

West Jordan Master Transportation Plan Update, 2006



Project 050112

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Introduction

The City of West Jordan hired InterPlan Co. to update their Master Transportation Plan. West Jordan City recently adjusted their projected build-out land use plans city wide. The previous projections, created in 2003, have been re-calibrated to create a new West Jordan Land Use Plan in 2005. There are also several isolated pocket areas of development where multi-use land uses are planned and for which “specific area plans” have been undertaken by West Jordan City. InterPlan’s task was to come up with several different land use scenarios and model them using the regional Travel Demand Model. Additional different roadway networks were also modeled in an attempt to see if any patterns or alternatives emerged which had not been considered previously.

Land Use Inputs and Socio-Economic Forecasts

InterPlan created five different future land use options to model for West Jordan.

- New West Jordan Land Use Plan
- New West Jordan Land Use Plan, plus Kennecott land development
- New West Jordan Land Use Plan, plus Woods Crossing development
- New West Jordan Land Use Plan, plus Highlands Commons development
- New West Jordan Land Use Plan, plus Kennecott land development, plus Woods Crossing development, plus Highlands Commons development

Land use plans and the travel model’s socio-economic inputs are quite different interpretations of the same thing. InterPlan collected the different land use plans, categorized them into land uses such as low, medium, high density residential; commercial, industrial, parks and opens space, and linked these to broad estimates for population, households, and employment by traffic analysis zone (TAZ).

Assumptions

To aggregate all residential land uses into total households and population numbers, some assumptions were made. To convert residential land use into total population for a traffic analysis zone, several factors must be gathered. First, we need the number of acres for each land use in the TAZ. This data was taken from an electronic map of the land use plan. Second, we need the number of households per acre for each density. This was derived from the assumptions

made for the original West Jordan Master Transportation Plan. These assumptions are displayed in Table 1. Third, to calculate population, we need to know the number of people per household. People per household numbers were also taken from the assumptions in the West Jordan Master Transportation Plan, and are also shown in Table 1.

TABLE 1.

Land Use	Households per Acre	People per Household
Very Low Density Residential	0 - 2	3.30
Low Density Residential	2.1 - 4.5	3.15
Medium Density Residential	4.6 - 8.4	3.00
High Density Residential	8.5 - 16	2.60
Very High Density Residential	16.1 - 24	1.70
Transit Oriented Development	20 - 30	1.20

Source: InterPlan work for the West Jordan Master Transportation Plan December 2003

Knowing these numbers allowed InterPlan to create accurate population and household numbers for the different land use scenarios. Similar assumptions were needed to estimate the number of jobs, or employment, in each traffic analysis zone. For the model input, the employment was categorized into total employees and retail employees. The acreage of each land use was again taken from maps of the different land use plans. The assumptions for number of employees per acre and the number of retail employees per acre were derived from the West Jordan Master Transportation Plan. These assumptions are shown in Table 2.

TABLE 2.

Land Use	Total Employees per Acre	Retail Employees per Acre
Professional Office	60	0
Research Park	25	0
Neighborhood Commercial **	75	65
Community Commercial	18	15
Regional Commercial	19	17
Transit Oriented Development	20	10
Light Industrial	15	0
Public Facilities	3	0
Parks and Open Land	0	0
Agricultural Open Space	0	0
Unclassified	0	0

** Employees for each location not by acre

With these numbers, InterPlan was able to calculate the total population, number of households, and employment per traffic analysis zone for each of the different land use options.

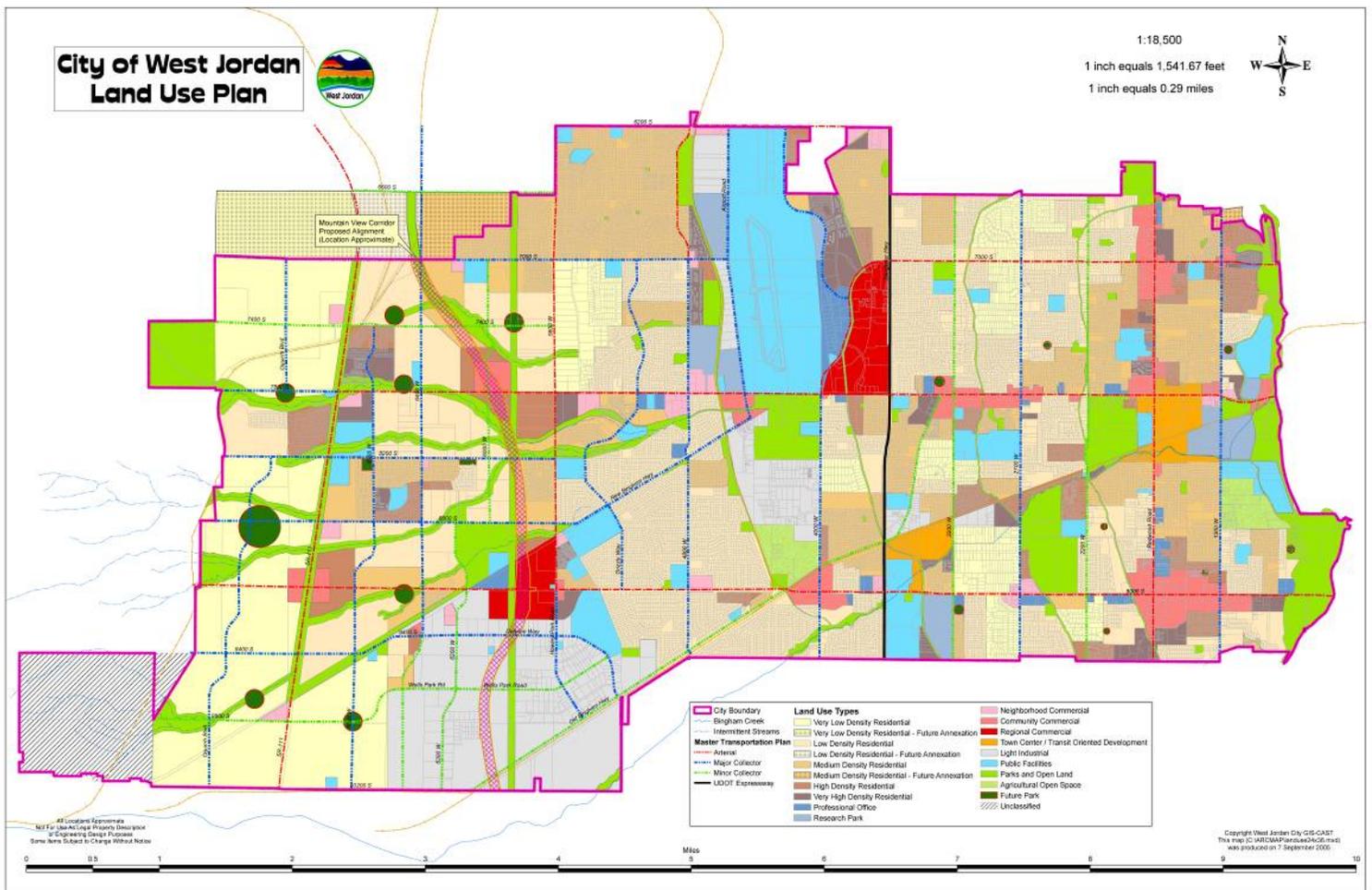
New West Jordan Land Use Plan

Figure 1 is a map of the new West Jordan Land Use Plan, adopted in 2005. The total population, number of households, and employment estimates based on this land use plan, are shown in Table 3.

TABLE 3.

Option	2030 Population	2030 Households	2030 Employment
New West Jordan Land Use Plan	176,160	66,956	68,480

FIGURE 1.



New West Jordan Land Use Plan, plus Kennecott Land development

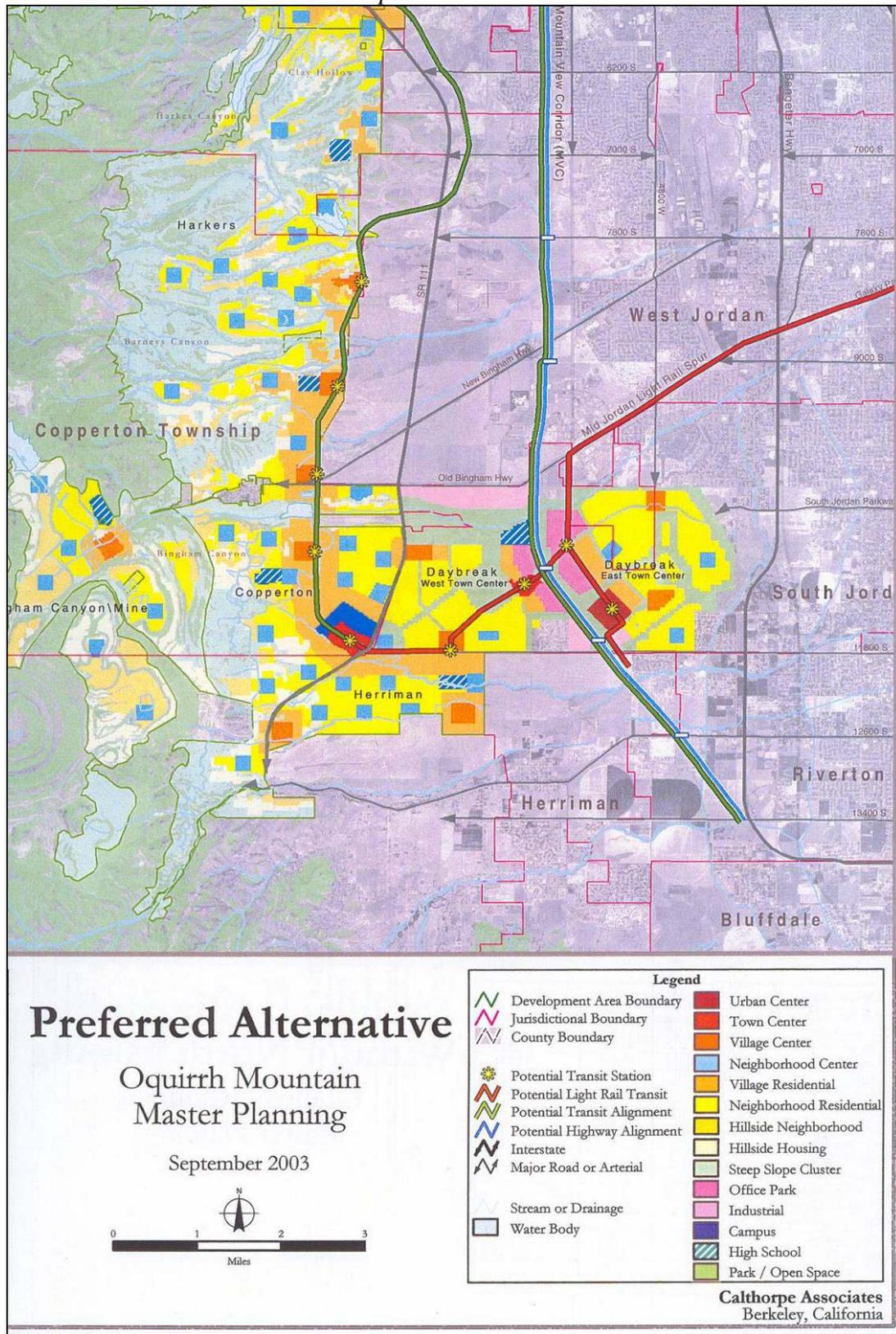
Figure 2 is a map of the proposed Kennecott Land development. This future land use option does not include full build out of the Kennecott land, but rather just Phase One, or, their 2030 plan. Most of the area remains undeveloped by 2030, but some areas, such as Daybreak in South Jordan, are built-out by 2030. The total population, number of households, and employment estimates based on this land use scenario, are shown in Table 4. These numbers estimate those Traffic Analysis Zones which are completely in West Jordan and do not represent all of Kennecott's 2030 development.

TABLE 4.

Option	2030 Population	2030 Households	2030 Employment
New West Jordan land use plus Kennecott	190,747	72,102	74,811

Note: Figure 2 the Kennecott Land Development Plan is a draft for illustrative purposes only and actual development plans should be coordinated with Kennecott Land Company.

FIGURE 2. Kennecott Land Development



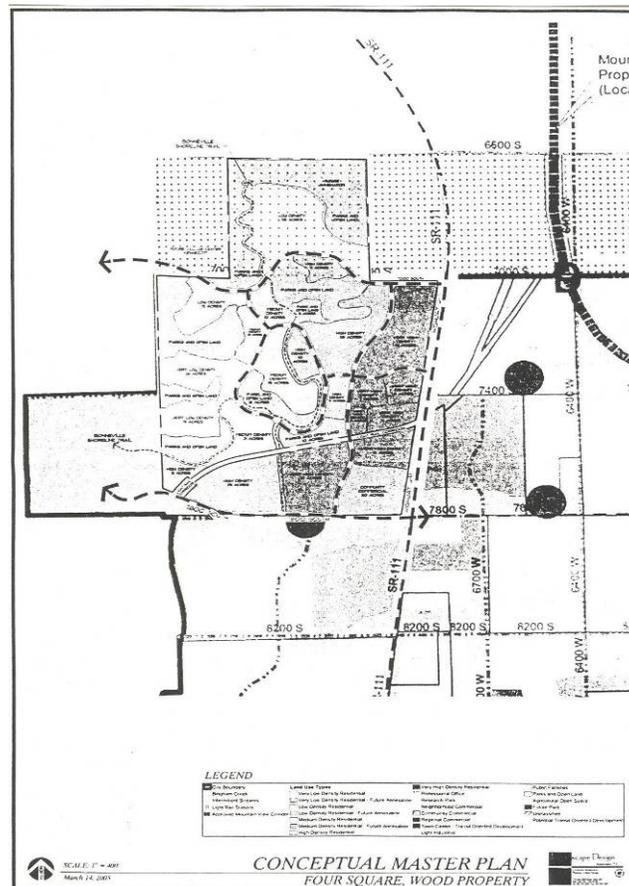
New West Jordan Land Use Plan, plus Woods Crossing development

Figure 3 is a map of the proposed Woods Crossing, or Four Square, land development plan. This is a 728 acre area located in the northwest corner of West Jordan. The area is planned for low density residential in the West Jordan Land Use Plan. The Woods Crossing development includes 1,965 units of very high density residential and 1,081 high density residential units, plus other land uses including medium density residential, transit oriented development, commercial, and parks/open spaces. Using the same factors listed in Tables 1 and 2, InterPlan calculated Woods Crossing will build-out to 7,922 more people, 3,617 new households and 850 new jobs. The total population, number of households, and employment estimates, based on this land use scenario, are shown in Table 5.

TABLE 5.

Option	2030 Population	2030 Households	2030 Employment
New West Jordan land use plus Woods Crossing	184,082	70,573	69,330

FIGURE 3.



SOURCE: General Plan Committee Staff Report, West Jordan, April 13, 2005

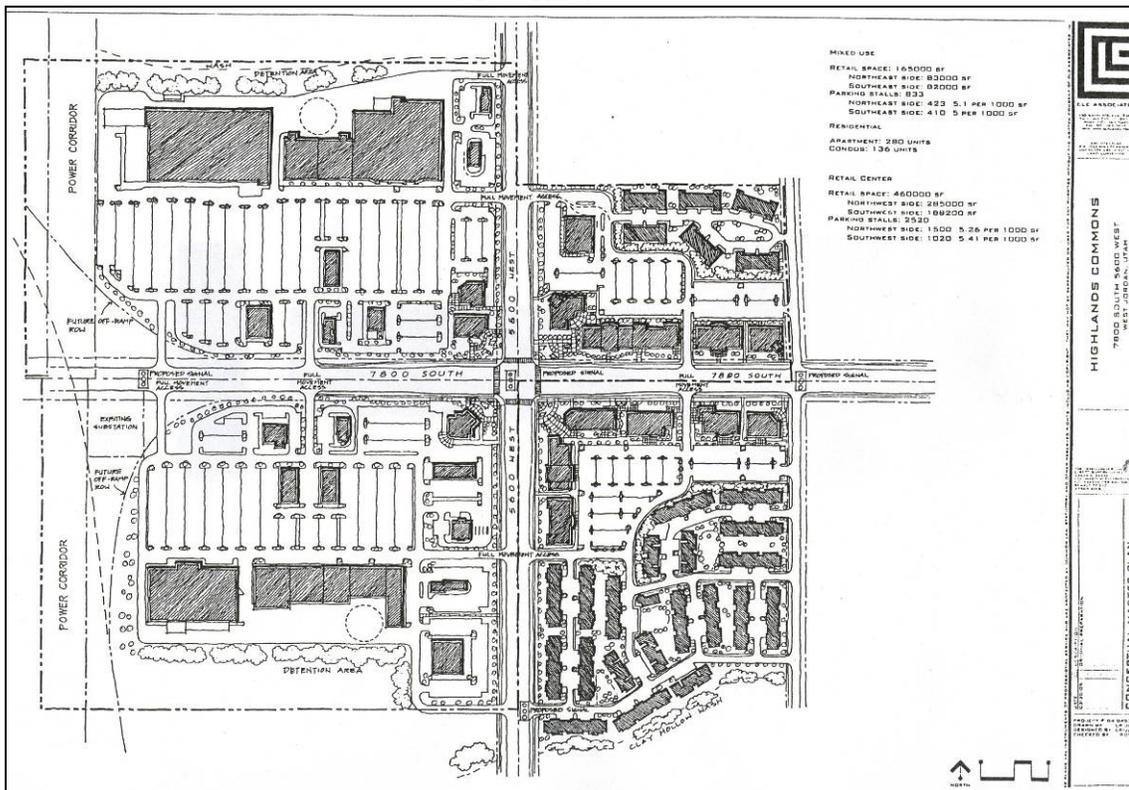
New West Jordan Land Use Plan, plus Highlands Commons development

Figure 4 is a map of the proposed Highlands Commons land development plan. This development includes 107 acres, generally located along 7800 South, between 5600 West and the proposed Mountain View Corridor. This development calls for land use changes from low density residential and high density residential to regional commercial and neighborhood commercial. The affect is an estimated decrease of 1,936 people, 708 fewer households and an additional 2,892 jobs to the area (as compared to the West Jordan Land Use Plan). The total population, number of households, and employment estimated based on this land use scenario are shown in Table 6.

TABLE 6.

Option	2030 Population	2030 Households	2030 Employment
New West Jordan land use plus Highlands Commons	174,224	66,248	71,372

FIGURE 4.



SOURCE: General Plan Committee Meeting, West Jordan, EOC Room, April 13, 2005

New West Jordan Land Use Plan, plus Kennecott land development, plus Woods Crossing development, plus Highlands Commons development

The total population, number of households, and employment estimated based on this land use scenario are shown in Table 7.

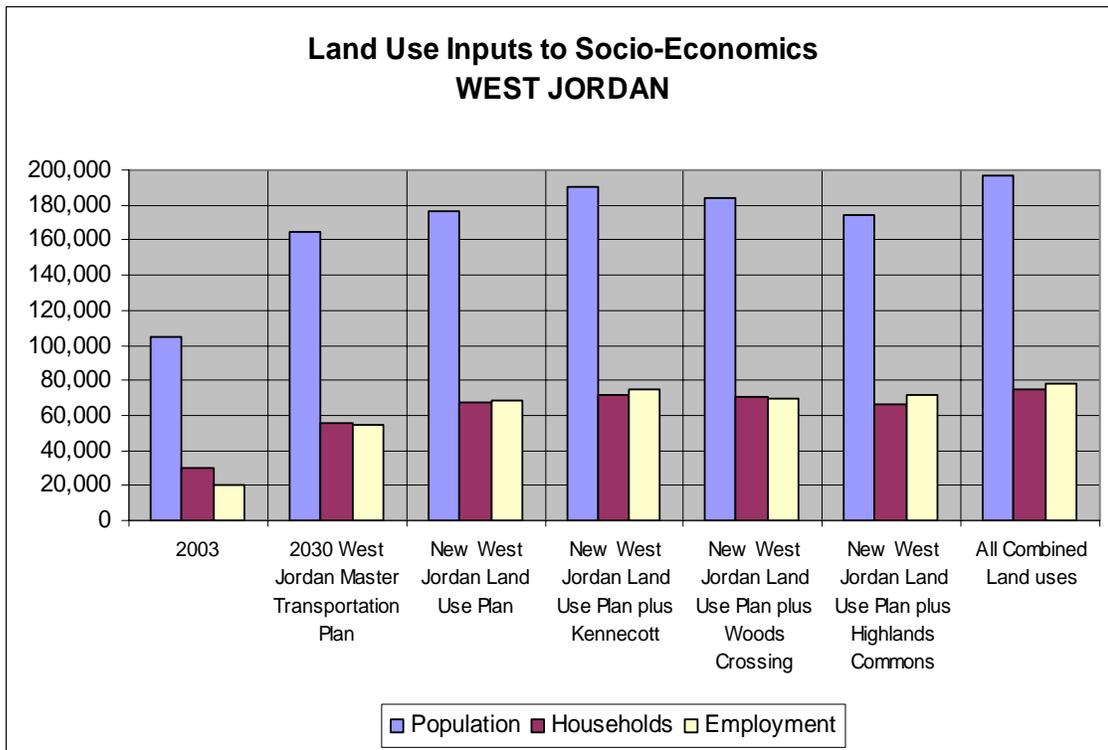
TABLE 7.

Option	2030 Population	2030 Households	2030 Employment
All combined Land Uses	196,733	75,011	78,553

All Land Use Plans Combined

Figure 5 summarizes the calculations made to convert planned land use acreage into the socio-economic data used by the Travel Demand Model.

FIGURE 5.



Travel Demand Modeling

A regional travel demand model was used to evaluate the transportation benefits of various planned road options in West Jordan. The travel model is a good tool to measure future traffic volumes and to estimate the use of roads yet to be built. While the travel model is not an absolute prediction of the future, it is a useful and reasonably accurate tool which aids considerably in traffic analyses.

Since many of the transportation problems are growth-related problems of the future as compared to measurable problems of today, this analysis relies heavily on the results of a travel demand model. Eight different scenarios were modeled for this Master Transportation Plan update. They are:

1. 2003 Network with 2003 land use data (Base Year Model)
2. 2030 Network with new West Jordan Land Use Plan
3. 2030 Network with new West Jordan Land Use Plan, plus Kennecott Land development
4. 2030 Network with new West Jordan Land Use Plan, plus Woods Crossing development
5. 2030 Network with new West Jordan Land Use Plan, plus Highlands Commons development
6. 2030 Network with new West Jordan Land Use Plan, plus, Kennecott Land development, Woods Crossing development, plus Highlands Commons development
7. 2030 Network with new West Jordan Land Use Plan, plus Highlands Commons development, without Mountain View Corridor

Scenarios two through six were modeled to demonstrate a comparison of different socio-economic factors due to different specific area plans as discussed previously. Scenario 7 is included as an example of the options and alternatives which were also modeled for an analysis of various effects.

1. 2003 Base Year Model

The 2003 base year model was run to test the calibration in the model and to give a basis for the existing conditions on the roads in West Jordan. This run included all functionally classified roads that were completed in 2003 and it also used the already existing 2003 land use inputs from Wasatch Front Regional Council. The total population, number of households, and employment estimated based on this land use scenario are shown in Table 8.

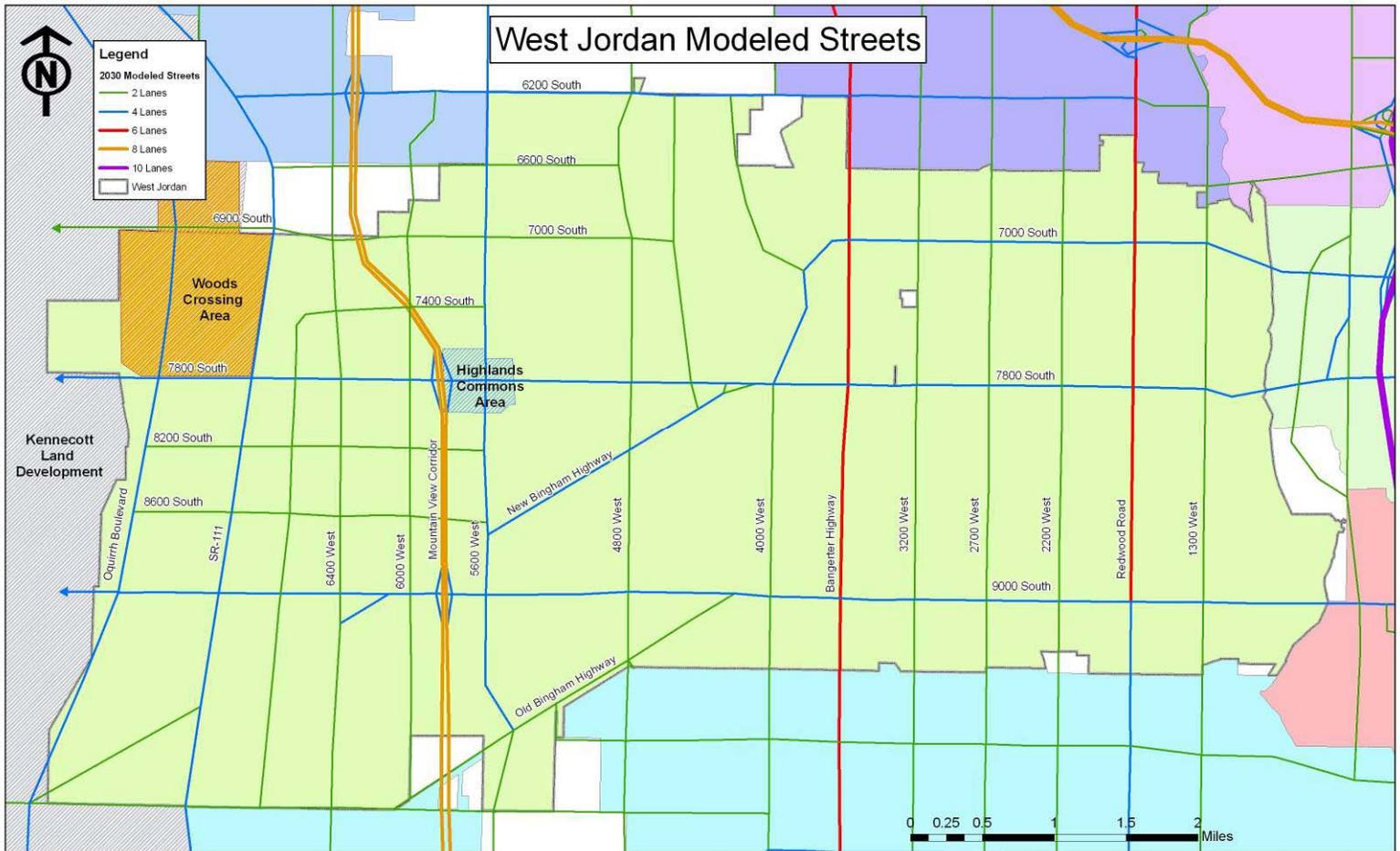
TABLE 8.

Option	2003 Population	2003 Households	2003 Employment
2003 West Jordan land use	104,282	29,697	20,239

2. 2030 Network with new West Jordan Land Use Plan

The 2030 roadway network was developed from the West Jordan Master Transportation Plan (December, 2003) with some revisions from West Jordan City. Many roads on the west side of West Jordan in the Master Transportation Plan currently do not exist, including Mountain View Corridor. These roads are planned for and therefore are included in all the 2030 model runs, except number seven which omits the Mountain View Corridor. Figure 6 is a map of all the modeled streets in West Jordan by the year 2030. The map displays the classified roads by the number of lanes on the road.

FIGURE 6.



This modeling scenario also includes the new West Jordan Land Use Plan that has been described above.

3. 2030 Network with new West Jordan Land Use Plan, plus Kennecott Land Development

This modeling scenario includes the same 2030 roadway network as the previous scenario, but the socio-economic data is different. This scenario includes Kennecott’s Phase One, or 2030 development plan, as detailed above. For example, this scenario includes an additional 14,587 people on the west side of West Jordan.

4. 2030 Network with new West Jordan Land Use Plan, plus the Woods Crossing development

This modeling scenario includes the same 2030 roadway network as shown in Figure 6, but with the estimated Woods Crossing socio-economic data. For example, this scenario includes an additional 7,922 people and 850 new jobs on the northwest corner of West Jordan.

5. 2030 Network with new West Jordan Land Use Plan, plus Highlands Commons development

This modeling scenario includes the same 2030 roadway network as shown in Figure 6. The modeling scenario, however, includes the Highlands Commons socio-economic data. This land use option changes residential land use to commercial near the proposed Mountain View Corridor. It adds over 2,500 jobs to the center of West Jordan.

6. 2030 Network with new West Jordan Land Use Plan, plus Kennecott Land development, plus Woods Crossing development, plus Highlands Commons development

This modeling scenario is the same 2030 network, including Mountain View Corridor, which we used for the majority of the model runs. This scenario also combines all the different land use options and socio-economic data.

7. 2030 Network with new West Jordan Land Use Plan, plus Highlands Commons development, without Mountain View Corridor

This modeling scenario includes the 2030 roadway network, plus Highlands Commons development, without the Mountain View Corridor. It is the same as scenario 5 with the Mountain View Corridor omitted. Mountain View Corridor is a planned freeway which can carry a lot of traffic. Running a model without the Mountain View Corridor will divert that traffic onto other roads and show us which roads in the network will be over their capacity. This scenario also includes the Highlands Commons development in order to examine the results of additional commercial land use on 7800 South.

Other scenarios

Other model runs were examined to see if additional factors had a greater effect on West Jordan's roadways. For example, InterPlan modeled an "unconstrained"

network in which all roads were adjusted to be at least five lanes. This simulates a network where no roads are over capacity. None of the additional model runs were seen to have noticeable effects on traffic in West Jordan in 2030.

Recommendations

Project List

InterPlan developed a project list by taking the 2030 roadway network and subtracting the existing roads and widths. Figure 7 is a map of the projects in West Jordan.

FIGURE 7.

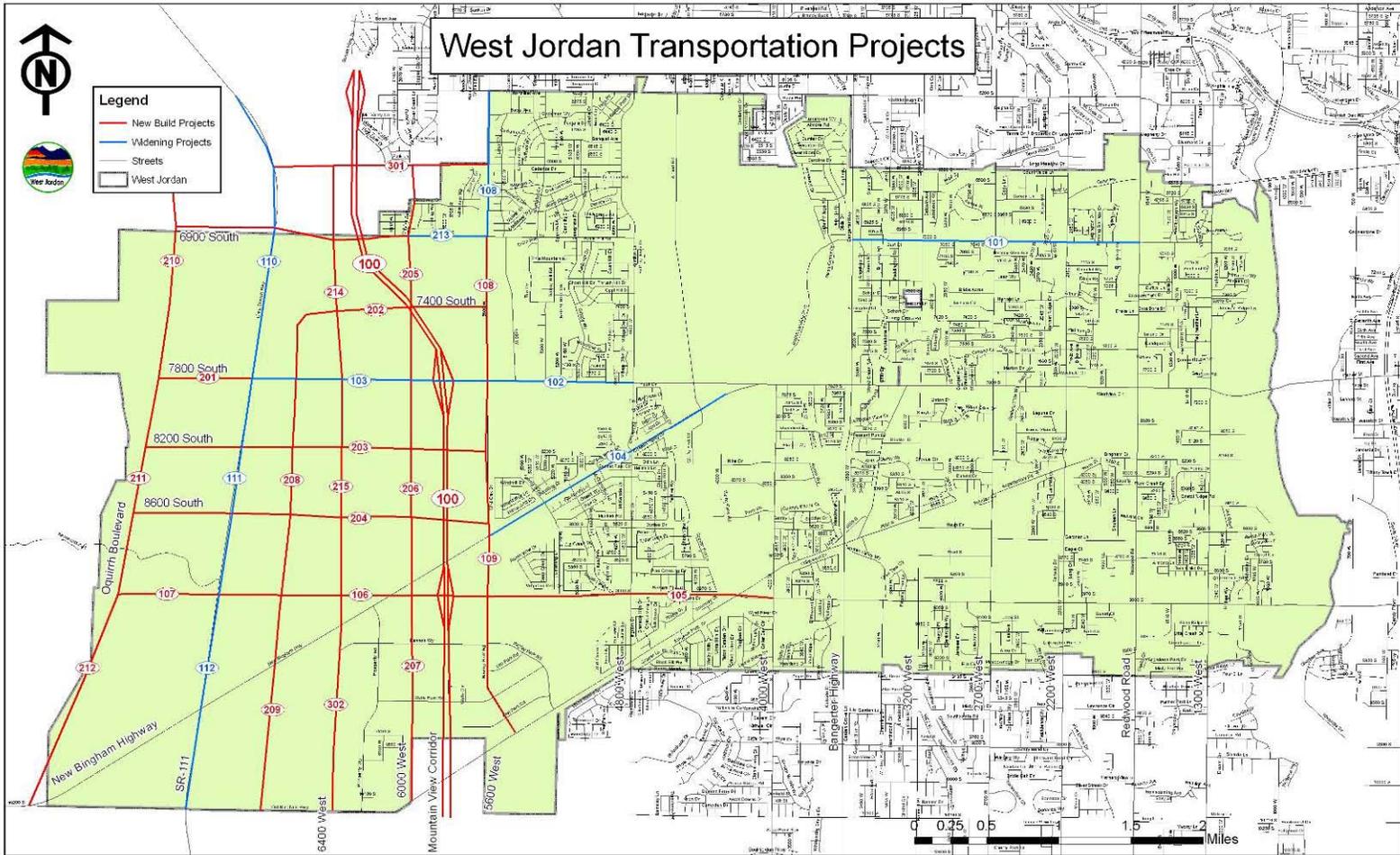


TABLE 9. West Jordan Roadway Improvement List

Project Number	Street	Limits		Project	Street Classification	Length (miles)	Capacity (AADT)
		Begin	End				
100	Mountain View Corridor	6600 South	Old Bingham Highway	New Build	Freeway	4.82	180,000
101	7000 South	Redwood Rd	Bangerter Hwy	Widen to Arterial	Arterial	1.99	40,000
102	7800 South	4800 West	5600 West	Widen to Arterial	Arterial	1.00	40,000
103	7800 South	5600 West	SR-111	Widen to Arterial	Arterial	2.27	40,000
104	New Bingham Highway	7800 South	5600 West	Widen to Arterial	Arterial	2.15	40,000
105	9000 South	4000 West	5600 West	Widen to Arterial	Arterial	1.98	40,000
106	9000 South	5600 West	SR-111	Widen to Arterial	Arterial	1.86	40,000
107	9000 South	SR-111	Oquirrh Boulevard	Widen to Arterial	Arterial	0.70	40,000
108	5600 West	6200 South	7800 South	Widen to Arterial	Arterial	2.00	40,000
109	5600 West	7800 South	Old Bingham Highway	Widen to Arterial	Arterial	2.50	40,000
110	SR-111	6600 South	7800 South	Widen to Arterial	Arterial	1.47	40,000
111	SR-111	7800 South	9000 South	Widen to Arterial	Arterial	1.52	40,000
112	SR-111	9000 South	South Jordan	Widen to Arterial	Arterial	1.50	40,000
201	7800 South	SR-111	Oquirrh Boulevard	New Build	Major Collector	1.20	20,000
202	7400 South	5600 West	6800 West	New Build	Major Collector	1.25	20,000
203	8200 South	5600 West	Oquirrh Boulevard	New Build	Major Collector	2.36	20,000
204	8600 South	5600 West	Oquirrh Boulevard	New Build	Major Collector	2.47	20,000
205	6000 West	6600 South	7800 South	New Build	Major Collector	1.50	20,000
206	6000 West	7800 South	9000 South	New Build	Major Collector	1.52	20,000
207	6000 West	9000 South	Old Bingham Highway	New Build	Major Collector	1.42	20,000
208	6800 West	7400 South	9000 South	New Build	Major Collector	1.91	20,000
209	6800 West	9000 South	Old Bingham Highway	New Build	Major Collector	1.50	20,000
210	Oquirrh Boulevard	6600 South	7800 South	New Build	Major Collector	1.52	20,000

211	Oquirrh Boulevard	7800 South	9000 South	New Build	Major Collector	1.53	20,000
212	Oquirrh Boulevard	9000 South	Old Bingham Highway	New Build	Major Collector	1.58	20,000
213	7000 South	5600 West	SR-111	New Build	Major Collector	1.48	20,000
214	6400 West	6600 South	7800 South	New Build	Major Collector	1.48	20,000
215	6400 West	7800 South	9400 South	New Build	Major Collector	1.88	20,000
301	6600 South	5600 West	SR-111	New Build	Minor Collector	1.48	12,000
302	6400 West	9400 South	Old Bingham Highway	New Build	Minor Collector	1.12	12,000

Model Volumes

InterPlan then modeled this project list with each of the land use scenarios, in order to get estimated 2030 traffic volumes on these roadway projects. Table 10 is a list of the projects by scenario and their traffic volume. Project 100, Mountain View Corridor, was omitted from one modeling scenario to test the effect it would have on the other streets.

TABLE 10. West Jordan Modeled Projects

Project Number	Length (miles)	Capacity (AADT)	Modeled Traffic Volume						
			2003 Base Year	2030 new land use	2030 Kennecott	2030 Woods Crossing	2030 Highlands	2030 Highlands - NO MVC	2030 All land uses
100	4.82	180,000	N/A	160,600	172,700	174,000	163,100	N/A	173,700
101	1.99	40,000	23,800	46,400	46,200	47,000	44,900	50,700	46,000
102	1.00	40,000	13,200	22,200	22,100	23,900	23,200	29,000	24,700
103	2.27	40,000	5,100	22,600	33,800	32,500	19,900	20,400	35,000
104	2.15	40,000	26,300	30,300	31,400	32,700	30,900	37,600	31,300
105	1.98	40,000	9,800	31,000	33,400	32,800	31,900	34,700	33,900
106	1.86	40,000	N/A	8,500	15,600	15,600	8,900	10,000	17,300
107	0.70	40,000	N/A	500	2,800	4,700	500	1,700	3,600
108	2.00	40,000	10,400	25,600	26,200	28,100	25,700	31,000	27,300
109	2.50	40,000	1,900	19,700	21,300	20,900	19,700	24,200	21,600

110	1.47	40,000	10,500	34,000	45,200	44,800	34,400	42,000	49,900
111	1.52	40,000	7,200	36,600	49,800	47,100	36,000	41,100	49,300
112	1.50	40,000	6,700	43,900	53,500	54,600	44,100	48,900	53,100
201	1.7	20,000	N/A	1,600	4,100	2,800	1,600	4,300	2,700
202	1.25	20,000	N/A	13,700	16,800	16,900	14,000	16,500	18,200
203	2.36	20,000	N/A	3,700	6,800	6,500	3,700	3,300	6,900
204	2.47	20,000	N/A	3,000	13,300	10,700	7,500	6,800	14,000
205	1.50	20,000	N/A	6,000	7,500	7,600	5,300	8,500	6,700
206	1.52	20,000	N/A	4,300	8,600	5,100	3,700	4,700	4,700
207	1.42	20,000	N/A	2,400	2,800	2,700	2,400	1,900	2,900
208	1.91	20,000	N/A	13,300	12,900	12,500	9,700	14,600	13,200
209	1.50	20,000	N/A	4,300	4,800	5,200	3,800	6,800	4,900
210	1.52	20,000	N/A	3,000	6,000	7,000	2,800	9,400	7,200
211	1.53	20,000	N/A	2,900	7,000	7,000	2,600	8,400	7,200
212	1.58	20,000	N/A	2,900	9,200	10,700	3,000	7,300	9,900
213	1.48	20,000	N/A	4,600	6,500	6,800	3,700	3,600	6,900
214	1.48	20,000	N/A	10,200	11,600	12,300	9,600	15,000	12,300
215	1.88	20,000	N/A	12,400	9,900	15,400	12,900	18,500	16,600
301	1.48	12,000	N/A	4,700	8,600	8,700	4,900	4,900	11,000
302	1.12	12,000	N/A	11,200	9,900	11,700	11,200	13,100	9,900
TOTALS	47	984,000	114,900	586,100	700,300	708,300	585,600	518,900	721,900

Project 201, 7800 South

This project is an extension of 7800 South from SR-111 to Oquirrh Boulevard. This project would be a new construction, and is expected to be a 3-lane major collector. The travel model projects that this road segment will carry between 1,000 and 4,000 vehicles a day in 2030. With that projected volume, this road does not need to be a 3-lane major collector. A smaller 2-lane minor collector would suffice.

Project 203, 8200 South

This project connects 5600 West with Oquirrh Boulevard. This would be a new construction of a 3-lane major collector. 8200 South is projected to have an average daily volume of between 3,000 and 7,000 vehicles. With daily volumes below 12,000 vehicles, 8200 South does not need to be a 3-lane major collector facility. It can be reduced to a 2-lane minor collector.

Project 204, 8600 South

This project connects 5600 West with Oquirrh Boulevard, similar to 8200 South. This would be a new construction of a 3-lane major collector. 8600 South is projected to have an average daily volume of between 7,000 and 14,000 vehicles. This road would work as a 2-lane minor collector street.

Project 205-207, 6000 West

This project extends from 6600 South to Old Bingham Highway. This project would be a new construction of a 3-lane major collector. 6000 West crosses Mountain View Corridor in northern West Jordan, this crossing should be planned for during construction of the Mountain View Corridor. 6000 West is projected to have an average daily volume of between 2,000 and 8,000. With daily volumes below 12,000 vehicles, 6000 West does not need to be a 3-lane major collector facility. It can be reduced to a 2-lane minor collector.

Project 208-209, 6800 West

This project extends from 7400 South to Old Bingham Highway. This project would be a new construction of a 3-lane major collector. 6800 West is projected to have a 2030 volume of between 4,000 and 14,000 vehicles a day, with the higher volume on the north leg of the road. A smaller 2-lane minor collector would suffice.

Project 210-212, Oquirrh Boulevard

This project is a north/south road that would extend through the western side of West Jordan. This project would be a new construction of a 3-lane major collector west of SR-111. Oquirrh Boulevard is projected to have a 2030 volume of between 3,000 and 9,000 vehicles a day. This road carries more vehicles with the Kennecott land use option and even more vehicles if Mountain View Corridor is not built. This road can be reduced to a 2-lane minor collector.

Project 213, 6900/7000 South

This project is an east/west road that would connect 5600 West and Oquirrh Boulevard. This project includes widening portions that exist, with new construction where it does not exist. The road would be a 3-lane major collector street. 6900 South is projected to have a 2030 volume of between 4,000 and 7,000 daily vehicles. With volumes that low a 2-lane minor collector would function well.

2030 Traffic Volume Maps

For comparison with existing and future traffic volumes on all the modeled streets in West Jordan, InterPlan prepared 3 maps of the traffic volumes:

- Figure 8. New West Jordan Land Use Plan
- Figure 9. New West Jordan Land Use Plan, plus Kennecott land development, plus Woods Crossing development, plus Highlands Commons development
- Figure 10. New West Jordan Land Use Plan, plus Highlands Commons development without Mountain View Corridor

These traffic volume maps are labeled with the 2030 average daily volume on different segments of each road. The posted traffic volumes came directly from the travel demand model run for the given scenario.

Proposed Functional Classification Map

Several roads proposed to be major collectors operate with relatively low daily volumes (below 12,000 in 2030). Based on these volumes, the roads could be reclassified as minor collectors and they would still operate at an acceptable level of service. The roads that may be down-sized from a major collector to a minor collector include:

- Project 213: 6900 South – from 5600 West to Oquirrh Boulevard.
- Project 201: 7800 South - from SR-111 to Oquirrh Boulevard.
- Project 203: 8200 South – from 5600 West to Oquirrh Boulevard.
- Project 204: 8600 South – from 5600 West to Oquirrh Boulevard.
- Project 205-207: 6000 West – from 6600 South to Old Bingham Highway
- Project 209: 6800 West – 9000 South to Old Bingham Highway
- Project 210-212: Oquirrh Boulevard – 6600 South to Old Bingham Highway

A proposed functional classification map with these changes is displayed in Figure 11, found after the traffic volume maps.

FIGURE 8.

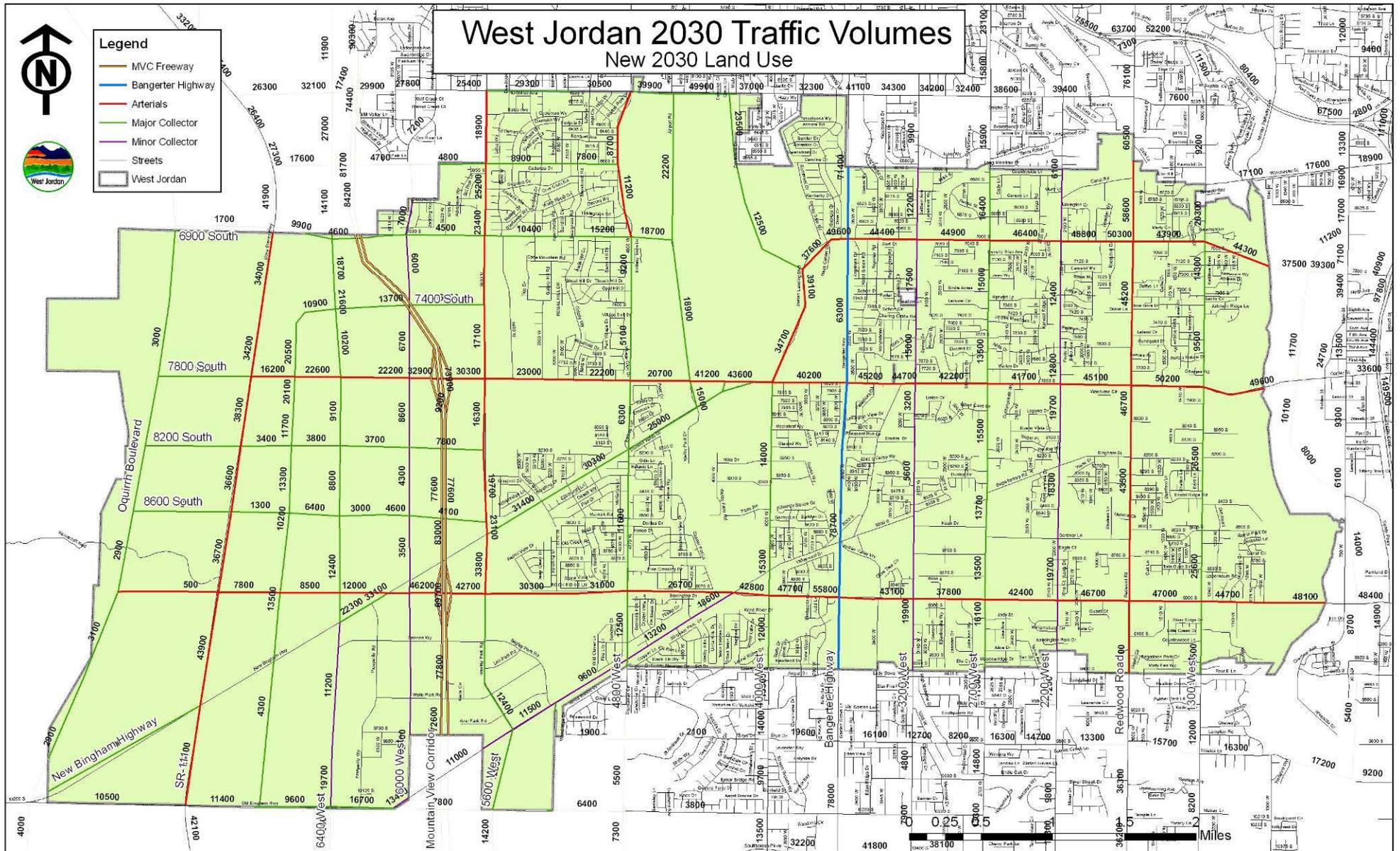


FIGURE 9.

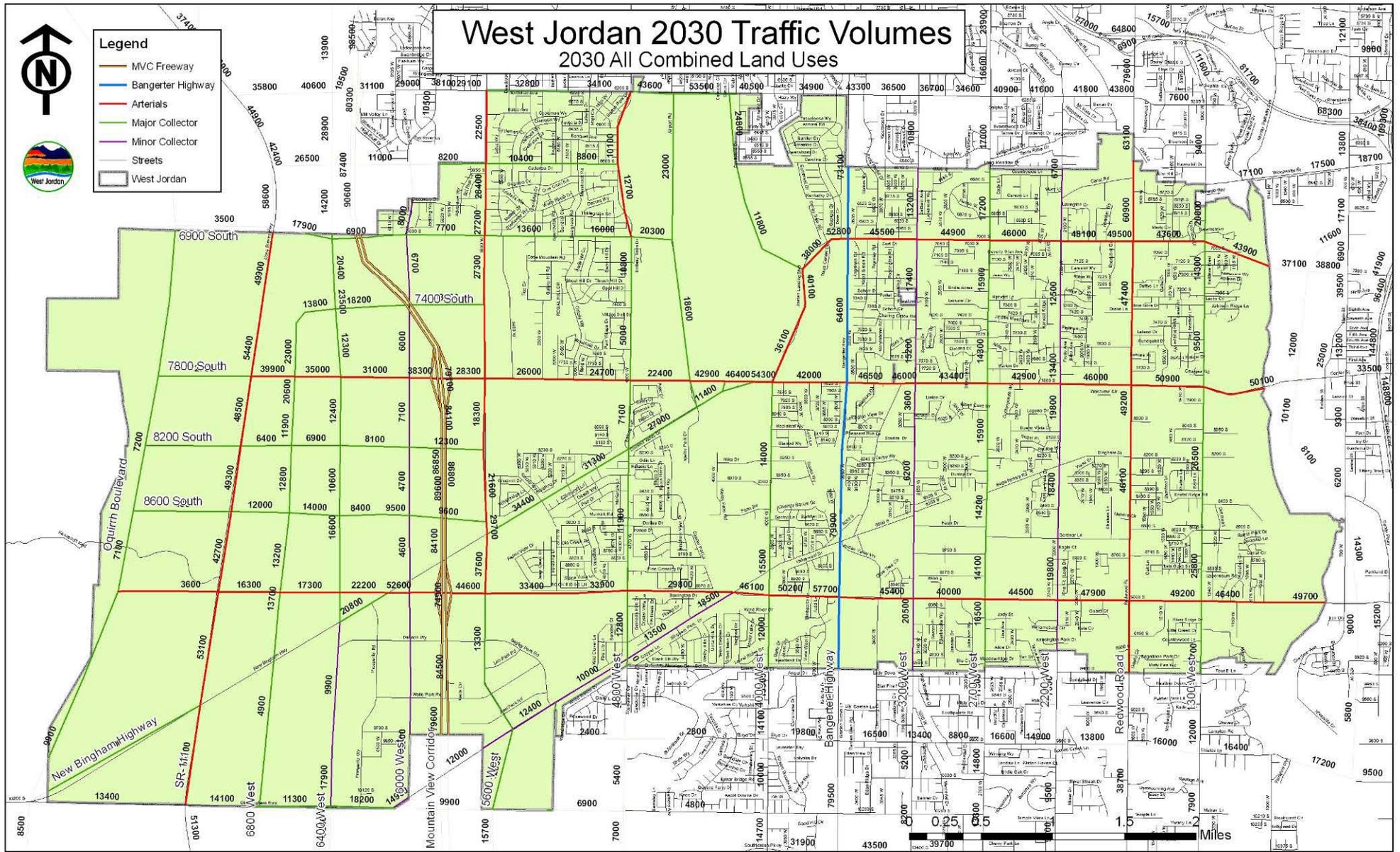
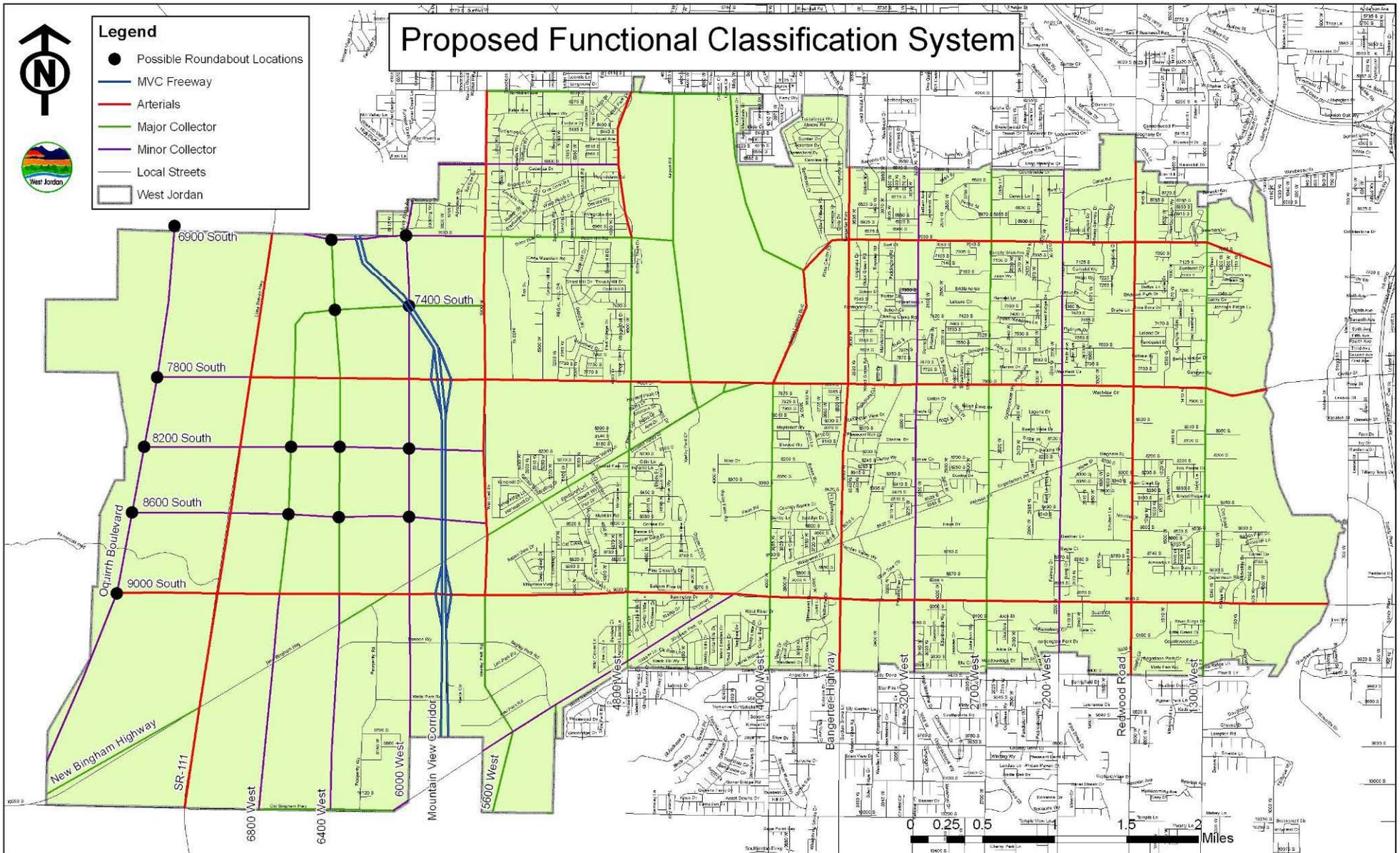


FIGURE 11.



Access Spacing

Even though this revised functional classification system in West Jordan proposes down-sizing some segments to minor collectors, all of these future roads should still have limited access. All functionally classified roads must follow West Jordan's access management standards, including minimum signal, street, and access spacing distances. West Jordan prefers no driveways on collectors and above and limits the spacing of residential cross streets. State roads such as 7800 South, 9000 South and SR-111 need coordination with UDOT in conforming to the UDOT access management standards.

Roundabouts

There are several intersections where a roundabout may be used in place of a traffic signal or a four-way stop. Single lane roundabouts can be assumed to have a capacity of approximately 20,000 vehicles per day. Intersections with a volume lower than 20,000 vehicles a day can be assumed to function well with a roundabout. Many intersections on the west side of West Jordan meet this criterion, including:

- 6000 West and 7000 South
- 6000 West and 7400 South
- 6000 West and 8200 South
- 6000 West and 8600 South
- 6400 West and 7000 South
- 6400 West and 7400 South
- 6400 West and 8200 South
- 6400 West and 8600 South
- 6800 West and 8200 South
- 6800 West and 8600 South
- Oquirrh Boulevard and 6900 South
- Oquirrh Boulevard and 7800 South
- Oquirrh Boulevard and 8200 South
- Oquirrh Boulevard and 8600 South
- Oquirrh Boulevard and 9000 South

Each of these intersections should be evaluated individually before roundabouts are put in place.

Mountain View Corridor Interchanges

The Mountain View Corridor Freeway is planned to have two interchanges in West Jordan City at 7800 South and 9000 South. In planning for new freeway interchanges on the arterials in West Jordan it has been proposed that 7800 South and 9000 South be widened to a 7-lane facility similar to Redwood Road leading into the interchange with Mountain View Corridor.

The interchange ramp configuration has not been determined and needs to be looked at carefully before construction begins to determine the number of lanes on the ramps and cross streets. Based on daily traffic volumes it would not be necessary to widen either 7800 South or 9000 South to 7-lanes under the new West Jordan land use option. However, in the 2030 combined land use option which includes the Kennecott land development and the Highlands Commons development, widening 9000 South is preferred. 9000 South would only have to be widened to 7-lanes from about 5600 West to New Bingham Highway. This would allow the street to maintain its level of service through this high volume area and facilitate traffic movement on and off Mountain View Corridor.