FREDERICK COUNTY

BUILDING AND SITE DESIGN GUIDELINES FOR CRITICAL DIGITAL INFRASTRUCTURE

MAY 2022

Fannie Mae Data Center – rodgers.com

Use of Design Guidelines

The Frederick County Design and Development was created for planners, developers, engineers to seeking to develop any digital critical infrastructure in Frederick County.

Critical Digital Infrastructure: A use or facility consisting of one or more buildings used primarily for the storage, management, processing, and transmission of digital data, which houses computer and or network equipment, systems, servers, appliances, and other associated components related to digital data operations. Such facility may also include an accessory office use, air handlers, power generators, water cooling and storage facilities, utility substations, and other associated utility infrastructure to support sustained operations of the digital infrastructure.

Critical Digital Infrastructure Electric Substation: A high-voltage electric system facility used to switch generators, equipment, and circuits or lines in and out of a system, change AC voltages from one level to another, and/or change alternating current to direct current or direct current to alternating current. Critical Digital Infrastructure Electric Substations may only be constructed for the primary purpose of providing power to Critical Digital Infrastructure.

Goals

- To clarify and explain the architectural and development design standards.
- To graphically represent the design guidelines and better illustrate the application of the guidelines.
- To be used as a reference tool.
- To improve the quality and compatibility of development of digital critical infrastructure proposed in Frederick County.

Process

Architectural renderings or plans shall be submitted as part of the Site Development Plan application for approval by Staff and the Planning Commission to assure that the appearance, type of building materials, or other aspects of the building are consistent with the purposes and intent of the Critical Digital Infrastructure design requirements.

ARCHITECTURE AND BUILDING DESIGN

Finishes and Materials
Buildings shall be predominantly designed and constructed to include finishes and materials of consistent quality and design on all sides.

Materials help define architectural styles and create visually appealing building facades.

Types of Exterior Materials for Critical Digital Infrastructure

- Masonry
- Metal
- Siding
- Glass
- Composite

Brick Exterior Design – bruns-pak.com

Glass Exterior Design – builtin.com

Combination of Siding, Glass, Metal Exterior – LL Bean Stonewall Data Center - hed.design.com

LL Bean Data Center Enlarged – rrcengineering.com

The materials for each buildng should:

- Complement the neighborhood, region, and architectural style.
    - For example: buildings located in more urban or suburban settings may appear more modern or appear like office buildings.
- Be durable and compatible with other building materials.
- Have a finished appearance on all sides.
    - The variety of finishes of the materials can add character to a building design.

This modern CDI building would be more appropriate in an urban environment.
Photo Credit: Staff

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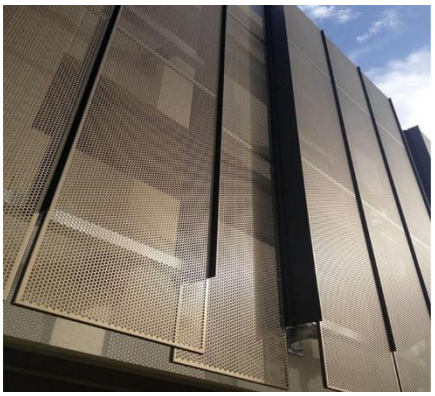
Photo Credit: Staff

This CDI building appears like an institutional use.
– bruns-pak.com

For example: metal finishes can be applied in a variety of finishes like ribbed, batten, flat, perforated etc.

Building Exterior Finish Precedent - prweb.com

Equinix NY5 – blog.equinix.com



Building Exterior Finish Precedent - stainless-plate.com

Building Façade and Articulation Designs Discouraged:

All building facades that are in public view shall avoid the use of undifferentiated facades and long, plain wall sections. Adding architectural elements to otherwise massive building structures help bring the scale and massing to a human scale.

The building facades should avoid:

- Sole reliance on horizontal or vertical bands
- Shallow recesses or bump outs
- Rooflines at the same heights or no step-backs
- Indistinct entrances
- Use of color schemes with little or no contrast
- Bulk of building mass a single color

There are little to no architectural elements to break down the scale of this CDI, which is discouraged. Scott Data Center – scottdatacenter.com

This CDI could use more articulation in color, walls, roofline, etc., especially when viewed from the public street. Banner Data Center – kpff.com

The splash of blue on the walls do not successfully break down the mass of the CDI building.
Photo Credit: Staff

The color contrast, shallow variation in the walls, and odd entrances do not break up the building massing or long plain facades.
SDN Communications Data Center – sdncommunications.com

The light-colored portion of the CDI is lost against the bulk of the dull grey concrete building. Photo Credit: Staff

Building Façade and Articulation
Designs Encouraged:
Long plain wall sections can be avoided with the combination of the following design elements:

- Changes in building material and building heights
- Changes in patterns and textures
- Building step-backs, recesses, or protrusions
- Colors or use of accent materials (prominent use at entrances)
- Use of windows (or faux windows)

Architectural Features also encouraged:

- Accent/trim colors that contrast but are compatible with primary building color
- Perforated or louvered screens
- Distinct articulation of the building sections (base, middle, and top)
- Columns and bays
- Substantial recesses

This CDI demonstrates a varied roofline, pedestrian scaled entrance, the use of clear and glazed windows. Element Critical – CoStar.com

The building mass is broken up well by using a combination of a difference material, color, sizes, and bump outs.
Highmark Data Center – callisonrtkl.com

Building entrances shall be designed and oriented in terms of their relationship to the human scale and shall reflect this relationship through the inclusion of human-scaled architectural elements.

The CDI building shows a pedestrian scaled entrance highlighted by a designed accent glass glazed wall. CloudHQ's MCC1 Data Center – datacenterknowledge.com

Color, vertical and horizontal designs, provides visual interest to the CDI building. More use of bump outs or recesses and a varied roofline would increase the visual break down of the massing. Photo Credit: Staff

This CDI building utilizes color and faux of windows to avoid plain wall sections. A more prominent entrance, better screening, and location of duct work would greatly increase an already attractive design. Photo Credit: Staff

A prominent entrance, use of color, bump outs, change of material in addition to faux windows work well on this CDI rendering.
Corgan Data Center – corgan.com

Other Critical Digital Infrastructure Building Design Examples:

Building M1 – hed.design

Advanced Technology Research Facility Data Center – hdrinc.com

NTT VA3 Data Center – hed.design

VA2 Data Center – ragingwire.com

Data Center Exterior Precedent – bruns-pak.com

NSA's Utah Data Center - businessinsider.com

QTS Data Center - qtsdatacenters.com

SITE DESIGN

Screening and Buffering

In order to minimize visibility from adjacent roads and adjacent properties, ground level and roof top mechanical equipment, power generators, water cooling and storage facilities, utility substations, and other associated utility infrastructure to support sustained operations of the infrastructure shall be screened.

This CDI building has a combination of fencing and a berm. Landscaping could be added as a reinforcement to the screening. Mineral Gap Data Center - (dpfacilities.com)

Types of Effective Screens for Critical Digital Infrastructure

- Principal Building
- Visually Opaque Fence*
- Screen Wall or Panel*
- Parapet Wall*
- Other visually opaque screen that shall be constructed of materials compatible with those used in the exterior architectural finishes of the principal building.

*Walls and fences must be made of quality materials and enhance rather than detract from the beautification of the site.

Fencing and landscaping working together for an effective screen. Multilayered landscaping with a variety of plant materials is needed. Photo Credit: Staff

In addition to the items to be screened listed above, the areas that shall be screened and located to the rear or side of the buildings or be incorporated in the building design:

- Service and Loading Areas
- Refuse and Recycling Areas

Wall of similar building materials to successfully screen outdoor equipment. Photo Credit: Staff

Areas requiring a landscape buffer:

- Front yards abutting roadways
- Side and rear yards (except where adjoining a CDI use)

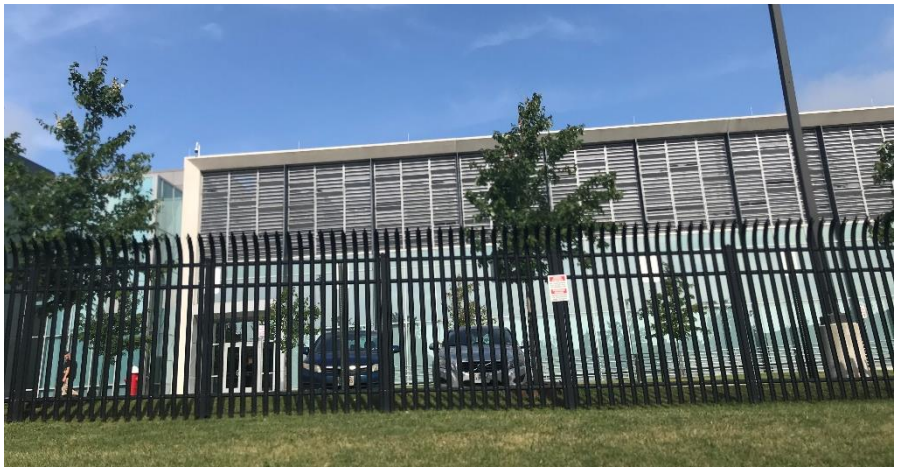
Types of Effective Buffers for Critical Digital Infrastructure

- Landscape buffer (in accordance with the Frederick County Zoning Ordinance)
- Berm, wall, or fence in combination with vegetation.
    - If security fencing is proposed, vegetative screening shall be placed between the fence and the public view.
- Existing forest or hedgerows (supplemented with new plantings where necessary)

This current condition of the CDI building does not provide sufficient fencing and landscaping to successfully screen the ground equipment from the public way. Pacific Blvd - Google Maps

The ground equipment is clearly visible from the public way and there is not enough landscaping for a suitable screen. Photo Credit: Staff

Views of the rooftop equipment must be screened unlike this CDI building. Photo Credit: Staff



This portion of the CDI site is not adequately screened with the fencing and landscaping.
Photo Credit: Staff

Although the dumpster enclosures blend in with the CDI building, the enclosure should not be viewed from the public street.
Photo Credit: Staff

Another example of rooftop mechanical equipment that must be screened from public view. Red Rum Dr - Google Maps

CDI Electric Substations must be thoughtfully designed where the structures have sufficient screening and buffering from the public street. This CDI Electric Substation has no visual screen. Photo Credit: Staff

This CDI Electric Substation has a wall and landscaping. The color of the wall brings attention to the utilities. More design in the materials, colors, and altering wall direction would help with concealment. Photo Credit: Staff

A mixture or alternate row of trees would greatly enhance the landscape screening of this CDI building.
Photo Credit: Staff

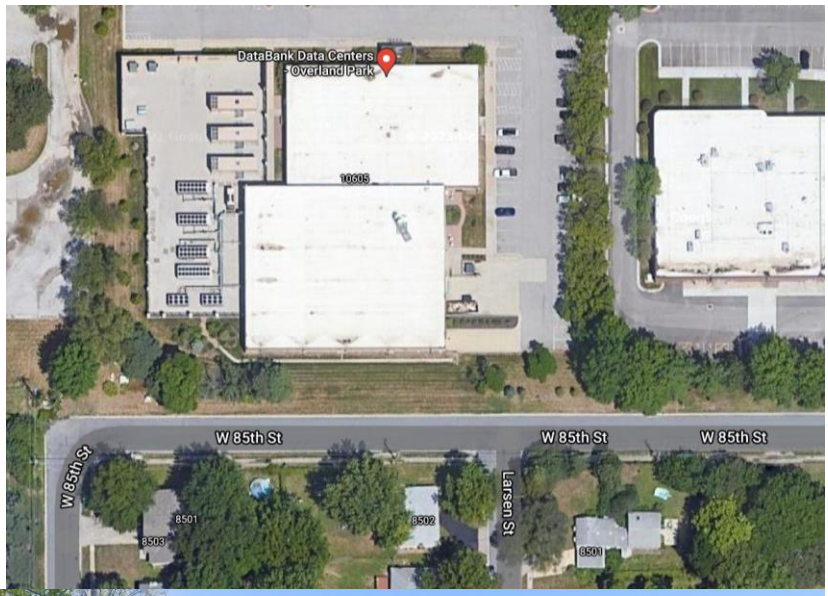
The inclusion of deciduous overstory trees to the existing landscaping will adequately screen the site from the public way. In addition to the screening, a higher quality fence would be required.
Photo Credit: Staff

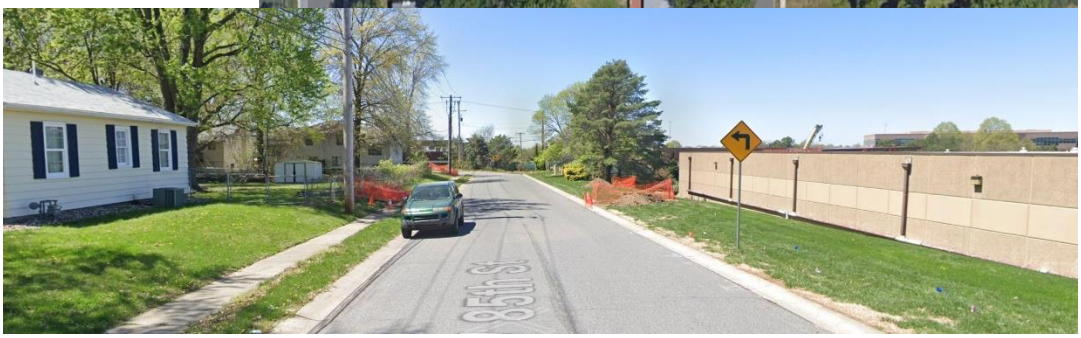
The landscaping throughout this site does a good job of visually breaking up the size of this CDI building.
Photo Credit: Staff

SITE DESIGN

Land Use Compatibility

Data Centers abutting residential, institutional or agricultural districts must provide sufficient buffering and screening. Landscape buffering and screening must be heavily landscaped and a mix of deciduous and evergreen trees. If buffered or screened by a fence or wall then materials, colors, form, scale, and design of the fencing and walls considered should be compatible with the main structure.





The CDI building above does not provide adequate buffer or screening from the public way or the nearby residential properties. Kansas City, MO data center - Google Maps

SITE DESIGN

Lighting

Extremely tall light poles add to the overwhelming mass of the buildings and site. Light pole must be designed in accordance with the Frederick County Zoning Ordinance but not to exceed 18 ft. More restrictive lighting may be enforced where deemed appropriate.

The light poles on this CDI site are unnecessarily high.
Photo Credit: Staff

An example of parking area light poles that are higher than needed, especially in an area where trucks are not permitted. Waxpool Rd - Google Maps

This CDI building also shows unnecessarily high light poles. VA-625 - Google Maps

The light poles and building mounted fixtures on this CDI site are appropriately sized. Photo Credit: Staff

An example of reduced height of the parking area light poles. Photo Credit: Staff

The security entrance at this CDI building is lighted by fixtures whose poles do not exceed the height of the building. Photo Credit: Staff