# South Meridian Transportation Network Analysis

Prepared for
**Ada County Highway District**
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September 2012

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# Citation

Parametrix. 2012. South Meridian Transportation Network Analysis. Prepared by Parametrix, Boise, Idaho. September 2012.

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# Executive Summary

## Project Background

The South Meridian planning area is approximately nine square miles, located in unincorporated Ada County, within the City of Meridian's Area of Impact. The planning area limits are generally between Interstate 84 (I-84) to the north, Lake Hazel to the south, Linder to the east, and McDermott to the west.

The City of Meridian recently conducted a future land use map update process to identify the best future land use designations for the area. The City engaged with land owners, businesses, and other interested stakeholders to consider a variety of future development options for the South Meridian planning area. The preferred land use scenario will be taken forward to adoption by the City of Meridian as part of the City's Comprehensive Plan.

An important component of the Future Land Use Plan Update is the impact to the transportation network based on the land use designations. The land use/transportation impact analysis was based on the anticipated growth through 2035 and recommends the number of travel lanes, bike lanes, length of left turn lanes, and intersection control for seven roadway segments and 16 intersections within the nine square mile project area.

2035 was used for the analysis as it represents the accepted valley-wide planning timeline. This plan will need to be updated as

development occurs and anticipated growth numbers are changed. In addition, ACHD's bike and pedestrian facility plans within this area of South Meridian will need to be re-evaluated based on the anticipated growth and development.

## Segments

The roadway segments outlined in the current ACHD 2012 CIP are the recommended segments to accommodate the anticipated needs for the South Meridian study area. Figure 9 depicts the proposed number of travel lanes as outlined in the CIP and is recommended to be carried forward for purposes of this analysis.

Two, three, and five-lane road sections, as identified in the Livable Street Design Guide as both Residential Arterial and Rural Roads are recommended for the South Meridian area, and are shown in Figure 9.

## Roundabouts

Many of the potential roundabout locations within the study area are anticipated to operate at LOS F by 2035. However, when comparing the AM and PM peak hour roundabouts analysis, three intersections operate well, are recommended to be carried forward as part of this analysis:

- McDermott / Overland – single lane (LOS A)
- McDermott / Victory – dual lane (LOS B in AM ; LOS C in PM)
- Black Cat / Victory – dual lane (LOS D)

In order to develop the roundabouts at these intersections, additional improvements will need to occur for the approach legs at the McDermott / Victory and Black Cat / Victory intersections. McDermott Road is recommended to be a two-lane facility and Victory Road is anticipated to be a three-lane facility at the McDermott / Victory intersection. Therefore, an additional approach lane along Victory Road and McDermott Road is needed in advance of this intersection to develop the proposed roundabout.

Black Cat Road is recommended to be a five-lane facility north of Victory Road and a three-lane facility south of Victory Road, and Victory Road is recommended to be a three-lane facility at the

Black Cat / Victory intersection by 2035. Therefore, an additional approach lane along both legs of Victory Road and the south leg of Black Cat is needed in advance of this intersection, in order to develop the proposed roundabout.

Three lane roundabouts will be explored when there are better analytical methods available.

## Signalized Intersections

Table ES-1 summarizes the proposed signalized intersection improvements for each identified study intersection within the planning area. The proposed lane configurations and control type are represented in Figure 9.

**Table ES-1. Proposed Signalized Improvements**

| Intersection | Control | Intersection Type | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|---|
| | | | LOS | Delay(s) | LOS | Delay(s) |
| McDermott / Amity | Signalized Intersection | 6x5 | E | 61.6 | E | 59.8 |
| McDermott / Lake Hazel | Signalized Intersection | 5x3 sb<br>5x4 nb | C | 32.9 | D | 40.4 |
| Black Cat / Overland | T-Intersection | See Figure 9 | D | 44.4 | C | 21.1 |
| Black Cat / Amity | Signalized Intersection | 6x4 | D | 49.0 | E | 59.9 |
| Black Cat / Lake Hazel | Signalized Intersection | 6x4 | D | 49.1 | D | 35.1 |
| Ten Mile / Overland | T-Intersection | See Figure 9 | D | 51.8 | C | 22.3 |
| Ten Mile / Victory | Signalized Intersection | 5x6 | D | 54.0 | E | 68.2 |
| Ten Mile / Amity | Signalized Intersection | 7x7 | D | 52.7 | E | 61.8 |
| Ten Mile / Lake Hazel | Signalized Intersection | 7x7 | D | 54.8 | D | 45.3 |
| Linder / Overland | Signalized Intersection | 7-8x7-8 | D | 48.9 | N/A | N/A |
| Linder / Victory | Signalized Intersection | 7x6 | D | 51.9 | C | 33.0 |
| Linder / Amity | Signalized Intersection | 7x7 | D | 50.9 | D | 48.4 |
| Linder / Lake Hazel | Signalized Intersection | 7x7 | D | 50.9 | D | 37.5 |

The Linder / Overland intersection currently has infrastructure in place to ultimately develop a 5x5 signalized intersection. The north and south legs are currently stop-controlled with the potential for signalization to take place once the demand volumes are reached.

As shown in Table 16, the proposed lane configuration at the Linder / Overland intersection will not sufficiently mitigate the anticipated volumes during the PM peak hour. Additional improvements beyond the lane configuration shown in Figure 9 will be required if LOS E or better is required.

The most substantial delay anticipated for the intersection is primarily attributable to the volume of westbound and southbound left turning movements. The left turn volumes also create substantial delay for the opposing thru movements. In order to sufficiently mitigate the anticipated 2035 volumes during the PM peak hour, additional improvements may be warranted. The anticipated signalized intersection footprint to achieve LOS D during the 2035 PM peak hour is located in Appendix F.

The Linder / Victory intersection is over capacity during the AM peak hour condition, as a result of maintaining a three-lane facility along Victory Road. LOS D can be achieved for both the AM and PM peak hour conditions if one additional eastbound and westbound thru lane is added to the intersection along Victory Road, making the intersection a 7x6, which is the recommended improvement for this intersection.

## Provisional Treatments

Provisional intersection treatments and associated lane configurations are identified for the Ten Mile / Lake Hazel, Linder / Lake Hazel and Linder / Victory intersections in Figure 9. The recommended configurations outlined in Figure 9 (in black) are the provisional intersection lane configurations resulting from the build scenario determined from the regional travel demand model projections.

The roadway segments identified south of Lake Hazel along both Ten Mile and Linder Roads are currently planned to be rural two lane roads. As a provisional treatment in advance of determining the ultimate roadway segment needs for both south legs of these intersections the lane configuration depicted in Figure 9 can be utilized. This configuration does not reflect the ultimate recommendations for this intersection and a degraded LOS will occur. Once improvements are identified for these segments south of the Ten Mile / Lake Hazel and Linder / Lake Hazel intersection it is recommended to implement the ultimate lane

configuration identified in Figure 9 to adequately mitigate the anticipated travel demand at each intersection or conduct an updated intersection needs analysis. Placement of the signal poles and cabinets at the ultimate improvement footprint is recommended if provisional signalized intersection treatments occur prior to the investigation into the roadway segment needs of Ten Mile and Linder Road south of Lake Hazel.

The Linder / Victory intersection shows two thru lanes as the ultimate configuration for east and westbound traffic. Developing the provisional treatment of one thru lane for the east and westbound traffic is consistent with the roadway segment improvements identified along Victory. Developing a 6x5 intersection here will result in a reduced LOS at the intersection. It should be noted, that the ACHD Commission has directed staff to evaluate Victory Road, as an entire corridor between Eagle Road and McDermott Road as a five lane facility.

## Turn Bay Recommendations

The left turn bay lengths at signalized intersections were determined based on the 95% queue resulting from the capacity analysis. As a baseline, the minimum storage length used for dedicated left turn bays was 100 feet, which is recommended for all left turn bay locations indicating a 95% queue length less than this minimum.

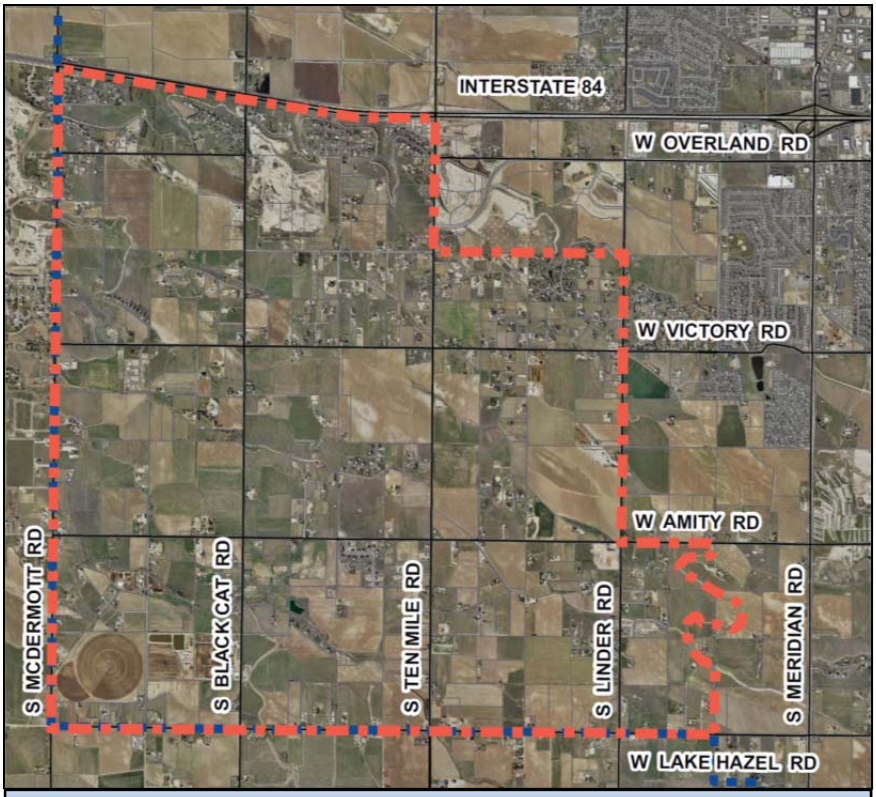
The ultimate left turn bay recommendations are an aggregate of the results from both the AM and PM signalized intersection analysis. The highest 95% queue length resulting from the either the AM or the PM condition was used and is recommended. The AM peak, PM peak and ultimate recommendation for left turn bay storage lengths are located in Appendix H.

The right turn bay length of 100 feet, as outlined in the Intersection Planning Level Standards (Submitted to ACHD March 21, 2006) is the length identified for all dedicated right turn bays within the South Meridian boundary area.

# 1 Project Background

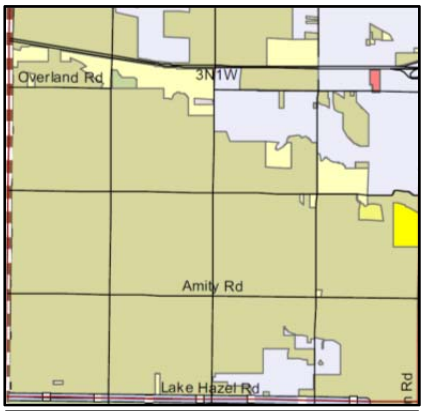
The South Meridian planning area is approximately nine square miles, located in unincorporated Ada County, within the City of Meridian's Area of City Impact. The planning area limits are generally between I-84 to the north, Lake Hazel to the south, Linder to the east, and McDermott to the west (Figure 1).

**Figure 1. Vicinity Map**




*The South Meridian planning area limits are generally between I-84 to the north, Lake Hazel to the south, Linder to the east, and McDermott to the west.*

The properties in this area are currently included on Meridian's Future Land Use Map, but are primarily designated as "Future Planning and Referral Area." The Ten Mile Interchange Specific Area Plan (adopted in 2007) identified land use recommendations for nearly 2,400 acres to the north and west of the South Meridian planning area. Of this acreage, just over 300 acres are designated for mixed-use commercial, residential and lifestyle center, and more than 900 acres of employment, including industrial uses. Rounding out the area is 800 acres of residential with the remaining in parks, open space, and right-of-way.




*Current Ada County zoning within the planning area is predominantly designated as Rural Urban Transition (RUT).*

This area is currently within the City of Meridian's Area of City Impact, as an area where annexation and development is anticipated. Unincorporated properties are subject to Ada County codes and zoning ordinances and most of the properties within the planning area are zoned Rural Urban Transition (RUT). Though not currently incorporated into the City of Meridian, planning responsibility for the area rests with the City of Meridian, while zoning and land use authority is maintained by Ada County.

The City of Kuna recently annexed over 230 acres north of Lake Hazel Road, between Linder and Ten Mile Roads, which is also within the South Meridian planning area. The current City of Kuna Comprehensive Plan identifies the area between Lake Hazel and Amity Roads as Kuna's "planning" area (not the Area of Impact), with a rural residential land use designation. The area south of Lake Hazel includes agricultural and low density land uses.

In order to identify the most appropriate land use for the area, the City of Meridian recently went through a planning process to update the City's Comprehensive Plan. The City engaged land owners, businesses, and other interested stakeholders to consider a variety of future development options. The preferred land use scenario that will be taken forward to adoption by the City of Meridian is included in Chapter 3 of this report.

An important component of Meridian's Future Land Use Plan Update is the impacts to the transportation network based on the selected land use designations. The analysis described in this report evaluated the impacts of the preferred land use scenario developed by the City of Meridian. The analysis was based on the 2035 scenario, and recommends the number of travel lanes, bike lanes, length of left turn lanes, and intersection control for eight roadway segments and 16 intersections within the nine square mile project area.

# 2 Existing Conditions

## 2.1 Roadway Segments and Intersection Configurations

*Many of the roadways within the planning area are two-lane, rural roadways with stop-control at the intersections.*

The majority of the current zoning designation within the South Meridian planning area is Rural Urban Transition (RUT). While there are some minor residential developments within the planning area, the existing land uses can generally be characterized as isolated residential lots with single family detached housing on more than one acre per parcel or agricultural.

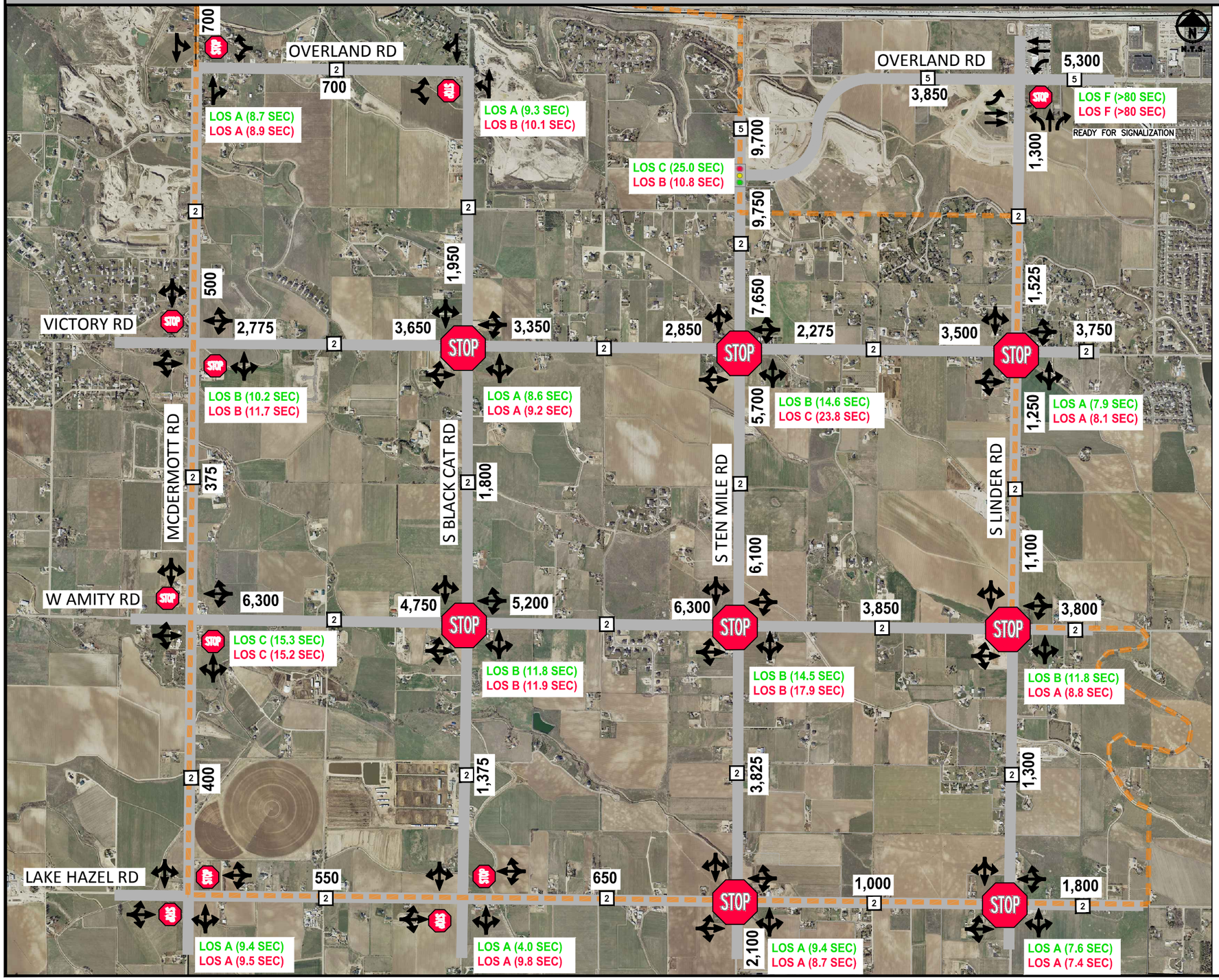
The rural nature of the existing land uses correlates to the existing roadway segments, most of which are rural two-lane roads with stop-control at the intersecting roadways. However, both Overland Road, from Linder Road to Ten Mile Road, and Ten Mile Road, from the Overland Road extension to I-84, are five-lane facilities.

With exception to the signalized intersections at Overland / Ten Mile, all intersections are stop-controlled. Figure 2 represents the current intersection control in use within the South Meridian planning area boundary. The figure also indicates the lane configurations at each identified intersection, level of service (LOS), the number of travel lanes (both directions), and current Average Daily Traffic (ADT) volumes.

As Figure 2 shows, the existing ADT volumes vary but there is not a segment currently within the South Meridian study boundary area with volumes greater than 10,000 daily trips.

# 2012 EXISTING CONDITIONS

FIGURE 2




## SOUTH MERIDIAN TRANSPORTATION NETWORK ANALYSIS

### LEGEND:

- LANE CONFIGURATION
- LOS A (7.9 SEC) / LOS A (8.1 SEC) — 2012 AM PEAK INT LOS / 2012 PM PEAK INT LOS
- 5,300 — 2012 ADT
- [5] — NUMBER OF TRAVEL LANES (BOTH DIRECTIONS)
- INTERSECTION CONTROL
- SOUTH MERIDIAN STUDY AREA

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McDermott Road ADT ranges from 375 trips to 700 trips; Black Cat Road varies from 1,375 trips to 1,950 trips; Ten Mile Road varies from 2,100 trips to 9,700 trips; and Linder Road varies from 1,100 trips to 1,525 trips (Figure 2).

The Overland Road corridor varies from 700 trips to 5,300 trips per day; Victory Road ADT varies from 2,775 trips to 3,750 trips per day; Amity Road currently experiences between 3,800 trips and 6,300 trips per day; and Lake Hazel Road varies from 550 trips to 1,800 trips per day. The roadway segments that experience the highest amount of vehicular trips per day are in close proximity and/or access to the recently constructed Ten Mile Interchange.

Table 1 shows that the existing LOS at the identified intersections within the South Meridian planning area operate at or better than LOS C, which is the operating standard, with exception of the Linder / Overland intersection. This intersection is currently stop-controlled and the northbound traffic experiences substantial delay in the AM and PM peak hours due to the east and westbound thru traffic volumes. East and westbound traffic at this intersection do not experience any delay, which is the dominant traffic movement at this intersection. It should also be noted that infrastructure is currently in place for this intersection to become signalized once the north leg is developed and the necessary warrants for signalization are met.

Appendix A contains the intersection capacity analysis and existing ADT values that were used to develop the information indicated in Figure 2 and Table 1.

**Table 1. Existing Conditions Capacity Analysis Summary**

| Intersection | Current Intersection Control | 2012 AM Peak Hour | | 2012 PM Peak Hour | |
|---|---|---|---|---|---|
| | | LOS | Delay (seconds) | LOS | Delay (seconds) |
| McDermott / Overland | STOP - WB | A | 8.7 | A | 8.9 |
| McDermott / Victory | TWSC - NB/SB | B | 10.2 | B | 11.7 |
| McDermott / Amity | TWSC - NB/SB | C | 15.3 | C | 15.2 |
| McDermott / Lake Hazel | TWSC - EB/WB | A | 9.4 | A | 9.5 |
| Black Cat / Overland | STOP - EB | A | 9.3 | B | 10.1 |
| Black Cat / Victory | AWSC | A | 8.6 | A | 9.2 |
| Black Cat / Amity | AWSC | B | 11.8 | B | 11.8 |
| Black Cat / Lake Hazel | TWSC - EB/WB | A | 4.0 | A | 9.8 |
| Ten Mile / Overland | SIGNALIZED | C | 25.0 | B | 10.8 |
| Ten Mile / Victory | AWSC | B | 14.6 | C | 23.8 |
| Ten Mile / Amity | AWSC | B | 14.5 | C | 17.9 |
| Ten Mile / Lake Hazel | AWSC | A | 9.4 | A | 8.7 |
| Linder / Overland | STOP - NB | F | >80 | F | >80 |
| Linder / Victory | AWSC | A | 7.9 | A | 8.1 |
| Linder / Amity | AWSC | A | 8.8 | A | 8.8 |
| Linder / Lake Hazel | AWSC | A | 7.6 | A | 7.4 |

## 2.2 Pedestrian, Bicycle, and Transit Facilities

Currently, there are no dedicated bicycle/pedestrian facilities within the South Meridian planning area. In addition, there are no existing multi-use pathways, nor transit services within the Area. The ACHD Roadway to Bikeways Plan, ACHD Pedestrian-Bicycle Transition Plan, City of Meridian Parks and Pathways Master Plan, and Valley Regional Transit Valley Connect Plan identify future pedestrian, bicycle, and transit facilities for the area (see Appendix B).

## 2.3 Street Typologies & Access Control

The primary roadways within the planning area are vital to the existing and future connectivity of the region. Because the planning area is centrally located between Nampa, Kuna, Meridian, and Boise, an efficient and planned roadway system is necessary in order to serve future development.

In 2009, ACHD adopted the Livable Street Design Guide (LSDG). The guide provides parameters for streets within Ada County. Each street typology outlines the context which the roadway is expected to be found, as well as the design details including cross section, travel and turn lane dimensions, bike lanes, sidewalks, landscape buffers, pedestrian zones, etc. Utilizing this document, the recommended land use scenario, and corresponding traffic demand, the appropriate street typologies will be determined and/or verified.

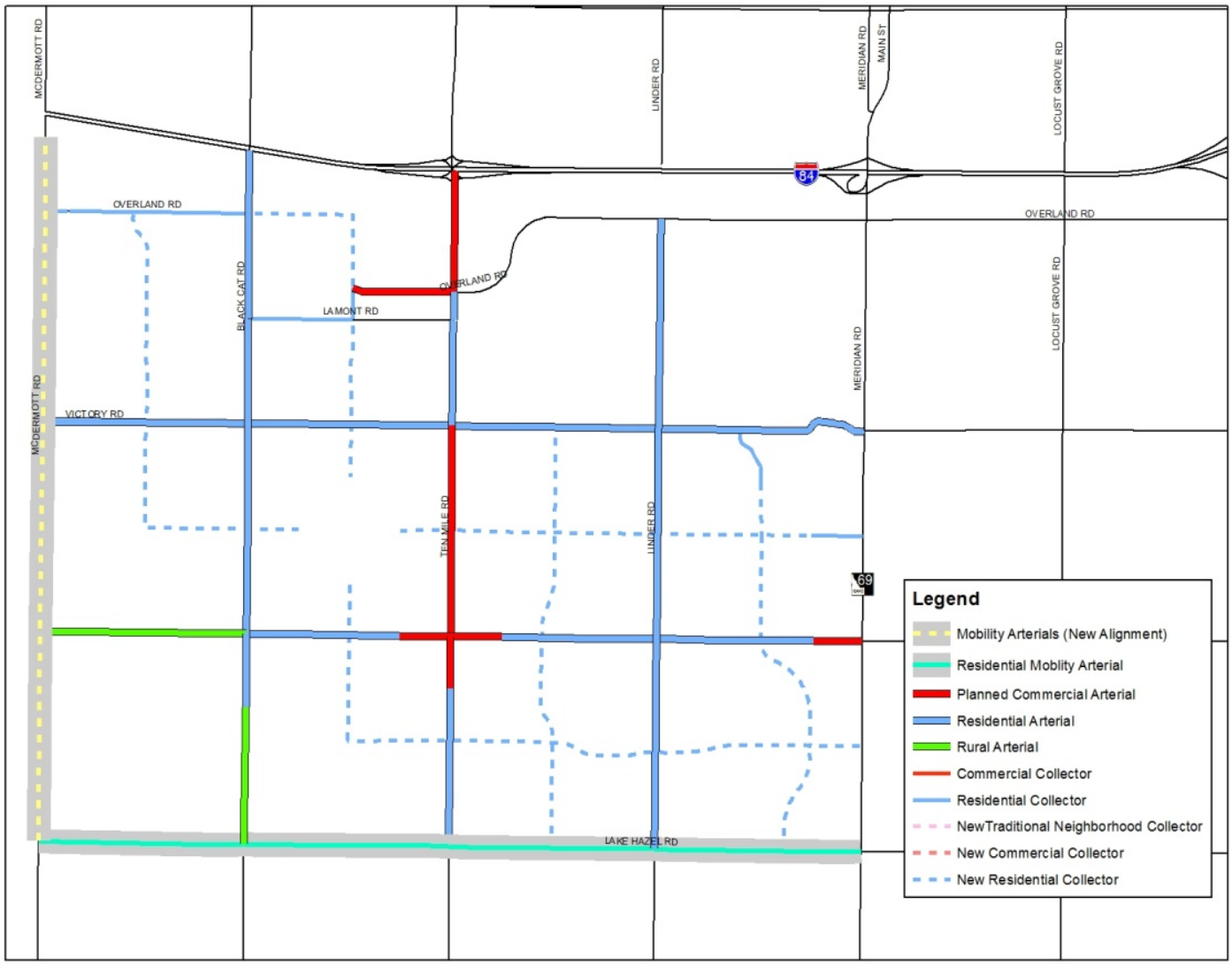
The ACHD Master Street Map (MSM) is a planning tool that works with ACHD's partner agencies comprehensive plans. The MSM creates a shared vision between ACHD and its partner agencies by capturing information about future roadway characteristics based on land use plans and transportation goals. The three primary functions of the MSM are to:

1. Define a shared vision of the future roadway network between ACHD and its partner agencies based on approved Comprehensive Plans and street typologies
2. Establish a county wide right-of-way preservation map
3. Establish an existing and future collector network map

The MSM includes street typologies, from the LSDG designated for the roadway segment. The typology is directly related to the planned land use adjacent to the roadway and provides basic information regarding the roadway segment. The current ACHD MSM classifies Black Cat, Linder, Victory, Amity, and Ten Mile as residential arterials. Lake Hazel is classified as a residential mobility arterial and McDermott a mobility arterial. COMPASS' 2035 Functional Classification Map functionally classifies Ten Mile, Amity, and Lake Hazel as principal arterials, Victory, Black Cat and Linder as minor arterials, and McDermott as an expressway (see Master Street Map and COMPASS 2035 Functional Classification Map in Appendix B).

Figure 3 represents the updates to the street typologies located within the South Meridian Planning Area. The updated street typologies depicted are consistent with the criteria outlined for ACHD's Master Street Map. The typology and collector updates indicated in Figure 3 represent the preferred land use scenario designations outlined in the South Meridian Land Use Update and are consistent with the improvements identified in the Comprehensive Plan update.

**Figure 3. Street Typology Update**



# 3 Future Plans

## 3.1 Land Use

### 3.1.1 South Meridian Future Land Use Map Update

The South Meridian Future Land Use Map Update, recently completed by the City of Meridian, identified future land use designations for the South Meridian planning area for inclusion within the City's Comprehensive Plan. The City submitted a Comprehensive Plan Amendment on June 15, 2012. The Planning & Zoning hearing is anticipated for August, followed by a City Council hearing in September/October 2012.

The planning process focused on land use "typologies" that would be appropriate for development of the South Meridian planning area. A "typology" is a way of classifying a system or a group of things that have certain characteristics or traits in common. When describing land use, typology refers to the primary categories of land usage, such as residential, commercial, agricultural or industrial. Five land use typologies were offered to the South Meridian planning area based on existing land uses, adjacent development patterns, and previous planning work. Those typologies (or designations) included Rural/Estate Residential (a new designation for the City), Low Density Residential, Medium Density Residential, Mixed Use, and Commercial (see Appendix B for designation definitions).

Public engagement was a hallmark of the City's land use update, and there were several different forms of involvement during the planning process. Specifically, engagement with neighboring jurisdictions and agencies, and several workshops and meetings with area stakeholders and the general public were incorporated throughout the project.

A Project Advisory Group (PAG) was created specifically for the project, with the primary purpose of providing technical information and guidance in the development of the plan. The PAG included representation from the City of Meridian, Kuna, Nampa, COMPASS, Ada County, the Ada County Highway District, Central District Health, and Nampa Highway District No.1. The group met four times over the course of the project, providing input on existing and planned water, sewer, roads, land use, and other infrastructure that would be necessary to support a variety of future land use scenarios.

Three public workshops were held, starting with an interactive game to introduce land owners and other interested participants to the land use planning process. Four initial future land use scenarios were developed at the first workshop. Following the first workshop, the PAG evaluated the impacts of each of the four scenarios that were created, and began to combine the common denominators into a single land use scenario. The combined scenario ("Original PAG" scenario) was presented, along with the four initial scenarios, at the 2nd public meeting on April 3, 2012. This second workshop included the City of Meridian Planning & Zoning Commission and City Council as well as land owners and other stakeholders.

After the second public workshop, the PAG met to discuss the themes from the workshop and to conduct further technical analysis. Changes based on this analysis and consideration of the workshop feedback led to refinements of the Original PAG scenario, which evolved into the "Refined PAG" scenario. The primary difference between the Original and the Refined PAG scenarios is residential density, which is slightly higher in the Refined Scenario. The Refined PAG scenario was displayed at the third public meeting, on May 29, 2012.

After taking into account all of the public input received throughout the project, revisions based on technical and engineering

constraints, and applying best planning practices, a preferred alternative scenario was created (Figure 4 and Table 2). The preferred alternative was moved through the adoption process, and was utilized for determining the Regional Travel Demand model projections used for this analysis.

**Table 2. Preferred Alternative Scenario Characteristics**

| Indicator | Original PAG | Refined PAG | Preferred Alternative |
|---|---|---|---|
| Rural/Estate (acres) | 2,367 | 1,928 | 1,931 |
| Low Density Residential (acres) | 2,891 | 2,781 | 2,839 |
| Medium Density Residential (acres) | 488 | 718 | 719 |
| Mixed Use Neighborhood (acres) | 396 | 527 | 527 |
| Commercial (acres) | 0 | 0 | 0 |
| Total Population | 16,814 | 18,891 | 19,095 |
| Total Dwelling Units | 6,686 | 7,710 | 7,778 |

### 3.1.2 Nampa Comprehensive Plan

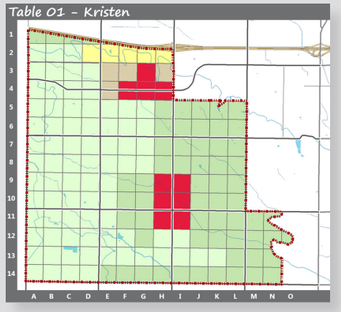
West of the planning area is unincorporated Canyon County, and much of it is also within the City of Nampa's Area of Impact. Current Canyon County Zoning west of McDermott is zoned rural residential. The City of Nampa's Comprehensive Plan designations for that area include agricultural between I-84 and Stamm, residential between Stamm and Powerline, and agricultural south of Powerline. The Comprehensive Plan also identifies a future Idaho Power substation at the corner of McDermott and Victory.

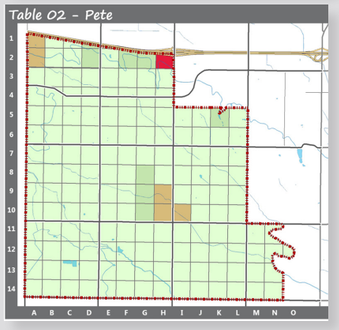
### 3.1.3 Kuna Comprehensive Plan

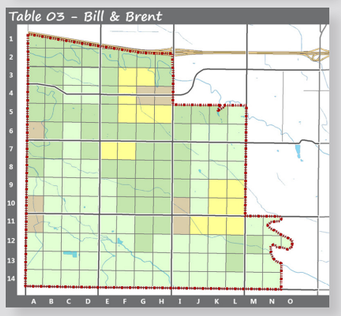
The current City of Kuna Comprehensive Plan identifies the area between Lake Hazel and Amity Roads as Kuna's "planning" area, with a rural residential land use designation. The City of Kuna recently annexed over 230 acres north of Lake Hazel Road, between Linder and Ten Mile Roads. The area south of Lake Hazel includes agricultural and low density land uses.

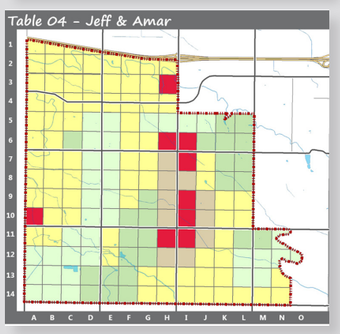
# FIGURE 4 - LAND USE SCENARIO PROGRESSION

**1.** Four Scenarios Developed at February 22, 2012 Public Workshop

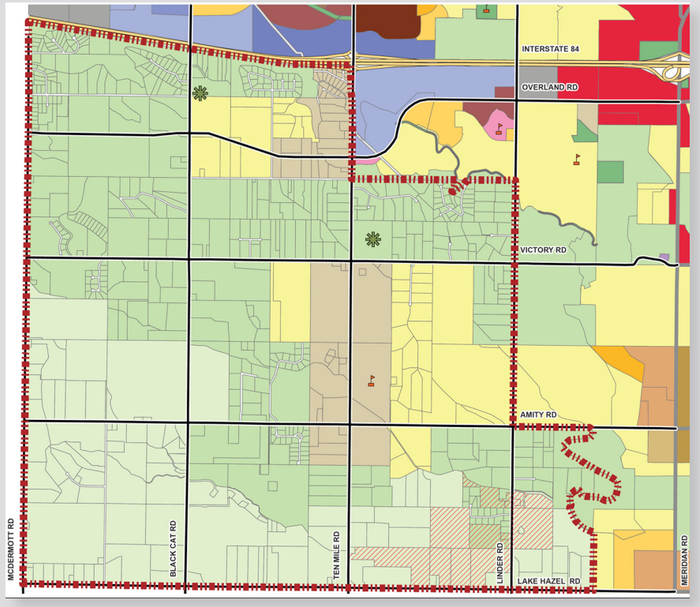


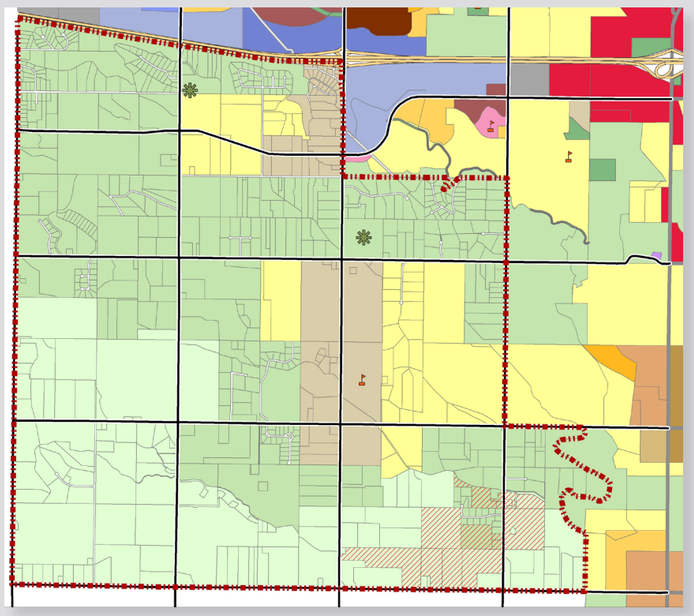



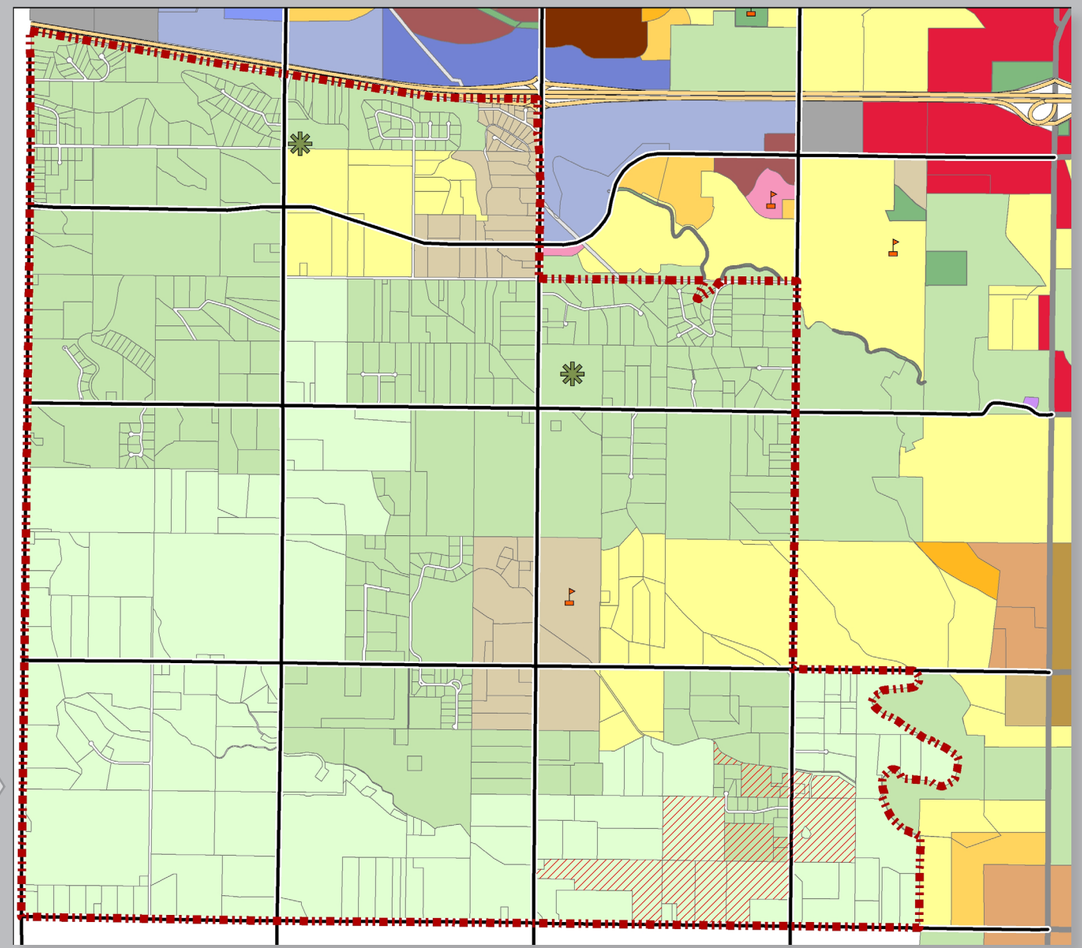

**2.** "Original PAG" Scenario




**3.** "Refined PAG" Scenario



**4.** Preferred Alternative Scenario



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## 3.2 Transportation

### 3.2.1 SH-16

ITD has plans to extend SH-16 as an expressway connecting I-84 to SH-44, in the general vicinity of McDermott Road. Design for the first segment of the SH-16 expressway, from SH-44 to US 20/26, is currently underway with construction likely in the next few years. Design and construction from US 20/26 to I-84 is not likely within the next 20 years, and plans to continue the expressway south of I-84 have not been finalized, or funded. However, it is possible that at some point in the long-term future, the SH-16 expressway will continue south through the South Meridian planning area, near the existing McDermott Road alignment. Because the planned improvements south of I-84 are not anticipated within the next 20 years, this corrdior was not included in the regional travel demand model or in the traffic analyis for South Meridian.

### 3.2.2 Airport / Overland Corridor

A future east-west corridor (Airport/Overland Road) is planned between Ten Mile and Garrity Boulevard in the City of Nampa. This corridor, planned to be three to four lanes, is anticipated to accommodate up to 28,000 vehicles per day by the year 2035. As stated in the Airport/Overland Road Corridor Plan, this roadway connection is anticipated to be constructed as adjoining properties develop and funding becomes available. This would be achieved through development, and no specific timeline is anticipated for development and construction. Therefore, this roadway connection was not included data obtained from COMPASS or in the traffic analysis.

### 3.2.3 COMPASS 2035 Communities in Motion (CIM)

COMPASS' 2035 Communities in Motion (CIM) is the regional long-range transportation plan for Ada and Canyon Counties. The plan describes each corridor within the region, its importance, characteristics, recommended improvements, opportunities, and past, current, or programmed improvements to meet the anticipated demand of the community. The list on the following summarizes COMPASS' description of each corridor within the planning area.

#### 3.2.3.1 Ten Mile Road:

- Purpose/Function- Provides north-south mobility in Meridian and a connection to Kuna. Planned to be a primary north-south corridor into the future. Links high-growth areas of Meridian and Kuna.
- Improvements- CIM identified Ten Mile Road from Lake Hazel to Chinden as a funded project, widening from two to five lanes. It also identified widening south of Lake Hazel, to Kuna, as a recommended, unfunded improvement.

#### 3.2.3.2 Black Cat Road:

- Purpose/Function- Serves as a north-south minor arterial between McDermott Road and Ten Mile Road.
- Improvements- CIM did not identify any funded improvements for Black Cat through 2035. CIM identified a widening project as an unfunded improvement north of the planning area (north of I-84).

#### 3.2.3.3 McDermott Road:

- Purpose/Function- Provides vital north-south travel and access to Ada and Canyon Counties. With its connection to the proposed SH-16 extension, McDermott Road has potential as a future expressway and is planned as such between SH-44 and Kuna-Mora Road.
- Improvements- CIM identified funded investments which include improvements much farther north than the planning area boundary. However, identified unfunded improvements include conducting a study for the corridor as an expressway, establishing right-of-way needs, developing an access management plan, and widening from Lake Hazel to I-84 from two to five lanes, including a railroad overpass at Hubbard (not included as a five lane facility for this analysis per the regional travel demand model projections as a two lane facility).

#### 3.2.3.4 Linder Road:

- Purpose/Function- Serves as a “reliever” for Ten Mile and Meridian Road.
- Improvements- CIM identified funded improvements that are located south of the planning area. Identified unfunded improvements include widening between Kuna-Mora and Ustick Road, including an I-84 overpass.

#### 3.2.3.5 Lake Hazel Road:

- Purpose/Function- Provides a southern route alternative to I-84 and a connection from unincorporated Ada County to Boise (Maple Grove), with plans to extend to Gowen Road.
- Improvements- CIM identified unfunded improvements from Happy Valley Road in Nampa to Locust Grove in Meridian, including a railroad overpass.

#### 3.2.3.6 Amity Road:

- Purpose/Function- Provides a southern route alternative to I-84, between Garrity and Meridian interchanges and a connection from Nampa to Boise.
- Improvements- CIM identified a funded investment project along Amity, widening Southside to Cloverdale from two to five lanes.

### 3.2.4 ACHD South Meridian Transportation Plan (2009)

In 2009, ACHD and the City of Meridian prepared a Transportation Plan for the South Meridian area. The planning area for that study extended farther east (Cloverdale Road) and south (Columbia Road) than the current South Meridian planning project. This document, consistent with the South Meridian Land Use Update planning boundary, extends from McDermott Road to the east, Linder Road to the west, Overland Road to the north and Lake Hazel Road to the south. The 2009 study was conducted to identify future roadway, intersection, and corridor needs as travel demand in the area increases. The goal of the plan was to serve as a guide for improving the transportation system as development occurs.

At the time the Plan was developed, Meridian City did not have land use designations for this area of South Meridian. Therefore, the Plan assumed one household unit per three acres, on average. Based on the technical analysis conducted, it was recommended that Amity Road, McDermott Road, Linder Road, and Black Cat Road be preserved as five-lane sections and Victory Road be preserved as a three-lane facility. The Plan also identified access management strategies and a pedestrian/bicycle travel plan for the area.

### 3.2.5 ACHD Five Year Work Plan

In the 2013-2017 Five Year Work Plan, ACHD has programmed improvements to several roadways within the planning area (see Table 3).

**Table 3. ACHD 2013-2017 Five Year Work Plan Improvements**

| Location | Proposed Improvements |
|---|---|
| Amity Road Bridge (1/2 mile east of McDermott) | Replace bridge and widen to five lanes |
| Amity Road Bridge (1/4 mile east of Ten Mile) | Replace bridge and widen to five lanes |
| Amity Road Bridge (700 feet east of McDermott) | Replace bridge and widen to five lanes |
| Ten Mile; Victory to Overland | Widen to give lanes with curb, gutter, and sidewalk |
| Ten Mile / Amity intersection | Install interim signal |
| Ten Mile / Victory intersection | Widen intersection to add left turn lanes on all approaches; install interim signal |

### 3.2.6 ACHD 2012 Capital Improvements Plan

ACHD prepared the 2012 Ada County Highway District Capital Improvements Plan (CIP) to meet the requirements of the Idaho Development Impact Fee Act. The CIP was developed with consideration of plans adopted by the ACHD Commission and the Master Street Map (MSM). Projects were derived from long-range plans, including the COMPASS 2010 Communities In Motion plan, studies, and other planning documents to better identify specific travel needs, characteristics, and to recognize areas of future growth. Several projects were identified within the planning area as shown in Table 4.

**Table 4. ACHD CIP Improvements**

| Location | Proposed Improvements |
|---|---|
| Amity; McDermott to Black Cat | Reconstruct/widen from two to five lanes |
| Amity; Black Cat to Ten Mile | Reconstruct/widen from two to five lanes |
| Amity; Ten Mile to Linder | Reconstruct/widen from two to five lanes |
| Amity / Black Cat Intersection | Add signal and reconstruct/widen approaches |
| Amity / Linder Intersection | Add signal and reconstruct/widen approaches |
| Amity / McDermott Intersection | Add signal and reconstruct/widen approaches |
| Amity / Ten Mile Intersection | Add signal and reconstruct/widen approaches |
| Black Cat; Amity to Victory | Reconstruct/widen from two to three lanes; *ROW Preservation Only* |
| Black Cat; Victory to Overland | Reconstruct/widen from two to three lanes; *ROW Preservation Only* |
| Lake Hazel; McDermott to Black Cat | Reconstruct/widen from two to five lanes; *ROW Preservation Only* |
| Lake Hazel; Black Cat to Ten Mile | Reconstruct/widen from two to five lanes; *ROW Preservation Only* |
| Lake Hazel; Ten Mile to Linder | Reconstruct/widen from two to five lanes; *ROW Preservation Only* |
| Lake Hazel / Black Cat Intersection | Add signal and reconstruct/widen approaches |
| Lake Hazel / Linder Intersection | Add signal and reconstruct/widen approaches |
| Lake Hazel / McDermott Intersection | Add signal and reconstruct/widen approaches |
| Lake Hazel / Ten Mile Intersection | Add dual-lane roundabout and reconstruct/widen approaches |

| Location | Proposed Improvements |
|---|---|
| Linder; Lake Hazel to Amity | Reconstruct/widen from two to five lanes; *ROW Preservation Only* |
| Linder; Victory to Overland | Reconstruct/widen from two to five lanes; *ROW Preservation Only* |
| Ten Mile; Lake Hazel to Amity | Reconstruct/widen from two to five lanes |
| Ten Mile; Amity to Victory | Reconstruct/widen from two to five lanes |
| Ten Mile; Victory to Overland | Reconstruct/widen from two to five lanes |
| Victory; McDermott to Black Cat | Reconstruct/widen from two to three lanes |
| Victory; Black Cat to Ten Mile | Reconstruct/widen from two to three lanes |
| Victory; Ten Mile to Linder | Reconstruct/widen from two to three lanes |
| Victory / Black Cat Intersection | Add dual-lane roundabout and reconstruct/widen approaches |
| Victory / Linder Intersection | Add signal and reconstruct/widen approaches |
| Victory / Ten Mile Intersection | Add signal and reconstruct/widen approaches |

### 3.2.7 ACHD Ten Mile Intersection Analysis

ACHD recently completed an intersection analysis for the six major unimproved intersections along the Ten Mile Corridor between I-84 and Kuna. The study was prompted by the opening of the Ten Mile Interchange on I-84, which created the need to analyze additional transportation improvements along Ten Mile Road. The analysis included programming of interim improvements as well as the programming and configuration of ultimate improvements that would ensure efficient traffic operations through the year 2035. This study was adopted by the ACHD commission on June 27th, 2012 will ultimately be updated to the Master Street Map so the District will preserve the appropriate right-of-way and provide a scope for future projects not identified in the Capital Improvements Plan (CIP). The recommendations from that study (for intersections within the South Meridian planning area) are included in Table 5.

**Table 5. ACHD Ten Mile Intersection Analysis – Proposed Improvements**

| Intersection | PROPOSED IMPROVEMENTS | | | |
|---|---|---|---|---|
| | Recommended Interim Improvement | | Recommended Long-Term Improvement / Right-of-Way Preservation | |
| | Traffic Control Device | Estimated Timeframe | Traffic Control Device | Estimated Timeframe |
| Ten Mile & Victory | Interim Signal | In Progress | Ultimate 5x6 signal | 2016-2025 |
| Ten Mile & Amity | Interim Signal | 2014-2018 (in FYWP) | Ultimate 7x7 signal | 2023-2026 |
| Ten Mile & Lake Hazel | Single Lane Roundabout | 2015-2020 (add to FYWP prioritization) | Dual-Lane Roundabout with SB bypass lane | 2024 |

### 3.2.8 ACHD Roundabout Study

The final outcomes and recommendations of the county-wide study will go before the ACHD Commission for adoption in fall 2012 with integration into the Master Street Map. Adoption is independent of the recommendations outlined in this document.

ACHD is also currently conducting a county-wide roundabout study to identify the intersections where roundabouts are feasible. ACHD policy requires a roundabout to be considered for any intersection identified for improvement. The purpose of the study is to identify roundabout locations to preserve adequate right-of-way as early as possible. The outcomes of the study will be integrated into the Master Street Map to ensure appropriate right-of-way preservation. Based on the work completed to-date, recommendations were made for intersections within the South Meridian planning area and are shown in Table 6.

**Table 6. ACHD Roundabout Study Recommendations**

| Intersection | No Roundabout Recommended | Single-Lane Roundabout Recommended | Multi-Lane Roundabout Recommended | Dual-Lane Roundabout Recommended |
|---|---|---|---|---|
| McDermott / Overland* | | ● | | |
| McDermott / Victory | | | ● | |
| McDermott / Amity | ● | | | |
| McDermott / Lake Hazel* | | | ● | |
| Black Cat / Overland* | | | ● | |
| Black Cat / Lamont* | | | ● | |
| Black Cat / Victory* | | | ● | |
| Black Cat / Amity* | | | ● | |
| Black Cat / Lake Hazel | | | | ● |
| Ten Mile / Overland | | | ● | |
| Ten Mile / Lamont* | | | ● | |
| Ten Mile / Victory | | | ● | |
| Ten Mile / Amity | ● | | | |
| Ten Mile / Lake Hazel* | | | | ● |
| Linder/Overland | ● | | | |
| Linder / Victory | | | ● | |
| Linder / Amity | | | ● | |
| Linder / Lake Hazel* | | | | ● |

**Intersections that need additional analysis to determine final configuration.*

## 3.3 Pedestrian, Bicycle, and Transit

### 3.3.1 ACHD Roadways to Bikeways Plan

The ACHD Roadway to Bikeways Plan, adopted in 2009, was prepared to provide a vision, strategies and action items to improve conditions for bicycling in Ada County over the next fifty years. Bikeway route improvements within the limits of the South Meridian planning area included Linder Road (entire north/south portion within the area), and Ten Mile Road (north of Overland). It should be noted, however, that considering the land use changes within the area, ACHD should revisit the plan.

http://www.achdidaho.org/Projects/Media/77/811_Final_Adopted_5.27.09.pdf

### 3.3.2 ACHD Pedestrian-Bicycle Transition Plan

The ACHD Pedestrian-Bicycle Transition Plan (prepared in 2004) was intended to provide a comprehensive plan for the Ada County pedestrian and bicycle system. The goal of the Plan was to identify missing sections discouraging pedestrian travel and plan for well-connected sidewalks and full mobility and access. Specific to the South Meridian planning area, the Plan notes that bike lanes along Ten Mile Road (between I-84 and Victory) were planned within the next 10 years, and Ten Mile, south of Victory, and Amity between Ten Mile and Maple Grove are long-term priorities for bicycle lane improvements.

http://www.achdidaho.org/Departments/PP/Ped-Bike_Plan.aspx

*Currently, there are no dedicated bike lanes on the roadways within South Meridian.*

### 3.3.3 City of Meridian Parks and Pathways Master Plan

The City of Meridian Parks and Pathways Master Plan identified future pathway routes along irrigation canals and laterals. These will likely be primarily constructed through development, with small gaps supplemented by the City as necessary to complete the network. The improvements identified in the Parks and Pathways Master Plan to not identify bike/pathway improvements along any section line roads within the study boundary.

http://cityofmeridian.org/parks_rec.aspx?id=2667

### 3.3.4 Valley Connect

Valley Connect is a plan produced by Valley Regional Transit which establishes a vision of the comprehensive alternative transportation system needed, given the growth projections and regional and local road plans. In the South Meridian planning area, the following corridors have been identified as future transit routes:

*Future transit options have been identified for the South Meridian planning area.*

- Kuna-Meridian route, which includes a park & ride lot in Kuna and would provide secondary service (pick-ups approximately every 30-60 minutes all day, with frequent stops) between Kuna and Meridian
- Overland route, which would provide primary service (pick-ups approximately every 15-30 minutes during the peak hours, and 30-60 minutes mid-day with frequent stops between Meridian
- Micron Employer Express route, which would operate every 30 minutes during peak times between South Meridian and Micron
- Flex Route service from I-84 to Lake Hazel, and Ten Mile to Cloverdale

http://www.valleyregionaltransit.org/Portals/0/valleyconnect/valleyconnect.pdf

# 4 2035 Traffic Analysis

## 4.1 Segments

Each mile roadway segment within the South Meridian planning area was investigated to determine if the planned improvements in ACHD's CIP can provide sufficient capacity to support the anticipated 2035 volumes. As a baseline, the roadway segments identified in ACHD's 2012 Capital Improvements Plan (CIP), as outlined in Chapter 3 of this report were used for analysis purposes. In addition, the criteria utilized for determining if sufficient roadway segment capacity will exist in 2035 was based on *Table C-4: Ada County Street Capacity Guidelines*, located in the 2012 CIP for the peak hourly volumes.

An additional investigation into the average daily traffic was also developed for this project. The daily planning thresholds were developed only for this study and are discussed in further detail in section 4.1.3.

Table 7 outlines how each specific corridor's number of lanes was determined for the analysis. Some of these roadways may be identified in the Master Street Map as other classifications, however for purposes of this study the segment information contained in the CIP was used as a baseline for comparison purposes. If the number of lanes were not identified as an improvement in the ACHD CIP document, they were determined based on input received from ACHD's planning department and coordination with the project team.

**Table 7. ACHD 2012 Capital Improvements Plan – Hearing Draft May 23, 2012**

| Segment | From | To | MSM Designation | Number of Lanes (currently planned) |
|---|---|---|---|---|
| Overland | McDermott | Black Cat | Res Col | 2 lanes |
| Overland | Ten Mile | Linder | Res Art/PI Comm | 5 lanes |
| Victory | McDermott | Linder | Res Art | 3 lanes |
| Amity | McDermott | Linder | Res Art | 5 lanes |
| Lake Hazel | McDermott | Linder | Resmob Art | 5 lanes |
| McDermott | Overland | Lake Hazel | Not in Ada Co. | Not identified – used 2 |
| Black Cat | Victory | Overland | Res Art | 5 lanes |
| Black Cat | Amity | Victory | Res Art | 3 lanes |
| Black Cat | Lake Hazel | Amity | Res Art | Not identified – used 2 |
| Ten Mile | Overland | Lake Hazel | Res Art | 5 lanes |
| Linder | Overland | Lake Hazel | Res Art | 5 lanes |

### 4.1.2 Peak Hour

The peak hour condition for each segment was investigated to determine if there is sufficient capacity by the year 2035. Data obtained from the regional travel demand model was utilized for this analysis (see Appendix C). For consistency purposes, peak hour thresholds in the CIP were utilized for this analysis. According to ACHD's street capacity guidelines the threshold for Minor Arterials shall be LOS D and Principal Arterials LOS E for determining planning level segment capacity thresholds.

Tables 8 and 9 show the capacity determination based on the 2035 peak hourly volumes for each segment within the South Meridian Land Use Study limits.

**Table 8. CIP Peak Hour Thresholds – Minor Arterials**

| Segment | No. of Lanes Per Direction of Travel | CIP LOS D Threshold (One Way) | 2035 One Way Peak Hour Traffic Total | Sufficient Capacity at 2035 | % Volume to Capacity |
|---|---|---|---|---|---|
| McDermott Road – Lake Hazel to Amity | 1 | 550 | 735 | No | 134% |
| McDermott Road – Amity to Victory | 1 | 550 | 610 | No | 111% |
| McDermott Road – Victory to Overland | 1 | 550 | 526 | Yes | 96% |
| Black Cat Road – Lake Hazel to Amity | 1 | 550 | 574 | No | 104% |
| Black Cat Road – Amity to Victory | 1 | 720 | 770 | No | 107% |
| Victory Road – McDermott to Black Cat | 1 | 720 | 976 | No | 136% |
| Victory Road – Black Cat to Ten Mile | 1 | 720 | 1,005 | No | 140% |
| Victory Road – Ten Mile to Linder | 1 | 720 | 849 | No | 118% |

*Notes: The highest volume for a specific leg of an intersection was used for analysis purposes.*

**Table 9. CIP Peak Hour Thresholds – Principal Arterials**

| Segment | No. of Lanes Per Direction of Travel | CIP LOS E Threshold (One Way) | 2035 One Way Peak Hour Traffic Total | Sufficient Capacity at 2035 | % Volume to Capacity |
|---|---|---|---|---|---|
| Black Cat Road – Victory to Overland | 2 | 1,770 | 1,140 | Yes | 64% |
| Ten Mile Road – Lake Hazel to Amity | 2 | 1,770 | 1,350 | Yes | 76% |
| Ten Mile Road – Amity to Victory | 2 | 1,770 | 1,557 | Yes | 88% |
| Ten Mile Road – Victory to Overland | 2 | 1,770 | 2,355 | No | 133% |
| Linder Road – Lake Hazel to Amity | 2 | 1,770 | 1,301 | Yes | 74% |
| Linder Road – Amity to Victory | 2 | 1,770 | 1,603 | Yes | 91% |
| Linder Road – Victory to Overland | 2 | 1,770 | 1,605 | Yes | 91% |
| Lake Hazel Road – McDermott to Black Cat | 2 | 1,770 | 1,590 | Yes | 90% |
| Lake Hazel Road – Black Cat to Ten Mile | 2 | 1,770 | 1,886 | No | 107% |
| Lake Hazel Road – Ten Mile to Linder | 2 | 1,770 | 1,725 | Yes | 97% |
| Amity Road – McDermott to Black Cat | 2 | 1,770 | 1,848 | No | 104% |
| Amity Road – Black Cat to Ten Mile | 2 | 1,770 | 1,878 | No | 106% |
| Amity Road – Ten Mile to Linder | 2 | 1,770 | 1,690 | Yes | 95% |
| Overland Road – Ten Mile to Linder | 2 | 1,770 | 1,680 | Yes | 95% |

*Notes: The highest volume for a specific leg of an intersection was used for analysis purposes.*

### Summary

Portions of McDermott Road, Black Cat Road, Lake Hazel, Ten Mile and Amity Road exceed the thresholds identified. In addition, the entire Victory Road corridor, when strictly looking at the peak hourly volumes, shows that one travel lane per direction exceeds the outlined threshold.

When comparing the thresholds against the 2035 Peak Hour One-Way Traffic Total, it should be noted that with the exception of Ten Mile Road (Victory to Overland) and Victory Road (Black Cat to Ten Mile), portions of McDermott, Black Cat, Lake Hazel Ten Mile and Amity are slightly over the capacity thresholds (within an acceptable margin of error), as indicated in the percent comparison column on Tables 8 and 9.

With the exception of Ten Mile Road (Victory to Overland), Victory Road (McDermott to Black Cat and Black Cat to Ten Mile), and McDermott Road (Lake Hazel to Amity) all of the segments are less than 25% over the high end of the CIP peak hour threshold. Although some of the segments exceed the CIP capacity thresholds, it is not recommended to increase the number of thru-travel lanes on these roadways. The capacity demand at intersections generally dictates the delay for a given roadway network. Developing intersection improvements that accommodate anticipated travel demand during the peak hour will typically provide an overall network benefit to the adjacent roadway segments.

Average Daily Traffic (ADT) is a generally accepted planning method for determining the anticipated number of lanes for roadway segments and is a comparative tool used in reinforcing the recommendations in this document.

## 4.1.3 Average Daily Traffic Volumes

In addition to conducting a peak hour segment analysis, which is the governing criteria for determining the segment threshold capacity, an investigation into the ADT volumes was conducted. The peak hour capacity thresholds identified for ACHD's 2012 CIP was utilized for this analysis by applying a K-factor of 12 to the peak hour volume thresholds, based on the regional travel demand model projections, to arrive at the daily thresholds for planning purposes. The ADT condition for each segment was investigated to determine if there is sufficient capacity in the year 2035. Data

obtained from the regional travel demand model was utilized for this analysis and the original data is located in Appendix C for reference.

Tables 10 and 11 show the capacity determination based on the 2035 ADT volumes for each segment within the South Meridian study limits.

**Table 10. Average Daily Traffic Threshold – Minor Arterials**

| Segment | No. of Lanes Per Direction of Travel | ADT Threshold (One Way) | 2035 One Way ADT Traffic Total | Sufficient Capacity at 2035 | % Volume to Capacity |
|---|---|---|---|---|---|
| McDermott Road – Lake Hazel to Amity | 1 | 8,280 | 6,200 | Yes | 75% |
| McDermott Road – Amity to Victory | 1 | 8,280 | 6,100 | Yes | 74% |
| McDermott Road – Victory to Overland | 1 | 8,280 | 6,700 | Yes | 81% |
| Black Cat Road – Lake Hazel to Amity | 1 | 8,280 | 5,600 | Yes | 68% |
| Black Cat Road – Amity to Victory | 1 | 10,560 | 9,100 | Yes | 86% |
| Victory Road – McDermott to Black Cat | 1 | 10,560 | 8,400 | Yes | 80% |
| Victory Road – Black Cat to Ten Mile | 1 | 10,560 | 11,500 | No | 109% |
| Victory Road – Ten Mile to Linder | 1 | 10,560 | 8,500 | Yes | 80% |

*Notes: The highest volume for a specific leg of an intersection was used for analysis purposes.*

**Table 11. Average Daily Traffic Threshold – Principal Arterials**

| Segment | No. of Lanes Per Direction of Travel | ADT Threshold (One Way) | 2035 One Way ADT Traffic Total | Sufficient Capacity at 2035 | % Volume to Capacity |
|---|---|---|---|---|---|
| Black Cat Road – Victory to Overland | 2 | 21,240 | 10,900 | Yes | 51% |
| Ten Mile Road – Lake Hazel to Amity | 2 | 21,240 | 10,700 | Yes | 50% |
| Ten Mile Road – Amity to Victory | 2 | 21,240 | 10,000 | Yes | 47% |
| Ten Mile Road – Victory to Overland | 2 | 21,240 | 22,100 | No | 104% |
| Linder Road – Lake Hazel to Amity | 2 | 21,240 | 9,900 | Yes | 47% |
| Linder Road – Amity to Victory | 2 | 21,240 | 11,700 | Yes | 55% |
| Linder Road – Victory to Overland | 2 | 21,240 | 12,200 | Yes | 57% |
| Lake Hazel Road – McDermott to Black Cat | 2 | 21,240 | 12,900 | Yes | 61% |
| Lake Hazel Road – Black Cat to Ten Mile | 2 | 21,240 | 14,900 | Yes | 70% |
| Lake Hazel Road – Ten Mile to Linder | 2 | 21,240 | 13,700 | Yes | 65% |
| Amity Road – McDermott to Black Cat | 2 | 21,240 | 17,100 | Yes | 81% |
| Amity Road – Black Cat to Ten Mile | 2 | 21,240 | 14,400 | Yes | 68% |
| Amity Road – Ten Mile to Linder | 2 | 21,240 | 13,500 | Yes | 64% |
| Overland Road – Ten Mile to Linder | 2 | 21,240 | 16,000 | Yes | 75% |

*Notes: The highest volume for a specific leg of an intersection was used for analysis purposes.*

With the exception of Victory Road (Black Cat to Ten Mile) and Ten Mile Road (Victory to Overland), all of the study segments are well within the ADT thresholds established for this analysis. Taking into consideration both the peak hour and ADT thresholds, it is recommended to proceed forward with the segments as outlined in this document in Chapter 5. Although some of the segments may experience conditions that are at or slightly over the needs in the peak hour, the ADT volumes indicate additional capacity is available and is the primary reasoning behind preserving these corridors.

The Airport-Overland Alignment Study was adopted by the ACHD Commission in 2011. It is expected that the alignment would be constructed through development, thus making it unclear when the alignment would be completed. The Study also established that the primary purpose of the alignment is to provide connectivity, not

congestion relief. For these reasons this alignment was not included in the primary analysis of the South Meridian Study. That being said, upon adoption of the new alignment a high level analysis was completed to analyze if the alignment would impact the proposed road configuration. The results are summarized in tables 12 and 13.

### 4.1.4 Peak Hour

The inclusion of the Airport / Overland alignment creates a 5 to 15 percent volume difference over various segments. When the alignment is included it eliminates the failure as a result of congestion on two roadway segments:

- Amity-McDermott to Black Cat
- Lake Hazel- McDermott to Black Cat

Overland, Ten Mile to Linder will exceed capacity as a result of the alignment. All other impacts from the alignment are not substantial enough to trigger a change in proposed roadway configuration. Impacts to the intersections were not considered at this time. These will be evaluated when a realistic estimate of the construction year of the alignment is established.

**Table 12. Peak Hour Volumes – Including Airport / Overland Connection**

| Segment | South Meridian Network | | | South Meridian with Airport Overland connectivity | | |
|---|---|---|---|---|---|---|
| | Volume | VC | Capacity Available? | Volume | VC | Capacity Available? |
| **Peak Hour** | | | | | | |
| McDermott Road – Lake Hazel to Amity | 735 | 1.34 | No | 681 | 1.23 | No |
| McDermott Road – Amity to Victory | 610 | 1.11 | No | 597 | 1.09 | No |
| McDermott Road – Victory to Overland | 526 | 0.96 | Yes | 523 | 0.95 | Yes |
| Black Cat Road – Lake Hazel to Amity | 574 | 1.04 | No | 582 | 1.06 | No |
| Black Cat Road – Amity to Victory | 770 | 1.07 | No | 837 | 1.16 | No |
| Victory Road – McDermott to Black Cat | 976 | 1.36 | No | 1000 | 1.39 | No |
| Victory Road – Black Cat to Ten Mile | 1005 | 1.40 | No | 1066 | 1.48 | No |
| Victory Road – Ten Mile to Linder | 849 | 1.18 | No | 878 | 1.22 | No |
| Black Cat Road – Victory to Overland | 1140 | 0.64 | Yes | 1190 | 0.67 | Yes |
| Ten Mile Road – Lake Hazel to Amity | 1350 | 0.76 | Yes | 1361 | 0.77 | Yes |
| Ten Mile Road – Amity to Victory | 1557 | 0.88 | Yes | 1455 | 0.82 | Yes |
| Ten Mile Road – Victory to Overland | 2355 | 1.33 | No | 1855 | 1.05 | No |
| Linder Road – Lake Hazel to Amity | 1301 | 0.74 | Yes | 1353 | 0.76 | Yes |
| Linder Road – Amity to Victory | 1603 | 0.91 | Yes | 1536 | 0.87 | Yes |
| Linder Road – Victory to Overland | 1605 | 0.91 | Yes | 1599 | 0.90 | Yes |
| Lake Hazel Road – McDermott to Black Cat | 1590 | 0.90 | Yes | 1398 | 0.79 | Yes |
| Lake Hazel Road – Black Cat to Ten Mile | 1886 | 1.07 | No | 1756 | 0.99 | Yes |
| Lake Hazel Road – Ten Mile to Linder | 1725 | 0.97 | Yes | 1664 | 0.94 | Yes |
| Amity Road – McDermott to Black Cat | 1848 | 1.04 | No | 1678 | 0.95 | Yes |
| Amity Road – Black Cat to Ten Mile | 1878 | 1.06 | No | 1720 | 0.97 | Yes |
| Amity Road – Ten Mile to Linder | 1690 | 0.95 | Yes | 1602 | 0.91 | Yes |
| Overland Road – Ten Mile to Linder | 1680 | 0.95 | Yes | 1784 | 1.01 | No |

### 4.1.5 Average Daily Traffic Volumes

The ADTs are generally below the roadway capacity. The segments of Victory, McDermott to Black Cat, and Ten Mile, Victory to Overland, are slightly above capacity. The Airport-Overland alignment reduced ADT on these segments. Overall, additional capacity is available in the system with or without Airport-Overland alignment.

**Table 13. ADT Volumes**

| Segment | South Meridian Network | | | South Meridian with Airport Overland connectivity | | |
|---|---|---|---|---|---|---|
| | Volume | VC | Capacity Available? | Volume | VC | Capacity Available? |
| **Daily** | | | | | | |
| McDermott Road – Lake Hazel to Amity | 6200 | 0.75 | Yes | 6100 | 0.74 | Yes |
| McDermott Road – Amity to Victory | 6100 | 0.74 | Yes | 4800 | 0.58 | Yes |
| McDermott Road – Victory to Overland | 6700 | 0.81 | Yes | 3800 | 0.46 | Yes |
| Black Cat Road – Lake Hazel to Amity | 5600 | 0.68 | Yes | 4300 | 0.52 | Yes |
| Black Cat Road – Amity to Victory | 9100 | 0.86 | Yes | 7400 | 0.70 | Yes |
| Victory Road – McDermott to Black Cat | 8400 | 0.80 | Yes | 7100 | 0.67 | Yes |
| Victory Road – Black Cat to Ten Mile | 11500 | 1.09 | No | 9400 | 0.89 | Yes |
| Victory Road – Ten Mile to Linder | 8500 | 0.80 | Yes | 8100 | 0.77 | Yes |
| Black Cat Road – Victory to Overland | 10900 | 0.51 | Yes | 9900 | 0.47 | Yes |
| Ten Mile Road – Lake Hazel to Amity | 10700 | 0.50 | Yes | 12200 | 0.57 | Yes |
| Ten Mile Road – Amity to Victory | 10000 | 0.47 | Yes | 11800 | 0.56 | Yes |
| Ten Mile Road – Victory to Overland | 22100 | 1.04 | No | 16100 | 0.76 | Yes |
| Linder Road – Lake Hazel to Amity | 9900 | 0.47 | Yes | 10900 | 0.51 | Yes |
| Linder Road – Amity to Victory | 11700 | 0.55 | Yes | 11000 | 0.52 | Yes |
| Linder Road – Victory to Overland | 12200 | 0.57 | Yes | 11700 | 0.55 | Yes |
| Lake Hazel Road – McDermott to Black Cat | 12900 | 0.61 | Yes | 12600 | 0.59 | Yes |
| Lake Hazel Road – Black Cat to Ten Mile | 14900 | 0.70 | Yes | 15200 | 0.72 | Yes |
| Lake Hazel Road – Ten Mile to Linder | 13700 | 0.65 | Yes | 13800 | 0.65 | Yes |
| Amity Road – McDermott to Black Cat | 17100 | 0.81 | Yes | 13900 | 0.65 | Yes |
| Amity Road – Black Cat to Ten Mile | 14400 | 0.68 | Yes | 15100 | 0.71 | Yes |
| Amity Road – Ten Mile to Linder | 13500 | 0.64 | Yes | 12700 | 0.60 | Yes |
| Overland Road – Ten Mile to Linder | 16000 | 0.75 | Yes | 16000 | 0.75 | Yes |

## 4.2 Intersections

The following intersections were identified for analysis within the South Meridian study area:

- McDermott / Overland
- McDermott / Victory
- McDermott / Amity
- McDermott / Lake Hazel
- Black Cat / Overland
- Black Cat / Victory
- Black Cat / Amity
- Black Cat / Lake Hazel
- Ten Mile / Overland
- Ten Mile / Victory
- Ten Mile / Amity
- Ten Mile / Lake Hazel
- Linder / Overland
- Linder / Victory
- Linder / Amity
- Linder / Lake Hazel

As part of this analysis, investigation into the potential for stop-control, signalization and/or roundabouts were considered at each identified intersection for the year 2035. The following will outline the results of this analysis, and the recommendations for each intersection control.

As a baseline of capacity thresholds for signalized intersections, the information contained in Table C-5 of the ACHD 2012 CIP was used. This table shows a LOS D at volume-to-capacity ratio (v/c) =0.90 and LOS E at v/c =1.0 as capacity goals for signalized intersections. Although this was established as a baseline LOS and capacity goal to achieve at these intersections, some of the improvements exceed the criteria outlined in the 2012 CIP.

### 4.2.1 MUTCD Warrants

Prior to beginning any investigation into the control for a certain intersection, the current Manual on Uniform Traffic Control Devices (MUTCD) signalizations warrants were evaluated to determine if the traffic volumes anticipated for the 2035 condition warrant signalization. Meeting a MUTCD signal warrant does not justify signal installation. However, meeting a signal warrant does provide a strong foundation for the recommendation of a signal and advises that further investigation may be desirable. Warrant 3, Peak Hour Condition, was utilized for this study.

COMPASS provided 2035 peak hour directional volumes for each intersection identified and these data were used for the MUTCD Warrant 3, peak hour analysis. According to that analysis, all of the intersections meet the peak hour warrant for signalization.

Appendix D provides the peak hour volumes for the major and minor streets that were used for this assessment.

### 4.2.2 Signalized Intersections

All the information utilized for the intersection analysis was provided to the consultant by COMPASS using the Regional Travel Demand Model. The model outputs took into consideration the forecasted 2035 build condition outlined in the South Meridian Land Use Plan and does not include the Overland / Airport extension project. This extended corridor was not included in the model as it will be constructed through development, and no specific timeline is anticipated for development and construction.

For purposes of this planning-level analysis the following parameters were used as a baseline:

- Saturated Flow Rate = 1850 vehicles per hour per lane (vphpl)
- Peak Hour Factor = 0.95
- Heavy Vehicles = 5%
- Max Cycle Length = 150 seconds
- Turn Type = Protected + Permitted allowed
- Yellow Time = 4.0 seconds
- All-Red Time = 1.0 seconds

#### 4.2.2.1 AM Peak Hour

The regional travel demand model has the ability to provide ADT and PM peak hour volumes, but does not have the capability to output AM peak hour volumes. In order to develop representable AM peak hour volumes, two alternative methods were considered: reversing the PM peak hour flow volumes, and developing K-factors. It was ultimately determined that the use of K-factors, which calculates a relative percentage of the AM peak to the PM peak condition, provided a more accurate data set for analysis purposes. According to ITE's Traffic Engineering Handbook, "The proportion of AADT occurring in the design hour is often referred to as the K-factor, which is expressed as a decimal and which varies on the basis of the hour selected for design or planning application and the characteristics of the subject route and its development environment." ACHD's Traffic Department and modeler agreed.

The existing ADT obtained from ACHD was utilized to determine the relative AM peak hour K-factor for each intersection within the study limits. The information utilized for determining the relative

AM K-factors and associated AM peak hour turning movements are located in Appendix E.

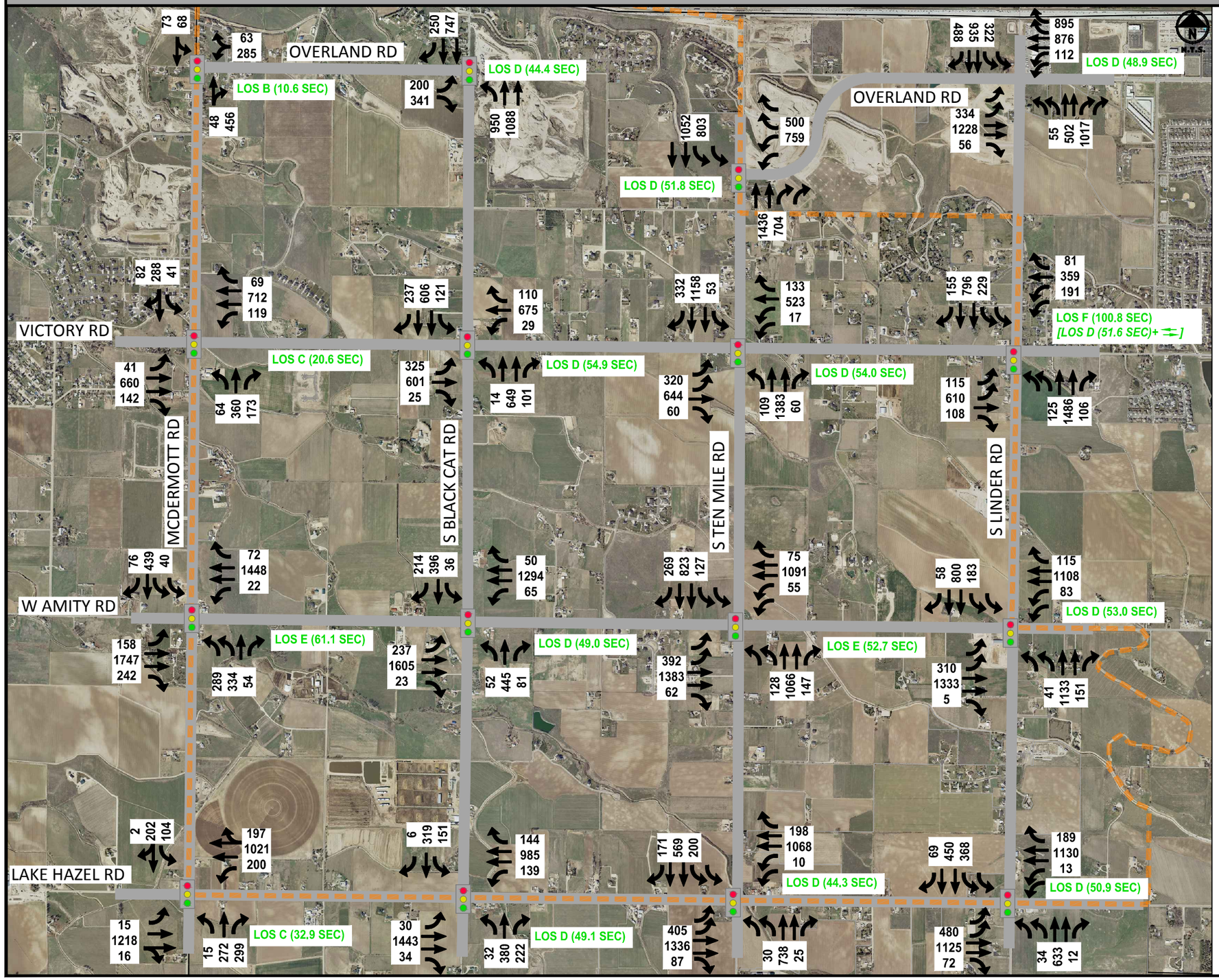
Figure 5 graphically represents the anticipated 2035 AM peak hour turning movement volumes, intersection control measure, lane configuration and associated LOS for each identified intersection. In terms of LOS, all the intersections during the AM peak hour operate at LOS D or better except the McDermott / Amity and Linder / Victory intersections. In terms of volume-to-capacity, as Table 14 indicates, some of the identified intersections are anticipated to operate at or above 1.00 with the proposed improvements. Although some of these intersections operate at or exceed a v/c ratio of 1.0, all of the improvements indicated in this report propose geometry that is generally consistent with lane recommendations in the 2012 ACHD Capital Improvement Plan.

**Table 14. 2035 Signalized Intersection Capacity – AM Peak Hour**

| Intersection | Lane Configuration – AM | 2035 AM Peak Hour | | Overall V/C Int |
|---|---|---|---|---|
| | | LOS | Delay(s) | |
| McDermott / Overland | See Figure 5 | B | 10.6 | 0.58 |
| McDermott / Victory | See Figure 5 | C | 20.6 | 0.65 |
| McDermott / Amity | See Figure 5 | E | 61.6 | 0.99 |
| McDermott / Lake Hazel | See Figure 5 | C | 32.9 | 0.92 |
| Black Cat / Overland | See Figure 5 | D | 44.4 | 1.02 |
| Black Cat / Victory | See Figure 5 | D | 54.9 | 1.04 |
| Black Cat / Amity | See Figure 5 | D | 49.0 | 0.94 |
| Black Cat / Lake Hazel | See Figure 5 | D | 49.1 | 1.04 |
| Ten Mile / Overland | See Figure 5 | D | 51.8 | 1.07 |
| Ten Mile / Victory | See Figure 5 | D | 54.0 | 1.00 |
| Ten Mile / Amity | See Figure 5 | D | 52.7 | 1.03 |
| Ten Mile / Lake Hazel | See Figure 5 | D | 44.3 | 0.88 |
| Linder / Overland | See Figure 5 | D | 48.9 | 1.00 |
| *Linder / Victory* | *See Figure 5* | *F* | *100.8* | *1.21* |
| *Linder / Victory – Addl EB and WB lane* | *See Figure 5* | *D* | *51.9* | *1.02* |
| Linder / Amity | See Figure 5 | D | 53.0 | 1.08 |
| Linder / Lake Hazel | See Figure 5 | D | 50.9 | 1.10 |

# 2035 AM PEAK HOUR - SIGNALIZED INTERSECTION CONFIGURATIONS

FIGURE 5




## SOUTH MERIDIAN TRANSPORTATION NETWORK ANALYSIS

**LEGEND:**

- LANE CONFIGURATION
- LOS A (7.9 SEC) — 2012 AM PEAK INT LOS
- INTERSECTION CONTROL
- SOUTH MERIDIAN STUDY AREA

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### Summary

Additional lanes can be added to the McDermott / Amity (North and Southbound lane) and Linder / Victory (East and Westbound lane) intersections to obtain a LOS D. However adding this additional capacity at the intersections would not provide much added benefit to the overall network unless additional lanes were included along the segment roadways.

The ultimate lane configuration recommendations are a result of the AM peak hour / PM peak hour signalized intersection and the AM peak hour / PM peak hour roundabout analyses and will be identified in the following sections below. The Synchro output for the AM and PM peak hour analyses is located in Appendix F.

#### 4.2.2.2 PM Peak Hour

The regional travel demand model provided 2035 PM peak hour volumes, which were utilized for the PM peak hour signalized intersection analysis. The model information provided entering and exiting volumes for each approach within the South Meridian study limits and these volumes were utilized to determine intersection turning movements based on that condition. All turning movements for this analysis are consistent with the methods recommended in the NCHRP-255 report, a publication produced by the Transportation Research Board titled, “Highway Traffic Data for Urbanized Area Project Planning and Design.” The PM peak hour turning movements utilized for this analysis are located in Appendix E for reference and correlate to the entering volumes identified by the COMPASS model.

Figure 6 graphically represents the anticipated 2035 PM peak hour turning movement volumes, intersection control, lane configuration, and associated LOS for each intersection within the study limits. Table 15 indicates the LOS and v/c ratio for each intersection based on the lane configuration depicted on Figure 6.

**Table 15. 2035 Signalized Intersection Capacity– PM Peak Hour**

| Intersection | Lane Configuration PM | 2035 PM Peak Hour – Build | | Overall V/C Int |
|---|---|---|---|---|
| | | LOS | Delay(s) | |
| McDermott / Overland | See Figure 6 | B | 13.8 | 0.65 |
| McDermott / Victory | See Figure 6 | C | 26.8 | 0.85 |
| McDermott / Amity | See Figure 6 | E | 59.8 | 1.05 |
| McDermott / Lake Hazel | See Figure 6 | D | 54.8 | 1.05 |
| Black Cat / Overland | See Figure 6 | C | 21.1 | 0.76 |
| Black Cat / Victory | See Figure 6 | D | 38.0 | 0.92 |
| Black Cat / Amity | See Figure 6 | E | 59.9 | 1.03 |
| Black Cat / Lake Hazel | See Figure 6 | D | 35.1 | 0.99 |
| Ten Mile / Overland | See Figure 6 | C | 22.3 | 0.94 |
| Ten Mile / Victory | See Figure 6 | E | 68.2 | 1.10 |
| Ten Mile / Amity | See Figure 6 | E | 61.8 | 1.02 |
| Ten Mile / Lake Hazel | See Figure 6 | D | 45.3 | 0.89 |
| Linder / Overland | See Figure 6 | F | 163.0 | 1.42 |
| *Linder / Victory* | *See Figure 6* | *E* | *67.8* | *1.05* |
| *Linder / Victory – Addl EB and WB lane* | *See Figure 6* | *C* | *33.0* | *0.94* |
| Linder / Amity | See Figure 6 | D | 48.4 | 1.01 |
| Linder / Lake Hazel | See Figure 6 | D | 37.5 | 1.01 |

## Summary

The intersection lane configurations indicated in Figure 6 are directly related to the roadway segment number of lanes identified in the CIP. Although some of these intersections are beyond LOS D and have v/c ratios above 1.0, the proposed lane configurations are consistent with the recommended roadway segments in this document. As Table 11 indicates, McDermott / Amity, Black Cat / Amity, Ten Mile / Victory, Ten Mile / Amity, and Linder / Victory operate at LOS E (Synchro output results from the PM peak hour analysis are located in Appendix F).

The intersection of Linder / Overland is predicted to operate at LOS F with 163.0 seconds of delay by the year 2035. The delay at this intersection is substantial, and is a function of the high left turning volumes at the intersection. With the exception of Linder / Overland, all of the above identified intersections can achieve a LOS D if additional thru lanes are added. Similar to the AM peak

hour condition, adding additional thru lanes for these intersections will improve the LOS experienced at the intersection itself, but without added capacity along the segment roadways, there is not a substantial overall network benefit to making these improvements.

The roadway segments outlined in the 2012 ACHD CIP are the recommended segments to accommodate the anticipated needs for the South Meridian study area. The proposed number of travel lanes outlined in the CIP is recommended to be carried forward for purposes of this analysis. The intersection configurations outlined in the recommendations section of this document are recommended to be carried forward for purposes of corridor preservation within the South Meridian study area.

# 2035 PM PEAK HOUR - SIGNALIZED INTERSECTION CONFIGURATIONS

FIGURE 6


DATE: Jul 20, 2012 FILE: XBO2554036-FIG 3NEW

## SOUTH MERIDIAN TRANSPORTATION NETWORK ANALYSIS

### LEGEND:

- LANE CONFIGURATION
- LOS A (7.9 SEC) — 2012 PM PEAK INT LOS
- STOP — INTERSECTION CONTROL
- SOUTH MERIDIAN STUDY AREA

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### 4.2.3 Roundabouts

In addition to considering the needs for signalization, the potential for roundabout placement was investigated. The AM and PM peak hour turning movements determined for the signalized intersections were also utilized for the roundabout analysis. The initial investigation at each intersection considered the placement of a single lane roundabout; if capacity was exceeded a dual lane roundabout was considered. If a dual lane roundabout did not meet the anticipated 2035 capacity needs, additional right turn bays were considered at locations where high right turn volumes are anticipated.

If the necessary dual lane configuration with dedicated right turn lanes were not sufficient to handle the anticipated 2035 capacity, a three lane roundabout was not considered at this time. Three lane roundabouts will be explored when there are better analytical methods available.

ACHD has outlined criteria for the Headway Measurements and HCM 2010 Variables when utilizing Excel or SIDRA 5.1 for analysis purposes. These criteria were input to the SIDRA modeling software for analysis purposes.

#### 4.2.3.1 AM Peak Hour

The AM peak hour turning movements utilized for the signalized intersection analysis were used for the AM peak hour roundabout analysis. Figure 7 graphically represents the anticipated 2035 AM peak hour turning movement volumes, lane configuration, and associated LOS for each intersection within the study limits. Table 16 indicates the LOS and associated delay for each intersection based on the lane configuration depicted on Figure 7.

**Table 16. 2035 Roundabout Intersection Capacity – AM Peak Hour**

| Intersection | Roundabout Control Type – AM | 2035 AM Peak Hour – Build Out | |
|---|---|---|---|
| | | LOS | Delay(s) |
| McDermott / Overland | Single Lane | A | 5.9 |
| McDermott / Victory | Dual Lane | B | 11.1 |
| McDermott / Amity | Dual Lane + EBR | F | 157.6 |
| McDermott / Lake Hazel | Dual Lane | C | 22.0 |
| Black Cat / Overland | Dual Lane | F | 110.9 |
| Black Cat / Victory | Dual Lane | D | 26.9 |
| Black Cat / Amity | Dual Lane + SBR | F | 115.7 |
| Black Cat / Lake Hazel | Dual Lane + WBR | F | 66.2 |
| Ten Mile / Overland | Dual Lane | F | 192.9 |
| Ten Mile / Victory | Dual Lane + SBR | F | 222.4 |
| Ten Mile / Amity | Three Lane | F | 246.3 |
| Ten Mile / Lake Hazel | Dual Lane + EBTR + WBR | F | 142.4 |
| Linder / Overland | Dual Lane + EBR + NBR + SBR | F | 410.5 |
| Linder / Victory | Dual Lane | F | 253.5 |
| Linder / Amity | Dual Lane + NBR | F | 372.1 |
| Linder / Lake Hazel | Dual Lane + EBTR + WBTR | F | 146.7 |

*EBR = Eastbound Right*
*SBR = Southbound Right*
*WBR = Westbound Right*
*NBR = Northbound Right*

## Summary

Many of the roundabouts within the study area reach LOS F during the AM peak hour condition. This can be primarily attributed to the 2035 peak hour volumes and the dominant directional (east / west or north / south) travel patterns and/or left turning vehicles anticipated in 2035. Roundabouts generally operate at better levels of service when there is a relative balance of approach volumes for all legs and sufficient time for gap acceptance into the roundabout is available. When a dominant movement occurs at a potential roundabout location it becomes increasingly difficult for the minor leg traffic to enter the roundabout, thus creating additional delay for those vehicles, effectively degrading the overall LOS experienced at the intersection.

Under the AM peak hour condition the McDermott / Overland, McDermott / Victory, McDermott / Lake Hazel, and Black Cat /

Victory intersections all operate at acceptable LOS. Proposed roundabout locations are included in the recommendations Section 5 (output data associated with the AM peak hour analysis is located in Appendix G).

#### 4.2.3.2 PM Peak Hour

Figure 8 graphically represents the anticipated 2035 PM peak hour turning movement volumes, lane configuration and associated LOS for each roundabout analysis conducted within the study limits. Table 17 identifies the LOS and associated delay for each intersection based on the lane configuration depicted on Figure 8.

**Table 17. 2035 Roundabout Intersection Capacity Analysis Summary – PM Peak Hour**

| Intersection | Roundabout Control Type – PM | 2035 PM Peak Hour – Build Out | |
|---|---|---|---|
| | | LOS | Delay(s) |
| McDermott / Overland | Single Lane | A | 6.4 |
| McDermott / Victory | Dual Lane | B | 14.5 |
| McDermott / Amity | Dual Lane + EBR | F | 176.4 |
| McDermott / Lake Hazel | Dual Lane | F | 92.4 |
| Black Cat / Overland | Dual Lane | E | 37.2 |
| Black Cat / Victory | Dual Lane | D | 28.5 |
| Black Cat / Amity | Dual Lane + SBR | F | 119.4 |
| Black Cat / Lake Hazel | Dual Lane + WBR | E | 38.1 |
| Ten Mile / Overland | Dual Lane | F | 171.4 |
| Ten Mile / Victory | Dual Lane + SBR | F | 154.5 |
| Ten Mile / Amity | Dual Lane + EBR +WBR + SBR | F | 295.7 |
| Ten Mile / Lake Hazel | Dual Lane + EBTR + WBR + SBR | F | 124.2 |
| Linder / Overland | Three Lane | F | 616.4 |
| Linder / Victory | Dual Lane + NBR | F | 155.9 |
| Linder / Amity | Dual Lane + SBR | F | 322.3 |
| Linder / Lake Hazel | Dual Lane + WBTR + SBR | F | 126.1 |

*EBR = Eastbound Right*
*SBR = Southbound Right*
*WBR = Westbound Right*
*NBR = Northbound Right*

## Summary

Similar to the AM condition, many of the potential roundabout intersection locations within the study area reach LOS F when analyzing the PM peak hour condition. Again, these degraded levels of service can generally be attributed to the hourly volumes anticipated in 2035 coupled with the dominant east/west and/or north/south travel patterns, as opposed to relatively even traffic volumes on all legs.

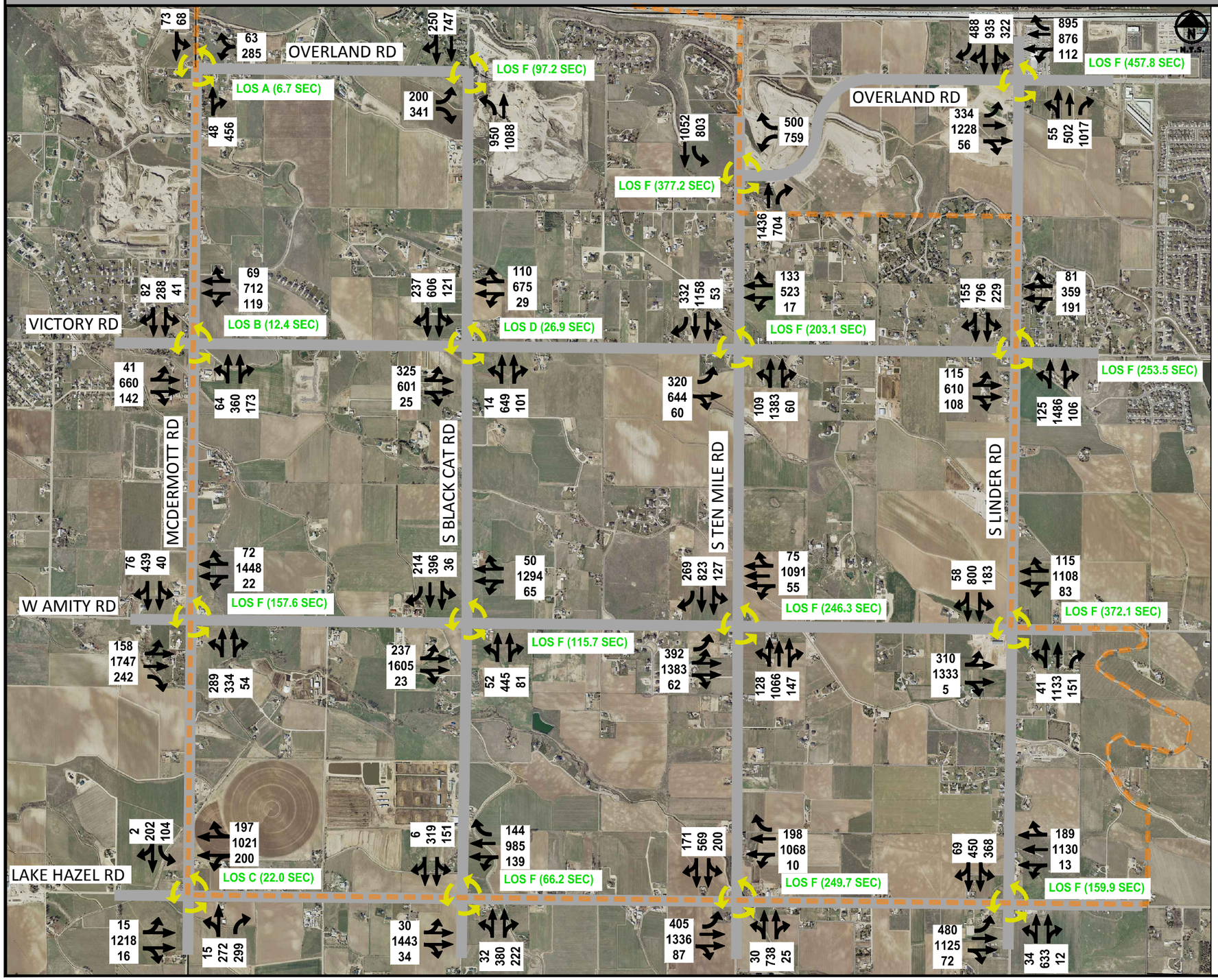
Based on the traffic volumes anticipated for the 2035 PM peak hour condition, the McDermott / Overland, McDermott / Victory and Black Cat / Victory intersections all operate at acceptable LOS. Analysis data associated for the PM peak hour Roundabout analysis is located in Appendix G.

In comparing the AM and PM peak hour analysis, the following roundabouts will operate at acceptable LOS, and were considered for placement under the ultimate recommendations:

- McDermott / Overland – single lane
- McDermott / Victory – dual lane
- Black Cat / Victory – dual lane

# 2035 AM PEAK HOUR - ROUNDABOUT INTERSECTION CONFIGURATIONS

**FIGURE 7**




## SOUTH MERIDIAN TRANSPORTATION NETWORK ANALYSIS

**LEGEND:**

LANE CONFIGURATION

LOS A (7.9 SEC) — 2012 AM PEAK INT LOS

INTERSECTION CONTROL

SOUTH MERIDIAN STUDY AREA

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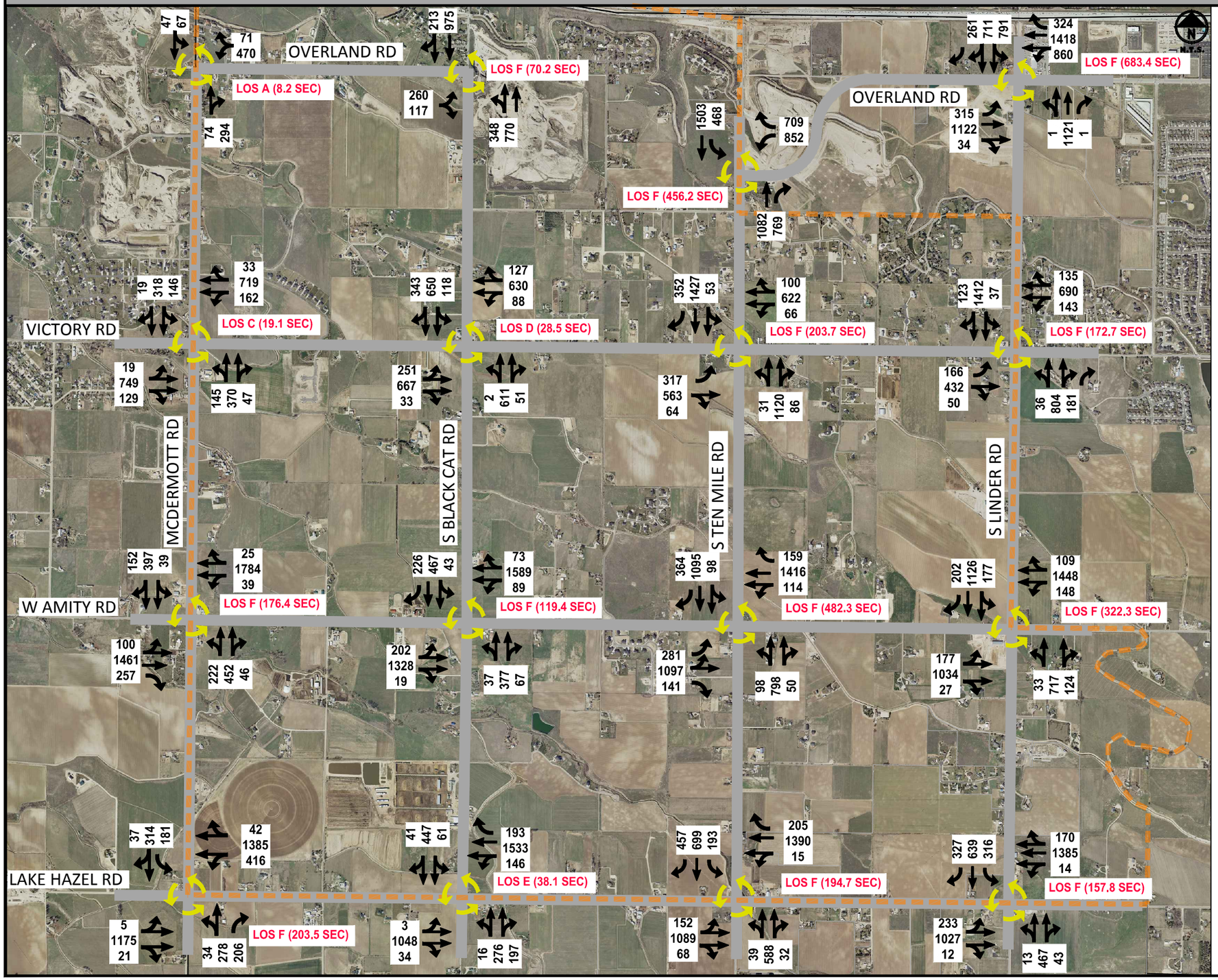
# 2035 PM PEAK HOUR - ROUNDABOUT INTERSECTION CONFIGURATIONS

FIGURE 8




## SOUTH MERIDIAN TRANSPORTATION NETWORK ANALYSIS

**LEGEND:**

- LANE CONFIGURATION
- LOS A (7.9 SEC) — 2012 PM INT PEAK LOS
- INTERSECTION CONTROL
- SOUTH MERIDIAN STUDY AREA

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# 5 Recommendations

After considering both the AM and PM peak hour conditions for signalized intersections and roundabouts, an aggregate of all the information was utilized to arrive at the recommended treatment for each of the study area intersections.

## 5.1 Segments

The roadway segments outlined in the current ACHD CIP are the recommended segments to accommodate the anticipated needs for the South Meridian study area. Figure 9 depicts the proposed number of travel lanes as outlined in the CIP and is recommended to be carried forward for purposes of this analysis.

Two, three, and five-lane road sections, as identified in the Livable Street Design Guide as both Residential Arterial and Rural Roads are recommended for the South Meridian area, and are shown in Figure 9.

## 5.2 Roundabout Locations

Many of the potential roundabout locations within the study area are anticipated to operate at LOS F by 2035. However, when comparing the AM and PM peak hour roundabouts analysis, three intersections operate well, are recommended to be carried forward as part of this analysis:

- McDermott / Overland – single lane (LOS A)
- McDermott / Victory – dual lane (LOS B in AM ; LOS C in PM)
- Black Cat / Victory – dual lane (LOS D)

In order to develop the roundabouts at these intersections, additional improvements will need to occur for the approach legs at the McDermott / Victory and Black Cat / Victory intersections. McDermott Road is recommended to be a two-lane facility and Victory Road is anticipated to be a three-lane facility at the McDermott / Victory intersection. Therefore, an additional approach lane along Victory Road and McDermott Road is needed in advance of this intersection to develop the proposed roundabout.

Black Cat Road is recommended to be a five-lane facility north of Victory Road and a three-lane facility south of Victory Road, and Victory Road is recommended to be a three-lane facility at the Black Cat / Victory intersection by 2035. Therefore, an additional approach lane along both legs of Victory Road and the south leg of Black Cat is needed in advance of this intersection, in order to develop the proposed roundabout.

Three lane roundabouts will be explored when there are better analytical methods available.

## 5.3 Signalized Intersections

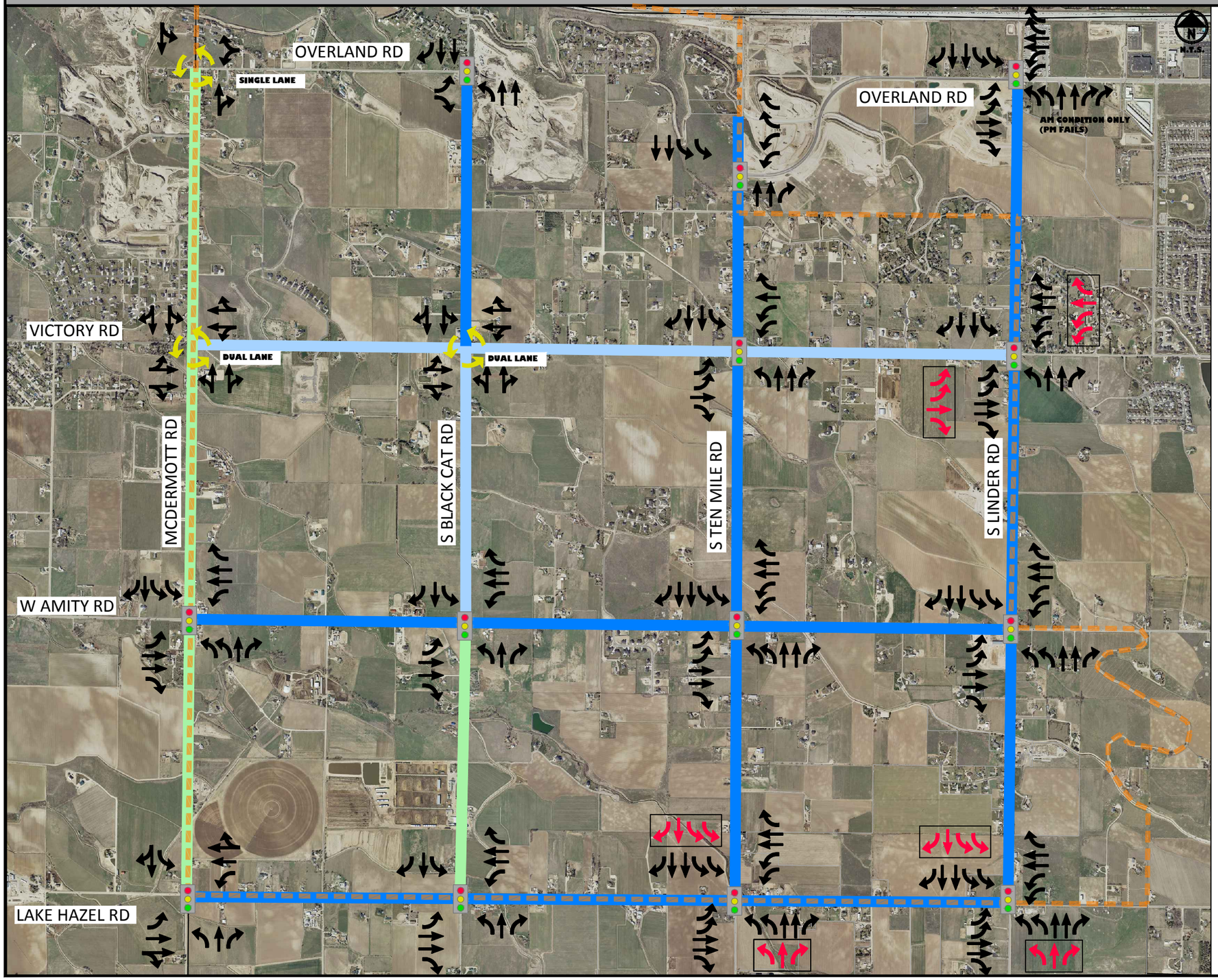
Table 18 summarizes the proposed signalized intersection improvements for each identified study intersection within the planning area. The proposed lane configurations and control type are represented in Figure 9.

**Table 18. Proposed Signalized Improvements**

| Intersection | Control | Intersection Type | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|---|
| | | | LOS | Delay(s) | LOS | Delay(s) |
| McDermott / Amity | Signalized Intersection | 6x5 | E | 61.6 | E | 59.8 |
| McDermott / Lake Hazel | Signalized Intersection | 5x3 sb<br>5x4 nb | C | 32.9 | D | 40.4 |
| Black Cat / Overland | Signalized T-Intersection | See Figure 9 | D | 44.4 | C | 21.1 |
| Black Cat / Amity | Signalized Intersection | 6x4 | D | 49.0 | E | 59.9 |
| Black Cat / Lake Hazel | Signalized Intersection | 6x4 | D | 49.1 | D | 35.1 |
| Ten Mile / Overland | T-Intersection - Signalized | See Figure 9 | D | 51.8 | C | 22.3 |
| Ten Mile / Victory | Signalized Intersection | 5x6 | D | 54.0 | E | 68.2 |
| Ten Mile / Amity | Signalized Intersection | 7x7 | D | 52.7 | E | 61.8 |
| Ten Mile / Lake Hazel | Signalized Intersection | 7x7 | D | 54.8 | D | 45.3 |
| Linder / Overland | Signalized Intersection | 7-8x7-8 | D | 48.9 | N/A | N/A |
| Linder / Victory | Signalized Intersection | 7x6 | D | 51.9 | C | 33.0 |
| Linder / Amity | Signalized Intersection | 7x7 | D | 50.9 | D | 48.4 |
| Linder / Lake Hazel | Signalized Intersection | 7x7 | D | 50.9 | D | 37.5 |

# 2035 RECOMMENDED INTERSECTIONS & SEGMENTS

**FIGURE 9**




## SOUTH MERIDIAN TRANSPORTATION NETWORK ANALYSIS

**LEGEND:**

- LANE CONFIGURATION
- INTERSECTION CONTROL
- SOUTH MERIDIAN STUDY AREA
- 2 LANE ROAD
- 3 LANE ROAD
- 5 LANE ROAD
- INTERIM TREATMENT

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## 5.4 Considerations

The Linder / Overland intersection currently has infrastructure in place to ultimately develop a 5x5 signalized intersection. The north and south legs are currently stop-controlled with the potential for signalization to take place once the demand volumes are reached.

As shown in Table 16, the proposed lane configuration at the Linder / Overland intersection will not sufficiently mitigate the anticipated volumes during the PM peak hour. Additional improvements beyond the lane configuration shown in Figure 9 will be required if LOS E or better is required.

The most substantial delay anticipated for the intersection is primarily attributable to the volume of westbound and southbound left turning movements. The left turn volumes also create substantial delay for the opposing thru movements. In order to sufficiently mitigate the anticipated 2035 volumes during the PM peak hour, additional improvements may be warranted. The anticipated signalized intersection footprint to achieve LOS D during the 2035 PM peak hour is located in Appendix F.

The Linder / Victory intersection is over capacity during the AM peak hour condition, as a result of maintaining a three-lane facility along Victory Road. LOS D can be achieved for both the AM and PM peak hour conditions if one additional eastbound and westbound thru lane is added to the intersection along Victory Road, making the intersection a 7x6, which is the recommended improvement for this intersection.

## 5.5 Provisional Treatments

Provisional intersection treatments and associated lane configurations are identified for the Ten Mile / Lake Hazel, Linder / Lake Hazel and Linder / Victory intersections in Figure 9. The recommended configurations outlined in Figure 9 (in black) are the provisional intersection lane configurations resulting from the build scenario determined from the regional travel demand model projections.

The roadway segments identified south of Lake Hazel along both Ten Mile and Linder Roads are currently planned to be rural two lane roads. As a provisional treatment in advance of determining

the ultimate roadway segment needs for both south legs of these intersections the lane configuration depicted in Figure 9 can be utilized. This configuration does not reflect the ultimate recommendations for this intersection and a degraded LOS will occur. Once improvements are identified for these segments south of the Ten Mile / Lake Hazel and Linder / Lake Hazel intersection it is recommended to implement the ultimate lane configuration identified in Figure 9 to adequately mitigate the anticipated travel demand at each intersection or conduct an updated intersection needs analysis. Placement of the signal poles and cabinets at the ultimate improvement footprint is recommended if provisional signalized intersection treatments occur prior to the investigation into the roadway segment needs of Ten Mile and Linder Road south of Lake Hazel.

The Linder / Victory intersection shows two thru lanes as the ultimate configuration for east and westbound traffic. Developing the provisional treatment of one thru lane for the east and westbound traffic is consistent with the roadway segment improvements identified along Victory. Developing a 6x5 intersection here will result in a reduced LOS at the intersection. It should be noted, that the ACHD Commission has directed staff to evaluate Victory Road, as an entire corridor between Eagle Road and McDermott Road as a five lane facility.

## 5.6 Turn Bay Recommendations

The left turn bay lengths at signalized intersections were determined based on the 95% queue resulting from the capacity analysis. As a baseline, the minimum storage length used for dedicated left turn bays was 100 feet, which is recommended for all left turn bay locations indicating a 95% queue length less than this minimum.

The ultimate left turn bay recommendations are an aggregate of the results from both the AM and PM signalized intersection analysis. The highest 95% queue length resulting from the either the AM or the PM condition was used and is recommended. The AM peak, PM peak and ultimate recommendation for left turn bay storage lengths are located in Appendix H.

The right turn bay length of 100 feet, as outlined in the Intersection Planning Level Standards (Submitted to ACHD March 21, 2006) is

the length identified for all dedicated right turn bays within the South Meridian boundary area.

## 5.7 Additional Considerations

With exception of the Linder / Victory AM peak hour and the Linder / Overland PM peak hour, all of the proposed improvements are anticipated to operate at LOS E or better. The proposed improvements at each intersection within the study limits reflect the number of lanes associated with each segment proposed in ACHD's CIP. This is reinforced with the analysis conducted in this document.

Although certain volume-to-capacity ratios at the signalized intersections are above 1.0 and some of the intersections will operate at LOS E in either the AM or PM peak hour condition, the recommendations are consistent with these goals.

Additional thru lanes to the following intersections operating at LOS E will result in improved LOS and volume-to-capacity ratios:

- Amity / McDermott – One additional Northbound and Southbound travel lane at the intersection
- Ten Mile / Victory – One additional Eastbound and Westbound travel lane at the intersection
- Ten Mile / Amity – One additional Eastbound and Westbound travel lane at the intersection

If the number of lanes along each segment is not increased to align with the intersection improvements, only the capacity issues at the intersections themselves would be mitigated.

Taking into consideration the anticipated 2035 LOS at the Linder / Victory intersection during both the AM (LOS F at 100.8 seconds) and PM (LOS E at 67.8 seconds) peak hour, the development of one additional eastbound and westbound lane at the intersection itself is recommended. These additional thru lanes at the Linder / Victory intersection will result in a LOS D with an average delay of 51.9 seconds during the AM peak hour and LOS C with an average delay of 33.0 seconds during the PM peak hour. Therefore, development of a 7x6 signalized intersection at Linder / Victory is the recommended ultimate lane configuration.

Additional improvements required to arrive at LOS D during the PM peak hour condition at the Linder / Overland intersection have been included for reference and should be taken into consideration prior to determining the final lane configuration solution for this intersection.

# 6 Comparisons with Other Studies

As previously discussed in Chapter 3, several independent studies have been developed in recent years, which have been adopted, or are in the process of being adopted, and designated future improvements to roadways within South Meridian. Table 19 describes whether the proposed roadway improvements in those documents are consistent with the recommendations developed through this study. The memorandum included in Appendix B contains the comparisons for all relevant studies undertaken in the planning area.

**Table 19. Consistency with Other Studies**

| Location | South Meridian | Other Studies | | | | | Comments |
|---|---|---|---|---|---|---|---|
| | | 2035 Communities in Motion | 2009 South Meridian Transportation Plan | ACHD 2013-2017 Five Year Work Plan | ACHD 2012 Capital Improvements Plan | ACHD Countywide Roundabout Study | |
| **SEGMENTS** | | | | | | | |
| McDermott; Overland to Victory | 2 lane | × | × | n/a | ✓ | n/a | CIM identified, though unfunded, improvements along McDermott Road to include conducting a study for the corridor as an expressway, establishing right-of-way needs, developing an access management plan, and widening from Lake Hazel to I-84 from 2 to 5 lanes.<br>2009 South Meridian Transportation plan identified McDermott Road as a Mobility Arterial |
| McDermott; Victory to Amity | 2 lane | × | × | n/a | ✓ | n/a | CIM identified, though unfunded, improvements along McDermott Road to include conducting a study for the corridor as an expressway, establishing right-of-way needs, developing an access management plan, and widening from Lake Hazel to I-84 from 2 to 5 lanes.<br>2009 South Meridian Transportation plan identified McDermott Road as a Mobility Arterial |
| McDermott; Amity to Lake Hazel | 2 lane | × | × | n/a | ✓ | n/a | CIM identified, though unfunded, improvements along McDermott Road to include conducting a study for the corridor as an expressway, establishing right-of-way needs, developing an access management plan, and widening from Lake Hazel to I-84 from 2 to 5 lanes.<br>2009 South Meridian Transportation plan identified McDermott Road as a Mobility Arterial |
| Black Cat; Overland to Victory | 5 lane | × | n/a | n/a | ✓ | n/a | CIM did not identify any funded improvements for Black Cat through 2035. |
| Black Cat; Victory to Amity | 3 lane | × | × | n/a | ✓ | n/a | CIM did not identify any funded improvements for Black Cat through 2035. |
| Black Cat; Amity to Lake Hazel | 2 lane | ✓ | × | n/a | × | n/a | Black Cat is identified as a 5 lane mobility arterial in the 2009 study. Improvements not identified in 2012 CIP. |
| Ten Mile; Overland to Victory | 5 lane | ✓ | ✓ | ✓ | ✓ | n/a | |
| Ten Mile; Victory to Amity | 5 lane | ✓ | ✓ | n/a | ✓ | n/a | |
| Ten Mile; Amity to Lake Hazel | 5 lane | ✓ | ✓ | n/a | ✓ | n/a | |
| Linder; Overland to Victory | 5 lane | ✓ | ✓ | n/a | ✓ | n/a | |
| Linder; Victory to Amity | 5 lane | ✓ | ✓ | n/a | ✓ | n/a | |
| Linder; Amity to Lake Hazel | 5 lane | ✓ | ✓ | n/a | ✓ | n/a | |
| Victory; McDermott to Black Cat | 3 lane | n/a | ✓ | n/a | ✓ | n/a | |
| Victory; Black Cat to Ten Mile | 3 lane | n/a | ✓ | n/a | ✓ | n/a | |
| Victory; Ten Mile to Linder | 3 lane | n/a | ✓ | n/a | ✓ | n/a | |
| Amity; McDermott to Black Cat | 5 lane | ✓ | ✓ | n/a | ✓ | n/a | |
| Amity; Black Cat to Ten Mile | 5 lane | ✓ | ✓ | n/a | ✓ | n/a | |
| Amity; Ten Mile to Linder | 5 lane | ✓ | ✓ | n/a | ✓ | n/a | |
| Lake Hazel; McDermott to Black Cat | 5 lane | ✓ | n/a | n/a | ✓ | n/a | |
| Lake Hazel; Black Cat to Ten Mile | 5 lane | ✓ | n/a | n/a | ✓ | n/a | |
| Lake Hazel; Ten Mile to Linder | 5 lane | ✓ | n/a | ✓ | ✓ | n/a | |

*✓ = Consistent with plan* *× = Inconsistent with plan* *n/a = No comparable improvement recommended*

| Location | South Meridian | Other Studies | | | | | Comments |
|---|---|---|---|---|---|---|---|
| | | 2035 Communities in Motion | 2009 South Meridian Transportation Plan | ACHD 2013-2017 Five Year Work Plan | ACHD 2012 Capital Improvements Plan | ACHD Countywide Roundabout Study | |
| **INTERSECTIONS** | | | | | | | |
| McDermott / Overland | Single lane roundabout | n/a | × | n/a | n/a | ✓ | The South Meridian Plan recommends signalized T-intersection. The South Meridian Study integrated the Airport / Overland Road connection in their analysis. |
| McDermott / Victory | Dual lane roundabout | n/a | × | n/a | n/a | × | The South Meridian Plan recommends a 5x3 signalized intersection; Countywide Roundabout Study recommends a multi-lane roundabout. |
| McDermott / Amity | 6x5 signalized | n/a | × | n/a | n/a | ✓ | The South Meridian Plan recommends a dual lane roundabout. |
| McDermott / Lake Hazel | 5x3 signalized | n/a | ✓ | n/a | × | × | CIP recommends a shared northbound thru/right lane ; Countywide Roundabout Study recommends a multi-lane roundabout |
| Black Cat / Overland | T-intersection | n/a | × | n/a | n/a | × | The South Meridian Plan recommends a dual lane roundabout for this intersection. The South Meridian Study integrated the Airport / Overland Road connection in their analysis; Countywide Roundabout Study recommends a multi-lane roundabout. |
| Black Cat / Victory | dual lane roundabout | n/a | ✓ | n/a | ✓ | × | Countywide Roundabout Study recommends a multi-lane roundabout. |
| Black Cat / Amity | 6x4 signalized | n/a | × | n/a | ✓ | × | The South Meridian Plan recommends a dual lane roundabout; Countywide Roundabout Study recommends a multi-lane roundabout. |
| Black Cat / Lake Hazel | 6x4 signalized | n/a | × | n/a | × | × | The South Meridian Plan recommends a 6x5 signalized intersection; CIP recommends shared east, west, and southbound shared thru/right lanes; Countywide Roundabout Study recommends a multi-lane lane roundabout. |
| Ten Mile / Overland | T-intersection | n/a | × | ✓ | n/a | × | The South Meridian Plan recommends a 7x7 signalized intersection. The South Meridian Study integrated the Airport / Overland Road connection in their analysis; Countywide Roundabout Study recommends a multi-lane roundabout. |
| Ten Mile / Victory | 6x5 signalized | n/a | × | × | ✓ | × | The South Meridian Plan recommends a 5x3 signalized intersection; The FYWP identifies development of an interim signal with left turn lanes on all approaches; Countywide Roundabout Study recommends a multi-lane roundabout. |
| Ten Mile / Amity | 7x7 signalized | n/a | × | × | ✓ | ✓ | The South Meridian Plan recommends a dual lane roundabout; The FYWP identifies development of an interim signal with left turn lanes on all approaches. |
| Ten Mile / Lake Hazel | 7x7 signalized | n/a | × | n/a | × | × | The South Meridian Plan recommends dedicated right-turn bays; CIP recommends a dual lane roundabout; Countywide Roundabout Study recommends a dual lane roundabout. |
| Linder / Overland | TBD | n/a | × | n/a | × | ✓ | The South Meridian Plan recommends a 7x7 signalized intersection; CIP recommends a 7wb x 8 eb x 5 signalized intersection |
| Linder / Victory | 7x6 signalized | n/a | × | n/a | × | × | The South Meridian Plan recommends a dual lane roundabout; CIP recommends a shared thru/right turn lane for northbound and eastbound lanes; Countywide Roundabout Study recommends a multi-lane roundabout. |
| Linder / Amity | 7x7 signalized | n/a | × | n/a | × | × | The South Meridian Plan recommends a dual lane roundabout; CIP recommends single left turn lanes for all approaches; Countywide Roundabout Study recommends a multi-lane roundabout. |
| Linder / Lake Hazel | 7x7 signalized | n/a | × | n/a | × | × | The South Meridian Plan recommends a 5x5 signalized intersection; CIP recommends 5x6 signalized intersection; Countywide Roundabout Study recommends a dual lane roundabout. |

*✓= Consistent with plan* *× = Inconsistent with plan* *n/a = No comparable improvement recommended*