Public Works DIGEST

Volume XXVIII, No. 1
January/February/March
2016

At U.S. Army Garrison Hawaii, planners are working to convert existing streets into safe and efficient avenues and boulevards to support multi-modal transit, infill development, and stormwater management. (Image courtesy of The Urban Collaborative)

This Issue:
Master Planning, Housing, and Barracks

Public Works DIGEST

Volume XXVIII, No. 1
JANUARY/FEBRUARY/MARCH 2016

U.S. Army Installation
Management Command
2405 Gun Shed Road
Fort Sam Houston, TX 78234-1223

Public Works Digest is an unofficial publication of the U.S. Army Installation Management Command, under AR 360-1, The Army Public Affairs Program. Method of reproduction: photo-offset; press run: 1,600; estimated readership: 5,000. Editorial views and opinions expressed are not necessarily those of the Department of the Army. Mention of specific vendors does not constitute endorsement by the Department of the Army or any element thereof.

Gregg Chislett
Chief, Public Works Division
Installation Management Command
U.S. Army Installation Management Command
2405 Gun Shed Road
Fort Sam Houston, TX 78234-1223
Attn: Editor, *Public Works Digest*

Candy Walters
Managing Editor,
U.S. Army Corps of Engineers
Headquarters, USACE
441 G Street, NW
Washington, DC 20314-1000
202-761-0022 DSN 763
editor.pwdigest@usace.army.mil

Printed on recycled paper.

Mixed Use solutions offer ultimate footprint reduction strategy

by Jerry Zekert, Mark Gillem and Courtney Cross

With the advent of low-density, auto-oriented development, single-use patterns have prevailed and resulted in more land and energy intensive development patterns. Now federal planners are again looking to mixed-use as a way to make military installations more effective and efficient thanks to a new focus on energy efficiency, convenience, and even the value of land.

The National Defense Authorization Act of fiscal year 2014 calls for horizontal and vertical mixed-use development to address sustainable planning requirements for installation master plans. Incorporating mixed-use planning also supports emission requirements, employee commuting and fleet performance requirements established by Executive Order 13693 Planning for Federal Sustainability in the Next Decade. There are compelling reasons to favor mixed-use development -- the widespread adoption of zoned development during the course of the last century has led to unfavorable sprawl and automobile dependency. The laudable intentions that led to single-use zoning were to limit incompatibilities between uses such as protecting dwellings from the noise of industrial traffic. However, segregating residences from places of work has resulted in intolerably long commutes, traffic congestion, vehicular pollution, and reduced quality of life due to time spent commuting and lack of access to community resources. A return to mixed-use development can be beneficial in many ways – neighborhoods can once again be rich with amenities and workplaces can be closer to residences promoting compact development and reducing the problems associated with commuting.

Studies comparing sprawling suburban communities to urban areas find substantial costs. According to research by Rutgers University, mixed-use patterns can reduce the cost of roads by 25 percent and utilities by 15 percent. Other research has found that people drive up to 50 percent less in mixed-use districts. Additionally,

In this mixed-use building at Fort Belvoir, Virginia, family townhomes above retail shops start to define a new main street for the Installation. (Photo by Mark Gillem)

according to Donald Appleyard's landmark 1982 study of San Francisco streets, car-dominated landscapes resulted in residents who had three times fewer friends than those living on streets with less traffic. Since mixed-use neighborhoods are not dominated by vehicles, community cohesion is also improved, and arguably this is even more vital in military development given service members and their families face extraordinary stressors and must rebuild their social networks upon each reassignment. In these financial constrained times, where we have a focus on footprint reduction, it is imperative that mixed-use solutions are essential.

Therefore, for military planning, mixed-use development is a regulatory imperative that has countless benefits in support of mission efficiency and quality of life for service members. Horizontal mixed-use development is comprised of compatible uses that may include places to shop, dine, live, worship, work, and play. A mixed-use development promotes town centers and town squares that provide convenient, easy access to amenities for residents living nearby. Living and amenities can be easily accessed through a network of connected sidewalks, making it a safe, comfortable, pedestrian-friendly destination with clear wayfinding throughout. Vertical mixed-use buildings, which incorporate a variety of uses in one structure, can achieve a much higher density than the same uses spread out horizontally in different facilities, resulting in a very land-efficient development pattern.

According to amendments to Section 2864 in the Fiscal Year 2014 National Defense Authorization Act, "A master plan for a major military installation shall be designed to (use) multi-story, mixed-use facility solutions that are sited in walkable complexes so as to avoid, when reasonable, single-purpose, inflexible facilities that are sited in a sprawling manner. Vertical mixed-use infrastructure can integrate government, non-government, or jointly

(See Mixed Use, page 10)

Narrow wing buildings bring in daylight, increase productivity

by Jerry Zekert and Lyndsey Pruitt

Higher productivity, lower absenteeism, fewer errors or defects in products, positive attitudes, reduced fatigue, and reduced eyestrain; are these the effects of a large cup of coffee? These are the benefits of different wavelengths of light on building occupants as summarized by the National Renewable Energy Laboratory. As architects, engineers, and planners, we are rediscovering daylight as a pure source of light that contains all wavelengths throughout the day.

Before 1940, daylight worked in combination with combustion lighting for all interior lighting needs. In the next 20-year span, electric light dominated the market and quickly became the design precedent. Electric light is less energy-efficient than daylight because electric light loses a large portion of energy in transmission where as daylight is direct-source energy. Further, daylight is generally cooler per lumen than electric light; thus, in a lumen per lumen comparison, electric light requires a larger cooling load offset. With the advent of sustainable building design, architects and engineers are challenged to integrate daylight for energy savings but should be aware of the superior quality of daylight and subsequent physiological and psychological effects.

There are many forms of integrating daylight into buildings. Typically they fall into four categories: skylights, clerestories, windows, and light tubes. Skylights, penetrations in the roof or ceiling to allow light infiltration, were used in Roman Architecture. Conventional skylights have numerous functional issues such as hot spots, glare, and uncontrolled heating. Modern technology has evolved to diffuse the incoming light through prismatic skylights. A clerestory is a raised section of interior above the adjacent rooftops to allow light to penetrate. It is historically part of the nave and transept of churches. Clerestories throw daylight back into spaces and can diffuse the light but do not provide views. Clerestories and skylights generally only work for one floor making them of limited value in multi-story buildings.

Almost every building has windows, the penetrations in a façade that allow daylight and views directly in and ornament the building exterior. Window technology has come a long way with various coatings, gas fillings, and layers to develop composite systems with better insulating properties. Light tubes are recent technology in which daylight is piped through a highly reflective tube and delivered where needed. Light tubes are typically used when mechanical

(See Narrow Buildings, page 11)

(Mixed Use, continued from page 9)

financed construction within a single unit." Combining complementary functions also minimizes the need for multiple Anti-Terrorism Force Protection buffers and extra utility lines. In addition, horizontal mixed-use areas contribute to a vibrant and safe retail core by bringing more "eyes on the street" from residences or offices on upper floors.

Mixed-use planning is also addressed in Unified Facilities Criteria 2-100-01 (Installation Master Planning). Mixed-use planning supports several other master planning strategies including: **sustainable planning** that calls for horizontal and mixed use development for the reasons described above; **natural, historic and cultural resource management** that calls for land preservation and mission compatibility; **healthy community planning** to create healthier environments for service members and their families; and **defensible planning** that calls for appropriate Anti-Terrorism Force Protection setbacks.

This pattern has been well-tested on military installations. In the 1950s, many of the old "rolling-pin" barracks had dining halls attached to barracks as well as company operations facilities. At Joint Base Lewis McChord, Washington, new housing is at the core of the installation creating a walkable, horizontal mixed use district. And some of the buildings use vertical mixed-use with ground floor commercial uses and housing above. Fort Belvoir, Virginia, provides another excellent model for mixed-use. The master plan emphasizes walkability and connectivity. Enhanced livability measures are well supported there, proving how both horizontal and vertical mixed-use development can make a military installation function better for those working or living there, even as the population increased drastically during the intervening years.

Master Planners' "planning tool-boxes" should include mixed-use solutions that will:

- Integrate compatible uses within districts such as recreation facilities and dining options in residential areas;
- Collocate places to live, work, shop, dine, worship, and play into vertical mixed-use buildings whenever possible;
- Locate public uses on active ground floors and follow a vertical public-private gradient; and
- Site mixed-use buildings around community centers and campus quads.

POC is Jerry Zekert, 202-761-7525, jerry.c.zekert@usace.army.mil

Zekert is chief, Master Planning Team, Headquarters, U.S. Army Corps of Engineers. Gillem, PhD, FAIA, AICP, is the Principal, The Urban Collaborative, LLC, and professor of Architecture and Landscape Architecture, the University of Oregon. Cross is a Leadership in Energy and Environmental Design Green Associate and assistant planner with The Urban Collaborative, LLC.