



## II. Architectural Systems Narrative

# Architectural Systems Description

## Architectural Systems

A neo-Georgian design aesthetic is selected for the new buildings that will define the Great Lawn, continuing the architectural language and massing of recent buildings at Christopher Newport University. The proposed, three story buildings are to be steel frame and metal frame construction. The exterior walls will be brick with cast stone trim and detailing and may include such elements as lintel keystones (to selected windows), window sills and trim to door openings. The sloped roofs will be simulated or real slate and designed to conceal roof mounted mechanical systems. Window and external door systems will be factory finished metal framed with insulated glazing.

The form of the new science building shall integrate with Gosnold Hall and the existing science building with an enclosed connector between the existing and new science buildings. The existing science building will be renovated to suit the new programmed spaces and re-location of faculty departments. Additions will be added on the east and west sides of the building, to both add required square footage and improve the appearance of the building.

## Applicable Building Codes for CNU Science Buildings

Codes relating to the new construction and renovation will include:

- Part 1 of the Virginia Uniform Statewide Building Code - The Virginia Construction Code (2003 Edition)
- International Building Code 2003
- International Fire Code 2003
- International Mechanical Code 2003
- International Plumbing Code 2003
- International Fuel Gas Code 2003
- International Energy Conservation Code 2003
- NEC – National Electrical Code 2002
- NFPA 90A (2000) The Installation of Air Conditioning and Ventilating Systems
- Commonwealth of Virginia Construction and Professional Services Manual (CPSM)
- Public Building Safety Regulations
- Virginia Statewide Fire Prevention Code

## Accessibility

Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG) 2004 in accordance with CPSM.

Where laboratories are to be provided the following codes will be applicable:

- NFPA 10
- NFPA 30
- NFPA 45
- NRC Guide for Care and Use of Laboratory Animals
- CDC/NIH Biosafety in Microbiological and Biomedical Laboratories – 4th Edition

### **Construction Type Classification**

Type I or Type II Construction based on building separation (due to limits on area).

### **Use and Occupancy Classification**

#### 302.1.1 Incidental Use Areas (potential)

Furnace room

Boilers

Storage Rooms

#### 304.1 Business – Educational above 12th grade.

Classrooms – 1 per 20 net

Classrooms w/ fixed seats – Count number of seats (including instructor)

Research Labs – 1 per 100 gross

Teaching Labs – 1 per 50 gross

All other spaces – 1 per 100 gross

### **Division 2 – Sitework**

#### **Regulations**

Department of Conservation and Recreation – Erosion and Sediment Control Regulations

Department of Conservation and Recreation – Stormwater Management Regulations

Department of Environmental Quality, Water Division, Regulations.

Department of Health Regulations

#### **Selective Demolition**

Remove all site features to prepare the site.

#### **Tree Protection**

Existing trees will be protected during construction. Trees may be removed to accommodate Great Lawn landscaping.

#### **Utility relocations**

It is proposed that the utilities required to support the building systems (chilled water & steam/high temperature hot water) will be part of the building infrastructure. Currently, the building design does not take advantage of a central chiller plant.

### **Site Work**

From available information, all public utilities are available at the proposed locations of the new buildings. Development of the site adjacent to the new buildings, forming part of the Great Lawn, will include brick walks, grassed open space and trees.

### **Asphalt Paving**

New service access area will be paved with 4" asphalt on 6" crushed stone. Heavy truck loading areas to be 6" reinforced concrete paving.

### **Concrete Sidewalks and Paving**

New concrete sidewalks will be 4" 3000 psi concrete on stone base. Areas of the courtyard entries will have brick pavers on concrete slabs.

## **Division 3 – Concrete**

### **Foundations and Footings**

Foundations are assumed to be shallow spread footings and slab on grade at the first floor. Foundation system and soil bearing capacity are to be determined. Precast-prestressed concrete piles or timber piles for deep foundations are not anticipated.

### **Architectural Concrete**

Exterior and interior areas requiring a high level of finish to be architectural concrete, vibrated and aerated, with finish as selected and specified by the Architect. Work in these areas includes concrete finishing, accessories, trim, and cast-in-place features.

## **Division 4 – Unit Masonry**

### **Concrete Masonry Units**

Exterior wall construction will include reinforced concrete masonry unit (CMU) construction as backup to the exterior brick veneer in specific areas (exit stairs). Selected interior back of house operations or other high maintenance areas will be reinforced CMU construction.

### **Brick Veneer**

Exterior wall construction will include brick veneer as selected by Architect over metal stud backup. All brick will be tied back to metal studs with galvanized ladder ties. Brickwork may also include brick faced retaining walls, pavers, and other architectural site features.

### **Pre-Cast Concrete**

Exterior wall construction may include pre-cast trim in colors and shapes as selected by Architect over metal stud backup as an alternate to cut limestone. All cast stone will be tied back to structure using stainless steel pins, ties, clips and other methods approved by the Cast Stone Institute. Cast Stone work may also include trim work at retaining walls, pavers, and other architectural site features.

## **Division 5 – Metals**

### **Structural Steel**

The structural system for the elevated floors is anticipated to be concrete slabs on composite steel deck supported on steel beams and columns. Flat portions of roof structure are anticipated to be metal deck supported on steel bar joists on steel girders and steel columns. Sloped sections of roof are anticipated to be metal deck on cold formed trusses on steel beams and columns. Because of the length of this building, at least one structural expansion joint is expected. Masonry veneer above the 2nd floor will be supported by the building structure. Lateral loads are anticipated to be resisted by a combination of roof deck or concrete floors acting as horizontal diaphragms that transfer loads to vertical braced bays or rigid frames.

### **Miscellaneous Metals**

Provide lintels, bracing, clips, equipment supports, rooftop mechanical equipment supports, rooftop access ladders and hatches, and related metal framing for laboratory casework and equipment.

### **Cold Formed Metal Framing**

Provide cold-formed metal framing for equipment support, anchorage, and attachment. Provide cold-formed metal trusses for the sloped sections of the roof.

### **Metal Handrails**

Provide shop-fabricated and finished metal handrails at ramps, metal stairs, loading docks or other areas as required by code.

### **Ornamental Metals**

Provide shop-fabricated and finished ornamental metalwork as designed by Architect.

## **Division 6 – Wood and Plastics**

### **Custom Millwork**

Provide custom grade wood veneer and plastic laminate millwork as designed by Architect.

### **Plastic Laminate**

Provide chemical resistant plastic laminates as indicated in colors and surfaces as selected by Architect.

### **Quartz Surfacing**

Window stools, toilet room vanities, and conference room, break area and other countertop surfaces will be monolithic quartz surface material equal to Silestone.

## **Division 7 – Thermal and Moisture Protection**

### **Building Insulation**

All exterior wall, foundation wall, and underslab conditions to include batt or rigid insulation as required to meet energy code. Roofing system will include rigid insulation compatible with a four-ply bitumen liquid applied system at flat roof areas. Rigid insulation will be provided at sloped roof areas. Sound attenuating batt insulation will be installed in interior partition walls according to UL designations and at partitions with sound isolation.

## **Firestopping**

Firestopping will be installed at all floor, wall, and ceiling penetrations as required by code to seal all rated penetrations. Firestopping rating will be equal to that of installed assembly. Penetrations above ceiling will be labeled for rating.

## **Joint Sealers**

### Interior:

Butyl caulking for sound rated partitions, toilet room fixtures, and interior glazing and miscellaneous sealant.

Chemical resistant silicone sealant is to be provided where all lab benches and backsplashes meet walls.

Anti-bacterial silicone or acrylic sealant for all joints and penetrations through walls, ceiling, and floors.

### Exterior:

One- or two-part silicone or polysulfide type sealant to be used at all exterior joints. All sealant joints at panels will be dual bead, rain screen type, with weeps at lowest points. Color as selected by Architect.

One-part clear silicone sealant will be provided at all window sash to pre-cast joints.

## **Roofing Systems**

**Flat Roofs:** Four-ply bitumen liquid applied built-up roofing system with stainless steel or copper flashing and counter flashing. Flashing joints will be soldered, with expansion joints according to SMACNA or Copper and Common Sense, by Revere, Inc. Interior roof drains and overflow drains will be provided at flat roof areas.

**Sloping Roofs:** Roofs will be selected to match existing buildings with slate shingle systems with copper flashing, gutters and downspouts. Natural or simulated slate will be selected. Roofing will be applied over a nailable roof deck with roof felt overlay.

## **Division 8 – Doors and Windows**

### **Standard Steel Doors and Frames**

Interior and exterior doorframes will be hollow metal in styles and configurations selected by Architect.

Frames will be fully welded shop primed and finished, ready for field painting. Grout will be provided for rating at masonry walls. Frame requirements will be coordinated with panic devices, electric strikes and card readers.

All metal doors to be rated seamless steel construction, shop primed and finished for field painting, shop fitted for hardware and wire glazing.

### **Wood Doors**

Interior doors at offices, classrooms, and other public areas will be solid core wood doors with veneer as selected by Architect. Select doors at offices, classrooms, and labs will have glazed vision panels. Fire-rated doors will be provided when required by code.

### **Door Hardware**

All door hardware to be ADA approved brushed stainless steel US 32 finish, or brushed chrome US 26 finish. All door hinges to be 5 knuckle, 3 minimum per door. All lab doors to have lockset, closer, kickplate, and latch sets as required. Lab entry doors to be minimum 3'-6" wide wood doors with vision panel. Doors along the paths of building egress will be provided with panic device hardware as required by code.

### **Exterior Windows and Curtainwall Systems**

Exterior windows to be thermally broken aluminum clad double-hung. Color shall be shop applied, Kynar finish. Marvin Windows shall be used as the basis of design.

### **Aluminum Entrances and Doors**

Exterior entrance doors will be thermally broken aluminum or frameless laminated glass in aluminum frame to match exterior window and curtain wall system.

### **Glazing**

Exterior glazing will be high performance low-e type 1" insulating clear vision glass, at least 80% light transmissivity. Interior glazing will be 1/4" laminated clear vision glass or 1/4" wire glass as required.

## **Division 9 – Finish Systems**

### **Gypsum Drywall**

Partitions other than those in mechanical areas, or other high maintenance areas to be level 4 finished painted gypsum wallboard on light gauge metal stud framing in UL assemblies, for fire and STC ratings. Metal studs will be 22 ga. with no greater than 1/240 vertical deflection. In lobby areas, animal rooms and other areas indicated, provide suspended gypsum wallboard ceiling on metal stud frame with furring strips. Seal all joints at walls, floors, and ceilings as described in Division 7.

### **Veneer Plaster**

Veneer plaster will be used to finish selected ceilings, walls, and soffits in high maintenance areas, exterior entrance areas and public lobbies.

### **Acoustic Tile Ceilings**

All labs, classrooms, and office areas to receive new mineral based modular cast or molded acoustic tile with factory painted finish and smooth texture. ACT to be white, kerfed edge, NRC 0.70. Animal holding rooms are to have vinyl-coated ceiling tile.

Suspension system to direct hung double steel web, roll formed and capped, pre-painted cold rolled steel, intermediate duty, with upward access. Ceilings in animal holding rooms are to be direct hung rust proof suspension system.

### **Carpet Tile**

Offices and meeting spaces to receive new modular nylon carpet tile. Colors and pattern as selected by Architects.

### **Resilient Flooring**

VCT - All labs, classrooms and corridors to receive new vinyl composition tile equal to Armstrong Excelon Premium in colors and style as selected by Architect.

### **Resilient Base and Accessories**

All base at VCT floors to be 4" rubber base as selected by the Architect. All fixed casework to have 4" rubber base.

### **Ceramic Tile**

Ceramic tile in toilet rooms to be glazed 4 1/4" X 4 1/4" and 2" X 2" units, with cove, base and bullnose to form a complete system. Colors and finishes as selected by Architect.

### **Thin Set Epoxy Terrazzo**

Public lobbies, monumental stairs and passenger elevators to receive new thin set epoxy terrazzo with aluminum divider strips. Colors and pattern as selected by Architects.

### **Resinous Flooring**

Animal housing flooring will be new epoxy resinous flooring system equal to Stonehard Stonclad GS. Colors and pattern as selected by architect.

### **Painting**

All walls in corridors, Labs, Offices, Toilet Rooms, and other spaces not related to Animal Housing or back of house support operations to be painted with low VOC semi-gloss water based latex paint. All walls to receive one coat primer and two coats paint.

Walls and ceiling in animal housing, back of house support and operation areas to receive high-build, three-coat semi-gloss epoxy paint system.

All shop-primed ferrous metals to receive two coats low VOC latex enamel. All exterior paint to be alkaloid based gloss enamel.

## **Division 10 – Specialties**

### **Visual Display Boards**

All white dry erase marker boards and black chalk boards will be porcelain enamel steel on rigid particleboard or composite substrate with aluminum frame. Provide movable units as noted on room data sheets..

### **Toilet Partitions**

Toilet Partitions to be stainless steel, ceiling hung, seamless partition system complete with doors, panels, and hardware.

### **Fire Extinguishers, Cabinets, and Accessories**

Provide fire Class ABC all-purpose fire extinguishers in fully recessed rated stainless steel cabinets with glass doors where indicated. Provide full body fire blankets by Lab Safety Supply or equal. All Fire extinguishers, blankets, and accessories to comply with NFPA, OSHA.

### **Signage**

Signage to be molded photopolymer ADA and silk-screened acrylic copy panels in colors and styles as selected by Architect.

### **Toilet Accessories**

All toilet accessories to be stainless steel, number 4 finish, by Bobrick or equal. Each toilet room to have one piece paper towel dispenser and waste receptacle, soap dispensers at each sink, infrared sensors for water operation, mirrors, and sanitary napkin dispenser in women's toilets. Each stall to have seat cover dispenser, two-roll toilet tissue dispenser, grab bars, coat hook, and sanitary napkin disposal in women's toilet room.

### **Wall Protection**

Main corridors to receive impact resistant, vinyl wrapped wainscoting panels.

Corner guards to be 7' high surface mounted stainless steel with number 4 finish.

Animal housing to receive #4 stainless steel crash rail equal to CS Group EC32S.

### **Greenhouse / Head House**

A freestanding aluminum-framed greenhouse with 1-inch insulated glass walls will be installed adjacent to the Science Building to support program needs of the Biology Department. It will be located within proximity of the Service Area, and will have an attached Head House to support the Greenhouse function.

## **Division 11 – Equipment**

### **Audio Visual**

All classrooms and teaching labs will receive motorized recessed projection screens, overhead projectors and smart lecterns. Provide smart boards as noted in room data sheets.

### **Laboratory Fume Hoods**

All fume hoods to be by-pass style for use with the specified HVAC system. Cabinet construction to be powder-coated cold rolled steel frame construction. Each hood to have electronic face velocity sensors and infrared occupancy sensors. All hoods to be pre-wired and pre-piped.

### **Basis of Design**

Kewaunee Scientific, Fisher Hamilton, Jamestown, MOTT, or Labconco and as approved by Architect. All hoods to meet ASHRAE 110-1995, BS 7258, DIN 12 924.

### **Bench Hoods**

Size: Typical: 6'

Base Cabinets:	Metal Flammable Storage, Vented Acid waste storage or as noted on drawings.
Sash:	Counter weighted vertical rising sash.
Sash Glazing:	Temper 1/4" safety glass.
Liner:	Poly vinyl liner, adjustable baffle.
Worktop:	Cast epoxy resin worktop.
Cup Sink:	Yes
Interior Light:	Two-tube fluorescent.
Electrical:	Two 120v receptacles.
Lab Services:	Gas, Air, Vacuum, DI Water, Hot Water, Cold Water.
Distillation Rack:	Not Required.

### **Bio-safety Cabinets**

Bio-safety cabinets will be Class II/Type A recirculating type cabinets.

All cabinets will be by Baker, Labconco, Nuair or equal as described in CDC/NIH Primary Containment for Biohazards.

### **Laminar Flow Cabinets**

Laminar Flow cabinets will be horizontal flow, clean bench type by Baker, Labconco, or Nuair, as described in CDC/NIH Primary Containment for Biohazards.

### **Animal Caging**

Static cage rack caging systems by Thoren, Lab Products or approved equal by Architect. Cages to be mounted on movable racks.

### **Cold Rooms**

ESI 0-10 Deg. C or approved equal.

### **Steam Sterilizers**

Steris Eagle Century 24 X 24 X 36, Pre-Vacuum or equal

### **Ice Makers**

Scotsman MFE400AE-1 with HTB555 Bin or approved equal.

### **DI Water and Water Polishing Stations**

DI water systems to be a centralized system with wall or deck mounted final polishing units configured for Reverse Osmosis, Ultra filtered, HPLC quality water as needed. Basis of Design: US Filter, Barnstead, Labconco, or equal as approved by Owner.

## **Division 12 – Furnishings**

### **Laboratory Casework**

All Metal Laboratory Casework to be full flush style casework. All base cabinets to have full height removable backs for access to service chase. Adjustable shelves will be provided for all base and wall units. All glazing to 1/8" tempered glass in metal frames. All service chase enclosures to matching cold rolled metal fabrication. Tops to be made of Epoxy, stainless steel, plastic laminate, or solid surfacing as selected by Architect.

All Wood or plastic laminate casework to be full flush overlay floor mounted wood casework with semi-concealed hinges with book matched and balance veneer. All doors and exposed edges to be edge banded in solid wood or heat welded PVC in colors and materials selected by Architect. Tops to be made of Epoxy, stainless steel, plastic laminate, or solid surfacing as required.

### **Basis of Design**

Wood/Plastic laminate Casework: Wood Casework by Kewaunee, Fisher Hamilton, Valley City Manufacturing, Case Systems or equal as approved by Owner.

Metal Casework: Kewaunee Scientific Alpha 2000 or equal by Fisher Hamilton or Jamestown and as approved by Owner.

### **Metal Casework Specifications**

Material: Cold Rolled Metal

Finish: Baked enamel, color by Architect.

Mounting: Floor Mounted, movable tables or rolling casework as shown on room data sheets, finish to match.

Pulls: 4" Stainless steel wire pull.

Hinges: 3-knuckle stainless steel, semi exposed

Slides: Manufacturer's standard.

Latches: Friction type.

Locks: Manufacturer's standard, US 26 finish.

Floor Levelers: Screw type, fully adjustable.

Shelves: Metal, adjustable.

Shelf Supports: Metal, manufacturer's standard for wall and bench supports. Provide floor mounted self-supporting shelf systems for all reagent racks and island bench cabinets for all suspended casework.

Reagent Racks: Manufacturer's standard.

Worktops: Cast epoxy resin (black or white), stainless steel, plastic laminate or solid surfacing.

Sinks: Cast epoxy resin, stainless steel, or solid surfacing, integral with tops.

Snorkels: Articulated aluminum and cast plastic by Lab Safety Supply or equal.

Eyewash: Deck mounted, single action, chrome finish.

Hose: 8ft. Reinforced PVC hose with squeeze lever-operated valve, spray type outlet head.

Emergency Shower: Fully accessible, barrier free ceiling recessed or freestanding model by Kewaunee, Guardian, Water Saver, or equal in chrome finish.

Pegboards: #4 stainless steel with white polypropylene pegs, mechanically fitted and friction mounted, removable. Stainless steel drain tray with clear polypropylene drain hose.

Balance Tables: 3" Cast epoxy table equal to Kewaunee model K7-6590-00.

Mech. Service Fittings: Epoxy coated cast bronze by Kewaunee, Chicago or Water Saver, or manufacturer's standard as approved. Color and finish selected by Architect.

Faucets: As noted above, with vacuum breakers or aspirator as noted.

Electrical Service Fittings: Manufacturer's standard stainless steel enclosures and faceplates. All electrical services fittings to be wall mounted at C-Frame metal casework.

Raceways: Aluminum by Raceway.

## Wood Casework Specifications

Material:	Wood veneer on plywood substrate, solid select wood frame, in Red Oak, Maple or veneers as approved by Owner.
Finish:	AWI #4 catalyzed clear finish.
Mounting:	Floor Mounted, movable tables, rolling casework.
Pulls:	4" Stainless steel wire pull.
Hinges:	Semi-Concealed Euro style.
Slides:	Accuride or equal telescoping slides, 100-lb. minimum.
Latches:	Friction, magnetic, or self-closing type.
Locks:	Manufacturer's standard, US 26 finish.
Floor Levelers:	Screw type, fully adjustable.
Shelves:	Solid wood, adjustable.
Shelf Supports:	Metal, manufacturer's standard for wall and bench supports. Provide floor mounted self-supporting shelf systems for all reagent racks and island bench cabinets for all suspended casework.
Reagent Racks:	Manufacturer's standard.
Worktops:	Cast epoxy resin (black or white), stainless steel, plastic laminate or solid surfacing.
Sinks:	Cast epoxy resin, stainless steel, or solid surfacing, integral with tops.
Snorkels:	Articulated aluminum and cast plastic by Lab Safety Supply or equal.
Eyewash:	Deck mounted, single action, epoxy coated.
Hose:	8ft. Reinforced PVC hose with squeeze lever-operated valve, spray type outlet head.
Emergency Shower:	Fully accessible, barrier free ceiling recessed or freestanding model by Kewaunee, Guardian, Water Saver, or equal in chrome finish.
Pegboards:	#4 stainless steel with white polypropylene pegs, mechanically fitted and friction mounted, removable. Stainless steel drain tray with clear polypropylene drain hose.
Balance Tables:	3" Cast epoxy table equal to Kewaunee model K7-6590-00.
Mech. Service Fittings:	Epoxy coated cast bronze by Kewaunee, Chicago or Water Saver, or manufacturer's standard as approved.
Faucets:	As noted above, with vacuum breakers or aspirator as noted.
Electrical Service Fittings:	Manufacturer's standard stainless steel enclosures and faceplates. All electrical services fittings to be wall mounted at C-Frame metal casework.
Raceways:	2-compartment, aluminum.

## Division 13 – Special Construction

None required at the time of this writing.

## Division 14 – Conveying Systems

### Elevators

#### Passenger Elevator

Type:	Hydraulic, Freight, Single plunger
Capacity:	5000 lbs.
Loading Class:	A
Speed:	100 fpm.
Operation:	Single push button

Interior: Custom wood veneer/stainless steel walls and ceilings with epoxy resin terrazzo as designed by Architect.  
Doors: Bi-Parting Automatic, 6'-0" Clear opening  
Cab Dimensions: 6'-4" W X 10'-0" D X 8'-0" H  
Fixtures: Stainless Steel  
Lighting: Manufacturers Standard  
Communications: Telephone, Alarm Bell

**Service Elevator:**

Type: Hydraulic, Freight, Single plunger  
Capacity: 5000 lbs.  
Loading Class: A  
Speed: 100 fpm.  
Operation: Single push button  
Interior: Stainless steel walls and ceilings with rubber floor  
Doors: Bi-Parting Automatic, 6'-0" Clear opening  
Cab Dimensions: 8'-0" W X 10'-0" D X 10'-0" H  
Fixtures: Stainless Steel  
Lighting: Manufacturers Standard  
Communications: Telephone, Alarm Bell

**Division 15 – Mechanical Systems**

The New Science Building HVAC shall be comprised of three-duct (supply, return, exhaust air) system with dedicated laboratory exhaust system. The system shall be tracking VAV with pressure-independent control in all laboratory teaching and research spaces and will utilize VAV commercial level controls in all non-research areas. Energy recovery will be integrated into the operation of the air and/or hydronic distribution systems to maximize energy efficiency.