Erratum to *Rainbow Turán Problems*, by P. Keevash, D. Mubayi, B. Sudakov and J. Verstraëte

In the proof of the upper bound in Theorem 1.5 we consider a graph $G$ on $n$ vertices that is properly coloured with no rainbow $C_6$. We let $G'$ be a bipartite subgraph of $G$ with $e(G') \geq e(G)/2$. We say that a subgraph $K_{2,t}$ of $G'$ is maximal if it is not contained in any $K_{2,t'}$ in $G'$ with $t' > t$. Then we claim that if $G'$ contains a maximal $K_{2,s}$ and a maximal $K_{2,t}$ with $s, t \geq 9$ then they must be edge-disjoint. However, the argument that we give for this claim is incorrect.

We correct the proof as follows. Suppose that $G'$ has bipartition $(A, B)$. We claim that one cannot find a maximal $K_{2,s} = (A_1, B_1)$ and a maximal $K_{2,t} = (A_2, B_2)$ sharing an edge, where $A_1, A_2 \subset A$ have size 2, $B_1 \subset B$ has size $s \geq 9$ and $B_2 \subset B$ has size $t \geq 9$. The proof of this claim is exactly that given for the first case ($x \in A_1 \cap A_2$ and $y \in B_1 \cap B_2$) in the paper: such a configuration leads a rainbow $C_6$, which is a contradiction. Now suppose that $(A', B')$ is a maximal $K_{2,t}$ with $A' = \{a_1, a_2\} \subset A$ and $B' \subset B$ of size $t \geq 9$. Delete from $G'$ all edges joining $a_1$ to $B'$. Repeat this process as long as there is any (maximal) $K_{2,t}$ with $t \geq 9$. Note that we have considered mutually disjoint sets of edges and deleted half of each, so we have deleted at most half of the edges of $G'$. The remaining graph $G''$ contains no $K_{2,9}$ with 2 points in $A$ and 9 points in $B$. Similarly, we can delete at most half of the edges of $G''$ to obtain a graph $G'''$ that contains no $K_{2,9}$ with 2 points in $B$ and 9 points in $A$, and so no $K_{2,9}$ at all.

Now, as in the paper, we apply Lemma 3.1 to $G'''$ and deduce that it has average degree $d''' < (1 + o(1))(87n)^{1/3}$. It follows that $e(G) \leq 2e(G') \leq 4e(G'') \leq 8e(G''') = 4d'''n < 18n^{4/3}$ for large $n$. Therefore the upper bound in Theorem 1.5 still holds, with a larger value of the constant $c_2$.

We also need to increase the constant in remark (1) following the proof of Theorem 1.5. It follows that an edge-coloured bipartite graph on $2n$ vertices with no rainbow $C_6$ has at most $\frac{1}{2} 18(2n)^{4/3} < 24n^{4/3}$ edges (for large $n$). Applying this to a bipartite Cayley graph we see that in any abelian group of order $n$, a $B_3^*$-set can have at most $24n^{1/3}$ elements.