

### Survey Accuracies and Specifications (SAS) – Setting Out Surveys Summary

|           |  | SAS Level 1<br>Low Accuracy  | SAS Level 2<br>Mid to Low Accuracy   | SAS Level 3<br>Medium Accuracy   | SAS Level 4<br>Medium to High Accuracy  | SAS Level 5<br>High Accuracy  |
|-----------|--|--|--|--|---|---|
| Paragraph | Description                                      | Level 1 surveys only require the use of a GPS and using long base lines (5-10km). The longer the base lines the lower the accuracy of the surveyed points. | Level 2 surveys require the use of a GPS with shorter base lines (2-5 km's). The shorter base lines increase accuracies of the placed points. Total station only being used to set out points where the GPS loses fix. | Level 3 surveys require the use of a GPS with shorter base lines (0-2 km's). The shorter base lines increase the accuracies of the placed points. Total station only being used to set out points where the GPS loses fix. | Level 4 surveys require the use of a GPS to establish the horizontal position of the placed points by using a double polar from two survey control points (short GPS base lines 0-2 km's). All placed points must either be levelled by means of a one way levelling run or by using total station heighting. | Level 5 surveys require the use of a Total Station to establish the horizontal position of the placed points by using double polars from two survey control points. All placed points must be levelled by using at least a digital level with a double levelling run. |
| 1         | Survey Control - Benchmarks or Trig Beacons (SC) | Ensure there is at least 1 survey control point on site  | Ensure there is at least 2 survey control points on site   | Ensure there is at least 2 survey control points on site   | Ensure there is at least 3 survey control points on site  | Ensure there is at least 3 survey control point or a target reference network on site   |
| 2         | Placed Points (Horizontal) (estimation)          | Relative to SC < 0.20m & Relative to Each Other < 0.10m  | Relative to SC < 0.10m & Relative to Each Other < 0.05m  | Relative to SC < 0.06m & Relative to Each Other < 0.03m  | Relative to SC < 0.04m & Relative to Each Other < 0.02m   | Relative to SC < 0.02m & Relative to Each Other < 0.005m  |
| 3         | Placed Points (Height) (estimation)              | Relative to SC < 0.50m Relative to Each Other < 0.20m  | Relative to SC < 0.20m Relative to Each Other < 0.08m  | Relative to SC < 0.10m Relative to Each Other < 0.05m  | Relative to SC < 0.05m Relative to Each Other < 0.03m   | Relative to SC < 0.02m Relative to Each Other < 0.005m  |
| 4         | Setting out Applications                         | Approximate site positions   | Farm boundaries, rural water pipeline routes, embankment positions for bulk earthworks   | Urban/farm boundaries (all cadastral work), urban/rural pipeline routes, general setting out   | Road setting out, building setting out  | Pre-cast structural setting out, column setting out, retaining wall positions   |
| 5         | Suggested Outputs                                | Survey report, control list and comparison spreadsheet   | Survey report, control list and comparison spreadsheet   | Survey report, control list and comparison spreadsheet   | Survey report, control list and comparison spreadsheet  | Survey report, control list and comparison spreadsheet  |
| 6         | Equipment and methods                            | GPS Base and Rover (strong radio)  | GPS Base and Rover and a Total Station (5")  | GPS Base and Rover and Total Station (3-5")  | GPS Base and Rover, Total Station (3") and a Level  | Total Station (0.5-3"), Scanner and a Digital/Precise Level   |
| 7         | Minimum Qualifications of surveyor               | Registered Technician (Diploma) under the supervision of a registered Technologist or Professional Surveyor  | Registered Technician (Diploma) under the supervision of a registered Technologist or Professional Surveyor (cadastral work can only be done under the supervision of a registered Professional Land Surveyor).        | Registered Technician (Diploma) under the supervision of a registered Technologist or Professional Surveyor (cadastral work can only be done under the supervision of a registered Professional Land Surveyor).            | Registered Technician (Diploma) with at least 2 years experience under the supervision of a registered Technologist or Professional Surveyor (cadastral work can only be done under the supervision of a registered Professional Land Surveyor).  | Professional Surveyor with prior experience in the field required or under the guidance of someone that has at least 2 years experience.  |

**Definitions:**  
**Relative to Survey Control (SC) :** Relative to SC accuracy refers to the difference between the placed point and that of the position of the SC from which it was placed.  
**Relative to each other:** Relative to each other accuracy refers to the difference between points that have been placed in close proximity to each other.  
**Comparison spreadsheet:** Comparison spreadsheet refers to a spreadsheet in which the design co-ordinates are being compared to the placed co-ordinates.