Series1500 Update: Traffic Control and Communications

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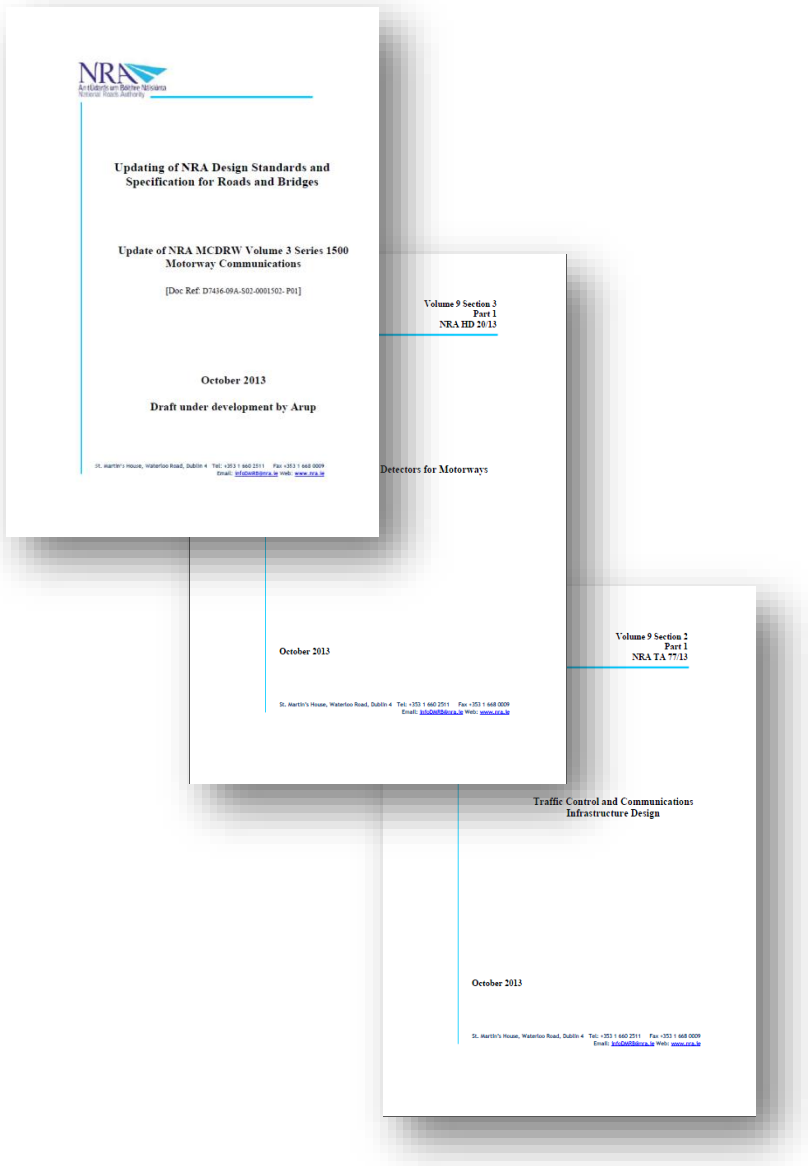
Background

Phase 1:

- Updates to 1500 series documents
- New RCD details
- New TA 77
- New HD 20

Phase 2:

- Updates to 1500 series documents
- New RCD Details
- Updates to TA 77
- New TD 302



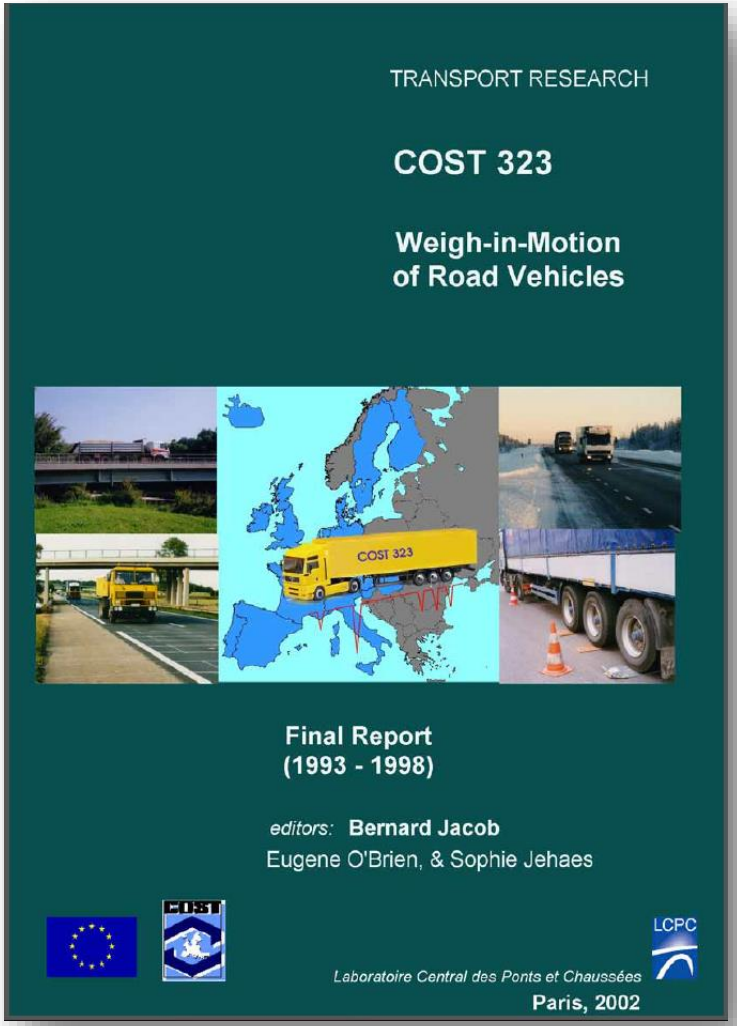
Phase 2

Focus of Phase 2 of the DMRB Update on:

- Weigh-in-Motion
- Poles for Lightweight Equipment
- Gantry Structures for ITS Equipment
- Electrical Power for ITS Equipment
- Traffic Control and Communications Systems Change Management

Weigh-in-Motion

- Included in ‘NRA TA 77 Traffic Control and Communications Infrastructure Design’
- Cost 323 European WIM Specification
- Criteria for Choice of Sites



Poles for Lightweight Equipment

- Updates to 1500 series
- Lightweight ITS equipment includes detection equipment, cameras, solar panels for ITS equipment and motorway entry signals.

Equipment Type	Design Criteria	Material Type			
		Steel#	Aluminium*	Other Materials**	
Detection Equipment	Pole Height:	CHS 168X4	CHS 200X4	Stiffness for bending, EI:	1429 kNm^2
	H: 6.1m			Stiffness for torsion, GIu:	440 kNm^2
	H1: 5.3m			Bending moment, Mu:	5 kNm
	H2: 0.8m			Moment for torsion, Tu:	0.5 kNm
				Shear capacity, V:	1 kN
	Pole Height:	CHS 219X4.5	CHS 250X4	Stiffness for bending, EI:	2069 kNm^2
	H: 8.0m			Stiffness for torsion, GIu:	637 kNm^2
	H1: 7.0m			Bending moment, Mu:	11 kNm
	H2: 1.0m			Moment for torsion, Tu:	0.5 kNm
				Shear capacity, V:	2 kN
Motorway Sign***	Sign face Area:	2 CHS 114X4	2 CHS 165X3.3	Stiffness for bending, EI:	433 kNm^2
	A: 1.8 m^2			Stiffness for torsion, GIu:	134 kNm^2
				Bending moment, Mu:	5 kNm
	Planting Depth:			Moment for torsion, Tu:	0 kNm
	H2: 0.7m			Shear capacity, V:	2 kN
	Sign face Area:	2 CHS 114X6	2 CHS 200X3.3	Stiffness for bending, EI:	615 kNm^2
	A: 2.7 m^2			Stiffness for torsion, GIu:	190 kNm^2
				Bending moment, Mu:	7 kNm
	Planting Depth:			Moment for torsion, Tu:	0 kNm
	H2: 0.8m			Shear capacity, V:	3 kN
	Sign face Area	2 CHS 140X5	2 CHS 226X4	Stiffness for bending, EI:	987 kNm^2
	A: 3.6 m^2			Stiffness for torsion, GIu:	304 kNm^2
				Bending moment, Mu:	11 kNm
	Planting Depth:			Moment for torsion, Tu:	0 kNm
	H2: 0.9m			Shear capacity, V:	4 kN

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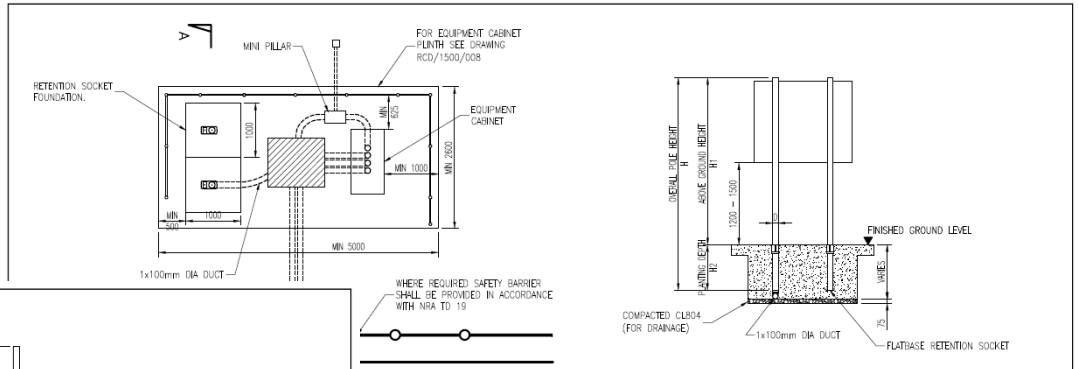
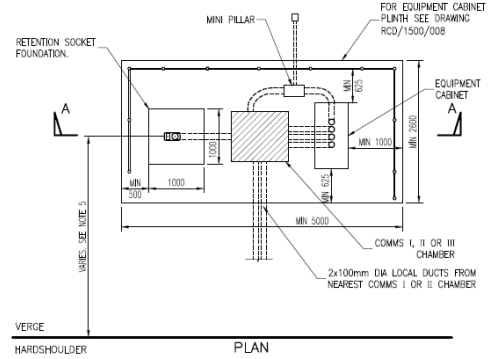
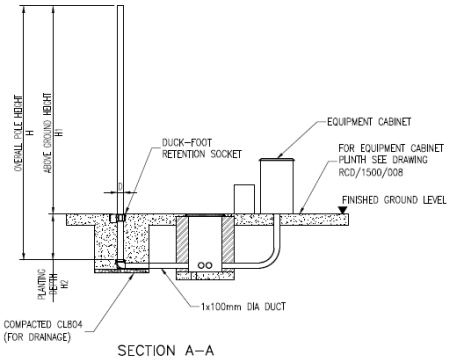
Poles for Lightweight Equipment

New RCD Drawings







NOTES:

1. THE LAYOUTS SHOWN IS TYPICAL ONLY. REFER TO DRAWING RCD/1500/008 FOR DETAILS OF THE STANDARD EQUIPMENT CABINET PLINTH.
2. THE RETENTION SOCKET FOUNDATION SHALL BE INCORPORATED AND CAST IN THE EQUIPMENT CABINET PLINTH. CONCRETE RETENTION SOCKET FOUNDATION INSTALLATION DETAILS:
   - CONCRETE SHALL COMPLY WITH I.S. EN 206–1
   - MINIMUM CONCRETE STRENGTH CLASS: C30/37
   - MINIMUM SLUMP CLASS: S2
   - MAXIMUM WATER/CEMENT RATIO: 0.50
   - MINIMUM CEMENT CONTENT: 320 KG/M3
   - CEMENT TYPE: SULPHATE–RESISTING CEMENT
   - MAXIMUM AGGRESSIVE CHEMICAL ENVIRONMENT: XA2. FOR INSTALLATIONS IN A MORE CHEMICAL AGGRESSIVE ENVIRONMENT, REFER TO I.S.EN 206–1:2002 FOR ADDITIONAL REQUIREMENTS.
3. THE PLANT DEPTH SHALL BE DETERMINED BY THE EQUIPMENT TYPE AND MOUNTING HEIGHT AS PER TABLE 15/1 IN SERIES 1500.
4. THE MAXIMUM OFFSET BETWEEN THE POLE AND THE EDGE OF CARRIAGEWAY SHALL BE DETERMINED BY REQUIREMENTS OF THE EQUIPMENT AS PER THE MANUFACTURER'S RECOMMENDATIONS. POLES NOT LOCATED BEHIND SAFETY BARRIER SHALL BE PASSIVELY SAFETY AS PER I.S EN 12767.
5. POLES WITH POWER AND/OR COMMUNICATIONS CABLES SHALL HAVE ACCESS DOORS AND SHALL BE CONNECTED TO THE EQUIPMENT CABINET WITH 1 NO 100mm DIA DUCT VIA A RETENTION SOCKET WITH A DUCT–FOOT BASE.
6. PASSIVELY SAFE POLES WITH POWER AND/OR COMMUNICATIONS CABLES SHALL BE FITTED WITH A SUITABLE ELECTRICAL DISCONNECT SYSTEM AS PER NA.8 OF THE NATIONAL ANNEX TO I.S. EN 12767.

NOT TO SCALE

Project Document Reference: D7436–09A–S04–1500005–D01

NRA NATIONAL ROADS AUTHORITY	ROAD CONSTRUCTION DETAILS	INSTALLATION DRAWING TCC	Issue: P1	Date: 06/14	SINGLE POLE INSTALLATION TYPICAL PLINTH LAYOUT AND LOCAL DUCTS	Drawing No. RCD/1500/069

1500/008 FOR DETAILS OF THE

CAST IN THE EQUIPMENT CABINET

DETAILS:

LLATIONS IN A MORE CHEMICAL

DDITIONAL REQUIREMENTS.

L BE CAST AS A SINGLE FOUNDATION

m.

3. THE PLANT DEPTH SHALL BE DETERMINED BY THE EQUIPMENT TYPE AND MOUNTING HEIGHT AS PER TABLE 15/1 IN SERIES 1500.
4. POLES CARRYING POWER AND/OR COMMUNICATIONS CABLES SHALL HAVE ACCESS DOORS AND SHALL BE CONNECTED TO THE EQUIPMENT CABINET WITH 1 NO 100mm DIA DUCT VIA A RETENTION SOCKET WITH A DUCT–FOOT BASE. ALL OTHER ADDITIONAL POLES SHALL BE INSTALLED IN FLAT BASE RETENTION SOCKETS.
5. MOTORWAY SIGNS SHALL BE INSTALLED ON MULTIPLE POLES AND SHALL BE ACCOMPANIED BY SAFETY BARRIER. SAFETY BARRIER SHALL BE PROVIDED IN ACCORDANCE WITH NRA TD 19.
6. PASSIVELY SAFE POLES WITH POWER AND/OR COMMUNICATIONS CABLES SHALL BE FITTED WITH A SUITABLE ELECTRICAL DISCONNECT SYSTEM AS PER NA.8 OF THE NATIONAL ANNEX TO I.S. EN 12767.

Project Document Reference: D7436–09B–S04–1500007–D01

TRUCTION LS	INSTALLATION DRAWING TCC	Issue: P1	Date: 06/14	MULTIPLE POLE INSTALLATION TYPICAL PLINTH LAYOUT AND LOCAL DUCTS	Drawing No. RCD/1500/070

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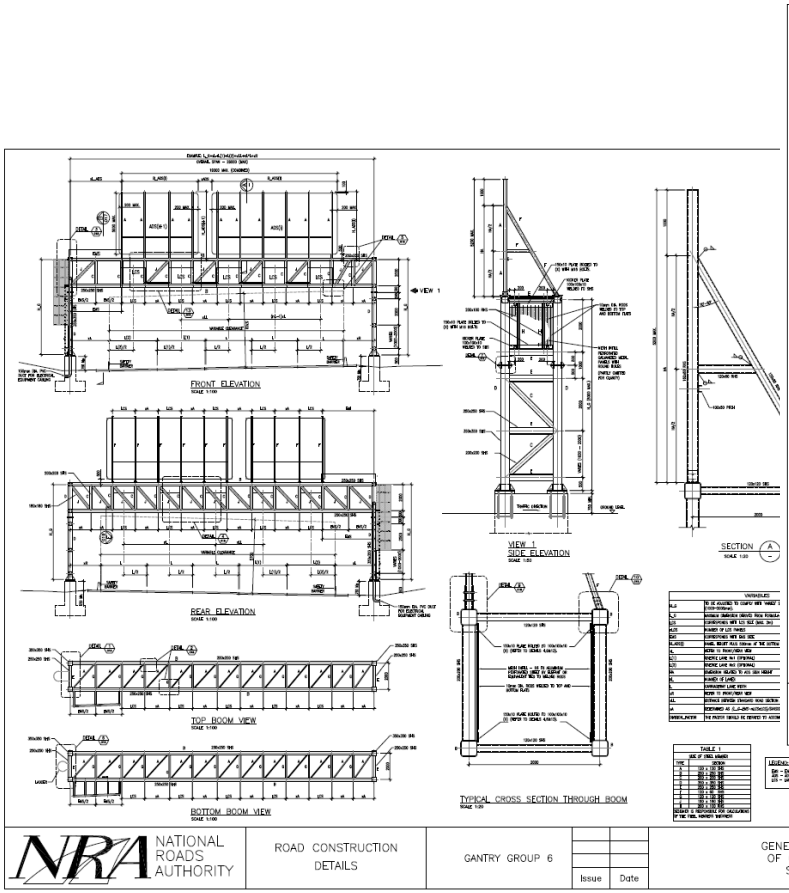
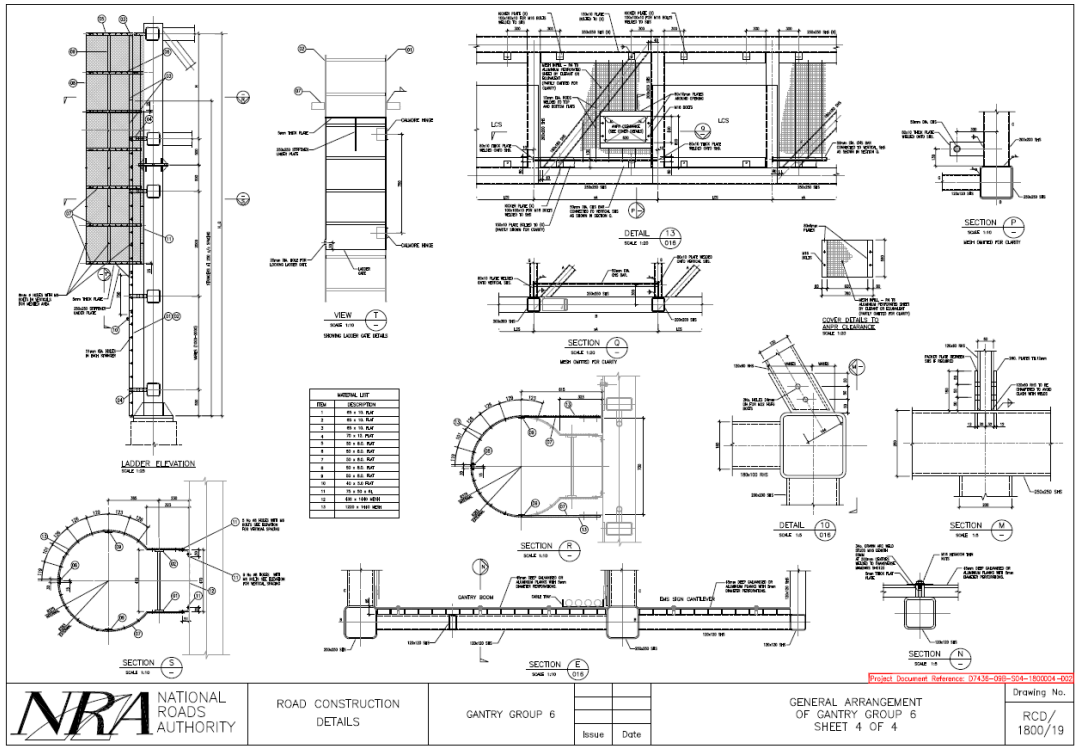
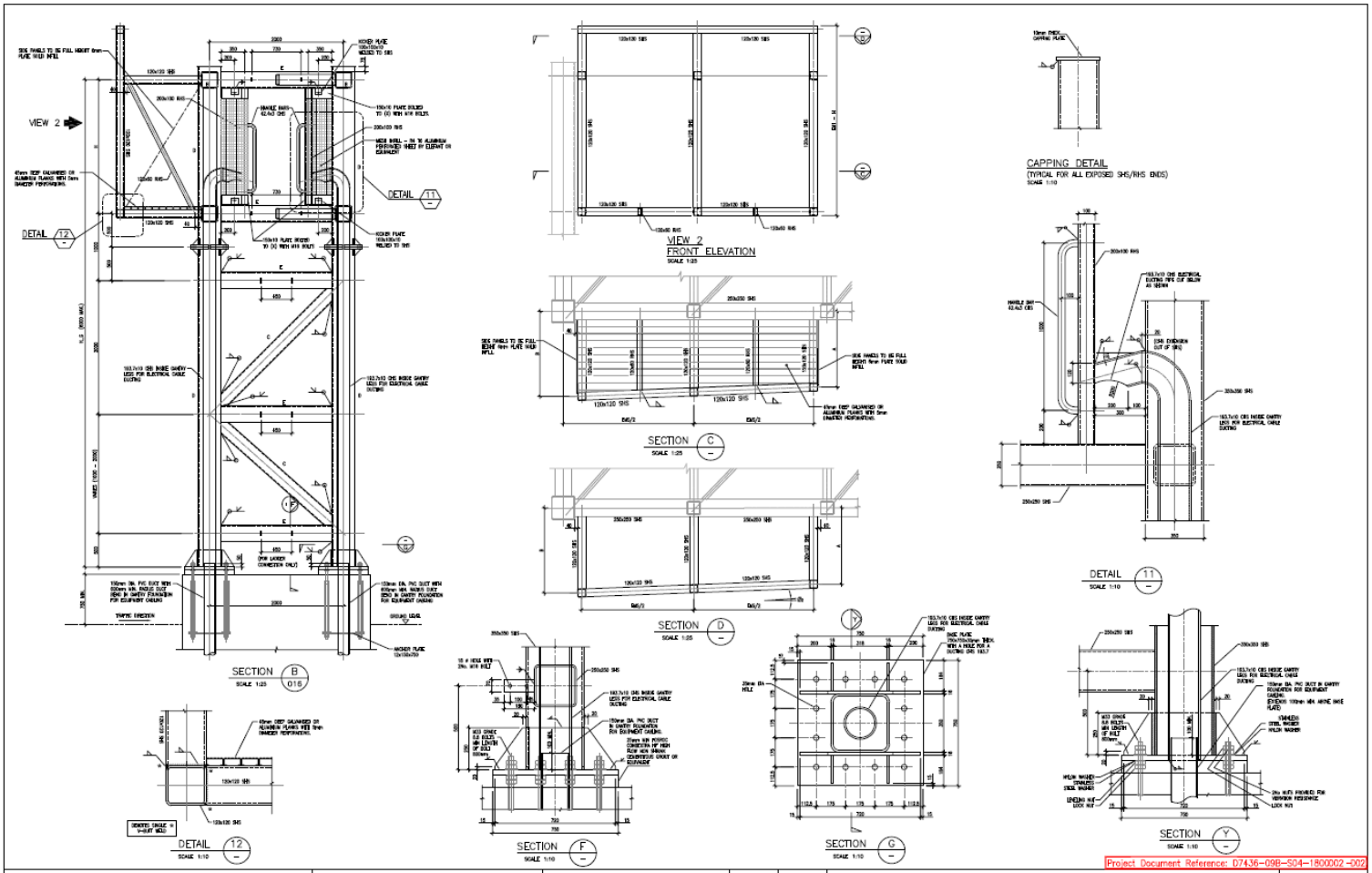
Gantry Structures for ITS Equipment

Included in the 1800 series Updates





Gantry Structures for ITS Equipment



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Electrical Power for ITS Equipment

Included in 'NRA TA 77 Traffic Control and Communications Infrastructure Design'

Motorway Cables:

- Armoured Power Cable
- Armoured Copper Communications Cable
- Armoured Composite Optical Fibre/Copper Cable
- Armoured Cable Installation

Miscellaneous Equipment:

- Uninterruptible Power Supplies (UPS)
- Batteries associated with Motorway Communication Systems
- Renewable Power Supplies

Electrical Power for ITS Equipment

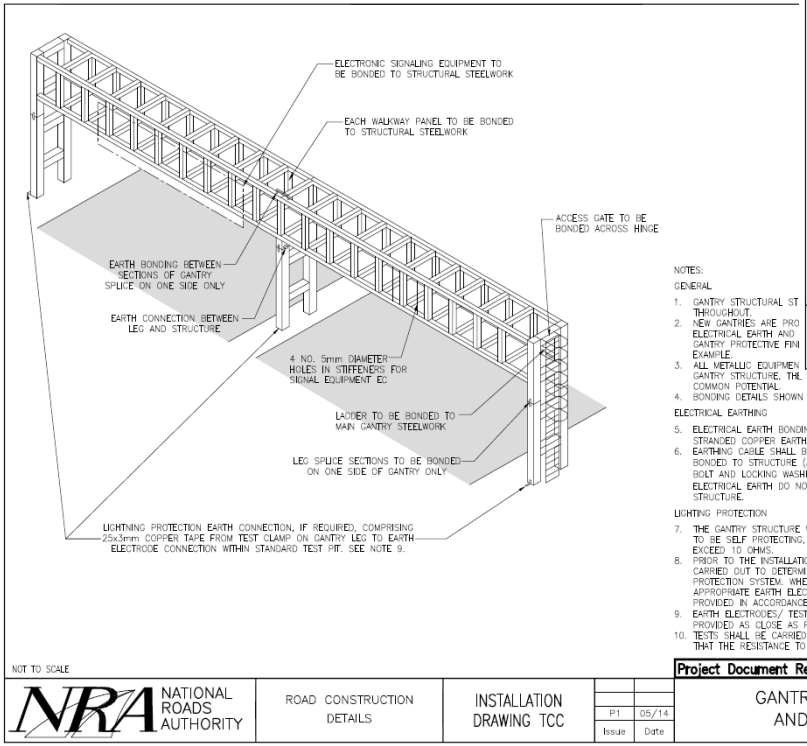
Power Supply Design

- Equipment Design Loads
- Operational and Design Requirements
- Safety Considerations

Table A - Nominal Electrical Load of Motorway Communications Equipment	
Equipment	Power (W)
Variable Message Sign - Small	2,000
Variable Message Sign - Large	5,000
Roadside Equipment Cabinet	2,000
Full Portal Gantry	10,000
Entry Signals (per site)	4,000

Electrical Power for ITS Equipment

- Updates to 1500 Series
- Updated RCD Drawings



NOTES:

GENERAL

1. GANTRY STRUCTURAL ST THROUGHOUT.
2. NEW GANTRIES ARE PRO ELECTRICAL EARTH AND GANTRY PROTECTIVE PIN EXAMPLE.
3. ALL METALLIC EQUIPMEN GANTRY STRUCTURE. THI COMMON POTENTIAL.
4. BONDING DETAILS SHOWN ON DIAGRAM ARE TYPICAL ONLY.

ELECTRICAL EARTHING

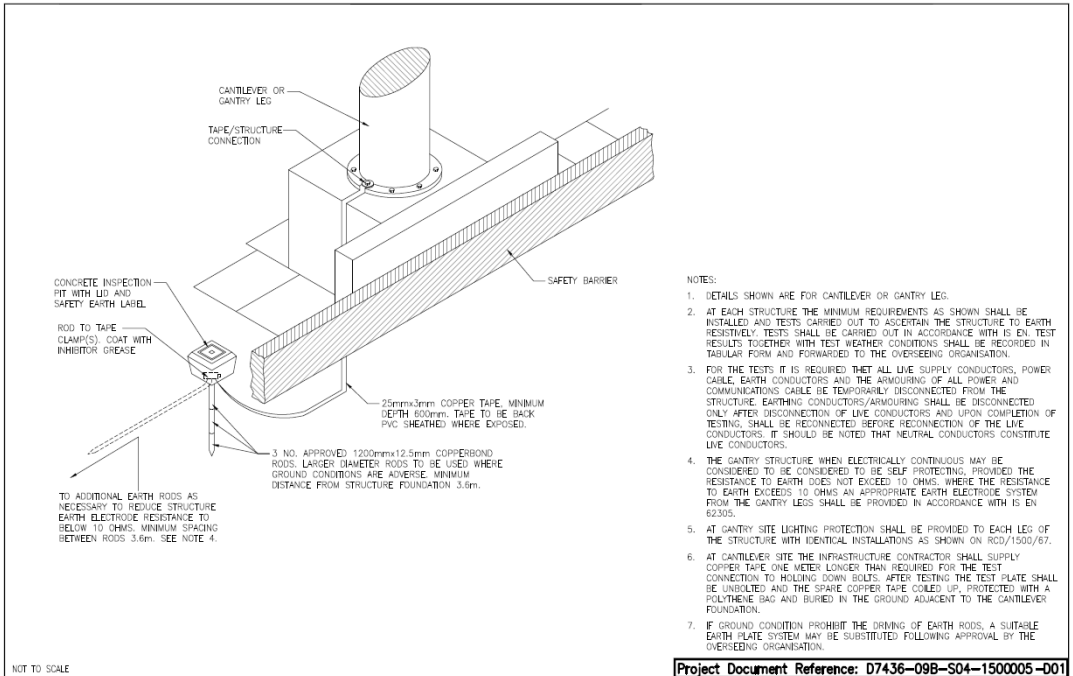
5. ELECTRICAL EARTH BONDING SHALL BE UTILISE 6mm²(MINIMUM) PVC INSULATED STRANDED COPPER EARTHING CONDUCTOR.
6. EARTHING CABLE SHALL BE PROVIDED WITH TERMINAL LUGS AND SHALL BE BONDED TO STRUCTURE (AT PREPROVIDED BONDING POINTS) WITH SUITABLE NUT, BOLT AND LOCKING WASHER ARRANGEMENT, SAFETY EARTH LABELS 'SAFETY ELECTRICAL EARTH DO NOT REMOVE' SHALL BE PROVIDED AT EACH BOND TO THE STRUCTURE.

LIGHTNING PROTECTION

7. THE GANTRY STRUCTURE WHEN ELECTRICALLY CONTINUOUS MAY BE CONSIDERED TO BE SELF PROTECTING, PROVIDED THE RESISTANCE TO EARTH DOES NOT EXCEED 10 OHMS.
8. PRIOR TO THE INSTALLATION OF THE GANTRY, SOIL RESISTIVITY TESTS SHALL BE CARRIED OUT TO DETERMINE THE NEED FOR THE PROVISION OF A LIGHTNING PROTECTION SYSTEM. WHERE THE RESISTANCE TO EARTH EXCEEDS 10 OHMS, AN APPROPRIATE EARTH ELECTRODE SYSTEM FROM THE GANTRY LEGS SHALL BE PROVIDED IN ACCORDANCE WITH ISEN 62305.
9. EARTH ELECTRODES/ TEST PITS (AS SHOWN ON RCD/1500/68 SHOULD BE PROVIDED AS CLOSE AS PRACTICAL TO GANTRY LEGS.
10. TESTS SHALL BE CARRIED OUT AFTER INSTALLATION OF GANTRIES TO ENSURE THAT THE RESISTANCE TO EARTH DOES NOT EXCEED 10 OHMS.

NOT TO SCALE

NATIONAL ROADS AUTHORITY	ROAD CONSTRUCTION DETAILS	INSTALLATION DRAWING TCC	Issue: P1	Date: 05/14	Project Document Reference: D7436–09B–S04–1500004 –D01 GANTRY EARTHING AND BONDING	Drawing No. RCD/ 1500/067



NOTES:

1. DETAILS SHOWN ARE FOR CANTILEVER OR GANTRY LEG.
2. AT EACH STRUCTURE THE MINIMUM REQUIREMENTS AS SHOWN SHALL BE INSTALLED AND TESTS CARRIED OUT TO ASCERTAIN THE STRUCTURE TO EARTH RESISTIVELY. TESTS SHALL BE CARRIED OUT IN ACCORDANCE WITH IS EN. TEST RESULTS TOGETHER WITH TEST WEATHER CONDITIONS SHALL BE RECORDED IN TABULAR FORM AND FORWARDED TO THE OVERSEEING ORGANISATION.
3. FOR THE TESTS IT IS REQUIRED THET ALL LIVE SUPPLY CONDUCTORS, POWER CABLE, EARTH CONDUCTORS AND THE ARMOURING OF ALL POWER AND COMMUNICATIONS CABLE BE TEMPORARILY DISCONNECTED FROM THE STRUCTURE. EARTHING CONDUCTORS/ARMOURING SHALL BE DISCONNECTED ONLY AFTER DISCONNECTION OF LIVE CONDUCTORS AND UPON COMPLETION OF TESTING, SHALL BE RECONNECTED BEFORE RECONNECTION OF THE LIVE CONDUCTORS. IT SHOULD BE NOTED THAT NEUTRAL CONDUCTORS CONSTITUTE LIVE CONDUCTORS.
4. THE GANTRY STRUCTURE WHEN ELECTRICALLY CONTINUOUS MAY BE CONSIDERED TO BE CONSIDERED TO BE SELF PROTECTING, PROVIDED THE RESISTANCE TO EARTH DOES NOT EXCEED 10 OHMS. WHERE THE RESISTANCE TO EARTH EXCEEDS 10 OHMS AN APPROPRIATE EARTH ELECTRODE SYSTEM FROM THE GANTRY LEGS SHALL BE PROVIDED IN ACCORDANCE WITH IS EN 62305.
5. AT GANTRY SITE LIGHTING PROTECTION SHALL BE PROVIDED TO EACH LEG OF THE STRUCTURE WITH IDENTICAL INSTALLATIONS AS SHOWN ON RCD/1500/67.
6. AT CANTILEVER SITE THE INFRASTRUCTURE CONTRACTOR SHALL SUPPLY COPPER TAPE ONE METER LONGER THAN REQUIRED FOR THE TEST CONNECTION TO HOLDING DOWN BOLTS. AFTER TESTING THE TEST PLATE SHALL BE UNBOLTED AND THE SPARE COPPER TAPE COILED UP, PROTECTED WITH A POLYTHENE BAG AND BURIED IN THE GROUND ADJACENT TO THE CANTILEVER FOUNDATION.
7. IF GROUND CONDITION PROHIBIT THE DRIVING OF EARTH RODS, A SUITABLE EARTH PLATE SYSTEM MAY BE SUBSTITUTED FOLLOWING APPROVAL BY THE OVERSEEING ORGANISATION.

NOT TO SCALE

NATIONAL ROADS AUTHORITY	ROAD CONSTRUCTION DETAILS	INSTALLATION DRAWING TCC	Issue: P1	Date: 05/14	Project Document Reference: D7436–09B–S04–1500005 –D01 TYPICAL EARTH BONDING SYSTEM FOR GANTRY AND CANTILEVER STRUCTURES	Drawing No. RCD/ 1500/068

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TD 302: Traffic Control and Communications Systems Change Management

Purpose:

- This is a new document that provides an overview of the Change Management process for technology change process. It outlines the activities involved in scheme delivery and the life-cycle from concept design up to the stage where it is handed over into operation and maintenance.
- To provide the key stakeholders with information to help develop the Project Execution Plan for their particular scheme. It identifies the typical activities involved in commissioning and their sequence, identifies typical roles, responsibilities, deliverables and possible areas of risk.
- Ensuring the timely and accurate capture and passage of information throughout the lifecycle.


National Roads Authority
Design Manual for Roads and Bridges

Volume 9 Section 4
Part 1 NRA TD 302/14

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An tÚdarás um Bóithre Náisiúnta
National Roads Authority

Volume 9 Section 4
Part 1
NRA TD 302/14

Traffic Control and Communications
Systems Change Management

DRAFT

November 2014

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TD 302: Traffic Control and Communications Systems Change Management

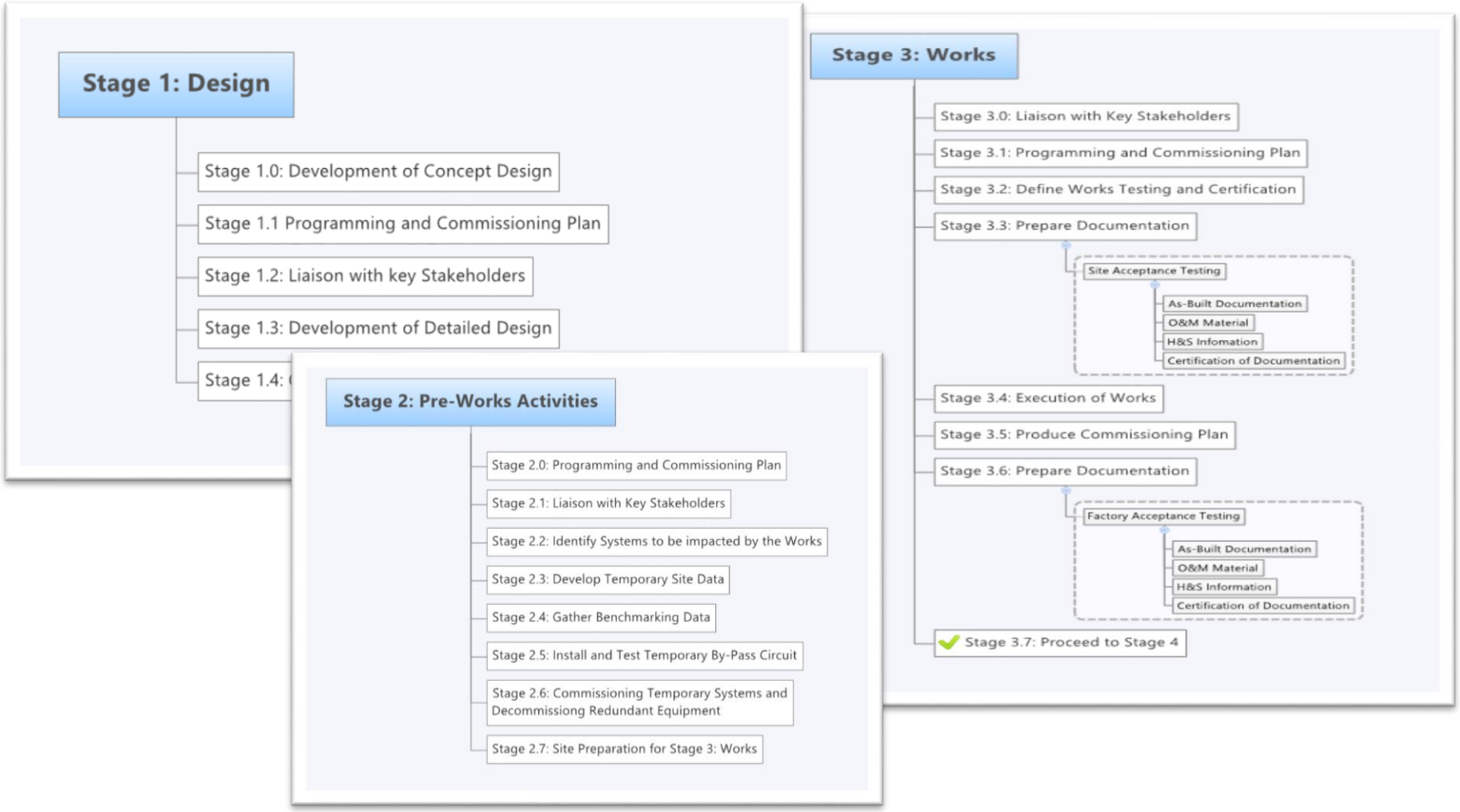
Application to Scheme Categories:

- Roadside hardware changes,
- In-station system changes, including software updates
- Data fault correction e.g. discrepancies observed by operators,
- NRA procedural changes,
- Operator procedural changes,
- MSP procedural changes

Scheme Stages

- Stage 1: Design
- Stage 2: Pre-Works Activities
- Stage 3: Works
- Stage 4: Commissioning/Integration
- Stage 5: Handover/Service Entry Point

TD 302: Traffic Control and Communications Systems Change Management



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TD 302: Traffic Control and Communications Systems Change Management

Approach

- Defining the elements of work and activities
- The sequence of work in which activities must be addressed.
- Defining the deliverables (Products) that must be in place before the next stage of the process is commenced.
- Defining the parties and stakeholders involved within each stage of the process.
- Defining roles and responsibilities.

TD 302: Traffic Control and Communications Systems Change Management

Outputs

- Project Execution Plan
- Communications Plan
- Risk Register
- Document Register
- Programme and Commissioning Plan
- FAT and SAT Results
- As-built documents