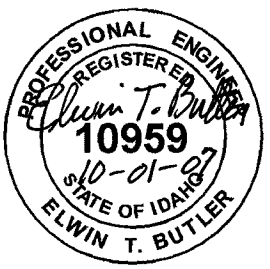
CITY OF MIDDLETON

MASTER TRANSPORTATION PLAN



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The Master Transportation Plan for the City of Middleton was developed with a cooperative effort between the City of Middleton and a Technical Advisory Committee (TAC). The TAC was comprised of officials from Local Highway Technical Advisory Council (LHTAC), City Planners, Canyon County Highway District 4 (CCHD 4) personnel, Community Planning Association of Southwest Idaho (COMPASS) and Idaho Transportation Department. Particular recognition of those whose assistance were valuable in the preparation and completion of this work were acknowledged:

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Travel Demand Forecast Model

Staff members of COMPASS are hereby acknowledged for developing the travel demand forecast models for the study area and for providing valuable technical information during the course of the project.

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INTRODUCTION AND OVERVIEW

The City of Middleton (City) and surrounding area have experienced significant growth since late 1990. The rate of growth in this region is expected to continue into the future increasing transportation needs in the community. It is necessary to develop a Master Transportation Plan (MTP) for the systematic City growth, economic development, and to plan and address the increasing traffic demand.

The MTP provides guidelines for future transportation project developments and programs, and assists the City to plan and progress to achieve goals and objectives furnished in the City's Comprehensive Plan. The MTP plays a vital role in determining how the City and surrounding areas will grow and accommodate growth in the future.

The City of Middleton adopted a Comprehensive Plan in July, 2004 (See Appendix C). The primary purposes of the road and street system, or transportation system within the City in the surrounding Area of Impact are as follows:

- Provide for movement of motorized vehicles including people and property
- Provide for safe vehicle routes
- Provide emergency vehicle access to identified locations rapidly and safely; and
- Minimize delays resulting in increased fuel consumption and air pollution.

Secondary functions of a transportation system include access for major utility corridors, demographic and planning unit identity, and non-motorized transportation route sharing [1].

The MTP was developed for the following purposes:

- To provide guidance and recommendations to accomplish the goals furnished in the City's Comprehensive Plan.
- To interrelate land use developments with the existing transportation system.
- To project future traffic on important roadways and at key intersections.
- To address issues and identify alternate measures for increasing traffic in the City and surrounding areas.
- To develop a Capital Improvement Program (CIP) prioritized based on the roadway condition within the study area.

This MTP is developed to build on the City's policies and directions outlined in the City of Middleton's Comprehensive Plan. It is also an integral part of the Canyon County Highway District # 4 (District) transportation plan, which is responsible for roadways in the surrounding areas of the City. This is a dynamic document and should be updated annually to reflect the growing and changing community of the City.

This project is funded by the Local Highway Technical Assistance Council (LHTAC) of Idaho Transportation Department (ITD) and the City of Middleton.

An overview of the Master Transportation Plan is comprised of the following:

1. *Introduction and an overview of the Master Transportation Plan.*
2. *Purpose, scope and methodology in developing the MTP.*
3. *Existing and projected population and land use information.*
4. *Evaluation of existing transportation system, including right of way and current traffic information.*
5. *Transportation issues and Future Planning: Looking at long term needs, right of way preservation, State Highway 44 bypass route, street circulation and classification plan and bike path planning.*
6. *Assessing and evaluating existing roadways: Asset valuation, pavement management system for maintenance and reconstruction, and street standards.*
7. *Capital Improvement Plan (CIP): CIP based on priorities, road condition, and traffic demand.*

A. Purpose

A Master Transportation Plan and a Capital Improvement Plan are documents to be used concurrently as a systematic planning tool to maintain and expand the City and the District facilities to provide citizens with basic necessary needs for life sustaining accommodations and conveniences. In addition, a Capital Improvement Plan (CIP) will be required to be submitted with any request for funding of highway or bridge projects. This CIP will become an important criterion in evaluation of projects.

There are several funding possibilities from the State of Idaho and the federal government, through the State. These funding agencies require, indirectly, local governments to develop Transportation Plans in order to apply for various funding packages in an organized and thoughtful manner. The indirect requirement of transportation plans is to ensure that in making improvements, the local government has considered future growth and road usage patterns and will be making judicious choices in improvement considerations.

ITD in collaboration with LHTAC, Metropolitan Planning Organizations (MPO) in Idaho and other interested agencies develops the Statewide Transportation Improvement Program (STIP). The STIP is a five-year master plan of transportation projects within the State. The STIP will be updated annually and shows how federal transportation funds will be used to fund a variety of transportation projects, including [9]:

- Highway, bridge, bicycle and pedestrian facilities
- Highway safety
- Air quality
- Railroad crossing safety
- Airports
- Public transportation
- Transportation planning

The Community Planning Association of Southwest Idaho (COMPASS) is an association of local governments working together to plan for the future of Ada and Canyon County. COMPASS conducts this work as the MPO for northern Ada County and Canyon County. The federal government requires the formation of an MPO when an urban area reaches 50,000 people [10].

COMPASS is a non-profit association and it is responsible for [3]:

- Preparing an annual **Unified Planning Work Program and Budget** that collectively defines how local and state agencies plan to use federal planning funds to accomplish metropolitan planning goals,
- Preparing a **Long Range Transportation Plan** for the urbanized area and its immediately surrounding area. This plan is a vision of what the local transportation system is to look like in the next 20 to 25 years. The vision must encompass all modes of transportation — roadways, public transportation, ride-sharing, and any other mode.
- Preparing and updating the annual **Transportation Improvement Program**. This is the short-term budget document that indicates how local and state agencies plan to use federal funds to enhance the transportation system in the next 3 to 5 years, short-range future.
- Developing a **Congestion Management System** to help local leaders evaluate how best to accommodate growing transportation needs to move greater number of people and vehicles.
- Performing all the above activities while ensuring that air quality will be maintained or enhanced.

(Source: 2002 Treasure Valley Transportation Survey final report, prepared by COMPASS)

The City of Middleton was included in the Nampa Urbanized area in early 2003 (See Appendix F for the Nampa Urbanized Area map). COMPASS develops the Transportation Improvement Program (TIP), which is a short-range (3-5 year) capital improvement (budget) program of transportation projects, consistent with federal regulations and the area's policies

and strategies. The TIP and STIP must contain consistent information about transportation projects.

The TIP is developed through a cooperative process by COMPASS for the Nampa Urbanized Area and the Northern Ada County Transportation Management Area (TMA). This process involves extensive participation by ITD, Canyon County Highway Districts, Canyon County, and the cities of Nampa, Caldwell, and Middleton [12].

To receive federal-aid funding, a proposed project must be listed in the TIP, inclusion of which begins through an application process. The Regional Technical Advisory Committee (RTAC) designates a subcommittee to rank all Canyon County applications. The COMPASS Board approves the priority order of projects for various funding categories. Projects under the Surface Transportation Program – Urban (STP-Urban) are considered by the Urban Balancing Committee. This committee is made up of representatives of all small metropolitan planning organizations (MPOS), and LHTAC represents small urban areas (under population of 5,000).

The COMPASS Board also approves the priority order of Surface Transportation Program – Enhancement (STP-E) projects in Canyon County. A statewide evaluation committee evaluates and recommends funding to the Idaho Transportation Board. Projects ranked as COMPASS's top priority will receive additional points when evaluated by the statewide evaluation committee. Congestion Mitigation Air Quality (CMAQ) projects are reviewed by COMPASS staff and recommended by the COMPASS Board; however, these applications are not ranked at the local level.

Planning of transportation improvements is considered an essential part of a successful federal-aid application by the State of Idaho. The Idaho Transportation Board is the ultimate authority in approval for funding the federal-aid projects.

Materials from COMPASS and the State on funding requirements and transportation planning were used in the preparation of this report to ensure that this report can be used by

the City of Middleton and the Canyon County Highway District No. 4 in applying for these various funding resources.

B. Scope of Study Area

The City of Middleton received funding administered by the LHTAC for the MTP to address issues within the city limits and Impact Area. The City of Middleton and the Canyon Highway District No. 4 recognized the need to expand the study area beyond the City's impact area. The District has jurisdiction over roadways in the City's Impact Area. LHTAC granted additional funds, requested by the City and District, to cover the expanded area in the study.

The study area for the MTP includes the area bounded by Can-Ada Road on the east, Interstate 84 on the west, Edna Lane on the north and Lincoln Road on the south.

C. Scope of Study

The MTP identifies the current conditions of the City and the County roadways and transportation structures, potential transportation needs and requirements for the future. An action plan is to inventory existing facilities and develop a Geographical Information System (GIS), including the study area base map and database to prioritize improvements. The road inventory survey includes a Global Positioning System (GPS) inventory of current road conditions, a GIS database of all city roads, an evaluation of each city road condition, a condition rating for each road, and probable cost for repairs of each road segment. From this, the City will provide strong justification and support for the selected improvements for community understanding and funding application.

Currently, the District has a GIS database for roadways within the jurisdiction, which will be updated periodically. The GIS developed for the City will be compatible with the District GIS. The City and District will be able to track needed improvements and associated costs using the developed GIS. Additionally, information from the GIS for annual updates to the CIP will be readily available to match potential funding sources with required and desired improvements.

This report includes a discussion of the methodology and hardware used for the collection and management of data, population trends, land use projection, existing transportation system, travel demand forecast, and the City and District's transportation goals. The report also discusses current road conditions, future transportation system considerations, and financial implications.

D. Methodology

General

The inventory of the City and District roads included in this study will compile all of the road data into one database and link this database to the City map. The system utilized to obtain these results included the Global Positioning System (Trimble/Pathfinder XRS), Pathfinder Office 2.9 Software, and Arcview 3.0 Software programming language.

Data Collection

The City roadway data was accomplished by using a GPS data collection unit, Trimble Data Collection Unit, a data dictionary with fields corresponding to ArcGis-9.2 and the inventory of each road by driving it from start to finish recording the variations in road conditions. The roadway data survey also included pavement width, shoulder width, drainage information, curb, gutter and sidewalk, sign post and culvert location. The Trimble Data Collection unit is a small computer stores the coordinates of latitudes and longitudes and altitude accuracy of plus or minus three feet and linking these coordinates with the library data. The location of culverts and bridges are recorded as part of the roadway inventory survey but the attributes of culverts and bridges within the City limits were not recorded. Appendix J contains a map showing the streets surveyed and location of culverts.

The inventory of each city road was completed during the summer and fall of 2006. Referenced material included the city road files, the ITD's road segment map, the City and District road classification map, street name map, and the City bridge map.

Database Library

A database library consists of geometric and road surface conditions, bridge and culvert size and type, and basic road sign groups. This database library contains the significant information required for the road evaluation, rating, and estimating the probable repair costs. This library is a checklist for each road segment. Each category on the checklist must be recorded for each segment. Appendix A contains the database library and descriptions of each attribute.

Database

The database includes all of the library information, the road rating values, and the probable repair costs that interact with one data map. The program allows digital pictures to be linked to any map location. The software allows for a live link between the database and the map. This concept (live link between the database and the map) identifies a true GIS system. The background of the data map is a county Government Control Database (GCDB) map. Any changes to the database or data map will automatically update the other. On the data map, roads are shown as lines and all other items such as bridges, culverts signs, etc. show up as points. Each time a road condition changes, a segment break is made in the road line. Any road segment or point may be selected on the map to obtain the road identification and conditions shown in a window on the computer monitor. This data may be sorted, joined or queried to identify any road having a certain condition.

Included in the database is a unit cost schedule. Item costs may be updated regularly to remain current. This unit cost schedule may be used as a reference and is linked to the default repairs. By keeping the cost schedule current, the City and the District will be able to achieve accurate cost estimates for maintenance and repairs of their road system.

Arcview

Arcview software is used to automate repetitious queries, road ratings, and assigns probable repair costs to road segments. This programming language will also reduce time in computer

operation and creating reports. Programs have been prepared to rate the roads and assign probable repair costs, based on road segment conditions.

One important aspect of this software package is the flexibility to update repair and maintenance costs, road widths, and interaction with the software to obtain the preferred results.

Planning Period

The MTP addresses transportation related issues and identifies needs to meet the future transportation demands through the year 2030. The travel demand forecast, population and land use projections were projected through the planning period of 2030.

E. Traffic Data and Analysis

The peak hour traffic data, at key intersections within the City, was obtained from the traffic impact studies submitted by various developers for future developments in the City. The level of service (LOS) of key intersections was assessed for the existing and future traffic conditions using the Highway Capacity Software Version 4.1e (HCS). LOS is a description of different operating conditions, which occur on a roadway or at an intersection when accommodating various traffic volumes. See Appendix B for definition of levels of service.

The current traffic counts within the City limits were collected and provided by the District at key locations. There are no previous traffic counts available within the City limits. The traffic counts were collected at the following locations within the City limits:

1. S. Middleton Road between Boise St and Star Blvd.
2. N. Middleton Road between Star Blvd and Main St.
3. Cemetery Road between Concord and Main St.
4. Hawthorn Dr. between Main St. and Concord
5. Hartley Lane between Concord and Willis Rd.

The District provided previous and current traffic counts on major roadways within the study area. The Travel Demand Forecast (TDF) model for the study area was developed by COMPASS based on inputs such as population, households, jobs, trip characteristics, and the roadway system.

Travel Demand Forecast Model

Travel Demand Forecasting (TDF) model is a powerful tool for the long range planning of the transportation system. The main purpose of developing the TDF model is to quantify the amount of travel on the transportation system. The demand for transportation is created from the general growth of a community, significant developments and other activities like recreation and tourism. The supply of the transportation system is represented by the planned roadway network, intersections performance, and roadway capacities.

There are four basic steps in the Travel Demand Forecasting model:

1. Trip Generation – This is the first step in conventional modeling. This step converts the demographic / land use data into productions and attractions. The households are converted into "producers" and the employment is converted into "attractors" at the Traffic Analysis Zone (TAZ) level.
2. Trip Distribution – This second step converts the trip generation data into trip table (s) containing the number of trips going from each origin to each destination for each pair of TAZs.
3. Mode Choice – This third step allocates the person trips from trip distribution to available modes based on a set of factors (i.e., availability, cost of driving and parking, accessibility, travel time). Currently, there is no public transit in the study area and hence only passenger cars were considered in this study. The potential trips that use other modes like walking and biking are negligible in this study and hence these modes are ignored.
4. Trip Assignment – The assignment process places the total TAZ to TAZ vehicle trips as estimated travel demand on each link in the model's roadway network. The assignment process uses an equilibrium methodology, which means traffic is

assigned to various routes until all routes to the same location take the same amount of time

The flowchart shown in Figure 1 depicts the methodology adopted by COMPASS for the TDF model, for the transportation system in Middleton area. The model output provides peak hour traffic volumes and Average Daily Traffic (ADT) on roadways within the study area. The intersection performance and capacity analysis can be assessed using the peak hour traffic volumes and the roadway capacity analysis and future right of way requirements can be evaluated using the forecasted ADT values.

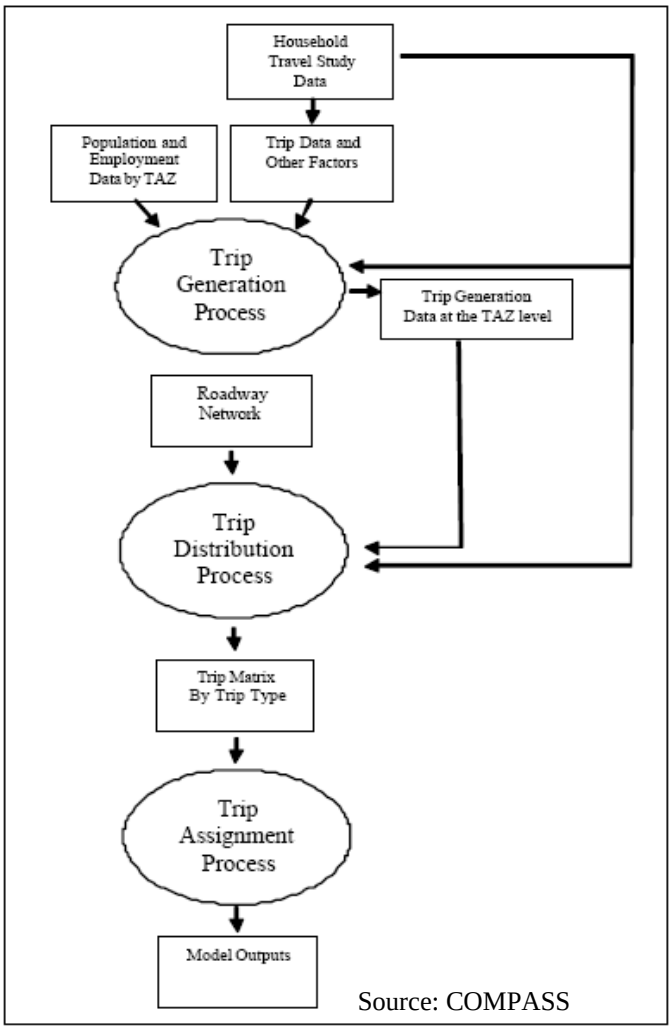


Figure 1: Travel Demand Forecast Model Flowchart

COMPASS divided Ada and Canyon County region into TAZs to develop the TDF model. The region includes 534 TAZ boundaries, 346 in Ada County and 188 in Canyon County, out of which 15 TAZs are located in the study area. See Appendix G for TAZ boundaries included in the study area. Further explanation of different stages in developing and running the TDF model is provided in a later section of this report.

POPULATION AND LAND USE

The City of Middleton is located in Canyon County, approximately 31 miles northwest of Boise. The City is located at 43°42'23" North, 116°37'13" West. State Highway 44 (SH44), major arterial, runs through the City and serves the major transportation demands of the City. The 2005 U.S. Census lists the population of the City of Middleton as 4,409 and for Canyon County as 164,593.

Population

Population trends and projections are key issues in determining transportation needs for the City. Community characteristics were obtained from various sources including the Idaho Department of Commerce web page, and the U.S. Bureau of Census.

Historical Population

The population of the City of Middleton peaked in 1980. Through the period from 1970 to 1980 the City experienced a growth rate of 15.72 % per year. The following years from 1980 to 1990 the population for the City declined by 0.26% per year. This has been followed by a growth period from 1990 to 2000. This period represents a growth rate of 6.08 % per year.

From the City's Comprehensive Plan and the Idaho Department of Commerce, the historical population records for the City and Canyon County were obtained and are shown in Table 1 and 2, respectively.

Table 1: City of Middleton Historical Census Population Data

Year	Population*	Numerical Change	% Change per Year	Population+	% Change per Year	Difference in %
1970	739	-	-	-	-	-
1980	1,901	1,162	15.7	-	-	-
1990	1,851	-50	-0.3	-	-	-
2000	3,020	1,169	6.3	2,978	-	-1.4
2001	3,173	153	5.1	-	-	-
2002	3,272	99	3.2	3,235	4.3	-1.1
2003	3,671	399	12.2	3,606	11.5	-1.8
2004	4,067	396	10.8	3,868	7.3	-4.9
2005	4,409	342	8.4	4,166	7.7	-5.5

(Source: * Idaho Commerce and Labor, + COMPASS)

Table 2: Canyon County Historical Census Population Data

Year	Population*	Numerical Change	% Change per Year	Population+	% Change per Year	Difference in %
1970	61,288	-	-			
1980	83,756	22,468	3.7			
1990	90,076	6,320	0.7			
2000	131,441	41,365	4.6	131,441	-	0.0
2001	139,117	7,676	5.8	-	-	-
2002	145,322	6,205	4.5	144,417	4.9	0.6
2003	151,508	6,186	4.3	152,174	5.4	-0.4
2004	157,883	6,375	4.2	159,531	4.8	-1.0
2005	164,593	6,710	4.3	167,141	4.7	-1.5

(Source: * Idaho Commerce and Labor, + COMPASS)

It can be observed from Tables 1 and 2 that the population in the City increased at an average annual growth rate of 10.6% in the last 3 years and; whereas, the annual growth rate in the County remained consistent at 4.3% for the last 3 years based on the information obtained from the Idaho Department of Labor. The above tables also provide historical census population data estimated by COMPASS. COMPASS estimated population with the 2000 census as a basis and added building permit activity. The residential permits are allocated by area, adjusted for occupancy rates to derive at total households. Then, households are multiplied by persons per household to estimate population. COMPASS estimates the population in the month of April, whereas Idaho Department of Labor estimates the population in the month of July, during non-decennial years. The population estimates from COMPASS were compared with Idaho Commerce and Labor estimates and the difference is tabulated in the above tables. The estimates from COMPASS were low when compared to

Idaho Department of Labor estimates, because the different procedures were adopted to estimate population by the two agencies. Nevertheless, the City has experienced significant growth in the last 3 years. The population of the City of Middleton is expected to continue to grow for the foreseeable future, due to its close proximity to the City of Boise, lower land development costs and attractive "small town" ambiance. In addition, growth is expected to be generated by the overlapping economic benefits of the Boise/Nampa/Caldwell regions, and the potential expansion of local commercial and industrial facilities.

Future Population Projection

Population projections depend on a number of variables and assumptions. Changing these variables will yield a range of possible population projections. Rapid population growth is expected in the immediate future as the City's Comprehensive Plan encourages mixed use developments, commercial and low to high density residential land use. Depending on land use developments applications and building permits received by the City and the County, the population is expected to grow at an average annual growth rate of 10.6% for the next 10 years.

The following table shows the developments approved and in process of review within the City and study area.

Table 3: Developments under construction/review

Development	Status	# Lots
Middleton Lakes #3	Approved	54
Middleton Lakes #4	Approved	61
Greenlinks #1	Approved	49
Sherwood Estates	Approved	36
The Pines #1	Approved	68
The Crossings #1	Approved	78
Falcon Valley #1	Approved	92
Falcon Valley #2	Approved	25
Powder River #2	Approved	76
Wellstone Business Park	Approved	17
Middleton Lakes #2	Approved	75
Schnell Subdivision	Approved	19
Middleton Annex	Approved	8
Lakes @ Telaga #1	Approved	44
Lakes @ Telaga #2/3	Approved	79
Powder River #1	Approved	37
Highland Ranch (1-4)	Approved	230
The Estates #1	Approved	56
Falcon Valley # 3	Under Review	81
Greenlinks # 2	Under Review	41
	TOTAL	**1226**

The following table shows the developments with preliminary plats under review and approved.

Table 4: Developments Preliminary Plats in Review/Approval

Development	# Lots
Highland Ranch (remaining)	567
The Crossings (remaining)	69
The Pines (remaining)	42
Creekside Terrace	130
Falcon Valley (remaining)	196
The Estates (remaining)	50
The Pines III	35
Carlton Meadows	70
Winding River	126
Watership Commons	69
Canyon Ridge	235
Windsor Valley Estates	406
Giovanni (Rivani) Estates	98
Magellan Subdivision	41
TOTAL	**2134**

The following table shows the developments which are at concept level.

Table 5 : Developments at Concept Level

Development	# Lots
Corinthian (Galvin)	782
LaRiviere Estates (Gabica)	390
Beachwood (Cemetery)	113
Saddle Creek	10
Silver Creek	127
TOTAL	**1286**

There are proposals for other developments in the vicinity of the study area which are potentially annexed into the City's Impact Area in the future. The following table shows the other developments.

Table 6: Other Developments

Development	# Lots
Wagner	550
V&M	400
Blue Meadows	120
Chapparel (except Telaga)	105
TOTAL	**1175**

The potential developments, in Tables from 3 to 6, depict growth in the City and surrounding area of impact. The full build out year for the majority of potential developments is projected to 2015. The horizon year for the potential developments listed in the above tables is anticipated as 2020, based on the assumption of 90% occupancy of residential lots after 5 years of full build out. The average household size in Canyon County is 2.7 based on the 2002 Treasure Valley Transportation Survey conducted by COMPASS. The total number of potential residential lots from the above listed developments within the study area is 5,821.

There is potential of developing small tracts of land simultaneously with the above listed developments. The additional population, from the above listed potential developments, can be expected to be approximately 15,716 and the total population is projected to be approximately 20,775 by end of the horizon year, 2020. Based on the land use zoning and demographics, a higher population growth rate can be expected along and in the vicinity of SH 44. The vicinity areas along SH 44 are zoned as high density residential areas and commercial land use type. A gradual reduction in the annual population growth rate can be expected after 2020 from 10.6% to 6% as a result of scattered developments in low density residential and agricultural land use areas surrounding the City's Impact Area.

The graphical presentation of population projection for the study area is illustrated in Figure 2.

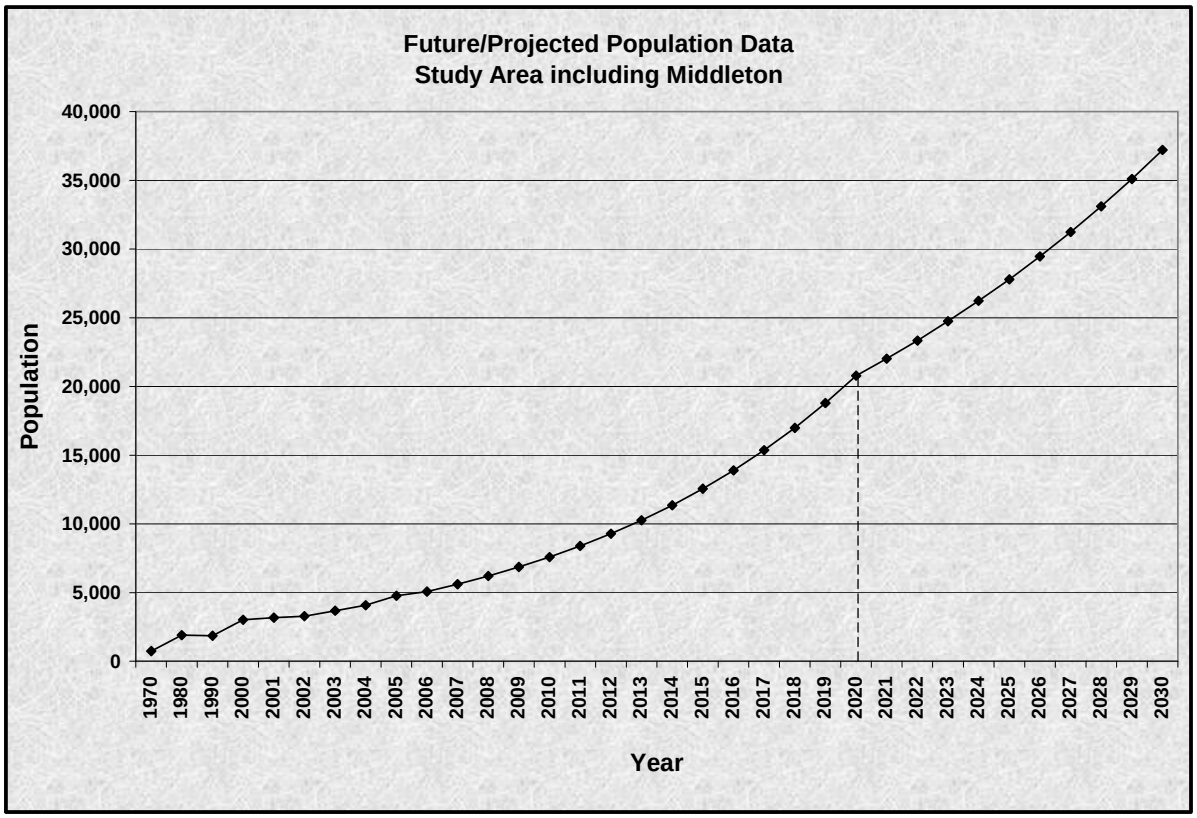


Figure 2: Population Projection for the Study Area including the City of Middleton

Based on the potential developments within the City's Impact Area, District and growth rate assumptions, the probable population by the year 2030, within the study area can be expected to reach 37,200.

Existing Land Use

The City of Middleton is basically a rural community with population less than 5,000 people. It is expected that the City will cross the mark of 5,000 by the end of 2007 or in the first quarter of 2008. The City of Middleton impact area is included in the Nampa Urbanized Area, See Appendix F, as identified on the smoothed boundary map of June 16, 2003, developed by COMPASS. The Comprehensive Plan for the City adopted in 2004 indicates that the City had a total of approximately 1150 acres in 2002 and the following Figure 3 shows the land use distribution.

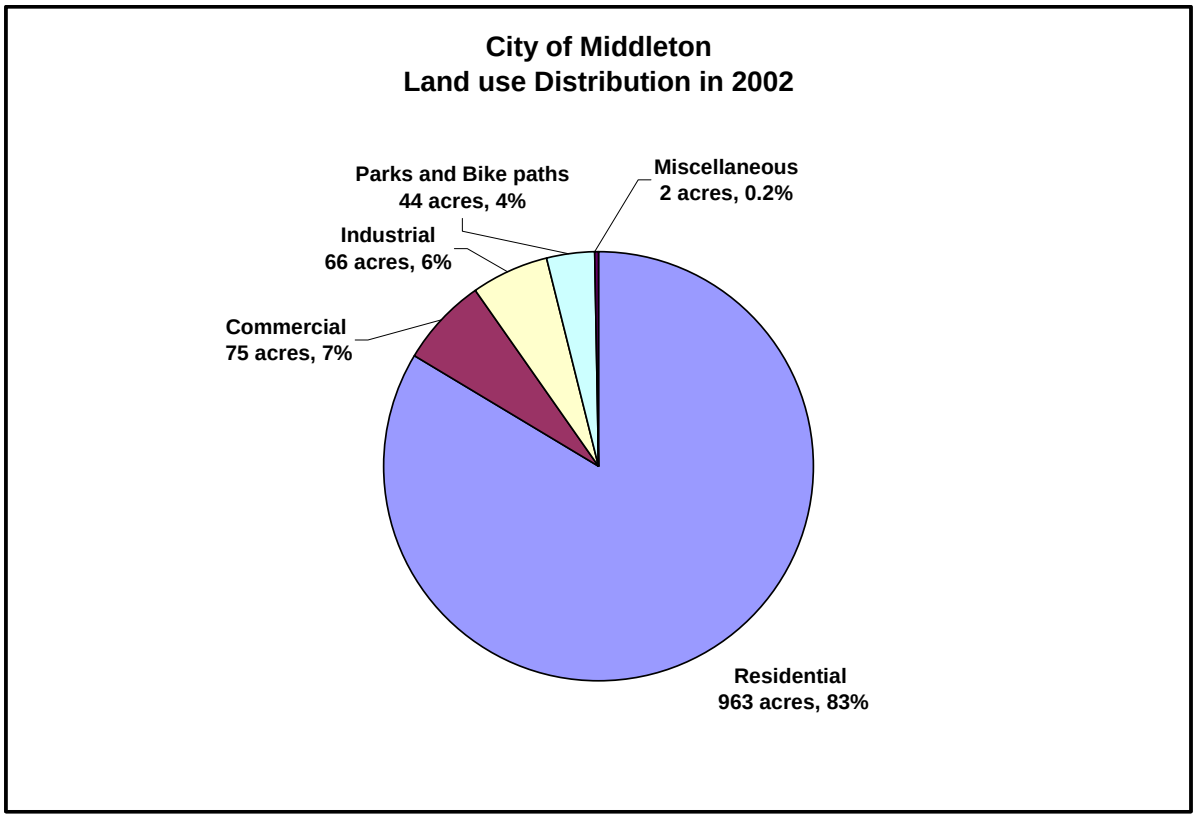


Figure 3: City of Middleton Land use Distribution in 2002

Between 2002 and 2006, approximately 1,576 acres of land were annexed into the City, adding the total acreage in the City limits to approximately 2,726 acres. It is evident that the annexation of the surrounding area into the City was approximately 34% per year. The following Figure 4 shows the current land use distribution within the City limits.

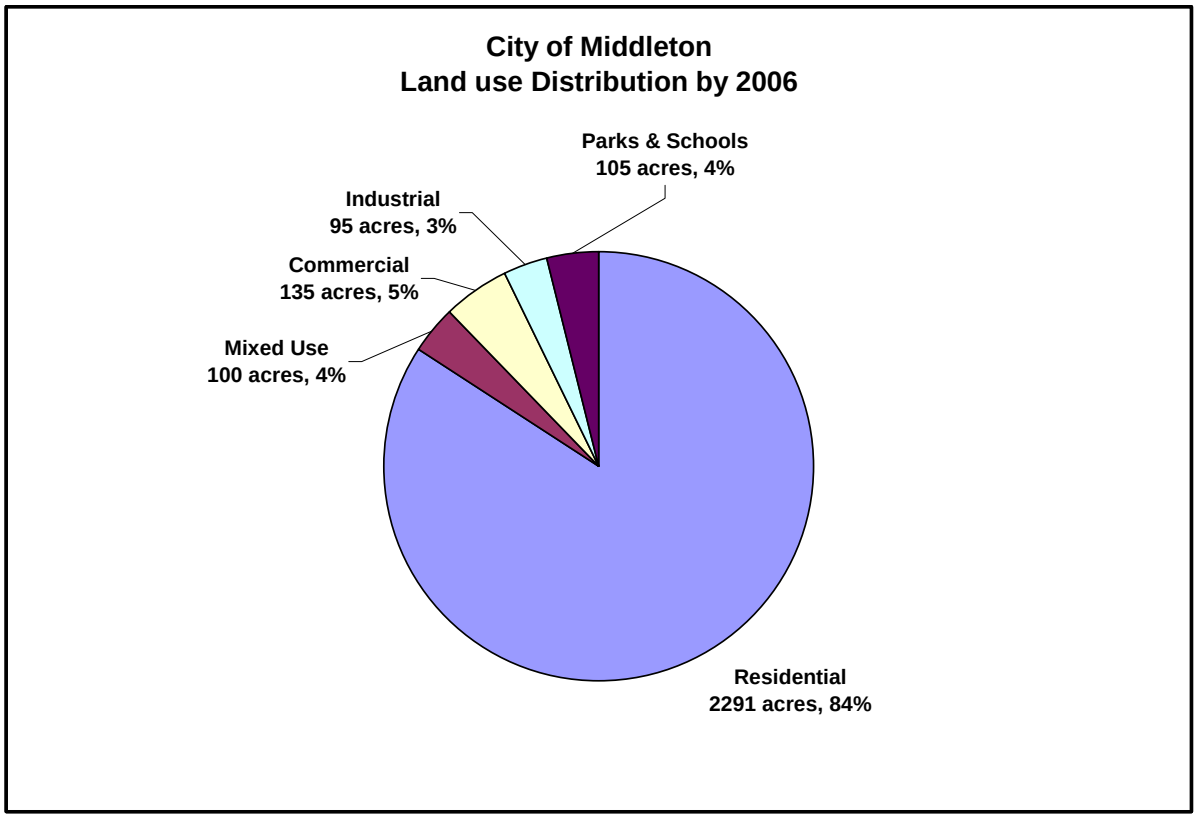


Figure 4: City of Middleton Land use Distribution in 2006

In existing conditions, the majority of land use is categorized as residential land within the City's impact area. The City Land Use goals as per the City's Comprehensive Plan are:

"To identify appropriate and sufficient areas that will accommodate a range of residential, commercial, industrial and high technical development to satisfy the needs of all citizens of the community and encourage an orderly transitional pattern from agricultural to urban use"

The City has strategies to accomplish these goals. These strategies suggest developing a Capital Improvement Plan, adopting a zoning map, standardizing street and sidewalk widths, and coordinating with the County and the District on planning and zoning issues. The City adopted a zoning map in 2006 to accomplish these land use goals. The majority of commercial and light industrial land use is contiguous to SH 44 within the City and surrounding impact area. See Appendix D for the City's Land use and Zoning Map.

The Canyon County Comprehensive Plan provides current land use types and their distribution. The following Figure 5 shows the current land use distribution in Canyon County.

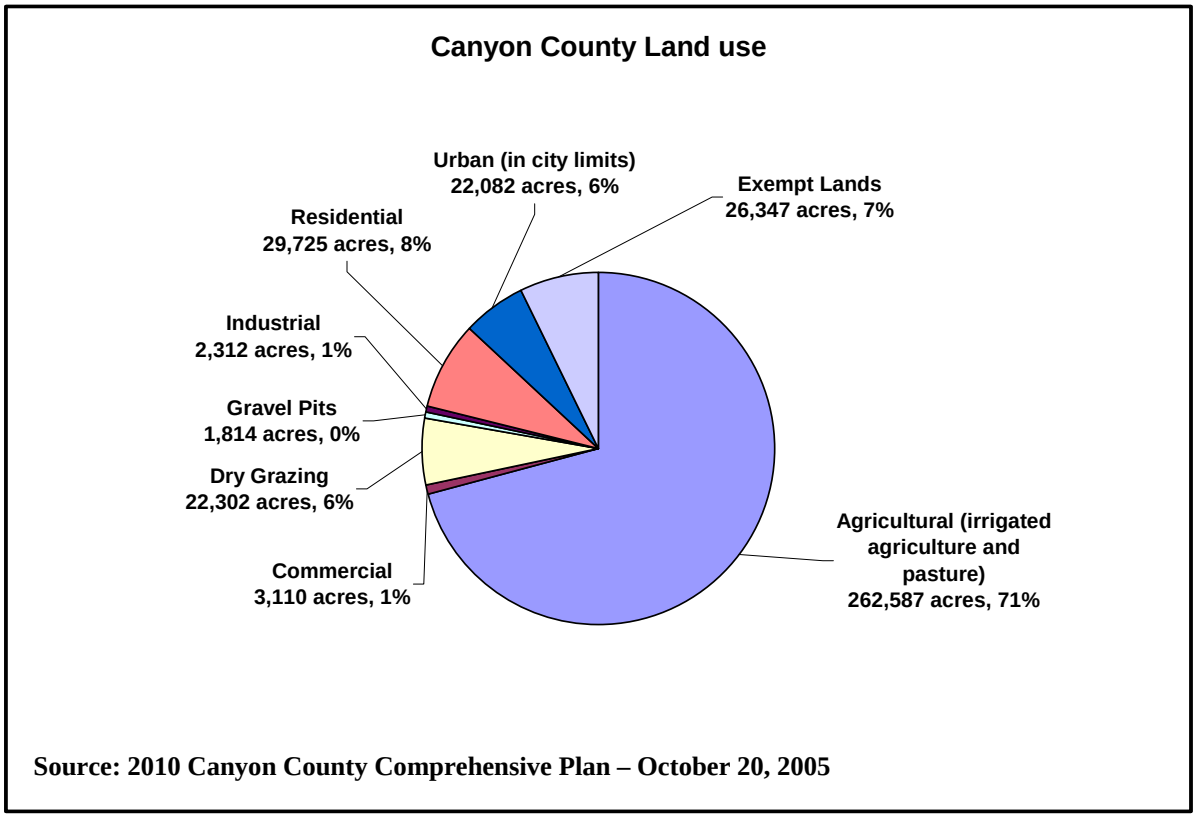


Figure 5: Canyon County Existing Land use Distribution

The County's Comprehensive Plan encourages protection of prime agricultural lands for the production of food and supports Idaho's "Right to Farm" law. The City of Middleton proposes an agreement be in place with Canyon County for land use decisions in pre-defined impact areas surrounding the City in the Comprehensive Plan.

Future Land Use

The City and surrounding area is prime real estate for growth and development; this real estate is being converted from agricultural to large lot development. The Canyon County Commissioners approved an 18 square mile addition on August 17, 2006 to Middleton's Area of Impact. See Appendix H for the approved Ordinance of Middleton Impact Area. The City's Comprehensive Plan encourages residential developments from very low densities

to high densities, mixed use land developments, industrial, commercial and High-Tech spin off developments.

Future land use within the City's Impact Area is defined and shown in Appendix D. The map shown in Appendix D is a future depiction of how land use distribution within the study area appears when planned land use densities are reached to maximum limits. The total acreage within the City Impact Area, with the addition of 18 square miles, is approximately 20,550 acres. Based on the zoning map and land use development applications received by the City, future land use category and the approximate acres are shown in the table below:

Table 7: Future Land use Distribution

Land Use Category	Acres	% of Impact Area
Residential	10,658	52%
Public (Parks & School)	278	1%
Commercial	935	5%
Mixed use	878	4%
Industrial	702	3%
Neighborhood	164	1%
Urban Growth Area	6,935	34%
Total	**20,550**	100%

The area between Lansing Lane and Can-Ada Road was categorized as a general Urban Growth Area in the County's land use map. The City of Middleton is working with other agencies on identifying land use types in this area to accomplish the City's land use goal, which is furnished in the City's Comprehensive Plan.

Future Development Potential

The City of Middleton is planning for growth management as an orderly, logical expansion of the City services. The City is currently experiencing growth above the County's and State's growth rate.

In March 2004, the City with the assistance of COMPASS undertook a long range plan to identify an alternate route for State Highway 44 to channel high traffic flow around the downtown core area due in large part to significant local peak hour congestion [1]. The City has identified a corridor between SH 44 and the Boise River for the bypass route connecting between Emmett Road and Duff Lane. Planning and design requirements of the SH 44 bypass route are discussed in a later section. The land use and zoning map proposes commercial and mixed use developments along with medium density residential lots fronting the SH 44 bypass route. The commercial developments may include a wide variety such as gas stations, convenience stores, department stores, etc. The City has adopted zoning ordinances and standards for different developments and construction in the City limits and in the Area of Impact.

Emmett Road is the major commute route for city residents working in the Emmett area. There is potential for commercial developments in the surrounding area of the intersection of Emmett Road and SH 44.

Middleton School District

The Middleton School District #134 (MSD) encompasses approximately 100 square miles of area. The MSD is located in a rural community and considered a medium sized Idaho School District. This unique rural bedroom community (population 4,409) offers a rare quality of life and is nestled in the Treasure Valley with two mountain ranges in full view. Middleton residents are within easy commuting distance (6-25 miles) of large industries and are surrounded by agricultural land [5].

The MSD is working proactively with new housing developments and have received three future elementary school sites to build the District's 4th, 5th and 6th elementary schools. A sixty acre high school site was purchased for a new school and will provide the needed secondary classroom space by allowing the existing high school building to become part of the Middle School campus, on or around 2011 [5].

The MSD has provided the student enrollment history for the last 20 years. The following table shows the actual enrollment and growth pattern.

Table 8: Student Enrollment at Middleton Schools

ACTUAL ENROLLMENT																						
	86-87	87-88	88-89	89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	
K	141	105	105	131	106	104	123	140	147	162	132	151	147	156	171	179	171	179	210	215	233	K
1	144	161	122	110	145	112	126	130	159	152	180	156	168	169	175	168	200	178	195	245	233	1
2	120	125	154	117	110	143	107	141	145	159	155	182	163	181	182	186	178	196	200	196	236	2
3	138	125	127	157	120	124	152	113	151	138	162	164	181	157	192	174	198	175	210	214	219	3
4	141	150	125	132	156	148	129	167	133	154	140	167	181	181	169	204	179	210	195	239	219	4
5	134	129	152	130	140	160	154	132	182	128	156	155	174	176	180	188	218	192	219	212	254	5
K-5	818	795	785	777	777	791	791	823	917	893	925	975	1014	1020	1069	1099	1144	1130	1229	1321	1394	K-5
6	144	136	130	150	128	156	169	164	159	190	125	167	158	171	184	196	191	219	203	233	235	6
7	142	145	127	137	152	148	168	185	176	164	187	141	184	160	185	183	210	188	223	232	242	7
8	119	141	139	136	143	156	157	173	202	173	165	191	153	169	162	183	189	214	203	210	233	8
6-8	405	422	396	423	423	460	494	522	537	527	477	499	495	500	531	562	590	621	629	675	710	6-8
9	132	124	141	145	142	143	159	158	177	178	170	166	199	156	164	174	184	190	226	218	226	9
10	99	127	124	140	132	134	138	140	145	171	163	149	150	175	142	171	164	190	191	216	210	10
11	107	83	106	122	126	120	130	120	143	125	153	147	128	120	162	135	155	168	167	179	211	11
12	96	107	74	110	103	108	102	125	111	114	118	142	135	122	122	148	133	156	164	164	164	12
9-12	434	441	445	517	503	505	529	543	576	588	604	604	612	573	590	628	636	704	748	777	811	9-12
Totals	1,657	1,658	1,626	1,717	1,703	1,756	1,814	1,888	2,030	2,008	2,006	2,078	2,121	2,093	2,190	2,289	2,370	2,455	2,606	2,773	2,915	Totals
Growth %		0%	-2%	6%	-1%	3%	3%	4%	8%	-1%	0%	4%	2%	-1%	5%	5%	4%	4%	6%	6%	5%	

It can be observed from Table 8 that enrollment has increased by approximately 5% in the past four years. This indicates that the City of Middleton is experiencing substantial growth.

The MSD has identified needs for new school buildings and provided proposed future school buildings in their ten-year facilities plan. The following Table 7 shows the committed or completed land contributions for future schools in the Middleton area.

Table 9: Completed or Committed Land contributions for future schools

Date	Developer	Dev. Acres	Zoning	# Homes	Acres Req.	Acres Com.*	Proposed School
2005	Coleman Communities, Inc.	294	R-3	794	--	7	Expansion of Ele. Site
	Off Cemetery Road						
5/1/2006	Corinthian Land Investments, LLC	507	R-3	1,400	80	60	1 Ele/1MS
	located west of Can-Ada Road, north & south of Highway 44, between Can-Ada & Blessinger Roads						
5/17/2006	Foothills Crossing Development Group	180	unknown	350	26	10	1 Ele
	Subdivision Development between Kingsbury and Blessinger (fronting Foothill Road)						
11/28/2006	REC, LLC (Taylor)	210	varies	343	15	15	1 Ele
	Cemetery and Willis						
11/16/2005	Woodhouse/Orson Group (Kingsbury)	153	varies	65	15	15	1 Ele
	Kingsbury Road						
			Totals	2,952	136	107	

Note: No exact addresses for the above sites at this time.

The MSD purchased a property of 60 acres at the southeast corner of Emmett and Willis Road for a new high school building to accommodate a total of 1,550 students. For further information on land contributions and proposed school locations, contact the Middleton School District # 134.

EXISTING TRANSPORTATION SYSTEM

The City of Middleton has three jurisdictions responsible for streets and roadways: the City Public Works Department, Canyon County Highway District No. 4, and the State of Idaho Transportation Department. The City of Middleton is served via State Highway 44. This highway, classified as a principal arterial, runs through the center of the City in the west-east direction extending approximately 9.56 miles through the study area. The other major roadways within the study area are Middleton Road, Cemetery Road, Purple Sage Road, Emmett Road, Duff Lane, Lansing Lane, and Kingsbury Lane.

State Highway 44 is the major route of commute for the City residents who work in the Eagle and Boise area. Middleton Road is the major commute route for the City residents who work in the Caldwell and Nampa area. Emmett Road connects the cities of Emmett and Middleton hence; Middleton Road and Emmett Road are classified as regional arterials in the current City's Comprehensive Plan. The present County road grid framework under the jurisdiction of the District surrounds the City at one-mile intervals. This grid will continue to provide essential high volume network of access as the City expands.

Road Inventory Survey

The road inventory survey included pavement surface condition survey, pavement width, location of curb, gutter and sidewalk, location of culverts and sign posts within the City limits. The City of Middleton has a total of 31.5 miles of paved roads and 4,700 feet of gravel roads, including alley ways. See Appendix J for surveyed paved and gravel roads within the City limits.

All intersections within the study area are STOP controlled intersections. Most of the traffic regulatory signs and traffic control signs like STOP and YIELD are according to the standards of the Manual on Uniform Traffic Control Devices (MUTCD). The following table shows the inventory of traffic control devices and signs within the City limits.

Table 10: Inventory of Traffic Control Devices

Sign Description	Number
Speed limit	43
Regulatory	8
STOP/Yield	82
Informative Signs	29
Warning Signs	7

Road Functional Classification

Functional classification is the process of grouping roadways into classes according to the character of service they are intended to provide. Most travel involves movement through a network of roads or even modes. It is necessary to determine how travel can be channeled within the network in a logical and efficient manner. Functional classification defines the nature of this process by defining the part that any particular roadway should play in serving the flow of trips through the network [10].

A road classification is not solely based on the width of the road or its daily vehicle count. It is based mainly on how the roadway functions within the transportation system. The width of the road and vehicle count may be factors, but roadways vary greatly.

There are three basic categories of roadways: arterials, collectors, and local roads. This is the hierarchy in which the roadway system interacts with the land use system. Arterials function to move traffic. They have limited access to land uses. Collectors are the connectors in the roadway system. They have access to land uses, but also provide necessary movement. Local roads provide access to land uses and serve many localized purposes [10].

The City's Comprehensive Plan, adopted in July 2004, lists roads and their functional classification. COMPASS has developed a new 2030 planning functional classification map for Northern Ada County and Canyon County. The map was approved by the COMPASS board. The approved map does not include collectors. COMPASS also developed an unofficial functional classification map for planning purposes. The unofficial functional

classification map shows collector streets. These maps are available on the COMPASS website http://www.compassidaho.org/prodserv/func-maps.htm also provided in Appendix I. The following Table 11 lists the functional classification of major roadways within the study area.

Table 11: Street Functional Classification

Functional Classification	Existing Comprehensive Plan	Existing COMPASS Plan	Proposed in Transportation Plan
Regional/Principal Arterial	State Highway 44	State Highway 44	State Highway 44
	Middleton Road	Middleton Road south of SH 44	Middleton Road south of SH 44
	Purple Sage Road		
	Emmett Road		
Minor Arterial	Willis Road	Emmett Road south of Purple Sage	Emmett Road
	Highland/Cemetery Road	Main Street	Main Street
	Duff Lane	Old Highway 30 south of SH 44	Old Highway 30 north of SH 44
	Lansing Lane	Purple Sage Road	Purple Sage Road
	Lincoln Road		Kingsbury Road
	Kingsbury Lane		Middleton Road south of SH 44
Major Collector	Main Street	9th Street	9th Street
	Hartley Road	Highland/Cemetery Rd.	Highland/Cemetery Rd.
	9th Street North	Concord Street	Hartley Road
	Hawthorne Avenue	Duff Lane	Duff Lane
	Stone Lane	Emmett Road north of Purple Sage	Blessinger Road
		Lansing Lane	Lansing Lane
	El Paso Road	North Middleton Road	Willis Road
	Harvey Road	Old Hwy 30 north of SH 44	El Paso Road
	Freezeout Road	Old Middleton Road	Freezeout Road
Minor Collector	Concord Street	El Paso Road	Concord Street
	Canyon Lane	Hartley Lane	Harvey Road
	Channel Road	Hawthorne Avenue	Hawthorne Avenue
	Lincoln Road		Lincoln road
	KCID Road	Willis Road	

The above table shows street names and the corresponding classification obtained from the City's comprehensive plan and the COMPASS map. The table also shows the proposed classification for streets. According to the City's Comprehensive Plan, the City has adopted the standards for minimum right of way and design level of service for different classes of roadways.

The following Table 12 shows the current design standards for the roads and streets within the City:

Table 12: Current Street Standards for Design and Planning

Functional Street Classification	Minimum Right-of-way	Travel Lanes	Restricted Access	Planning Volumes at LOS C
Regional/Principal Arterial	120 feet or more	Four or more	Yes	12500 to 33000
Minor Arterial	100 feet	Three or more	Yes	5000 to 25000
Major Collector	80 feet	Two or three	Yes	1500 to 8000
Minor Collector	60 feet	Two	No	500 to 2500
Local Street	50 feet	Two	No	Less than 1000

(Source: Current City of Middleton Comprehensive Plan, adopted in June 2004)

The City of Middleton requires all new public streets to meet these standards before the City will accept a street into their system for maintenance. In addition, the City reviews all new streets and modifications to existing streets within the City Impact Area. The City's street standards are included in the Comprehensive Plan, see Appendix C.

Roadway Classification and Right-of-Way for District Roadways

The District adopted Subdivision Development Standards and Design Criteria for site development in May, 2007. As per Section 3020, Roadway Classification, "all roadways within the District are classified in accordance with the Surface Transportation and Uniform Relocation Assistance Act of 1987. All roads are classified as Expressways, Arterials, Collectors, Local Roads or Low-Volume Local Roads. Functional Classification shall be based on the Planning Functional Classification Map adopted by the District or, when such

map has not been adopted by the District, the Planning Functional Classification Map for Canyon County" [15].

Current Right-of-Way Requirements for District Roads

The District has set minimum right-of-way requirements for streets in their jurisdiction for each classification as following:

Table 13: Current Right-of-Way Requirements for District Roads

Roadway Classification	Minimum Right-of-way*	
	Rural Areas	Urban Areas
Expressway	200 ft	200 ft
Arterial **	130 ft	100 ft
Collectors (5 lanes)**	130 ft	100 ft
Collectors (3 lanes)**	100 ft	80 ft
Local Roads ***	60 ft	56 ft
Low Volume Local roads	56 ft	50 ft

* Additional widths may be required for accommodation of extreme cut or fill sections, turn bays or other site characteristics.

** For the purpose of future planning, all section and quarter section line roads or boundaries are considered as potential arterials or collector highways. Section line roads will require a 130 foot right-of-way and quarter section line roads will require a 100 foot right-of-way. Some other roads may also be similarly designated. Presently these roads, where established, serve as farm-to-market and/or commuter routes. The District desires to preserve the integrity of these routes by designating them as potential arterials or collectors, and for this reason it is also deemed advisable to restrict the number of access points (driveways, etc.) in order to reduce safety problems and allow traffic to flow expeditiously and unimpeded.

*** Where public road right-of-way or property boundaries existed prior to August 8, 1991 and are necessary for a public road access to a parcel(s), the minimum width of right-of-way for a local road may be 56 feet with District Approval.

Street standards pertaining to the District roadways are available in Design Criteria, Section 3000, of the subdivision development ordinance.

Existing Traffic Counts within City limits

The current traffic volumes on roadways within the study area are important to understand the travel behavior and pattern. Also, the traffic counts provide a datum for the City decision-makers for future traffic volumes comparison. The District has collected traffic data for a week period at key locations, identified by the City, and provided the current traffic

volumes within in the City limits. There is no previous traffic count data available on the City streets. The following Table 14 shows the average daily traffic, based on data collected over a week period by the District on key City streets in October 2006.

Table 14: Average Daily Traffic on City Streets

Segment Code	Street Name	Location	ADT
015871	N. Middleton Road	115 ft North of HWY 44	3762
004700	Middleton Road	187 ft South of Hwy 44	8562*
012094	N. Highland Drive	248 ft North of Hwy 44	2411
013518	Hawthorne Drive	162 ft North of Hwy 44	1620
012086	Hartley Lane	385 ft South of Willis Rd.	340

(Note: * Traffic count obtained from the District taken in July, 2004)

It can be observed from the above table that Middleton Road carries significant traffic when compared to other streets in the City. Middleton Road is a major collector within the City limits and changes to an arterial which serves the areas of Middleton, Caldwell and Nampa. N. Middleton Road is a major collector that serves the north side of the City and funnels traffic flow to SH 44. The other major route is N. Highland Drive, also known as Cemetery Road, classified as a major collector which serves the northwest area of the City and carries traffic from the northwest side to SH 44. Hartley Drive is a local street which serves the local residential developments and it carries low traffic volumes. The traffic volume on the City streets is not constant over a week. The traffic volume and travel behavior varies depending on the period of a week. The following Figure 6 shows the variation in daily traffic volumes on the City streets, over a week period.

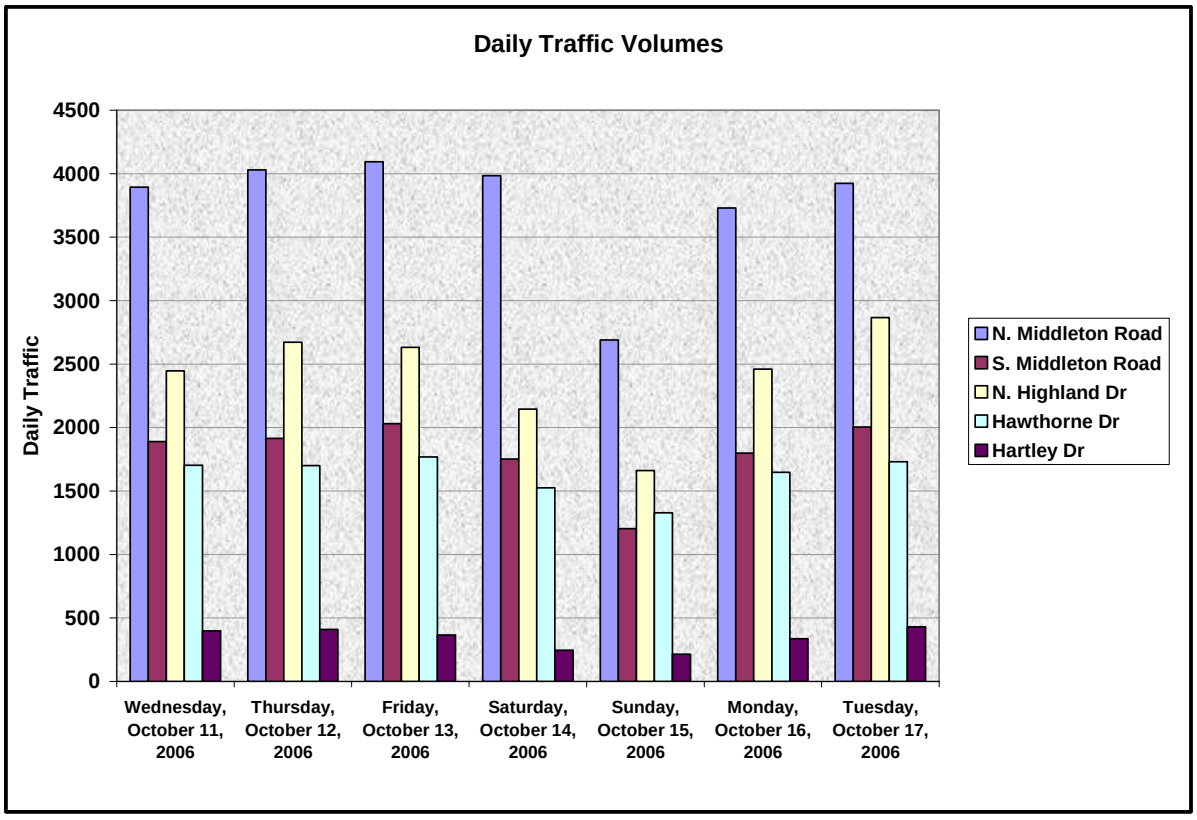


Figure 6: Daily Traffic Volumes on Major City streets

Traffic Data on SH 44

ITD has taken traffic counts on SH 44 over the past years. As stated earlier, SH 44 is classified as a principal arterial and serves the City of Middleton. It is necessary to study the traffic volumes and variation on SH 44 for the future planning. ITD provided Annual Average Daily Traffic (AADT) data on SH 44 for the period between 2000 and 2005 from milepost 0.00 (at Interstate 84) to milepost 9.56 (Can-Ada Road). The following Figure 7 shows the variation of traffic volume along SH 44 from the year 2000 to 2005.

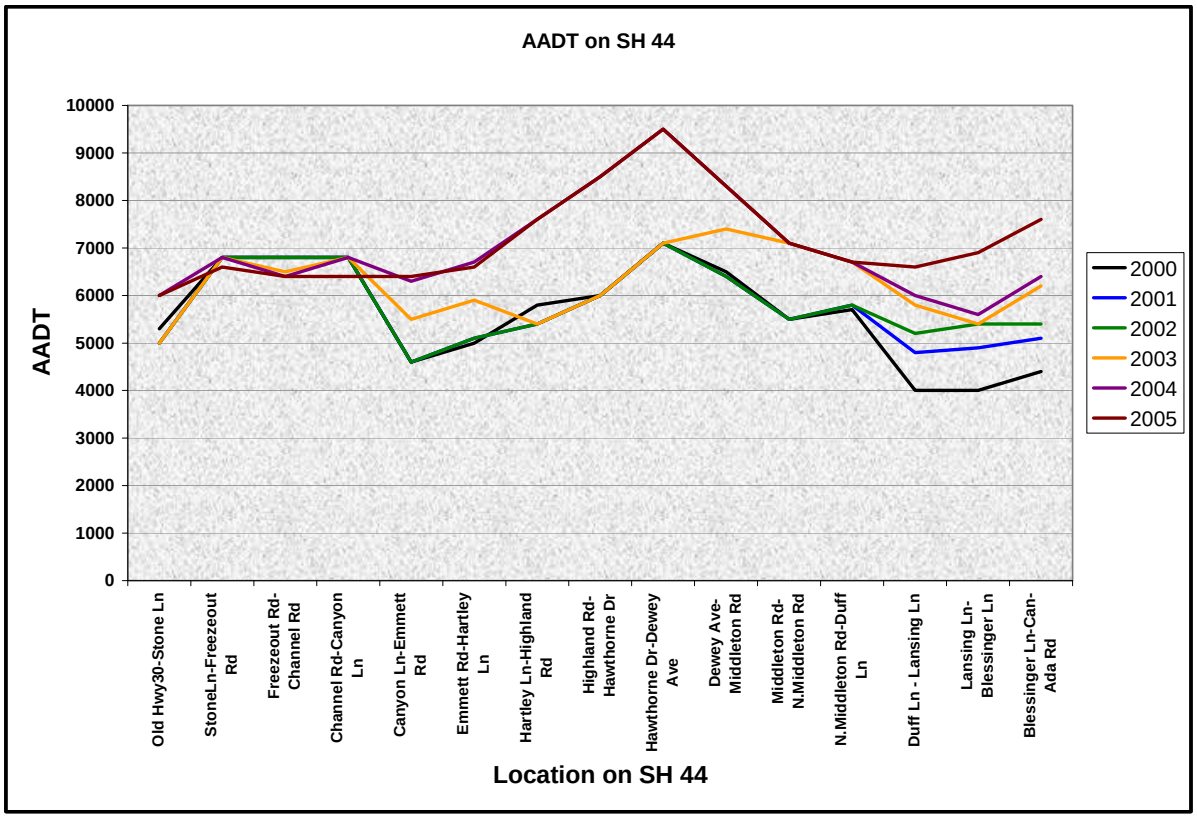


Figure 7: Annual Average Daily Traffic (AADT) on SH 44

It can be observed from the above figure that the AADT values increased between Emmett Road and Middleton Road. The peak AADT reached at the SH 44 and Dewey Avenue intersection. This observed trend explains that the traffic from Emmett and the northwest side of the City access SH 44 through Emmett Road, Hartley Lane, N. Highland Drive/Cemetery Road, and Hawthorne and Dewey Avenues. It can also be noticed that the traffic volume on SH 44 have increased since 2003. The following Table 15 shows the percentage of change in AADT annually on SH 44 since 2000.

Table 15 : Percentage change in AADT on SH 44

SH 44	Percentage change in AADT				
	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005
Old Hwy30 - Stone Lane	-5.7%	0.0%	0.0%	20.0%	0.0%
Stone Lane - Freezeout Rd	0.0%	0.0%	0.0%	0.0%	-2.9%
Freezeout Rd - Channel Rd	0.0%	0.0%	-4.4%	-1.5%	0.0%
Channel Rd - Canyon Lane	0.0%	0.0%	0.0%	0.0%	-5.9%
Canyon Lane - Emmett Rd	0.0%	0.0%	19.6%	14.5%	1.6%
Emmett Rd - Hartley Lane	2.0%	0.0%	15.7%	13.6%	-1.5%
Hartley Lane - Highland Rd	-6.9%	0.0%	0.0%	40.7%	0.0%
Highland Rd - Hawthorne Dr	0.0%	0.0%	0.0%	41.7%	0.0%
Hawthorne Dr - Dewey Ave	0.0%	0.0%	0.0%	33.8%	0.0%
Dewey Ave - Middleton Rd	-1.5%	0.0%	15.6%	12.2%	0.0%
Middleton Rd - N. Middleton Rd	0.0%	0.0%	29.1%	0.0%	0.0%
N. Middleton Rd - Duff Lane	1.8%	0.0%	15.5%	0.0%	0.0%
Duff Lane - Lansing Lane	20.0%	8.3%	11.5%	3.4%	10.0%
Lansing Lane - Blessinger Lane	22.5%	10.2%	0.0%	3.7%	23.2%
Blessinger Lane - Can-Ada Rd	15.9%	5.9%	14.8%	3.2%	18.8%

It is evident from the above table that traffic volume on SH 44 increased considerably since 2003 between the intersections of Emmett Road and SH 44, and Duff Lane and SH 44.

Existing Traffic Data on other Streets

The District collects traffic data on streets and roadways annually within the study area. This traffic information will be used to determine the traffic growth and travel patterns every year within the study area. The following Table 16 shows the ADT values on major streets which are located in the Study area and maintained by the District. ADT information on streets under the District's jurisdiction, not indicated in the table, is available with the District and can be obtained upon request.

Table 16: Average Daily Traffic on Other Streets

Segment Code	Street Name	Location	Year	ADT
012339	Blessinger Road	2207' North of Hwy 44	2006	796
008003	Can-Ada Road	600' North of Hwy 44	2006	1818
012094	Cemetery Road	672' South of Purple Sage	2005	1353
000298	Duff Lane	660' North of Hwy 44	2006	1442
000343	Emmett Road	600' North of Hwy 44	2006	3004
008005	Foothill Road	635' East of Lansing Lane	2006	402
012068	Freezeout Road	866' North of Hwy 44	2005	586
012086	Hartley Lane	781' North of Hwy 44	2005	450
012344	Kingsbury Road	853' North of Hwy 44	2006	505
004543	Lansing Lane	1466' North of Hwy 44	2006	2172
002563	N. Middleton Road	978' South of Purple Sage	2006	1168
004750	Old Highway 30	817' North of Hwy 44	2006	5895
000259	Purple Sage Road	953' East of Emmett Road	2006	1040
012355	Willis Road	2078' East of Old Hwy 30	2006	805

The City of Middleton and the District receive traffic impact studies for the future developments within the study area. The purpose of these traffic impact studies is to analyze and address potential impacts of the development on the surrounding transportation system. The studies analyze the roadway and intersections in the vicinity of the proposed development for the existing and future traffic conditions. The existing traffic conditions and the level of service of various intersections within the study area were obtained from the traffic impact studies submitted to the City and the District. The following Table 17 illustrates the existing level of service of major intersections located within the study area.

Table 17: Existing Level of Service of Major Intersections

Intersection	Eastbound			Westbound			Northbound			Southbound		
	LT	THR	RT	LT	THR	RT	LT	THR	RT	LT	THR	RT
SH 44 / Emmett Rd	A	A	N/A	N/A	A	A	N/A	N/A	N/A	D	N/A	D
SH 44 / Hartley Rd	A	A	N/A	N/A	A	A	N/A	N/A	N/A	C	N/A	C
SH 44 / Cemetery Rd	A	A	A	A	A	A	B	B	B	E	E	E
SH 44 / S. Middleton Road	A	A	A	A	A	A	F	N/A	B	N/A	N/A	N/A
SH 44 / N. Middleton Rd	A	A	A	A	A	A	C	C	C	D	D	D
SH 44 / Duff Lane	A	A	A	A	A	A	C	C	C	B	B	B
SH 44 / Blessinger Rd	A	A	A	A	A	A	C	C	C	C	C	C
SH 44 / Can-Ada Rd	A	A	A	A	A	A	N/A	N/A	N/A	C	N/A	B
Emmett Rd / Willis Road	B	B	B	B	B	B	A	A	A	A	A	A
Cemetery Rd / Willis Road	A	A	A	B	B	B	A	A	A	A	A	A
Cemetery Rd / Purple Sage Rd	A	A	A	A	A	A	A	A	A	A	A	A
Purple Sage / Middleton Rd	A	A	A	A	A	A	A	A	A	A	A	A
Hartley Rd / Willis Rd	A	A	A	A	A	A	A	A	A	A	A	A

(Note: Approaches currently not existing are denoted as N/A)

The table shown above lists the level of service of each approach at major intersections within the study area. The intersections on SH 44 between Emmett Road and Middleton Road operate at full capacity in existing conditions. The southbound approach at the intersection of SH 44 and Cemetery Road, and the northbound approach at the SH 44 and Middleton Road intersection are operating with level of service 'E' and 'F', respectively.

Street Ratings

Each conditional street segment and street within the City limits is rated numerically. Poor street conditions result in delays and the loss of comfort to the user. Each street condition attribute in the data dictionary is assigned a numeric value. Condition ratings for paved and gravel streets are determined using these values.

The District performs pavement condition survey on roadways which are under the District's jurisdiction. The numeric rating for the City streets was made consistent with the numeric rating of the District street rating system. The numeric rating for streets ranges from 0 to 100. Street ratings were determined using a weighted average of the individual street condition segments.

The following Table 18 lists the pavement condition rating of some of the paved streets within the City limits. The ratings of other streets within the study area are provided in Appendix M.

Table 18: Paved Roads Rating within the City

Street Name	Rating
S. Hawthorn Dr.	36
Murphy Avenue	55
Skyline Drive	55
S. Highland Drive	70
S. Dewey Avenue	73
Hartley Lane	75

Bridges and Culverts

Bridges and culverts must meet the "clear-span measurement of over 20 feet 6 inches" to be included in the National Bridge Inventory (NBI). Bridges that do not meet this requirement are not on the inspection program administered by ITD. Bridges included on the NBI are routinely inspected (every 12 to 24 months depending on the condition). Currently the City does not have any bridges listed in the NBI.

The location of culverts and bridges were recorded along with the road data during the road inventory survey. The City may update additional information on culverts, bridges, and signs.

Public Transit and Pedestrian Pathway

The City of Middleton is an active member of Valley Ride, the Regional Transportation Authority. The City encourages public transit to help reduce vehicular traffic and provide transportation access to jobs and services for all residents and employees, including the young, elderly, physically challenged, and those who do not have access to a private vehicle. Valley Regional Transit (VRT) conducted a telephone survey of Treasure Valley residents in the summer of 2006. In this survey, telephone interviews were completed among 600 Treasure Valley residents, who were selected randomly. The survey was useful to understand and learn about the residents' awareness on public transit and the available services. The survey indicated that the Treasure Valley residents are generally aware of some available public transit services; however, some residents are not aware of the name of their local bus system. The key findings of the survey indicate that Treasure Valley residents are increasingly favorable toward alternative modes of transportation [14].

Based on the survey findings, Valley Regional Transit proposed to provide a bus service on State Highway 44 (State Street) between Caldwell and Boise by June 15, 2007. This proposed bus service serves the cities of Caldwell, Middleton, Star, Eagle and Boise. As per the VRT sources, there would be one morning bus service run that originates in Caldwell and terminates in Boise, and another one afternoon run that originates in Boise and terminates in Caldwell.

The City also encourages safe pedestrian and bicycle travel by promoting sidewalks and pathways, especially around and near schools, parks and residential areas. The City has adopted a parks, pathways and greenbelt plan in the Comprehensive Plan; see Appendix S. This plan helps the City achieve goals and objectives in developing a safe pedestrian and bicycle travel system.

FUTURE TRANSPORTATION SYSTEM AND NEEDS

This section of the MTP discusses future transportation needs and the transportation system improvements needed to meet the future demand. The City of Middleton has experienced rapid growth over the last three years. The population in the City increased at an average annual growth rate of 10.6% in last three years, whereas, the County experienced an average annual growth rate of 4.3%. The City experienced a significant increase in construction of residential and commercial developments in last three years. The need for coordination between the transportation system and the increasing demand is more important than ever in this community. The future transportation demands of the community depend on the land use distribution and the City's growth principles provided in the Comprehensive Plan.

It is necessary to determine the future traffic on key roadways to evaluate the capacity of the existing transportation facilities. The traffic volumes (demand) on key roadways within the study area were forecasted using output from COMPASS' regional travel demand forecast model. These forecasts are based on a series of inputs such as population, households, jobs, trip characteristics, and the roadway system. The demographics for the Middleton area are provided in Appendix D.

As stated earlier, the City of Middleton was included in the Nampa Urbanized area in early 2003. COMPASS completed an update to the regional Travel Demand Forecast Model (TDF) in June 2004 for both counties of Ada and Canyon [10]. COMPASS used this TDF Model to forecast future traffic volumes on key roadways within the planning area.

COMPASS Travel Demand Forecast Model

COMPASS developed a Travel Demand Forecast Model which consists of two counties (Ada and Canyon) of over 480,000 people and 4,300 centerline miles. The 2002 model includes about half of those centerline miles and includes 534 TAZs boundaries (346 in Ada County and 188 in Canyon County). The zones range in size from a couple of city blocks in the downtown areas to several square miles in the rural areas [2].

Currently, the model outputs an average weekday 24-hour and peak hour (5 P.M. to 6 P.M.) traffic projection for collectors or higher. Some local roads have been added for connectivity and modeling purposes only [2].

The COMPASS model is used to perform analyses such as:

- Roadway system deficiencies
- Level of Service
- Air Quality Conformity
- Long Range Planning
- Transportation Improvement Programs
- Impact Fee Program for Ada County Highway District
- Special Studies

A detailed description of the model is available on the COMPASS website, www.compassidaho.org, and other reports; therefore it is not described in this report.

Future Transportation Demand

COMPASS divided Ada and Canyon County regions into Traffic Analysis Zones (TAZ) to analyze and forecast the future traffic volumes using the TDF model. There are 15 TAZs in the study area: 419, 420, 421, 422, 423, 424, 425, 426, 427, 433, 434, 435, 436, 437 and 440. The TAZ map is provided in Appendix G. These TAZs were further sub-divided, based on the land use zoning, to refine travel demand forecasting. The traffic volumes were projected for the years 2010, 2015, 2025, and 2030 using the TDF model.

As mentioned earlier, the TDF model outputs weekday ADT and Peak Hour volumes for collectors or higher classified roadways. The TDF model is a regional travel demand forecasting model which models the two counties area. It should be noted that the model is a regional model and the study area is only a subset of the Canyon County region and therefore, the model output provides a generalized idea of traffic on key roadways in the study area. The TDF model does not forecast traffic volumes on local streets in the study area.

The following is a list of some of the key roadways that are included in the TDF model street network. The complete model street network is provided in Appendix O.

- State Highway 44
- Cemetery Road
- Middleton Road
- Emmett Road
- Old Hwy 30
- Willis Road
- Purple Sage Road
- Duff Lane
- Lansing Lane
- Hartley Road

The following **Figure 8** shows the TAZs and roadways included in the TDF model.

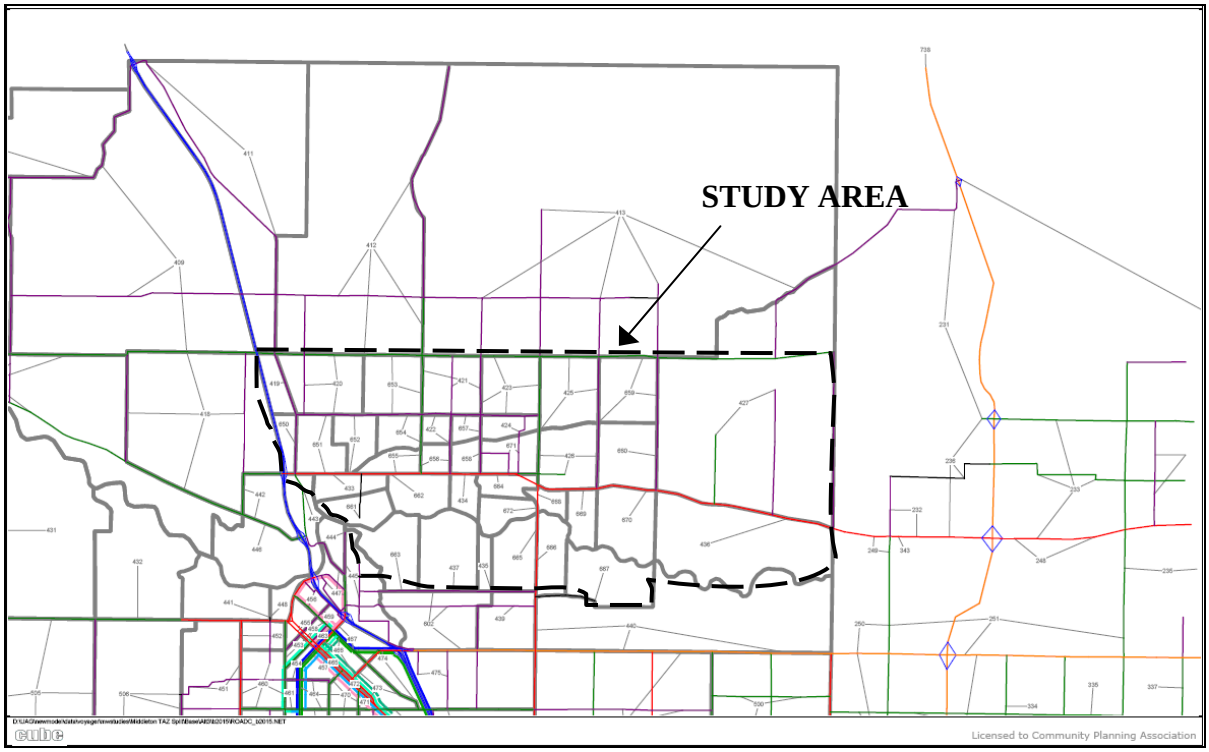


Figure 8: Street Network and TAZ for COMPASS TDF Model

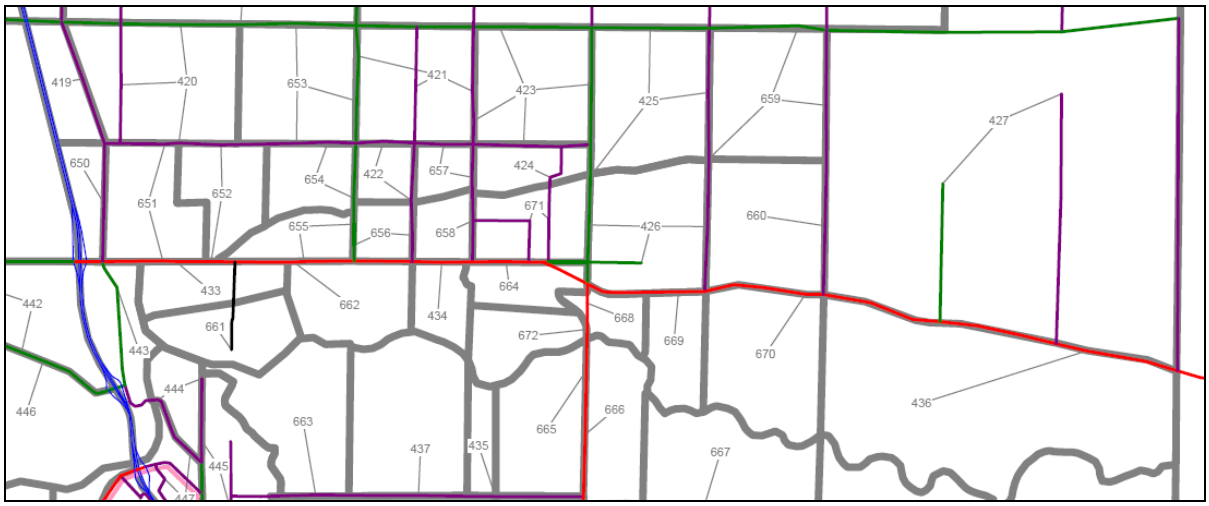


Figure 9: Study Area with TAZs and Street Network

The traffic volumes were projected for the years 2010, 2015, 2025 and 2030 based on the population growth rate, demographics and land use zoning information (discussed in the Population and Land use section) provided to COMPASS. The street network was changed in the TDF model for 2010, 2015, 2025 and 2030 based on the expected developments within the study area. The following section discusses the changes made in the TDF model for different forecast years.

2010 Forecast Model: The 2010 TDF model was developed with the existing transportation system. This model was developed based on the assumption that no additional roadways or additional lanes will be constructed by 2010. The traffic volumes for the year 2010 were projected based on the existing roadway system, inputs such as population, households, jobs, and trip characteristics.

2015 Forecast Model: Two changes in the existing street network were made for the 2015 TDF model, which are:

- N. Middleton Road/Murphy Avenue with 4 lanes from SH 44 to Mill Slough,
- N. Highland Dr. /Cemetery Road realigned from Concord Street to SH 44.

2025 Forecast Model: The 2025 TDF model was developed with the following changes in the street network:

- Landruff Lane was added to the network connecting from Duff Lane to Blessinger Lane.
- Kingsbury Road was extended and connected to Franklin Blvd.
- 9th Street was extended from Old Hwy 30 to Blessinger Road.
- Duff Lane, Lansing Lane, Kingsbury Road, Blessinger Road were extended to Galloway Road.

2030 Forecast Model: The 2030 TDF model was developed with the following changes in the street network in addition to the 2025 model network:

- Alternate SH 44 route was connected between Emmett Road and Duff Lane.
- Cemetery Road was extended from SH 44 to the proposed bypass SH 44.

The output from the above mentioned models shows the ADT and peak hour volumes on roadways at various locations. Street network maps showing the ADT and peak hour traffic volumes from the 2010, 2015, 2025 and 2030 models were provided in Appendices from O through R.

Future Street Classification and Street Circulation Plan

The City's Comprehensive Plan encourages a planned road grid network to provide high mobility. With the assistance of COMPASS and the District, the City of Middleton has developed a "*Street Circulation Plan*". The Street Circulation Plan was developed based on the long range plans of the City and the District, and also based on the land use zoning and demographics. The plan identifies the future roadways and their functional classification with recommended minimum right-of-ways shown in Table 19. The street classifications are in accordance with the American Association of State Highway and Transportation Officials (AASHTO) Functional Classification of streets and highways.

Table 19: Minimum Right-of-Way Requirements

Roadway Classification	Right-of-way	
	Existing	Proposed
Principal Arterial	120 ft	200 ft
Minor Arterial	100 ft	100 ft
Major Collector	80 ft	100 ft
Minor Collector	60 ft	80 ft
Local Roads	60 ft	60 ft

The above table shows the current minimum requirements of right-of-way adopted in the current City's comprehensive plan and the proposed minimum requirements. Federal-aid for capital improvements is available to arterials (principal and minor) and major collectors by City application to the State. Federal-aid funds are not available to "local streets", so the street classification is an important element in planning and funding of construction projects.

The Street Circulation Plan serves as a guide for decision-makers of the City, County and State in preserving right-of-ways and required set backs for future developments. This plan is available to the public on the City of Middleton's website. A copy of this plan is provided in Appendix K.

The key elements of the Street Circulation Plan are:

- Bypass SH 44 location was identified.
- Options for potential Boise River crossing were identified.
- Functional Classification of Purple Sage Road, Kingsbury Road and Old Highway 30 were changed from major collector to minor arterial.
- The potential locations for traffic signals within the study area were identified.
- The potential bike route compatible with the bikepath and greenbelt plan was identified.
- Future local roads and major collectors were identified.

Alternate State Highway 44 Planning

State Highway 44 is an important east-west corridor that connects Ada County and Canyon County. In March of 2000, the City, with the assistance of COMPASS, undertook a long range plan to identify an alternate route to channel flow-through highway traffic from Highway 44 around the downtown core due in large part to significant local peak hour congestion [1].

The intersections of major collector streets like Cemetery Road, Middleton Road, Duff Lane etc., with SH 44 are operating at capacity levels under the existing AM and PM peak hours. During AM peak hour, congestion was observed on SH 44 between Emmett Road and Middleton Road. ITD and COMPASS identified a need to protect SH 44 as a regional transportation corridor between I-84 and the City of Eagle. The City identified a corridor for the proposed alternate SH 44 route between the developed portion of the City and Boise River connecting between Emmett Road and Duff Lane. The proposed alternate SH 44 route corridor will be included in the ongoing SH 44 Corridor Preservation Study. The scope of work of this study includes analysis of the alternate SH 44 in Middleton from alignment and environmental perspective. The SH 44 Corridor Study is a collective effort of ITD and COMPASS. The purpose of this study is to evaluate the future highway improvements and potential environmental issues along the corridor. A map showing the proposed alternate SH 44 corridor and the surrounding intersection improvements is provided in Appendix N.

The following figure illustrates the proposed alternate SH 44 corridor.

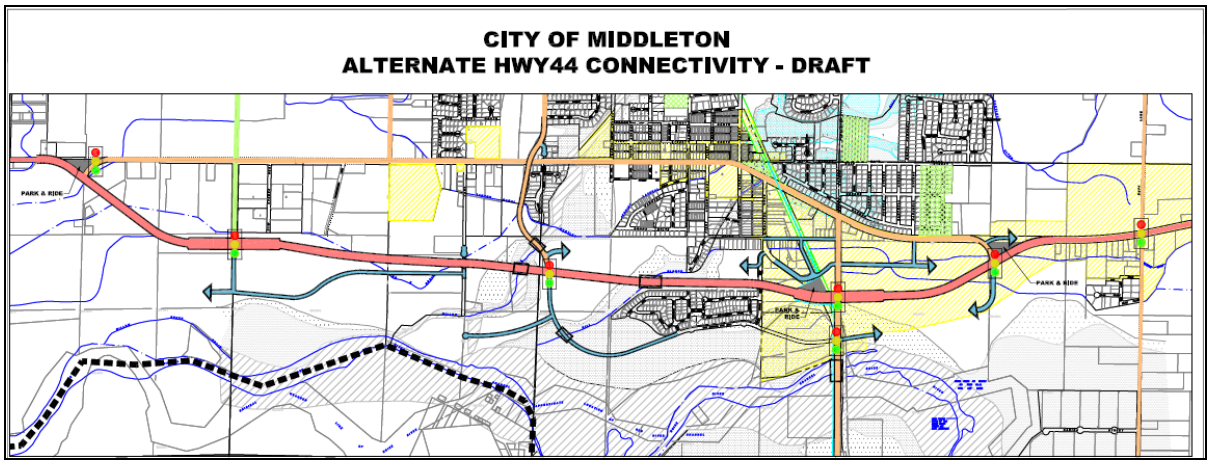


Figure 10: Proposed Alternate SH 44 Corridor

Advantages of the proposed alternate SH 44 route:

- Reduces congestion between Emmett Road and Duff Lane.
- Enhances safety to pedestrians and school-going kids.
- Reduces through and truck traffic through the City's Central Business District.
- Increases mobility and speed of through traffic.
- Reduces travel time between Emmett Road and Duff Lane and as a result decrease total travel time for commuters.
- Encourages commercial developments along the corridor and as a result increases the City's economy.

Projected Traffic Volumes and LOS

The TDF models for 2010, 2015, 2025 and 2030 forecast traffic volumes on major roadways which are included in the model network. As stated earlier, the TDF model developed by COMPASS is a regional model which includes both counties of Ada and Canyon and it does not include local streets. The street network and the corresponding projected average daily traffic volumes and peak hour volumes for 2010, 2015, 2025 and 2030 years are provided in Appendices from O through R. The future traffic volumes on other roadways and local streets, which are not included in the model network, were projected using an average annual growth rate of 8% to the year 2015 and 6% for further years through 2030. The average

annual growth rates of 8% and 6% are consistent with the projected population growth rates provided in Chapter 2.

Traffic Projection for City Streets

The projected ADT for the years 2010, 2015, 2025 and 2030 from the COMPASS TDF model and projected ADT using average growth rates for the major streets within the City limits are tabulated in Table 20. These projected ADT values represent traffic within 300 feet from State Highway 44 on the major City streets listed in Table 20.

Table 20: Projected Traffic Volumes for City Streets

City Street	COMPASS Projection				Average Growth Projection				
	2010	2015	2025	2030*	2006	2010	2015	2025	2030
N. Middleton Rd.	4100	3400	6800	8100	3763	4968	6473	11592	15513
S. Middleton Rd.	12200	13900	15800	17800	8562#	11302	14727	26373	35293
N. Highland Dr	1600	2400	3600	5600	2411	3183	4148	7428	9940
Hartley Ln.	400	600	1200	2000	342	452	589	1055	1412
Hawthorne Dr	-	-	-	-	1692	2150	2802	5018	6715

*Note: 2030 projections were done assuming a SH 44 alternate route south of the existing SH 44 and a new river crossing east of Middleton Road.
Note: 2006 traffic counts for S. Middleton Road were provided by the District taken in July, 2004.
Source: COMPASS projection based on the land use scenario and demographics provided by HECO.

The above table illustrates comparison of the projected traffic volumes in terms of ADT, which were projected using the COMPASS TDF model and linear projection using an average growth rate of 8% till the year 2015, and 6% through the year 2030. It can be observed from the above table that the projected ADT from the TDF model are different from the linear projected ADT values. The COMPASS TDF model is a large scale model which was developed based on a set of inputs, and complex calculations, trip length frequency, interaction and location of households, jobs and available roadway system throughout the two-county area. Linear projection using average annual growth rates was a straight forward projection with assumption that the same growth rate occurs in the future. Linear projection methodology does not consider impact of individual large scale developments outside the study area. The use of an average growth rate to project traffic

does not take into account major transportation investments such as road widening, river crossing or new street connections. The difference in traffic projections determined by the COMPASS TDF model and linear projection can be attributed to two different methodologies.

Traffic Projection for Other Streets in the Study Area

Average daily traffic volumes were projected for the streets which are under the District's jurisdiction using an average annual growth rate of 8% through the years 2010 and 2015, and 6% through the years 2025 and 2030. The following Table 21 illustrates the projected ADT values for the streets which are under the District's jurisdiction.

Table 21: Projected Traffic Volumes (ADT) for Other Streets

Street Name	Location	2006	2010	2015	2025	2030
Blessinger Rd.	2207' North of Hwy 44	796	1051	1591	2850	3813
Can-Ada Rd.	600' North of Hwy 44	1818	2473	3634	6508	8710
Cemetery Rd.	672' South of Purple Sage	1353	1841	2705	4844	6482
Channel Rd.	706' South of Hwy 44	408	555	816	1461	1955
Duff Lane	660' North of Hwy 44	1442	1962	2883	5162	6908
Emmett Rd.	600' North of Hwy 44	3004	4087	6005	10754	14391
Foothill Rd.	635' East of Lansing Lane	402	547	804	1439	1926
Freezeout Rd.	866' North of Hwy 44	586	797	1171	2098	2807
Griffin Lane	100' East of Old Hwy 30	232	316	464	831	1111
Hartley Rd.	781' North of Hwy 44	450	612	900	1611	2156
Harvey Rd.	126' South of Purple Sage	522	710	1043	1869	2501
Kingsbury Rd.	853' North of Hwy 44	505	687	1009	1808	2419
Lansing Lane	1466' North of Hwy 44	2172	2955	4342	7776	10405
N. Middleton Rd	978' South of Purple Sage	1168	1589	2335	4181	5596
S. Middleton Rd	At Lincoln Road	6900	9387	13793	24701	33056
Old Highway 30	817' North of Hwy 44	5895	8020	11784	21104	28241
Purple Sage Rd	953' East of Emmett Rd.	1040	1415	2079	3723	4982
Willow Creek Dr.	70' East of Kingsbury Rd.	186	253	372	666	891
Willis Road	2078' East of Old Hwy 30	805	1095	1609	2882	3857

The projected ADT for different streets within the study area using the COMPASS TDF model are provided in Appendices from O through R.

These projected ADT values provide a picture of growth of the study area and approximate number of vehicles on the street network. Major transportation investments such as street widening, additional streets connecting thoroughfares, river crossings etc., change the travel behavior and characteristics. The linear projection of traffic volume does not depict the changes in travel pattern which can be anticipated because of major transportation investments. Travel demand forecast model is capable of depicting travel behavior with changes in the street network and changing trip characteristics. Travel demand forecasts for future years for the Middleton area require refinements to the regional model. These refinements include TAZ splits, demographic allocation to the new TAZs, the addition of local streets and thorough fares, and calibration and validation of the area. This process requires additional data and advanced modeling tools which are not included in the scope of this project.

Projected Level of Service

Level of service of a roadway can be evaluated based on ADT values. The measure of effectiveness for roadways will be determined from the driver's perspective of freedom to drive in traffic whereas for intersections, it will be determined by average delay experienced by drivers. The levels of service range from LOS A (least congested) to LOS F (most congested). Detailed LOS definitions and qualitative measure of different levels of service for roadway and intersections are included in Appendix B.

The Highway Capacity Manual 2000 (HCM 2000) provides procedures and methodologies to evaluate the roadway capacities and determine level of service. The procedures and methodologies provided in the HCM 2000 can be applied to the existing conditions to determine the current level of service of roadways and intersections. COMPASS in collaboration with other agencies developed roadway capacities to calibrate the regional travel demand forecast model. The roadway capacities were provided to the Transportation Model Advisory Committee (TMAC) and accepted by the committee in April 2003. The

roadway capacities used for calibration purpose are provided in the "2002 Travel Demand Forecast Model Calibration Report for Ada and Canyon County" report which was accepted by COMPASS and TMAC in June 2006. The roadway capacities provide the City planners a generalized idea about the level of serviceability based on roadway geometry and functional classification. They also provide an approach to initiate planning of roadway developments in the future. These roadway capacities shall not be used as a benchmark to determine the number of lanes and assess impact fee etc. Other factors such as vicinity land use type, public safety, number of access locations, spacing of intersections etc. should be considered along with traffic volumes to determine the required number of lanes. The roadway capacities for different street classifications are provided in Appendix B. The projected traffic volumes, roadway capacities and street functional classification were used to develop the Capital Improvement Plan (CIP) for the study area.

Projected LOS of Key Intersections and Control Type

The traffic impact studies, received by the City and the District, evaluate and address potential impacts of the proposed developments on the existing transportation system. Most of the proposed developments were projected to be full built out by 2015. These studies evaluate the existing transportation system and estimate future traffic and the impact on the transportation system. The projected LOS of key intersections through the year 2015 provided in the traffic impact studies are illustrated in the following table.

Table 22: Projected LOS of Key Intersections

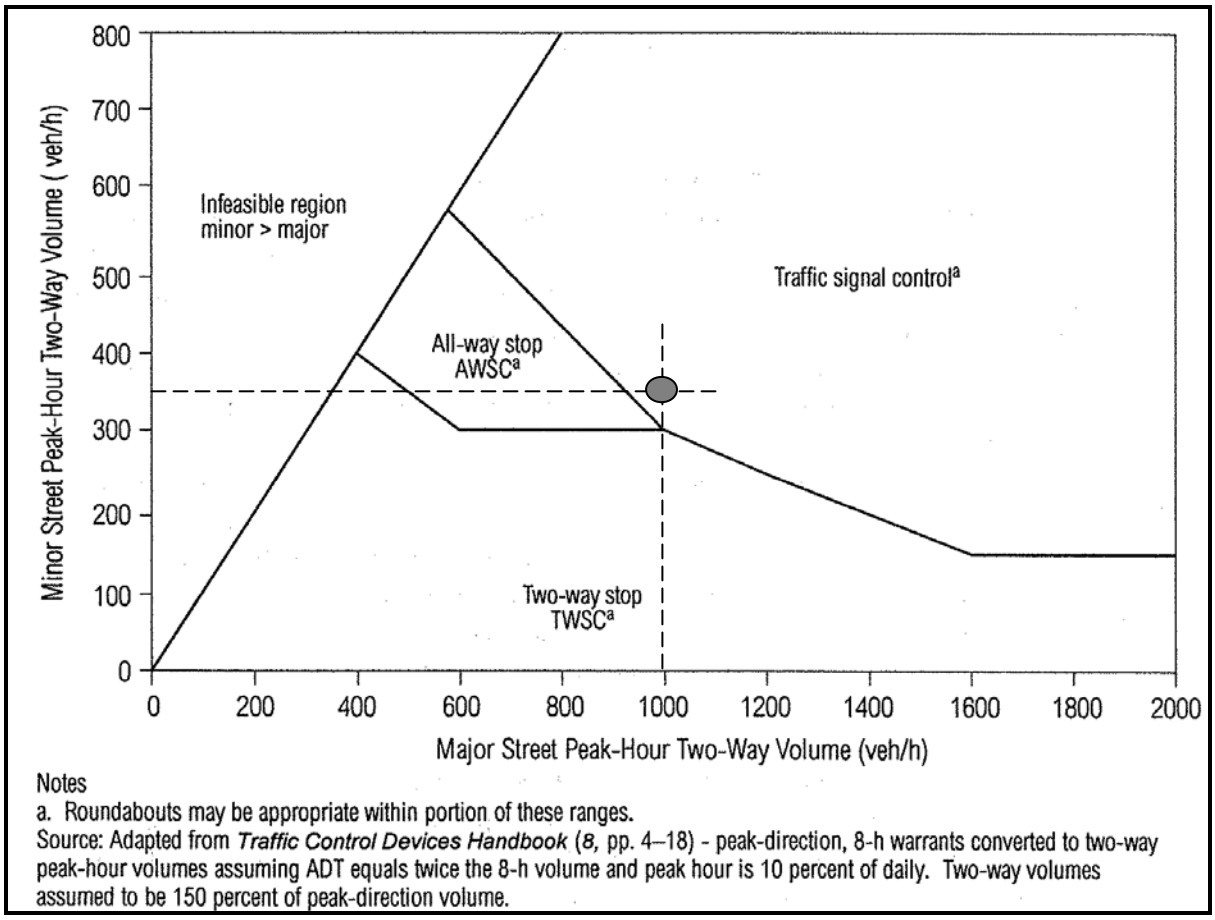
Intersection	East Bound			West Bound			North Bound			South Bound		
	LT	THR	RT	LT	THR	RT	LT	THR	RT	LT	THR	RT
SH 44 / Emmett Road	A	A	N/A	N/A	A	A	N/A	N/A	N/A	E	N/A	E
SH 44 / Hartley Road	A	A	N/A	N/A	A	A	N/A	N/A	N/A	F	N/A	F
SH 44 / Cemetery Rd	A	A	A	A	A	A	E	E	E	F	F	F
SH 44 / S. Middleton Road	A	A	A	A	A	A	F	N/A	D	N/A	N/A	N/A
SH 44 / N. Middleton Rd	A	A	A	A	A	A	E	E	E	F	F	F
SH 44 / Duff Lane	A	A	A	A	A	A	E	E	E	F	F	F
SH 44 / Blessinger Rd	A	A	A	A	A	A	D	D	D	E	E	E
SH 44 / Can-Ada Road	A	A	A	A	A	A	N/A	N/A	N/A	E	N/A	D
Emmett Road / Willis Road	C	C	C	C	C	C	A	A	A	A	A	A
Cemetery Rd / Willis Road	B	B	B	B	B	B	A	A	A	A	A	A
Cemetery Rd / Purple Sage Rd	B	B	B	B	B	B	A	A	A	A	A	A
Purple Sage / Middleton Rd	C	C	C	C	C	C	A	A	A	A	A	A
Hartley Road / Willis Road	A	A	A	B	B	B	A	A	A	A	A	A

(Note: Approaches currently not existing are denoted as N/A)

The above table illustrates LOS of key intersections within the study area with existing geometry and lane configuration for the forecast year 2015. It is evident from the above table that the intersections along SH 44 are projected to operate beyond the capacity limits by 2015.

The Highway Capacity Manual 2000 provides an exhibit to forecast the type of control for an intersection based on some assumptions stated in the HCM 2000 and Traffic Control Devices Handbook. The following Figure 11 shows an exhibit, Exhibit 10-15 of HCM 2000, which can be used to forecast the type of control using the projected two-way peak hour volumes at an intersection. In addition to using this exhibit, it is necessary to consider other factors such as vehicular and pedestrian safety, access control management, type of land use, etc., to determine the type of control.

The following graph helps the City and District planners and decision-makers predict the type of control for a given intersection, based on projected peak hour traffic volumes.



(Source: Highway Capacity Manual 2000)

Figure 11: Intersection Control Type and Two-way Peak Hour Volumes

The above figure illustrates the control type for an intersection based on the forecast two-way peak hour traffic volumes on major and minor streets. The horizontal axis of the graph shows major street peak hour two-way volume and the vertical axis shows minor street peak hour two-way volume.

Intersection Control Type for Key Intersections

Based on the assumptions made in the HCM 2000 and Traffic Control Devices Handbook and using Exhibit 10-15 of HCM 2000, a traffic signal control for an intersection can be predicted when major street peak hour volume and minor street peak hour volume exceeds

1000 vph and 350 vph, respectively. This information provides a baseline to predict the need for a traffic signal at an intersection within the study area. A separate study, traffic signal warrant analysis, is required to determine the necessity of a traffic signal at a given intersection.

Using the projected peak hour traffic volumes from the COMPASS TDF model, projected LOS from different traffic impact studies and the Exhibit 10-15 provided in HCM 2000, the type of control for the key intersections within the study area can be assessed. The following Table 23 illustrates the list of key intersections with priority sequence and the anticipated year for a traffic signal.

Table 23: Projected Year for Traffic Signal at Key Intersections

Priority	Intersection	Year
1	SH 44 / N. Middleton Rd	2010
2	SH 44 / Cemetery Rd	2010
3	SH 44 / Duff Lane	2010
4	SH 44 / Hartley Road	2010
5	SH 44 / Emmett Road	2015
6	SH 44 / Blessinger Rd	2015
7	SH 44 / Can-Ada Road	2020
8	Purple Sage / Middleton Rd	2020
9	Emmett Road / Willis Road	2025
10	Cemetery Rd / Willis Road	2025
11	Cemetery Rd / Purple Sage Rd	2025
12	Bypass SH 44 / Middleton Road	2030
13	Middleton Road / Sawtooth Road	2030

The intersections of N. Middleton Road and Cemetery Road with SH 44 are considered as high priority intersections for traffic signals. These two intersections are operating at capacity level with existing traffic conditions. The traffic impact studies submitted by various developers indicate that these two intersections will operate beyond capacity level by

2010 and impede minor streets traffic flow. The proximity of schools to these intersections is one of the reasons for high AM and PM peak hour traffic volumes at the two intersections.

Findings and Recommendation for Further Study

The current chapter of this report discussed the regional travel demand forecast model developed by COMPASS for the years 2010, 2015, 2025 and 2030 and the corresponding output. The projected ADT values for major collectors and LOS of key intersections within the study were discussed in this chapter. The output of the models provides projected traffic volumes for major collectors and arterials but does not focus on local thorough fares. An alternate route corridor for SH 44 was identified in the study. Differences between the forecast ADT values from the TDF models and the ADT values using linear projection were discussed.

There is potential of significant local trips like school bus trips, home based school trips and home based other trips within the study area. These trips may significantly impact the local thorough fares in the City. As stated earlier in the study, the intersections of Cemetery Road and Middleton Road with SH 44 operate at capacity levels during AM and PM peak hours because of school traffic. Therefore, it is necessary to evaluate these trips and their impacts on the existing and future transportation system. The COMPASS TDF model is a regional model and projects ADT for major collectors and higher classified roadways. It does not focus on local thorough fares, which are feeder streets to major collectors, and the impacts of future developments on these streets. Hence, it is recommended to develop a sub-regional travel demand forecast model which can be helpful to assess the impacts of individual developments on local thorough fares, collectors and higher classified roadways.

Advantages of developing a sub-regional travel demand forecast model

The following are the advantages in developing a sub-regional model for the Middleton Area:

- Impacts of future growth on local residential streets can be assessed using a sub-regional model. Local trips and their impact on the transportation system can be evaluated by focusing on the local residential streets.
- Impacts of individual developments in the study area on the current transportation system can be assessed. This analysis will be helpful to the City to collect impact fees from developers to mitigate impact on the current transportation system.
- During the event of major construction on a street section, the sub-regional model would assist the City to evaluate the impact of the event on other streets and help the City engineer to determine an alternate route to detour the traffic.
- In this study, a corridor was identified for the SH 44 alternate route. A sub-regional model can be used to determine the actual construction year of the alternate route by evaluating the existing transportation system using a number of scenarios (with and without alternate route) for the future years. In these scenarios, impacts on streets and intersections in the vicinity of the alternate route can be assessed.
- The study proposed traffic signals at key intersections based on the projected traffic volumes from the COMPASS TDF model. A sub-regional model can be used to evaluate the future traffic operation at these key intersections, including turn movements and project the planning period to initiate a study for a traffic signal.

Future Pedestrian and Bike Path Plan

The City of Middleton encourages safe pedestrian and bicycle travel by promoting sidewalks and pathways, especially around and near schools, parks and residential areas. It also encourages developing a continuous pathway network within the City that connects to the Regional Greenbelt System. The City has adopted a parks, pathways and greenbelt plan in the Comprehensive Plan; see Appendix S, which helps the City to achieve goals and objectives in developing a safe pedestrian and bicycle travel. To provide continuity and connection to the Regional Greenbelt system, the City developed a bike path plan along with

the street circulation plan. The bike path plan provides connectivity between pedestrian pathways, parks and the City's greenbelt. The bike path plan proposes attached bike lane along some major streets and detached bike lane with pedestrian pathways at some locations within the study area. The bike path plan is shown in the "Street Circulation and Classification Plan" in Appendix K.

Access Control Management

Access management strategies are essential with growing traffic demand and congestion. These strategies involve the systematic control of driveways, intersection design and spacing, median openings and street connections.

Access control and management is associated with a variety of benefits primarily preserving and improving public safety especially for pedestrians and bicyclists, reducing traffic congestion and delay and creating safe traffic operation.

The following are the major principles of access management:

- Design and manage roadways according to the primary function that they are expected to serve.
- Limit direct access to major roadways. Direct access to residential property from major collector and arterials should be discouraged.
- Limit the number of conflict areas on the highway.
- Provide appropriate transition from one classification of roadway to another by designing proper networks including intersections.

Access Control Standards

The above listed benefits of access management can be achieved by setting standards on access location, spacing of intersections and urban and private approaches. The following are the access control standards recommended to the City:

1. Access to State Highway 44 encompassing the area between Emmett Road and Middleton Road shall be at a minimum of 300 feet spacing between approaches, and at a quarter a mile spacing between intersections and signal spacing at half a mile. These

standards confirm with the Urban Type III Access Control Standards described in the "Idaho Transportation Department (ITD), Access Management: Standards and Procedures for Highway Rights-of-Way Encroachments, dated April 2001".

2. Access to State Highway 44 at other locations shall be at a minimum of half mile spacing. These standards confirm with the Urban Type IV access control standards described in ITD's Access Management policy.
3. The use of existing approaches on SH 44 shall be allowed to continue provided that:
    a) The existing use is lawful and properly permitted by ITD.
    b) The nature of land use does not change, for example, a residential use to a commercial use.
    c) The intensity of land use does not increase, for example, an increase in the number of residential dwelling units or an increase in the square footage of commercial space.
4. The developer shall develop or acquire access to a street, other than the State Highway, if the owner proposes a change in intensity of use or a change in land use type. The use of the existing approach shall be abandoned and removed.
5. A shared driveway approach should be encouraged over individual approaches to minimize the total number of driveway approaches on SH 44 and major collectors.
6. Frontage roads should be encouraged for access control on Highway 44.
7. Access on major collector streets within the City limits shall be at a minimum spacing of 150 feet between approaches and 660 feet between intersections. These standards confirm with ITD's Urban Type II access control standards.
8. Access on major collector streets and other streets beyond the City limits and within the study area shall be at a minimum spacing of 500 feet between approaches and at half a mile between intersections. These standards confirm with ITD's Rural Type II access control standards.
9. The building setback including landscape area for a new commercial development in Non-Business District shall not be less than seventy five feet (75') from SH 44 and fifty feet (50') from a major collector Rights-of-Way.
10. Setbacks along other roads and streets should meet requirements described in the City of Middleton's and Canyon County zoning ordinances.

11. The District may permit temporary accesses for a development under the conditions stated in Section 2020, Right-of-Way Dedication, of Subdivision Development Standards adopted by the District.

Street Standards

The City of Middleton has adopted the current Edition of the Idaho Standards for Public Works Construction (ISPWC). The City has prepared and adopted construction standards in conjunction with the current edition of the ISPWC. One of the components included in the construction standards is street standards. The street standards include recommended right-of-ways width, pavement materials, construction practices, geometric design elements of roadways, typical sections of roadways and other specified requirements, which may not be covered under the ISPWC standards or contained in the City Code.

The City Code of ordinances was first adopted in October, 1981. Under the Subdivision Regulations, street standards, easements, lot requirements and public area requirements were furnished in the code. The street standards, addendum to the ISPWC, provided in the construction standards and the subdivision regulations were reviewed and the following are the recommendations proposed to the City:

- The City provided the back-of-curb to back-of-curb width for paved sections in the addendum to the ISPWC. The City approves local streets with less width than specified in the standards on a case by case and based on local conditions. The City coordinated with the District and recommends minimum width of 49 feet for major collectors; Willis Lane, Cemetery Road, Hartley Lane, Middleton Road and 78 feet for Purple Sage and Emmett Road. It is recommended to incorporate these pavement widths in the standards and update the addendum.
- The standard street section provided in the City standards indicates base course depth as 12” of pit run or 10” of 2” minus crushed compacted gravel. It is recommended that this street section standard should be approved based on a geotechnical report and a traffic data report. In the case of absence of a geotechnical and traffic report, it is recommended that a minimum sub-base course of 15” and a base course of 9” should be provided for major collector and arterials.

- In the City standards, the minimum width for sidewalks in residential areas was indicated as four (4) feet and five (5) feet in industrial/commercial areas from the back of curb. AASHTO recommends a minimum sidewalk width of 5 feet from the back of curb and ADAAG recommends 5 feet sidewalks. It is recommended that the minimum sidewalk width standards be updated from 4 feet to 5 feet in the City standards and in the City code.
- It is recommended to reserve additional right-of-way to construct ADA ramps for pedestrians on corners.
- In the subdivision ordinance, sections 6-3-7-F and 6-4-2-A-2, a minimum of a seven (7) feet width was indicated for multi-use pathway. As per AASHTO, a minimum of ten (10) feet should be provided for multi-use pathways.
- It is recommended to adopt access control standards provided in this report and incorporate these standards in the City standards.

Subdivisions or developments should conform to the standards set forth in this report. In the case of conflict with the City standards report, the standards set forth in this transportation plan take precedence.

PAVEMENT MANAGEMENT SYSTEM

Currently, the City of Middleton has a total of 31.5 miles of paved roads and 4,700 feet of gravel roads. Pavements deteriorate over time due to traffic and the environment. It is necessary to know how and when to resurface or apply other treatments to the City streets, to maintain pavement at a serviceable level and keep operating costs at a minimum. The purpose of a pavement management system is to provide assistance in making cost-effective decisions related to pavements.

The following is a brief description of a pavement management system verbatim taken almost from the Pavement Management Guide, November 2001, published by the American Association of State Highway and Transportation Officials (AASHTO).

"*A pavement management system (PMS) is a set of tools or methods that assist decision-makers in finding optimum strategies for providing, evaluating, and maintaining pavements in a serviceable condition over a period of time"[16]*.

An effective PMS can help the City to:

- maintain up to date information on the City streets and traffic control devices,
- employ cost-effective treatment strategies,
- allocate funds for street surface treatment and rehabilitation and make decisions on funding strategies, and
- enhance the quality and performance of the City streets and roadways.

The City of Middleton has limited personnel and resources to develop and maintain a PMS. In this project, a brief version of the PMS is introduced and suggested to the City called the Surface Management Plan (SMP). The SMP was developed based on the similar principles of an effective PMS. This SMP helps the City to maintain the streets in a timely manner, minimize the life cycle costs and derive maximum long-term benefit from the capital expenditure.

Surface Management Plan

The SMP is a set of tools or methods that can assist decision-makers in finding cost effective strategies for providing, evaluating, and maintaining road surfaces in a serviceable condition. The proposed SMP consists of 5 primary elements. These elements are flexible and may be tailored to the City's specific needs.

The following are the 5 elements in the SMP:

1. Road Inventory and Database
2. Street Surface Condition Assessment
3. Prioritize Projects and Maintenance Techniques
4. Schedule and Funding
5. Documentation

A detail description of the above elements is provided in the following sections.

Road Inventory and Database

A road inventory survey includes visual inspection of surface type (paved and unpaved) and condition, pavement width, drainage characteristics, location of traffic control devices like sign posts, location of curb, gutter and sidewalk. A database can be developed from the road inventory survey.

A road inventory survey was conducted for the City streets using automated GPS equipment during the summer of 2006 and a data base was set up to allow for frequent updates and cost calculation to assist in setting up maintenance project goals and their associated costs. These costs can be directly placed into the City's street maintenance budget. The costs included in the database can be updated regularly to account for any variations from year-to-year and to reflect actual unit costs that the City has historically encountered. The GIS component of this project includes a street inventory and surface condition assessment. This information is vital in developing budgets for the operation and maintenance of streets.

Street Surface Condition Assessment

The street surface condition can be assessed by calculating a numerical score or index between 0 (worst) and 100 (best) based on the visible pavement distress, which is called the Pavement Condition Index (PCI). The PCI values assigned were based on the following six surface distress conditions:

1. surface cracking
2. surface distortion
3. surface disintegration
4. paved width
5. acceptable drainage
6. shoulder treatment

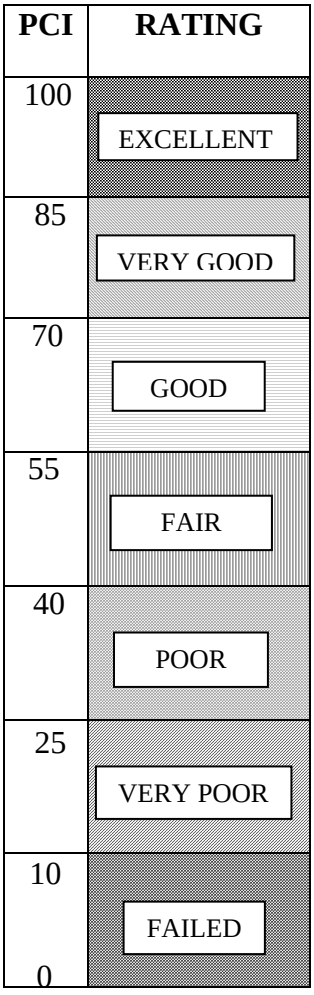


Figure 12 shows the graphical representation of PCI and pavement condition rating. This figure provides an idea of the pavement condition with respect to the PCI. A street map showing all of the paved roads and the calculated PCI values is provided in Appendix M.

Figure 12: PCI Scale and Condition Rating

As discussed earlier, pavements deteriorate over time due to traffic and the environment. Pavements tend to deteriorate slowly during the first few years after construction and very rapidly when they are aged. Aged pavement without any treatments tends to fail quickly. Therefore, certain treatments and maintenance techniques should be adopted to rejuvenate the pavement life. The following Figure 13 shows the curves of pavement deterioration, with age, without any maintenance and with maintenance.

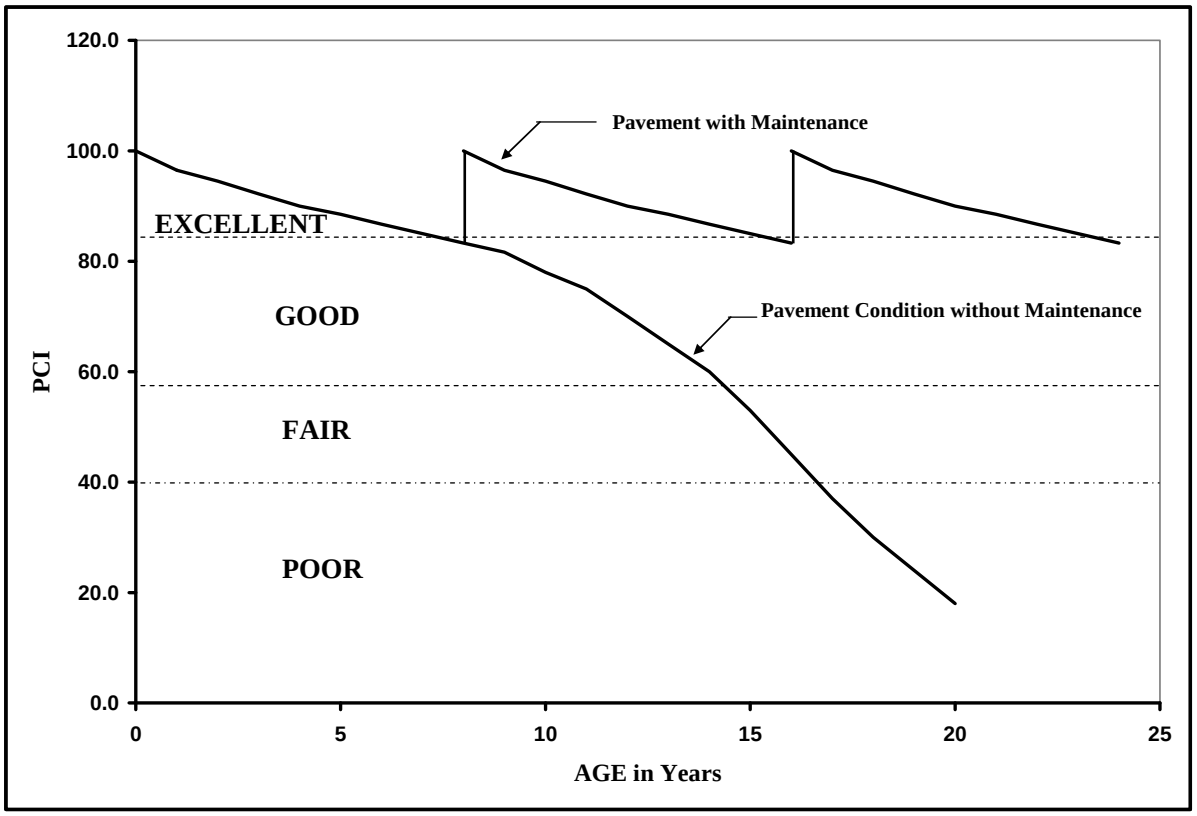
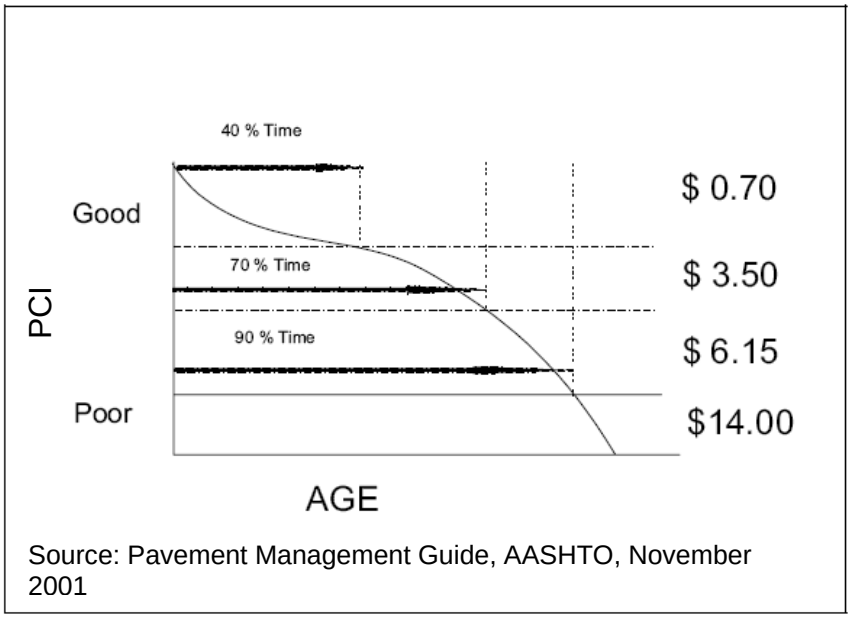


Figure 13: Pavement Condition vs. Age

The above figure allows the reader to visualize the life cycle of asphalt pavements with and without maintenance. With the proper construction and maintenance, the PCI can be increased and as a result the life cycle of pavement may be extended. Providing proper maintenance extends the asphalt life, thus reducing capital expenditures of reconstruction of the street sections. The T2 Center of Idaho recommends a pavement management program of maintaining good roads first, then improving poor roads as the budget allows.

Figure 14, published in AASHTO pavement management guide, shows the average rate of asphalt pavement deterioration and the change in repair costs. The repair costs shown in the figure do not represent the repair costs in the Middleton area. The following figure provides an insight of timing for repairs or treatments to the City streets.



Source: Pavement Management Guide, AASHTO, November 2001

Figure 14: Effect of Timing on Repair Costs

It is evident from the above figure that the overall costs will be less if treatments were applied earlier and more often. However, the pavement should be structurally adequate to carry the traffic load. As per the AASHTO guide, previous studies indicate that it "costs an agency less to have good pavements than poor pavements".

Prioritize Projects and Maintenance Techniques

Based on the pavement condition and the PCI values, the City should identify the street sections needing repair or treatment and determine the source of funding so that the street sections can be restored to the desired level of service. These sections should be prioritized for funding. The goal of prioritization of projects is to provide the greatest benefit to the community for the funds expended on the project.

There are a large number of project prioritization approaches. A simple ranking procedure often ranks those with the worst condition street section as the highest priority; however, this

procedure is limited in the number of available parameters. Generally, pavements with poor PCI require substantial repair or treatment which requires significant funds to restore the streets to the desired level of serviceability. Hence, prioritization of projects should be done based on good engineering judgment and the most positive impact on the community.

Maintenance activities on asphalt surfaces preserve the existing pavement surface and prevent further deterioration. Maintenance activities can be divided into four separate categories (as presented in The Asphalt Handbook, Asphalt Institute, 1989):

- Routine maintenance – the day-to-day work that is necessary to preserve and keep a pavement as close to an as-constructed condition as possible. This may include crack sealing (annually), pothole patching (as soon as possible) and drainage maintenance (semi annual). This maintenance technique should be applied to pavements with a PCI ranging between 100 and not less than 30.

In addition to the above listed routine maintenance, other road maintenance work like pavement marking, upgrading traffic control devices (sign boards), re-grading borrow ditches for proper drainage etc., should be applied to all the City streets.

- Preventive maintenance - work which is done to prevent deterioration of a pavement, thus reducing the need for more substantial maintenance work. This may include drainage (street side) maintenance and fog or chip seals (every 4 to 5 years). This maintenance technique should be applied to pavements with a PCI ranging between 85 and not less than 30.

- Major maintenance (rehabilitation) – work which is needed to restore a pavement to an acceptable serviceability condition. It includes surface treatments, surface recycling and thin overlays. This maintenance treatment should be applied to pavements when the PCI rating is reduced less than 50.

- Reconstruction – work includes reconstruction of sub-base, base and asphalt surface to restore a pavement to its as-constructed condition. This maintenance technique should be applied to pavements with a PCI less than 30.

PCI	Maintenance Technique
100	Routine Maintenance
80	Preventive Maintenance
50	Major Rehabilitation
30 0	Reconstruction with Base Treatment

Figure 15: Pavement Maintenance and PCI Rating

The above figure illustrates the range of PCI values that triggers different maintenance techniques. This information will be helpful to the City to select an appropriate treatment to retain or enhance the level of serviceability of the City streets. Good maintenance practices will prolong the life of the wearing surface of gravel and paved streets, and thus reduce the capital expenditure on the City streets.

Schedule and Funding

Schedule road surface maintenance based on the available funds and priority of the project. The City of Middleton has limited funds and hence, it is recommended to apply preventive maintenance techniques to the street sections with annual City funds and acquire the State and/or Federal funds for major capital expenditure projects.

Based on the street surface condition survey and the PCI values, a map was prepared identifying the street sections having the highest need for maintenance, as soon as budgeting allows. This map is included in Appendix M.

Documentation

Document the maintenance techniques, cost, and time of maintenance when maintenance technique are applied to the City streets. Maintain an updated unit cost schedule for improvements, as it is critical for budget and future planning. The street inventory and street surface condition data base should be updated annually.

Recommendations to the City

Currently, the City of Middleton does not have a pavement management plan. Due to limited resources and personnel, the City repairs and applies routine maintenance treatments depending on availability of funds and a need to be done policy. The City's current strategy of applying crack sealing and pothole patching is the primary reason for the existing good quality pavements in the City.

Based on the SMP principles, the following are recommendations to the City to maintain the City streets in an acceptable and serviceable condition.

- The GIS component of this project provides the current street surface condition and also a database was set up from the road inventory survey. This database should be updated when the streets, culverts and sign boards are repaired.
- The unit cost schedule should be updated regularly to account for any variations from year-to-year and to reflect actual unit costs that the City has encountered in the past. The updated unit costs should be included in the database to prepare the City's street maintenance budget.
- It is recommended that the City apply chip seal to street sections where the PCI rating falls to less than 50 or every 5 years, whichever presides.

- It is recommended to develop a program to set aside funds for routine maintenance work every year and to apply for State and/or Federal funds for major capital expenditure projects.

Asset Management

Recently, the AASHTO and the Federal Highway Administration conducted workshops and seminars to include asset management concepts in transportation agencies. The following is the definition taken from the AASHTO, which was used at the workshops:

"*Asset management is a systematic process of maintaining, upgrading, and operating physical assets cost-effectively*".

Asset management is a critical part of the City management. Law requires that cities complete a GASB Statement No. 34 of all publicly own properties. City streets and appendages are to be included in this report. The GIS inventory completed for this study provides the City with valuable information that allows assets to be monitored annually with current updates of the data base. Based on the value of right-of-way, replacement cost, standard life cycle of asphalt pavements (depreciation), and current surface conditions, the value of the street system may be calculated. An asset valuation report generated from the GIS data base is included in Appendix V. This report provides the total cost of the City's street system, which will be included in the GASB Statement No. 34.

CAPITAL IMPROVEMENT PLAN

Capital Improvement Plan

A Capital Improvement Plan (CIP) is a major transportation-planning tool. It is the process of systematically inventorying and prioritizing a community's major capital improvement projects within a proposed time frame. The CIP lists the projects and improvements needed based on the projected traffic volumes and capacity analysis of roadways and intersections, sense of priority and available funding options and indicates the agency responsible for implementation.

There are several benefits for developing and adopting a Capital Improvement Plan. The CIP provides a management tool for the City Council and City Staff and can also provide valuable information to the Planning Commission, citizens of the City, developers and businesses who are interested in the development of the community. The CIP document will assist in planning available resources and funds and coordinating City projects with those of other public or private developments.

Despite many benefits of capital improvement planning, it is necessary to understand that this CIP is a document and serves as a guideline book. There can be changes in the plan and order of projects identified because of many reasons. Estimated costs for the projects and available funds can fluctuate as a result of changing economic conditions or shifts in public policy and hence these CIP projects should be reviewed and updated annually. Project priorities may be adjusted depending on the need and funding availability.

Recommended street improvement projects are identified in two classifications; major reconstruction and minor repairs/reconstruction of a small segment. For major reconstruction of streets, the City will most likely seek federal funding. Minor repairs/reconstruction of small segments will likely be locally funded projects. The following Table 24 presents the proposed projects for the City for the next 5 years. A CIP listing proposed projects for the City for the next 20 years is included in Appendix T.

Table 24: Capital Improvement Projects

Priority	Project Name	Funding Source	City's Goal	Projected Construction Year				
				FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
1	Main Street Revitalization	Local Funds & Other Grants	2006					X
2	N. Middleton Road from SH 44 to Mill Slough	STP – Urban	2007				X	
3*	Murphy Ave from SH 44 to Boise Street	STP – Urban	2008					
4	Intersection; N. Highland Dr./Cemetery Rd. and SH 44	STP – Urban	2009				X	
5*	Alternate Highway 44 Bypass	ITD Project	2010					
6#	Murphy Ave from Boise St. to Middleton Road	STP – Urban	2010					X
7	Willow Creek Bridge Replacement	Local or Other Funds	2011					X
8*	SH 44 Revitalization between Cemetery Rd. and 4th St. W.	STP Enhancement	2011					X

* Note: These projects are not included in TIP.
# This project is included in Draft FY 2008-2012 Nampa Urbanized Area TIP

Note: All federal funding through the State is restricted to Major Collectors and Arterials in the Surface Transportation Improvement Program (STIP). Some of the proposed projects are not currently listed as Major Collectors in the STIP. Application may be made to the State to change the classification of qualified streets. Federal funded projects time frame is an average of four to eight years. Please note that the given approximate costs are for construction only as per current unit costs. Costs for application, design engineering, construction engineering, project administration, contingency and other costs associated with a street construction project need to be added based upon site specific review. Project size may have to be varied to meet available funding.

Current Funded Projects

The City is currently in the process of the design/construction of the following projects, both through the federally funded programs and through the use of local funds. These projects are presented in the following table.

Table 25: Current Funded Projects

Project	Key Number	Funding Source	Probable Project Cost	Projected Construction Year
Int. N. Highland/Cemetery and SH 44	09513	STIP-Local Urban	$ 874,000.00	2010
N. Middleton Rd.; Jct. SH 44 to Mill Slough	09515	STIP-Local Urban	$ 796,000.00	2010

Capital Improvement Plan for District

The District developed a CIP and updates the plan annually. The District's CIP primarily consists of rehabilitation and maintenance projects like chip sealing, crack sealing, seal coat application. The CIP developed by the District is provided in Appendix T.

Funding Strategies for Street Development

Funding for street maintenance, operations and capital improvement projects are of primary importance. Growing communities like the City of Middleton must plan, set a strategy and budget for years to create sufficient funds for capital improvement projects. Obtaining matching funds through State and Federal Grant Programs is one method of stretching City funds. The City of Middleton was included in the Nampa Urbanized area in early 2003. As explained in the first section of this report, COMPASS develops TIP for the counties of Ada and Canyon through cooperative process, which involves extensive participation by ITD, the Canyon County Highway Districts, Canyon County, and the cities of Nampa, Caldwell and Middleton.

There are several funding possibilities available from the State and Federal government, through State Agencies. There are possible funds available through agencies such as the Idaho Commerce and Labor Department and Economic Development. Most funding agencies require the City to identify projects and list them in their Capital Improvement Plan. Most of these funding agencies require the City to provide a percentage of local funds to match the total funding. The matching funds for Capital Improvement Projects may be funded though local tax revenues and development fees. Following, is a list of funding agencies and programs that provide funds for street developments:

1. Surface Transportation Program (STP) Local Urban

   These funds are allocated for projects in urban areas and in cities with populations more than 5,000. They may be used for new construction and/or reconstruction or rehabilitation of roadways functionally classified with FHWA as major collectors with a small percentage allowed for minor collectors. The local match requirement is 7.34 %. The funds are awarded through the Surface Transportation Program – Urban Balancing Committee and administered by ITD.

2. Surface Transportation Program (STP) Enhancement

   These funds are available to state, local, federal agencies, universities and Indian tribes, for enhancement activities such as developing pedestrian and bicycle facilities,

landscaping and other scenic beautification, historic preservation, rehabilitation and operation of historic transportation buildings, structures or facilities, etc.

3. Congestion Mitigation Air Quality (CMAQ)

These funds are an available statewide competitive program which provides federal transportation funding for air quality projects, planning and programs. Projects under this program fall under two categories: construction and non-construction. These funds are available for projects which provide significant air quality benefits, and projects directed toward solving a transportation related air quality problem. The local match requirement is 7.34 percent. Projects such as dust control and prevention (sweeper/flusher trucks, unpaved road stabilization, and deicing equipment/supplies), special studies for air quality monitoring, alternative transportation education etc., are eligible under this program.

(Source: http://www.itd.idaho.gov/planning/reports/cmaq/cmaq.html)

The above listed funds are available from the state and federal government annually. The funding process and project selection procedure were explained in the first section of this report.

Local Improvement Districts are another way to fund projects. Under this option, a district of property owners that benefit from the proposed improvements is created by the City. The project costs are divided between each of the property owners in the district based on lot front footage, area of lot, benefits derived, or a combination thereof. Bonds are sold to allow 5, 10 or more years for payback of the project.

Long and short term planning is critical for growing communities like Middleton. State and federal funds matched with local funds will aid the City in meeting their transportation needs. It is recommended that the City adopt a plan to procure local funds annually to match state and federal funds for local projects. It is also recommended that the City start planning toward construction of the projects listed on the Capital Improvement Plan.

Recommendations to the City

In addition to the recommendation for developing a sub-regional model, the following recommendations were made to the City for more accurate planning and improvements to the transportation system.

1. Preserve and improve the existing street system by adopting the recommended Surface Management Plan and increasing the pavement width where traffic warrants.
2. Preserve right-of-way along the identified corridor for construction of alternate SH 44 route.
3. Adopt the recommended SMP and maintain an up-to date GIS database.
4. Update traffic counts annually during periods of heaviest use to confirm traffic volumes and travel patterns.
5. Adopt the Street Circulation Plan and preserve future rights of way, as shown on the plan, by requiring setbacks and land dedications to allow for collectors and future multi-lane routes. The proposed functional classifications for streets identified in the plan should be updated on the current classification map and proposed to ITD.
6. Adopt the proposed Capital Improvement Plan and update it annually.
7. Adopt the proposed access control standards and enforce the access control policy on the new developments.
8. Preserve rights of way to develop a continuous bike and pathway as suggested in the comprehensive plan and the street circulation plan.
9. Establish an inspection program to evaluate the conditions of all structures not covered under the NBIS (bridges with a span of less than 20 feet 6 inches). The inspection program should include a schedule inspection of 2 to 5 years depending on the specific bridge conditions and traffic loading.

REFERENCES

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15. "Subdivision Development Standards", Canyon County Highway District # 4.
16. "Executive Summary Report, Pavement Management Guide", November 2001, prepared by the AASHTO.
17. "Standards for Public Works Construction, Addendum to the ISPWC", City of Middleton.

APPENDICES