

## SHELL & CORE: UTILITY BUILDING

### Definition

Utility Building shell and core unit costs include the building structure, envelope, circulation, public spaces, physical plant support spaces, and site improvements that constitute the facilities to house industrial, warehouse, storage, agricultural, and other utility functions. Specifically, the building shell and core includes the following:

- Site improvement allowance adequate to comply with life safety and other zoning set-backs, including: ground cover, planting, storm water handling systems, vehicle roadways, sidewalks, lighting, signage, fences, screens, and buffer zones;
- Base structure, including: foundation, beams, columns, floor slabs, and roof structure that includes special structural bay spacing and floor-to-floor heights required to accommodate high-bay industrial and storage applications;
- Building envelope, including: insulated exterior walls, exterior glazing, roof, and area separation walls;
- Common areas, including: entrance vestibule, lobby, roof access stairways, emergency egress corridors, equipment room, and communication equipment rooms;
- Public toilets;
- Electrical and mechanical systems, including: packaged roof-mounted heating and ventilating units, Building Automation System (BAS), and emergency generator;
- Combination fire standpipe/sprinkler system and the central fire alarm system;
- Building utility distribution system, including: potable domestic water, service sanitary drain, sanitary vent, electrical power distribution panels and circuit breakers in an electrical closet, designated connection point to the central fire alarm system, and a distribution backboard within a wire closet; All services will provide for connection to extensions to the tenant functions;
- The shell will include one loading dock bay, platform, door, and apron for building services;
- The security level is Level B, with costs added as a special item for security upgrades.

Items that should be considered special requirements include:

- Additional loading dock bays, including: platforms and doors to serve tenant activities;
- Special ventilation, dust removal, filtration and other ventilation systems to serve industrial processes;
- Subgrade excavation for tenant equipment or other tenant-driven purposes;
- Automated material handling and/or retrieval equipment.

## References and Design Standards

The unit costs incorporate the following references and design standards:

- Facilities Standards for the Public Buildings Service;
- International Building Code;
- GSA Public Buildings Service Pricing Desk Guide, Edition No. 2.

## Building Classification and Fire Resistance

Factory Industrial F-1 Moderate Hazard Occupancy or Storage Group S-1 Moderate Hazard Occupancy or Utility and Miscellaneous Group U. For the purposes of this study assume:

- Sprinklered Type VA construction, with unlimited area as allowed by the International Building Code, Section 507.2 when surrounded by 60 foot public ways;
- Construction 1 hr structure, 1 hr exterior bearing walls, 1 hr interior bearing walls, 1 hr exterior non-bearing walls, 1 hr floor construction, 1 hr roof construction.

### Example Program

The utility building unit costs are based on the following representative building program.

<b>UTILITY SHELL &amp; CORE</b>	
Tenant Spaces	USF
Light Industrial	42,643
Warehouse	42,592
<b>TOTAL USABLE SF</b>	<b>85,235</b>

## Construction Area Summary

### BUILDING AREA

FLOOR	USF Production/ Warehouse	USF SUBTOTAL TENANT SPACE	USF Public Space	USF Common Space	USF Wall Thickness	USF SUBTOTAL NON-TENANT SPACE	GSF TOTAL NON - PARKING AREAS	TOTAL BUILDING GROSS AREA
1ST FLOOR	85,235	<b>85,235</b>	6,510	4,140	1,320	<b>11,970</b>	97,205	97,205
<del>TOTAL</del>	<del>85,235</del>	<del><b>85,235</b></del>	<del>6,510</del>	<del>4,140</del>	<del>1,320</del>	<del><b>11,970</b></del>	<del>97,205</del>	<del>97,205</del>
TOTAL ROUNDED	85,200	<b>85,200</b>	6,500	4,100	1,300	<b>12,000</b>	97,200	97,200

### STRUCTURAL AREA

FLOOR	SLAB ON GRADE	ROOFING	TOTAL STRUCT.
1ST FLOOR	97,205		97,205
PARAPET			
ROOF		97,205	97,205
<del>TOTAL</del>	<del>97,205</del>	<del>97,205</del>	<del>97,205</del>
TOTAL ROUNDED	97,200	97,200	97,200

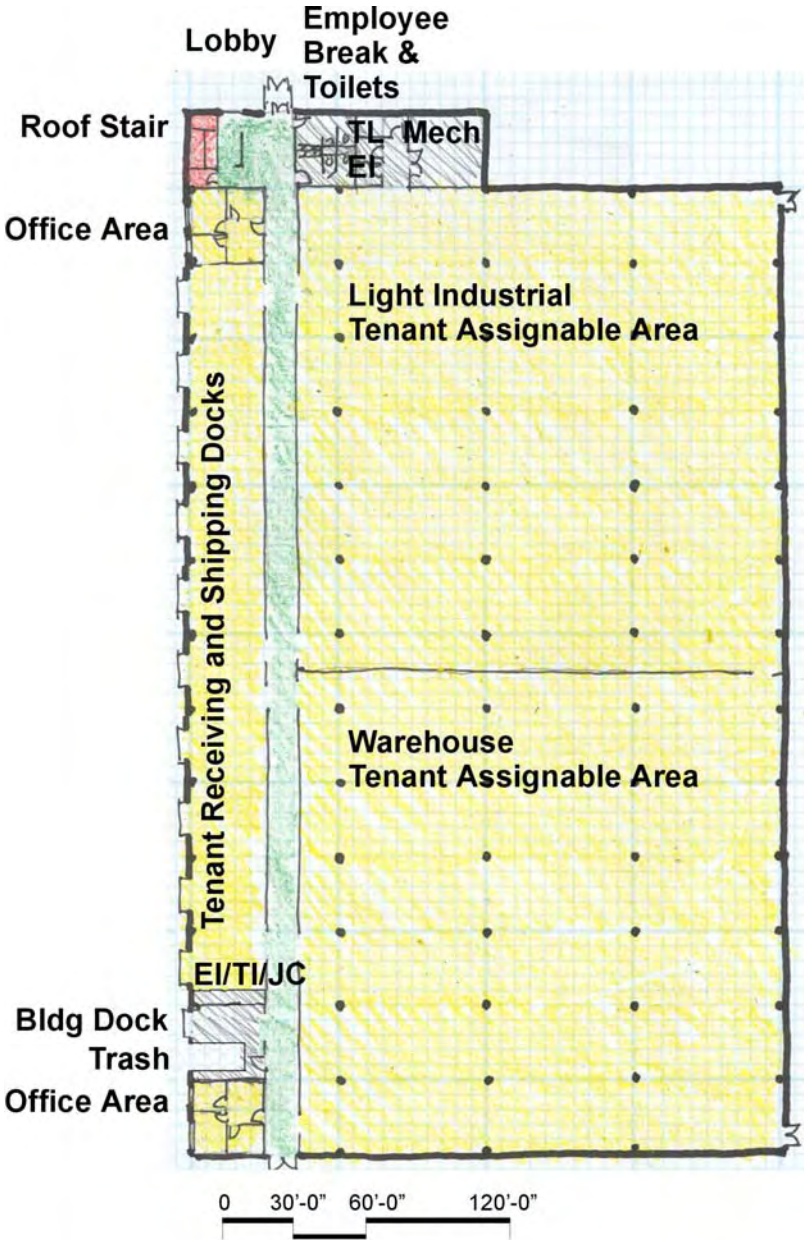
### SKIN AREA

SKIN AREA	HT	EXTERIOR PERIM	EXTERIOR TOTAL	1.25 X EXTERIOR TOTAL*
1ST FLOOR	25.00	1,320	33,000	41,250
PARAPET	2.00	1,320	2,640	3,300
SUBTOTAL			35,640	<b>44,550</b>
FOUNDATION				<b>0</b>
TOTAL FINISHED SKIN			35,640	<b>44,550</b>

\* 1.25 Factor to account for the articulation of the exterior wall.

### Example Plans

The following diagram illustrates the utility building design upon which the unit costs are based and is representative of typical building plans.



**Utility Shell with  
Light Industrial Space Type  
and Warehouse Space Type**

## Construction Criteria

The unit costs for the Utility Building are based on the construction quality and design features outlined in the following table. This information has been generally arranged in Uniformat structure. Only *Low-Rise (1 story)* costs have been developed.

Category	Low-Rise
<b>Substructure Foundation</b>	
<i>Standard Foundation</i>	<ul style="list-style-type: none"> <li>■ Reinforced concrete spread footings (20-25% fly ash content)</li> <li>■ Allowable soil bearing pressure of 2 tons/SF was assumed for spread footings</li> </ul>
<b>Substructure Envelope</b>	
<i>Slab on Grade</i>	<ul style="list-style-type: none"> <li>■ 4500 PSI 8 inch concrete slab with welded wire fabric (20-25% fly ash content)</li> <li>■ Moisture barrier</li> <li>■ Gravel base on compacted fill</li> <li>■ Sealant at joints and wall junctures</li> </ul>
<b>Shell Superstructure</b>	
<i>Structural Frame</i>	<ul style="list-style-type: none"> <li>■ Steel column and beam structure with open web joists supporting roof deck; intermediate channel for wall support</li> <li>■ 24'- 0" high structural bays</li> </ul>
<i>Roof Construction</i>	<ul style="list-style-type: none"> <li>■ 20 gauge steel roof deck</li> <li>■ Separate steel supports for rooftop HVAC units</li> </ul>
<b>Shell Exterior Closure</b>	
<i>Exterior Wall</i>	<ul style="list-style-type: none"> <li>■ Brick/CMU bearing wall with waterproofing and rigid board insulation in masonry cavity</li> <li>■ 2'- 0" parapet with anodized aluminum cap and CMU backup wall</li> </ul>
<i>Corner Stone</i>	<ul style="list-style-type: none"> <li>■ Cast stone</li> </ul>
<i>Exterior Glazing</i>	
<i>Fenestration</i>	<ul style="list-style-type: none"> <li>■ 10% glazing/90% skin</li> </ul>
<i>Window System</i>	<ul style="list-style-type: none"> <li>■ Aluminum framed punched window system</li> <li>■ Glass to be insulated double glazed units with annealed coated low-e glass</li> </ul>
<i>Exterior Doors</i>	
<i>Entrance Vestibule</i>	<ul style="list-style-type: none"> <li>■ Automatic swinging door including, operator, jamb, and door panels</li> <li>■ Overhead concealed electrical operator</li> <li>■ 6'- 0" (w) by 7'- 0" (h)</li> <li>■ Door panel to be aluminum frame glass panel with intermediate rail</li> <li>■ Glass to be safety tempered, coated low-e</li> <li>■ Provide keyed lock with panic release</li> </ul>

Category	Low-Rise
<i>Non-Glazed Exterior Doors</i>	<ul style="list-style-type: none"> <li>■ Hollow metal 1¾" insulated 3'- 0" (w) by 7'- 0" (h)</li> <li>■ 16 gauge steel frame with thermal break</li> <li>■ Keyed lever lockset with panic release bar on inside</li> <li>■ Automatic closers</li> </ul>
<i>Fire Doors</i>	<ul style="list-style-type: none"> <li>■ Overhead coiling fire doors</li> <li>■ Concealed overhead installation</li> <li>■ 20 gauge metal interlocking slats</li> <li>■ Nylon smoke seals</li> <li>■ Motor operated with gear mechanism</li> <li>■ Visual and audio enunciator to warn of operation</li> </ul>
<i>Coiling Overhead Dock Doors</i>	<ul style="list-style-type: none"> <li>■ Concealed overhead coiling door</li> <li>■ 26 gauge metal slats</li> <li>■ Motor operation</li> <li>■ Bottom lock</li> <li>■ Weather seals at the bottom, guides, and hood</li> </ul>
<i>Vents and Areaways</i>	<ul style="list-style-type: none"> <li>■ Architectural drainable steel louvers with 6" deep adjustable blades with rain gutter</li> </ul>
<i>Exterior Soffit</i>	<ul style="list-style-type: none"> <li>■ Plaster on metal lath supported on metal stud framing system</li> </ul>
<b>Shell Enclosure Roof</b>	
<i>Roof Covering</i>	<ul style="list-style-type: none"> <li>■ EPDM single-ply sheet roofing</li> <li>■ Area drains every 3,600 SF</li> <li>■ Gravel ballast</li> </ul>
<i>Insulation</i>	<ul style="list-style-type: none"> <li>■ Two layers 2" thick closed cell polystyrene rigid insulation</li> </ul>
<i>Roof Edge</i>	<ul style="list-style-type: none"> <li>■ See Shell Exterior Closure–Exterior Wall for parapet</li> </ul>
<i>Canopies</i>	<ul style="list-style-type: none"> <li>■ 18 gauge steel canopy with 3" column support</li> </ul>
<i>Smoke Hatch</i>	<ul style="list-style-type: none"> <li>■ 14 gauge steel hatch and curb unit</li> </ul>
<i>Skylights</i>	<ul style="list-style-type: none"> <li>■ Aluminum frame sloped skylight on curb with low-e monolithic glazing units 12 SF opening every 1000 SF</li> </ul>
<b>Interior Construction</b>	
<i>Partitions</i>	
<i>General</i>	<ul style="list-style-type: none"> <li>■ Slab to roof assembly</li> <li>■ 6" CMU partition</li> </ul>
<i>Entrance Vestibule, Lobby, and Exit Corridors</i>	<ul style="list-style-type: none"> <li>■ ½" GWB on metal studs at 16" OC to ceiling assembly</li> <li>■ Acoustical insulation filling the GWB wall cavity and extended 48" each side of partition on ceiling assembly</li> </ul>
<i>Area Separation</i>	<ul style="list-style-type: none"> <li>■ 1 hr partitions</li> <li>■ Slab to roof assembly</li> <li>■ 6" CMU partition</li> </ul>

Category	Low-Rise
<i>Public Toilets</i>	<ul style="list-style-type: none"> <li>■ ½” GWB on metal studs at 16” OC to ceiling assembly</li> <li>■ Acoustical insulation filling the GWB wall cavity and extended 48 ” each side of partition on ceiling assembly</li> </ul>
<i>Janitor Closets, Electrical Closets, Telephone Closets</i>	<ul style="list-style-type: none"> <li>■ Structural slab to underside of roof</li> <li>■ Construction as required for 1 hr fire rating</li> <li>■ 5/8” GWB on metal studs at 24” OC</li> </ul>
<i>Equipment Rooms</i>	<ul style="list-style-type: none"> <li>■ Structural slab to underside of roof</li> <li>■ Construction as required for 1 hr fire rating</li> <li>■ 5/8” GWB on metal studs at 24” OC Acoustical insulation filling the wall cavity</li> </ul>
<i>Ventilation, Plumbing, and Mechanical Shafts</i>	<ul style="list-style-type: none"> <li>■ 5/8” GWB on metal studs at 24” OC</li> </ul>
<b>Doors</b>	
<i>General</i>	<ul style="list-style-type: none"> <li>■ 1¾” hollow metal doors 3’- 0” (w) by 7’- 0” (h)</li> <li>■ Doorframes will be a minimum 14 gauge metal frame construction</li> <li>■ Hardware to be locksets with levers</li> <li>■ Key locks</li> </ul>
<i>Public Toilets, Vending/Concession Area, Janitor Closets, Electrical Closets, Telephone Closets</i>	<ul style="list-style-type: none"> <li>■ Insulated 1¾” hollow metal doors 3’- 0” (w) by 7’- 0”(h)</li> <li>■ Doorframes will be a minimum 14 gauge metal frame construction</li> <li>■ Hardware to be locksets with levers</li> <li>■ Key locks</li> </ul>
<i>Vehicle Pathways</i>	<ul style="list-style-type: none"> <li>■ 1” ABS plastic clad wood core double service doors 5’- 0” (w) by 8’- 0” (h)</li> <li>■ 250 degree cam hinge system</li> <li>■ Acrylic view window</li> <li>■ Impact plates and cart bumpers</li> <li>■ OSHA marking</li> <li>■ 6” concrete filled steel protective bollards at each jamb</li> </ul>
<i>Equipment Rooms</i>	<ul style="list-style-type: none"> <li>■ Fire rated hollow metal 1¾” double doors 6’- 0” (w) by 8’- 0” (h)</li> <li>■ 16 gauge welded metal frames</li> <li>■ Lockset hardware with levers</li> <li>■ Key locks</li> </ul>
<i>Emergency Egress</i>	<ul style="list-style-type: none"> <li>■ Insulated fire rated 1¾” hollow metal doors 3’- 0” (w) by 7’- 0” (h)</li> <li>■ 16 gauge welded metal frames</li> <li>■ Panic release hardware with levers opposite side</li> <li>■ Automatic closers</li> </ul>
<b>Specialties</b>	
<i>Handrail</i>	
<i>Roof Access Stairs</i>	<ul style="list-style-type: none"> <li>■ Pipe handrail welded construction</li> </ul>
<i>Toilet Accessories</i>	<ul style="list-style-type: none"> <li>■ Stainless steel ceiling hung partitions</li> <li>■ Toilet paper holder</li> <li>■ Feminine napkin disposal (female toilets only)</li> <li>■ Feminine napkin dispenser (female toilets only)</li> </ul>



Category	Low-Rise
	<ul style="list-style-type: none"> <li>■ Paper towel dispenser combination waste receptacle</li> <li>■ Soap dispenser</li> <li>■ Mirror with brushed stainless steel edging</li> <li>■ ADAAG compliant grab bars</li> </ul>
<b>Signage</b>	
<i>Building Directory</i>	<ul style="list-style-type: none"> <li>■ Illuminated directory</li> <li>■ Interlocking black background letter system for interchangeable information</li> <li>■ Plastic laminate clad wood wall mounted case</li> </ul>
<i>Great Seal</i>	<ul style="list-style-type: none"> <li>■ Cast plaster 24" diameter</li> </ul>
<i>Interior United States Flag</i>	<ul style="list-style-type: none"> <li>■ Cantilever pole aluminum mounted</li> <li>■ Manual operated</li> </ul>
<i>Dedication Plaque</i>	<ul style="list-style-type: none"> <li>■ Bronze 4 SF with raised letters</li> </ul>
<i>Emergency Egress</i>	<ul style="list-style-type: none"> <li>■ Vinyl letters on plastic laminate signage system panel with ADAAG compliant tactile Braille signage modules</li> </ul>
<i>Room Identification for Public Spaces</i>	<ul style="list-style-type: none"> <li>■ Room identification signage to be raised plastic letters mounted beside the door with ADAAG compliant tactile Braille signage modules</li> </ul>
<i>Room Identification</i>	<ul style="list-style-type: none"> <li>■ Signage system to be modular vinyl lettering on plastic laminate signage frame system with ADAAG compliant tactile Braille vinyl signage modules</li> </ul>
<i>Hazard Markings at Dock Edge</i>	<ul style="list-style-type: none"> <li>■ OSHA floor markings and signs indicating areas of vehicle movement, changes in elevation, and hazardous material storage; Provide raised floor markings for ADAAG compliant hazard warning</li> </ul>
<i>Telephone Enclosure</i>	<ul style="list-style-type: none"> <li>■ Painted steel dividers with stainless steel shelf and perforated interior face with acoustical material</li> </ul>
<b>Interior Finishes</b>	
<b>Walls</b>	
<i>Lobby</i>	<ul style="list-style-type: none"> <li>■ Wall surface to be Type II vinyl wall covering</li> </ul>
<i>General</i>	<ul style="list-style-type: none"> <li>■ Exposed columns</li> <li>■ Painted partitions with vinyl base</li> <li>■ Wood chair rail bumper guards</li> <li>■ Steel corner guards</li> </ul>
<i>Public Toilets</i>	<ul style="list-style-type: none"> <li>■ <math>\frac{3}{8}</math>" textured porcelain tile base and wainscot with paint above</li> </ul>
<i>Materials Movement Corridors, Loading Dock, Trash Room</i>	<ul style="list-style-type: none"> <li>■ Painted with vinyl cove base and chair rail guard and stainless steel corner guards</li> </ul>
<i>Equipment Rooms, Janitor Closets, Electrical Closets, Telephone Closets</i>	<ul style="list-style-type: none"> <li>■ Enamel painted with vinyl cove base and steel corner guards</li> </ul>

Category	Low-Rise
<b>Floors</b>	
<i>Entrance Vestibule</i>	<ul style="list-style-type: none"> <li>■ Quarry tile floor</li> <li>■ Drained entrance grid with structural aluminum rails, drain pan and carpet tread inserts of monofilament solution died nylon fusion bonded to backing</li> </ul>
<i>Lobby</i>	<ul style="list-style-type: none"> <li>■ Quarry tile floor</li> </ul>
<i>Public Toilets</i>	<ul style="list-style-type: none"> <li>■ Textured porcelain tile</li> </ul>
<i>Vending/Concession Area</i>	<ul style="list-style-type: none"> <li>■ Vinyl composition tile</li> </ul>
<i>Trash Room, Janitor Closets</i>	<ul style="list-style-type: none"> <li>■ Sealed concrete</li> </ul>
<i>Loading Dock, Equipment Rooms</i>	<ul style="list-style-type: none"> <li>■ Sealed concrete</li> </ul>
<i>Electrical Closets, Telephone Closets</i>	<ul style="list-style-type: none"> <li>■ Sealed concrete</li> </ul>
<b>Ceiling</b>	
<i>Entrance Vestibule</i>	<ul style="list-style-type: none"> <li>■ Painted plaster ceiling</li> </ul>
<i>Lobby</i>	<ul style="list-style-type: none"> <li>■ Suspended 24" by 24" acoustical tile ceiling</li> </ul>
<i>Public Toilets</i>	<ul style="list-style-type: none"> <li>■ Painted plaster ceiling</li> <li>■ Soffit over counter areas</li> </ul>
<i>Vending/Concession Area</i>	<ul style="list-style-type: none"> <li>■ Suspended 24" by 24" acoustical tile ceiling</li> <li>■ Painted GWB soffit above equipment and counter areas</li> </ul>
<i>Egress Corridors</i>	<ul style="list-style-type: none"> <li>■ Exposed structure above</li> </ul>
<i>Trash Room, Loading Dock, Equipment Rooms, Janitor Closets, Electrical Closets, Telephone Closets</i>	<ul style="list-style-type: none"> <li>■ Exposed structure above</li> </ul>
<b>Plumbing</b>	
<i>Utility Service: Domestic Water Supply</i>	<ul style="list-style-type: none"> <li>■ Domestic cold water services shall be provided connecting to the public utilities in the adjacent streets</li> <li>■ Domestic cold water services shall be fully metered in accordance with local requirements</li> </ul>
<i>Utility Service: Storm Drainage and Sewer Systems</i>	<ul style="list-style-type: none"> <li>■ Sanitary and storm water drain services shall be provided from the building and connect to public utilities in adjacent streets</li> </ul>
<i>Utility Service: Natural Gas</i>	<ul style="list-style-type: none"> <li>■ A natural gas service shall be extended into the building and be metered in accordance with local requirements</li> <li>■ Shut-off valve at gas service entry point per code</li> </ul>

Category	Low-Rise
<i>Domestic Cold Water System</i>	<ul style="list-style-type: none"> <li>■ Pumping systems required to compensate for inadequate street pressure are considered special cost excluded from unit cost</li> <li>■ All domestic water connections to non-potable applications shall be provided with suitable backflow preventors</li> <li>■ Provide non-freeze hydrants around the base of the building; Hydrants shall be located on each side of main entrance and spaced approximately 100' - 0" OC around building</li> </ul>
<i>Domestic Hot Water System</i>	<ul style="list-style-type: none"> <li>■ Domestic hot water shall be generated by localized gas-fired storage type water heaters; Water heater flues shall be extended through main roof or side wall</li> </ul>
<i>Public Toilets</i>	<ul style="list-style-type: none"> <li>■ Inset counter-mounted porcelain sink</li> <li>■ Cold water and hot water</li> <li>■ Lever faucet</li> <li>■ Porcelain floor mounted flush-valve water closet</li> <li>■ Floor drain with primer</li> </ul>
<i>Equipment Rooms</i>	<ul style="list-style-type: none"> <li>■ Floor drain with primer</li> </ul>
<b>HVAC</b>	
<i>General</i>	<ul style="list-style-type: none"> <li>■ All HVAC systems and equipment shall at minimum comply with the energy performance criteria within the "Facilities Standards for the Public Buildings Service" supporting an assigned energy performance goal</li> <li>■ System and equipment selections indicated below are for the purposes of this cost study only; Alternate system and equipment options should be investigated on a specific building project for improved efficiency of operation and enhanced life cycle economic performance</li> </ul>
<i>Design Conditions and Loads</i>	<ul style="list-style-type: none"> <li>■ Outdoor design conditions shall be as per GSA Standards</li> <li>■ Shops and related areas: Winter 72° F db/25-35% RH, 55° F db (unoccupied hours)</li> <li>■ Ventilation rates shall meet or exceed all required codes and standards, including ASHRAE-62, but in no case be less than 20 CFM of outside air per occupant</li> <li>■ Space-heating equipment has been sized assuming a design load of 10 BTU per hour per gross square foot of building; Total heating capacity shall be 120% of the design heating load</li> </ul>
<i>Energy Supply</i>	<ul style="list-style-type: none"> <li>■ See plumbing description for natural gas service</li> </ul>
<i>Heat and Ventilating System</i>	<ul style="list-style-type: none"> <li>■ Shall be by rooftop gas-fired units; For cost purposes provide six (6) 5,000 CFM units (approximately one unit per 20,000 GSF of floor area); Heating capacity of each unit shall be 200,000 BTUH</li> <li>■ For distribution of warm air from each unit, provide ducts with registers that run fifty feet in each of four directions</li> <li>■ Storage and warehouse will not be mechanically cooled</li> <li>■ Office space shall be cooled with package dx equipment or heat pump</li> </ul>
<i>Exhaust Air</i>	<ul style="list-style-type: none"> <li>■ Toilets and vending/concession areas: provide direct 100% exhaust operated by time clock or Building Automation System</li> </ul>
<i>Controls</i>	<ul style="list-style-type: none"> <li>■ Building Automation Systems: All building systems shall be monitored or controlled or interfaced through the Building Automation System (BAS); The BAS consists of an Energy Management System (EMS), Security System and Fire Protection System; System selection shall be expandable and allow communication with other automation systems</li> </ul>

Category	Low-Rise
<i>Loading Dock</i>	<ul style="list-style-type: none"> <li>■ Exhaust fan and make-up system with heating and ventilating unit (to provide 10 air changes per hour) controlled by CO<sub>2</sub> sensors</li> </ul>
<b>Fire Protection</b>	
<i>Service</i>	<ul style="list-style-type: none"> <li>■ Two services connecting to public utilities in adjacent streets</li> <li>■ Fully metered in accordance with local requirements</li> </ul>
<i>Fire Suppression</i>	<ul style="list-style-type: none"> <li>■ Combination fire standpipe/sprinkler system throughout the building pressurized by automatic electric fire pump and jockey pump (fire pump required to compensate for inadequate street pressure is inadequate)</li> <li>■ Fire pump shall be supplied with normal and emergency power with an automatic transfer switch</li> <li>■ Automatic wet pipe sprinkler system throughout, except a dry pipe system shall be used for loading dock</li> <li>■ Provide one sprinkler head for every 100 SF of finished space</li> <li>■ Siamese connections</li> <li>■ Tamper switches on all fire protection control valves</li> <li>■ Each sprinkler system connection to water main provided with OS&amp;Y gate valve with tamper switch, check valve, water flow alarm, inspectors test and drain, drain with sight glass and check valve</li> <li>■ Multipurpose ABC dry chemical fire extinguisher in recessed cabinets by exit doors and equipment rooms</li> </ul>
<i>Fire Alarm System</i>	<ul style="list-style-type: none"> <li>■ Addressable type, electronic fully supervised multiplexing type employing high frequency carrier applied to dedicated wires for the distribution of its multiplex coded signals</li> <li>■ Fire safety system command center in room in lobby with direct access for fire fighters</li> <li>■ Fire protection alarm system devices are in accordance with the following: manual fire alarm pull station adjacent to each exit door; space smoke detectors (analog type) in all electrical switchgear, transformer vaults, and telephone exchanges; duct smoke detectors (analog type) in air handling systems in excess of 2000 CFM; waterflow detectors in sprinkler piping; tamper switches on valves in sprinkler piping; automatic control (stopping) of air handling systems in response to signal from the fire protective alarm system; and manual control of fans from the fire command center</li> </ul>
<b>Electrical</b>	
<i>Electrical Service</i>	<ul style="list-style-type: none"> <li>■ Suitable for receiving secondary power at the <sup>480</sup>/<sub>277</sub> volt level from facilities provided by the utility company</li> </ul>
<i>Service and Distribution Equipment</i>	<ul style="list-style-type: none"> <li>■ Single supply connection main switchboards</li> <li>■ All required subsidiary panelboards (power, distribution, lighting, and appliance)</li> <li>■ Automatic power factor correction equipment for each switchboard to maintain a 90% power factor</li> <li>■ Incorporate copper busses and copper wiring throughout</li> <li>■ 480 volts, three phase for all motors ½ horsepower and larger</li> <li>■ 277 volts single phase to all fluorescent (and other discharge type lamp) lighting fixtures</li> <li>■ Provide driven rod grounding system with counterpoise cable</li> <li>■ Provide master labeled UL96 lightning protection system</li> </ul>

Category	Low-Rise
<i>Emergency Power</i>	<ul style="list-style-type: none"> <li>■ Exterior pad-mounted 100 KW diesel-driven emergency generator unit</li> <li>■ Automatic transfer switches (by-pass isolation type) arranged to maintain the emergency power distribution system energized from the normal utility company source or the generating set</li> </ul>
<i>Electrical Outlets</i>	
<i>General</i>	<ul style="list-style-type: none"> <li>■ Wall mounted duplex outlets every column</li> </ul>
<i>Corridors and Lobby Spaces</i>	<ul style="list-style-type: none"> <li>■ Wall mounted duplex outlets every 50' - 0" OC</li> <li>■ Provide recessed duplex wall receptacle for clock in lobby and corridor</li> </ul>
<i>Vending/Concession Area</i>	<ul style="list-style-type: none"> <li>■ One quadplex counter splash mounted electrical outlet</li> <li>■ One duplex wall outlet for each vending machine</li> </ul>
<i>Electrical and Communication Closets</i>	<ul style="list-style-type: none"> <li>■ Two dedicated duplex outlets on emergency power plus additional outlets for every 5' - 0" of wall space</li> </ul>
<i>Public Toilets</i>	<ul style="list-style-type: none"> <li>■ Ground fault electrical duplex outlets</li> </ul>
<i>Lighting</i>	
<i>General</i>	<ul style="list-style-type: none"> <li>■ Metal halide light fixtures mounted high and tight to structure above to maximize clearance; provide emergency auxiliary quartz strike fast start</li> </ul>
<i>Docks, Material Movement Corridors</i>	<ul style="list-style-type: none"> <li>■ Metal halide light fixtures mounted high and tight to structure above to maximize clearance with full wire guards</li> <li>■ Dock light on swinging arm</li> </ul>
<i>Entry Vestibule</i>	<ul style="list-style-type: none"> <li>■ Recessed down lamps compact fluorescent lamps, one per every 10 SF</li> </ul>
<i>Lobby, Break Areas</i>	<ul style="list-style-type: none"> <li>■ Parabolic fluorescent 24" (w) by 48" (l) recessed ceiling fixtures located every 80 SF</li> </ul>
<i>Public Toilets</i>	<ul style="list-style-type: none"> <li>■ Recessed fluorescent light fixture located in the soffit above the lavatory and the toilet</li> </ul>
<i>Building Perimeter</i>	<ul style="list-style-type: none"> <li>■ Metal halide or sodium vapor perimeter lighting every 50' of building wall, except loading dock every 25'</li> </ul>
<i>Telephone and Communication Outlets</i>	
<i>Lobby</i>	<ul style="list-style-type: none"> <li>■ Telephone connections for security screening post</li> <li>■ Public pay telephone connections</li> </ul>
<i>Telephone Closets</i>	<ul style="list-style-type: none"> <li>■ Conduit for telephone cable</li> <li>■ Mounting board for telephone and LAN switch connections (part of shell and core)</li> </ul>
<i>Equipment Rooms</i>	<ul style="list-style-type: none"> <li>■ Conduit for telephone line</li> </ul>
<i>Security Devices</i>	
<i>General</i>	<ul style="list-style-type: none"> <li>■ Exterior intrusion detection system, including CCTV camera at loading dock and conduit boxes and power supply provided Interior security power and mounting support will be provided as a special feature, with equipment and wiring provided by tenant</li> </ul>

Category	Low-Rise
<i>Entry Vestibule, Dock Man Door, and Cargo Overhead Door</i>	<ul style="list-style-type: none"> <li>■ Card reader access control system</li> <li>■ Intrusion detection system with door position and lock keeper detectors and glass break sensors</li> <li>■ Closed circuit television monitor</li> </ul>
<i>Emergency Egress Doors</i>	<ul style="list-style-type: none"> <li>■ Intrusion detection system with balanced magnetic door position and lock keeper detectors</li> </ul>
<i>Lobby</i>	<ul style="list-style-type: none"> <li>■ Closed circuit television monitor</li> <li>■ Glass break sensor</li> <li>■ Metal detector if provided will be a special feature and is not included in the unit cost</li> <li>■ X-ray baggage inspection equipment if provided will be a special feature and is not included in the unit cost</li> </ul>
<i>Roof Access</i>	<ul style="list-style-type: none"> <li>■ Balanced magnetic door position and lock keeper switches</li> </ul>
<b>Commercial Equipment</b>	
<i>Dock Loading Equipment</i>	<ul style="list-style-type: none"> <li>■ Building service dock bay to have electro-hydraulic operation dock leveler</li> </ul>
<b>Furnishings</b>	
<i>Casework</i>	
<i>General</i>	<ul style="list-style-type: none"> <li>■ All millwork to be AWI Custom grade plastic laminate veneer panels with solid hardwood dimensional lumber caps</li> </ul>
<i>Public Toilet</i>	<ul style="list-style-type: none"> <li>■ Cantilevered plastic laminate counter with splash</li> </ul>
<i>Vending/Concession Area</i>	<ul style="list-style-type: none"> <li>■ AWI custom hardwood veneer base and upper cabinets</li> <li>■ Plastic laminate counter with splash</li> </ul>
<b>Building Site Work</b>	
<i>General</i>	<ul style="list-style-type: none"> <li>■ Site work allowance carried in estimate to cover such items as roadways, walkways and plazas, vegetation, building perimeter and site lighting, and site utilities</li> <li>■ Site allowance is based on a site area to GSF ratio of 90%</li> <li>■ Outside parking (structured and surface) is not included in site work allowance and is treated as a separate space type</li> </ul>
<i>Flagpoles</i>	<ul style="list-style-type: none"> <li>■ 30' - 0" (h) aluminum pole with internal halyard and spread footing base for U.S. flag (flagpoles for tenant flags provided as special tenant improvement feature)</li> </ul>