Reduce to minimum weight bipartite matching under the L_1 (Manhattan) distance metric. $O(n^2 \log^3 n)$ (for complete matching) [1]. We can probably modify the algorithm to work for the noncomplete matching case. Alternatively, we can reduce to 3D noncomplete matching under the L_∞ distance metric, by adding dummy vertices $(0, 0, M)$, where M is sufficiently large, and the original graph (transformed to L_∞, by rotating 45°) lie on the x-y plane. We only get a $\log^{O(1)} n$-factor slowdown (the number of logs can be determined by the complexity of 3D range trees).

References

[1] Pravin M Vaidya. Geometry helps in matching. *SIAM Journal on Computing*, 18(6):1201–1225, 1989.