Measuring Urbanity One Block at a Time: The Neighborhood Transit Readiness Scorecard

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This paper outlines a methodology that assesses urbanity in three dimensions (density, diversity, and design) and creates a combined scorecard that weights each dimension according to its influence on transit usage and walkability. Using no proprietary methods, this approach can be repeated by any individual or local government with GIS software and basic internet access. The resulting measurements can be used by communities to assess what types of investments and regulatory changes are necessary to create more transit- and pedestrian-friendly communities.

Introduction: Why Do We Need a Scorecard for Urbanity?

Heightened environmental awareness, changing lifestyle preferences, increasing fuel prices and other issues are causing cities and towns to ask themselves the same question: "how can we make our community more attractive to pedestrians and transit users?" Despite the fact that research on how built environment variables influence travel behavior is the most studied subject in urban planning, relatively few tools and methods exist to help cities and towns determine which of their neighborhoods already possess numerous attributes that support walking and transit use, and which neighborhoods need improvement.

In the Raleigh-Durham-Chapel Hill region, referenced hereafter by its regional moniker "the Triangle," the Triangle Transit Authority (Triangle Transit) is leading a planning effort for two potential light rail systems linked by a commuter rail line. The current effort to develop station area plans is raising the above issues from planners, elected officials, and citizens alike, providing the impetus for the Neighborhood Transit Readiness Scorecard (the Scorecard).

With planning for rail stations underway, the Scorecard emerged as a response to two issues, one general in nature and the other more specific. At the general level, Triangle Transit planning staff wanted to develop a tool to illustrate which neighborhood characteristics best support rail and bus transit usage within a half-mile radius of stations. More specifically, as Triangle Transit evaluated which corridors to advance into detailed analysis, the

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agency utilized the Scorecard to assess station areas in two different corridors in Durham in order to illustrate which investment was more likely to succeed.

The objective of the Scorecard project was to generate an easily replicable land-use evaluation tool to quantify the transit-readiness and pedestrian-friendliness of a variety of Triangle region neighborhoods. Building on the ideas set forth by Ewing and Cervero (2001), the Scorecard's methodology relies on metrics to estimate density, diversity and design in the proposed station areas. In their most recent paper, Ewing and Cervero (2010) developed a compelling case for weighting design above both density and diversity.

By using widely available socioeconomic data for employment and housing density, free Walkscore data as a proxy for diversity, and GIS-based sidewalk and street network data to illustrate design, the technique can be used in a variety of contexts, from small area planning to analysis across major metropolitan regions. The Scorecard is weighted using context-specific density goals and utilizes a meta-analysis of ten years' worth of research to establish the relative importance of each metric. The final product provides a mechanism to translate raw data into an easy-to-understand format that can do each of the following:

- Create meaningful comparisons between stations areas with quantitative data
- Provide assessment maps that easily identify neighborhood barriers for pedestrian and transit usage
- Determine variance in levels of neighborhood performance in quarter-mile intervals
- Be replicated by others with the same tools and publicly available data

The Importance of Density, Diversity, and Design

While the New Urbanist and Smart Growth movements have increased the awareness of the importance of Transit-Oriented Development (TOD), providing residents with multiple transportation options is not simply a matter of encouraging development adjacent to transit stops. Many studies have shown that demand for transit is tied to three primary and interrelated factors known as the 3Ds: Density, Diversity, and Design (Ewing and Cervero 2001).

The challenge for practitioners (even those who are aware of the importance of the 3Ds) is to work within a community to address questions such as:

- Is our community dense enough for bus transit? For rail transit?
- Does the mix of land uses in our community support and encourage walking? Are some uses that strongly support walking under-represented?
- Given limited funds, which pedestrian improvement project will support the greatest increase in walking to a nearby commercial district?

There is a need for a tool that helps address such questions with greater specificity than general opinion statements about walkability or density, words that may mean different things to different stakeholders. The Scorecard helps stakeholders understand why seemingly similar neighborhoods can have considerable differences in pedestrian activity. The tool broadens the discussion about what type of development pattern complements transit beyond the "transit = more density" mantra.

Density

Housing and employment densities generate the primary transit ridership base for any given neighborhood. While minimum density thresholds should be met in order to reach reasonable rail transit ridership goals, medium-to-high employment or housing densities do not automatically translate into transit ridership.

Density is often highly correlated with the design of the built environment due to historical development patterns where downtown central business districts (CBDs) developed long before private automobiles took over as the dominant mode of travel.

Perhaps because of this historical correlation between density and downtown urban cores, residents will often envision a "dense" neighborhood as a noisy, high-rise, concrete environment isolated from the countryside. TOD that relies on effective smart growth strategies, however, can allow for transit-supportive density while still accommodating low- to mid-rise buildings, parkland, and multiple housing choices.

Diversity

A greater diversity of land uses within a neighborhood provides a powerful motivator to accomplish multiple trip purposes at once. Diversity of land uses, or the level of variety in retail, dining, entertainment, and other daily shopping needs, is largely a measure of the overall convenience and desirability of the station area. Within many older communities, existing gridded street systems often exhibit this high diversity of uses. Twentieth century suburban design patterns have introduced two other layouts for retail that generate high diversity: the strip shopping center and the enclosed or open-air mall, each with ample parking. Whether it is within a walkable neighborhood retail core or a regional shopping mall, the ability to complete multiple errands at once can reduce total trips through consolidation.

Design

Even with transit-supportive densities and a variety of uses in a neighborhood, barriers to pedestrian and bicycle flow will suppress demand. The health of the pedestrian environment is important because most transit trips begin and end with walking, and true transit level of service is influenced by all the modes required to use the transit system door-to-door. A successful transit station area must therefore work to minimize barriers to pedestrian flow and

provide safe and direct access.

These barriers to amenity and transit system access occur in varying degrees of impedance. Barriers that exhibit *Total Impedance* completely restrict pedestrian movement:

- Water bodies
- Freeway facilities with no grade-separated pedestrian crossings
- Fences, gates, terraces, walls, ditches, or wooded areas
- Communities with privately-owned streets

Partial Impedance barriers present some form of physical limitation that, while surmountable by most individuals without a disability, discourage pedestrian activity by restricting direct access:

- Steep grades and stairs
- Fragmented street grid with dead ends
- Winding, circuitous streets
- Wide and heavily congested arterials
- Limited sidewalk and crosswalk coverage

Pedestrian Deterrents are often considered insignificant and therefore ignored, but the cumulative effect can be quite detrimental:

- Cracked or overgrown sidewalks
- Poorly lit underpasses and other unsafe conditions
- Barren natural landscapes or empty lots
- Large empty wall faces (such as parking garages or big box stores)

Figure 1 compares two Seattle neighborhoods: one with dead end streets, winding collector roads, and large open areas; and the other with a more traditional neighborhood street grid. The illustration shows the half-mile distance actually experienced by a pedestrian (bolded streets) from their respective neighborhood centers.

While the network on the right provides convenient access to the vast majority of buildings contained within the half-mile radius, the network on the left demonstrates the crippling effects that barriers and discontinuity can have on the neighborhood walkshed. A predominantly fragmented street network with collector streets serving dead-end local streets, as well as additional physical impediments such as roads and waterways, severely limit the number of destinations within a half-mile. In summary, a higher level of pedestrian-oriented design increases the actual and perceived ease and/or safety of traveling on foot and by transit.

Methodology: Measuring the 3Ds

When measured appropriately and taken together, density, diversity, and design can quantify transit readiness, identify capital improvement needs, and evaluate TOD proposals and zoning guidelines. Devised primarily as a land-use evaluation tool, the Neighborhood Transit Readiness Scorecard and its metrics do not attempt to predict transit ridership at any individual station or within a neighborhood. Instead, the methodology allows for an objective comparison of station areas based on clearly defined metrics that have been shown to correlate strongly with transit demand.

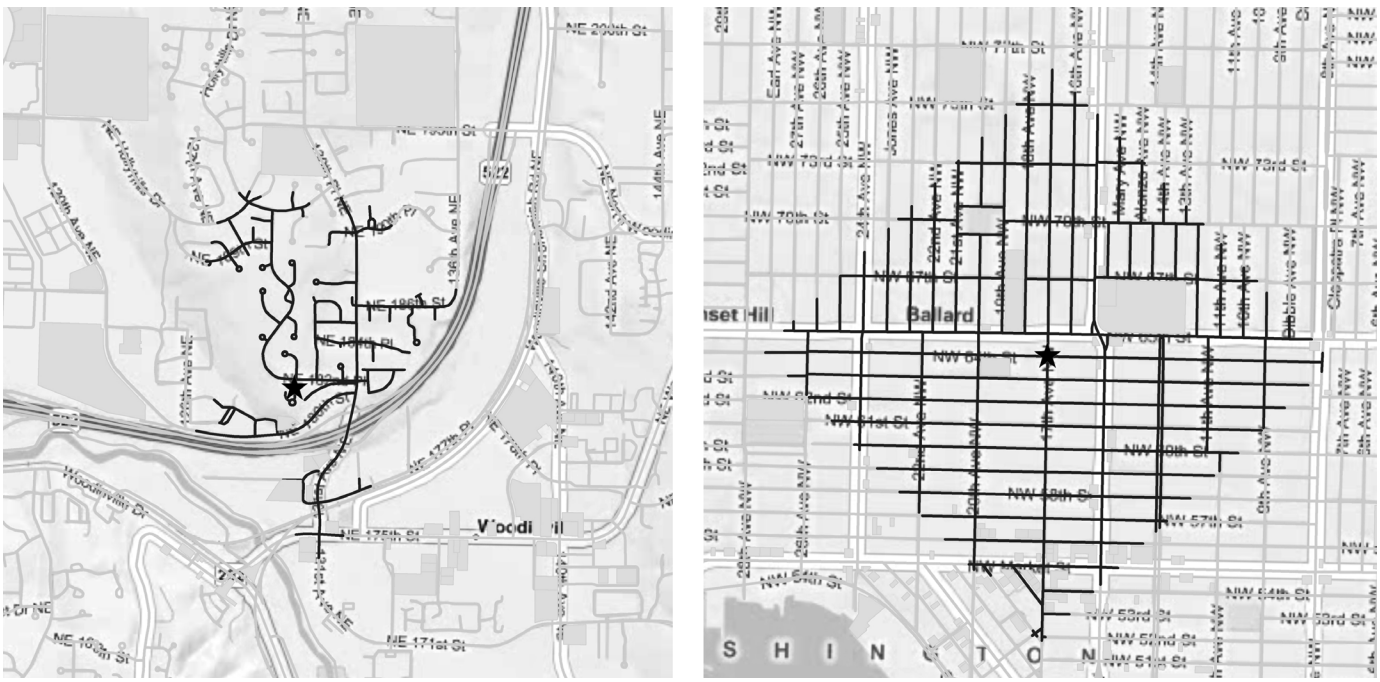

Figure 1: Street design in Woodinville, WA (left) vs. Ballard, WA (right). Bolded streets indicate half-mile walk distance from neighborhood center. *Image courtesy of Urban Design 4 Health.*

Density Measurement Methodology

Density typically refers to either dwelling units per acre or total jobs per acre. To obtain a single measure of density that accounts for both kinds of density, it is necessary to establish an equivalency between jobs and dwelling units. Using previous studies and measurements of travel demand elasticities for both employment and housing density, the 1997 Triangle Transit Authority Station Area Development Guidelines (SADG) established 3.2 jobs to be roughly equivalent to a single dwelling unit in terms of trip production. Using this basic relationship, described hereafter as the Activity Intensity Measure (AIM), the combined density can be calculated as follows:

AIM = (Dwelling Units + Jobs/3.2)/acre

The calculation was applied to socioeconomic data in the Triangle Regional Model for the years 2005 and 2035, which are the horizon years for the region's adopted long range transportation plan. After generating a single AIM score for each Traffic Analysis Zone (TAZ) by analysis year (current or projected), it is possible to produce a heat map of intensities for station areas using GIS-based contour analysis.

Figure 2 illustrates this mapping technique using projected data for the year 2035 for the UNC-CH Hospital station area. The map shows high densities concentrated around UNC-CH and downtown Chapel Hill, with sharp declines just off the edge of campus and a few streets away from Franklin Street, Chapel Hill's primary urban corridor.

Diversity Measurement Methodology

Zoning designations alone provide limited detail into the actual variety contained within a station area. Until recently, it has been difficult to quantify diversity. Walkscore, built on the Google Maps platform, now provides a readily available tool that can serve as a proxy for diversity. Starting from a user-defined location, Walkscore will almost instantaneously measure the straight line distance to thirteen different categories of community amenities that can be displayed visually in a GIS environment. The Walkscore algorithm awards no points for *quantity* of amenities within each category and is therefore primarily intended to quantify the *variety* of amenities. The final score (out of 100) indicates that the location falls within one of five basic categories:

- <25 – Car-Dependent
- 25-49 – Car-Dependent with a few walkable amenities
- 50-69 – Somewhat Walkable
- 70-89 – Very Walkable
- >90 – Walker's Paradise

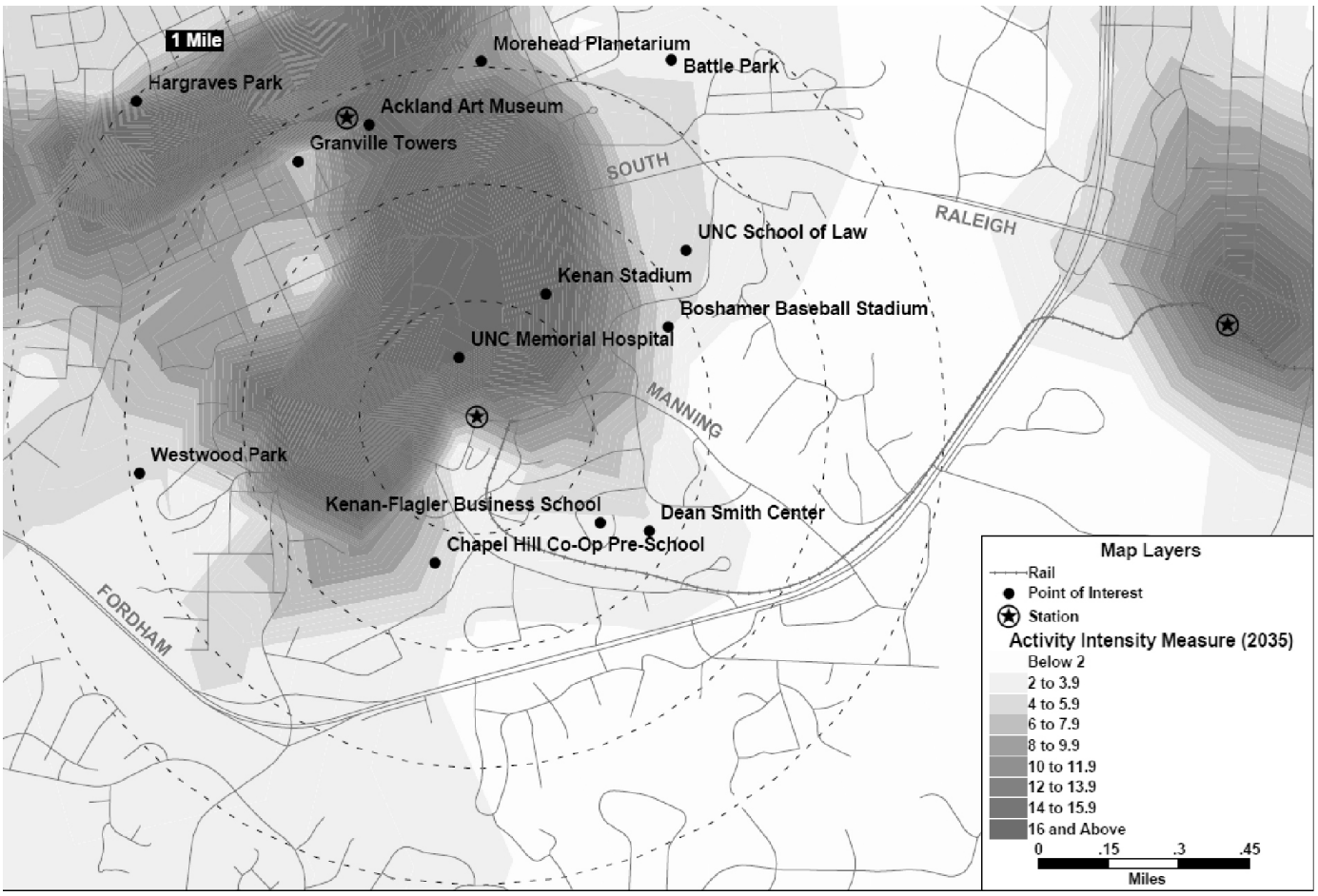

Figure 2: Heat map of projected year 2035 density for UNC-Chapel Hill station area. *Image courtesy of Patrick McDonough.*

Using Walkscore, an average of approximately ten to fifteen Walkscore points within a half-mile of any given station would comprise the final diversity score for that half-mile station region, or around twelve to nineteen Walkscore points per square mile of interest.

Design Measurement Methodology

Objectively defining design presents greater challenges than defining density or diversity due to the sheer number of variables that contribute to a walkable street network. It is therefore helpful to start at the most basic level: what are the characteristics of street networks that maximize pedestrian access to amenities in the neighborhood? In short, three factors are most important to the quality of walkable streets per square mile: an abundance of intersections, minimal dead-end streets, and an extensive sidewalk network measured in total sidewalk miles.

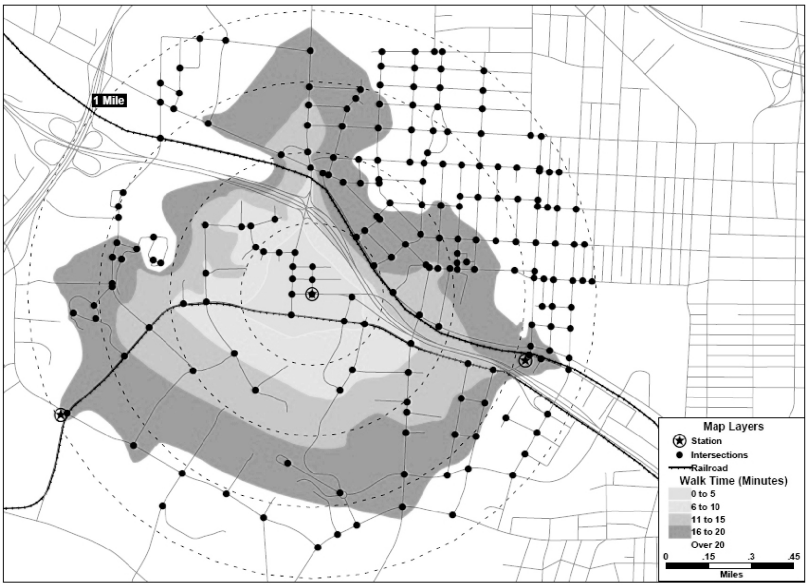

Figure 3: Intersection density at Duke Medical Center. *Image courtesy of Patrick McDonough.*

Using downtown Raleigh's 450-foot intersection spacing as an example, one can count intersection quantities and sidewalk miles contained within a half-mile radius of any particular location downtown. The result is roughly 139 intersections and 46 sidewalk miles per square mile. These values indicate a well-connected and pedestrian-friendly environment. The final design score can therefore be calculated as:

Design Score = Min [50, 50*(Intersections/mi^2 – Dead Ends/mi^2)/139] + Min [50, 50*(Sidewalk Miles/mi^2)/46]

The visual outputs for the design variable will include maps showing all the intersections within a one-mile radius of potential transit stations and also maps sidewalk coverage. Figure 3 shows the intersection map for the Duke Medical Center station. The contrast is evident between the higher density of intersections north of the freeway (closer to downtown Durham) and the more suburban street network of the hospital complex to the southwest of the freeway.

Factor Weighting in the Scorecard

With the three metrics defined, the final step is to create a single score that can be used to quickly and easily compare station areas. As discussed previously, improving diversity of uses, intersection density, and sidewalk density are all critical objectives, regardless of the character of the neighborhood. However, it is reasonable for density goals to vary based on station area objectives and real estate market realities. For example, a downtown Raleigh station located in the CBD for a city of 400,000 people should probably be scored differently than a downtown station built in a town of less than 20,000 residents. As such, the density grading scale varies with the anticipated long-range growth projection for the station area. Based on a series of development intensity "tiers" outlined in Triangle Transit's SADG, the minimum density thresholds, by tier, are divided into dwelling units per acre (DU/acre) ranges (Triangle Transit Authority 1997):

- Tier 4 – 30 DU/acre
- Tier 3 – 16 DU/acre
- Tier 2 – 11 DU/acre

Each station area was assigned grades from an "A+" to "F." Minimum densities over a half-mile radius were given a "B" grade (3.0 grade points), with the rest of the grading scale for each tier developed around this baseline. For example, for stations considered Tier 3 stations, 22 DU/acre is an "A," 16 DU/acre is a "B," and 10 DU/acre is a "C." Table 1 provides the entire grading scale, by metric.

The diversity grading scale, based on Walkscore's predefined categories of walkability, assigns a letter grade to each of the five cut-off points. Finally, the design score, based on an idealized concept of design, establishes the grading scale break points at equivalent spacing assuming a score of 80 earns an "A." As an example, in order to receive at least a "B-" in each individual category, a Tier 3 station would need to have 14 DU/acre, an average Walkscore of 63, and an average design score of at least 53.

Assigning Weights to Individual Scores for the 3Ds

The final component of the grading system involves combining the individual scores for the three metrics into one composite score. But first we must determine the relative weights of the 3Ds. To do so, we relied on a recent addition to the literature by the authors who originally laid out the framework for the 3Ds. Reid and Ewing (2010) generated weighted elasticity values for each metric from a collection of more than 200 built environment and travel studies that included quantifiable results. In perhaps the

Grade	Grade Points	Density			Diversity	Design
		Tier 4	Tier 3	Tier 2		
F	0.00	0.0	0.0	0.0	0	0
D-	0.67	3.8	2.0	1.4	17	13
D	1.00	7.5	4.0	2.8	25	20
D+	1.33	11.3	6.0	4.1	33	27
C-	1.67	15.0	8.0	5.5	42	33
C	2.00	18.8	10.0	6.9	50	40
C+	2.33	22.5	12.0	8.3	57	47
B-	2.67	26.3	14.0	9.6	63	53
B	3.00	30.0	16.0	11.0	70	60
B+	3.33	33.8	18.0	12.4	77	67
A-	3.67	37.5	20.0	13.8	83	73
A	4.00	41.3	22.0	15.1	90	80
A+	4.33	45.0	24.0	16.5	97	87

Table 1: Grading Scale by Metric.

most comprehensive assessment of these variables to date, results indicate a relative weighting of approximately 17%, 29%, and 55% for measures of density, diversity, and design, respectively. In other words, the design of the pedestrian network is the single greatest predictor of transit use of these three metrics.

Using these weighting factors, a final comprehensive score can be calculated based on the letter grade for each metric. A station that scores a "B" on both density and diversity, and a "C" for design would achieve a final letter grade of "C+," calculated as:

(0.167)*(3.0) + (0.286)*(3.0) + (0.548)*(2.0) = 2.455 = "C+"

As a weighted average of multiple metrics using a pre-defined scoring system, the final grade can be used as a method of comparing stations within the same tier based on measures of density, diversity, and design.

Triangle Region Findings

Forty-two station areas or neighborhoods were defined for the Triangle region version of the Neighborhood Transit Readiness Scorecard. Each analysis included three maps, with the score based on statistics collected for the area within a half-mile of the proposed station location or neighborhood center.

Primary Finding: The Triangle Scores Better on Diversity than on Density or Design

The Triangle region, which experienced its most rapid growth in the late twentieth century, is largely characterized by an auto-oriented transportation network that serves mostly separate land uses in a design pattern built on suburban principles. The overall grade distribution for the Triangle's Scorecard (shown in Table 2) is consistent with this reality, where the average grade for density is roughly a "D+," the average grade for diversity is a "C+," and the average grade for design is a "D+."

Density Grades

Although there is only one "F" in the density category (at Raleigh-Durham International Airport), there are also no "A's" for density in any of the three tiers. Only four station areas achieve a "B-," and only two of those achieve the recommended density level for their respective tiers from the SADG by 2035. Overall, nearly 65% of the stations are in the "D" range for density, unsurprising as stations with even lower densities were likely weeded out early in the station selection process.

Diversity Grades

The Triangle region fares better at providing a variety of retail and entertainment options in the neighborhoods surrounding potential rail stations. Almost 80% of the stations analyzed were identified as "somewhat walkable" by their average Walkscore. However, while some of these station areas are likely to become high-quality urban commercial districts, auto-oriented commercial centers such as strip malls also score within this range on the diversity metric. Therefore, Walkscore assigns very similar diversity scores both to Meadowmont, a New Urbanist development in Chapel Hill, and to Patterson Place, an auto-oriented complex in Durham. On the design metric, Meadowmont's score was three times that of Patterson Place.

Design Grades

The Triangle presents a very bottom-heavy distribution on design, the most important of the 3Ds. To be sure, at least three of the 27 stations that score a "D+" or lower occupy areas largely untouched by development and are thus artificially low. Regardless, the distribution is telling of the overall development patterns in the region. The nine stations that score a "B-" or better are either universities or areas connected to historic downtown districts primarily developed before the automobile era. In other words, no proposed suburban station area in the region scored higher than a "C" on the critical measure of design.

Grade	Density	Diversity	Design	Overall Grade
A's	0	6	4	3
B's	4	7	5	2
C's	10	20	6	10
D's	27	7	13	18
F's	1	2	14	9

Table 2: Triangle Region Grade Distribution For All Tiers.

With these summaries of the grade distributions for each of the 3Ds completed, the next section of the paper describes the composite grades for Tier 2 and Tier 3. With only seven stations/neighborhood centers out of 42 in Tier 4, and most of them being highly developed central city stations in Raleigh and Durham, the opportunity to explore policy choices to improve transit usage is much greater for Tier 2 and Tier 3 station areas.

Tier 2 Stations – Grades and Insights

Table 3 presents the final grades for each metric, as well as the final weighted grade for the twenty Tier 2 stations identified for this study. Stations described in the original SADG document were placed in the same tier that they were assigned to in the 1990s. While we recognize that community goals and relative market propensities for development may have changed at some stations, we retained the original tiers for consistency. Stations that were not assessed in the SADG were assigned to tiers based on growth trajectories identified in small area plans, overlay district regulations, and/or socioeconomic data. Stations with an asterisk denote locations that were neither included in the SADG nor in the basemap for the fixed guideway transit corridor between Chapel Hill and Durham (which was adopted by the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization in 2002).

The three top performing places in this category are all either historic downtown centers or older city neighborhoods that existed prior to widespread use of automobiles. Two relatively recent development projects in Chapel Hill designed using New Urbanist principles, Meadowmont and Southern Village, are the only post-World War II neighborhoods to receive a combined grade above a "D." These two neighborhoods outperformed other suburban contexts with recent development such as northwest Cary, Highwoods, and west Raleigh primarily due to their much greater intersection density and better sidewalk coverage, as well as their mixed-use commercial districts.

Many of the lowest scoring areas in this tier occupy the low density region in the center of the Triangle near Glover Road, McCrimmon Parkway, downtown Morrisville, Park West Village, and northwest Cary. Intersection density and sidewalk coverage are very low in this part of the Triangle. In the case of Glover Road, there is not one single foot of existing sidewalk within a one-mile radius of the likely rail platform location.

Tier 2 Stations/ Neighborhood Centers	Density	Diversity	Design	Overall Grade	GPA
Downtown Apex*	D	B	B	C+	2.7
Downtown Cary	D+	B+	C+	C+	2.5
Alston Avenue	C-	C+	B-	C+	2.4
Southern Village*	D-	C+	C-	C-	1.7
Meadowmont	D-	C-	C	C-	1.7
State Fairgrounds	D+	C+	D-	D	1.3
Morreene Rd.	C+	C-	D-	D	1.2
Pickett Rd.	D	C	D-	D	1.1
East 54	D-	C	D-	D	1.0
West Raleigh	C-	D+	D-	D	1.0
Highwoods	C-	C+	F	D-	0.9
Gateway	C	C	F	D-	0.9
Park West Village*	D+	C-	F	D-	0.7
Northwest Cary	D-	C	F	D-	0.7
Garrett Rd.	D	C-	F	F	0.6
McCrimmon Pkwy.*	D	C-	F	F	0.6
Downtown Morrisville*	D-	C-	F	F	0.6
Leigh Village	C	D-	F	F	0.5
Glover Rd.*	D-	D-	F	F	0.3
RDU Airport*	F	F	F	F	0.0

Table 3: Tier 2 Station Grade Distrubution.
*Note for all tables: * indicates an area not considered for a station.*

Tier 3 Stations – Grades and Insights

Table 4 provides the final score for the fifteen Tier 3 stations/neighborhood centers. As would be expected, the top performing stations are centered in historic downtown districts and near universities. The poorly performing stations mostly consist of suburban retail centers, defined by reasonable destination diversity coupled with low density and poor design.

Ignoring Carolina North and Veridea (proposed mixed-use office park or campus developments on currently undeveloped land), the two lowest performing Tier 3 areas – Triangle Metro Center and North RTP – occupy the center of the Triangle region, similar to the cluster of low performing Tier 2 stations. Both received a "F" for the design metric, indicating that potential transit users would likely be unable to reach their destination by foot regardless of density or diversity.

In this tier, the location with perhaps the greatest potential that could be realized quickly is N.C. Central University. With a "B" design grade, the neighborhood has a well-developed urban street grid. However, the City of Durham's zoning immediately adjacent to the university is mostly "Residential Urban 5" or "Residential Suburban Multifamily." Both are single-use districts that do not permit commercial

uses, allowing small-scale commercial uses and moderately increasing density could greatly increase the pedestrian-friendliness of the neighborhood.

Insights

With the first edition of the Scorecard complete for the Triangle region, the following insights will guide our next steps in developing future versions of the Scorecard.

Insight 1: Scorecard is a Complement to, Not Substitute for, Travel Demand Models

The strength of the Scorecard in comparison to traditional four-step travel demand models, or the Federal Transit Administration's Aggregate Rail Ridership Forecast model, is that such models operate primarily at a regional scale. In doing so, they often skip over critical local factors such as station area accessibility for pedestrians. Still, such models are critical in determining potential ridership based on station area densities and the relative attractiveness of regional traffic flows to major employment centers. Therefore, the Scorecard is not intended to replace this more in-depth modeling approach. It is a complementary tool that evaluates current and projected land use scenarios and identify strengths and weaknesses in the density goals, diversity projections, and network connectivity from the pedestrian's point of view. Also, the Scorecard takes a more detailed look at the diversity of uses and connectivity of the network in order to determine the degree to which individual stations are likely to meet, fall short, or exceed these ridership projections from the traditional travel demand models.

Tier 3 Station/ Neighborhood Centers	Density	Diversity	Design	Overall Grade	GPA
Downtown Chapel Hill*	B-	A-	B-	B-	3.0
N.C. State University	C	B	B-	C+	2.7
N.C. Central University*	D	C-	B	C	2.3
Downtown Carrboro*	C-	A-	C-	C	2.2
Ninth Street	D+	B	C	C	2.2
Spring Forest	D	B+	D	D+	1.7
Friday Center	D-	C-	C-	D+	1.5
South Square	D+	B	D-	D+	1.4
New Hope Church	D+	B	D-	D+	1.4
Patterson Place	D+	C	D-	D	1.2
NERC*	D+	D	D-	D-	0.9
Triangle Metro Center	D+	C	F	D-	0.8
Carolina North*	D	D-	F	F	0.4
North RTP	D-	D-	F	F	0.3
Veridea*	D-	F	F	F	0.1

Table 4: Tier 3 Station Grade Distrubution.

Insight 2: Benefits of Good Urban Design are Long-Lasting

Perhaps the most powerful insight generated by the Scorecard project is that street networks designed many decades ago still provide some of the best levels of pedestrian access in the Triangle region. This is true not only for the large CBDs but equally so for smaller urban neighborhoods, such as downtown Cary and Alston Avenue. Neither of these areas features the large employment densities or the fast-growing residential populations of downtown Raleigh or downtown Durham. Newer developments such as Meadowmont and Southern Village that attempt to mimic these older street patterns considerably outperformed their contemporary counterparts built out using more conventional suburban development patterns. The lesson for communities here is above all else: "get the streets right the first time."

Insight 3: Diversity is the Easiest to Improve Quickly

The various station area maps generated by the Scorecard show that businesses seek to agglomerate regardless of the urban or suburban context. Planners should recognize that businesses want to agglomerate, and thus find ways to allow variety and agglomeration to increase in proximity to residences. Changes to design may require public funding for street improvements and expensive utility relocations. Adding density to a neighborhood may require lengthy and contentious rezoning procedures. On the other hand, adding another retail type to a street with several restaurants can raise the level of destination variety on a block very quickly.

Insight 4: Interface Between New and Old Development is Key

Often when a new development proposal reaches a city or town council, requests pour in to shield existing neighborhoods from the new development activities. Common responses are fencing, vegetative buffers, or truncated street networks that separate pedestrians from activities and necessitate auto trips. The Scorecard reveals how significantly dead-ends and various impedance barriers greatly reduce pedestrian mobility.

Communities should work to replace the buffering mindset of how to separate uses and impacts with an approach that seeks to maximize the benefits of interface between neighboring development parcels. These interface considerations should include traffic calming, safety, and security considerations as well as aesthetic improvements that reframe connections as opportunities rather than threats.

National Comparisons to the Triangle

To place the Triangle Scorecard grades in context, an analysis was performed on five additional station sites outside the Triangle region. Care should be taken when analyzing these results, as grading for any metropolitan region should ideally be conducted on a scale appropriate to that area. However, this approach provides a simple mechanism to envision growth in the Triangle as measured against other familiar stations.

Ballston and Clarendon are two walkable stations on the Washington Metrorail's Orange Line in Arlington, Virginia. Due to the densities and diversity of uses in Arlington, both were graded as Tier 4 stations. Prior to the construction of the Metro, Arlington, Virginia was largely a suburban, low density region across the Potomac from Washington D.C. By concentrating TOD around five stations and promoting high density, mixed-use growth surrounded by medium-to-low density residential, the Rosslyn-Ballston corridor was transformed into a walkable urban district comparable to Downtown Raleigh in terms of transit-readiness.

East/West and Scaleybark are two stations on Charlotte's Lynx Blue Line. East/West occupies an area known as the South End, just south of the heart of the Charlotte's business district. Due to its proximity to downtown and projected growth, East/West is comparable to a Tier 3 station in the Triangle. Scaleybark, on the other hand, is located about two miles southwest of the South End in an area largely characterized by suburban, single family residential. As such, it is more aptly defined as a Tier 2 station, and the trajectory of growth in this region could provide critical insight for Tier 2 stations in the Triangle.

Northgate in Seattle, Washington, is the only neighborhood on the list not currently served by rail, although a light rail station is planned for the area. Located about seven miles north of Seattle's CBD, the area includes a medium to high density commercial and retail core surrounded by low to medium density residential, and is most comparable to Tier 3 stations in the Triangle.

Table 5 provides the final grades for each of the five non-Triangle stations analyzed, ordered by tier. Measured against the Triangle's Tier 4 stations, both Clarendon and Ballston would finish at the top of the Scorecard, achieving approximately the same score as Downtown Raleigh (Core). The transit-friendliness of both of these station areas is clear to anyone who visits, and it is certainly encouraging that transit has been able to facilitate such a dramatic reshaping of a region in a city only a few hundred miles away.

East/West in Charlotte and Northgate in Seattle would both score in the top three among Tier 3 stations in the Triangle on the land-use Scorecard, comparable to Downtown Chapel Hill and N.C. State University. Focused primarily around a mall, Northgate can provide an example for similar but lower-performing stations in the Triangle, such as Patterson Place and South Square. It achieves only slightly higher density levels than these two stations, but improved connectivity and a greater diversity of uses indicated the region is currently much more transit-ready.

The final station, Scaleybark, scores lower than some of the older downtown Tier 2 stations in and near Raleigh, such as Alston Avenue or Downtown Cary, but only slightly higher than similar suburban stations such as Pickett Road or Morreene Road. As such, the successes and failures in development trends at Scaleybark can provide a valuable case study; one that should be followed closely in the coming years in order to help maximize the potential of comparable Triangle neighborhoods.

		Geography	Density	Diversity	Design	Overall Grade	GPA
Tier	4	*Downtown Raleigh*	*B+*	*A-*	*A+*	*A-*	*4.0*
		Ballston, V.A.	A+	A-	A	A-	4.0
		Clarendon, V.A.	B-	A-	A+	A-	3.9
	3	East/West, N.C.	A-	B+	C+	B-	2.8
		Northgate, W.A.	C-	B+	C+	C+	2.5
	2	Scaleybark, N.C.	C	C+	C-	C-	1.9

Table 5: Scorecard Comparisons Outside the Triangle.

Insight 5: Scorecard's Scale Shows How Individual Projects Contribute to Urbanity

Much of urban planning analysis around rail transit occurs at the regional level (i.e. travel demand models) or at the site level (i.e. an individual development proposal). The Scorecard excels at placing individual development proposals into a neighborhood-level context. One local example of how the Scorecard illustrates the difference between the impressions and the reality of building transit-friendly development can be found on the south side of Research Triangle Park at the proposed rail station called Triangle Metro Center.

Developers have proposed a relatively dense, vertically mixed-use project with a healthy internal street grid adjacent to the station. Although the proposal sounds ideal for increased pedestrian and transit activity, the Scorecard reveals that while the proposal is certainly an improvement over the area's current suburban pattern, at less than 10% of the acreage in the half-mile radius around the Triangle Metro Center station, the quality of mixed-use development is not enough. If this station is to be as successful as other core stations are likely to be, the street grid pattern established by the development proposal needs to extend considerably beyond the 40 acre project site to approximately 200 to 350 acres.

Limitations

When interpreting the Scorecard's final results, it is critical to recognize that there are limitations. In the interest of generating a standardized, easily replicable, and primarily land use-based grade derived from the 3Ds, a number of significant variables were excluded from the analysis. As a result, the transit readiness of some neighborhoods may be underestimated likely due to one of the following:

- *The "Fourth D" is Demand Management:* Parking supply, parking fees, tolling, and employer incentives for transit use are just a few examples of demand management strategies that affect transit demand. Parking management, in particular, is a critical component with most successful TODs, and these policies need to be explored in much greater detail on a station-by-station basis.
- *The "Fifth D" is Destination Accessibility:* Overall system ridership is tied not only to local accessibility, but to the total number of regional destinations (and particularly major destinations) served by a transit system within a given travel time. All other characteristics being equal, a station two stops from the CBD of a central city is more likely to attract transit riders than one seven stops away.
- *Existing Data Context for Future Planned Stations and Growth Areas:* The low diversity and design scores of currently undeveloped stations areas that are likely to be future growth nodes may understate their potential and distort their comparison to non-greenfield sites. The design variable could be altered to include analysis based on proposed street networks, rather than only existing ones.
- *Park and Ride Transit Stations:* As the Scorecard focuses heavily on improving pedestrian access to stations, the variables that make a rail station successful as a park and ride station are generally unaddressed by this study. Although currently unanalyzed, we expect that Scorecard grades for rail stations with heavy park-and-ride patronage will be significantly less correlated with actual daily station ridership than at non park-and-ride stations.

Future Applications

Now that the basic components of the Scorecard tool have been developed by Triangle Transit, several future research vectors may expand on the activities outlined in this article. Applications could include, among other things, comparisons of neighborhoods (New Urbanist vs. pre-World War II neighborhoods), effects of non-public infrastructure barriers, and testing for significance correlations between rail station pedestrian ingress and egress counts to Scorecard variables.

Perhaps the most significant potential application (which is most likely our next step) is an assessment of how site plans for proposed developments in a station area would change the Scorecard results. This would be followed by an analysis of how site plans could be altered prior to approval to improve the pedestrian-friendliness of developments. This item would have direct implications for light rail station area planning in the Triangle region, as well as for overall planning for pedestrian improvements that will benefit transit and non-transit users alike.

In closing, we believe that the Neighborhood Transit Readiness Scorecard is an exciting new tool for urban planners. The Scorecard is both quantitatively rigorous and adaptable to numerous contexts. It broadens the discussion of how to plan for rail transit or urban redevelopment beyond simple debates about the "right" amount of density, and it makes effective comparisons between "less urban" and "more urban" neighborhoods that can help identify community projects that will support more pedestrian activity and transit usage.

References

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See *http://www.urbanscorecard.com* for more information.