CLARKSBURG TOWN CENTER

Supplemental Parking Analysis

NNP II – Clarksburg, LLC
November 20, 2008

LINOWES AND BLOCHER LLP
ATTORNEYS AT LAW

November 20, 2008

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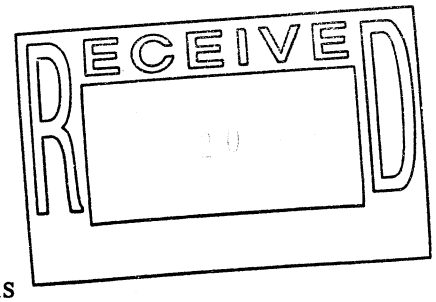
By Hand Delivery



Dr. Royce Hanson, Chair
and Members of the Montgomery County
Planning Board
8787 Georgia Avenue
Silver Spring, Maryland 20910

Re: Clarksburg Town Center – Supplemental Parking Analysis

Dear Dr. Hanson and Members of the Planning Board

On behalf of the Applicant, NNPII-Clarksburg, LLC, this letter transmits the additional parking analysis and related adjustments to the overall Retail Core site plan, including a comparison to the Program of Compliance and related adjustments to the overall retail core site plan requested by the Planning Board at the November 6, 2008 hearing on the Clarksburg Town Center. Please include this letter and its attachments in the public hearing record.

At the November 6, 2008 hearing, the Planning Board requested additional information on the proposed parking for the Town Center retail core specifically. The Board requested an analysis that included a discussion of what the appropriate parking ratio(s) should be for the retail core and why, and a description of where the parking would be located in relation to the uses within the retail core.

Enclosed with this letter are the following materials which demonstrate an adequate supply of conveniently located parking will be provided for the retail core utilizing a single parking structure in combination with off-street surface parking and on-street parking. The analysis demonstrates the parking can be provided without requiring customers to use a second parking structure:

1. Statement from John Torti of Torti Gallas and Partners, describing Mr. Torti's plan for the retail core, including several modifications made in response to Board comment and direction at the November 6, 2008 hearing and including proposed parking ratios and locations.

2. Modified retail core plan prepared by Torti Gallas and Partners in response to Board comments, including proposed parking ratios, supply and locations.

3. Analysis by Robert Gibbs of Gibbs Planning Group, Inc., of parking ratios for town center developments, including supporting letter exhibits from well-respected experts in the

field that provide a national perspective on the issue. Mr. Gibbs' analysis demonstrates that the parking ratios proposed by Mr. Torti in his plan are conservative considering what is being done nationally and what is recommended in academic circles on the subject of town center parking and its relationship to walkability.

4. Overall summary of retail core development program, including modifications to address Board comments at the November 6, 2008 hearing.

5. University of Connecticut Parking Studies referred to by Mr. Gibbs (*Parking at Mixed-Use Centers in Small Cities; Reassessing On-Street Parking;* and *The Effects of Traditional Versus Contemporary Urban Form on Parking: A Case Study of New England Centers*).

The Applicant looks forward to discussing the enclosed materials with the Board at the next hearing. In the interim, if additional information is needed, please let us know.

Very truly yours,

LINOWES AND BLOCHER LLP

Stephen Z. Kaufman

Todd D. Brown

TDB:cp

cc: Mr. Robert Ditthardt
Mr. Douglas Delano
Douglas Hageman, Esq.
Ms. Rose Krasnow
Mr. Robert Kronenberg
Ms. Lyn Fantel (CTCAC)
David Brown, Esq.

Design Narrative for Clarksburg Town Center

Since the December 6, 2008 Montgomery County Public Hearing the design effort has been focused on returning the plan to its original Compliance Plan form designed by Torti Gallas and Partners and Duany Plater-Zyberk, Company.

There are three (3) exceptions to the above and they are;

1. The library format has been adjusted per the County's wishes.
2. There is one multi-level parking garage not two.
3. The south block extends into the stream valley approximately 30' (but not into the stream valley buffer).

Virtually all of the Urban Design and Architectural Guidelines remain in tact and are the same as the Compliance Plan. The architectural program for retail, apartments above the retail, liner townhomes, townhomes, courtyard townhomes and flex space is not identical but very close to the Compliance Plan, in some cases exceeding the Compliance Plan.

All parking required for the Retail District which includes the three blocks south of Clarksburg Square Road and all of the live work townhomes is provided within the same retail district. In other words, the parking for the Retail Town Center and its housing does not extend into the other residential neighborhoods, to the West, North or East, of Clarksburg Town Center.

All parking for the Retail District (which is contained in the Retail District) are at the identical ratios used at the Charrette and used in the Compliance Plan. These ratios are 4.3 spaces per thousand square feet of Retail, 4 spaces per unit for the Live Work, 1.7 spaces per unit for the Apartment over the Retail and Liner Townhomes and 2 units per Townhome and Courtyard Townhomes which are all self-parked on each townhome lot.

We have adjusted all streetscapes to be identical to the Charrette and the Compliance Plan. The Architectural Guidelines have been subdivided into two (2) documents; 1. the Development Standards that the County will administer and 2. the Architectural Guidelines that the Town Architect will administer. As part of that arrangement the County will require the Town Architect Sign-off on all projects and their compliance to the Architectural Guidelines before the County issues any building permits.

In summary, we have adjusted and fine tuned this Urban Design Plan to be virtually identical in program and design to the original intent of the Charrette and to the Compliance Plan.

Compliance Plan			November 19th, 2008 Plan		
Uses	**Program**	**Parking Required**	**Program**	**Parking Required**	**Parking Provided**
RETAIL					**Curb Spaces: 160 Spaces**
Super Market			49,408 SF		**Parking Lots**
Pharmacy			11,125 SF		Block KK: 156 Spaces
In line Retail			67,467 SF		Block MM: 105 Spaces
Subtotal Retail	**128,000 SF** (With or Without Mezzanine)	4.3/ 1000sf = 550 Spaces	**128,000SF** (Without Mezzanine)	4.3/ 1000sf = 550 Spaces	Block GG: 33 Spaces
Flex	**7,680 SF**	No Parking Required	**9,150 SF**	No Parking Required	Block BB: 12 Spaces
Live/Work	**50 Units = 50,000 SF**	4/ Unit = 200 Spaces	**46 Units = 46,000 SF**	4/ Unit = 184 Spaces	Block CC: 28 Spaces
Total Retail	**185,680 SF**		**183,150 SF**		**Parking Lots: 334 Spaces**
RESIDENTIAL					**Parking Garage**
Apartments including Accessibles	**72 Units**	1.7/ Unit = 122 Spaces	**90 Units**	1.7/ Unit = 153 Spaces	Block LL Lower Level: 225 Spaces
Liner Town Homes	**19 Units**	1.7/ Unit = 32 Spaces	**16 Units**	1.7/ Unit = 27 Spaces	Block LL Upper Level: 195 Spaces
Town Homes	**19 Units**	2/ Unit = 38 Spaces, Self Park	**17 Units**	2/ Unit = 34 Spaces, Self Park	**Parking Garage: 420 Spaces**
Courtyard Town Homes	**12 Units**	2/ Unit = 24 Spaces, Self Park	**7 Units**	2/ Unit = 14 Spaces, Self Park	
Total Housing	**122 Units**		**130 Units**		
Total Parking Spaces		**904 Spaces Required**		**914 Spaces Required**	**914 Spaces Provided**

LINER RETAIL	48,994 SF.
PHARMACY	11,017 SF.
GROCERY	67,989 SF.
TOTAL RETAIL	128,000 SF.

COURTYARD TH	7 UNITS
LIVE/WORK	46 UNITS
LINER T.H.	16 UNITS
TOWN HOME	17 UNITS

BLOCK BB
12 PARKING SPACES
6 LIVE/WORK UNITS
BLOCK CC
15 PARKING SPACES
6 LIVE/WORK UNITS
15 PARKING SPACES
6 LIVE/WORK UNITS
BLOCK KK
9 LIVE/WORK UNITS
9 LINER TOWN HOMES
RETAIL CORE BOUNDARY
8,418 SF.
156 PARKING SPACES
ACCESSIBLE UNIT
10,180 SF.
4,690 SF.
6,583 SF.
14,046 SF.
ACCESSIBLE UNIT
STAIRS TO LOWER LEVEL
6,160 SF.
4,410 SF.
5,752 SF.
3,324 SF.
4,426 SF.
ACCESS-IBLE UNIT
PHARMACY 11,017 SF.
BLOCK MM
6 LIVE/WORK UNITS
105 PARKING SPACES
TOWN HOME 1
TOWN HOME 2
TOWN HOME 3
TOWN HOME 4
TOWN HOME 5
TOWN HOME 6
TOWN HOME 7
TOWN HOME 8
TOWN HOME 9
TOWN HOME 10
TOWN HOME 11
TOWN HOME 12
TOWN HOME 13
TOWN HOME 14
TOWN HOME 15
TOWN HOME 16
COURTYARD TH 1
COURTYARD TH 2
COURTYARD TH 3
COURTYARD TH 4
COURTYARD TH 5
COURTYARD TH 6
COURTYARD TH 7
GROCERY 48,994 SF.
195 SPACES IN GARAGE UPPER LEVEL
BLOCK LL
ACCESSIBLE UNIT
7 LINER TOWN HOMES
STAIRS TO LOWER LEVEL
BLOCK GG
6 LIVE/WORK UNITS
33 PARKING SPACES
N

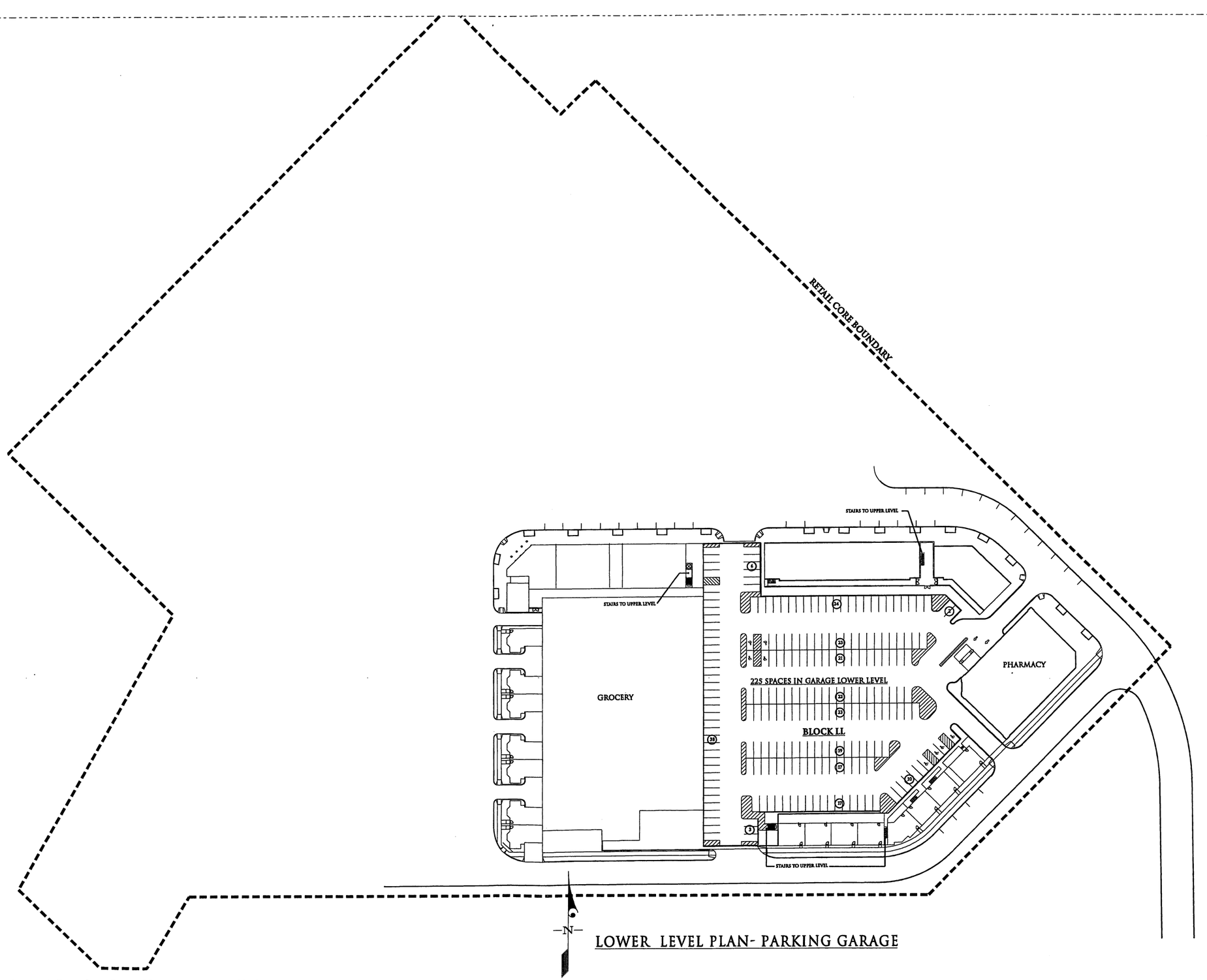
STREET LEVEL PLAN- PROGRAM TABULATION

 | 1300 Spring Street, 4th Floor, Silver Spring, Maryland 20910 301.588.4800

NOVERMBER 19

TORTI GALLAS AND PARTNERS, INC.

CLARKSBURG TOWN CENTER- WEST SIDE RETAIL CO



LOWER LEVEL PLAN- PARKING GARAGE

 | 1300 Spring Street, 4th Floor, Silver Spring, Maryland 20910 301.588.4800

TORTI GALLAS AND PARTNERS, INC.

CLARKSBURG TOWN CENTER- WEST SIDE RETAIL CORE

BLOCK MM	14 APARTMENTS & 1 ACCESSIBLE UNIT
BLOCK LL	38 APARTMENTS & 2 ACCESSIBLE UNITS
BLOCK KK	34 APARTMENTS & 1 ACCESSIBLE UNIT
TOTAL APARTMENTS 90 UNITS	(INCLUDING 4 ACCESSIBLE UNITS)

RETAIL CORE BOUNDARY

BLOCK KK

ACCESSIBLE UNIT BELOW

ACCESSIBLE UNIT BELOW

APARTMENT NUMBER (TYPICAL)

BLOCK MM

GROCERY

BLOCK LL

ACCESSIBLE UNIT BELOW

STAIRS TO LOWER LEVEL

N

APARTMENT LEVEL PLAN

 | 1300 Spring Street, 4th Floor, Silver Spring, Maryland 20910 301.588.4800

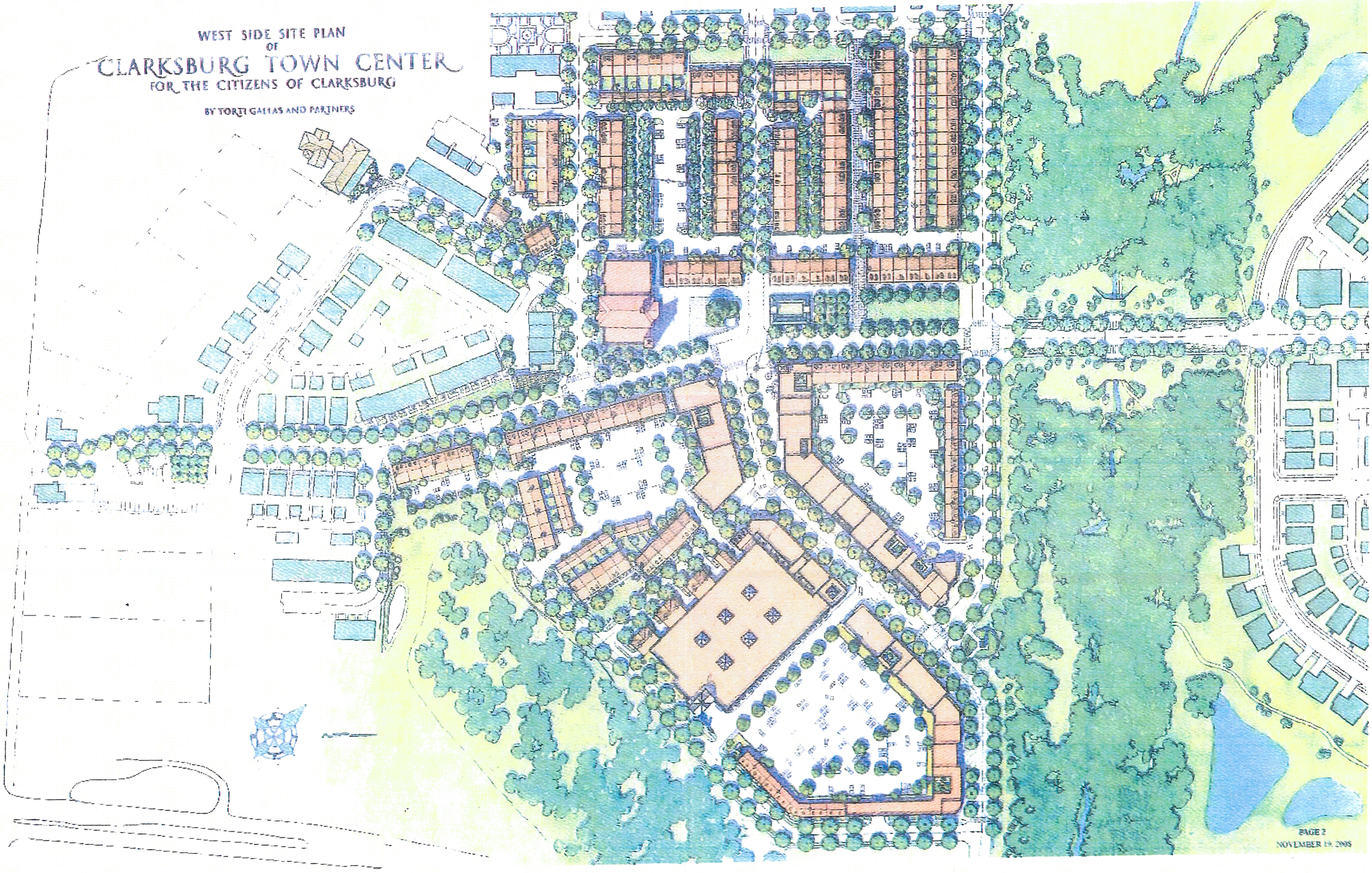
NOVERMBER 19TH, 2008

TORTI GALLAS AND PARTNERS, INC.

CLARKSBURG TOWN CENTER- WEST SIDE RETAIL CORE

WEST SIDE SITE PLAN
OF
CLARKSBURG TOWN CENTER
FOR THE CITIZENS OF CLARKSBURG

BY TORTI GALLAS AND PARTNERS



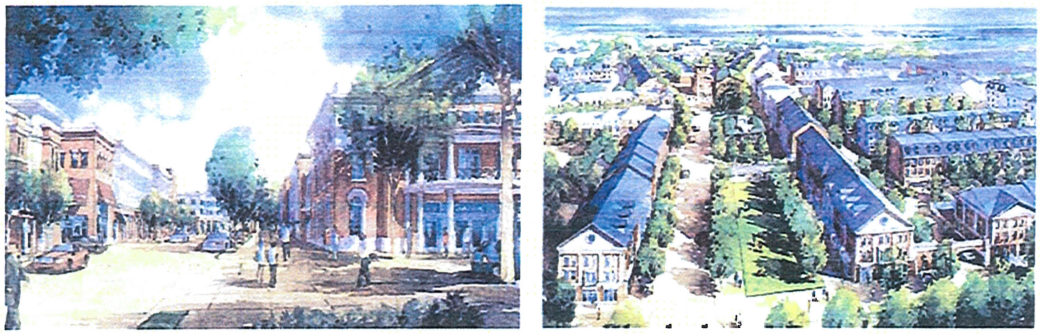
GIBBS
PLANNING
GROUP

18 November, 2008

Dr. Royce Hanson, Chairman
Montgomery County Planning Commission
8787 Georgia Avenue
Silver Spring, Maryland 20910

Dear Dr. Hanson:

This letter summarizes urban planning and shopping center industry research relating to the parking needs of mixed-use traditional town centers. In addition to the following widely accepted standards, I have included supporting letters from industry professionals and excerpts and research documents that advocate for new approaches which take advantage of parking synergies in mixed-use environments, similar to Clarksburg's proposed town center.



Clarksburg Town Center's General Store Street looking north & library plaza looking east. Torti Gallas & DPZ Architects.

Executive Summary

Research from leading professional organizations, institutes and shopping center developers has proven that well planned mixed-use town centers generate reduced parking demands, when compared to conventional suburban shopping centers. These studies have demonstrated that overall parking ratios of 3.0 to 4.0 cars per 1000 square feet of retail development are more than adequate for peak time parking demands. In addition, live/work town homes have demands ranging from 1.0 to 3.0 parking stalls per unit.

Conventional suburban shopping center parking ratio requirements have been generated by studies that examine single use activities and are not appropriate for Clarksburg. These studies estimate that peak usage is based on single purpose car trips and shopping visits. Communities often overlook the possibility that a parking surplus, like a parking shortage, may have undesirable consequences.

Conventional baseline parking requirements can be reduced on a site by site basis through the assessment of specific site characteristics including range of compatible and complimentary uses, estimation of peak parking by use over different time periods,

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employment of parking demand management techniques and a detailed review of demographic and location characteristics specific to the mixed-use development. Mixed-use walkable communities such as Clarksburg Town Center can reduce a comparable strip shopping center's parking need by up to 40%.

Introduction
Parking ratio requirements are intended to estimate the equilibrium of parking supply and parking demand for a project. The Ratio requirements are typically generated from generic standards published by organizations including the *Institute of Transportation*, *The Highway Research Board, National Parking Association, Urban Land Institute, and The American Planning Association.* These standards are derived from studies that measure peak parking demand for projects where parking is free, generated by a single use, generated by an auto with a single occupant, with 100% project occupancy, and inaccessible via alternative modes of transportation (walking, biking or carpooling).

RETAIL PARKING DEMANDS
The following studies demonstrate a need for variances from the conventional maximum peak parking ratio requirements on a case by case examination of project specific requirements for both traditional commercial development, and in specific for mixed-use development.

Please find below a summary of various professional organizations' and institute's research and recommendations regarding reduced parking ratios for mixed-use community centers, such as the Clarksburg Town Center.

American Planning Association
The APA published a proven methodology to determine reduced parking requirements in an article by Donald Shoup: *"AN OPPORTUNITY TO REDUCE MINIMUM PARKING REQUIREMENTS"* found in the *Journal of the American Planning Association,* Vol. 61, No. 1, Winter 1995, pp.14-28.

Shoup states that many municipalities "*work on the theory that parking requirements should serve the 20th busiest hour of the year. This leaves empty spaces over 99% of the time and half the spaces empty more than 40% of the time. If parking regulations do not accurately reflect local demand, these percentages of empty spaces can become even more drastic. Prior studies estimating maximum parking demand have often become the conventional established minimum parking requirement in municipal zoning codes, creating an inflexible approval process which disregards the location & demographics, parking management techniques, and mixed-use synergy factors specific to an individual project.*"

The Institute of Transportation Engineers: *4.0 / 1000 sf*
ITE's 2004 edition of *Parking Generation* estimates parking demand across a variety of land uses based on data acquired nationwide. According to this source, the expected average peak parking demand for general retail is 4.0 spaces per 1,000 square feet of floor area. While ITE states that this publication is *"not a manual, recommended practice, or standard"* and that *"the data alone will not provide accurate estimates,"* it constitutes the default minimum parking standards in many municipalities.

University of Connecticut- Marshall & Garrick*: 1.5 – 2.3 / 1000 sf*
Wesley E. Marshall, P.E. and Norman W. Garrick, Ph.D., both of the University of Connecticut, use the following example in their presentation entitled *PARKING AT*

MIXED-USE CENTERS IN SMALL CITIES given at the Annual Meeting of the Transportation Research Board in Washington, D.C. in January 2005, a *"study (that) looked at forty-two different sites with freestanding retail or office complexes. They found that most lots were significantly underutilized with an average of just over 47% of parking spaces occupied."*

The study compared actual parking utilization at mixed-use and traditional shopping centers in small cities and towns in New England. The towns' existing zoning codes required a base average of 5.37 spaces per 1,000 square feet of building space.

The University of Connecticut study showed that there was 24% less demand for parking in the mixed-use centers such as Clarksburg than in the conventional shopping centers. Average peak parking occupancy was 80% for mixed-use sites, which approximated to 1.8 peak parking spaces per 1,000 square feet of building space. For conventional locations, peak parking was at 50% occupancy, which approximated to 2.3 parking spaces per 1,000 square feet. The average non-peak occupancy was 67% for mixed study sites and 37% for control shopping center sites, which approximated to 1.5 and 1.7 non-peak parking per 1,000 square feet respectively.

Overall, existing parking standards that were studied required 168% more parking spaces than were needed on the busiest day of the year, and 234% more parking than on the average day. It concluded: *"Even accounting for the maximum allowable reductions, minimum parking requirements would have to be drastically reduced in order to reflect actual demand in every one of these activity centers."* The researchers also argued for shifting more parking to on-street spaces, which are preferred by customers. The study holds municipal regulations responsible for the overbuilding of parking facilities and recommends taking other factors into account beside square footage of building space.
(See attached study)

Urban Land Institute/International Council of Shopping Centers: *4.0 / 1000 sf*
Both the ULI and the ICSC recommend *4.0 parking spaces per 1,000 square feet* for shopping centers containing less than 400,000 square feet of gross leasable area. This figure is based on peak usage and allows for parking capacity not exceeding more than 85% to 90% of capacity. This ratio assumes that the shopping center only includes commercial uses, and does not account for internal trip capture common with walkable mixed-use town centers such as the Clarksburg plan. Internal trip capture would reduce the parking demand further. Source: *Dollars and Sense of Shopping Centers 2008.*
(See attached exhibit)

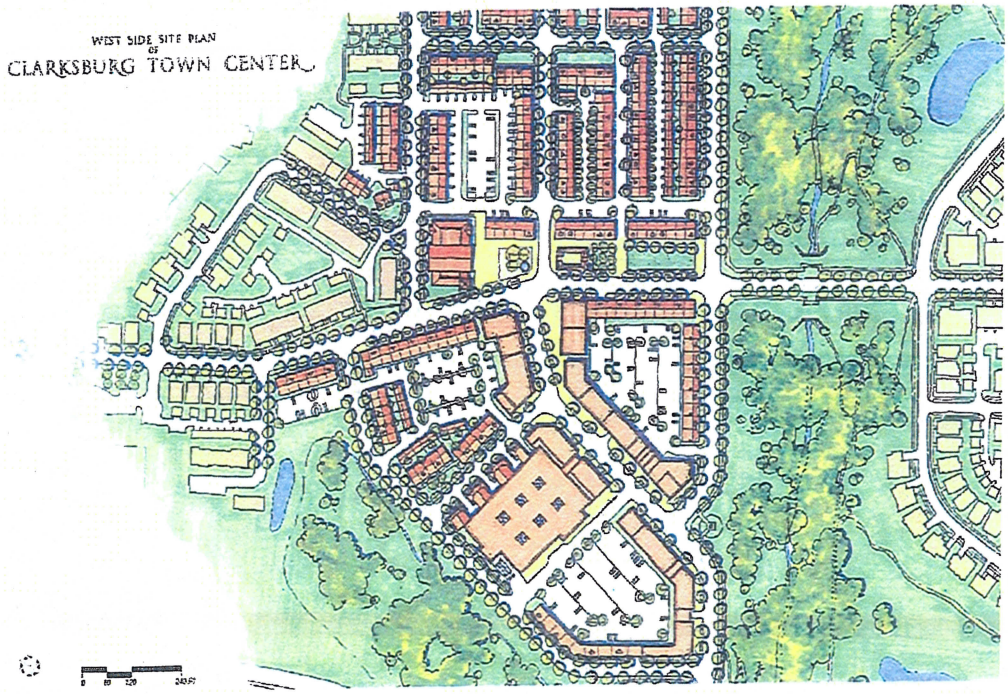
Maryland Governor's Office of Smart Growth
The report created by the Governor's Office of Smart Growth points out that "*Since most parking spaces are only used part time, this policy leads to the underutilization of many parking facilities, with a significant portion of spaces unused.*

On the other hand, by allowing for and encouraging shared parking, local jurisdictions can decrease the total number of spaces required relative to the total number of spaces needed for each land use separately. As a result, allowing for shared parking arrangements significantly reduces the amount of land devoted to parking and, in so doing, created more opportunities for creative site planning and landscaping."

The study states that standards such as these are *"typically drawn from generic parking generation rates, irrespective of site-specific and project-specific characteristics and*

other variables that would help to more accurately reflect market reality. The overstatement of parking ratios has in many cases led to an oversupply of parking" (from *Driving Urban Environments: Smart Growth Parking Best Practices*). It states further: *"Rather than imposing inflexible requirements, local zoning ordinances could incorporate mechanisms to tailor parking requirements to specific development projects."*

In a subsequent section entitled "Shared Parking", the Maryland report defines the opportunity for parking facilities to be *"utilized jointly among different buildings and facilities in an area to take advantage of different peak parking characteristics that vary by time of day, day of week, and/or season of year"* and describes the process for preventing oversupply of parking via a calculation of peak use during different times of day for each nearby use. It notes that *"the Montgomery County Zoning Ordinance allows for shared parking when any land or building is under the same ownership or under a joint use agreement and is used for 2 or more purposes."*



Proposed Clarksburg Town Center Master Plan: Torti Gallas & DPZ Architects.

SmartCode: *3.0 / 1000 sf*
The SmartCode is a nationally-recognized land development ordinance template currently in use in over 100 municipalities in the U.S. The SmartCode classifies its land use standards based upon the overall character and density of the development.

The code recommends *"judicious use of sources such as ITE"*, stating that much of the data *"is from isolated, single-use locations."* It warns that *"too often, these worst-case scenario numbers are erroneously applied as minimums in mixed-use, pedestrian-friendly contexts."*

Under the SmartCode, the Clarksburg Town Center would be defined as a "T5 Urban Center Zone." The SmartCode recommends as a general guide, a parking ratio of 3.0 spaces per 1,000 square feet of retail.

The SmartCode further recommends that nothing is more useful than *"collecting actual local parking data, or data from a comparable location". In walkable commercial areas in T5 and T4, for example, peak cumulative parking demand rarely exceeds 2.0 spaces per 1,000 square feet, even where parking is free and transit is limited, simply because many motorists park once and visit multiple destinations."*

LIVE/WORK PARKING DEMANDS

American Planning Association: *1 / Unit*
The APA's 2006 *Model Live/Work Ordinance* recommends the following: "*For live/work units of less than 2,500 square feet, one parking space is required for each unit. For live/work units greater than 2,500 square feet, required parking will be based on the applicable parking standard for the nonresidential use or the closest similar use as determined by the zoning administrator."* It inserts the following comment: *"The relatively non-stringent parking standards provided here reflect the fact that a person occupying a relatively small live/work unit may have less use for a car given that he or she works on the premises."*

SmartCode-PlaceMakers: *1 / Unit*
The SmartCode only requires 1 space for the combined commercial and residential area of livework town homes where the commercial is less than 1,500 sf, when located in a T-5 type development such as Clarksburg Town Center. The total required parking spaces for Clarksburg's live/work units under the SmartCode is 1 space per unit. (See attached letter from PlaceMakers,LLC)

Live/Work Institute: *1 - 2 / Unit*
The data collected from the non-profit Live/Work Institute (Oakland, CA) indicate that *"Most urban live/work projects built today are occupied by single people, couples, empty nesters, and occasional children. If at least one member of a couple truly works at home, we have observed that such a family unit will -- as likely as not -- get along well with only one car... It is clear that the parking needs and traffic... generated by live/work are different than those of normal housing."*

The Institute finds that *"Most cities have settled on one to 1-1/2 spaces per unit as a requirement, or to require parking in proportion to work area, e.g. one space for every 400-600 square feet of the aggregate work area of a project. This latter approach has in some cases resulted in many vacant spaces, especially if combined with a project in which employees and walk-in trade are not permitted."*
(See attached letter from the Live/Work Institute)

New Urbanism: *2 / Unit*
The Comprehensive Report & Best Practices Guide (3rd Edition), published by the New Urban News, recommends 2 off-street parking stalls per each live/work town home unit pg.10-26 LCA proposed Codes and Regulations. (See attached exhibit)

Sample Parking Ordinances: *1 – 2 / Unit*
As previously noted, some municipalities assign the same parking requirements for live/work units as the commercial or industrial use portion of the building would require, for a minimum of one per live/work unit (e.g., Larkspur, CA); others regulate the parking requirements based on the residential portion of the unit (e.g., Laguna Beach or Riverside, CA) reasoning that live/work units are primarily for individual entrepreneurs and visitors will be minimal. Most commonly, ordinances state the parking requirements

as a fixed number: one space per unit (e.g., St. Charles, IL), 1.5 spaces per 1 bathroom unit or 2 spaces per 2 bathroom unit (Albuquerque, NM), 1.66 spaces per unit (West Hyattsville, MD for units not near transit), or 2 spaces per unit (Everett, WA).

Parking Demand Management Techniques
The report created by the Maryland Governor's Office of Smart Growth, notes that some municipal governments provide substantial reductions of up to 40% of the minimum parking requirement by substituting Transportation Demand Management Programs, including *"for every 4 covered bicycle parking spaces provided, the total parking requirement may be reduced by 1 space up to a maximum of 5% of the total parking requirement."*

Nelson/Nygaard Consulting Associates
Nelson/Nygaard's research further quantifies the effects of parking demand management practices on lowering parking requirements in its August 2005 report titled *CREDITING LOW TRAFFIC DEVELOPMENTS*. The report supports the relationship between fewer trips generated by residential and non-residential uses resulting in smaller quantities of onsite parking for both types of uses. Their findings support the reductions from the baseline requirements found in the Institute of Transportation Engineer's handbook, *PARKING GENERATION*:

Pedestrian/bicycle friendliness generates up to 9% fewer trips for both residential and non-residential uses, and affordable/low cost housing reduces the trips generated by up to 4% less than the parking generation baseline.

SUMMARY TABLE

Retail/General Commercial

Source	*Recommended*	*Observed*
ITE	4.0/1000 sf	
ULI/ICSC	4.0/1000 sf	
SmartCode	3.0/1000 sf	2.0
UCONN		1.8 (mixed-use) 2.3 (traditional)

Live/Work Units

Source	Spaces per unit
APA	1.0 (if <2,500 square feet) or Based on commercial portion (if >2,500 sq. ft.)
SmartCode	1.0
Live/Work Institute	1.0-1.5 Based on commercial portion
Various Ordinances	1.0-2.5

Comparison of Town Centers and Super Regional Anchors
Clarksburg Town Center's *"main street"* will be made up of dozens of small to medium-sized specialty retailers and restaurants, anchored with a supermarket. These businesses will offer a variety of unique local, regional and national goods and services grouped in street front shops that must appeal to a broad range of market segments and demographic groups. Clarksburg's success will depend on its ability to attract the casual afternoon browser, the purpose driven purchaser and the extended multi-store destination shopper, as well as those living in the surrounding neighborhoods.

Clarksburg's business district must also compete with the region's larger, multiple, suburban new lifestyle centers. These small shops and cafes can best compete with major superstores and retail centers by offering quality goods and services that are combined with the needs of the modern shopper.

The many individually owned shops in Clarksburg's traditional town center are in sharp contrast to the large discount or regional superstore anchors such as Costco, Target and Wegman's. At 140,000 to 200,000 square feet each in size, these super regional anchors are often larger than many small towns. These major retailers pull from large trade areas and their shoppers plan on extended shopping times.

Wegman's superstores, for example, offer a combination of departments that could easily fill a small village of shops, including a bakery, a book store, a Costco, a card shop, a coffee shop, a gift shop, an organic grocery, a seafood market, a restaurant and a wine shop, all in addition to a full sized supermarket.

As a result of their massive size and inventory, the superstore or regional mall shopper is willing to park in large surface lots or parking decks. Imposing these large surface lots and parking decks on a traditional town center such as Clarksburg would diminish its competitive advantage over super sized anchors and reduce the town's viability. Comparing superstore and regional shopping destinations to traditional town centers such as Clarksburg is inappropriate and simply does not make sense.

Thank you for your consideration, and I am looking forward to discussing these proven traditional planning principles with you and the Montgomery County Planning Commission in the near future.

Sincerely,
GIBBS PLANNING GROUP, INC.

Robert J. Gibbs, ASLA
President
rgibbs@gibbsplanning.com

cc. Douglas Delano, Newland Communities

Attachments:

Avenue A Letter
Hall Planning & Engineering Letter
ICSC / ULI Dollars & Cents of Shopping Centers Code
Live/Work Institute Letter
Middleton Hills Letter
New Urbanism Best Practices Guild Live/Work Code
PlaceMakers Letter
Shook Kelley Letter
TND Engineering Letter
Street-Works Letter
University of Connecticut Studies (3)

Street-Works Associates LLC
Development and Consulting Group

Retail Development

Leasing Strategies

Mixed-use Planning

Entitlements

Architecture

30 Glenn Street
White Plains, New York
10603

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November 18, 2008

Dr. Royce Hanson
Chairman Montgomery County Planning Commission
8787 Georgia Avenue
Silver Spring, Md. 20910

Re: Parking Ratios

Dear Dr. Hanson,

I have been asked by Mr. Robert Gibbs to share with you our experience with appropriate parking ratios in mixed-use town center environments. As you may not know, Street-Works is both a design and development consulting company who advises cities and developers in addition to developing, for their own account, significant mixed-use projects. Not only have we consulted on more than fifty urban mixed-use districts but we have developed, or are in the process of developing, more than two billion dollars of new urban mixed-use environments. Some of the built environments we have helped create include:

- Mizner Park: Boca Raton, Florida
- Bethesda Row: Bethesda, Maryland
- Village at Shirlington: Arlington, Virginia
- Rockville Town Center: Rockville, Maryland
- Reston Town Center: Reston, Virginia
- Santana Row: San Jose, California
- Crocker Park: Cleveland, Ohio
- University Village: Seattle, Washington
- New Roc City: New Rochelle, New York
- Blue Back Square: West Hartford, Connecticut

Not only are we familiar with the specific parking issues related to mixed-use environments, we have anchored over 20 urban grocery stores in mixed-use environments as owners and/or consultants to Stop-N-Shop, Whole Foods, Giant Food Stores and Publix. We are currently the developers with Giant on a site on Wisconsin Avenue which is similar in size and uses to your proposed project at Clarksburg.

As a result of this BUILT experience, throughout the country and in the Washington, DC metro area, I can unequivocally say that most jurisdictions and retail tenants as well, consistently demand parking ratios that are well beyond what is required to

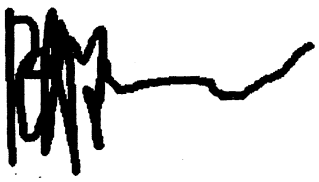
service the needs of the community and/or the retailer. For example, we own a center in Stamford, Ct. with one of the top grossing markets in Stop-N-Shop's chain. It has a parking ratio for its retail at only 2.5 spaces/1,000 sf and while tight at times continues to be one of their top grossing stores. We find that a base number of 4 spaces/1,000 sf for retail is the base number we use BEFORE we take shared reductions for a mix of uses, internal trip synergy and other typical reductions which can lead to a 15% to 25% reduction. I feel VERY comfortable recommending to you a ratio of 3.5 spaces/1,000 sf for retail in the configuration and size that you are showing in your plans. As for live-work units, we feel very comfortable with a standard of 3 spaces/unit. This ratio allows 1 space to be dedicated to the upper 'living' floors with a second space shared at night.

Obviously, in the development of mixed-use centers, the phrase "Parking is Destiny" holds true in many, many ways. From the project economics to environmental impacts to the design and social character of the final place, basic decisions on the parking have more impact than any other decision. Street-Works recommends that you seriously consider reducing the parking ratios in this project to those suggested above.

It has also been brought to my attention that there is a standard that requires 'liner' retail to be 60' or more. It has generally been our experience that the merchandising program for street retail doesn't support that assertion. In fact the smaller, unique national and mom + pop retailers can use a smaller depth depending on the overall size of tenants being marketed to. It is in fact hard to provide for retailers less than 1,000 sf in space more than 40' deep.

I am a huge advocate of the most progressing planning commission and process in the United States, that of Montgomery County and sing your praises nationally on a regular basis. I hope that you find these thoughts helpful in your deliberations and would be happy to speak with you about it further if you so desire.

Sincerely,
STREET-WORKS



Richard Heapes
Co-founding Partner

cc. Douglas C. Delano, Newland Communities

AVENUE A
REALTY ADVISORS LLC

November 17, 2008

Dr. Royce Hanson
Chairman
Montgomery County Planning Commission
8787 Georgia Avenue
Silver Spring, Maryland 20910

Dear Dr. Hanson,

By request of Robert Gibbs of Gibbs Planning Group, a consultant to Newland Communities on Clarksburg Town Center ("CTC"), I am pleased to provide an opinion on automobile parking requirements in the commercial portion of mixed-use environments analogous to CTC.

This opinion is based on my extensive experience in commercial development. Prior to forming my own advisory and investment company in 2004, Avenue A Realty Advisors, LLC, I was, for nearly 20 years, a principal officer of Federal Realty Investment Trust ("FRT"), a NYSE company involved in the development, re-development and ownership of retail and mixed-use projects from coast-to-coast. Until the mid-1990s, FRT owned and operated properties comprising nearly 20 million square feet, mostly "strip" shopping centers, often grocery-store anchored. Among others, FRT owned and operated Congressional Plaza, Federal Plaza and Mid-Pike Plaza on Rockville Pike in Montgomery County. During the years prior to my retiring from FRT, I held the position of Senior Vice-President, Real Estate, responsible for the income side of the total real estate portfolio.

Beginning in 1994, I also held the position of Managing Director of Street Retail, Inc ("SRI), a wholly-owned subsidiary of FRT. SRI was created to identify, acquire and develop retail and mixed-use "main street" properties and town centers. Through SRI, FRT was among the first major commercial real estate development organizations to recognize and participate in the movement towards smart and sustainable growth, by utilizing existing public infrastructure to efficiently mix building uses and add density. Such projects of significance during my tenure include Bethesda Row, Bethesda, MD; Pentagon Row, Arlington, VA; the Village at Shirlington, Arlington, VA; and Santana Row, San Jose, CA. Since leaving FRT, I have been engaged as a consultant and advisor on mixed-use projects, as well as developing properties on my own.

At the risk of pedantry, a glimpse of historical background may be helpful to explain how we have come to be where we are today in parking commercial developments and my opinion on realistic parking requirements. Today's mixing of commercial and residential uses is largely a throw-back to ancient times and its densely populated cities, where the commercial center was convenient to a citizenry that traveled on foot. With the automobile came the need to provide services, principally centered on groceries and other necessities, outside of the city limits. To meet this need the neighborhood shopping center, served by dedicated parking spaces, was invented. As is well-documented, notably by Richard Longstreth in "The Neighborhood Shopping Center in Washington, D.C., 1930-1941, Journal of the Society of Architectural Historians, Vol. LI , No 1, March 1992), parking requirements became a principal driver of design for these centers.

Fast forward: Department stores, long a fixture in downtowns, suffered falling sales due to the outflow of population to the suburbs and the lack of sufficient automobile infrastructure downtown, specifically, inconvenient road networks and inadequate parking. The department store owners saw the opportunity to locate large, modern stores surrounded by new highways and seas of convenient parking close to these growing communities, and at sites where people could easily travel from long distances. Department stores required developers to build parking that surpassed any reasonably imagined need, sometimes 6 and 7 spaces per 1000 square feet of buildings. Developers put up little resistance because department store leases were bankable, and/or supported other leasing, and land was plentiful and cheap. Government delivered seemingly unlimited new public infrastructure to accommodate the developments, and let the developers build parking with minimum restriction. As "big box" mass merchants became the new version of the department store, they required similar concessions from developers regarding parking. With few exceptions, parking was overbuilt, land and resources wasted. In later years, these stores used their "minimum parking requirement" contained in leases as leverage to extract financial concessions from developers who wanted to expand their projects without providing additional parking. Thus, the extra parking became a monetary asset for the tenant and a burden to the developer and the community.

While there certainly is a public interest by the community in assuring sufficient parking, the "minimum" requirements that became codified were influenced more by the demands of mass merchants than by adequate information based on site-specific needs. In fact, "sufficient" parking is entirely dependant on consumer demand, and driven by many variables including, among others, the types and sizes of uses, peak use hours, population density, the road system, and the local competitive environment. For example, four shopping centers within five miles of each other, each containing a grocer, would unlikely have the same minimum parking need as would only one grocer in the same area, all other factors being equal. Yet, municipal codes typically have the same requirement for each of the four shopping centers. Another example is a live/work unit occupied by a professional where a client visits occasionally, as opposed to stock brokerage offices: Most codes require the same amount of parking. Ultimately, the burden of providing sufficient parking is on the developer, who needs to attract customers for its space since, without adequate parking, tenants and residents are unlikely to lease and purchase the space.

The burden of this "one size fits all" approach falls upon the community as it requires substantial additional investment by developers for unused parking which is passed through to tenants and buyers, and then on to consumers through higher prices. Overbuilding parking wastes land and other resources, and creates unneeded impermeable surfaces with consequential water run-off. Further, unused parking gives the negative impression of stores that are not busy and, if nothing else, empty parking lots are aesthetically unpleasant.

My real world experience is that retail shopping centers rarely need parking spaces in excess of 3 spaces per 1000 square feet of net building area. With the exception of Friday night and Saturday, during most days a ratio of 2 to 2.5 per 1000 square feet is realistic. Of course, there are exceptions: Weekends are busier than weekdays. The weekends before Thanksgiving and Christmas may approach full capacity. Movie theaters (and other assembly uses) and sit-down restaurants fill more spaces for longer times than other retail, and can conflict with peak retail hours. For theaters, 2.5 to 3 spaces per 4 seats is adequate. Restaurants are more difficult and parking requirements depend upon the concept; however, a ratio of 6 to 8 spaces per 1000 square feet of restaurant public areas is generally adequate. Modern grocers require more spaces during more hours than other retail, certainly no less than 3 per 1000 square feet. During those few times of near full capacity, the project can provide alternatives, such as using valets.

Retail mixes well with other uses since parking often is shared without conflict. During the week, most retail shopping takes place after normal business hours, when office tenants have gone. We find that, at most, additional parking of 1.5-2 spaces per 1000 square feet of office space is adequate. Residents typically are not home during the day, and do not receive guests until the evening, thus creating no conflict and requiring no additional spaces. The number of spaces per resident is highly dependent by the size of the units, the price level of the units, and the availability of alternative transportation. In a typical suburban mixed-use environment, 1- 1.5 dedicated parking spaces per bedroom is sufficient.

Although retail developers have long-known that minimum parking codes provide parking requirements that far exceeds demand, and that parking shared among different uses sharply decreases total parking needs, only recently are longer-term and deeper studies providing empirical data confirming this knowledge. In "Shared Parking," a book published by the Urban Land Institute, the authors found that parking shared by a mix of uses can cut by half the amount of parking required by code were each use parked separately. As reported in New Urban News, Volume 13, Number 6, September 2008, in a 2005 study by two professors at the University of Connecticut of six commercial centers in New England, three traditional mixed-use downtown sites and three conventional suburban sites,

> "[t]here was 24 percent less demand for parking in the mixed-use centers than in the conventional sites. Their study...is roughly consistent with a large recent study of mixed-use development, led by Reid Ewing [at the National Center for Smart Growth Research and Education at the University of Maryland].
>
> During the season of peak demand--generally the holiday shopping period-- cars filled 2.3 parking spaces per 1000 sq. ft. of building space in conventional suburban

developments.... In the mixed-use centers, cars filled 1.8 parking spaces per 1000 sq. ft."

These conclusions also support the concept that in well-merchandised mixed-use settings, customers park once and take advantage of being on foot to visit multiple locations within the site. This means fewer trips, less automobile use, and less need for parking. In my opinion, Clarksburg Town Center, a seemingly well-planned mixed-use community of 170,000 square feet of gross commercial space, assuming a 48,000 square foot grocer and 30,000 gross square feet of sit-down restaurants, would have sufficient commercial parking at an overall ratio of 3.3 spaces per 1000 gross square feet of retail building area, assuming a mix of uses otherwise typical of such developments.

Thank you for this opportunity to provide my input. Perhaps the most important take-away that I can leave is that decisions on minimum parking requirements should be *ad hoc*, deliberate and site-specific based on a wide variety of material considerations.

If you have any questions, please do not hesitate to contact me.

Very Truly Yours,

Nate Fishkin
Principal

Avenue A Realty Advisors, LLC
4663 Kenmore Drive
Washington, DC 20007
301.580.2417
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cc: Douglas C. Delano, Newland Communities

HPE
Hall Planning & Engineering, Inc.

November 18, 2008

Dr. Royce Hanson, Chairman
Montgomery County Planning Commission
8787 Georgia Avenue
Silver Springs, Maryland 20910

RE: Parking Requirements for Clarksburg Town Center

Dear Dr. Hanson:

Mr. Robert Gibbs, (Gibbs Planning Group) asked HPE to review and comment on Montgomery County zoning code requirements for off-street parking; specifically for "live-work" units and "retail" land uses. This relates to the application of these requirements to plans for Clarksburg Town Center.

It is HPE's understanding current Montgomery County zoning code requirements call for the following:

- Live-work units – 7 parking spaces/1,000 sf
- Retail – 5 parking spaces/1,000 sf

In HPE's experience, these requirements would be accurate for suburban sprawl conditions. However, fewer parking spaces should be required for a mixed-use traditional neighborhood development project.

Live-Work Units

Key to live-work function is placement of living quarters above work space. Frequently, the retail or professional proprietor lives in the unit, thus reducing parking demand for the unit.

As far as HPE can determine, the Montgomery County Zoning Code does not define or provide off-street parking standards specifically for "live-work" units, but such standards are applied in other areas. Live-work land use has become common enough that the American Planning Association issued a Planning Advisory Service report titled "Section 4.2 Model Live/Work Ordinance."

For live-work off-street parking, HPE recommends the approach utilized in APA's model ordinance:

- "For live/work units of less than 2,500 square feet, one parking space is required for each unit."

- "For live/work units greater than 2,500 square feet, required parking will be based on the applicable parking standard for the nonresidential use or the closest similar use as determined by the zoning administrator."

HPE
Hall Planning & Engineering, Inc.

316 Williams St., Tallahassee, FL 32303 • (850) 222-2277 • www.hpe-inc.com

This is similar to the San Jose, California live-work parking requirement:

- "no additional parking required above what is required for commercial use parking."

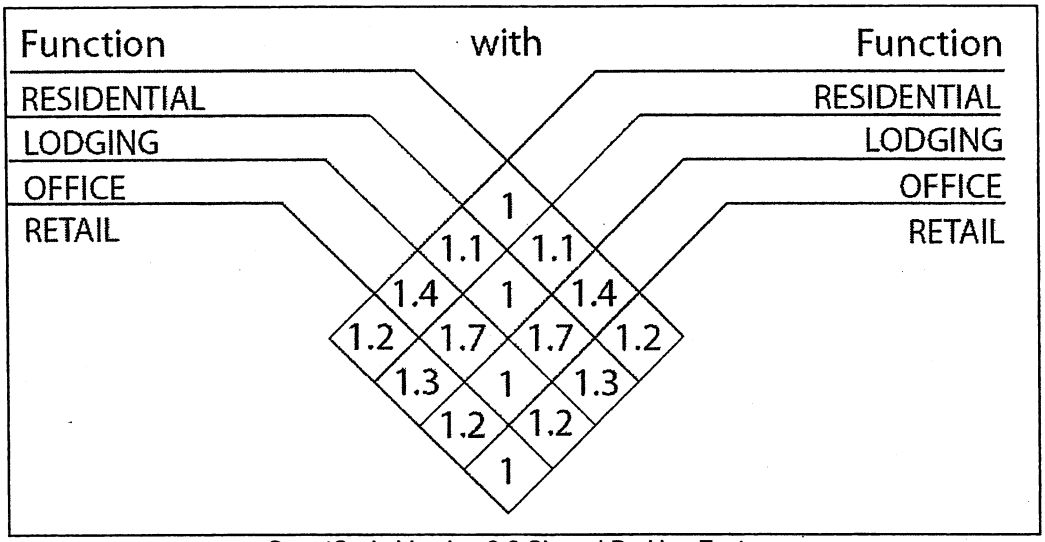
Retail

For mixed use – traditional neighborhood development retail parking, HPE recommends the approach utilized in SmartCode Version 9.2 ©DPZ & Co. which specifies **4 spaces/1,000 square feet** in **T4 "general urban"** areas, and **3 spaces/1,000 square feet** in **T5 "urban center"** and **T6 "urban core" areas**.

Off-street Parking Reductions for Mixed Use Development

Off-street parking reductions should also be made for mixed-use developments such as Clarksburg Town Center. Montgomery County Zoning Code Section 59-E-3.1 "mixed uses" provides for such reductions, and at a minimum, they should be applied to Clarksburg Town Center.

A better approach could be utilizing shared parking factors from the SmartCode Version 9.2.



SmartCode Version 9.2 Shared Parking Factors

According to the SmartCode, "the shared parking factor for two functions, when divided into the sum of the two amounts (in the diagram) produces the effective parking needed for each site involved in sharing. Conversely, if the sharing factor is used as a multiplier, it indicates the amount of building allowed on each site given the parking available."

I hope this information is helpful. Please do not hesitate to contact me or Ted Mack in my office, if you have questions.

Sincerely,

Richard A. Hall, P.E.
President

RAH/tm/lm

MIDDLETON HILLS

November 17, 2008

Dr. Royce Hanson
Chairman, Montgomery County Planning Commission
8787 Georgia Avenue
Silver Spring, Maryland 20910

Dear Dr. Hanson:

I am writing to provide you a built case study for parking recommendations based on a Duany Plater-Zyberk planned mixed-use development. Middleton Hills, located in the City of Middleton near Madison, WI, is a suburban infill pedestrian oriented neighborhood that began construction in 1995 and is 90% complete. The 150-acre project includes 350 single-family homes, 99 multi-family units, 98 units of Independent Senior Housing and approximately 112,000 square feet of commercial use in the neighborhood center. The commercial area includes a 44,000 square foot Copp's Grocery Store, a Starbucks coffee shop, a bank, 2 small restaurants, all of the mailboxes for the neighborhood, a medical clinic and various retail and professional offices.

The size of the commercial spaces range from 40 – 54 feet in depth, with a national leading retailer like Starbucks in a space 40 feet deep by 36 feet wide. The market demand has been for a space within the 1000 – 1500 square foot range. With an average demand for a 1200 square foot space, the ideal size is approximately 45 feet in depth to allow for a comfortable width.

The commercial center was planned by Duany Plater-Zyberk and approved by the city with a parking ratio of 2.5 spaces per 1000 square feet. The City of Middleton's current zoning requirement is 3.3 spaces per 1000 square feet for commercial uses such as retail, banks, offices and medical clinics. More is required for restaurants and civic uses. The current build-out in Middleton Hills provides 3.6 spaces per 1000 square feet. The parking ratio for the live/work units planned by DPZ and approved by the city is 1 space per 1 bedroom, 2 spaces per 2 bedroom and 1.5 spaces per commercial unit, for a total of 3.5 spaces per live/work unit. All of the parking is either on street or surface parking, there are no parking structures.

6727 Frank Lloyd Wright Avenue ■ Middleton WI 53562 ■ Phone: (608) 836-4923 ■ Fax (608) 836-9050

Overall the parking supply has been sufficient to meet the daily demands of the commercial center. The shared parking lots have helped to balance demands and allow a 'park once and walk to a variety of services'. My opinion is that a similar mixed-use development would work best with an overall parking ratio of 4 spaces per 1000 square feet. This would take into account the increase parking demand for a larger restaurant and civic use, which we are shortly anticipating.

My recommendations are based on 13 years of experience as the Design Director and currently Project Director for Middleton Hills and 10 years of observation having my office located next to the grocery store on the Main Street. I have included a site plan of the commercial area for your reference and photos.

Sincerely,

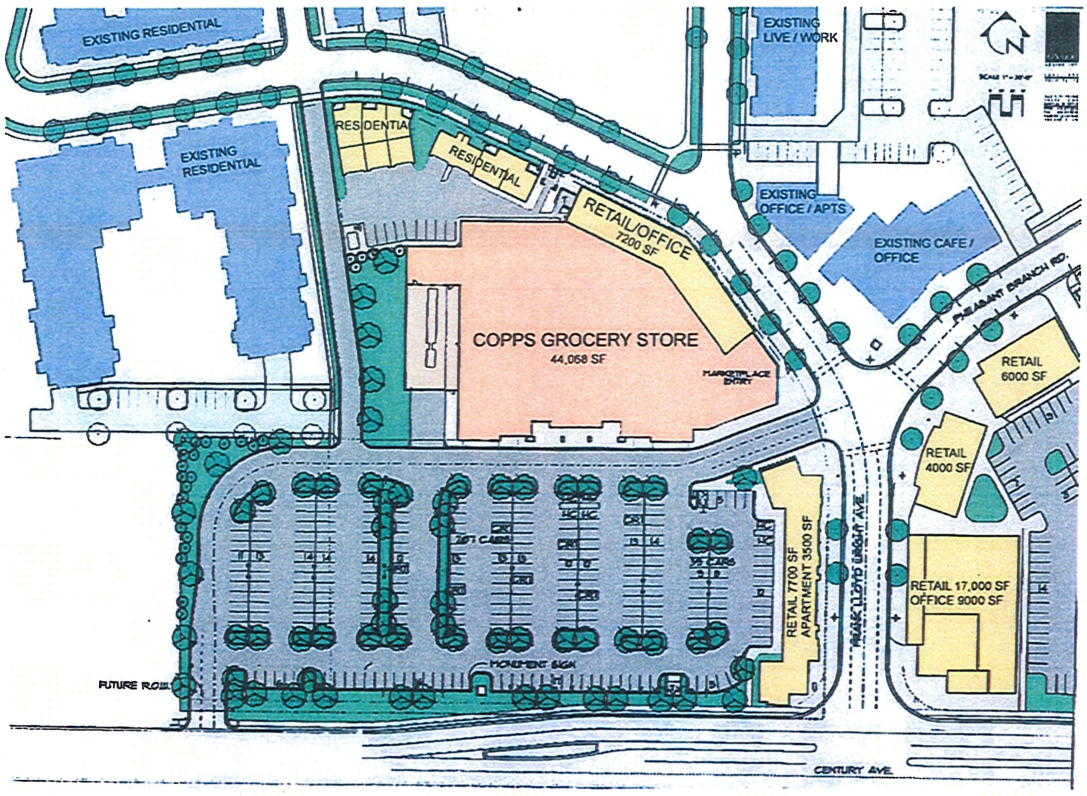
Jane Grabowski - Miller

Jane Grabowski-Miller
Project and Design Director, Middleton Hills

Attachments: Site plan of commercial area and photos

Cc: Douglas C. Delano, Newland Communities

Middleton Hills, Madison, Wisconsin DPZ Architects
Parking: 3.6/1000 sf Retail & 3/Livework Town Home



TND

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Dr. Royce Hanson, Chairman
Montgomery County Planning Commission,
8787 Georgia Avenue Silver Spring, Maryland 20910
c/o Mr. Robert Gibbs
Advance Copy Via Email: rgibbs@gibbsplanning.com

November 18, 2008

Re: Clarksburg Town Center parking

Dear Mr. Hanson:

At your request, TND Engineering has looked at the parking plans for the Clarksburg Town Center.

A parking analysis is outlined on page 2 of a digital plan set with a first page entitled "Clarksburg Town Center Index Plans" prepared by Gutschick Little & Weber, PA dated April, 2007 and revised through 05.19.08. This analysis is shown here:

Parking Analysis

	Zoning Code	Previously Approved Plan	Required
West Side			
Single-Family Detached:	2 Spaces / D.U.	2 Spaces / D.U.	38 Spaces (19 D.U. X 2 Sp / D.U.)
Single-Family Attached:	2 Spaces / D.U.	2 Spaces / D.U.	428 Spaces (214 D.U. X 2 Sp / D.U.) (259 D.U. - 41 Mixed-Use Core = 214 D.U.)
Multi-Family	1.5 Spaces / D.U.	1.5 Spaces / D.U.	18 Spaces (12 D.U. X 1.5 Sp / D.U.) (110 D.U. - 98 Mixed-Use Core = 12 D.U.)
Mixed-Use Core[8] Retail:	5 spaces / 1,000 GLA[8] (5 Sp./1000 X 100%)	4.5 spaces / 1,000 GLA[8] (5 Sp./1000 X 90%)	914 Spaces* (184,720 S.F. X 5 Sp./1000 S.F. X 100%)
Live-Work:	N/A	N/A	204 Spaces*+ (51 D.U. X 4 Sp./D.U. X 100%)
Multi-Family	1.5 Spaces / D.U.[9] (1.5 Sp./D.U. X 100%)	1.5 Spaces / D.U.[9] (1.5 Sp./D.U. X 100%)	147 Spaces* (98 D.U. X 1.5 Sp./D.U. X 100%)
Single-Family Attached:	2 Spaces / D.U.	2 Spaces / D.U.	82 Spaces (41 D.U. X 2 Sp./D.U.)
			TOTAL 1,891 Spaces

Page 12 of this same digital plan set shows a total of 1,948 parking spaces on the "West Side" including 383 on-street spaces. In my experience, on-street spaces should definitely be counted as a part of the available supply in a location such as this.

Many land uses utilize parking at different times of day or on different days of the week, such as Churches and offices. Because of this, it is possible to furnish less overall parking for proximate land uses than might otherwise be required for the same group of land uses located farther apart.

The Urban Land Institute publishes a "Shared Parking" book and Excel analytical tool, both of which are considered authoritative on this topic. TND Engineering tested the Clarksburg "West Side" using the ULI calculation methodology under two scenarios.

First, it was assumed: that there would be a total of 194,720 sq. ft. of "Community Shopping Center"; that all of the 435 dwelling units would be owned (no rentals, which use less parking); and, that each of the dwellings would have 1 "reserved" space, meaning that those spaces would not be available for sharing.

Using these assumptions, the ULI methodology shows a peak parking utilization occurring on a December weekend at 2 PM, when there would be 636 occupied customer spaces, 370 employee occupied spaces and the 435 reserved residential spaces for a total of 1,441 occupied spaces. This would leave 507 unoccupied spaces of the 1,948 supply shown on page 12.

A second set of calculations was performed with the additional very conservative assumption regarding the live/work units where each of the 51 live/work units would have 1,200 sq. ft. of retail, for a total of 255,920 sq. ft. of "Community Shopping Center", together with the same additional assumptions above.

Under this second scenario, the ULI methodology shows a peak parking utilization again occurring on a December weekend at 2 PM, when there would be 832 occupied customer spaces, 419 employee occupied spaces and the 435 reserved residential spaces for a total of 1,686 occupied spaces. This would leave 262 unoccupied spaces of the 1,948 supply shown on page 12.

In my experience working throughout the US, live/work units typically do not generate much traffic or parking demand beyond their residential component.

Dowling Associates, a California engineering firm, gathered actual trip generation data from four live/work projects in 2003. These projects ranged in size from 46 to 237 live/work units in size. TND engineering's analysis of this data has shown that live work units generate trips (vehicular traffic) almost identically with the Institute of Transportation Engineers (ITE) Land Use Code 221 data.

ITE Land Use Code 221 is described by the ITE as "Low-Rise Apartments", such as garden apartments and are one or two levels.

As noted previously, live/work units do not typically require any parking beyond what is needed for the residential component thereof, and based on the Dowling data they generate traffic at approximately the same level as low-rise apartments, and 2 – 3 parking spaces per unit are usually adequate.

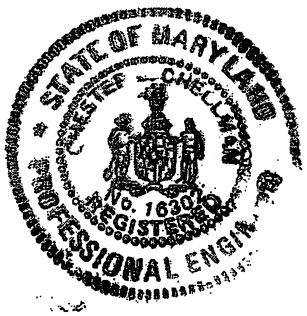
I have analyzed a number of mixed-use walkable town centers and town center projects over the past 25 years or so. A fully mature walkable town center area typically has an overall parking ratio much lower than is found in a suburban strip center area, and this is one reason folks walk more in these locations.

The walkable centers typically have ratios of 2.5 spaces per thousand square feet of commercial, or about half of what is found in many suburban locations. Given the nature of the Clarksburg Town Center project, I would expect its commercial parking needs to be between 2.5/1000 and 4.0/1000; the ULI analysis supports this as well.

In my opinion as a professional engineer licensed in the State of Maryland, a ratio of 4.0/1000 is adequate for the peak parking demands of the commercial components of Clarksburg Town Center, and the proposed parking supply shown on the plan set referenced above is more than adequate.

At Your Service,
TND Engineering

Chester "Rick" Chellman, P.E.
Principal



Dr. Royce Hanson
Chairman Montgomery County Planning Commission
8787 Georgia Avenue
Silver Spring, MD 20901

Dear Dr. Hanson,

Recent Smart Growth polices have addressed the issues of the destruction of urbanity with excessive surface parking in the last few years. An equally important issue is the expense parking contributes to housing, especially in these times when affordability is critical. Euclidian zoning ordinances specify parking minimums that ensure adequate parking on the few peak days of the year, resulting in cities having more parking spaces than they would if the matter was left up to free market. Fortunately, some reform is being pursued worldwide, for example Great Britain enacted the Planning Policy Guidance 13: Transport, in March of 2001. It states "Local authorities should....not require developers to provide more spaces than they themselves wish...." Since it's understood development is based upon financial viability, many cities remove parking requirements for their downtowns entirely.

PlaceMakers, LLC provides the SmartCode Workshop with Andrés Duany twice a year to educate public and private planners to calibrate this model form-based code for municipalities. Additionally, we provide the calibrations ourselves. Our familiarity with the code is intimate and a number of our principals have been contributors to the SmartCode & Manual. The SmartCode has been adopted in over twenty municipalities regionally ranging from Petaluma, California to Sarasota, Florida, and in size from El Paso, Texas to Pike Road, Alabama. It is in the adoption process for another seventy cities and counties nationwide.

The requirements for parking in the SmartCode are based upon use but allow for parking reductions relative to the site's degree of urbanity. The lowest requirements are in town center areas because of the opportunities to park once for multiple destinations as well as the ability to live, work and shop in the same area with possible transit connectivity. The mixed-use area of Clarksburg Town Center would be zoned T5 – urban center using SmartCode criteria. In this situation the code calls for 1 space per unit of residential, 2 spaces per 1,000 square feet of office, and 3 spaces per 1,000 square feet of retail. Additionally commercial spaces under 1,500 square feet are exempt from parking requirements. Finally, for town center locations, parking may be counted as the sum of the spaces provided on-site, along the parking lane corresponding to the lot frontage, and by purchase or lease within ¼ mile of the site. There is also a parking reduction factor for mixed use that comes into play both for mixed use within a building and even within a block. This provides for a specific reduction for live/work units.

So in the case of the Clarksburg Town Center live/work units, they would be calculated by providing 1 space per unit for the residential. Since they will have a commercial area of 1,000 square feet per unit, they qualify for the parking exemption for the commercial and the total requirement for each live/work would be 1 space per unit.

There are a number of other Smart Growth ordinances that give similar results. For example the American Planning Association has a model live/work ordinance that has the following requirements: For a live/work unit of less than 2,500 square feet, one parking space is required for each unit. If the unit is larger than 2,500 square feet, parking is based upon the parking standard for the non-residential use only; the residential use is eliminated from the requirements. A number of implemented ordinances are even more lenient. For example Lawrence, MA only requires one on-site space per live/work, with no additional for retail and office, and Riverside, CA requires the standard City parking for the residential and none for the retail. It is assumed the retail parking will be accommodated by public on-street spaces.

Many municipalities across the country are becoming enlightened about the urban blight caused by surface parking lots. Additionally, because of the desire to reduce VMT and carbon emissions, they are beginning to encourage urban rather than suburban development. It's a grave mistake to over park these new developments and thus reduce the site's permeability, encourage auto-dependence, and unnecessarily raise housing prices.

Best regards,

Susan Henderson
Principal
PlaceMakers, LLC

cc: Robert Gibbs
Douglas C. Delano

NAB

Development
Brokerage
Consulting

NA BERKOWITZ
DEVELOPMENT GROUP, INC.

November 18, 2008

Dr. Royce Hanson
Chairman
Montgomery County Planning Commission
8787 Georgia Avenue
Silver Spring, MD 20910

Dear Dr. Hanson,

I have over 28 years experience as a broker working with developers, leading retailers and restaurant tenants in suburban and mixed-use urban centers. Presently, I am leasing mixed-use centers in Houston, TX (Regent Square), Atlanta, GA (High Street) and have had direct involvement for predevelopment of mixed-use urban projects in Rochester, NY, University Place, WA and Exton, PA, just to name a few. In addition, our firm has gone into an existing urban center in Birmingham, MI, adding over $250 MM in mixed-use construction value.

Prime retailers and restaurants are seeking creative mixed-use locations, such as the proposed Clarksburg Town Center. These retailers prefer the walk ability offered in these town centers and have significantly modified their suburban building and site design standards in order to fit into these new urban formats. As a result, I have found that retailers will accept parking ratios of 3.5/1000 to 4.0/1000 square feet of gross leasable floor area.

These lower parking ratios have been proven to be widely workable in the town centers in which I have participated. In our Birmingham, Michigan projects we added 225,000 square feet of additional retail, along with residential and office and did not add one space. Based upon my professional experience with retailers and developers across the United States, and my understanding of the proposed Clarksburg Town Center, I believe that a total parking ratio of 3.75 to 4.0 per 1000 square feet of gross leasable floor area for retail and restaurant space is more than adequate to attract prime local, regional and national retailers.

All the best,

Neal A. Berkowitz

cc: Douglas C. Delano, Newland Communities

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Charlotte : Los Angeles

17 November 2008

Dr. Royce Hanson
Chairman
Montgomery County Planning Commission
8787 Georgia Avenue
Silver Spring, Maryland 20910

Re: Clarksburg Town Center
Mixed-Use and Live/work Parking

Dr. Hanson,

Shook Kelley, Inc. was asked by Robert Gibbs, ASLA, of Gibbs Planning Group to submit to you our opinion pertaining to parking requirements for Clarksburg Town Center (proposed). Our opinion is based upon findings of relevant research studies and industry standards of which we are aware and which are publicly promulgated, and our own project experience. In addition to our findings, we have included our recommendations for the amounts of parking needed for the commercial areas, including live/work units.

Shook Kelley, Inc. is an urban planning and architectural firm involved with projects across the U.S. Our experience is varied and ranges from traditional neighborhood developments to vertically-integrated, mixed-use and transit-oriented developments. Some of our projects encompass the entire range of use types that one would encounter within a community. Therefore, we understand the importance and consequences of the array of decisions necessary to create successful projects, not the least of which is parking.

GENERAL OBSERVATIONS

Montgomery County, Maryland already allows for shared parking to meet minimum parking requirements, parking reductions based on proximity to transit, and participation in Traffic Demand Management (TDM) programs. The County was included in the EPA's Parking Spaces / Community Places as a model to emulate.

Our world is changing, however, and many cities and towns are rethinking what is important to them. Words like "sustainable," "walkable," "connected," and "quality of life" have reentered our vocabulary at a time when vehicular traffic, vehicular miles traveled, and gas prices are up. Also, our State and Federal transportation dollars are waning, placing increased pressure upon communities to build systems that can be sustained in the future. As we move a small step away from auto-dependency, the traffic engineer's paradigm of transportation planning based solely on mobility is changing, and so is their notion of parking based on single-use, peak demand.

Getting the parking right in mixed-use projects is difficult. There is no "one size fits all" solution, and it is important to be flexible and to understand the blend of uses within the project. We do not profess to understand the intricacies of Clarksburg Town Center.

However, the ramifications of overbuilding parking can have real effects on all involved. For the community, getting the balance right and limiting parking promotes efficient use of land, enhances urban form, encourages use of alternative modes of transportation, provides for better pedestrian movement, can strengthen the tax base, and protects air and water quality. For the developer, "right sizing" the parking provides the amount appropriate for the mix of uses, without compromising the urbanism or adding unnecessary costs to the project.

RECOMMENDATIONS

Based upon both our experiences in other locales and our observations of actual built situations, Shook Kelley, Inc. can make the following recommendations:

Mixed-Use Town Center Parking Recommendation:

3.5 to 4.0 parking stalls per 1000 square feet of gross retail, restaurant and office development area. Allow on-street parking counts within a mixed-use project or district as a method to satisfy parking requirements.

Live/Work Parking Recommendation:

1 to 1.5 spaces per unit, or 1 space for every 400-600 of gross square feet of the aggregate work area of a project.

Live/Work Background Information:

The APA has crafted a model Live/Work Ordinance. It also referenced parking standards in Berkeley, Oakland, San Jose, and Seattle.

- For live/work units of less than [2,500] square feet, one parking space is required for each unit.
- For live/work units greater than [2,500] square feet, required parking will be based on the applicable parking standard for the nonresidential use or the closest similar use as determined by the [zoning administrator].

Comment: The relatively non-stringent parking standards provided here reflect the fact that a person occupying a relatively small live/work unit may have less use for a car given that he or she works on the premises. Larger units may have additional residents as well as employees, and thus must provide more parking.

The APA Parking Standards list the following for Live/Work Studios:

- 1 space for each 2,000 square feet of occupied floor area, where occupied floor area exceeds 7,500 square feet, except in RH or RM Districts, for which the requirement shall be 1 space per unit (San Francisco, CA)

- 1.33 spaces per live/work unit. For buildings with more than 10 live per work units, 1 space per unit (Yonkers, NY, pop. 196,086)
- 1.5 parking spaces for up to 1,000 square feet of work area, plus 0.5 additional spaces for every additional 500 square feet of floor area above the first 1,000 square feet, subject to compliance with all other applicable requirements (Alameda, CA, pop. 72,259)
- 3.5 spaces per 1,000 square feet (West Hollywood, CA, pop. 35,716)

Various other Live/Work Requirements

• Oakland, CA	1 space per Live/Work Unit
• Colorado Springs, CO (MU District)	Residential- 1 space per Dwelling Unit Non-Residential- The lesser of: 1. 1 space per 300 square feet; or 2. 1 spaces per each non-resident employee
• San Luis Obispo, CA	Minimum of 2 spaces per unit

We hope this information proves to be useful to you and to Montgomery County.

Sincerely,
Shook Kelley, Inc

Terry Shook, AIA
President

c: Robert Gibbs, Gibbs Planning Group
Douglas C. Delano, Newland Communities

Thomas Dolan Architecture

Architecture, Urban Design, Planning and Development Consultation

TDA

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18 November 2008

Dr. Royce Hanson,
Chairman, Montgomery County Planning Commission
8787 Georgia Avenue
Silver Spring,
Maryland 20910

RE: Parking ratios for live/work in Clarksburg, MD

Dear Dr. Hanson:

Allow me to introduce myself. In 1997, I founded The Live/work Institute, an organization dedicated to establishing precise terms and definitions in order to allow regulators, developers, architects and occupants of live/work spaces to have a common language by which to describe this hybrid land use and building type, and to understand its many unique needs. Live/work is a combination of residential and commercial, and yet is at once neither and both.

In 1999, in the wake of a lengthy effort to create a comprehensive live/work building code in Oakland, I was asked by Jerry Browns' administration to write Live Work in Plain English, a layman's explanation of the new code. That document is still in use in Oakland today, and can be found at live-work.com/plain English.

Over the years, Thomas Dolan Architecture has built hundreds of live/work spaces. Meanwhile, I have consulted with cities all over North America on live/work planning, policy and code issues, and I continue to serve as the primary source for live/work information in the Congress for the New Urbanism, of which I am a Charter Member.

Now to the matter at hand: in my 23 years of experience as a live/work designer and planner, I have never experienced a requirement that approached that being imposed in Clarksburg, i.e. two cars for the residential portion (based on two bedrooms) and five cars per thousand square feet for the ground floor work space, to total seven cars per unit. There are some fundamental differences between a standalone residence and a commercial space that is in its own separate building. Let me go into a little more detail:

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- The reason why we call live/work Zero Commute Housing[tm] is that, in fact, the people who work downstairs commute via their staircase and are therefore—in part or in total—the same people as those who work downstairs. Therefore adding the parking requirements as if the two drivers are not the same people is a fallacy.
- In our experience, most new urbanist live/works are not high intensity businesses who employ very many people. Examples might be: a rare book dealer, an art gallery, an architect, real estate agent or accountant. These are small businesses that, if they we to get to a point where they employed a lot of people, would likely be ready to move out of their live/work unit to a standalone, separated commercial space.
- In New Urbanist communities, and likely in the DPZ code at Clarksburg, there is a strong emphasis on walkability. Many customers—those that aren't by appointment, really clients--will walk in fromn the neighborhood, and the employees at the businesses in the live/works will walk to work. Also, unlike standard land use regulation, one should take into account the on-street parking being provided on both sides of most streets on which live/works are placed. Certainly customers and likely some employees will use those on-street spaces.

In our experience, the highest number of off-street parking spaces required per live work unit has been two. Often it is one. Occasionally, when the work space exceeds 1500 square feet, more parking is required. As stated above, the assumption is that most of the workers are one in the same as the residents, and that non-resident employees either walk to work or park on the street. Transit proximity can also be a factor.

If you would like us to provide a more detailed list of jurisdictions and their requirements, or if you have further questions, please feel free to contact me at the number listed above. You may also wish to visit our web site.

Sincerely,

Thomas Dolan

Thomas Dolan
President
The Live/Work Institute

RETAIL CORE DEVELOPMENT PROGRAM AND COMPARISON TO PROGRAM OF COMPLIANCE

The October 23, 2008 Staff Report, on page 16, staff defines the retail core as the area contained within Blocks KK, LL and MM together with those portions of Blocks BB, CC and GG containing the live-work units. Although circle page 19, as well as circle page 23, of the Compliance Program defines the retail core as the entirety of Blocks 1 (CC), 2 (BB), 3 (KK), 4 (MM), and 5 (LL), the Applicant agrees with the staff's definition as it relates to the retail core's parking requirements.

With regard to the amount of retail square footage to be provided, the Compliance Program prescribes the following:

> Attachment 4, at circle page 19 second paragraph, states the overall retail square footage will be "at least" 168,000 square feet of which 40,000 square feet will be contained in live/work townhouse units. This means that 128,000 square feet of retail is required exclusive of the live/work.[1]
>
> Attachment 4, at circle page 19 second paragraph, provides that "at least" 40,000 square feet of retail will be contained within the street level portions, or first floor, of the live/work townhouse units. Also stated at circle page 23 Item A.3.
>
> Attachment 4, at circle page 19 second paragraph, indicates the grocery may be expanded to include a mezzanine containing 14,000 square feet (= 65,000 – 51,000) which is clearly described as "potential." At circle page 23, Item B.6., the grocery store "may" also include mezzanine space.
>
> Attachment 4, at circle page 23 Item A.3., states the flex space was to be provided under the alternate plan for Block 4 (MM). Item B.5. further states that the flex space shall be approved "in the alternate." Again, an alternate Block 4 (MM) plan is not proposed.

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[1] Attachment 4, at circle page 23 Item A.3., indicates the "maximum" amount of retail that would be provided under an Alternate Block 4 plan would be 195,500 square feet. An alternate Block 4 (MM) plan is not proposed.

With regard to the number of residential dwelling units to be provided within the retail core, the Compliance Program prescribes the following:

> Attachment 4, at circle page 23 Item A.2., indicates the unit mix includes a "maximum" of 50 live/work residential units.
>
> Attachment 4, at circle page 23 Item B., also provides that a total of 143 dwelling units shall be developed within Blocks 3-5 (KK thru MM) as shown on Exhibit B (shown on circle page 37), including townhouses, multi-family and live/work units.

The Applicant has revisited the retail core site plan to address certain issues raised both by staff and the Board before and during the November 6th hearing including, but not limited to, adherence to the new-urban town center envisioned by Torti-Gallas/Duany Plater-Zyberk, the depth of the Block KK retail buildings, the sidewalk depths within the retail core along Public Road "A", resident access to designated resident parking, and pedestrian access to the grocery from Public Road "A", as well as parking. The revised plan is attached and includes the following changes to the 9/5/08 plans:

> Block KK: All retail buildings are 60-ft. deep and the sidewalk width has been adjusted; former live/work unit #1 is replaced by street-level retail with MF above; the retail space is ***increased*** from 25,600 to 29,871 square feet; the number of MF residential units is reduced from 37 to 34; and the number of spaces in the surface parking lot is reduced from 163 to 156.
>
> Block LL: The grocery's entry vestibule is relocated from the front of the store to Public Road "A"; the drive-aisle/parcel pick-up lane has been eliminated to encourage the park-once approach, and the width of the sidewalk located between the grocery and the parking structure has been correspondingly reduced; walkway connections to the bottom deck of the parking structure have been added; and the total number of parking spaces in the parking structure has increased from 178 to 195 on the top deck and from 198 to 225 spaces on the bottom deck.
>
> Block MM: An additional 5 spaces have been added to the surface parking lot.

The proposed revised plan complies with all aspects of the Compliance Program with respect to the amount of development within the retail core area. A comparison of the program of development within the retail core area for the Compliance Program, the 9/5/08 plans and the enclosed proposed plan is as follows:

Retail Core Area Comparison of Program of Development

Use	Compliance Program	9/5/08 Plans, revised	Proposed Plan
Single-family detached, du	0	0	0
Single-family attached (TH), du	50	41	40
Multi-family, du	72	98	90
Live-work - residential, du	50 (max.)	51	46
Live-work - retail, Sq. Ft.	40,000	48,000	46,000
Street-level Retail, Sq. Ft.	114,000	125,000	128,000
Optional Mezzanine Retail, Sq. Ft.	14,000	14,000	0
Optional Residential "Flex" - retail, Sq. Ft.	7,680	7,720	9,150

With regard to the amount of retail square footage required by the Compliance Program, the proposed plan meets the minimum amount of retail space exclusive of live/work and exceeds the minimum live/work retail. With regard to the number of dwelling units required, the proposed plan meets or exceeds that required by the Compliance Program by 33 units (= 40 + 90 + 46 - 143).

ban developments." Smaller mixed-use developments, when they are in "walkable areas with good transit access," cause more people to walk or use mass transit rather than driving, the researchers found. In both instances, car trips are cut down. The researchers' elaborate analysis sets forth a new methodology for more accurately predicting the traffic impact of such developments.

Stuart Sirota at TND Planning Group in Baltimore believes the new methodology is "a much-needed tool for helping traditional neighborhood developments and new urbanist projects to be treated differently than sprawl projects." It "will help them get through the tortuous traffic impact study process that most development projects of any size are subject to," Sirota says.

"Some analysts have identified a serious 'suburban bias' in the current ITE rates," says G.B. Arrington, principal practice leader at PB PlaceMaking in Portland, Oregon. "Auto trip generation is likely to be overstated for TODs."

If standards based on recent research are introduced, developers of residential TODs would likely be charged as much as 50 percent less in fees and exactions, reflecting the actual traffic performance of their projects, Arrington says. "For instance, a 700-unit condominium development proposed for a city in California could see its traffic impact fee reduced by half — from $4,500 per unit to $2,250 per unit." The developer would save $1.6 million, presumably making the units more affordable.

Transit-oriented development trip generation

City	% below morning peak ITE[1] rate
Washington, DC	59.9
Portland, OR	49.6
San Francisco, CA	47.5
Philadelphia/Newark[2]	30.5

Source: Transit Cooperative Research Program

[1] Institute of Transportation Engineers

[2] Two apartment projects near suburban commuter rail stations outside of Philadelphia, PA, and Newark, NJ

OVERHAUL AT ITE

All three studies were scheduled to be presented at the ITE annual meeting Aug. 17-20 in Anaheim, California. The next step will be to incorporate the studies' results into ITE's "Trip Generation Report" — a large collection of data relied upon by zoning board officials, developers, and others who want to know how much traffic a project will generate. The report documents vehicle trips associated with specific, single land uses.

"We're now in the process of updating the Trip Generation Report," says Lisa Fontana Tierney, traffic engineering senior director at ITE. The revised Trip Generation Report is expected to be released in November.

That will set the stage for ITE to start revising the *Trip Generation Handbook* around the beginning of 2009. The *Handbook*, a manual that tells how to apply the data in the Trip Generation Report, is especially important because it presents recommendations, not just figures. It contains instructions for dealing with what Bochner calls "special land uses," such as mixed-use projects. Updating of the *Handbook* is a complicated, multistep process that will take "at least a year," Tierney says.

Bochner says accurately forecasting traffic volumes to and from a mixed-use development is complicated by the variety of these projects. "Most mixed-use developments include three uses," he says. "Often they include four, and sometimes all six uses." The proportions of the various uses differ from one project to another.

The methods that Bochner's team has developed take into account what the balance of uses is. Researchers have struggled with questions such as whether it's important to know what kinds of restaurants will be in a project. Presumably the traffic generated by high-volume fast-food restaurants is not the same as the traffic produced by fine-dining establishments.

His project, which began more than two years ago, focuses on six locations. Most were projects overseen by a single master developer, the largest encompassing a few hundred acres. A draft report is expected to be completed by the end of this year. Ewing's study looked mainly at

Less parking, better centers

A two-year study in New England found that when uses are mixed, 24 percent less parking is needed.

Norman Garrick and Wesley Marshall of the University of Connecticut examined six centers in Connecticut, Massachusetts, and Vermont. Three were mixed-use areas — West Hartford Center in Connecticut and the downtowns of Northampton, Massachusetts, and Brattleboro, Vermont. The other three were relatively conventional suburban sites in Connecticut: Avon Center, Glastonbury Center, and Somerset Square in Glastonbury.

The UConn researchers found that in relation to the volume of building space, there was 24 percent less demand for parking in the mixed-use centers than in the conventional sites. Their study, completed in 2005, is roughly consistent with a large recent study of mixed-use development, led by Reid Ewing.

During the season of peak demand — generally the holiday shopping period — cars filled 2.3 parking spaces per 1,000 sq. ft. of building space in conventional suburban developments, Garrick and Marshall found. In the traditional mixed-use centers, cars filled 1.8 parking spaces per 1,000 sq. ft.

That was only part of the disparity. Garrick and Marshall discovered that in West Hartford Center and the two downtowns, 80 percent of the total parking was occupied during the peak season, whereas "less than 50 percent of the parking spaces at the [conventional] sites were filled." The researchers declared: "This is a tremendous waste of land and is also environmentally unsound." When parking is so oversupplied, the vibrancy of the center is dampened, they noted.

The UConn researchers argued for reducing municipal parking requirements. "Most developments could get by with less than 3 spaces per 1,000 square feet of building, depending on the level of activity expected," they said. They also called for encouraging connected, mixed-use development; shifting more parking to on-street spaces, which are preferred by customers and safer for pedestrians; and considering shared municipal lots.

Parking at Mixed-Use Centers in Small Cities

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ABSTRACT

The debate about parking has shifted in the last decade, as some places attempt to move from conventional development patterns to creating urban centers modeled on new urbanism and smart growth concepts. Now the focus is less on providing sufficient parking to meet demand and more on ensuring that issue of parking does not undermine the possibility of creating vibrant places. The goal of this project is to better understand parking and parking provision as it relates to smaller cities and towns with mixed-use centers. Specifically, we wanted to address how having a dense, walkable, mixed-use center affects parking supply and demand, and how mixed-use centers compare to centers designed along more conventional lines. We tested these questions by conducting case study assessments of six sites in New England.

In general, the three mixed-use study sites provided much less parking per square foot than the conventional control sites. The study sites thrived by making much more efficient use of land for parking. The study sites also furnished a significant amount of on-street parking and relied more on shared municipal parking lots and parking garages. Given these differences, it is surprising to note that the towns with mixed-use centers demanded almost as much parking for new construction as did the towns in which the conventional sites are located. On average, the amount of parking mandated by base regulation in these six towns is about two and a half times more than the peak use.

INTRODUCTION

Parking and the provision of parking are often overlooked subjects of academic research in the transportation field. However, the issue of how, when, where - and how much parking is provided - plays a large role in transportation choices and in the health and vitality of urban areas. The debate about parking has shifted in the last decade as some places attempt to move from conventional development patterns to the creation of urban centers in the paradigm of the new urbanism. Now the focus is less on providing sufficient parking to meet demand and more on ensuring that parking does not overwhelm the desire for vibrant places. But some developers and planners are finding that it is extremely difficult to create relatively dense urban districts in face of the amount of parking that is mandated in conventional zoning regulations. Some argue that these regulations not only dampen the vitality of urban centers, but that the amount of parking mandated is actually not needed since, by their very nature, mixed-use places use less parking.

This premise seems to have gained wide acceptance even though only a handful of studies have been conducted to test the extent to which parking behavior in mixed-use urban centers differs from that in districts developed along more conventional lines. And those studies that have been done have focused on sites in larger cities where the parking patterns and other variables are quite different from those in smaller cities and towns. The goal of the research reported in this paper is to begin to address the need to better understand parking and parking provision as it relates to smaller cities and towns with mixed-use centers. Specifically, we wanted to address the following questions: To what extent does having a dense, walkable, mixed-use center affect parking supply and demand? Do these mixed-use centers perform differently from more conventional centers?

We tested these questions by conducting case study assessments of six sites in New England. The sites were selected because they fit into one of two categories: study sites with dense, walkable, mixed-use places, and control sites with more conventional single-use zoning. All six sites are major retail and commercial activity centers of small New England towns. The three study sites are older, traditional downtowns: Brattleboro (VT), Northampton (MA) and West Hartford (CT). The more conventionally-oriented sites in terms of parking include one small traditional downtown that has been expanded along conventional lines (Glastonbury Center, CT), and two newer commercial centers (Avon, CT and Somerset Square also in Glastonbury, CT). We compared land uses, municipal parking requirements, in addition to peak and non-peak parking demands in these centers. We also examined parking facility attributes such as the differences in usage between municipal lots and private parking, the quality of the pedestrian environment, and the degree of mixed land use for each town center.

LITERATURE REVIEW

The attitude towards parking and the provision of parking in American cities and towns has evolved significantly since the 1960s. Now there is more focus on the impact of parking in the urban environment as opposed to simply ensuring that sufficient, cheap, and convenient parking is provided. This change in approach is reflected in the research literature. In the following section, we present an overview of the literature relating to research on parking provision and parking policy.

In 1965, *Parking in the City Center* was published as an examination of the needs of cities as they increase their parking supply to meet growing parking demand (*1*). Focusing on major cities, the authors contended that due to the increasing use of cars, the central business district of every American city will need more parking with the goal of providing ample spaces for all of the city's daytime population. However, in order to accommodate the increased traffic flow, the authors reasoned that *on*-street parking should be *reduced*. Consequently, they asserted that *off*-street parking would be the most critical factor to the future success of cities. Furthermore, they stated that parking lots often make for the best land use. From their research in Hartford and Los Angeles, they concluded that off-street parking enhanced commercial activity in these cities by taking the place of less productive land uses without obstructing other alternative uses.

Special Report No. 125, published by the Highway Research Board in 1971, also supported the need for substantial off-street parking increases in American cities. An important recommendation in this report was that on-street parking in downtown areas should be eliminated altogether to address traffic and safety concerns. The main justification given was a 1959 program supported by the National Parking Association that called for the eventual cessation of on-street parking in downtown areas because the first priority of any street should to be the through movement of traffic (*2*). This prioritizing of the street realm as being primarily for through traffic is at odds with current thinking about the function of streets in the urban environment (*3*). This approach to the allocation of street space away from parking to increasing traffic flow has been very influential and is the status quo in most American cities (*4*). Interestingly, in the case of the cities in our study, all the study sites have on-street parking in comparison to the more conventional control sites that have almost no on-street parking.

The HRB Special Report No. 125 is also one of the only studies that looked at the differences in parking between cities of different sizes. The goal was to provide a reference for municipalities to use in creating their own zoning ordinances. The study grouped cities by population and collected information regarding parking quantities and use. From the point of view of our current research, this report demonstrated the extent to which parking use and provision in small cities differed from that in the larger cities, which are usually the focus of most research on parking.

Lots of Parking explored the history of the on-street versus off-street parking question. Streets with on-street parking were always known to be more problematic when it came to cleaning and plowing, but on-street parking was not typically restricted until the mid 1960s and early 1970s when traffic engineers started to point out that it reduced the capacity of the road by as much as 45% (*5*). On the other hand, the authors point out that limiting on-street parking reduces the functionality of the street by transforming it from an entity that provides access to a corridor that provides primarily for the through movement of vehicles. Traffic also tends to move slower in the presence of on-street parking, which can be of benefit to a commercial district. In Los Angeles, the decision to ban on-street parking resulted in a noticeable decline in retail business (*5*).

Zoning regulations play a significant role in the development of parking. As cities eliminated on-street parking, off-street parking grew in relative importance. Consequently, towns began to regulate off-street parking as part of their regular zoning requirements. In general, their goal was to ensure that enough parking was provided so not to impact businesses and traffic mobility or to disturb nearby uses. The 1972 edition of the Eno Foundation's work titled *Zoning, Parking, and Traffic* compiled survey results from over 200 planning and zoning

officials located throughout the country (*6*). This report is one of the first to take a more holistic approach to the provision of parking and its impact on an urban area. In fact, many of the principles discussed in this report are similar to principles from the much more recent charter of the New Urbanism movement (*7*). This included measures to shortening trips and reducing travel demand by allowing mixed-land use. The Eno Foundation Report also discussed problems associated with setting aside more area for parking than for more active land use, arguing that development then becomes too spread out for pedestrians to negotiate.

The most common reason cited for needing parking regulations in the Eno Report survey was the contention that insufficient parking leads to traffic congestion and aggravates neighbors. However, some of specific comments from the survey contradicted this thinking. Comments gathered from the planning and zoning officials included the following:

- "The more parking you provide, the more cars you attract and you're back where you started."
- "Automobiles are a detriment to the business district; that is why we do not require parking with new buildings in the business district."
- "Access may be more important than off-street parking" (*6*).

The Eno Foundation Report begins to hint at the idea of a link between parking policies and the character of a central business district in 1972. Our research of New England cities is designed to further explore some of these concepts.

Since the 1980s, the trend in parking research has shifted to a greater emphasis on understanding the influence of parking on the economic and social vitality of cities. For example in "People, Parking, and Cities," Shoup looks at parking and parking regulations in Los Angeles, San Francisco, and New York (*8*). One important theme from this paper is that a uniform parking policy across an entire city is detrimental. Shoup contends that a uniform parking requirement across an entire city harms the downtown area because of the cost associated with complying with this requirement downtown and the lost opportunity cost. He points to Los Angeles as an example of a city that has suffered from trying to accommodate too much parking downtown. Shoup recommends that cities would be better served to set parking maximums and allow the market to establish the cost to park.

The majority of municipal zoning regulations do the exact opposite. They mandate parking minimums by specifying the fewest number of parking spaces that must accompany a building. Most office and retail uses require parking based upon the square footage of leasable space while residential uses typically require parking on a per unit basis. However, parking maximums are becoming more common; in addition to San Francisco, other major cities with at least partial parking maximums include Seattle and Portland. Portland has a regional program that extends those maximum parking regulations beyond the city into the surrounding areas.

Millard-Ball in "Putting on Their Parking Caps" researched innovative approaches to zoning regulations in smaller cities (*9*). Cities cited include Beaverton and Eugene, Oregon, and Cambridge, Massachusetts. Beaverton's regulations specify the maximum area of land available to the developer for parking rather than a maximum number of spaces. This allows those with greater parking needs to build a structure if they deem it necessary. Cambridge instituted parking maximums in the early 1980s. It also has a program requiring all developers to submit a Transportation Demand Management (TDM) plan that attempts to reduce automobile usage. The plan was to reduce automobile use to at least 10% below the 1990 census average by

subsidizing public transit passes, decreasing the amount of parking available, and implementing parking fees. Eugene initiated parking maximums in order to increase densities and decrease paved areas, not just to reduce the area devoted to parking. According to Millard-Ball, the benefits these smaller cities and towns have seen included reduced traffic and congestion as well as becoming denser and more pedestrian-oriented.

In "An Opportunity to Reduce Minimum Parking Requirements," Shoup makes the case that more people drive because minimum parking requirements virtually guarantee a space (*10*). This induces a higher demand and sets up a vicious cycle of requiring even higher future minimum parking requirements. According to Shoup, many places work on the theory that parking requirements should serve the 20th busiest hour of the year. This leaves empty spaces over 99% of the time and half the spaces empty more than 40% of the time. If parking regulations do not accurately reflect demand, these percentages of empty spaces can become even more drastic. Our research will evaluate demand in terms of the zoning ordinances, but also in terms of the actual number of parking spaces provided.

Shoup suggests various solutions for mitigating spillover such as residential parking permits, time limits, and setting fees for parking. The need to charge for parking is a principle that Shoup repeatedly emphasizes. In *The High Cost of Free Parking,* Shoup states that nothing is truly free, especially parking (*11*). When zoning regulations require excess parking, that cost usually winds up in the form of hidden prices. Thus, everyone ends up paying for free parking, even those who walk, bike, or ride public transportation. Free parking also encourages people to drive more often. Interestingly, of all the cities surveyed by Shoup, Hartford, CT (which is the core metropolitan city for four of the sites in our study) had the highest percentage of drivers parking for free at 98%. The value of parking fees for a city can be more than just parking revenue and the potential for a decrease in driver mode share. *Lots of Parking* points to research demonstrating that metered spaces result in an increase in sales on a per vehicle and per person basis (*5*).

In trying to understand the numerical basis for the parking minimums in many towns, Shoup examined *ITE Parking Generation* (*11*). Shoup found that many of the assumptions ITE uses in determining the parking generation rates were faulty when applied to many situations. He reported that ITE develops most of the data based on suburban sites with plenty of free parking, insignificant transit ridership, and the automobile as the single mode choice.

The stated goal of the 2004 version of *ITE Parking Generation* (*12*) is to provide observed parking demand information for a variety of land uses. ITE emphasizes the informational nature of the data by noting that the report is "NOT a manual, recommended practice, or standard" and that "the data alone will not provide accurate estimates" (*12*). Given this disclaimer, it is not clear how engineers and planners should use this publication. Our research suggests that there are no set standards to guide towns in developing appropriate parking standards.

In 2002, a parking study was conducted for the Northwestern Connecticut MPO using a format similar to that in the *ITE Parking Generation* (*13*). The motivation for the study was to improve water quality by reducing the amount of unnecessary impervious parking surfaces. The study looked at forty-two different sites with freestanding retail or office complexes. They found that most lots were significantly underutilized with an average of just over 47% of parking spaces occupied (it is not clear whether this is the peak or average use). All the big box retail stores studied experienced less that 25% occupancy. The study holds municipal regulations

responsible for the overbuilding of parking facilities and recommends taking other factors into account beside square footage of building space.

Our study differs from that of the Northwestern Connecticut MPO in that we are focusing on activity centers within our study towns that have a degree of mix of uses and are not stand alone sites (the control sites in our study generally have much less mix of use). Todd Litman of the Victoria Transport Policy Institute identifies the unique role of a town center in the economic and social development of an area with his paper "The Value of Downtown" (*14*). Litman defines a downtown as follows: "a downtown is a relatively small, central, walkable area, usually less than a square kilometer, where commercial, cultural, and civic activities are concentrated." According to Litman, what makes a town center special and successful is a critical mass of activities. This allows for a compact development that improves efficiency and convenience. Part of this efficiency is the reduced need for parking. The advantages of a town center are multifold ranging from environmental benefits, such as reducing sprawl and preserving greenspace, to health benefits, such as increasing walking. In terms of transportation, Litman contends that a well-designed town center will reduce per capita automobile use, and in turn, reduce traffic crash risk by limiting exposure. The study sites in our research embody many of the qualities identified by Litman. These types of sites have not been extensively researched. Our goal is to determine if the advantages cited by Litman in terms of parking do indeed accrue to these types of locations.

STUDY DESIGN

Three study sites and three control sites were chosen based upon the following factors: land use type, area, demographics, and parking system. The study sites tended to possess the qualities of a good downtown described by Litman such as mixed land uses and highly walkable precincts while the control sites generally did not have these qualities (*14*). Each site possesses a comparable land area in a town with similar income levels surrounded by like population levels. All the sites are also similarly accessible by bus public transportation. The system of parking varies amongst the sites including on-street parking, private spaces, shared parking, municipal parking, and garage parking.

The following study sites were chosen based upon these criteria:

1. Brattleboro, VT
2. Northampton, MA
3. West Hartford, CT

The following control sites were chosen:

1. Avon, CT
2. Glastonbury, CT
3. Somerset Square in Glastonbury, CT

Our original goal was to confine the study to Connecticut cities, but we found it difficult to find sites that met our criterion of being mixed-use, walkable precincts in small cities. With few candidates for inclusion, we had to expand the search to nearby cities in other New England states. We finally settled on the three cities chosen primarily because of their similarity in size.

Once the three study sites where chosen, we then sought control sites that were of roughly the same size as the study sites.

One issue encountered in this process is that there are some structural differences relating to parking between the study sites and the control sites. For example, all the study sites have managed, municipal parking, and generally charge for parking. None of the control sites do. In addition, the study sites all have on-street parking, which is generally not the case for the control sites. Based on our site vetting process, it appears that these confounding factors are unavoidable.

Fieldwork consisted of the research team conducting several parking occupancy counts for each site. The intent was to find the peak level of parking occupancy as well as a typical day count. The peak parking demand for most of the sites occurred during the holiday shopping season. We also collected typical daily average counts during the summer months under good weather conditions. In terms of the peak parking occupancy, Brattleboro turned out to be a distinctive case because the anticipated holiday season peak period was about the same as the average daily count taken during the summer. From discussions with pedestrians and business owners, most regarded Brattleboro as an event-driven downtown. Over the course of the year, the downtown plays host to several such events each month. One of the busiest regular parking periods (as opposed to a one-time event) takes place on the first Friday of each month at Gallery Walk. The local businesses take turns hosting artists and their works, while people walk up and down Main Street eating, shopping, and perusing the exhibits. Thus, while peak demands in most centers revolved around the holiday shopping season, the peak parking occupancy for Brattleboro was Gallery Walk. The fieldwork portion of the study also included a survey component questioning shoppers, employees, and business owners on their impression of the town center and the parking situation.

Characterization of the Six Sites

Every site chosen is in an economically strong location with minimal retail/office vacancies. As an indicator of the economic state of the town centers selected, we compared first floor retail rental rates with those of town centers near each of our six sites (the same comparison towns were used for all four Connecticut sites since all four sites are in the same metropolitan region). Retail rental rates for all six sites compare favorably with nearby town centers.

The parking lots at each site were predominantly well maintained and kept very clean. All parking at the control sites was free, while a fee was charged for most of the parking at the study sites. Parking fee rates varied, and money collection was carried out with meters, attendants, or pay-and-display machines. Similar to a parking meter, pay-and-display machines collect money (typically cash but sometimes credit or debit cards). The driver pays for the desired amount of time and the machine dispenses a ticket that must be displayed on the dashboard of the vehicle. The ticket identifies the time of day when the ticket expires. Unlike a parking meter that is located at each parking space, a single pay-and-display machine services numerous parking spaces. A large lot may possess several pay-and-display machines in order to limit the need for a patron to traverse a long distance to the machine and back to the car to pay for parking.

The three study sites seemed to rigorously police parking violations. One difference in fee collection is whether the patron pays at the beginning or pays at the end. Up-front payment requires the person to guess how long they will stay parked compared to allowing the patron to

stay as long as they like and pay for what they use at the end. Brattleboro and Northampton primarily employed the pay first system, whereas the West Hartford municipal lots collected money upon completion of parking. Although West Hartford may accrue less revenue from parking violations, their method allows drivers to spend as much time as they need in the town center without having to worry about underestimating their time and having to return to their cars prior to completing their business. Northampton recently switched their parking garage collection system from paying at the end to up-front payment. One business owner noted in their survey that sales have been noticeably down since the change, and that he or she has observed many customers leaving the store before completing their shopping.

When comparing the number of parking spaces required to the number provided, this study used both the base parking regulations from each town as well as the maximum reduction allowance specified for reasons such as shared parking. To qualify for a reduction allowance, a developer would typically have to confront the zoning board of appeals and plead their case. Because of a potentially arduous process, many shy away from this and end up adhering to the base number specified. Most of the towns specify a 20% to 30% reduction in a shared parking situation. West Hartford allows for a 50% reduction with "good cause." Brattleboro is an exception because in addition to shared parking reductions, Brattleboro may reduce parking requirements if an alternative mode of transportation is available or if 50% of the spaces could be accommodated on the side or back of the building. Furthermore, if the site is located within 300' of a municipal parking lot, Brattleboro completely waives the parking requirements. Thus, for some of the buildings near Brattleboro's town center, no parking would be required whatsoever. For the purposes of these calculations, we assumed a shared parking reduction for Brattleboro.

Assessment of the Pedestrian Environment

Off-street parking is important to any town center, but placement, design, and operation are the key elements in creating a pedestrian-friendly environment. Parking layout styles vary tremendously amongst the sites. For the study sites, parking rarely detracts from the layout of the buildings. Brattleboro places municipal pay-and-display lots behind buildings along Main Street with one mid-block parking lot serving as the courtyard for numerous shops and restaurants. Most stores and restaurants possess secondary rear entrances for patrons.

In Northampton, the municipal parking lots and parking garage sit on the periphery of the downtown leaving mid-block parking for mostly private, business-related use. The parking layout for West Hartford is similar to Northampton with municipal lots surrounding the downtown area. West Hartford reduces the visual impact of the parking lots with landscape barriers and makes the pedestrian connections attractive with brick paving and landscaping. Most stores and restaurants in West Hartford with secondary entrances adjacent to the parking lots reserve these entrances for employees, forcing patrons to enter from the street side.

Northampton and West Hartford offer wide, sometimes brick-paved sidewalks often on the order of 12' to 15' wide. The three study sites provide sidewalks with high connectivity to and from the parking lots as well as within the town center and to adjacent neighborhoods. This permits drivers to park in one location and run multiple errands around the town center. Results from the survey data indicate that over 70% of people at the study sites always park in one location and walk to several destinations compared to 25% at the control sites.

In Avon, the parking lots are well landscaped and maintained but separate many of the buildings from the street. For those buildings set close to the street with minimal setback, few

provide pedestrian access from the sidewalk along the street. Even though a good portion of the area possesses sidewalks, many of these sidewalks are not continuous. Parking for one store and trying to walk to another, other than within the same plaza, proved to be very difficult especially if this involved crossing Main Street, which is a four lane, highway like facility. Glastonbury Center possesses a blend of parking layouts with many of the older buildings along Main Street having on-street parking and rear parking similar to the study sites, while the newer complexes are more conventional with the buildings set back and separated from the street by the parking lot. This arrangement makes for long distances between some of the neighboring shopping areas, but with good sidewalk connectivity, these walks are feasible.

For Somerset Square, parking surrounds and separates the various shopping and office complexes. There are residences beyond the outer parking near the main shopping area, but there are no viable pedestrian connections, although opportunities exist. Glastonbury Boulevard, which divides the two sides of Somerset Square, has attractively tree-lined sidewalks and a landscaped median. However, with high vehicle traffic and no crosswalks, Glastonbury Boulevard is difficult to cross as a pedestrian. Overall, the control sites seem to be less pedestrian friendly than the study sites.

Degree of Mixed Land Use

The study sites all have a significant mixed-use component with a sizeable residential component approaching 30% of the overall town center building space. Conversely, the control sites provide less than 5% of the residential space available at the study sites. This discrepancy enables the study sites to take advantage of the efficiencies of a mixed-use downtown environment and the reduced need for parking (*14*). However, it should also be borne in mind that some of the differences in the use of parking may be related to the fact that the study sites charged for parking and the control sites did not.

RESULTS

In the results section we will assess how much parking is required, how much parking is used, and how much parking is supplied. We perform this analysis for each individual site and look for overall trends as well as the overall differences between the study and control sites. Looking beyond site occupancy counts, we will investigate parking demand as it relates to the type of parking space provided, i.e. municipal parking lot or private parking lot. We will also assess the differences in the pedestrian environments as well as the land use mix in an effort to identify key characteristics of the study sites and control sites. The key findings from the study are summarized in Table 1 including parking provided, parking used, parking required by current zoning, and the amount of land devoted to buildings versus that devoted to parking. These themes will be discussed in the following sections.

Parking Provided

An important disparity between the study sites and control sites emerged with the number of spaces actually provided as summarized in Table 1.

- The study sites supplied half the number of spaces per 1,000 SF of building space.

This equates to the study sites providing 44.9% of the spaces required by the base regulations and only 71.1% of the spaces required when accounting for the maximum reduction allowances. In contrast, the control sites supply 79.0% of the base regulations required spaces and 112.8% of the reduced requirements. This substantial discrepancy can likely be attributed to the fact that the three study sites are traditional downtowns that were developed prior to the introduction of formal parking regulations. The control sites were developed more recently than the study sites, and as a result, parking regulations were part of the development process.

Although the study sites provided significantly less parking with respect to the regulations than the control sites, this decrease did not result in a parking shortage.

- Peak occupancy for the study sites was 79.8% of the parking spaces provided.
  - Off-peak occupancy was 66.5% of capacity.
- Peak occupancy for the control sites was only 49.9% of the parking spaces provided.
  - Off-peak occupancy was 37.3% of capacity.

At the control sites, this leaves more than half the parking spaces empty on the busiest day of the year.

Parking Requirements by Regulation

The number of parking spaces required by zoning regulations for all the sites is significantly more than the number being used, even on the heaviest use days.

- Peak parking demand was only 37.2% of the base number of spaces required by the towns and 56.6% of the maximum reduced requirements.

Peak usage numbers per 1,000 SF of building space fell far shy of the amount required.

- The towns required a base average of 5.37 spaces per 1,000 SF of building space and a maximum reduced averaged of 3.53 spaces.
- Peak demand averaged 2.00 spaces per 1,000 SF of building space.
- Non-peak demand averaged 1.60 spaces per 1,000 SF of building space.

Taken as a whole, the base regulations required over 168% more parking spaces than necessary on the busiest day of the year and 235% more parking than is used on the average day. Even accounting for the maximum allowable reductions, minimum parking requirements would have to be drastically reduced in order to reflect actual demand in every one of these activity centers. In this case, the reduced regulations required over 75% more than the peak demand and 120% more than the non-peak average use.

Land Use in the Town Centers

Intelligent land use is especially important in a town center area where land is in limited quantity. By providing more parking than necessary during the peak period, the control sites averaged approximately thirteen acres of idle land occupied by empty parking spaces; in

contrast, peak demand for the study sites resulted in only 3.5 acres of vacant land for parking in each town center. But it could be argued that even the study sites are not using land to its optimum efficiency as they allocate more land to parking than for buildings.

- The study sites used 1,551 SF of land for parking for every 1,000 SF of building footprint, and the control sites used 2,842 SF of land for parking for every 1,000 SF of building footprint.
- Subtracting the effect of the multi-story parking garages, the study sites use 1,903 SF of land for parking for every 1,000 SF of building footprint while the control sites use 2,865 SF.

The additional land needed at the control sites is not only a result of the extra parking spaces provided but also the larger area the average space consumes due to pedestrian connections, longer access driveways, and a higher frequency of larger landscaped islands. By matching the amount of land per parking space realized by the study sites with more efficient layouts, the control sites would acquire 6.8 acres of additional land in each activity center for a use other than parking. Although these results are magnified due to the fact that each study site has a parking garage, subtracting this advantage would still yield 2.9 acres of added land in each control site town center.

The number of parking spaces provided by the study sites does not meet the minimum regulations even when taking into account the potential reductions. On average, the study sites have approximately 30% less parking than the regulations with maximum reductions would require. In terms of the land required for parking:

- Parking would occupy 84.6% of the total land for the study sites and 54.8% of the land at the control sites under base parking regulations.
- With the maximum allowable parking reductions, parking would still occupy 65.5% of the study site land and 39.0% of control site land.

In the most extreme case, West Hartford's base parking requirements would call for more than 100% of the downtown area. This supports the argument made by some that based on current regulations, it would be impossible to recreate a town center like West Hartford today unless substantial parking reduction allowances were granted from the zoning board of appeals.

Comparison of Two Sites: West Hartford and Avon

Figure 1 illustrates the contrast in land use for the study sites and control sites by examining the examples of West Hartford and Avon in more detail. Figure 1 serves as a visual to help consider the relationship among the land occupied by parking, the land occupied by buildings, and the overall activity center area.

Although West Hartford had 2.4 more acres of land occupied by buildings, West Hartford used 3.8 acres less acres to supply over 1,100 more spaces than Avon. This discrepancy resulted in Avon using almost three times more land for parking than for building footprint while West Hartford used 1.8 times more land for parking than for building footprint. In terms of the usable building space requiring parking, Avon's ratio of building space to land occupied by parking approached four while West Hartford's dropped to less than 0.7, indicating that West Hartford had more usable building space than land devoted to parking.

Characterization of the Provision of Parking

One of the key differences between the study sites and control sites was the number of parking spaces owned by the municipality. Brattleboro, Northampton, and West Hartford (study sites) all had on the order of two times more publicly owned spaces than privately owned spaces while control site parking was predominantly off-street and privately owned. West Hartford has a mix of municipal parking, both on-street and off-street, as well as a parking garage and private lots; private parking dominates Avon Center. Glastonbury Center did have a small number of publicly owned spaces. These spaces were not metered and represented less than 10% of the total parking spaces in the town center. In addition to a parking structure, each of the study sites has a significant number of on-street spaces. Based upon the occupancy rates, on-street spaces represented the most valuable parking spaces to the driver.

- On-street spaces averaged 98.9% occupancy during the peak periods and 84.0% off-peak occupancy.

If an on-street parking space was not open, drivers most often used off-street municipal spaces.

- Off-street municipal spaces averaged 85.3% occupancy during the peak periods and 81.1% off-peak occupancy.

The data suggesting that on-street parking and municipal lots were the most appealing was consistent for all three study sites. Conversely, the control sites continue to limit on-street parking as once recommended by the federal agencies, therefore escalating the need for off-street parking (*6*). Recent research suggests that on-street parking can help curtail vehicle speeds and create a more pedestrian-friendly town center. On-street parking can also shift the functionality of the road from through mobility to land access helping to bring vehicles into the street life. People view the street as an end in itself rather than as a means to get somewhere (*5*).

While all of the on-street spaces in Brattleboro are parallel parking spaces, Northampton and West Hartford primarily use angled on-street parking. Angled on-street parking tends to give drivers and pedestrians an occupied outlook of the street, and parallel on-street parking leaves sight lines somewhat more open (*5*). Parallel on-street parking reduces pedestrian crossing distances, but it often requires drivers to spend extra time entering and exiting the space; angled on-street parking increases pedestrian crossing distances, and the crowded view of the street can help slow drivers down.

CONCLUSION

Many cities and towns are rethinking their approach to providing parking for their activity centers. This is occurring in the framework of an overall reconsideration of contemporary development patterns influenced by New Urbanist concepts, the smart growth movement, and considerations of sustainability. Some argue that New Urbanist type places are difficult to develop in light of the amount of parking currently mandated in typical zoning regulations. They also argue that New Urbanist type places, with potentially dense and walkable precincts, require much less parking than conventional developments. These two points illustrate that parking and

parking provision cannot be treated in a simple cookbook manner relating building square footages to parking spaces and that more attention needs to be paid to understanding the inter-relationship between parking and place making.

The purpose of this study was to examine some of the issues related to parking and the provision of parking in small urban areas. In this study, we focused on parking provision, parking demand, and parking regulations in six New England activity centers. Three of the centers, which we designated study sites, embodied the New Urbanist characteristics of walkable, mixed-use activity precincts embedded in and connected to surrounding (largely residential) urban neighborhoods. The three sites in this category were Brattleboro (VT), Northampton (MA) and West Hartford (CT). The other three sites, designated control sites, were typically more homogenous in terms of use, much less walkable, and generally isolated from their surrounding urban neighborhoods. We compared land uses, municipal parking requirements, in addition to peak and non-peak parking demands in these centers. We also examined parking facility attributes such as the differences in usage between municipal lots and private parking, the quality of the pedestrian environment, and the degree of mixed land use for each town center.

Overall, the study sites are getting much more benefit out of a smaller amount of parking. In terms of parking used, we found that the study sites consistently used less parking both on a regular basis and during the peak period. The difference is relatively small (11.0% less on an average day and 19.7% during the peak period) but the study sites are generally much more vibrant (in terms of the number of people around) than the control sites.

Parking occupancy counts revealed that every site provided more parking than necessary, even during the peak parking period. This was particularly true for the control sites because the busiest day of the year still left more than half the spaces empty. The parking supply for the study sites was more in line with demand in part because the study sites provided less than half the spaces required by the base regulations and only about 70% of that required by the regulations when allowing for the maximum parking reductions. Both are far less than the amount of parking provided by the control sites. The study sites thrive with less parking than conventional wisdom would suggest by minimizing the amount of land area taken up by parking, furnishing as much on-street parking as possible, relying more on shared municipal parking lots and parking garages, as well as making much more efficient use of spaces over the course of a day due to the wide variety of activities.

Given these differences between the study sites and the control sites, it was surprising to note that the towns with mixed-use centers stipulated almost as much parking for new construction as did the towns in which the conventional sites are located. On average, the amount of parking mandated by the base regulations in these six towns is about two and a half times more than the peak use. Taking into account the maximum parking reduction allowed by code, the towns still require on the order of one and three-quarters more parking than peak usage.

While most major cities manage parking with a comprehensive plan, few smaller cities and towns enforce much more than the standard regulations. Parking ordinances in New England rarely vary from town to town, yet town centers exhibit diverse design qualities and parking arrangements. Communities often overlook the possibility that a parking surplus, like a parking shortage, may have undesirable consequences. Land unnecessarily consumed by parking is an opportunity lost for a more beneficial use, and uncalled for parking also extends distances between points of interest, diminishing the ability of a town center to be pedestrian friendly.

Businesses want to provide cheap and convenient parking as an incentive to shop. Towns usually take the stance that parking should be regulated, and off-street parking should be required according to use so not to negatively impact traffic or disturb adjacent uses. Parking regulations typically require a minimum number of spaces dependent upon the various land use considerations such as retail square footage or the number of seats in a restaurant. The results in this study suggest that as an alternative, parking regulations should take into account issues such as parking fees, the character and density of the development, street characteristics, the level of public transportation, and the mixed-use component. Instead of parking requirements shaping the development of a town center, it should be the character and vision of the town center that impacts the parking policies.

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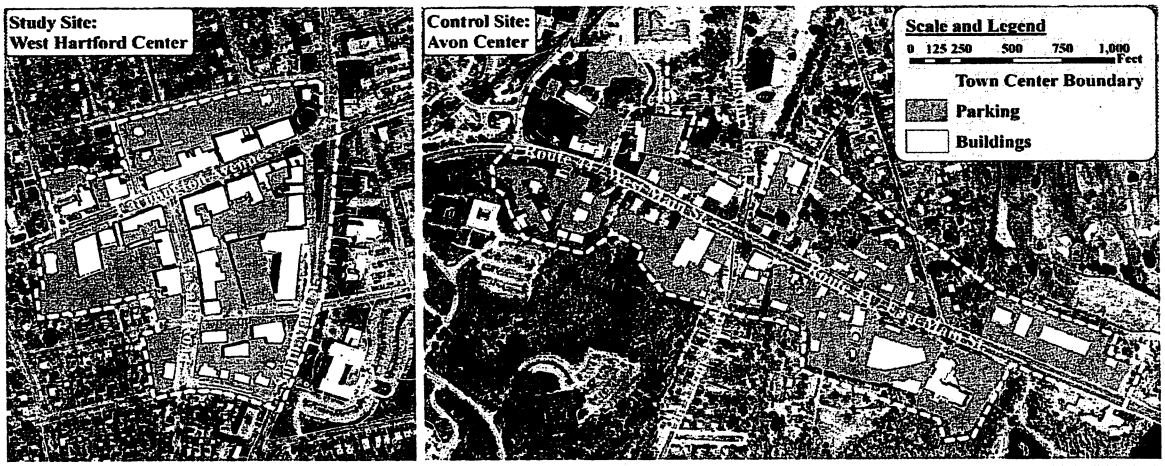
LIST OF TABLES AND FIGURES

TABLE 1 Land Use and Parking Demand Summary

	BUILDING SPACE & LAND USE			PARKING LAND USE		
	Avg. Town Center Area	Avg. Building Space	Avg. Building Footprint Area	% of Town Center Occupied by Buildings	Avg. Total Parking Lot Area	% of Town Center Occupied by Parking
Study Sites	2,010,601 SF	869,487 SF	492,239 SF	24.5%	763,590 SF	38.0%
Control Sites	2,573,432 SF	460,598 SF	392,065 SF	15.2%	1,114,359 SF	43.3%
Difference	28.0%	-47.0%	-20.4%	-37.8%	45.9%	14.0%
	PARKING PROVIDED			**PARKING LAND USE**		
	Avg. No. of Parking Spaces Provided	No. of Spaces per 1,000 SF Building Space	No. of Spaces per 1,000 SF Building Footprint	Avg. Land Area per Parking Space	Avg. Multi-Story Garage Footprint & No. of Spaces	Avg. Land Area Minus Multi-Story Garage Spaces
Study Sites	2,002	2.30	4.07	381 SF	39,356 SF; 454	468 SF
Control Sites	2,119	4.60	5.40	526 SF	4,417 SF; 23	530 SF
Difference	5.8%	100.0%	32.9%	37.9%	-88.8%; -94.9%	13.2%
	PARKING REQUIRED - BASE REGULATIONS			**PARKING REQUIRED - MAX. REDUCTIONS**		
	Avg. No. of Parking Spaces Req'd Base Regulations	% of Req'd Spaces Provided Base Regulations	Spaces Req'd per 1,000 SF Building Space Base Regulations	Avg. No. of Parking Spaces Req'd Max. Reductions	% of Req'd Spaces Provided Max. Reductions	Spaces Req'd per 1,000 SF Building Space Max. Reductions
Study Sites	4,457	44.9%	5.13	2,815	71.1%	3.24
Control Sites	2,682	79.0%	5.82	1,878	112.8%	4.08
Difference	-39.8%	75.9%	13.5%	-33.3%	58.7%	25.9%
	PEAK PARKING DEMAND			**NON-PEAK USAGE**		
	Avg. Peak No. of Parking Spaces Used	Avg. Peak Occupancy	Peak Usage per 1,000 SF of Building Space	Avg. Non-Peak No. of Parking Spaces Used	Avg. Non-Peak Occupancy	Non-Peak Usage per 1,000 SF of Building Space
Study Sites	1,597	79.8%	1.84	1,331	66.5%	1.53
Control Sites	1,057	49.9%	2.29	791	37.3%	1.72
Difference	-33.8%	-37.5%	24.5%	-40.6%	-43.9%	12.4%



LAND USE

	Building Land Use			Parking Land Use		
	Total Town Center Area	Total Building Space	Building Footprint Area	% of Town Center Occupied by Buildings	Total Parking Lot Area	% of Town Center Occupied by Parking
Study Site						
West Hartford	1,775,331 SF	1,143,606 SF	411,785 SF	23.2%	742,693 SF	41.8%
Control Site						
Avon	2,496,505 SF	231,834 SF	305,395 SF	12.2%	910,762 SF	36.5%
Difference	40.6%	-79.7%	-25.8%	-47.3%	22.6%	-12.8%

PARKING REQUIREMENTS

	Parking Provided		Base Regulations		Max. Reductions	
	No. of Spaces Provided	No. of Spaces per 1,000 SF Building Space	No. of Spaces Required	% of Req'd Spaces Provided	No. of Spaces Required	% of Req'd Spaces Provided
Study Site						
West Hartford	2,506	2.19	6,201	40.4%	3,101	80.8%
Control Site						
Avon	1,371	5.91	1,667	82.2%	1,167	117.5%
Difference	-45.3%	169.9%	-73.1%	103.5%	-62.4%	45.4%

FIGURE 1 Typical Study Site (West Hartford) Versus Typical Control Site (Avon) Summary.

Reassessing On-Street Parking

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ABSTRACT

The ongoing debate about the merits and drawbacks of on-street parking has few definitive answers because comprehensive research in this area has been lacking. Our goal is to develop a better understanding of the gamut of issues related to on-street parking, ranging from parking demand and the pedestrian environment to less researched topics such as the efficiency of land use. Additionally, we address the basic question of safety in a more precise way than previously done by taking into account actual vehicle speeds and crash severity levels.

Our investigation points to on-street parking playing a crucial role in benefiting activity centers on numerous levels. Users of the downtowns consistently valued these land-efficient on-street parking spaces over and above off-street surface lots and garages. Low speed streets with on-street parking also had the lowest fatal and severe crash rates of any road category in our study of 250 Connecticut roadway segments. Part of the reason for this is that the presence of parking had a measurable effect on vehicle speeds.

On-street parking is not purely a device to be used in the right environment; rather, it is a tool to help create that right environment. On-street parking should be more commonly used but especially in situations where the road is part of the destination and where the intent is to get drivers to slow down. Our results suggest that these places are safer, more walkable, require less parking, and have more vitality.

KEY WORDS

Parking, on-street, curbside, land use, safety, speed, sustainability, mixed-use, pedestrian, zoning, walkable, walkability, town centers, new urbanism, smart growth, urban planning.

INTRODUCTION

The ongoing debate about the merits and drawbacks of on-street parking has few definitive answers because research in this subject has been lacking over the last two or three decades. Some downtowns simply provide on-street parking wherever possible, while others prohibit it as being unsafe and a nuisance to moving traffic. Part of the problem is that prevailing thought on the subject has shifted over the years. Consequently, finding real answers is difficult because even the best studies seem to focus on one or two qualities of on-street parking, failing to account for the broad range of potential outcomes.

Even though many planners, engineers, and particularly New Urbanists now consider on-street parking an integral part of any downtown, questions linger. Proponents cite places where on-street parking works incredibly well, whereas detractors cite places with contrary results. One issue is that these examples are informal and rarely based on more than word of mouth regarding the true outcomes. The bigger issue begs the question as to why some places have been successful when it comes to incorporating on-street parking in their downtowns. With this research, we intend to develop a better understanding of the gamut of issues related to on-street parking, ranging from parking demand and the pedestrian environment to less researched topics such as land use and the impact on vehicle speed. In addition, we address the basic question of safety in a more precise way than previously done with on-street parking studies by taking into account vehicle speeds and crash severity.

The findings in this paper are an outcome of two separate studies. We assessed these questions in a first study by developing case studies for six major commercial activity centers in small New England cities and towns and in a second study by investigating vehicle speeds and safety reports from over 250 Connecticut roads. The case study sites were selected to be either traditional town centers with dense, walkable, mixed-use downtowns with on-street parking or contemporary sites with more conventional single-use zoning and little or no on-street parking. Brattleboro (VT), Northampton (MA), and West Hartford (CT) represent the older more traditional downtowns. The second group of more contemporary sites includes Avon (CT) and Somerset Square in Glastonbury (CT), two newer commercial centers, along with Glastonbury Center (CT), which was a traditional downtown that has been expanded along more conventional lines.

The speed and safety study was based on collecting over 100 free flowing vehicle speeds for each site in addition to safety information and road segment characteristics. We purposefully selected streets both with and without on-street parking as well as those with different speed limits and adjacent land uses so that the 250 sites represented a wide array of road characteristics.

By relying on multiple lines of research, we intend to forge a more complete analysis of on-street parking. We will assess the benefits and shortcomings of on-street parking vis-à-vis the other common methods of supplying parking (off-street surface parking and structured garage parking) as well as looking at the context in which on-street parking can be successfully employed.

LITERATURE REVIEW

On-street parking has a varied and inconsistent history. Once prevalent almost everywhere in the United States, restrictions against on-street parking began as early as 1920 (1). When the rapid rise of the automobile in downtown Los Angeles started to impinge upon the flow of streetcars, the quick and easy solution was to ban on-street parking. A mere 19 days later the ordinance was repealed for a variety of reasons, including claims that the parking restrictions were discriminatory against motorists. Seven years later, Chicago instituted some of the earlier successful on-street parking restrictions (1). The difference in this case was that Chicago continued to allow priced on-street parking in some areas. Los Angeles on the other hand flip-flopped back and forth on the issue for decades. What Chicago seemed to find was that on-street parking not only provided revenue, but it was also convenient and buffered pedestrians from the moving traffic. Although it is difficult to argue with the convenience factor and the idea of a pedestrian buffer, the debate continues as to the real benefits of on-street parking versus other types of parking in terms of issues such as land use, user demand, vehicle speeds, and safety concerns. This literature review examines the evolution of our approach to on-street parking in the United States as well as the existing research regarding its implications.

Even though places like Los Angeles initiated on-street parking bans in the early part of the twentieth century, the concept did not start becoming commonplace until the mid 1960s and early 1970s. By 1971, a comprehensive guide to the principles of parking by the Highway Research Board commenced their description of on-street parking by saying:

> "*Curb parking can seriously impede traffic movement along major routes. It typically contributes to or is directly involved with some 20 percent of urban street accidents. One of the best and most economical methods of increasing capacity and safety is the removal of curb parking*" (2).

This line of thinking took hold during this period when vehicle movement was the main focus of authorities charged with maintaining roads. By the time this 1971 book by the Highway Research Board was written, there was already abundant support from a variety of organizations for policies that advanced the ideas it contained. A 1955 policy statement from the U.S. Chamber of Commerce called for giving the first priority of any street to the "movement of people and goods with such restrictions on curb usage as this principle may dictate" (2). An influential 1959 report by the National Parking Association highlighted this issue further by suggesting the eventual banning of on-street parking in downtown areas based on this idea that priority in the street realm should first and foremost be for through traffic (2). A 1965 study deduced that limiting on-street parking not only increases road capacity, but also that off-street parking in city centers enhances retail activity (3). On this basis, the authors concluded that on-street parking should be reduced wherever possible and that off-street parking will be vital in determining the economic prospects of activity centers.

All these opinions against on-street parking started to force the hands of cities. People seemed to believe that providing off-street parking, even in the form of structured garages, was less costly than supporting the economic losses due to traffic congestion, crashes, and maintaining parking meters. Even cities that are today well-known for their on-street parking listened. A 1970 San Francisco policy eliminated on-street parking in their downtown on weekdays from 7 am to 6 pm on one side of most streets. Although the other side of the street could have been still used for parking, the city set it aside as a truck loading zone (2). According

to the Highway Research Board at the time, on-street parking would only be acceptable in situations where the street is not required to function as part of the street network, where the through movement of traffic can be prohibited, and where the need for parking is so great that it trumps vehicular movements (*2*). This list of warrants in essence promoted the idea that first and foremost streets are for the through movement of traffic. This widespread approach to allocating the street realm away from parking toward increased vehicular movement has been a significant factor toward the current state of affairs in many American cities.

Today, there is much more thought toward accommodating multiple types of road users as well as shifting the balance towards non-motorized modes in many urban situations. Carmel, California has gone to the other extreme by banning *off*-street parking in the downtown (*1*). Many cities however have been and are still being influenced by the long standing idea that the focus in street allocation should be on automobile movement. The research history regarding the effects of on-street parking is not extensive, but there have been some studies that describe certain components of the potentially multifaceted outcomes.

Theories about the benefits of on-street parking are as plentiful as the theories against. Aside from the convenience, on-street parking is said to be one of the best ways to provide shared parking (4). It is thought to be in higher demand than alternative off-street spaces and considered more efficient due to higher occupancy rates. For this reason, pricing proponents like Shoup suggest setting the highest fees for the on-street spaces (5). During one of Los Angeles' on-street parking bans, the city started to find a noticeable decline in retail business (6). Without the on-street parking spaces, the convenience factor seemed to diminish and people shopped elsewhere.

On-street parking is also considered to be more efficient in terms of land use since on-street spaces do not require access lanes or driveways (4). Comparing the amount of land required for an off-street surface lot to that needed for an on-street parking space, Litman and Shoup both estimate that these access lanes and driveways more than double the amount of land devoted to parking (1, 4). In addition, landscaping requirements generally account for adding another 10 to 15% of total land area to a parking lot (4). Providing parking solutions on the street is generally less expensive. When compared to off-street surface lots, the financial savings is achieved with land use efficiency (4). Versus parking garages, the expense of the structure needs to be considered carefully compared to the cumulative land costs; in many instances, providing additional on-street parking rather than structured parking allows for a more prudent use of resources (*1*). On-street parking is also widely regarded to significantly impact the pedestrian environment. Four of the most prominent pedestrian level of service methodologies all give better scores to streets with a higher degree of on-street parking (*7*). The buffer between pedestrians and through traffic imparted by on-street parking increases segment level of service scores, but these numbers do not begin to take into account the potentially increased walkability afforded to a denser place that devotes less land to parking.

In terms of the issue of on-street parking and safety, much of the research work was carried out from the 1940s to early 1970s. Almost nothing has been published since the 1980s. It would seem that to most traffic engineers the safety issues relating to on-street parking have already been decisively researched. The general conclusions drawn from these studies are that on-street parking is unsafe, prone to crashes, and subject to increased congestion. In light of the fact that a major focus of traffic engineers at the time was to speed up and discharge traffic quickly, concerned engineers were worried that on-street parking reduced road capacity,

sometimes by as much as 45% (6). Additionally, crash data from 1965 and 1966 revealed that 16% of crashes in American cities directly involved cars parking along the road (2).

Many studies on curbside parking prohibitions have generally suggested a decrease in traffic collisions with the removal of parking. One study found that non-intersection crash rates reduced by an average 37% for six road segments after on-street parking has been eliminated in a before-and-after study of curbside parking prohibition on arterial streets in the city of Hamilton, Ontario (8).

However, there have also been some contrary results. For example, an extensive Copenhagen study on the provision of bicycle lanes found an increase in crashes and injuries as a result of the prohibition of on-street parking to make way for bicycle lanes (9). The study indicated that the prohibition of curbside parking shifted parking onto side streets, which increased turning traffic. The issue of providing, maintaining, or prohibiting curbside parking should be considered not only in terms of total crashes but also in the context of the land use and traffic priority of the roadway section. If the purpose is to calm traffic and reduce the operating speeds of traversing vehicles so that pedestrians and other road users may feel confident to share the road with moving traffic, then allowing for on-street parking may be favorable. To date, few studies have been conducted that examine these issues of context and operating speed on the safety of on-street parking.

TOWN CENTER PARKING STUDY

The groundwork for this investigation of on-street parking was derived from a combination of two separate research efforts. This first study focused on parking in six New England town centers. The second study explored the effect of roadside design features on driver speeds and safety from over 250 roadway segments located in Connecticut.

Town Center Parking Study Methodology

The following three case study sites were chosen because they can be characterized by having traditional mixed land uses supported by a fee-based, organized system of parking featuring on-street parking along most streets:

Traditional Sites

1. Brattleboro, VT
2. Northampton, MA
3. West Hartford, CT

We then selected the following three more contemporary sites supported by free, privately-owned surface parking lots with similar land areas and land uses. Both sets of sites are in towns with similar income levels and demographics:

Contemporary Sites

1. Avon, CT
2. Glastonbury, CT
3. Somerset Square in Glastonbury, CT

Two of the three contemporary sites had no on-street parking and the third possessed on-street parking along less than half of one side of one street. This instance of on-street parking constituted approximately 3.6% of the parking in that single activity center. Overall, on-street parking accounted for 1.1% of the total parking at the contemporary sites and over 11.0% at the traditional sites.

Following site selection, we established a boundary around each town center to designate the area of interest. The boundary lines incorporated each activity center's commercial district and any nearby parking lots meant to serve the downtown. We then gathered data detailing the provision of parking within each town center. Each lot was mapped and categorized by the parking type. Parking lot types were initially broken into two main categories: public and private. The public municipal parking lots consisted of on-street parking spaces and off-street parking spaces, including both surface lots and structured garages. The private parking lots were open to the public and normally outdoor surface lots.

We collected land use data in terms of retail space, office space, and residential units for comparison with each town's parking regulations and with the Institute of Transportation Engineers manual on parking generation. The majority of on-site work consisted of parking lot occupancy counts carried out a minimum of five times at each site. This was done in an effort to collect what could be considered a typical peak usage as well as an average non-peak occupancy. Peak demand counts were principally collected during the busy holiday shopping season. We also counted the total number of pedestrians per site in conjunction with one parking occupancy count at each site in order to gauge the level of on-site activity.

The initial research paper detailed the amount of parking provided by each town in contrast with the amount required by zoning regulations and actual demand. Overall, the traditional sites provided less parking, used less parking, and used what parking they did have more efficiently in terms of occupancy as compared to the more contemporary sites (10). Every site provided less parking than required by the zoning regulations. The traditional sites provided approximately 45% of the parking required in the base regulations while the contemporary sites provided 79%. And even though all the sites provided less parking than required, we found a peak demand of just below 80% of the parking provided at the traditional sites while the contemporary sites were less than half full at peak. In addition to occupancy efficiency, the traditional sites were also less wasteful in terms of land dedicated to parking. For additional background information regarding the town center parking study, including topics such as land use, parking lot location, and pricing, please refer to the earlier paper (10).

Town Center Parking Study Results

Parking Demand

Based on a study of six town centers, the on-street parking spaces represented the most valuable parking spaces to the patrons of those activity centers. Table 1 displays these results.

The on-street parking spaces were consistently in highest demand. This was true even though the on-street parking spaces charged higher fees than the off-street parking and had the shortest maximum time allotments. This combination of higher fees and the shortest maximum time allotment seemed to maintain high turnover in these most convenient spaces without negatively impacting usage. The goal of the parking fees in general, especially for the off-street surface parking lots, seemed to be focused more on parking management and less on maximizing revenue. Nevertheless, parking demand for the on-street parking was consistently higher than the off-street and garage parking lots.

Land Use

One often overlooked fact in assessing parking is its efficiency in terms of both land use and cost. Our data for the six centers shows that on-street parking is by far the most cost efficient way to provide parking. In comparison to parking in a surface lot, on-street parking typically uses less than 176 SF (maximum space size is approximately 8 feet by 22 feet) per space compared to 513 SF for each space in a surface lot. These values confirm the parking space land requirements estimated by Litman and Shoup that were discussed in the literature review. The difference is caused by the need to provide single purpose driveways, access lanes, and often, landscaped islands for off-street surface lots. Although these features are necessities for off-street surface lots, they do result in significant land consumption. Figure 1 shows elements of this land consumption for an off-street surface parking lot compared to the much more efficient land use associated with on-street parking. Taking this difference in land utilization into account highlights the important role that on-street parking plays in ensuring that enough land is available in the center for more productive uses. To illustrate the point, if a town center with approximately 2,000 parking spaces, similar to our town centers, were able to provide 15% of their parking curbside instead of with off-street surface lots, they would save over 2.3 acres of land.

One outcome of being able to minimize unnecessary land used for parking is being able to devote more land to development. In fact, the traditional sites ended up having:

- 58% greater building density,

- 176% greater floor to area ratio, and
- 90% more leasable building space in each of those town centers.

The third approach to providing parking is through the use of parking garages. Parking garages use much less land area than either on-street parking or surface lots. Given that each of our traditional town centers also had one parking garage, this played a role in the increased development numbers. The trade-off in this case was in the high cost of constructing and maintaining the parking garage. For example, in looking at Brattleboro's 305-space parking garage, the cost of each parking space was approximately $29,508 in 2004 dollars (11). However, the true number of cars added by a parking structure should subtract the number of off-street surface lot spaces the same parcel of land could accommodate (1). As a result, the actual cost per parking space added to a town center by a parking garage is even higher.

Added congestion is often considered to be one of the costs associated with on-street parking. In reality, this is not a big price for most cities to pay. Various researchers, primarily studying road diet conversions, have shown that under most traffic conditions, actual road capacity is largely controlled by the capacity of the signalized intersections (12-14). Left-turn lanes and cross street traffic volumes have more to do with the throughput of a road than the number of lanes devoted to moving traffic or the reduction in speeds caused by the parking of vehicles. Additionally, most urban settings embrace the vitality of the pedestrian environment created by slower moving vehicles along the street segments. This vitality means that more people are choosing to walk (i.e. treating the area as a park once center), which works to reduce the amount of vehicle traffic that needs to be accommodated in the town center.

Assessment of the Pedestrian Environment

On-street parking is just one of many mechanisms that helps create a specific atmosphere in an activity center. Other factors that have been discussed in the literature include: street design, pedestrian connections, dense (and hence, compact) development, land use mixture, building orientation with respect to the street, setback requirements, and vehicle speeds; the combination of which, incorporated with on-street parking, can help create the desired town center atmosphere. In fact, the concept of on-street parking can easily be misapplied without taking into account the contribution of these supporting features.

Ideally in a study of this nature, it would be nice to find centers with various combinations of some features and not others, in order to separate out the contribution of each individual feature to the performance of the street and center. Unfortunately in our study design phase, we found this very difficult to achieve, especially given the resources available for carrying out the project. But even with unlimited resources, our experience suggests that it would be a challenge to find centers with certain combinations of these features and not others. In general, on-street parking came as part of a package with these other features including compact development and mixed land use. Therefore, in assessing the pedestrian environment we need to be cognizant of the fact that the differences in the pedestrian environments seen are attributable to a larger number of complementary factors, of which on-street parking is just one.

In assessing the pedestrian environments, the first thing we looked at was how the centers were being used. What we found was that the centers with on-street parking and other compatible features, including compact development, pedestrian connections, and street-oriented buildings, were much more vibrant in terms of pedestrian activities. Our data showed that the traditional sites with on-street and other supporting conditions had more than six times the

number of pedestrians walking around the site at similar times on similar days. The contemporary sites averaged fewer than 50 pedestrians while the traditional sites averaged well over 300 pedestrians. These counts represent a snapshot of the number of pedestrians per site.

A part (but not all) of the explanation for this discrepancy is the difference in modes used for accessing the sites. We questioned site users about the mode by which they traveled to the town centers and compared this information with mode choice worker data from the 2000 Census Transportation Planning Package (CTPP) for each location (15). The user survey data at the contemporary sites matched up remarkably well with the census data for a moderately sized survey. Table 2 highlights this information. Although the automobile was the prevailing mode choice for all the sites, almost 25% of those traveling to the traditional sites did not use a car compared to just 9% at the contemporary sites.

Public transportation was used almost five times more at the traditional sites; this difference was noteworthy because all the sites had similar levels of bus transit available. Non-motorized walking and bicycling trips comprised the remaining mode choices. Bike use reached 2.5% at the traditional sites compared to almost none at the contemporary sites. Other than driving, walking was the next most popular mode. The user survey found that almost 15% of trips to the traditional sites were walking trips while people at the sites without on-street parking walked less than half that rate at 7.4%.

Most trips to the sites were for shopping purposes, based upon our user surveys. For this reason, we compared the mode choice results to the U.S. average for shopping trips found in the 2001 National Household Travel Survey (NHTS) (16). This comparison showed not only how closely the user survey for the contemporary sites mirrored the national averages, but also how extraordinary the traditional sites turned out to be. Overall, the users of the traditional sites walked more than twice the national average, used public transit more than four times the national average, and biked more than eight times the national average. Furthermore, the survey found that users of the traditional sites tended to always park once and walk to multiple errands, as opposed to those at the contemporary sites who only did so sporadically. Again, these trends are not directly attributable to on-street parking; however, the presence and use of on-street parking seemed to help contribute to differences in how the places functioned and how these places were used.

The considerable difference in terms of pedestrian activities in the centers is one way of assessing the comparative pedestrian environments. However, we also used established measures of pedestrian levels of service to quantify this difference. Based upon the pedestrian level of service model developed by Landis and the Florida Department of Transportation, the level of service for the major streets in all three sites with on-street parking and other compatible factors was LOS B. Alternatively, the major streets in the three sites without on-street parking were LOS C, C and D, respectively. This quantitative measure of the pedestrian environment correlated well with the level of pedestrian activity observed. However, this LOS measure does not seem to fully capture the qualitative difference in the pedestrian environment across the six centers.

SPEED AND SAFETY STUDY

The second portion of this paper investigated the impact of on-street parking on vehicle speed and traffic safety based upon over 250 roadway segments located in Connecticut.

Speed and Safety Study Methodology

This study focused on identifying elements of the roadway and the driving environment that significantly influenced drivers' choice of speed. The predictor parameters of interest in this study were roadway type, land use type, posted speed limit, lane width, roadway width and shoulder width where present, on-street parking, planting strips, road edge delineation, side curbs, and medians. Other variables of interest in the study included the presence of sidewalks. For each site, a minimum of 100 free flowing vehicles speeds were measured to represent the speed profile of the site. The estimated mean free flow speed was measured as the dependent variable. The study suggested a strong correlation between free flow speed and on-street parking.

On-street parking was measured at three levels of occupancy of the roadside with parking: 50 - 100%, 30 - 50% and less than 30%. We determined that the 50 - 100% and the 30 - 50% levels did not show any statistical difference in the mean free flow speeds and were therefore merged into a single level recorded as significant on-street parking. The third level of less than 30% on-street parking was found not to be significant in affecting the free flow speeds of the sites. The segment lengths of the roadways were determined by the consistency of the variables we were interested in for the study. Segments began and ended with the presence and/or termination of any or all of the variables mentioned. One of the observations noted during field data collection was that on-street parking was typically present or permitted at sites with a reasonably high level of pedestrian activity. For more background information regarding the speed study, please refer to the original paper (17).

Free flow speed was used to ensure that the presence of other vehicles did not influence the drivers' choice of speed. The assumption we made was that a driver's chosen speed is influenced only by the road and roadside conditions. For streets with significant on-street parking, the parking environment is the most prominent feature in the drivers' perception. In extracting the severity levels from the crash records, the severest injury for each crash was assigned as the severity level of that crash. Due to the naturally rare occurrence of crashes, we aggregated the crashes for each road segment over a six-year period (1998-2003) so as to attain a reasonable count for statistical analysis.

Speed and Safety Study Results

Operating Speed and On-Street Parking

Our study was conducted to determine the factors affecting the speed selected by drivers given the design of the road cross-section and the roadway environment. Preliminary analysis of the data showed that it was useful to characterize the roadway into two types based upon a package of cross-section design features. The two roadways types were designated 'streets' and 'highways'. The street type was typical of roadways found in an urban environment while highway types were more characteristic of rural areas. With our definition, the primary distinction between streets and highways was that streets have no edge striping delineating shoulders while highways had shoulders. In addition, streets typically had raised, continuous,

and non-mountable curbs while highways mostly had mountable and intermittent curbs for drainage purposes. Streets also often had on-street parking while highways often did not. These patterns however were not consistent for Connecticut since highway type facilities were often found in an urban context where on-street parking might be appropriate.

Our study using analysis of variance (ANOVA) indicated that the design of the roadway and the road environment characteristics affected mean free flow speed on roadway segments (17). Overall, the model explained about 80% of the variability in the mean free speeds chosen by drivers. One of the most important predictors of speed was road type – in other words, whether the road was a street or a highway. Parameter estimates indicated that streets compared to highways resulted in speed reductions of about 1.5 mph. However, other factors were also significant in affecting the chosen speed. These factors included land use type, posted speed limit, building setback, the presence of a vegetated strip, and the presence of on-street parking. Table 3 displays these results.

For building setbacks, small setbacks registered a reduction in mean free flow speed of 1.48 and 1.50 mph as compared to speeds on roadway segments with large setbacks. Similarly, the free flow speed on streets with on-street parking found a reduction in speed of about 2.3 mph as compared to streets without on-street parking. The study showed that the largest decrease in speed occurred on those roadways with a combination of factors complementary to a 'street' type facility with smaller building setbacks and on-street parking. It was interesting to note that the three traditional centers in the town center parking study all exhibited these basic characteristics.

Road Safety and On-Street Parking

In our study of speed and road design, we also collected data on the traffic safety of the road segments. In order to examine the relative safety of roads with on-street parking, we focused just on the roads that we defined as 'streets' and not those that we defined as 'highways'. The reason for this was that a third of the streets had a significant level of parking compared to only about 3% of the sites classified as highways. As such, we did not possess a large enough sample of highways with parking to conduct a statistically rigorous analysis.

Previous studies of safety and on-street parking did not distinguish between high speed and low speed environments and did not separate crashes by severity. In our study, we did both. We separated the streets into low-speed and high-speed facilities, analyzing them separately. We used 35 mph as this delineation point since we found a very different outcome for facilities with speeds less than 35 mph versus those with speeds greater than 35 mph. For example, we found that all the recorded vehicular fatalities occurred on facilities with speeds greater than 35 mph.

Table 4 summarizes the results of the road safety analysis. The results are given in terms of crash rate per mile per site for i) low speed streets with parking, ii) high speed streets with parking, iii) low speed streets with no parking, and iv) high speed streets with no parking, respectively. The numbers represent crash data aggregated for a six-year study period. We found that low speed streets with parking had by far the lowest rate per mile of fatal and severe crashes but not the lowest rate for all types of crashes. In other words, over 96% of crashes that occurred on low speed streets with parking resulted in either a minor injury or property damage only crash while only 4% of the crashes on these low speed streets resulted in severe injuries. On low speed streets without parking, 10% of the crashes resulted in fatality or severe injuries. It is equally important to note that high speed streets with parking generally had higher crash rates at all severity levels than all other street categories (it should however be pointed out that only five street segments in our study fell into this category). However, this large discrepancy in

safety outcomes between low speed and high speed streets with parking might be one of the reasons why our results differ from previous research where no distinction was made on the basis of roadway speed.

These results point to the importance of considering context in assessing the potential for on-street parking because a low speed environment for on-street parking appears to be critical in ensuring safe use. Current thinking in street design supports this distinction. For example, the new ITE/CNU manual also recommends speeds of less than 35 mph for streets with on-street parking (18). In Europe, speeds on urban streets are often kept at less than 20 mph (19). Our results suggest than under these low speed conditions, on-street parking helps improve safety, and in particular, these roads with on-street parking show a significantly reduced crash rate for the most severe types of crashes.

Our results show that streets can be actively designed to limit speed. The provision of on-street parking is one factor that helps to reduce speeds, but on-street parking by itself is not enough. In fact, on-street parking without the other supportive conditions may be counter-productive and result in extremely unsafe conditions. This suggests that for the best results in terms of creating safe low-speed conditions, on-street parking should be part of a package that includes a 'street' type design (i.e. no shoulders, raised curbs, small building setbacks, sidewalks, and vegetated buffer strips).

CONCLUSION

Our investigation points to on-street parking as playing a crucial role in benefiting activity centers on numerous levels. Users of the downtowns consistently selected on-street parking spaces over and above less expensive off-street surface lots and garage parking. These shared on-street spaces served a wide variety of uses while experiencing the most use and the most turnover. On-street parking also resulted in a more efficient use of land. Using the curbside for parking saves considerable amounts of land from life as an off-street surface parking lot; with land being a limited resource, this issue is particularly important in areas where density and high activity are desired. Therefore, the benefit of being able to conserve over two acres of land in small to medium town centers by providing parking on the street rather than with an off-street surface lot is immense. This efficiency in land use can allow for a much higher density commercial development than is possible if the center is to rely solely on off-street surface lots to meet all its parking needs.

Based on the observed variation in activity patterns in the centers we studied, on-street parking offers pedestrians a safer and more comfortable environment. The strip of parked vehicles along the curbside serves as a buffer to pedestrian activities immediately beyond the curbside. Our study results showed that centers with on-street parking and other compatible characteristics, such as mixed land use and higher density, recorded more than six times the number of pedestrians walking around compared to the more contemporary sites, which in general lacked these traits. All other things being equal, higher density developments with fewer large, half-empty off-street surface lots to traverse are intrinsically more walkable. These types of advantages are factors in creating vibrant places where more people walk and bike both to, and within, the town centers.

Our results suggest that on-street parking can also help to create a safer environment. While this statement seems to contradict some existing research, the reality is that lower speed roads (less than 35 mph) with on-street parking have far less severe and fatal crashes. In fact, lower speed streets without parking had a severe and fatal crash rate more than two times higher than the streets with parking. We also showed conclusively that drivers tended to travel slower in the presence of features such as on-street parking and small building setbacks. Slower vehicle speeds provide pedestrians, cyclists, and drivers more time to react, and when a crash does occur, the chance of it being life-threatening is greatly reduced.

Considering the current trend towards harmonizing the conflicting demands of transportation facilities, the results of this study could inform our efforts in creating pedestrian friendly streetscapes that support vibrant centers. On-street parking is not purely a device to be used in the right environment; rather, it is also a tool to help create that right environment. On-street parking should be used more commonly but especially in situations where the street is part of the destination and where the intent is to get drivers to slow down and recognize that they have reached a place. Our results showed that these places with on-street parking tended to be safer, more walkable, require less parking, and have much more vitality.

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LIST OF TABLES AND FIGURES

TABLE 1 Parking Occupancy

	Peak Occupancy	Avg. Non-Peak Occupancy
On-Street Parking	94.5%	81.6%
Off-Street Surface Parking	59.2%	48.8%
Structured Garage Parking	75.5%	49.4%

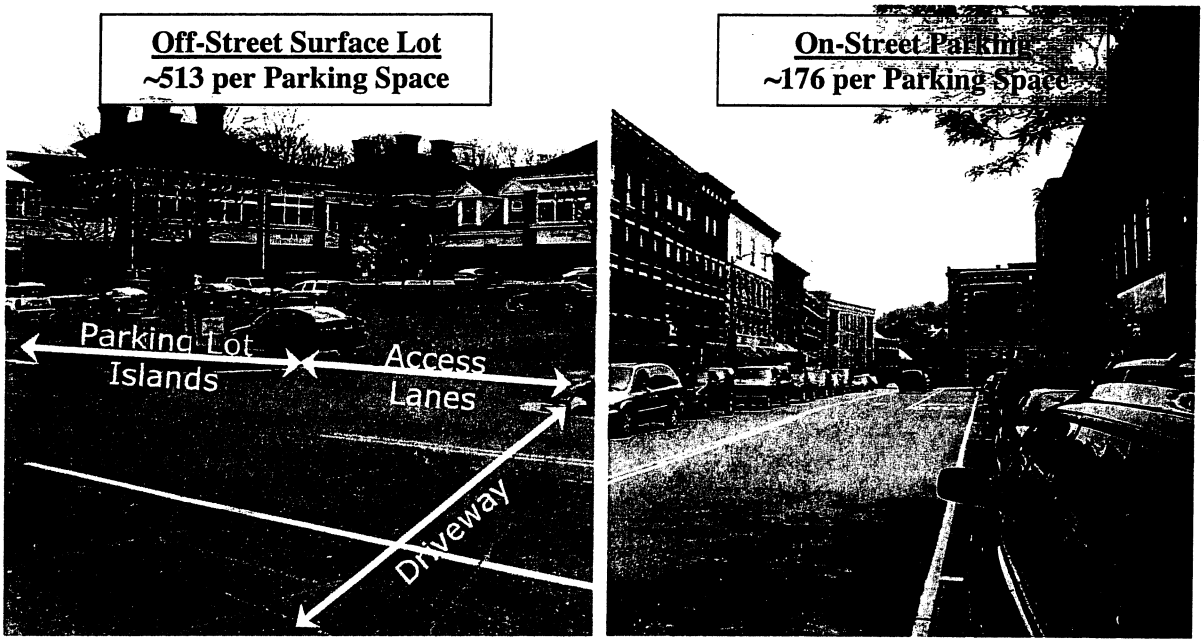

FIGURE 1 Land use of off-street vs. on-street parking

TABLE 2 Mode Choice

	User Survey		2000 Census by Town for Work Trips		U.S. Average (2001 NHTS)
MODE	Contemporary Sites	Traditional Sites	Contemporary Sites	Traditional Sites	Shopping Trips
% Driving	91.0%	75.2%	92.1%	83.4%	91.5%
% Public Transit	1.4%	6.9%	1.1%	2.3%	1.4%
% Bicycling	0.2%	2.5%	0.4%	1.6%	0.3%
% Walking	7.4%	14.8%	0.7%	8.3%	6.5%

TABLE 3 Vehicle Speed Full ANOVA Table

Source	Type III SS	Degrees of Freedom	Mean Square	F	Significance
Corrected Model	5483.890 (a)	14	391.706	66.027	0.000
Intercept	51858.064	1	51858.064	8741.336	0.000
Posted Speed Limit	860.154	4	215.039	36.247	0.000
Roadway Type	55.683	1	55.683	9.386	0.002
Land Use	351.174	5	70.235	11.839	0.000
Presence of On-Street Parking	42.292	2	21.146	3.564	0.030
Building Setback	87.053	2	43.527	7.337	0.001
Error	1477.195	249	5.933		
Total	426492.639	264			
Corrected Total	6961.085	263			

$R^2 = 0.796$ (Adjusted $R^2 = 0.781$)

TABLE 4 Crash Rates for Street Types

	Actual Speed	No. of Sites	Total Miles	Crash Rate / Mile / Site (1998 - 2003) Fatal	Severe	Minor	PDO	All
Parking	Low Speed (<35 mph)	13	3.06	0 (0%)	11.1 (3.8%)	47.7 (16.5%)	231.1 (79.7%)	289.9 (100%)
	High Speed (35-40 mph)	5	1.45	0.7 (0.2%)	29.0 (8.5%)	89.7 (26.2%)	222.8 (65.1%)	342.1 (100%)
No Parking	Low Speed (<35 mph)	13	2.36	0 (0%)	28.0 (10.4%)	48.3 (18.0%)	192.0 (71.6%)	268.2 (100%)
	High Speed (35-40 mph)	24	5.12	0.2 (0.1%)	17.2 (9.7%)	44.7 (25.3%)	114.8 (64.9%)	177.0 (100%)

The Effects of Traditional Versus Contemporary Urban Form on Parking: A Case Study of New England Centers

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ABSTRACT

In this paper we look at the influence of specific urban design factors on parking in three traditional and three contemporary New England commercial centers. We found that the character and structure of the centers in terms of building density, street and sidewalk design, and the management and organization of parking as well as the population densities and street structure of the surrounding neighborhoods result in very different transportation outcomes. Nearly 25% of the users at the traditional downtowns travel by means other than the automobile compared to only 9% at the contemporary sites. Additionally, 70% of those at the traditional sites always park once and walk to multiple errands while only 25% of the people at the contemporary places did so. These differences resulted in traditional centers that were much more vibrant than their contemporary counterparts; in fact, the traditional centers had 250 more pedestrians on their streets at any one time and averaged 1.80 people per car on site compared to only 1.06 people per car at the contemporary sites.

1. INTRODUCTION

In this paper we examine how urban design factors affect parking in six small New England commercial centers. Three of these centers, Brattleboro, VT, Northampton, MA and West Hartford, CT, are traditional New England downtowns with mixed land uses supported by an organized system of parking. The other three, Avon Center, CT, Glastonbury Center, CT and Somerset Square in Glastonbury, CT, are more contemporary, automobile-oriented sites that are of similar size to the traditional centers. The specific urban design factors that were compared included

- The character and structure of the centers in terms of building density, street and sidewalk design, and the management and organization of parking,
- The neighborhoods and street network of the surrounding residential areas in terms of population densities and street structure.

We collected data to characterize the supply, management and usage of parking, mode choice for travel to the centers, and level of pedestrian activities for each site. Finally, we conducted on-site surveys to characterize how users perceive and use the sites. This data helped assess whether or not there are systematic differences in parking between the traditional and contemporary centers.

2. BACKGROUND

For decades, we have allowed minimum parking requirements to shape how we build our urban centers even though we know that urban character should be the controlling factor. In his recent book titled *Parking Management Best Practices*, Litman explains how urban design factors might affect parking demand (1). He rationalizes that better urbanity and improved walking conditions help increase the functional parking supply by extending the effect of shared parking. In fact, he suggests reducing parking requirements by 5 to 15% in more walkable areas where people have the ability to park once and walk to multiple errands. The problem is that very few if any studies quantify these concepts.

Most parking ordinances are based on those from nearby towns or reference books such as the ITE *Parking Generation* manual. While the introduction to *Parking Generation* mentions that land use density, pedestrian-friendly design, and multi-stop trip making have the potential to influence parking, ITE makes no attempt to quantify or even give informal instructions as how to account for such factors. And although the latest edition of the manual is beginning to categorize parking demand for single land uses into one of five area types (rural, suburban, suburban center, central city, and central business district), the ITE approach continues to focus on gathering more data (2). The bigger issue is that even with more data points, this approach still fails to truly consider the effect of urban design on parking.

Knowledge of the relationship between urbanism and parking has been around far longer than the regulations themselves. In fact, the Highway Research Board's 1971 book on the principles of parking supports most of Litman's ideas about how urban design affects parking. Repeatedly ignoring the intricacies of this connection has pushed us into the predicament where we continue to allow parking to control the urban form. Our goal is to reset this balance by conducting research that investigates the extent to which urban design is important in parking for the six New England centers we studied.

3. CHARACTER & STRUCTURE OF THE CENTERS

We compared the urban character of the traditional and contemporary centers by looking for differences in character and structure in terms of land use density, how the parking lots are managed and organized, and in the design of the streets and sidewalks. These differences are summarized in the following sections.

3.1 Density Within the Town Centers

There were distinct differences in both land use densities and floor area ratios (FAR) between the traditional and contemporary sites. The traditional sites achieved higher density and provided more usable building space. Table 1 shows that the building density was nearly 58% higher for the traditional sites and the FAR was 176% greater. These higher densities at the traditional sites resulted in over 90% more leasable building space.

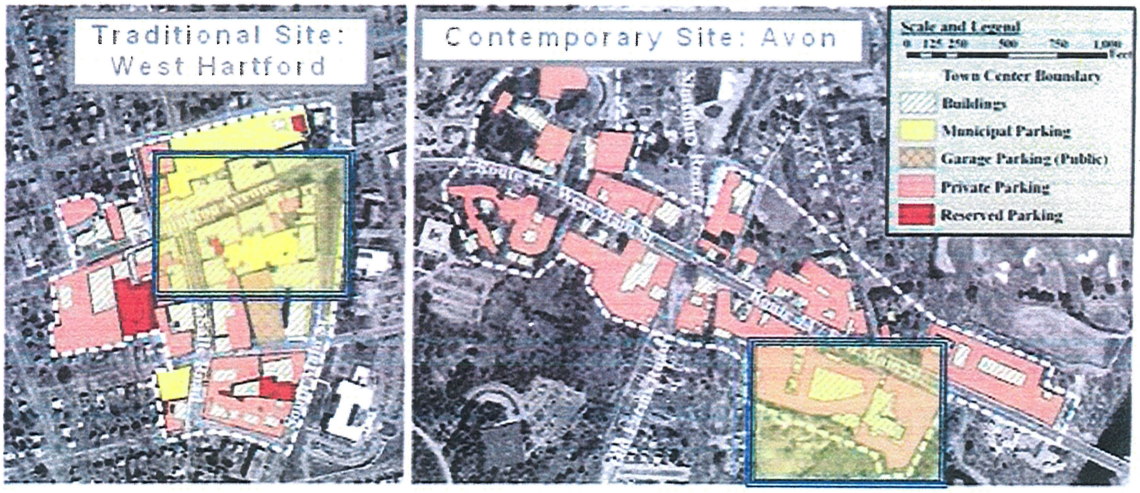
Table 1 Characteristics of the Contemporary & Traditional Sites

	CONTEMPORARY SITE AVERAGE	TRADITIONAL SITE AVERAGE	DIFFERENCE
TOWN CENTER COMPARISON			
Total Downtown Land Area	2,573,432 SF	2,010,601 SF	-21.9%
Total Building Footprint	392,065 SF	492,239 SF	25.6%
Total Building Space	460,598 SF	869,487 SF	88.8%
Building Density	0.16	0.25	57.9%
Floor Area Ratio	0.17	0.47	175.7%
Pedestrian Level of Service	3.09 = C	2.38 = B	-23.0%
WALKABLE ZONE COMPARISON			
Walkable Zone Population	2,049	8,328	306.5%
Walkable Zone Area (sq. mi.)	2.6	2.2	-15.1%
Walkable Zone Density (pop. / sq. mi.)	802.7	3764.5	369.0%
Total Length of Highways (mi.)	1.36	0.63	-53.9%
Total Length of Major Roads (mi.)	1.61	3.06	90.7%
Total Length of Minor Roads (mi.)	11.11	19.75	77.8%
Minor Road Density (street miles / sq. mi.)	4.26	8.91	109.3%
Minor-Major Road Ratio	4.14	11.07	167.6%
Total No. of Intersections	103.50	218.67	111.3%
Intersection Density (intersections / sq. mi.)	39.66	98.65	148.8%
Total No. of Dead Ends	19.50	25.33	29.9%
Dead-End Density (dead ends / sq. mi.)	7.47	11.43	53.0%
Intersection-Dead End Ratio	5.32	16.04	201.5%
TOWN COMPARISON			
Town Population	26,528	34,857	31.4%
Town Area (sq. mi.)	42.6	30.2	-29.2%
Town Density (pop. / sq. mi.)	622.6	1154.7	85.5%
Density of Walkable Zone Vs. Town	28.9%	226.0%	681.2%

3.2 Management & Organization of Parking

The traditional sites supplied a broad range of parking options with on-street parking, private and municipal off-street surface parking, and a parking garage at each site. Parking at the contemporary sites was predominantly privately-owned, off-street, surface lots. Figure 1 depicts these parking lot types for one traditional and one contemporary site. Municipal spaces made up more than half of the parking at the traditional centers. In terms of layout, the surface lots at the contemporary sites surrounded and separated buildings. Conversely, the surface parking lots at traditional sites were often located mid-block, which typically allowed for a single lot to supply a greater number of buildings.

Figure 1 Traditional & Contemporary Site Parking Lot Types Comparison



NUMBER OF PARKING SPACES BY LOT TYPE

	Municipal Parking						
	On-Street Parking	Off-Street Surface Lots	Garage Parking	Private Parking	Reserved Parking	Total Number of Spaces Provided	Percent Municipal Spaces
West Hartford	250	470	715	691	380	2506	57.3%
Avon	0	0	0	1273	98	1371	0%

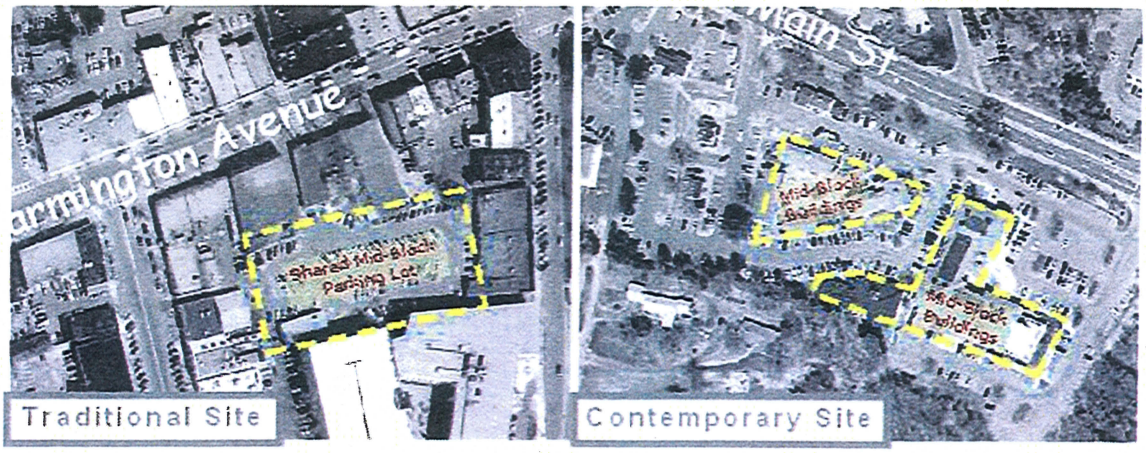
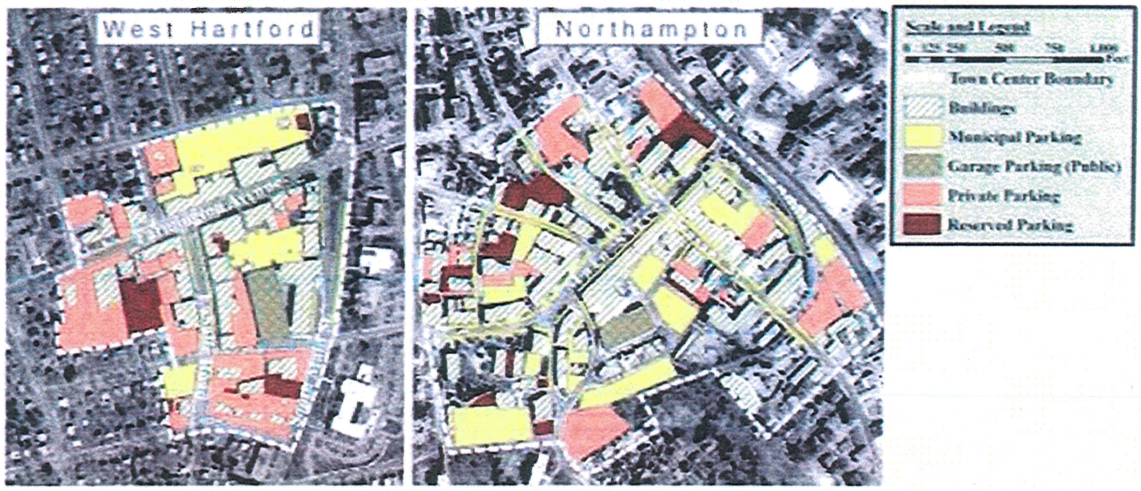


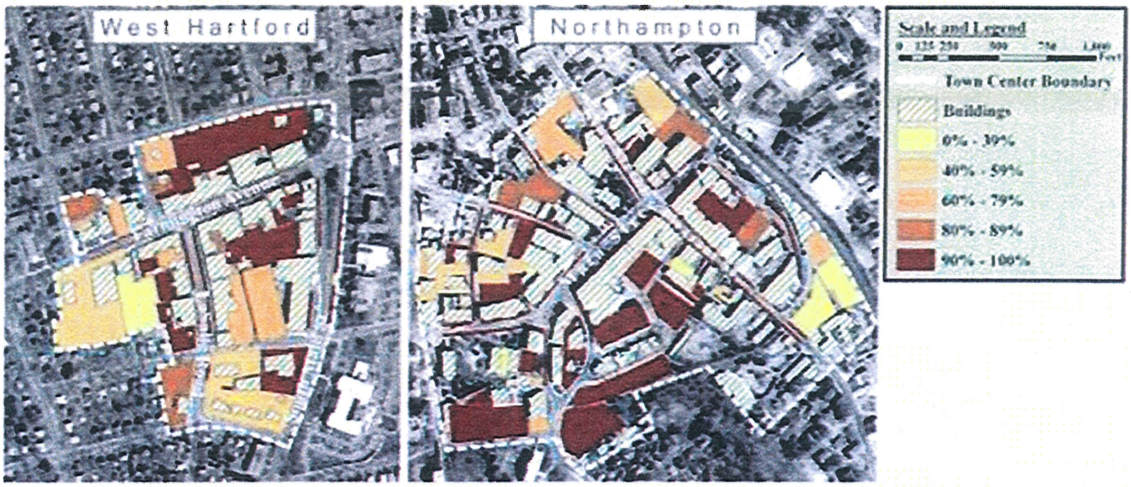
Figure 2 illustrates parking lot types and peak occupancy counts for two traditional sites. Overall, municipal parking experiences the greatest demand. At a peak occupancy, these shared, often centralized, spaces were over 90% full while the private spaces were less than 60% full.

Figure 2 Parking Lots Types & Demand for Traditional Sites



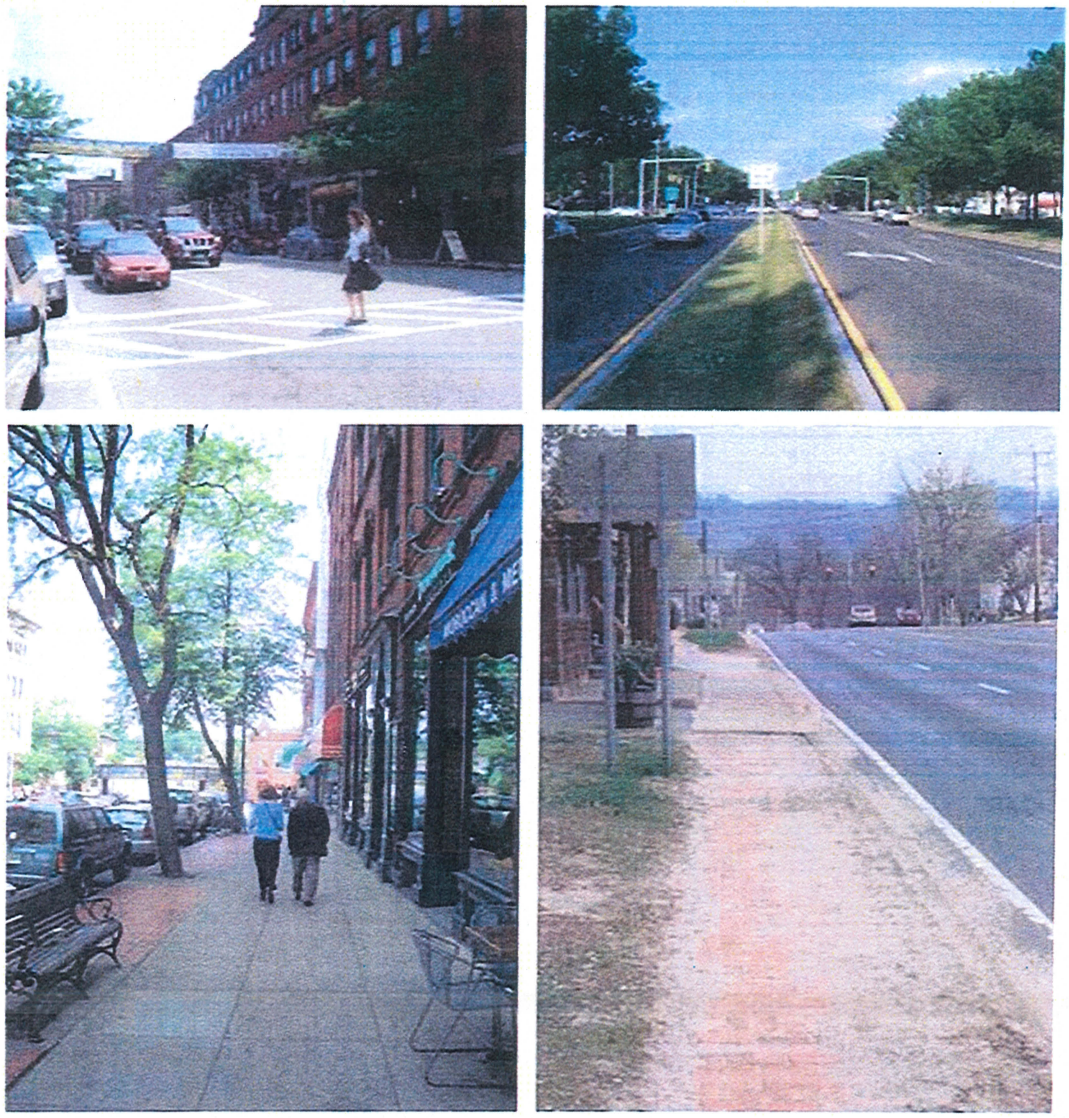
CHARACTERIZATION OF THE PROVISION OF PARKING

	Municipal Parking					Percent Municipal Spaces
	On-Street Parking	Off-Street Surface Lots	Garage Parking	Private Parking	Total No. of Parking Spaces	
West Hartford						
No. of Spaces	250	470	715	1071	2506	57.3%
% of Total Spaces	10.0%	18.8%	28.5%	42.7%	-	
Peak Demand % Occupancy	**98.8%**	**97.9%**	**68.1%**	**57.1%**	**72.1%**	
Northampton						
No. of Spaces	309	548	394	1034	2359	54.7%
% of Total Spaces	13%	23%	17%	43.8%	-	
Peak Demand % Occupancy	**98.7%**	**98.9%**	**100.0%**	**62.0%**	**85.9%**	



3.3 Street & Sidewalk Design

Figure 3 Traditional & Contemporary Site Street & Sidewalk Comparison



Traditional Site
Street & Sidewalk

Contemporary Site
Street & Sidewalk

Figure 3 depicts the disparities between the typical streets and sidewalks through the traditional and contemporary sites. The pedestrian environments were very different even though every site featured high intensity automobile traffic. In many cases, the streets shaping the contemporary sites served as significant pedestrian obstacles. With regard to consistency, the sidewalks at the traditional sites were typically wide with high connectivity throughout the entire center. Alternatively, the contemporary sites provided wide, landscaped walkways within

individual plazas but rarely were the sidewalks continuous between plazas. Figure 4 shows some typical traditional site pedestrian connections from a mid-block parking lot.

Figure 4 Pedestrian Connections from Mid-Block Parking for a Traditional Site

The major streets at each of the traditional site received a level of service (LOS) B based upon the popular Landis model while two contemporary sites received LOS C and the third LOS D as shown in Table 1. These values indicate that the traditional sites provide pedestrians with safer and more comfortable surroundings, results further confirmed by the user survey that we discuss later in this paper (3).

4. THE WALKABLE ZONE

Another set of factors potentially influencing parking is the makeup of the surrounding residential zones (especially the areas within a reasonable half-mile walking distance) and the extent to which they are connected to the commercial centers (4). The half-mile zones were adjusted to exclude areas beyond major pedestrian obstructions such as highways or rivers.

Figure 5 Walkable Zone Street Structure Comparison

4.1 Density Around the Town Centers

Overall, Table 1 shows that the 1/2-mile walkable zones surrounding all the town centers were denser in population when compared to the rest of the town. However, while the contemporary sites were only 27% denser, the traditional towns were over 180% denser than the rest of their respective towns. Secondly, the traditional walkable zones were 369% denser in population than the contemporary site walkable zones. This was the case even though the traditional towns themselves were only slightly more than twice as dense. Consequently, more than 6,200 additional people lived within walking distance of each of the traditional town centers.

4.2 Street Structure

Table 1 also quantifies the walking environment based upon the surrounding road networks shown in Figure 5. The traditional sites averaged an 86% denser network of minor roads and almost double the total length of roads suitable for a pedestrian. In terms of the overall street network, the traditional sites had 111% more intersections and a 129% higher intersection density. The appreciably higher intersection density typically correlates to more direct pedestrian routes (5).

5. TRANSPORTATION RESULTS RELEVANT TO PARKING

The differences in the character and structure of the sites and surrounding neighborhoods corresponded with very different transportation results. The objective in this section is to determine the transportation choices of the users of these centers and how these decisions impact parking. When assessing the transportation outcomes, we need to bear in mind that urban design factors are interrelated; each feature is part of a total package that helps facilitate the functionality of the traditional sites.

5.1 Alternative Modes

While only 9% of those surveyed traveled to the contemporary sites via a mode other than the automobile, this number reached 25% for the traditional sites. Other than driving, walking was the most important mode in each of these town centers. Our user survey showed that at the traditional sites, almost 15% of trips to the town center were walking trips while at the contemporary sites, only 7 % walked to the site. Bike use reached 2.5% in the user survey at the traditional sites compared to a negligible bicycle use at the contemporary sites. In terms of public transportation, nearly 7% of those at the traditional sites used transit compared to only 1.4% at the contemporary sites. The difference was noteworthy because both the contemporary and traditional sites had similar levels of transit available (6).

We also compared the survey results to the U.S. average found in the 2001 National Household Travel Survey (NHTS) (7). The users of the traditional sites walked more than twice the national average, used public transit more than four times the national average, and biked more than eight times the national average. With an extra 15% of people reaching the town centers by means other than a car, this equates to a 15% reduction in the parking needed or 300 unnecessary parking spaces in the average 2,000-space center. Our research found that off-street surface parking averaged 525 SF per space (including driveways, access lanes, and parking lot islands); based upon this number, 300 unnecessary parking spaces could result in over 3.6 acres of land no longer needed for parking. When most surface lots cost between $3,000 and $5,000 per space, this would save between $900,000 and $1.5 million.

Table 2 Transportation Results Relevant to Parking

	CONTEMPORARY SITE AVERAGE	TRADITIONAL SITE AVERAGE	DIFFERENCE
MULTI-STOP TRIP MAKING			
Always Park Once & Walk	25%	70%	180.0%
Sometimes Park Once & Walk	43%	23%	-46.5%
Never Park Once & Walk	32%	7%	-78.1%
MODE CHOICE: U.S AVG. FOR SHOPPING TRIPS (2001 NHTS)			
Driving	91.5%		
Public Transit	1.4%		
Bicycling	0.3%		
Walking	6.5%		
MODE CHOICE: USER SURVEY			
Driving	91.0%	75.2%	-17.4%
Public Transit	1.4%	6.9%	392.9%
Bicycling	0.2%	2.5%	1150.0%
Walking	7.4%	14.8%	100.0%
MODE CHOICE: 2000 CENSUS WORK TRIPS BY TOWN			
Driving	92.1%	83.4%	-9.4%
Public Transit	1.1%	2.3%	109.1%
Bicycling	0.4%	1.6%	300.0%
Walking	0.7%	8.3%	1085.7%

5.2 Multi-Task Trip Making.

When asked whether they always, sometimes, or never park once and walked to multiple errands, over 70% of traditional site drivers said that they *always* compared to only 25% at the more contemporary sites. Furthermore, while only 7% of those at the traditional sites *never* parked once and walked, this number exceeded 32% at the more contemporary sites. Table 2 shows these results.

With regard to parking, this distinction is noteworthy. Parking once and running multiple errands within a downtown as opposed to driving from store to store results in less parking being required to accommodate the same activity; this is a more efficient use of resources. Litman suggested reducing parking requirements by 5 to 15% in more walkable communities where parking once and running multiple errands is favored. Our results suggest that this potential for increased efficiency in parking is far greater than 15%. If just 35% of users parked once and walked to only two destinations, we could reduce parking by that same percentage. In an average 2,000 space center, 35% less parking is 700 fewer spaces. This could save up to 8.4 acres of land and between $2.1 and $3.5 million for a typical surface lot.

5.3 Parking Supply & On-Site Activity

Combining the effects of the distinctions we found in mode choice and multi-task trip making between the traditional and contemporary sites, this greater degree of urbanity should be accompanied by at least 50% fewer parking spaces. In fact, this is exactly what the traditional sites did to the tune of 2.3 spaces provided per 1,000 SF of building space compared to 4.6 spaces per 1,000 SF of building space provided at the contemporary sites (6). Even at this rate of supply, the traditional sites did not even reach 80% capacity during a peak occupancy count, which suggests that the number of spaces provided could be reduced even more. It is interesting to note that the standard zoning regulations for both the traditional and contemporary towns required over 5 parking spaces per 1,000 SF of building space.

In terms of on-site activity, the traditional sites averaged over 300 pedestrians and the contemporary sites less than fifty as well as twice the number of people in stores on similar weekday afternoons. Combined with an estimate of the on-site employees, the traditional sites averaged 1,300 more people on site; a level of activity successfully sustained with only 400 more parked cars. This means that the traditional sites averaged 1.80 people per car on site compared to 1.06 people per car at the contemporary sites on a typical day.

6. CONCLUSIONS

Our research illustrates how some typical urban design factors influence parking. The character and structure of the traditional centers in terms of higher densities, shared mid-block municipal parking lots, and a better pedestrian environment help impact parking by increasing the opportunities and instances where town center users could park once and run multiple errands. These improving conditions that are favorable to multi-task trip making can reduce parking requirements by more than 35%.

The places that are able to provide significantly less parking with respect to the number of people on site were able to do so not only because of the character and structure of the centers themselves, but also that of the surrounding walkable zone. A center can effectively operate with less parking in situations where the opportunity to travel via mode other than the automobile exists. The traditional sites in our study possessed a higher density of residential development and a much denser network of minor roads. Such palpable differences resulted in over 15% more trips to the traditional centers by way of a mode other than the automobile and consequently far less parking.

At first glance, it might be surprising that these traditional town centers were able to attract 1,300 more people with only 400 more cars on site on an average day. Better urban design helps make this possible. Our results suggest that the supply of parking can reduced by more than 50% with only a moderate degree of urbanity. This difference in supply could result in saving twelve acres of land from life as a parking lot and between $3 and $5 million in construction costs, land and money that would better serve these downtowns in another fashion.

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