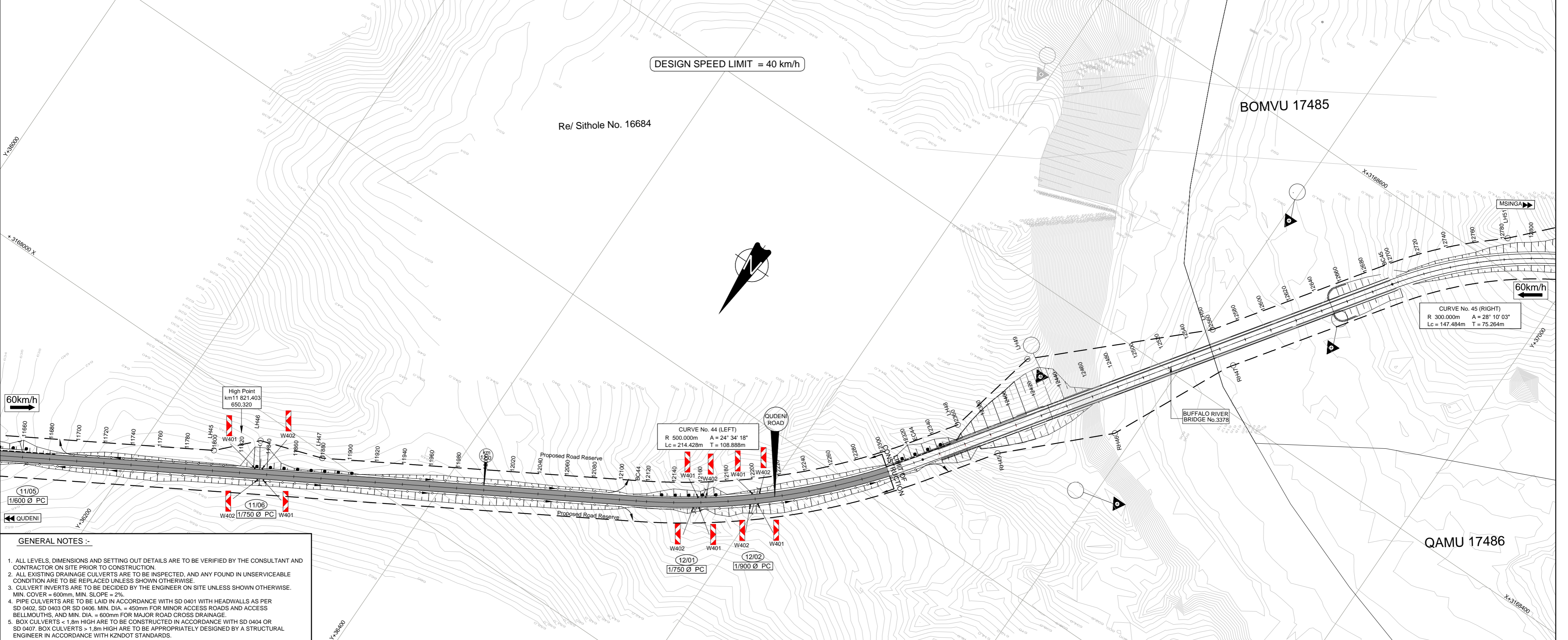


PIPE AND BOX CULVERT SCHEDULE												
ITEM No.	DISTANCE km	SIZE I (mm)	PIPE CLASS	BEDDING TYPE	LENGTH (m)	SKEW	INVERT LEVEL		AREA (ha)	DISCHARGE (m³/s)	VELOCITY (m/s)	REMARKS
							INLET	OUTLET				
11/06	11.833	1x750	100D	A	23	270°	648.543	645.118	0.0593	0.582	6.48	Drop inlet & outlet, daylighting and Gabion dissipator required at outlet.
12/01	12.159	1x750	100D	A	26	299°	625.815	621.922	0.0823	0.8	7.65	Head wall inlet & outlet, daylighting and Gabion energy dissipator required at outlet.
12/02	12.201	1x900	100D	A	41	299°	620.801	617.288	0.098	0.95	5.96	Drop inlet & head wall outlet, daylighting and Gabion dissipator required at outlet.

SIDE DRAIN SCHEDULE						
LEFT HAND SIDE			RIGHT HAND SIDE			COMMENTS
FROM km	TO km	LENGTH	FROM km	TO km	LENGTH	
11.690	11.820	130m	11.660	12.110	450m	1.5m CONCRETE V-DRAIN
11.920	12.110	190m	12.160	12.330	170m	1.5m CONCRETE V-DRAIN
12.180	12.300	120m				1.5m CONCRETE V-DRAIN
12.300	12.350	50m				KERB AND CHANNEL

GUARDRAIL SCHEDULE							
LEFT HAND SIDE (LENGTH EXCLUDES BURIED ENDS)				RIGHT HAND SIDE (LENGTH EXCLUDES BURIED ENDS)			
FROM km	TO km	LENGTH	BURIED ENDS	FROM km	TO km	LENGTH	BURIED ENDS
11.840	11.900	60m	0				
12.140	12.170	30m	0				
12.310	12.350	40m	0				



- GENERAL NOTES :-**
- ALL LEVELS, DIMENSIONS AND SETTING OUT DETAILS ARE TO BE VERIFIED BY THE CONSULTANT AND CONTRACTOR ON SITE PRIOR TO CONSTRUCTION.
 - ALL EXISTING DRAINAGE CULVERTS ARE TO BE INSPECTED, AND ANY FOUND IN UNSERVICEABLE CONDITION ARE TO BE REPLACED UNLESS SHOWN OTHERWISE.
 - CULVERT INVERTS ARE TO BE DECIDED BY THE ENGINEER ON SITE UNLESS SHOWN OTHERWISE. MIN. COVER = 600mm. MIN. SLOPE = 2%.
 - PIPE CULVERTS ARE TO BE LAID IN ACCORDANCE WITH SD 0401 WITH HEADWALLS AS PER SD 0402, SD 0403 OR SD 0406. MIN. DIA. = 450mm FOR MINOR ACCESS ROADS AND ACCESS BELLMOUTHS, AND MIN. DIA. = 600mm FOR MAJOR ROAD CROSS DRAINAGE.
 - BOX CULVERTS < 1.8m HIGH ARE TO BE CONSTRUCTED IN ACCORDANCE WITH SD 0404 OR SD 0407. BOX CULVERTS > 1.8m HIGH ARE TO BE APPROPRIATELY DESIGNED BY A STRUCTURAL ENGINEER IN ACCORDANCE WITH K2NDOT STANDARDS.
 - FOR EROSION CONTROL GABION MATTRESSES ARE RECOMMENDED AT CULVERT INLETS AND OUTLETS.
 - EARTH BERMS ARE TO BE CONSTRUCTED AT CULVERT INLETS TO DIRECT STORMWATER INTO CULVERTS WHERE NECESSARY.
 - ROCK BOLSTERS ARE TO BE PLACED ACROSS THE INVERT OF DRAINS SUSCEPTIBLE TO EROSION FOR EVERY 2m VERTICAL DROP.
 - GRASSED/CONCRETE LINED V-DRAINS AS PER 0601/3 & 4 ARE RECOMMENDED FOR SHALLOW CUTTINGS OF DEPTH < 5m MEASURED AT A POINT 6m FROM EDGE OF CARRIAGEWAY. CONCRETE LINED 1000 V DRAINS AS PER SD 0601/2 ARE RECOMMENDED FOR DEEP CUTTINGS OF DEPTH > 5m MEASURED AT A POINT 6m FROM EDGE OF CARRIAGEWAY.
 - SUBSOIL DRAINS AS PER SD 0501 ARE TO BE INSTALLED WITH 1000 V-DRAINS, OR WHERE HIGH WATER TABLES ARE ENCOUNTERED.
 - KERB AND CHANNEL DRAINS AS PER SD 0701 ARE TO BE PROVIDED WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT.
 - WHERE SURFACE RUNOFF IS TOWARDS THE ROAD, CATCHWATER BANKS ARE TO BE PROVIDED TO DIVERT STORMWATER TO MAJOR CROSS DRAINAGE STRUCTURES.
 - NEW FILLS AND EXPOSED CUTTINGS ARE TO BE TOPSOILED AND VEGETATED IMMEDIATELY AFTER CONSTRUCTION TO PREVENT EROSION.
 - THE POSITIONS OF ACCESSES ARE TO BE DETERMINED IN CONSULTATION WITH THE LOCAL COMMUNITY. DAYLIGHTING REQUIREMENTS ARE TO BE DECIDED BY THE ENGINEER ON SITE. CONCRETE WEDGES AS PER SD 0303 OR ACCESS RAMPS AS PER SD 0306 IN THE CASE OF KERBING MAY BE USED IN PLACE OF SURFACED BELLMOUTHS FOR ACCESSES SERVING SINGLE RESIDENTIAL PROPERTIES UNLESS OTHERWISE SHOWN. ACCESS CLOSURES ARE TO BE PHYSICALLY BARRICADED WITH GUARDRAILS WHERE ACCESS IS STILL POSSIBLE AFTER COMPLETION OF WORKS.
 - GUARDRAILS ARE TO BE INSTALLED IN ACCORDANCE WITH SD 1101 AND SD 1102 WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT OR WHERE HAZARDOUS OBSTRUCTIONS CANNOT BE REMOVED.
 - EXISTING ROAD SIGNS, SERVICES AND FENCING AFFECTED BY CONSTRUCTION ARE TO BE REMOVED/RELOCATED WHERE NECESSARY.
 - UNDERGROUND SERVICE CROSSINGS AND MARKERS ARE TO BE IN ACCORDANCE WITH SD 1001.3.
 - ALL NEW ROAD SIGNS AND ROADMARKING REQUIREMENTS ARE TO CONFORM TO THE SOUTHERN AFRICAN DEVELOPING COMMUNITY ROAD TRAFFIC SIGNS MANUAL (SADC-RTSM).
 - ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH THE COLTO SPECIFICATIONS FOR ROAD AND BRIDGE WORKS FOR STATE ROAD AUTHORITIES.

EXPROPRIATION CO-ORDINATES : QUDENI LINK ROAD

POINT	CO-ORDINATES WG Lo. 31°		POINT	CO-ORDINATES WG Lo. 31°	
	Y-	X + 3 000 000.00		Y-	X + 3 000 000.00
LH 45	36246.3992	3167956.493	RH 45	36724.016	3168278.838
LH 46	36270.7427	3167981.835	RH 46	36786.9745	3168339.696
LH 47	36315.4282	3167996.605	RH 47	36830.8342	3168429.884
LH 48	36687.9741	3168279.83	-	-	-
LH 49	36703.1137	3168348.653	-	-	-
LH 50	36803.4533	3168443.123	-	-	-
LH 51	36945.0632	3168620.888	-	-	-

REFERENCE PEG (WGS 84 CO-ORDINATES)

POINT	Y	X + 3 000 000.00	LEVEL (m)
-	-	-	-
-	-	-	-
-	-	-	-

CENTRE LINE (WGS 84 CO-ORDINATES)

CHAINAGE	Y	X + 3 000 000.00
12.0	36426.8607	168044.005
12.5	36781.0577	168385.47

PROPOSED ROAD RESERVE CO-ORDINATES

CHAINAGE	Y	X + 3 000 000.00
-	-	-
-	-	-
-	-	-

QUDENI LINK ROAD : HORIZONTAL ALIGNMENT

POINT	CHAINAGE	CO-ORDINATES WG Lo. 31°		CURVE DATA
		Y+	X + 3 000 000.00	
BCC 43	11 431.089	35 929.150	167770.241	R = 500.000m
PI 43		35 984.820	167787.141	Δ = 13° 16' 26"
ECC 43	11 546.925	36 035.122	167816.371	T = 58.178m
				Lc = 115.836m
BCC 44	12 112.424	36 524.063	168100.494	R = 500.000m
PI 44		36 618.210	168155.202	Δ = 24° 34' 18"
ECC 44	12 326.852	36 681.082	168244.105	T = 108.888m
				Lc = 214.428m
BCC 45	12 695.419	36 893.891	168545.027	R = 300.000m
PI 45		36 937.348	168606.478	Δ = 28° 10' 03"
ECC 45	12 842.903	37 004.666	168640.137	T = 75.264m
				Lc = 147.484m

LEGEND

	EROSION PROTECTION
	GUARDRAIL
	KERB SIDE INLET
	CULVERT (SD 0401/B, SD 0406 & SD 0407)
	DEPRESSED INLET (SD405/A)
	CHUTE (SD 0604/A)
	CONCRETE LINED V-DRAIN (SD 0601/B)
	TOE DRAIN
	KERB AND CHANNEL
	CATCHWATER BANK
	PIPE CHUTE INLET (SD 0605/2)
	ENERGY DISSIPATOR (DRAWING NUMBER TO FOLLOW)

AS BUILT

Symbol	Date	Description	Checked	Signed
A	06/2014	Expropriation Details Added	UD	
AMENDMENTS				

Continued from:-	-	Designed by:-	K.MAFU
Continued on:-	-	Checked by:-	P.L. FORREST
Cross Section No:-	-	Drawn by:-	U. DORFLING
Longitudinal Section No:-	-	Checked by:-	K.MAFU
Design Plan No:-	-	Date of approval:-	



Designed by: **Royal HaskoningDHV**
Enhancing Society Together

TRANSPORTATION ENGINEERING
CHIEF ENGINEER

HEAD : TRANSPORT

MAIN ROAD P752 : NKAMBA TO QUDENI

PORTION
QUDENI LINK ROAD
ROAD LAYOUT AND DRAINAGE PLAN
(km11,700 - km12,800)

Staked km distance km6.000 TO km13.300	Sheet :- 10
Scale 1 : 1000	Plan No. :- C38361/A

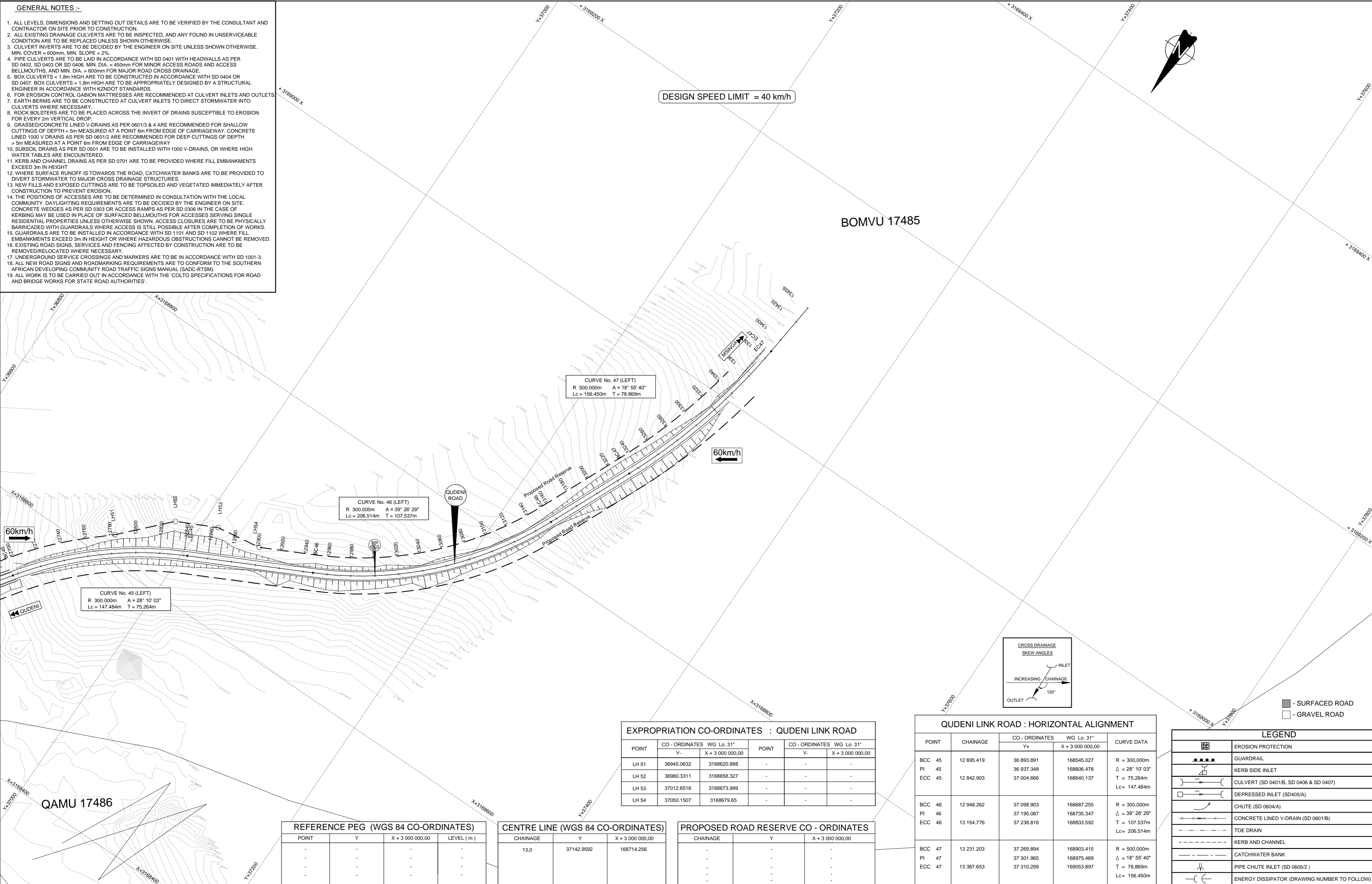
Plan No. C38361/1

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DESIGN SPEED LIMIT = 40 km/h

BOMVU 17485



CURVE No. 47 (LEFT)
R 500.000m A = 18° 55' 40"
Lc = 156.450m T = 78.869m

CURVE No. 46 (LEFT)
R 300.000m A = 39° 26' 29"
Lc = 206.514m T = 107.537m

CURVE No. 45 (LEFT)
R 300.000m A = 28° 10' 03"
Lc = 147.484m T = 75.264m

EXPROPRIATION CO-ORDINATES : QUDENI LINK ROAD

POINT	CO - ORDINATES WG Lo. 31°		POINT	CO - ORDINATES WG Lo. 31°	
	Y-	X + 3 000 000,00		Y-	X + 3 000 000,00
LH 51	36945.0632	3168620.888	-	-	-
LH 52	36980.3311	3168658.327	-	-	-
LH 53	37012.6516	3168673.999	-	-	-
LH 54	37050.1507	3168679.65	-	-	-

QUDENI LINK ROAD : HORIZONTAL ALIGNMENT

POINT	CHAINAGE	CO - ORDINATES WG Lo. 31°		CURVE DATA
		Y+	X + 3 000 000,00	
BCC 45	12 695.419	36 893.891	168545.027	R = 300,000m Δ = 28° 10' 03" T = 75,264m Lc = 147,484m
PI 45		36 937.348	168606.478	
ECC 45	12 842.903	37 004.666	168640.137	
BCC 46	12 948.262	37 098.903	168687.255	R = 300,000m Δ = 39° 26' 29" T = 107,537m Lc = 206,514m
PI 46		37 195.087	168735.347	
ECC 46	13 154.776	37 238.816	168833.592	
BCC 47	13 231.203	37 269.894	168903.415	R = 500,000m Δ = 18° 55' 40" T = 78,869m Lc = 156,450m
PI 47		37 301.965	168975.469	
ECC 47	13 387.653	37 310.299	169053.897	

REFERENCE PEG (WGS 84 CO-ORDINATES)

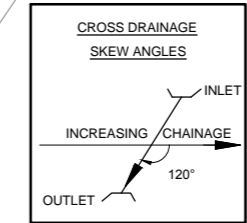
POINT	Y	X + 3 000 000,00	LEVEL (m)
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

CENTRE LINE (WGS 84 CO-ORDINATES)

CHAINAGE	Y	X + 3 000 000,00
13,0	37142,9592	168714,256

PROPOSED ROAD RESERVE CO - ORDINATES

CHAINAGE	Y	X + 3 000 000,00
-	-	-
-	-	-
-	-	-
-	-	-



LEGEND

Symbol	Description
[Symbol]	EROSION PROTECTION
[Symbol]	GUARDRAIL
[Symbol]	KERB SIDE INLET
[Symbol]	CULVERT (SD 0401/B, SD 0406 & SD 0407)
[Symbol]	DEPRESSED INLET (SD 0405/A)
[Symbol]	CHUTE (SD 0604/A)
[Symbol]	CONCRETE LINED V-DRAIN (SD 0601/B)
[Symbol]	TOE DRAIN
[Symbol]	KERB AND CHANNEL
[Symbol]	CATCHWATER BANK
[Symbol]	PIPE CHUTE INLET (SD 0605/2)
[Symbol]	ENERGY DISSIPATOR (DRAWING NUMBER TO FOLLOW)

■ - SURFACED ROAD
□ - GRAVEL ROAD

AS BUILT

Supervising Engineer	Date

Continued from:-	-	Designed by:-	K.MAFU
Continued on:-	-	Checked by:-	P.L. FORREST
Cross Section No:-	-	Drawn by:-	U. DORFLING
Longitudinal Section No:-	-	Checked by:-	K.MAFU
Design Plan No:-	-	Date of approval:-	



REPUBLIC OF SOUTH AFRICA
DEPARTMENT OF TRANSPORT
UMNYANGO WEZOKUTHUTHA

Designed by:-
Royal HaskoningDHV
Enhancing Society Together

TRANSPORTATION ENGINEERING
CHIEF ENGINEER
HEAD : TRANSPORT

MAIN ROAD
P752 : NKAMBA TO QUDENI
PORTION
QUDENI LINK ROAD
ROAD LAYOUT AND DRAINAGE PLAN
(km12,800 - km13,300)

Staked km distance km6.000 TO km13.300	Sheet :- 11
Scale 1 : 1000	Plan No. :- C38362/A

Plan No. C38362