VIC CIVIL – Structural Concrete – VR

ITP Number:	ITP007a-VC235-	Revision Number:	2

Author (Vic Civil)				Client Approver (Multiplex)			
Name	Ben Thomas			**Name**	Jayden Campbell		
Position	Engineer			**Position**	Project Engineer		
Signature		**Date**		**Signature**		**Date**	

Authorisation (Vic Roads)			
Name			
Position	Vic Roads Site Representative		
Signature		**Date**	

Work Lot Number:	North Architectural Column	Work Lot Description:	Construction of architectural / structural column over Ballarat Road – Northern Section
Design Package:	370_VU Bride	**Structural Engineer**	4D Workshop

ITP007a – Architectural Concrete Columns

Item No.	Operational Activities	Verification			Inspection				Records & Comments
		Specification Reference	Acceptance Criteria	Test / Inspection Method & Frequency	Vic Civil		Multiplex / Vic Roads		KEY: ✓ = Applicable X = Not Applicable X and ✓are to be initialled
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1.0	**PRELIMINARIES** - *Prior To Commencement of Work*								
1.1	Work Lot Map	▪ N/A	▪ Work Lot Map attached to Work Lot	▪ Per work lot	**PE (H)**		**PE (H)**		[ ] Work Lot Map
2.0	**MATERIAL COMPLIANCE** - *Prior To Commencement of Work*								
2.1	Calibration Certificates	▪ Process Control	▪ Confirm that external equipment calibration and testing facilities are registered ▪ External equipment calibration meets contract requirements for each item of test equipment	▪ Visual check with certificates, ITP, checklist or inspection report	**PE (H)**		**PE (H)**		[ ] Record of visual inspection [ ] Calibration Certificates
2.2	Concrete Mix Design	▪ VicRoads 610.07 ▪ AS 3600 ▪ IFC Drawings	Concrete mix design approved and in accordance with the IFC drawings	▪ Approved mix confirmation prior to commencing works	**PE (H)**		**PE (H)**		[ ] Approved VicRoads mix design registration
2.3	Steel Reinforcement Certification	▪ VicRoads 611.05 ▪ AS 4671 ▪ IFC Drawings	▪ ACRS certificate provided for suppliers and manufacturers of steel	▪ ACRS certificate supplied within 14 days of contract award	**PE (H)**		**PE (H)**		[ ] ACRS Certificate
2.5	Bar chairs and spacer compliance	▪ VicRoads 610.26(a) ▪ AS/NZS 2425 ▪ IFC Drawings	▪ Reinforcement supports comply with AS/NZS 2425. ▪ Concrete bar chairs are tested in accordance with VicRoads 610.26(a)	▪ Review of certificates prior to ordering materials	**PE (H)**		**PE (H)**		[ ] Compliance certificates
2.6	Formwork / Falsework Design	▪ VicRoads 614.04 ▪ VicRoads 613.04 ▪ JHG Temp Works Design Procedure	▪ Approved Formwork Design ▪ Approved Falsework Design ▪ Design brief approved and verified	▪ Proof Eng'g Certificate or Design Verification forwarded to Client	**PE (H)**		**PE (H)**		[ ] Temporary Works Design Ref No._____

INSPECTION CODES:	***S:*** Surveillance Point ***W:*** Witness Point ***H:*** Hold Point ***R:*** Review	INSPECTION ROLE TYPES*:	***SE:*** Site Engineer ***SF:*** Supervisor/Foreman ***ENV****: Enviro Representative* ***SU:*** Surveyor ***PE:*** Project Engineer ***QM:*** Quality Manager ***CR****: Community Relations Advisor*

2.7	Confirm approval of curing compound	▪ VicRoads 610.23	▪ Curing compound approved and in accordance with VR IFC Design via RFI.	▪ All batches	**PE (H)**		**PE (H)**		[ ] Curing compound Design Approval Ref:
3.0	**QUALIFICATION REQUIREMENTS** *- Prior To Commencement of Work*								
3.1	Welding Requirements	▪ Approved Weld Procedures [ ] AS 1554.1 Clause 4.1 to 4.11 [ ] AS 1554.3 Clause 4.1 to 4.11 IFC Drawings ▪ Welder Qualifications. [ ] AS 1554.1 Clause 4.12 [ ] AS 1554.3 Clause 4.12 TGN-BC-01: Tack welding of reinforcement bar	▪ Weld Procedures have been reviewed and approved by Construction Team & Quality Team for all welding required- this includes Non Load Bearing tack welds ▪ Evidence that all welders are qualified with regards to the applicable welds ▪ Weld Supervisor has required qualifications	▪ Provided by subcontractor	**PE (H)**		**PE (H)**		[ ] Weld Procedures [ ] Weld Procedure Qualification Records [ ] Welder Qualifications [ ] Supervisor Qualifications Welding Procedures required for the works to be listed here Eg. Fillet welds/ splices, tack etc:
3.2	Concrete Technical Specialist	▪ VicRoads 610.24	▪ The assessment of the cracked concrete structure shall be undertaken by a technical specialist with a minimum of 5 years' experience	▪ Prior to repair	**PE (H)**		**PE (H)**		[ ] Evidence of experience

NOTE:

1. All preliminary records have been reviewed and approved.

Vic Civil Representative:	Vic Civil Signature:	Date:
Multiplex Representative:	Multiplex Signature:	Date:

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4.0	**CONSTRUCTION ACTIVITIES** - *Prior To Commencement and During Works – **Sub-lot Records (if applicable)***								
4.1	Inspection of incoming materials: • All embedded Items cast into structural concrete	▪ Project Requirement Specification	▪ Materials conform to IFC drawings and Specifications ▪ Free of defects, transportation damage and/or imperfections	▪ Visual check with written notes in Delivery docket, ITP, checklist or inspection report. ▪ Upon Delivery	**SE (W)**		**PE (H)**		[ ] Structural Concrete Checklist –
4.2	Survey Set-out & Initial pour against ground	▪ IFC Drawings	▪ Survey marks (levels and offsets) in place (where applicable)	▪ Visual Inspection / Spot Check – Prior to commencing works	**SE (W)**		**SE (W)**		[ ] Structural Concrete Checklist
4.3	Pre-pour inspection: Reinforcement	▪ IFC Drawings ▪ VicRoads 611 ▪ AS 5100 ▪ AS 1554	Concrete shall not be placed until: • All reinforcement installed as per design	▪ Visual Inspection prior to concrete pour	**SE (W)**		**PE (H)**		[ ] Structural Concrete Checklist
4.4	Pre-pour inspection: Formwork, falsework & scaffold	▪ VicRoads 610.18 ▪ VicRoads 614 ▪ IFC Drawings ▪ Temp Works Design & Procedure ▪ AS 3610	• On-site inspection and validation of Temporary Works Design • Falsework erected in accordance with certified design • Refer to checklist	Visual inspection prior to concrete pour ▪ Inspection of falsework construction by Engineer	**SE (W)**		**PE (H)**		[ ] Structural Concrete Checklist
4.5	Construction Joints	▪ IFC Drawings ▪ VicRoads 610.20	• Concrete cast against concrete to be clean and free of laitance with roughened and coarse aggregate exposed to depth of 3mm	▪ As required	**SE (W)**		**SE (W)**		[ ] Structural Concrete Checklist
4.6	Cast in items, voids and block outs	▪ IFC Drawings ▪ Temp Work Drawings	• All cast in items, voids and block outs installed as per design and given tolerances	▪ Visual Inspection prior to concrete pour	**SE (W)**		**SE (W)**		[ ] Structural Concrete Checklist

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4.7	Install thermocouples to monitor early age thermal cracking of large members >500mm.	▪ VicRoads 610.22	▪ Required for concrete members where: (a) The least dimension of a member exceeds 500mm; or (b) One or more faces of a concrete member is restrained by previously placed hardened concrete or by other external restraints. ▪ Thermocouples installed • Temperature differential across concrete member is less than 20ºC during the period of curing.	▪ As required	**SE (W)**		**SE (W)**		[ ] Structural Concrete Checklist
4.8	Concrete supply & testing	▪ VicRoads 610.16 ▪ Mix Design ▪ AS 1379	• Slump tests acceptable within limits of mix design • If mix contains superplasticiser, slump testing shall be in accordance with VicRoads 610.16(c) • Concrete samples taken in accordance with VicRoads 610.16	Complete the structural checklist for every pour ▪ Testing frequency as per VicRoads Table 610.161	**SE (W)**		**SE (W)**		[ ] Structural Concrete Checklist
4.9	Discharge of Concrete	▪ VicRoads 610.13 ▪ VicRoads 610.17 ▪ VicRoads 610.18 ▪ AS 1379	• Discharge completed within time limit approved on mix design • No water added once discharge commenced • Concrete temp between 10-32 °C and Air temp between 5-35 °C.	▪ Visual inspection – Each delivery	**SE (W)**		**SE (W)**		[ ] Structural Concrete Checklist
4.10	Placement	▪ VicRoads 610.17 ▪ VicRoads 610.18	• Placed in near horizontal layers not more than 350mm thick • Concrete shall not be dropped from a height exceeding 2m. • Compacted with vibrators and power screeds as appropriate • Needle vibrators to be used vertically to full depth plus 100mm into the lower layer.	▪ Visual inspection – Each pour	**SE (W)**		**SE (W)**		[ ] Structural Concrete Checklist
4.12	Concrete Testing - Compressive Testing	▪ VicRoads 610.16	• Concrete shall be tested for compressive strength in accordance with VR 610 3 cylinders (1 x 7day, 2 x 28 Day) taken for each sample, minimum no. of samples: **Quantity, m3** / **# Samples** 0-10 / 1	▪ Each Pour	**SE (W)**		**SE (W)**		[ ] Structural Concrete Checklist

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			10 to 25: 2 25 to 50: 3 50 to 100: 4 >100: 1 sample for each 50m³ >100						
4.13	Formwork and Falsework Deformation check	▪ Temp Work Drawings	▪ Ensure that no significant deformations have occurred during the pour	▪ Visual – Each Pour	**SE (W)**		**SE (W)**		[ ] Structural Concrete Checklist
4.14	Surface Finishing	▪ VicRoads 610.31 ▪ VicRoads 610.18(d)	• Surface finished as specified in drawings ▪ Joint surfaces left rough, set retardant applied where required	▪ Visual – Each Pour	**SE (W)**		**SE (W)**		[ ] Structural Concrete Checklist
4.15	Curing	▪ VicRoads 610.23 ▪ BCRC REPORT	▪ Approved methodology and application rate	▪ Where Required, after discharge	**SE (W)**		**SE (W)**		[ ] Structural Concrete Checklist
4.16	Removal of Form / Falsework & Inspection of Stripped Surfaces	▪ VicRoads 610.24 ▪ VicRoads 610.25 ▪ VicRoads 610.31 ▪ VicRoads 610.34	• Falsework and formwork removed no earlier than specified in Table 610.251, unless otherwise approved • Specified Surface finish class achieved. ▪ Specified cover achieved within tolerance	Visual Inspection – Each Pour ▪ 10 cover checks in 3m2 test areas for every 25m2 surface area	**SE (W)**		**PE (H)**		[ ] Structural Concrete Checklist
4.17	Patch repair (Where applicable)	▪ VicRoads 610.32 ▪ VicRoads 689	▪ Surfaces repaired using approved cementitious products achieving similar texture and colour to surrounds	▪ Review – Each Pour	**SE (W)**		**SE (W)**		[ ] Structural Concrete Checklist
4.18	Crack Inspection and repair (Where applicable)	▪ VicRoads 610.24 ▪ VicRoads 687	• Structural cracks assessed by qualified professional ▪ Approved crack repair procedure	▪ Visual/measure– Each Pour	**PE (W)**		**PE (H)**		[ ] Structural Concrete Checklist

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5.0	**TESTING AND COMMISSIONING REQUIREMENTS** – *Post Construction Works* – ***Sub-lot Records (if applicable)***								
5.1	As Built Survey	▪ IFC drawings	▪ As-built survey is within tolerance when compared to Design & Specifications	▪ As-built vs Design Survey is within Tolerance	**SE (R)**		**SE (R)**		[ ] Structural Concrete Checklist
5.2	Maturity Testing	▪ VR610.16	▪ Confirm concrete has achieved minimum compressive strength required for demoulding/lifting	▪ As required	**SE (R)**		**SE (R)**		[ ] Structural Concrete Checklist
5.3	Concrete cover checks	▪ VR610.34 ▪ VR 610.41 ▪ AS5100.5, 4.14.3	▪ Minimum Cover measurements demonstrated that minimum concrete cover as per the drawings and the allowable dimensional tolerances as stated in Clause VR 610.41.	▪ Min. 10 concrete cover measurements carried out using a cover meter in a 3m2 test area for every 25 m2 or part thereof on a representative and randomly selected number of exterior surface areas. Record min. measurement.	**SE (R)**		**SE (R)**		[ ] Structural Concrete Checklist
5.4	Temperature Monitoring Report	▪ VR 610.22	• Monitor early age thermal cracking of concrete for large and restrained members to ensure temperature differential is not greater than 20°C during the period of ▪ Internal concrete temperature does not exceed 75°C.	As required	**SE (R)**		**SE (R)**		[ ] Structural Concrete Checklist
5.5	Laboratory testing of concrete	▪ VicRoads 610.05 ▪ VicRoads 610.16	• Compressive strength testing ▪ Slump test results	As per VicRoads Table 610.161	**SE (R)**		**SE (R)**		[ ] Structural Concrete Checklist

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6.0	**COMPLETION REQUIREMENTS** – *Post Construction Works* – ***Sub-lot Records (if applicable)***								
6.2	Close out NCR(s)	▪ Project Specification	▪ All out of tolerances notified via Site NCR reporting system	▪ Prior to closing and signing ITP	**PE (H**		**PE (H)**		[ ] Structural Concrete Checklist
6.3	Relevant RFI(s):	▪ Project Specification	▪ Design/Construction Queries or clarifications relating to this ITP are addressed and closed. ▪ All 'parts' of RFI are included ▪ All 'supporting evidence' is included ▪	▪ RFIs closed and linked to NCRs where applicable	**PE (H)**		**PE (H)**		[ ] Structural Concrete Checklist

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6.4	Redline Marked-up Drawings	▪ Project Specification	▪ Redline drawing to be produced & maintained by engineers to include all changes made during construction ▪ Redline to use latest IFC version of the design drawings and be marked-up in red pen, to identify any variations ▪ RFI, DCR, ECW and Client Wavers to be referenced in redlines (as required)	▪ Completion of Works	PE (H)		PE (H)		[ ] Structural Concrete Checklist

ITP CLOSE OUT

1. All applicable verification records must be legible, signed/ initialled and dated where required.

Vic Civil Representative:	Vic Civil Signature:	Date:
Multiplex Representative:	Multiplex Signature:	Date:

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