

Topographical survey using total station

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Abstract—The topographic survey shall be performed on the ground to obtain the information required in this standard. The Surveyor shall select the equipment and procedures necessary to obtain the horizontal and vertical positional accuracy required by these standards. Map production – This will involve plotting of details picked on site to produce the survey plan / map. The plan / map will show all details and contour lines for the site. This will be done using AutoCAD. Utilities are services provided by governmental and private entities that provide the following: electric power, telephone, water, sanitary and storm sewer, gas, etc

I. INTRODUCTION

TOPOGRAPHICAL AND DETAILS SURVEY SCOPE OF WORKS

- i. Obtaining relevant survey data/maps for the area mentioned.
- ii. The field work – This will involve laying out survey control stations and picking of the details on site with total station survey equipment.
 - a. Boundary confirmation
 - b. Picking of x,y,z position of all existing manmade and natural ground features. This includes but not limited to accurate positions of buildings, roads, rivers, shorelines etc
- iii. Map production – This will involve plotting of details picked on site to produce the survey plan / map. The plan / map will show all details and contour lines for the site. This will be done using AutoCAD.

II. TOPOGRAPHICAL SURVEY CHECKLIST

INTRODUCTION

Total station is a surveying equipment combination of Electromagnetic Distance Measuring Instrument and electronic theodolite. It is also integrated with microprocessor, electronic data collector and storage system. The instrument can be used to measure horizontal and vertical angles as well as sloping distance of object to the instrument.

APPLICATION OF THE STANDARD

This standard applies to topographic surveys that are intended to show the contour of the earth's surface and/or the position of fixed objects thereon. The Surveyor in making topographic surveys uses accepted terrestrial or GPS surveying methods. Topographic surveys that additionally depict the location of property lines must also be in compliance with the current standard for property surveys.

DEFINITIONS

- Bench Mark is a relatively permanent material object, natural or artificial, bearing a marked point whose elevation above or below and adopted datum is known.
- A Contour is an imaginary line on the ground, all points of which are of the same elevation above or below a specified datum.

RESEARCH AND INVESTIGATION

- The Surveyor shall acquire the elevation and datum of all bench marks to be used in the survey. The elevation used shall be based on a nationally accepted datum whenever practical.

THE PUBLISHED RESULT

A topographic map or plat shall be prepared that shall be of a scale, size and accurately to clearly show the results of the survey.

DATA

- The surveyor shall locate and show on the topographic survey map or plat the following information:
- Existing contours lines indicating the shape and elevation of the land over the entire parcel in accordance with the following table, unless specifically excluded in the contract with the client:
 - The location of permanent structures including compound walls, roads, and pathways.
 - The location of road paving, entrance drives openings and sidewalks.
 - The official building names and address numbers are assigned.
 - North arrow and scale of drawing.

- Legend depicting the symbols and abbreviations used on the drawing.
- Spot elevations covering the entire survey limits showing high points, low points, grade changes, and at sufficient intervals to represent the general character of the terrain.
- Location of lawn, fountain, or drainage courses on or near the surveyed
- Description and location of bench marks used in the survey.
- All optional items required in Section 9.

POSITIONAL ACCURACY

The following relative positional accuracies are provided as a guide for Positional Accuracy is given at the 95 percent confidence level.

OPTIONAL ITEMS

The following items may be included in the requirements to be shown on a Topographic survey if specifically and mutually agreed upon by the surveyor Boundary survey of the parcel.(Must comply with boundary survey standards)Plot the location of easements and rights-of-way as shown on the recorded subdivision plat and all easements evidenced by a recorded document provided by the client. The reference book and page, or document number of each shall be shown.

- Vicinity map with subject property highlighted.
- Observable evidence of site use as a solid waste dump, sump or sanitary landfill.
- Observable evidence of recent earth moving work, borrow or fill.
- Location and the top elevation of soil borings or monitoring wells if ascertainable.

(Performed by others)

- Location and elevation of at least one bench mark within the limits of the survey.Existing contours shall not be drawn but the drawing shall show existing elevations in both directions over the parcel at 0.5m intervals in rough ground and 1m intervals on level ground and spot elevations at any abrupt changes.
- Elevations at the inside of walk, top of curb, and gutter at approximately 5m intervals at the final map scale.
- Dimensions of curb, sidewalk, and gutter lines or ditch lines and centerline of all streets, alleys or roads adjoining the parcel. Indicate type of paving surface and condition.Location, width and elevation at both ends of all existing sidewalks. Include a description of the kind and general condition of the sidewalk.
- Location, diameter, and species of all trees over 0.3m diameter.
- Perimeter outline only of thickly wooded areas unless otherwise directed.
- Electric utilities – the location of power poles, guy wires, anchors, vaults, etc., on the parcel or in the

buildings, roads, alleys, or railroad right of way adjoining the parcel.

- Storm, sanitary or combined sewers – the location of all observable manholes and other structures such as culverts, headwalls, catch basins and clean-outs on the parcel or in streets, roads alleys or railroad right of way adjoining the parcel. Include elevations of the top and bottom of manholes and catch basins. Show type, size, direction of flow and invert elevation of all pipes or culverts.
- Location and dimensions of any existing buildings, tanks, fences, miscellaneous structures, driveways, or other obstructions on the parcel.
- Location and description of any building or major structure on adjoining land that is not more than 5m outside the parcel being surveyed

III.CONCLUSION

The project may request the Surveyor to provide the survey data in an electronic format. These formats include such files as CAD drawing files, digital terrain model (DTM) files, or digital elevation model (DEM) files. When the Surveyor provides these files, they are only for the benefit of the client on this specific survey. In every case the surveyor shall also provide a signed and sealed hard copy drawing or representation of the survey. This drawing shall be the official plat or map and shall be deemed to be correct and superior to the electronic data.