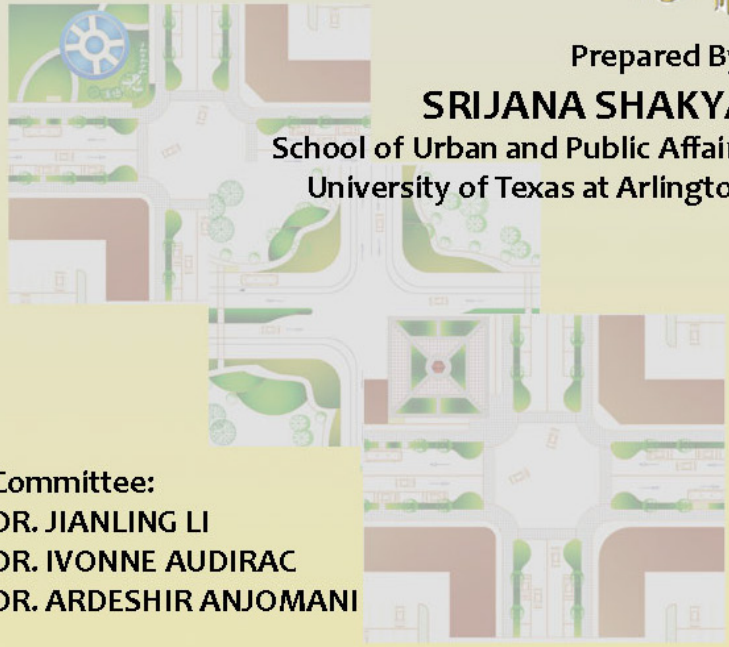




PROFESSIONAL REPORT

URBAN DESIGN FRAMEWORK FOR ALONG PRESTON CORRIDOR



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Abstract

The city of Celina is a small city located within Collin County in the northern part of the North Central Texas Metroplex. The city used to be a rural based community with a large percentage of agricultural land. However, over the past decade, Celina's population tripled from around 1800 to over 5200 people. Currently, the city is in a transition phase and is anticipated to grow and develop rapidly in the future. Development is predicted to occur first along Preston Corridor (SH 289), which runs through the city boundary, for two main reasons. First, the continual development trend along Preston Corridor in the neighboring cities such as Plano, Frisco, and Prosper is influencing Celina too. Therefore, the city is expected to grow in the same manner in the future. Secondly, the intersection of Preston Corridor with two new regional highways– Dallas North Tollway (DNT) on the west and Collin County Outer Loop on the south of Celina, will transform city's transportation system over the next few years. So, the change in social, economic and physical structure is certain in the city.

Currently, Celina is a small community having its own identity and character. The citizens of Celina desire to preserve its identity and character, despite its anticipated change in social, economic, and physical structure. With this vision in mind, a group of students from University of Texas at Arlington (UTA) analyzed the current conditions and future outlook of Celina, and conceptualized the three building blocks framework along the corridor, namely, Corridor Connector, Historical Core and Rural District. UTA student group also conducted a visual preference survey to identify the community's preferred character elements for the corridor. Building on the research

findings from the previous study, my project covers three main objectives. The first objective is to apply those preferred character elements in the three Building Blocks so as to preserve the city's character and tradition, and to create a unique identity. In addition, the community has a preference for pedestrian and transit oriented development along the corridor. The next objective of my project is to develop the land use guidelines, and create an urban design framework for the three Building Blocks, which can support transits and pedestrian movement.

Transit-oriented-development standards, developed by Peter Calthope in his book "The New American Metropolis", for Neighborhood TOD and Urban TOD are compatible with Celina's three Building Blocks. So, I have adopted Calthope's land use guidelines for these three Building Blocks focusing on major nodes (intersections). The guidelines are applicable within TOD boundary which is half mile from the center of the Preston Corridor. Apart from the land use guidelines, I also proposed urban design guidelines for the corridor which comply with TOD. Recommending land use guidelines for the corridor is not sufficient enough to show the pattern of activity between the land uses and the surrounding environment. Creating an urban design framework will help in developing a better connection between the land uses, transportation and the surrounding environment. The TOD urban design standards, developed by Andrey Duany and his co-authors, for six transects are compatible with Celina's three Building Blocks. So, I proposed the urban design guidelines for the three Building Blocks-Corridor Connector, Historical Core, and Rural District, which complement with the three transects- Urban Core (T5), General Urban Core (T4), and Rural Zone (T2) respectively. Lastly, I suggested urban design elements in three Building Blocks, focusing mainly on paths, edges, districts and landmarks, as described by Kevin Lynch in order to make the surrounding environment visibly organized and sharply identified.

The proposed land use and urban design guidelines will help in updating planning and design guidelines for the city, which will be a driving force for the communication and consensus-building between local planning authorities, local communities, developers and stakeholders. The final product of my report will help in creating a long- term vision for Celina to allow growth potential along this corridor.

Chapter I

INTRODUCTION

I. Introduction

The city of Celina is a small city located within Collin County in the northern part of the North Central Texas Metroplex. The city is anticipated to grow very fast in several years in the future. Development is predicted to occur first along Preston Corridor (SH 289) which runs through the city boundary and connects directly to Dallas downtown on the south. Since the last decade, there has been tremendous growth along Preston corridor in cities such as Plano, Frisco and Prosper. This continual development trend along the corridor is influencing Celina too, and is thus expected to grow in the same manner as other cities. In addition, the construction of two regional highways – Dallas North Tollway (DNT) on the west and Collin County Outer Loop on the south of Celina and their intersection with the Preston corridor will transform the city's transportation system over the next few years and thus will change social, economic, and physical characteristics of Celina.

The existing development pattern in Celina is designed for auto-traffic. The land uses - residential, offices, retail stores, and public buildings are segregated and are neither pedestrian friendly nor transit oriented. The city wants to change this prevailing development pattern in the future, and aspire to see the city with mixed land uses and public transits facility. The change in the land use pattern and mode of transportation will change the pattern of movement of people. As mentioned above, the new development pattern is likely to occur first along the corridor. The City of Celina conducted its own city-wide planning to manage future development pressures and growth. Through Celina By Choice: The 2030 Comprehensive Plan. The community

developed a vision for the next 20 years and created a vision statement which states that “Celina is a premier community of unique heritage, exceptional livability and Natural Beauty, committed to offering its citizens an array of settings in which to live, work, play, and raise a family, while managing quality and environmentally responsible growth. Its strategic location will allow the promotion of a diverse economy while retaining much of its hometown atmosphere.” With this vision in mind, a group of students from UTA analyzed the current conditions and future outlook of Celina, and conceptualized a three building block framework along the corridor, namely, Corridor Connector, Historical Core and Rural District. The student group also conducted a visual preference survey to identify the community’s preferred character elements for the corridor.

II. Objective

Building on the research findings from the previous study and from the city’s future goals mentioned in 2030 City’s Comprehensive Plan, my project will offer three following recommendations which will help the city in achieving the desired identity and character for three Building Blocks, as well as will help in making the city pedestrian and transit friendly:

- Develop land use guidelines within half-mile distance from Preston Corridor based on Peter Caltrope’s guidelines for transit-oriented-development (TOD).
- Develop urban design guidelines within TOD boundary built under the guidelines set by Andrey Duany and his co-authors.

- Provide different graphics in the form of drawings and photomontages, incorporating the character elements selected by city's residents and stakeholders from the Visual Preference Survey, to reflect the character and give unique identity to three Building Blocks along Preston Corridor- Corridor Connector, Historical Core and Rural District. The graphics mainly focuses on nodes, edges, districts, and landmarks complying with Kevin Lynch's theory.

The proposed guidelines can be used by the city to update planning and design guidelines for the Preston Corridor development in order to achieve the desired identity and character for the three Building Blocks, and make the city pedestrian and transit friendly. The guidelines can also be used by the city for the communication and consensus-building between local planning authorities, local communities, developers and stakeholders to create a long- term vision for Celina.

III. Literature Review

1. Corridor

Corridors refer to relatively well-defined geographic areas which serve traffic demands of single or multiple transportation routes or facilities such as thoroughfares, public transits, railroads, highways, bike lanes, adjacent land uses, and the connecting network of streets. Corridors usually connect two cities or segments of major transportation facilities and may range in length from few miles to hundreds of miles depending upon the level of planning -local, metropolitan, state or multi-

state. Corridor plan at local level may encompass a length of 5-10 miles while at state or multi-state level. It may cover from 50 to 100 miles in length (Meyer 2009).

Traditionally, corridors were oriented radially from suburbs to the city center. After World War II, with the development in urban fringe, many corridors planning focus on suburb-to-suburb trip patterns (Meyer 2009). Corridors not only connect from suburb-to-suburb but also connect from district-to-district and neighborhood-to-neighborhood. Most common corridors such as highways and arterials were developed in the form of commercial strip development, which should be redeveloped into higher density mixed-use regional centers (Duany, Speck and Lydon 2010). Instead of making the corridors auto-mobile dependent, they should be turned into a pedestrian, bike and transit friendly roads. There are different modes of transit system, some transits support mixed-use development whereas others create barrier to pedestrians. Therefore, transits such as buses, light rails etc. should be encouraged (Calthrope and Fulton 2001) . Apart from these artificial or manmade corridors as highways and arterials, natural corridors also connect neighborhoods, districts, and cities. Natural corridors are usually in the form of wide greenways and narrow lengthy medians/boulevards. The greenways intersected by roads should be provided with “critter crossing” to avoid roadkill. Medians with more than 20 feet wide should be provided with median-crossing to avoid pedestrian from crossing randomly (Duany, Speck and Lydon 2010). In addition to natural and manmade corridors, utility corridors such as water supply system, drainage, and sewerage system are equally important and should be relocated in areas such as infill

and redevelopment in order to preserve farmland and natural features (Calthrope and Fulton 2001). “Lastly, old and abandoned railway tracks can be reused for new transit links that run through the heart of a region’s historic core and older suburb” (Calthrope and Fulton 2001, 60).

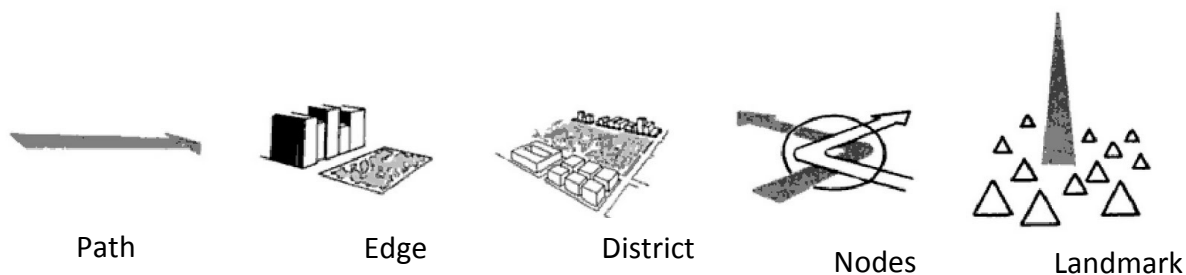
2. Corridor planning

Corridor planning is usually conducted in response to the problems or issues identified by state or local officials. The main purpose of corridor planning is to address future transportation needs and recommend a series of land use, transportation and other infrastructure improvement strategies within the corridor. It bridges the gap between land use planning and transportation, and provides opportunities for future development along the corridor. Since, land use and transportation are interrelated to each other, corridor planning helps in providing the information about how transportation decisions affect landuse pattern and urban design, and vice versa.

3. Relationship of corridor planning with urban design

Corridor planning shows the connection between land use and transportation while urban design organizes all the parts of landuse and transportation into a coherent pattern so as to make them easily identifiable. Creating a visual image of a city on an observer might be difficult to an observer/pedestrian if there are many confusions, weak boundaries, isolations, breaks in

continuity, and lack of character or differentiations. Therefore, if land uses and transportation are to operate successfully, there should be better connection between the two, which is possible only when they are connected by “paths, edges, districts, nodes and landmarks as shown in figure below (Lynch, The image of the city 1974).



Source: Yuen, Jacky. “Five elements: Paths, Edge, District, Node, Landmark. From: Kevin Lynch. Image of the City”. escapsule.blogspot.com. 23 March 2011

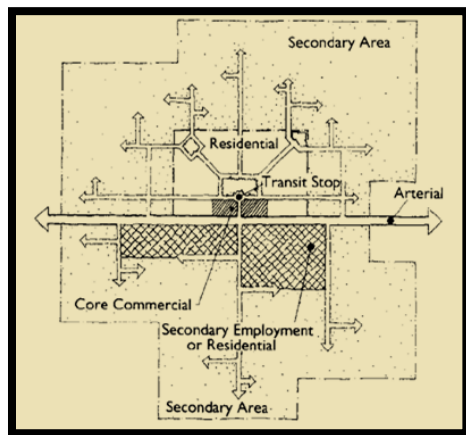
Figure 1. Lynch’s five unique elements

A path denotes streets, walkways, transit lines and railroads along which observer moves. Edges are the boundaries between phases, and linear breaks in continuity such as shores, railroad cuts, edges of development, walls etc. These are connected based on social meaning of an area, and its functions, its history or even its name. Districts are mainly considered as two-dimensional medium to large sections of the city and are used for exterior reference. Nodes are generally junction, a cross-section of streets or places of break in transportation. Finally, landmarks are physical objects such as buildings, signs, towers or natural feature as hills/mountains which are considered as the points of reference and clues of identity by observers. A city

will become a remarkable place if the surrounding environment is visibly organized and sharply identified, and if the people can visualize the city with some meaning and can feel pleasure while walking through the streets (Lynch, *The image of the city* 1974).

Peter Calthorpe has also mentioned about the importance of better linkages between land uses and transportation. He has used similar vocabulary to define these connections such as arterial streets, connector streets, commercial streets, local streets, alleys, pedestrian routes, arterial crossings and pedestrian bridges, bikeways, village greens and transit plazas, community buildings, schools and community parks and so forth. He suggests that land uses and transportation will be more communicative if people use public transits instead of automobiles. Automobiles discourage people to walk and encourage government to build massive highways and big parking lots. Our prevailing built environment clearly delineates human dimensions for our culture. The scale of our environment is built for large institution rather than small community/neighborhood. The streets instead of designing for human pace are constructed for automobiles. The pattern of the city/region is for mass production rather than for local crafts and businesses. Finally, “the bounds are set by wealth and power rather than proportion and nature” (Calthorpe 1993, 11). He contends that a city will be aesthetically pleasing only when it is “scaled to the human body, timed to a stride, patterned to ceremony, and bonded to nature.” So, the only alternative to sprawl is to bring back the traditional town in a modern new ways such as creating “neighborhood of housing, parks, and housing

within a walking distance of shops, civic, jobs and transits.” (Calthorpe 1993, 16). Mixing the land uses together in human scale not only make a community pedestrian-friendly but also creates an identity and focus for the community, and can enhance the function of each use. Likewise, using public transits instead of automobiles can save a land that are used for parking lots, save energy and resources needed for automobiles, reduce traffic volume tremendously, and can bring more access for elderly and children. The figure below shows connection of the land uses and transportation, and distribution of land uses at walking distance.



Source: Literature Review. “Transit-Oriented Development (Calthorpe 1993)”. web.mit.edu. 23 March 2011
<<http://web.mit.edu>>

Figure 2. Calthorpe’s concept of Transit-oriented

Development. Andrey Duany and his co-authors in the manual “Smart Growth” has interpreted these linkages as avenues and boulevards, free-flow streets and roads, slow-flow streets and roads, yield-flow streets and roads, rear alley and lanes, passage and paths,

sidewalks, high points, civic services, schools, local open space and so forth. Like Calthrope, Duany has also expressed the absence of better linkages between the land uses which is resulted due to “single-use zoning, massive road construction and urban disinvestment”, and thus has led to ecological, economic and social crisis. A single-use zoning has made a fragmentation of civic life due to a segregation of housing, shops, offices and other public spaces, which are reachable only by automobiles. Multiple traffic lanes and congestion, great distances between the activities, and longer commuting time have discouraged people from walking, strolling, and participating in public realm. Secondly, a massive construction of highways and heavy movement of cars have destroyed natural landscape, threatened endangered species, and polluted the atmosphere (Duany, Speck and Lydon 2010). Therefore, restoring a neighborhood structure by constructing a tight network of walkable streets supported by transits and mixed-use neighborhood centers, is the solution to current issues. However, in order to retain American dream, the authors have also proposed a wide variety of development pattern named as “transect” as shown in figure below. Transect is a progression through a sequence of habitat from rural hinterland to urban core in which all the detail including building, its area, height, setbacks, transportation, landscaping, and all other design elements vary across the transect , however, they all are consistent and mutually supportive (Duany, Speck and Lydon 2010).



Figure 3. Transect concept by Duany

Source: Drueding, Meghan. "Courtesy Duany Plater-Zyberk & Co."

<http://ra.hw.net> 23 march 2011 < <http://ra.hw.net> >

4. Urban Design Elements

People are concerned about the quality of public realm and pattern of living in their surrounding environment. "Urban Design is seen as an interactive design field addressing the traditional and overlapping concerns of city planning, landscaping architecture, civil engineering and architecture" (Lang 2005, 3). It deals with the creation of physical public realm of human settlements within the public realm of decision-making (Lang 2005, 4) . Physical public realm constitutes different design elements which create different behavior settings, and activities among different groups of people. Urban design can also be defined as "a relationship between different buildings; a relationship between buildings and streets, transit stops, sidewalks, squares, parks and waterways, and other spaces which make up the public domain, and a pattern of movement and activity" (Lang 2005, 6).

The figure below illustrates a typical streetscape plan and section which make up a built environment in the surrounding. In addition, urban design elements shown in the figure that create different activities along the street, are elucidated below.

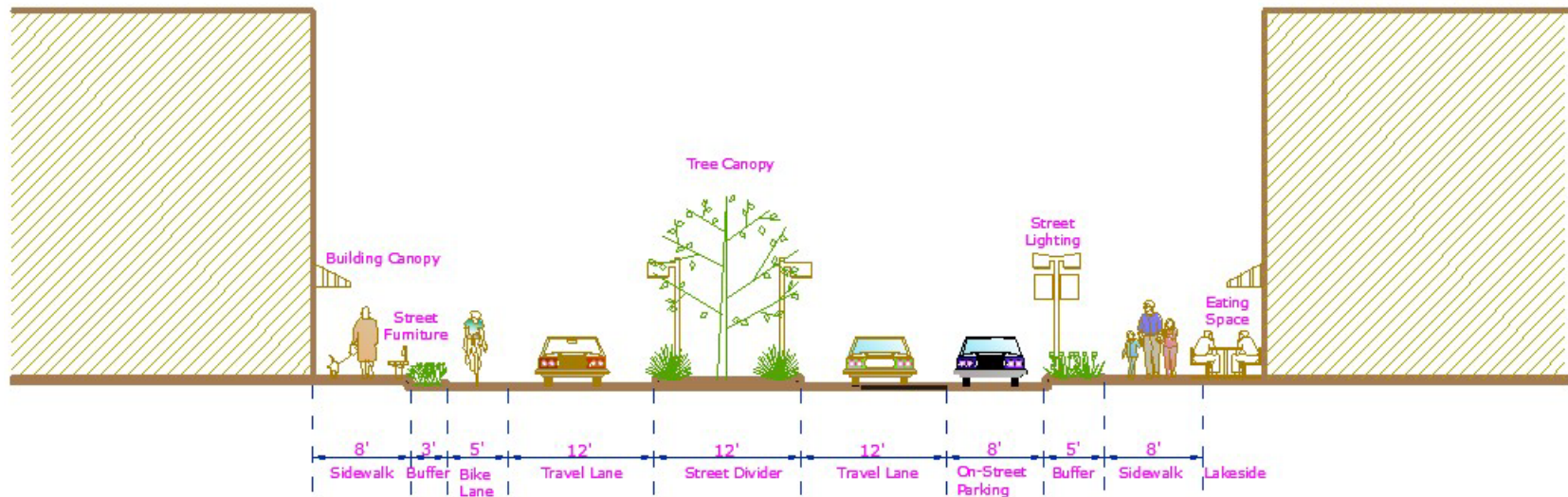


Figure 4. Typical Streetscape Plan

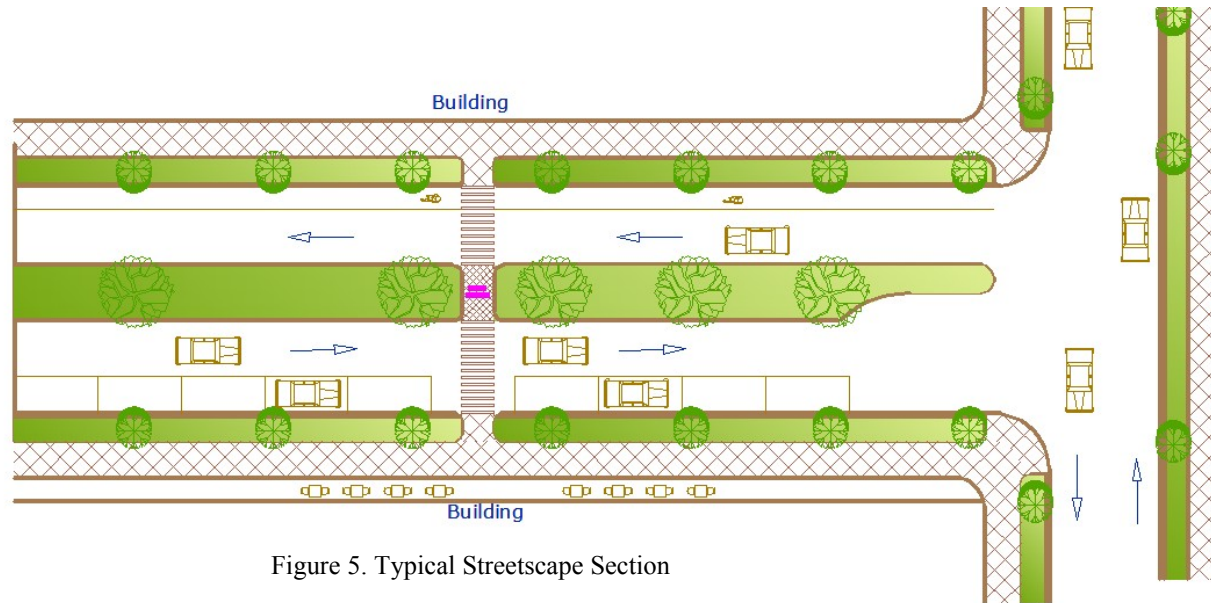


Figure 5. Typical Streetscape Section

a. Street Signage

There are mainly three points in street signage which should be taken into account such as size of a signage, its coherence and a sense of place. Pedestrian and transit-oriented streets should have a sign in human scale as the streets have lower speed limit and observers should be able to read it clearly. Secondly, the signs should be made coherent which means it should be consistent in shape, color and lettering (Barnett 2003). Chaotic pattern of sign will overwhelm the observers as well as give messy look to the building façade and streets. Finally, the signs should convey a sense of place which means that it should

reflect a character of the city/district so that it will add pleasure to the pedestrians of being there. Signs are usually located at nodes, building facades and with street furniture.



Figure 6. Street Signage

Source: <http://media.photobucket.com>. March 2011

Source: <http://www.brandonindustries.com>. March 2011

b. Open Space

Open space is one of the essential features in a city. Open space can take many different forms such as recreational parks/plaza, natural landscape, trails, greenways, bike trails, pedestrian paths etc. Open space creates extensive benefit to a community, brings people together, create healthy atmosphere, and provides environmental benefit. Open space is financially beneficial too. The values of the properties, which are in proximity to open space, are higher than those that are not. Therefore, if cities want to be competitive and want to attract more people and create tax base, it is essential to develop open space.

Furthermore, interconnecting other land uses such as commercial and residential areas with open space such as greenways, bike trails, and pedestrians encourage pedestrian activity. In transit-oriented development, the importance of open space is even more so.



Source: www.pennconnects.upenn.edu. March 2011



Source: www.kpbs.org. March 2011



Source: <http://gwslepthere.com>. March 2011



Source: www.broomfield.org. March 2011

Figure 7. Different forms of open Space

c. Sidewalks

The width of the sidewalk varies with the type of areas. A high-volume area, such as core commercial area, requires greater width of sidewalks than rural/suburban areas. Minimum width of sidewalks should be five feet in order for two people to walk abreast comfortably. But in core commercial areas where there are lots of activities on the streets, the width of the street should be should be at least eight feet in order for two couples to walk comfortably.

People will not be encouraged to walk just by adding sidewalks along the streets. Sidewalk must incorporate pedestrian-friendly features so that pedestrians are encouraged to walk, sit, eat, and shop along the streets. Features such as lightings, trees, shrubs, sittings, dining space etc. not only encourage pedestrians to walk, but also bring life to the streets. These features add beauty and security to streets as well as increases social interaction among people. Therefore, apart from minimum requirement of streets, mainly, there should be a room for greenbelt, sitting and lighting. “The minimum width for an urban sidewalk is about thirteen feet, which includes eight for pedestrians to walk and five feet for trees/shrubs/lighting/parking meters and other street furniture. In order to leave room for dining, another five feet should be added” (Barnett, p.217).

Lastly, it is equally essential to maintain continuity, connectivity, clarity, and visibility in sidewalks. Lack of clarity, discontinuity and interruption in the sidewalk discourage people to walk.

One thing we should keep in mind is that, sidewalks should be wide enough to accommodate pedestrian traffic without crowding, “yet not too wide as to appear empty most of the time” (Reid, p.17).



Source: www.freedomguidedogs.org, March 2011 Source: www.japaneselifestyle.com, November 2010



Source: <http://www.sorensenrestoration.com>, March 2011 Source: <http://www.debateitout.com>, March 2011

Figure 8. Sidewalks

d. Street furniture

Street furniture helps in making a street lively. However, care should be taken while designing and arranging the street furniture. Excessive use of colors and too much elegance might create adverse effect on the streets and on the observer. Street furniture whether it be benches or streetlights or trash bins, they should be appropriately scaled and positioned so that people passing by are encouraged to use them. Shrubs, flowers beds/ trees, and signage can support street furniture. Street furnitures is usually located at transit stops along streets at certain interval and at public open space such as plaza.



Flashy Street Furniture



Street Furniture decorated with shrubs

Source: <http://streetfurniture.com>. March 2011

Source: Google Image. March 2011



Source: www.forgotten-ny.com. March 2011 Source: Google Image. March 2011

Figure 9. Types of street furniture

e. Transit Stops

There are two things that should be taken into consideration in transit stops: comfort and safety to transit users. Shelters at transit stops that protect the users from different weather conditions can provide comfort to users. Transit stops can also be furnished with tree canopies that will give shade to the users. Shades can also be provided by installing canopies on the building, provided that the transit stops are closer to the building.

Safety is one of the essential factors in transit stops. Transit users should be protected from crime and traffic, or else transit users will not be encouraged to use the transit stops. The shelters provided on the transit stops should be visible from traffic lanes and should be provided with adequate lighting. Therefore, while designing a shelter, care should be taken on its width, height, wall and choice of materials. Traffic stops should also maintain traffic safety, which can be achieved either by creating sufficient setback from traffic lanes or by providing a vertical curb on the streets.



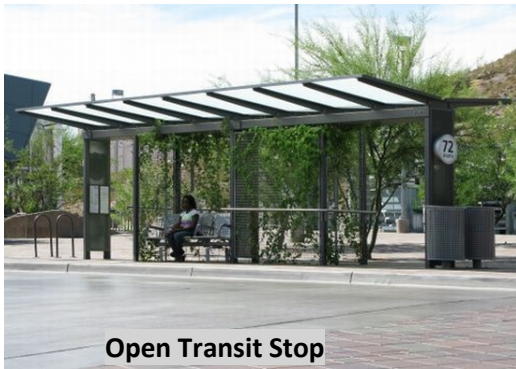
Closed Transit Stop

Source: www.a-streetfurniture.com. March 2011



Semi-Open Transit Stop

Source: www.a-streetfurniture.com. March 2011



Open Transit Stop

Source: www.greendiary.com. March 2011



Transit Stop at Building Canopy

Source: www.a-streetfurniture.com. March 2011

Figure 10. Transit Stops¹⁹

f. Crossings

Crossings should be designed in such a way that it provides sufficient service and safety to the pedestrians and motorists.

While designing a crossing, its width, pattern and curb radius should be taken into consideration. In TOD, the width of the

crossing should be kept minimum at human scale in order to make pedestrians comfortable and safe enough to use it. The pattern of the crossing should also be distinct from that of the street so that it is evident to the pedestrians. A different paving material on a crossing has two advantages- firstly, it makes the streets look attractive, and secondly, it makes the public environment safer since it reduces the speed of the vehicles. One of the methods for making the crossing safe is by reducing the radius of the curb. Minimum radius of the curb reduces the width of the crossing and thus makes pedestrians feel safe and comfortable. The radius of the curb is calculated from crossing distance and turning speed.

In TOD, non-intersection crossing can also be facilitated at mid-blocks and medians. Well-designed mid-block and median crossings can afford many safety benefits to the pedestrians than intersection-crossing, provided that they are placed at appropriate locations (FHWA course on bicycle and pedestrian transportation). Flaring sidewalks can also be one way of reducing the crossing distance and add safety to pedestrian.



Source: www.fhwa.dot.gov. March 2011



Source: Google Image. March 2011



Source: www.clearwaterks.org. March 2011



Source: www.metroed.org. December 2008

Figure 11. Crossing



Figure 12. Streetwalls

Source: www.yesmagazine.org . March 2011

Source: <http://streetswiki.wikispaces.com>. March 2011

g. Trees

“Trees are the most prominent design element capable of linking together an entire city” (Arnold 1980, 43). The importance of trees on streets is the psychological effect that it creates. The extension of tree canopy over the street helps in reducing its right-of-way. Number of rows of trees on street affects a sense of scale. “Single row of trees planted on six lanes shows weakness in the scale whereas two additional rows of trees planted on the same street reduce the scale of the street as well as become a dominant element on the street” (Arnold 1980, 53)

The importance of trees on sidewalks is even more. The branches of trees create a tent or canopy on the sidewalks which gives a sense of protection against weather condition and street traffic, and gives psychological comfort to the pedestrians. “Their size, spacing, subtle translucency, and continuity give greater visual unity and enclosure for pedestrian” (Arnold 1980, 44).

The right spacing of the trees of 30 feet (Thirty feet) center- to- center with a minimum height of 15 feet (Fifteen feet) from the

ground. (Ewing 1996) Street trees arranged closely form a continuous, arched canopy and brings visual unity with uninterrupted quality of light and shade. “Trees spaced far apart gives interrupted pattern of light and shade emphasizing each individual tree” (Arnold 1980, 51).

The choice of trees also makes a great difference to the surrounding. The evergreen trees should be limited in open areas since they provide cool breeze shade in summer but gives cold and dreary feeling in winter due to its dense and unchanging foliage. Deciduous change are better choice on sidewalks since their seasonal change provides a continual and infinite variety of colors and textures during the entire year, enlivening the streets and giving visual pleasure to the pedestrian and motorist. (Arnold 1980, 45).

h. Street walls

In order to make the streets secure and safe for pedestrians, it is essential to make street-walls as closer to street as possible.

Street-walls are uninterrupted building facades which includes storefronts. It is essential to enliven the street-space and the street-walls since it helps in making the street-level use active. Street-walls on either sides of the streets and situated closer to streets make the pedestrians feel secure and safe.

If the street-walls are not continuous, it should be balanced either by inserting other design elements in between the street walls such as a line of trees, a public space or a public art. These elements not only break a monotony of the street-walls but also enliven the streets through virtual street-walls.



Source: <http://la.curbed.com>. 2011

Source: www.hellooakland.com March 2011

Figure 12. Street walls

i. Public art

Public art can be monument, sculpture, mural, fountain, inlaid pavement, and decorative bench or any artwork which helps in defining and enriching the public, and also helps in increasing a level of pedestrian activity on the streets. Public art serves less as a function, and more as a landmark which reflects city's past memories, events, and add richness to the surrounding because of its peculiar size, shape, color, and decoration. It can be located anywhere along the streets, nodes, open space or transit stops.



Source <http://www.countryclubplaza.com>. 2011



Source: <http://usfartstampabay.wikispaces.com>. March 2011



Source: <http://www.cleveland.com>. 2010

Figure 13. Different forms of public art

5. Visual Preference Survey

Urban design strategy is very essential in corridor planning both at a local and metropolitan level. Urban design in corridor planning at local and metropolitan level is much more concentrated on specific problems/issues. Public involvement is important throughout the planning process, as it gives opportunities to the community groups, developers/stakeholders, and other public interest groups to discuss about prevailing issues/problems of their cities/communities, to suggest different solutions to those problems, and to express their opinion on the kind of development that they have envisioned for their cities/communities for future. Visual preference survey is one kind of workshop/technique which is carried out in the

planning process. In this workshop, the residents, stakeholders, developers and other interest groups are shown a series of images in order to obtain their feedback on their preference of the visuals presented. The high-rated items are taken into consideration for future built environment.



Figure (Left) Source: (School of Public and Urban Affairs 2010)

Figure (Right) Source: Google image

Figure 14. Visual Preference Survey

Chapter II
BACKGROUND OF CELINA

I. Introduction

City of Celina is a small city located within Collin County in a northern exurban area of North Central Texas Metropolitan, DFW shown in figure below. According to the information collected from City of Celina's website, the city was founded in 1876 and started growing in early 1900's with a construction of new transportation system – St.Louis/San Francisco/Texas Railway and Celina Pike. Entrepreneur J.Fred Smith is considered as a leading person, who saw potential in Celina and geared the city towards development. Since its establishment, Celina had always remained a rural community with agricultural-based economy, until World War II when people started moving to Celina due to its proximity from other cities such as Dallas, Frisco and Plano and thus became a bedroom community. Since that time, people have been commuting from Celina to nearby cities for their jobs. From 2000-2007, population of Celina grew rapidly more than the past 128 years. Currently, Celina has a total population of 5200 .The trend even suggests that population will escalate faster than in past decade. It is predicted that Celina's population will grow up to 35,000 in 2030.

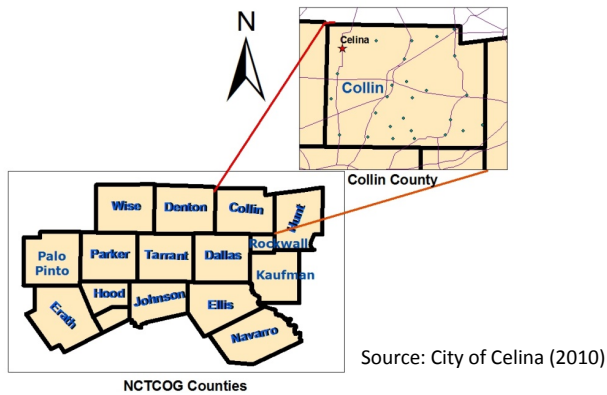


Figure 15. NCT Counties

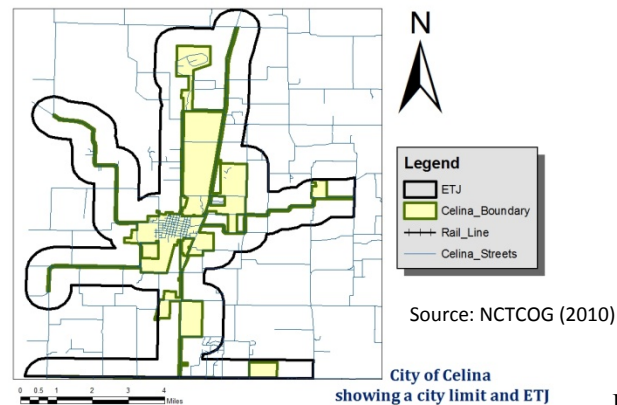


Figure 16. Celina Boundary and ETJ

II. Why Celina is expected to grow so fast in future?

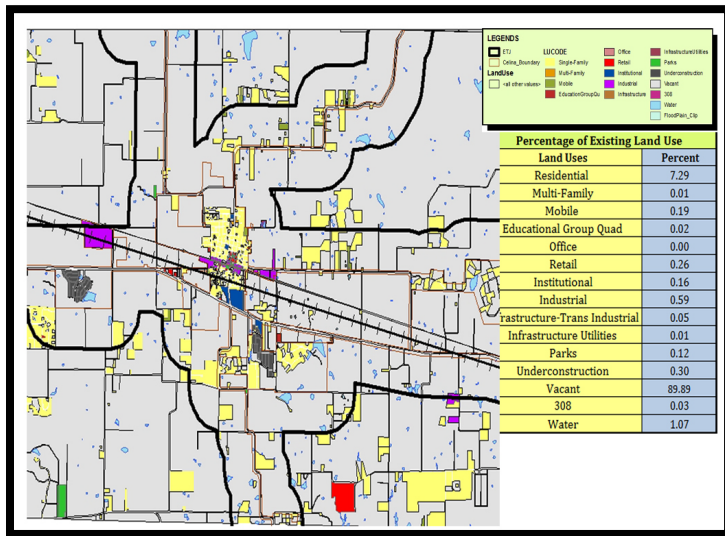
The State Highway 289 (Preston Corridor) which runs through city boundary directly connects to Dallas. Furthermore, it is predicted that the two major regional highway projects - Dallas North Tollway (DNT) on the west and Collin County Outer Loop on the south will be constructed and will transform Celina’s transportation system over the next several years. In addition, the proposed widening of Preston road and its major intersection with the proposed highways could change future development within Celina, and thus could change the character of the city socially, physically, and economically.

Another reason for its future development is the growth trend in other cities such as Plano, Frisco and Prosper along Preston road. Growth pressure first influenced Plano in 1970's and then in Frisco in 1990. Therefore, this continual development trend on the northern side of the corridor is influencing Celina too and thus expected to grow in the same manner in future.

III. Social, physical and economic characteristics of Celina

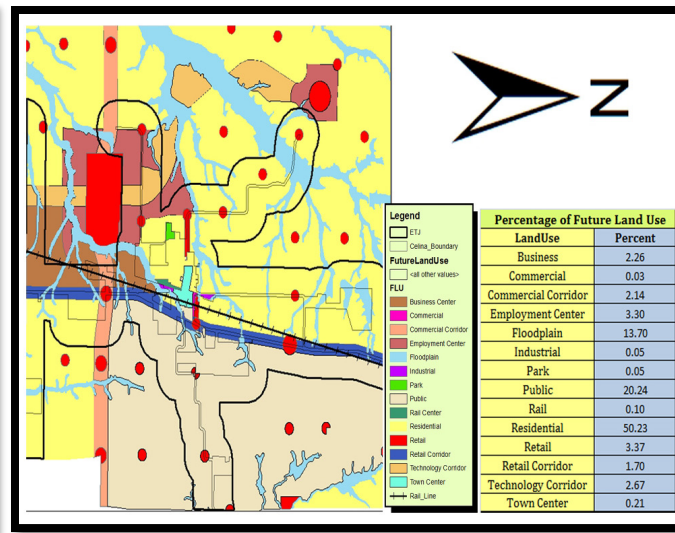
Population of Celina in 2010 according to NCTCOG is around 5200 with a density of 1037 per square mile. In 2000, the median age of Celina is 32.7 which was close to the median age of Collin county (32.9). The city's household income is \$37,383 which is less than household income of Collin County (\$70,835).

Celina comprises of mostly open space, agricultural land, some residential development and few commercial development along Preston Corridor and downtown. The existing landuse, as shown in figure below, is mostly single-family residential houses constructed on large lots and are scattered. Other landuses are some industrial, government and some vacant lands. Preston corridor (SH289) is the major highway which directly connects to Dallas on south and which brings traffic to the city.



Source: NCTCOG (2010)

Figure 17. Celina's Existing Land Use Map



Source: City of Celina (2010)

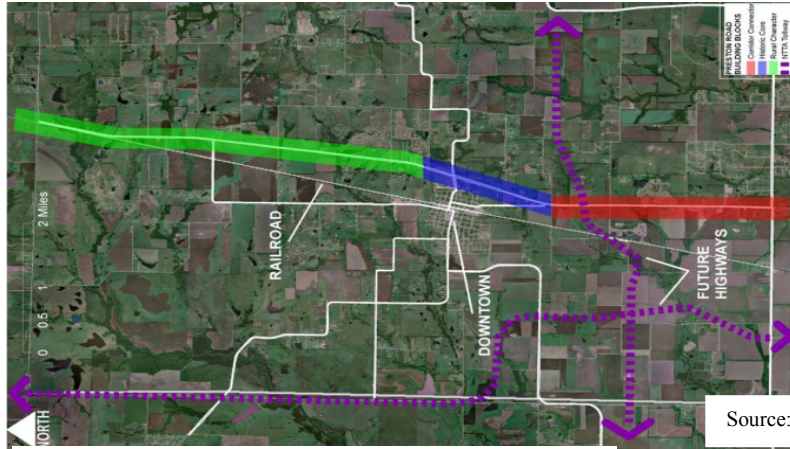
Figure 18. Celina's Future Land use Map

Celina is a community which is welcoming with its unique heritage and a hometown atmosphere. Natural beauty is a key element of a city which reflects its suburban character and provides a sense of place to the community. Its natural landscape is found in different forms of such as trees, waterways, vistas and rolling hills.

IV. Vision of Celina in future

In 2030 comprehensive plan, City developed a vision which states that “Celina is a premier community of unique heritage, exceptional livability and natural beauty, committed to offering its citizens an array of settings in which to love work, play and raise a family, while managing quality and environmentally responsible growth. Its strategic location will allow the promotion of diverse economy while retaining much of its hometown atmosphere.” With this vision, the City decided to have mixed-used development along Preston Corridor consisting of housing, retail and offices in close proximity to each other. As such, the City’s vision is to make transit-oriented development so as to make it pedestrian, bike and transit friendly.

Considering an internal and external factors of the city, the student group of University of Texas at Arlington came up with a concept of three building blocks along the Preston corridor which are: 1) Corridor Connector 2) Historical Core 3) Rural District. The following are the excerpts from the student report “Preston Corridor Study The community Preference Report”:



Source: School of Public and Urban Affairs 2010)

Figure 19. Preston Corridor Three Building Blocks

1. Corridor Connector

This segment of Preston corridor lies on the southern part of the corridor between Prosper and downtown of Celina. It is also an extension of the developments in Frisco and Prosper. Because of its proximity to these two cities, which have grown tremendously since last decade, this segment have high development pressures and thus is likely to develop more rapidly and intensely than other two blocks.

Furthermore, Preston corridor is expected to expand from two lanes to four lanes. Developers and investors have purchased much of the

land due to the anticipation of new infrastructure. In addition, the construction of two new highways – DFW Outer Loop and DNT

Construction is expected to cut through this block.

As this block is closer to other neighboring cities such as Frisco and Prosper, it is expected to have higher density than other two Building Blocks. Since the block is targeted mainly for youths, the design features/elements will mainly serve youths' requirements and their interests such as shopping centers, restaurants, game parlors, and so forth. The ambience will also be vibrant and lively to give a fresh look to the block.

2. Historical Core

This segment of corridor lies between the rural district and corridor connector and is adjacent to historic downtown of Celina. Because of its proximity to downtown and the development around it, this block will be highly influenced by the social and economic activities of the community. The future development pattern in this block will reflect the characteristics of the downtown.

This district is mainly targeted to elder people as they are more familiar to Celina's history. Therefore, this building block will be designed in such a way as to reflect its historic character. The density will not be as compact as the Corridor Connector but will be denser than the Rural District. The amenities will mainly serve the purpose of historical district such as museums, other galleries, antique stores, small restaurants, open space (golf course) and so forth.

3. Rural District

The rural district lies on the northern end of the corridor. Since the block does not have much connection to regional transportation network and has been influenced by agricultural, natural and rural environment, it is likely to develop less rapidly than other two blocks. The growth trend shows that the density goes on decreasing as we head from southern to northern part of the corridor, as such this rural district will be least dense than the other two building blocks. It will reflect a rural character with natural landscape, residential buildings and few commercial blocks. The block is targeted mainly for single-family dwellers having children.

Chapter III
METHODOLOGY

I. Introduction

As mentioned above in Chapter I, the main objective of my project is to create an urban design framework along Preston Corridor, improve the physical characteristics of the city, reflect its character and identity, and make the corridor transit and pedestrian friendly. The proposed study area of Preston corridor extends from Farmer's Market (FM) 1461 in the south to Country Road (C.R.) 107 in the north, with a total length of 8 miles. The length of Corridor Connector is 1.94 mile, Historical District – 2.26 mile and Rural District- 4.79 mile.

This section covers three main components:

- Land use guidelines developed by Peter Caltrope for transit-oriented-development (TOD).
- Urban design guidelines for TOD in six transects developed by Duany and his co-authors.
- Visual Preference Survey used by Lynch to incorporate urban design elements.

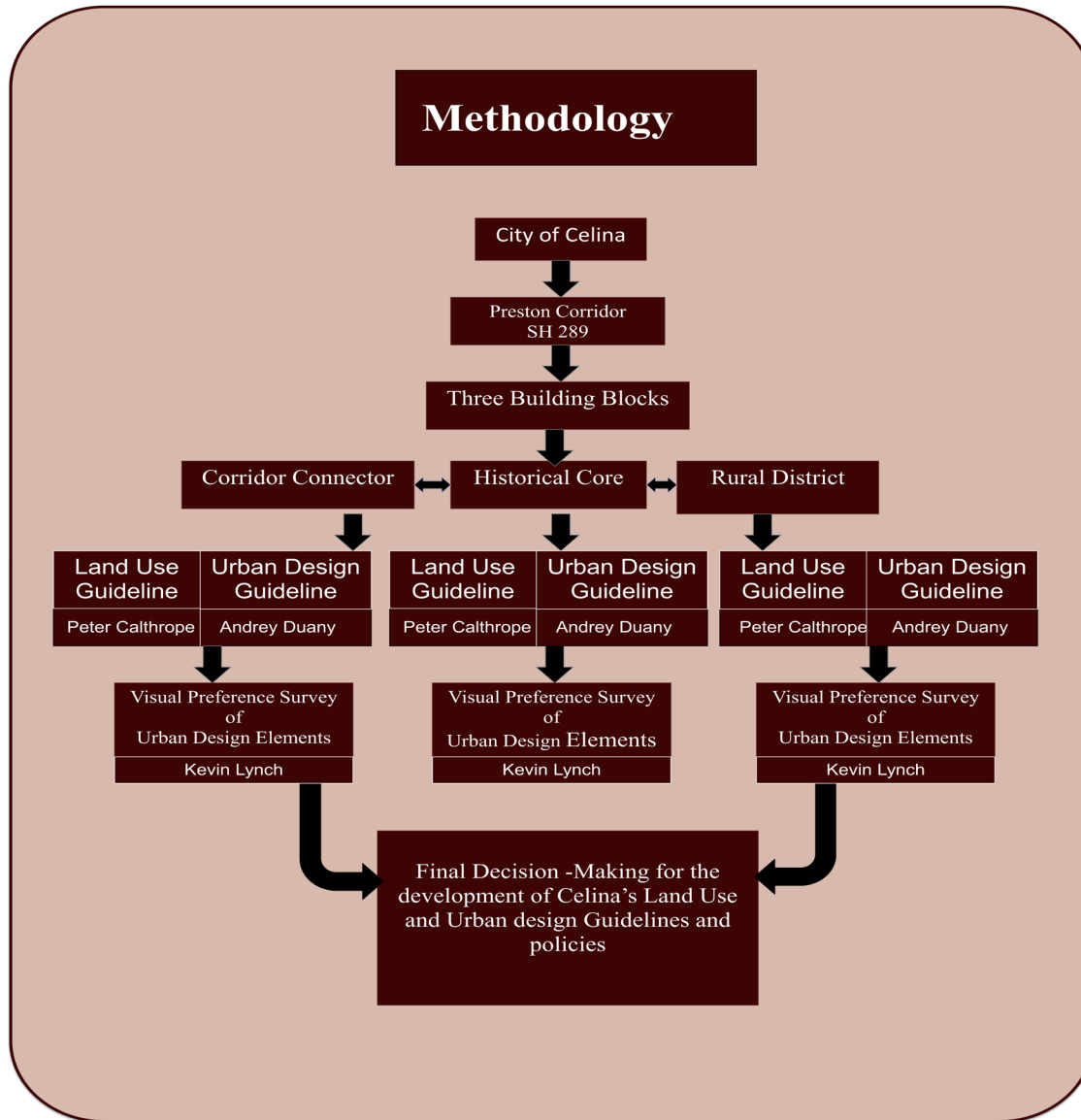


Figure 20. Flowchart Showing the Steps of the Project

II. Land use guidelines

“The land use guidelines estimates the amount of land needed to accommodate the future level of activity expected for the particular land class, land use, or the community facility.” (Kaiser, Godschalk and Stuart 1995). The proposed land use guidelines for Preston Corridor will fulfill the community’s vision for the future answering three primary questions:

- 1) What is the minimum requirement of land uses for TOD?
- 2) How much land should be allocated for each land use along the corridor, in order to make it transit and pedestrian friendly?
- 3) Where should these land uses be located?

The land use plan of Preston corridor builds on the future goals prepared by the City of Celina, its Steering Committee and the residents of Celina. One of the future goals, mentioned in the City’s comprehensive plan “Celina By Choice: The 2030 Comprehensive Plan, states that the city wants to “Create transit stations at appropriate and convenient locations.” In order to fulfill the city’s future goal and to implement the preferred choices, given by the residents in the Visual Preference Survey conducted by UTA student group, the land use plan calls for re-dividing the existing land uses into a new proportion. Peter Calthrope in his book “The New American Metropolis” has provided a very useful set of guidelines in order to create mixed-used communities that are transit and pedestrian friendly.

Peter Calthrope's land use guidelines

The land use guidelines set by Peter Calthrope support transit-oriented-development. He has categorized the land uses into three basic parts. He contends in his book "The New American Metropolis" that "a city should contain certain minimum proportion of mixed land uses in order to encourage pedestrian and transit activity, and to provide economic incentives for developing with mixed-used patterns" (Calthorpe 1993, 63). Therefore, minimum requirements for any city to make a TOD are public uses, employment center, and housing. Public uses are comprised of parks, plaza, open space, and public buildings such as daycare centers, community centers or schools. Employment centers include retail commercials, shopping centers, and office complexes, which help in augmenting more uses in the surroundings. Lastly, housing encompasses single family houses, multi-family houses, apartments, and townhouses which also help in generating more uses in the surroundings.

The size of the TOD varies with an ability to provide internal, local, and street connections. The size of TOD varies from one TOD to another due to different topography, size of plats or road network. However, a 2000 foot radius (1/2 mile- 10 minutes walking distance) is considered as a "comfortable walking distance" for majority of people by the rule of thumb (Calthorpe 1993, 56). "If a neighborhood or employment area has local destinations within convenient walking distance, residents, and employees are more likely to walk or bicycle" (Calthorpe 1993, 63). In addition, 10 minutes travel time is the maximum time

that the people are willing to walk to ride a transit. Regarding a distance between the transit stops, these should be located within 2-3 miles from the trunk line network stop, with at least 15 minutes frequency of service.

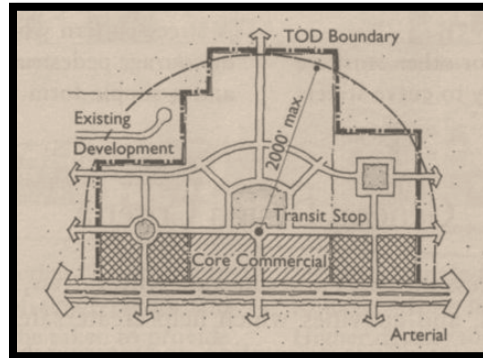


Figure 21. Transit-Oriented-Development Boundary

The TOD boundary also varies with different location types. TOD should have a minimum of 10 acres of land for Re-developable and Infill Sites, and 40-160 acres of land for New Growth Areas, in order to meet a basic requirement of TOD area- 10 minutes walking distance from transit stop. However, the size of TOD might be different with different site location because of varying topography, parcel sizes, and road network. For instance, TOD area should be aligned in a such way that a parcel is not bisected, but rather should be connected with a street network. While choosing a TOD site for Redevelopment Development, there should be abundant vacant land to allow for TOD implication. Likewise, for Infill Development, the

surrounded used land should fit with new TOD standards. Finally, the land developed as a New TOD Growth Areas should have larger percentage of unused land (Calthorpe 1993, 66).

Calthorpe has divided transit-oriented-development (TOD) into two category- Neighborhood TOD and Urban TOD. The distribution of land uses- public, employment center, and housing varies in both types of TODs in order to create different use emphases. For instance, Neighborhood TOD is more emphasized on residential uses and has larger percentage of land allocated for housing. Urban TOD underscores those land uses, which helps in generating jobs and, therefore, consists of higher percentage of employment centers. The following table, Fig.22, shows a mix of land uses by percentage of land area within TOD boundary.

Peter Calthorpe Guidelines		
Land uses	Neighborhood TOD	Urban TOD
Public	10% - 15%	5% - 15%
Core/Employment	10%- 40%	30% - 70%
Housing	50% - 80%	20% - 60%

Source: New American Metropolis by Peter Calthorpe

Figure 22. Peter Calthorpe Land Use Guidelines

III. Urban Design Guidelines

The land use guideline helps in giving a direction for future growth and development, whereas, urban design guidelines helps in improving the appearance and quality of development, and creates visual interest to the observers. Typically, urban design standards will provide guidelines in order to give the property owners a direction on more qualitative design objectives of the buildings, infrastructures, landscaping, and all other minute design details. Since urban design pays attention to both horizontal and vertical elements, it covers the guidelines such as building placement, its size, height, coverage area, width of sidewalks, height and type of street lightings, on-street parking, off- street parking, landscaping and buffering, design of signage, way finding signs, gateways, street furnitures, and other minute design elements.

Duany's Urban Design Guidelines

Urban Design guidelines, developed by Duany and his co-authors in Smart Code, is a form-based code which pays attention to different scales of design, from regional to specific design elements. It is based on rural- to- urban transect which “organizes the natural, rural, suburban, and urban landscape into categories of density, complexity, and intensity, in the same way related to the traditional towns and villages” (Duany, Speck and Lydon 2010). Duany has categorized a transect into six zones - T1, T2, T3, T4, T5 and T6 arranging them in a sequence of rural- to- urban environment as shown in Figure 23. “T1 is a Natural

Zone with a minimum density, which intends to preserve natural features of the surrounding environment such as lakes, creeks, trees, or shrubs. Instead of destroying these natural features, they are utilized as natural amenities. T2 is a Rural Zone consisting of sparsely settled land which includes agricultural land, farmhouses, grassland, irrigable deserts, and villas. T3 is a Sub-Urban Zone which consists of low density residential areas with large blocks and setbacks with planting that are more naturalistic, and roads that are more irregular to accommodate natural condition. T4 is a General Urban Zone consisting of a mixed use buildings but primarily residential with medium-sized blocks, varied setbacks and landscaping. Streets include curbs and sidewalks. T5 is an Urban Center Zone consisting of higher density mixed use buildings such as retail, offices, row houses, and apartments. Street network is tight and comprises of wide sidewalks and steady tree planting, and buildings set close to the streets. T6 is an Urban Core Zone consisting of higher density mixed use buildings with civic buildings of regional importance. Streets are wide with steady tree planting and buildings set close to wide sidewalk (Smart Code Central 2003). The details of physical design, at the scale of streetscape, vary across the transects, and characterize each zone. However, the transition at every transect is gradual and are mutually supportive.

Source: The Smart Growth Manual

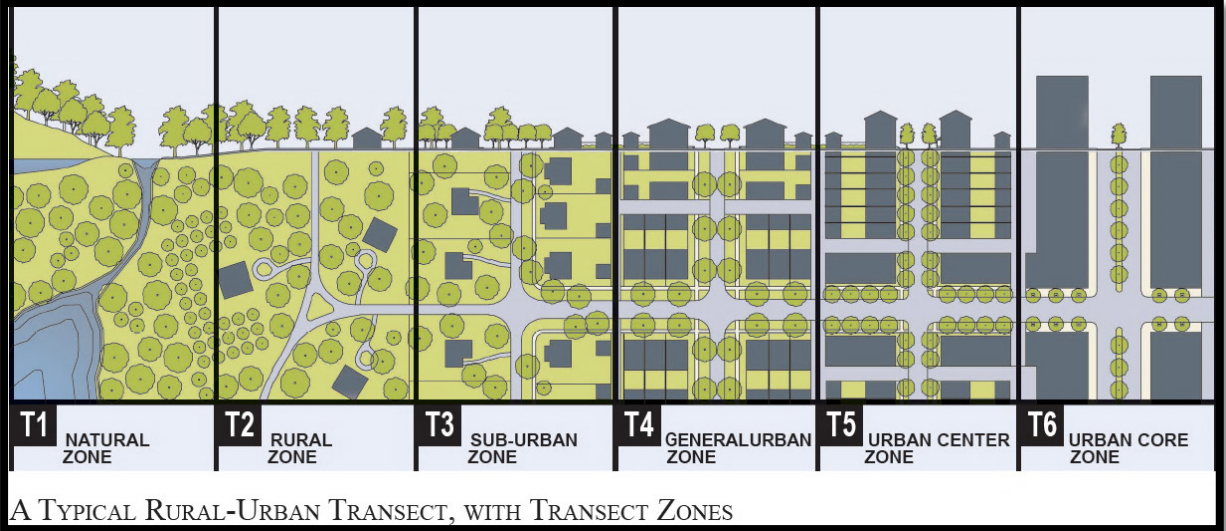


Figure 23. A Typical Rural-Urban Transect

Chapter IV

PROPOSED URBAN DESIGN FRAMEWROK FOR CELINA

I. Land Use Guidelines

1. Current and planned land use distribution of Celina

The existing land use map as shown in Fig. 24 consists of mostly open space and agricultural land with few single-family housing, and segregated commercial buildings. The residential buildings, mainly at the city center, are smaller lots arranged in grid pattern, whereas those outside the city center are generally larger lots in suburban subdivisions. Commercial buildings are located in and around the city center and are in scattered form. Lastly, other land uses such as industrial, institutional, and community buildings are mostly concentrated near the city center. The arrangements of the existing land use map are all auto-oriented and are not designed for pedestrians. The distribution of land uses in Preston Corridor is more fragmented than in the city center.

The future land use map shows that Celina will have higher percentage of land uses than the existing land use. Future land use consists of residential, business, commercial, commercial corridor, industrial, park, public space, retail corridor, technology corridor, and town center. The future land uses along Preston Corridor are designated as commercial corridor. The City of Celina is planning to have a mixed-used development along the corridor in future, focusing on key intersections.

2. Proposed Land use guidelines

Calthrope land use guidelines reveals that the minimum requirements for any city to make a TOD are public, employment center, and housing. Based on his assumption, the land uses are divided into three basic categories- public, employment center, and housing. Following the land use percentage set by Calthrope, a new percentage of land uses has been calculated for the three Building Blocks. The first Building Block-Corridor Connector is more of a business and shopping destination, and can generate more jobs in Celina in future. In this respect, Corridor Connector resembles with Calthrope's Urban TOD, and, therefore, divided the land uses following the Urban TOD land use percentage. Historical Core lies half way between Urban TOD and Neighborhood TOD in term of land use percentage. It is neither as urban as Corridor Connector, nor as rural as Rural District. Historical Core, being situated adjacent to the city core, is more of a historical mixed-used development, in which percentage of housing and public space is greater than Corridor Connector, but lower than Rural District. However, the percentage for employment is lower than Corridor Connector, and greater than Rural District. Finally, Rural District resembles with Neighborhood TOD consisting of large residential lots and open space due to its rural character. It follows the similar land use percentage of Neighborhood TOD. The table below, Fig. 26, shows the percentage of land uses in the three Building Blocks:

Figure 24.

Percentage of Existing Land Use	
Land Uses	Percent
Residential	7.29
Multi-Family	0.01
Mobile	0.19
Educational Group Quad	0.02
Office	0.00
Retail	0.26
Institutional	0.16
Industrial	0.59
Infrastructure-Trans Industrial	0.05
Infrastructure Utilities	0.01
Parks	0.12
Underconstruction	0.30
Vacant	89.89
308	0.03
Water	1.07

Figure 25.

Percentage of Future Land Use	
LandUse	Percent
Business	2.26
Commercial	0.03
Commercial Corridor	2.14
Employment Center	3.30
Floodplain	13.70
Industrial	0.05
Park	0.05
Public	20.24
Rail	0.10
Residential	50.23
Retail	3.37
Retail Corridor	1.70
Technology Corridor	2.67
Town Center	0.21

Peter Calthrope Guidelines		
Land uses	Neighborhood	Urban
	TOD	TOD
Public	10% - 15%	5% - 15%
Core/Employment	10%- 40%	30% - 70%
Housing	50% - 80%	20% - 60%

Calculation of land uses in three building block			
Land uses	Corridor	Historical	Rural
	Connector	Core	District
Public	5%-10%	8%-10%	10%-15%
Core/Employment	40%-70%	40%-50%	30%-40%
Housing	30%-55%	35%-70%	35%-80%

Figure 26. Percentage of land Use in three Building Blocks

3. TOD boundary for each building block

The whole idea of giving specific land use percentage for each Building Block is to attain transit-oriented-development along the corridor. After calculating the land use percentage, the next step is to set a TOD boundary and calculate the area for each land use in the three Building Blocks. The TOD boundary is created in order to acquire a convenient walking distance between neighborhood and commercial centers, and also between neighborhood, commercial centers, and transit stops. The size and boundary of the plats, existing road network and existing land uses are taken into consideration while setting the TOD boundary so as to make it economically and physically viable. For example, the existing roadways can be redesigned to facilitate pedestrian access between buildings and transit.

As TOD boundary should be at a walking distance which is approximately 2000 feet from transit stops, it is essential to decide where the transit stops should be located along the corridor. So, the next step is to locate the transit stops along the corridor. Preston Corridor has altogether twenty-one intersections within Celina's ETJ, out of which nine intersections are chosen as the locations for the transit stops.

The entry points of each Building Block are first chosen for locating the transit stops, which will be the major nodes of the corridor. However, it is not sufficient enough to designate the major nodes at the three entry points of the Building Blocks as per the requirement. A spacing between the transit stops should be 1 to 1.5 mile, otherwise, transit riders would not be willing to walk to get on the buses. Therefore, an additional two transit stops are designated at Rural District as it covers a total length of 4.79 mile and thus should have three transit stops in order make a distance of approximately 1 to 1.5 mile between those stops. The spacing between the nodes is based on one-mile spacing guidelines, which according to Calthrope “the one mile spacing guidelines relates to the market area necessary to support a grocery store as well as being a typical spacing for transit stops.” (Calthorpe 1993, 67). Therefore, the distance between the nodes ranges from 1 to 1.5 miles in length, however, the distance between major nodes ranges between 2 to 3 miles in length. The location of the major nodes (transit stops) are shown in table below. After setting the major nodes, minor nodes are also located between the major nodes. Minor nodes are the general intersection with or without access from either side of the Preston corridor.

Major Nodes	Location
Node 1	Intersection of Preston Rd and FM 1461
Node 2	Intersection of Preston Rd and C.R. 88
Node 3	Intersection of Preston Rd and FM 455
Node 4	Intersection of Preston Rd and C.R. 100
Node 5	Intersection of Preston Rd and C.R. 107
Minor Nodes	Location
Node A	Intersection of Preston Rd and C.R 83
Node B	Intersection of Preston Rd and C.R. 55
Node C	Intersection of Preston Rd and Brook Ln (Future Extension)
Node D	Intersection of Preston Rd and C.R. 102

Figure 28. Location of Major and Minor Nodes

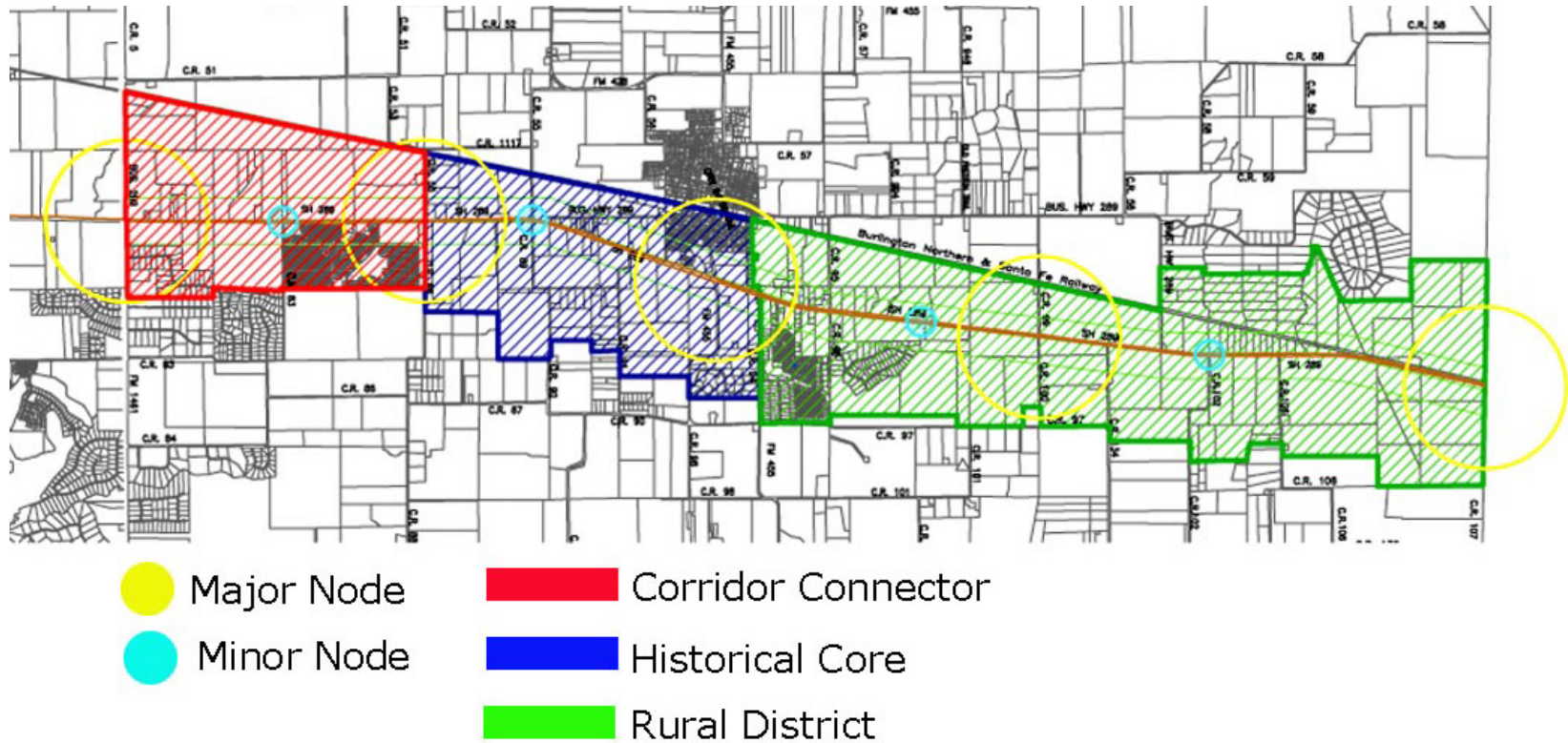


Figure 29. Map Showing Major and Minor Nodes

After defining the major nodes, the next step is to create a distance of 2000 feet from these nodes. The proposed TOD boundary for Preston corridor is made 2500 feet from the major nodes instead of 2000 feet because of varying size and shape of the plats, and location of the road networks. The area of TOD boundary for Corridor Connector is 268.91 acre, for Historical Core, it is 261.53 acres and 3949 acres for Rural District. Finally, area for each land use is calculated according to the proposed

land percentage for each Building Blocks as shown in table above. The table below shows the total area of land designated for , Corridor Connector, Historical Core and Rural Core, and the area of land uses- housing, employment centers and public spaces .

Calculation of land uses in three building block									
	Corridor Connector			Historical Core				Rural Core	
	Percent	Sq.Ft	Acre	Percent	Sq.Ft.	Acre	Percent	Sq.Ft.	Acre
Land Uses			2.29568E-05			2.29568E-05			2.3E-05
Total area		11713936	268.91		11392119.24	261.53		172041571.6	3949.531
Public	0.1	1171393.60	26.89	0.08	911369.54	20.92	0.1	17204157.16	394.95
Core/Employment	0.6	7028361.58	161.35	0.5	5696059.62	130.76	0.3	51612471.48	1184.86
Housing	0.4	4685574.39	107.57	0.42	4784690.08	109.84	0.35	60214550.06	1382.34

Figure 30. Calculation of land uses in three

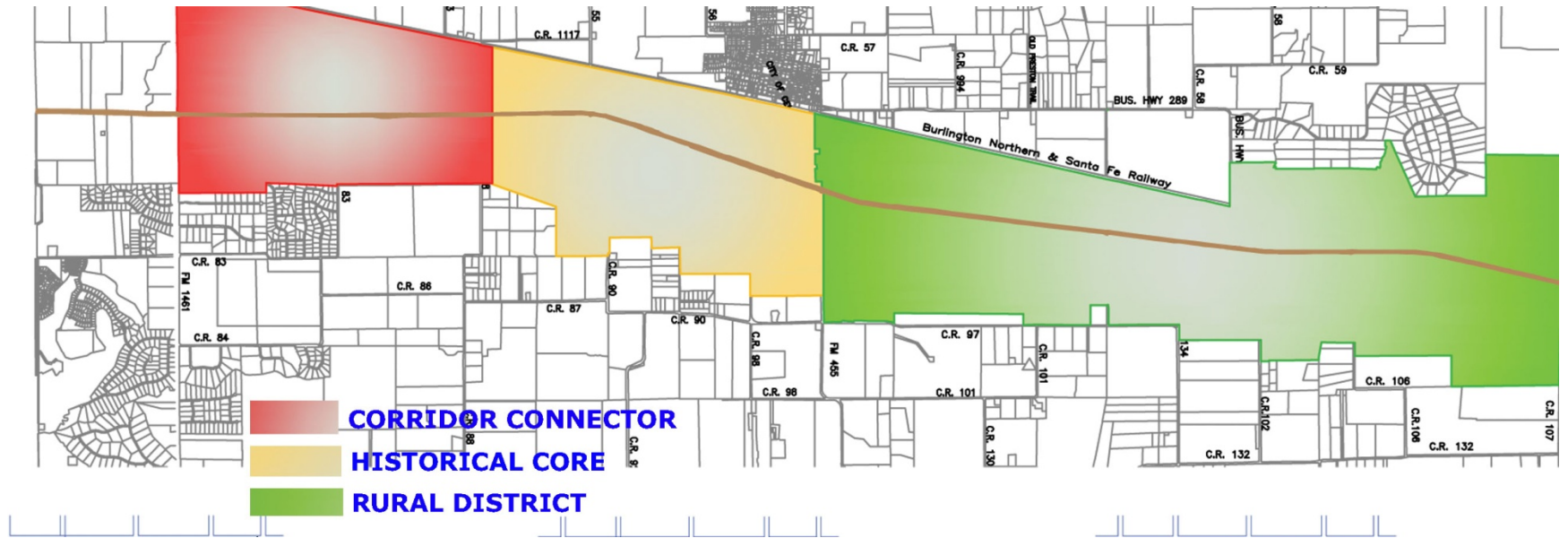


Figure 31. Three Building Block Boundaries

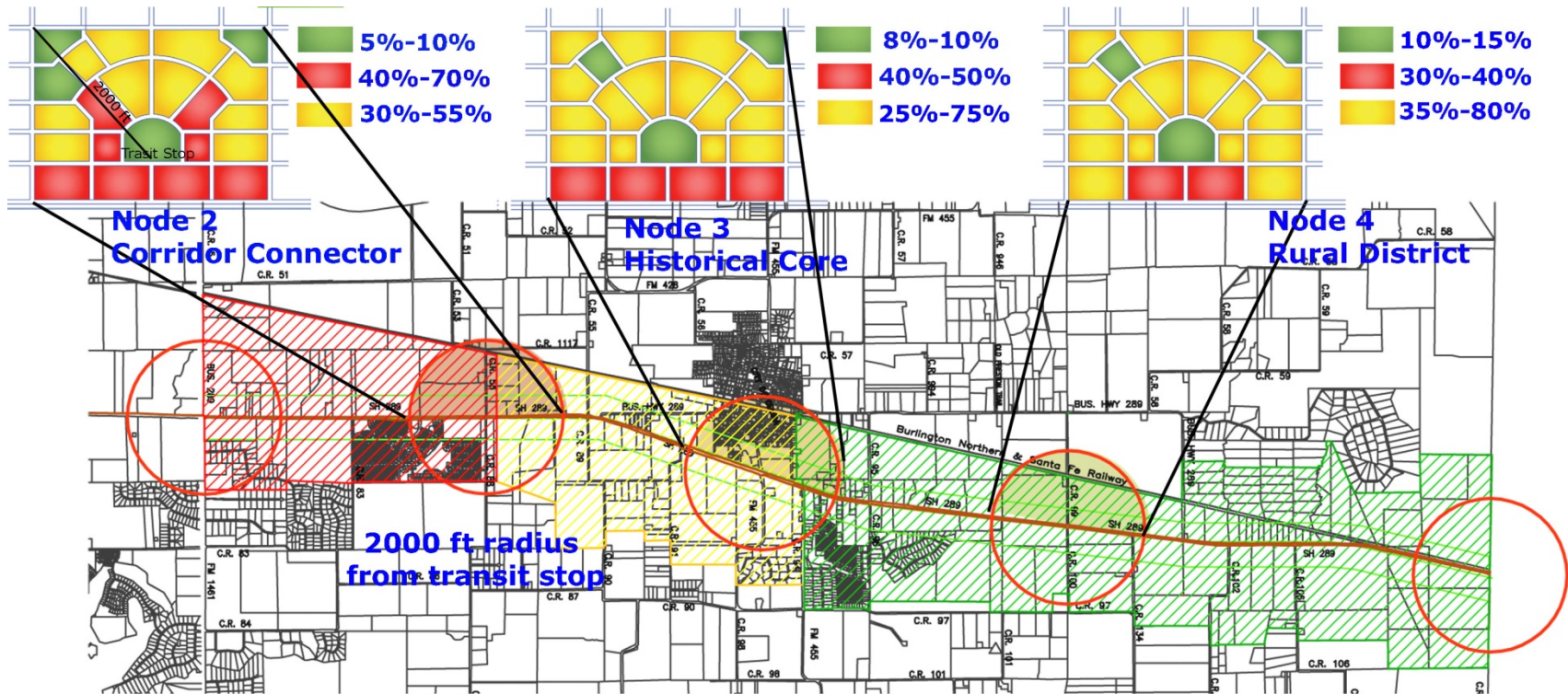


Figure 32. Land use Distribution three Building Blocks

II. Urban Design Guidelines

1. Existing Preston Corridor zoning, land use and design guidelines

Currently, the corridor is characterized by very few land uses, which are mostly single-family housing, few schools, some grocery stores, and some public buildings. These land uses are stand-alone, self-contained buildings that have little relationship to the street and to each other. The distance between existing commercial buildings are too far from each other with deep setbacks of building behind surface parking lots and with frequent curb-cuts, which discourage pedestrian activity along the corridor. The existing development of all buildings facing the corridor fall under either C-1 (Retail District), C-2 (General Commercial District), AG (Agricultural District), PD (Planned Development District), SF-10 (Single-Family Residential – 10 District), SF-E (Single-Family Estate Residential District) as shown in the zoning map below in figure below

City of Celina has also an additional district which is called Preston Corridor District. It is a zoning tool which guides the future growth and character of an area. The main purpose of this overlay district is “to provide appropriate design standards for the use of properties fronting on Preston Road and intersecting thoroughfares. These standards recognize the area’s unique development character and provide for coordination between districts and categories of use.”(Section 4.500 Preston Road Overlay District). However, the overlay district does not comply with transit-oriented-development standards.

Source: Celina 2010

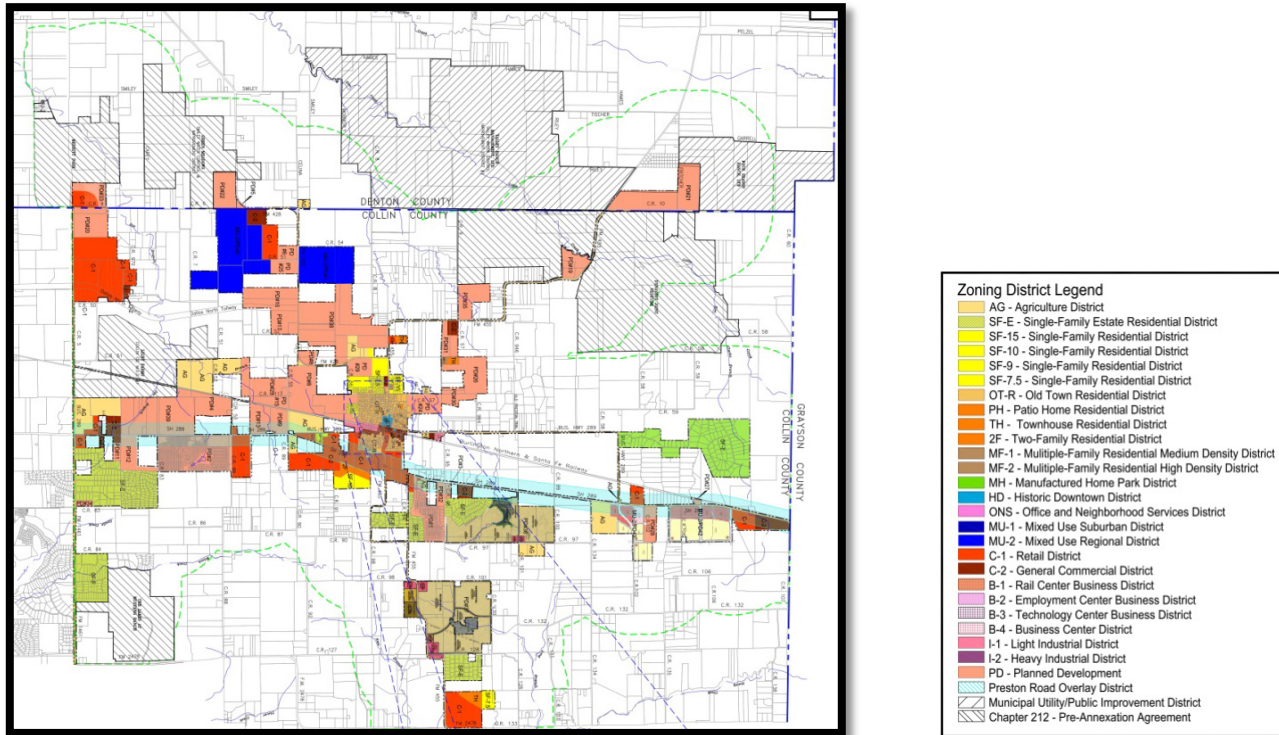


Figure 33. Existing Zoning Map

2. Results of Visual Preference Survey

Public involvement is important throughout the planning process as it gives opportunities to the community groups, developers/stakeholders and other public interest groups to discuss about prevailing issues/problems of their cities/communities, to suggest different solutions to those problems, and to express their opinion on the kind of development

that they have envisioned for their cities/communities for future. In order to understand the underlying value preferences related to urban design from the community groups, developers, and stakeholders, UTA student group organized a charrette where they conducted a visual preference survey. The survey focused following eight character elements which could express the existing and desired character of Celina along Preston Corridor:

Character Elements	
1) Natural Beauty	2) Corridor Enclosure
3) Unique Heritage	4) Pedestrian Realm
5) Hometown Atmosphere	6) Facades
7) Way-finding	8) Signage

Figure 34. Eight Character Elements

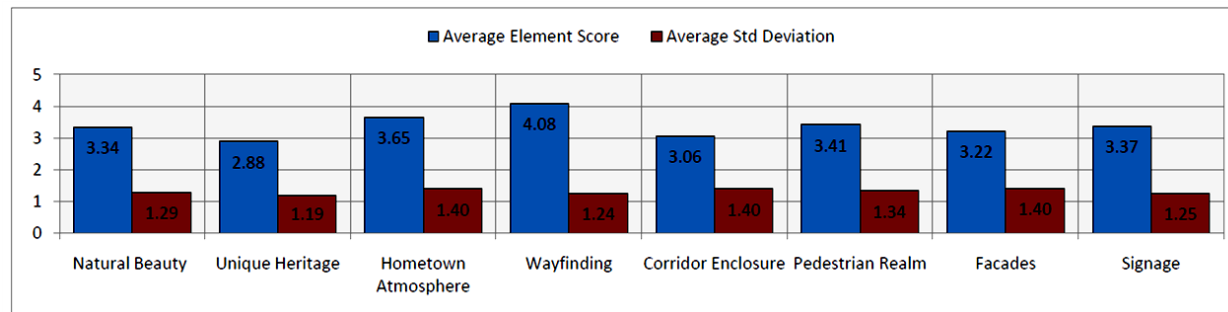


Figure 35. Average Score across all Building Blocks

Source: UT Arlington Study Report

By looking at the chart above, it seems that among the eight character elements the participants liked to see “wayfinding signs” the most around their city. Surprisingly, “unique heritage” was the least preferred character elements. The participants scored each character elements in the following order from highest to lowest:

1	2	3	4	5	6	7	8
Wayfinding	Hometown Atmosphere	Pedestrian Realm	Signage	Natural Beauty	Facades	Corridor Enclosure	Unique Heritage

Figure 34. Order of Preference of Eight

The UTA group presented and described four images for each character elements and asked the participants to rate them according to their preference for each Building Block. The result of the rating for each images are shown in the table below.

Source: UT Arlington Study Report

Building Blocks	Natural Beauty				Unique Heritage				Hometown Atmosphere				Wayfinding			
	Native Plants	Vistas/ Views	Water ways	Agricul tural	Down town	Railroad	Historic Signs/Art	Silos	Football Stadium	Church/ Commu nity Centers	Town Square	Parks	Landmark Finding	City Pride Wayfinding	Directional Wayfinding	Gateways
Corridor Connector	4.12	3.59	2.53	2.33	2.53	2.53	2.59	2.12	2.94	3.47	3.29	3.94	3.59	4.12	4.47	4.47
Historic Core	4.06	3.18	2.65	2.18	4.18	2.76	4.18	2.47	3.65	3.76	4.71	3.71	4.06	4.29	4.65	4.12
Rural District	4.29	4	3.53	3.65	2.59	3.12	2.82	2.71	3.35	359	306	435	3.65	3.88	4.12	3.53

Building Blocks	Corridor Enclosure				Pedestrian Realm				Facades				Signage			
	Scenic Enclosure	Suburban Enclosure	Historic Enclosure	Urban Enclosure	Historic Elements	Pedestrian Buffer	Crosswalks	Hike/Bike Trail	Neo-Classical	Historic	Post-Modern	Institution	Temporary	Banner	Façade Signs	Monuments
Corridor Connector	2.41	3.41	2.41	3.59	2.71	3.76	3.59	3.71	3.94	2.88	3.29	3.82	2.06	3.47	4.24	3.88
Historic Core	2.06	3.35	4.12	3.76	4	4	4.18	3.18	3.94	3.88	2.76	3.24	3	4.41	4.35	3.82
Rural District	4.29	2.65	2.24	2.41	2.59	2.59	2.24	4.41	2.47	2.71	2.24	3.47	2.41	2.65	2.94	3.24

Figure 35. Visual preference survey result

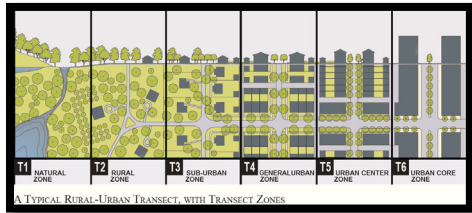
The result of the visual preference survey has not only helped in choosing the urban design elements for each Building Block but also supported in producing or setting new urban design guidelines along the corridor.

3. Proposed Urban Design Guidelines

The design standards and guidelines are applicable to all types of buildings- residential, commercial, and public buildings, within TOD boundary map. The proposed study area of Preston corridor extends from Farmer’s Market (FM) 1461 on the south to Country Road (C.R.) 107 on the north with a total length of 8 miles. The length of Corridor Connector is 1.94 mile, Historical District – 2.26 mile and Rural District- 4.79 mile. I adopted Duany’s Smart Growth TOD guidelines for developing new urban design guidelines which could support pedestrian movement and transits along the corridor in future.

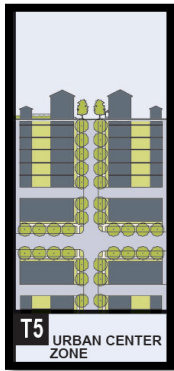
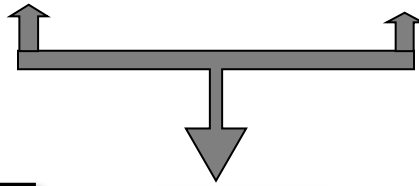
The transect concept complements with the three Building Blocks of Preston Corridor in Celina, where the density of population goes on increasing from corridor connector on the south, historical core on the north, and rural district on the

northern most end. With reference to the Visual Preference Survey result, the type of corridor enclosure, that the residents and developers have envisioned for three Building Blocks, seems to be analogous with Duany's three transects – Urban Center Zone (T5), General Urban Zone (T4), and Rural Zone (T2). Corridor Connector reflects a characteristics of Urban Center Zone, as the former also will consist of higher density mixed used buildings with more commercial activity. Likewise, Historical Core, consisting of mixed used buildings, but less dense and less commercial activity than Corridor Connector, is very similar to General Urban Zone (T4). Lastly, Rural District, consisting of mostly residential buildings with large lots and open space, can adopt Rural Zone (T2). The other two transects- Natural transect (T1) and Urban Core Zone (T6) are the two extreme development scenarios, which do not comply with Celina's future vision. The transect Sub-Urban Zone (T3) is the kind of development that exists today in Celina, however, the city does not want to persist this kind of development in future as shown in Visual Preference Survey result.

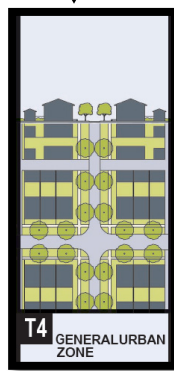


Duany's Six Transect Zones

Corridor Enclosure Preference from Visual Preference Survey Choices (VPS)



Corridor Connector

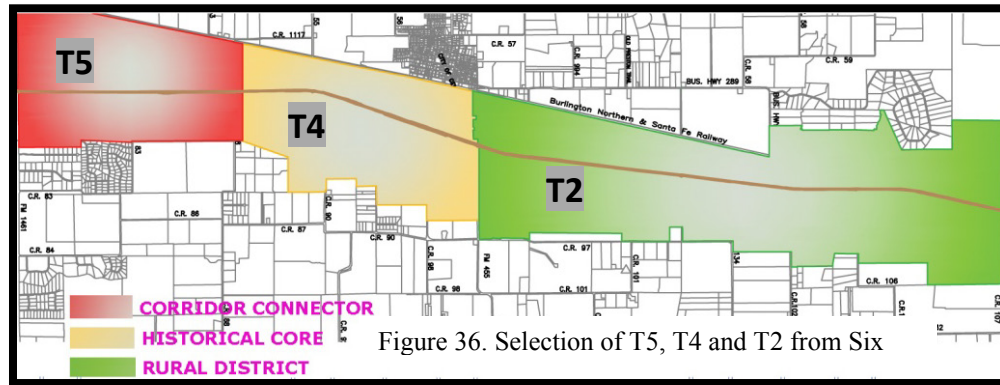


Historical Core



Rural District

T5, T4 and T2 chosen for three building Blocks



a. Setting an Urban design Guidelines for three Building Blocks

In order to reflect the characteristics of three Building Blocks, the city requires an amendment in the current “Building Code of Ordinance.” The City needs to set new urban design guidelines that will resemble the three selected transects (T6), (T4), and (T5). The new urban design guidelines are applied to the following variables suggesting minimum standards and ranges for three building blocks:

Urban Form	Transportation	Open Space
Building coverage area	Width of street	Width of Sidewalk
Building area (Width and Depth)	Right-Of-Way (ROW)	Width of greenways/buffer
Floor area ratio (FAR)	Transportation Modes	Width of bike lake/jogging track
Building Setbacks (Front, Rear, Side)	Transit Stops	Spacing of trees
Parking Requirements		Width of on-street parking

Figure 37. Variables for Urban Design Guidelines

The change in the design guidelines will affect the quality of development in Celina and will meet the future goal of the city, as well as will be able to reflect the character of three Building Blocks. The existing building standards are firstly carefully studied before coming up with new guidelines. The existing design standards such as building standards, parking standards, and open space requirement do not support TOD development. In order to increase the density and intensity along the corridor, the figures/numbers of the standards have to be either increased or decreased depending upon the type of variables and type of zone. For example, the current size of the residential lots ranges from 6500 sq.ft to 9000 sq.ft. The lot size needs

to be dropped down to almost four times (1500 sq.ft to 2000 sq.ft) in order to meet the requirements of TOD depending upon the type of zone.

Furthermore, in order to make a corridor transit and pedestrian friendly, and to make the corridor aesthetically pleasing, it is very essential to reduce the visual impact of large parking lots allocated at the front part of the building. We can achieve this goal by bringing the buildings closer to the streets, relocating the off-parking lots at the rear part of the site, and proposing an on-street parallel parking. On-street parallel parking not only facilitates customers to park their cars for shopping, but also squeeze the width of the street, reduces traffic speed, and thus encourages pedestrian movement.

Furthermore, we need to change the conventional “minimum setback requirements” into “maximum setback requirements.” Setting “maximum setback requirement” not only supports pedestrian activity but also helps in increasing the density of the surrounding as the buildings will be closer to each other and coverage area of the building will be greater. Furthermore, currently, the city lacks sidewalks along the corridor which discourage the pedestrian activity. Thus, the sidewalks need to be added and should be wide enough for more physical activity.

The tables and graphics below illustrate a more detailed existing and proposed design guidelines:

	Existing Design Standards of Celina	TOD Design Standards			Proposed Design Standard for three building Blocks		
		T5 Urban Center	T4 Urban General	T2 Rural	Corridor Connector	Historical Core	Rural District
Area							
Lot Size of Residential (Width by Depth)	65 to 75 feet By 110 to 120 feet	1500	1800	2000	(1500-1700) sq.ft.	(1800-2000) sq.ft.	(3000-4000) sq.ft.
Lot Size of Commercial (Width by Depth)	60 to 100 feet By 100 feet	350	5000	500	450 sq.ft.	550 sq.ft.	1000 sq.ft.
Intensity/Density							
Minimum Residential Density	3 to 6 Dwelling Unit/Acre	25 to 35 Dwelling Units/Acre	30 to 45 Dwelling Units/Acre	5 to 10 Dwelling Units/Acre	25 to 30 Dwelling Units/Acre	20 to 25 Dwelling Units/Acre	10 to 15 Dwelling Units/Acre
Population Density	12 to 36 Persons/Acre	65 to 85 Persons/Acre	45 to 65 Persons/Acre	10 to 25 Persons/Acre	75 to 90 Persons/Acre	60 to 75 Persons/Acre	25 to 35 Persons/Acre
Minimum Floor Area Ratio of Residential	0.1-0.3	3.0-4.0	2.0-3.0	0.5-1.0	3.0-4.0	2.0-3.0	0.5-1.0
Minimum Floor Area Ratio of Commercial Center		3.0-4.0	2.0-3.0	0.5-1.0	3.0-4.0	2.0-3.0	0.5-1.0
Minimum Floor Area Ratio of Employment center		3.0-4.0	2.0-3.0	0.5-1.0	3.0-4.0	2.0-3.0	0.5-1.0
Minimum Lot Coverage		70%	70%	50%	70%	70%	50%
Minimum Residential Building Height	35 feet	4 or more Stories	3 or more stories	1 or more Stories	4 or more Stories	3 or more stories	1 or more Stories
Minimum Townhouse Building Height	40 feet	4 or more Stories	3 or more stories	1 or more Stories	4 or more Stories	3 or more stories	1 or more Stories
Minimum Commercial Building Height	35-45 feet	4 or more Stories	3 or more stories	1 or more Stories	4 or more Stories	3 or more stories	1 or more Stories
Minimum Street Frontage	90%-50%	70%	70%	70%	70%	70%	70%
Parking and Open Space							
Maximum Residential Parking	2 spaces/unit	1.5 Spaces/Unit	2 spaces/Unit	2 spaces/Unit	1.5 Spaces/Unit	2 spaces/Unit	2 spaces/Unit
Maximum Office/Retail Parking	One space/250 sq.ft	2 Spaces/1000 sq.ft	3 spaces/1000 sq.ft	4 spaces/1000 sq.ft.	2 Spaces/1000 sq.ft	3 spaces/1000 sq.ft	4 spaces/1000 sq.ft.

Figure 38. Existing and Proposed Urban Design Guidelines

Urban Design Guidelines - CORRIDOR CONNECTOR	
Area	Corridor Connector (T5 Urban Center)
Lot Size of Residential	(1500-1700) sq.ft.
Lot Size of Commercial	450 sq.ft.
Intensity/Density	
Minimum Residential Density	25 to 30 Dwelling Units/Acre
Population Density	75 to 90 Persons/Acre
Minimum Floor Area Ratio of Residential	3.0-4.0
Minimum Floor Area Ratio of Commercial	3.0-4.0
Minimum Floor Area Ratio of Employment	3.0-4.0
Minimum Lot Coverage	70%
Minimum Residential Building Height	4 or more Stories
Minimum Townhouse Building Height	4 or more Stories
Minimum Commercial Building Height	4 or more Stories
Minimum Street Frontage	70%
Parking and Open Space	
Maximum Residential Parking	1.5 Spaces/Unit
Maximum Office/Retail Parking	2 Spaces/1000 sq.ft



Facade



On-Street Dining



Typical Plan of a Node



Transit Stop



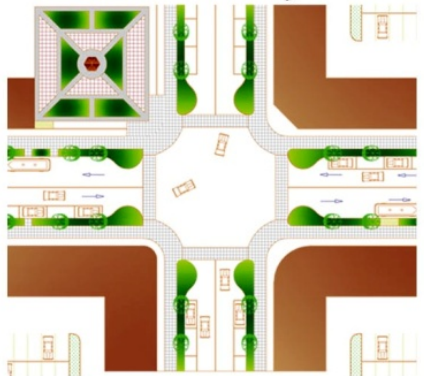
Typical Streetscape Section

Figure 39. Urban design Guidelines for Corridor Connector

Urban Design Guidelines - HISTORICAL CORE	
Area	Historical Core (T5 Urban Center)
Lot Size of Residential	(1800-2000) sq.ft.
Lot Size of Commercial	550 sq.ft.
Intensity/Density	
Minimum Residential Density	20 to 25 Dwelling Units/Acre
Population Density	60 to 75 Persons/Acre
Minimum Floor Area Ratio of Residential	2.0-3.0
Minimum Floor Area Ratio of Commercial	2.0-3.0
Minimum Floor Area Ratio of Employment	2.0-3.0
Minimum Lot Coverage	70%
Minimum Residential Building Height	3 or more stories
Minimum Townhouse Building Height	3 or more stories
Minimum Commercial Building Height	3 or more stories
Minimum Street Frontage	70%
Parking and Open Space	
Maximum Residential Parking	2 spaces/Unit
Maximum Office/Retail Parking	3 spaces/1000 sq.ft



On-Street Dining



Typical Plan of Node



Facade



Public Square



Historic Public Art

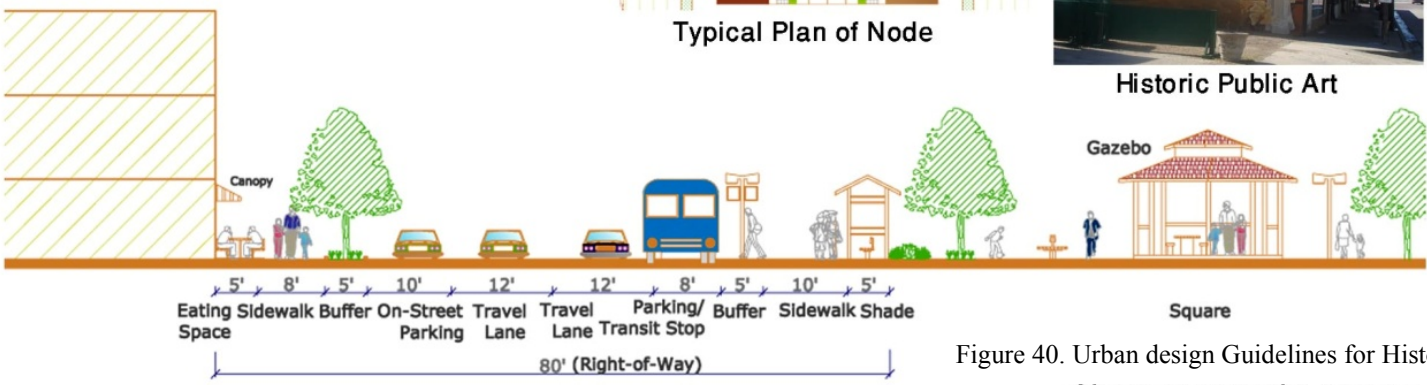


Figure 40. Urban design Guidelines for Historical

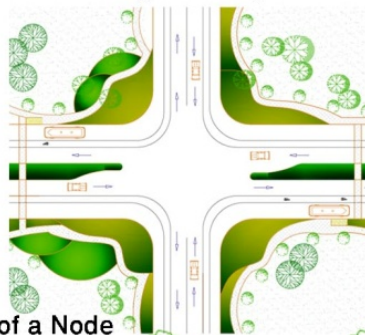
Urban Design Guidelines - RURAL DISTRICT	
Area	Rural District (T5 Urban Center)
Lot Size of Residential	(3000-4000) sq.ft.
Lot Size of Commercial	1000 sq.ft.
Intensity/Density	
Minimum Residential Density	10 to 15 Dwelling Units/Acre
Population Density	25 to 35 Persons/Acre
Minimum Floor Area Ratio of Residential	0.5-1.0
Minimum Floor Area Ratio of Commercial	0.5-1.0
Minimum Floor Area Ratio of Employment	0.5-1.0
Minimum Lot Coverage	50%
Minimum Residential Building Height	1 or more Stories
Minimum Townhouse Building Height	1 or more Stories
Minimum Commercial Building Height	1 or more Stories
Minimum Street Frontage	70%
Parking and Open Space	
Maximum Residential Parking	2 spaces/Unit
Maximum Office/Retail Parking	4 spaces/1000 sq.ft.



Meandering Walkway with berm



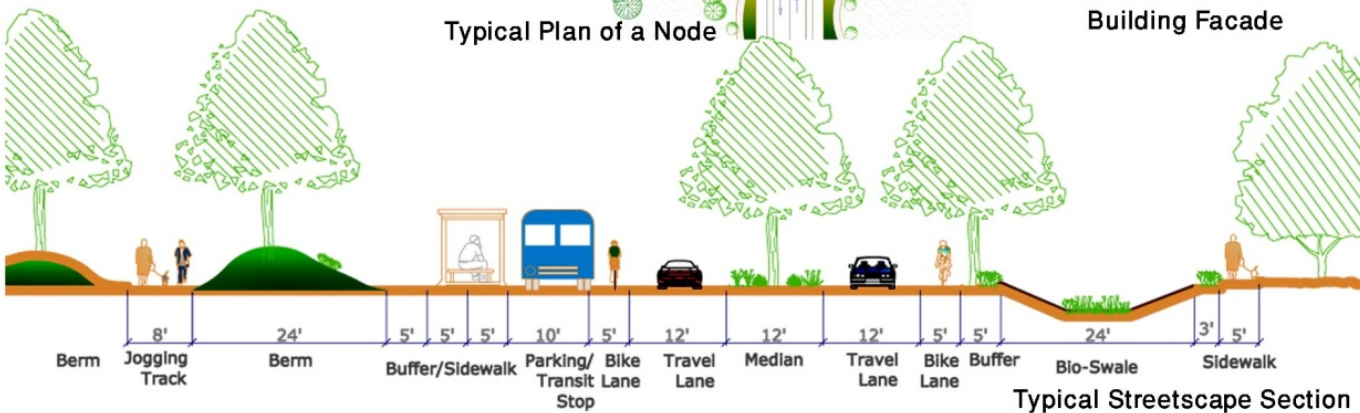
Bio-Swale along the Street



Typical Plan of a Node



Building Facade



Typical Streetscape Section

Figure 41. Urban design Guidelines for Rural District

III. Urban Design Elements

Based on Visual Preference Survey result, the urban design elements for each building block are suggested in order to allow Celina’s form to be more defined and shaped by these elements, and thus expect to achieve an unique identity and character for the city. These urban design elements are categorized into Lynch’s network of path, edge, districts and landmarks:

Path	District	Edge	Landmarks	Nodes
Streets	Corridor Connector	Three Nodes at each Builing Block	Public Plaza	Major Nodes
Walkway	Historical Core		Public Square	Minor Nodes
Grenbelt	Rural District		Public Art	Plaza and Square at Node
Jogging Trail			Vistas	Corner Building Façade
Bike Lane			Silos	Corner Eating Place
Transit Line			Schools	
			Churches	
			Gateway	
			Signage	
			Historical Element	
			Park	

Figure 42. Design Elements categorized into Lynch Elements

Based on Visual Preference Survey result, the following goals can be achieved in each Building Block:

a. Corridor Connector

- Encourage high-quality buildings, preferably of neo-traditional style, that are well-designed, visually interesting and compatible with their surroundings.
- Support active and pedestrian-oriented public spaces throughout the Corridor Connector.
- Transit stops should be attractively designed and lighted so that it is easily recognizable by the pedestrians.
- Awnings and canopies are encouraged on the street frontages of the ground floors of all the buildings.
- Plaza/park/small pocket parks with different types and designs of street furnitures are encouraged at the nodes to allow pedestrians to gather and interact as well as to reflect the desired character of the Block. Interactive fountains or musical fountains are encouraged in order to add vibrancy in this block.
- Gateway signs at the entry to three Building Blocks are recommended in order to create a sense of enclosure and to make the people realize that they are entering into a unique place.
- Enhance corner building at the node, which can be a good landmark for the area.
- Encourage more activities for the youth such as sports center, clubs, and theaters in the Corridor Connector.

b. Historical Core

- Encourage traditional buildings to reflect Celina’s historical character and to make the buildings compatible with the city core.
- Support active and pedestrian-oriented public spaces such as squares/public art throughout the Historical Core.
- Transit stops should be attractively designed and lighted so that it is easily recognizable by the pedestrians.
- Awnings and canopies are encouraged on the street frontages of the ground floors of all the buildings. Flags and banners are also encouraged in order to give festive look to the surrounding.
- Square/formal park/small pocket parks with preferably old-fashioned street furnitures are encouraged at the nodes to allow pedestrians to gather and interact as well as to reflect the desired character of the Block. Gazebo in the park/square adds unique character to the Block.
- Monument signage at the entry to the Block is recommended in order to create a sense of enclosure and to make the people realize that they are entering into a Historic Core.
- Encourage a public art and cultural amenities at the node, which can be good landmarks for the area.
- Encourage more activities for the elderly people such as community center, museums, or art galleries in order to tie in with the city core.

- Brick paving is preferable on the crossings in order to give a traditional look to the streets. Brick paving also helps in traffic-calming.

c. Rural District

- Encourage two-storied residential, community and commercial buildings to reflect Celina's rural character.
- Create a jogging trail and bike trail with trees, berms, and bio-swale along them to give a natural look to the surroundings.
- Parks and Open space are encouraged mainly around the lakes so that people can utilize that space for different recreational activities such as fishing and picnic.
- A bio-swale or vegetated swales are recommended into surface parking lots, road medians, and along highways and residential roadways in order to infiltrate and treat a portion of the storm water volume.
- Community centers and daycare centers are encouraged in this district to serve the residents.
- Since the transit service will not be as frequent as in the Corridor Connector and Historical Core, an unshaded transit stops may also be sufficient.
- Conserve and preserve natural resources such as lakes, creeks, etc.

The images below illustrate the different urban design elements suggested for the three Building Blocks according to Visual Preference Survey result.

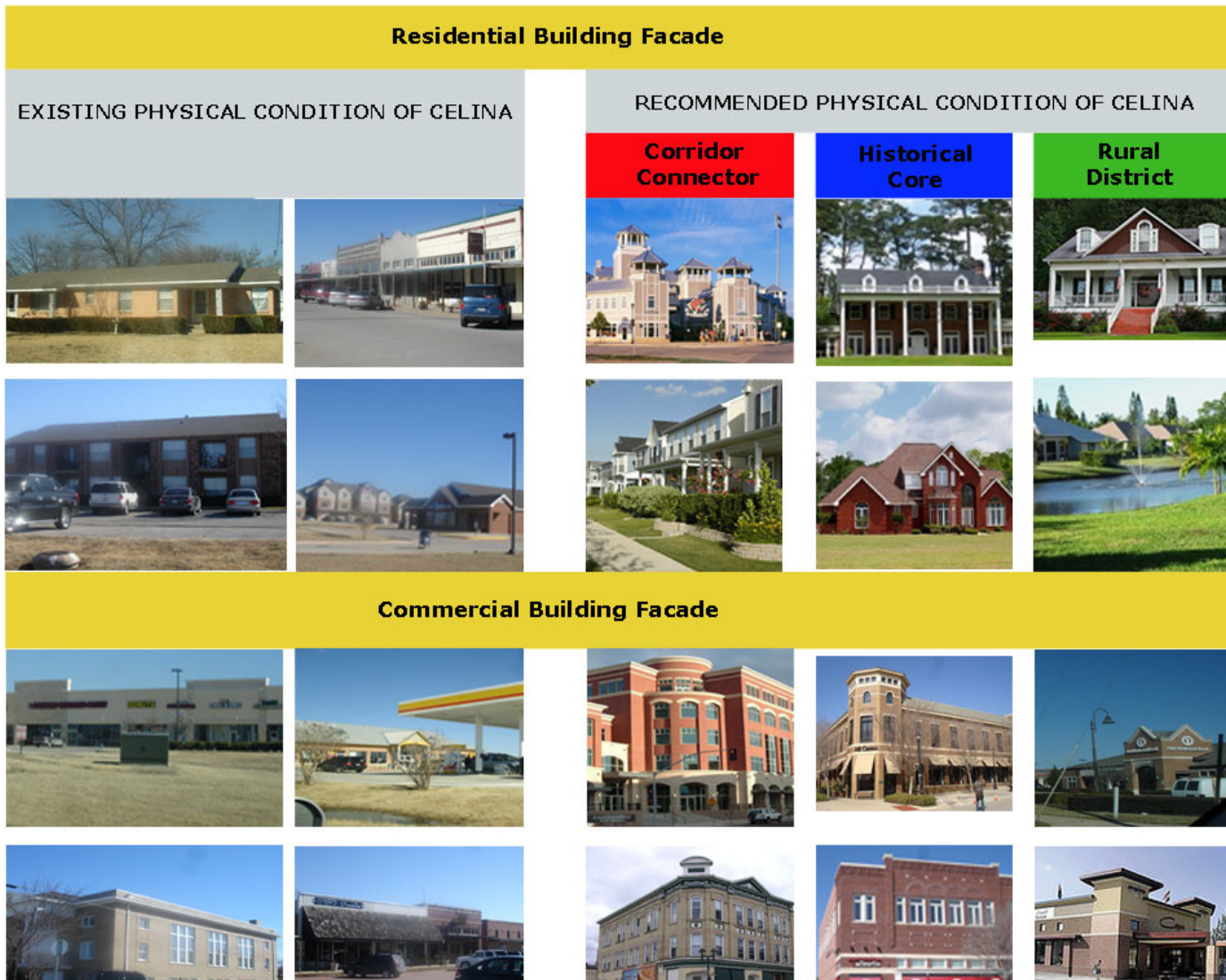


Figure 43.Scenarios of Façades for Different Types of Buildings



Figure 44.Hometown Atmosphere Scenarios

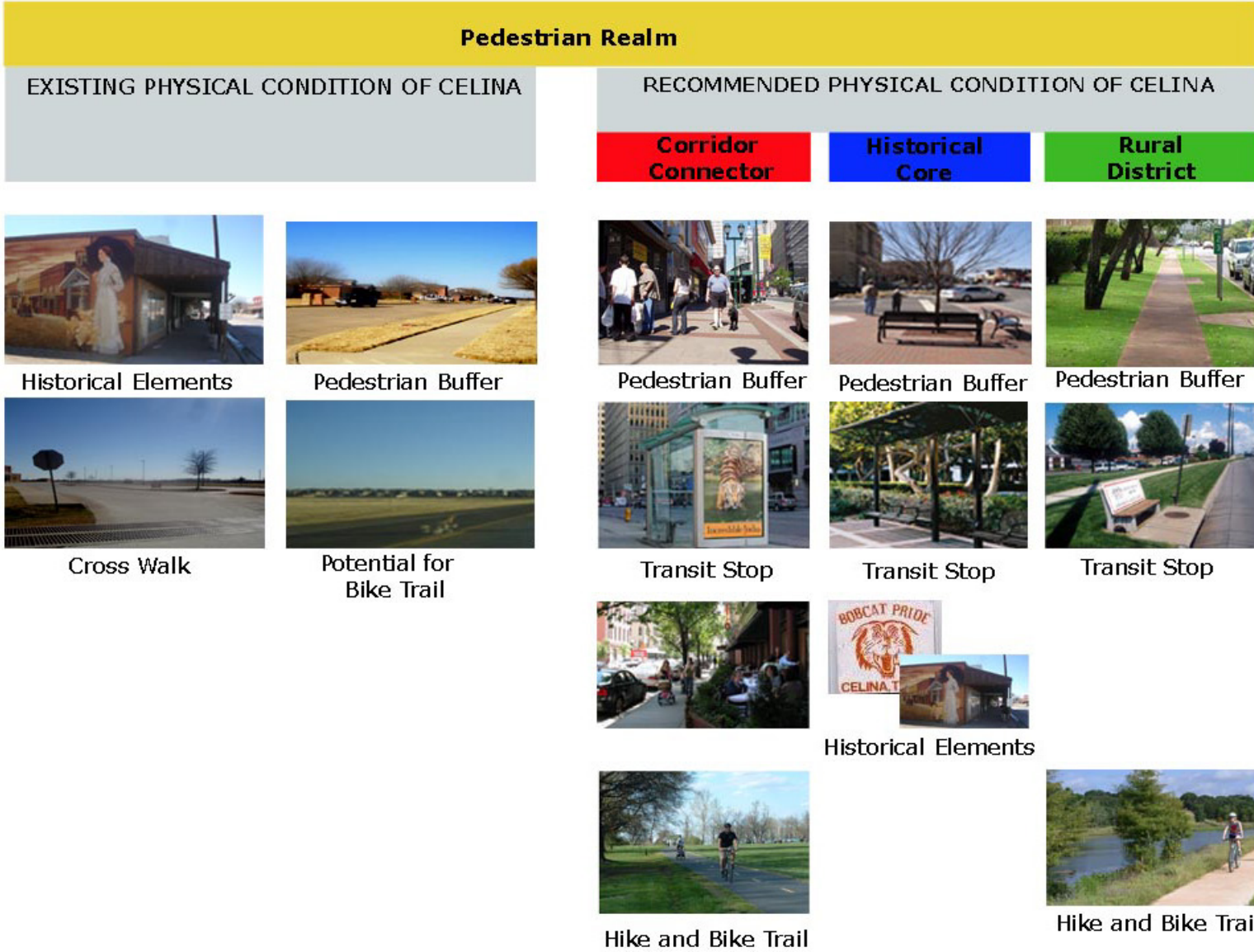


Figure 43 Pedestrian Realm Scenarios

Signage and Wayfinding

EXISTING PHYSICAL CONDITION OF CELINA



Wayfinding Sign



Wayfinding Sign



Unique Heritage (Silo)



Historic Monument



Banner



Gateway



City Pride
Wayfinding Sign

RECOMMENDED PHYSICAL CONDITION OF CELINA

Corridor Connector



Gateway

Historical Core



Gateway

Rural District



Gateway



Wayfinding Sign



Directional Wayfinding



Wayfinding Sign



Directional Wayfinding



Banner



Sign



Facade Sign



City Pride
Wayfinding Sign



Monument

Figure 43 Signage and Wayfinding Scenarios

Node of Corridor Connector



Before

Intersection FM 1461 and Preston Corridor



After

Node of Historical Core



Intersection FM 55 and Preston Corridor



Node of Rural District



Intersection C.R. 99 and Preston Corridor



Chapter V

CONCLUSION

Creating an urban design framework is an important step in improving the existing development pattern in Celina. However, without dedicated and passionate individuals and groups to carry out the recommendations of proposed land use guidelines and urban design guidelines, the document would be of lesser value. Therefore, local planning authorities, communities, developers, and stakeholders should come together and take a lead to implement the ideas contained in this report. It is also essential to realize that some of these recommended actions can be implemented immediately, while others may take significantly longer time. For example, introducing urban design elements such as wayfinding signs, banners, gateways, etc. are easier and quicker to implement. However, changing the lot size, setbacks, right-of-way, etc will be a lengthy process to implement because it needs property owners' consent. It is not an easy task to replace the conventional design guidelines with the new ones. The proposed urban design standards could place properties at a disadvantaged situation where the new development cannot be subjected to old standards. For example, if a property, where off-street parking was allowed before, is restricted to use off-street parking for any new development, tenants may hesitate to buy that property. This situation will thus cause a loss to a property owner. Therefore, in order to overcome this problem, it is important that the new property owners are given incentives for adopting the new design guidelines. We can encourage the property owners, developers, and stakeholders to follow the new guidelines by "creating a process that rewards transit-oriented-development". If a developer comes up with a project which comply with new land use and urban design guidelines, that project should be given the first priority over other projects and should be considered for incentives. In order to determine whether a project qualifies for incentives or not,

government should consider two factors: the priority of the project development sector and its design's compliance with TOD criteria. If the project complies with both land use guidelines and urban design guidelines, it should be given first priority than the one with less compliance and considered for incentives.

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