

HOLLOW CORE CONCRETE – ITP for the manufacturing of Stressed deck slabs				PROJECT – Port Headland AP5 Wharf				LOT NUMBER -			
SPECIFICATIONS – VICROADS 600 SERIES and AS/NZS ISO 9001				CLIENT –TAMS Group				LOT CAST DATE			
HP: Hold Point, WP: Witness Point											

Item 1.0	Approvals and reviews								
		Reference(s)	Supporting Documents	Acceptance Criteria	Conformance		HCC Sign	TAMS Group Sign	Remarks
					Method	Frequency			
1.1	Submit Concrete mix design	610.07 (a) (b) Design spec drawings	Mix design and associated on going testing results	Strength, quality, colour, shrinkage must be as per the relevant contract specification. Approved mix design code TU604AA62	Written	Prior to casting	HP	HP	
1.2	Submit ACRS certification of reinforcement and certification for the tendons		Current ACRS certificate for all Tendons and reinforcing	Valid certificate provided	Written	Prior to casting	HP	HP	
1.3	Radiant heat curing with curing compounds	610.23 (h) (g)	MSDS Complies with AS 3799	SikaFilm applied during finishing, covers installed after finishing of concrete. Radiant heat curing will occur until the Antisol AC sprayed or rolled over the components within 30 minutes of removing formwork.	Written	Every component	HP	HP	
1.4	Submit curing methodology	610.23 (a)	Product TDS, SDS & NATA Certificate	Curing compound meets or exceeds AS3799. Application rates noted.	Written	Prior to casting	HP	HP	
1.5	Submit evaporative retardant (aliphatic alcohol-based)	610.17 (f)	Product TDS & SDS	Application rates noted.	Written	Prior to casting	HP	HP	
1.6	Submit ITP for review	610.18 (a) (i)	This document	Written acceptance to proceed	Written	Prior to casting	HP	HP	
1.7	Submit repair procedure for review	610.24 (b) 689.13	Repair Procedure/ Methodology	Review and approval by Client	Written	Prior to repairing components	HP	HP	
1.8	Ensure all shop drawings are IFC before casting the components	HCC QMP	Stamped shop drawing	Shop drawings are to be IFC and numerical revision	Written	Prior to casting	HP	HP	
1.9	Stressing Calculations have been submitted for review	622.02	Stressing Calculations and chart	Stressing calculations are to be reviewed by project consultant		Once before commencement of casting Reviewed if changes occur during the course of the production	HP	HP	

HOLLOW CORE CONCRETE – ITP for the manufacturing of Stressed deck slabs			PROJECT – Port Headland AP5 Wharf	LOT NUMBER -
SPECIFICATIONS – VICROADS 600 SERIES and AS/NZS ISO 9001			CLIENT – TAMS Group	LOT CAST DATE
	HP: Hold Point, WP: Witness Point			

Item	Description	Reference(s)	Supporting Documents	Acceptance Criteria	Method	Frequency	HCC Sign & Date	NA Sign & Date	Remarks
2.0	SECTION 2 - Manufacturing Activities								
2.1	Pre-pour inspection (external)	610.18 (a) (ii & iii)	Nominated authority's checklist Relevant shop drawings	Product dimensions, cast in components, correct reinforcement, cover, lifting anchors etc. conform to structural requirements and specifications. Moulds/formwork are clean and free from debris. 7 Day notification given via ACONEX. Any changes to be reported within 24 hours prior to the pour.	Measured / Visual	Each Unit	HP	HP	
2.2	Pre-pour inspection (internal)	610.18 (a) (ii & iii)	HCC QMP Section 3.12 Check Sheets in the form of the product specific shop drawings HCC drawings 0001 TO 0254	Product dimensions, cast in components, correct reinforcement, cover, lifting anchors etc. conform to shop drawings. Moulds/formwork are clean and free from debris.	Measured / Visual	Each Unit	HP		
2.3	Check conditions prior to, during and post concrete delivery and placement	610.17 (a-f)	On-line Weather report and forecast	Ambient temperature not: < 5°C or > 35°C Concrete temperature not: < 10°C or > 32°C Weather condition: conducive to pour Evaporation Limits for Concreting Operations The Contractor shall be responsible for measuring and recording the air temperature, relative humidity, concrete temperature and wind velocity (measured one metre above the as placed concrete) at the point of concrete placement from commencement of placing the concrete and continue until curing has commenced. This information shall be used in conjunction with Figure 610.171 to determine the rate of evaporation of water from the freshly placed and unprotected surface of the concrete. The rate of evaporation shall be monitored by the Contractor until such time as curing commences. When the value of the rate of evaporation as determined from Figure 610.171 exceeds 0.50 kg/m² per hour the Contractor shall take precautions to minimise evaporative moisture losses such as the application of an aliphatic-alcohol based evaporative retarding compound or controlled fog spray. Application of evaporative retarding compound is required during pouring of concrete.	Measured / Visual	Each Lot	HP		
2.4	Reinforcing placement and inspection	611	AS 5100 Component Check Sheets in the form of the product specific shop drawings HCC drawings 0001 TO 0254	Check against relevant shop drawing that all reinforcing bars are installed correctly, at the right centres and in a clean condition. Reinforcing bars spacing to be no less than 1.5 times the size of the largest aggregate. Correct bar laps to be observed. Correct radius in bends.	Visual/ measuring	Each component	HP		
2.5	Cover verification	610.33 610.26 610.46 611.10 AS 2425	Post-pour Check Sheet in the form of the product specific shop drawings HCC drawings 0001 TO 0254 AS 5100.5	Requirements of the design documents. all around as per drawings. Ensure bar chairs comply with AS2425. (Higher cover for standard form work. Lower cover for rigid formwork with high intensive vibrators fitted to form work.) Tie wire not to intrude into cover zone. Maintain cover to rebar during concrete placing. Cover to be minimum 25 mm all around , 20mm on top (tolerance of 0 to +5mm).	Measure cover using measuring tape	Ensure 100% compliance of cover requirement Is achieved and witnessed Compliance must be recorded on check sheet drawings	HP		
2.6	Tendons supply and traceability	622.03 622.02	AS/NZ 4672, 4672.1.1 Component check sheet	15.2mm strands used. ACRS supplied, Coil batch certification recorded, stressing design approved and documented by consulting engineer Strands Certificate of Compliance Designs, drawings and De-bond detail plan	Visual	All Components	HP		
2.7	Storage and surface condition of Tendons	622.2 (d)	AS/NZ 4672	Coils of wire and strand and assembled tendons shall be stored above ground level and shall be protected from mechanical damage, contamination with harmful substances or other damage until their incorporation into the works. Wires and strands that show any evidence of damage, kinks or bends shall not be used.	Visual	All Coils	HP		

HOLLOW CORE CONCRETE – ITP for the manufacturing of Stressed deck slabs		PROJECT – Port Headland AP5 Wharf	LOT NUMBER -
SPECIFICATIONS – VICROADS 600 SERIES and AS/NZS ISO 9001		CLIENT – TAMS Group	LOT CAST DATE
	HP: Hold Point, WP: Witness Point		

Item	Description	Reference(s)	Supporting Documents	Acceptance Criteria	Method	Frequency	HCC Sign & Date	NA Sign & Date	Remarks
2.0	SECTION 2 - Manufacturing Activities								
				<p>Wires and strands which are heavily corroded or visibly pitted will not be accepted.</p> <p>Slight surface rusting shall not be a reason for rejection provided that no pitting is visible.</p> <p>Wire and strand shall be kept free from loose rust, oil, grease, tar, paint, soil or any other harmful substances.</p> <p>If the wire or strand become contaminated with any substance, it shall be cleaned with suitable equipment and appropriate detergents and/or clean water until all of the contaminant and any detergent has been removed satisfaction of the Superintendent.</p> <p>Loose rust shall be removed by mechanical or manual methods that do not cause damage to the wire or strand or which impair the bond between the wire or strand and the concrete.</p>					
2.8	Placing Tendons	622.04		<p>Tendons shall be placed in continuous lengths in the positions shown on the drawings and shall be held in the required position by end-blocks of sufficient strength and stiffness to safely maintain the required force in the tendons.</p> <p>Tendons shall be de-bonded in the positions shown on the shop drawings.</p> <p>19mm paper thin plastic sleeves will be used for de-bonding strands.. Grease or other coatings shall not be used for de-bonding.</p> <p>Tendons shall not be allowed to come into contact with the oiled surface of the formwork. If a tendon is contaminated with oil or other harmful substance it shall be cleaned using an appropriate method in order to ensure that the bond between the tendon and the concrete is unimpaired. Tendons that cannot be cleaned shall be replaced.</p> <p>Tendons shall not be welded or exposed to heat from welding or other sources.</p> <p>Where deflected tendons are shown on the drawings, tendons shall be restrained with devices of sufficient strength to hold the tendons in their proper positions without displacement during the placing and compaction of concrete.</p>	Visual Inspection	For all components	HP		
2.9	Tensioning, equipment, anchoring and Tendon force	622.06 622.02 a, b, c and d	Calibration AS2193	<p>Equipment</p> <p>Contractor shall maintain current calibration certificates conforming to the requirements of AS 2193 Grade B for the jack and pressure gauges or other force measuring devices. Jacks and pressure gauges and other devices shall be calibrated and used as a single unit. Calibration to AS 2193 shall be carried out by a laboratory that is NATA-accredited for that method, and at the appropriate force range.</p> <p>The power unit shall be adjusted so that the rate of extension of the tendon is within the specified limits. The measuring equipment shall permit measurement of the tendon force prior to lock-off to the degree of accuracy required by AS 2193 Grade B. The measuring equipment used shall permit elongation to be determined to an accuracy of ±2%. The equipment shall prevent unwinding of the strand during tensioning.</p> <p>The sag take-up force in the tendons shall be measured with equipment which complies with the repeatability and accuracy requirements of AS 2193 Grade B, at a scale mark at which the equipment has been calibrated. The readability requirements of AS 2193 Grade B shall be ignored for the purpose of establishing sag take-up. Sag take-up force shall not exceed 20% of the required tendon force, and shall be not less than 10% of the required tendon force or 10% of gauge capacity, whichever is the greater.</p> <p>Anchorage</p> <p>Anchorage shall be of a type that prevents the occurrence of slip during casting and curing operations.</p> <p>Tendon Force</p> <p>Before tensioning commences, the Contractor shall calculate the extension corresponding to the required tendon force shown on the drawings. The calculation shall be based on the measured length of the tendon between the tendon anchorages at the end blocks and the modulus of elasticity determined from the sample tested in accordance with Clause 622.02.</p>	Visual Inspection	For Stressing Jack and Guage	HP	HP (If applicable)	

HOLLOW CORE CONCRETE – ITP for the manufacturing of Stressed deck slabs		PROJECT – Port Headland AP5 Wharf	LOT NUMBER -
SPECIFICATIONS – VICROADS 600 SERIES and AS/NZS ISO 9001		CLIENT – TAMS Group	LOT CAST DATE
	HP: Hold Point, WP: Witness Point		

Item	Description	Reference(s)	Supporting Documents	Acceptance Criteria	Method	Frequency	HCC Sign & Date	NA Sign & Date	Remarks
2.0	SECTION 2 - Manufacturing Activities								
				<p>The calculations shall include allowances for all losses including slip at anchorages, elastic shortening of the stressing bed, pull-in on transfer of prestress, friction losses and temperature changes.</p> <p>The calculations shall be reviewed by the designer of the pre-tensioned concrete units who shall certify that the calculations meet the requirements of the specification and the drawings. The Contractor shall provide a copy of the designer's certification to the Superintendent.</p> <p>After all tendons have been anchored to the end-blocks (locked off), the force remaining in the tendons at mid-span of the unit shall be the required tendon force stated on the drawings.</p> <p>The allowable variation of the tendon force shall be $\pm 2\%$.</p> <p>Under no circumstances shall the maximum tensioning force exceed the lesser of the rated capacity of the jacking equipment or 80% of the tensile strength of the tendon.</p> <p>The tensioning force required to achieve the design tendon force shall be determined from the calibration certificate and the actual elongation of the tendon corresponding to the tensioning force shall be recorded. Alternatively, the Superintendent may approve determination of the tensioning force by measurement of the elongation, provided that the limits of variation of the modulus of elasticity of the tendons are satisfactory. In this case, the jacking force shall be recorded.</p> <p>Should the modulus of elasticity of batches of tendons differ by more than 3%, the required elongation shall be adjusted accordingly.</p> <p>Where the difference between the force determined from the calibration certificate and the tensioning force calculated from the elongation exceeds 4%, the Contractor shall nominate some or all of the following remedial steps subject to review by the Superintendent. The Contractor shall suspend stressing until the completion of the Superintendent's review:</p> <ul style="list-style-type: none">• re-calibration of tensioning equipment;• testing of tendon material to check the modulus of elasticity;• that tendons be released and restressed (with the adoption of a modulus of elasticity applicable to the second stressing);• other steps as agreed by the Superintendent.					
2.10	Tensioning Procedure	622.06 (d)	Refer to HCC tendon tensioning procedure	<p>Tensioning Procedure</p> <p>All stressing operations shall be recorded on the daily stressing sheet</p> <p>Tensioning operations shall be performed by suitably trained and experienced personnel.</p> <p>Tensioning has been carried out in accordance with The Hollow Core Concrete Tensioning procedure document</p>	Visual Inspection	For all components	HP	HP (Refer stress record Sheet for HPR)	WP
2.11	Transfer of prestress	622.08 a, b, c	Post-pour Check Sheet in the form of the product specific shop drawings HCC drawings	Transfer of stress will only be permitted after the cylinder testing shows minimum of 40 MPa of compressive strength (as approved by the designer)	Visual Inspection	For all components	HP		
2.12	Calibration certificates for Jack and Guage	622.06	Calibration certificates	Calibration certification will be conduct at six monthly intervals. Current certified equipment is being used.	Visual Inspection	For all components	HP		
2.13	Data to be recorded	622.09	AS/NZ 4672.1 HCC Prestress Check List	<p>Ensure the following data is recorded:</p> <ul style="list-style-type: none">• identification number of the unit;• identification number of each dynamometer, gauge, and jack;• calibration certificates for each dynamometer, gauge, and jack;• identification details for each tendon;	Measured / Visual Recorded	Every component	HP		

HOLLOW CORE CONCRETE – ITP for the manufacturing of Stressed deck slabs			PROJECT – Port Headland AP5 Wharf			LOT NUMBER -		
SPECIFICATIONS – VICROADS 600 SERIES and AS/NZS ISO 9001			CLIENT – TAMS Group			LOT CAST DATE		
			HP: Hold Point, WP: Witness Point					

Item	Description	Reference(s)	Supporting Documents	Acceptance Criteria	Method	Frequency	HCC Sign & Date	NA Sign & Date	Remarks
2.0	SECTION 2 - Manufacturing Activities								
				<ul style="list-style-type: none">sag take-up force (or pressure) when tendons are marked for measurement of elongation;elongation obtained at intervals during tensioning, together with corresponding force (or pressure gauge reading);tendon force (or pressure) and elongation obtained on completion of tensioning prior to lock-off;elongation after release of jack;pull-in;compressive strength of concrete at time of transfer of prestress;steam curing charts;measurement of hog following transfer of prestress. <p>Completed records shall be forwarded to the Nominated Authority prior to delivery of the pre-stressed units to the site.</p>					
2.14	Protection of Exposed ends of Tendons	622.10	Mega poxy MSDS	If the ends of tendons are to remain exposed, they shall be wire-brushed to remove rust, loose mortar, grease, dirt and all other harmful material and shall then be coated with a minimum 6 mm thickness of epoxy compound.	Visual Inspection	For all components	HP		
2.15	Concrete delivery	610.16	Concrete docket	Correct information on delivery docket	Visual	Each Load	HP		
2.16	Concrete Mix Design	610	Hanson concrete mix design letter	TU604AA62 150 Slump	Documented	All Components	HP		
2.17	Concrete slump test	610.16	AS1012.3.1 Concrete tester's field sheet	150mm slump = ±30mm (120mm to 180mm)	Measured / Visual	Each Load	HP		
2.18	Concrete compressive strength cylinders made	610.05 610.16 (L)	AS1012.8	Sets of 3 cylinders, also one cylinder to be used for early strength verification as required.	Visual	0–10m³ = 1 set 10-25m³ = 2 sets 25-50m³ = 3 sets	HP		
2.19	Concrete placement	610.18 (a), (d) 610.22	Daily observation will take place to monitor this process is followed	<p>Time lag between trucks on site not to exceed 25 minutes</p> <p>Air bubbles released to surface without segregation of the mix</p> <p>Ensure segregation of the concrete does not occur by preventing free fall of concrete from anything greater than 2 meters</p> <p>Care shall be taken to fill every part of the forms or excavations, to force the concrete under and around the reinforcement without displacing it, to work coarse aggregate back from the face, and to remove air bubbles and voids.</p> <p>Concrete shall be deposited in horizontal layers not more than 350 mm thick.</p> <p>During and immediately after placing, the concrete shall be effectively compacted by vibrators of adequate size, number and frequency.</p> <p>It be applied to the full depth of each layer and extended into the top 100 mm of the underlying layer. Vibration shall continue at each point until air bubbles cease to emerge from the concrete, then withdrawn slowly. Concrete shall not be vibrated to the point where segregation of the ingredients occurs.</p> <p>Where internal vibrators are used, they shall be inserted vertically at spacings not exceeding 250 mm spacings and shall not be allowed to rest on the steel reinforcement.</p> <p>Curing shall commence immediately following the progressive completion at any location of final finishing operations.</p> <p>Thermo Couples shall be placed Three per Unit as agreed with the super intendent.(One central in the Unit, another 25mm from the exposed face and edge of the unit, the third central in the unit 25 mm deep from the exposed face.</p> <p>Maximum temperature shall not exceed 75 degrees Celsius.</p> <p>Maximum differential temperature to be no greater than 20 degrees Celsius.</p>	Visual	Every Load	HP		
2.20	Placement of the lifting lugs	Certified Shop drawings	Shop drawings for each individual component drawings	Ensure all lifters are cast into position to within 20 mm tolerances from the design locations	Visual	Every unit	HP		

HOLLOW CORE CONCRETE – ITP for the manufacturing of Stressed deck slabs				PROJECT – Port Headland AP5 Wharf				LOT NUMBER -			
SPECIFICATIONS – VICROADS 600 SERIES and AS/NZS ISO 9001				CLIENT – TAMS Group				LOT CAST DATE			
HP: Hold Point, WP: Witness Point											

Item	Description	Reference(s)	Supporting Documents	Acceptance Criteria	Method	Frequency	HCC Sign & Date	NA Sign & Date	Remarks
2.0	SECTION 2 - Manufacturing Activities								
2.21	Evaporation retarding compound	610.17	Product MSDS	Apply aliphatic alcohol-based compound, as required, during initial finishing of concrete .	Visual	Every unit	HP		
2.22	Concrete finish	610.18 (d) (iii)	-	Requirements of the Project is exposed washed surface on top and off form class 2 finish to the sides and bottoms of the beams	Visual	Every Unit	HP		
2.23	Early age thermal cracking	610.22	HCC Thermal monitoring record sheet	Measures to be taken if least dimension exceeds 500mm thickness and one or, more faces are restrained. Thermal Couplers used,	Thermal monitoring	First Unit of each type of beam. If risks are identified, further sampling will be carried out	HP		

HOLLOW CORE CONCRETE – ITP for the manufacturing of Stressed deck slabs	PROJECT – Port Headland AP5 Wharf	
SPECIFICATIONS – VICROADS 600 SERIES and AS/NZS ISO 9001	CLIENT –TAMS Group	
HP: Hold Point WP: Witness Point		

Item	Description	Reference(s)	Supporting Documents	Acceptance Criteria	Method	Frequency	HCC Sign & Date	NA Sign & Date	Remarks
3.0	SECTION 3 - Post-Manufacturing Activities								
3.1	Concrete compressive strength	610.05	AS1012.8 Lifting Certificate HCC drawings	Requirements of the Project/Unit: Stripping strength = 40MPa 7 Day strength = 40MPa 28 Day strength = 50MPa	Schmidt Hammer NATA Laboratory	0–10m³ = 1 set 10-25m³ = 2 sets 25-50m³ = 3 sets Note: 3 cyls/ set	HP		
3.2	Units labelled	620.06	Post-pour Check Sheet in the form of the product specific shop drawings HCC drawings 0001 TO 0254	The identification number, date of casting, the manufacturer’s name or registered mark and the maximum mass shall be marked on every precast unit.	Visual	Each Unit	HP		
3.3	Curing (apply Sika Antisol AC curing compound)	610.23 (d), 610.231 AS3799	Manufacturer’s TDS & SDS	2 coats with a minimum application rate of 0.2 litres/m².Keep record. Record rate of application. 1 st coat to be applied within 30 minutes of stripping form work. Allow 3 hours between coats. Check box on label once the second coat is applied. Curing membrane shall be retained and maintained as per Table 610.231	Measured / Visual	Each Unit	HP		
3.4	Post-pour Inspection	610.30 610.46	Post-pour Check Sheet in the form of the product specific shop drawings HCC drawings 0001 TO 0254	Surface finish as per Project requirements (Class 3) Dimensions as per table 610.463 and 610.464.	Measured / Visual / Photographic	Each Unit	HP		
3.5	Cracking or any other imperfections to the product	610.24 (a) (b) Table 610.241 687	Post-pour Check Sheet in the form of the product specific shop drawings HCC drawings	Refer to Table 610.241 for acceptable maximum crack widths. Cracks assessed by a technical specialist with a minimum of 5 years practical experience. Submit a crack repair procedure prior to any repair works being undertaken. If cracking is witnessed NCR will be raised and repair procedure selected following an inspection by the NA.	Visual Inspection	For all components	HP	HP	WP
3.6	Post pour dimensional checks	610.46	Post-pour Check Sheet in the form of the product specific shop drawings HCC drawings	Ensure that post pour dimensional checks are carried out. Cast in items checked and noted. Concrete finishes are as per design drawings Curing applied	Measured / Visual	For all components	HP		

HOLLOW CORE CONCRETE – ITP for the manufacturing of Stressed deck slabs	PROJECT – Port Headland AP5 Wharf	
SPECIFICATIONS – VICROADS 600 SERIES and AS/NZS ISO 9001	CLIENT –TAMS Group	
HP: Hold Point WP: Witness Point		

Item	Description	Reference(s)	Supporting Documents	Acceptance Criteria	Method	Frequency	HCC Sign & Date	NA Sign & Date	Remarks	
3.0	SECTION 3 - Post-Manufacturing Activities									
3.7	Lifting product out of the mould	620.03	Refer to shop drawings HCC drawings	Minimum of 40 MPa strength required before lifting the components out of the mould.	Cylinder crack testing.	Each Lot	HP			
3.8	Post pour cover check	610.34	Record results on Cover check sheet	Test 3 square meters out of every 25m2 of surface. 10 tests or measurements must be recorder per 3 square meter sample area.	Written record	Each unit	HP			
3.9	Storage and stacking of the bridge planks	620.07 622	Rigging and Stacking Design Doc	Components shall only be lifted by the designated cast- in lifters. Components will be stacked simply supported by a bearer under each end directly under the cast in lifters. Maximum of 3 components to be stacked. Stacking will be in accordance with engineers design Bearers will be positioned in line with the cast in lifters. Bearer will be placed on a level concreted ground surface.	Visual Inspection	For all components	HP			
3.10	Product delivery	620.08, 610.26	Delivery Docket(s) Certificates of Compliance	Unit(s) to have achieved minimum 28 day compressive strength and must comply with table 610.261 prior to transporting. Components will be lashed down in accordance with engineers design. Chains will be directly above the bearers under the Beams. Beam edges will be protected using plastic angels to prevent damage from the tie down chains. Compliance certificates will be issued the day before delivery of components to site.	Written	Each Unit	HP			

HOLLOW CORE CONCRETE – ITP FOR Smoke Duct Stressed beams	PROJECT – WGTP	
SPECIFICATIONS – VICROADS 600 SERIES and AS/NZS ISO 9001	CLIENT – CPBJH	
HP: Hold Point, HP*: Internal Hold Point, IP:SP: Surveillance Point, WP: Witness Point		

4.0	SECTION 4 Lot Conformance &Notes									
<input type="checkbox"/> Lot conforms			Non-conformances raised for this lot: _____					<input type="checkbox"/> Non-conformances closed out		
Hollow Core Representative’s Name:		Aidan Collins <input type="checkbox"/> Balint Djeri <input type="checkbox"/> Chelsy Grief <input type="checkbox"/>			Hollow Core Representative’s Signature: _____				Date:_____	

NOTES: