Annex A NOT USED

NOT USED

Annex B ABPM Item Rates

REF	Description	Unit of Measure	Rate
1.0	PCF Stage 0 to 3	% of Construction Works	3.84%
2.0	PCF Stages 4 to 5	% of Construction Works	7.46%
3.0	PCF Stages 6 & 7 Technical Support	% of Construction Works	5.50%
4.0	PCF Stages 6 & 7 Construction Costs including any Advance Works		
4.1	**Construction Fee**	% of Construction Total	8.26%
4.2	**Construction Total**		
4.3	**Construction Management Stage 6 & 7**	% of Construction Works	16.02%
4.4	**Construction Works**		
4.4.1	PRELIMINARIES - NON-STAFF	% of Direct Works	38.30%
4.5	**Direct Works**		
4.5.1	GENERAL WORKS	Scheme Km	83,788.60
4.5.1.1	*Take up or Down and Set Aside for Re-use or Remove to Store or Tip off Site - kerbs, channels, edgings incl CKD units*	m	7.40
4.5.1.2	*Take up or Down and Set Aside for Re-use or Remove to Store or Tip off Site - linear drainage channels*	m	56.12
4.5.1.3	*Site Clearance - Partial demolition of gantries*	No	25,592.93
4.5.1.4	*Fencing, Gates and Stiles - Environmental barriers*	m	253.63
4.5.2	MODIFICATION OF EXISTING STRUCTURES	Scheme Km	60,970.58
4.5.2.1	*Fabrication of Steelwork - Modification of Existing Gantries (Steelwork)*	t	7,915.46
4.5.3	MAIN CARRIAGEWAY	Single Lane km	60,100.79
4.5.3.1	*Safety barriers (inc terminals & connections of existing systems)*	m	122.47
4.5.3.2	*Pedestrian Parapets & Guardrails - Pedestrian guardrails*	m	56.86
4.5.3.3	*Drains & Service Ducts and Filter Drains*	m	113.36
4.5.3.4	*Chambers & Gullies - Chambers*	No	5,966.53
4.5.3.5	*Imported Fill & Compaction of Fill*	m3	40.32
4.5.3.6	*Excavation & Disposal of Material*	m3	42.64
4.5.3.7	*Sub-base*	m3	48.17
4.5.3.8	*Pavements - Base course*	m3	209.50
4.5.3.9	*Pavements - Binder course*	m3	231.46
4.5.3.10	*Pavements - Surface course*	m3	338.99
4.5.3.11	*Kerbs, Channels, Edgings, Combined Drainage and Kerb Blocks & Linear Drainage Channel Systems – Combined drainage and kerb units*	m	118.52
4.5.3.12	*Kerbs, Channels, Edgings, Combined Drainage and Kerb Blocks & Linear Drainage Channel Systems - Linear drainage channels*	m	306.20
4.5.3.13	*Lighting columns (incl ductwork and cabling)*	No	9,292.36

4.5.4	CENTRAL RESERVE	Km	117,428.11
4.5.4.1	*Safety barriers (inc terminals & connections to existing systems)*	m	148.86
4.5.4.2	*Drains & Service Ducts and Filter Drains (including Chambers and Connections)*	m	245.97
4.5.4.3	*Disposal of Material*	m3	38.89
4.5.4.4	*Sub-base*	m3	50.90
4.5.4.5	*Pavements / Regulating Course - Base, binder and regulating course*	m3	192.02
4.5.4.6	*Pavements - Surface course*	m3	302.05
4.5.4.7	*Kerbs, Channels, Edgings, Combined Drainage and Kerb Blocks & Linear Drainage Channel Systems - Channels*	m	148.16
4.5.5	EMERGENCY AREA	No	136,012.73
4.5.6	JUNCTIONS	No	175,118.81
4.5.7	TECHNOLOGY	Scheme Km	817,714.84
4.5.7.1	*Trench for Communications Cable or Duct - Trench for duct*	m	68.48
4.5.7.2	*Trench for Communications Cable or Duct - Trenchless for duct*	m	1,078.74
4.5.7.3	*Chambers*	No	5,968.24
4.5.7.4	*Communications Equipment - Cabinets (single)*	No	4,540.56
4.5.8	TECHNOLOGY (RETROFIT ONLY)	Scheme Km	458,268.39
4.5.9	MS CANTILEVER GANTRY	No	48,314.77
4.5.9.1	*Cast-in-place Piles (inc Piling Plant & Reinforcement for Cast-in-place Piles)*	m	1,255.45
4.5.10	SINGLE SPAN GANTRY	No	80,005.34
4.5.10.1	*Cast-in-place Piles (inc Piling Plant & Reinforcement for Cast-in-place Piles)*	m	922.98
4.5.11	DUAL SPAN GANTRY	No	318,589.88
4.5.12	RETAINING WALLS	m	190.96
4.5.12.1	*Ground Anchorages*	m	63.27
4.5.12.2	*Steel Sheet Piles*	m2	258.52
4.5.12.3	*Contiguous Bored Pile Walls*	m2	401.19
4.5.12.4	*Plastic Sheet Piles*	m2	191.52
4.5.12.5	*Structural Concrete (inc. In-Situ Concrete, Surface Finish of Concrete - Formwork, Steel Reinforcement for Structures)*	m3	1,014.70
4.5.13	MISCELLANEOUS STRUCTURES	No	14,990.10
4.5.13.1	*Precast Concrete Piles, Cast-in-place Piles, Steel Bearing Piles (inc Piling Plant)*	m	3,780.93
4.6	**Essential Improvement Works**		
4.6.1	EXTENDED UNDERBRIDGES	New Deck Area - m2	3,065.05
4.6.2	FOOTBRIDGE	Deck Area - m2	3,959.16
5.0	**Other Costs**		
5.1	**Lands**	Scheme Km	6,212.29
5.2	**Statutory Undertakers**	Scheme Km	552.96
5.3	**Third Party Costs**	Scheme Km	737.67
5.4	**NRTS Costs**	Scheme Km	105,231.61
5.5	**Technology Installation Costs**	Scheme Km	21,037.04
5.6	**Bulk Purchase Items**	Scheme Km	219,438.91

5.7	**RCC Costs**	Scheme Km	16,352.08
5.8	**DNO Connections - Power Supplies**	Scheme Km	6,549.68
5.9	**Safety Camera Partnership**	Scheme Km	45,135.21
5.10	**HADECS communications links annual maintenance costs**	Scheme Km	1,427.58
5.11	**Task Force for MIDAS / Ramp Metering / CCTV / Managed Motorway**	Scheme Km	3,877.10
5.12	**Site Specific - ANPR / WIM**	Scheme Km	4,069.32
5.13	**Site Data Costs**	Scheme Km	14,700.76
5.14	**Area Mac / TechMac**	Scheme Km	36,895.56
5.15	**Employer's Management Costs**	Scheme Km	40,358.37
5.16	**Post Road Opening (Excluding Aftercare)**	Scheme Km	134.02
6.0	**Inflation**		
6.1	Inflation - Pre-Construction	Index	See Section 3
6.2	Inflation - Construction	Index	See Section 3
7.0	**Programme Level Service**	**% of all of the above**	**3%**

Annex C Method of Measurement – Item Coverage

REF	Description	Unit of Measure	Item Coverage
1.0	PCF Stage 0 to 3	Construction Works Total (£)	Costs incurred in the delivery of and completion of PCF Stages 0 to 3 *(PCF Product Matrix)* and any other associated Highways Governance. This is calculated as a percentage of the Construction Works (Item 4.4).
2.0	PCF Stages 4 to 5	Construction Works Total (£)	Costs incurred in the delivery of and completion of PCF Stages 4 to 5 *(PCF Product Matrix)* and any other Highways Governance for a scheme which does not require a Development Consent Order. Any activity or activities deemed necessary or beneficial in preparing for start of works. Any investigation and any survey required to produce the construction design. This is calculated as a percentage of the Construction Works (Item 4.4).
3.0	PCF Stages 6 & 7 Technical Support	Construction Works Total (£)	Any PCF Stages 6 and 7 *(PCF Product Matrix)* people costs not covered in Item 4.3. This is calculated as a percentage of the Construction Works (Item 4.4).
4.0	PCF Stages 6 & 7 Construction Costs including any Advance Works		
4.1	**Construction Fee**	Construction Total (£)	An allowance to cover construction fee in accordance with the conditions of the contract. This is calculated as a percentage of the Construction Total (Item 4.2).
4.2	**Construction Total**	£	The sum total of Items 4.3 and Item 4.4.
4.3	**Construction Management Stage 6 & 7**	Construction Works Total (£)	Planning, design, management, supervision and / or administration of the Construction Works included in Series 100 - Series 5000 of the Manual of Contract Documents for Highways Works - Volume 1 carried out by People not covered by the Construction Industry Joint Council (CIJC) Working

			Rule Agreement. This is calculated as a percentage of the Construction Works (Item 4.4).
4.4	**Construction Works**	£	The sum total of Items 4.4.1 and Item 4.5.
4.4.1	PRELIMINARIES - NON-STAFF	Direct Works (£)	Includes all works required in accordance with Series 100 of the Manual of Contract Documents for Highways Works - Volume 4 Section 1 and any other costs associated with delivering the works included in Series 200 - Series 5000 of the Manual of Contract Documents for Highways Works - Volume 1. This includes the People covered by the CIJC Working Rule Agreement not included in Item 4.3. This is calculated as a percentage of the Direct Works (Item 4.5).
4.5	**Direct Works**	£	The sum total of Items 4.5.1 to 4.6.
4.5.1	GENERAL WORKS	Scheme Km	Coverage in accordance with MMHW: Volume 4 - Series 200: Site Clearance, Series 300: Fencing, Series 2700: Accommodation Works and Series 3000: Landscaping. Excludes works in Items 4.5.1.1 to 4.5.1.4.
4.5.1.1	*Take up or Down and Set Aside for Re-use or Remove to Store or Tip off Site - kerbs, channels, edgings including CKD units*	m	Coverage in accordance with MMHW: Volume 4 - Series 200: Site Clearance- Paragraph 8 to 11 - Take Up or Down & Set Aside for Re-use or Remove to Store or Tip off Site - Group II Feature 4 - Kerbs, channels, edgings and combined drainage and kerb blocks only.
4.5.1.2	*Take up or Down and Set Aside for Re-use or Remove to Store or Tip off Site - linear drainage channels*	m	Coverage in accordance with MMHW: Volume 4 - Series 200: Site Clearance- Paragraph 8 to 11 - Take Up or Down & Set Aside for Re-use or Remove to Store or Tip off Site - Group II Feature 4 - Linear drainage channel systems only.
4.5.1.3	*Site Clearance - Partial demolition of gantries*	No	Coverage in accordance with MMHW: Volume 4 - Series 200: Site Clearance- Paragraph 2 to 7 – Group I Feature 4 - Partial Demolition of Individual Structures.
4.5.1.4	*Fencing, Gates and Stiles – Environmental*	m	Coverage in accordance with MMHW: Volume 4 - Series 300: Fencing - Paragraph 1 to 4 - Fencing and Series 2500: Special Structures - Paragraph

	barriers		1
			to 5 - Group II Feature 3 - Environmental barrier.
4.5.2	MODIFICATION OF EXISTING STRUCTURES	Scheme Km	Coverage includes all works associated with the Modification of Existing Structures. Modification of Existing Structures encompasses any works associated with existing gantries, underbridges and overbridges required to deliver the scope in accordance with IAN 161/15. This item excludes extending underbridges and overbridges which are covered in Item 4.6 as Essential Improvement works. Coverage in accordance with MMHW: Volume 4 - Series 200 to 5000 as required. Excludes works in Item 4.5.2.1.
4.5.2.1	*Fabrication of Steelwork - Modification of Existing Gantries (Steelwork)*	t	Coverage in accordance with MMHW: Volume 4 - Series 1800: Steelwork for Structures - Paragraph 1 to 9 - Fabrication & Erection of Steelwork.
4.5.3	MAIN CARRIAGEWAY	Single Lane km	Coverage includes all works associated with the Main Carriageway. Main Carriageway encompasses all roadworks items within the boundary fencing on either side of the route including merges and diverges at junctions up to the back of the nosing, and the section of main carriageway through a junction. It does not cover the area of central reserve between the carriageways and Emergency Area locations. Coverage in accordance with MMHW: Volume 4 - Series 400 to 1400 as required. Excludes works in Items 4.5.3.1 to 4.5.3.13.
4.5.3.1	*Safety barriers (including terminals & connections to existing systems)*	m	Coverage in accordance with MMHW: Volume 4 - Series 400: Road Restraint Systems - Paragraph 1 to 13 - Safety Barriers / Terminals / Connections to Existing Systems.
4.5.3.2	*Pedestrian Parapets & Guardrails - Pedestrian guardrails*	m	Coverage in accordance with MMHW: Volume 4 - Series 400: Road Restraint Systems - Paragraph 22 to 26 - Pedestrian Parapets & Pedestrian Guardrails - Group I Feature 2 - Pedestrian guardrail.

4.5.3.3	*Drains & Service Ducts and Filter Drains*	m	Coverage in accordance with MMHW: Volume 4 - Series 500: Drainage & Service Ducts - Paragraph 1 to 8 – Definitions, Paragraphs 9 to 16 - Drains & Service Ducts and Paragraphs 17 to 22 - Filter Drains – Group I Feature 1 – Filter Drains.
4.5.3.4	*Chambers & Gullies* *- Chambers*	No	Coverage in accordance with MMHW: Volume 4 - Series 500: Drainage & Service Ducts - Paragraph 33 to 37 - Chambers & Gullies - Group I Feature 1 – Chambers.
4.5.3.5	*Imported Fill & Compaction of Fill*	m3	Coverage in accordance with MMHW: Volume 4 - Series 600 - Earthworks - Paragraph 1 to 13 - Definitions and Paragraph 40 to 52 - Imported Fill / Compaction of Fill.
4.5.3.6	*Excavation & Disposal of Material*	m3	Coverage in accordance with MMHW: Volume 4 - Series 600 - Earthworks - Paragraph 1 to 13 - Definitions, Paragraph 14 to 23 - Excavation and Paragraph 34 to 39 - Disposal.
4.5.3.7	*Sub-base*	m3	Coverage in accordance with MMHW: Volume 4 - Series 700 - Pavements - Paragraph 1 to 5 - Sub-base.
4.5.3.8	*Pavements - Base course*	m3	Coverage in accordance with MMHW: Volume 4 - Series 700 - Pavements - Paragraph 6 to 9 - Pavement. Group II Feature 1 - Base, Feature 2 – Lower base and Feature 3 - Upper base.
4.5.3.9	*Pavements - Binder course*	m3	Coverage in accordance with MMHW: Volume 4 - Series 700 - Pavements - Paragraph 6 to 9 - Pavement. Group II Feature 4 - Binder course.
4.5.3.10	*Pavements - Surface course*	m3	Coverage in accordance with MMHW: Volume 4 - Series 700 - Pavements - Paragraph 6 to 9 - Pavement. Group II Feature 5 - Surface course.
4.5.3.11	*Kerbs, Channels, Edgings, Combined Drainage and Kerb Blocks & Linear Drainage Channel Systems - Combined drainage and kerb units*	m	Coverage in accordance with MMHW: Volume 4 - Series 1100 - Kerbs, Footways and Paved Areas - Paragraph 1 to 4 - Kerbs, Channels, Edgings, Combined Drainage & Kerb Blocks and Linear Drainage Channels - Group I Feature 4 - Combined drainage and kerb blocks.

4.5.3.12	*Kerbs, Channels, Edgings, Combined Drainage and Kerb Blocks & Linear Drainage Channel Systems - Linear drainage channels*	m	Coverage in accordance with MMHW: Volume 4 - Series 1100 - Kerbs, Footways and Paved Areas - Paragraph 1 to 4 - Kerbs, Channels, Edgings, Combined Drainage & Kerb Blocks and Linear Drainage Channels - Group I Feature 5 - Linear drainage channel systems.
4.5.3.13	*Lighting columns (including ductwork and cabling)*	No	Coverage in accordance with MMHW: Volume 4 - Series 1300 - Road Lighting Columns and Brackets, CCTV Masts and Cantilever Masts - Paragraph 1 to 4 - Road Lighting Columns and Brackets, CCTV Masts and Cantilever Masts - Group I Feature 1 - Road Lighting Columns and associated works under Series 1400 - Electrical Work for Road Lighting & Traffic Signs - Paragraph 1 to 35.
4.5.4	CENTRAL RESERVE	Km	Coverage includes all works associated with the Central Reserve. Central Reserve encompasses all works within the area that separates the carriageways of a dual carriageway with the exception of hard strips. This item excludes works to existing structures which are covered under Item 4.5.2. Coverage in accordance with MMHW: Volume 4 - Series 400 to 1400 as required. Excludes works in Items 4.5.4.1 to 4.5.4.7.
4.5.4.1	*Safety barriers (including terminals & connections to existing systems)*	m	Coverage in accordance with MMHW: Volume 4 - Series 400: Road Restraint Systems - Paragraph 1 to 13 - Safety Barriers / Terminals / Connections to Existing Systems.
4.5.4.2	*Drains & Service Ducts and Filter Drains (including Chambers and Connections)*	m	Coverage in accordance with MMHW: Volume 4 - Series 500: Drainage & Service Ducts - Paragraph 1 to 8 – Definitions, Paragraphs 9 to 16 - Drains & Service Ducts, Paragraphs 17 to 22 - Filter Drains – Group I Feature 1 - Filter Drains, Paragraph 29 to 32 - Connections and Paragraph 33 to 37 - Chambers and Gullies – Group I Feature 1 – Chambers.
4.5.4.3	*Disposal of Material*	m3	Coverage in accordance with MMHW: Volume 4 - Series 600 - Earthworks - Paragraph 1 to 13 - Definitions and

			Paragraph 34 to 39 - Disposal.
			Excludes Group II Feature 5 - Unacceptable material Class U2.
4.5.4.4	*Sub-base*	m3	Coverage in accordance with MMHW: Volume 4 - Series 700 - Pavements - Paragraph 1 to 5 - Sub-base.
4.5.4.5	*Pavements / Regulating Course - Base and Binder course*	m3	Coverage in accordance with MMHW: Volume 4 - Series 700 - Pavements - Paragraph 6 to 9 - Pavement. Group II Feature 1 - Base, Feature 2 - Lower base, Feature 3 - Upper base and Feature 4 - Binder course and Paragraph 10 to 14 – Regulating Course.
4.5.4.6	*Pavements - Surface course*	m3	Coverage in accordance with MMHW: Volume 4 - Series 700 - Pavements - Paragraph 6 to 9 - Pavement - Group II Feature 5 - Surface course.
4.5.4.7	*Kerbs, Channels, Edgings, Combined Drainage and Kerb Blocks & Linear Drainage Channel Systems - Channels*	m	Coverage in accordance with MMHW: Volume 4 - Series 1100 - Kerbs, Footways and Paved Areas - Paragraph 1 to 4 - Kerbs, Channels, Edgings, Combined Drainage & Kerb Blocks and Linear Drainage Channels - Group I Feature 2 – Channels.
4.5.5	EMERGENCY AREA	No	Coverage includes all works associated with the Emergency Area. Emergency Area encompasses all roadworks items associated with constructing an Emergency Area. Coverage in accordance with MMHW: Volume 4 - Series 400 to 1400 as required.
4.5.6	JUNCTIONS	No	Coverage includes all works associated with Junctions. Junctions encompasses all roadworks items associated with the connector roads from the back of the nosing of the slip road, ancillary lanes and work to the junction itself with the exception of structures. Coverage in accordance with MMHW: Volume 4 - Series 400 to 1400 as required.
4.5.7	TECHNOLOGY	Scheme Km	Coverage in accordance with MMHW: Volume 4 - Series 1500: Motorway Communications and list of documents contained within TSS Plans Registry available at https://www.gov.uk/guidance/traffic-

			systems-and-signing-plans-registry-how-to-access-documents. Excludes works in Items 4.5.7.1 to 4.5.7.4.
4.5.7.1	*Trench for Communications Cable or Duct - Trench for duct*	m	Coverage in accordance with MMHW: Volume 4 - Series 1500 - Motorway Communications - Paragraph 5 to 8 - Trench for Communications Cable or Duct – Group I Feature 2 – Trench for Communications Duct.
4.5.7.2	*Trenchless Installation of Highway Drainage & Service Ducts (Comms Only)*	m	Coverage in accordance with MMHW: Volume 5 - Section 8 - Part 4 - Series 8000 - Trenchless Installation of Highway Drainage & Service Ducts.
4.5.7.3	*Chambers*	No	Coverage in accordance with MMHW: Volume 4 - Series 1500 - Motorway Communications - Paragraph 42 to 46 – Chambers.
4.5.7.4	*Communications Equipment - Cabinets*	No	Coverage in accordance with MMHW: Volume 4 - Series 1500 - Motorway Communications - Paragraph 20 to 27 - Communications Equipment.
4.5.8	TECHNOLOGY (RETROFIT ONLY)	Scheme Km	Coverage in accordance with MMHW: Volume 4 - Series 1500: Motorway Communications and list of documents contained within TSS Plans Registry available at https://www.gov.uk/guidance/traffic-systems-and-signing-plans-registry-how-to-access-documents.
4.5.9	MS CANTILEVER GANTRY	No	Coverage includes all works associated with new MS Cantilever Gantries. MS Cantilever Gantries encompass the MS3 and MS4 structures. This item does not cover Series 1500: Motorway Communications. Coverage in accordance with MMHW: Volume 4 - Series 400 to 2000 as required. Excludes works in item 4.5.9.1.
4.5.9.1	*Cast-in-place Piles (including Piling Plant & Reinforcement for Cast-in-place Piles)*	m	Coverage in accordance with MMHW: Volume 4 - Series 1600 - Piling & Embedded Retaining Walls - Paragraph 1 to 6 - Establishment of Piling Plant – Group II Feature 2 – Bored cast-in-place piles and Feature 3 – Driven cast-in-place piles, Paragraphs 19 to 28 – Cast-in-places Piles / Reinforcement for

			Cast-in-place Piles and Paragraph 40 to 44 - Proof Loading of Piles.
4.5.10	SINGLE SPAN GANTRY	No	Coverage includes all works associated with new Single Span Gantries. Single Span Gantries encompass sign / signal gantries of either cantilever or portal construction which spans one side of the carriageway. This item does not cover Series 1500: Motorway Communications. Coverage in accordance with MMHW: Volume 4 - Series 400 to 2000 as required. Excludes works in item 4.5.10.1.
4.5.10.1	*Cast-in-place Piles (including Piling Plant & Reinforcement for Cast-in-place Piles)*	m	Coverage in accordance with MMHW: Volume 4 - Series 1600 - Piling & Embedded Retaining Walls - Paragraph 1 to 6 - Establishment of Piling Plant – Group II Feature 2 – Bored cast-in-place piles and Feature 3 – Driven cast-in-place piles, Paragraphs 19 to 28 – Cast-in-places Piles / Reinforcement for Cast-in-place Piles and Paragraph 40 to 44 - Proof Loading of Piles.
4.5.11	DUAL SPAN GANTRY	No	Coverage includes all works associated with new Dual Span Gantries. Dual Span Gantries encompass sign / signal gantries which span both sides of the carriageway. This item does not cover Series 1500: Motorway Communications. Coverage in accordance with MMHW: Volume 4 - Series 400 to 2000 as required.
4.5.12	RETAINING WALLS	m	Coverage includes all works associated with new Retaining Walls. Retaining Walls encompass any measure required to retain earth of proposed smart motorway works. Coverage in accordance with MMHW: Volume 4 - Series 300 to 2400 as required. Excludes works in Items 4.5.12.1 to 4.5.12.5.
4.5.12.1	*Ground Anchorages*	m	Coverage in accordance with MMHW: Volume 4 - Series 600 - Earthworks - Paragraph 1 to 13 - Definitions and Paragraph 125 to 136 – Ground Anchorages.
4.5.12.2	*Steel Sheet Piles*	m2	Coverage in accordance with MMHW: Volume 4 - Series 1600 - Piling & Embedded Retaining Walls - Paragraph

			1 to 6 - Piling Plant – Group II Feature 5 – Steel Sheet Piles and Paragraph 45 to 58 - Steel Sheet Piles.
4.5.12.3	*Contiguous Bored Pile Walls*	m2	Coverage in accordance with MMHW: Volume 4 - Series 1600 - Piling & Embedded Retaining Walls - Paragraph 59 to 62 – Embedded Retaining Wall Plant – Group II Feature 4 – Contiguous bored pile walls and Paragraph 71 to 78 - Contiguous Bored Pile Walls / Reinforcement for Embedded Retaining Walls.
4.5.12.4	*Plastic Sheet Piles*	m2	Coverage in accordance with MMHW: Volume 4 - Series 1600 - Piling & Embedded Retaining Walls - Paragraph 1 to 6 - Piling Plant – Group II Feature 5 Steel Sheet Piles and Paragraph 45 to 58 – Steel Sheet Piles. Appropriately amended for Plastic Sheet Piles.
4.5.12.5	*Structural Concrete (including In-Situ Concrete, Surface Finish of Concrete - Formwork, Steel Reinforcement for Structures)*	m3	Coverage in accordance with MMHW: Volume 4 - Series 1700 - Structural Concrete - Paragraph 1 to 5 - In-Situ Concrete, Paragraph 11 to 16 - Surface Finish of Concrete – Formwork and Paragraph 22 to 32 - Steel Reinforcement for Structures / Reinforcement for Reinforced and Anchored Earth Structures.
4.5.13	MISCELLANEOUS STRUCTURES	No	Coverage includes all works associated with new Miscellaneous Structures. Miscellaneous Structures encompasses masts or columns along with associated foundations for Closed Circuit Television System, External Aspect Verification, Remotely Operated Temporary Traffic Management Sign, Side Fire Radar, Entry Stop Signal, Automatic Number Plate Recognition, and any other communication system. Coverage in accordance with MMHW: Volume 4 - Series 300 to 2400 as required. Excludes works in Item 4.5.13.1.
4.5.13.1	*Precast Concrete Piles, Cast-in-place Piles, Steel Bearing Piles (including Piling Plant)*	m	Coverage in accordance with MMHW: Volume 4 - Series 1600 - Piling & Embedded Retaining Walls - Paragraph 1 to 6 - Establishment of Piling Plant excluding Group II Feature 5 – Steel sheet piles and Paragraph 7 to 44 - Precast Concrete Piles / Cast in Places

			Piles / Reinforcement for Cast in place Piles / Steel Bearing Piles / Proof Loading of piles.
4.6	**Essential Improvement Works**		
4.6.1	EXTENDED UNDERBRIDGES	New Deck Area - m2	Coverage includes all works associated with Extended Underbridges. Extended Underbridges encompasses works associated with widening underbridges to accommodate smart motorway solutions. Coverage in accordance with MMHW: Volume 4 - Series 300 to 2500 as required.
4.6.2	FOOTBRIDGE	Deck Area - m2	Coverage includes all works associated with new Footbridges. Footbridges encompasses all works to new structures carrying non-motorised user traffic over both carriageways. Coverage in accordance with MMHW: Volume 4 - Series 300 to 2500 as required.
5.0	**Other Costs**		
5.1	**Lands**	per Scheme Km	Costs associated with Acquisition, Blight and Part 1 Claims incurred in the works.
5.2	**Statutory Undertakers**	per Scheme Km	Costs of moving any affected apparatus, in accordance with the New Roads and Streetworks Act 1991, in providing the associated works.
5.3	**Third Party Costs**	per Scheme Km	Cost associated with the Rail Authority (e.g. Network Rail, HS2, etc.), Environment Agency, Canal & River Trust and Local Authority.
5.4	**NRTS Costs**	per Scheme Km	Costs payable in accordance with the National Road Telecommunication Systems contract for the works.
5.5	**Technology Installation Costs**	per Scheme Km	Costs payable to other Contractors in providing works for the installation, testing and commissioning of the technology equipment / system on the scheme not included in Items 4.5.7 and 5.4.
5.6	**Bulk Purchase Items**	per Scheme Km	Costs payable to other Contractors / Suppliers for the issue of equipment made available to the Contractor by the *Client* in accordance with the stock

			management system.
5.7	**RCC Costs**	per Scheme Km	Costs associated with the upgrade of the Regional Control Centre to accommodate a smart motorway scheme.
5.8	**DNO Connections - Power Supplies**	per Scheme Km	Costs payable to Distribution Network Operators in connection with the provision of new and / or upgraded power connections for a scheme.
5.9	**Safety Camera Partnership**	per Scheme Km	Costs payable to Safety Camera Partnerships for temporary traffic speed enforcement during the construction works.
5.1	**HADECS communications links annual maintenance costs**	per Scheme Km	Costs payable in relation to the installation of the Highways Agency Digital Enforcement Compliance System communication link to Evidence Receiving and Controlling Unit Office.
5.11	**Task Force for MIDAS / Ramp Metering / CCTV / Managed Motorway**	per Scheme Km	Costs payable to others to provide training to Highways England staff for operation and maintenance of MIDAS / Ramp Metering / CCTV / Managed Motorway systems.
5.12	**Site Specific - ANPR / WIM**	per Scheme Km	Costs payable to others for the relocation and installation of existing Automatic Number Plate Recognition System and Way In Motion System on the scheme.
5.13	**Site Data Costs**	per Scheme Km	Costs payable to others to provide a Site Data reload to incorporate a new smart motorway scheme into the Regional / National Communication Network data.
5.14	**Area Mac / TechMac**	per Scheme Km	Costs payable to the Local Area Maintainer Operations Contractor / Technology Managing Agent Contractor, in connection with their people costs, for delivering the scheme.
5.15	**Employer's Management Costs**	per Scheme Km	Costs payable to others to provide Highways England Contract Administration and Conference Centre venues.
5.16	**Post Road Opening (Excluding Aftercare)**	per Scheme Km	Costs payable to the Local Area Maintainer Operations Contractor to provide post road opening planting and

			associated seeding and aftercare.
6.0	Inflation	Index	See Section 3.
7.0	Programme Level Service	% of all of the above	Extra over allowance.

Annex D Defined Solution 1 - All Lane Running

Design principles

This solution for 'All Lane Running' is in accordance with Interim Advice Note 161/15 (Smart Motorways) and revised by Major Projects Instruction 66 (Updated requirements to IAN161/15).

For clarity, the following works are included in the scope of this solution:

- Central reserve and verge drainage works, including repair/rehabilitation of existing Category 4/5 defects only where coincident with incidents of flooding,
- Carriageway resurfacing of Lanes 1 and 4 only, on 4 lane ALR links,
- Environmental screens and barriers (where justified by assessment as essential mitigation of scheme impacts).

In addition to the works defined in the IAN 161/15 and MPI 66 the following works are also included in this solution:

- Carriageway resurfacing as follows;
  - On 3 lane ALR links: resurfacing of all 3 lanes;
  - On 5 lane ALR links: resurfacing of Lanes 1 and 5 only.

Quantification Rules

Reference	Description	Quantification Rules
1.0	PCF Stage 0 to 3	Item 4.4
2.0	PCF Stages 4 to 5	Item 4.4
3.0	PCF Stages 6 & 7 Technical Support	Item 4.4
4.0	PCF Stages 6 & 7 Construction Costs including any Advance Works	
4.1	Construction Fee	Item 4.2
4.2	Construction Total	Item 4.3 and Item 4.4
4.3	Construction Management Stage 6 & 7	Item 4.4
4.4	Construction Works	Item 4.4.1 and Item 4.5
4.4.1	PRELIMINARIES - NON-STAFF	Item 4.5
4.5	Direct Works	The sum total of Items 4.5.1 to 4.6
4.5.1	GENERAL WORKS	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
4.5.1.1	Take up or Down and Set Aside for Re-use or Remove to Store or Tip off Site - kerbs, channels, edgings including CKD units	654.48 metres per Scheme Km measured in accordance with Item 4.5.1.
4.5.1.2	Take up or Down and Set Aside for Re-use or Remove to Store or Tip off Site - linear drainage channels	18.37 metres per Scheme Km measured in accordance with Item 4.5.1.
4.5.1.3	Site Clearance - Partial demolition of gantries	1 number per Scheme Km measured in accordance with Item 4.5.1, rounded to the nearest whole number.
4.5.1.4	Fencing, Gates and Stiles - Environmental barriers	105.03 metres per Scheme Km measured in accordance with Item 4.5.1.

4.5.2	MODIFICATION OF EXISTING STRUCTURES	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
4.5.2.1	Fabrication of Steelwork - Modification of Existing Gantries (Steelwork)	0.0024 tonnes of steelwork per Scheme Km measured in accordance with Item 4.5.2.
4.5.3	MAIN CARRIAGEWAY	The length between the merge nose of the starting junction and the point of the diverge nose of the terminal junction, broken down into sections of different lane numbers. The sum of the product of the individual section lengths and the number of lanes are combined together.
4.5.3.1	Safety barriers (including terminals & connections to existing systems)	Scheme Km measured in accordance with item 4.5.1 multiplied by 1,000 to convert to metres.
4.5.3.2	Pedestrian Parapets & Guardrails - Pedestrian guardrails	5.51 metres per Single Lane Km measured in accordance with Item 4.5.3.
4.5.3.3	Drains & Service Ducts and Filter Drains	Scheme Km measured in accordance with Item 4.5.1, multiplied by 1,000 to convert to metres, multiplied by two (for each carriageway) and multiplied by 50% .
4.5.3.4	Chambers & Gullies - Chambers	Length of Drains & Service Ducts and Filter Drains measured in accordance with Item 4.5.3.3 divided by 90m c/c, rounded to the nearest whole number
4.5.3.5	Imported Fill & Compaction of Fill	221.41 cubic metres per Single Lane Km measured in accordance with Item 4.5.3
4.5.3.6	Excavation & Disposal of Material	322.36 cubic metres per Single Lane Km measured in accordance with Item 4.5.3
4.5.3.7	Sub-base	Scheme Km measured in accordance with Item 4.5.1, multiplied by two (Lane 1 for each carriageway), multiplied by 30%, multiplied by 1,000 to convert to metres, multiplied by 3.65 metres wide and multiplied by 0.250m depth.
4.5.3.8	Pavements - Base course	Scheme Km measured in accordance with Item 4.5.1, multiplied by two (Lane 1 for each carriageway), multiplied by 30%, multiplied by 1,000 to convert to metres, multiplied by 3.65 metres wide and multiplied by 0.250m depth.
4.5.3.9	Pavements - Binder course	Scheme Km measured in accordance with Item 4.5.1, multiplied by two (Lane 1 for each carriageway), multiplied by 50%, multiplied by 1,000 to convert to metres, multiplied by 3.65 metres wide and multiplied by 0.060m depth.
4.5.3.10	Pavements - Surface course	Scheme Km measured in accordance with Item 4.5.1, multiplied by four (Lane 1 / 4 for each carriageway), multiplied by 1,000 to convert to metres, multiplied by 3.65m wide and multiplied by 0.050m depth.
4.5.3.11	Kerbs, Channels, Edgings, Combined Drainage and Kerb Blocks & Linear Drainage Channel Systems - Combined drainage and kerb units	Scheme Km measured in accordance with Item 4.5.1, multiplied by 1,000 to convert to metres, multiplied by two (for each carriageway) and multiplied by 30%.
4.5.3.12	Kerbs, Channels, Edgings, Combined Drainage and Kerb Blocks & Linear Drainage Channel Systems - Linear drainage channels	Scheme Km measured in accordance with Item 4.5.1, multiplied by 1,000 to convert to metres, multiplied by two (for each carriageway) and multiplied by 50%.
4.5.3.13	Lighting columns (including ductwork and cabling)	0.21 number per Single Lane Km measured in accordance with Item 4.5.3, rounded to the nearest whole number.
4.5.4	CENTRAL RESERVE	Distance between the point of merge nose of the starting junction and the point of the diverge nose of the terminal junction. Minus the length of existing RCB.
4.5.4.1	Safety barriers (including terminals & connections to existing systems)	Central Reserve Length measured in accordance with Item 4.5.4 multiplied by 1,000 metres
4.5.4.2	Drains & Service Ducts and Filter Drains (including Chambers and Connections)	Central Reserve Length measured in accordance with Item 4.5.4, multiplied by 1,000 to convert to metres, multiplied by two (for each carriageway) and multiplied by 20%.
4.5.4.3	Disposal of Material	2,084.10 cubic metres per Km of Central Reserve Length measured in accordance with Item 4.5.4.
4.5.4.4	Sub-base	Central Reserve Length measured in accordance with Item 4.5.4, multiplied by 1,000 to convert to metres, multiplied by 3.4 metres wide and multiplied by 250mm depth. Plus Central Reserve Length measured in accordance with Item

		4.5.4, multiplied by 1,000 to convert to metres, multiplied by 1.25 metres wide and multiplied by 250mm depth.
4.5.4.5	Pavements / Regulating Course - Base and Binder course	Central Reserve Length measured in accordance with Item 4.5.4, multiplied by 1,000 to convert to metres, multiplied by 3.4 metres wide and multiplied by 310mm depth. Plus Central Reserve Length measured in accordance with Item 4.5.4, multiplied by 1,000 to convert to metres, multiplied by 1.25 metres wide and multiplied by 310mm depth.
4.5.4.6	Pavements - Surface course	Central Reserve Length measured in accordance with Item 4.5.4, multiplied by 1,000 to convert to metres, multiplied by 2.4 metres (1.2m setback for each side of the carriageway) and multiplied by 50mm depth.
4.5.4.7	Kerbs, Channels, Edgings, Combined Drainage and Kerb Blocks & Linear Drainage Channel Systems - Channels	Central Reserve Length measured in accordance with Item 4.5.4, multiplied by 1,000 to convert to metres, multiplied by two (for each carriageway) and multiplied by 20%.
4.5.5	EMERGENCY AREA	Link length (*) multiplied by two (for each carriageway), divided by 1.6km spacing, and rounded to the nearest whole number.
4.5.6	JUNCTIONS	Number of Junctions between the point of merge nose of the starting junction and the point of the diverge nose of the terminal junction.
4.5.7	TECHNOLOGY	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
4.5.7.1	Trench for Communications Cable or Duct - Trench for duct	Scheme Km measured in accordance with Item 4.5.7, multiplied by 1,000 to convert to metres and multiplied by two (for each carriageway).
4.5.7.2	Trench for Communications Cable or Duct - Trenchless for duct	Scheme Km measured in accordance with Item 4.5.7, broken down into Link Lengths (*) (defined as distance between the merge nose of the first junction and the diverge nose of the next junction). Each link length (*) is divided by 0.5km, rounded to the nearest whole number and multiplied by 30.9 metres (length of CCD). In addition 7.15 metres of CCD should be assumed for every slip road.
4.5.7.3	Chambers	Scheme Km measured in accordance with Item 4.5.7, multiplied by two (dual carriageway), multiplying by two again (2no. chambers per km per carriageway), rounded to the nearest whole number. Plus number of MS Cantilever Gantries measured in accordance with Item 4.5.9. Plus number of Single Span & Dual Span Gantries measured in accordance with Items 4.5.10 and 4.5.11 multiplied by two. Plus two new chambers for every new cross carriageway duct as measured in accordance with Item 4.5.7.2
4.5.7.4	Communications Equipment - Cabinets (single)	Scheme km measured in accordance with Item 4.5.7, divided by 5km, multiplied by 6 and rounded to the nearest whole number. Plus number of MS Cantilever Gantries measured in accordance with Item 4.5.9. Plus Number of Single Span & Dual Span Gantries measured in accordance with Items 4.5.10 and 4.5.11 multiplied by two.
4.5.8	TECHNOLOGY (RETROFIT ONLY)	N/A
4.5.9	MS CANTILEVER GANTRY	Scheme Km measured in accordance with Item 4.5.7, multiplied by two, divided by 0.85km and rounded to the nearest whole number. Plus one MS Cantilever Gantry per Junction measured in accordance with Item 4.5.6 plus a further two MS Cantilever Gantries .
4.5.9.1	Cast-in-place Piles (including Piling Plant & Reinforcement for Cast-in-place Piles)	36.42 metres per MS Cantilever Gantry measured in accordance with Item 4.5.9.
4.5.10	SINGLE SPAN GANTRY	Total number of spans multiplied by 70% rounded to the nearest whole number. The total number of spans is calculated by taking the scheme km measured in accordance with Item 4.5.7 broken down into Link Lengths (*). The Link Length (*) is divided by 6km and multiplied by two, i.e. two spans are required for every 6km.
4.5.10.1	Cast-in-place Piles (including Piling Plant & Reinforcement for Cast-in-	79.23 metres per Single Span Gantry measured in accordance with Item 4.5.10.

	place Piles)	
4.5.11	DUAL SPAN GANTRY	Total number of spans multiplied by 30%, divided by two, rounded to the nearest whole number. The total number of spans is calculated by taking the scheme km measured in accordance with Item 4.5.7 broken down into Link Lengths (*). The Link Length (*) is divided by 6km and multiplied by two, i.e. two spans are required for every 6km.
4.5.12	RETAINING WALLS	259.54 metres per Scheme Km measured in accordance with Item 4.5.8.
4.5.12.1	Ground Anchorages	0.19 metres per metre of Retaining Wall measured in accordance with Item 4.5.12.
4.5.12.2	Steel Sheet Piles	4.48 square metres per metre of Retaining Wall measured in accordance with Item 4.5.12.
4.5.12.3	Contiguous Bored Pile Walls	0.17 square metres per metre of Retaining Wall measured in accordance with Item 4.5.12.
4.5.12.4	Plastic Sheet Piles	0.01 square metres per metre of Retaining Wall measured in accordance with Item 4.5.12.
4.5.12.5	Structural Concrete (including In-Situ Concrete, Surface Finish of Concrete - Formwork, Steel Reinforcement for Structures)	0.11 cubic metres per metre of Retaining Wall measured in accordance with Item 4.5.12.
4.5.13	MISCELLANEOUS STRUCTURES	5.18 number per Scheme Km measured in accordance with Item 4.5.7, rounded to the nearest whole number.
4.5.13.1	Precast Concrete Piles, Cast-in-place Piles, Steel Bearing Piles (including Piling Plant)	1.86 metres per Miscellaneous Structure measured in accordance with Item 4.5.13.
4.6	Essential Improvement Works	Item 4.6.1 and 4.6.2
4.6.1	EXTENDED UNDERBRIDGES	Square area of the proposed bridge deck minus the square area of the existing bridge deck (existing area to be provided by SMIS). The deck area is defined as the length between the movement joints multiplied by the length between the outside of the parapet edge beam.
4.6.2	FOOTBRIDGE	Length between the movement joints multiplied by the length between the outside of the parapet edge beam.
5.0	**Other Costs**	
5.1	Lands	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.2	Statutory Undertakers	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.3	Third Party Costs	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.4	NRTS Costs	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.5	Technology Installation Costs	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.6	Bulk Purchase Items	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.7	RCC Costs	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.8	DNO Connections - Power Supplies	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.9	Safety Camera Partnership	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge

		and the diverge nose.
5.10	HADECS communications links annual maintenance costs	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.11	Task Force for MIDAS / Ramp Metering / CCTV / Managed Motorway	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.12	Site Specific - ANPR / WIM	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.13	Site Data Costs	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.14	Area Mac / TechMac	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.15	Employer's Management Costs	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.16	Post Road Opening (Excluding Aftercare)	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.

(*) Link Length defined as the carriageways between two adjacent junctions. The initial link is the length between the merge nose of the first junction and the mid-point of the adjacent junction. Whilst the final link is the length between the mid-point of the adjacent junction and the diverge nose of the terminal junction. For example, if there were 3 junctions on the scheme (A, B, C), the first link would be the length between the merge nose of junction A and the mid-point of junction B, whilst the second link would be the length between the mid-point of junction B and the diverge nose of junction C.

Annex E Defined Solution 2 –

Controlled Motorway Design principles

This solution for 'Controlled Motorway' is in accordance with Interim Advice Note 161/15 (Smart Motorways) and revised by Major Projects Instruction 66 (Updated requirements to IAN161/15).

For clarity, the following works are included in the scope of this solution;

- Replacement of longitudinal and local communication ducting along the scheme not acceptable to NRTS,
- Replacement or relocation of existing MS4, Entry Stop Signals and MS3 signals where necessary and
- Environmental screens and barriers (where justified by assessment).

Quantification Rules

Reference	Description	Quantification Rules
1.0	PCF Stage 0 to 3	Item 4.4
2.0	PCF Stages 4 to 5	Item 4.4
3.0	PCF Stages 6 & 7 Technical Support	Item 4.4
4.0	PCF Stages 6 & 7 Construction Costs including any Advance Works	
4.1	Construction Fee	Item 4.2
4.2	Construction Total	Item 4.3 and Item 4.4
4.3	Construction Management Stage 6 & 7	Item 4.4
4.4	Construction Works	Item 4.4.1 and Item 4.5
4.4.1	PRELIMINARIES - NON-STAFF	Item 4.5
4.5	Direct Works	The sum total of Items 4.5.1 to 4.6
4.5.1	GENERAL WORKS	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
4.5.1.1	Take up or Down and Set Aside for Re-use or Remove to Store or Tip off Site - kerbs, channels, edgings including CKD units	N/A
4.5.1.2	Take up or Down and Set Aside for Re-use or Remove to Store or Tip off Site - linear drainage channels	N/A
4.5.1.3	Site Clearance - Partial demolition of gantries	1 number per Scheme Km measured in accordance with Item 4.5.1.
4.5.1.4	Fencing, Gates and Stiles - Environmental barriers	N/A
4.5.2	MODIFICATION OF EXISTING STRUCTURES	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
4.5.2.1	Fabrication of Steelwork - Modification of Existing Gantries (Steelwork)	0.0024 tonnes of steelwork per Scheme Km measured in accordance with Item 4.5.2.

4.5.3	MAIN CARRIAGEWAY	The length between the merge nose of the starting junction and the point of the diverge nose of the terminal junction, broken down into sections of different lane numbers. The sum of the product of the individual section lengths and the number of lanes are combined together.
4.5.3.1	Safety barriers (including terminals & connections to existing systems)	N/A
4.5.3.2	Pedestrian Parapets & Guardrails - Pedestrian guardrails	N/A
4.5.3.3	Drains & Service Ducts and Filter Drains	N/A
4.5.3.4	Chambers & Gullies - Chambers	N/A
4.5.3.5	Imported Fill & Compaction of Fill	N/A
4.5.3.6	Excavation & Disposal of Material	N/A
4.5.3.7	Sub-base	N/A
4.5.3.8	Pavements - Base course	N/A
4.5.3.9	Pavements - Binder course	N/A
4.5.3.10	Pavements - Surface course	Scheme Km measured in accordance with Item 4.5.1, multiplied by four (Lane 1 / 4 for each carriageway), multiplied by 1,000 to convert to metres, multiplied by 3.65m wide and multiplied by 0.050m depth.
4.5.3.11	Kerbs, Channels, Edgings, Combined Drainage and Kerb Blocks & Linear Drainage Channel Systems - Combined drainage and kerb units	N/A
4.5.3.12	Kerbs, Channels, Edgings, Combined Drainage and Kerb Blocks & Linear Drainage Channel Systems - Linear drainage channels	N/A
4.5.3.13	Lighting columns (including ductwork and cabling)	0.21 number per Single Lane Km measured in accordance with Item 4.5.3, rounded to the nearest whole number.
4.5.4	CENTRAL RESERVE	Distance between the point of merge nose of the starting junction and the point of the diverge nose of the terminal junction. Minus the length of existing RCB.
4.5.4.1	Safety barriers (including terminals & connections to existing systems)	Central Reserve Length measured in accordance with Item 4.5.4 multiplied by 1,000 metres
4.5.4.2	Drains & Service Ducts and Filter Drains (including Chambers and Connections)	N/A
4.5.4.3	Disposal of Material	420 cubic metres per Km of Central Reserve Length measured in accordance with Item 4.5.4.
4.5.4.4	Sub-base	Central Reserve Length measured in accordance with Item 4.5.4, multiplied by 1,000 to convert to metres, multiplied by 1.4 metres wide and multiplied by 200mm depth.
4.5.4.5	Pavements / Regulating Course - Base and Binder course	Central Reserve Length measured in accordance with Item 4.5.4, multiplied by 1,000 to convert to metres, multiplied by 1.4 metres wide and multiplied by 100mm depth.
4.5.4.6	Pavements - Surface course	N/A
4.5.4.7	Kerbs, Channels, Edgings, Combined Drainage and Kerb Blocks & Linear Drainage Channel Systems - Channels	N/A
4.5.5	EMERGENCY AREA	N/A
4.5.6	JUNCTIONS	Number of Junctions between the point of merge nose of the starting junction and the point of the diverge nose of the terminal junction.

4.5.7	TECHNOLOGY	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
4.5.7.1	Trench for Communications Cable or Duct - Trench for duct	Scheme Km measured in accordance with Item 4.5.7, multiplied by 1,000 to convert to metres and multiplied by two (for each carriageway).
4.5.7.2	Trench for Communications Cable or Duct - Trenchless for duct	Scheme Km measured in accordance with Item 4.5.7, broken down into Link Lengths (*). Each link length (*) is divided by 0.5km, rounded to the nearest whole number and multiplied by 30.9 metres (length of CCD). In addition 7.15 metres of CCD should be assumed for every slip road.
4.5.7.3	Chambers	Scheme Km measured in accordance with Item 4.5.7, multiplied by two (dual carriageway), multiplying by two again (2no. chambers per km per carriageway), rounded to the nearest whole number. Plus number of MS Cantilever Gantries measured in accordance with Item 4.5.9. Plus number of Single Span & Dual Span Gantries measured in accordance with Items 4.5.10 and 4.5.11 multiplied by two. Plus two new chambers for every new cross carriageway duct as measured in accordance with Item 4.5.7.2
4.5.7.4	Communications Equipment - Cabinets (single)	Scheme km measured in accordance with Item 4.5.7, divided by 5km, multiplied by 6 and rounded to the nearest whole number. Plus number of MS Cantilever Gantries measured in accordance with Item 4.5.9. Plus Number of Single Span & Dual Span Gantries measured in accordance with Items 4.5.10 and 4.5.11 multiplied by two.
4.5.8	TECHNOLOGY (RETROFIT ONLY)	N/A
4.5.9	MS CANTILEVER GANTRY	Scheme Km measured in accordance with Item 4.5.7, multiplied by two, divided by 0.85km and rounded to the nearest whole number. Plus one MS Cantilever Gantry per Junction measured in accordance with Item 4.5.6 plus a further two MS Cantilever Gantries .
4.5.9.1	Cast-in-place Piles (including Piling Plant & Reinforcement for Cast-in-place Piles)	36.42 metres per MS Cantilever Gantry measured in accordance with Item 4.5.9.
4.5.10	SINGLE SPAN GANTRY	Total number of spans multiplied by 70% rounded to the nearest whole number. The total number of spans is calculated by taking the scheme km measured in accordance with Item 4.5.7 broken down into Link Lengths (*). The Link Length (*) is divided by 6km and multiplied by two, i.e. two spans are required for every 6km.
4.5.10.1	Cast-in-place Piles (including Piling Plant & Reinforcement for Cast-in-place Piles)	79.23 metres per Single Span Gantry measured in accordance with Item 4.5.10.
4.5.11	DUAL SPAN GANTRY	Total number of spans multiplied by 30%, divided by two, rounded to the nearest whole number. The total number of spans is calculated by taking the scheme km measured in accordance with Item 4.5.7 broken down into Link Lengths (*). The Link Length (*) is divided by 6km and multiplied by two, i.e. two spans are required for every 6km.
4.5.12	RETAINING WALLS	259.54 metres per Scheme Km measured in accordance with Item 4.5.8.
4.5.12.1	Ground Anchorages	0.19 metres per metre of Retaining Wall measured in accordance with Item 4.5.12.
4.5.12.2	Steel Sheet Piles	4.48 square metres per metre of Retaining Wall measured in accordance with Item 4.5.12.
4.5.12.3	Contiguous Bored Pile Walls	0.17 square metres per metre of Retaining Wall measured in accordance with Item 4.5.12.
4.5.12.4	Plastic Sheet Piles	0.01 square metres per metre of Retaining Wall measured in accordance with Item 4.5.12.

4.5.12.5	Structural Concrete (including In-Situ Concrete, Surface Finish of Concrete - Formwork, Steel Reinforcement for Structures)	0.11 cubic metres per metre of Retaining Wall measured in accordance with Item 4.5.12.
4.5.13	MISCELLANEOUS STRUCTURES	5.18 number per Scheme Km measured in accordance with Item 4.5.7, rounded to the nearest whole number.
4.5.13.1	Precast Concrete Piles, Cast-in-place Piles, Steel Bearing Piles (including Piling Plant)	1.86 metres per Miscellaneous Structure measured in accordance with Item 4.5.13.
4.6	Essential Improvement Works	Item 4.6.1 and 4.6.2
4.6.1	EXTENDED UNDERBRIDGES	N/A
4.6.2	FOOTBRIDGE	N/A
5.0	**Other Costs**	
5.1	Lands	N/A
5.2	Statutory Undertakers	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.3	Third Party Costs	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.4	NRTS Costs	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.5	Technology Installation Costs	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.6	Bulk Purchase Items	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.7	RCC Costs	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.8	DNO Connections - Power Supplies	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.9	Safety Camera Partnership	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.10	HADECS communications links annual maintenance costs	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.11	Task Force for MIDAS / Ramp Metering / CCTV / Managed Motorway	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.12	Site Specific - ANPR / WIM	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.13	Site Data Costs	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.14	Area Mac / TechMac	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.15	Employer's Management Costs	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.16	Post Road Opening (Excluding Aftercare)	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the

		diverge nose.

(*) Link Length defined as the carriageways between two adjacent junctions. The initial link is the length between the merge nose of the first junction and the mid-point of the adjacent junction. Whilst the final link is the length between the mid-point of the adjacent junction and the diverge nose of the terminal junction. For example, if there were 3 junctions on the scheme (A, B, C), the first link would be the length between the merge nose of junction A and the mid-point of junction B, whilst the second link would be the length between the mid-point of junction B and the diverge nose of junction C.

Annex F Defined Solution 3 – Retrofit

Design principles

This solution comprises of the conversion of Dynamic Hard Shoulder Running, covered in IAN 111/09 and IAN 112/08, to All Lane Running in accordance with Interim Advice Note 161/15 (Smart Motorways) and revised by Major Projects Instruction 66 (Updated requirements to IAN161/15).

For clarity, the following works are included in the scope of this solution;

- Provision of a new Rigid Concrete Barrier (RCB) where not already provided,
- Central reserve strip hardening to accept RCB,
- Drainage chamber covers in Lane 1 relocated to verge or strengthened,
- New road markings,
- Modifications to post-mounted and overhead signing, with redundant signage removed,
- New or replacement Vehicle Restraint System (VRS) in the verges (where coincident with new roadside infrastructure),
- New retaining structures to accommodate verge infrastructure within land take,
- Modification to Pan-Tilt-Zoom (PTZ) CCTV cameras, in order to provide 100% coverage of the carriageway and
- Stopped Vehicle Detection (SVD).

Quantification Rules

Reference	Description	Quantification Rules
1.0	PCF Stage 0 to 3	Item 4.4
2.0	PCF Stages 4 to 5	Item 4.4
3.0	PCF Stages 6 & 7 Technical Support	Item 4.4
4.0	PCF Stages 6 & 7 Construction Costs including any Advance Works	
4.1	Construction Fee	Item 4.2
4.2	Construction Total	Item 4.3 and Item 4.4
4.3	Construction Management Stage 6 & 7	Item 4.4
4.4	Construction Works	Item 4.4.1 and Item 4.5
4.4.1	PRELIMINARIES - NON-STAFF	Item 4.5
4.5	Direct Works	The sum total of Items 4.5.1 to 4.6
4.5.1	GENERAL WORKS	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
4.5.1.1	Take up or Down and Set Aside for Re-use or Remove to Store or Tip off Site - kerbs, channels, edgings including CKD units	N/A
4.5.1.2	Take up or Down and Set Aside for Re-use or Remove to Store or Tip off Site - linear drainage channels	N/A
4.5.1.3	Site Clearance - Partial demolition of gantries	N/A

4.5.1.4	Fencing, Gates and Stiles - Environmental barriers	N/A
4.5.2	MODIFICATION OF EXISTING STRUCTURES	N/A
4.5.2.1	Fabrication of Steelwork - Modification of Existing Gantries (Steelwork)	N/A
4.5.3	MAIN CARRIAGEWAY	The length between the merge nose of the starting junction and the point of the diverge nose of the terminal junction, broken down into sections of different lane numbers. The sum of the product of the individual section lengths and the number of lanes are combined together.
4.5.3.1	Safety barriers (including terminals & connections to existing systems)	N/A
4.5.3.2	Pedestrian Parapets & Guardrails - Pedestrian guardrails	N/A
4.5.3.3	Drains & Service Ducts and Filter Drains	N/A
4.5.3.4	Chambers & Gullies - Chambers	Scheme km measured in accordance with Item 4.5.1, rounded to the nearest whole number
4.5.3.5	Imported Fill & Compaction of Fill	N/A
4.5.3.6	Excavation & Disposal of Material	N/A
4.5.3.7	Sub-base	N/A
4.5.3.8	Pavements - Base course	N/A
4.5.3.9	Pavements - Binder course	N/A
4.5.3.10	Pavements - Surface course	N/A
4.5.3.11	Kerbs, Channels, Edgings, Combined Drainage and Kerb Blocks & Linear Drainage Channel Systems - Combined drainage and kerb units	N/A
4.5.3.12	Kerbs, Channels, Edgings, Combined Drainage and Kerb Blocks & Linear Drainage Channel Systems - Linear drainage channels	N/A
4.5.3.13	Lighting columns (including ductwork and cabling)	N/A
4.5.4	CENTRAL RESERVE	Distance between the point of merge nose of the starting junction and the point of the diverge nose of the terminal junction. Minus the length of existing RCB.
4.5.4.1	Safety barriers (including terminals & connections to existing systems)	Central Reserve Length measured in accordance with Item 4.5.4 multiplied by 1,000 metres
4.5.4.2	Drains & Service Ducts and Filter Drains (including Chambers and Connections)	N/A
4.5.4.3	Disposal of Material	420 cubic metres per Km of Central Reserve Length measured in accordance with Item 4.5.4.
4.5.4.4	Sub-base	Central Reserve Length measured in accordance with Item 4.5.4, multiplied by 1,000 to convert to metres, multiplied by 1.4 metres wide and multiplied by 200mm depth.
4.5.4.5	Pavements / Regulating Course - Base and Binder course	Central Reserve Length measured in accordance with Item 4.5.4, multiplied by 1,000 to convert to metres, multiplied by 1.4 metres wide and multiplied by 100mm depth.
4.5.4.6	Pavements - Surface course	N/A
4.5.4.7	Kerbs, Channels, Edgings, Combined Drainage and Kerb Blocks & Linear Drainage Channel Systems - Channels	N/A
4.5.5	EMERGENCY AREA	N/A
4.5.6	JUNCTIONS	N/A

4.5.7	TECHNOLOGY	N/A
4.5.7.1	Trench for Communications Cable or Duct - Trench for duct	N/A
4.5.7.2	Trench for Communications Cable or Duct - Trenchless for duct	N/A
4.5.7.3	Chambers	N/A
4.5.7.4	Communications Equipment - Cabinets (single)	N/A
4.5.8	TECHNOLOGY (RETROFIT ONLY)	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
4.5.9	MS CANTILEVER GANTRY	N/A
4.5.9.1	Cast-in-place Piles (including Piling Plant & Reinforcement for Cast-in-place Piles)	N/A
4.5.10	SINGLE SPAN GANTRY	N/A
4.5.10.1	Cast-in-place Piles (including Piling Plant & Reinforcement for Cast-in-place Piles)	N/A
4.5.11	DUAL SPAN GANTRY	N/A
4.5.12	RETAINING WALLS	Scheme Km measured in accordance with Item 4.5.8, multiplied by 2, divided by 0.5km rounded to the nearest whole number and multiplied by 10 metres.
4.5.12.1	Ground Anchorages	0.19 metres per metre of Retaining Wall measured in accordance with Item 4.5.12.
4.5.12.2	Steel Sheet Piles	4.48 square metres per metre of Retaining Wall measured in accordance with Item 4.5.12.
4.5.12.3	Contiguous Bored Pile Walls	0.17 square metres per metre of Retaining Wall measured in accordance with Item 4.5.12.
4.5.12.4	Plastic Sheet Piles	0.01 square metres per metre of Retaining Wall measured in accordance with Item 4.5.12.
4.5.12.5	Structural Concrete (including In-Situ Concrete, Surface Finish of Concrete - Formwork, Steel Reinforcement for Structures)	0.11 cubic metres per metre of Retaining Wall measured in accordance with Item 4.5.12.
4.5.13	MISCELLANEOUS STRUCTURES	N/A
4.5.13.1	Precast Concrete Piles, Cast-in-place Piles, Steel Bearing Piles (including Piling Plant)	N/A
4.6	Essential Improvement Works	Item 4.6.1 and 4.6.2
4.6.1	EXTENDED UNDERBRIDGES	N/A
4.6.2	FOOTBRIDGE	N/A
5.0	**Other Costs**	
5.1	Lands	N/A
5.2	Statutory Undertakers	N/A
5.3	Third Party Costs	N/A
5.4	NRTS Costs	N/A
5.5	Technology Installation Costs	N/A
5.6	Bulk Purchase Items	N/A
5.7	RCC Costs	N/A
5.8	DNO Connections - Power Supplies	N/A

5.9	Safety Camera Partnership	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.10	HADECS communications links annual maintenance costs	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.11	Task Force for MIDAS / Ramp Metering / CCTV / Managed Motorway	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.12	Site Specific - ANPR / WIM	N/A
5.13	Site Data Costs	N/A
5.14	Area Mac / TechMac	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.15	Employer's Management Costs	Distance between the merge nose of the starting junction and the diverge nose of the terminal junction. Includes the length of the merge and the diverge nose.
5.16	Post Road Opening (Excluding Aftercare)	N/A