



Campus Planning & Projects  
461 Webster Street, 3A  
Bethlehem, PA 18015-1796  
Tel: 610.758.3970  
Fax: 610.758.4986  
Web: www.lehigh.edu/~infac

## LAND SURVEYING REQUIREMENTS

Final as of July 30, 2018

### GENERAL SURVEY REQUIREMENTS

1. All services shall be performed by qualified personnel under the supervision of a professional licensed or otherwise qualified by the state Professional Land Surveyor licensed by the Commonwealth of Pennsylvania to practice land surveying, and the document(s) submitted shall bear the Surveyor's seal and statement to that effect.
2. All services shall be performed in accordance with the current edition of the Manual of Practice for Professional Land Surveyors in the Commonwealth of Pennsylvania.
3. The Owner has title to this property and the right of entry for this survey.
4. Record documents provided to the Surveyor by Lehigh University, if any, are attached. After reviewing this information, the Surveyor shall notify Lehigh University of any information gaps or discrepancies that should be resolved in order to complete the Scope of Work.
5. The survey work to be performed will serve as the basis for design of a future land development project requiring zoning and subdivision and land development approval from the local municipality and other county, state and federal agencies. As a result, any survey plans prepared for this project must also meet the drawing requirements of the local municipality's Zoning and Subdivision and Land Development Ordinances and any other related regulations.
6. It is understood that the Owner, or an Agent on the Owner's behalf, may reproduce the Surveyor's drawings without modification and distribute the prints in connection with the use or disposition of the property without incurring obligation for additional compensation to the Surveyor. The original drawings shall remain the property of the Surveyor. Ownership of the Surveyor's work products provided by this contract shall be in accordance with the Surveyor's signed Master Services Agreement.
7. All work and drawings shall be tied to the North American Datum of 1983 (NAD 83), Pennsylvania State Plane Coordinate System, South Zone and North American Vertical Datum of 1988 (NAVD 88) in US feet.
8. All work and drawings shall be tied to two (2) of Lehigh University's permanent control monuments as described in the attached Control Survey Report for Lehigh University as prepared by Herbert, Rowland & Grubic, Inc. and dated September 29, 2016.
9. All drawings containing a building footprint shall be drawn so that at least two points of the building's footprint (preferably corners at opposite ends of a building) are referenced to the Pennsylvania State Plane Coordinate System, South Zone.

10. All drawings containing above ground and/or underground utilities shall be drawn so that at least two points of a permanent structure (one that will remain after construction, preferably a building footprint) are referenced to the Pennsylvania State Plane Coordinate System, South Zone.
11. Unless otherwise stated elsewhere, the precision of the survey shall be based on the positional accuracy concept. The Surveyor shall recommend in the proposal positional accuracy limits and error of closure limits for the property being surveyed.
12. Note that Lehigh University is currently developing standards for the integration of property and topographic survey information with our Geographic Information System. Although these standards have not been finalized, we would appreciate your cooperation in how features are represented on drawings, drawing layers are managed and data is transferred to Lehigh. Additional guidance in this regard will be provided as soon as it is available.

#### **PROPERTY BOUNDARY SURVEY REQUIREMENTS**

1. If requested by Lehigh, the survey work shall be performed in accordance with the Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys effective February 23, 2016 including the additional tasks described in the attached Table A.
2. Prior to making this survey and insofar as is possible, the Surveyor shall acquire data including, but not limited to, deeds, maps, certificates or abstracts of title, section line and other boundary line locations in the vicinity.
3. Reconcile any discrepancies between the survey and the recorded legal description.
4. Show boundary lines, giving length and bearing (including reference or basis) on each straight line; interior angles, radius, point of tangency and length of curved lines.
5. Show individual lot lines and lot block numbers; show street numbers of buildings if available.
6. Give area of the property in square feet if less than one acre; in acres (to .001 acre) if over one acre.
7. Give names of owners of adjacent property.
8. Note identity, jurisdiction and right-of-way width of existing adjoining alleys, streets and highways, including width and type of pavement and edging. Identify street monuments and show distance to the nearest intersection.
9. Note planned rights-of-way and the nature of each.
10. Note planned street widenings.

11. Show recorded or otherwise known easements and rights-of-way and identify owners (holders).
12. Show zoning classification of property. If more than one zone, show the extent of each. Show zoning of adjacent property and property across the street(s) or highway(s).
13. Show building line and setback requirements, if any.
14. Show the net developable area to be calculated in accordance with the local municipal ordinances and regulations.
15. Plot location of structures on the property. Label structures with names. Dimension to property lines and other buildings. Describe building materials and note number of stories. Dimension the perimeters of structures in feet and inches to nearest 1/2 inch.
16. Locate structures on adjacent property within 50 feet of Lehigh University's property and across road rights-of-way adjacent to Lehigh University's property.
17. Note vacant parcels as VACANT.
18. Show encroachments, including cornices, belt courses, etc., either way across property lines.
19. Describe driveways, sidewalks, fences and walls and locate them with respect to property lines.
20. Include identification of party walls.
21. Furnish a legal description based upon the survey results.
22. Unless otherwise prohibited by law, where no monument exists, set permanent iron pin (monument) or other suitable permanent monument at property corners in accordance with local municipal ordinances and regulations; drive pin adequately into ground to prevent movement and mark with wood stake; state on the drawing(s) whether corners were found or set and describe each.
23. The Surveyor shall include as an option in the proposal the recording of survey documents in the county courthouse, if requested by Lehigh University.
24. The Surveyor shall include as an option in the proposal the preparation of a Lot Consolidation Plan, if requested by Lehigh University.

#### **TOPOGRAPHIC SURVEY REQUIREMENTS**

1. All lines of levels shall be checked by separate check level lines, or on previous turning points or benchmarks.

2. Contours shall be shown at 1 foot intervals where existing slopes are equal to or less than 5 percent, at 2 foot intervals where existing slopes are greater than 5 percent and equal to or less than 20 percent, and at 5 foot intervals where existing slopes are greater than 20 percent; error shall not exceed one-half contour interval.
3. Spot elevations shall be shown at:
  - a. Each intersection of a 50-foot square grid covering the property;
  - b. Street intersections;
  - c. 50-foot intervals along the centerline of streets and at the edges of paving not otherwise edged with curbing;
  - d. The top and bottom of all stairs;
  - e. 50-foot intervals and at changes in direction at the top and bottom of curbing, along both edges of sidewalks, and at the top and the upper and lower finished grades along walls.
4. Spot elevations on paving or other hard surfaces shall be to the nearest .01 foot; on other surfaces, to the nearest .10 foot.
5. The name, address, phone number and contact person of the company providing any photogrammetry to the Surveyor, including the date on which any photogrammetry products were created.
6. Floor elevations and elevations at each entrance of buildings on the property. Finished floor elevations for all structures/buildings shall be measured at a point centered on and immediately inside the threshold of the main entrance to the building.
7. Plotted location of structures, paving and improvements above and below ground.
8. The topographic survey work shall include the location of above ground and underground utilities in accordance with Quality Level C, as described in the current edition of the American Society of Civil Engineers (ASCE) Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data CI/ASCE 38-02.
9. Above ground and underground utilities are to be shown based on record information and on surface evidence. Surveyor must place a Pennsylvania One Call for utility locates and coordinate a field meeting with Lehigh University Facilities Services and Campus Planning & Projects staff as part of the survey procedure.
10. Incomplete or unknown information requiring the surveyor to employ techniques of subsurface exploration to locate features or utilities will be an additional service subject to Lehigh University approval.

11. At a minimum, the following information is to be included in the completed survey based on record information and surface evidence.

- **Domestic Water:** piping location, depth and size; valve boxes, meter pits;
- **Fire Protection:** piping location and size including water main connection size; post indicator valves, fire hydrants and valves including ownership of each; size of the main serving each fire hydrant;
- **Sanitary Sewer:** piping location, depth, pressure and size, direction of flow; manhole location, size, depth and inverts and sizes of pipes at each. Note if piping is combined sanitary and stormwater sewer. Sanitary lift stations, buried tanks and septic fields are to be identified;
- **Stormwater Sewer:** piping location, depth and size, direction of flow; manholes, catch basins, culverts, inlets and outlets, and overflow structures including location, depth and size and inverts of pipe at each; rain gardens, retention and detention structures including underground tanks. Note if piping is combined sanitary and stormwater sewer. Stormwater lift stations are to be identified;
- **Electric:** location, elevation, configuration, size and characteristics of underground cable and ductbanks, overhead power poles and cable; configuration and size of manholes and vaults, transformers, traffic control facilities, street and area lighting poles;
- **Natural Gas:** piping location, depth and size, pressure; ownership; main valves and lateral shutoff valves, meter locations; above-ground or buried tanks;
- **Telecommunications:** location, elevation, configuration, size and characteristics of fiber optic, telephone, cable TV and any other communications systems; underground cable and ductbanks; overhead cable and poles; junction boxes and handholds;
- **Central Steam and Condensate Distribution:** underground piping location, depth and size; system pressure, manhole size and depth. Include location and size of meters, traps and tunnels;
- **Central Chilled Water Distribution:** piping location, depth, pressure and size, valves, vents and drains.

12. Show the name of the owner and operating authority, including contact person and phone number, for each utility indicated above.

13. Location and type of signage and site furniture.

14. Show and describe the following natural features:

- a. Soil types as identified in county soil surveys.
- b. Mean elevation of water in any excavation, well or nearby body of water.
- c. Location of flood plains and the flood levels of streams or adjacent bodies of water.
- d. Delineated wetlands.
- e. Sinkholes.
- f. Extent of the watershed(s) within the property.
- g. Location of trees with a diameter at breast height of 2" or more. Locate the center of these trees within a tolerance of 6 inches and identify the genus and species in common English and botanical terms. Note those specimen trees flagged by the Owner.
- h. Location of hedges, landscaped beds or other planting areas.
- i. Perimeter outline only of thickly wooded areas unless otherwise directed.

#### **GEOTECHNICAL SURVEY REQUIREMENTS**

1. Show the location of test borings if ascertainable, and the elevation of the tops of holes.
2. Show the location(s) of suspected or confirmed soil contamination(s).

#### **CONSTRUCTION AND AS-BUILT SURVEY REQUIREMENTS**

1. A minimum of one permanent benchmark shall be set on the property for each four acres of area. The benchmark shall be set at an elevation to nearest .01 foot and a description of the benchmark shall be noted.
2. As-built dimensions of utilities shall be taken as construction occurs to an accuracy as stated in the proposal submitted by the Surveyor and approved by Lehigh University prior to the start of any work.
3. As-Built drawings shall include, at a minimum, elevation and plan view dimensions of at least 50-foot intervals and whenever there is a change in the direction or elevation. Plan view dimensions shall be referenced to building walls, edges of sidewalks, back of curbs, existing survey monuments, and/or other approved structures. Elevations shall be made from finished grade to the top of the utility. Underground pipes, tunnels, and direct buried cables shall be measured vertically from the top of the utility and the centerline in the horizontal direction.



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Items exposed or above grade such as valve boxes, cast iron lids, flush access doors, and hydrants shall be measured from the centerline.

4. As-built drawings will be requested after the utilities are in the ground, which may be considerably before the building is complete.