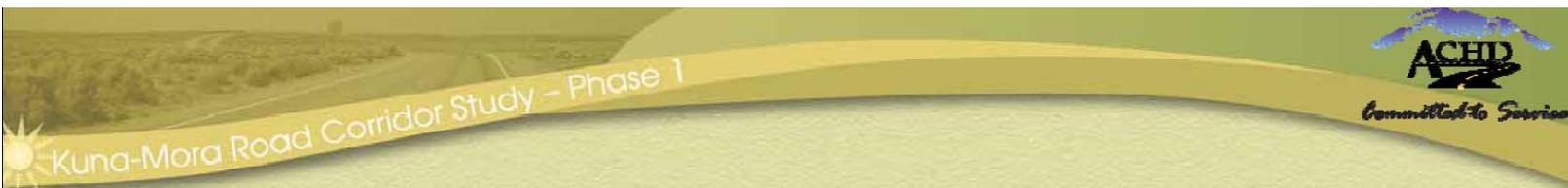




Kuna-Mora Road Corridor Study Phase 1

Prepared for
Ada County Highway District

November 2008



CH2MHILL

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1.0 Introduction

A substantial number of developments and planned communities have recently been proposed in the southwest Boise area and along the Kuna-Mora Road corridor. In response to this growth and the abundance of development proposals, a need has arisen to study in greater detail the future transportation demand in this area, and to identify and preserve adequate right-of-way for needed future transportation corridors. This study evaluates and establishes a policy for preservation of a transportation corridor based on the long-term needs of Ada County. The planning horizon for this document is 2030 and efforts have been made to address potential conditions beyond that timeframe. Since the start of our study, fluctuation in the real estate market conditions has occurred. This market may fluctuate from year to year, however, long-range planning should not be discounted because of this variation. Depending on whether development occurs within a Planned Community development or in an established municipality, it will represent development and additional demand on the transportation system. The assumptions and base information used to develop the 2030 planning horizon forecasts are expected to change little as a result of this potential categorical revision.

The Ada County Highway District (ACHD) commissioned two studies – the Southwest Boise Transportation Study (SWBT) and the Kuna-Mora Road Corridor Study – to identify future roadway, intersection, and corridor needs. The SWBT Study focuses on the area between Overland Road and King Road, from Eagle Road in the west to Pleasant Valley Road in the east. The Kuna-Mora Road Corridor Study includes the area along Kuna-Mora Road, from the Ada/Canyon County line in the west to the Black’s Creek interchange with I-84 at the east end of Kuna-Mora Road.

The Kuna-Mora Road corridor study is the culmination of previous efforts that have concluded the need for an improved and continuous roadway along the Kuna-Mora Road alignment from the Canyon County line at Bowmont Road to Interstate 84. The currently adopted long-range transportation plan, *Communities in Motion* (CIM), produced by the Community Planning Association of Southwest Idaho (COMPASS) and adopted by ACHD in September 2007, suggests that the Kuna-Mora Road should be preserved to allow for an expressway with potential grade-separated interchanges (see appendix E). Currently, this facility is a non-continuous, two-lane rural route that accommodates minimal traffic volumes. According to the COMPASS 2030 Functional Classification Map, it is classified as a principal arterial.

The corridor covers approximately 21 miles beginning at its western terminus at the Ada/Canyon County line at Bowmont Road (south of Kuna) and extending east to I-84 south of Boise. Figure 1-1 depicts the study limits for this project. CIM describes the area as follows:

“Much of the western end of this corridor is irrigated farmland. Bureau of Land Management (BLM) property breaks the continuity of the roadway between McDermott and Swan Falls roads. Farmland is irrigated from the Mora Canal, south of Kuna. While much of the land is held in 40-acre parcels, there are many 1- to 5-acre parcels along the road. Subdivisions are increasing in number along

the corridor. Further east, land along the corridor turns into unirrigated land, and scattered non-residential uses, including a gun club and model airplane flight area. The BLM owns a small lake and wetlands near I-84.”

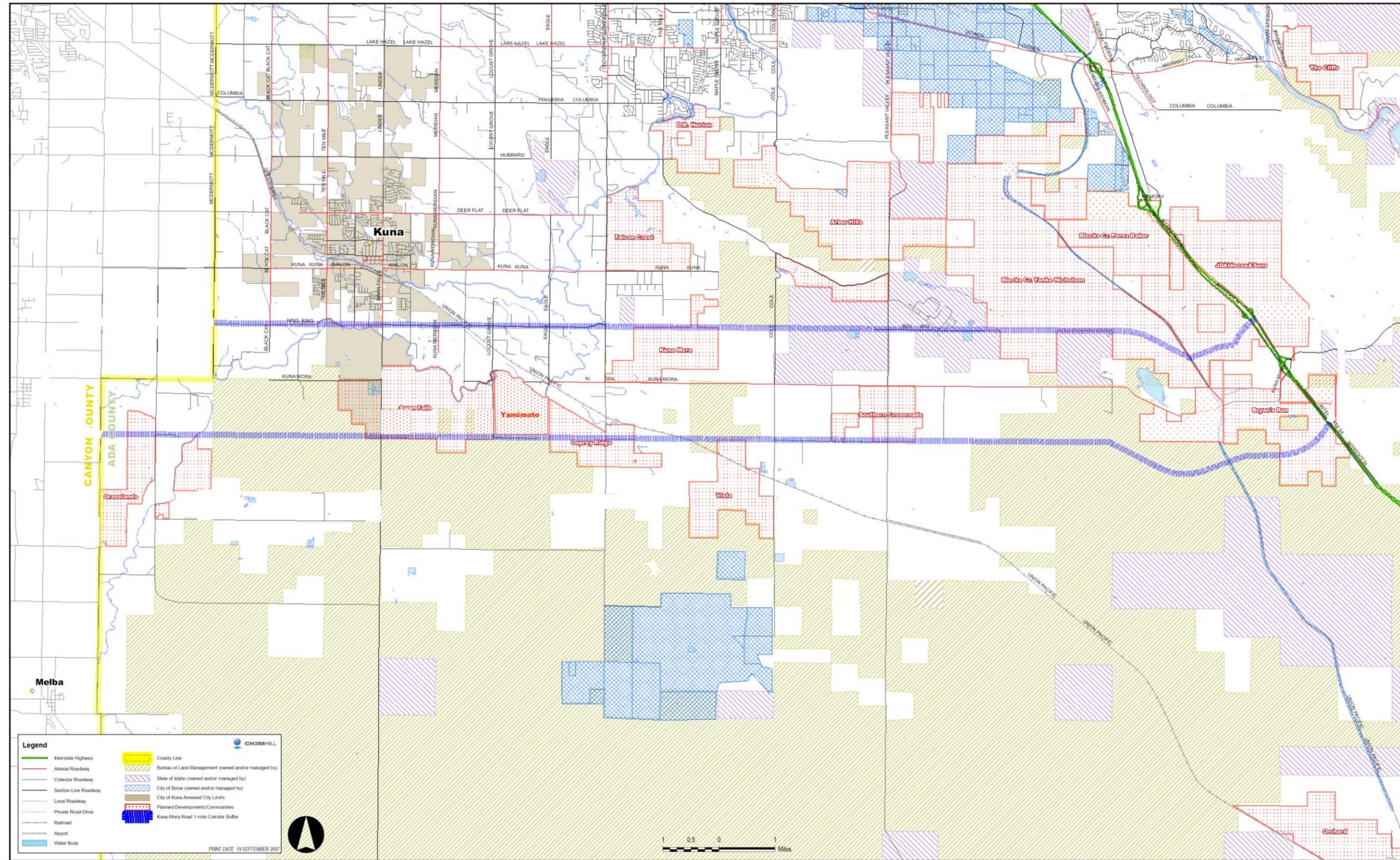
A recent report discussing the status of CIM, how it has been followed, growth and development trends both inside municipalities and in rural areas of the county. This report has been included in the appendix for reference (see appendix E).

In response to conclusions reached by CIM and the need to take immediate action to preserve this corridor ACHD drafted a *Kuna-Mora Road Interim Policy* that was adopted June 20, 2007 (see appendix A). Conditions of this policy dictate preservation of a 200-foot wide corridor to accommodate an expressway with three travel lanes in each direction, center turn lanes where warranted, and a median island. Major intersections were identified at State Highway 69 (SH-69)/Meridian Road, Cloverdale Road, and Pleasant Valley Road. These locations were identified as possible interchanges or signalized intersections as development occurs. The *Interim Policy* also suggests the need to restrict full access to 1-mile spacing and allow partial access at 0.5- and 0.25-mile approaches. Traffic signals would only be permitted at 1-mile access locations. Additionally, provisions are included for consideration and development of frontage and backage roads and parallel collector systems.

In 2007, ACHD executed a contract with CH2M HILL to verify proposed conditions associated with the *Interim Policy*. In order to complete this effort, CH2M HILL collaborated with COMPASS to produce additional land use scenarios that were viewed as more reflective of anticipated development in this area. This report discusses in detail the process, analysis, and recommendations based on this evaluation. In subsequent sections of this report, each of the following key elements is considered in development of a final recommendation for the corridor:

- Stakeholder and Public Involvement
- Traffic Modeling
- Traffic Operations
- Access Control
- Design Criteria
- Conclusions

FIGURE 1-1
Project Limits and Study Area



KUNA-MORA ROAD CORRIDOR

2.0 Public Involvement and Stakeholder Meetings

Public Involvement Meeting (PIM) one (1) was held on August 16, 2007 at the Kuna Public Library. The intent of this initial meeting was to convey the background and intent of the current project, identify the associated study limits, review the Interim Kuna-Mora Road Policy, and provide insight into future project phases. This information was provided in a series of presentation display boards at an open house meeting (see appendix G). A total of 151 individuals attended the meeting. A comment form was provided to solicit feedback on project need, corridor issues and concerns, and general comments. Twenty-eight written comments forms were received. A summary of these comments was prepared and is included (see appendix H). The following opinions were noted:

- 68 percent think a corridor study is needed.
- 68 percent do not think the corridor should be developed along Kuna-Mora Road.
- 61 percent think the corridor should be moved north or south.
- 14 percent think that additional north-south access is needed.
- 39 percent think an east-west corridor should be preserved
- 21 percent are concerned about noise.
- 11 percent think an expressway is needed.

A second PIM was held on November 8, 2007, at Kuna High School to convey preliminary results of the Phase 1 study, and specifically to explain intended development of the Final Kuna-Mora Road Policy. The meeting focused on presenting an adaptable and flexible solution to Kuna-Mora Road. Ultimately, the corridor is expected to become a high-volume facility driven primarily by localized development. It was proposed that initially the corridor would be developed as a continuous two-lane rural arterial, but could ultimately become a limited access facility with frontage/backage roads. This information was provided in a series of display boards at an open house meeting (see appendix I). A total of 105 individuals attended this meeting. Again, a comment form was provided to solicit feedback on the Phase 1 findings. 26 written comments forms were received. A summary of these comments was prepared and is included (see appendix J). Based upon the comments received, the following items were noted:

- 50 percent agreed with staged approach, 31 percent did not, 19 percent expressed no opinion.
- 62 percent agreed with the plan to limit access, 8 percent did not, 30 percent did not express an opinion.
- 19 percent think the corridor should be built to a larger cross-section than 2 lanes initially.
- 19 percent favor a Kuna-Mora Road expressway as an alternative to I-84.
- 27 percent are concerned about impacts to adjacent property.
- 31 percent felt an alternate alignment should be considered.

Generally, the written comments align with verbal commentary heard at these meetings.

In addition to the two public involvement meetings, several stakeholder meetings were held to discuss the proposed project and solicit feedback from developers, property owners, government agencies, and associated representatives. The stakeholder meetings and topics discussed are summarized in Table 2-1. Meeting minutes for each of these meetings are included (see appendix K).

TABLE 2-1 Stakeholder Meetings, Attendees, and Issues Discussed		
Date	Attendees	Issues Discussed
September 17, 2007	Idaho Air National Guard (IDANG), U.S Bureau of Land Management (BLM), the Idaho Transportation Department (ITD), and Idaho Power Company	Air space, ground transport, Birds of Prey Conservation Area, BLM lands, funding, bypass opportunities
September 20, 2007	City of Boise, Nampa Highway District, City of Kuna, Ada County, Canyon County, Idaho Department of Lands (IDL), and Idaho Power Company	Power facilities, developer plans, access management, access, Bowmont Road, corridor width, railroad, planned communities
September 26, 2007	Joyceann Fick and Bob Fick	Question need for this project, equal treatment of stakeholders, resulting value of land, north-south access, driven by developers and COMPASS
September 28, 2007	Vision Land Management, Yanke/Nicholson, Washington Group International (WGI), and Isaac's Canyon, Inc.	Connection to Interstate 84 (I-84), access, traffic, corridor width, additional I-84 interchange
October 15, 2007	WRG Design and WGI	Corridor width, interchanges through the corridor, status of Southern Crossroads Development
October 17, 2007	Vision Land Management, Spink Butler, and Dennis Baker and Associates	Right-of-way width, cross section, CIM amendment, traffic

3.0 Traffic Modeling

3.1 Background Information

The COMPASS Travel Demand Model was used to forecast predicted levels of traffic demand along the Kuna-Mora Road corridor in the year 2030. The forecast model used is based on the travel demand model developed for CIM, the long-range transportation plan (LRTP) for the Ada and Canyon County region, adopted in 2006. Two primary factors affecting the outcome of the forecast model include predicted land use (population density, location, and types of land uses) and the corresponding transportation network (highways, transit, and local streets in the region).

CIM considered future transportation needs by developing two land use scenarios: the “Community Choices” scenario – the adopted land use scenario used in the LRTP – and the “Trend” scenario, for comparison purposes. Both land use scenarios considered the effects of growth on the regional transportation network. The “Trend” scenario assumes growth in the region continues much as it has historically. Low-density residential development would be expected to result in growth extending beyond the areas of impact for cities in the region. Businesses and jobs under the “Trend” scenario would be expected to remain mostly separated from housing, with more growth occurring in undeveloped areas. In contrast, the “Community Choices” scenario assumes more infill development and redevelopment in existing developed areas (see appendix D and E). Higher residential densities and more densely developed areas around major transportation corridors are expected to focus employment and population growth primarily within the existing city limits and their areas of impact.

The City of Kuna, as shown in Figure 3.1 has expanded their city limits east along Kuna-Mora Road. This expansion means that existing land density based on the county requirements would now fall under the City of Kuna density of land-use. Based on our modeling efforts, it appears unlikely that changes made to density levels in this area under the City of Kuna zoning requirements will have a noticeable impact on the resulting travel demand for the planning horizon forecast of the overall corridor. There are many assumptions based on expected growth trends and development of land that could be significantly smaller than anticipated that were used to develop the base 2030 forecasts. Any increased development density in one location is likely to be offset by decreases in another. This is our anticipated result but as development along the corridor begins to fill in this vacant land, a review of the assumptions and approved densities may be required to ensure that our planning level densities and assumed demographics hold to what is implemented. Subsequent phases of the study will evaluate specific segments of the corridor in detail and at that time, proposed development patterns will be further reviewed.

Figure 3-1
Area of Impact Change and City Limit Expansion (2007 to 2009)

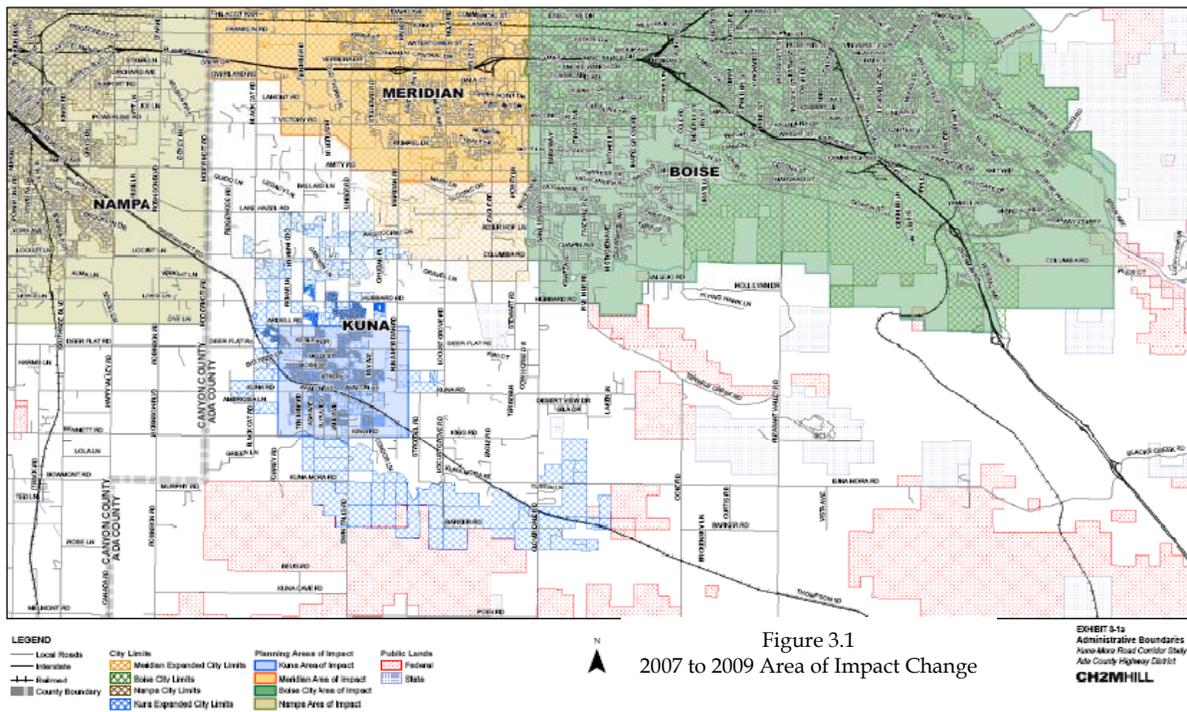


Figure 3.1
2007 to 2009 Area of Impact Change

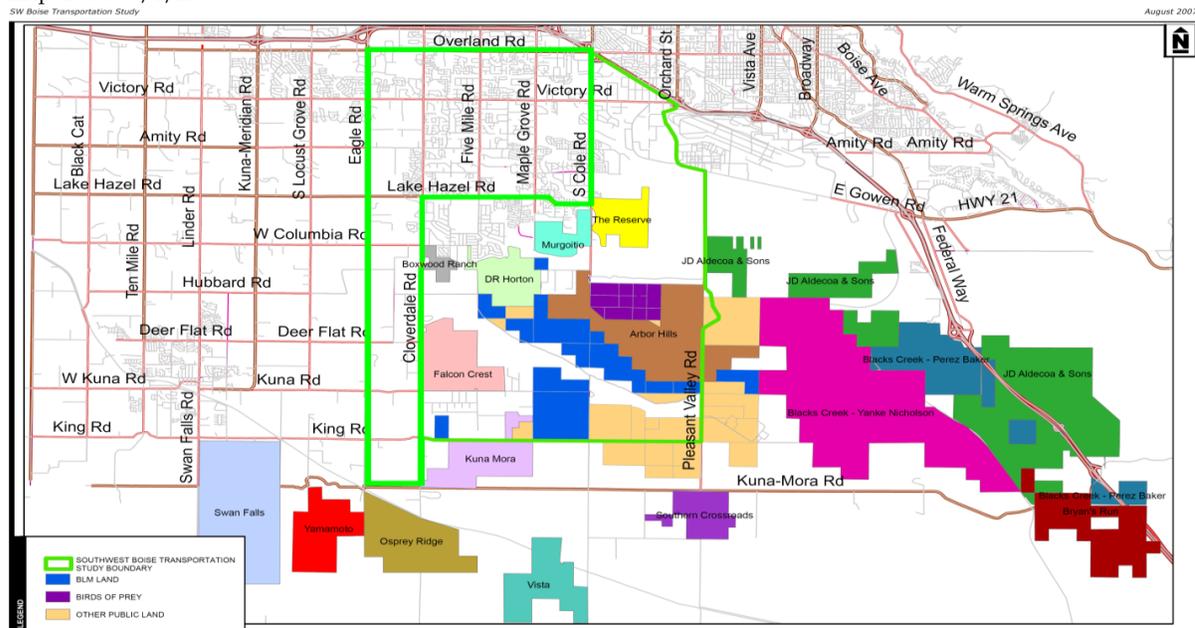
3.2 Forecast Model Demographic Refinements

Neither the “Trend” scenario nor the “Community Choices” scenario predicted the level and concentration of development currently anticipated in the southern part of Ada County. To provide a better estimate of future travel demand in the Kuna-Mora Road corridor resulting from this increase in proposed development, two new forecast scenarios were prepared. These forecasts considered increases in planned development and 15 planned communities south of the City of Boise and along Kuna-Mora Road (see Figure 3-2).

Estimated demographic information for each subdivision and planned community, such as projected population, number of households, number of vehicles, and employment data, were incorporated into the forecast models (see Table 3-1). Assumptions were made with respect to some of the development. The study was prepared using the most recent development information available at the time of the study. Stakeholder meetings were held to gather feedback from municipalities, developers, private property owners, and government representatives. The information gathered from these meetings was used to further refine the assumptions in the report.

Regardless of whether the development begins at the east end of the corridor, the west end, or in the center, the study assumes a certain level of development by the 2030 planning horizon. The resulting demand on the transportation system is not predicated on whether that growth occurred within existing or expanded city limits or within a new “planned community.” To the transportation system, this demand is seen as demand.

Figure 3-2*
 2030 Planned Development in South West Boise Transportation Study Area and Kuna-Mora Road Corridor Study Area
 *map created 6/1/2007



The information presented in this study was accurate at the time the Study was prepared. The remaining phases of the corridor study will reflect appropriate forecasts and projected development patterns. This information will be more accurate once additional land use information is provided by developments and the corresponding land use agencies. Within the study area of the Southwest Boise Transportation (SWBT) Study (see Figure 3-2), planned development is at a stage sufficient to assume that by 2030, 100 percent will be built out.

However, outside of the SWBT Study area, the proposed planned communities are at varying stages of planning and proposal. Many of these planned communities do not have defined demographic data, and for others, the data changes frequently as developers adjust their plans.

The two forecast scenarios were prepared, based on the uncertainty of development levels and the range of timing horizons for these planned communities. Both forecasts assume that within the SWBT Study area, 100 percent of the planned development occurs. Outside the SWBT Study area, the first forecast assumes modest development levels, while the second forecast assumes substantially more intensive development levels. The two scenarios resulted in forecast travel demands and patterns that were used to estimate 2030 traffic volumes for this study.

TABLE 3-1
2030 Demographic Data included in Forecast Models

Planned Development	Households	Jobs	Schools
The Reserve ^A	2,600	4,880	—
Murgurito ^A	1,200	—	—
DR Horton ^A	1,800	—	—
Arbor Hills ^A	6,700	3,385	6
Falcon Crest ^A	2,000	105	—
Boxwood Ranch ^A	N/A	N/A	N/A
Kuna Mora ^A	3,895	1,675	2
Blacks Creek – Perez Baker ^B	2,695/5,395	760/1,515	2
Blacks Creek – Yanke Nicholson ^B	5,110/10,225	2,260/4,515	5
Bryan's Run ^B	1,560/3,120	3,375/6,750	2
JD Aldecoa & Sons ^B	4,640/9,280	2,050/4,095	2
Osprey Ridge ^B	1,235/2,470	620/1,240	4
Southern Crossroads ^B	1,380/2,760	490/980	1
Vista ^B	675/1,350	185/370	—
Swan Falls ^B	2,220/4,440	370/735	2
Yamimoto ^B	600/1,200	—	—

^A Development located within SWBT Study area and assumed fully built-out

^B Development located outside SWBT Study area and assumed modest/intensive build out levels

Source: Southwest Boise Transportation Study, Expanded Area Scenario Land-Use Assumptions

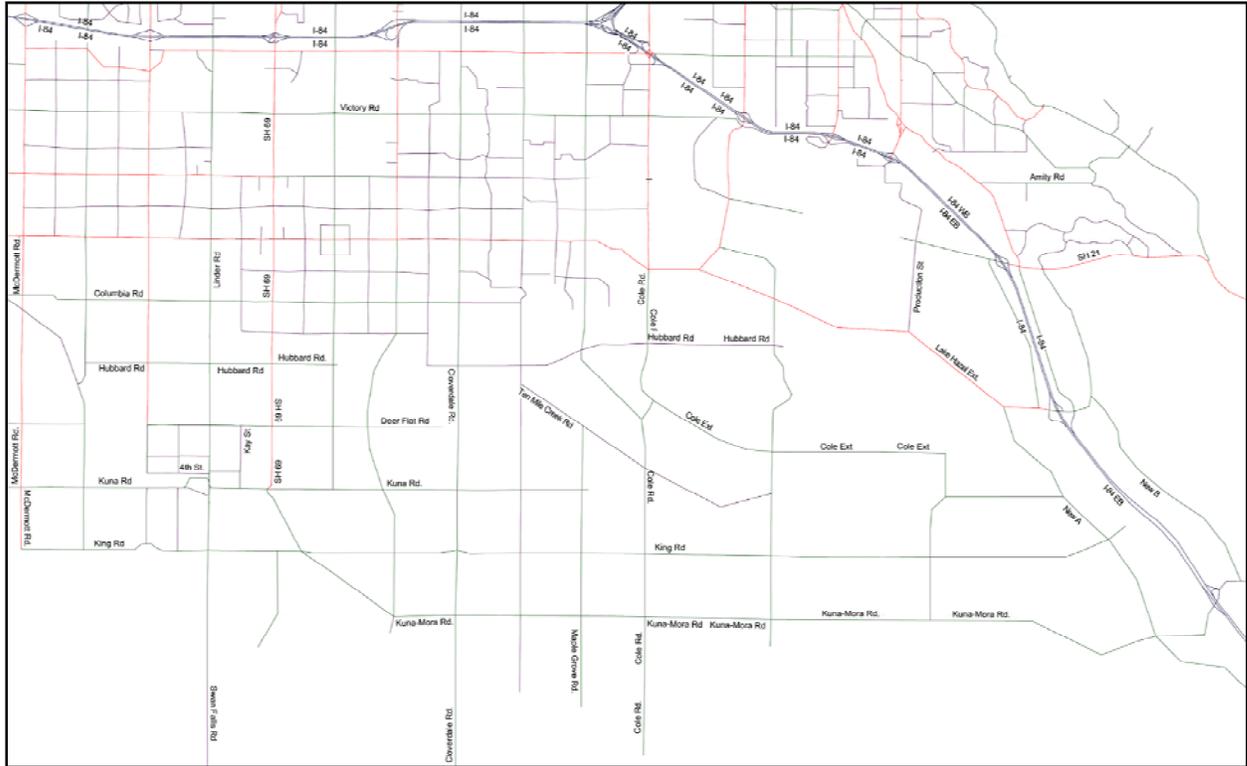
The development of the 2030 planning horizon is based on CIM and the current modeling that is available. Looking at the corridor in 10 year increments could be useful but with changes in development patterns and changes in economic trends, this may induce more error than a look at roadway and intersection needs based on a 25+ year horizon.

Though not 100 percent built out, the more intensive forecast scenario provides a reasonable estimate of development patterns expected by the year 2030. Planning for levels beyond that will require a more detailed review of area arterial and collector roadways, supplementing the Kuna-Mora Road corridor and Interstate 84.

3.3 Forecast Model Network Refinements

After estimating demographics for the two forecast scenarios, modifications were made to the roadway network in the model, to accommodate the increased development. These modifications expanded the roadway network in southern Ada County, associated with the planned development in the SWBT Study area. Figure 3-3 shows the revised roadway network, based on the SWBT Study. Modifications included adding select new roads, extending some existing roads, and increasing the number of travel lanes on major arterial roadways. Kuna-Mora Road was configured as it is today – a disconnected, two-lane roadway with at-grade intersections that terminates at the west end of the corridor. No western connection to Canyon County or to a north-south roadway is shown. This refined model network represents the No-Build roadway condition used in this Kuna-Mora Road Corridor Study.

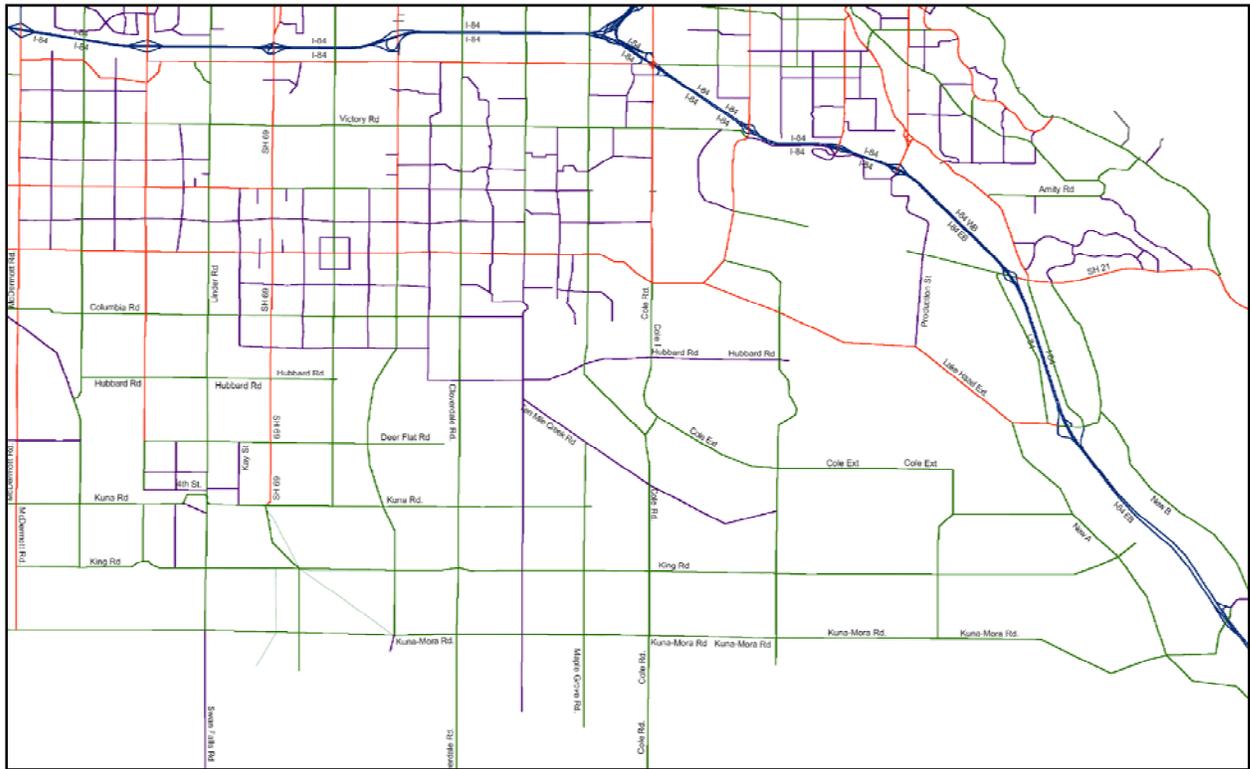
FIGURE 3-3
Modified 2030 'Base Assumptions' Model Roadway Network



Traffic forecasts, using modest development and this No-Build model network indicate that Kuna-Mora Road, east of Eagle Road would be expected to carry between 16,000 and 30,000 vehicles daily. The heaviest traffic volumes in the corridor would occur at the east end near the Black's Creek interchange with I-84.

To evaluate Kuna-Mora Road as a future potential east-west corridor, modifications to the No-Build network were necessary. The first was to connect the roadway west, extending Kuna-Mora Road to the Ada/Canyon County line, as shown in Figure 3-4. West of the county line, Kuna-Mora Road joins Bowmont Road, continuing to SH-45 where it terminates. Additional modifications include connecting to McDermott Road and connecting McDermott Road with I-84 at an interchange. These modifications do not recommend any particular configuration or alignment for Kuna-Mora Road or McDermott Road. They only provide the model network a link to connect future traffic from the western end of the Kuna-Mora Road corridor north to I-84 and areas beyond.

FIGURE 3-4
Modified 2030 'Kuna-Mora Arterial' Model Roadway Network



3.4 Projected Corridor Traffic Demands

After modifying the roadway network to establish a connected Kuna-Mora Road corridor within Ada County, the next step was to project future traffic demands in the corridor. The capacity of Kuna-Mora Road is a critical component of projecting traffic volumes in the corridor. To determine the forecast model's sensitivity to capacity along Kuna-Mora Road, three different roadway configurations (facility types) were evaluated. This helped determine what the range of projected traffic volumes would be assuming different types of roadways. Each of these forecasts used the modest development scenario as a baseline for comparison.

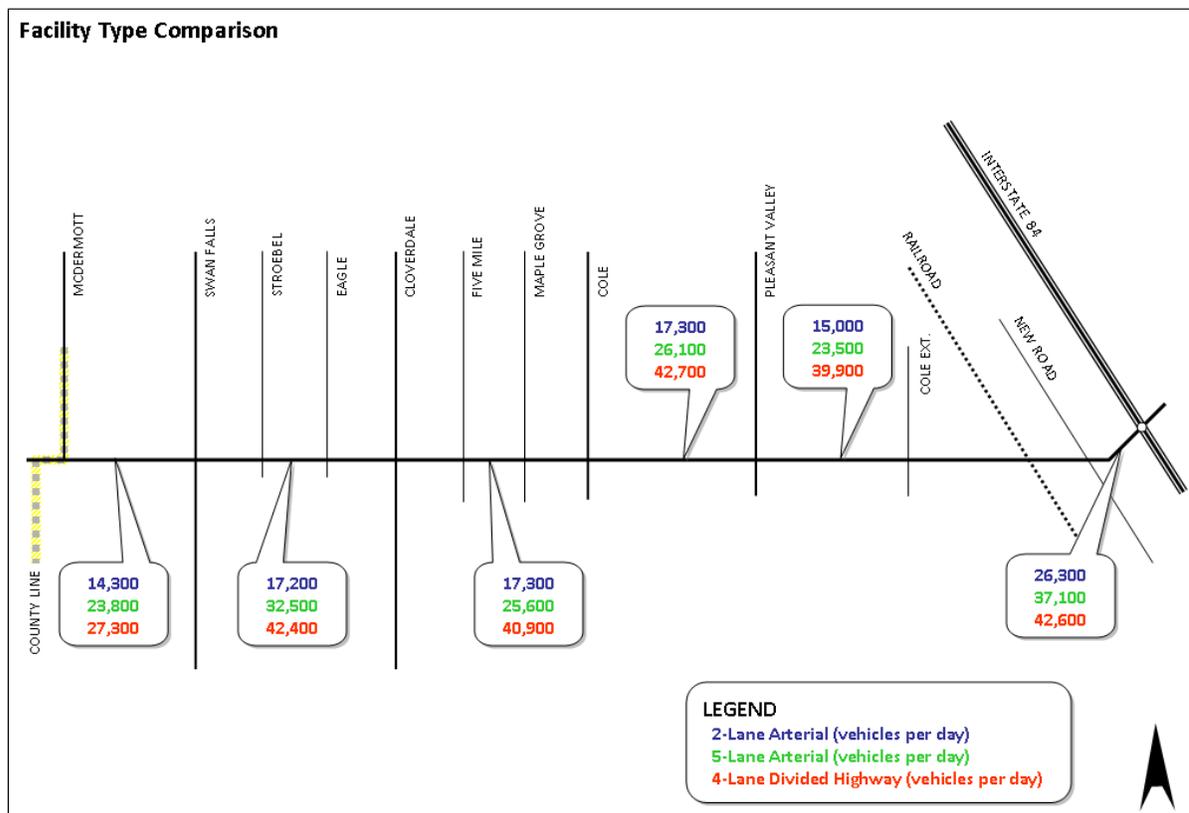
The first configuration, a two-lane arterial, is similar to what Kuna-Mora Road looks like today east of Eagle Road. This assumes a consistent two-lane (one in each direction) roadway through the entire corridor, with at-grade intersections. Even with a new connection at the west end of the corridor, to I-84 via McDermott Road, projected demand for this configuration is not substantially different than that of the No-Build condition. Daily traffic volumes range between 17,000 and 27,000 vehicles daily along the corridor, with the heaviest traffic volumes occurring at the east end near the Black's Creek interchange with I-84 (see Figure 3-5). This implies that simply connecting the corridor at the west end to I-84 and Canyon County does not substantially affect travel demand along Kuna-Mora Road.

The second configuration is a five-lane arterial (two travel lanes in each direction and a center left-turn lane). Forecast traffic on this type of roadway ranges between 23,000 and 37,000 vehicles daily, again with the highest demands at the east end of the corridor. This

level of forecast traffic is similar to 2030 forecasts for other major east-west corridors in the Treasure Valley, such as Ustick Road and Franklin Road.

The third scenario configures Kuna-Mora Road as a four-lane divided highway with access control and interchanges at McDermott Road, Stroebel Road, Cloverdale Road, Cole Road, Pleasant Valley Road, a new Cole Road extension, and a new road east of the Boise railroad spur providing access to planned communities in that area. This configuration could also be considered an “expressway” with full or partial control of access and grade separations at major intersections. The controlled access and higher speed limits on a divided highway result in lower estimated travel times through the corridor, when compared with either the two-lane or five-lane arterial. In the forecast model, this translates into the divided highway configuration having the highest projected traffic volumes along Kuna-Mora Road. As shown in Figure 3-5, these traffic volumes are between 27,000 and 43,000 vehicles daily.

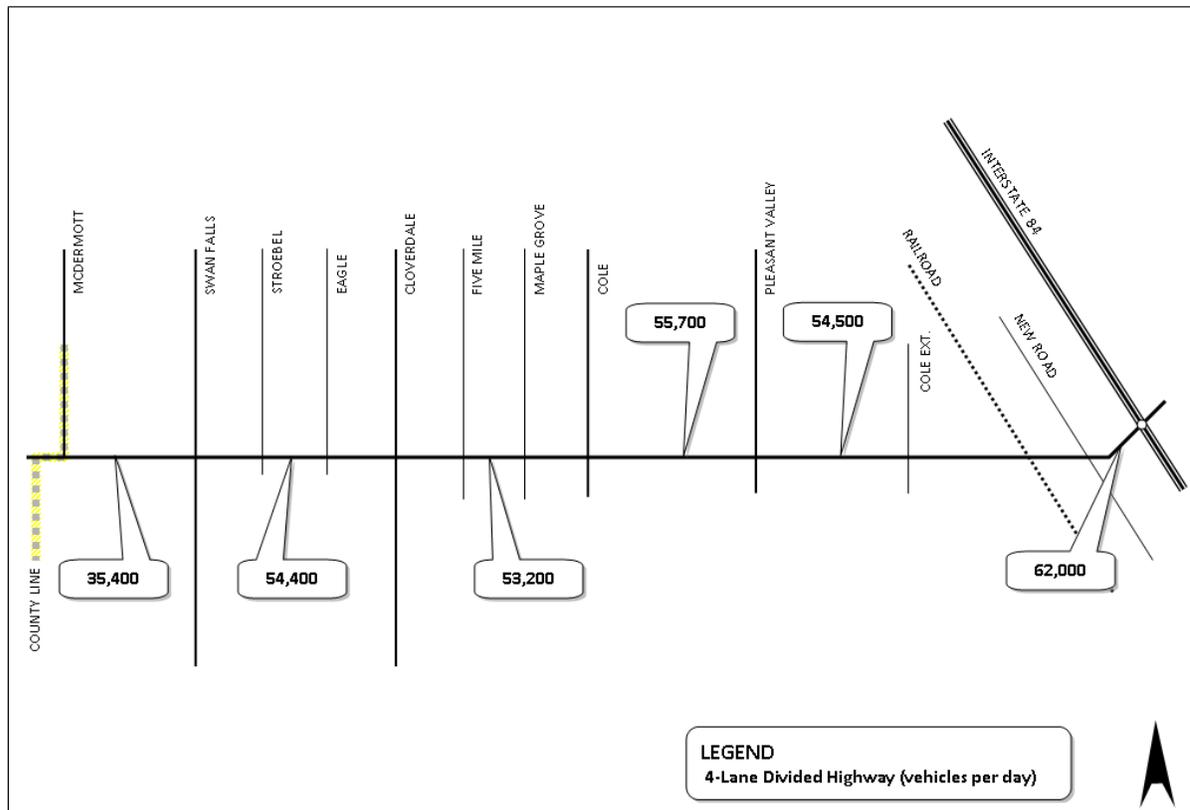
FIGURE 3-5
Comparison of Forecast Two-Way Daily Traffic Volumes with Modest Development and Different Roadway Configurations



Forecast Two-Way Average Daily Traffic Volumes
2030 Projected Traffic Assuming Modest Development Scenario

To more conservatively estimate long-term traffic levels, the divided highway configuration was used with the more intensive development demographics. This combination of an access controlled divided highway with heavier levels of planned development yielded projected traffic volumes between 35,000 and 62,000 vehicles daily (see Figure 3-6). This scenario is considered a conservatively high estimate of 2030 traffic volumes along Kuna-Mora Road because of the intensive development and a lack of modeled supplemental roadways along the corridor.

Figure 3-6
Forecast Two-Way Daily Traffic Volumes with Intensive Development and Divided Highway Configuration



Forecast Two-Way Average Daily Traffic Volumes
2030 Projected Traffic Assuming More Intensive Development Scenario

These last two access control scenarios resulted in the highest projected traffic volumes in the corridor. These forecast traffic volumes were then used to perform all subsequent planning and analysis functions for the study. While traffic volumes and levels of development beyond the 2030 planning horizon may exceed the values assumed for this evaluation, these projected traffic demands represent the best available forecast information out to the 2030 planning horizon. Planning for this level of growth was determined prudent based on planned and potential developments.

The pattern of forecast traffic volumes through the corridor suggests that the vast majority of traffic directly results from development of the planned communities along the corridor.

Some project stakeholders have discussed extending the corridor west beyond the Ada/Canyon County line along Bowmont Road. They suggest the corridor could continue west past its termination at SH-45 and north to a new connection with I-84 near Caldwell,

creating a southern by-pass around most of the Treasure Valley. It is possible that this type of extension could affect the amount of “by-pass” traffic using Kuna-Mora Road. ACHD and Canyon County agencies are cooperatively working toward defining the Western High Speed Limited Access Route.

COMPASS staff, in a 2006 Idaho Statesman editorial, noted that “nonlocal truck traffic accounts for less than 10 percent” of traffic on I-84 in the Boise area. Considering these factors and assuming that close to 90 percent of traffic on I-84 is local, this would imply that primarily, forecast 2030 traffic along Kuna-Mora Road either originates, or is destined for a location along Kuna-Mora Road.

However, at the time of this study there is no defined connection or agreement among agencies and jurisdictions on how the elements necessary would be combined to create a southern by-pass route. Based upon this uncertainty, the current scope of work associated with this project terminates at the county line.

Ongoing coordination efforts

- Between Ada County Highway District and Canyon County agencies and jurisdictions have commenced. These coordination efforts will continue in connection with several studies and projects in the near future such as: Ada County Highway District and Nampa Highway District coordination on Kuna Mora Road connection to Bowmont Road.
- Canyon County Highway Districts and Ada County Highway District involvement in selecting a possible Western Route location.
- Nampa Highway District and Ada County Highway District future coordination on McDermott Road study area.

4.0 Traffic Operations

The two sets of projected traffic volumes obtained from the most conservative forecast modeling scenarios described in Chapter 3 were used for all analyses. Planning-level traffic operations analyses were conducted in accordance with *Highway Capacity Manual (HCM)* procedures. A planning-level analysis is a simplified approach that requires less detailed data and relies on default values for operational characteristics. This level of review is a reasonable approach at a preliminary stage of study when detailed analysis is unnecessary and many variables are unknown.

The City of Kuna, through land-use authority, are in the process of a Comprehensive Plan update that may include sub-area plans that will specify land-use at certain locations along the corridor as Commercial and Industrial. These types of land-use attributes and land-use impacts are best addressed in the next phase of this corridor study and in subsequent phase when a more detail intersection analysis would be included.

Intersection planning analysis was conducted at the following potential at-grade intersections with Kuna-Mora Road:

- McDermott Road
- Swan Falls Road
- Stroebel Road/SH 69 extension
- Eagle Road
- Cloverdale Road
- Five Mile Road
- Maple Grove
- Cole Road
- Pleasant Valley Road
- Cole Road Extension
- New Access Road (east of railroad spur)
- Alternative New Access Road 1 (1 mile west of I-84)
- Alternative New Access Road 2 (0.5 mile west of I-84)

This type of analysis requires the use of turning-movement traffic volumes at studied intersections. The projected peak-hour traffic volumes for each approach to an intersection were provided by the forecast models. These approach traffic volumes were post-processed to estimate peak-hour turning movements.

At each intersection, a ratio calculation was applied to entering peak-hour traffic volumes. The calculation is based on the ratio of entering traffic for each approach with respect to the corresponding exiting traffic. This method, however, does not create balanced entering and exiting traffic volume totals. To adjust for imbalances, the estimated values are further blended, based on a comparison of the opposite ratio formulation, which is the ratio of the exiting traffic volume with respect to the corresponding entering volume. The resulting estimated peak-hour turning volumes were then rounded to the nearest five vehicles per hour.

The intersection planning level analysis provides results in the form of a “critical volume-to-capacity ratio” (v/c ratio) for the analyzed intersection. The critical v/c ratio is an indicator of the expected level of congestion at the intersection. It is dependent on the rate of traffic flow in the critical lane group, as well as a range of assumed values for the traffic signal

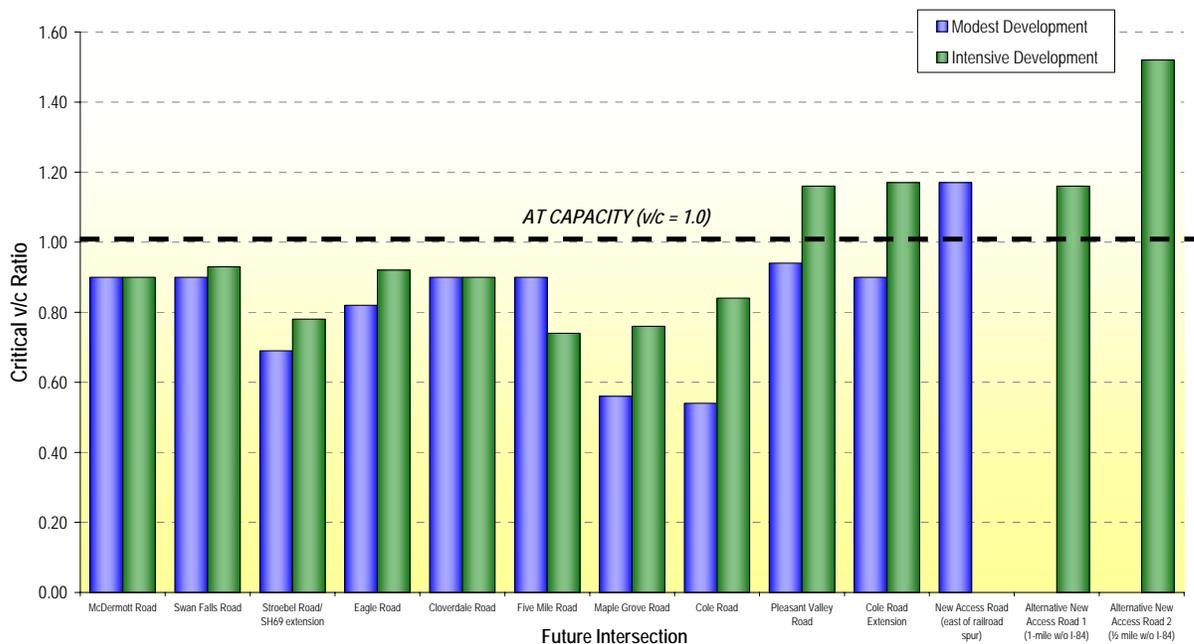
timing and phasing. The results also provide a statement as to whether the analyzed intersection is under, near, at, or over capacity. A v/c ratio greater than 1.0 indicates that conditions at the intersection are over capacity and will likely result in level-of-service (LOS) F, or congested conditions. It cannot be concluded from this analysis that LOS F will not occur when a v/c ratio is below 1.0, but it is an indication that the intersection will operate within acceptable levels of congestion.

A No-Build analysis was considered unnecessary since the configuration of the roadway is non-continuous through the corridor and forecast traffic for the two-lane configuration is well below the capacity of the roadway.

The first iteration of intersection analysis assumed that Kuna-Mora Road was configured with four lanes (two travel lanes in each direction). Cross streets were assumed to consist of two lanes each. Additional turn lanes were added to intersections where appropriate. Based on the results of the analysis, Kuna-Mora Road, configured as noted, can accommodate forecast traffic associated with modest levels of development.

Subsequent analysis showed that at least a six-lane arterial (three travel lanes per direction) would be required to accommodate the higher forecast traffic volumes associated with more intensive development levels. At this higher level of development, intersecting cross streets were determined to need a minimum of four lanes to accommodate projected demands. Figure 4-1 presents the resulting critical v/c ratios for analyzed intersections along Kuna-Mora Road.

FIGURE 4-1
Summary of 2030 Forecast Critical v/c Ratios at Kuna Mora Road Future Intersections



Note: Cross streets are assumed to be two lanes with Modest Development, and four lanes with Intensive Development. Both scenarios assume a peak-hour factor (PHF) of 0.90

The results of the planning analysis suggest that the forecast traffic volumes associated with modest development levels can be accommodated with Kuna-Mora Road configured as a

four-lane arterial. The higher forecast traffic volumes associated with more intensive development levels and a six-lane section reveal several over-capacity and near-capacity intersection conditions, especially from Pleasant Valley Road east to I-84.

The most severe location is at the east end of the corridor, within one mile of the I-84 interchange. A single intersection (New Access Road) was analyzed. This single intersection was located to comply with the intersection spacing requirements in the *ACHD Kuna-Mora Road Interim Policy*. Given the high concentration of development in this one mile segment, the intersection is expected to operate over capacity with both modest and intensive development levels. The critical v/c ratio would be near 2.0—about twice its capacity—due to a very high estimated number of turn movements (from the east to the south and from the south to the east) combined with limited north-south access in this vicinity. Adding through and turning lanes to this intersection to increase capacity produced an unreasonable and unacceptable configuration. Additional capacity enhancement measures will be required to accommodate projected traffic in this area.

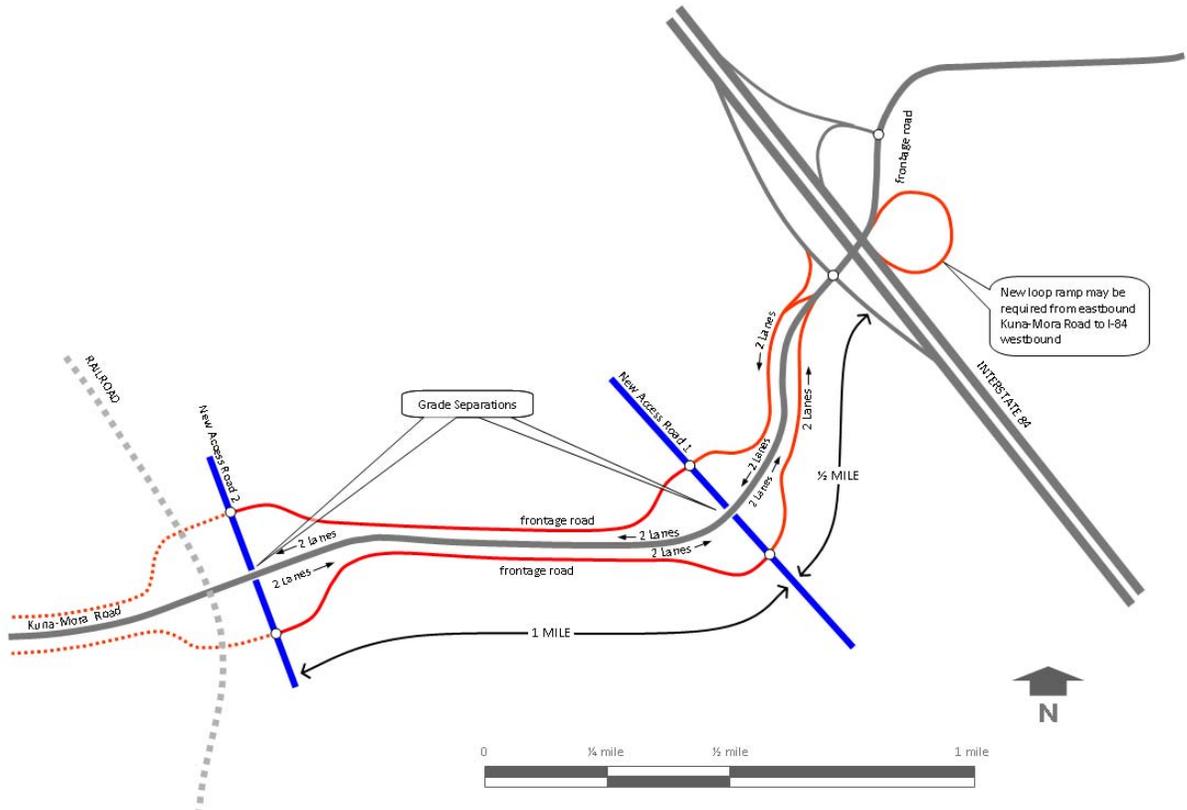
Possible solutions include additional north-south access. This will more efficiently distribute forecast traffic volumes and reduce congestion along the corridor. Replacing the single full-access intersection with two intersections spaced at 0.5-mile and 1.0-mile intervals respectively (New Access Roads 1 and 2) results in improvements, however, operational problems are still prevalent.

To further mitigate operational problems, this heavily-traveled segment of the corridor could ultimately require a complimentary network of frontage and backage roads, along with grade-separated intersections. This supporting network of roadways has the potential to enhance capacity, provide the necessary direct access to adjacent properties, and separate through traffic along Kuna-Mora Road from turning traffic. It is further expected that a frontage road system would require some re-configuration of the Black's Creek Interchange at I-84. A schematic of this potential configuration is shown in Figure 4-2. Detailed intersection analysis for this example configuration, using microsimulation (Trafficware's Synchro plus SimTraffic 7) indicates that at-grade intersections at the frontage roads would operate at LOS C.

Under the more intensive development scenario, the intersections at Pleasant Valley Road and the new Cole Road Extension also have critical v/c ratios greater than 1.0. Possible solutions include extending the system of frontage roads along the Kuna-Mora Road corridor through these two intersections. This would reduce the number of conflicting turns and improve overall traffic operations. More detailed analysis will be necessary in subsequent phases of the Corridor Study to determine specific intersection configurations.

The Florida Department of Transportation (FDOT) Systems Planning Office developed a series of planning thresholds to estimate LOS for various facility types, based on daily traffic volumes (see Table 4-1). An additional traffic operations review confirmed results of the HCM planning analysis using these thresholds as a guide. The resulting forecast daily traffic volumes along Kuna-Mora Road confirms the need for at least six total lanes under intensive development conditions, while at the east end of the corridor up to eight total lanes could be required.

FIGURE 4-2
Potential Kuna-Mora Road and Supporting Frontage/Backage Road Configuration



Note: Frontage Roads assumed to continue west to Pleasant Valley Road until traffic volumes on west portion of corridor warrant inclusion.

TABLE 4-1
Daily Planning Thresholds

Lanes*	Divided?	A	B	C	D	E
2	N	**	4,200	13,800	16,400	16,900
2	Y	**	4,410	14,490	17,220	17,745
4	N	4,560	27,835	32,965	33,915	**
4	Y	4,800	29,300	34,700	35,700	**
6	N	6,935	42,465	49,495	50,825	**
6	Y	7,300	44,700	52,100	53,500	**
8	N	8,930	55,100	62,795	64,410	**
8	Y	9,400	58,000	66,100	67,800	**

* Assumes two-way Class I arterial, 0.00 to 1.99 signals per mile, with left turn lanes and posted speed limit of 45 mph to 50 mph

** Not applicable

Source: Florida Department of Transportation

5.0 Access Control

5.1 Future Corridor Roadway Classification

The *ACHD Kuna-Mora Road Interim Policy* echoes recommendations made for CIM, suggesting that Kuna-Mora Road “be preserved to allow for an expressway with potential grade-separated interchanges....” This is premised by the following assumptions:

- 1) The Kuna-Mora Road corridor will eventually provide an alternative to or bypass of Interstate 84.
- 2) Kuna-Mora Road is needed to serve higher speeds and higher volumes of through truck and vehicular traffic.
- 3) Kuna-Mora Road will be the only main east-west access for future development.

The results of the travel demand modeling efforts described in Section 3.0 illustrate two important points. First, this corridor is expected to be well into a transition from a mostly rural environment to an urbanized area by 2030. Fifteen planned communities – occupying thousands of acres – are at various stages of planning and proposal, extending the urbanized areas of Kuna and Boise into this currently undeveloped space. Second, even extending Kuna-Mora Road west to the Ada/Canyon County line and connecting it via McDermott Road to I-84, does not substantially draw through traffic to the corridor by 2030. The corridor continues to primarily serve local access.

Projected traffic volumes along the future Kuna-Mora Road corridor (see Figure 4-3) indicate that the heaviest traveled segments (the far east end and the central portion) are the result of vehicles accessing planned development in those areas. Considered in conjunction with COMPASS’ observation of approximately 90 percent local traffic on I-84, these forecasts suggest that the far east end of the corridor (east of the railroad spur line) is providing access between I-84 and the planned communities of Bryan’s Run and Black’s Creek. The central segment of the corridor, between Pleasant Valley Road and Swan Falls Road, is primarily servicing traffic traveling between the north-south arterials and the planned communities of Southern Crossroads, Vista, Osprey Ridge, Kuna Mora, and Swan Falls.

The future urban character of this area should be considered when determining the expectations of the surrounding transportation network. Traditional rural high-speed, controlled-access freeways with large interchanges and few access points may not necessarily provide the level of access and mobility appropriate to the future land use.

The City of Kuna is in the process of creating a zoning overlay along major roadway corridors. This would include access management, right-of-way width, buffering, landscaping, and other management control strategies. The overlay zone needs to be addressed in any development that is proposed along the sections of Kuna-Mora Road that are currently or are anticipated to be included with the cities Area of Impact or within their city limits. A draft of their ordinance for this overlay zone is included in an appendix as part of this report (see appendix F).

ITD defines roadway functional classification and access control types in their *Access Management Standards and Procedures*. A principal arterial is described as a roadway typically having medium to high traffic volumes with speeds that vary from medium in urban areas to high in rural areas. Multi-lane principal arterials have two or more through lanes in the same direction of travel. Based on this description, the results of the forecast modeling, the planning analysis, and the expected transition of this area from a rural to an urban environment, it is recommended that Kuna-Mora Road be classified as a multi-lane principal arterial for planning and design purposes. This classification is consistent with the description in the Interim Policy.

5.2 Future Corridor Access Management

ITD's *Access Management Standards and Procedures* also identify five types of access, shown in Figure 5-1, depending upon the roadway functional classification. Following these standards, Type IV access control, using a combination of at-grade intersections and grade-separated interchanges is recommended for Kuna-Mora Road.

FIGURE 5-1
ITD Access Types and Their Relationship to Functional Classification

ACCESS TYPE	RURAL FUNCTIONAL CLASS	URBAN FUNCTIONAL CLASS
I →	Minor Collector, Major Collector	
II →	Minor Arterial	Collector, Minor Arterial
III →	Principal Arterial	Principal Arterial
IV →	Principal Arterial (multiple-lane)*	Principal Arterial (multiple-lane)*
V →	Interstate	Interstate

* Multiple-lane implies a highway with two or more through lanes in the same direction of travel. The highway may or may not be divided.

Source: Idaho Transportation Department, *Figure 2.3.1, Access Management: Standards and Procedures for Highway Right-of-Way Encroachments*, March 2002

In Figure 5-2, ITD's minimum approach and traffic signal spacing requirements for Type IV access is shown as one mile in rural areas and a half mile in urban areas. The Interim Policy restricts long-term access on Kuna-Mora Road to one-mile spacing to allow for the possible future development of traffic interchanges in lieu of conventional signalized intersections.

FIGURE 5-2
ITD Minimum Approach and Signal Spacing

ACCESS TYPE	URBAN/RURAL	TYPE	APPROACHES		SIGNALS	FRONTAGE ROADS
			INTERSECTION SPACING	APPROACH SPACING	SIGNAL SPACING	
IV	U	At-grade/ Interchange	.8 km (.5 mi.)	NA	.8 km (.5 mi.)	.4 km (.25 mi.)
	R	At-grade/ Interchange	1.6 km (1 mi.)	NA	1.6 km (1 mi.)	.4 km (.25 mi.)

Source: Idaho Transportation Department, *Table 4.5.1.1, Access Management: Standards and Procedures for Highway Right-of-Way Encroachments*, March 2002

The *Access Management Manual*, Transportation Research Board, Washington, D.C., 2003 defines a relationship between roadway functional classification and access category. Access Category 1 is reserved for Interstate highways and freeways, while Access Category 2 aligns with roadways of statewide importance or major arterials of regional importance. Access Category 3 is a strategic arterial. A multilane divided highway or expressway is considered Category 2. In this case, direct property access is not allowed and access is only permitted at major public roads in the form of interchanges or intersections. Category 3 restricts or denies direct property access, permits access at major public roads in the form of interchanges or intersections, and does permit right turns at other access connections. Generally, access control policies from around the Country allow a signal spacing of 0.5 mile for Category 2 and Category 3 facilities while secondary access is generally allowed at 0.25 mile.

This analysis conducted herein supports the Interim Policy's stated need for parallel collector systems and frontage/backage roads; in particular, at the east end of the corridor. The high volume of turning traffic, combined with significant through traffic particularly near the Interstate substantiates a need for controlled access and a supporting network of frontage and backage roads. In general, frontage roads along the Kuna-Mora Road corridor could be configured within the typical 200-foot-wide right-of-way.

6.0 Design Criteria

Design criteria are based on guidelines provided in *A Policy on Geometric Design of Highways and Streets, AASHTO, 2004*. Based on forecast traffic conditions and the resulting traffic operations review, the recommended design criteria for Kuna-Mora Road is presented in Table 6-1.

TABLE 6-1
Kuna-Mora Road Design Criteria

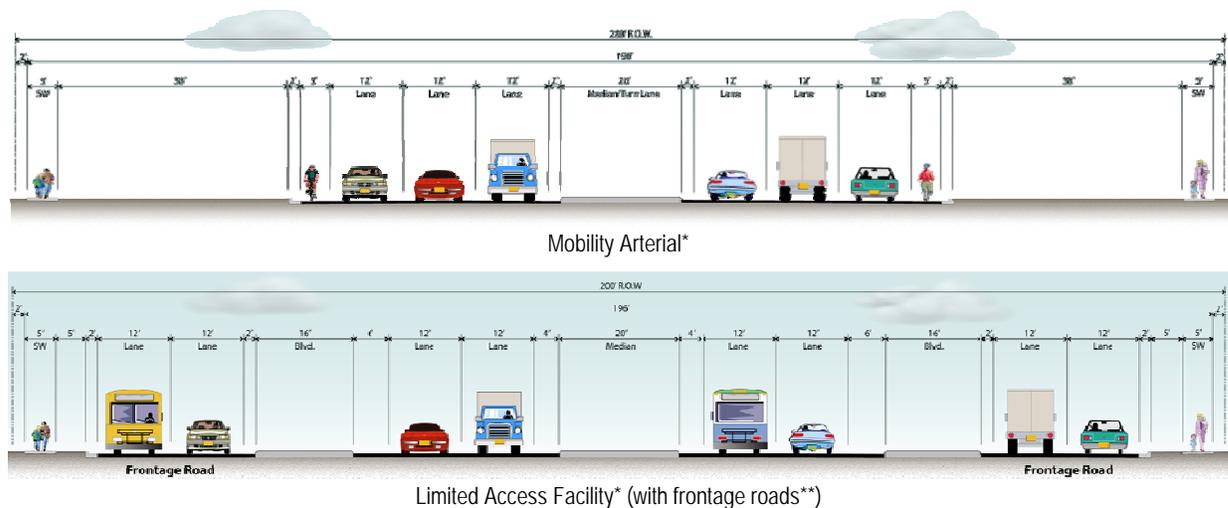
	KUNA-MORA ROAD	NOTES	REFERENCE
GENERAL INFO			
2030 ADT	35,000 to 62,000		Based on revised COMPASS Travel Demand Model (assuming 60% buildout)
Functional Classification	Principal Arterial		Ada County Long Range Highway & Street Map, 2030 Functional Street Classification System
Level-of-Service	LOS C	LOS C desired, LOS D minimum in heavily developed sections	2004 AASHTO Green Book, pg.470
Ownership	ACHD		
Access Control	Partial	Direct access to arterials is normally restricted.	
Design Speed (mph)	60		
Posted Speed (mph)	45 - 55		
HORIZONTAL GEOMETRY			
Minimum Radius (with super, ft)	1330	Minimum Centerline Radius	2004 AASHTO Green Book (Exhibit 3-26).
E _{max} (%)	6%		2004 AASHTO Green Book, pg.145
INTERSECTIONS			
a) Minimum Curb Radius	15'/35'	Local/Major Intersections	
b) Design Vehicle	WB-65		2004 AASHTO Green Book, pg. 18
c) Signals	1.0 mi		
VERTICAL GEOMETRY			
Maximum Grade (%)	5%		2004 AASHTO Green Book (Exhibit 7-10).
Minimum Grade (%)	0.40%	Curbed Areas	ACHD Policy Manual 7204.6.8
K _{sag} (%)	136		2004 AASHTO Green Book (Exhibit 3-75).
K _{crest} (%)	151		2004 AASHTO Green Book (Exhibit 3-72).
SIGHT DISTANCE			
Stopping (ft) (min)	570		2004 AASHTO Green Book (Exhibit 3-1)
CROSS SECTION			
Type of Cross Section	Principal Arterial		
Standard Pavement Width	Varies		See typical sections
Right of Way Width	200 ft		
Sidewalk to P/L	2 ft to 4 ft		
Sidewalk/Multi-Use Path	5 ft to 10 ft		
Planter	5 ft to 25 ft		
Curb	0.5 ft	2 ft including gutter	
Bike Lane	5 ft	4.5 ft not incl. face to lip of gutter	
Travel Lane	12 ft		
Median/Turn Lane	20 ft/12 ft		
VERTICAL CLEARANCE			
Above Roadway (ft)	16'	Account for superelevation, cross slope, structure depth.	AASHTO says 16' for urban arterials
CLEAR ZONE			
Clear Zone Distance (ft) (min)	30' - 32'	6:1 or flatter foreslope	2002 AASHTO Roadside Design Guide (Table 3.1)
ROADSIDE DEVELOPMENT			
Noise Control	No		
Lighting	No	Intersection lighting provided at signalized intersections	ACHD Preference

Through *Blueprint for Good Growth* and *CIM* long-range planning efforts, the public has stated a desire for better design of roadways and increased coordination with adjacent land uses. People have expressed preferences for roads that fit well and complement the built environment (neighborhood, downtown district, etc.). There also appears to be a strong desire for well-thought-out growth that avoids sprawl and ensures that basic services are in place and that the development does not become a drain on the prior residents.

The *Transportation and Land Use Integration Plan*, or *TLIP*, is an attempt by ACHD to better link land-use and transportation planning. In January 2008, ACHD transmitted drafts of several critical *TLIP* documents to Ada County and the cities of Boise, Eagle, Garden City, Kuna, Meridian and Star for review and comment. This process is still underway and has not yet been formally adopted. However, a DRAFT *Livable Street Design Guide (LSDG)* has been prepared in conjunction with this effort. As a matter of information, the *LSDG* has identified Kuna-Mora Road as a “Mobility Arterial.” The typical section associated with this type of facility would include up to three travel lanes per direction with a median/turn lane, bicycle lanes, curb, gutter and sidewalk. This configuration is consistent with the ultimate needs of the corridor from McDermott Road to Pleasant Valley Road, but would not accommodate the 2030 forecast travel demand in the segment from Pleasant Valley Road to I-84. The interim condition for the segment of Kuna-Mora Road could include a four- or five-lane cross section until demands reach appropriate levels for six travel lanes. Additionally, the proposed 200-foot ROW is adequate to support adjacent frontage roads, should corridor conditions change or travel demands beyond 2030 justify this type of cross section.

The design criteria provided in Table 6-1 were used to develop a series of typical sections for Kuna-Mora Road as determined through the traffic operations analysis presented in Section 4. These typical sections are presented in Figure 6-1.

FIGURE 6-1
Kuna-Mora Typical Sections



* Sidewalk and bicycle facilities are shown for planning purposes and may be revised during more detailed design in subsequent phases of the Corridor Study

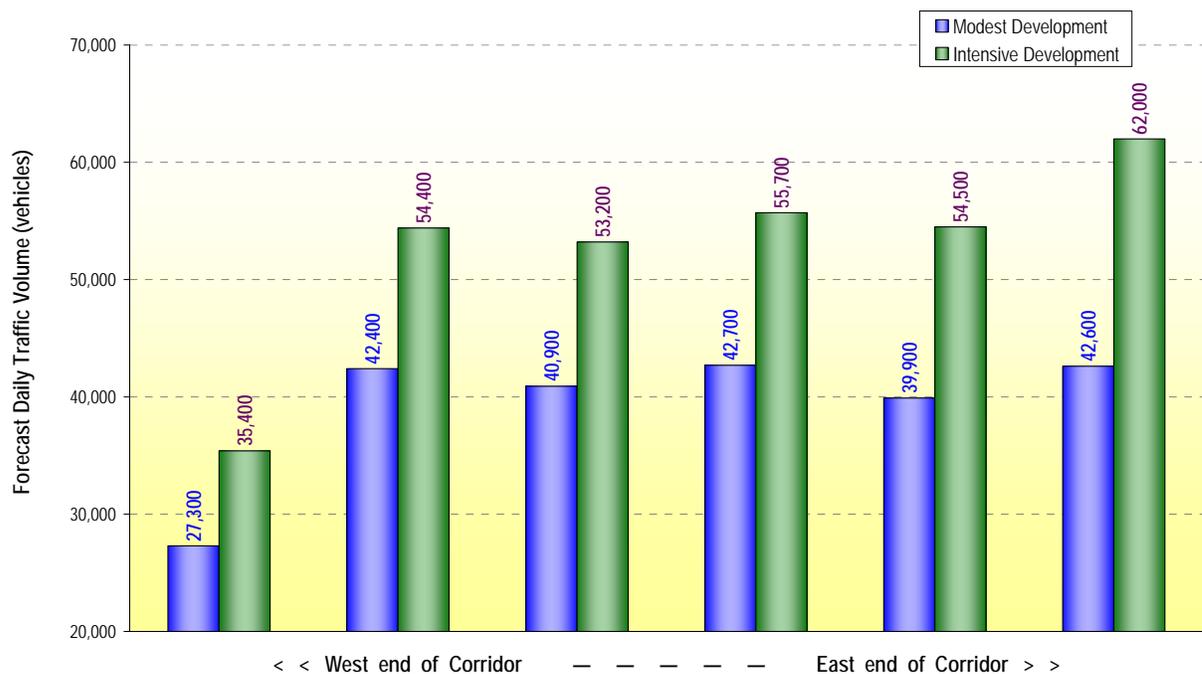
** Distances between travel lanes and the frontage roads will be discussed further in subsequent phases and based on AASHTO minimum values.

7.0 Conclusions

Currently, the CIM Regional LRTP projects minimal traffic volumes along the Kuna-Mora Road Corridor. The rural two-lane character of this facility would generally accommodate these conditions. However, several large-scale developments are planned in the vicinity of the corridor. For that reason, a more in-depth review of forecast traffic conditions and the roadway types needed to meet those demands was warranted. Projected 2030 traffic volumes associated with modest and more intensive levels of development were estimated. The most conservative (highest) traffic volumes were then evaluated throughout the corridor.

Based on this comprehensive review, the Kuna-Mora Road corridor could be expected to carry 35,000 to 62,000 vehicles per day (vpd) by 2030. As shown in Figure 7-1, projected traffic volumes are expected to be higher at the east end of the corridor, near I-84 due to large-scale planned communities in this vicinity.

FIGURE 7-1
Forecast Daily Traffic Volumes along Kuna-Mora Road



These results lead to the determination that by 2030 the corridor, as studied, would likely continue to function as a principal east-west route, connecting future growth and development to both the Interstate east of Boise and to a network of north-south arterials in the area. There is a possibility that over time, as development continues to evolve, the purpose of the corridor may shift to serve as more of a by-pass type facility beyond the 2030 planning

horizon used for this study. Another factor that could cause this shift would be if the corridor were extended west into Canyon County connecting to I-84 near Caldwell. The concept of a future truck route are based on the types of connections and also based on the level of congestion along I-84 as we get closer to a congested freeway that would make this southern route more appealing. Added truck traffic onto the corridor and specific measures to handle or address these are possibilities that will be looked at in subsequent phases. These possibilities are beyond the reach of this study and should be considered at a regional level.

Based on the results of the analysis, two general sections are recommended. The majority of the corridor, specifically the western 20 miles to Pleasant Valley Road, would require a six-lane section consistent with that defined under the DRAFT *Livable Street Design Guide (LSDG)* for a Mobility Arterial. The traffic analysis discussed in Section 4.0 supports further modifying the configuration from Pleasant Valley Road to I-84. To accommodate through traffic along Kuna-Mora Road, while facilitating the high volume of expected turning traffic in this area, a four-lane roadway with two-lane frontage roads and grade separated intersections is ultimately recommended. Limiting access within the four-lane section and separating turning traffic from through traffic allows Kuna-Mora Road to function at acceptable levels of service, even assuming the more intensive development demands.

The following corridor policies, presented in Table 7-1 are suggested for Kuna-Mora Road.

TABLE 7-1
Recommended Kuna-Mora Road Corridor Policies

Functional Classification	Principal Arterial/Urban Expressway*
Design Speed	60 mph
Posted Speed	45 mph to 55 mph
Right-of-Way	200 feet typical, additional at major intersections to accommodate frontage roads where applicable
Typical Section – East (I-84 to Pleasant Valley Rd)	Total Travel Lanes (8) 4 through lanes (2 per direction) 2-lane frontage roads per direction
Typical Section – West (Pleasant Valley Rd to McDermott Rd)	Total Travel Lanes (6) 6 through lanes (3 per direction) with auxiliary turn lanes at intersections
Signalized Intersection Spacing	0.5 mile east of I-84 and 1.0 mile thereafter**
Unsignalized Intersection Spacing	0.25 mile partial, 0.5 mile directional***

* Urban Expressway implies a median-separated roadway ultimately with combination of signalized intersections and grade separations.

** Ultimate configuration does not preclude grade-separated interchanges

***McDermott Road to Pleasant Valley Road only. Partial access accommodates right in/right out only while directional access permits right in/right out/left in. From Pleasant Valley Road to I-84 secondary access restricted to frontage/backage roads to facilitate development of ultimate configuration.

These guidelines are recommended to minimize potential conflict locations and achieve higher roadway capacity conditions, while at the same time allowing access to adjacent properties and flexibility in corridor development. Exceptions to these conditions could be granted with demonstration that the operating capacity and travel speeds on Kuna-Mora Road would not be degraded.

Upon conclusion of this Phase 1 review, ACHD plans to further study individual sections of the Kuna-Mora Road Corridor. It is anticipated that this review will be conducted in 7-mile sections throughout the corridor, in three separate phases. ACHD will determine the sequential order of subsequent analysis with highest priority given to those segments with immediate development potential. Detailed review will involve consideration of alternative alignments, traffic operations, environmental impacts, and right-of-way constraints. Selection of a recommended alignment for each of these sections will be predicated on associated impacts, public opinion and relative construction costs.

EXECUTIVE SUMMARY

A substantial number of developments and planned communities have recently been proposed in the southwest Boise area and along the Kuna-Mora Road corridor. In response to this growth and the abundance of development proposals, a need has arisen to study in greater detail the future transportation demand in this area, and to identify and preserve adequate right-of-way for a future transportation corridor. The corridor covers approximately 21 miles beginning at its western terminus at the Ada/Canyon County line at Bowmont Road (south of Kuna) and extending east to I-84 south of Boise. Currently, this facility is a non-continuous, two-lane rural route that accommodates minimal traffic volumes. This report addresses long-term needs relative to the expected roadway function, traffic impacts and corridor preservation.

Neither the “Trend” nor the “Community Choices” planning scenarios developed under *Communities in Motion* (CIM) predicted the level and concentration of development currently anticipated in the southern part of Ada County. CH2M HILL worked in coordination with the Community Planning Association of Southwest Idaho (COMPASS) and other consultants to provide a more complete estimate of future travel demand in the Kuna-Mora Road corridor. This review indicated that the corridor is expected to ultimately carry 35,000 to 62,000 vehicles per day (vpd) with the greatest intensity of traffic occurring at the east end of Kuna-Mora Road in the vicinity of I-84. These results lead to the determination that by 2030, the corridor as studied will function as a principal east-west route, connecting future growth and development to both the Interstate east of Boise and to a network of north-south arterials in the area.

Based on the results of a planning level traffic operations review, two general sections are recommended. The majority of the corridor, specifically the western 20 miles to Pleasant Valley Road, would require a six-lane section (future expressway) consistent with that defined under the DRAFT *Livable Street Design Guide (LSDG)* for a Mobility Arterial. From Pleasant Valley Road to I-84, a four-lane roadway with two-lane frontage roads and grade separated intersections is ultimately recommended to accommodate through traffic, while facilitating the high volume of expected turning traffic in this area. To promote design flexibility within the corridor, traffic signal spacing should be restricted to 1.0 mile. Secondary access should be restricted to frontage/backage roads from I-84 to Pleasant Valley Road. From Pleasant Valley Road to McDermott Road secondary access could be permitted at 0.5 mile and 0.25 mile spacing. A corridor width of 200 feet is recommended to accommodate buildout improvements. These guidelines are suggested to minimize potential conflict locations and achieve higher roadway capacity conditions when warranted, while at the same time allowing access to adjacent properties and development.

Upon conclusion of this Phase 1 review, ACHD plans to further study individual sections of the Kuna-Mora Road Corridor. Detailed review will involve consideration of alternative alignments, traffic operations, environmental impacts, and right-of-way constraints.