Long Range Transit Plan
Discussion Paper

Town of Chapel Hill

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1.0 INTRODUCTION

The Town of Chapel Hill has a well defined urban boundary within which there remain only a few undeveloped tracts of land. One of these is the Horace Williams property, which is the subject of significant redevelopment proposals by the University of North Carolina at Chapel Hill. The potential size of this and the other future developments elsewhere in the Town is such that the traffic that they might generate would have a severe impact on the level of service of the Town's transportation system unless major changes are made.

In its *Comprehensive Plan*[1], the Town has set, as its primary transportation goal, the enhancement of a balanced, multi-modal transportation system that will improve mobility for all citizens, reduce automobile dependence, and preserve/enhance the character of Chapel Hill. To do this, the Town wishes to increase the per capita use of public transportation so that the new developments can be accommodated without the need for any major expansion of the existing arterial road network.

This paper suggests the form and scope for a proposed Long Range Transit Plan for Chapel Hill that should be the jumping off point for the implementation of an expanded transit system to address this need. Given the integrated nature of the existing transit services in Chapel Hill and Carrboro, the Plan will need to encompass both communities and all references in this paper to the need for expanded transit service in Chapel Hill should be read as applying to Carrboro as well. The Long Range Transit Plan should be a goal oriented plan that should specify the transit mode shares needed to maintain the quality of life in Chapel Hill in the face of the expected population and employment growth. The Long Range Transit Plan should also lay out a strategy as to how this should be done including how the Town's future transit system should be linked to the regional system. The paper discusses why such a Plan should be prepared, how the development of the Plan might be approached, and what outputs should be expected. The paper also offers comments on the qualifications and process of engagement of the consultant that the Council may wish to retain to assist in the preparation of the Plan.

2.0 LONG RANGE TRANSIT PLAN RATIONALE

The Town already has a well used conventional bus system, with a high ridership by American standards. For example, the Chapel Hill annual average boardings per capita of 91 (based on Chapel Hill's population only) compares with the national annual average boardings per capita figure of 49.

While increasing the service provided by the current bus service would likely increase ridership somewhat, experience suggests that some form of higher order transit system will be required to produce the significant ridership increase needed to really reduce automobile dependence. North American transit industry experience also shows that people who can choose whether or not to use a car for a trip, will only use transit if the service is easy to understand and is frequent, reliable and competitive in terms of travel time with the use of a private car. These requirements may be relaxed somewhat for travel to and from a large high density well established node with limited parking, if the attractiveness of the node outweighs any travel disadvantages. The downtown campus of the university is an obvious example of this. A new suburban high density node, however, that must compete in the open market place to attract development cannot use parking restrictions to reduce its automobile dependence without also providing high quality transit. If the high quality transit service is not provided, much of the planned development is likely to migrate to other locations with adequate road access where there are no parking restrictions.

[1] *Planning for Chapel Hill's Future: The Comprehensive Plan, May 8, 2000*

The proposed development of the Horace Williams property is an obvious example of this latter situation and it could develop in two totally different ways depending upon the transportation strategy pursued by the Town. On the one hand, without a strong transit oriented transportation strategy, it is likely to develop in a fairly conventional way, to a level compatible with the available capacity of the road network. In this case, however, the development/road capacity balance will probably occur at a point when the level-of-service on the neighboring road network is E rather than the desirable minimum of D. In effect, there would be many more intersections than the seven current intersections[2] operating at levels-of-service of E and F and the Town would be hard pressed to maintain its road level of service policies. From the University perspective, this outcome would also be undesirable because the development potential of the site would not be realized. On the other hand, with a significant transit investment and supportive policies, the Horace Williams property could be developed to the higher densities envisioned by the university while, at the same time, maintaining the road levels-of-service desired by the Town. In this case the Town would be able to protect its road level of service policies and the university would enjoy a higher financial return. This same argument applies to other major development sites in the Town.

The primary reason for developing a Long Range Transit Plan for Chapel Hill, therefore, is to lay out the optimum process for implementing a higher order transit system strategy that will allow and encourage desired development on sites throughout Chapel Hill and Carrboro, to the benefit of the property owners, without degrading the road system's future level of service or causing the future development to contribute to more urban sprawl. It is important to emphasize though that the Long Range Transit Plan is only the first step in the implementation of improved transit service and the Town will have to remain focussed on the need to improve its transit service long after this initial planning work is complete.

One of the important next steps, once the Long Range Transit Plan is complete, will be securing the funding support for the improved transit service. By focussing on the implementation of financially feasible transit services and demonstrating the need with quantifiable objectives, the Long Range Transit Plan will provide a solid basis for seeking this funding support.

3.0 THE LONG RANGE PLAN SCOPE

The transit system network strategy in the Long Range Transit Plan should describe and estimate the cost of the new transit system for the Town of Chapel Hill at a conceptual level of engineering detail and cost. It should also include a representative operating plan, an estimate of likely operating costs and the associated land use and urban policies required to support the transit system. In addition, quantifiable objectives should be provided to permit the Town to properly schedule the implementation of the new transit system and to monitor its performance.

Transit mode share growth is about service and service includes such items as the following:

- Frequency of service during various time periods;
- Travel time as a function of scheduled operating speeds and transfer requirements;
- Service reliability/on-time performance;
- Passenger amenities and information systems;
- Safety and security;
- Pedestrian facilities.

Building a higher order transit system can contribute to improvements in all these areas but infrastructure by itself is not enough. Service also requires management by people who understand this not only at the organizational level but also in terms of the needs of their

[2] *Town of Chapel Hill 2004 Data Book, page 7.18*

individual customers. This understanding, while essential, also will be insufficient without the necessary funds to support the level of operating and maintenance costs that will be required. Decision makers need to take a long term view and understand that the true cost of a particular transit mode includes more than just the initial capital cost, which may be shared with senior levels of government, but also the on-going operating and maintenance costs that are likely to be mostly a charge on local funding sources.

The Long Range Transit Plan, therefore, should also document the minimum acceptable service levels for all Chapel Hill transit services in terms of service frequency, reliability, speed, hours-of-service, and passenger facilities so that the level of on-going funding required can also be included as part of the Plan.

The higher order transit system in the Long Range Transit Plan should offer significant travel time and travel reliability benefits and the same sense of place and ease of understanding that is typical of rail systems. The transit system should be supportive of local transport policies and have a high potential to attract current car drivers to transit and to act as an important catalyst for transit oriented development. None of the higher order transit system alignments should cause serious disruption to the existing highway network, and the Long Range Transit Plan should confirm that there are no serious environmental concerns that cannot be mitigated.

The Long Range Transit Plan also needs to show that the capital and operating costs of the higher order transit system strategy are financially feasible and competitive with those of other transit systems when expressed in terms of cost per annual passenger, and that implementing the network will create positive financial benefits compared with other transportation strategies available to the Town.

For funding reasons, implementation of the higher order transit system is likely to be spread over many years. The Long Range Transit Plan should include a staging plan that permits the early introduction of high quality service between key park and ride lots and the majority of the potential areas identified for development and intensification so as to reinforce the Long Range Transit Plan's *transit first message*.

The higher order transit system described in the Long Range Transit Plan will be presented at a conceptual level of engineering detail and be subject to further planning and design steps before its construction can be initiated. The Long Range Transit Plan, in effect, should confirm that the higher order transit system alignments are feasible in terms of a broad brush assessment of engineering feasibility, operational effectiveness, environmental impact and construction cost. The subsequent studies will optimize the Long Range Transit Plan's transit network alignments to identify the best alignment in each corridor.

The characteristics of the higher order transit system should include:

1) A high level of service in terms of speed and reliability that will attract existing and future auto users from both within and outside Chapel Hill.
2) An ability to offer an improved level of transit service to a clear majority of trip makers in Chapel Hill and Carrboro.
3) Strong links to the regional transit system.
4) An ability to be constructed in stages so as to be able to respond to the future needs where and when they occur.
5) Capital and operating costs that are financially feasible within the same time frame as that proposed for the new development so that the presence of the higher order transit service can influence the mode choices made by the employees and residents of the new developments.
6) Environmentally sensitive infrastructure and operations that recognize the unique environmental concerns of Chapel Hill residents.

The conceptual engineering plans for the higher order transit system in the Long Range Transit Plan should be drawn at a scale of 1 inch to 200 feet on an aerial photograph base. Profiles with a vertical scale of 1 inch to 20 feet and cross-sections at critical locations should also be included. Potential station locations should be shown with possible platform layouts, pedestrian connections to adjacent land uses (existing and proposed), local feeder bus facilities and park and ride where required. Standard cross-sections and design details for major elements of the preferred higher order transit system network technology should also be included in the Long Range Transit Plan.

Infrastructure and vehicle capital costs should be estimated using a proven transit costing methodology and based on locally available current dollar unit costs calibrated to the capital costs for completed projects in the area.

The operating plan for the higher order transit system should be integrated with and include all transit operations in the Chapel Hill/Carrboro area. The methodology used for its development should be shown to satisfactorily replicate the existing transit operations in terms of the number of vehicles, vehicle hours and vehicle miles. Easy to read high quality graphic representations of the operating plan should be included in the Long Range Transit Plan.

The associated land use and urban policies required to support the higher order transit system should be included in a format that is easy for a member of the general public to comprehend and in sufficient detail to permit their easy translation into Town ordinances and guidelines.

An important requirement of the Long Range Transit Plan should be that it not only be affordable but also that it be implementable in stages in conjunction with a monitoring plan. This will permit on-going plan adjustments so as to ensure the achievement of the ultimate plan objectives. The Long Range Transit Plan should specify these monitoring requirements and the additional data that the Town will need to collect.

The Long Range Transit Plan should be a top-down document that specifies transit mode shares in various parts of the Town as the objectives that need to be achieved for the projected new development to be accommodated without degrading the existing road level-of-service. Achievement of these objectives should be shown to define the required elements of the Long Range Transit Plan.

4.0 LONG RANGE PLAN DEVELOPMENT

4.1 Approach

It is strongly recommended that the Long Range Transit Plan should be a goal oriented document that sets out clear and unambiguous transit mode share objectives that will support the desired land-use, lifestyle and transportation vision for Chapel Hill as defined by its *Comprehensive Plan*. These transit mode share objectives should become part of the Town Council's standard procedures for approving major transportation and land use projects. The recommended higher order transit system strategy needs to be shown to be clearly linked to the achievement of these objectives.

The first phase in the development of the Long Range Transit Plan, therefore, should be the determination of these transit objectives. They should be expressed as peak hour transit mode shares for the travel corridors and screenlines in the Town. These objectives should then be used to define the need and location of the transit service improvements and thus the higher order transit system strategy in the second step in the development of the Long Range Transit Plan.

The higher order transit system strategy should have the following key components:

- Defined alignments and station locations;

- A preferred rapid transit technology;
- A recommended operating strategy;
- Supportive land use and urban design measures.

These key components are inter-related and the determination of one will affect the choices available among the others. For this reason an iterative planning process will be required to arrive at the preferred higher order transit system strategy. After the development of the transit mode share objectives in Phase One, a two-stage process will be needed in Phase Two to define the higher order transit system strategy.

In the first stage of Phase Two, preliminary higher order transit system representative alignments and station locations should be defined and costed for a limited number of candidate rapid transit technologies, probably limited to Bus Rapid Transit (BRT), Light Rail Transit (LRT) and possibly self-propelled commuter rail Diesel Multiple Units (DMU). Initial operating plans also should be prepared so that operating and maintenance costs can be determined. Finally an initial environmental screening study of each alignment and technology option should be undertaken to determine whether major mitigation measures may be required. An assessment of any differences in the land-use and urban design measures required will also be necessary.

The information arising from this process should be sufficient for a decision to be made as to the preferred technology for the higher order transit system strategy. The evaluation process leading to the decision should consider affordability both in capital and operating terms, the ability to implement the strategy in a time frame compatible with the expected development, the feasibility of the land-use and urban design measures and the implications of any serious environmental impacts.

The Town Council and other major stakeholders should confirm their support of the technology decision before the second stage of Stage Two is initiated.

In the second stage of Phase Two, the higher order transit system alignments and station locations will be refined in light of the technology decision and appropriate land-use and urban design measures prepared. The Long Range Transit Plan, however, should be limited to only identifying a feasible higher order transit system alignment in each corridor rather than ensuring that the alignments are necessarily optimal. The alignment should satisfy reasonable engineering, cost, operations and environmental criteria but the optimum alignment would normally only be determined after the development and approval of the Long Range Transit Plan.

The Long Range Transit Plan should be regarded essentially as a strategy document requiring subsequent more detailed studies to refine the strategy for implementation. Examples of the sort of follow-on studies that will be required are Federal Transit Administration (FTA) approved Alternatives Analysis and Environmental Impact Statement studies. Once the Long Range Transit Plan has been approved by the Town Council and other major stakeholders, the subsequent studies will be more focused and thus more efficient from a cost and timing perspective than if they are undertaken with no clear understanding of the Town's ultimate objectives for its transportation system.

4.2 Transit Mode Share Objectives

A strong commitment to measurable targets in terms of peak hour transit market shares is an important contributor to any program to increase transit use. The adoption of transit policy peak hour mode share targets in critical corridors allows limited transit investment resources to be allocated where they can be most effective. The reality of urban travel today is the ubiquity of the car and the access that most people now have to it, particularly for off-peak trips. In these circumstances, it is easy to dissipate the often limited transit resources by spreading them too thinly in a futile attempt to reverse the trends to increased car travel. By adopting policy mode

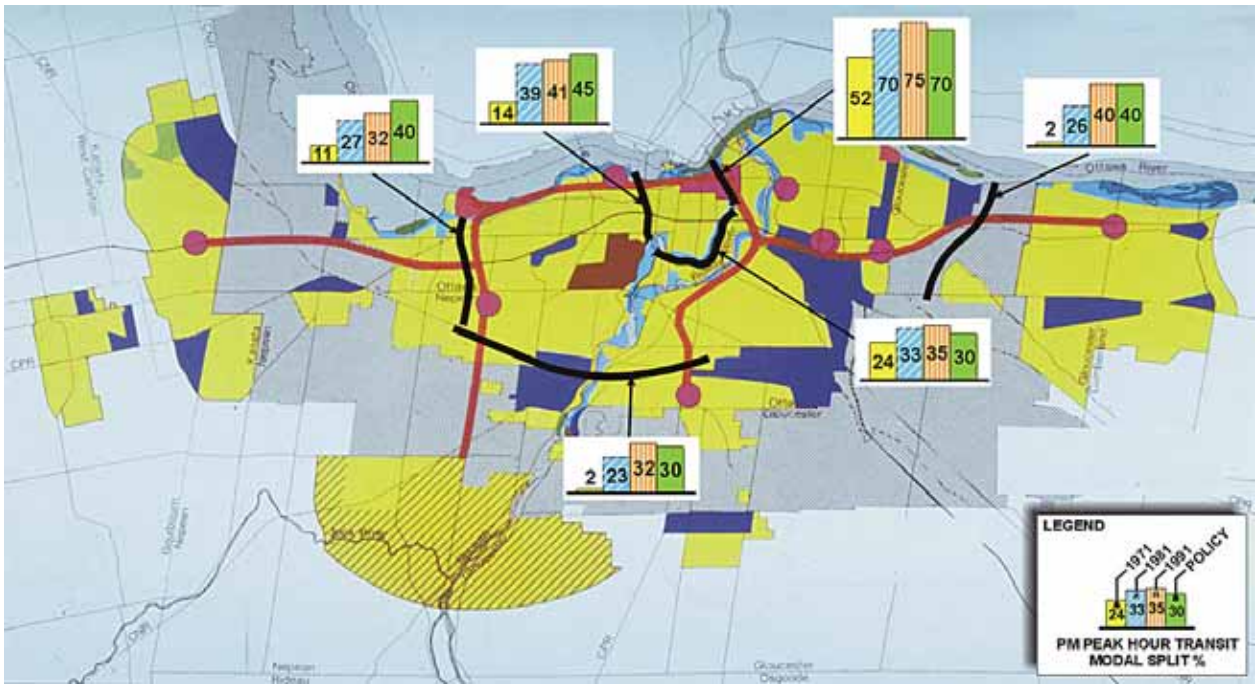
share targets for transit in key corridors where there is a reasonable chance of them being achieved, a more focused and ultimately more successful transit strategy can be pursued. Minimum levels of transit service can be provided throughout the urban area for basic social justice reasons, leaving the balance of the available resources to be used where they are most likely to produce successful outcomes from a transportation perspective.

The policy mode share targets provide a focus for short and medium term transportation and land use decisions and investments and a feedback mechanism with which to monitor and track progress. This allows adjustments to be made to the transportation program to improve its effectiveness.

The targets must be reasonable and achievable both theoretically and in practice. This will require a realistic assessment of the political will to make supportive land use and transportation decisions as well as the availability of sufficient funds for the required capital and operating expenditures. It is no good adopting transit policy modal share targets in some glossy report and then continuing with business as usual.

It is recommended that the Long Range Transit Plan be founded on the same sort of transit mode share objectives and methodology as were successfully used to develop the Ottawa Transitway system. In this case, ambitious transit mode share targets set in the 1970s for the turn of the century were met and in many cases exceeded by the early 1990s as shown by Exhibit 1.

Exhibit 1 Ottawa Transit Mode Share Objectives and Performance



The transit mode share is the proportion of the total travel on all the roads and transit facilities across an imaginary line (screenline) in a corridor. In Exhibit 1, the screenlines are the solid black lines and the bars associated with them show the PM peak hour outbound transit percentage at different dates from 1971 to 1991. The policy percentage shown in the right-hand bar for each screenline is the transit share required to make the adopted land use plan function with the assumed road network in the plan.

This approach will require the development of a horizon year peak hour person trip table that assumes the full build out of all the projected development (region wide). This person trip table

should be converted to a vehicle trip table assuming no transit use and assigned to a future road network that in Carrboro and Chapel Hill includes the existing network and only the publicly acceptable and financially feasible new links and widenings. The peak hour demand should be compared with the capacity of the road network at various Carrboro and Chapel Hill screenlines to produce volume to capacity measures. These volume-to-capacity measures should be used to calculate the transit mode share that will be required at each screenline for the road system to be able to function at no worse than a D level-of-service. These transit mode shares should be compared with the existing mode shares at the same screenlines to document the magnitude of the problem that the Long Range Transit Plan must address.

The travel across each screenline should be examined in terms of its major origins and destinations both inside and outside Carrboro and Chapel Hill to establish its potential to be diverted to transit and the extent to which this future use of transit will involve the Carrboro and Chapel Hill transit service alone or in conjunction with transit improvements elsewhere in the region. A risk analysis should be undertaken to assess the likelihood of achieving the required internal Carrboro and Chapel Hill transit mode shares. In situations where it is apparent that there is a low likelihood of achieving the required transit mode share an iterative process should be pursued to bring the scale of the project land use growth, the assumed road network and level of service and the transit mode share objective into a reasonable and acceptable balance. The revised transit mode share objectives should be adopted as the Long Range Transit Plan mode share objectives and used to develop a horizon year peak hour transit person trip table and to specify:

1) The required capacity of the transit links in the network.
2) The scale of the transit level of service improvement needed by corridor.
3) The nature of the connections needed to the regional transit and transportation networks.

Providing high quality connections to the regional transit network will be a major determinant of the future level of transit use in Chapel Hill and so their consideration must be an important element of the Long Range Transit Plan. That said, it is also important to recognize that there is now some urgency for the development of the Plan and if some elements of the regional transit plan remain subject to further study, the Long Range Transit Plan will have to make appropriate assumptions while protecting for as much flexibility as possible.

4.3 Identifying the Initial Higher Order Transit System Elements

4.3.1 Alignments

The current and Long Range Transit Plan target transit mode shares defined for each corridor in the Town should be used to identify those corridors where a significant increase in mode share is required and also the accompanying increment of transit ridership that will be required. Based on North American transit operating experience it will then be possible to list those corridors in the Town where some form of higher order transit will be required to achieve the desired outcomes. The size of the mode share increase required will also provide an indication of the magnitude of the increase in the transit level-of-service that will be necessary. This process will lead to the identification of a preliminary conceptual higher order transit network for Chapel Hill.

The preliminary alignment identification process will be one of the foundations for the eventual Long Range Transit Plan and it is important that all alternatives are identified and assessed so as to avoid any possibility of having to back-track in the future. To do this, a workshop should be held with stakeholders to prepare a long list of possible alignments that respond to the identified conceptual higher order transit network. Workshop participants should be challenged to justify their choices and critique those of other participants. The idea being to challenge the rationale of current ideas where possible and to suggest alternatives not previously considered. These

alternatives could arise from consideration of non-traditional ways of implementing the potential technologies and/or variations in the land use assumptions due to land use-transportation interactions.

By the end of the workshop the objective would be to have reached consensus amongst the participants as to what constitutes the final list of alignments for consideration in the study.

As part of the workshop process, the alignment identification process will be tested by postulating a series of goals and objectives gleaned from a review of the *Comprehensive Plan*. These are likely to include such items as:

- Improve corridor mobility;
- Promote patterns of smart growth;
- Permit cost effective solutions;
- Minimize community and environmental impacts;
- Ensure consistency with other planning efforts.

Using the results of the workshop, available mapping should be used to develop possible higher order transit networks from the various possible alignment combinations. The objective should be to develop networks that offer a large proportion of exclusive right-of-way operation and as low as possible proportion of mixed flow operation so as to maximize the probability of achieving the required transit mode share objectives. The mapping should show the higher order transit system alignments by type (exclusive, on-street priority and mixed flow) as well as tentative station locations.

The mapped higher order transit networks should be subject to a preliminary level one screening based on the workshop objectives to confirm that none of the alignments has fatal flaws and to identify the representative network for technology evaluation. This screening process should also include a preliminary environmental assessment to confirm that none of the environmental features that may be present on or close to the possible higher order transit system alignments is considered of major concern at this conceptual engineering stage.

The environmental assessment will be a desk top study of published technical information covering such subjects as:

- Nature conservation (designated sites, potential habitats);
- Watercourses;
- Floodplains;
- Land use (open space/recreation areas, sensitive land uses, dismantled railways, public rights of way etc.);
- Land allocations/designations;
- Tree preservation orders;
- Archaeological and cultural heritage (listed buildings, conservation areas).

4.3.2 Technology Options

Different higher order transit modes and technologies provide different types of service and therefore the key issue in selecting among them is to determine the nature of the problem to be solved. If the market is predominantly long distance commuters travelling to and from the Central Business District, a commuter rail or bus service characterized by wide station spacings and a high speed operation would be appropriate. At the other end of the scale, are the high volume passenger markets in compact urban areas, which require a service of moderate speed

Exhibit 2 LRT Technology

operating characteristics of the higher order transit system transit technologies that could be appropriate for the Chapel Hill environment. Even at this early stage of the study it should be possible to identify a limited short list of transit technologies using the information provided in the technical memorandum. Experience would suggest that this short list is likely to be limited to, at the most, three different technologies namely LRT (Exhibit 2) and BRT (Exhibit 3) and possibly DMU (Exhibit 4). This latter technology is most appropriate for corridors with wide station spacing with high reliability and relatively close station spacings. For very high passenger volumes heavy rail rapid transit in a totally exclusive right-of-way like the New York Subway is required. Lower volumes can be served by both bus and rail technologies in semi-exclusive rights-of-way.

A technology technical memorandum should be prepared that describes the costs and

Exhibit 3 BRT Technology

Exhibit 4 DMU Technology

and has limited application for purely urban services like that envisioned for Chapel Hill.

Exhibit 5 Guided BRT

The choice between LRT and BRT will involve considerations of capital and operating costs, level of

service and stageability. LRT has long been a strong contender as a preferred higher order transit technology in other American towns and cities but its high capital and operating costs in most applications are making it increasingly difficult to justify in the face of recent BRT technology developments.

BRT is a bus based technology so it has the flexibility to operate in its own right of way like a rail system and on-street like a bus. This gives it the ability to offer a higher proportion of one-seat rides than a rail technology and a greater ability to stage its infrastructure construction than is possible with a rail based technology. Many of the modern BRT vehicles are low-floor diesel-hybrid powered buses. This means that the vehicle has much lower tail-pipe emissions than a conventional bus and can operate entirely under electric power in environmentally sensitive areas. The BRT stations are just like rail stations and the running way can be a conventional busway or a guided busway (Exhibit 5). Guided busways have application in narrow corridors, in environmentally sensitive areas and also offer precision docking at stations just like a rail system.

The technology short list recommendation from the technology memorandum should be confirmed by the Town Council and the major stakeholders as soon as possible after it has been made to ensure that the study budget is used effectively.

The initial representative higher order transit system network should be modified and costed to reflect the operation of each of the short-listed technologies in terms of alignment geometry and other issues identified in the technology memorandum. For example, access ramps will be required for the BRT technology, wider station spacing will be required for the DMU technology and linked maintenance and storage facilities will be required for both the LRT and DMU technologies.

4.3.3 Initial Operations Plans

The different technologies will have different operations plans and preliminary operations plans for each technology and the representative higher order transit network should be developed. It is recommended that operations models for each technology option be prepared using VISUM software. VISUM is currently the best software package available for detailed modeling of transit operations, which can be coded to a timetable level of detail with actual stop locations. The model output is in fact detailed enough to provide input directly to the scheduling packages used by the transit industry. This level of detail is required to properly understand the operating and level of service differences between the candidate technologies.

For each technology, the operations model should encompass the whole of Chapel Hill Transit's operating area. Operating experience underlines the importance of developing higher order transit system operating plans in conjunction with the background transit service because of the significant differences that the choice of higher order transit system mode and technology can have on the amount and configuration of the background transit service.

The peak hour target mode share transit person trip table should be assigned to each technology model and equilibrated to bring service supply and ridership into reasonable balance using the compatible technology loading standards developed in the technology memorandum. Level of service and operations data should then be output from the model for use in developing the operating costs and other technology evaluation factors.

At this stage, it will be necessary also to develop an operating plan for what can be described as the Baseline Alternative, which would be the existing system, adjusted simply to reflect population and employment growth. The comparisons between the Baseline Alternative and the various technology alternatives will provide a framework for evaluating the changes in passenger convenience measures, hours of operation, vehicles and annual costs.

The operating plans for the higher order transit system technology options will be derived from the Baseline Alternative to ensure the feeder and background bus system is compatible and

consistent for all options. The higher order transit system fixed guideway component is overlaid on the Baseline Alternative operating plan and adjustments are then introduced to eliminate duplication and to integrate the local system properly.

4.3.4 Technology Selection

The technology evaluation process should result in the selection of the technology option which best meets the Town's goals in an affordable manner. It would be useful, therefore, at this stage to establish the range of affordability from the Town's budgetary perspective. Affordability being the ability to secure the necessary funds to permit the construction of the higher order transit system within a time frame that is compatible with the expected development. This means that a significant proportion of the network must be operational before most of the new development is occupied. Changing travel behaviour after the fact is next to impossible and progressive land use and urban design measures are most effective when the associated transportation infrastructure is already in place or at least there is a firm commitment to its construction.

It is quite possible that this affordability criterion will rule out one or more of the technology options from further consideration without the need for major study.

The affordable technology options should be compared in terms of their costs, environmental impact, passenger level of service, compatibility with the desired Chapel Hill land use and other factors important to the Town. The result of this evaluation process should be the selection of a preferred higher order transit system technology that is publicly supported by the Town and the other major stakeholders.

4.4 Refining the Higher Order Transit Network

4.4.1 Alignment Review

At this point in the study the representative higher order transit system network used in the technology selection process should be reviewed in light of the technology selection. This review should include modifications to take account of the costing and operating results and the possible reconsideration of the potential alignment components not included in the representative network.

An initial set of 1:200 scale drawings of the refined higher order transit system network should be prepared at this stage and used to repeat the costing and evaluation undertaken for the technology selection in more detail. The findings of this second level analysis should lead to further refinement of the network and be used to prepare the recommended higher order transit system alignments and drawings to be included in the Long Range Transit Plan.

As a further check on feasibility, the final higher order transit system should be reviewed, using the findings of all relevant reports provided by the Town, to determine whether there are any significant conflicts with heritage resources, major zoning designations, planned developments, inventories of natural resources, environmentally sensitive areas, hazard lands and the location of significant utilities and municipal services.

4.4.2 The Land Use Issues and Station Locations

The Long Range Transit Plan should be more than just a line on a map. As a transit strategy document it also needs to address other planning and implementation issues. A key requirement in this regard being the need to ensure that the higher order transit system and in particular its station locations maximize the opportunities for transit oriented development. This will improve the transit ridership and lead to other outcomes supportive of the *Comprehensive Plan.*

Urban structure, employment and residential densities and land use mix influence transit use. Land use mix and urban design in combination with land use density work well in attracting

significantly higher levels of transit use than would otherwise be the case. The clear indication from the body of research is that compactness (density) is the principal influence on transit use. Without it, urban design and land use mix are not sufficient to ensure an environment within which transit will have a steady growth. The Toronto Transit Commission in Toronto, for example, has stated in its experience…"*that transit modal splits in excess of 30% are only possible if the density in the vicinity of stations and in the corridors exceeds 100 jobs and/or residents per hectare"*[3] . Data presented by the Toronto Transit Commission shows, that in the Greater Toronto Area, below 20 residents and jobs per hectare, very low transit modal splits occur. Where densities reach 50 to 150 residents and jobs per hectare modal splits of up to 35% are feasible with high levels of transit service. (Note: A hectare is approximately equivalent to 2.5 acres.)

The levels of density sufficient to affect mode choice necessarily also involve increasing attention to the needs of the pedestrian. This means that transit oriented development also requires consideration of the pedestrian environment and a diversity of land uses so that a high proportion of local trips can be made on foot. To do this the development of the higher order transit system stations should be accompanied by changes in design standards, building setback requirements and other regulations to recognize their role as focal points for transit oriented development.

The quoted impact of increased densities and improved urban design standards only impacts transit mode split if there is reasonable access to high quality transit services. This usually means areas that are within a walking distance of a maximum of 1500 to 2000 feet of a station. The maximum walking distance is a function of the level of transit service provided. transit oriented developments are often identified as discrete development nodes in a corridor although linear transit oriented developments of up to one mile in length have developed in Toronto in areas where the average subway station spacing is about 2000 feet.

The challenge for the Long Range Transit Plan will be to identify suitable areas for transit oriented development having regard to the identified higher order transit system, existing and planned conventional transit service, development trends and the nature of the existing development. The challenge for the Town relates to the extent of the opportunities it will have to initiate transit oriented development and to discourage conventional patterns of development in the areas identified for transit oriented development. The intent is not to proscribe a particular life-style, but to ensure that the Town has a range of options from which its residents can choose.

4.4.3 Station Locations

Station locations should be defined to maximize the proportion of the Town's employment and population that could be within a comfortable walking distance of the higher order transit system service having regard to the operating characteristics of the selected higher order transit system technology. In addition the opportunities for transit oriented development should be maximized.

4.4.4 Land Use and Urban Policy Requirements

The Long Range Transit Plan should set out the transit oriented development zoning and urban design standards that the Town needs to incorporate into its ordinances to support transit oriented development where required around station sites. These will cover such items as density, mix of uses, prohibited uses, parking, building orientation and pedestrian facilities, etc.

4.4.5 Implementation Staging

The Long Range Transit Plan should include a discussion on implementation staging and recommendations as to a preferred staging plan. Staging may also be a significant criterion for

[3] *TTC Rapid Transit Expansion Study, 2001*

technology selection. The opportunity to influence travel behaviour and land use as new development is occurring can bring significant benefits in terms of ridership growth. Issues to be considered in developing a staging plan include:

- The early implementation of a network operating plan as similar as possible to that ultimately proposed so as to reinforce the long term trip patterns.
- Ensure that the higher order transit system brand is reinforced by high quality early infrastructure and operations.
- Maximize the early opportunities for redevelopment and transit oriented development.
- Promote elements of the network that have the highest patronage and operating savings potential.
- Promote elements with a high potential to attract car drivers.
- Defer network links in areas of low congestion.
- Minimize the need for throw away temporary infrastructure.

4.4.6 Network Assessment

The implementation of a higher order transit system strategy and its ongoing funding will require a significant capital and operating investment. To build long term community support for the necessary funding programs, the Long Range Transit Plan should demonstrate that the higher order transit system strategy will deliver a strong benefit/cost when compared with the direct costs to the Town and the public of the alternative do-nothing and road-oriented strategies. This information will be required to justify the ongoing transit investment in the face of competing demands to fund other programs.

5.0 CONSULTANT QUALIFICATIONS

Several different skill sets will be required to develop the Long Range Transit Plan and a consultant team approach will be necessary. The team should be led by an individual with a proven track record of having successfully undertaken similar transit planning processes covering all the same basic requirements from strategic planning through implementation.

This track record should include desirably:

- Strategic long range transit planning;
- The analysis and setting of successful transit mode share goals;
- Successful new service implementation and operation;
- State-of-the-art transit operations modeling;
- A demonstrated understanding of transit/land use interactions;
- Transit service benefit/cost evaluations and business plan preparation;
- Good presentation skills.

Other consultant team members will include individuals with experience with land use planning and regulation in Chapel Hill, public consultation and environmental assessment. Some parts of these aspects of the study process could be undertaken by Town staff.

6.0 NEXT STEPS

Once the Town has confirmed that the Long Range Transit Plan scope, outlined in this discussion paper, meets its requirements for a long range transit plan it should decide on the level of effort and degree of public and Council involvement that it would like to see applied to the development of the Plan and therefore the budget that it should allocate to the project. The key determinants of the size of this budget will be the level of detail that the Town wishes the Plan to have and the scope of the consultation with the public and stakeholders. At this stage, it will also be important to seek the support of Carrboro and the University of North Carolina for the proposed planning process. They are important contributors to the current transit service and clearly have a stake in its future. Their support and cooperation with the study will greatly aid its successful outcome.

The Town should develop a scope for the study based on this discussion paper and the proposed approach to public consultation. This scope of study needs to reflect the desired level of effort in sufficient detail for a consultant to be able to properly understand the skills required to undertake the Plan development.

It is recommended that the Town first select the consultant to undertake the core tasks in the study based on his or her relevant technical qualifications and experience. This is best done by selecting this consultant on the basis of expressions of interest limited to the consultant's experience and a demonstration of their understanding of the study requirements. The Town should then retain this consultant to prepare a study work plan, inception report and budget in consultation with the Town. Assuming the work plan and budget are acceptable to the Town, the other specialist members of the consultant team would be added. These specialist members of the consultant team would be subject to the agreement of the primary consultant but could be nominated by the Town based on their previous experience.