



## **B-02 - SURVEYING**

### **B-02.1 – GENERAL SURVEY GUIDELINES**

The Designer shall confer with the University’s Project Manager, the future occupants, and the owner representatives at the beginning of the schematic design phase to review the program and establish the project requirements.

#### Existing Conditions

The University attempts to provide accurate, as-built drawings for the use of the Designer. However, due to the age of many of the University’s buildings and the many renovations some buildings have endured, as-built drawings are not always available. It is the responsibility of the Designer to notify the Project Manager when any information regarding the existing conditions of a project is inaccurate or inadequate.

#### Site Utilities Information

Additional information is available on the conditions of existing structures, maintenance items that need to be addressed, and hazardous materials in existing structures. This information should not be considered complete or accurate.

The Designer is responsible to review record documents of existing facilities to determine all utility and subsurface tie-ins to adjacent buildings, or building being renovated, including storm and foundation drains, and to determine all utilities located within the project limits, including areas impacted by work of the project.

Project impact limits include improvements may be off the main project site, but are part of the project, such as utility extensions, driveways, and roadways.

#### Site and Existing Conditions Information

The Designer should contact Engineering Information Systems and Energy Services to obtain latest information for construction. They will furnish utility drawings and record drawings for remodeling projects. The University cannot warrant the accuracy of this information.

Given the complexity of the utility infrastructure and the importance of the landscape on UNC-Chapel Hill’s three campuses, it is critical that a surface and sub-surface feature conditions survey be completed by the schematic design phase. Review of the surface and sub-surface features survey by all University utilities is also critical.



## B-02.2 - SITE SURVEY

### Scope of Site Survey

Perform field location surveys of utilities installed during the construction phase. The following outline lists the utilities to be located and the data to be collected. Conventional survey standards are to be utilized during the collection of field data. A mylar copy and digital file of the location surveys are to be provided in AutoCAD 2000 or later format and a DXF file. The surveys will also require an ESRI Shapefile (shp,shx,dbf,xml) file to include the current Metadata Minimum Standards developed by the UNC-CH Engineering Information Services, GIS Team. Prior to awarding of contract, contact Katherine O'Brien at 919-843-1872 or [kobrien@fac.unc.edu](mailto:kobrien@fac.unc.edu) for the current Metadata requirements.

All locations performed will be tied to the University of North Carolina Campus Control Network, North Carolina State Plane Coordinate System NAD83 (2011), horizontal and NAVD88, vertical. For a map of Campus Control Points contact UNC's Campus Surveyor at 919-962-3039 or see <https://maps.unc.edu/pdf/>

A minimum of two (2) survey control points of semi-permanent material such as rebar or iron pipe oriented to this system shall be established at the project location. The bearing and distance from at least one of the project control points to the UNC-CH Control Monuments used shall be labeled.

### Utilities

The Construction firm in charge will provide a surveyor on site to locate all newly installed underground utilities to be delivered with the final construction documentation.

#### **1. Steam Tunnel and Lines**

- a. Location and elevations of the tunnel slab, top of the cap, condensation lines and manholes.
- b. Location, size and change in elevations on the steam and condensation pipes in the tunnel.
- c. List the construction material for the tunnels.
- d. Elevations are to be within a tenth of a foot (0.10')

#### **2. Water Lines (Domestic, Chilled & Hot Water other than OWASA mains)**

- a. Locations, size and elevations at the top installed water lines.
- b. Locations of valves and a valve type designation.
- c. Elevations are to be within a tenth of a foot (0.10')

#### **3. Electric and Communication Duct Banks**

- a. Location and elevation of the duct bank top and bottom.
- b. Location and elevations of conduit runs in the duct bank.
- c. Elevations are to be within a tenth of a foot (0.10')

#### **4. Storm Sewer**

- a. Locate manholes rims or inlets with invert elevations to a hundredth of a foot (0.01').
- b. Note if manhole rims are in the center of the structure or measure the offset, pipe sizes, material types and the direction of the flow.

#### **5. Sanitary Sewer**

- a. Locations and elevations of manholes with inverts of all pipes entering and leaving the structure.
- b. Elevations are to be within a tenth of a foot (0.10').



## 6. Existing Utilities

- a. Locate any existing utilities exposed during excavation of trenches for new utilities. Provide the locations and elevations of these utilities along with a digital photograph of the crossing.
- b. Elevations are to be within a tenth of a foot (0.10')

## 7. Safety Issues

Safety is UNC's number one priority on the job site. On sites with current construction activity, Surveyors must sign in with the Construction Superintendent. The Surveyors are required to wear safety glasses, hard hats and orange vests at all times on a construction job site. The Construction Superintendent will direct all locations being performed in or near open trenches and structures.

## 8. Deliverables

- a. The subsurface location surveys data and platting will be continuous throughout the project. All data and plats are due to UNC-CH within two-weeks of the backfilling of utilities or completion of a construction task.
- b. The surveys shall be delivered in a DWG electronic format and a PDF format.

### Delivery Format

A final site survey of newly constructed surface and sub-surface features to include but not limited to hardscape and landscape will be submitted before the project is finalized. Drawing is to include a survey report as outlined in <http://www.maps.unc.edu> The survey shall include where newly constructed features tie into existing features.



## B-02.2 - SURFACE LOCATION AND TOPOGRAPHIC SURVEY STANDARDS

### General Requirements

1. The plat or map of such survey shall bear the name, address, telephone number, and signature of the professional land surveyor who made the survey, his or her official seal and registration number, the date the survey was completed and the dates of all revisions.
2. The survey shall be drawn to a convenient scale, with that scale clearly indicated. A graphic scale, shown in feet, shall be included. A north arrow shall be shown. Symbols or abbreviations used shall be identified on the face of the plat or map by use of a legend or other means. If necessary for clarity, supplementary or exaggerated diagrams shall be presented accurately on the plat or map. The plat or map shall be a minimum size of 11 by 17 inches. The Surveyor will provide UNC-Chapel Hill with a sealed mylar copy and digital file of the location surveys in AutoCAD 2000 or later format and a DXF file. The surveys will also require an ESRI Shapefile (shp, shx, dbf, xml) file to include the current Metadata Minimum Standards developed by the UNC-Chapel Hill Engineering Information Services, GIS Team. Prior to awarding of contract, contact Katherine O'Brien at 919-843-1872 or [kobrien@fac.unc.edu](mailto:kobrien@fac.unc.edu) for the current Metadata requirements.
3. All locations performed will be tied to the University of North Carolina Campus Control Network, North Carolina State Plane Coordinate System NAD83 (2011), horizontal and NAVD88, vertical. For a map of Campus Control Points contact UNC's Campus Surveyor at 919-962-3039 or see <https://maps.unc.edu/pdf/>. A minimum of two (2) survey control points of semipermanent material such as rebar or iron pipe oriented to this system shall be established at the project location. The bearing and distance from at least one of the project control points to the UNC-CH Control Monuments used shall be labeled.
4. Measured and record distances from corners of parcels surveyed to the nearest right-of-way lines of streets, together with recovered lot corners and evidence of lot corners, shall be noted. The distances to the nearest intersecting street shall be indicated and verified. Names and widths of streets and highways abutting the property surveyed and widths of rights of way shall be given.
5. The identifying titles of all recorded plats, filed maps, right of ways maps, or similar documents that the survey represents, wholly or in part, shall be shown with their appropriate recording data, map numbers, and the lot, block, and section numbers or letters of the surveyed premises. For non-platted adjoining land, names and recording data identifying adjoining owners as they appear of record shall be shown. For platted adjoining land, the recording data of the subdivision plat shall be shown. The survey shall indicate platted setback or building restriction lines which have been recorded in subdivision plats or which appear in a Record Document.
6. All evidence of monuments shall be shown and noted to indicate which were found and which were placed.
7. The location of all buildings upon the lot or parcel shall be shown and their locations defined by measurements perpendicular to the boundaries. If there are no buildings erected on the property being surveyed, the plat or map shall bear the statement, "No buildings." Proper street numbers shall be



shown where available. Show the exterior dimensions of all buildings at ground level and square footage of the exterior footprint of all buildings at ground level.

8. Easements of record shall be shown, both those burdening and those benefiting the property surveyed, indicating recording information. If such an easement cannot be located, a note to this effect shall be included. Observable evidence of easements and/or servitudes of all kinds, such as those created by roads; rights-of-way; water courses; drains; telephone, telegraph, or electric lines; water, sewer, oil or gas pipelines on or across the surveyed property and on adjoining properties if they appear to affect the surveyed property, shall be located and noted. If the surveyor has knowledge of any such easements and/or servitudes, not observable at the time the present survey is made; such lack of observable evidence shall be noted. Surface indications, if any, of underground easements and/or servitudes shall also be shown.
9. The character and location of all walls, buildings, fences, and other visible improvements within five feet of each side of the boundary lines shall be noted.
10. Driveways and alleys on or crossing the property must be shown. Where there is evidence of use by other than the occupants of the property, the surveyor must so indicate on the plat or map. Where driveways or alleys on adjoining properties encroach, in whole or in part, on the property being surveyed, the surveyor must so indicate on the plat or map with appropriate measurements.
11. As accurately as the evidence permits, the location of cemeteries and burial grounds disclosed in the process of researching title to the premises or observed in the process of performing the field work for the survey, shall be shown.
12. Ponds, lakes, springs, or rivers bordering on or running through the premises being surveyed shall be shown.
13. Vicinity map showing the property surveyed in reference to nearby highway(s) or major street intersection(s).
14. Flood zone designation with proper annotation based on Federal Flood Insurance Rate Maps or the state or local equivalent, by scaled map location and graphic plotting only.
15. Parking areas and, if striped, the striping and the type (e.g. handicapped, motorcycle, regular, etc.) and number of parking spaces. Indication of access to a public way such as curb cuts and driveways.
16. Location of utilities existing on or serving the surveyed property as determined by: Observed evidence, observed evidence together with plans and markings provided by client, utility companies, and other appropriate sources (with reference as to the source of information), railroad tracks and sidings, manholes, catch basins, valve vaults or other surface indications of subterranean uses, wires and cables (including their function) crossing the surveyed premises, all poles on or within ten feet of the surveyed premises, and the dimensions of overhangs affecting the surveyed premises.
17. Locate/note observable evidence of the site being use as a solid waste dump, sump or sanitary landfill.



18. Elevations for manholes rims, inlets, inverts, curb & gutter and pavement elevations will be to a hundredth of a foot (0.01'). Spot elevation will be at 25' intervals on curb/gutter and pavement.
19. Elevations for ground shots, water lines, steam lines, and duct banks will be to a tenth of a foot (0.10'). Spot elevation will be at 50' intervals for ground shots.
20. For contours, the error shall not exceed one-half contour interval.

#### Safety Issues

Safety is UNC's number one priority on the job site. On sites with current construction activity, Surveyors must sign in with the Construction Superintendent. The Surveyors are required to wear safety glasses, hard hats and orange vests at all times on a construction job site. The Construction Superintendent will direct all locations being performed in or near open trenches and structures.

#### Delivery Format

A final site survey of newly constructed surface and sub-surface features to include but not limited to hardscape and landscape will be submitted before the project is finalized. Drawing is to include a survey report as outlined in <http://www.maps.unc.edu> The survey shall include where newly constructed features tie into existing features.



### **B-02.3 - DESIGN AND CONSTRUCTION SURVEYING/GIS GUIDELINES**

#### General

Layer definitions will adhere to National CAD standards for layers collected in the survey.

#### Survey Datum

All surveys will be tied to the **North Carolina State Plane Coordinate System NAD 83 survey feet with the vertical datum of NAVD 88**.

#### Planning & Design Phase

A site survey of surface and sub-surface features tied to the **North Carolina State Plane Coordinate System NAD 83 survey feet with the vertical datum of NAVD 88** will be submitted no more than one week after the site survey has been delivered to the project design firm. The site survey shall be delivered in a DWG electronic format. Layer definitions will adhere to National CAD standards for layers collected in the survey. The electronic documents will be delivered to Facilities Services as directed.

#### Bid Phase

Overall site plan drawings of surface and sub-surface features, rendered in **North Carolina State Plane Coordinate System NAD 83 survey feet with the vertical datum of NAVD 88**, will be submitted no more than two weeks after awarding the project to a contractor. If appropriate the demo plan is to be included. The site plan shall be delivered in a DWG electronic format. Layer definitions will adhere to National CAD standards.

Separate from the site plan drawing, submit a drawing file that shows and contains only newly designed features.

The electronic documents will be delivered to Facilities Planning and Construction as directed.

#### During Construction

The Construction firm in charge will provide a surveyor on site to locate all newly installed underground utilities to be delivered with the final construction documentation. All locations performed will be tied to the North Carolina State Plane Coordinate System NAD 83 survey feet with the vertical datum of NAVD 88.

#### Final Construction Document

A final site survey of newly constructed surface and sub-surface features to include but not limited to hardscape and landscape tied to the **North Carolina State Plane Coordinate System NAD 83 survey feet with the vertical datum of NAVD 88** will be submitted before the project is finalized. Drawing is to include a survey report as outlined in [www.maps.unc.edu](http://www.maps.unc.edu). The survey shall include where newly constructed features tie into existing features. The site survey shall be delivered in a DWG electronic format. Layer definitions will adhere to National CAD standards. The electronic documents will be delivered to Facilities Planning and Construction as directed. Separate from the final site plan drawing, submit a drawing file that shows and contains only newly constructed and installed features.