

# STATE UNIVERSITY CONSTRUCTION FUND

## PROGRAM DIRECTIVES

DIRECTIVE 2-3

Issue date: February 2013

### SITE UTILITIES

#### 1. General

- a. This Directive has been developed as a requirement and guide for the engineering of underground utilities on Fund projects. Site utilities are typically considered those extending five (5) feet beyond the face of the building. Site utility work shall be the responsibility of civil engineering consultant or other qualified consultant as approved by the Fund.
- b. Site work utilities are considered but are not necessarily limited to: domestic water supply, fire protection, gravity sanitary sewers, pressurized sanitary sewers, pump stations, storm drainage, roof drainage, foundation drainage (located beyond foundation wall), site lighting conduit and fixtures, gas, power and communication duct banks, steam, hot water (HTHW and MTHW), fuel supply, condenser water, chilled water, and irrigation.
- c. Prior to submitting the Schematic phase, review the age, capacity and condition of all utilities within the project work area with the Campus. Include replacement of aged or unreliable utilities. For those not being replaced, include a specific acceptance of this approach by the Campus in the minutes.

#### 2. Policy

- a. The Consultant shall be responsible for preparing properly detailed and coordinated site work utility drawings which, to the satisfaction of the Fund, define all foreseen utility work and associated costs. This work shall include installation of new utilities and building services, relocations of utilities impacted by site construction, resetting of existing frames, valves and other surface features, abatement of hazardous materials, and removal and abandonment of utilities. Contract documents shall address the appropriate surface restoration and repair.
- b. Adherence to standards shall be the responsibility of the Consultant. Information contained within this Directive has been compiled in an attempt to demonstrate design standards preferred by the Fund, although it shall be the Consultant's responsibility to communicate design criteria pertinent to the specific project application.

# STATE UNIVERSITY CONSTRUCTION FUND

## PROGRAM DIRECTIVES

- c. It is the policy of the Fund to require the conformance to, but not necessarily limited to, the following Codes and Standards as well as others as applicable:
- 1) Campus requirements and standards
  - 2) New York State Stormwater Management Design Manual
  - 3) Building Code of New York State – as applicable to site utilities
  - 4) ASCE -Manual of Engineering Practice – Bulletin No. 37.
  - 5) Recommended Standards For Water Works – Great Lakes- Upper Mississippi River Board of State Public Health & Environmental Managers (“Ten States”) –
  - 6) Recommended Standards For Wastewater Facilities – Great Lakes - Upper Mississippi River Board of State Public Health & Environmental Managers (“Ten States”)
  - 7) Local municipality having jurisdiction, including fire and highway departments as appropriate.
- d. Where required, the Consultant shall obtain approval by authorities having jurisdiction (i.e. NYSDOT, DOH). These approvals shall be secured prior to PreBid Approval and shall identify those requirements, including permits, fees and notification, specific to the construction phase.
3. Planning
- a. Together with topographic and utility field surveys, all existing utilities, both active and abandoned shall be properly documented. This documentation shall include the type of utility, size and material, approximate depth, type of bury (i.e. direct, encased, etc) surface types, etc.
  - b. The Consultant shall attempt to minimize missing or undocumented below grade information through investigative means such as performance of test pits, television inspection, smoke testing, ground penetrating radar, etc. Where information is assumed or not available, conservative assumptions based on reputed or assumed information shall be provided in order to form the basis of a bid.

# STATE UNIVERSITY CONSTRUCTION FUND

## PROGRAM DIRECTIVES

- c. Site utilities shall be laid out and detailed in plan view on a consolidated Site Utility Plan at a scale no smaller than 1"= 50 feet. Use of architectural scales is not appropriate.
  - d. Building penetrations and services shall be properly coordinated with all disciplines. Information shall include pipe size, material type and invert at building face.
  - e. Utility profiles shall be provided to adequately identify their installation and all conflicts with existing and proposed utilities. Such profiles shall be prepared by the Design Manual phase or as otherwise approved. The location and elevations of existing utilities shall be determined through field investigation and/or confirmed as-builts. When unavailable or not practical to confirm, depths of bury shall be assumed based on standard construction and engineering practice.
4. Design and Performance Criteria
- a. The following summarizes general utility information. It shall be the Consultant's responsibility to properly research local requirements and guidelines in the preparation of sitework utility improvements contained within the contract documents.
  - b. Refer to Directive 15H-10 "Piping Types and Materials" for additional information on pipe, fitting, and insulation materials and standards.
  - c. The depth of utility lines, as well as approved pipe materials and other pertinent design information, should be as follows unless otherwise required by the authority having jurisdiction. All new underground utilities shall include the installation of a metallic-lined, plastic underground marker tape. The tape shall be buried directly above the utility and contain the printed name of the utility repeated continuously along its length.
    - 1) Domestic Water and Fire Protection:
      - i. The Consultant shall review available hydrant flow information, perform hydrant flow test(s), and develop hydraulic model as required per Directive 15F-1 Fire Protection Systems.
      - ii. The history of line maintenance and exercising of valves shall be reviewed with the Campus during the early stages of design. Provide new valves where existing valves required for project

# STATE UNIVERSITY CONSTRUCTION FUND

## PROGRAM DIRECTIVES

- shutdown do not have a history of being exercised and cannot be functionally tested.
- iii. Piping shall be buried a minimum of 4'6" below finished grade or as required by local frost conditions.
  - iv. Pipes shall be 4" minimum in diameter, ductile iron pipe cement-lined Class 52 or Polyvinyl (PVC) Pressure Pipe (ANSI/AWWA C900 up to 12 inch diameter and C905 14 inch diameter or larger. The practice of wrapping DIP pipe in polywrap pipe shall be reviewed with Campus facilities personnel.
  - v. Site distribution should be looped to minimize dead ends.
  - vi. Hydrants, including leads, shall be served by a minimum-sized line of 6" when available. Space hydrants a maximum of 500 feet. The location of fire hydrants, thread sizes, direction of turn, hydrant types, finish color, fire department connection location, PIV location, as well as fire access during construction shall be reviewed with the local fire department and Campus personnel.
  - vii. Backflow prevention shall be provided to protect water provider from Campus, either at property line or at individual buildings. Confirm acceptability with water provider prior to the Pre Bid submission. If Campus is protected at their property line, individual buildings and usage locations may also be individually protected depending on the building usage to prevent intra-campus contamination. Comply with NYSDOH requirements. The specifications shall require that a completed backflow prevention report be provided to the College for the submission to the DOH. Refer to Directive 15P-5 for additional information.
  - viii. A post indicator valve shall be located along the fire protection line feeding fire protection sprinklers. Where necessary at building entrances, the Consultant shall locate the PIV so as to not detract from the building appearance.
  - ix. Confirm with the Campus valve open/close direction. Provide telescoping box set in concrete; provide two valves at each "T" connection.

# STATE UNIVERSITY CONSTRUCTION FUND

## PROGRAM DIRECTIVES

- x. Contract documents shall contain details for appurtenances such as thrust blocks, fittings, valves, meters, pressure reduction, etc.
- 2) Storm Drainage:
- i. Excluding plaza areas and foundation drains, storm drainage pipes shall be a minimum of 6" in diameter.
  - ii. The use of high density polyethylene pipe (HDPE), corrugated metal pipe (CMP), polyvinyl chloride (PVC), reinforced concrete pipe (RCP) shall be reviewed based on traffic loading, material and installation costs, and compatibility with Campus infrastructure.
  - iii. Closed storm water drainage systems shall be designed for a ten-year storm event unless otherwise directed.
  - iv. The Consultant shall evaluate pre- and post-development runoff values. Where necessary, storm water management areas shall be designed to mitigate post-development runoff values for identified storm events and release at rates equal to their pre-development runoff values, unless otherwise permitted.
  - v. Minimum pipe slopes of 0.5 percent shall be provided with the exception of underdrains.
  - vi. Drainage structure (including catch basin and storm manholes) shall contain a minimum sump depth of 12 inches. Grade adjustments shall be made with precast concrete grade rings; the use of brick is not permitted.
  - vii. Do not locate drainage inlets in parking stalls or other blocked locations where access to them may be blocked for maintenance.
  - viii. Pipe length between accessible structures shall not exceed 300 feet.
  - ix. Pipes within drainage structures (manholes and catch basins) shall be cut flush with the inside face for ease of maintenance.

# STATE UNIVERSITY CONSTRUCTION FUND

## PROGRAM DIRECTIVES

- x. Structures and castings shall be sufficient to withstand a minimum H-20 vehicular loading. Structures shall include openings and steps sufficient to ensure access by properly protected personnel for maintenance.
  - xi. Drainage inlets within roadways shall be bicycle safe. Review Campus preference for casting types.
  - xii. Where subject to vehicular loading, the depth of cover shall be sufficient to achieve proper compaction in subbase and not intrude in subbase section of pavement.
  - xiii. End-sections (outfalls and inlets) shall be protected with rip rap.
  - xiv. Consultant shall review groundwater and subsurface drainage and include underdrains where warranted.
- 3) Sanitary Sewers:
- i. Sanitary flows shall be separated from storm flows in all cases.
  - ii. Gravity sewers shall be polyvinyl chloride pipe minimum PVC–SDR 35 and pressurized sanitary sewers shall be minimum PVC-SDR 26. Install thrust blocks or restrain force mains.
  - iii. Gravity systems shall be provided with a four- (4) feet minimum depth of cover where practical.
  - iv. Minimum slope of 8-inch gravity sewers shall be 0.4 percent in conformance with Ten States Standards but shall be reviewed against expected flows. Flows shall not be less than 2 fps and shall not exceed 15 fps.
  - v. Structures and castings shall be sufficient to withstand vehicular H2O loading. Structures shall include openings and steps sufficient to ensure access by properly protected personnel for maintenance.
  - vi. Castings for sanitary sewers shall contain “SANITARY”.
  - vii. A minimum of ten (10) feet horizontal and 18-inch vertical separation between water and sanitary shall be maintained at all times. If this is not feasible, the consultant shall demonstrate

# STATE UNIVERSITY CONSTRUCTION FUND

## PROGRAM DIRECTIVES

and detail an acceptable installation alternative such as pressurized pipe, encased, and location of joints.

viii. Pumps stations shall be equipped with removable duplex pumps, remotely read, high and low level alarms.

4) Natural Gas Service:

i. Refer to Fund Directive 15P-1 for additional information regarding natural gas service requirements.

ii. The depth of bury shall be a minimum of thirty (30) inches or as otherwise directed by the local gas utility.

iii. Pipe material shall be steel or pressurized plastic as reviewed and approved by the authority having jurisdiction.

iv. Trenching shall contain proper backfill and tracer wire.

v. The installation and selection of meters, regulators, concrete pads and other appurtenances shall be reviewed with the Fund, Campus and applicable authority having jurisdiction.

5) Medium or High Temperature Hot Water and Steam Systems:

i. Refer to Directive 15H-6 for additional information regarding medium and high temperature hot water installations.

ii. The Fund has a standard specification for direct bury piping systems.

iii. Consultant shall request and review the existing system information from the Campus, including line sizes, existing materials, operating temperatures and pressures.

iv. The Consultant shall prepare the required analysis and calculations specific to the location and sizing of lines, services, expansion loops, thrust blocks, spacing of pipe supports, anchors and slides, etc.

v. Manholes located in paved areas shall be designed to accommodate H-20 vehicular loadings and shall be properly drained.

# STATE UNIVERSITY CONSTRUCTION FUND

## PROGRAM DIRECTIVES

- vi. Manholes, where access to the confined space may be required for maintenance, shall have a minimum 5' x 7' x 7' internal clear work area. Structures shall include openings and steps sufficient to ensure access by properly protected personnel for maintenance.
  - vii. All manhole structures shall be coated with a minimum 60-mil bituminous waterproofing.
  - viii. The building wall penetration shall be made with an appropriate watertight seal.
  - ix. The Consultant shall coordinate the invert elevations for all connections including building penetrations and connections to existing.
- 6) Site Lighting
- i. Refer to Fund Electrical Directives (16 Series) for additional information regarding site lighting requirements.
  - ii. The depth of bury shall be a minimum of 18 inches.
  - iii. Lighting conduit shall be installed in 2 inch PVC Schedule 80 or rigid steel conduit with pull wire. Conduit under traffic areas are to be encased in concrete.
  - iv. Poles adjacent to Campus roadways shall be breakaway types so as not to present a hazard resulting from vehicle impacts.
  - v. Poles located within parking areas shall be set on concrete bases with a minimum height of 2' 6" above finished grade and shall be extended to below frost.
  - vi. Pull boxes and manholes located in paved areas shall be designed to accommodate H-20 vehicular loadings.

# STATE UNIVERSITY CONSTRUCTION FUND

## PROGRAM DIRECTIVES

- 7) Power and Communication:
- i. Refer to Fund Directives, Sections 16 and 27 and other applicable Directives for additional information regarding power and communication requirements.
  - ii. The depth of bury shall be a minimum of 30". Conduits shall include pull wire.
  - iii. The extent of concrete encased ducts shall be reviewed with the Campus and the Fund. Primary power and communications conduits shall be encased in reinforced concrete with a minimum cover of 30 inches. Encasement may be omitted on secondary runs whose protection is not essential to the Campus or building operation.
  - iv. Duct bank shall be low enough in elevation at entrance of manhole to coordinate with the racking of the cabling within the manhole. Coordinate racking with the existing Campus preferences.
  - v. The adequacy and availability of existing spare conduits in duct banks shall be confirmed through mandreling and other appropriate investigations.
  - vi. Each length of duct bank shall include one empty, spare conduit for each filled conduit for new installations.
  - vii. Manholes, handholes and junction boxes should be provided as required to properly install, inspect and maintain the systems and shall be provided at all changes in direction or steps in elevation. Manhole spacing shall not exceed 300 feet.
  - viii. Manholes, where access to the confined space may be required for maintenance, shall have a minimum 5' by 7' by 7' high internal clear work area. Structures shall include openings sufficient to ensure access by properly protected personnel for maintenance.

# STATE UNIVERSITY CONSTRUCTION FUND PROGRAM DIRECTIVES

- ix. Installation of manholes in paved areas should be avoided. Structures and castings shall be sufficient to withstand H-20 vehicular loadings in the event that future improvements result in traffic loadings. Castings for manholes shall contain label such as "POWER" or "COMMUNICATION".
- x. All manhole structures shall be waterproofed with an externally applied 60-mil bituminous coating. Manhole covers shall be gasketed.
- xi. It is recommended that conduit be pitched a minimum of 0.5% so that groundwater can be drained.

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