APPENDIX C: DESIGN GUIDE

Overview

This design guide provides additional design criteria relevant to the recommendations of this master plan. It is not intended to be a complete design guideline document, rather an identification of additional elements to be incorporated into the Borough's Design Guide.

Design specifics are provided for streetscapes (materials and furnishings palette and recommendations by street typology), architecture and community branding. In addition, there is a section on sustainable practices which describes best practices in sustainable development. Considerations for sustainability are also incorporated into specifics as they relate to streetscapes.

Branding Style Guide

The brand style guide includes guidance on proper usage of the identity system, color specifications in RGB, CMYK and Pantone, a copyright release allowing the Borough and Downtown Improvement District to modify and use the system as needs evolve and a simple licensing agreement should Downtown Improvement District wish to allow products with the logo to be developed and sold. In addition, a complete electronic file system with all logos, ad templates, typefaces and support graphics has been provided.

Streetscape Materials and Furnishings Palette

Following is a summary of standard streetscape elements that should be used throughout downtown. All elements will not be included on every streetscape. The streetscape typologies described following this section identify the elements that are associated with each street type. The outline below represents general descriptions; refer to Borough specifications for detailed specifications.

Ornamental Street Light Options (Existing Borough Standard)

Union Metal Corporation Nostalgia Lighting Poles
- Octaflute tapered streetlight pole (23')
- Bracket arm (6' long at 23 foot mounting height)
- Outlet mounted 6" below Luminaire arm
- Banner arm
- Black

King Luminaire
- 165 watt QL induction luminaire
- Black

Approved Equals

Ornamental Pedestrian Light Options (Existing Borough Standard)

Holophane Lighting
- Fluted straight pole (14'-5")
- Parking meter arm
- Banner arm
- Pedestrian control box provision
- 85 watt QL induction luminaire
- Post top finial
- Black

Approved Equals

Sidewalk Paving Options

Brick on concrete base with concrete banding (existing standard)
- Brick to be selected as part of Allen Street Promenade Project.
- Vehicular Thickness
- Consider matching specification used on campus (pavers by Whitacre-Greer)

Brick on concrete base with no concrete banding (proposed standard for some applications)
- Same manufacturers as above

Permeable pavers (limited applications only)
- Varies and should be determined by specific situation

Scored concrete
- Standard 5' saw cut/scoring (existing standard)
- Special scoring (proposed option for limited applications)

Alley Paving Options

Asphalt (existing standard)

Stamped concrete (proposed option for limited applications)
- Varies and should be determined by specific design situation

Concrete Unit Pavers
- Key areas, private parking pads adjacent to alley

Crosswalk Options

"Piano Key" white thermoplastic markings (existing standard)

Color stamped concrete (proposed standard for limited applications)
- "Cobble/stone effect," gray color range
- Imitation brick look/color to be avoided

Tree Pits (Existing and Proposed Standards)

Tree Grate
- 60" square "Boulevard" by Neenah Foundry (existing standard)
- 60" x 84" rectangular "Boulevard" by Neenah Foundry (proposed option)
- Cornell Structural Soil

Tree Guard
- Existing Standard (6' Ht., 16" Opening)

Planter Pots
- To be selected as part of first streetscape project
- Custom designs (select areas)

Street Furniture

Bench
- Model 119-60, 6' by DuMor (Borough Standard)
- Black (proposed standard)
- Scarborough by Landscape Forms, Inc. (Campus side of College Avenue)
- Black

Trash Receptacles
- Concourse Series FC-12 by Victor Stanley (Borough)
- Midtown 32 by Keystone Ridge Designs, Inc.
- Black (proposed standard)

Recycle Receptacles
- Model FC-12 by Victor Stanley
- Black

BigBelly Solar Waste/recycling
- Black/Gray

Newspaper Corral
- To be selected as part of first streetscape project
- Black

Bike Facilities

Bike Racks
- Model custom design by Spicer Welding & Fabrication
- Black
- Custom design (special locations)

Bike Hitch
- Bike Hitch by Dero, A Playcore Company
- Black
- Select locations
- Custom design (special locations)

Covered Bike Parking
- "Apex" by Duo-Gard
- Black
- Custom design (special locations)

Transit Shelter
- Penn State standard, custom design by Enseicom
- Black

Retaining and Seat Walls
- Limestone to match historic campus wall
- Brick to match campus brick, east of Garner

- Custom (to be identified during time of streetscape design)

Ornamental Pedestrian Channelization Fence
- Custom design to use Penn State post and chain post detail
- Black

Hoop Fence
- Custom design by Brooks Welding - Pleasant Gap, PA (Borough Standard)
- Black

Streetscape Typologies

Following is an outline of design specifics as they relate to each street typology. Many design specifics are determined as part of this master plan, however, some will be determined as each street is being designed.

Type-A Primary

These streets are the most important in terms of establishing the downtown public realm image and framework and receive the highest level of design treatment, going above and beyond what has already been completed downtown.

Locations

Allen Street Promenade (College to Beaver)

College Avenue Core (Atherton to Garner)

Heister Street (College to Beaver-Potential Future, similar to Allen Street Promenade)

Signal Mast Arms

Borough standard all signalized intersections

Street and Pedestrian Lighting

Borough Standard

Pavement

Brick/concrete base: South side College Avenue sidewalks and paved areas adjacent to transit stops and curb areas on north side. Allen Street, building face to building face, including crosswalks

Concrete: Shared Use path/upper walk on campus/ north side

Permeable pavers: (where necessary to provide for drainage/amenity strip on south side of College Avenue)

Stamped concrete: Crosswalks on College Avenue (cobble/stone paving pattern and color) and bus pull-off zones

Tree Pits

Tree grates: College Avenue, south side and as needed on north side; Allen Street Promenade

Tree lawns: College Avenue, north side

Structural soil: College Avenue (tree grate locations); Allen Street Promenade

Planter Pots: College Avenue, both sides

Street Furnishings

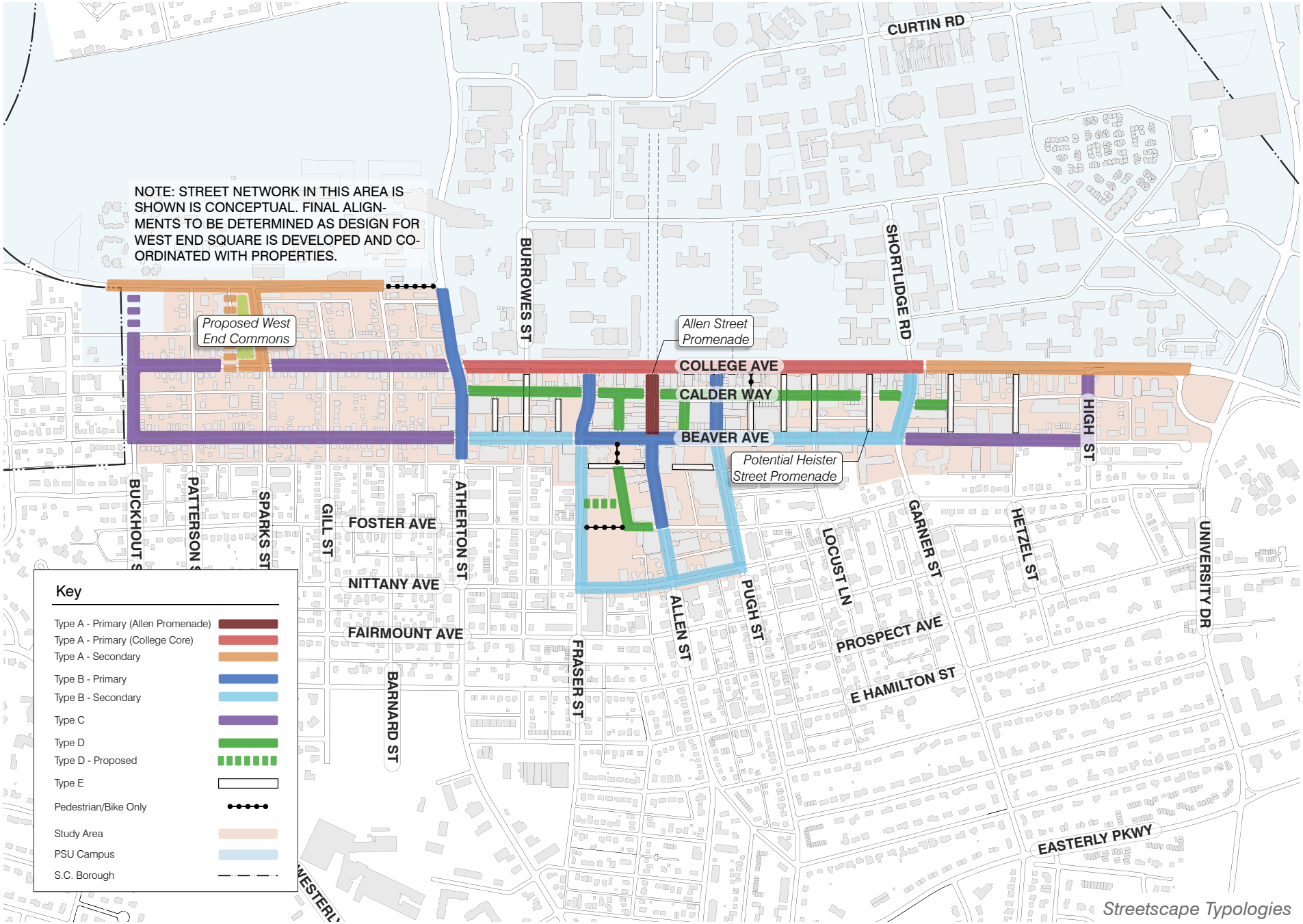
Bench, trash receptacles and recycle receptacles: Borough standard south side of College Avenue and throughout Allen Street Promenade (black); campus standard north side of College (black)

Newspaper Corrals: College Avenue and Allen Street Promenade, both sides at transit stops and intersection nodes

Bike Facilities

Bike racks: At larger intersection nodes and gathering areas along both sides of College Avenue and Allen Street Promenade near College and Beaver intersections

Bike hitch: Both sides of College Avenue and Allen Street Promenade in smaller nodes and gathering areas.



Streetscape Typologies

Transit Shelters

College Avenue transit stops

Stone Retaining Walls

Limestone: north side of College (west of Shortlidge intersection)

Brick: north side of College (east of Shortlidge)

Custom: South side of College Avenue and throughout Allen Street Promenade (to be determined at time of final design, if needed)

Special Considerations

BigBelly Solar Waste/Recycling: Key locations along College Avenue, both sides and Allen Street Promenade

Infiltration Planters: South side of College Avenue where needed to accommodate grade transitions in amenity strip

Rain Gardens: Key locations along College Avenue (in larger bulb-out areas on south side and within lawn areas at South Halls) and Allen Street Promenade based on feasibility with geotechnical investigations

Use of Recycled Materials: Along College Avenue and Allen Street Promenade as special accents such as stone slab "benches," pavement inserts, etc. (to be determined at time of design)

Public Art: Various locations, particularly in gathering areas and nodes (to be determined in conjunction with public art master plan)

Type-A Secondary

These streets are also important in terms of establishing the downtown public realm image and framework and are natural extensions to Type A –Primary streets.

Locations

College Avenue (Garner to University)

West College Avenue (Segment near Sparks, associated with proposed West End Square)

West Campus Drive (Barnard Street to Buckhout Street)

Sparks (Between College and West Campus Drive)

Proposed Street (Part of street network to define proposed open space)

Signal Mast Arms

Borough standard all signalized intersections

Street and Pedestrian Lighting

Borough Standard

Pavement

Brick /concrete base: All sidewalks

Tree Pits

Tree grates: All streets

Structural soil: All streets

Street Furnishings

Bench, trash receptacles and recycle receptacles: Campus standard north side of West Campus Drive; Borough standard all other streets

Newspaper Corrals: West Campus Drive

Bike Facilities

Bike racks: At larger intersection nodes and gathering areas along all streets

Bike hitch: Along all streets in smaller nodes and gathering areas.

Transit Shelters

College Avenue transit stop near Sparks Street and any future stops along West Campus Drive

Special Considerations

BigBelly Solar Waste/Recycling: Key locations along West Campus Drive

Infiltration Planters: Consider along West Campus Drive

Rain Gardens: Consider along West Campus Drive and within proposed West End Square based on feasibility with geotechnical investigations

Use of Recycled Materials: Along key locations of West Campus Drive and streets defining proposed West End Square

Public Art: Along key locations of West Campus Drive and streets defining proposed West End Square(to be determined in conjunction with public art master plan)

Type-B Primary

These streets are important streets that define the downtown core. Some streetscapes along these streets have already been completed (portions of Allen and Fraser Streets and portions of Beaver Avenue) or are in the process of being implemented (a portion of Atherton Street and a portion of Pugh Street) and have set the materials standard for all of downtown.

Locations

Atherton Street (Between Railroad Avenue and West Highland)

Pugh Street (Between College and Beaver)

Beaver Avenue (Incomplete sections between Fraser and Pugh)

Signal Mast Arms

Borough standard all signalized intersections

Street and Pedestrian Lighting

Borough Standard

Pavement

Brick /concrete base and Concrete Banding : All streets (consider eliminating band that runs the length of the sidewalk)

Tree Pits

Tree grates: All streets

Planter Pots:

All streets where room allows

Street Furnishings

Bench, trash receptacles and recycle receptacles: Borough standard

Newspaper Corrals: All streets at larger gathering nodes and transit stops

Bike Facilities

Bike racks: At larger intersection nodes and gathering areas along all streets

Bike hitch: All streets in smaller nodes and gathering areas.

Transit Shelters

Beaver Avenue transit stop

Special Considerations

BigBelly Solar Waste/Recycling: Key locations along all streets

Rain Gardens: Key locations along Pugh Street based on feasibility with geotechnical investigations

Use of Recycled Materials: Along all streets as special accents such as stone slab “benches,” pavement inserts, etc. (to be determined at time of design)

Public Art: Along all streets, particularly in gathering areas and nodes (to be determined in conjunction with public art master plan)

Type-B Secondary

These streets complete the perimeter of the downtown core. The primary difference between these streets and Type B-Primary is that they do not utilize the brick/concrete banding paving pattern. Sidewalks are primarily concrete with some brick accent areas.

Locations

Beaver Avenue (Between Atherton and Fraser and between Pugh and Garner)

Garner Street (Between College and Beaver)

Allen Street (Between Foster and Nittany)

Nittany Avenue (Between Pugh and Fraser)

Fraser Street (Between Beaver and Nittany)

Signal Mast Arms

Borough standard all signalized intersections

Street and Pedestrian Lighting

Borough Standard

Pavement

Concrete: Most areas

Brick /concrete base accents: Intersection nodes, bulb-out areas, transit stops and other accent areas as determined during design

Tree Pits

Tree grates: Beaver Avenue, Fraser Street (Beaver to Nittany east side and Beaver to Foster, west side)

Tree lawns: All other areas

Planter Pots:

Beaver Avenue where space allows

Street Furnishings

Bench, trash receptacles and recycle receptacles: Borough standard

Newspaper Corrals: Beaver and Garner at larger gathering nodes and transit stops

Bike Facilities

Bike racks: At larger intersection nodes and gathering areas along all streets

Bike hitch: All streets in smaller nodes and gathering areas.

Bike lane and contra lane: Garner

Transit Shelters

Beaver Avenue transit stops

Special Considerations

BigBelly Solar Waste/Recycling: Key locations along Beaver Avenue

Rain Gardens: Key locations along Pugh Street and Fraser Street based on feasibility with geotechnical investigations

Use of Recycled Materials: Along all streets as special accents such as stone slab “benches,” pavement inserts, etc. (to be determined at time of design)

Public Art: Along South Allen to Foster and Along Fraser to Nittany (link to Memorial Field) and Garner between Calder and College

Type-C

These streets represent the east and west extensions of College and Beaver Avenues (and the connecting portions of High and Buckhout Streets) but are outside of the downtown core and do not warrant the same level of design as Type A and B above. They should, nonetheless, be compatible in design.

Locations

Beaver Avenue (Between Garner and High)

High Street (Between College and Beaver)

West College Avenue (Between Atherton and Buckhout)

West Beaver Avenue (Between Atherton and Buckhout)

Buckhout Street (Between Beaver and College)

Signal Mast Arms

Borough standard all signalized intersections

Street and Pedestrian Lighting

Borough Standard

Pavement

Concrete: Most areas

Brick /concrete base accents: Intersection nodes, bulb-out areas, transit stops and other accent areas as determined during design

Tree Pits

Tree grates: Some areas along all streets

Tree lawns: Most areas along West Beaver and West College, High and Buckhout Streets and some areas along East Beaver

Street Furnishings

Bench, trash receptacles and recycle receptacles: Borough standard in limited areas

Bike Facilities

Bike racks: At larger intersection nodes and gathering areas along all streets

Bike hitch: All streets in smaller nodes and gathering areas.

Bike lanes: West College, West Beaver

Transit Shelters

East Beaver stops (West Beaver and College as well?)

Special Considerations

Rain Gardens: Key locations along West College and West Beaver based on feasibility with geotechnical investigations

Type-D

This street type represents alleys designed as "shared space," with a heavy emphasis on accommodating pedestrians while also accommodating service vehicles, bicycles and limited automobile traffic.

Locations

Calder Way (Atherton to Sowers)

D Alley (West Highland to Foster and potential future extension to Beaver)

Kelly Alley (Calder to Beaver)

Foster Avenue (Allen to D Alley)

Street and Pedestrian Lighting

Borough Standard as well as custom lighting such as overhead string lights and wall-mounted lights.

Utility Poles

Ornamental pole cover/light such as "Wrap-A-Post" (minimum solution) or custom pole wraps developed with local arts community as part of public art master plan (preferred)

Pavement

Stamped Concrete: All sections with (exception of Foster Avenue) to emphasize arts

Concrete unit pavers: (where necessary to provide for drainage/amenity strip on south side of College Avenue)

Tree Pits

Tree grates or planters: Select areas as feasible to avoid conflicts with utilities and service

Planter Pots

Custom design in select areas where feasible

Street Furnishings

Bench, trash receptacles and recycle receptacles: Borough standard throughout and/or custom designs developed in coordination with local artists

Bike Facilities

Bike racks: Borough standard or custom developed in coordination with local artist at larger alcoves and gathering areas

Bike hitch: Borough standard or custom developed in coordination with local artist in smaller nodes and gathering areas.

Covered bike parking: Borough standard or custom design developed with local artists in larger alcoves or in conjunction with private property owners

Bike Contra Lane: Calder Alley

Special Considerations

BigBelly Solar Waste/Recycling: Key locations with custom stencils, branding

Rain Gardens: In select areas coordinated with private property owners based on feasibility with geotechnical investigations

Green/Living Walls: On blank building facades

Use of Recycled Materials: Throughout all sections as special accents such as stone slab "benches," overhead structures, wall-mounted art, pavement inserts, etc. (to be determined at time of design)

Public Art: Special emphasis on public art in various locations as described above as it relates to paving, street furniture, bicycle facilities and use of recycle materials

Type-E

This street type represents all other streets within downtown and will include base level of treatment. Sidewalk paving would be predominantly concrete, however, the Borough standards for lights, street furniture, tree grates, etc. would be used.

Locations

All other downtown streets

Signal Mast Arms

Borough standard all signalized intersections

Street and Pedestrian Lighting

Borough Standard

Pavement

Scored concrete

Tree Pits

Tree grates or tree lawns as required, depending upon space conditions

Street Furnishings

Bench, trash receptacles and recycle receptacles: Borough standard

Bike Facilities

Bike racks: Borough standard at larger intersection nodes and gathering areas along all streets

Bike hitch: Borough standard at all streets in smaller nodes and gathering areas.

ARCHITECTURAL DESIGN

The Street Wall: Buildings define the street wall and have a powerful impact on the overall impression as well as the specific pedestrian experience created by a mixed-use street environment. The following are some best practices frequently found codified in zoning codes and design guidelines for contemporary American downtown streets.

- Uniformity of building height and set-back lines.
- Consistent transparency and activity at the ground floor – minimize blank walls and structured parking along the sidewalk at street level.
- Special building elements / building configuration at corners and major entrances.
- Appropriate uses – pedestrian friendly and activated uses at the first floor.

Proportions and Scale: Comfortable, appropriate proportions and human scale features contribute greatly to the impact of the building on the pedestrian experience. In addition, some tried and true design best-practices have proven consistently effective in producing a familiar and welcoming downtown environment.

- Base / Middle / Top: Definition of these three zones in the design of building facades can contribute to appropriate scale and proportion – and also provide rational mechanisms for expressing and accommodating the various building uses.
- First Floor Taller than Upper Floors: A taller first floor creates hierarchical importance; is consistent with the base/middle/top design approach and provides adequate vertical dimension to support a variety of retail functions.
- Scale Giving / Functional Elements: Provide canopies, awnings, railings and signage placed and sized with attention to human scale.
- Balance solid and void at the upper floors: Provide as high a proportion of glass to solid walls as is feasible. In addition to the benefits to resident health and comfort plus reduced lighting costs, larger and more frequent windows create the reality and the perception of "more eyes on the street" resulting in a safer and more welcoming streetscape.

Building Materials and Systems-Pedestal Construction: Current building codes permit as much as 5 stories of wood frame construction for multi-housing residential use above a concrete or steel frame "pedestal " at the first floor, provided that an adequate fire separation is achieved between the two systems.

- The "pedestal "construction approach has proven to be the most economical for mid-rise mixed-use development and is used commonly even in "high-end" markets.
- The "pedestal" level can be used for all varieties of retail and parking and can be combined with additional below-grade structured parking.
- Considerable flexibility in the configuration of the "wood frame" residential components can be achieved above the pedestal.

Building Skin / Surface Materials: The demand for economical market-rate and workforce housing has spawned the proliferation of materials and systems for building skins that can provide durability and aesthetic quality for a reasonable cost. The following are materials that we have seen most frequently used – in approximate order of cost from highest to lowest. Also provided are our suggestions for the appropriate deployment of the materials:

- Metal Panel: Concealed or exposed fastener metal panels customarily used on modern buildings and most appropriate for areas above the first floor (to avoid impact damage). Depending on the system, metal panel can be considerably more or similar in expense to brick veneer.
- Stone: There is a history of stone used throughout the Borough in institutional as well as commercial buildings. Where economically feasible, the use of stone as a veneer or accent material may be utilized.

- Brick or High Density Masonry Veneer: Customary hand-laid masonry units ideal for all styles of architecture and recommended for any and all locations on the building and on the street level.
- EIFS – Exterior Insulated Finishing System: Commonly referred to as Dryvit this system has suffered from significant performance failures over the years resulting in mitigating measure that significantly add to the cost. If installed to correct and current standards, the system can be as expensive as real, hand-laid brick veneer. Not recommended at the street level due to impact damage – best applied at upper stories due to aesthetic deficiencies.
- Thin-Masonry Veneer Panels: Thin ceramic / masonry tiles adhered to a backing panel provide the "appearance" of real hand laid brick. Commonly assembled off site and erected as panels often for accelerated schedules. Most appropriate on simple, uniform and repetitive building facades on areas above the first floor – may not be durable enough for first floor applications.
- Cementitious Boards: composed of cement and reinforcing fibers this material can be utilized in a variety of applications from simulated wood siding to flat panels with a similar overall appearance as metal panels. It is available in planks or sheets. There is considerable variety in texture, color and design application. The product is durable and paintable. Cementitious board is installed in the same fashion as aluminum or vinyl siding with direct fastening to the building sheathing. Appropriate for all locations on the building exterior with judicious use on the first floor to mitigate possible impact damage.
- Aluminum or Vinyl Siding: Customary sheathing materials which are most appropriately employed in traditional residential applications. For mixed use, downtown applications on the street wall the materials are generally not appropriately except at upper levels far from close view and away from impact areas. To save overall skin costs, these materials are commonly used even in downtown mixed-use developments at the back of buildings or in areas not viewable from significant public spaces such as the main street.

SUSTAINABLE BUILDING AND SITE DEVELOPMENT PRACTICES

The following sustainable practices are to be considered for individual buildings and sites outside of the public realm. Sustainable practices for projects within the public realm are incorporated into each of the public realm enhancements described in section 3 of the report.

Environmentally conscious design for neighborhoods, existing buildings and new construction

The intentions of sustainable planning and design are to eliminate negative impact on the local and global environments, both natural and built, through skillful, sensitive design. There are many environmental design, reference and performance standards being employed locally and nationally. Green construction codes such as ASHRAE 189.1, Standard for the Design of High Performance, Green Buildings, the International Energy Conservation Code (IECC), International Green Construction Code (IgCC) are emerging on the national code stage. Voluntary green building rating and certification systems are prevalent across building types. One of the better known rating system is Leadership in Energy and Environmental Design (LEED) by the United States Green Building Council (USGBC), a non-profit trade organization. LEED is a framework for assessing building performance and meeting sustainability goals in a holistic approach and assigns rating levels to projects depending on the amount of credits earned. LEED-ND (Neighborhood Development), LEED-NC (New Construction and Major Renovations), LEED-EBOM (Existing Buildings; Operations & Maintenance) and LEED-H (Homes and Mid-Rise) are just a handful of the applicable rating systems. Other user-friendly voluntary certification programs include EPA's Energy Star, NAHB National Green Building Program, The Sustainable Sites Initiative and Enterprise Green Communities.

These rating systems and certifications act as helpful design measurement tools and resources. Several design decisions can be considered to take advantage of the local environment, encourage smart growth practices, minimize site disturbance, optimize energy performance, create healthy indoor environmental quality, conserve water and relieve over-stressed resources. Environmentally-friendly materials, systems and strategies can be considered and value-rated for appropriateness for each project. For example, optimization of the building envelope is critical for new buildings. Added wall and roof insulation, careful installation and detailing of air/vapor barriers at openings and intersections and proper drainage/rainscreens behind certain façade materials (particularly important in the specification of EIFS systems) will improve energy performance (resulting in reduced operating costs and less impact on the environment) and optimize indoor air quality, minimizing the potential for mold and other pollutants that can cause illness and reduce human performance. Other design considerations include installing a reflective roof to reflect the sun's heat and reduce the heat island effect. A vegetative roof will also filter stormwater and provide a natural habitat for insects and birds. Developing cooling gardens of native plant materials will soak up stormwater and reduce cooling costs. Installing energy efficient appliances and high performance mechanical and lighting systems will reduce the energy performance. Further improvements such as meters and lighting controls will adjust for temperature, sunlight, carbon dioxide levels, humidity and time of day, all resulting in reduced operating costs. Specifying renewable carpets, local materials that include a high percentage of recycled content will reduce landfill waste and transportation costs. Durable, low-VOC materials will last longer and contribute to occupant health. And perhaps most importantly, providing controlled natural daylight will decrease dependence on artificial lights and mechanical ventilation, provide a visual connection to the outdoors and views to connect occupants with nature.

When dealing with existing buildings and significant renovations, many of the above recommendations are relevant. Window replacements, comprehensive re-pointing and application of new sealants where appropriate, combined with window replacements can have a significant impact on the energy performance of the building envelope. Further enhancements can be achieved by adding insulation to the interior of existing walls where space permits in major renovation projects. Replacing existing plumbing fixtures will low-flow showers, urinals, lavatories and dual-flush toilets will greatly reduce potable water usage.

While practical application varies among disciplines, some common principals are as follows:

Energy Efficiency and Indoor Environmental Quality

- Building HVAC systems designed using high efficiency packaged roof top units with economizer control and energy recovery; and an energy model as a design tool to optimize energy performance
- Outside air measurements and CO2 level monitoring to ensure proper and continuous ventilation quality is maintained
- Thermal controls provided to meet the latest ASHRAE 55 standards and accommodation of the individual preferences of building occupants for comfort
- Use of environmentally-friendly HVAC refrigerant(s)
- Consideration for an Energy Management System (EMS) to monitor the use of energy in the buildings (an EMS is a computer that controls the operation of all major building systems, in order to run the building efficiently and effectively and balance the source of energy with the consumption of energy)
- Employment of an independent Commissioning Authority that will be involved through design and construction phases of the project
- Specification for low-VOC (volatile organic compounds) products that contain little or none of the dangerous chemicals commonly found in these materials, such as paints, adhesives, carpets and composite wood products
- Consideration to banning smoking in buildings or within

25 feet of the entrances, operable windows, or fresh air intakes

- Meeting ASHRAE 55-2004 standards to ensure thermal comfort and providing thermal controls to ensure accommodation of the individual preferences of its occupants

Lighting and Power

- Using lighting and power electrical systems that will utilize techniques of energy conservation and daylight harvesting (such as high efficiency lamping, rapid programmed start electronic ballasts and LED fixtures)
- Allowing for natural daylight via windows and clerestories to create bright and airy spaces that reduce the need for artificial lighting
- Use of dimming, multiple switching, daylight sensors and vacancy sensors in appropriate places
- Exterior lighting design that addresses personal security, while minimizing light pollution of surrounding areas through the use of down light fixtures with full cut-offs that incorporate "Dark Sky" technology
- Control of exterior security lighting using photocells and control of exterior accent lighting using an astronomical time clock

Building Envelope

- Use of large windows to provide views of the outdoors while also allowing for natural daylighting and winter solar heating
- Building siting (as feasible in an urban grid) he to allow for optimum solar orientation – maximizing interior spaces with north and south exposures and limiting the glazing to the east and the west
- Consideration for the use of exterior sun shades, vertical fin shading elements and overhead for solar and glare control
- Use of high-performance, double-glazed, "Low-E" windows with thermal breaks to control solar loads (low-energy glass is insulated and tinted to filter heat and UV rays from the sun and maximizes the amount of useable natural light to enter the building).
- Consideration for operable windows for natural ventilation and individual control as appropriate in buildings
- Utilization of air and vapor barriers (Air barriers restrict the flow of air through a material and vapor barriers resist the flow of water vapor through a material. Depending on the exterior cladding materials and the detailing of the wall and roof assemblies, the air and vapor barriers will ensure that the risk of air leakage, water damage, mold and condensation are eliminated).
- Efficient building envelope designs to optimize the R-values for both roof and wall assemblies (R-value is a measure of the capacity of a material to impede heat flow, with increasing values indicating a greater capacity)

Site Considerations

- Enhanced pedestrian connections to attractions, community services and transit stops
- Encouraging and promoting car-pooling and use of bus service
- Use of low-emitting and fuel efficient vehicles
- Provision of preferred parking spaces for carpools and LEFEV vehicles
- Bike racks within public and private properties to promote and support increased bicycle usage
- Potential use of pervious paving if specific site conditions allow, considering the limestone geology. (Pervious—or permeable—paving allows the movement of stormwater through the paving surface. In addition to reducing runoff, it effectively traps suspended solids and filters pollutants from the water. This controls stormwater at the source, reduces runoff and improves water quality by filtering pollutants in the substrate layers.)
- Continued emphasis on use of shade trees to shade paved surfaces and building facades to reduce "heat

island effects," which contribute to higher summer temperatures (Heat island effects can result in increased cooling loads which require larger HVAC equipment and energy for building operations. These effects can be mitigated though the application of shading and the use of materials that reflect the sun's heat instead of absorbing it).

- Consideration for "cool roof" technology for most of the roof areas (The Energy-Star compliant system will have a white cap sheet or coating to reflect the sun's rays and contribute to reducing the "heat island effect").
- Consideration for vegetated roof systems (green rood), as "extensive" or "intensive" systems (vegetative roofs reduce storm water runoff, protect the roof from UV deterioration, provide additional insulation value and recreate habitats for butterflies, insects and songbirds)

Water Conservation

- Use of plumbing systems that minimize the use of water, including water-conserving toilets (such as dual-flush and/or low-flow), low-flow urinals and sensored faucets
- Use of native and drought-resistant plants that eliminate the need for an irrigation system or extensive watering

Conservation of Materials and Resources

- Specification preference for locally-extracted and manufactured building materials
- Use of high-recycled content materials including: steel, concrete, carpet, rubber, acoustical ceiling panels, drywall and finish materials
- Consideration for areas throughout buildings for the collection of materials for recycling and centralized areas dedicated for the separation and storage of these materials
- Specification of wood-based materials that are certified in accordance with the Forest Stewardship Council's (FSC) Principals and Criteria to encourage environmentally responsible forest management
- Consideration for replacing large quantities of portland cement with either fly ash or ground granulated blast furnace slag (ggbfs) in concrete in concrete masonry units and site-cast concrete (Both fly ash and ggbfs are by-products of steel production. Utilization of slag cement or fly ash in concrete lessens the burden on landfills, reduces emissions and ultimately conserves energy).
- Development of a Construction Waste Management plan to divert construction and land clearing debris from landfill disposal by recycling and/or salvaging the waste

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