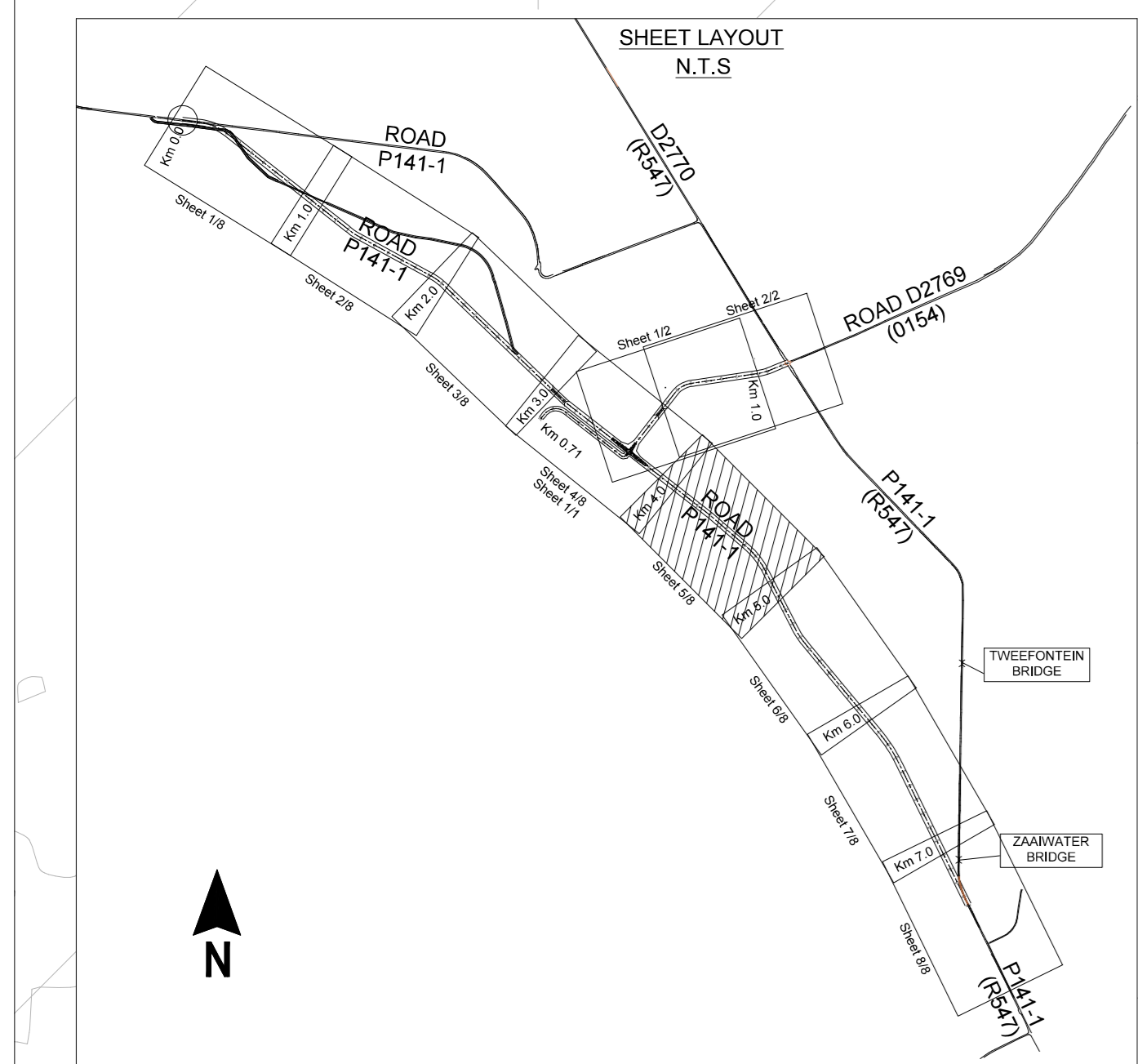


← OGIES

BETHAL →

← SHEET 4/8

SHEET 6/8 →



LEGEND

- FENCE WITH GATE
- POWER LINES
- TELEPHONE LINES
- DIRECTION OF TRAFFIC MOVEMENT
- BUILDINGS
- WATER PIPE LINES
- CULVERT NOTATION
- CADASTRAL INTERSECTION BOUNDARY
- EXISTING ROAD
- EXISTING RAILWAY
- FUTURE RAILWAY

CENTRE LINE CO-ORDINATES
Road P141-1 (Lo 29°)

Chainage km	Y-Coord +0.000	X-Coord +0.000
4000.000	-17978.607	2881162.840
4281.345	-18200.396	2881335.943 BC 5
4320.725	-18230.831	2881360.928 EC 5
4500.000	-18366.558	2881478.049
4624.132	-18460.537	2881559.146 BC 6
4815.063	-18578.073	2881708.140 EC 6
5000.000	-18662.977	2881872.435

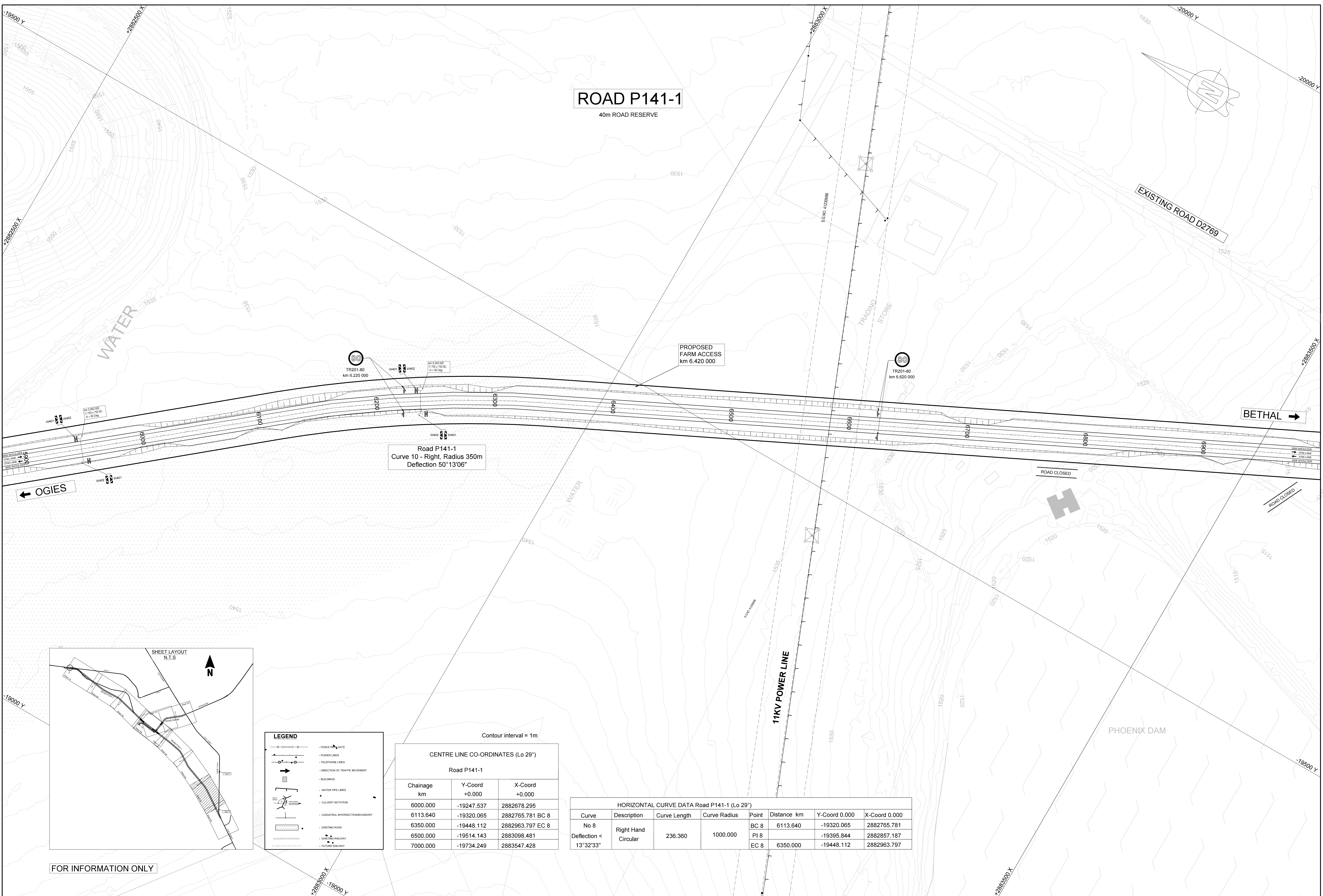
HORIZONTAL CURVE DATA Road P141-1 (Lo 29°)

Curve	Description	Curve Length	Curve Radius	Point	Distance km	Y-Coord 0.000	X-Coord 0.000
No 5 Deflection < 2°49'13"	Right Hand Circular	39.380	800.000	BC 5	4281.345	-18200.396	2881335.943
				PI 5		-18215.921	2881348.060
				EC 5	4320.725	-18230.831	2881360.928
No 6 Deflection < 21°52'45"	Right Hand Circular	190.931	500.000	BC 6	4624.132	-18460.537	2881559.146
				PI 6		-18533.704	2881622.284
				EC 6	4815.063	-18578.073	2881708.140

AA	18/12/2012	FOR APPROVAL	WYSIGINGS / AMENDMENTS	mms Hoof v. Dept for Head of Dept.	DATUM DATE	HANDTEK / SIGNAT.	DATUM / DATE	SURVEYED BY: ONTWERP VBI / DESIGNED FOR TWEEFONTEIN PROJECT XSTRATA COAL SA	ONTWERP DEUR / DESIGNED BY JEFFARES & GREEN PTY (LTD) ENGINEERING AND ENVIRONMENTAL CONSULTING	ONTWERP GOEDGEKEUR / DESIGN APPROVED GOEDGEKEUR DEUR / APPROVED BY mms Raadgewende Ingenieur for Consulting Engineers	ONTWERP DEUR / DESIGNED BY INJN / LN / LN / CCLR MPUMALANGA REGERING / OPENBARE WERKE, PANE EN VERVOER MPUMALANGA MPUMALANGA GOVERNMENT / PUBLIC WORKS, ROADS AND TRANSPORT	SKAAL / SCALE 1:1000	LÉER N° / FILE N° -	DISTRIK / DISTRICT NKANGALA	PROVINSIE PLAN N° / PROVINCE PLAN N° MRS 06/--/05Lyn
REV No	DATUM DATE							XSTRATA COAL 		mms Hoof van Departement for Head of Department DATUM/DATE:	REALIGNMENT OF P141-1, D2769 AT TWEEFONTEIN P141/1 LAYOUT KM 4.000 TO 5.000 (SH 5 OF 8)	TPE ONTWERP / TYPE OF PLANNING PRELIMINARY DESIGN	PAD N° / ROAD N° P141/1 & D2769	XSTRATA COAL PLAN N° / PLAN N° TOP-J&G-5003-CV-01-1104	

V:\002368 - Tweefontein Re-alignment CC to Road\03 Drawings\Working Drawings\Alternative 2012\Primary Design\Rev AC2368\AL_TOP-J&G-5003-CV-01-1104

PROVINCE PLAN N°
XSTRATA COAL PLAN N°
MRS 06/--/05Lyn
TOP-J&G-5003-CV-01-1104



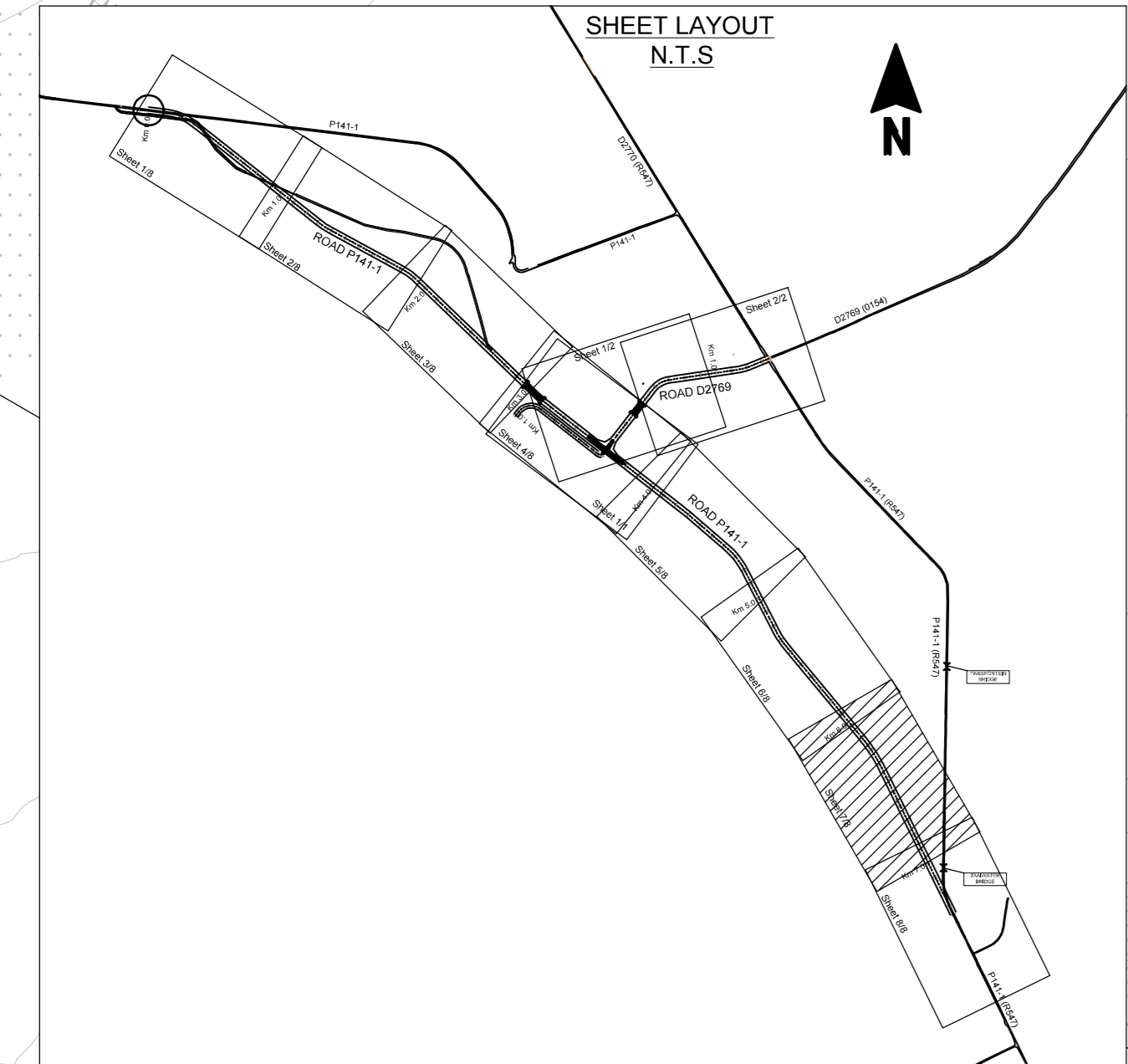
LEGEND

- FENCE / GATE
- POWER LINES
- TELEPHONE LINES
- DIRECTION OF TRAFFIC MOVEMENT
- BUILDINGS
- WATER PIPE LINES
- CULVERT NOTATION
- CADASTRAL INTERSECTION BOUNDARY
- EXISTING ROAD
- EXISTING RAILWAY
- FUTURE RAILWAY

Contour interval = 1m

CENTRE LINE CO-ORDINATES (Lo 29°)		
Road P141-1		
Chainage km	Y-Coord +0.000	X-Coord +0.000
6000.000	-19247.537	2882678.295
6113.640	-19320.065	2882765.781 BC 8
6350.000	-19448.112	2882963.797 EC 8
6500.000	-19514.143	2883098.481
7000.000	-19734.249	2883547.428

HORIZONTAL CURVE DATA Road P141-1 (Lo 29°)							
Curve No	Description	Curve Length	Curve Radius	Point	Distance km	Y-Coord 0.000	X-Coord 0.000
No 8	Right Hand Circular	236.360	1000.000	BC 8	6113.640	-19320.065	2882765.781
Deflection < 13°32'33"				PI 8		-19395.844	2882857.187
				EC 8	6350.000	-19448.112	2882963.797

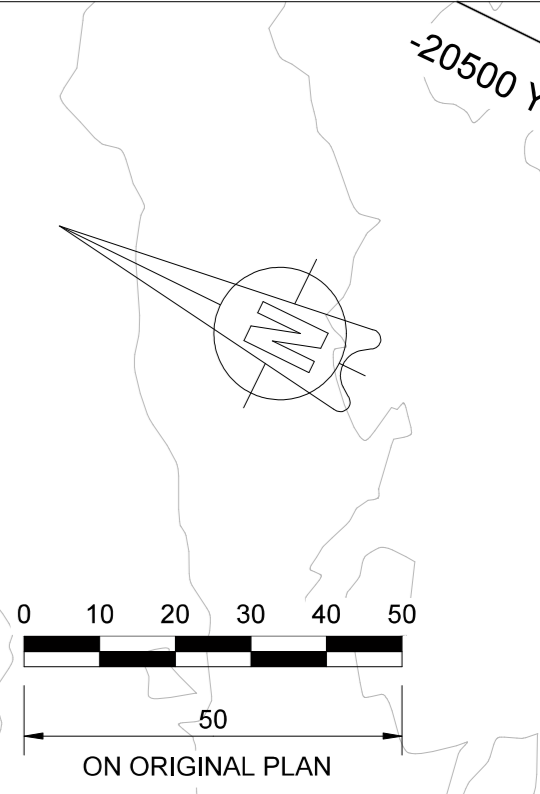
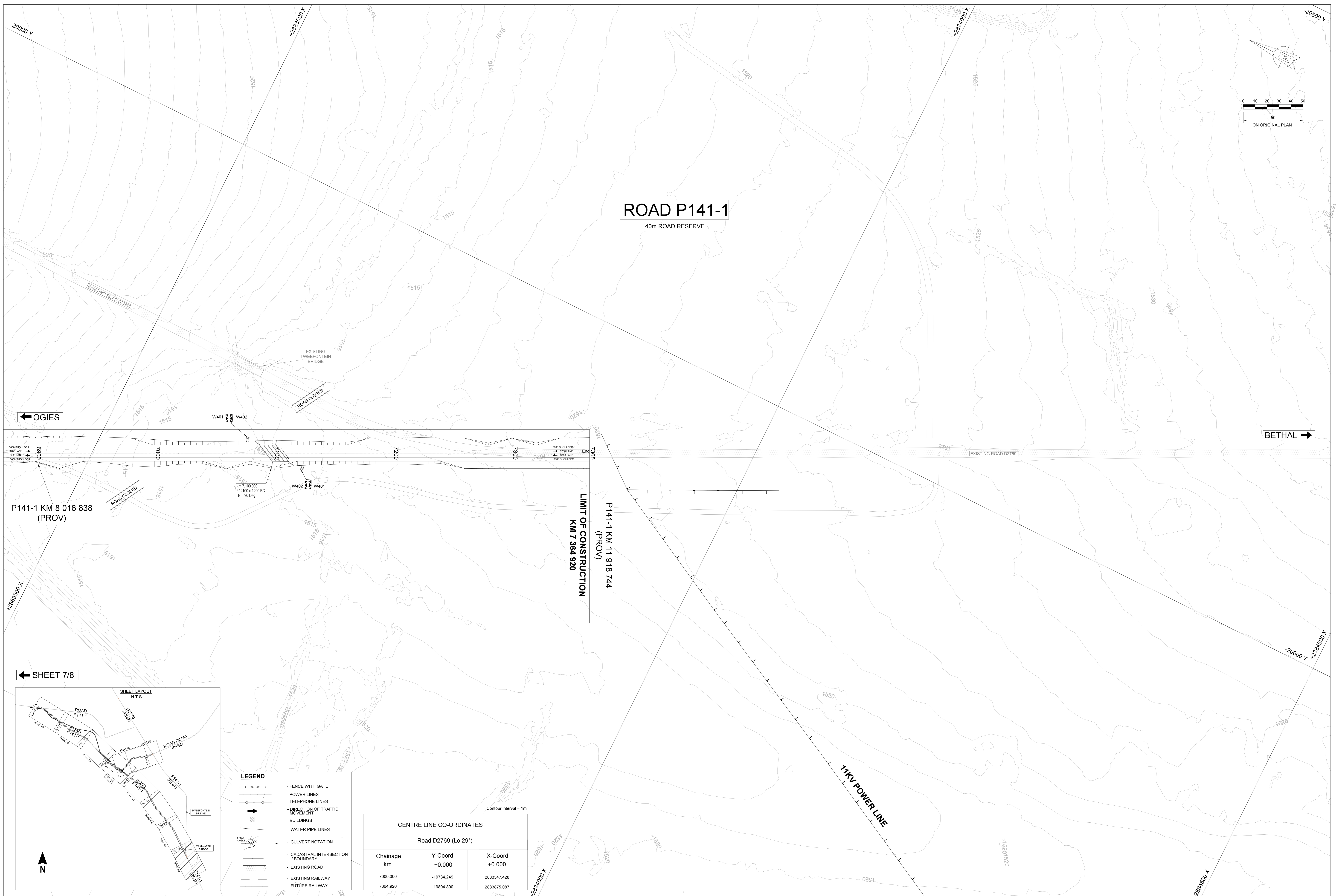


FOR INFORMATION ONLY

No	DATUM DATE	WYSIGINGS / AMENDMENTS	SURVEYED BY: LIDAR SURVEY NOVEMBER 2011 PROVIDED BY XSTRATA			ONTWERP GOEDGEKEUR DESIGN APPROVED nms Raadgevende Ingenieur for Consulting Engineers	GOEDGEKEUR DEUR APPROVED BY nms Hoof van Departement for Head of Department	ONTWERP DEUR DESIGNED BY NAGESIEN DEUR CHECKED BY LN GE TEKEN DEUR DRAWN BY NAGESIEN DEUR CHECKED BY CCLR	MPUMALANGA REGERING OPENBARE WERKE PANEEL EN VERVOER MPUMALANGA REALIGNMENT OF PROVINCIAL ROADS		SKAAL / SCALE	LÉER Nr / FILE No	DISTRIK / DISTRICT	PROVINSIE PLAN Nr / PROVINCE PLAN No
		1:1000									-	NKANGALA	MRS 06/-/07Lyn	
ROAD P141/1 LAYOUT KM 6.000 TO 7.000											TYPE ONTWERP / TYPE OF PLANNING		XSTRATA COAL PLAN Nr / PLAN No	
											PRELIMINARY DESIGN		TOP-J&G-5003-CV-01-1106	

PROVINCE PLAN No
XSTRATA COAL PLAN No
MRS 06/-/07Lyn
TOP-J&G-5003-CV-01-1106

10/02/2011 - Tweefontein Re-alignment (CC) by Road/03 Drawings/Working Drawings/Alternative 2012/Preliminary Design/Rev A1



ROAD P141-1
40m ROAD RESERVE

OGIES ←

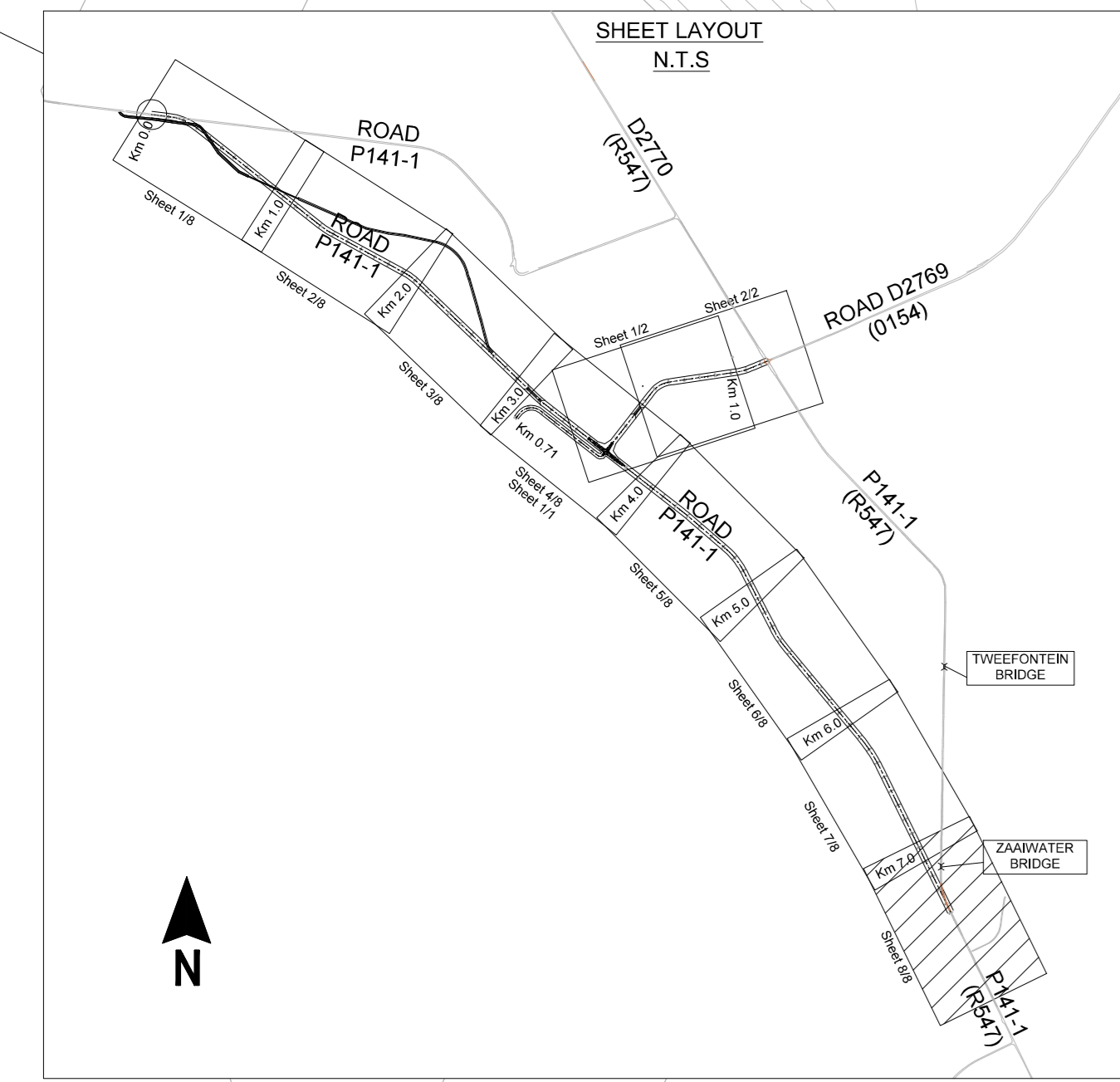
→ BETHAL

P141-1 KM 8 016 838 (PROV)

LIMIT OF CONSTRUCTION
KM 7 364 920

P141-1 KM 11 918 744 (PROV)

← SHEET 7/8



- LEGEND**
- FENCE WITH GATE
 - POWER LINES
 - TELEPHONE LINES
 - DIRECTION OF TRAFFIC MOVEMENT
 - BUILDINGS
 - WATER PIPE LINES
 - CULVERT NOTATION
 - CADASTRAL INTERSECTION / BOUNDARY
 - EXISTING ROAD
 - EXISTING RAILWAY
 - FUTURE RAILWAY

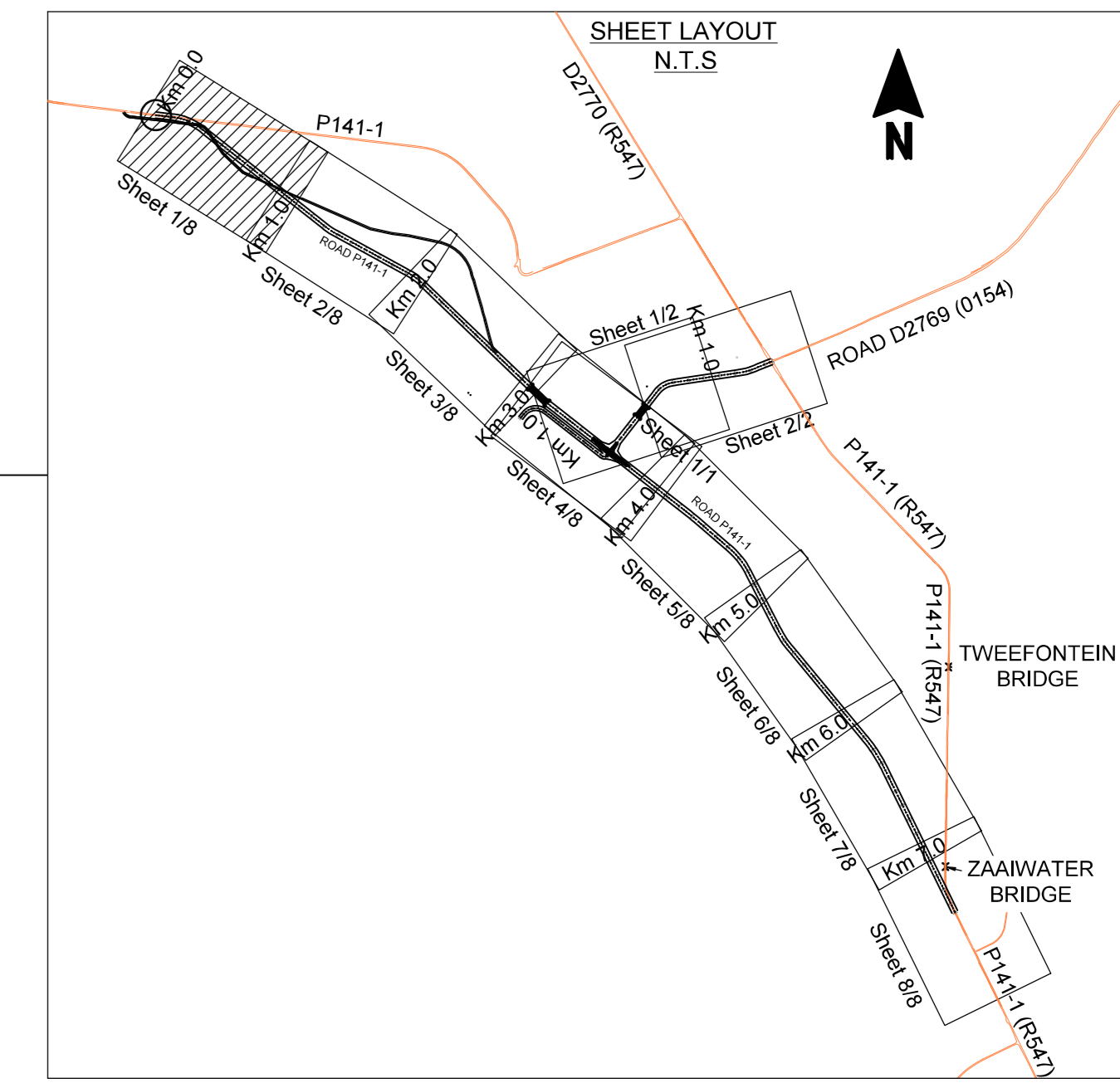
Contour interval = 1m

CENTRE LINE CO-ORDINATES		
Road D2769 (Lo 29')		
Chainage km	Y-Coord +0.000	X-Coord +0.000
7000.000	-19734.249	2883547.428
7364.920	-19894.890	2883875.087

AA	18/12/2012	FOR APPROVAL																				
REV No	DATUM DATE	WYSIGINGS / AMENDMENTS	rms Hoof v. Dept. for Head of Dept.	DATUM DATE	HANDTEK / SIGNTR.	DATUM / DATE					SKAAL / SCALE	LÉER Nr / FILE No	DISTRIK / DISTRICT	PROVINSIE PLAN Nr / PROVINCE PLAN No								
							SURVEYED BY: LIDAR SURVEY NOVEMBER 2011 PROVIDED BY XSTRATA ONTWERP DEUR (DESIGNED BY) JEFFARES & GREEN PTY (LTD) ENGINEERING AND ENVIRONMENTAL CONSULTING ONTWERP GOEDGEKEUR (DESIGN APPROVED) ONTWERP DEUR (DESIGNED BY) JEFFARES & GREEN PTY (LTD) GOEDGEKEUR DEUR (DESIGN APPROVED BY) rms Raadgeverde Ingenieur for Consulting Engineers ONTWERP DEUR (DESIGNED BY) JN GOEDGEKEUR DEUR (DESIGNED BY) LN ONTWERP DEUR (DESIGNED BY) LN GOEDGEKEUR DEUR (DESIGNED BY) CCLR	MPUMALANGA REGERING OPENBARE WERKE PAAB EN VERVOER	MPUMALANGA PUBLIC WORKS, ROADS AND TRANSPORT	1:1000	--	NKANGALA	MRS 06/-/08Lyn									
											TYPE ONTWERP / TYPE OF PLANNING PRELIMINARY DESIGN	PAD Nr / ROAD No P141/1 & D2769	XSTRATA COAL PLAN Nr / PLAN No TOP-J&G-5003-CV-01-1107									

V:\002368 - Tweefontein Realignment ECC in Road\03 Drawings\Working Drawings\Alternative 2012\Preliminary Design\Rev AC2368Lyn_TOP-J&G-5003-CV-01-1107

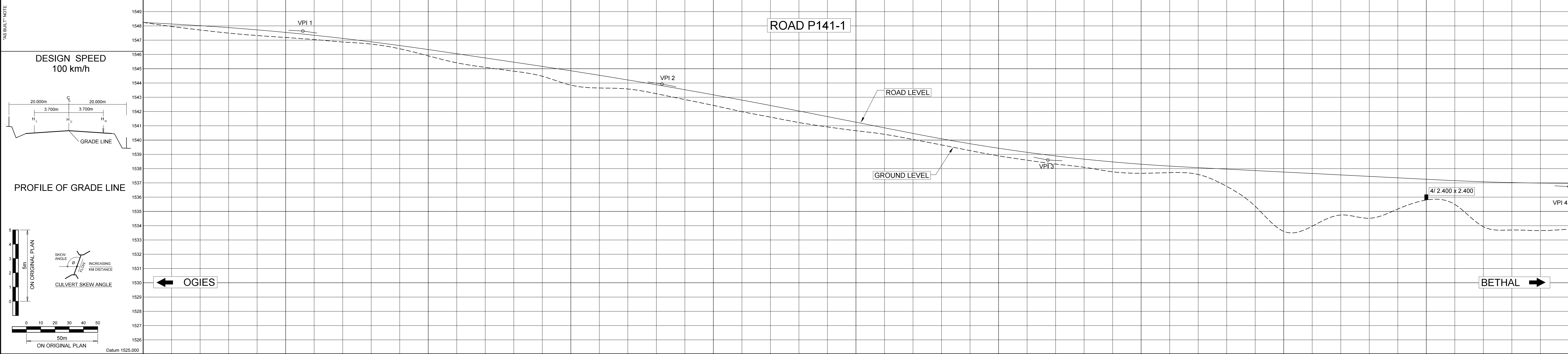
DRG No.	DESCRIPTION	TITLE	SIGNATURE	TITLE	SIGNATURE
		MECHANICAL		DRAWN BY	
		PROCESS		CHECK BY	
		PIPING		MANAGER ENGINEERING	
		CIVIL		TECHNICAL PROJECT MANAGER	
		STRUCTURAL		AREA MANAGER	
		ELECTRICAL/INSTRUMENTATION		CLIENT	



SETTING OUT DATA AND REFERENCE PEGS

← DESIGN SPEED = 100 Km/h →

CENTRE LINE



VERTICAL CURVES	BVC 22.1	180.0m VC K = 192.4	207.1 EVC	BVC 293.9	190.0m VC K = 385.5	483.9 EVC	BVC 539.6	190.0m VC K = 130.3	729.6 EVC	BVC 910.0	180.0m VC K = 177.9	1000.000 EVC			
GRADE	-0.539 %		112.101 1547.640		-1.474 %		363.920 1543.927		-1.967 %		634.586 1538.602		-0.509 %		1000.000 1535.745

FINAL ROAD LEVELS	H _L 3.7m LEFT	H _C ON C	H _R 3.7m RIGHT
	1546.170	1546.244	1546.170
	1546.052	1546.136	1546.052
20	1547.194	1547.194	1547.194
40	1547.714	1547.714	1547.714
60	1547.899	1547.899	1547.899
80	1547.921	1547.921	1547.921
100	1547.186	1547.186	1547.186
120	1547.055	1547.055	1547.055
140	1546.853	1546.853	1546.853
160	1546.770	1546.770	1546.770
180	1546.428	1546.428	1546.428
200	1546.502	1546.502	1546.502
220	1546.374	1546.374	1546.374
240	1546.001	1546.001	1546.001
260	1544.827	1544.827	1544.827
280	1544.698	1544.698	1544.698
300	1543.724	1543.724	1543.724
320	1543.628	1543.628	1543.628
340	1543.650	1543.650	1543.650
360	1543.252	1543.252	1543.252
380	1542.835	1542.835	1542.835
400	1542.439	1542.439	1542.439
420	1541.975	1541.975	1541.975
440	1541.616	1541.616	1541.616
460	1541.208	1541.208	1541.208
480	1540.917	1540.917	1540.917
500	1540.647	1540.647	1540.647
520	1540.434	1540.434	1540.434
540	1540.037	1540.037	1540.037
560	1539.696	1539.696	1539.696
580	1539.296	1539.296	1539.296
600	1538.874	1538.874	1538.874
620	1538.598	1538.598	1538.598
640	1538.289	1538.289	1538.289
660	1538.140	1538.140	1538.140
680	1537.719	1537.719	1537.719
700	1537.651	1537.651	1537.651
720	1537.726	1537.726	1537.726
740	1537.753	1537.753	1537.753
760	1538.800	1538.800	1538.800
780	1538.583	1538.583	1538.583
800	1538.029	1538.029	1538.029
820	1533.922	1533.922	1533.922
840	1535.091	1535.091	1535.091
860	1534.203	1534.203	1534.203
880	1535.221	1535.221	1535.221
900	1535.823	1535.823	1535.823
920	1535.884	1535.884	1535.884
940	1533.468	1533.468	1533.468
960	1533.820	1533.820	1533.820
980	1533.877	1533.877	1533.877
1000	1533.783	1533.783	1533.783

SUPERELEVATION	-2.000		5.570		-5.570		-2.000							
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GROUND LEVELS ON CENTRE LINE	1546.245	1547.194	1547.714	1547.899	1547.921	1547.186	1547.055	1546.853	1546.770	1546.428	1546.502	1546.374	1546.001	1544.827	1544.698	1543.724	1543.628	1543.650	1543.252	1542.835	1542.439	1541.975	1541.616	1541.208	1540.917	1540.647	1540.434	1540.037	1539.696	1539.296	1538.874	1538.598	1538.289	1538.140	1537.719	1537.651	1537.726	1537.753	1538.800	1538.583	1538.029	1533.922	1535.091	1534.203	1535.221	1535.823	1535.884	1533.468	1533.820	1533.877	1533.783
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CHAINAGE m	0	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	720	740	760	780	800	820	840	860	880	900	920	940	960	980	1000
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GUARD RAIL LEFT	
KERB OR PAWING LEFT	
SURFACED SHOULDER LEFT	
SURFACED SHOULDER RIGHT	
KERB OR PAWING RIGHT	
GUARD RAIL RIGHT	

HORIZONTAL ALIGNMENT	Direction 277°	Curve 1 Right Radius=350.000 Angle=31°	Direction 308°
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DRAINAGE	KILOMETRE DISTANCE SIZE AND ANGLE Ø	
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SURVEYED BY:	Lidar Survey Received 25/10/2011 From Xstrata
DESIGNED BY:	JEFFARES & GREEN PTY (Ltd) ENGINEERING AND ENVIRONMENTAL CONSULTING
CHECKED BY:	ONTWERP GOEDGEKEUR DESIGN APPROVED
DRAWN BY:	MPUMALANGA REGERING DPENSARE WERKE PAWIE EN Vervoer
DATE:	18/12/2012

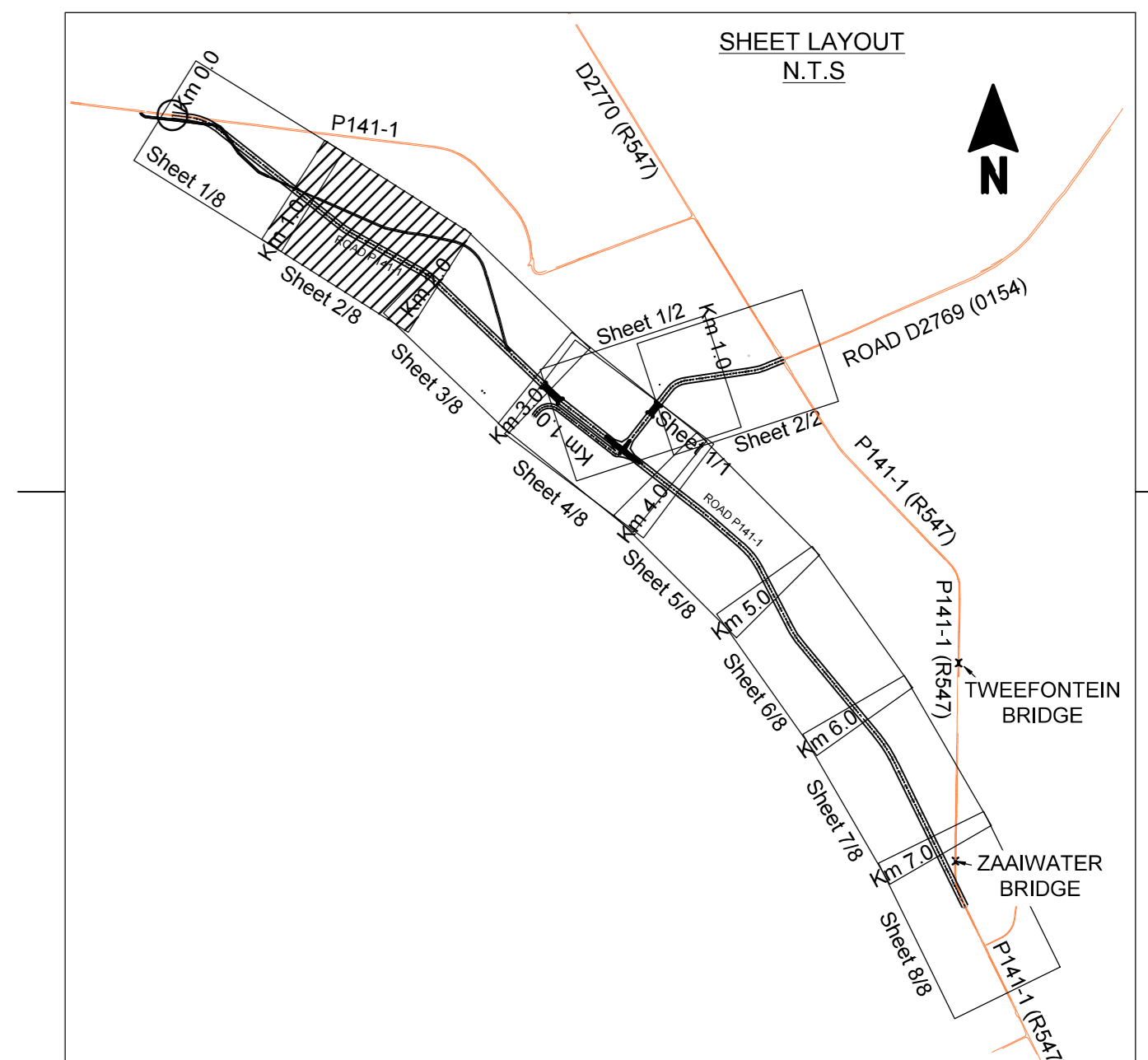
CLIENT	XSTRATA COAL SA
PROJECT	ALIGNMENT OF TWEEFONTEIN PROJECT
PROJ. NO.	PR 980444
DATE	18/12/2012
SCALE	1:1000
TYPE	PRELIMINARY DESIGN
DISTRICT	MPUMALANGA
ROAD NO.	P141/1 & D2769

PROVINCE PLAN No	MRS 06/-/011S
PROVINCE PLAN No	MRS 06/-/011S
PROVINCE PLAN No	MRS 06/-/011S

18/12/2012 - Tweefontein Re-alignment (EC & Road) 2D Drawing (Working Drawing) Alternative 2012 Preliminary Design Rev A (2D) - TOP-J&G-5003-CV-01-1108.dwg

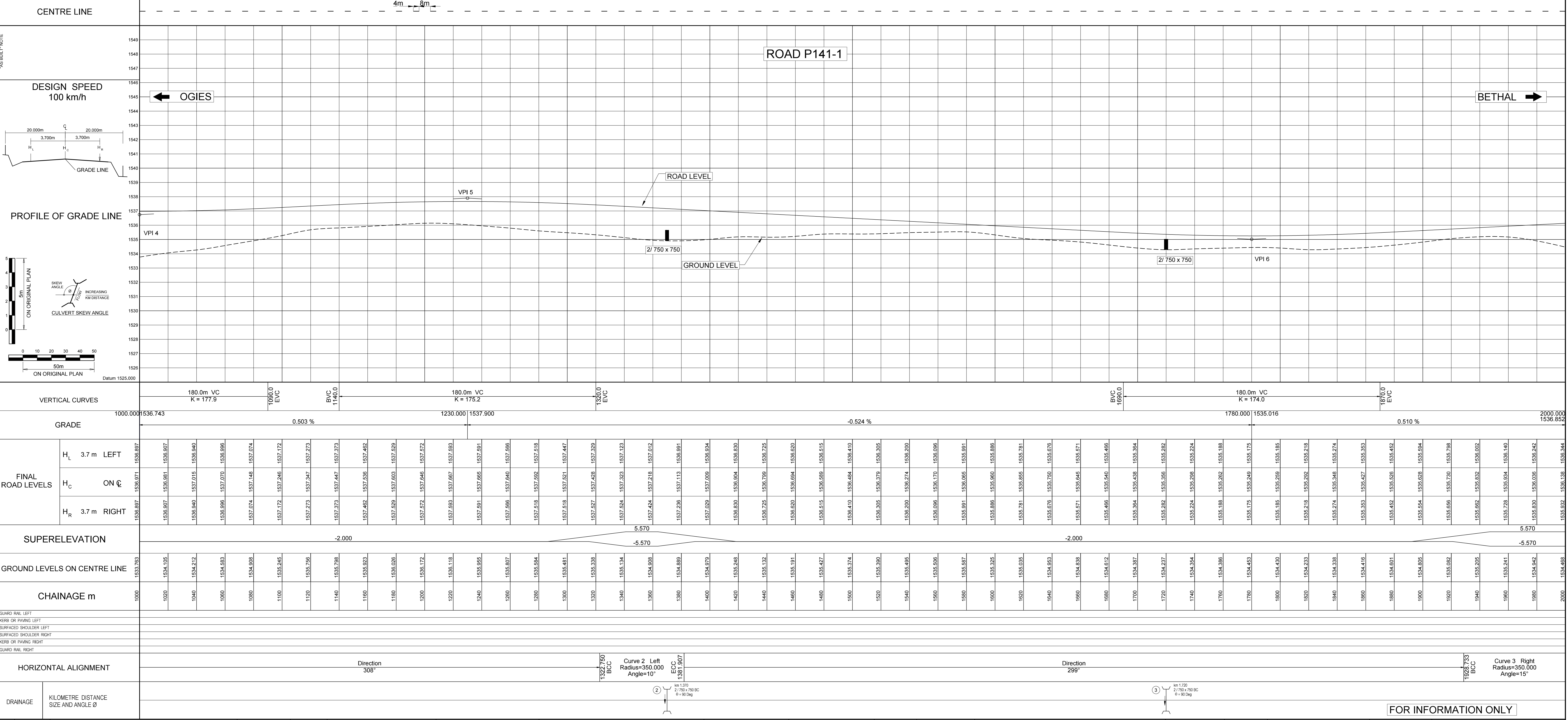
PROVINCE PLAN No
 XSTRATA COAL PLAN No
 MRS 06/-/011S
 TOP-J&G-5003-CV-01-1108

REFERENCE DRAWINGS		TITLE	SIGNATURE	TITLE	SIGNATURE
DRG No.	DESCRIPTION	MECHANICAL		DRAWN BY	
		PROCESS		CHECK BY	
		PIPING		MANAGER ENGINEERING	
		CIVIL		TECHNICAL PROJECT MANAGER	
		STRUCTURAL		AREA MANAGER	
		ELECTRICAL/INSTRUMENTATION		CLIENT	



SETTING OUT DATA
AND REFERENCE PEGS

← DESIGN SPEED = 100 Km/h →



DRAINAGE	KILOMETRE DISTANCE SIZE AND ANGLE Ø
2	1:371 2/790 x 790 BC Ø = 90 Deg
3	1:290 2/790 x 790 BC Ø = 90 Deg

HORIZONTAL ALIGNMENT		Direction 308°		Curve 2 Left Radius=350.000 Angle=10°	Direction 299°		Curve 3 Right Radius=350.000 Angle=15°
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FOR INFORMATION ONLY

AA	18/12/2012	For Approval	WYSIGINGS / AMENDMENTS	DATUM DATE	DATUM DATE	HANDTEK / SKINTR.	DATUM / DATE
<div style="display: flex; justify-content: space-between;"> <div style="width: 25%;"> <p>TWEEFONTAIN PROJECT XSTRATA COAL SA</p> </div> <div style="width: 25%;"> <p>JEFFARES & GREEN PTY (LTD) ENGINEERING AND ENVIRONMENTAL CONSULTING</p> </div> <div style="width: 25%;"> <p>GOEDGEKEUR DEUR DESIGN APPROVED</p> </div> <div style="width: 25%;"> <p>MPUMALANGA REGERING PUBLIC WORKS, ROADS AND TRANSPORT</p> </div> </div>							

W:\002391 - Tweefontein Re-alignment (CC in Road) Drawings\Drawings\Alternative 2012\ Preliminary Design\for ARI\2391_M\TOP-J&G-5003-CV-01-1109.dwg