

The Butler Way General Specifications

Revised: September 4, 2019

Introduction

The following pages represent Butler University's expectations for the delivery of all new construction and renovation projects on campus. We will ensure that our maintenance objectives are met by all contractors that perform work on our campus as the design/build phase of a project is a short amount of time compared to the overall lifespan of the building. As a result, long term maintenance, life cycle costing, renewal and sustainability are considered in every decision; initial cost is not the only factor considered.

Butler University prescribes to an integrated design/construction delivery method with all new construction built to a minimum LEED Silver certification. We contract directly with the Construction Manager, Architect, and Commissioning Agent. All are at the design table from the onset.

Each discipline will be provided a copy of BU construction guidelines prior to the start of the design process. Some of the items in this document may not be applicable to each project, but all should be taken into consideration. If there is question as to whether an item is applicable to a project, the Butler Project Manager (PM) shall be notified and asked for verification in advance. Furthermore, this document is updated as frequently as possible, but there may be outdated model numbers or information included. If a discipline wishes to challenge a material or suggested practice (i.e. if there is a solution that better fits the greater needs and goals of Butler University), they must seek written approval from the Butler Project Manager prior to that phase of design being completed. If written approval does not occur, the responsible discipline will be held 100% liable for any and all associated costs to correct mechanical design, installation, or equipment issues associated with this deviation. Suggested changes should be reviewed at the various charrette meetings so that all participants understand the issue and hears a clear response from the owner.

A design review charrette with maintenance personnel is required after each phase of the design process, to include but not be limited to: Schematic Design, Design Development, Construction Documents, and Value Engineering. The Butler Project Manager may also choose to include other representatives from the University at select review meetings, such as Building Services, BUPD, Information Technology, or other parties affected by the building's construction. Present at each meeting shall be that disciplines "project manager", the Construction Manager and their superintendent, the owner's rep and project manager and maintenance personnel as deemed necessary. The intent of these meetings is to review operational and long term maintenance concerns of the design and to raise questions about BU specifications or design intent, not to critique the aesthetic design. The designers and/or CM shall bring a list of any and all deviations, including Value Engineering items, to the Butler Way proposed for the design of the project. Meeting minutes shall be taken by the CM which should identify each topic of concern and should post a clear resolution to the concern. Notes will be forwarded to all present for review. If there are issues or concerns with these notes, they must be raised within 3 days of initial distribution.

Each contractor will be required to submit, along with their bid, a signed form stating they have read and agree to the owner's requirements for the portion of the project for which they are responsible, as well as recognizing Butler Policies and Procedures. For example, the electrical contractor must review the BU Policies and procedures document, as well as the design criteria and specifications listed under the electrical portion, and sign a form stating they will adhere to all. If they recognize a variation in the project specs versus BU specs, they should raise it before completing the work so the issue can be resolved.

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00 00 00 Construction Deliverables and Programming Requirements

DELIVERABLES

Butler University requires a 2 year warranty of everything in the building including all materials, equipment, workmanship, etc.

Adhesives and materials should be chosen to avoid problems associated with sick building syndrome.

Attic stock specifications must be met and delivered to a designated space in the same building, unless otherwise approved by Maintenance Services. The owner will be provided with a minimum of 1% attic stock for all flooring types, ceiling tiles, light bulbs. If different than our standard stock, we also require 1% attic stock of fuses, window locks, sashes, and other moving parts. Design team shall coordinate with Maintenance Services to determine the final attic stock list for each project.

AV installer to submit an entire equipment list of AV equipment. List to include type of equipment, number of equipment installed, room number installed, IDF/MDF room serving the equipment, manufacturer, and model number of equipment.

The mechanical contractor is to submit an equipment inventory upon completion of all projects. The inventory shall be in an Excel spreadsheet and shall contain the following information: equipment type, manufacturer, model number, serial number, vendor, date installed (month and year), room number, filter information (including size), and motor information (including horsepower and electrical information). This information should be coordinated with Butler University's Campus Engineer and Maintenance Services Department to ensure proper formatting to be imported to Butler's work order management system, TMA.

PROGRAMMING

A 10' X 16' room will typically accommodate stock and must be included in the design for major renovation or new construction projects. The owner will supply heavy duty, freestanding shelving to accept materials.

One custodial closet is required for every 20,000 SF or a minimum of 1 per floor. Closet dimensions shall be no less than 6' X 6'. Locate closets near restrooms, not on stair landings, and accessed by a 36" wide door off the main hallway. No service panels to be located within the closet. There must be clear floor access free of drain lines, concrete curbing, etc. from the front door to the curb sink location.

Butler University requires designated student soft spaces for informal meetings and gatherings. The location should be off of main corridors but around classrooms and dispersed inside of office suites. These rooms should be no less than 10' X 15' and should be located one in every 4000 sq. ft.

A centrally located telecommunications shaft shall be constructed; buildings over 300' in length may require two. The shaft shall be comprised of one room per floor stacked atop of the other. All rooms are to be on emergency back-up generator power. Room specifications as followed:

- a. All upper floor IDFs shall be minimum 10' X 10' and the main room MDF to be 10' X 15'
- b. Exposed, sealed concrete
- c. Wall opposite of door to be covered with ¾" fire treated plywood at 8' high
- d. Open from the main hallway via a 36" wide door

All faculty, staff, and administrative offices should have the same finishes and furniture styles unless expressed otherwise. The standard office shall have floor to deck walls and carpeting, The walls must be painted.

The following list of standard rooms and sizes guidelines are based upon Butler's established standard with the understanding that some room sizes will be evaluated based on current circumstances and architectural considerations. These sizes must be used as a basis of standardization.

• Administration Office (not to include bathroom)	200 – 250
• Conference Room	250 – 275
• Deans Office (not to include bathroom)	200 – 250
• Department Head	135 – 150
• Faculty Office	120
• Interview Room	100 – 110
• Lounge	250
• Modular work station	80 – 100
• Office Administrative Asst.	120 – 130
• Part time faculty/Adjunct Office for two	130 – 150
• Secretary storage/filing	150 – 175
• Secretary/support space w/waiting	150 – 300
• Seminar Room	350
• Student Assistant/ cubicle	50 – 70
• Student Soft space	150 – 200
• Waiting area	075
• Work room/ Storage/Filing/Kitchenette	250

01 00 00 General Requirements

01 50 00 Temporary Facilities and Controls

- A safe, user friendly foot route must be generated and posted on site as well as provided to the owner to post on its planning, design, and construction web page.

01 55 00 Vehicular Access and Parking

- A safe and clear path for construction traffic and debris removal should be generated by the contractor for approval of Butler University.
- Access gates must have Butler accessible padlocks provided by Butler in conjunction with the CM site padlocks. They must lock so that Butler personnel have access to them on a daily basis for emergency access if required.
- A parking plan needs to be developed to take into account university policies and procedures.
- All contractors are required to purchase a Butler University approved parking decal.
- Alternate traffic patterns, staging areas, and construction trailers and equipment need to be located to avoid soil compaction around the drip lines of major trees. Consultation with the owner to establish these areas is required.
- Staging areas and the construction site itself must be confined and secured every evening and over the weekends. A minimum of an 8' high fence with dust screening must be constructed to keep pedestrians out of these areas. Signs must be installed in prominent locations on the fence stating this.

01 56 00 Temporary Barriers and Enclosures

- The construction site shall be secured with an 8' high chain link fence. Fence is to be lined with dust reducing mesh control fabric.
- All construction debris including but not limited to rocks, trash, rebar, etc. must be removed from the site, and all planting areas must include flower beds, sod and seed areas, etc. No fill materials should be larger than 1" diameter nor should it contain wood of any kind.

01 80 00 Performance Requirements

- The Butler University standard for all new construction and renovation is LEED SILVER based on the current version of LEED in conjunction with ASHRAE 189. Our accepted payback period is 20 years or better. We will sub-meter each power and lighting subpanel.
- In residence halls, Butler is intending to require a student ID card to be inserted into the system to activate power in the room. We are also considering water source heat pumps throughout.
- Butler utilizes enhanced commissioning on every project as our physical plant is expanding. Our commissioning (CommX) agent must be involved from the very beginning in every phase of design to ensure we are meeting our sustainable goals. Building envelope and roof commissioning and thermal scanning is encouraged.
- Building as-built drawings will be presenting in BIM or Revit standards with the ultimate goal of using the BIM model as the building controls model.
- To achieve these standards, use the following construction and design philosophies:
 - Integrative Process** – Butler University requires an integrative design and building approach. Our CommX agent is on board at the start, along with our construction manager, architect, and engineers so that all can develop a centralized sustainability goal. We also require a LEED AP BD+C on every new construction project.
 - Location and Transportation** – We are encouraging a bicycle network on campus with a covered and compact storage facility at the HRC. We are also encouraging the investment in hybrid vehicles by maximizing our hybrid vehicle parking spaces.
 - Sustainable Sites** – Bioswales, rainwater harvesting, pervious concrete, and rain gardens are all being encouraged as we attempt to reduce irrigation needs and minimize storm water run-off. A minimum of 25% of the outdoor area of the building must be vegetated and have an overhead vegetated canopy.

Water Efficiency – Green/live roofs, native plant material, gray water systems for toilet flushing and other low use systems, and low flow water fixtures are all encouraged. We want to quantify all water input and output to and from the building and site to ensure we provide safe water for ground water recharge.

Building skin and orientation – Maximize the building skin performance for walls, roof, and framing to meet the most recent version of ASHRAE 90.1 standards.

Energy and Atmosphere – Day lighting, smart electrical systems, LED lighting, and occupancy sensors are encouraged. Electrical systems shall be designed to ASHRAE 189. All appliances shall be energy star rated.

Materials and Resources – We require our CM to recycle all building site materials and to divert construction debris from landfills. We institute our campus wide recycling program in each new building.

Indoor Environmental Quality – Low VOC, low emitting paints, finishes, and FFE, minimum of 12 feet of walk off mats at main entryways, utilization of green walls in lounges and atriums (i.e. Nedlaw living walls), raised floors in offices, suites, and classrooms that allow for personal relocation of ac diffusers which reduces ductwork costs, operable windows for occupant comfort, hydration stations (i.e. Brita) at water fountains, and recycling stations throughout the building should all be utilized. Each office shall have its own thermostat for additional thermal comfort and adjustability.

Performance – We require all utilities coming into the building to be metered. In addition, we require sub-meters on each floor's electrical outlet and lighting panels. We also require a water meter on each floor. It is our intent to compare the actual utility usage to the expected design usage.

Innovation - Butler University has a goal of purchasing 100% green power from our local utility by the year 2021. In 2011, we are at 10% and plan to increase that usage by 10% per year until 2021, where we intend to be utilizing 100% green power.

Regional Priority - The University supports and encourages the production, manufacture, and use of locally produced goods and services (within 500 mile radius) and prefers to use them wherever possible.

Buying Group Contracts with Butler University – National IPA Contracts, ICI Independent Colleges of Indiana, E & I – BWM Buying Groups are available but at the discretion of Butler.

01 84 00 Interiors Performance Requirements

- All interior finishes shall be durable and easily maintained.

02 00 00 Existing Conditions

02 40 00 Demolition and Structure Moving

02 41 00 Demolition

- The contractor is responsible for the removal and proper disposal of all indicate sidewalk areas. Any damages incurred to other areas other than the designated replacement areas are subject to the contractor's responsibility to repair in a pre-approved method (this includes spills or stains on any surfaces). The contractor must be aware that Butler has many underground utilities and irrigation systems. Frequently these items are underneath sidewalks in contact with the bottom of the concrete.

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04 00 00 Masonry

04 05 00 Common Work Results for Masonry

- All masonry joints equal to 8 feet above AFF shall be tooled smoothly and will not have globs of mortar, irregular joints visible in any way, deep recesses, or missing mortar. This also applies to interior masonry walls.

04 20 00 Unit Masonry

04 22 00 Concrete Unit Masonry

- In the fitness center and residence hall projects, all public corridor spaces must have concrete masonry unit walls. Interior walls must be minimum 8" thick and reinforced every other course with truss-style durawall. Interior walls can be a lightweight concrete material. Exterior or below grade concrete masonry units should be concrete block with the size according to the structural specification.

06 00 00 Wood, Plastics, and Composites

06 05 00 Common Work Results for Wood, Plastics, and Composites

- Wood blocking is required for all door stops, wood bases, chair rails, marker boards, bulletin boards, cabinetry, restroom grab bars, and etc.

07 00 00 Thermal and Moisture Protection

07 50 00 Membrane Roofing

07 51 00 Built-Up Bituminous Roofing

- All roofs must be 4 ply built up asphalt with a 90 mil thick top layer white granular cap sheet and 20 year warranty. Acceptable manufacturers are Tampro, Certainteed, or GAF.
- Install additional granular modified roofing at door and landing locations, and around mounted mechanical equipment for walk areas.
- Install steel success ladders with handrails when height difference from one roof level to the next is greater than 36".
- Keep roof penetrations to an absolute minimum.
- Install a water spigot somewhere on the roof or inside the roof door access area (prevents freezing) to allow for maintenance.
- Roof access must be via stairs and door, not ceiling hatches. The door shall be lockable from the inside and open freely from on the roof.
- In non-flat roof applications, shingles shall be 30 year dimensional type.
- All roofs must be designed to LEED specifications. The required 4 ply fully adhered hot asphalt mopped BUR system must consist of:
 - a. A single reinforced layer fiberglass base sheet of 68 lbs per roll size covering 3 squares
 - b. Two plies of fiberglass reinforced felt rolls of 44 lbs per 5 square rolls
 - c. A white granulated hot mop cap sheet with a thickness of 0.155 inches, approximately 103 lbs per 1 square roll
 - d. A 20 year warranty

07 70 00 Roof and Wall Specialties and Accessories

07 71 00 Roof Specialties

- In heavily wooded areas, a heavy duty gutter guard is required to prevent leaf build up

07 80 00 Fire and Smoke Protection

07 84 00 Fire stopping

- All mechanical, electrical, janitor, and phone room penetrations must be fire stopped.
- Fire stopping is required for all ceiling, wall, floor penetrations.

08 00 00 Openings

08 10 00 Doors and Frames

- Main entrance exterior doors shall be 42" wide if single leaf. Other building exterior doors must be minimum of 39" wide if single leaf. If double doors are required, a Best key removable center mullion is also required. A 24" tall kick plate is required on both sides of the door.
- Access classrooms via a 39" door opening to meet all ADA requirements
- No wood exterior doors. Steelcraft Gaintech doors simulate wood and should be specified where a wood look is desired.
- Special-lite fiberglass reinforced polyester doors would be considered by the owner if presented as critical by the architect.
- Exterior doors must have a pull type, non-operable handle with a BEST locking core and also heavy duty, stainless steel continuous hinges.
- Exterior door headers should be reinforced to offset door closer torque. When installed on non-reinforced aluminum, this torque wrenches the header and eventually pulls the screws out of the frame.
- If stile and rail door with glass is desired for aesthetics, there must be a center mullion behind the panic hardware. This offers stability for the door and protects against breakage of glass with slips off panic bar.
- All heavy use doors (classrooms, computer labs, etc.) and heavy doors due to acoustical treatments must have continuous stainless steel hinges.
- Interior doors must be 1-3/4" solid core with a vision glass in all doors except for storage, mechanical, and electrical rooms. Accepted manufacturers: LCN closures, model # 4040 or 4041 or Stanley closures, model # QDC and Best locks, series 35H mortise
- Interior doors require heavy duty Stanley or Hager hinges.
- Review the lever style with owner. Stanley will custom make our levers.
- All main circulation doors must be minimum of 36" wide, and classroom doors must be minimum of 39" wide with kick plates on both sides. Storage room doors must have kick plates on the interior side of the room. 24" tall kick plates required on classrooms and all major circulation path doors.
- Reinforced, welded metal door frames with wood blocking, no "knock downs". Double studs and header for each frame, with interior 2 X 4 wood stud for stability.

08 30 00 Specialty Doors and Frames

08 31 00 Access Doors and Panels

- All access panels, access doors, roof hatches, etc. must be able to accept or adapt to Stanley Best, small format cores. If this is not feasible, then each type of access panel should be so that one key operates them. For example, every water spigot access should open with one key.
- Access panels are required when plumbing joints, connections, valves, etc. are installed in inaccessible areas. Roof access panels must be a minimum of 12" X 12". Through the wall access panels shall be a minimum of 18" X 36".
- Whenever a valve, air-hammer, arrestor, air vent, or another mechanical device is installed behind walls, floors, or ceilings, an access panel minimum size of 12" X 12" must be installed with the device visually centered in its frame and located less than 12" from the panel.

08 50 00 Windows

- All windows shall have thermal, low E glass.
- 8 • At least a portion of windows is required to be operational in every office space to allow for comfort and adjustability.
- Windows in non-office spaces must be fixed, thermal, low E double paned glass with glare treatment; treatment for glare is especially important if windows are located in stairwells have direct morning or afternoon sunlight.

- Outside windows are required in each office and work space when possible. If not possible, borrowed light via transom window or some other means shall be installed.
- Windows must be heavy duty, commercial grade quality with high R rating. Style and manufacturer to be discussed with owner.
- Owner must be supplied with attic stock of locks, sashes, and any other moveable parts.

08 70 00 Hardware

08 71 00 Door Hardware

- All door hardware finishes should match throughout the building. Preferred hardware finishes include: Standard US10B or Best Dark Bronze 613 or Polished Chrome Best 626
- To prevent continuous maintenance problems with door systems initially incorrectly installed, we require a pre-installation instruction meeting with the manufacturer reps as well as a post installation walk-thru punch list with the same group (these are free of charge). Additionally, we require a representative from Maintenance Services to inspect and approve the door system installation. Door systems must be installed per manufacturer and industry standards.
- Butler requests the following for an electronic door opener package (interior and exterior):
 - a. LCN Control Box with electric gear drive, not pneumatic
 - b. LCN 957 Remote wireless actuator switch, battery operated
 - c. LCN 931 Receiver
- **Due to active shooter concerns, faculty and students must have the ability to lock the door to all classrooms from the inside. Butler Maintenance Services and BUPD will need to approve the proposed solution.**

08 74 00 Access Control Hardware

Any deviation from the considerations and specifications related to access control listed below must be brought to the attention of the BU project manager before work precedes.

- Butler uses the Lenel OnGuard electronic access control system. Doors are monitored for afterhours activity, being propped or forced opened, and other basic security. Butler will be represented in all card access planning, design, and implementation meetings by a representative from NETech Corporation.
- All access control hardware specifications shall be reviewed with the owner prior to final specification as model upgrades and replacements happen frequently. All model numbers should be reviewed and selected with the owner.
- Classrooms, computer labs, and program specific spaces may also require access control specified in the building program.
- Access control wiring diagrams must be included when a building store front is sent out to bid to ensure the wiring pathway is installed and delivered to the correct locations.
- Each door that is in the access control system must be equipped with a Belden 5 bundle cable
- These are the basic requirements for each type of opening:
 - a. Key codes will be generated by Best. A certified locksmith or a Best hardware installer should be contracted to install all hardware/ Consult with Butler personnel for screw set points.
 - b. A pre and post install meeting shall occur with the hardware provider and Maintenance Services representative to ensure proper installation and perform a punch list after the hardware install.
 - c. Two copies of door hardware close out documents in separate binders are required. Must include door schedule, material list and cut sheets in deliverables.
- Main circulation exterior doors must have Stanley Securities card readers that can be programmed to interact with our automatic door opener package.
- Each exterior door will need:
 - a. A door position switch for monitoring purposes

- b. Electronic locking hardware
- c. Door contacts, request to exit, and other function specific to our system
- d. Electric power transfer: a Von Duprin EPT-10 hinge or Stanley6 conductor electrified hinge.
- e. Sentrol Contacts, 1078 Magnet Contact Br
- f. H.I.D. Corporation, Reader, Thinline, Classic Gray
- g. MC-25 BEA automatic door operator I/F module as required to interface with automatic doors
- h. Von Duprin, Request to Exit, panic device, Von Duprin back-up battery option card and EL latch retract
- i. Von Duprin power supply must be mounted above ceiling within 50' of card reader opening; this power supply requires 100 volt power
- j. A dual reader interface board (LNL 1320) for every two card reader openings
- k. Intelligent system controller (ISC, LNL 2220) per building or as required by building architecture
- Interior doors of computer labs will need:
 - a. Power transfer for electrified hinge or EPT
 - b. Sentrol Contacts, 1078 Magnet Contact BR
 - c. HD – H.I.D. Corporation, Reader, Thinline, Classic Gray
 - d. Schlage or Best, Electric Mortise lock with integrated door hardware

09 00 00 Finishes

09 20 00 Plaster and Gypsum Board

09 29 00 Gypsum Board

- High traffic areas should include entry vestibules, corridors with 20 gauge metal studs screwed to both sides of the floor track, 5/8" impact resistant gypsum board to 7' AFF or to top of door headers, drywall expansion joint, and regular drywall to the deck with batt insulation. A level 5 finish is required on these surfaces up to 7'.
- All other walls to be 20 gauge metal studs, 5/8" drywall both sides to the deck with batt insulation. Drywall in lower level raised ½" above concrete floor.
- Impact resistant gypsum board must be used up to 7 feet AFF or to align with door headers.
- Classrooms and circulation spaces require a level 5 finish. High impact resistant gypsum board to 8' with drywall expansion joint should also be designed.
- All moisture resistant drywall in moisture sensitive areas.

09 50 00 Ceilings

- Ceilings require:
 - a. A minimum of 6" between ceiling grid and the lowest pipes or other structural elements.
 - b. A 2' X 2' Armstrong Cortega 704A white single reveal tile, Series 200 grid in common areas.
 - c. Kemlite fluted polypropylene ceiling tile in moisture sensitive areas such as shower rooms and restrooms (www.glasbord.com).
 - d. A Kemlite Sanigrid II solid vinyl ceiling grid.

09 60 00 Flooring

- Raised flooring shall be used in all computer labs and at least in front of all classrooms to facilitate technology cart location.
- Flooring shall be static proof, direct glue, and loop pile carpet – per flooring specs.
- 10** • In bathrooms, floors must be unglazed, smooth ceramic tile with dark grout.
- Use Spartan Green Solutions Seal / Finish 3504 for floor wax for vinyl composition tile and sealer for terrazzo.
- Use Spartan Green Solutions Floor Finish Remover 3505 as a floor wax stripper.
- Floor specs - Steelcase Pathways floor and wiring or Smart Desk Fit computer floor.

- Resilient base shall be Johnsonite, 4" cover base (no straight base) in the medium to dark color range (black is preferred).
- All hard surface/wet areas should contain appropriate water resistant materials.
- Stair treads must be terrazzo poured, terrazzo tile, or ceramic tile system. Nosings can be Johnsonite 3" poured in place frames.
- Reducers / nosings requirements:
 - a. 2" vinyl in dark color range; manufacturer – Johnsonite
 - b. Carpet to vinyl composition tile reducer; CTA-XX-K
 - c. Carpet termination; CTA-XX-J
 - d. Vinyl composition tile termination; SSR-XX-B
 - e. Nosing, carpet treat / resilient riser; Gradus
 - f. Nosing, carpet treat/ carpet riser; Gradus
- Sheet vinyl must be Armstrong Medintech with heat welded seams.
- Smooth, non-skid vinyl composition tile shall be used in corridors and service areas, unless otherwise determined by the program. The owner will provide specifications for finish coatings (wax).
- Approved models: Armstrong Excelon, Premium Excelon. 1' X 1' X 1/8" and preferable color is "Sterling" for field if compatible with color scheme.
- Entrance vestibule flooring shall be terrazzo with no recessed walk off mat. Owner will provide specifications for terrazzo sealer.
- No recessed entry walk off mats; terrazzo entrance vestibules are preferred. Consider Interface Huega Tile as an option or owner will provide carpet with walk off mats vinyl backing. Proper door clearance is required for either.

09 68 00 Carpeting

- Carpet should be utilized in programmable spaces except where noted.
- Carpet specifications:
 - a. Interface, Tandus or any product that meets the performance criteria.
 - b. Thermoplastic
 - c. Face yarn is premium blended nylon, Solutia, or Dupont
 - d. Gauge is 1/10 to 5/64
 - e. Minimum of 10 inches per stitch
 - f. 20 to 24 oz yarn weight per square yard
 - g. Anti-microbial: lifetime, intercept
 - h. Fiber treatment: protekt2
 - i. Density: 6000 as a minimum
 - j. Free lay grid system as installation method

09 70 00 Wall Finishes

- A chair rail is required to protect the walls from furniture damage. Height and style to be determined by type of furniture, typical is 6" mounted roughly 33" AFF.
- Wall construction per specs. Finish is type II wall covering.
- Where applicable, wall coverings should be smooth-surfaced vinyl, easily cleaned, easily maintained, and type II classification. They should be installed on primed walls and primer should be compatible with the wall coverings adhesive.
- In restrooms, glazed tile is recommended for wet walls. If tile budget is an issue, a minimum requirement for protection against cleaning chemicals and spills is a plastic / vinyl shield installed around sinks and urinals.

09 80 00 Acoustic Treatment

- Ceilings shall be 2'X2' acoustical lay-in tile, per specification

09 90 00 Painting and Coating

- General painting specifications:

- a. Low VOC paint is required. The highest commercial grade standard manufacturers are acceptable such as MAB, Sherwin Williams, and Porter.
- b. Walls require 3 coats of paint (1 primer and 2 finish coats). Butler antique white is preferred color.
- c. Concrete block must have a semi-gloss finish with at least one coat of block filler and 2 finish coats.
- d. Restrooms and showers must be painted with water based epoxy.
- e. Door frames and all metals must be highest quality alkyd enamel semi-gloss.
- f. All paint formulas must be identified on the finished plan as well as marked on each attic stock can.
- Paint is the preferred wall finish for classrooms, offices, and circulation spaces. Circulation and classrooms shall receive water based epoxy in Butler antique white with one wall as an accent wall. Offices are to be painted with flat or eggshell finish. No whiteboard paint to be used.
- Exterior staining is based on application and 2 coats of SPAR is also required.
- Interior staining must be oil based tonetic alkyd with 2 coats polyurethane.

10 00 00 Specialties

10 10 00 Information Specialties

10 11 00 Markerboards and Tackboards

- Markerboards should be of manufacturer – Greensteel, F series sliders, and AL series fixed panel; vitricite panels, 1.5" aluminum frame, with a map rail and a marker tray.
- A standard classroom consists of a markerboard with the following specifications:
 - a. Classroom size up to 500 square feet: 4' X 16' board with one 5' sliding panel
 - b. Classroom size up to 700 square feet: 4' X 16' board with two 5' sliding panels
 - c. Classroom size up to 900 square feet: 4' X 16' board w/ three 5' sliding panels
 - d. There must be a display rail across the top of the frame for push pins and a map rail.
- Bulletin boards may be mounted in circulation spaces. The quantity and location will be determined by the owner. The typical size is 4' X 6' in aluminum or wood frame construction.
- A bulletin board or map rail is required inside each classroom. Standard bulletin board size is 4' X 5' and should be mounted inside the room close to the door. A map rail running the length of the two long walls of the room, mounted at the same height as the top rail of the marker board, is another option.

10 14 00 Signage

- Signage has to meet ADA requirements and meet the expectations of the user, consistent to current building signage. All doors should have an assignment #.
- All non ADA signs to be mounted 5 feet to top of sign. Mount ADA signs at designated height.
- Every faculty and staff office shall have the standard window sign which includes the room number, a name insert window and tack surface – overall size is 6" wide X 9" tall.
- All circulation room numbers have the same window insert philosophy, with more window inserts and a larger size – roughly 10" (for 3 inserts) or 12" (for 5 inserts).
- All service room numbers (MEP, T-Comm, etc.) will be installed on the door header.
- A building exterior sign to match the university standard must be provided for each building site. The sign has a concrete base, is interiorly lit tied to a photo cell, and is provided by Butler personnel. The purchase and installation of the unit must come from the project budget.
- Exterior building signs to have power but not internally lit. Signs to be lit externally.
- Guidelines for assigning room numbers:
 - The first digit indicates the floor which room is located, e.g. 123 is located on the first floor. Lower level numbers will have prefix or 3 digits total, so will read 012 and not only 12.
 - In a building with only one dividing corridor, room numbers should flow in ascending order from one end to the other end of the building. With a more complex corridor

system, numbers should flow in ascending order in a clockwise direction starting from the main entrance.

- Assign room numbers so odd numbers are on one side of the hall and even on the other.
- To the greatest extent possible and without creating inconsistencies, rooms with the same digits in the last two spots should be located in the same position of the building. Thus 001, 101, 201, etc. occur in a vertical stack. This is especially helpful with landmark rooms, for example, a conference room on the corner of each floor or service closets that occur in a vertical stack.
- Skip numbers as appropriate in order to reserve numbers for future use. Most buildings undergo renovation, so when larger rooms are divided into smaller spaces, new room numbers are needed. In the event of a planned addition onto a new building, a block of numbers should be held out for that purpose, or at least discussed. Reserving room numbers eliminates the need to renumber an entire level.
- Each room to have only 1 identification number, regardless of how many doors open to it.
- Rooms entered from a main corridor or lobby receive numbers with no suffix. Rooms within a suite always are numbered with the entrance room number plus an alpha suffix, e.g. 101A and 101B, beginning with the closest to the main entrance and proceeding in a clockwise direction.
- All rooms including mechanical and electrical rooms, janitorial closets, and restrooms and excluding main corridors, stairs, and elevators, should be numbered sequentially (skipping numbers if needed). Stairs shall be numbered Stair “X” starting with the southwest stairwell and proceeding in a clockwise direction. If more than one elevator, use the same method described for stairs with abbreviation “Elev. X”.
- Stairwells shall be labeled as “ST” with stairwell number and the floor it is on and sequentially in a clockwise direction.
- Exterior doors shall be labeled sequentially clockwise. They will be labeled with EN and 1 as first entry.
- The architect is responsible for a final room number plan following the guidelines listed above. A draft plan shall be reviewed by owner during conceptual design. All drawings shall refer to the final room number plan for equipment location and panel description purposes. A PDF copy of the room number plan shall be provided to the owner on disk as part of project deliverables.

10 20 00 Interior Specialties

10 26 00 Wall and Door Protection

- Heavy duty 2” width flange corner guards are required in all public areas on the outside corners.

10 28 00 Toilet, Bath, and Laundry Accessories

- Do not specify soap or toilet paper dispensers as the owner will supply them for the contractor to install.
- Bathroom partitions must be solid vinyl Capitol Partitions (or similar) with continuous stainless steel hinges, continuous wall brackets, and stainless steel hardware with tamper-proof screws. Each stall should have a coat hook on the back side of the door.
- Restroom fixtures specifications; Must meet the quality standards equal to Bobrick specifications; stainless steel, satin finish
 - a. Mirrors – standard style
 - b. Grab bars
 - c. Stainless steel shelf
 - d. Soap dish and bar (for showers only)
 - e. Shower curtain rod –
 - f. Folding shower seat

10 50 00 Storage Specialties

10 51 00 Lockers

- Lockers (manufacturer – Republic) are to be heavy 16 gauge ventilated platform base, individually numbered with key operated locks or hardware for pad locks, unique to each individual area of design assessed by the Project Manager – Republic should be the standard.

10 55 00 Postal Specialties

- Built in mailboxes must be key access type rather than combination with small format 7 pin and removable core. Discuss manufacturer with owner.

10 56 00 Storage Assemblies

- In all restrooms, install a shelf at an accessible height for holding backpacks and books in the sink area.
- In women's restrooms, a shelf is required adjacent to each sink / mirror area.

10 57 00 Wardrobe and Closet Specialties

- Coat racks for offices should be standardized by each building.
- Custodial closets require:
 - a. A floor sink with curbs.
 - b. 1/8" thick durable resilient material such as fiberglass reinforced polyester to be mounted 4' AFF on the walls above the sink for moisture protection. The joint between the sink and the resilient material and the space from the FRP to drywall should be caulked.
 - c. Four wood adjustable shelves on heavy duty KV standards.
 - d. The floor to be polyurethane sealed concrete.

10 70 00 Exterior Specialties

10 74 00 Manufactured Exterior Specialties

- Window well material shall extend 6" above finish grade with grade built up for drainage away from building.
- Window wells (and airways) must be covered by clear plastic or tight black mesh to prevent debris from entering well area.

11 00 00 Equipment

11 10 00 Vehicle and Pedestrian Equipment

11 13 00 Loading Dock Equipment

- If a loading dock is deemed necessary, access to the main building circulation system and elevators from the dock should be easily achieved. It should have the appropriate overhead doors and bumper guards, and a single leaf door that is proximate to ramp or stairs from grade to level dock.

11 20 00 Commercial Equipment

11 21 00 Retail and Service Equipment

- If deemed appropriate, all vending areas must have:
 - a. Ceramic tile or VCT flooring.
 - b. Wall material shall be resilient and easily cleaned.
 - c. A minimum of one hot/cold water feed and a floor drain located in the area.
 - d. A door to close off the area is not required unless specifically requested.
 - e. Waste and recyclable receptacles shall also be located in this space.

11 50 00 Educational and Scientific Equipment

11 52 00 Audio-Visual Equipment

- AV installer to submit an entire equipment list of AV equipment. List to include type of equipment, number of equipment installed, room number installed, IDF/MDF room serving the equipment, manufacturer, and model number of equipment.

- An electronically switch operated, recessed projection screen (Draper Envoy Motor-in-roller with automatic shut off and ceiling enclosure, 10' nominal diagonal dimension) is required in each classroom. Align 1 edge of the screen with the center of the marker board. This placement allows for simultaneous projection and writing on marker boards.
- Security protection must be provided on all projector units.

11 80 00 Facility Maintenance and Operation Equipment

11 82 00 Facility Solid Waste Handling Equipment

- A designated trash collection site should be located on each floor close to a vending area. Waste and recycling locations should be identified and designated throughout a building.
- Space must be provided in all restrooms for a non-recessed trash receptacle.
- Owner will provide receptacles for a minimum of one recycling station per floor. Space needs to be 6 feet wide and 3 feet deep. Wall finishes around recycling station shall be a hard, easily cleaned surface or semi-gloss epoxy based paint.

12 00 00 Furnishings

12 20 00 Window Treatments

12 21 00 Window Blinds

- Window coverings for offices must be 1 inch Levelor aluminum mini blinds with alabaster color.

12 24 00 Window Shades

- Window treatments shall be manually operated, vinyl roll shades.

12 30 00 Casework

12 36 00 Countertops

- Restrooms require solid surface countertops with integral sinks or individual porcelain fixtures.

12 40 00 Furnishings and Accessories

12 48 00 Rugs and Mats

- There shall be no recessed walk off mats at main entrance doors. The owner will provide carpet-type walk off mats with rubber backing on hard surfaces or Huega carpet tile walk off type carpet as an alternative. Door clearances and sweeps must be sized accordingly to avoid catching the walk off mats.

12 50 00 Furniture

12 56 00 Institutional Furniture

- Furniture: manufacturer, KI – style, color, etc. to be determines.

12 90 00 Other Furnishings

12 93 00 Interior Public Space Furnishings

- Locations for trash and recycle receptacles should be designated on each floor. The owner will provide the free standing receptacles. Easily cleanable finished must surround the enclosure.

14 00 00 Conveying Equipment

14 20 00 Elevators

- All ADA requirements must be met for each elevator.
- Accepted manufacturers: Thyssen Krupp. Service agreement shall extend for 2 years, with monthly fire service testing included.

14 27 00 Custom Elevator Cabs and Doors

- No glossy finishes inside or outside the elevator
- Door enclosures, thresholds, and transitions shall be brushed stainless steel

14 28 00 Elevator Equipment and Controls

- Proprietary equipment shall not be specified.
- Two protective railings: 1 at the chair rail height and 2 above the floor base treatment are required to prevent cart and delivery damages.
- Service agreement shall extend for 2 years with monthly fire service testing.
- Elevator equipment shall not be located in or directly adjacent to a programmable space, as the operational noise is an issue.
- Owner must be involved in call button design.

21 00 00 Fire Suppression

- Fire extinguisher cabinets shall be located in main hallways so that travel more than 75 feet does not occur before passing a fire extinguisher and shall receive a 5LB ABC type only.
- Submittals:
- For Kitchen and Data Rooms, fire suppression design is to be submitted to Butler for review during the design phase.

21 10 00 Water-Based Fire-Suppression Systems

- All sprinkler heads to be in the ceiling are to be recessed type, located in the center of the ceiling tile, if lay in ceiling is present.

22 00 00 Plumbing

- All work shall be completed in accordance with all local, state and national building codes.
- Access panels are required when plumbing joints, connections, valves, etc. are installed in inaccessible areas. Roof access panels should be minimum 12" X 12". Through the wall access panels must be minimum of 18" X 36".
- Custodial Closets are to be provided hot and cold water services with lever hardware and a swivel, threaded faucet for hose attachment, should be mounted 3' AFF.

22 05 00 Common Work Results for Plumbing

- We require all utilities coming into the building to be metered. We also require a water meter on each floor. It is our intent to compare the actual utility usage to the expected design usage.
- Showers and Locker rooms: A hose bib with hot and cold water valves shall be provided in shower and locker rooms for ease in cleaning. To be located under the sink area.
- All piping shall be supported per governing code. All metal piping shall be insulated with proper dielectrics to protect it from any metal hangars supporting the pipe.
 - a. Provide hanger or support at all valves, tees, and elbows.
 - b. Spacing of hangers or supports for cast iron pipe shall be 5'-0" maximum. Place hanger close to joint.
 - c. Other risers shall be supported at lowest point of floor through which they pass. Pipe 2" and smaller in size shall be guided at every floor.
- All piping must be labeled or colored.

22 06 00 Schedules for Plumbing

- Water heater pre-set temperatures must be in the acceptable range in order to ensure a faucet temperature of 105-120 degrees.

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- Restrooms shall meet all plumbing codes and ADA guidelines.
- In restrooms, floor drains must be located in lowest part of the room.

22 07 00 Plumbing Insulation

- All metal piping shall be insulated with proper dielectrics to protect it from any metal hangars supporting the pipe.

- Rubatex is NOT permitted on campus.

22 10 00 Plumbing Piping

- All transitions from ferrous to non-ferrous types of metal piping shall be made using proper dielectrics.

22 13 00 Facility Sanitary Sewerage

- All sanitary drains must be tested for heavy use at least 2 weeks prior to owner occupancy.

22 14 00 Facility Storm Drainage

- Roof drains must be in lowest part of the roof and taper insulation accordingly.
- All roof drains must be tested for heavy use at least 2 weeks prior to owner occupancy.

22 30 00 Plumbing Equipment

22 33 00 Electric Domestic Water Heaters

- Water temperatures set and tested to ensure proper range is set.

22 34 00 Fuel-Fired Domestic Water Heaters

- Water temperatures set and tested to ensure proper range is set

22 35 00 Domestic Water Heat Exchangers

- Water temperatures set and tested to ensure proper range is set

22 40 00 Plumbing Fixtures

- Water Efficiency – gray water systems for toilet flushing and other low use systems, and low flow water fixtures are all encouraged. We want to quantify all water input and output to and from the building and site to ensure we provide safe water for ground water recharge.
- All drains to have cleanouts installed according to code: every 135 degree change of direction and every 50 feet. Cleanout openings shall terminate through floor or through the wall, within 24" of the floor, and shall be accessible without removing fixtures. All cleanouts shall be "full pipe-size."
- A hose bib is required on the exterior wall of new construction close to the main entrance and must be Smith Wall Hydrants, series 5500 through 5900.
- No cross connect T's shall be installed in wet drain or inaccessible areas.

22 42 00 Commercial (and Residential) Plumbing Fixtures

- Food sprayer in food prep areas to be T&S, 1.24 GPM @ 60 PSI.
- Hand operated Sloan flush valves ONLY.
- Kohler Plumbing fixtures (white) only.
- Urinals are to be pint flush.
- Dual flush water closets are to be provided in women's restrooms, at a minimum.
- Toilet seats shall be hard resin plastic and stain resistant (toilet cleaner used is Clinging Crew which is 9.25% Hydrogen chloride, shower cleaner used is Q&A Shower Foam which is 12% phosphoric acid).
- Wall mounted urinals and toilets shall be utilized.
- Urinals and water closets are to be porcelain or china, not PVC
- On back to back lavatories, drains shall be double Y's or vertical offset Y's – NO CROSS or double T's in any drain or wet vent.
- All faucets are to be Kohler and Delta (white) only.
- Lavatory faucets are to be provided with a 0.5 GPM aerator.
- Each tub and shower fixture shall have an individual shut off valve or screw stop.
- Selected bathtubs shall not require any caulking. The caulking results in a maintenance issue, in having to repair and recaulk.
- 17 • Each tub and shower fixture shall have an individual shut off valve or screw stop.

22 47 00 Drinking Fountains and Water Coolers

- Drinking fountains to be Halsey Taylor HTHB-HACG8BLSS-WF Hydration stations, as determined by owner.

- A drinking fountain/bottle filling station shall be located on each floor, typically close to a restroom. It shall meet all ADA requirements and have easily accessible valves, motors, etc.
- Brand: Halsey Taylor – Specification below:
 - Model HTHB-HVRGRN8BLWF that delivers 8GPH - 50oF drinking water at 90oF ambient air and 80oF inlet water. It will include the WaterSentry® Plus filter, certified to NSF/ANSI 42 and 53 for lead reduction, with visual monitor to indicate when filter replacement is necessary. Bottle Filler will be sensor-actuated with auto shut-off timer and bottle counter. It will provide 1.1-1.5 GPM with laminar flow for minimal splash. It will include anti-microbial protected plastic components. Cooler will have stainless steel cabinet and basin and removable drain strainer. It will have a vandal resistant bubbler and front pushbutton activation. It will comply with ADA standards, U.L. Listed and be certified to lead-free compliance including NSF/ANSI 61- Annex G, AB1953

23 00 00 Heating, Ventilating, & Air Conditioning (HVAC)

- An excel spreadsheet must be kept of all mechanical equipment – fans, motors, anything with belts or filters that needs to be replaced or maintained - which indicates ALL of the following to facilitate entering into facilities preventive maintenance software. This spreadsheet must be provided to the owner at the completion of the project
 - Manufacturer
 - Model number
 - Serial number
 - Date of installation and date of manufacture
 - Warranty date
 - Location (room # REQUIRED)
 - Cost (estimated if actual not available)
 - All of the following applicable information: Amps, Capacities, Horsepower, Volts
- Each and every piece of equipment that will require service or maintenance – belts changed, joints lubed, filter changed, batteries exchanged, etc. must have an owner provided spec sheet filled out and submitted as part of close out documents. These sheets should all be collected in a separate 3 ring binder. This info is required for our maintenance system software.
- All mechanical equipment must be tagged with an in-service date.
- All work shall be completed in accord with local, state, and national codes.
- Whenever a valve, air-hammer, arrestor, air vent, or another mechanical device is installed behind walls, floors, or ceilings, an access panel minimum size of 12" X 12" must be installed with the device visually centered in its frame and located less than 12" from the panel.
- All utilities and services shall include provisions for monitoring and tracking consumption on a building by building basis. If, for example, two buildings share a common chiller, provisions shall be made to measure each. All shall be recorded and totalized monthly on the campus network. Refer to individual sections for desired metering types for domestic water (33 12 33), natural gas (33 51 33), chilled water and heating hot water (33 61 33), and electrical (26 27 13).
- Custodial Closets: provide exhaust for all custodial closets. Ensure that the LEED requirements have been met for exhaust/negative pressurization in these spaces.
- IDF/MDF Rooms: Constant air circulation via wall mounted "hotel type" AC unit.

23 05 00 Common Work Results for HVAC

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- All equipment shall be installed so that unit fans, valves, and filters are easily accessible and can be easily serviced. All equipment shall be installed per manufacturer's work clearance requirements and Butler shall be notified if this is not met.
- Vibration pads are required for all indoor equipment.
- VAV boxes and valves shall be identified with a tag, naming the unit type and number. Tag shall be stainless and attached to the grid.

23 07 00 HVAC Insulation

- Ductwork to be externally insulated within 20' of fan units.
- All ductwork in an environmental return air plenum shall have external insulation.
- OA ductwork to be insulated
- Rubatex is NOT permitted on campus.

23 09 00 Instrumentation and Control for HVAC

- Each individual office, classroom, and lab will have an individual temperature control device, located within that room. Temperature Control shall be mounted perpendicular and in vertical alignment with the room light switch.
- Temperature control shall provide occupant with +/- 2 degrees from design set point for cooling and heating.
- Elevator motors and equipment rooms must not get too hot, as this damages equipment and causes service interruptions once the building opens. Service agreement shall extend for 2 years with monthly fire service testing.
- Where possible, it is Butler's desire that occupancy sensors control lights as well as VAV boxes/HVAC controls. This provides desired energy savings opportunities. If not feasible, the occupancy sensor shall at least have this capability for future connection. Please coordinate with electrical engineer to ensure proper specification of sensor.

23 20 00 HVAC Piping and Pumps

23 25 00 HVAC Water Treatment

- Glycol and closed loop systems shall be provided and designed with an air dirt separator with automatic blowdown.
- Glycol systems shall be provided with an auto make up system feeder. Contractor to be required to flush all piping before final turn over to owner.

23 30 00 HVAC Air Distribution

- Carrier, Trane and Haakon Air Handlers and DX systems are acceptable.

23 31 00 HVAC Ducts and Casings

- Duct work shall be properly secured and joints sealed for best performance.

23 37 00 Air Outlets and Inlets

- No slot diffusers. Butler has found these diffusers to be difficult to relocate during future renovations and also increase the rate of required cleaning for adjacent ceiling tiles. All diffusers shall be 2x2 lay in type unless dictated by hard ceiling.
- Return air grills shall also be 2x2, and the standard should be the egg crate type grill.

23 38 00 Ventilation Hoods

- Butler prefers the use of no exhaust type fume hoods, similar to those used in Gallahue 3rd floor labs.

23 40 00 HVAC Air Cleaning Devices

23 41 00 Particulate Air Filtration

- HVAC units must be serviced prior to filter media exchange, which needs to occur at end of job. Material for 1 additional filter change must also be provided. MERV 13 filters are required. MERV 8 pre-filters must also be provided to reduce replacement rate and to protect the more expensive MERV 13 filters.
- For all air handling units, a pressure differential sensor shall be provided to monitor filters and when replacement is required. It is Butler's desire that these sensors be tied into the Building Automation System such that Butler maintenance can be notified when a filter replacement is needed.
- No bag filters and no headers is desired.

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23 50 00 Central Heating Equipment

23 52 00 Heating Boilers

- Boilers shall be Aerco (not Lockinvar or Fulton), hot water, high efficiency units.

- For condensing boiler exhaust piping, DuraVent PolyPro must be utilized. Screws are not to be used due to the corrosive nature of these boilers' exhaust.

23 60 00 Central Cooling Equipment

- Refer to section 23 23 23 for refrigerant requirements.

23 80 00 Decentralized HVAC Equipment

23 81 00 Decentralized Unitary HVAC Equipment

- All DX units shall have a liquid line sight glass.
- All DX units shall have both liquid line and suction line filters and dryers.
- Condensing units shall be mounted outside. Air handlers to have a plastic secondary catch pan with drain under the unit to ease clean up.

23 84 00 Humidity Control Equipment

- Do not use heated-pan humidifiers, wetted-element humidifiers, jacketed steam humidifiers, or portable humidifiers.
- Atomizing humidifiers, direct-steam-injection humidifiers (only with drip pans underneath), or self-contained steam humidifiers are acceptable options. Butler prefers the use of self-contained steam humidifiers.

25 00 00 Integrated Automation

- As Butler's primary BAS provider, Honeywell must be involved throughout the design process to provide appropriate graphics on maintenance system software. Responsibility for temperature control wiring devices, installation, types of devices, installation, types of devices/t-stats/sensors, etc. must be clearly defined.
- Temperature controls shall be Honeywell brand. Coordinate requirements with Honeywell personnel.
- All controls are to be digital.
- Integration to BAS is currently not needed for fire protection or card access.
- Laptop for BAS Connection
 - A laptop may be specified by the design team for maintenance access to building automation system, but should not be provided by contractor as IT will provide the necessary maintenance/upgrades of this laptop. If specified, designer shall coordinate with Butler's Information Technology (IT) department to ensure IT includes this laptop in their budget (IT to purchase and provide laptop, design team to coordinate network and power connection)
 - Butler requires 1 connection location for BAS laptop, at minimum, per building and prefers 1 laptop to be provided (by IT) at this connection location. Connection point location to be coordinate with Butler maintenance services, but typical desired location would be in main mechanical or electrical room (or other mechanical/electrical room where additional space is available). Note: laptop for access to building automation system shall only be provided for access by Maintenance Services Department, in Facilities, and not for end user access. End users shall be given control via lighting controls and thermostats in spaces. If additional change is needed, they will submit work order tickets to Maintenance Services.

26 00 00 Electrical

- Process
 - a. Review design at each phase (specifically of medium voltage lines)
 - b. All scheduled power outages to be coordinated with Butler and 2 weeks advance notice is to be provided
 - c. Submit all light fixtures to Butler PM for review by Butler PM and Butler TEMP
 - d. Notify Butler PM, so they may notify Butler TEMP, 2 weeks before drywall has been hung, so that an in wall inspection can be completed
 - e. Butler TEMP will purchase the UPS for the TCOMM room.

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- f. IDF/MDF and Electrical rooms are to be separate rooms.
- General requirements:
 - a. No single pole breakers less than 20 amps.
 - b. Disconnects to be a minimum of 30 amps. Circuits can be fused at 20 amps.
 - c. Disconnects shall be installed as close to device as possible, preferably within sight or within 50 feet. Minimum fuse size – 20 amperes.
 - d. Label all disconnects, starters, and controllers as to what device they serve and from which panel they are fed.
 - e. Circuits should be calculated at continuous duty.
 - f. All underground circuits are to be in conduit.
 - g. Lighting and receptacle circuits shall be separate.
 - h. Circuit wiring shall be continuous color according to industry standards:
 - a. 120/208V – 3 phase; Black, Red, Blue, White neutral, Green ground wires.
 - b. 277/480V – 3 phase; Brown, Yellow, Purple, Gray neutral, Green w/yellow stripe ground wire.
 - i. All wiring must be run with 90 degree turns and not run diagonally across the space it feeds.
 - j. Conduit runs to have a junction box every 100 feet.
 - k. Conduit to be anchored at 5 foot intervals.
 - l. All in-ground junction boxes to be installed inside a hand hole box.
 - m. For ease of maintenance purposes, install a switch in the main electric room to shut down all emergency and exit circuits via an HOA contactor.

26 05 00 Common Work Results for Electrical

- We require a minimum of 1 building exterior “service station” for conferences consisting of a 100 amp, three phase, 4 wire, type 12, safety disconnect and a telecommunication box with ¾” conduit feeder.
- All grounds shall be *down* on all 120V outlets.
- Floor mounted outlets are acceptable. For new construction, all floor mounted outlets to be cast in slab and flush with finish floor.
- Material Specifications:
 - a. Receptacles, switches and plate covers shall be of plastic construction, ivory in color – unless installed on medium to dark wood, where dark brown shall be utilized
 - b. Receptacles shall be P&S “PT5362-A
 - c. Receptacles within 5 feet of any water outlet to be GFI type.
- Exterior - An electrical outlet is required both on the exterior wall of new construction close to the main entrance as well as on each of the other exterior walls. The electrical outlet shall be 110 volt, GFCI and housed in a protective waterproof enclosure. In roofing systems, electrical outlet is required at every 100’ of perimeter wall between counter flashing and coping
- Corridors, Lounges and Soft Spaces – An electrical convenience outlet is to be located every 50-60 feet in hallways and every 6 feet along the wall in corridor gathering spaces, student lounges and soft spaces.
- Classrooms – Located in the center of each wall shall be an electrical outlet and a telecommunications port
- Copiers – all copiers utilized on campus require a dedicated 120V electrical outlet with a 20 amp plug as well as a data port in the same location.
- Offices – There shall be one telecommunication location per office, each accompanied by a quadruplex electrical outlet. An additional duplex outlet is required, preferably on the hallway wall, and one on the opposite wall.
- Vending – All vending areas are to be designed as follows: 1 circuit per each electrical outlet and two machines per outlet.
- Custodial Closet – Two GFI electrical outlets needed in each closet.
- Restrooms:

- General: 1 GFI outlet shall be located in the space for cleaning equipment
- Residence Halls: 1 GFCI outlet per every 2 sinks are to be provided, adjacent to the mirrors
- Electric hand dryers (X-celerator or Dyson Air Blade) are to be provided in each restroom. Ensure necessary power is provided. A stainless steel wall panel protection should also be provided to protect the wall below all electric hand dryers.
- All utility ground boxes – quasi, power, etc. – shall be at least 1” above final grade. (Final grade to include prediction for any mulch.)

26 06 00 Schedules for Electrical

- All 120volt branch circuits shall be a minimum 20 amps with #12 THWN or THHW dual rated stranded wire and a separate ground.

26 20 00 Low-Voltage Electrical Transmission

26 24 00 Switchboards and Panelboards

- Provide each switchboard (480V and 280V) with two microprocessor based monitoring and protecting metering devices that provides the following meter readings and field adjustable setting protection functions with trip outputs:
 - a. AC ampere (Phase A, B, and C)
 - b. AC voltage (phase to phase, and phase to neutral)
 - c. Watts
 - d. Vars
 - e. VA
 - f. Power factor
 - g. Frequency
 - h. Watt demand power
 - i. Watt hours
 - j. VAR hours
 - k. THD current
 - l. THD voltage
 - m. K-factor
 - n. Phase loss
 - o. Phase unbalance
 - p. Phase reversal
 - q. Over voltage
 - r. Under voltage
 - s. Delay (range 0-8 seconds with 1 second increment)
 - t. Maximum recorded current
- Acceptable manufacturers for motor starters and panel boards: Square “D” and Siemens
- Panelboards shall have dual hinges, dual locks (maintenance styles).
- All electrical panels that end up in circulation or public spaces shall be outfitted with BEST locking hardware.
- Circuits shall be marked by room number on the panel schedule, and the schedule to be permanently attached to panel.
 - Labeling should not include room name or description. Room numbers shall be permanent room numbers and not construction room numbers. Verify room numbers with Butler University.
 - Labeling is to be permanent and not painters tape. Should be embossed/raised.

26 27 00 Low-Voltage Distribution Equipment

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- We require all utilities coming into the building to be metered. In addition, we require sub meters on each floor’s electrical outlet and lighting panels.
- It is our intent to compare the actual utility usage to the expected design usage.
- Meters shall be one of the following: Square D, model Power Logic Model PM 870 OR Siemens 9360.

26 30 00 Facility Electrical Power Generating and Storing Equipment

26 32 00 Packaged Generator Assemblies

- Backup generator – A backup generator is required for every building. It shall serve emergency exit path lighting through the facility, the building's TCOMM system (MDF and IDF's), fire alarm, access control (for residence halls) as well as code required loads and selected critical loads. The critical loads will be determined by building.
- Acceptable manufacturers are as follows: Cummins, Generac, Kohler or Caterpillar

26 35 00 Power Filters and Conditioners

- Power Factor Correction – provisions for power factor correction shall be designed into all building services to 100%. The capacitor bank may be added at a later date after the system "KVAR" is known.
- Power shall be conditioned as needed to provide for reliable operation of computers and other electronic equipment.

26 50 00 Lighting

26 51 00 Interior Lighting

- General –
 - a. Butler prefers the use of LED lights. If the design does not allow for LEDs, approval from PM should be obtained. (If not LED's, all fluorescent tube lights shall be GE Eco Brand, F series T8's, SP41, 4100K)
 - b. If LED lights require dimming, there shall be a dimmer on board.
 - c. Occupancy sensors shall be Watt Stopper 360 Dual Technology Low Voltage model DT-305 with S120/277/347 E-P Auxiliary Relay Pack, BZ-50 E-P Power Pack
 - d. Exit lights shall be Dual Lite, Lite forms collection, series LXURWE. Use Bodine in place of wall mount emergency lights.
 - e. There should be a minimum of 6 inches clear ceiling cavity above ceiling grid and light fixtures.
 - f. Lay-in light fixtures shall be secured to the building decking with safety chain.
 - g. Surface mounted light fixtures to be mounted with toggle bolts.
 - h. All light switches are to be 20 amps 120/277 volt.
 - i. Room light switches shall be mounted perpendicular and in vertical alignment with the temperature control devices.
- Classrooms – Lighting shall be 2'x2' or 2'x4' LED lay in, per specification, with a minimum of 3 zones. One switch, or zone, will turn off the row lights immediately in front of the projection screen and half of the lights in the subsequent rows. The second zone will turn off the balance of the lights on main 2 switches. These lights will also be controlled by the Lutron Graphic Eye Dimming System, so they can be controlled by classroom technology. All lighting shall be on occupancy or vacancy sensors. All classroom and conference room night lights and security lights need to be able to be switched off for room use.
- Public Space – All public space lighting – classrooms, restrooms, labs, etc. shall be activated in two ways – by switch and occupancy sensor. All classroom and conference room night lights and security lights need to be able to be switched off for room use.
- Custodial Closet – One occupancy sensor shall be installed in lieu of a single pole light switch. 2'x4' fluorescent lay in light fixture to be provided by the single occupancy sensor.
- All restrooms, mechanicals rooms, tele data room, storage room, and other smaller closet type rooms shall be outfitted with occupancy sensors in lieu of light switches. Mechanical rooms shall be provided with an override switch for 1 hour with an audible alert prior to lights shutting off.
- IDF/MDF Rooms: To be provided with 2 2'x4' LED light fixtures operated by a single pole switch. 4 electrical outlets, each on an individual circuit served by the generator are to be provided in each of these spaces. A minimum of three (3) 4" sleeves shall be stubbed into the hallway.

26 56 00 Exterior Lighting

- All exterior lighting is to be full cut-off (no light emitted above 90 degrees from nadir).
- Install an exterior light above roof access door.
- In ground lighting is not preferable, but if it must be provided, then it shall be mounted on a 6" concrete base on 2'-6" pea gravel below base for drainage.
- Exterior building lighting shall provide adequate lighting for up to 10' of the ground surface area surrounding the outside of the building.
- Outside ground lights shall be individually fused at each fixture w/ type HEH buss fuse holder and SC fuse.
- Outside lighting on a photo cell contactor with a hand off auto switch. The photo cell is to be of the "screw on" type.
- Parking Lighting: Footcandle levels shall be 3-4
- Footcandle levels for patios shall be 1-2
- Landscape lighting to be mounted on a concrete base 6 inches above grade
- Footcandle levels shall be 1-2 for walkways.

27 00 00 Communications

27 05 00 Common Work Results for Communications

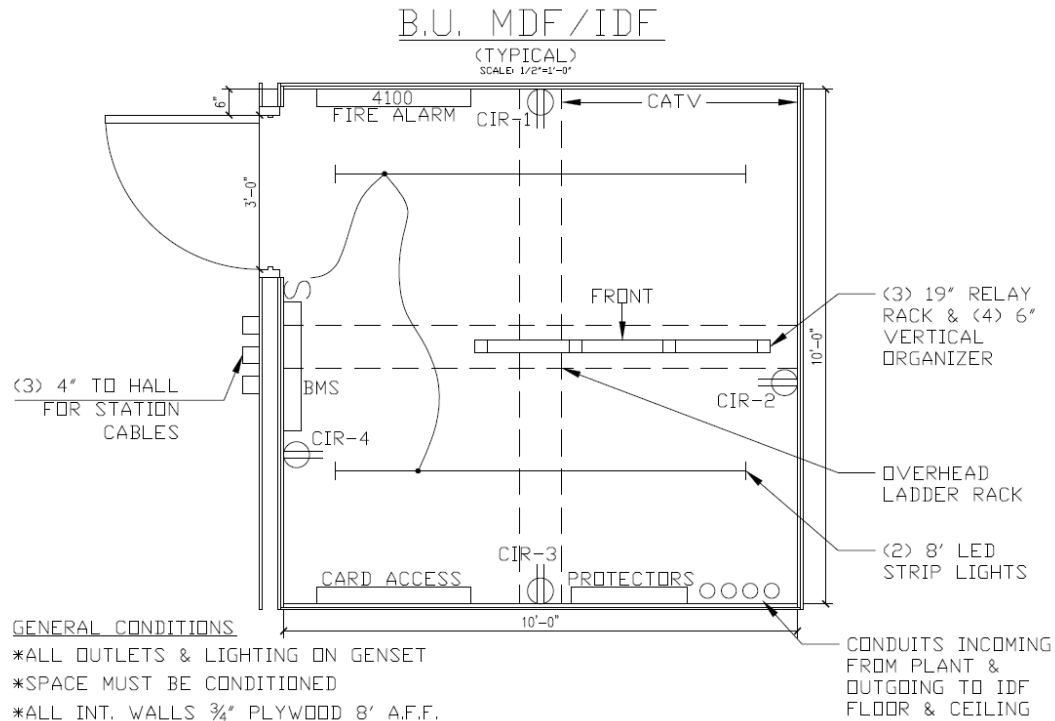
- **General:**
 - Interruptions to existing electric, water, natural gas, voice, data, video, security or other utility should be avoided where at all possible. If it becomes necessary to interrupt a utility service, approval must be approved by and scheduled with Butler. Approval is gained by submitting the outage request form to the PDC Project Manager in advance of the outage (advance notice ranges from 2 days to several months depending on the severity – refer to the outage request form for more information).
- **Software/Butler Network Integration Requirements**
 - Butler network is not open and advance consideration must be taken. Any user or device attempting to connect to the Butler network must successfully authenticate with our Network Access Control (NAC) system before acquiring access. This will require a Butler user account and a device capable of utilizing 802.1x authentication. If the device does not have this capability, the user will need to coordinate with Butler IT. Butler accounts should also be coordinated through Butler IT.
 - We do not store credit card data on site. It must be managed by a third party who can provide PCI compliance. Projects including the need for credit card use shall be coordinated and the proposed solution approved by Butler IT and the Business Office in advance.
 - Software provider/installer must work with Butler IT to coordinate connectivity in order to meet our network security requirements
 - Software provider/installer must agree to a periodic security assessment and remediate any issues that might affect Butler security
 - Software provider/installer must coordinate with Butler IT on any server needs. Servers are to be virtualized and housed in the Butler Data Center
- **OSP Cabling Quantities per Butler Building**
 - **Butler Buildings (non Greek Houses)**
 - Butler currently requires a minimum of 4Gb bandwidth, but plans to move to 10Gb in the future and this should be planned for an easy transition. Our recommendation based on this is as follows. Designer to provide recommendations based on latest technology to accommodate future master plan.
 - The Contractor shall run and terminate 12 Single-mode fiber and 12 Multi-mode fiber for a total of 24 strands EACH running from the building to the Dawg House in the Apartment Village and to Jordan

- Hall. Therefore, there will be a total of 48 strands, 24 to Jordan and 24 to the Dawg House
 - Multi-mode – 4 for fire alarm, 2 for voice for fire alarm, 4 for Honeywell – 2 spares
 - Single-mode – 1 strand for CATV (to JH only), 8 strands for network (to both JH and DH), 3 spares
- The Contractor shall run 25-50 pair copper lines to all Butler buildings from the building to Jordan Hall, based on the size of the building.
- Greek Houses
 - Butler currently requires a minimum of 4Gb bandwidth, but plans to move to 10Gb in the future and this should be planned for an easy transition. Our recommendation based on this is as follows. Designer to provide recommendations based on latest technology to accommodate future master plan.
 - The Contractor shall run and terminate 6 Single-mode fiber to all Greek houses to Jordan Hall only. Multi-mode may be required at the request of the Greek organization in needing a specific service.
 - Single-mode – 1 for CATV, 4 reserved for network and 1 spare
 - The Contractor shall run 25 copper lines to all Greek houses.
- All wiring, especially inside and delivered to telecommunications closets should be run in a neat and orderly fashion, to include and not limited to: telecommunications, electrical, fire alarm, access control, etc. Wire should be run at 90 degrees and collected in orderly fashion running to termination.
- TCOMM Process:
 - a. Butler IT will purchase and/or approve Cisco switches, wireless access points and any network based data equipment, but the costs will be applied against the total project cost. Butler Maintenance Services shall purchase the UPS and jumpers, but costs will be applied against the total project cost.
 - b. During CD phase, TEMP shop (Butler maintenance) shall be provided with a layout of all MDF and IDF spaces so they can approve the final layout. IT shall determine how many switches are needed, TEMP shall size the UPS, TEMP submits UPS cut sheet to the designer for review.
 - c. Butler IT will purchase Cisco switches and any data equipment, but the costs will be applied against the total project cost. Butler Maintenance Services shall purchase the UPS, but costs will be applied against the total project cost. Butler Maintenance Services will also provide the jumpers.
 - d. Data contractor is to provide racking, ladder racking, patch panels, organizers, cable trays, fiber patch panels, and jumpers. Data contractor is not to connect to Butler campus network equipment. Instead, the contractor shall notify Butler Maintenance Services once ready to connect to any Butler equipment and Butler will make the final network connection.
- Required Submittals to Butler:
 - a. Submit qualifications data for material installers, supervisors, and the project RCDD (Registered Communications Distribution Designer).
 - b. Designer shall submit a schedule to the TEMP Shop and IT showing the list of ports, their name/number, and what will serve each prior to the documents going out to bid. On smaller projects, this information should be provided to the TEMP Shop and IT at least 2 weeks before the ports must be live.
 - c. Submit a drawing highlighting the proposed Port numbers for all ports at least 2 weeks before ports must be live.
 - A. Ports shall be numbered by Room number then alphabetically starting with the port nearest to the hinge side of the door and working around the room. (Ex: Room 110A port located nearest to the hinge side of the door would be Port #110A). If multiple

entries or no door exist to the room, then numbering shall be done in a clockwise order around the room.

- d. Submit completed cable records, including:
 - i. Floor plans riser diagrams
 - ii. Manhole diagrams
 - iii. Cable routing
 - iv. Locations and final cable lengths
 - v. Supporting structures
 - vi. Telecommunications room and terminal details
 - vii. Conduit and cable tray routing, elevations installed at and section lengths
 - viii. Pull box locations, elevations, installed at and sizes
 - ix. Information outlet locations, label ID's, types and serving telecommunications room
 - x. For each change reflected on the record drawings, the Change Order Request number shall be shown
 - xi. Information outlet
 - xii. Terminal locations and ID's.
- e. Submit warranty documentation at the completion of the project.
- f. Submit as-built information to the Owner and accompany with all test result information. As-built information shall be in red-lined format on a copy of construction drawings. Indicate location of all riser conduit routes, distribution cable trays, junction boxes, and all additions and deletions pertaining to telecommunications. Include riser labeling next to all telecom symbols.
- Contractor Qualifications:
 - a. The contractor must have a minimum of one RCDD on staff that shall be responsible for the proper implementation of the project. The RCDD shall approve the construction design and upon completion of installation, certify compliance with the standards and installation practices as specified in this document.
 - b. The contractor must be registered with BICSI and 40% of the installation personnel must be BICSI registered telecommunications installers
 - c. Qualified telecommunication contractors shall have completed no less than 3 successful projects of equivalent scope of work.
 - d. Termination and testing of the telecommunication cabling shall be performed by qualified telecommunication installer with at least 5 years' experience that can ensure the installation and testing parameters are met.
 - e. Installing Contractor must have five years' experience in installations similar to those required for this project.
 - f. RCCD and BICSI certification for onsite Technician whom shall be the job Forman is required.
 - g. The Contractor shall provide the services of a communication (computer) network company and provide equipment listed by Underwriters Laboratories, Inc. The computer network system contractor shall issue an equipment certification stating that the equipment and connected wiring and devices which form the specified system, together with installation have a Category 6E 2-year Application Assurance and 2-year Extended Product Warranty on Installation, and are in compliance with the requirements established by EIT/TIA 568, 569, and BICSI Standards.
- General:
 - a. The telecommunications infrastructure shall be certified under the Essex/Leviton NextLan Warranty Program, as well as the Corning Extended Warranty Program (EWP). The contractors must show proof of certification with their respective bid proposals. No substitutions will be permitted.
 - b. Prior to commencing the work of Division 27, the Contractor responsible for installing the equipment shall convene a meeting with the Construction Manager, PDC Project Manager, Design Engineer for TCOMM, and a member of the Butler TEMP shop to review project specifications, addendum, change orders, IDF Layouts, labeling, scheduling, etc.

- c. The general requirements of the voice and data telecommunications infrastructure shall consist of the following:
 - i. Installation of equipment racks and cable management.
 - ii. Installation of approved fire/smoke barrier penetration apparatuses, sleeves and firestopping systems.
 - iii. Installation of horizontal and backbone pathway support systems.
 - iv. Installation, termination, labeling, testing and certification of the copper backbone system.
 - v. Installation, termination, labeling, testing and certification of the fiber optic backbone system.
 - vi. Installation, termination, labeling, testing and certification of the horizontal cabling system.
 - vii. Certification and warranty registration of the installed Telecommunications infrastructure with manufacturer.
- d. The warranty on labor installed by the Contractor shall be in effect for two (2) years from the date of acceptance of the work.
- e. The warranty on material will be based on the Essex / Leviton NextLan Extended Product assurance Warranty as well as the Corning EWP Extended Warranty.
- f. Contractor shall repair, adjust, and/or replace, whichever the Owner determines to be in its best interests, any defective equipment, materials, or workmanship, as well as such parts of the work damaged or destroyed by such defect, during warranty period, at the Contractor's sole cost and expense.
- g. In the event that any of the equipment specified, supplied, and/or installed as part of the work should fail to produce capacities or meet design specification as published or warranted by the manufacturer of the equipment involved or as specified in this document, the Contractor shall, in conjunction with the equipment manufacturer, remove and replace such equipment with equipment that will meet requirements without additional cost to the Owner.
- h. Interruptions to existing electric, water, natural gas, voice, data, video, security or other utility should be avoided where at all possible. If it becomes necessary to interrupt a utility service, approval must be approved by and scheduled with Butler. Approval is gained by submitting the outage request form to the PDC Project Manager in advance of the outage (advance notice ranges from 2 days to several months depending on the severity – refer to the outage request form for more information).
- i. If contractor is pulling power along the same route as data cables, Butler reserves the right to request electrical contractor to pull the data as well.
- j. IDF/MDF Rooms
 - i. A centrally located telecommunications shaft shall be constructed; buildings over 300' in length may require two. The shaft shall be comprised of one room per floor stacked atop of the other. All rooms are to be on emergency back-up generator power. Room specifications as followed: All upper floor IDFs shall be minimum 10' X 10' and the main room MDF to be 10' X 15'; wall opposite of door to be covered with ¾" fire treated plywood at 8' high; open from the main hallway via a 36" wide door.
 - ii. Provide two of each normal (ivory receptacle) and emergency/generator (red receptacles) power receptacles to support the voice and data equipment with one outlet on each wall. . Receptacles shall be NEMA 5-20 120 volt. The receptacles shall be on four separate 20 amp circuits.
 - iii. All equipment shall be installed in a neat and workmanlike manner, arranged for convenient operation, testing and future maintenance.
 - iv. Follow the layout below for our Typical and preferred IDF/MDF room layout. Each room may have its own special dimensional constraints, but the layout below should be used as a guideline during the design and the final layout (to be included in the CD documents) shall be submitted to the Butler PM for approval by the Butler PM and TEMP Shop. Changes during construction shall also be approved by Butler through the Butler PM.



k. Access Control Head End Components - If T-Comm closet is less than 10 X 10, then the Head End must be housed in the Access Control Closet:

- i. Lenel Equipment enclosures, sized to operate all electronic door devices. LNL-600-ULX-CTX (Multiples as needed)
- ii. Power supply with charger, 45amp transformer & large enclosure (LNL400ULX) or 10 amp (AL1012ULM AND AL 1024ULM)
- iii. Wire as needed, Belden Composite access cable B658AFS (Plenum rated)
- iv. BUPD recommends that only 1 door have battery back-up due to safety.
- v. Access control shall be fed with an individual 120V hand branch with means of disconnect.

l. All data/phone jacks shall be a single gang 4"X4"x2-1/8" minimum depth box w/ mud ring sizes as required, on 1" conduit stubbed out above the ceiling with a 90 degree elbow and bushing. In remodeled areas, if conduit cannot be installed, a box eliminator with pull string is acceptable.

m. Owner may require the electrical contractor to pull data/telecommunications cable. In that case, the owner will provide the cable.

n. Owner makes all final connections and terminations unless otherwise determined and stated.

o. Cables shall be plenum rated unless noted different in the bidding documents.

• Offices:

- Offices less than 225 sq. ft. shall receive 1 data jack with an electrical outlet also in this location. The electrical and data outlets need to be between 42 and 48 inches from back wall of office to allow for proper furniture placement.
- There shall be 2 wire pulls to each individual faculty/staff office location.

• Reception and Work Room (Copy Room) Areas:

- Reception areas and select other areas may receive multiple drops with spares located above ceiling. 20% of cables pulled to these areas must be spares.

- Classroom:
 - Each classroom or meeting space shall have a phone/data/120 V electrical outlet centered on each wall, and 2-4 gang boxes with a 1" conduit from each box stubbed above the ceiling with a 90 degree elbow and bushings.
- Hangars are to be CAT 6 compliant.
- Four 1" interducts with PVC duct from manhole.
- Building Equipment Naming and Data Jack Standards
 - When connecting a device such as a Code Blue, Card Access Controller, Meter, Camera or Wireless Access Point please use this section to assign the data port number to the device as well as how the equipment naming should be entered into the software. The intent of the document is not to be prescriptive, just to establish guidance so that all 4 parties (IT, Operations, Vendor, BUPD) can begin to speak the same language when troubleshooting. Cut sheets should also reflect this information:
 - Labeling:
 - CA = Security Camera (Physical labeling)
 - CB = Code Blue
 - DC = Card Access Controller
 - UPS = UPS Network Management Port
 - ME = Meter or Building Automation
 - AP = Wireless Access Points (Physical labeling)
 - All existing network ports that are reused and changed from a typical network port to a specialty port will be relabeled for the new function and all jacks and jumpers changed out to align with these standards.
 - Jack and Jumper Colors:
 - Red- Standard data port
 - Blue- Analog port
 - Black- CTS Standard data port
 - Pink Jumper/Gray Jack- Camera
 - Purple-UPS
 - Green- Meters
 - White- Card access
 - Orange- Code Blue
 - Software Naming Convention - Example: HB AP in room 104B (HB-AP104B-A) - The ID of the device including Building Location then in parentheses you will add the data jack number.
 - Device Labeling - Physically on the device there will be a visible label on the device that will have the software name or at least will have the port number on it. The label will include Building code Room number and port ID. (example: CA105B-B). For APs only the Building code will be added to both the physical label on the AP. (example HB-AP104B-A) In addition when AP devices are using the dual network feeds the devices will be labeled HB-AP104B-AB to show that this device has 2 data ports assigned to it.
 - Responsibilities:
 - TEMP/Wiring vendor-
 - Label the patch panel and use the correct jack color for the type of connection.
 - TEMP installs equipment (for internal work orders only)
 - BUPD
 - Define naming on the device. Cameras and Code Blue
 - IT
 - Setup Equipment in the software with the approved name from BUPD or Building Map including the port number.
 - Label device with the assigned name.

- Vendor
 - Obtain data jack number/code from building floor plan, cut sheet or IT.
 - When necessary label the equipment with the given information above (label needs to be visible from ground)

Example:

What	Label
Camera	CAHL3-3-A
Port	CAHL3-3-A
Patch Panel	CAHL3-3-A
WAVE software	LSB 2nd Floor Center (CAHL3-3-A)

27 10 00 Structured Cabling

27 15 00 Communications Horizontal Cabling

- General
 - a. Contractor shall provide tools, materials, equipment and labor necessary to complete a turnkey installation, including but not limited to the following items, which shall be supplied by contractor unless otherwise noted:
 - i. Cable trays, hangers and mounting hardware.
 - ii. Conduit.
 - iii. Connecting blocks.
 - iv. Cross-connect cable.
 - v. Cross-connect rings or spools.
 - vi. Mounting hardware.
 - vii. Labels for cables and receptacles.
 - viii. Modular station receptacles.
 - ix. Mounting brackets.
 - x. Demolition and removal of existing telecom cables within project area.
 - xi. Station blocks.
 - xii. Station cables.
 - xiii. Velcro Tie wraps, bushings and miscellaneous. Plastic cable tie wraps shall not be used
 - b. Each telecom outlet shown on plan shall have the number of Category 6e cables as indicated on the designated TeleData Symol. Cables shall be Category 6e, plenum rated.
 - c. No data (copper) cabling runs shall exceed 295' lineal feet of cable, point of termination to point of termination.
 - d. Separation from EMI Sources:
 - i. Open cables and cables in non-metallic raceways and unshielded power.
 - ii. Electrical less than 2 KVA: 5 inch minimum.
 - iii. Electrical 2 to 5 KVA: 12 inch minimum.
 - iv. Electrical greater than 5 KVA: 24 inch minimum.
 - v. Cables in grounded metallic raceways and unshielded power:
 - vi. Electrical less than 2 KVA: 2-1/2 inch minimum.

- vii. Electrical 2 to 5 KVA2: 6 inch minimum.
- viii. Electrical greater than 5 KVA: 12 inch minimum.
- ix. Cables in grounded metallic raceways and shielded power:
 - x. Electrical less than 2 KVA: 1 inch minimum.
 - xi. Electrical 2 to 5 KVA: 3 inch minimum.
 - xii. Electrical greater than 5 KVA: 12 inch minimum.
- xiii. Cables and electrical motors and transformers 5 KVA or larger: 48 inches.
- xiv. Cables and fluorescent fixtures: 5 inches.
- e. Test 100% of station wire in both directions with a certified handheld tester, such as the Fluke Omni Scanner or the Fluke DSP 4000 and other test equipment as necessary to assure proper termination sequences, continuity, and Category 6e compliance. Station wire shall have NO bad pairs. When all station wire is determine acceptable, Butler IT may choose to spot test the cable using a certified handheld tester.
- f. Standard Information Outlets (single or double gang) shall be located at the same height as 120 V AC outlets (normally 18" above finished floor).
- g. All equipment shall be installed in a neat and workmanlike manner, arranged for convenient operation, testing and future maintenance.
- Hangars and Support
 - a. Cables shall be Category 6e, plenum rated.
 - b. J-hooks shall be installed where no provisions for cabling runways.
 - c. J-hooks shall be installed per ANSI/EIA/TIA 569 Commercial Building Standards for Telecommunications Pathways and Spaces.
- Wireless Access Points – Owner shall provide wireless access point locations to be completely wired by the Contractor.
- TV – Each TV location shall have a minimum of one RG6 coax cable.
- Labeling
 - a. The telecommunications contractor's onsite representative(s) shall schedule a meeting with the Butler University IT representative prior to the permanent labeling of Information Outlets and IDF patch panels.
 - b. Station Outlet receptacles, cables, and terminations shall be labeled with a standard identification tag at both the Information Outlet and on the jack fields in the IDF/Telecom Room.
 - i. Tags shall be preprinted or computer printed with indelible water proof ink and mechanically secured in a permanent fashion; for example, such as using an appropriate label maker with 3/8" tape.
 - ii. Handwritten labels are NOT acceptable.
 - iii. Labels shall be mounted in a manner which permits easy access and viewing.
 - iv. The station cable serving each receptacle must be labeled at the room receptacle and the IDF/Telecom Room rack.
- Approved Material List
 - a. Plenum Rated Copper Cable, Outlets and Faceplates:
 - i. SUPERIOR ESSEX 54-246-6B CATEGORY 6e YELLOW
 - ii. LEVITON 61110-RC6 CRIMSON CATEGORY 6e JACK.
 - iii. LEVITON 41080-2IB – 2-PORT FACEPLATE
 - iv. LEVITON 4108W-OSP – WALL PHONE PLATE.
 - b. Copper Termination Hardware and Components:
 - i. LEVITON 49255-24 – 24 PORT EMPTY 1U PATCH PANEL
 - ii. LEVITON 49255-48 – 48 PORT EMPTY 2U PATCH PANEL
 - c. Fiber Terminations:
 - i. LEVITON 5R4UH-S12 – 4U FIBER ENCLOSURE
 - ii. LEVITON 5R4UM-F12 – 4U FIBER ENCLOSURE
 - iii. CORNING PCH-04U – 4U FIBER ENCLOSURE
 - iv. LEVITON 5R2UH-S06 – 2U FIBER ENCLOSURE
 - v. LEVITON 5R2UM-S06 – 2U FIBER ENCLOSURE

- vi. CORNING PCH-02U – 2U FIBER ENCLOSURE
- vii. LEVITON 5F100-129 – MM COUPLER PANEL
- viii. LEVITON 5F100-12Z – SM COUPLER PANEL
- ix. CORNING CCH-CP12-D3 – MM COUPLER PANEL
- x. CORNING CCH-CP12-A9 – SM COUPLER PANEL
- xi. LEVITON 49991-5LC – MM LC CONNECTOR
- xii. LEVITON 49991-SLC – SM LC CONNECTOR
- xiii. CORNING 95-050-99 – MM LC CONNECTOR
- xiv. CORNING 95-200-99 – SM LC CONNECTOR
- d. Racks, Frames and Wire Management:
 - i. MIDDLE ATLANTIC RLA-191245B - 19" X 84" TWO POST RELAY RACK OR EQUIVALENT
 - ii. NEAT-PATCH – NP2 – CABLE MANAGEMENT
 - iii. LEVITON 4980L-VFR – VERTICAL CABLE MANAGER
 - iv. MIDDLE ATLANTIC – RLA-CC – VERTICAL CABLE MANAGER
 - v. LEVITON HFM-19-2SRC – HORIZONTAL WIRE MANAGER
 - vi. LEVITON – 41188-SM1 – SPACE MAKER
- Risers
 - a. Riser cables shall consist of twenty-five, and/or fifty, and/or one hundred unshielded twisted pairs, 24 gauge, solid copper, S-R PVC insulated conductors, ARMM, rated category 3, with overall gray PVC jacket, CMR rated. ** Plenum cables to be installed where required.** Manufacturer shall be Superior Essex
 - b. The Contractor shall verify existing cable fill in riser conduit before installation of additional cables so as not to exceed 40% cable fill. Contractor will be responsible for installation of additional riser conduit, where additional cables to be added will exceed the 40% cable fill.
 - c. Provide a nylon pull cord in each empty conduit to facilitate future installation of cables.
 - d. Communication pathways requiring fire stopping shall utilize removable/re-usable fire stopping putties for ease of Moves, Adds, and Changes.
 - e. The copper riser / backbone cabling will be terminated at the MDF and IDFs on patch panels or wall mount 110 blocks
 - f. Contractor is responsible to obtain and follow installation instructions for Leviton products for correct termination and wire management of cables on respective products.
 - g. Owner to provide future cross terminations to Campus switch.
 - h. ARMM cables shall be bonded to the grounding busbar within the telecommunications room at each end of the cable with a #6 AWG.
 - i. Wiring Color Code - Unshielded Data Riser Cable and telephone trunk cable. Note: Riser cables greater than 25 pair have same color code with different binder ribbon for each 25 pair group.
 - j. Cable fill in riser conduits shall not exceed 40% cable fill
- Riser Fiber Optic Cabling
- General
 - a. The fiber optic riser cabling will be terminated on either wall mountable fiber enclosures on in frame mountable fiber enclosures. Verify termination type and location with a Butler University IT Telecommunications Representative.
 - b. Owner to provide future cross terminations to network equipment.
 - c. Fiber Color Code-
 - Note: Riser cables greater than 12-strand have same color code with different colored tube for each 12-strand group. Tube colors use same color scheme.

Type	Strand	Color Combination
Fan-out	1	Blue

Fan-out	2	Orange
Fan-out	3	Green
Fan-out	4	Brown
Fan-out	5	Slate
Fan-out	6	White
Fan-out	7	Red
Fan-out	8	Black
Fan-out	9	Yellow
Fan-out	10	Violet
Fan-out	11	Rose
Fan-out	12	Aqua

- d. Provide a minimum 8'-0" and maximum 10'-0" of slack. Loop at the TRs to be contained on the bottom side of the horizontal cable tray. Additional slack of (4'- 6') of 900um is required within the fiber enclosures.
- e. Within Telecom Rooms, cables shall be snugly wrapped using Velcro reusable cable ties, a minimum of every 3'-0" for cable organization. Velcro ties shall be tightened so as not to deform cable jackets and thus affect cable performance. Plastic cable tie wraps shall not be used.
- f. Cable fill in riser conduits shall not exceed 40% cable fill.
- g. Optical Fiber Horizontal Cabling Acceptable Manufacturer: Corning Fiber – provides a lifetime warranty
- h. All connectors are to be LC
- **Multimode Fiber Optic Riser Cable (Data)** -Provide backbone cables from the MDF to each data IDF as indicated on Drawings. The optical fiber cable construction shall consist of 50/125 >tm laser optimized multimode optical fibers, typically bound into groups of 6 or 12 fibers each. These groups and individual fibers shall be identifiable in accordance with ANSI/EIA-598. These groups consist of individually jacketed 900um tight buffered fiber strands around a dielectric central member with a flame-retardant outer jacket to form a protective sheath.
- **Single-mode Fiber Optic Riser Cable (Data)** -Provide backbone cables from the MDF to each data IDF as indicated on Drawings. The optical fiber cable construction shall consist of 8/125 >tm single-mode optical fibers, typically formed into groups of 6 or 12 fibers each. These groups and individual fibers shall be identifiable in accordance with ANSI/EWTIA-492CAAA. These groups consist of individually jacketed 900um tight buffered fiber strands around a dielectric central member with a flame-retardant outer jacket to form a protective sheath.

27 20 00 Data Communications

27 21 00 Data Communications Network Equipment

- We require a minimum of 1 building exterior "service station" for conferences consisting of a telecommunication box with 1" conduit feeder.
- Classrooms – Located in the center of each wall shall be an 120V electrical outlet, a telecommunications port, and a 4 gang box with RGB 404 faceplate with a 1" conduit stubbed out above the ceiling with 90's and bushings for technology cabling.
- Copiers – all copiers utilized on campus require a dedicated 120V electrical outlet with a 20 amp plug as well as a data port in the same location.
- Offices – There shall be one telecommunication location per office, each accompanied by a quadraplex electrical outlet. An additional duplex outlet is required, preferably on the hallway wall, and one on the opposite wall.

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27 30 00 Voice Communications

27 32 00 Voice Communications Terminal Equipment

- An Emergency ETS phone, MFR Code Blue (model # IP2501) shall be included and installed on the project site. The Owner will place the order, but the costs will be paid for out of the project. Locations will be determined with Owner consultation.
- Area of Refuge – Where an area of refuge is required, the call device shall be a Butler Blue phone – Code Blue Interact, model #IP2501K.
- A University Campus courtesy phone shall be accessible in the main lobby.
- Each elevator must have an emergency phone: Code Blue Interact, model #IP2501. This is a specialized phone and needs to be approved by state agency prior to cab manufacturer. Contractor to provide the code blue and shall coordinate phone requirements with Butler University. The cable shall be braided and rated for 1 million cycles or more.

27 40 00 Audio-Video Communications

27 41 00 Audio-Video Systems

- Cable Television System
 - a. Minimum acceptable distribution system performance at all user-interface points shall be as follows:
 - i. RF Video Carrier Level: Between 6 and 12 dBmV.
 - ii. Relative Video Carrier Level: Within 3 dB to adjacent channel.
 - iii. Complete operation and acceptable system.
 - b. Distribution Components:
 - i. Broadband Indoor Amplifier Manufacturers: B&T Model BIDA Series, -55 db to -30 db or equivalent
 - ii. Fiber Optic Transmitter: Broadband Networks TR2100-7713-R17-SCA
 - iii. Fiber Optic Receiver: Broadband Networks TR2200-750 (10)-R17-SCA
 - c. Wall Plates: Match materials and finish of power outlets in the same space.
 - d. Cable Acceptable Manufacturers:
 - i. West Penn
 - ii. Coleman Cable
 - iii. Commscope
 - iv. Belden
 - e. Cable Connectors Acceptable Manufacturers
 - i. Amphenol Corporation
 - ii. B&L Coaxial Connections, Ltd.
 - iii. Connect-Tech Products
 - iv. Leviton Voice & Data Division

27 50 00 Distributed Communications and Monitoring Systems

27 53 00 Distributed Systems

- Butler has a centralized wireless clock system – Visiplex. All clocks will be battery operated.

28 00 00 Electronic Safety and Security

28 10 00 Electronic Access Control and Intrusion Detection

28 13 00 Access Control

- Any deviation from these considerations and specifications must be brought to the attention of the BU Project Manager before work proceeds.
- Butler utilizes the Lenel OnGuard electronic access control system. Doors are monitored for: after-hours activity, being propped open, forced open, basic security, etc. Butler University will be represented in all card access planning, design, and implementation meetings by a representative from NETech Corporation.
- Design guidelines:
 - a. If T-comm closet is less than 10' X 10', we require a 3' X 4' closet, close to the TCOMM shaft shall be dedicated to the Lenel OnGuard access control panel which controls the

system. This closet needs 2 data ports, 2 surge protected 120 volt electrical outlets and battery back-up for the control box.

- b. Every exterior door will have a door position switch for monitoring purposes.
- c. Every exterior door shall have electronic locking hardware.
- d. All exterior doors must have door contacts and will require an electronic lock, REX (request to exit) and other functions specific to our system.
- e. Exterior doors: Electric power transfer: a Von Duprin EPT-10 hinge or Stanley6 conductor electrified hinge.
- f. Exterior doors: Sentrol Contacts, 1078 Magnet Contact Br
- g. Exterior doors: H.I.D. Corporation, Reader, Thinline, Classic Gray
- h. Exterior doors: MC-25 BEA automatic door operator I/F module as required to interface with automatic doors
- i. Exterior doors: Von Duprin, Request to Exit, panic device, Von Duprin back-up battery option card and EL latch retract
- j. Exterior doors: Von Duprin power supply must be mounted above ceiling within 50' of card reader opening; this power supply requires 100 volt power
- k. Exterior doors: A dual reader interface board (LNL 1320) for every two card reader openings
- l. Exterior doors: Intelligent system controller (ISC, LNL 2220) per building or as required by building architecture
- m. Classrooms, computer labs and program specific spaces may also require access control. This will be specified in the building program.
- n. Interior doors: Power transfer for electrified hinge or EPT
- o. Interior doors: Sentrol Contacts, 1078 Magnet Contact BR
- p. Interior doors: HD – H.I.D. Corporation, Reader, Thinkline, Classic Gray
- q. Interior doors: Schlage or Best, Electric Mortise lock with integrates door hardware
- r. All electronic lock doors will have a battery back-up.
- s. All model numbers to be reviewed and selected with the owner.
- t. ISC to be on back-up generator.
- Components - If T-Comm closet is less than 10 X 10, then the Head End must be housed in the Access Control Closet:
 - a. Lenel Equipment enclosures, sized to operate all electronic door devices. LNL-600-ULX-CTX (Multiples as needed)
 - b. Power supply with charger, 45amp transformer & large enclosure (LNL400ULX) or 10 amp (AL1012ULM AND AL 1024ULM)
 - c. Wire as needed, Beldin Composite access cable B658AFS (Plenum rated)
 - d. BUPD recommends that only 1 door have battery back-up due to safety.

28 20 00 Video Surveillance

28 21 00 Surveillance Cameras

- Contractor shall purchase cameras and licenses compatible with Butler IT's centralized camera environments in order to connect each camera to BUPD's monitoring and storage software.
- Contractor will coordinate installation of cameras with BUPD and Butler IT so that Butler IT may configure each camera and appropriately attach the device to BUPD's monitoring and storage software.
- Contractor will coordinate camera locations with BUPD.
- The contractor shall pay for any associated licenses and contracting fees to be compatible and tied into Butler centralized camera system. Contractor shall coordinate with Butler Information Technology department to ensure appropriate licenses are purchased.

- The contractor shall pay to purchase storage which meets Butler's video retention policy which is approximately 330 GB/camera

28 30 00 Electronic Detection and Alarm

28 31 00 Fire Detection and Alarm

- Our fire alarm and smoke detection requirements are greater than are required by code. Even if the building is sprinkled, we require most rooms to have smoke detection and audible alarm.
- Process
 - Simplex is the only accepted smoke alarm manufacturer on our campus. They are our partner and should be included in the design phase. Engineer shall provide fire detection and alarm drawings to Simplex for comments during the design phase OR shall work with Simplex to have them complete the fire alarm design during the design phase.
 - Provide a CD set of the fire alarm drawings to the Butler PDC PM or Campus Engineer for review. PDC PM or Campus Engineer will work with Maintenance to review these drawings
 - Butler PDC PM or Campus Engineer shall be copied on all fire detection and alarm submittals and will review them as necessary.
 - 30 days prior to scheduled start of up fire alarm, Simplex shall provide Butler with ID net labeling form draft for review. At this time the Simplex shall also coordinate the final network connection date with the Butler Maintenance Services TEMP shop.
 - Once network connection has been made, notify Butler University Police Department (BUPD) prior to any work being done on the fire alarm panel.
 - Coordinate test with Butler Maintenance Services (MS) Department. Simplex will need to check out a key from the Service Center and work with Butler MS to notify occupants in the building (if applicable) and BUPD.
- ID Net Labeling
 - Labeling shall include the following items in the following order:
 - Two or three letter building code (To be obtained from Butler's TMA system – contact Butler PDC PM to obtain this)
 - Room number
 - Floor identifier (if more than 1 story) – for corridors, designate the location by using a proximity to an identified space. ex: “outside room XX” or “near east entrance”
 - Room description – this is only to be included for room types that are not subject to change without a major renovation – Mechanical RM, TCOMM or Data Rm, Elect Rm, Sprinkled Riser Rm, Elevator Rm, Attic or Crawlspace.
 - Simplex code
 - Example: “CH 111 1FL SV 28:T1:1” or “RH 108 Mech Rm 1FL SV 36:T1:8”
- Detection is required in every building, even if sprinkled and smoke detectors should be every 75' or per code in all public areas.
 - Simplex is the only accepted manufacturer, 4100 ES is the control unit. Custom and Manual voice notification from the Butler Police shall be a provided option in the control unit.
 - ID net labeling must be developed in conjunction with Maintenance Services.
- Knox Box – A Knox Box shall be provided and installed by contractor for all new construction projects or for renovations where one does not already exist. Preferred box is Knox-Box 3200 Series Hinged Door Model recessed mount. The location is to be determined in conjunction with Fire Marshal. Contractor shall coordinate the desired finish with the Architect and the Butler University Project Manager(s). The larger unit, to be used when an electrical shutdown switch is required, is to be # 4444 series recessed mounted with a hinged door and

single lock. If no electrical shutdown switch is required, the standard unit is # 3275 which is recess mounted with a hinged door and single lock; box shall be mounted on the exterior of the main entrance to the facility. The electrical shutdown switch is required if either of the following is true:

- a. For when there are two existing close-by services and a remote 3rd service must be added. In this case, the switch should be added at the old services location to control the remote 3rd service.
 - b. For a residence hall complex with multiple services scattered throughout the buildings.
- The Fire Alarm Annunciation panel needs to be located in a visible and easily accessible location of the building main entry. The fire alarm control panel, MFR Simplex 4100 ES, reports to Butler's Police Department's (BUPD) central monitoring system.
 - Dual heat and smoke detector in all elevator equipment rooms
 - Smoke detectors every 75' or as required by "Code"
 - Smoke detector in main reception area of every office suite
 - Smoke detector on every air handler over 2000 CFM's
 - Smoke detectors shall be installed in all telecommunication closets; elevator shafts; electrical switch rooms; video and electronic control rooms; classroom tech closets, mediated class rooms and in main reception area of every office suite.
 - Near Shower Rooms or other high particle generating areas (ex: wood shops): Any smoke detector near a shower room shall contain a photoelectric sensor and be capable of analyzing CO to help remove false alarms and identify non fire conditions.
 - **Classrooms and Hallways are to be provided with an ionization smoke detector**
 - For spaces with ceilings higher than 25 feet, an air sampling system shall be provided for smoke detection.
 - Pull stations are to be provided at every exit and in all laboratories.
 - All mechanical spaces are required to have a strobe in addition to horn.
 - All classrooms, meeting rooms, public areas (especially residence halls) and main reception area of each office suite must have a strobe and voice capability.
 - All restrooms must have a strobe.

31 00 00 Earthwork

31 10 00 Site Clearing

- Tree and shrub removal is a sensitive issue on the Butler campus and shall only occur with owner approval. Once a tree or shrub is cut down, it must be removed from the site within 24 hours.

31 20 00 Earth Moving

31 23 00 Excavation and Fill

- All backfill to curbs, walks, and streets should be compacted every 12" to prevent future settling. Utilities or site conduits shall be run in sand.

32 00 00 Exterior Improvements

32 10 00 Bases, Ballasts, and Paving

32 13 00 Rigid Paving

- All parking lots should incorporate pervious asphalt or concrete.

37 32 16 00 Curbs, Gutters, Sidewalks, and Driveways

- **All crosswalks are to be thermoplast and consist of two white outside lines and dog prints between the outside lines. All dog prints shall travel in the direction towards the center part of the main campus/Norris plaza/Jordan Hall. If the direction is questionable due to crosswalk location, the designer/installer shall obtain confirmation from the Butler PM.**

- Provide 4" minimum diameter schedule 40 PVC piping between 4" and 6" below finish grade of all walks and drives at locations designated by the owner. This will provide future utility crossing points, and these conduits must be set in sand.
- No sidewalk should be less than 5' wide
- Designated "vehicular traffic sidewalks" of 8' and larger must be minimum of 6" thick and meet the 5000 psi standard to allow 10,000 lbs.
- All walks should be designed to meet ADA guidelines. Butler requires all affected slopes to be designed at 4% grade, rather than the 5% grade as called by the ADA. This allows for field condition corrections to occur to still stay within the 5% slope.
- Zip strips and caulking shall be utilized in all sidewalks. Caulking should remain approximately ¼" recessed below the surface so plows and snow shovels do not snag it.
- When replacing existing sidewalk (not when creating a new sidewalk path), contractors shall follow these guidelines:
 - Protection/Safety:
 - All work is to be performed with as minimal of an impact to the environment, landscaping and existing concrete as possible.
 - All work is to be performed with as minimal of an inconvenience to the public as possible.
 - Provisions to provide a safe and alternative passage route for the public must be implemented during all phases of the project.
 - All work areas must be designated as such and blocked off with alternative routes clearly marked.
 - A protective covering over any removed color/stamped areas may be implemented when applicable.
 - Contractor is responsible to ensure uncured concrete is protected and not disturbed.
- Removal:
 - Contractor is responsible for the removal and proper disposal of all indicated areas.
 - Any damages incurred to areas other than the designated replacement areas are subject to the contractors' responsibility to repair in a method pre-approved by the University (this includes spills or stains on any surfaces).
 - Contractor must be aware that Butler University has many underground utilities and irrigation systems. Frequently these items are underneath sidewalks in contact with the bottom of the concrete.
- Replacement:
 - Contractor must ensure all areas to receive new concrete have proper and adequate compaction.
 - All concrete shall be 6" thick.
 - All concrete shall be a 4,000 PSI standard sidewalk formula with reinforcement fiber.
 - All concrete to be placed next to existing concrete or next to a separate pour shall have rebar (3/4"), epoxy/dowel every 18" apart with a minimum of 10" penetration centered in existing and new concrete. Rebar (1 / 2 ") is to be attached at an opposing angle on the top of the ¾" rebar.
 - All color/stamped bands of concrete shall have two continuous rebar ½" spaced 12" apart and shall remain at a minimum of 2" from all edges of the pour.
 - Concrete sections other than colored bands are to utilize reinforcement wire, over lapping and attached to rebar at the edges.
 - Concrete shall have expansion material with a removable cap (snap caps) for caulking purposes as needed per industry standards or as indicated from Butler University.
 - All color/stamped concrete shall have the color integrated within the entire pour.
 - Colored concrete shall be premixed in the delivery truck in accordance to specific Scofield Systems Chromix C-24 (Charcoal) provided by I.M.I.
- Finishes:
 - All finish details are to match existing areas, or as indicated from Butler University.

- Color/stamped concrete shall maintain the same dimensions as existing. Approximately 16" wide bands with individual brick patterns of 4" wide X 8" long, two rows of brick laid end to end equaling the 16" width. The grooves in the emulated joints between each brick shall maintain a 3/8" depth. "Loafing" of individual bricks shall be avoided and a flat surface on each brick shall be maintained.
- Concrete sealer shall be applied to all exposed concrete surfaces per manufacture's specifications.
- Contractor shall provide Sonneborn S.L.1 sealant for all expansion joints, after concrete has reached recommended manufacture's specifications.
- All expansion sealants shall remain slightly recessed to allow snowplows clearance without impacting sealant.
- Contractor shall ensure sealant does not become damaged, or tracked onto other surfaces.
- Contractor shall place pulverized top soil in accordance to the surrounding landscape at any over dig or other areas that may have been impacted during the project.

32 17 00 Paving Specialties

- Do not align parking bumpers at 90 degrees to the space in angled parking. Align them parallel to the drive to facilitate snow plowing.

32 30 00 Site Improvements

32 33 00 Site Furnishings

- If a dumpster is deemed appropriate for the building, it must be located outside the building close to a main interior circulation path for easy access for housekeeping but still not in a highly visible spot. It shall be concealed by part of the building envelope or wooden, dog eared shadow box fencing.

32 80 00 Irrigation

- Irrigation shall only be Hunter (brand). Tracer lines must run down all mains and laterals. The controller clock shall have its own circuit. Must include 2 sets of as built

32 90 00 Planting

- Landscape material heights must be low at windows, doors, walks, and gathering spots to allow for easy police surveillance.
- All plant material must be provided with a 3-year warranty

32 91 00 Planting Preparation

Lawn Establishment Site Preparation and Warranty

The contractor will warranty and repair all areas where any utility line trench settling and/or water pooling occurs for a period of 3 years.

- All plant bed edging and tree rings must be returned to original form.
- All final grades must not exceed a maximum 3:1 slope ratio.
- If top soil needs to be added it must be pulverized top soil free of all debris including and not limited to rocks, rebar, trash and wood.
- All irrigation and utility line trenches must be back filled in lifts and compacted to prevent settling.
- After final grade is established and confirmed by a university representative a rock hound must be run over the site to ensure no rocks bigger than ½ inch diameter are left in the top 2 inches of soil.
- Seed or sod shall not be installed until a university representative has approved the site.

32 92 00 Turf and Grasses

Lawn Establishment Time Line, Product Specifications and Warranty

The contractor will for a period of 3 years warranty and replace any seed or sod until 100% coverage is confirmed.

- Seeding shall only occur during these time frames March 1 to May 31 and August 15 to September 15.
- Spring and fall seeding brand must be John Deere Landscapes Premium Athletic Mix 70/30 (blue/rye). SiteOne is the vendor.
- All spring and fall seeding must have John Deere Landscapes 18-24-12 starter fertilizer applied. SiteOne is the vendor.
- Matting and/or erosion control blankets must be 100% biodegradable and not contain any nylon mesh. American Excelsior Curlex Netfree is the only acceptable product.
- Sod must be used from June 1 to August 1 and after September 15 to November 1.
- Sod must be 100% Blue Grass.
- The contractor will be responsible for all watering for establishment and for a period 180 days after establishment, for all areas seeded and sodded.
- Contractors are responsible for watering plants and grass they install. Discuss start date of warranty with Owner.

32 93 00 Plant Material Warranty, Installation, Planting Accessories and Plant Species

- All plantings will be under a 3 year minimum warranty for replacement.
- Start date of warranty is to begin when final completion of project is agreed upon with owner.
- The contractor will be responsible for watering plant material throughout installation and for a period of 180 days after final completion is determined.
- All plant material will be installed according to industry standards in regards proper planting depth.
- Proper planting depth is determined as top of the root ball or container about 1 to 2 inches higher than the surrounding landscape, with the soil and mulch smoothing the transition.
- The contractor will be responsible for replanting or replacing all trees and plants that do not meet this requirement.
- All mulch around trees and plant material will kept away from the trunks of trees and stems of plants.
- Bark mulch shall only be Select Supreme Dyed Bark Mulch – Brown.
- Below is a list of plants that are preferred by the University as they are known to survive and grow well in our soil. If other plants are desired, they must be submitted through the Butler University Project Manager to be reviewed by the Butler University Grounds Department.

Trees	
Acer r 'Autumn Flame'	Autumn Flame Maple
Acer r 'Franksred'	Red Sunset Maple
Acer r 'October Glory"	October Glory Red Maple
Acer palmatum 'Bloodgood'	Upright Japanese Maple
Acer palmatum Emperor I 'Wolf'	Upright Japanese Maple
Acer saccharum 'Commemoration'	Commemoration Sugar Maple

Acer saccharum 'Grenn Mountain'	Green Mountain Sugar Maple
Acer saccharum 'Legacy' PP4979	Legacy Sugar Maple
Cornus f 'Cherokee Princess'	Cherokee Princess White Flw Dogwood
Cornus kousa	Kousa Dogwood
Fagus grandifolia	American Beech
Fagus sylvatica 'Roseo-marginate	Tricolor Beech
Ginkgo biloba 'Princeton Sentry'	Princeton Sentry Ginkgo
Gleditsia t I 'Skycole' PP1619	Skyline Honeylocust
Gleditsia t 'Draves'	Street Keeper Honeylocust
Magnolia stellata 'Royal Star'	Royal Star Magnolia
Magnolia x 'Jane'	Jane Magnolia
Picea abies	Norway Spruce
Picea omorika	Serbian Spruce
Picea p 'Baby Blue Eyes'	Baby Blue Eyes Spruce
Picea p 'Fat Albert'	Fat Albert Spruce
Quercas alba	White Oak
Quercas rubra	Red Oak
Shrubs	
Buxus x koreana 'Green Gem' PP3736	Green Gem Boxwood
Buxus x koreana 'Green Mountain'	Green Mountain Pyramidal Boxwood
Deutzia gracilis	Slender Deutzia
Euonymus alatus 'Compactum'	Dwarf Burning Bush
Hydrangea arborescens 'Abetwo' PPAF	Incrediball Hydrangea
Hydrangea arborescens 'Annabelle'	Annabelle Hydrangea
Ligustrum x vicaryi	Golden Vicary Privet
Spirea japonica 'Shirobana'	Shirobana Spirea
Spirea x bumalda 'Gold Flame'	Gold Flame Spirea
Taxus x m 'Wardii	Wards Spreading Yew
Ornamental Grasses	
Calamagrostis x acutiflora 'Karl Foerster'	Karl Foerster Feather Reed Grass
Miscanthus sinensis 'Little Kitten'	Little Kitten Maiden Grass
Pennisetum alopecuroides 'Little Bunny'	Little Bunny Fountain Grass
Pennisetum a 'Piglet'	Piglet Dwarf Fountain Grass
Perennials	
Hemerocallis 'Fire King'	Fire King Orange Daylily

Hemerocallis 'Mauna Loa'	Mauna Loa Orange Daylily
Hosta sieboldiana 'Elegans'	Blue Giant Hosta
Hosta x 'Royal Standard'	Royal Standard Hosta
Sedum 'Autumn Fire' PPAF	Autumn Fire Stonecrop
Sedum 'Autumn Joy'	Autumn Joy Sedum

32 94 00 Planting Accessories

All tree circles must return to original form

33 00 00 Utilities

33 05 00 Common Work Results for Utilities

- Our campus has a complex network of publicly and privately owned utilities including a chiller water loop system, a central steam plant, an electrical substation, a fiber optics network, and more. Each new building will have both common and unique infrastructural requirements that must fit in with this sensitive existing system, so consultations with the University Facilities Management must occur to develop new building utility service strategies.
- **Underground Utilities - Authorized Facilities Management staff must approve all proposed excavation before the project begins. Area of dig site must be white lined for locate! It is the responsibility of each contractor to locate public utilities via IUPPS directly before a project begins and to maintain the location through project completion. The University's Maintenance Staff will receive calls through IUPPS after the contractor has called in these. The Maintenance Staff will then locate the private utilities prior to construction. Each contractor will be required to maintain those locations through project completion. Additional and/or excessive quantities of private utility locates may be billed back to the individual contractor if found to be a result of negligence. In addition to contacting IUPPS, the responsible contractor or surveyor calling in the locates must coordinate which exact areas (shown on a map) will need to be located by which day. Providing a vague area, such as "all utilities around XX building", will not be acceptable if construction is only happening on one side of the building at a specific time. The University's Maintenance personnel's time is valuable and calling in excessive locates without being specific is not acceptable.**
- **Any disturbance to normal University operations and associated costs are the responsibility of the contractor. Contractors are responsible for all ground disturbance permitting.**

33 10 00 Water Utilities

33 12 00 Water Utility Distribution Equipment

- We require all utilities coming into the building to be metered. We also require a water meter on each floor. It is our intent to compare the actual utility usage to the expected design usage. Domestic water that serves cooling towers and irrigation shall also be monitored separately, as the sewer portion of this bill can be deducted from the water bill.
- Suggested meter is: Onicon F1100.

33 50 00 Fuel Distribution Utilities

33 51 00 Natural-Gas Distribution

- We require all utilities coming into the building to be metered. It is our intent to compare the actual utility usage to the expected design usage.
- Suggested meter is: Dattus FM-200 or FM-300.

33 60 00 Hydronic and Steam Energy Utilities

33 61 00 Hydronic Energy Distribution

- We require all utilities coming into the building to be metered (including any campus hot water or chilled water). It is our intent to compare the actual utility usage to the expected design usage.

- Hot Water – Coils shall be sized at 130°F EWT and 110°F LWT
- Chilled Water – Coils shall be sized at 44°F EWT and 56°F LWT
- Suggested meter: SeaMetrics EX-100/200
- Meter is to be a series electromagnetic insertion flow sensor with ball valve connection that allows for removal of meter without draining pipe.
 - a. Paddle wheel meter or other types with moving parts *shall not be allowed*.
 - b. Entering and leaving water temperatures shall be monitored and reported to Butler's Honeywell EBI system.
 - c. Flow and temperature shall be averaged on an hourly (minimum) basis and used to calculate consumption on an MBTU basis and totaled by month.

33 70 00 Electrical Utilities

33 71 00 Electrical Utility Transmission and Distribution

- We require all utilities coming into the building to be metered. In addition, we require sub meters on each floor's electrical outlet and lighting panels. It is our intent to compare the actual utility usage to the expected design usage.
- Meters shall be one of the following: Square D, model Power Logic Model PM 870 OR Siemens 9360.