

Highlights

- New facility location problems that combine the use of neighbourhoods and barriers together.
- Exact second-order cone formulations for the k-median with neighbourhoods and barriers.
- Preprocessing and strengthening techniques that enhance the formulations.
- Design of a matheuristic algorithm that provides good quality solutions for the formulations.
- Exhaustive computational experiments on planar graph instances considering different parameters and approaches.
- Case study in drone delivery applied to the city of Córdoba.