Supplementary Table 1: Detailed Multiplex IHC Staining Condition

Order	Antibody	Source	Clone	Manufacturer	Dilution	Diluent	AR pH	Detection Kit	Opal
1	PD-1	Rabbit	EPR4877(2)	Abcam	1:1500	Antibody Diluent/Block (Akoya Biosciences)	9	Mach 3 Rabbit HRP-polymer (Biocare Medical)	540
2	CD103	Rabbit	EPR4166(2)	Abcam	1:1500	Antibody Diluent/Block	9	Opal Polymer HRP Ms + Rb (Akoya Biosciences)	620
3	CD8	Mouse	C8/144B	Dako	1:1500	Antibody Diluent/Block	9	Opal Polymer HRP Ms + Rb	650
4	CD3	Rabbit	MRQ-39	Cell Marque	1:1500	Antibody Diluent/Block	9	Opal Polymer HRP Ms + Rb	570
5	CD39	Rabbit	EPR20627	Abcam	1:2000	Antibody Diluent/Block	9	Opal Polymer HRP Ms + Rb	520
6	SOX10	Mouse	BC34	Biocare Medical	1:200	Renoir Red (Biocare Medical)	9	Opal Polymer HRP Ms + Rb	690

Supplementary Figure 1. CD8+ T cell population association with other clinical factors. Composition of the $CD8^+$ T cell compartment as a percentage of each population in all patients (n = 84). CD8+ T cell population profiles were divided by BRAF status (A) and PD-L1 positivity (B)

Supplementary Figure 2. Impact of treatment type on CD8+ T cell associations with recurrence. CD8+ T cells, P1 and P8 were evaluated for outcome (recurrence (R) and recurrence-free (RF)) separately in

patients treated with either anti-PD-1 alone (n=58) or anti-PD-1 + anti-CTLA-4 (n=26). Statistical differences were calculated using an unpaired non-parametric Mann-Whitney test ($p < 0.05$).

Supplementary Figure 3. P1 proximity to melanoma is significantly closer than that of P8. Distance from each CD8+ T cell population analysed to melanoma and % of each population within 20 µm of melanoma was analysed in all patients (n = 84).

Supplementary Figure 4. Recurrence free survival split by quartile. Kaplan-Meier curves were plotted for patients with $CD8^+$ (A), P1 (B), P8 (C) cells. Cutoffs for CD8+ T cell populations were determined by quartiles, with Q1 being the lowest cells/mm^2 or % of CD8+ T cells to Q4 being the highest. Statistical differences were calculated using a log-rank test.

Supplementary Figure 5. High P1/CD39+ Trms remain significantly associated with recurrence-free survival in the validation cohort. Kaplan-Meier curves were plotted for patients with high $CD8^+$ (A), P1 (B), P8 (C) cell counts against low counts. High vs low groups were determined by the median value for each cell population as calculated from the discovery cohort. Median RFS is shown where it is reached. Statistical differences were calculated using a log-rank test.

Supplementary Figure 6. PD-L1 lacks utility as a predictive biomarker at multiple positivity cutoffs. Kaplain-Meier curves for recurrence-free survival were generated based on PD-L1 staining, using either 1% or 5% as a cutoff for positivity. Statistical differences were calculated using a log-rank test.