7. Ecological Footprint Study

CITY OF MADISON
INTER-DEPARTMENTAL
CORRESPONDENCE

DATE: October 18, 2005

TO: Brad Murphy, Michael Waidelich, Bill Fruhling, Dave Trowbridge
FROM: Rebecca Cnare
SUBJECT: **Street Width and Efficiency Discussion**

I have attached a few spreadsheets that outline some statistics and information regarding skinny streets and ecological footprints of streets/alleys in 4 different single family residential zoning classifications: R1, R2, R2T, R2Y

In order to fully grasp the essential information, I have boiled down the information into a few points:

Page 1: This page lays out the basic lot and development intensity for the four different zoning classifications.

- Section 'A' illustrates the gross area required to build a house and its associated ROW. For example:
  R1: min. lot 8000 ***sq ft***
  R1 including assoc. 32' street ROW: ***9885 Gross sq ft*** R1 w/ 28'ROW: ***9755 sq ft***

- Section 'B' determines the impervious footprint of the rights-of-way per dwelling unit for 32' and 28' streets, For example:
  R1 32' ROW: ***1525 sq ft*** per lot R1 28' ROW: ***1395 sq ft*** per lot

- Section 'C' determines the approximate impervious footprint of a house, garage and driveway per dwelling unit, as well as the total impervious footprint per dwelling unit. For example:
  R1 House/Garage/Driveway Footprint: ***2525 sq ft*** per lot
  R1 Total impervious footprint of private development plus a 32' ROW: ***4050 sq ft***

- This entire page, then, allows us to calculate the percentage of impervious area per dwelling unit for each zoning type for both 32 ft and 28 ft rights-of-way. For Example:
  R1 32' ROW: ***41%*** of gross lot area is impervious
  R1 28' ROW: ***40%*** of gross lot area is impervious

Page 2 and 3: Since these types of numbers are rarely intuitive, pages 2 and 3 try to put these numbers into a development perspective.

- Development 'Option 1'
  - Determines the amount of full build-out potential of each zoning type under 32' and 28' right-of-way conditions.
  - These figures essentially determining the efficiency of a 28 ft ROW vs. a 32 ft ROW.
- Development 'Option 2'
  - This development scenario determines the efficiency of higher density development for use in our TND ordinance. By using a static number of 158 units in a 40-acre site, we can see the efficiency of land use in the four zoning districts.
  - Even though R2Y has a higher percentage of impervious area per lot, the aggregation of lots proves to be a much more efficient and ecological sound use of land. The associated pie charts on page 3 illustrate this point.
    - 158 units in an R1 zone use all 40 acres and create a 37% impervious development.
    - 158 units in an R2Y zone use only 25 acres of land, and overall, is only 30% impervious.

Page 4:
This section tries to put the 'Alley question' into perspective. Often, adding an alley seems counter-intuitive to staving off the development of impervious surfaces. Why add an additional 12 feet of roadway to a development that already has a 32 ft street? It all comes down to the aggregate area of all private driveways required to front-load garages using existing setbacks.

- The aggregate area of driveways more than makes up for the additional paving of an alley.
- However, these calculations also have to take into account the added gross area needed to accommodate an alley, so more discussion is needed to determine when and where alleys are appropriate.

Page 5:
This section is the least intuitive, but interesting never the less. It tries to show the amount of development potential as compared to the amount of paving required in each zoning district.

STREET WIDTH DISCUSSION - PAGE 1

STREET EFFICIENCY & ECOLOGICAL FOOTPRINT

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		32 Foot Road Width				28 Foot Road Width			
		R1	R2	R2T	R2Y alley	R1	R2	R2T	R2Y alley
SECTION A - Lot Information									
Zoning	Min Lot Width (ft.)	65	50	44	40	65	50	44	40
Info	Garage Setback (driveway length in ft.)	30	30	20	2	30	30	20	2
	lot size (sq. ft.)	**8000**	**6000**	**5000**	**4000**	***8000***	***6000***	***5000***	***4000***
Street	*Sidewalk (5 ft)*	*325*	*250*	*220*	*200*	325	250	220	200
ROW	*Terrace (8 ft)*	*520*	*400*	*352*	*320*	520	400	352	320
	1/2 of Street (16ft or 14 ft)	1040	800	704	640	910	700	616	560
	sub-total street ROW (sq. ft.)	**1885**	**1450**	**1276**	**1160**	***1755***	***1350***	***1188***	***1080***
Alley	*Alley Terrace (5.5 ft)*	*n/a*	*n/a*	*n/a*	*220*	n/a	n/a	n/a	220
ROW	*Alley Gutter (1.5 ft)*	*n/a*	*n/a*	*n/a*	*60*	n/a	n/a	n/a	60
	1/2 of alley (6 ft)	*n/a*	*n/a*	*n/a*	*240*	n/a	n/a	n/a	240
	sub-total alley ROW (sq. ft.)	**n/a**	**n/a**	**n/a**	**520**	***n/a***	***n/a***	***n/a***	***520***
	Total Area of ROW (sq. ft.)	**1885**	**1450**	**1276**	**1680**	1755	1350	1188	1600
	Gross Land Area (sq. ft.) = Lot Size + ROWs	**9885**	**7450**	**6276**	**5680**	**9755**	**7350**	**6188**	**5600**

		32 Foot Road Width				28 Foot Road Width			
		R1	R2	R2T	R2Y alley	R1	R2	R2T	R2Y alley
SECTION B - Impervious Footprint of ROWs									
	(street, drive apron, sidewalk)								
Street	*City Sidewalk (5 ft)*	*325*	*250*	*220*	*200*	*325*	*250*	*220*	*200*
ROW	*Drive Apron (8 ft Front terrace x 20' wide)*	*160*	*160*	*160*	*n/a*	*160*	*160*	*160*	*n/a*
	1/2 of Street (16ft or 14ft)	*1040*	*800*	*704*	*640*	*910*	*700*	*616*	*560*
	sub-total	**1525**	**1210**	**1084**	**840**	**1395**	**1110**	**996**	**760**
Alley	*Drive Apron, Terrace: 20 ft wide x 5.5 ft*	*n/a*	*n/a*	*n/a*	*110*	*n/a*	*n/a*	*n/a*	*110*
ROW	*Alley Gutter (1.5 ft)*	*n/a*	*n/a*	*n/a*	*60*	*n/a*	*n/a*	*n/a*	*60*
	1/2 of alley (6 ft)	*n/a*	*n/a*	*n/a*	*240*	*n/a*	*n/a*	*n/a*	*240*
	sub-total	**n/a**	**n/a**	**n/a**	**410**	**n/a**	**n/a**	**n/a**	**410**
	Total Impervious Surface Area of ROW	**1525**	**1210**	**1084**	**1250**	**1395**	**1110**	**996**	**1170**
	Total Area of ROW	*1885*	*1450*	*1276*	*1680*	*1755*	*1350*	*1188*	*1600*
	% of impervious ROW surface	**81%**	**83%**	**85%**	**74%**	**79%**	**82%**	**84%**	**73%**
	units per acre (net: lot size only)	5.45	7.26	8.71	10.89	5.45	7.26	8.71	10.89
	units per acre (gross: lots + ROWs)	4.41	5.85	6.94	7.67	4.47	5.93	7.04	7.78

	32 Foot Road Width				28 Foot Road Width			
	R1	R2	R2T	R2Y alley	R1	R2	R2T	R2Y alley
SECTION C:								
Impervious Footprint of House, Driveway and Garage								
Garage (525 sq ft)	525	525	525	525	525	525	525	525
House footprint (1400 sq ft)	1400	1400	1400	1400	1400	1400	1400	1400
Front Driveway (20ft wide x front setback)	600	600	400	n/a	600	600	400	n/a
Alley Driveway (20ft wide x 2ft setback)	n/a	n/a	n/a	40	n/a	n/a	n/a	40
Sub-Total: House/Garage/Driveway Footprint	*2525*	*2525*	*2325*	*1965*	*2525*	*2525*	*2325*	*1965*
Previous Impervious Area of ROWs	*1525*	*1210*	*1084*	*1250*	*1395*	*1110*	*996*	*1170*
Total Impervious area per unit (ft)	*4050*	*3735*	*3409*	*3215*	*3920*	*3635*	*3321*	*3135*
Percentage of Impervious Area per DU	**41%**	**50%**	**54%**	**57%**	**40%**	**49%**	**54%**	**56%**

STREET WIDTH DISCUSSION - PAGE 2

STREET EFFICIENCY & ECOLOGICAL FOOTPRINT

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Potential 40 Acre Development Scenarios

SECTION D - 40 Acre Development

Option 1 - Full Build-out (each dwelling unit requires 1100 sq ft of designated park land)

	32 Foot Road Width				28 Foot Road Width			
	R1	R2	R2T	R2Y alley	R1	R2	R2T	R2Y alley
Dwelling Units	***158***	***203***	***235***	***257***	***161***	***206***	***239***	***261***
Land Occupied by Units (in Acres)	35.85	34.72	33.86	33.51	36.05	34.76	33.95	33.55
Required Public Open Space (in Acres)	4.0	5.1	5.9	6.5	4.1	5.2	6.0	6.6
Total Impervious Area	14.69	17.41	18.39	18.97	14.49	17.19	18.22	18.78
% Impervious Area	***37%***	***44%***	***46%***	***47%***	***36%***	***43%***	***46%***	***47%***

Option 2 - 40 Acre Development Scenario with 158 dwelling units and one required 4 acre park

158 Dwelling Units	***158 du***	***158 du***	***158 du***	***158 du***	***158 du***	***158 du***	***158 du***	***158 du***
House/Garage/Driveway Footprint (acres)	9.16	9.16	8.43	7.13	9.16	9.16	8.43	7.13
Alley/Street/Sidewalk Footprint (acres)	5.53	4.39	3.93	4.53	5.06	4.03	3.61	4.24
sub-total impervious area	***14.69***	***13.55***	***12.37***	***11.66***	***14.22***	***13.18***	***12.05***	***11.37***
Private Open Space (acres)	19.86	12.60	9.70	7.38	19.86	12.60	9.70	7.38
Terrace Open Space	1.31	0.87	0.70	1.56	1.31	0.87	0.70	1.56
Public Open Space (4 acre park req.)	4	4	4	4	4	4	4	4
sub-total open space	***25.16***	***17.47***	***14.40***	***12.94***	***25.16***	***17.47***	***14.40***	***12.94***
Additional Land Available	**0**	**9**	**13**	**15**	**1**	**9**	**14**	**16**

STREET WIDTH DISCUSSION - PAGE 3

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40 Acre Development Scenarios

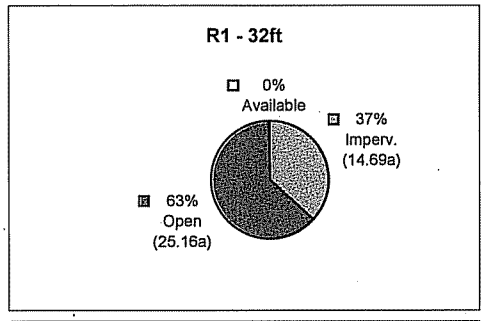
Charts for Section D: Option 2 - 158 dwelling units with required 4 acre park

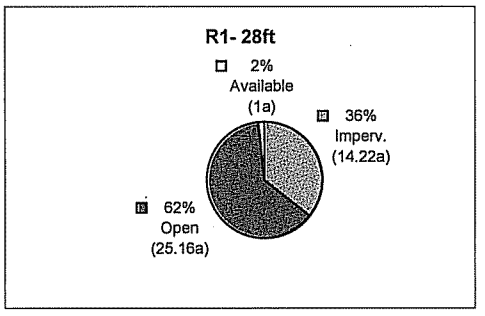
Impervious Areas Equal:

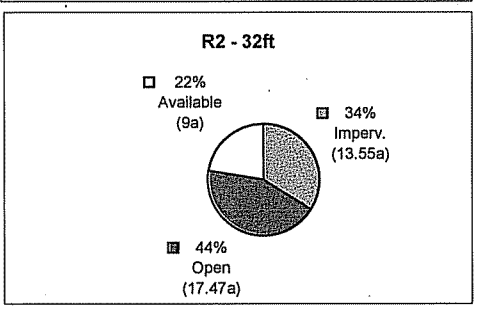
House and Garage Footprint
Driveway and Driveway Apron
Sidewalk
Curb and Gutter
Streets and Alleys

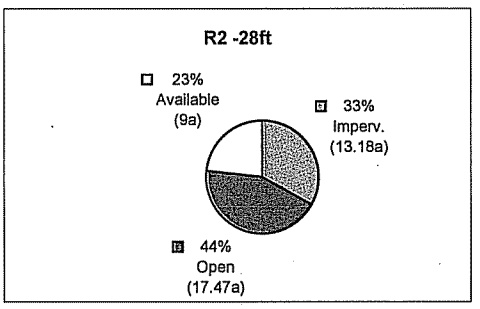
Open Areas Equal:

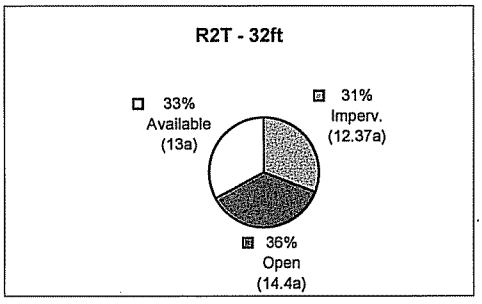
Terrace Green space
Private Yards
Required 4 acre Designated Parkland

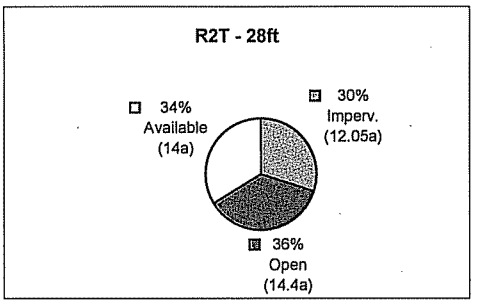


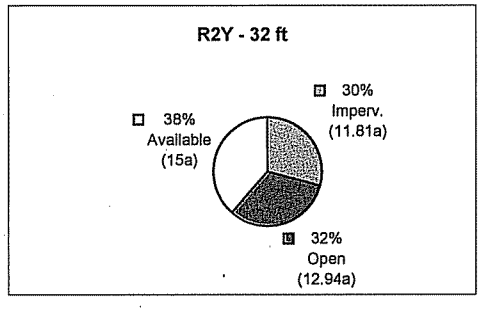


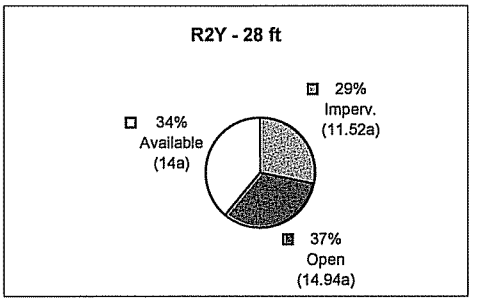












STREET WIDTH DISCUSSION - PAGE 4

STREET EFFICIENCY & ECOLOGICAL FOOTPRINT

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Section E: Driveways v. Alleys

R1

R1 Zoning District with Driveways	
Lot Width	65 ft
Drive Apron (20' wide x 8' terrace)	160 ft
Driveway (20' wide x 30' minimum front setback)	600 ft
Total Impervious Surface	***760 ft***

R1 Zoning District with Alleys	
Lot Width	65 ft
Drive Apron (20' wide x 5.5' alley terrace)	110 ft
Driveway (20' wide x 2' minimum alley setback)	40 ft
Gutter (1.5' x 65' lot width)	97.5 ft
1/2 Alley ROW (6' x 65' lot width)	390 ft
Total Impervious Surface	***637.5 ft***
Land needed per lot to create alley (13' x lot width)	845 ft
previous land requirement per lot (4.41 units/acre)	9885 ft
Gross Land Area Per lot	10730 ft
Gross Dwelling Units per acre	4.13 u/a

R2

R2 Zoning District with Driveways	
Lot Width	50 ft
Drive Apron (20' wide x 8' terrace)	160 ft
Driveway (20' wide x 30' minimum front setback)	600 ft
Total Impervious Surface	***760 ft***

R2 Zoning District with Alleys	
Lot Width	50 ft
Drive Apron (20' wide x 5.5' alley terrace)	110 ft
Driveway (20' wide x 2' minimum alley setback)	40 ft
Gutter (1.5' x 50' lot width)	75 ft
1/2 Alley ROW (6' x 50' lot width)	300 ft
Total Impervious Surface	***525 ft***
Land needed per lot to create alley (13' x lot width)	650 ft
previous land requirement per lot (5.85 units/acre)	7450 ft
Gross Land Area Per lot	8100 ft
Gross Dwelling Units per acre	5.38 u/a

R2T

R2-T Zoning District with Driveways	
Lot Width	44 ft
Drive Apron (20' wide x 8' terrace)	160 ft
Driveway (20' wide x 20' minimum front setback)	400 ft
Total Impervious Surface	***560 ft***

R2-T Zoning District with Alleys	
Lot Width	44 ft
Drive Apron (20' wide x 5.5' alley terrace)	110 ft
Driveway (20' wide x 2' minimum alley setback)	40 ft
Gutter (1.5' x 44' lot width)	66 ft
1/2 Alley ROW (6' x 44' lot width)	264 ft
Total Impervious Surface	***480 ft***
Land needed per lot to create alley (13' x lot width)	572 ft
previous land requirement per lot (6.94 units/acre)	6276 ft
Gross Land Area Per lot	6848 ft
Gross Dwelling Units per acre	6.36 u/a

R2Y

R2-Y Zoning District with Driveways	
Lot Width	n/a ft
Drive Apron (20' wide x 8' terrace)	n/a ft
Driveway (20' wide x 20' minimum front setback)	n/a ft
Total Impervious Surface	***n/a ft***

R2-T Zoning District with Alleys	
Lot Width	40 ft
Drive Apron (20' wide x 5.5' alley terrace)	110 ft
Driveway (20' wide x 2' minimum alley setback)	40 ft
Gutter (1.5' x 40' lot width)	60 ft
1/2 Alley ROW (6' x 40 lot width)	240 ft
Total Impervious Surface	***450 ft***
Land needed per lot to create alley (13' x lot width)	required ft
previous land requirement per lot (7.67 units/acre)	5680 ft
Gross Land Area Per lot	5680 ft
Gross Dwelling Units per acre	7.67 u/a

STREET WIDTH DISCUSSION - PAGE 5

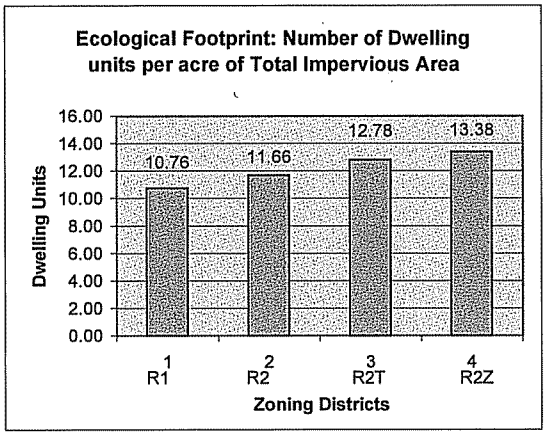
Draft 17 May 2004

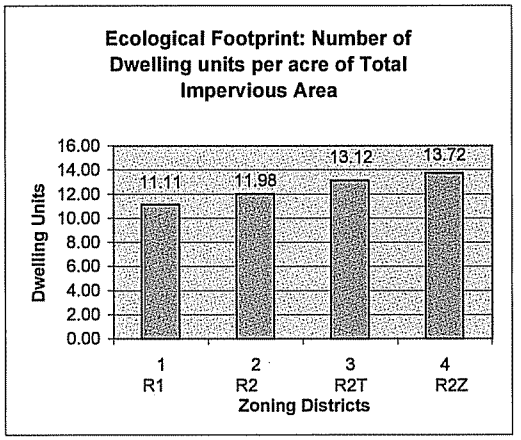
Total Ecological Efficiency

What do we get for one acre of hard surface???

	R1	R2	R2T	R2Y
One acre pavement	1.00	1.00	1.00	1.00
Dwelling Units	*10.76*	*11.66*	*12.78*	*13.38*
Acres of developed land	2.44	1.99	1.84	1.74
Total square feet of driveways	6,456	6,996	5,112	535
Total square feet of private yards	58,911	40,519	31,191	27,228
Linear feet of road	350	291	281	268
Linear feet of sidewalk	700	582	562	536
Linear feet of alley	n/a	n/a	n/a	268

	R1	R2	R2T	R2Y
One acre pavement	1.00	1.00	1.00	1.00
Dwelling Units	*11.11*	*11.98*	*13.12*	*13.72*
Acres of developed land	2.52	2.05	1.89	1.79
Total square feet of driveways	6,456	6,996	5,112	535
Total square feet of private yards	60,827	41,631	32,047	27,920
Linear feet of road	361	300	289	274
Linear feet of sidewalk	722	600	577	549
Linear feet of alley	n/a	n/a	n/a	274

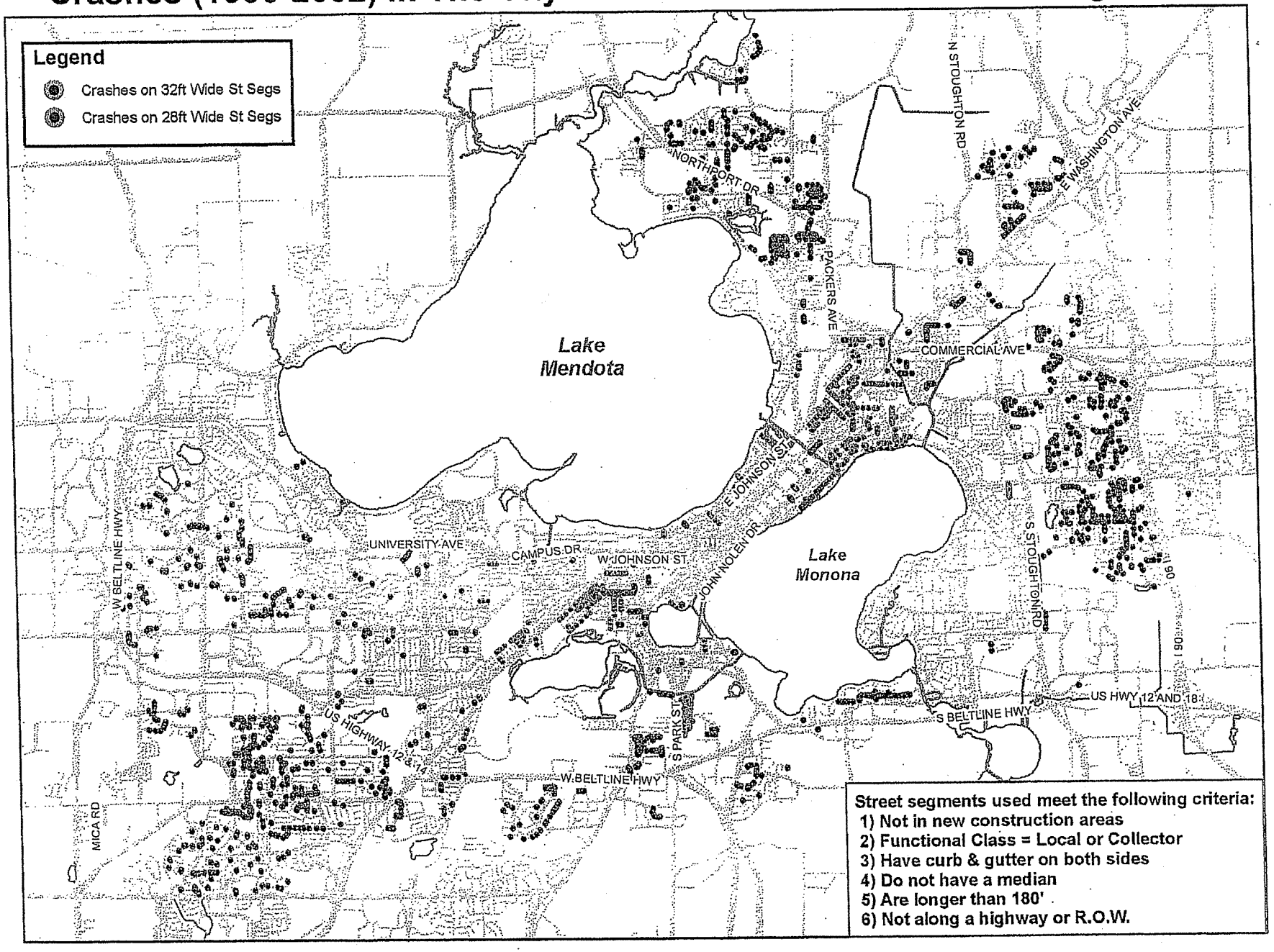


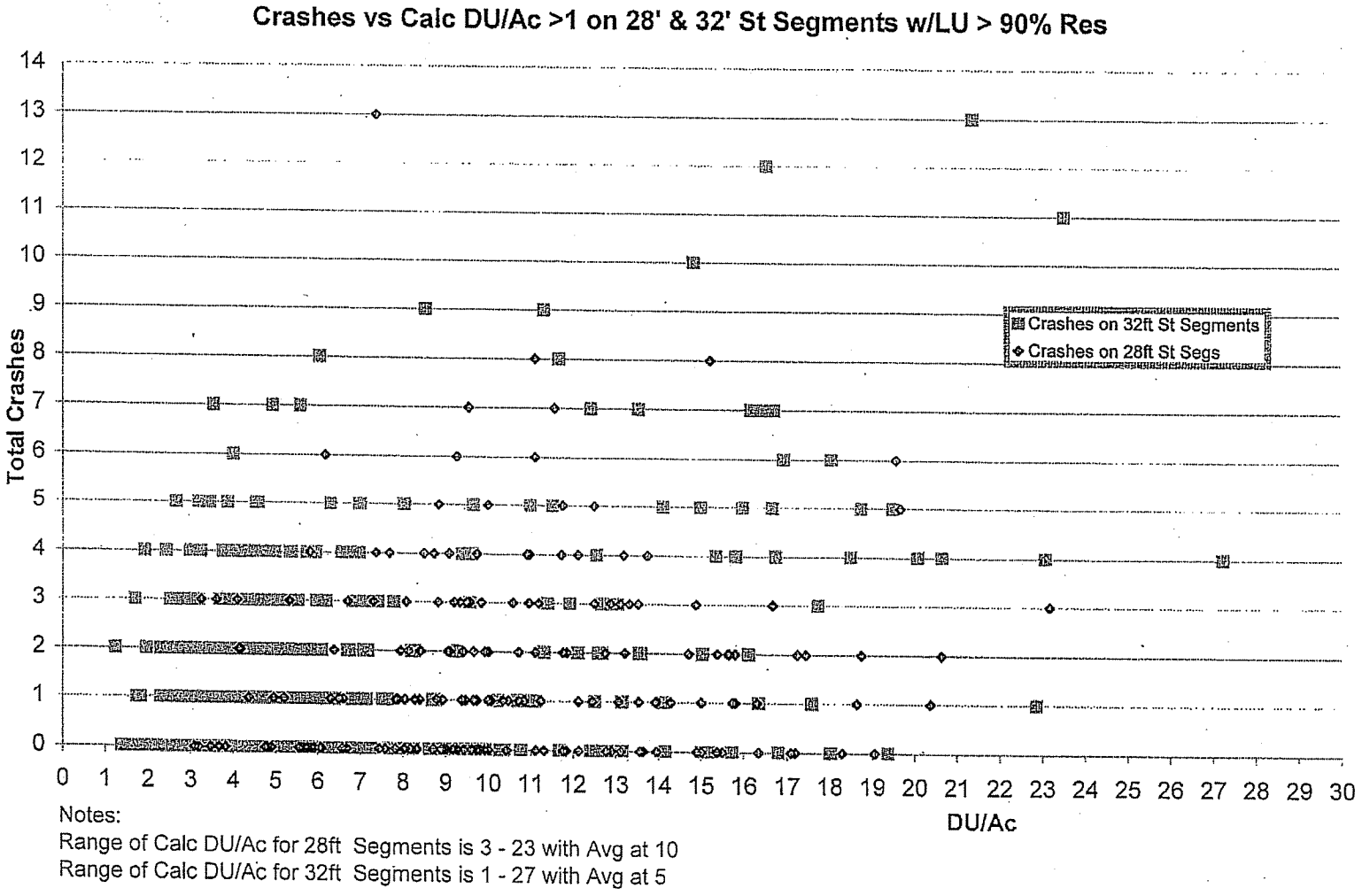


Madison 28ft & 32ft Street Segments vs. Jan1990-Nov2002 Crash Data

	28ft Street Segments		32ft Street Segments	
Total Crashes	658 Crashes		1736 Crashes	
Injury Crashes	89	13.5%	325	18.7%
Ped Crashes	9	1.4%	40	2.3%
Bike Crashes	10	1.5%	38	2.2%
Parking/Backing Related Crashes	412	62.6%	927	53.4%
Total Miles of Street Segments	24 Miles		179 Miles	
Not including:				
New St Segments (new plats under construction)				
Arterial St Segments				
No Curb & Gutter St Segments				
St Segments w/Median				
< 180' St Segments				
St Segments w/Parcels Outside City				
Total Crashes Per Mile	27 Crashes/Mile		10 Crashes/Mile	
Injury Crashes Per Mile	3.7 Crashes/Mile		1.8 Crashes/Mile	
Ped Crashes Per Mile	0.4 Crashes/Mile		0.2 Crashes/Mile	
Bike Crashes Per Mile	0.4 Crashes/Mile		0.2 Crashes/Mile	
Parking/Backing Related Crashes Per Mile	17.2 Crashes/Mile		5.2 Crashes/Mile	

Crashes (1990-2002) In The City of Madison On 32ft & 28 ft St Segments





Notes:
Range of Calc DU/Ac for 28ft Segments is 3 - 23 with Avg at 10
Range of Calc DU/Ac for 32ft Segments is 1 - 27 with Avg at 5

Possible Criteria for Evaluating the Use of 28-foot Streets
- Draft (1-14-05) -

Based on the discussion at the Long Range Transportation Planning Commission meeting of 12-15-04, the following are possible criteria for evaluating the use of 28-foot wide residential streets. The 28-foot wide streets would utilize 56-foot rights-of-way and allow parking on both sides of the street.

These criteria would be applied on local residential streets, in all single-family residential zoning districts R1, R2, R2S, R2T, R2Y and R2Z.

==========
APPLICABLE ZONING CATEGORIES
==========

R1 (<5.44 du/ac)
Similar to current policy, 28-foot wide allowed by right with densities less than 5.44 du/ac.

- Where special off-street parking generators (such as schools, churches, commercial businesses, sports and entertainment venues or large multi-family dwellings) exist, these standards should be considered advisory/guidelines to be administered on a case-by-case basis.

R2 and R2T (5.44 – 8.71 du/ac)
These criteria are intended to apply to residential areas that are predominantly single-family detached housing on individual lots, and will be used by staff in the review of the plat. If the criteria are met, then 28-foot wide streets would be allowed. Staff from the Planning Unit, Traffic Engineering, and City Engineering would make a recommendation to the Plan Commission.

- For front-loaded (non-alley) garages, the driveway length must be at least 20 feet;

- At least 75% of the houses in the subdivision must have 2-car garages;

- Where 2-car garages exist, and where driveways provide direct access to the street, there must be a minimum of 2 parking spaces in front of the garage;

- Where alleys exist, 75% of houses must have 2-car garages. In addition, a total of 3 off-street parking spaces must be provided, including the garage, a garage setback of 10 feet, or a parking space adjacent to the garage; and,

- Where special off-street parking generators (such as schools, churches, commercial businesses, sports and entertainment venues or large multi-family dwellings) exist, these standards should be considered advisory/guidelines to be administered on a case-by-case basis.

R2S, R2Yand R2Z (8.72 – 12.44 du/ac)

Within each subdivision plat, there are typically logical neighborhood subareas defined by natural features and higher-order streets (i.e., collectors or arterials). In many cases, these subareas generally correspond to an area with a ¼-mile walking distance (from the center of the subarea).

During the subdivision preliminary plat review process, an analysis will be conducted to determine whether or not 28-foot wide streets are appropriate within the defined neighborhood subareas.

NOTE: R2Y and R2Z are alley-only zoning categories

- All criteria listed above in the R2 and R2T districts apply, in addition to the following factors to be considered;

- Area street connectivity should be considered (including the proximity of local residential streets to higher-order collectors or arterials). The length of blocks in the residential area could be considered (shorter lengths of blocks promotes better connectivity within the neighborhood);

- If the number of off-street parking spaces provided is 3 per unit, the use of 28-foot streets could be considered;

- Where alleys exist, the use of shared mid-block parking lots could be considered;

- Prohibiting parking on only one side of the street (for the entire block length) may be an option if it is demonstrated that sufficient off-street parking is not available (e.g., less than 3 parking spaces per housing unit);

- The use of on-street parking "chicanes" (i.e., staggered prohibition of parking, alternating "no parking" on each side of the street every few houses) could be considered;

- The percentage of total street miles in the subarea with 56-foot R-O-W may be considered (*note:* the Autumn Lake subdivision has approximately 30% of its street lineage utilizing 56-foot rights-of-way);

- As with R2 and R2T zoning districts, where special off-street parking generators (such as schools, churches, commercial businesses, sports and entertainment venues or large multi-family dwellings) exist, these standards should be considered advisory/guidelines to be administered on a case-by-case basis; and,

- 28-foot streets will be allowed, if approved by the Plan Commission and Common Council, and after review and comment by the following City agencies - Traffic Engineering, Fire Department, City Engineering, Streets Division, Planning Unit, and Madison Metro.

On-Street Parking Study – Draft Findings

8 December 2004
City of Madison
Planning and Development Department
Planning Unit

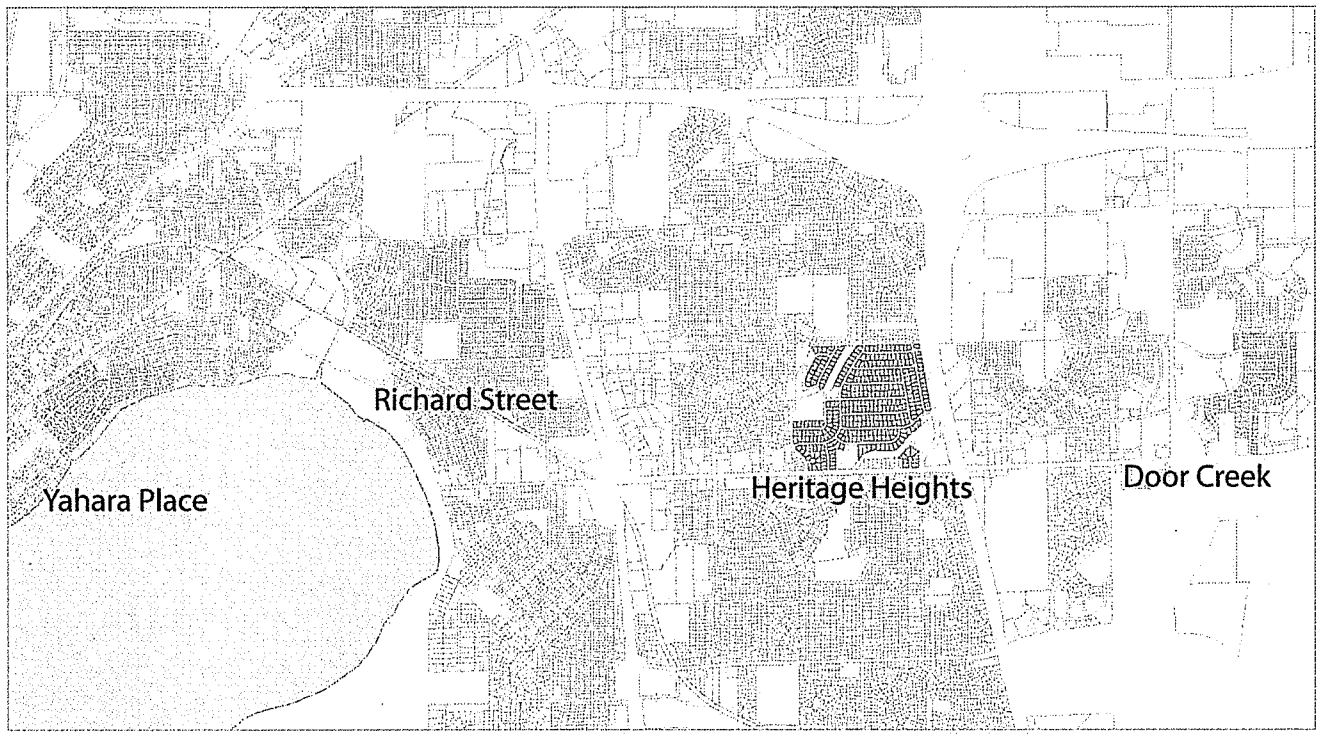
Four Neighborhoods:

- Yahara Place
- Richard Street
- Heritage Heights
- Door Creek

Three different times:

Saturday Morning:	between 8am & 10 am
Weekday Early Morning:	between 4am & 6 am
Weekday Midday:	Between 11 am & 1 pm

All data gathered between the dates of:
Sat October 30, 2004 – Sat November 13, 2004



City of Madison - Planning Unit
Fall 2004 Parking Study
Neighborhoods Map

0 800 1,600 2,400 4,000 7,200 8,000 Feet

Yahara Place:

Larger Neighborhood Information (2000 census data):

Census Tract 20, Block group 3 / Census Tract 19, Block Group 1

Households:	1,239 occupied housing units (63.4% owner occupied =786)
Population:	2,645 Total population (85.7% 16 or older = 2,267)
Vehicles:	1,853 cars = 1.5 cars per household

Study Area:

Number of parcels:	**433**
Number of households:	491 (378 single family) (311 owner occupied)
Population Estimate:	1048 total population (86.7% 16 or older = 909)
Vehicles Estimate:	**737 cars** (1.5 per household)
Average date of structure:	82 years (Built in 1922)
Avg. Previous Assessment:	$207,825
Avg. Current Assessment:	$237,906
Zoning:	**R2, some R3**
Physical Characteristics:	
Average parcel size:	**4445 sq ft (9.8 units per acre density)**
Average Lot width / Depth:	41 ft wide / 90 feet long
Average Driveway Width / Depth:	9 ft wide / 70 ft long
Mailboxes:	Posted on House

Parking Capacity Off-Street (Driveway / Garage)

Total:	**1949**
Average Garage Capacity:	1.5 cars (Total Capacity = 650)
Average Driveway Capacity:	3 cars (Total capacity = 1299)

Approx. Street frontage available for parking:

33,300 ft	Total Street frontage	(77 ft per parcel)
- 3,897 ft	subtract driveway width total	(9ft x433 parcels)
- 4,330 ft	subtract driveway-parking buffer	(5ft x 2 sides x 433 parcels)
- 4,200 ft	subtract one side "no parking" on Oakridge, Lakeland, Riverside, Yahara Pl	
- 2,500 ft	subtract Intersection buffers	(15 ft each side of @ corner)

18,373 ft TOTAL Available Parking frontage length (linear feet)

(42 lineal ft Total parking frontage per parcel)

Average Per Parcel Data

Each on-street car takes up approximately 20 feet of linear street frontage

Yahara Place Field Parking Data:

	# of cars parked in street	# of cars parked in driveway
Early Weekday AM: *(11/05/04 4:15am)*	**175**	**335**
Weekday Midday: *(11/09/04 11:30am)*	**130**	**193**
Saturday Mid-Morning: *(11/13/04 8:30am)*	**166**	**275**

On-street Parking Usage:

Early Weekday AM:

On-Street Data: 175 cars (1 car per 2.54 houses)
Driveway Cars: 335 cars (1 car per 1.29 houses)
Instances of two cars parked directly across the street from each other: **19** (Affected Block-faces = 8)

% of available street frontage used by cars: 3500ft / 18,373 ft = 19%
(175 cars x 20 ft = 3500 ft)

Weekday Midday

On-Street Data: 130 cars (1 car per 3.33 houses)
Driveway Cars: 193 cars (1 car per 2.24 houses)
Instances of two cars parked directly across the street from each other: **13** (Affected Block-faces = 3)

% of available street frontage used by cars: 2600 ft / 18,373 ft = 14%
(130 cars x 20 ft = 2600 ft)

Saturday Mid-Morning:

On-Street Data: 166 cars (1 car per 2.61 houses)
Driveway Cars: 275 cars (1 car per 1.57 houses)
Instances of two cars parked directly across the street from each other: **20** (Affected Block-faces = 9)

% of available street frontage used by cars: 3,320ft / 18,373 ft = 18%
(166 cars x 20 ft = 3320 ft)

Richard Street:

Larger Neighborhood Information (2000 census data):

Census Tract 27

Households:	1607 occupied housing units (83.2% owner occupied =1337)
Population:	3341 Total population (84.2% 16 or older = 2816)
Vehicles:	2618 cars = 1.6 cars per household

Study Area:

Number of parcels:	**444**
Number of households:	444 (444 single family) (369 owner occupied)
Population Estimate:	923 total population (84.2% 16 or older = 777)
Vehicles Estimate:	**710 cars** (1.6 per household)
Average date of structure:	49 years (Built in 1955)
Avg. Previous Assessment:	$129,677
Avg. Current Assessment:	$139,140
Zoning:	**R2**

Physical Characteristics:

Average parcel size:	**7253 sq ft (6 units per acre density)**
Average Lot width / Depth:	45 ft wide / 93 feet long
Average Driveway Width / Depth:	20 ft wide / 40 ft long
Mailboxes:	Posted on House

Parking Capacity Off-Street (Driveway / Garage)

Total:	**1949**
Average Garage Capacity:	2 cars (Total Capacity = 888)
Average Driveway Capacity:	4 cars (Total capacity = 1776)

Approx. Street frontage available for parking:

33,635 ft	*Total Street frontage*	*(76 ft per parcel)*
- 8,880 ft	*subtract driveway width total*	*(20ft x 444 parcels)*
- 4,440 ft	*subtract driveway-parking buffer*	*(5ft x 2 sides x 444 parcels)*
- 1,665 ft	*subtract Intersection buffers*	*(15 ft each side of @ corner)*

18, 650 ft TOTAL Available Parking frontage length (linear feet)

(42 lineal ft total parking frontage per parcel =)

Average Per Parcel Data

Each on-street car takes up approximately 20 feet of linear street frontage

Richard Street Field Parking Data:

	# of cars parked in street	# of cars parked in driveway
Early Weekday AM: *(11/03/04 5:00am)*	**110**	**336**
Weekday Midday: *(11/04/04 11:00am)*	**97**	**206**
Saturday Mid-Morning: *(10/30/04 8:00am)*	**122**	**251**

On-street Parking Usage:

Early Weekday AM:

On-Street Data: 110 cars (1 car per 4.04 houses)
Driveway Cars: 336 cars (1 car per 1.32 houses)
Instances of two cars parked directly across the street from each other: **13** (Affected Block-faces = 9)

% of available street frontage used by cars: 2200 ft / 18,650 ft = 12%
(110 cars x 20 ft = 2200 ft)

Weekday Midday

On-Street Data: 97 cars (1 car per 4.57 houses)
Driveway Cars: 206 cars (1 car per 2.15 houses)
Instances of two cars parked directly across the street from each other: **12** (Affected Block-faces = 3)

% of available street frontage used by cars: 1940 ft / 18,650 ft = 10%
(97 cars x 20 ft = 1940 ft)

Saturday Mid-Morning:

On-Street Data: 122 cars (1 car per 3.64 houses)
Driveway Cars: 251 cars (1 car per 1.77 houses)
Instances of two cars parked directly across the street from each other: **11** (Affected Block-faces = 6)

% of available street frontage used by cars: 2440 ft / 18,650 ft = 13%
(122 cars x 20 ft = 2440 ft)

Heritage Heights:

Larger Neighborhood Information (2000 census data):

Census Tract 30.01 Block Group 2

Households:	392 occupied housing units (99.5% owner occupied =390)
Population:	1094 Total population (80.6% 16 or older = 881)
Vehicles:	784 cars = 2 cars per household

Study Area:

Number of parcels:	**364**
Number of households:	*364 (364 single family) (362 owner occupied)*
Population Estimate:	*923total population (84.2% 16 or older = 777)*
Vehicles Estimate:	**728 cars** (2 per household)
Average date of structure:	34 years (Built in 1970)
Avg. Previous Assessment:	$174,195
Avg. Current Assessment:	$179,873
Zoning:	**R1**

Physical Characteristics:

Average parcel size:	**11,447 sq ft (3.8 units per acre density)**
Average Lot width / Depth:	86 ft wide / 126 feet long
Average Driveway Width / Depth:	22 ft wide / 30 ft long
Mailboxes:	Posted on House

Parking Capacity Off-Street (Driveway / Garage)

Total:	**1820**
Average Garage Capacity:	2 cars (Total Capacity = 728)
Average Driveway Capacity:	3 cars (Total capacity = 1092)

Approx. Street frontage available for parking:

41,910 ft	*Total Street frontage*	*(115 ft per parcel)*
- 8,008 ft	*subtract driveway width total*	*(22ft x 364 parcels)*
- 3,640 ft	*subtract driveway-parking buffer*	*(5ft x 2 sides x 364 parcels)*
- 1,710 ft	*subtract Intersection buffers*	*(15 ft each side of @ corner)*

28,550 ft TOTAL Available Parking frontage length (linear feet)
(78 lineal ft total parking frontage per parcel)

Average Per Parcel Data

Each on-street car takes up approximately 20 feet of linear street frontage

Heritage Heights Field Parking Data:

	# of cars parked in street	# of cars parked in driveway
Early Weekday AM: *(11/05/04 4:00am)*	**43**	**221**
Weekday Midday: *(11/02/04 11:30am)*	**30**	**132**
Saturday Mid-Morning: *(10/30/04 9:00am)*	**76**	**230**

On-street Parking Usage:

Early Weekday AM:

On-Street Data: 43 cars (1 car per 8.5 houses)
Driveway Cars: 221 cars (1 car per 1.65 houses)
Instances of two cars parked directly across the street from each other: **0** (Affected Block-faces = 0)

% of available street frontage used by cars: 860 ft / 28,550 ft = 3%
(43 cars x 20 ft = 860 ft)

Weekday Midday

On-Street Data: 30 cars (1 car per 12.1 houses)
Driveway Cars: 132 cars (1 car per 2.75 houses)
Instances of two cars parked directly across the street from each other: **1** (Affected Block-faces = 1)

% of available street frontage used by cars: 600 ft / 28,550 ft = 2%
(30 cars x 20 ft = 600 ft)

Saturday Mid-Morning:

On-Street Data: 76 cars (1 car per 4.79 houses)
Driveway Cars: 230 cars (1 car per 1.58 houses)
Instances of two cars parked directly across the street from each other: **4** (Affected Block-faces = 3)

% of available street frontage used by cars: 1520 ft / 28,550 ft = 5%
(76 cars x 20 ft = 1520 ft)

Door Creek:

Larger Neighborhood Information (2000 census data):

Census Tract 114 -- This neighborhood was not built at the time of the 2000 census

Households:	-- occupied housing units (--% owner occupied =--)
Population:	--Total population (--% 16 or older = --)
Vehicles:	-- cars = -- cars per household

Study Area:

Number of parcels:	**215**
Number of households:	*(194 single family) (21 vacant)*
Population Estimate:	*-total population (-% 16 or older -)*
Vehicles Estimate:	**-- cars** (- per household)
Average date of structure:	2 years (Built in 2002)
Avg. Previous Assessment:	$192,020
Avg. Current Assessment:	$213,177

Zoning: **PUD-SIP R4**

Physical Characteristics:

Average parcel size:	**8741 sq ft (5 units per acre density)**
Average Lot width / Depth:	70 ft wide / 103 feet long
Average Driveway Width / Depth:	22 ft wide / 24 ft long
Mailboxes:	Posted in Street

Parking Capacity Off-Street (Driveway / Garage)

Total:	**1820**
Average Garage Capacity:	2 cars (Total Capacity = 728)
Average Driveway Capacity:	3 cars (Total capacity = 1092)

Approx. Street frontage available for parking:

22,030 ft	*Total Street frontage*	*(102 ft per parcel)*
- 4,730 ft	*subtract driveway width total*	*(22ft x 215 parcels)*
- 1,075 ft	*subtract driveway-parking buffer*	*(5ft x 1 sides x 215 parcels)*
-2,580 ft	*subtract mailbox buffer*	*(2ft away from driveway 10ft buffer=12 x 215)*
- 1,230 ft	*subtract Intersection buffers*	*(15 ft each side of @ corner)*

12,415 ft TOTAL Available Parking frontage length (linear feet)
(58 lineal ft total parking frontage per parcel)

Average Per Parcel Data

Each on-street car takes up approximately 20 feet of linear street frontage

Door Creek Field Parking Data:

	# of cars parked in street	# of cars parked in driveway
Early Weekday AM: *(11/05/04 5:00am)*	**29**	**55**
Weekday Midday: *(11/04/04 11:00am)*	**25**	**26**
Saturday Mid-Morning: *(10/30/04 8:00am)*	**32**	**56**

On-street Parking Usage:

Early Weekday AM:

On-Street Data: 29 cars (1 car per 7.4 houses)
Driveway Cars: 55 cars (1 car per 4 houses)
Instances of two cars parked directly across the street from each other: **1** (Affected Block-faces = 1)

% of available street frontage used by cars: 580 ft / 12,415 ft = 5%
(29 cars x 20 ft = 580 ft)

Weekday Midday

On-Street Data: 25 cars (1 car per 8.6 houses)
Driveway Cars: 26 cars (1 car per 8.3 houses)
Instances of two cars parked directly across the street from each other: **1** (Affected Block-faces = 1)

% of available street frontage used by cars: 500 ft / 12,415 ft = 4%
(25 cars x 20 ft = 500 ft)

Saturday Mid-Morning:

On-Street Data: 32 cars (1 car per 6.7 houses)
Driveway Cars: 56 cars (1 car per 3.8 houses)
Instances of two cars parked directly across the street from each other: **2** (Affected Block-faces = 1)

% of available street frontage used by cars: 640 ft / 12,415 ft = 5%
(32 cars x 20 ft = 6420 ft)