



South Wokingham Distributor Road - Spine Road and Western Gateway Phase 1

Specification Appendices - Road Restraint Systems

WMHP-TG-SRWG1-SP-HI-0401

Revision: P08

Date: 19/01/2024

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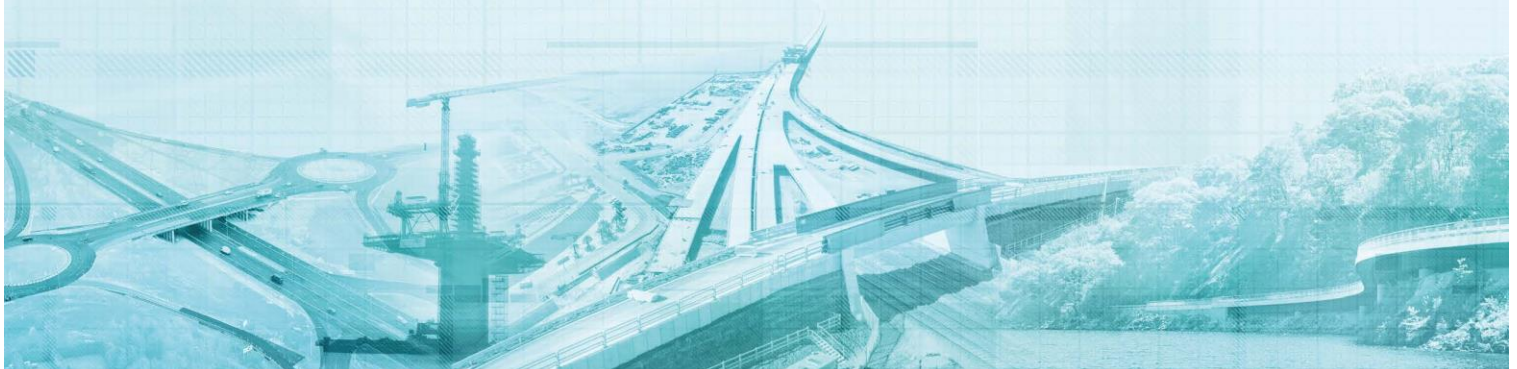
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Wokingham Borough Council

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P01	25/05/21	Detailed Design Issue	MH	BH	JC
P02	20/08/21	SCO comments and Planning	BH	JC	JC
P03	02/09/21	Updated to include SANG area	DJF	BH	JC
P04	29/09/21	Updated for planning discharge	BH	JC	ALM
P05	01/04/22	Updated for planning discharge	MH	JC	ARL
P06	08/04/22	Internal Review Updates	MH	BH	JC
P07	27/05/22	Matters outstanding WMHP-TG-SRWG1-RG-DM-0010	MH	BH	JC
P08	19/01/24	Roundabout VE Update	DJF	MH	JC

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APPENDIX 4/1 – Road Restraint Systems (Vehicle and Pedestrian)

Location

Vehicle Restraint Systems

1. The location of parapets, safety barriers and transitions are shown on drawing numbers WMHP-TG-SRWG1-DR-HI-0401 to 0409. For details of Containment Level, Impact Severity Level (ISL), Working Width Class, maximum height and Length of Need requirements for safety barriers see Table 4/1.1.
2. The location of safety barrier terminals are shown on drawing numbers WMHP-TG-SRWG1-DR-HI-0401 to 0409. For details of Performance Class, Impact Severity Level (ISL), Permanent Lateral Displacement Zone (PLDZ) Characteristic and Exit Box Class (D) requirements for terminals see Table 4/1.1.
3. Vehicle restraint systems shall comply with the requirements of Clause 401 and they shall be installed in accordance with Clause 403.
4. Bridge Parapets shall comply with the requirements of Clause 406, 407 and 408.

Pedestrian Restraint Systems

5. The location of guardrails for pedestrian protection are shown on drawing number WMHP-TG-SRWG1-DR-HI-0401 to 0409. For details of guardrails see table 4/1.1. Pedestrian restraint systems to wingwalls and headwalls are to be galvanised steel, 'Kee Klamp' or similar approved, see drawing number WMHP-TG-SRWG1-DR-HI-0421 for connection details. All pedestrian restraint systems shall conform to BS 7818 and shall be installed in accordance with the manufacturers recommendations."
6. Pedestrian restraint systems shall comply with the requirements of Clause 411.

Anti-glare Screens

7. Not Used

Other details:

Safety Barriers, Terminals, Transitions and Crash Cushions

8. Refer to Clauses 401, 402 and 403 for further requirements for safety barriers, terminals and transitions.
9. No crash cushions specified.
10. Concave and convex bends with 40m radius to be constructed with segmented 4m beams and 13m with 2m beams as per manufacturer specification.

Testing

Refer to Appendix 1/5 for full 400 series testing details.

Destructive Testing

11. Refer to Clause 402.6 (v) for Requirements for provision of copies of certified reports of destructive tests and for supply of test components

Site Testing on Post Foundations

12. Refer to Clause 404 for the requirements of site load tests. A minimum of 1 test and not less than 1 test per 100m of safety barrier shall be carried out. This shall include terminal posts and transition posts, in addition to barrier posts.

Temporary safety barriers

13. Not Used

Schedule of road restraint systems (vehicle and pedestrian)

14. Setback and ISL classes state minimum requirements only. For the avoidance of doubt setback is the lateral distance between the traffic face of a safety barrier and as appropriate:
 - a. Nearside: the back of the nearside hardstrip
 - b. Nearside: the kerb face for roads without a nearside hardstrip or hardshoulder
15. Dimensions are approximate only and will vary subject to the requirements of the above drawings (See section 1).



Table 1: Schedule of Road Restraint Systems

Reference Number	Location	Start Chainage (m)	Finish Chainage (m)	Minimum Length (m)	Position on Cross-Section	Type of Road Restraint System	Set-back (m)	Containment Level	Impact Severity Level (ISL)	Working Width Class	Permanent Lateral Displacement Zone (PLDZ) Characteristic	Exit Box Class	Maximum Height that allows Required Visibility (m)	Other Requirements / Comments	Drg No.	Barrier Lengths Based On The Following Product
1.1	Finchampstead Road North	-6.0 HI-Zz_35_10_40-M-Dn_TESCO_APP_02	0.0 HI-Zz_35_10_40-M-Dn_TESCO_APP_02	6.153	Verge – Behind Footway	Transition	0 to 0.25 From back of footway (varies)	N2	B	W1	N/A	N/A	0.8	To be installed as per manufacturers specification – see drawing PD-ENGRTR103-1-Iss-B and PD-ENGRTR103-2-Iss-B for details.	WMHP-TG-SRWG1-DR-HI-0401	Hill and Smith N2 Guardrail to Non-Connecting Transition or equivalent approved

Reference Number	Location	Start Chainage (m)	Finish Chainage (m)	Minimum Length (m)	Position on Cross-Section	Type of Road Restraint System	Set-back (m)	Containment Level	Impact Severity Level (ISL)	Working Width Class	Permanent Lateral Displacement Zone (PLDZ) Characteristic	Exit Box Class	Maximum Height that allows Required Visibility (m)	Other Requirements / Comments	Drg No.	Barrier Lengths Based On The Following Product
1.2	Finchampstead Road North	0.0 HI-Zz_35_10_40-M-Dn_TESCO_APP_02	9.0 HI-Zz_35_10_40-M-Dn_TESCO_TO_WEST_ROUNDABOUT	9.00	Verge – Behind Footway	Single Sided Barrier	0.25 From back of footway	N1	A	W1	N/A	N/A	0.8		WMHP-TG-SRWG1-DR-HI-0401	Hill and Smith FlexBeam or equivalent approved

Reference Number	Location	Start Chainage (m)	Finish Chainage (m)	Minimum Length (m)	Position on Cross-Section	Type of Road Restraint System	Set-back (m)	Containment Level	Impact Severity Level (ISL)	Working Width Class	Permanent Lateral Displacement Zone (PLDZ) Characteristic	Exit Box Class	Maximum Height that allows Required Visibility (m)	Other Requirements / Comments	Drg No.	Barrier Lengths Based On The Following Product
1.3	Finchampstead Road North	9.0 HI-Zz_35_10_40-M-Dn_TESCO_TO_WEST_ROUNDAB OUT	22.0 HI-Zz_35_10_40-M-Dn_TESCO_TO_WEST_ROUNDAB OUT	13.05	Verge – Behind Footway	Single Sided Terminal	0.25 From back of footway	P1	A	N/A	D1.1	Z1	0.7		WMHP-TG-SRWG1-DR-HI-0401	Hill and Smith Single Sided FlexBeam P1 Terminal or equivalent approved
2.1	Tesco Roundabout (North East)	165 HI-Zz_35_10_40-M-Dn_TESCO_TO_WEST_ROUNDAB OUT	178 HI-Zz_35_10_40-M-Dn_TESCO_TO_WEST_ROUNDAB OUT	12.00	Verge – Behind Footway	Single Sided Terminal	0.25 From back of footway	P1	A	N/A	D1.1	Z1	0.7		WMHP-TG-SRWG1-DR-HI-0401	Rondino Roads' GRP-4M highway 12m approach terminal or equivalent approved

Reference Number	Location	Start Chainage (m)	Finish Chainage (m)	Minimum Length (m)	Position on Cross-Section	Type of Road Restraint System	Set-back (m)	Containment Level	Impact Severity Level (ISL)	Working Width Class	Permanent Lateral Displacement Zone (PLDZ) Characteristic	Exit Box Class	Maximum Height that allows Required Visibility (m)	Other Requirements / Comments	Drg No.	Barrier Lengths Based On The Following Product
2.2	Tesco Roundabout (North East)	178 HI-Zz_35_10_40-M-Dn_TESCO_TO_WEST_ROUNDAB OUT	61.7 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	88	Verge – Behind Footway	Single Sided Barrier	0.25 From back of footway	N1	A	W1	N/A	N/A	0.8	Minimum radius bend 15m	WMHP-TG-SRWG1-DR-HI-0401	Rondino Roads' GRP-2M highway barriers or equivalent approved
2.3	Tesco Roundabout (North East)	61.7 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	74.8 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	12.00	Verge – Behind Footway	Single Sided Terminal	0.25 From back of footway	P1	A	N/A	D1.1	Z1	0.7		WMHP-TG-SRWG1-DR-HI-0401	Rondino Roads' GRP-4M highway 12m approach terminal or equivalent approved
3.1	Tesco Roundabout (South West)	33.2 HI-Zz_35_10_40-M-Dn_TESCO_RBT_W_LIN K	45.5 HI-Zz_35_10_40-M-Dn_TESCO_RBT_W_LIN K	12.00	Verge – Behind Footway	Single Sided Terminal	0.25 From back of footway	P1	A	N/A	D1.1	Z1	0.7		WMHP-TG-SRWG1-DR-HI-0401	Rondino Roads' GRP-4M highway 12m approach terminal or equivalent approved
3.2	Tesco Roundabout (South West)	45.5 HI-Zz_35_10_40-M-Dn_TESCO_RBT_W_LIN K	263 HI-Zz_35_10_40-M-Dn_TESCO_TO_WEST_ROUNDAB OUT	24	Verge – Behind Footway	Single Sided Barrier	0.25 From back of footway	N1	A	W1	N/A	N/A	0.8	Minimum radius bend 13.6m	WMHP-TG-SRWG1-DR-HI-0401	Rondino Roads' GRP-2M highway barriers or equivalent approved

Reference Number	Location	Start Chainage (m)	Finish Chainage (m)	Minimum Length (m)	Position on Cross-Section	Type of Road Restraint System	Set-back (m)	Containment Level	Impact Severity Level (ISL)	Working Width Class	Permanent Lateral Displacement Zone (PLDZ) Characteristic	Exit Box Class	Maximum Height that allows Required Visibility (m)	Other Requirements / Comments	Drg No.	Barrier Lengths Based On The Following Product
3.3	Tesco Roundabout (South West)	263 HI-Zz_35_10_40-M-Dn_TESCO_TO_WEST_ROUNDAB OUT	275.6 HI-Zz_35_10_40-M-Dn_TESCO_TO_WEST_ROUNDAB OUT	12.00	Verge – Behind Footway	Single Sided Terminal	0.25 From back of footway	P1	A	N/A	D1.1	Z1	0.7		WMHP-TG-SRWG1-DR-HI-0401	Rondino Roads' GRP-4M highway 12m approach terminal or equivalent approved
4.1	Emm Brook Overbridge (North Side)	123 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	136.5 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	13.05	Verge – Behind Footway	Single Sided Terminal	0.25 From back of footway	P1	A	N/A	D1.1	Z1	0.7		WMHP-TG-SRWG1-DR-HI-0402	Hill and Smith Single Sided FlexBeam P1 Terminal or equivalent approved
4.2	Emm Brook Overbridge (North Side)	136.5 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	194 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	56	Verge – Behind Footway	Single Sided Barrier	0.25 From back of footway	N2	B	W2	N/A	N/A	0.8		WMHP-TG-SRWG1-DR-HI-0402	Hill and Smith FlexBeam or equivalent approved
4.3	Emm Brook Overbridge (North Side)	194 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	Refer to structures drawing WMHP-TG-SRWG1-DR-SE-4102 & WMHP-TG-SRWG1-DR-SE-4103 for details	16	Verge – Behind Footway	Transition	0.25 From back of footway (varies)	N2	B	W2	N/A	N/A	0.8		WMHP-TG-SRWG1-DR-HI-0402	Hill and Smith N2 Single Sided FlexBeam to Varley and Gulliver Parapet VRS Transition (TranZFlex 110-170)

Reference Number	Location	Start Chainage (m)	Finish Chainage (m)	Minimum Length (m)	Position on Cross-Section	Type of Road Restraint System	Set-back (m)	Containment Level	Impact Severity Level (ISL)	Working Width Class	Permanent Lateral Displacement Zone (PLDZ) Characteristic	Exit Box Class	Maximum Height that allows Required Visibility (m)	Other Requirements / Comments	Drg No.	Barrier Lengths Based On The Following Product
4.4	Emm Brook Overbridge (North Side)	Refer to structures drawing WMHP-TG-SRWG1-DR-SE-4102 & WMHP-TG-SRWG1-DR-SE-4103 for details			Back of Footway	Parapet	3.5	N1	A	W1	N/A	N/A	1.5	Refer to structures drawing WMHP-TG-SRWG1-DR-SE-4102 & WMHP-TG-SRWG1-DR-SE-4103 for details	WMHP-TG-SRWG1-DR-HI-0402	Varley and Gulliver Steel Parapet (VGSN-805)
4.5	Emm Brook Overbridge (North Side)	Refer to structures drawing WMHP-TG-SRWG1-DR-SE-4102 & WMHP-TG-SRWG1-DR-SE-4103 for details	282 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	16	Verge – Behind Footway	Transition	0.25 From back of footway (varies)	N2	B	W2	N/A	N/A	0.8		WMHP-TG-SRWG1-DR-HI-0402	Hill and Smith N2 Single Sided FlexBeam to Varley and Gulliver Parapet VRS Transition (TranZFlex 110-170)
4.6	Emm Brook Overbridge (North Side)	282 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	331 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	52	Verge – Behind Footway	Single Sided Barrier	0.25 From back of footway	N2	B	W2	N/A	N/A	0.8		WMHP-TG-SRWG1-DR-HI-0402	Hill and Smith FlexBeam or equivalent approved
4.7	Emm Brook Overbridge (North Side)	331 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	343 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	13.05	Verge – Behind Footway	Single Sided Terminal	0.25 From back of footway	P1	A	N/A	D1.1	Z1	0.7		WMHP-TG-SRWG1-DR-HI-0402	Hill and Smith Single Sided FlexBeam P1 Terminal or equivalent approved

Reference Number	Location	Start Chainage (m)	Finish Chainage (m)	Minimum Length (m)	Position on Cross-Section	Type of Road Restraint System	Set-back (m)	Containment Level	Impact Severity Level (ISL)	Working Width Class	Permanent Lateral Displacement Zone (PLDZ) Characteristic	Exit Box Class	Maximum Height that allows Required Visibility (m)	Other Requirements / Comments	Drg No.	Barrier Lengths Based On The Following Product
5.1	Emm Brook Overbridge (South Side)	150.4 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	163 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	13.05	Verge – Behind Footway	Single Sided Terminal	0.25 From back of footway	P1	A	N/A	D1.1	Z1	0.7		WMHP-TG-SRWG1-DR-HI-0402	Hill and Smith Single Sided FlexBeam P1 Terminal or equivalent approved
5.2	Emm Brook Overbridge (South Side)	163 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	194.2 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	32	Verge – Behind Footway	Single Sided Barrier	0.25 From back of footway	N2	B	W2	N/A	N/A	0.8		WMHP-TG-SRWG1-DR-HI-0402	Hill and Smith FlexBeam or equivalent approved
5.3	Emm Brook Overbridge (South Side)	194.2 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	Refer to structures drawing WMHP-TG-SRWG1-DR-SE-4102 & WMHP-TG-SRWG1-DR-SE-4103 for details	16	Verge – Behind Footway	Transition	0.25 From back of footway (varies)	N2	B	W2	N/A	N/A	0.8		WMHP-TG-SRWG1-DR-HI-0402	Hill and Smith N2 Single Sided FlexBeam to Varley and Gulliver Parapet VRS Transition (TranZFlex 110-170)
5.4	Emm Brook Overbridge (North Side)	Refer to structures drawing WMHP-TG-SRWG1-DR-SE-4102 & WMHP-TG-SRWG1-DR-SE-4103 for details			Back of Footway	Parapet	3.5	N1	A	W1	N/A	N/A	1.5	Refer to structures drawing WMHP-TG-SRWG1-DR-SE-4102 & WMHP-TG-SRWG1-DR-SE-4103 for details	WMHP-TG-SRWG1-DR-HI-0402	Varley and Gulliver Steel Parapet (VGSN-805)

Reference Number	Location	Start Chainage (m)	Finish Chainage (m)	Minimum Length (m)	Position on Cross-Section	Type of Road Restraint System	Set-back (m)	Containment Level	Impact Severity Level (ISL)	Working Width Class	Permanent Lateral Displacement Zone (PLDZ) Characteristic	Exit Box Class	Maximum Height that allows Required Visibility (m)	Other Requirements / Comments	Drg No.	Barrier Lengths Based On The Following Product
5.5	Emm Brook Overbridge (South Side)	Refer to structures drawing WMHP-TG-SRWG1-DR-SE-4102 & WMHP-TG-SRWG1-DR-SE-4103 for details	282 HI- Zz_35_10_40-M- Dn_TG_DE SIGN	16	Verge – Behind Footway	Transition	0.25 From back of footway	N2	B	W2	N/A	N/A	0.8		WMHP-TG-SRWG1-DR-HI-0402	Hill and Smith N2 Single Sided FlexBeam to Varley and Gulliver Parapet VRS Transition (TranZFlex 110-170)
5.6	Emm Brook Overbridge (South Side)	282 HI- Zz_35_10_40-M- Dn_TG_DE SIGN	358 HI- Zz_35_10_40-M- Dn_TG_DE SIGN	72	Verge – Behind Footway	Single Sided Barrier	0.25 From back of footway	N2	B	W2	N/A	N/A	0.8		WMHP-TG-SRWG1-DR-HI-0402	Hill and Smith FlexBeam or equivalent approved
5.7	Emm Brook Overbridge (South Side)	358 HI- Zz_35_10_40-M- Dn_TG_DE SIGN	371.7 HI- Zz_35_10_40-M- Dn_TG_DE SIGN	13.05	Verge – Behind Footway	Single Sided Terminal	0.25 From back of footway	P1	A	N/A	D1.1	Z1	0.7		WMHP-TG-SRWG1-DR-HI-0402	Hill and Smith Single Sided FlexBeam P1 Terminal or equivalent approved
6.1	Not in use															
6.2	Not in use															
6.3	Not in use															
7.1	Mainline (South Side)	1278.5 HI- Zz_35_10_40-M- Dn_TG_DE SIGN	1291.4 HI- Zz_35_10_40-M- Dn_TG_DE SIGN	12.00	Verge – Behind Footway	Single Sided Terminal	0.25 From back of footway	P1	A	N/A	D1.1	Z1	0.7		WMHP-TG-SRWG1-DR-HI-0405	Rondino Roads' GRP-4M highway 12m approach terminal or equivalent approved

Reference Number	Location	Start Chainage (m)	Finish Chainage (m)	Minimum Length (m)	Position on Cross-Section	Type of Road Restraint System	Set-back (m)	Containment Level	Impact Severity Level (ISL)	Working Width Class	Permanent Lateral Displacement Zone (PLDZ) Characteristic	Exit Box Class	Maximum Height that allows Required Visibility (m)	Other Requirements / Comments	Drp No.	Barrier Lengths Based On The Following Product
7.2	Mainline (South Side)	1291.4 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	1400 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	108	Verge – Behind Footway	Single Sided Barrier	0.25 From back of footway	N1	B	W1	N/A	N/A	0.8		WMHP-TG-SRWG1-DR-HI-0405	Rondino Roads' GRP-4M highway barriers or equivalent approved
7.3	Mainline (South Side)	1400 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	1413 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	12.00	Verge – Behind Footway	Single Sided Terminal	0.25 From back of footway	P1	A	N/A	D1.1	Z1	0.7		WMHP-TG-SRWG1-DR-HI-0405	Rondino Roads' GRP-4M highway 12m approach terminal or equivalent approved
8.1	Mainline (North Side)	1714.3 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	1726.7 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	12.00	Verge – Behind Footway	Single Sided Terminal	0.25 From back of footway	P1	A	N/A	D1.1	Z1	0.7		WMHP-TG-SRWG1-DR-HI-0406	Rondino Roads' GRP-4M highway 12m approach terminal or equivalent approved
8.2	Mainline (North Side)	1726.7 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	1883.8 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	160	Verge – Behind Footway	Single Sided Barrier	0.25 From back of footway	N1	B	W2	N/A	N/A	0.8		WMHP-TG-SRWG1-DR-HI-0406	Rondino Roads' GRP-4M highway barriers or equivalent approved
8.3	Mainline (North Side)	1883.8 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	1907.3 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	12.00	Verge – Behind Footway	Single Sided Terminal	0.25 From back of footway	P1	A	N/A	D1.1	Z1	0.7		WMHP-TG-SRWG1-DR-HI-0406	Rondino Roads' GRP-4M highway 12m approach terminal or equivalent approved

Reference Number	Location	Start Chainage (m)	Finish Chainage (m)	Minimum Length (m)	Position on Cross-Section	Type of Road Restraint System	Set-back (m)	Containment Level	Impact Severity Level (ISL)	Working Width Class	Permanent Lateral Displacement Zone (PLDZ) Characteristic	Exit Box Class	Maximum Height that allows Required Visibility (m)	Other Requirements / Comments	Drg No.	Barrier Lengths Based On The Following Product
9.1	Mainline (South Side)	1714.2 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	1727.8 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	12.00	Verge – Behind Footway	Single Sided Terminal	0.25 From back of footway	P1	A	N/A	D1.1	Z1	0.7		WMHP-TG-SRWG1-DR-HI-0406	Rondino Roads' GRP-4M highway 12m approach terminal or equivalent approved
9.2	Mainline (South Side)	1727.8 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	1802 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	72	Verge – Behind Footway	Single Sided Barrier	0.25 From back of footway	N1	B	W2	N/A	N/A	0.8		WMHP-TG-SRWG1-DR-HI-0406	Rondino Roads' GRP-4M highway barriers or equivalent approved
9.3	Mainline (South Side)	1802 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	1814.2 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	12.00	Verge – Behind Footway	Single Sided Terminal	0.25 From back of footway	P1	A	N/A	D1.1	Z1	0.7		WMHP-TG-SRWG1-DR-HI-0406	Rondino Roads' GRP-4M highway 12m approach terminal or equivalent approved
10.1	Mainline (South Side)	41 HI-Zz_35_10_40-M-Dn_SIDE_R OAD_2	27.1 HI-Zz_35_10_40-M-Dn_SIDE_R OAD_2	12.00	Verge – Behind Footway	Single Sided Terminal	0.25 From back of footway	P1	A	N/A	D1.1	Z1	0.7		WMHP-TG-SRWG1-DR-HI-0406	Rondino Roads' GRP-4M highway 12m approach terminal or equivalent approved
10.2	Mainline (South Side)	27.1 HI-Zz_35_10_40-M-Dn_SIDE_R OAD_2	1905 HI-Zz_35_10_40-M-Dn_TG_DE SIGN	60	Verge – Behind Footway	Single Sided Barrier	0.25 From back of footway	N1	B	W1	N/A	N/A	0.8	Minimum radius bend 13m	WMHP-TG-SRWG1-DR-HI-0406	Rondino Roads' GRP-2M highway barriers or equivalent approved

10.3	Mainline (South Side)	1905 HI- Zz_35_10_ 40-M- Dn_TG_DE SIGN	1917.8 HI- Zz_35_10_ 40-M- Dn_TG_DE SIGN	12.00	Verge – Behind Footway	Single Sided Terminal	0.25 From back of footway	P1	A	N/A	D1.1	Z1	0.7		WMHP- TG- SRWG1- DR-HI- 0406	Rondino Roads’ GRP- 4M highway 12m approach terminal or equivalent approved
11.1	Tesco Pedestrian Link	1.5 HI- Zz_35_10_	16.5 HI- Zz_35_10_	15	Verge – Behind Footway	Pedestrian Guardrail	0.1	N/A	N/A	N/A	N/A	N/A	1	To be installed as per	WMHP- TG- SRWG1-	Varley and Gulliver Standard



Reference Number	Location	Start Chainage (m)	Finish Chainage (m)	Minimum Length (m)	Position on Cross-Section	Type of Road Restraint System	Set-back (m)	Containment Level	Impact Severity Level (ISL)	Working Width Class	Permanent Lateral Displacement Zone (PLDZ) Characteristic	Exit Box Class	Maximum Height that allows Required Visibility (m)	Other Requirements / Comments	Drg No.	Barrier Lengths Based On The Following Product
	(North Side)	40-M-Dn_Footpath_3	40-M-Dn_Footpath_3											manufacturers specification	DR-HI-0401	Pedestrian Guardrail (TYPE 50). Class 2 with class C bar infill to BS 7818.



Reference Number	Location	Start Chainage (m)	Finish Chainage (m)	Minimum Length (m)	Position on Cross-Section	Type of Road Restraint System	Set-back (m)	Containment Level	Impact Severity Level (ISL)	Working Width Class	Permanent Lateral Displacement Zone (PLDZ) Characteristic	Exit Box Class	Maximum Height that allows Required Visibility (m)	Other Requirements / Comments	Drg No.	Barrier Lengths Based On The Following Product
11.2	Tesco Pedestrian Link (North Side)	16.5 HI-Zz_35_10_40-M-Dn_Footpath_3	20 HI-Zz_35_10_40-M-Dn_Footpath_3	3.5	On structure – culvert headwall	Pedestrian Parapet	-	N/A	N/A	N/A	N/A	N/A	1.15	Refer to structures drawing WMHP-TG-SRWG1-DR-SE-0581 for specification and details	WMHP-TG-SRWG1-DR-HI-0401	Varley and Gulliver Standard Pedestrian Guardrail (TYPE 50)

Reference Number	Location	Start Chainage (m)	Finish Chainage (m)	Minimum Length (m)	Position on Cross-Section	Type of Road Restraint System	Set-back (m)	Containment Level	Impact Severity Level (ISL)	Working Width Class	Permanent Lateral Displacement Zone (PLDZ) Characteristic	Exit Box Class	Maximum Height that allows Required Visibility (m)	Other Requirements / Comments	Drg No.	Barrier Lengths Based On The Following Product
11.3	Tesco Pedestrian Link (North Side)	20 HI- Zz_35_10_ 40-M- Dn_Footpa th_3	30.9 HI- Zz_35_10_ 40-M- Dn_Footpa th_3	10.9	Verge – Behind Footway	Pedestrian Guardrail	-	N/A	N/A	N/A	N/A	N/A	1	To be installed as per manufacturers specification	WMHP-TG-SRWG1-DR-HI-0401	Varley and Gulliver Standard Pedestrian Guardrail (TYPE 50). Class 2 with class C bar infill to BS 7818.
12.1	Tesco Pedestrian Link (North Side)	2 HI- Zz_35_10_ 40-M- Dn_Footpa th_3	17 HI- Zz_35_10_ 40-M- Dn_Footpa th_3	15	Verge – Behind Footway	Pedestrian Guardrail	-	N/A	N/A	N/A	N/A	N/A	1	To be installed as per manufacturers specification	WMHP-TG-SRWG1-DR-HI-0401	Varley and Gulliver Standard Pedestrian Guardrail (TYPE 50). Class 2 with class C bar infill to BS 7818.
12.2	Tesco Pedestrian Link (North Side)	17 HI- Zz_35_10_ 40-M- Dn_Footpa th_3	33 HI- Zz_35_10_ 40-M- Dn_Footpa th_3	16	On structure – culvert headwall	Pedestrian Parapet	-	N/A	N/A	N/A	N/A	N/A	1.15	Refer to structures drawing WMHP-TG-SRWG1-DR-SE-0581 for specification and details	WMHP-TG-SRWG1-DR-HI-0401	Varley and Gulliver Standard Pedestrian Guardrail (TYPE 50)

Reference Number	Location	Start Chainage (m)	Finish Chainage (m)	Minimum Length (m)	Position on Cross-Section	Type of Road Restraint System	Set-back (m)	Containment Level	Impact Severity Level (ISL)	Working Width Class	Permanent Lateral Displacement Zone (PLDZ) Characteristic	Exit Box Class	Maximum Height that allows Required Visibility (m)	Other Requirements / Comments	Drg No.	Barrier Lengths Based On The Following Product
13.1	Ludgrove Access Road	N/A refer to drawing WMHP-TG-SRWG1-DR-HI-0408	N/A refer to drawing WMHP-TG-SRWG1-DR-HI-0408	4	Behind fence line	Single Sided Terminal	0.4m behind fence line	P1	A	N/A	D1.1	Z1	0.7		WMHP-TG-SRWG1-DR-HI-0408	Rondino Roads' GRP-4M highway 4m approach terminal or equivalent approved
13.2	Ludgrove Access Road	N/A refer to drawing WMHP-TG-SRWG1-DR-HI-0408	N/A refer to drawing WMHP-TG-SRWG1-DR-HI-0408	32	Behind fence line	Single Sided Barrier	0.4m behind fence line	N1	A	W2	N/A	N/A	0.8	Minimum radius bend 13m	WMHP-TG-SRWG1-DR-HI-0408	Rondino Roads' GRP-2M highway barriers or equivalent approved
13.3	Ludgrove Access Road	N/A refer to drawing WMHP-TG-SRWG1-DR-HI-0408	N/A refer to drawing WMHP-TG-SRWG1-DR-HI-0408	4	Behind fence line	Single Sided Terminal	Varies behind fence line	P1	A	N/A	D1.1	Z1	0.7		WMHP-TG-SRWG1-DR-HI-0408	Rondino Roads' GRP-4M highway 4m approach terminal or equivalent approved
14.1	Ludgrove Access Road	N/A refer to drawing WMHP-TG-SRWG1-DR-HI-0408	N/A refer to drawing WMHP-TG-SRWG1-DR-HI-0408	4	Behind fence line	Single Sided Terminal	0.4m behind fence line	P1	A	N/A	D1.1	Z1	0.7		WMHP-TG-SRWG1-DR-HI-0408	Rondino Roads' GRP-4M highway 4m approach terminal or equivalent approved
14.2	Ludgrove Access Road	N/A refer to drawing WMHP-TG-SRWG1-DR-HI-0408	N/A refer to drawing WMHP-TG-SRWG1-DR-HI-0408	32	Behind fence line	Single Sided Barrier	0.4m behind fence line	N1	A	W2	N/A	N/A	0.8	Minimum radius bend 13m	WMHP-TG-SRWG1-DR-HI-0408	Rondino Roads' GRP-2M highway barriers or equivalent approved



Reference Number	Location	Start Chainage (m)	Finish Chainage (m)	Minimum Length (m)	Position on Cross-Section	Type of Road Restraint System	Set-back (m)	Containment Level	Impact Severity Level (ISL)	Working Width Class	Permanent Lateral Displacement Zone (PLDZ) Characteristic	Exit Box Class	Maximum Height that allows Required Visibility (m)	Other Requirements / Comments	Drg No.	Barrier Lengths Based On The Following Product
14.3	Ludgrove Access Road	N/A refer to drawing WMHP-TG-SRWG1-DR-HI-0408	N/A refer to drawing WMHP-TG-SRWG1-DR-HI-0408	4	Behind fence line	Single Sided Terminal	Varies behind fence line	P1	A	N/A	D1.1	Z1	0.7		WMHP-TG-SRWG1-DR-HI-0408	Rondino Roads' GRP-4M highway 4m approach terminal or equivalent approved

APPENDIX 4/2 - Information Required To Demonstrate Compliance of Vehicle Restraint Systems to BS1317-1, BS EN1317-2, BS-EN 1317-3 and DD ENV 1317-4:2002

The Contractor shall submit the following supporting information demonstrating compliance with BS EN 1317-1, BS EN 1317-2, BS EN 1317-3 and DD ENV 1317-4:2002 to the Employer for acceptance:

EUROPEAN COMMITTEE FOR STANDARDISATION (CEN) COMPLIANCE

1. Initial submission documents to be supplied for consideration of initial type test are as follows:
 - a. test report in accordance with BS EN1317-1, Clause 9 (and including any additional test data required under BS EN 1317-3, Clauses 7.3 and 7.4 and DD ENV 1317-4:2002, Clauses 7.3 and 7.4);
 - b. video / high speed film of test annotated showing date, test number and performance class;
 - c. still photographs of complete installation including anchorage points;
 - d. still photographs of vehicle before and after impact;
 - e. full drawings of tested items;
 - f. certification from the manufacturer that the item tested complies with drawing supplied;
 - g. certificate from test house accredited in accordance with the requirements of Series 400 (MCHW 1.400).
2. Additional information, which will be required on acceptance of initial type test prior to installation:
 - a. manufacturer's specification;
 - b. installation drawings;
 - c. manufacturer's installation instructions including foundation requirements and test methods to verify their performance;
 - d. manufacturer's repair and maintenance manual;
 - e. certificate of compliance with the Quality Management Scheme 1 for the Manufacture of Fencing Components;
 - f. compliance with the Quality Management Sector Scheme 2 - Supply and Installation of Fences:
 - Sector Scheme 2B for Vehicle Restraint Systems;
 - g. certificate of compliance for the Quality Management Sector Scheme 5 for the Fabrication and Installation of Bridge Parapets and Cradle Anchorages:
 - Sector Scheme 5A for the Manufacture of Parapets for Road Restraint Systems; and
 - Sector Scheme 5B for the Installation of Parapets for Road Restraint Systems;

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- h. nominal loads (direct forces, moments and co-existent shears) to be transferred from the parapet to the structure or foundation.
 - 3. Notes:
 - a. All documents, which are not in English, will have to be translated.
 - b. Items 12 and 13 are required for safety barrier systems and transitions.
 - c. Items 14 and, 15 are required for vehicle parapets. See also Note 1 under Sector Scheme B in Appendix A of the Specification for Highway Works.

SUBMISSION FOR COMPLIANCE WITH BS EN 1317-1, BS EN 1317-2, BS EN 1317-3, AND DD ENV 1317-4:2002			
TYPE OF VEHICLE RESTRAINT SYSTEM:			
CONTAINMENT PERFORMANCE CLASS/PERFORMANCE LEVEL/PERFORMANCE CLASS (*):			
TEST REPORT NUMBER: (Test of)			
Test Type: Primary/Complementary Test) (*)			
TEST NUMBER: TEST DATE: (*) delete as appropriate			
COMPANY NAME: CONTACT: ADDRESS: Tel:/Fax:/E-mail: PRODUCT NAME:			
Initial submission documents to be supplied for consideration of Initial Type Test (ITT)			
Item	Comment	Item Received (Y or N)	Date requested
1	Test report		
2	Video/high speed film		
3	Still photographs		
4	Still photographs		
5	Drawings		
6	Certification from the manufacturer		
7	Confirmation from test house		
Additional information, which will be required on acceptance of initial type test prior to installation			
8	System specification	Manufacturer's specification	
9	Installation details	Manufacturer's drawings	
10	Installation procedures	Manufacturer's installation instructions	
11	Maintenance Manual	Manufacturer's inspection, repair and maintenance instructions	
12	Certificate of compliance	With the Quality Management Scheme 1 for Manufacture of Fencing Components 2	
13	Certificate of compliance	With the Quality Management Sector Scheme 2B for the Supply and Installation of Vehicle Restraint Systems.	
14	Certificate of compliance	With the Quality Management Sector Schemes 5A and 5B for the Manufacture and Installation of Bridge Parapets and Cradle Anchorages: (i) Sector Scheme 5A for The Manufacture of Parapets for Road Restraint Systems; and (ii) Sector Scheme 5B for the Installation of Parapets for Road Restraint Systems	
15	Support loads	Nominal loads (direct loads, bending moments and shear forces) that have to be transferred from the vehicle restraint system to the supporting Structure or foundation.	
Signature:		Name:	
Date:			

SUBMISSION FOR COMPLIANCE WITH BS EN 1317-1, BS EN 1317-2, BS EN 1317-3, AND DD ENV 1317-4:2002 TYPE OF VEHICLE RESTRAINT SYSTEM: Safety Barrier, Vehicle Parapet or Transition (*) CONTAINMENT PERFORMANCE CLASS/LEVEL (*): TEST REPORT NUMBER: (Test of) Test Type: Primary/Complementary Test (*) TEST NUMBER: TEST DATE: (*) delete as appropriate						
COMPANY NAME: CONTACT: ADDRESS: Tel:/Fax:/E-mail: PRODUCT NAME:						
Initial submission documents to be supplied for consideration of Initial Type Test (ITT)						
			Specified	Actual	Satisfactory (Yes or No)	Compliance
BS EN 1317-1, Table 1	Vehicle Details	Impact Conditions				
		Total vehicle mass (kg)	 (±...)			
		Speed (km/h)	 (0, +7%)			
		Angle (degrees)	 (-1, +1.5)			
		Centre of Gravity				
		Vertical height (m)	 (± 10%)			
		Longitudinal (m)	 (± 10%)			
		Lateral (m)	±			
		Model				N/A
BS EN 1317-2, Clause 4.2	Vehicle Restraint System (VRS) Behaviour	1) The VRS shall contain and redirect the vehicle without breakage of principal longitudinal elements of the system. 2) No major part of the VRS shall become totally detached or present undue hazard to other traffic, pedestrians or personnel in a work zone. 3) Elements of the VRS shall not penetrate the passenger compartment that can cause serious injuries are not permitted. 4) Ground anchorages and fixings shall perform according to the design of the VRS.				
BS EN 1317-2, Clause 4.3	Vehicle Behaviour	1) The centre of gravity (CG) of the vehicle shall not cross the centreline of the deformed system. 2) The vehicle shall remain upright during and after impact, although moderate rolling, pitching and yawing are acceptable. 3) The vehicle shall leave the VRS after impact so that the wheel track does not cross a line parallel to the initial traffic face of the VRS, at a distance A (2.2 metres) plus vehicle width + 16 per cent of the length of the vehicle within a distance B (10 metres) from the final intersection (break) of wheel track with the initial traffic face of the VRS.				
BS EN 1317-2, Clause 5.3.2	Installation	1) The length of the VRS shall be sufficient to demonstrate the full performance characteristics of the system. 2) If the VRS has to develop tension, end anchorages shall be provided in accordance with the VRS specification. Post foundation shall meet the design specification.				
BS EN 1317-2, Clause 4.4	Severity Indices	SPECIFIED THIV Limit 33km/h PHD Limit 20g ASI Limit 1.4	ACTUAL THIV km/h PHD g ASI			
BS EN 1317-2, Clause 5.7, Figure 3	Photographic coverage	1) Photographic coverage shall be sufficient to clearly describe behaviour and vehicle motion during and after impact. 2) High speed cameras shall be operated at a minimum of 200 frames per second and stills. 3) As recommended in Clause 5.7 and Figure 3.				
	Drawings	Drawings included				
N/A = Not Applicable						
FULLY COMPLIES WITH STANDARD: BS EN 1317-1, BS EN 1317-2, DD ENV 1317-4:2002						
Signature:			Name:			
Date:						

SUBMISSION FOR COMPLIANCE WITH BS EN 1317-1, AND BS EN 1317-3						
TYPE OF VEHICLE RESTRAINT SYSTEM:		Crash Cushion (Redirective [R] or Non-redirective [NR] (*)				
TEST REPORT NUMBER:		TEST TYPE: (Primary/Complementary Test) (*)				
PERFORMANCE LEVEL:		VELOCITY CLASS:		(Test of)		
TEST NUMBER:		TEST DATE:		(*) delete as appropriate		
COMPANY NAME:						
CONTACT:						
ADDRESS:						
Tel:/Fax:/E-mail:						
PRODUCT NAME:						
			Specified	Actual	Satisfactory (Yes or No)	Compliance
BS EN 1317-1	Vehicle Details	Impact Conditions				
		Total vehicle mass (kg)	 (±...)			
		Speed (km/h)	 (0, +7%)			
		Angle (degrees)	 (-1, +1.5)			
		Centre of Gravity				
		Vertical height (m)	 (± 10%)			
		Longitudinal (m)	 (± 10%)			
		Lateral (m)	±			
		Model				N/A
BS EN 1317-3, Clause 6.2	Crash Cushion Behaviour	1) Elements of the crash cushion shall not penetrate the passenger compartment of the vehicle. Deformations of, or intrusions into, the passenger compartment that could cause serious injuries are not permitted. 2) No major element of the crash cushion, having a solid mass greater than or equal to 2.0 kg, shall become totally detached, unless this is required by the working of the crash cushion. No major element of the crash cushion shall impede the path of adjacent traffic. The final position of the detached element shall be considered to determine the displacement classification.				
BS EN 1317-3, Clause 6.3	Vehicle Behaviour	1) The vehicle shall remain upright during and after the collision although yawing and moderate rolling and pitching are acceptable. The post-impact trajectory of the test vehicle shall be controlled by means of the exit box shown in Figure 2 and specified as detailed in Tables 11 and 12.				
BS EN 1317-3, Clause 7.3.2	Installation	1) The installation of the crash cushion for the test shall comply with the structural design details and the on-road system details as given in the design specification.				
BS EN 1317-3, Clause 5.4 and Table 4	Impact Severity Indices	SPECIFIED	ACTUAL			
		Level A: THIV≤44km/h (Tests 1, 2 & 3) THIV≤ 33km/h (Tests 4 & 5) ASI ≤ 1.0				
		Level B: THIV≤44km/h (Tests 1, 2 & 3) HIV ≤ 33km/h (Tests 4 & 5) ASI ≤ 1.4				
		Levels A & B : PHD ≤ 20g				
BS EN 1317-3, Clause 7.7, Figure 4	Photo graphic coverage	1) High speed cameras and / or high speed video cameras shall be operated at minimum of 200 frames per second.				
		2) Stills				
		3) As recommended in Clause 7.7 and Figure 4				
	Drawings	Drawings included				
N/A = Not Applicable						
FULLY COMPLIES WITH STANDARD: BS EN 1317-1, and BS EN 1317-3						
Signature:			Name:			
Date:						

SUBMISSION FOR COMPLIANCE WITH BS EN 1317-1 AND DD ENV 1317-4:2002						
TYPE OF VEHICLE RESTRAINT SYSTEM:		Terminal				
PERFORMANCE CLASS:		(Test of)				
Test Type: Primary/Complementary Test) (*)						
TEST TYPE NUMBER:						
TEST NUMBER:		TEST DATE: (*) delete as appropriate				
COMPANY NAME:						
CONTACT:						
ADDRESS:						
Tel:/Fax:/E-mail:						
PRODUCT NAME:						
			Specified	Actual	Satisfactory (Yes or No)	
BS EN 1317-1, Table 1 DD ENV 1317-4: 2002, Clauses 7.4 and 7.5	Vehicle Details	Impact Conditions				
		Total vehicle mass (kg)	 (±...)			
		Speed (km/h)	 (0, +7%)			
		Angle (degrees)	 (-1, +1.5)			
		Centre of Gravity				
		Vertical height (m)	 (± 10%)			
		Longitudinal (m)	 (± 10%)			
		Lateral (m)	±			
		Model				
DD ENV 1317-4: 2002, Clauses 5.4 and 5.5.2	Terminal Behaviour	1) Elements of the terminal shall not penetrate the passenger compartment of the vehicle. Deformations of, or intrusions into, the passenger compartment that could cause serious injuries are not permitted. 2) No major part of the terminal shall be come totally detached and come to rest outside the permanent lateral displacement zones defined in Clause 5.4. 3) Anchorages and fixings shall perform to the terminal design specifications and other specified requirements as listed in the rest report.				
DD ENV 1317-4: 2002, Clause 5.5.3	Vehicle Behaviour	1) The vehicle shall not overturn, although rolling, yawing and moderate pitching may be accepted. For the Performance Class P1 rolling onto a side may be accepted. 2) The exit box values for the specified test are as defined in Figures 5.6 and 7 (as appropriate).				
DD ENV 1317-4, 2002 Clause 7.3.2	Installation	1) The terminal shall conform to the structural design details and with the system installation details as given in the design specification of the manufacturer.				
DD ENV 1317-4: 2002, Clause 5.5.4 and Table 5	Impact Severity Indices	SPECIFIED Level A: THIV≤44km/h (Tests 1, 2 & 3) THIV≤ 33km/h (Tests 4 & 5) ASI ≤ 1.0 Level B: THIV≤44km/h (Tests 1, 2 & 3) HIV ≤ 33km/h (Tests 4 & 5) ASI ≤ 1.4 Levels A & B : PHD ≤ 20g	ACTUAL			
DD ENV 1317-4, 2002 Clause 7.7, Figure 7	Photographic coverage	1) Photographic coverage shall be sufficient to describe clearly terminal and vehicle motion during and after impact 2) High speed cameras and / or high speed video cameras at a minimum of 200 frames per second 3) Stills				
	Drawings	Drawings included				
					N/A = Not Applicable	
FULLY COMPLIES WITH STANDARD: BS EN 1317-1 AND DD ENV 1317-4:2002						
Signature:			Name:			
Date:						