 - MH 09	3.961	200mm uPVC Class 34
MH 09 - MH 10	70.382	200mm uPVC Class 34
MH 10 - MH 11	60.550	200mm uPVC Class 34
MH 11 - MH 12	61.553	200mm uPVC Class 34
MH 12 - MH 13	61.480	200mm uPVC Class 34
MH 13 - MH 14	61.036	200mm uPVC Class 34
MH 14 - MH 15	60.899	200mm uPVC Class 34
MH 15 - MH 16	65.383	200mm uPVC Class 34
MH 16 - MH 17	65.880	200mm uPVC Class 34
MH 17 - MH 18	72.589	200mm uPVC Class 34
MH 18 - MH 19	72.589	200mm uPVC Class 34
MH 19 - MH 20	62.685	355mm uPVC Class 34
MH 20 - MH 21	73.399	355mm uPVC Class 34
MH 21 - MH 22	63.421	355mm uPVC Class 34
MH 22 - MH 23	61.560	355mm uPVC Class 34
MH 23 - MH 24	59.677	355mm uPVC Class 34
MH 24 - MH 25	60.434	355mm uPVC Class 34
MH 25 - MH 26	64.672	355mm uPVC Class 34
MH 26 - MH 27	55.677	355mm uPVC Class 34
MH 27 - MH 28	57.649	355mm uPVC Class 34
MH 28 - MH 29	60.157	355mm uPVC Class 34
MH 29 - MH 30	60.157	355mm uPVC Class 34
MH 30 - MH 31	36.255	450mm uPVC Class 34
MH 31 - MH 32	61.257	450mm uPVC Class 34
MH 32 - MH 33	79.737	450mm uPVC Class 34
MH 33 - MH 34	33.166	450mm uPVC Class 34
MH 34 - MH 35	75.468	450mm uPVC Class 34
MH 35 - MH 36	75.468	450mm uPVC Class 34
MH 36 - MH 37	75.468	450mm uPVC Class 34
MH 37 - MH 38	81.954	450mm uPVC Class 34
MH 38 - MH 39	86.544	450mm uPVC Class 34
MH 39 - MH 39A	31.112	450mm uPVC Class 34
MH 39A - MH 40	60.904	450mm uPVC Class 34
MH 40 - MH 41	92.016	450mm uPVC Class 34
MH 41 - MH 42	79.569	450mm uPVC Class 34
MH 42 - MH 43	79.569	450mm uPVC Class 34
MH 43 - MH 44	90.283	450mm uPVC Class 34
MH 44 - MH 45	79.901	450mm uPVC Class 34
MH 45 - MH 46	108.720	450mm uPVC Class 34
MH 46 - MH 47	11.026	450mm uPVC Class 34
MH 47 - MH 48	33.865	450mm uPVC Class 34
MH 48 - MH 49	71.951	450mm uPVC Class 34
MH 49 - MH 50	71.951	450mm uPVC Class 34
MH 50 - MH 51	19.478	450mm uPVC Class 34
MH 51 - MH 52	76.483	450mm uPVC Class 34
MH 52 - MH 53	66.310	450mm uPVC Class 34
MH 53 - MH 54	83.506	450mm uPVC Class 34
MH 54 - MH 55	79.583	450mm uPVC Class 34
MH 55 - MH 56	75.945	450mm uPVC Class 34

0.000	1362.458	1361.064	-1.394
20.000	1362.467	1360.897	-1.570
40.000	1362.436	1360.730	-1.706
58.878	1362.343	1360.573	-1.770
60.000	1362.339	1360.569	-1.770
80.000	1362.333	1360.503	-1.830
97.569	1362.383	1360.444	-1.939
101.064	1362.341	1360.433	-1.908
120.000	1362.272	1360.370	-1.902
140.000	1362.198	1360.303	-1.895
152.233	1362.153	1360.262	-1.891
160.000	1362.226	1360.236	-1.990
180.000	1362.415	1360.170	-2.245
200.000	1362.604	1360.103	-2.501
209.450	1362.719	1360.072	-2.647
220.000	1362.753	1360.037	-2.716
225.051	1362.781	1360.020	-2.761
240.000	1362.681	1359.970	-2.711
260.000	1362.757	1359.904	-2.853
271.576	1362.710	1359.865	-2.845
275.537	1362.698	1359.851	-2.847
280.000	1362.743	1359.836	-2.907
300.000	1362.771	1359.770	-3.001
320.000	1362.678	1359.703	-2.975
340.000	1362.593	1359.637	-2.956
345.920	1362.560	1359.617	-2.943
360.000	1362.778	1359.570	-3.208
380.000	1362.886	1359.503	-3.383
400.000	1362.552	1359.437	-3.115
406.469	1362.490	1359.415	-3.075
420.000	1362.406	1359.370	-3.036
440.000	1362.501	1359.303	-3.198
460.000	1362.469	1359.237	-3.232
468.023	1362.392	1359.210	-3.182

58.878m	38.691m	3.495m	51.169m	57.217m	15.601m	46.525m	3.961m	70.383m	60.549m	61.554m
1: 119.914	1: 299.930	1: 317.727	1: 299.234	1: 301.142	1: 300.019	1: 300.161	1: 282.929	1: 300.782	1: 299.748	1: 300.263
0.834 %	0.333 %	0.315 %	0.334 %	0.332 %	0.333 %	0.333 %	0.353 %	0.332 %	0.334 %	0.333 %

200mm uPVC Class 34 Class C rigid pipe bedding										
3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	16.35	16.35	16.35
0.67	0.48	0.47	0.48	0.48	0.48	0.48	0.49	0.71	0.71	0.71
27.82	17.59	17.09	17.61	17.55	17.59	17.58	18.11	17.56	17.59	17.58
1.13	0.71	0.69	0.71	0.71	0.71	0.71	0.74	0.71	0.71	0.71

MH 01 - MH 12



OUTFALL SEWER LAYOUT
MH 12 - MH 19
SCALE 1:1000

TOTAL LENGTHS OF PIPING	
MH Centre to MH Centre	
Diameter (mm)	Length (m)
450mm uPVC Class 34	1817.49
355mm uPVC Class 34	679.49
200mm uPVC Class 34	927.88
Total :	
3424.85	

COORDINATE LIST		
WG 25		
Wolmaransstad Outfall		
MH No.	YLo	XLo
Constant	-90000.000	3000000.000
MH 01	-5757.605	10884.823
MH 02	-5729.959	10936.807
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MH 04	-5711.061	10974.324
MH 05	-5709.205	11025.459
MH 06	-5706.013	11082.587
MH 07	-5705.996	11098.188
MH 08	-5704.729	11144.595
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MH 10	-5725.677	11216.020
MH 11	-5744.431	11273.592
MH 12	-5762.573	11332.411
MH 13	-5780.885	11391.101
MH 14	-5799.214	11449.319
MH 15	-5817.445	11507.426
MH 16	-5837.166	11569.764
MH 17	-5857.094	11632.557
MH 18	-5878.949	11700.718
MH 19	-5900.804	11770.998
MH 20	-5919.915	11830.699
MH 21	-5942.559	11900.517
MH 22	-5963.342	11960.435
MH 23	-5982.041	12019.087
MH 24	-5999.253	12076.227
MH 25	-6016.181	12134.242
MH 26	-6034.700	12195.205
MH 27	-6052.164	12249.072
MH 28	-6071.006	12303.555
MH 29	-6088.347	12361.159
MH 30	-6105.687	12418.763
MH 31	-6140.779	12409.653
MH 32	-6199.263	12391.432
MH 33	-6275.579	12368.325
MH 34	-6301.702	12347.890
MH 35	-6341.001	12283.461
MH 36	-6380.299	12219.032
MH 37	-6419.598	12154.603
MH 38	-6489.564	12197.278
MH 39	-6526.506	12119.015
MH 39A	-6557.602	12119.989
MH 40	-6618.479	12121.829
MH 41	-6710.452	12124.642
MH 42	-6754.791	12058.572
MH 43	-6799.130	11999.503
MH 44	-6876.771	11946.429
MH 45	-6945.300	11905.344
MH 46	-7044.978	11861.937
MH 47	-7056.004	11861.852
MH 48	-7089.869	11862.050
MH 49	-7158.616	11840.818
MH 50	-7227.364	11819.586
MH 51	-7246.836	11820.051
MH 52	-7310.885	11778.249
MH 53	-7377.194	11778.460
MH 54	-7460.700	11778.149
MH 55	-7540.282	11778.429
MH 56	-7616.215	11779.764

NOTES

- MH # NEW MANHOLE
 NEW OUTFALL SEWER PIPE
 EXISTING MANHOLE
 EXISTING OUTFALL SEWER PIPE
bm# BENCHMARK
 EXISTING RAILWAY LINE
 N12 NATIONAL ROAD

Benchmarks				
Name	Desc	Y	X	Elevation
bm#f	h/c	-96617.578	3013925.630	1359.888
bm1	h/c	-95748.317	3010882.977	1362.739
bm2	h/c	-95703.779	3011097.406	1362.926
bm3	h/c	-95760.185	3011332.839	1362.314
bm4	h/c	-95834.789	3011569.895	1361.990
bm5	h/c	-95887.724	3011775.952	1361.551
bm6	h/c	-95980.288	3012019.612	1361.837
bm7	h/c	-96088.957	3012288.230	1361.749
bm8	h/c	-96267.278	3012372.094	1358.652
bm9	h/c	-96525.901	3012114.921	1354.373
bm10	h/c	-97377.478	3011780.033	1341.732
bm11	h/c	-97615.840	3011783.095	1339.186

REFERENCE DRAWINGS

PLAN No.	DESCRIPTION

APPROVED: _____ DATE: _____
ENGINEER: _____
APPROVED: _____ DATE: _____
CLIENT: _____

PRINT ISSUED ON



Mobile: + 27 (0)83 265 1524
329 Stateway Chambers, Stateway, Welkom,
PO Box 2600, Welkom, 9460, South Africa



CLIENT
**MAQUASSI HILLS
LOCAL MUNICIPALITY**

PROJECT

UPGRADING OF OUTFALL SEWER
IN WOLMARANSSTAD EXTENSIONS

IMPLEMENTING AGENT:

MAQUASSI HILLS LM

DRAWING TITLE

**OUTFALL SEWER LAYOUT
AND LONGSECTION
MH 12 - MH 19**

DESIGN	DATE	DRAWN	DATE
	JUN 2023		JUN 2023
SURVEYED	DATE	CHECKED	DATE
		J.BATEMAN	JUN 2023

SCALE AS SHOWN

DRAWING No. **2023-02-S/L/002**

REVISION No.									
1.0									

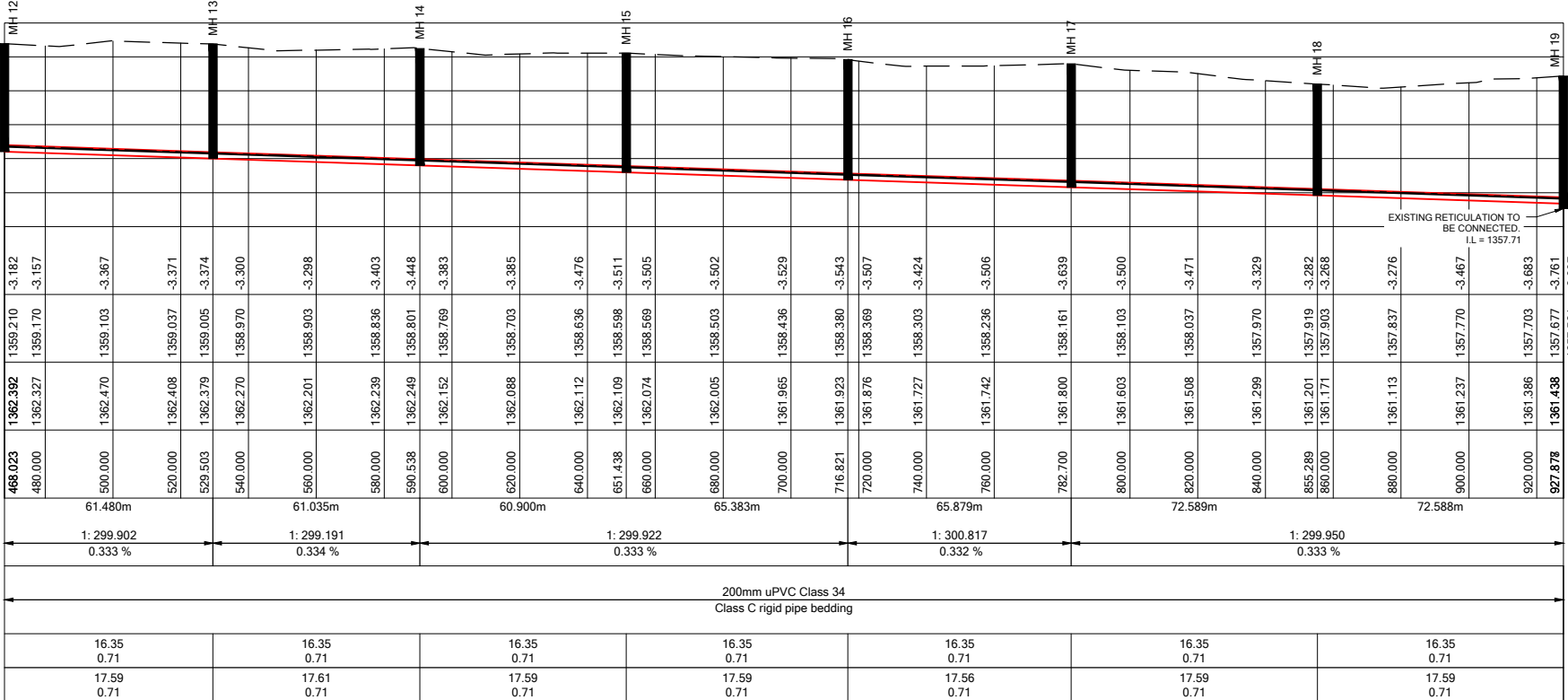
- EGL
--- HGL
--- PIPE
--- NGL

SCALES:

Horizontal 1:1000
Vertical 1:100

Datum : 1357m

DEPTH TO INVERTS
INVERT LEVEL
GROUND LEVEL
CHAINAGE (m)
PIPE GRADES
PIPE DETAILS
HYDRAULICS
DESIGN: Q (l/s) V (m/s) MAX.(0.83D): Q (l/s) V (m/s)



MH 12 - MH 19

PIPE DATA LIST		
MH - MH	Distance	Diam.
(m) (mm)		
Wolmaransstad Outfall		
MH 01 - MH 02	58.878	200mm uPVC Class 34
MH 02 - MH 03	38.691	200mm uPVC Class 34
MH 03 - MH 04	3.495	200mm uPVC Class 34
MH 04 - MH 05	51.169	200mm uPVC Class 34
MH 05 - MH 06	57.217	200mm uPVC Class 34
MH 06 - MH 07	15.601	200mm uPVC Class 34
MH 07 - MH 08	46.525	200mm uPVC Class 34
MH 08 - MH 09	3.361	200mm uPVC Class 34
MH 09 - MH 10	70.382	200mm uPVC Class 34
MH 10 - MH 11	60.550	200mm uPVC Class 34
MH 11 - MH 12	61.553	200mm uPVC Class 34
MH 12 - MH 13	61.480	200mm uPVC Class 34
MH 13 - MH 14	61.036	200mm uPVC Class 34
MH 14 - MH 15	60.899	200mm uPVC Class 34
MH 15 - MH 16	65.383	200mm uPVC Class 34
MH 16 - MH 17	65.880	200mm uPVC Class 34
MH 17 - MH 18	72.589	200mm uPVC Class 34
MH 18 - MH 19	72.589	200mm uPVC Class 34
MH 19 - MH 20	62.685	355mm uPVC Class 34
MH 20 - MH 21	73.399	355mm uPVC Class 34
MH 21 - MH 22	63.421	355mm uPVC Class 34
MH 22 - MH 23	61.560	355mm uPVC Class 34
MH 23 - MH 24	59.677	355mm uPVC Class 34
MH 24 - MH 25	60.434	355mm uPVC Class 34
MH 25 - MH 26	64.672	355mm uPVC Class 34
MH 26 - MH 27	55.677	355mm uPVC Class 34
MH 27 - MH 28	57.649	355mm uPVC Class 34
MH 28 - MH 29	60.157	355mm uPVC Class 34
MH 29 - MH 30	60.157	355mm uPVC Class 34
MH 30 - MH 31	36.255	450mm uPVC Class 34
MH 31 - MH 32	61.257	450mm uPVC Class 34
MH 32 - MH 33	79.737	450mm uPVC Class 34
MH 33 - MH 34	33.166	450mm uPVC Class 34
MH 34 - MH 35	75.468	450mm uPVC Class 34
MH 35 - MH 36	75.468	450mm uPVC Class 34
MH 36 - MH 37	75.468	450mm uPVC Class 34
MH 37 - MH 38	81.954	450mm uPVC Class 34
MH 38 - MH 39	86.544	450mm uPVC Class 34
MH 39 - MH 39A	31.112	450mm uPVC Class 34
MH 39A - MH 40	60.904	450mm uPVC Class 34
MH 40 - MH 41	92.016	450mm uPVC Class 34
MH 41 - MH 42	79.569	450mm uPVC Class 34
MH 42 - MH 43	79.569	450mm uPVC Class 34
MH 43 - MH 44	90.283	450mm uPVC Class 34
MH 44 - MH 45	79.901	450mm uPVC Class 34
MH 45 - MH 46	108.720	450mm uPVC Class 34
MH 46 - MH 47	11.026	450mm uPVC Class 34
MH 47 - MH 48	33.865	450mm uPVC Class 34
MH 48 - MH 49	71.951	450mm uPVC Class 34
MH 49 - MH 50	71.951	450mm uPVC Class 34
MH 50 - MH 51	19.478	450mm uPVC Class 34
MH 51 - MH 52	76.483	450mm uPVC Class 34
MH 52 - MH 53	68.318	450mm uPVC Class 34
MH 53 - MH 54	83.506	450mm uPVC Class 34
MH 54 - MH 55	79.583	450mm uPVC Class 34
MH 55 - MH 56	75.945	450mm uPVC Class 34



OUTFALL SEWER LAYOUT
MH 19 - MH 26
SCALE 1:1000

TOTAL LENGTHS OF PIPING	
MH Centre to MH Centre	
Diameter (mm)	Length (m)
450mm uPVC Class 34	1817.49
355mm uPVC Class 34	679.49
200mm uPVC Class 34	927.88
Total :	3424.85

COORDINATE LIST		
WG 25		
Wolmaransstad Outfall		
MH No.	YLo	XLo
Constant	-90000.000	3000000.000
MH 01	-5757.605	10884.823
MH 02	-5729.959	10936.807
MH 03	-5711.617	10970.873
MH 04	-5711.061	10974.324
MH 05	-5709.205	11025.459
MH 06	-5706.013	11082.587
MH 07	-5705.996	11098.188
MH 08	-5704.729	11144.696
MH 09	-5705.527	11148.554
MH 10	-5725.677	11216.020
MH 11	-5744.431	11273.592
MH 12	-5762.573	11332.411
MH 13	-5780.885	11391.101
MH 14	-5799.214	11449.319
MH 15	-5817.445	11507.426
MH 16	-5837.166	11569.764
MH 17	-5857.094	11632.557
MH 18	-5878.949	11701.718
MH 19	-5900.804	11770.998
MH 20	-5919.915	11830.699
MH 21	-5942.559	11900.517
MH 22	-5963.342	11960.435
MH 23	-5982.041	12019.087
MH 24	-5999.253	12076.227
MH 25	-6016.181	12134.242
MH 26	-6034.206	12196.205
MH 27	-6052.164	12249.072
MH 28	-6071.006	12303.555
MH 29	-6088.347	12361.159
MH 30	-6105.687	12418.763
MH 31	-6140.779	12409.653
MH 32	-6199.263	12391.432
MH 33	-6275.579	12368.325
MH 34	-6301.702	12347.890
MH 35	-6341.001	12283.461
MH 36	-6380.299	12219.032
MH 37	-6419.598	12154.603
MH 38	-6489.564	12197.278
MH 39	-6526.506	12119.015
MH 39A	-6557.602	12119.989
MH 40	-6618.479	12121.829
MH 41	-6710.452	12124.642
MH 42	-6754.791	12058.572
MH 43	-6799.130	11992.503
MH 44	-6876.771	11946.429
MH 45	-6945.300	11905.344
MH 46	-7044.978	11861.937
MH 47	-7056.004	11861.852
MH 48	-7089.869	11862.050
MH 49	-7158.616	11840.818
MH 50	-7227.364	11819.586
MH 51	-7246.836	11820.051
MH 52	-7270.885	11778.249
MH 53	-7277.194	11778.460
MH 54	-7460.700	11778.149
MH 55	-7540.282	11778.429
MH 56	-7616.215	11779.764

REVISIONS

No.	DATE	BY	DESCRIPTION

NOTES

- MH #
- NEW MANHOLE
 - NEW OUTFALL SEWER PIPE
 - EXISTING MANHOLE
 - EXISTING OUTFALL SEWER PIPE
 - BENCHMARK
 - EXISTING RAILWAY LINE
 - N12 NATIONAL ROAD

Benchmarks				
Name	Desc	Y	X	Elevation
bmcf	h/c	-96617.578	3013925.630	1359.888
bm1	h/c	-95748.317	3010882.977	1362.739
bm2	h/c	-95703.779	3011097.406	1362.926
bm3	h/c	-95760.185	3011332.839	1362.314
bm4	h/c	-95834.789	3011569.895	1361.990
bm5	h/c	-95887.724	3011775.952	1361.551
bm6	h/c	-95980.288	3012019.612	1361.837
bm7	h/c	-96088.957	3012288.230	1361.749
bm8	h/c	-96267.278	3012372.094	1358.652
bm9	h/c	-96525.901	3012114.921	1354.373
bm10	h/c	-97377.478	3011780.033	1341.732
bm11	h/c	-97615.840	3011783.095	1339.186

REFERENCE DRAWINGS

PLAN No.	DESCRIPTION

APPROVED: _____ DATE: _____

ENGINEER: _____ DATE: _____

APPROVED: _____ DATE: _____

CLIENT: _____ DATE: _____

PRINT ISSUED ON

Tsela Tsweu
CONSULTING ENGINEERS

Mobile: + 27 (0)83 265 1524
329 Stateway Chambers, Stateway, Welkom,
PO Box 2600, Welkom, 9460, South Africa

CLIENT

MAQUASSI HILLS LOCAL MUNICIPALITY

PROJECT

UPGRADING OF OUTFALL SEWER
IN WOLMARANSSTAD EXTENSIONS

IMPLEMENTING AGENT:

MAQUASSI HILLS LM

DRAWING TITLE

**OUTFALL SEWER LAYOUT
AND LONGSECTION
MH 19 - MH 26**

DESIGN	DATE	DRAWN	DATE
	JUN 2023		JUN 2023
SURVEYED	DATE	CHECKED	DATE
		J.BATEMAN	JUN 2023

SCALE AS SHOWN

DRAWING No.

2023-02-S/L/003

REVISION No.									
1.0									

- EGL
- HGL
- PIPE
- NGL

SCALES:
Horizontal 1:1000
Vertical 1:100

Datum : 1356m

DEPTH TO INVERTS	
INVERT LEVEL	
GROUND LEVEL	
CHAINAGE (m)	
PIPE GRADES	
PIPE DETAILS	
HYDRAULICS	DESIGN: Q (l/s) V (m/s)
	MAX.(0.83D): Q (l/s) V (m/s)

MH 19	MH 20	MH 21	MH 22	MH 23	MH 24	MH 25	MH 26
927.877	1361.438	1357.637	-3.907				
940.000	1361.532	1357.506	-4.026				
960.000	1361.431	1357.464	-3.967				
980.000	1361.346	1357.423	-3.923				
990.562	1361.319	1357.401	-3.918				
1000.000	1361.355	1357.382	-3.973				
1020.000	1361.528	1357.342	-4.186				
1040.000	1361.669	1357.302	-4.387				
1060.000	1361.484	1357.262	-4.222				
1063.961	1361.451	1357.254	-4.197				
1080.000	1361.380	1357.222	-4.158				
1100.000	1361.438	1357.182	-4.256				
1120.000	1361.476	1357.142	-4.334				
1127.381	1361.491	1357.127	-4.364				
1140.000	1361.451	1357.102	-4.349				
1160.000	1361.557	1357.062	-4.495				
1180.000	1361.665	1357.022	-4.643				
1188.941	1361.684	1357.004	-4.680				
1200.000	1361.564	1356.982	-4.582				
1220.000	1361.438	1356.942	-4.496				
1240.000	1361.434	1356.902	-4.532				
1248.618	1361.444	1356.885	-4.559				
1260.000	1361.520	1356.862	-4.658				
1280.000	1361.677	1356.822	-4.855				
1300.000	1361.608	1356.782	-4.826				
1309.051	1361.564	1356.764	-4.800				
1320.000	1361.491	1356.742	-4.749				
1340.000	1361.479	1356.702	-4.777				
1360.000	1361.457	1356.662	-4.795				
1373.723	1361.410	1356.635	-4.775				
355mm uPVC Class 34 Class C rigid pipe bedding							
54.35 0.81		54.35 0.80		54.35 0.80		54.35 0.80	
64.22 0.83		63.11 0.81		63.11 0.81		63.10 0.81	

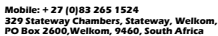


COORDINATE LIST			
WG 25			
Wolmanranstad Outfall			
M/H No.	YLO	XLO	
Constant	-9000.000	30000.000	
MH 01	-5755.606	10884.823	
MH 02	-5723.958	10836.507	
MH 03	-5711.617	10870.873	
MH 04	-5711.061	10974.324	
MH 05	-5709.205	11025.458	
MH 06	-5706.013	11082.587	
MH 07	-5705.996	11098.188	
MH 08	-5704.729	11144.696	
MH 09	-5705.627	11148.554	
MH 10	-5707.577	11216.807	
MH 11	-5744.431	11273.592	
MH 12	-5762.573	11332.411	
MH 13	-5780.885	11391.101	
MH 14	-5799.214	11449.319	
MH 15	-5817.445	11507.426	
MH 16	-5837.166	11569.764	
MH 17	-5857.094	11632.557	
MH 18	-5874.999	11701.778	
MH 19	-5900.804	11770.998	
MH 20	-5919.915	11830.699	
MH 21	-5942.559	11900.517	
MH 22	-5963.342	11960.435	
MH 23	-5982.041	12019.087	
MH 24	-5999.253	12076.227	
MH 25	-6016.181	12134.242	
MH 26	-6032.700	12192.261	
MH 27	-6052.164	12249.072	
MH 28	-6071.006	12303.555	
MH 29	-6088.347	12361.159	
MH 30	-6105.687	12418.763	
MH 31	-6140.779	12409.653	
MH 32	-6199.263	12391.432	
MH 33	-6275.579	12368.325	
MH 34	-6334.002	12247.890	
MH 35	-6341.001	12283.461	
MH 36	-6380.299	12219.032	
MH 37	-6419.958	12154.603	
MH 38	-6489.564	12197.278	
MH 39	-6526.506	12119.015	
MH 39A	-6557.602	12119.989	
MH 40	-6618.479	12121.829	
MH 41	-6710.451	12124.642	
MH 42	-6719.792	12083.461	
MH 43	-6799.130	11992.503	
MH 44	-6876.771	11946.429	
MH 45	-6945.300	11905.344	
MH 46	-7044.978	11861.937	
MH 47	-7056.004	11861.852	
MH 48	-7089.869	11862.050	
MH 49	-7158.616	11840.818	
MH 50	-7224.864	11819.464	
MH 51	-7246.836	11820.051	
MH 52	-7310.885	11778.249	
MH 53	-7377.194	11778.460	
MH 54	-7460.700	11778.149	
MH 55	-7540.282	11778.429	
MH 56	-7616.215	11779.764	

NOTES

MH #		NEW MANHOLE
		NEW OUTFALL SEWER PIPE
		EXISTING MANHOLE
		EXISTING OUTFALL SEWER PIPE
bm#		BENCHMARK
		EXISTING RAILWAY LINE
		N12 NATIONAL ROAD

REFERENCE DRAWINGS	
PLAN Nr.	DESCRIPTION

PRINT ISSUED ON _____

IMPLEMENTING AGENT:
MAQUASSI HILLS LM

DESIGN	DATE JUN 2023	DRAWN	DATE JUN 2023
SURVEYED	DATE	CHECKED J.BATEMAN	DATE JUN 2023

DRAWING No.

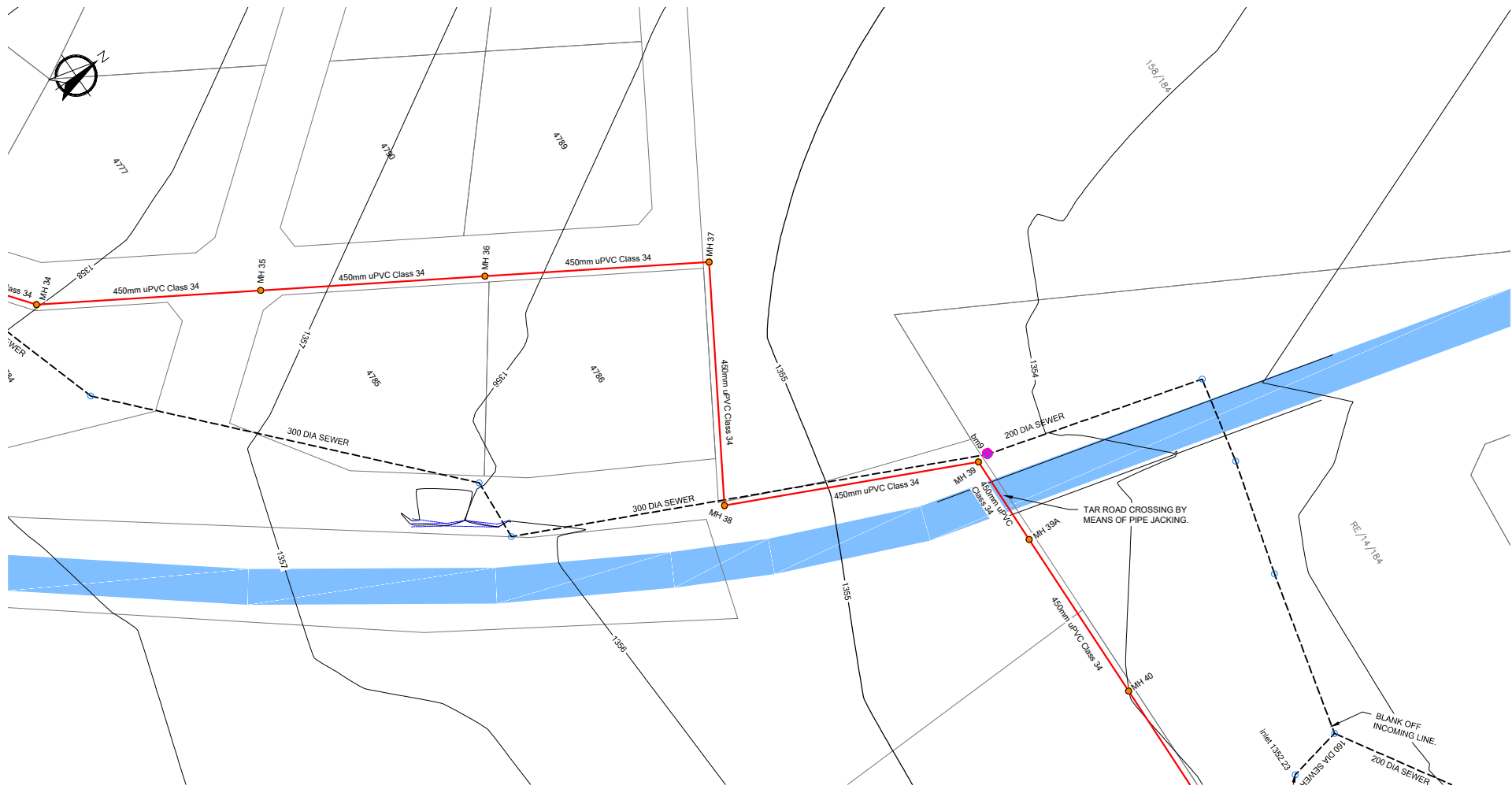
2023-02-S/L/004

_____ EGL
 _____ HGL
 _____ PIPE
 _____ NGL

SCALES:
 Horizontal 1:1000
 Vertical 1:100

MH 26 - MH 34

MH - MH	Distance	Diam.
Wolmransteden Outfall		(mm)
MH 01 - MH 02	58,878	200mm uPVC Class 34
MH 02 - MH 03	38,691	200mm uPVC Class 34
MH 03 - MH 04	3,495	200mm uPVC Class 34
MH 04 - MH 05	51,169	200mm uPVC Class 34
MH 05 - MH 06	57,217	200mm uPVC Class 34
MH 06 - MH 07	15,601	200mm uPVC Class 34
MH 07 - MH 08	46,525	200mm uPVC Class 34
MH 08 - MH 09	3,961	200mm uPVC Class 34
MH 09 - MH 10	70,589	200mm uPVC Class 34
MH 10 - MH 11	60,550	200mm uPVC Class 34
MH 11 - MH 12	61,553	200mm uPVC Class 34
MH 12 - MH 13	61,084	200mm uPVC Class 34
MH 13 - MH 14	61,036	200mm uPVC Class 34
MH 14 - MH 15	60,899	200mm uPVC Class 34
MH 15 - MH 16	65,383	200mm uPVC Class 34
MH 16 - MH 17	20,000	200mm uPVC Class 34
MH 17 - MH 18	72,589	200mm uPVC Class 34
MH 18 - MH 19	72,589	200mm uPVC Class 34
MH 19 - MH 20	62,685	355mm uPVC Class 34
MH 20 - MH 21	73,399	355mm uPVC Class 34
MH 21 - MH 22	63,421	355mm uPVC Class 34
MH 22 - MH 23	61,560	355mm uPVC Class 34
MH 23 - MH 24	59,677	355mm uPVC Class 34
MH 24 - MH 25	60,600	355mm uPVC Class 34
MH 25 - MH 26	64,672	355mm uPVC Class 34
MH 26 - MH 27	55,677	355mm uPVC Class 34
MH 27 - MH 28	57,649	355mm uPVC Class 34
MH 28 - MH 29	60,157	355mm uPVC Class 34
MH 29 - MH 30	60,157	355mm uPVC Class 34
MH 30 - MH 31	36,255	355mm uPVC Class 34
MH 31 - MH 32	69,737	450mm uPVC Class 34
MH 32 - MH 33	71,737	450mm uPVC Class 34
MH 33 - MH 34	33,166	450mm uPVC Class 34
MH 34 - MH 35	75,468	450mm uPVC Class 34
MH 35 - MH 36	75,468	450mm uPVC Class 34
MH 36 - MH 37	75,468	450mm uPVC Class 34
MH 37 - MH 38	81,954	450mm uPVC Class 34
MH 38 - MH 39	45,000	450mm uPVC Class 34
MH 39 - MH 39A	31,112	450mm uPVC Class 34
MH 39A - MH 40	60,904	450mm uPVC Class 34
MH 40 - MH 41	92,016	450mm uPVC Class 34
MH 41 - MH 42	79,569	450mm uPVC Class 34
MH 42 - MH 43	79,569	450mm uPVC Class 34
MH 43 - MH 44	90,283	450mm uPVC Class 34
MH 44 - MH 45	79,901	450mm uPVC Class 34
MH 45 - MH 46	45,000	450mm uPVC Class 34
MH 46 - MH 47	11,026	450mm uPVC Class 34
MH 47 - MH 48	33,865	450mm uPVC Class 34
MH 48 - MH 49	71,951	450mm uPVC Class 34
MH 49 - MH 50	71,951	450mm uPVC Class 34
MH 50 - MH 51	19,478	450mm uPVC Class 34
MH 51 - MH 52	76,483	450mm uPVC Class 34
MH 52 - MH 53	45,000	450mm uPVC Class 34
MH 53 - MH 54	83,006	450mm uPVC Class 34
MH 54 - MH 55	75,583	450mm uPVC Class 34
MH 55 - MH 56	75,945	450mm uPVC Class 34



**OUTFALL SEWER LAYOUT
MH 34 - MH 40**
SCALE 1:1000

TOTAL LENGTHS OF PIPING	
MH Centre to MH Centre	
Diameter (mm)	Length (m)
450mm uPVC Class 34	1817.49
355mm uPVC Class 34	679.49
200mm uPVC Class 34	927.88
Total :	3424.85

COORDINATE LIST		
WG 25		
Wolmaransstad Outfall		
MH No.	YLo	XLo
Constant	-90000.000	3000000.000
MH 01	-5757.606	10884.823
MH 02	-5729.959	10936.807
MH 03	-5711.617	10970.873
MH 04	-5711.061	10974.324
MH 05	-5709.205	11025.459
MH 06	-5706.013	11082.587
MH 07	-5705.996	11098.188
MH 08	-5704.729	11144.696
MH 09	-5705.627	11148.554
MH 10	-5725.677	11216.020
MH 11	-5744.431	11273.592
MH 12	-5762.573	11332.411
MH 13	-5780.885	11391.101
MH 14	-5799.214	11449.319
MH 15	-5817.445	11507.426
MH 16	-5837.166	11569.764
MH 17	-5857.000	11632.557
MH 18	-5878.949	11701.718
MH 19	-5900.804	11770.998
MH 20	-5919.915	11830.699
MH 21	-5942.559	11900.517
MH 22	-5963.342	11960.435
MH 23	-5982.041	12019.087
MH 24	-5999.253	12076.227
MH 25	-6016.181	12134.242
MH 26	-6034.700	12196.205
MH 27	-6052.164	12249.072
MH 28	-6071.006	12303.555
MH 29	-6088.347	12361.159
MH 30	-6105.687	12418.763
MH 31	-6140.779	12409.653
MH 32	-6199.263	12391.432
MH 33	-6275.579	12368.325
MH 34	-6301.702	12347.890
MH 35	-6341.001	12283.461
MH 36	-6380.299	12219.032
MH 37	-6419.598	12154.603
MH 38	-6489.564	12197.278
MH 39	-6526.506	12119.015
MH 39A	-6557.602	12119.989
MH 40	-6618.479	12121.829
MH 41	-6710.452	12124.642
MH 42	-6754.791	12058.572
MH 43	-6799.130	11992.503
MH 44	-6876.771	11946.429
MH 45	-6945.300	11905.344
MH 46	-7044.978	11861.937
MH 47	-7056.004	11861.852
MH 48	-7089.869	11862.050
MH 49	-7158.616	11840.818
MH 50	-7227.364	11819.586
MH 51	-7246.836	11820.051
MH 52	-7370.885	11778.249
MH 53	-7377.194	11778.460
MH 54	-7460.700	11778.149
MH 55	-7540.282	11778.429
MH 56	-7616.215	11779.764

- NOTES**
- MH # NEW MANHOLE
 - NEW OUTFALL SEWER PIPE
 - EXISTING MANHOLE
 - EXISTING OUTFALL SEWER PIPE
 - bm# BENCHMARK
 - EXISTING RAILWAY LINE
 - N12 NATIONAL ROAD

Benchmarks				
Name	Desc	Y	X	Elevation
bmcf	h/c	-96617.578	3013925.630	1359.888
bm1	h/c	-95748.317	3010882.977	1362.739
bm2	h/c	-95703.779	3011097.406	1362.926
bm3	h/c	-95760.185	3011332.839	1362.314
bm4	h/c	-95834.789	3011569.895	1361.990
bm5	h/c	-95887.724	3011775.952	1361.551
bm6	h/c	-95980.288	3012019.612	1361.837
bm7	h/c	-96088.957	3012288.230	1361.749
bm8	h/c	-96267.278	3012372.094	1358.652
bm9	h/c	-96525.901	3012114.921	1354.373
bm10	h/c	-97377.478	3011780.033	1341.732
bm11	h/c	-97615.840	3011783.095	1339.186

REFERENCE DRAWINGS

PLAN Nr.	DESCRIPTION

APPROVED:	DATE:
ENGINEER:	DATE:
APPROVED:	DATE:
CLIENT:	DATE:

PRINT ISSUED ON



**UPGRADING OF OUTFALL SEWER
IN WOLMARANSSTAD EXTENSIONS**

IMPLEMENTING AGENT:
MAQUASSI HILLS LM

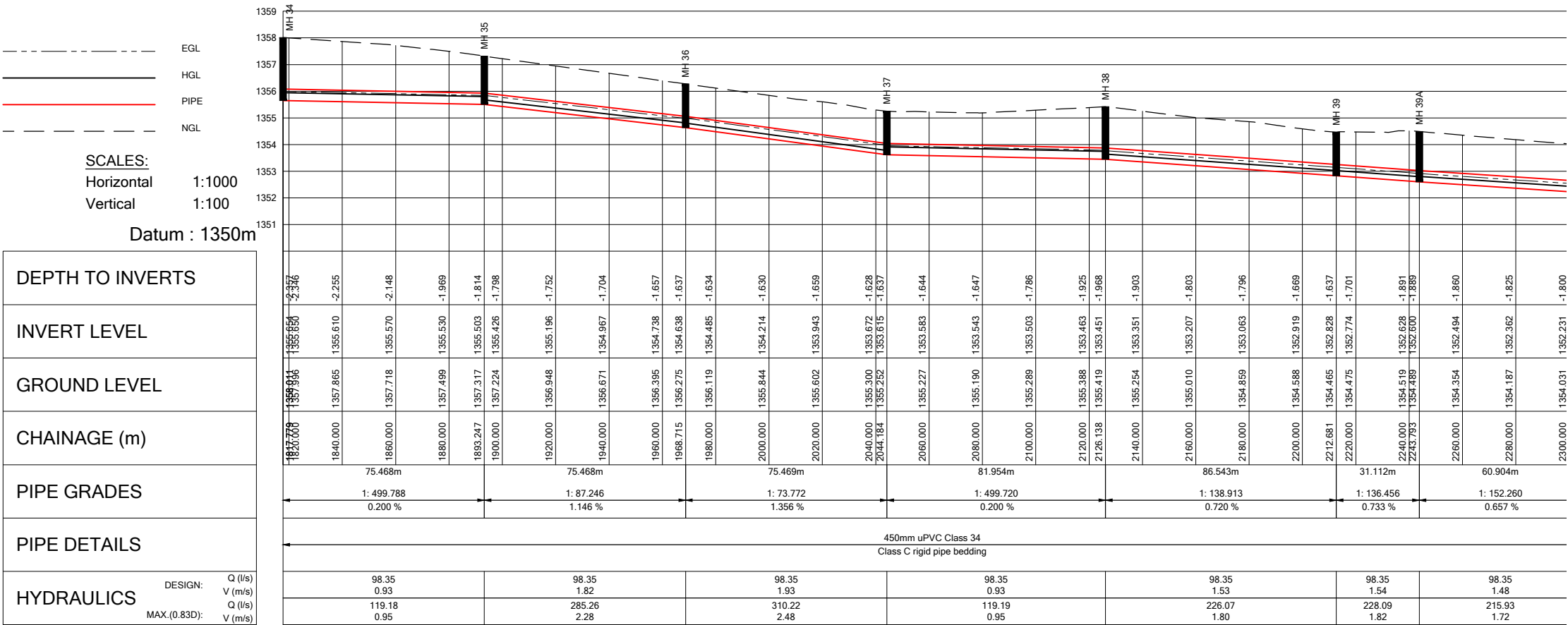
DRAWING TITLE
**OUTFALL SEWER LAYOUT
AND LONGSECTION
MH 34 - MH 40**

DESIGN	DATE	DRAWN	DATE
	JUN 2023		JUN 2023
SURVEYED	DATE	CHECKED	DATE
		J.BATEMAN	JUN 2023

SCALE **AS SHOWN**

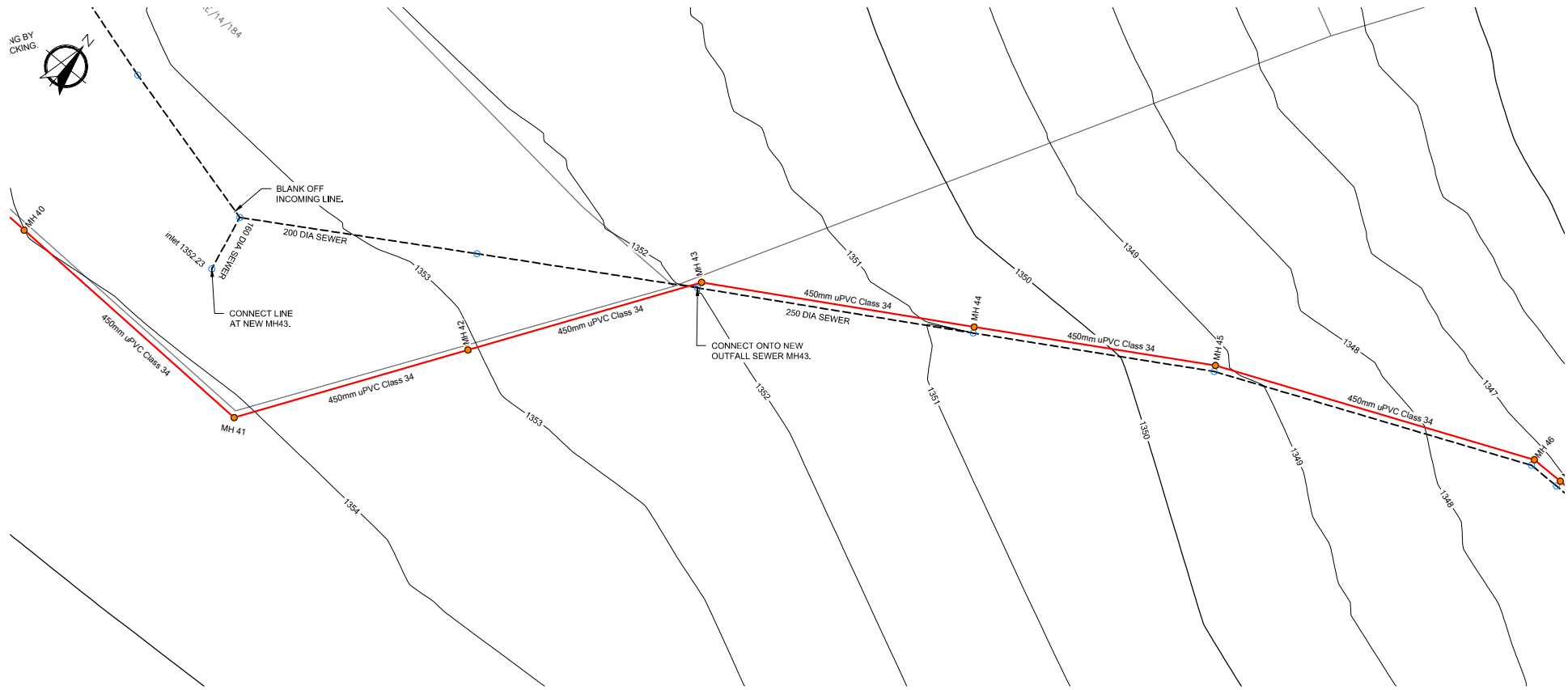
DRAWING No.
2023-02-S/L/005

REVISION No.									
1.0									



MH 34 - MH 40

COORDINATE LIST		
WG 25		
MH No.	YLo	XLo
Constant	-90000.000	3000000.000
MH 01	-5757.606	10884.823
MH 02	-5729.959	10936.807
MH 03	-5711.617	10970.873
MH 04	-5711.061	10974.324
MH 05	-5709.205	11025.459
MH 06	-5706.013	11082.587
MH 07	-5705.996	11098.188
MH 08	-5704.729	11144.696
MH 09	-5705.627	11148.554
MH 10	-5725.677	11216.020
MH 11	-5744.431	11273.592
MH 12	-5762.573	11332.411
MH 13	-5780.885	11391.101
MH 14	-5799.214	11449.319
MH 15	-5817.445	11507.426
MH 16	-5837.166	11569.764
MH 17	-5857.094	11632.557
MH 18	-5878.949	11701.778
MH 19	-5900.804	11770.998
MH 20	-5919.915	11830.699
MH 21	-5942.559	11900.517
MH 22	-5963.342	11960.435
MH 23	-5982.041	12019.087
MH 24	-5999.253	12076.227
MH 25	-6016.181	12134.242
MH 26	-6034.700	12196.205
MH 27	-6052.164	12249.072
MH 28	-6071.006	12303.555
MH 29	-6088.347	12361.159
MH 30	-6105.687	12418.763
MH 31	-6140.779	12409.653
MH 32	-6199.263	12391.432
MH 33	-6275.579	12368.325
MH 34	-6301.702	12347.890
MH 35	-6341.001	12283.461
MH 36	-6380.299	12219.032
MH 37	-6419.598	12154.603
MH 38	-6489.564	12197.278
MH 39	-6526.506	12119.015
MH 39A	-6557.602	12119.989
MH 40	-6618.479	12121.829
MH 41	-6710.452	12124.642
MH 42	-6754.791	12058.572
MH 43	-6799.130	11992.503
MH 44	-6876.771	11946.429
MH 45	-6945.300	11905.344
MH 46	-7044.978	11861.937
MH 47	-7056.004	11861.852
MH 48	-7089.869	11862.050
MH 49	-7158.616	11840.818
MH 50	-7227.364	11819.586
MH 51	-7246.836	11820.051
MH 52	-7310.885	11778.249
MH 53	-7377.194	11778.460
MH 54	-7460.700	11778.149
MH 55	-7540.282	11778.429
MH 56	-7616.215	11779.764



OUTFALL SEWER LAYOUT
MH 40 - MH 46
SCALE 1:1000

PIPE DATA LIST		
MH - MH	Distance (m)	Diam. (mm)
Wolmaransstad Outfall		
MH 01 - MH 02	58.878	200mm uPVC Class 34
MH 02 - MH 03	38.691	200mm uPVC Class 34
MH 03 - MH 04	3.495	200mm uPVC Class 34
MH 04 - MH 05	51.469	200mm uPVC Class 34
MH 05 - MH 06	57.217	200mm uPVC Class 34
MH 06 - MH 07	15.601	200mm uPVC Class 34
MH 07 - MH 08	46.525	200mm uPVC Class 34
MH 08 - MH 09	3.961	200mm uPVC Class 34
MH 09 - MH 10	70.382	200mm uPVC Class 34
MH 10 - MH 11	60.550	200mm uPVC Class 34
MH 11 - MH 12	61.553	200mm uPVC Class 34
MH 12 - MH 13	61.480	200mm uPVC Class 34
MH 13 - MH 14	61.036	200mm uPVC Class 34
MH 14 - MH 15	60.899	200mm uPVC Class 34
MH 15 - MH 16	65.383	200mm uPVC Class 34
MH 16 - MH 17	65.880	200mm uPVC Class 34
MH 17 - MH 18	72.589	200mm uPVC Class 34
MH 18 - MH 19	72.589	200mm uPVC Class 34
MH 19 - MH 20	62.685	355mm uPVC Class 34
MH 20 - MH 21	73.399	355mm uPVC Class 34
MH 21 - MH 22	63.421	355mm uPVC Class 34
MH 22 - MH 23	61.560	355mm uPVC Class 34
MH 23 - MH 24	59.677	355mm uPVC Class 34
MH 24 - MH 25	60.434	355mm uPVC Class 34
MH 25 - MH 26	64.672	355mm uPVC Class 34
MH 26 - MH 27	55.677	355mm uPVC Class 34
MH 27 - MH 28	57.649	355mm uPVC Class 34
MH 28 - MH 29	60.157	355mm uPVC Class 34
MH 29 - MH 30	60.157	355mm uPVC Class 34
MH 30 - MH 31	36.255	450mm uPVC Class 34
MH 31 - MH 32	61.257	450mm uPVC Class 34
MH 32 - MH 33	79.737	450mm uPVC Class 34
MH 33 - MH 34	33.166	450mm uPVC Class 34
MH 34 - MH 35	75.468	450mm uPVC Class 34
MH 35 - MH 36	75.468	450mm uPVC Class 34
MH 36 - MH 37	75.468	450mm uPVC Class 34
MH 37 - MH 38	81.954	450mm uPVC Class 34
MH 38 - MH 39	86.544	450mm uPVC Class 34
MH 39 - MH 39A	31.112	450mm uPVC Class 34
MH 39A - MH 40	60.804	450mm uPVC Class 34
MH 40 - MH 41	92.016	450mm uPVC Class 34
MH 41 - MH 42	79.569	450mm uPVC Class 34
MH 42 - MH 43	79.569	450mm uPVC Class 34
MH 43 - MH 44	90.283	450mm uPVC Class 34
MH 44 - MH 45	79.901	450mm uPVC Class 34
MH 45 - MH 46	108.720	450mm uPVC Class 34
MH 46 - MH 47	11.026	450mm uPVC Class 34
MH 47 - MH 48	33.865	450mm uPVC Class 34
MH 48 - MH 49	71.951	450mm uPVC Class 34
MH 49 - MH 50	19.478	450mm uPVC Class 34
MH 50 - MH 51	76.483	450mm uPVC Class 34
MH 51 - MH 52	66.310	450mm uPVC Class 34
MH 52 - MH 53	83.506	450mm uPVC Class 34
MH 53 - MH 54	79.583	450mm uPVC Class 34
MH 54 - MH 55	75.945	450mm uPVC Class 34
MH 55 - MH 56	75.945	450mm uPVC Class 34

TOTAL LENGTHS OF PIPING	
MH Centre to MH Centre	
Diameter (mm)	Length (m)
450mm uPVC Class 34	1817.49
355mm uPVC Class 34	679.49
200mm uPVC Class 34	927.88
Total :	3424.85

REVISIONS				
No.	DATE	BY	DESCRIPTION	

NOTES	
MH #	NEW MANHOLE
—	NEW OUTFALL SEWER PIPE
○	EXISTING MANHOLE
- - -	EXISTING OUTFALL SEWER PIPE
bm#	BENCHMARK
	EXISTING RAILWAY LINE
	N12 NATIONAL ROAD

Benchmarks				
Name	Desc	Y	X	Elevation
bmcf	h/c	-96617.578	3013925.630	1359.888
bm1	h/c	-95748.317	3010882.977	1362.739
bm2	h/c	-95703.779	3011097.406	1362.926
bm3	h/c	-95760.185	3011332.839	1362.314
bm4	h/c	-95834.789	3011569.895	1361.990
bm5	h/c	-95887.724	3011775.952	1361.551
bm6	h/c	-95980.288	3012019.612	1361.837
bm7	h/c	-96088.957	3012288.230	1361.749
bm8	h/c	-96267.278	3012372.094	1358.652
bm9	h/c	-96525.901	3012114.921	1354.373
bm10	h/c	-97377.478	3011780.033	1341.732
bm11	h/c	-97615.840	3011783.095	1339.186

REFERENCE DRAWINGS	
PLAN Nr.	DESCRIPTION

APPROVED:	
ENGINEER:	
DATE:	
APPROVED:	
CLIENT:	
DATE:	
PRINT ISSUED ON	



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CONSULTING ENGINEERS

Mobile: + 27 (0)83 265 1524
329 Stateway Chambers, Stateway, Welkom,
PO Box 2600, Welkom, 9460, South Africa

CLIENT	MAQUASSI HILLS LOCAL MUNICIPALITY
--------	--------------------------------------

PROJECT

UPGRADING OF OUTFALL SEWER
IN WOLMARANSSTAD EXTENSIONS

IMPLEMENTING AGENT:
MAQUASSI HILLS LM

DRAWING TITLE
OUTFALL SEWER LAYOUT
AND LONGSECTION
MH 40 - MH 46

DESIGN	DATE JUN 2023	DRAWN	DATE JUN 2023
SURVEYED	DATE	CHECKED J.BATEMAN	DATE JUN 2023

SCALE AS SHOWN

DRAWING No.

2023-02-S/L/006

REVISION No.									
1.0									

--- EGL

--- HGL

--- PIPE

--- NGL

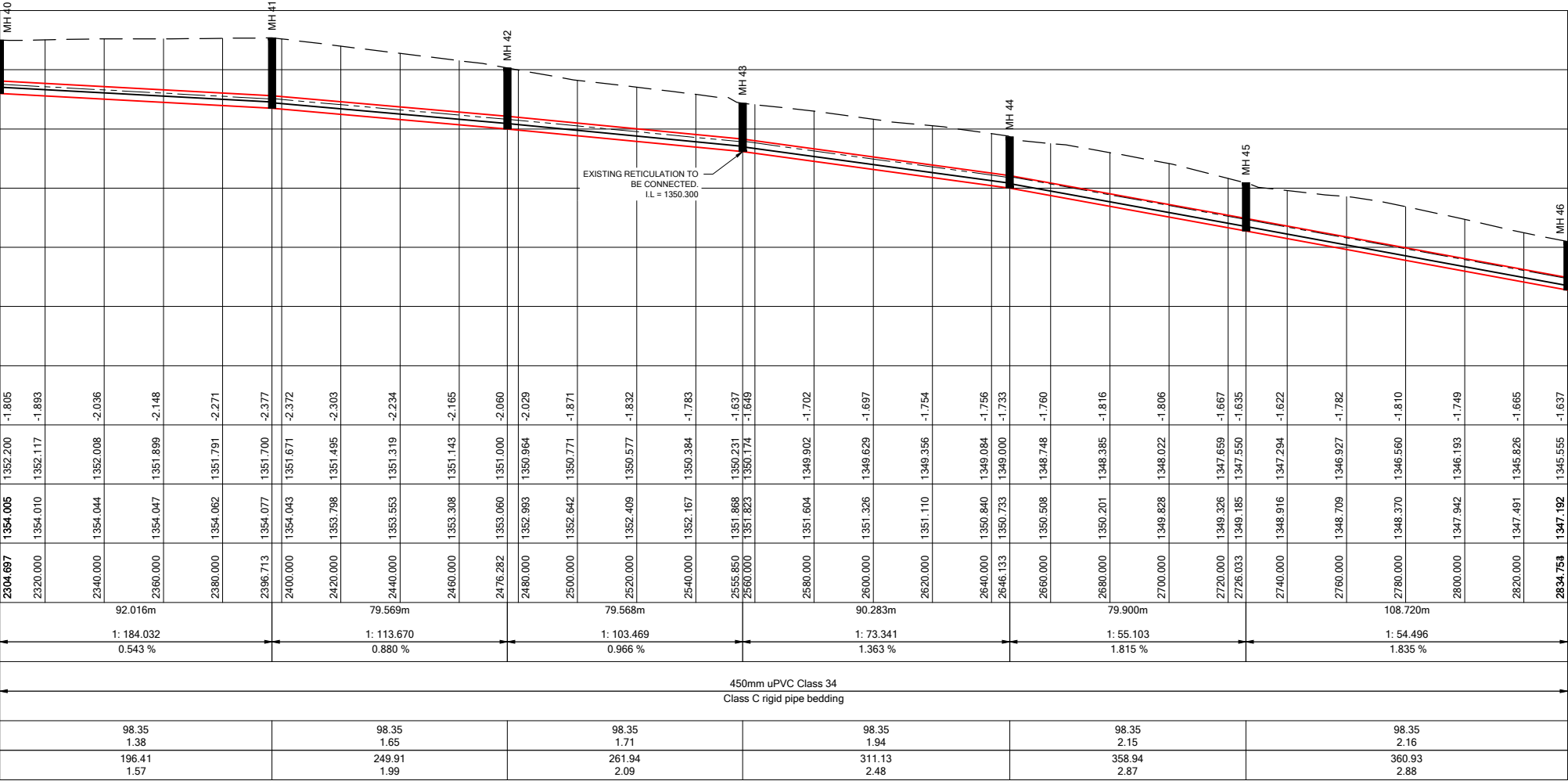
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Horizontal 1:1000

Vertical 1:100

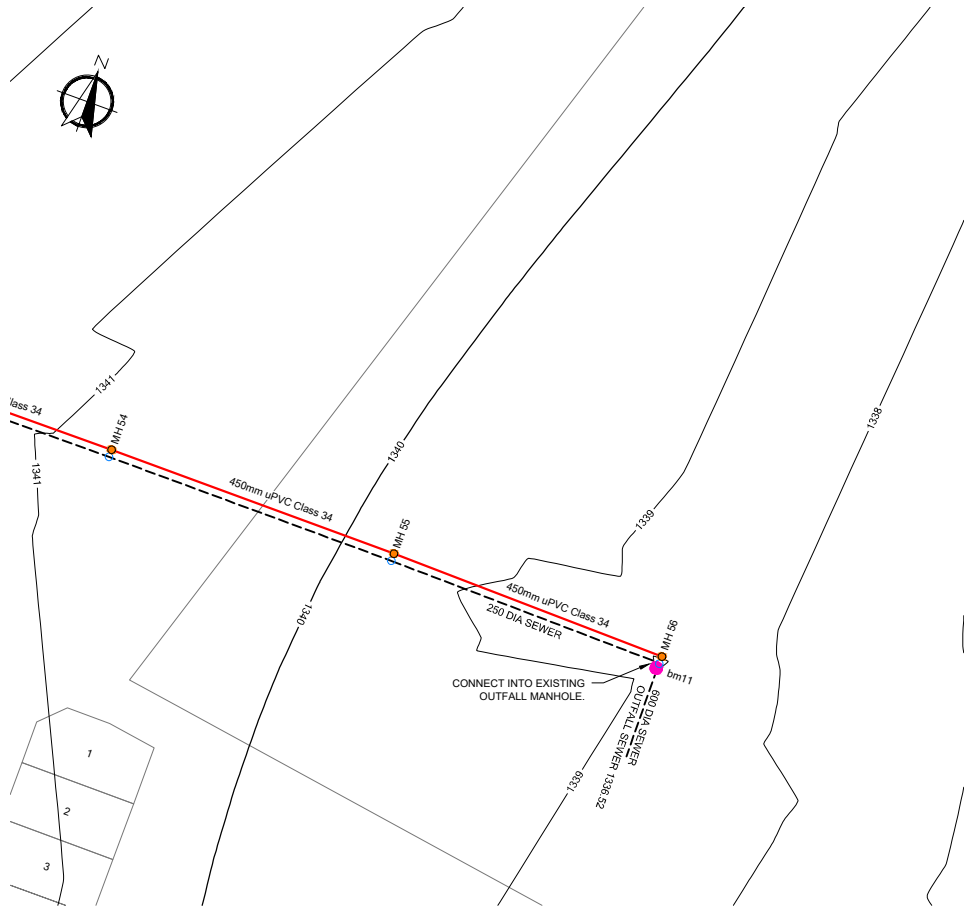
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DEPTH TO INVERTS	
INVERT LEVEL	
GROUND LEVEL	
CHAINAGE (m)	
PIPE GRADES	
PIPE DETAILS	
HYDRAULICS	
DESIGN:	Q (l/s)
	V (m/s)
	Q (l/s)
	V (m/s)
MAX. (0.83D):	V (m/s)



MH 40 - MH 46





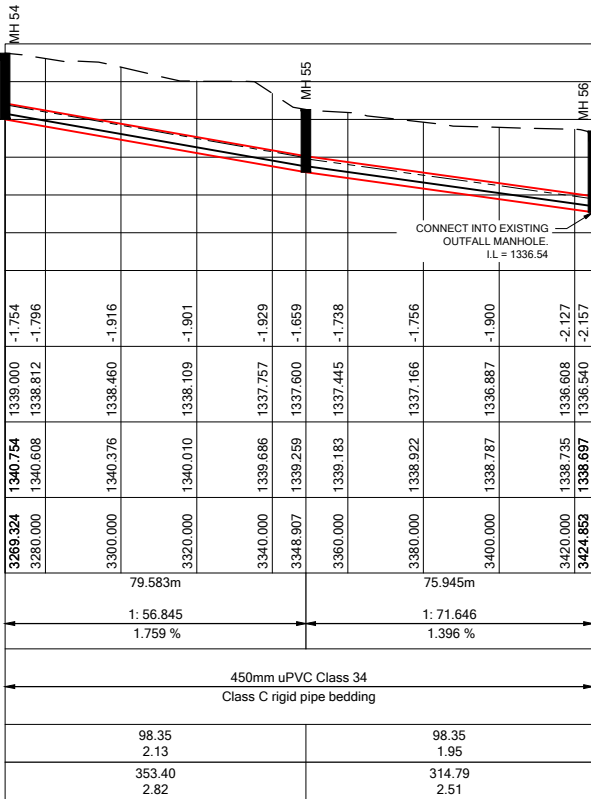
OUTFALL SEWER LAYOUT
MH 54 - MH 56
SCALE 1:1000

--- EGL
--- HGL
--- PIPE
--- NGL

SCALES:
Horizontal 1:1000
Vertical 1:100

Datum : 1335m

DEPTH TO INVERTS
INVERT LEVEL
GROUND LEVEL
CHAINAGE (m)
PIPE GRADES
PIPE DETAILS
HYDRAULICS
DESIGN: Q (l/s) V (m/s)
MAX.(0.83D): Q (l/s) V (m/s)



MH 54 - MH 56

TOTAL LENGTHS OF PIPING	
MH Centre to MH Centre	
Diameter (mm)	Length (m)
450mm uPVC Class 34	1817.49
355mm uPVC Class 34	679.49
200mm uPVC Class 34	927.88
Total :	3424.85

COORDINATE LIST		
WG 25		
Wolmaransstad Outfall		
MH No.	YLo	XLo
Constant	-90000.000	3000000.000
MH 01	-5757.606	10884.823
MH 02	-5729.959	10936.807
MH 03	-5711.617	10970.873
MH 04	-5711.061	10974.324
MH 05	-5709.205	11025.459
MH 06	-5706.013	11082.587
MH 07	-5705.996	11098.188
MH 08	-5704.729	11144.696
MH 09	-5705.627	11148.554
MH 10	-5725.677	11216.020
MH 11	-5744.431	11273.592
MH 12	-5762.573	11332.411
MH 13	-5780.885	11391.101
MH 14	-5799.214	11449.319
MH 15	-5817.445	11507.426
MH 16	-5837.166	11569.764
MH 17	-5857.094	11632.557
MH 18	-5878.949	11701.718
MH 19	-5900.804	11770.998
MH 20	-5919.915	11830.699
MH 21	-5942.559	11900.517
MH 22	-5963.342	11960.435
MH 23	-5982.041	12019.087
MH 24	-5999.253	12076.227
MH 25	-6016.181	12134.242
MH 26	-6034.700	12196.205
MH 27	-6052.164	12249.072
MH 28	-6071.006	12303.555
MH 29	-6088.347	12361.159
MH 30	-6105.687	12418.763
MH 31	-6140.779	12409.653
MH 32	-6199.263	12391.432
MH 33	-6275.579	12368.325
MH 34	-6301.702	12347.890
MH 35	-6341.001	12283.461
MH 36	-6380.299	12219.032
MH 37	-6419.598	12154.603
MH 38	-6489.564	12197.278
MH 39	-6526.506	12119.015
MH 39A	-6557.602	12119.989
MH 40	-6618.479	12121.829
MH 41	-6710.452	12124.642
MH 42	-6754.791	12058.572
MH 43	-6799.130	11992.503
MH 44	-6876.771	11946.429
MH 45	-6945.300	11905.344
MH 46	-7044.978	11861.937
MH 47	-7056.004	11861.852
MH 48	-7089.869	11862.050
MH 49	-7158.616	11840.818
MH 50	-7227.364	11819.586
MH 51	-7246.836	11820.051
MH 52	-7370.805	11778.249
MH 53	-7377.194	11778.460
MH 54	-7460.700	11778.149
MH 55	-7540.282	11778.429
MH 56	-7616.215	11779.764

PIPE DATA LIST		
MH - MH	Distance	Diam.
Wolmaransstad Outfall		
	(m)	(mm)
MH 01 - MH 02	58.878	200mm uPVC Class 34
MH 02 - MH 03	38.691	200mm uPVC Class 34
MH 03 - MH 04	3.495	200mm uPVC Class 34
MH 04 - MH 05	51.169	200mm uPVC Class 34
MH 05 - MH 06	57.217	200mm uPVC Class 34
MH 06 - MH 07	15.601	200mm uPVC Class 34
MH 07 - MH 08	46.525	200mm uPVC Class 34
MH 08 - MH 09	3.961	200mm uPVC Class 34
MH 09 - MH 10	70.382	200mm uPVC Class 34
MH 10 - MH 11	60.550	200mm uPVC Class 34
MH 11 - MH 12	61.553	200mm uPVC Class 34
MH 12 - MH 13	61.480	200mm uPVC Class 34
MH 13 - MH 14	61.036	200mm uPVC Class 34
MH 14 - MH 15	60.899	200mm uPVC Class 34
MH 15 - MH 16	65.383	200mm uPVC Class 34
MH 16 - MH 17	65.880	200mm uPVC Class 34
MH 17 - MH 18	72.589	200mm uPVC Class 34
MH 18 - MH 19	72.589	200mm uPVC Class 34
MH 19 - MH 20	62.685	355mm uPVC Class 34
MH 20 - MH 21	73.399	355mm uPVC Class 34
MH 21 - MH 22	63.421	355mm uPVC Class 34
MH 22 - MH 23	61.560	355mm uPVC Class 34
MH 23 - MH 24	59.677	355mm uPVC Class 34
MH 24 - MH 25	60.434	355mm uPVC Class 34
MH 25 - MH 26	64.672	355mm uPVC Class 34
MH 26 - MH 27	55.677	355mm uPVC Class 34
MH 27 - MH 28	57.649	355mm uPVC Class 34
MH 28 - MH 29	60.157	355mm uPVC Class 34
MH 29 - MH 30	60.157	355mm uPVC Class 34
MH 30 - MH 31	36.255	450mm uPVC Class 34
MH 31 - MH 32	61.257	450mm uPVC Class 34
MH 32 - MH 33	79.737	450mm uPVC Class 34
MH 33 - MH 34	33.166	450mm uPVC Class 34
MH 34 - MH 35	75.468	450mm uPVC Class 34
MH 35 - MH 36	75.468	450mm uPVC Class 34
MH 36 - MH 37	75.468	450mm uPVC Class 34
MH 37 - MH 38	81.954	450mm uPVC Class 34
MH 38 - MH 39	86.544	450mm uPVC Class 34
MH 39 - MH 39A	31.112	450mm uPVC Class 34
MH 39A - MH 40	60.904	450mm uPVC Class 34
MH 40 - MH 41	92.016	450mm uPVC Class 34
MH 41 - MH 42	79.569	450mm uPVC Class 34
MH 42 - MH 43	79.569	450mm uPVC Class 34
MH 43 - MH 44	90.283	450mm uPVC Class 34
MH 44 - MH 45	79.901	450mm uPVC Class 34
MH 45 - MH 46	108.720	450mm uPVC Class 34
MH 46 - MH 47	11.026	450mm uPVC Class 34
MH 47 - MH 48	33.865	450mm uPVC Class 34
MH 48 - MH 49	71.951	450mm uPVC Class 34
MH 49 - MH 50	71.951	450mm uPVC Class 34
MH 50 - MH 51	19.478	450mm uPVC Class 34
MH 51 - MH 52	76.463	450mm uPVC Class 34
MH 52 - MH 53	66.310	450mm uPVC Class 34
MH 53 - MH 54	83.506	450mm uPVC Class 34
MH 54 - MH 55	79.583	450mm uPVC Class 34
MH 55 - MH 56	75.945	450mm uPVC Class 34

REVISIONS

No.	DATE	BY	DESCRIPTION

NOTES

MH #

NEW MANHOLE

NEW OUTFALL SEWER PIPE

EXISTING MANHOLE

EXISTING OUTFALL SEWER PIPE

bm#

EXISTING RAILWAY LINE

N12 NATIONAL ROAD

Benchmarks

Name	Desc	Y	X	Elevation
bmcf	h/c	-96617.578	3013925.630	1359.888
bm1	h/c	-95748.317	3010882.977	1362.739
bm2	h/c	-95703.779	3011097.406	1362.926
bm3	h/c	-95760.185	3011332.839	1362.314
bm4	h/c	-95834.789	3011569.895	1361.990
bm5	h/c	-95887.724	3011775.952	1361.551
bm6	h/c	-95980.288	3012019.612	1361.837
bm7	h/c	-96088.957	3012288.230	1361.749
bm8	h/c	-96267.278	3012372.094	1358.652
bm9	h/c	-96525.901	3012114.921	1354.373
bm10	h/c	-97377.478	3011780.033	1341.732
bm11	h/c	-97615.840	3011783.095	1339.186

REFERENCE DRAWINGS

PLAN Nr.	DESCRIPTION

APPROVED:

ENGINEER: _____ DATE: _____

APPROVED:

CLIENT: _____ DATE: _____

PRINT ISSUED ON

Tsela Tsweu

CONSULTING ENGINEERS

Mobile: + 27 (0)83 265 1524
329 Stateway Chambers, Stateway, Welkom,
PO Box 2600, Welkom, 9460, South Africa

CLIENT

MAQUASSI HILLS
LOCAL MUNICIPALITY

PROJECT

UPGRADING OF OUTFALL SEWER
IN WOLMARANSSTAD EXTENSIONS

IMPLEMENTING AGENT:

MAQUASSI HILLS LM

DRAWING TITLE

OUTFALL SEWER LAYOUT
AND LONGSECTION
MH 54 - MH 56

DESIGN	DATE	DRAWN	DATE
	JUN 2023		JUN 2023

SURVEYED	DATE	CHECKED	DATE
		J.BATEMAN	JUN 2023

SCALE

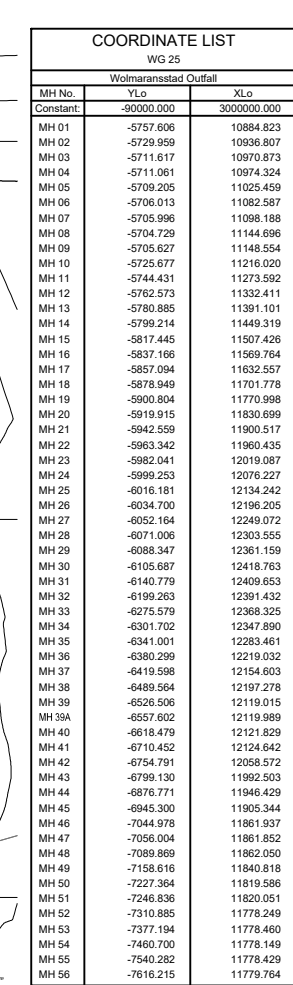
AS SHOWN

DRAWING No.

2023-02-S/L/008

REVISION No.

1.0							
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