Introduction

The following summarizes the development process of the major street plan element of the Comprehensive Plan prepared for the City of Hoover, Alabama. Both land use and the roadway system were analyzed in this study effort. The purposes of the transportation component are to guide development in the establishment of a planned roadway network, assess the effectiveness of the existing roadway system, considering the present land uses and transportation network, and to develop a major Street plan that will mitigate current and future roadway deficiencies, increase mobility, support the Comprehensive Plan, and create a safe and efficient roadway system for the future.

Sources of information for the major street plan included the City of Hoover, the Alabama Department of Transportation, the Regional Planning Commission of Greater Birmingham, Atkins, the KPS Group, Inc. and office files and field reconnaissance efforts of Skipper Consulting, Inc.

Background

If a major street plan does not exist, streets become major by their use as determined by the traveling public to meet their immediate traffic needs. A major street plan proposes the development and use of streets that provides the greatest safety and long range economy. To ensure that transportation plan meets the desires of the City of Hoover it was determined that the transportation plan should meet the following criteria:

- Meet the long range transportation need of the city;
- Encourage and accommodate traffic on the interstate, arterials and collectors while discouraging traffic on local and neighborhood streets;
- Provide access among all developed areas of Hoover;
- Improve overall accessibility to employment, education, public facilities, and other major activity centers;

- Provide for an orderly improvement and expansion of the roadway system at minimum cost as the need for improvement arises; and
- Minimize disruptions of existing and planned developments and established community patterns.

Existing Transportation System

All transportation networks have some form of classification to categorize the hierarchy of movement in the system. The roadway network developed for the Hoover study area was based on the functional classification system prepared by the Alabama Department of Transportation. The components of this network are freeways, arterials, collectors and local streets.

Each type roadway provides separate and distinct traffic service functions and is best suited for accommodating particular demands. Their designs also vary in accordance with the characteristics of traffic to be served by the roadway. The following is a brief description of each roadway type.

❖ *Interstates* are divided highways with full control of access and grade separation at all intersections. The controlled access character of freeways results in high-lane capacities, enabling these roadways to carry up to three times as much traffic per lane as arterials. Freeways move traffic at relatively high speeds.

❖ *Arterials* are important components of the total transportation system. They serve as feeders to the interstate system as well as major travelways between land use concentrations within the study area. Arterials are typically roadways with relatively high traffic volumes and traffic signals at major intersections. The primary function of arterials is moving traffic. Arterials provide a means for local travel and land access.

- *Collectors* provide both land service and traffic movement functions. Collectors serve as feeders between arterials as well as provide access to the local streets. Collectors are typically lower volume roadways that accommodate short distance trips.

- *Local Streets* sole function is to provide access to the land uses that are immediately adjacent to the roadways. These streets are not included in the computer network for this project.

The existing transportation functional classification system for the City of Hover is illustrated in Figure X.

Existing Traffic Volumes

Traffic volume, as indicated by traffic counts at various locations on the roadway network; reflect current travel patterns and how well the network is serving the travel demand. Traffic counts were collected throughout the study. The following is a summary of the 2016 maximum daily traffic volumes that occur on major roadways in the study area:

Interstate 65	124,500 vehicle per day
Interstate 459	107,300 vehicle per day
U.S. Highway 31	48,000 vehicle per day
U.S. Highway 280	91,600 vehicle per day
Alabama Highway 150	36,400 vehicle per day
Lorna Road	23,900 vehicle per day
Galleria Boulevard	22,400 vehicle per day
Valleydale Road	35,500 vehicle per day
Riverchase Parkway	18,900 vehicle per day

Figure X - Roadway Classification System

Roadway Capacity

Roadway networks are evaluated by comparing the traffic volumes along each facility to the facility's capacity. Roadway capacity is defined as the ability of the facility to accommodate traffic. Service flow volume is the level of traffic flow (vehicles per day) that can be accommodated at various levels of service. The current level of service scale, as developed by the Transportation Research Board in the *Highway Capacity Manual*, Sixth Edition, ranges from a level of service "A" to a level of service "F". Abbreviated definitions of each level of service are as follows:

Level of Service A	Free traffic flow (0% –35% of capacity)
Level of Service B	Stable traffic flow (35% –50% of capacity)
Level of Service C	Stable traffic flow (50% –62% of capacity)
Level of Service D	High-density stable traffic flow (62% –75% of capacity)
Level of Service E	Capacity level traffic flow (75% –100% of capacity)
Level of Service F	Forced or breakdown traffic flow (>100% of capacity)

As a general rule, the desired operation of a roadway should be no lower than level of service "C". Level of service "D" may be acceptable under certain circumstances. A level of service "E" or "F" is considered unacceptable.

The methodology used to evaluate roadway segment capacity in this project was a tabular analysis relating roadway classification, number of lanes, levels of service, and daily service volumes. The estimated 24-hour capacities of the facilities included in the area network are shown in Table 1. Figure X summarizes the levels of service and deficiencies for the roadway segments.

TABLE 1
CITY OF HOOVER
ROADWAY CAPACITIES

FUNCTIONAL CLASSIFICATION	# OF LANES	CAPACITIES
Freeway	4	68,000
	6	102,000
	8	136,000
	10	170,000
Expressway	4	50,000
	6	75,000
	8	100,000
Divided Principal Arterial	2	22,000
	4	33,900
	6	50,000
	8	73,600
Und*ivided Principal Arterial*	2	17,800
	4	31,000
	6	45,800
	8	63,100
Divided Minor Arterial	2	21,000
	4	31,900
	6	45,600
	8	N/A
Undivided Minor Arterial	2	17,800
	4	27,400
	6	N/A
	8	N/A
Divided Collector	2	20,800
	4	28,500
	6	42,000
Undivided Collector	2	16,600
	4	26,200
	6	38,700
One-way Principal Arterial	2	17,100
	3	25,600
	4	37,800
One-way Minor Arterial	2	14,100
	3	19,500
	4	26,000
One-way Collector	2	11,300
	3	15,600
	4	20,800
One-way Ramp	1	9,000
	2	18,000
	3	27,000

Figure X Existing LOS

Land Use and Transportation Systems

The relationship between land use and a transportation system is used to determine the demand for travel on a roadway network. Each land use (residential, commercial, industrial, etc.) generates and attracts traffic depending on the nature of the development and the amount of land developed. In order to identify this demand for travel, inventories of existing land uses must be made. This information is used in conjunction with the physical location of the adjacent land uses, constraints on the roadway network, and other related factors to develop the interrelationship between land use and the transportation system.

The future travel demands and trends were forecasts based on the land use plan that was developed for the City of Hoover, the density current and future development and the suitability of vacant land for development.

Transportation Modeling Process

Travel demand models are developed to predict future traffic on the street and highway system. The models are initially developed using existing land use data to duplicate travel for the base year. How well the model duplicates base year conditions is considered as an indication of how well it will predict future travel. If the model cannot produce traffic volumes similar to those observed on existing streets and highways, then the model is reevaluated and adjustments are made. This adjustment or calibration process continues until the model is adequately simulating base year traffic conditions. The process of building and modifying the model to simulate base year travel is called calibration. After the model is calibrated, trip generation data is developed for the land use plan and input into the model to predict future travel demand. The travel demand modeling for the Transportation Component of Hoover Comprehensive Plan was provided by Atkins.

No Build Assignment

The travel demand generated by future is assigned to the existing roadway network. The purpose of this step is to identify where future deficiencies might occur if no roadway improvements are undertaken. As was discussed in the Existing Conditions section, the future year no-build forecast traffic volumes were compared with the roadway capacities to determine roadway segment levels of service. Roadways which show a projected volume/capacity (v/c) ratio of greater than 0.75 (Level of Service "E") should be considered deficient. Emphasis should be placed on those areas where the v/c ratio is greater than 1.00 (Level of Service "F"). Based on those ratios, the roadways estimated to be deficient are shown in Figure X.

Major Street Plan Development

The Major Street Plan for Hoover, Alabama was developed in an effort to provide a policy guide for local officials to utilize in addressing existing traffic congestion, mitigating anticipated future year capacity deficiencies, improving mobility, increasing safety and promoting economic vitality. The Major Street Plan can serve as a planning tool for private developers to enable them to design subdivisions that function as part of an overall plan. The major street plan can also serve as a stability factor for homebuyers who realize that neighborhoods have been developed according to a plan that would avoid future disruption.

The Major Street Plan was developed as a result of public meetings, meetings with Hoover officials and the results of analyses that were performed by Atkins and Skipper Consulting. Various types of roadway improvements have been included in Hoover's Transportation Plan. The improvements include adding travel lanes to existing roadways and constructing new roadways. The Major Street Plan is described below and illustrated in Figure X.

Figure X No Build LOS

Figure X Major Street PLan

1. Extend Galleria Boulevard;
2. Construct I-459 frontage roads;
3. Extend Merchant's Drive;
4. Construct Shades Crest Connector (Scenic View Dr);
5. Stadium Trace to Brocks Gap Road connector;
6. I-459/ South Shades Crest Road interchange with Ross Bridge Parkway connector;
7. Modify interchange at I-459 and Alabama Highway 150;
8. Widen Valleydale Road to 5 lanes from Caldwell Mill Road to U.S. Highway 280;
9. Widen Valleydale Road to 5 lanes from U.S. Highway 31 to Riverchase Parkway;
10. Widen Old Montgomery Highway to 5 lanes;
11. Construct a connector road from Old Rocky Ridge Road to Acton Road;
12. Construct a connector road from Hoover High School to Cahaba River Estates;
13. Construct Hidden Valley Road from Chapel Lane to Preserve Parkway;
14. Construct a connector road from U.S. Highway 31 to Data Drive;
15. Construct a roadway from Lornaridge/Lorna Lane to Municipal Center Drive;
16. Construct a connector road from Inverness Corners to Meadowview Parkway;
17. Construct a median and develop an access management plan along U.S. Highway 31;
18. Construct a connector road from Cahaba River Road to Inverness Parkway;
19. Construct a connector road from South Shades Crest Road to Elvira Road/Shelby County Road 52;and
20. Construct a connector road from Stadium Trace to Elvira Road (gated).

The travel demand generated by the future development was assigned to the roadway network that included the projects outlined in the Major Street Plan using the travel demand model. The purpose of this assignment is to determine the benefit of the Major Street Plan. The traffic assigned to the roadway network was compared with roadway capacities that are represented by the Major Street Plan. The Major Street Plan was reviewed to determine which facilities would have a projected volume/capacity (v/c) ratio of greater than 0.75 (Level of Service "E"). As was the case in the review of the no-build network, roadways with a volume/capacity (v/c) ratio of greater than 0.75 (Level of Service "E") should be considered deficient. Based on those ratios, the levels of service and for the roadway segments are illustrated in Figure X.

Figure X Future LOS

Conclusions

This is a summary of the development of the Major Street Plan for the City of Hoover. The conditions summarized included traffic analysis for existing conditions, future conditions and recommendations for roadway improvements that would help correct current and future transportation deficiencies. It is virtually impossible to eliminate all transportation deficiencies that may occur in a city but the recommendations in this report will help relieve existing and future traffic congestion, improve mobility, improve traffic safety and increase the opportunity for economic vitality.