Memorial Avenue Upgrade, Kellyville Job No. 1680 Client: Transport for New South Wales (TfNSW) Principal's Authorised Person: Mark Jajou		Area No.	1
		Activity Type	Heavy Duty Dense Graded Asphalt

INSPECTION AND TEST PLAN	***Heavy Duty Dense Graded Asphalt – R116*** ***Ed 9 / Rev 0 (July 2020)***	Checklist No.	1680-CHK-R116-001

Item	Activity	Reference		Acceptance Criteria	Frequency	Acceptance By			Record / Comments
		Spec	Method			DG	TfNSW	Other	
	In work sequence	OHSR, Environment, Quality aspect Specification, standard or			Inspection/testing frequency	See key on final page.			Identify relevant records Add notes to assist.
✓	**PRELIMINARIES**								
1.1	SWMS, EWMS and EPL	G22 Cl 3.4 G36 G38		-Ensure SWMS & EWMS are in place, understood and signed off by all personnel involved in completing the task -Ensure EPL criteria are conformed with	Prior to commencement	PE	✓		Refer to checklist 1680-CHK-R116-001
1.2	Erosion and Sedimentation Control Plan	G38 Cl 2.1.2 G38 Cl 3.1.1		Ensure ERSED plan has been developed and communicated to site team.	Prior to commencement	ENM	✓		Refer to checklist 1680-CHK-R116-001
1.3	Traffic Control	G10 Cl 2		-Traffic control is in place. -Relevant TCP and VMP are approved	Prior to commencement	TM	✓		Refer to checklist 1680-CHK-R116-001
1.4	Construction Lot Identification, Traceability and Frequency of Testing	Q6 Cl 7.5.3 Annexure L1 Annexure L3		-Set the bounds for each construction lot as per Q6 requirements -Lot Number assigned -Lot size as per specification -This lot number as an identifier on all quality records -Lot map is prepared for traceability -Frequency of testing as per Q6/L3 and specification requirements	Prior to commencement	PQR	✓		Refer to checklist 1680-CHK-R116-001

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✓	**MATERIAL & PRODUCTION OF ASPHALT**								
2.1	Submission of nominated mix design details **HOLD POINT**	R116, Cl 2.3.5		Documents as detailed in Clause 2.3.3	Each mix and 7 days prior to placement	ENG	HP		Refer to checklist 1680-CHK-R116-001
2.2	Progression to a higher RAP Approval Level **HOLD POINT**	R116, Ann F1		Documentation demonstrating compliance with the Performance Period corresponding to the higher RAP Approval Level applied for	Prior to commencement	ENG	HP		Refer to checklist 1680-CHK-R116-001
2.3	Production tolerance	R116, C6 2.4.2		The actual combined particle size distribution & actual binder content may vary from their nominated values within the limits shown in Table R116.8 **Table R116.8 – Production Tolerances** **Description** / **Tolerance (% by mass)** **Permissible variation to nominated values during production, for each mix size:** **Combined particle size distribution (AS sieve)** [1, 3] 4.75 mm and larger: ± 7 2.36 mm: ± 5 1.18 mm: ± 5 600 µm: ± 4 300 µm: ± 4 150 µm: ± 2.5 75 µm: ± 1.5 **Binder content** [2, 3]: ± 0.3	Per Lot	ENG	✓		Refer to checklist 1680-CHK-R116-001
2.4	Storage and handling (Production)	R116 Cl 2.4.4		**Binder**: Heating and storage must comply with the temperature and time limits set out in Advisory Note 7 published by AAPA **Asphalt:** which does not contain RAP material may be retained in hot storage silos for a period not exceeding 24 hours	Per Lot	SS	✓		Refer to checklist 1680-CHK-R116-001

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2.5	Manufacturing Temperatures	R116, Cl 2.4.5		The temperature of asphalt must not at any time in the process exceed 175˚C.	Per Lot	SS	✓		Refer to checklist 1680-CHK-R116-001
2.6	Sampling and testing during production	R116, Cl 2.4.7		-Verify conformity with the Specification by sampling and testing and maintain records of your process control during asphalt production. - Asphalt samples in accordance with AS 2891.1.1	Annexure R116/L	ENG SS	✓		Refer to checklist 1680-CHK-R116-001
2.7	Transport of asphalt	R116, Cl 2.5		-Transport of asphalt in accordance with AS2150 -Ensure a uniform, light coating of the vehicle's tray without ponding of surplus release agent	Per Lot	ENG SS	✓		Refer to checklist 1680-CHK-R116-001
✓	**PLACEMENT OF ASPHALT**								
3.1	Surface preparation	R116, Cl 3.1.2		Prepare the surface to be paved in accordance with AS 2150, including removal of raised extruded thermoplastic road markings and raised pavement markers	Per Lot	SS	✓		Refer to checklist 1680-CHK-R116-001
3.2	Protection of Road and Services Fixtures	R116, Cl 3.1.3		Prevent asphalt from entering or adhering to grates, hydrants or valve boxes, service covers, bridge joints and other road fixtures	Per Lot	SS	✓		Refer to checklist 1680-CHK-R116-001
3.3	Existing surface condition	R116, Cl 3.2.1		Clean, dry, and free from loose material, prior to application of the tackcoat	Per Lot	SS	✓		Refer to checklist 1680-CHK-R116-001

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3.4	Tackcoat application rate	R116, Cl 3.2.2		Apply the tackcoat evenly at a rate of between 0.15 & 0.30 L/m^2 of residual bitumen. For joints and chases, double the application rate. Nominate in writing to the **Principal** your proposed tackcoat application rate prior to applying the tackcoat	Per Lot	ENG SS	✓		Refer to checklist 1680-CHK-R116-001
3.5	Tackcoat daily record	R116, Cl 3.2.4		Provide to the **Principal** a signed daily record of the average tackcoat application rate applied to each Lot	Per Lot	ENG SS	✓		Tackcoat daily record
3.6	Condition of tackcoat at commencement of asphalt placement	R116, Cl 3.2.5		The tackcoat must be intact at the commencement of asphalt placement	Per Lot	SS	✓		Refer to checklist 1680-CHK-R116-001

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3.7	Temperature and weather condition	R116, Cl 3.3		Measure & record the temperature of the surface to be paved, & wind velocity at the point of asphalt placing Pavement surface temperature must comply with below requirements: (a) Where the nominal size of asphalt is < 20 mm, the min. pavement surface temperature must be < 8ºC at zero wind speed at pavement level for binder complying with RMS D&C 3253; (b) Where the nominal size of asphalt Is ≥ 20 mm, the min. pavement surface temperature must be < 5ºC at zero wind speed at pavement level for binder complying with RMS D&C 3253; (c) Add 5ºC to each of the limits in (a) or (b) above for binder complying with RMS D&C 3252; and (d) Add 5ºC to each of the limits in (a), (b) & (c) above for each 5 kph of wind speed above zero (measured at pavement level) provided that the cumulative temperature for (a), (b) or (c) above does not exceed 30ºC	One measurement every 2 hours	ENG SS	✓		Asphalt paving record

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3.8	Method of placement	R116, Cl 3.4		Place the asphalt using a self-propelled paver with the ability to be operated with automatic grade control & automatic joint matching facility Hand placement of asphalt is only permitted for minor corrections of the existing surface & in areas where placement with a paver is impractical Material transfer vehicle (MTV) to be used in the paving operations. MTV must be a self-propelled machine with independent controls and must comply with R116, Cl 3.4.3	Per Lot	SS	✓		Refer to checklist 1680-CHK-R116-001
3.9	Submission of paving and compaction temperature details to achieve conformity (including trial section) **HOLD POINT**	R116, Cl 3.5		Submit details of the following: (a) minimum temperature at which asphalt will be delivered to the paver; (b) minimum temperature at which initial compaction of the asphalt can still commence. (c) method of temperature measurement Measure the asphalt temperature using a hand held or machine mounted infrared thermometer, which is accurate to within ± 2°C, either at the point of discharge from a tipper truck or at the distribution auger on the paver	Per Lot	ENG SS	**HP**		Refer to checklist 1680-CHK-R116-001
3.10	Course and layer thicknesses	R116, Cl 3.6.1 R116, Cl 3.6.2		-The specified course thickness is detailed in Annexure R116/A, or shown on the Drawings -The nominated thickness of a layer of asphalt must be between 3.0 to 5.0 times the nominal mix size	Per Lot	SS	✓		Refer to checklist 1680-CHK-R116-001

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3.11	Placing of asphalt in nonconforming layer thicknesses **HOLD POINT**	R116, Cl 3.6.3		Submit details of the following: (a) nominated layer thicknesses which does not conform to specified thicknesses; (b) work methods capable of producing a dense homogeneous layer at these thicknesses; (c) areas affected, and evidence that these areas are the absolute minimum necessary.	Per Lot	ENG SS	**HP**		Refer to checklist 1680-CHK-R116-001
3.12	Joints	R116, Cl 3.7.1		**Longitudinal joints must be:** (a) offset by 150 mm from the joint in the underlying layers; (b) located within 150 mm of the line of change in crossfall; (c) coincident with final traffic markings, unless otherwise approved by the Principal. **Transverse joints must be:** (i) located at a minimum of 25 m apart; (ii) offset by a minimum of 1 m from the joint in the underlying layer; (iii) formed at the commencement of each paving run; (iv) formed when a delay in paving causes asphalt temperature to fall below the initial compaction temperature nominated	Per Lot	SS	✓		Refer to checklist 1680-CHK-R116-001

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3.13	Temporary ramps at joints	R116, Cl 3.7.3		-Construct temporary ramps at joints either by placement of asphalt complying with this Specification, or by cold milling the existing or new asphalt layer to form the ramp -The length & grade of temporary ramps must be equivalent to those specified for treatment at edges & structures described in R101	Per Lot	SS	✓		Refer to checklist 1680-CHK-R116-001
3.14	Tie-ins to existing pavements	R116, Cl 3.7.4		Construct permanent tie-ins to existing pavement by placement of asphalt complying with R116	Per Lot	SS	✓		Refer to checklist 1680-CHK-R116-001
3.15	Submission of verification checklists and test results from trial section **HOLD POINT**	R116, Cl 3.8		-Construct a separate trial section using the plant and personnel proposed for the work for each nominated mix -Submit Verification checklist and all relevant test results from the trial section demonstrating conformity to the specified requirements, at least 3 working days prior	Each mix	ENG SS	**HP**		Refer to checklist 1680-CHK-R116-001

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✓	**SAMPLING AND TESTING OF PLACED ASPHALT**								
4.1	Determination of insitu air voids	R116, Cl 4.2 R116, Cl 5.3 Ann. R116/K1		-Asphalt layer > 30mm & determined by either: (a) **Cores**: Take cores in accordance with AS 2891.1.2. Do not reduce the core thickness by > 5 mm. or, (b) **Nuclear density gauge**: In accordance with AS/NZS 2891.14.2 & AS/NZS 2891.14.3. -Determine the bulk in accordance with AS/NZS 2891.9.2. **Characteristic Values of Insitu Air Voids** Layer Type / Lower Limit / Upper Limit Specified layer thickness: > 30 mm and < 50 mm: 3.0% / 8.0% ≥ 50 mm: 3.0% / 7.0%	As specified for relative compaction > 100.0% in Q6 Clause L3.1	ENG SS	✓		Test Report / Refer to checklist 1680-CHK-R116-001
4.2	Determination of course thickness	R116, Cl 4.3.2 R116, Cl 4.3.3		**From Cores**: Cores taken in accordance with AS 2891.1.2 -The core layer thickness is determined prior to trimming of the core -The maximum and minimum characteristic values of thickness for the Lot calculated in accordance with Annexure R116/K2 **By Survey:** Carry out surveys for product conformity in accordance with Specification TfNSW G71 Clause 5.3.3	For cores: As specified for relative compaction > 100.0% in Q6 Clause L3.1 G71 Clause 5.3.3 for survey	ENG SS SU	✓		Test Report Survey report / Refer to checklist 1680-CHK-R116-001

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4.3	Course thickness, where finished surface level not specified	R116, Cl 5.4.1		-The course is a single layer & is placed over an existing pavement constructed by others, the average compacted course thickness for each Lot must be within the tolerances specified in Table R116.10 for the nominal size of asphalt -Where the course is placed over one or more layers which have been placed by you, the characteristic values of the course thickness for the Lot must be within the tolerances specified in Table R116.10 for the nominal size of asphalt -Where the asphalt is placed in one or more layers to form a single course, the course thickness calculated in accordance with Clause 4.3.1 must be within the tolerances specified in Table R116.10 for the nominal size of asphalt **Table R116.10 – Allowable Tolerances for Course Thickness** Nominal Size of Asphalt (mm) / Tolerances (mm) 5 / –0 / +5 7 / –0 / +5 10 / –0 / +6 14 / –0 / +8 20 / –0 / +10 28 / –0 / +12	For cores: As specified for relative compaction > 100.0% in Q6 Clause L3.1 G71 Clause 5.3.3 for survey	ENG SS	✓		Test Report Survey report /Refer to checklist 1680-CHK-R116-001

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4.4	Course thickness, where finished surface level specified	R116, Cl 5.4.2		The course thickness is deemed to conform if the asphalt course surface levels conform under Clause 5.5.1 The average compacted course thickness of each Lot of the wearing course must be within 10% of the specified course thickness.	For cores: As specified for relative compaction > 100.0% in Q6 Clause L3.1 G71 Clause 5.3.3 for survey	ENG SS			Test Report Survey report / Refer to checklist 1680-CHK-R116-001
4.5	Determination of course position	R116, Cl 4.4		**Finished Surface Levels Not Specified:** determine the course position of each Lot by reference to existing pavement surface & road fixtures. **Finished Surface Levels Specified:** measure the course position of each Lot by survey in accordance with Q6 & G71 Cl 5.3.3. **Survey Location for Determining Course Position:** The survey location of any point on the surface of a course for level determination must be located within 25 mm from the corresponding point determined from the dwgs	Per Lot	ENG SS	✓		Refer to checklist 1680-CHK-R116-001
4.6	Course position	R116, Cl5.5.1		Must not deviate from the design levels by more than the tolerances shown in Table R116.11 **Table R116.11 – Course Surface Level Tolerances** **Course** / **Tolerances (mm)** Wearing course: –0 / +10 Top Intermediate course: –5 / +10 Other Intermediate Courses: -10 / +10 Corrective course: –15 / +10	Per Lot	ENG SU	✓		Survey report / Refer to checklist 1680-CHK-R116-001

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4.7	Matching existing surface levels	R116, Cl 5.5.2		Construct the pavement such that its surface levels match the surface levels of the existing road structure & its surface does not pond water	Per Lot	ENG SS	✓		Refer to checklist 1680-CHK-R116-001
4.8	Determination of surface shape	R116, Cl 4.5		-In accordance with Test Method TfNSW T183 -The maximum Lot size must be in accordance with TfNSW Q but extended to include the adjacent longitudinal joints, transverse joints and tie-ins	As per R116/L.5	SS	✓		Refer to checklist 1680-CHK-R116-001
4.9	Surface shape	R116, Cl 5.6		-The surface of the course including longitudinal and transverse joints must not pond water -The surface shape of the course within and across traffic lanes must not deviate from the bottom of the straightedge laid in any direction by > the tolerances shown in Table R116.12 **Table R116.12 – Maximum Deviation From Straightedge (mm)** **Course** / **Through Carriageway < 70 kph Traffic Speed, Ramps and Roundabouts** / **Through Carriageway ≥ 70 kph Traffic Speed** **Immediately after placing** Corrective course: 15 / 10 Intermediate course: 10 / 5 Wearing course: 5 / 3 **Prior to placing overlying layer** (1) Corrective course: 18 / 13 Intermediate course: 13 / 8 **12 months after placing** Wearing course: 8 / 6	**(a) within lane**: One measurement in longitudinal direction and 1 measurement in transverse direction every 60 m2 **(b) Longitudinal joint** One measurement per 20 lineal metres or adjacent to within lane measurements whichever is the lesser **(c) Transverse joint** One measurem ent in each wheel path in each lane	SS	✓		Test report / Refer to checklist 1680-CHK-R116-001

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4.10	Determination of ride quality	R116, Cl 4.6		-Determine the ride quality from measurements of the longitudinal profile (as specified in Ann. R116/A) taken by a vehicular laser profilometer -The International Roughness Index (IRIS) determined in accordance with Test Method TfNSW T188 -Where the Works comprise a single layer of asphalt placed over a pavement constructed by others, determine, and report the ride quality of the existing surface prior to commencement -**Provide the Principal** with copies of the TfNSW Accreditation Certificates for each proposed vehicular laser profilometer driver and operator	Per Lot	ENG SS	✓		Test report / Refer to checklist 1680-CHK-R116-001 Certificates
4.11	Requirements for ride quality	R116, Cl 5.7		-The surface of the wearing course must have a smooth longitudinal profile (a) construction of the underlying pavement forms part of the contract; or (b) the course comprises > one layer of asphalt, including any corrective course, placed over a pavement constructed by others; or (c) the aim of the asphalt paving work is to improve the ride quality. -The ride quality of each Lot < IRI_S of 1.56 m/km. -Where a single layer of asphalt is placed over pavement constructed by others, the ride quality of each Lot must not exceed the IRI_{Sa} values determined as follows (refer Clause 4.6): $IRI_{Sa} = 0.2 + (0.6 \times IRI_{Sb})$, but not > 1.56 m/km	Per Lot	ENG SS	✓		Test report / Refer to checklist 1680-CHK-R116-001

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4.12	Submission of test results	R116, Cl 4.7		Submit to the Principal test reports for: (a) combined particle size distribution, binder content and air voids in laboratory compacted mix within 1 working day of placing the asphalt. (b) the tests for insitu air voids, course thickness and course shape within 3 working days of placement of the asphalt.	Per Lot	ENG SS	✓		Test report / Refer to checklist 1680-CHK-R116-001
4.13	Restoration of core holes	R116, Cl 4.8		-Materials used for restoration of core holes must be a bituminous mix, and may be installed either hot or cold in accordance with the product manufacturer's recommendations and suitable for the intended purpose -Prepare the core holes by removing any dirt inside, then brush, sponge and/or vacuum the core hole clean and allow it to dry -Apply a heavy coating of rapid set bitumen emulsion or similar material, to the sides and floor of the core hole -Fill the core holes without segregation or contamination of the fill material in layers not exceeding 50 mm -Compact each layer using suitable compaction equipment such as motorised hammer, plate compactor, and/or hand tampers. -The finish top surface of the backfill material must not be below the level of the existing pavement	Per Lot	SS	✓		Refer to checklist 1680-CHK-R116-001

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✓	**CONFORMANCE**								
5.1	Homogeneity	R116, Cl 5.2		Placed asphalt must be homogeneous in appearance, and must not exhibit segregation, cracking, ravelling, bony or fatty material, or have been damaged during construction	Per Lot	ENG SS	✓		Refer to checklist 1680-CHK-R116-001
5.2	Rectification or replacement of a nonconforming Lot **HOLD POINT**	R116, Cl 5.8.5		Nonconformity Report and details of your proposal to rectify or replace the Lot	Per Lot	ENG	**HP**		Refer to checklist 1680-CHK-R116-001
5.3	Further production of the nominated mix **HOLD POINT**	R116, Ann B2.3		a) Proposed corrective action to achieve conformity. (b) Test results for insitu air voids and all properties specified in Clause 2.2 of the nonconforming Lot	Per Lot	ENG	**HP**		Refer to checklist 1680-CHK-R116-001
5.4	Identification and Control of Non-conforming Products or Services	Q6 Cl 8.3		NCR to be opened & closed prior to closing of construction Lot	After work completion	PQR	✓		Non-Conformance Report
5.5	Verification that Rectified Work Conforms **HOLD POINT**	Q6 Cl 8.3		Verification that rectified works conform to accepted rectification method and specifications within the NCR	Prior to covering up the works	PQR	**HP**		**NCR #** Refer to checklist 1680-CHK-R116-001
5.6	Final Verification of Construction Lot Records	Q6 Cl 8.2.4.3		To confirm that all inspections and tests have been carried out to completely verify conformity.	Prior to closing out each lot	PQR	✓		Refer to checklist 1680-CHK-R116-001

Memorial Avenue Upgrade, Kellyville Job No. 1680 Client: Transport for New South Wales (TfNSW) Principal's Authorised Person: Mark Jajou		Area No.	1
		Activity Type	Heavy Duty Dense Graded Asphalt

INSPECTION AND TEST PLAN	***Heavy Duty Dense Graded Asphalt – R116*** ***Ed 9 / Rev 0 (July 2020)***	Checklist No.	1680-CHK-R116-001

Item	Activity	Reference		Acceptance Criteria	Frequency	Acceptance By			Record / Comments
		Spec	Method			DG	TfNSW	Other	
	In work sequence	OHSR, Environment, Quality aspect Specification, standard or			Inspection/testing frequency	See key on final page.			Identify relevant records Add notes to assist.

KEY				
	CoC	Certificate of Conformance	ENG	Engineer Responsible
	HP	Hold point	ENM	Environmental Manager
	IR	Identified Record	PE	Project Engineer
	S	Surveillance	PQR	Project Quality Representative
	T	Test	SS	Site Supervisor
	WP	Witness point	SA	Site Administrator
			SU	Surveyor
			TM	Traffic Manager

Prepared by: Tamer Mohamed	Authorised for Use: Andrew Rigby	Date: 28/03/2022