SYSTEM NEEDS ASSESSMENT

As the region grows and development patterns evolve, the needs for all transportation modes will increase. The need to manage all elements of the transportation system will become much more pronounced. This Chapter describes the needs the WFRC identified through public input, analysis of current and future travel patterns, and other means. Critical regional corridors are identified in section 3.2.

PUBLIC SCOPING OF NEEDS

3.1

The following is a summary of public involvement efforts and comments received during the scoping phase of the 2030 RTP. Numerous events were held and efforts made to ascertain the mind of the public concerning needed and desirable changes and enhancements to the regional transportation system. Those efforts included a visioning process done in partnership with the Mountainland Association of Governments and Envision Utah which involved about a thousand members of the public including many elected and appointed officials. In addition, presentations on transportation issues were made to many groups including members of the State Legislature, the governor's office, civic groups, chambers of commerce, service clubs, environmental justice and low income groups, environmental groups, and motor cargo organizations.

The Wasatch Front Regional Council sponsored annual transportation fairs in each urban county and participated in dozens of open houses sponsored by other transportation agencies in order to receive feedback on the current 2030 RTP. Thousands of copies of the Communiqué and the Moving Forward Together brochure were distributed. These publications discuss both the current Plan and transportation system needs. Quarterly newsletters were also mailed, and presentations made on transportation needs on an annual basis to the respective county councils of government. Based on the above public involvement efforts, it became clear that the following transportation needs were perceived by members of the public.

Weber County

- Frontrunner Commuter Rail is desperately needed (this project is currently underway with an anticipated completion date of late 2007 or early 2008)
- The 24th Street interchange should be upgraded
- 24th Street from I-15 to Ogden including the overpass needs to be improved
- A west side corridor for the North Legacy Highway needs to be identified and preserved
- I-15 needs to be widened all the way to 2700 North (this project is currently underway with an anticipated completion date of October 2008)
- Intersection of Harrison Boulevard and US-89 needs to be made into an interchange
- Mountain Road in North Ogden needs to be completed
- Riverdale Road needs to be widened (will be underway in next year or two)
- There needs to be some form of intensive transit service available from the downtown area to Weber State University
- Environmental justice groups emphasized that bus transit is often the only means of local mobility for low income residents and people with disabilities. Reductions in service or fare increases generally hit them hard. Frontrunner Commuter Rail will be nice, but will not help them get around town. More extensive bus service throughout Weber County needs to be maintained.

Davis County

- North Legacy Highway through northern Davis County needs to be built in the first phase of the Plan
- East / West travel in northwestern Davis County should be a priority
- Remaining intersections along US-89 between Lagoon and I-84 should be made into interchanges
- I-15 in northern Davis County needs to be widened
- Parrish Lane Interchange needs to be improved (underway)
- Legacy Parkway cannot be constructed soon enough (underway)
- Commuter Rail is important and greatly anticipated. However, it will not help south Davis County very much. Some form of intensive transit into southern Davis County is needed
- Environmental justice groups emphasized that bus transit is often the only means of local mobility for low income residents and people with disabilities. Reductions in service or fare increases generally hit them hard
- Bus service needs to be maintained and more closely coordinated with human service agencies. A specific comment in this regard was provided by the Community Services Group. They state that it is apparent that the location of bus stops has not been coordinated with human service providers

Salt Lake County

- East / West highway expansion must be a priority
- Completion of the TRAX system must be sooner rather than later
- Bus travel from western Salt Lake County to the downtown area is problematic
- SR-201 must be widened all the way to the Mountain View Corridor
- Completion of the Mountain View Corridor is essential in the next 10-15 years
- Mountain View Corridor should not be funded with tolls
- SR-111 in the Magna area from SR-201 to 3500 South needs to be widened
- 3500 South from 5600 West to 8400 West should be widened
- 9000 South west of the Bangerter Highway to SR-111 should be widened
- 6200 South west of Bangerter Highway to 5600 West needs to be widened
- 7000 South widening should be in the first phase of the Plan
- 7800 South west of Bangerter Highway to SR-111 should be widened
- The right of way for the Herriman bypass for 12600 South should be preserved
- The railroad bridge over State Street at 7900 South needs to be widened
- Wasatch Boulevard in the southeastern portion of Salt Lake County needs to be completed
- 5600 West between SR-201 and I-80 needs to be widened to accommodate truck traffic
- 5600 West near 4500 South needs to be widened (programmed)
- Foothill Boulevard needs to be widened to six lanes from 1300 South to I-215
- Narrow railroad bridge on 14600 South is a traffic bottleneck and a safety hazard
- Redwood Road south of Bangerter Highway needs to be widened
- Eastbound traffic on the south end of Bangerter Highway to I-15 is beginning to reach the saturation point. A cutoff in the form of the Porter Rockwell Highway is desirable
- Environmental justice groups emphasized that bus transit is often the only means of local mobility for low income residents and people with disabilities. Reductions in service or fare increases generally hit them hard. The TRAX extensions will be nice, but will not be sufficient for local travel. Bus service needs to be maintained. Numerous environmental justice groups stressed, however, that the proposed TRAX extensions should not be sacrificed in order to get more bus service
- Environmental groups would like to see a transit first policy

- Bicycle groups would like to see a more consistent effort at including bicycle accommodation in highway construction

Comments on both general and specific needs were also received from members of the WFRC technical advisory committees. These are listed below by urbanized area.

Ogden - Layton Urbanized Area

- Transit service is needed to and from Morgan, and to and from Ogden Valley.
- More sidewalks and pedestrian paths are needed in west Weber County.
- South Weber Drive needs to be widened to accommodate cyclists.
- Improvements are needed to address East / West traffic.
- More roads are needed that do not connect to I-15 in North Davis County so that going through an interchange is not required to travel across I-15.
- Cyclist safety needs to be improved, perhaps by prioritizing construction of separate trails, through signage and education, and by including more law enforcement in group rides.
- High congestion levels at and around the 650 North and 5600 South interchanges and an additional I-15 interchange is greatly needed.
- Work is needed to ensure pedestrian safety across railroad tracks. Several school boundaries extend across the tracks.
- Improved pedestrian facilities are needed within one mile of commuter rail stations.
- Roads may need to be improved for automobile access to commuter rail stations.
- Bus and light rail connections will be needed to commuter rail.
- North Legacy and widening of 2000 West / 3500 West are both needed.
- A new road from Layton to South Weber is needed.

Salt Lake Urbanized Area

- SR-111 corridor needs study.
- 5600 West from SR-201 to I-80 needs to be widened.
- 5600 West needs a uniform five-lane section south of 4500 South.
- Right turn lanes on Bangerter Highway need to be lengthened.
- Bike crossing where 9000 South crosses the Jordan River is needed.
- Traffic flow at the I-15 / I-215 South interchange needs improvement.
- The High Occupancy Vehicle / Toll lanes on I-15 need conversion to an electronic system to reduce user violations.
- An adaptive signal system would work well for Union Park Avenue and 1300 East.
- A downtown transit circulator would improve accessibility and mobility.
- Bus rapid transit systems need to be developed.
- Bus connections to rail lines will need to be made.
- East / West traffic flow needs to be improved.
- 13400 South from 5600 West to Bangerter Highway needs widening.
- 12600 South from 5600 West to Bangerter Highway needs widening.
- Intersection of 12300 South and 700 East needs improvement.
- 11400 South from Redwood Road to I-15 needs to be completed, including the interchange at I-15.
- Big Cottonwood Trail needs a connection between Old Mill and Bonneville Trail.
- Cyclists need better options to get across I-15.
- A higher capacity expressway is needed at 6200 South or 5400 South.
- The Black Rock structure, near the Great Salt Lake, that connects SR-201 and I-80 is a bottleneck that needs widening.

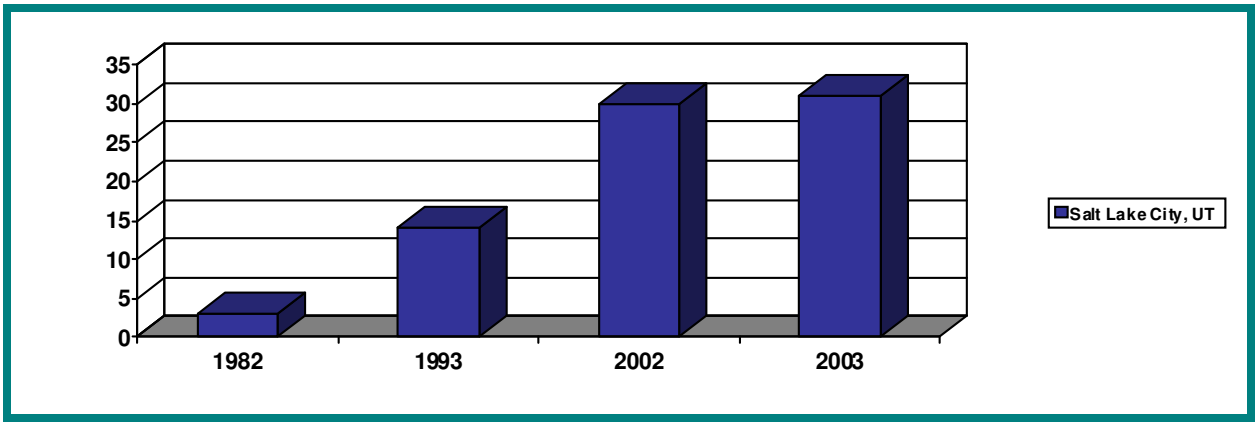
3.2 GENERAL NEEDS OVERVIEW

Performance of the Existing Transportation Systems

Transportation performance is getting worse in the greater Wasatch Front Region**.** Figure 3-1, derived from a national study by the Texas Transportation Institute, shows that traveler delay doubled in the decade between 1993 and 2002. Annual Delay per Traveler is defined as the extra travel time for peak period travel during the year divided by the number of travelers who begin a trip during the peak periods of 6 to 9 a.m. and 4 to 7 p.m. Free-flow speeds of 60 mph on freeways and 35 mph on principal arterials are used as the comparison threshold.

FIGURE 3-1

TRENDS - ANNUAL DELAY PER TRAVELER, 1982 to 2003



Source: Texas Transportation Institute

The greater Wasatch Front region is compared to other urban areas in Figure 3-2 to give a sense of relative congestion. With annual delay per traveler of 30 hours, this region is in the middle between Albuquerque at 18 hours and Denver at 51 hours.

FIGURE 3-2

ANNUAL DELAY PER TRAVELER OF SALT LAKE AND OTHER URBAN AREAS

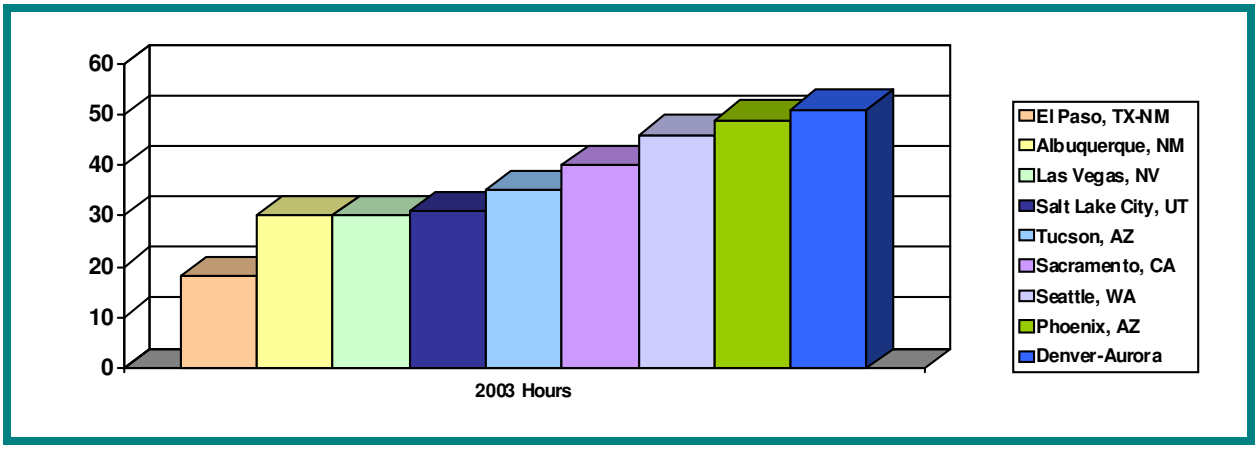


FIGURE 3-3

2006 PM PEAK DELAY

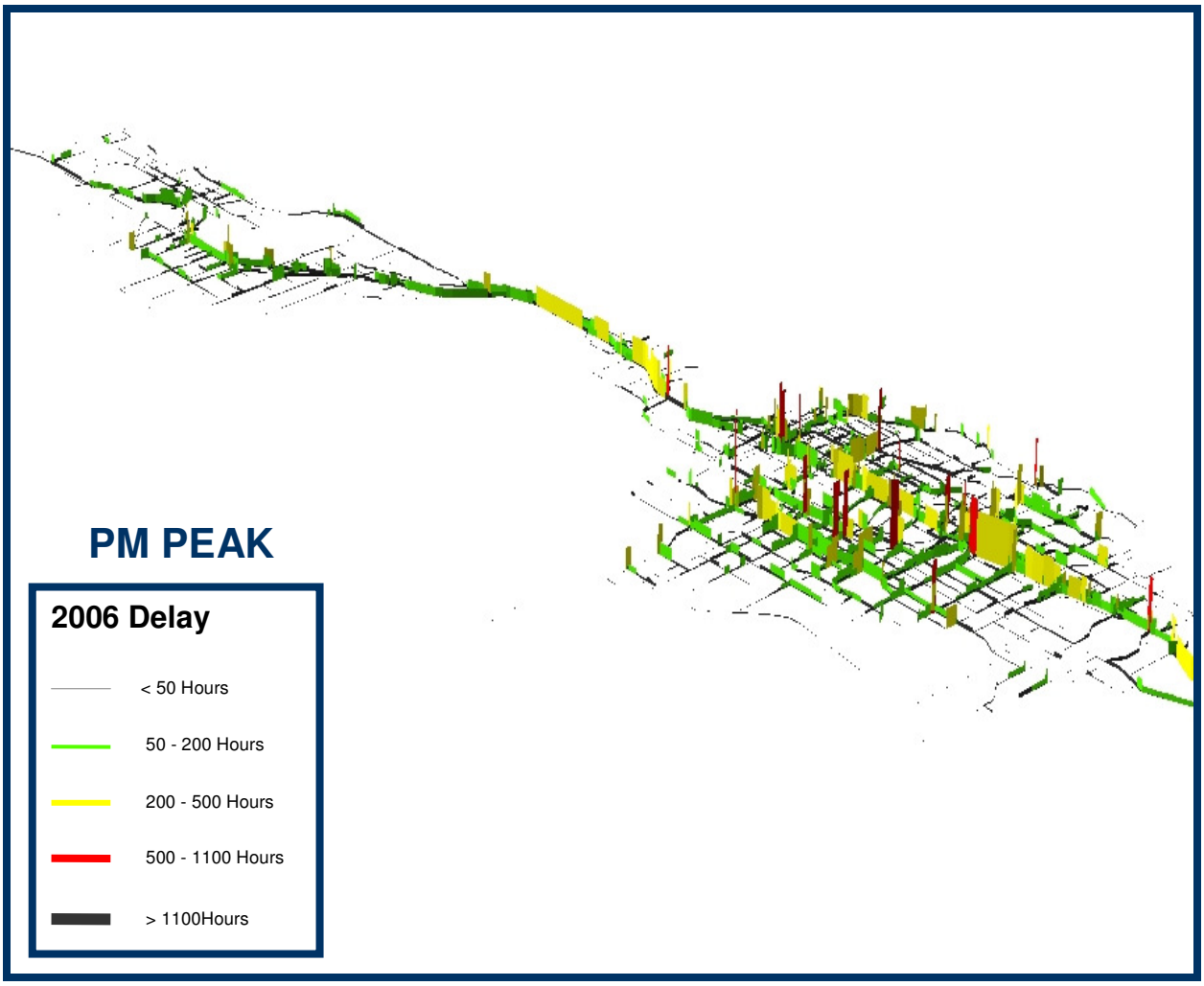


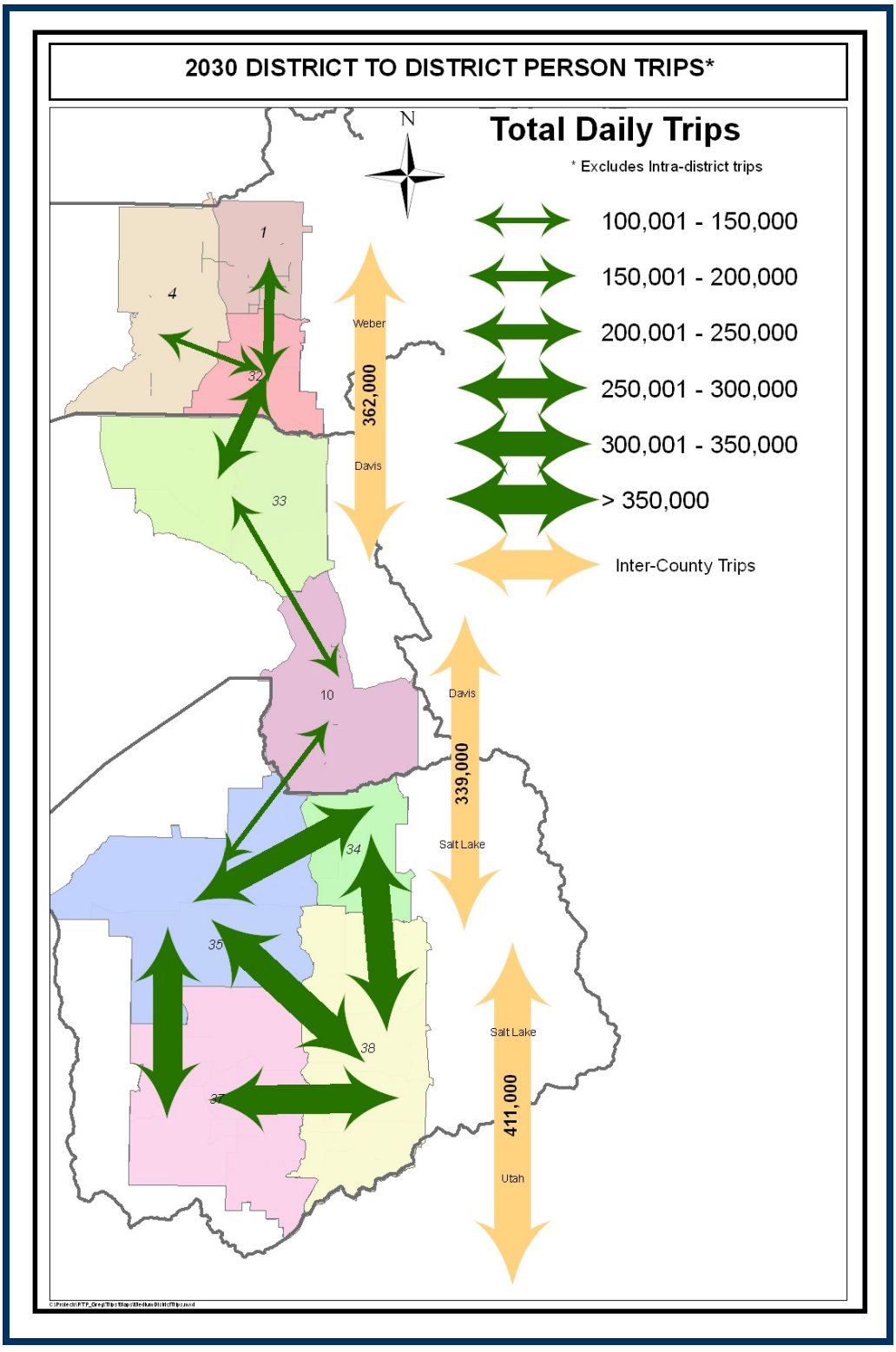
Figure 3-3, shown above, presents an oblique view of the sectional vehicle hours of delay during a typical 2006 afternoon peak period. Color and height of the fin distinguish the varying degrees of congestion along arterial and freeway facilities. The length of the fin matches the length of the highway section. The graphic confirms significant delays on I-15 in Salt Lake, Davis, and Weber Counties, as well as on Bangerter Highway, east-west facilities in western Salt Lake County, and several other roadways.

Major Future Travel Demand Corridors

In order to fully identify transportation system needs, one must also quantify future travel demand. The regional travel demand model facilitates analyses to accomplish this. A detailed documentation of this model is included in Appendix E. The projected 2030 desire lines of travel are displayed in Figure 3-4, the width of the line indicating the magnitude of the travel flows. Only the largest intra-county 2030 travel flows are shown in addition to each of the north-south, urban inter-county flows. The magnitude of the inter-county travel flow arrows illustrates the interconnected economy of the Wasatch Front Region.

FIGURE 3-4

2030 TRAVEL DESIRES



Based upon the travel characteristics illustrated in Figure 3-4, it appears that some of the WFRC primary travel corridors will be, in order of magnitude, as follows.

- North / South flow between southwestern and northwestern Salt Lake County
- East / West flow between southeastern and southwestern Salt Lake County
- East / West flow between southeastern and northwestern Salt Lake County
- North / South flow between southeastern and northeastern Salt Lake County
- North / South flow across the Salt Lake / Utah County line
- North / South flow across the Davis / Weber County line
- East / West flow between northwestern and northeastern Salt Lake County
- North / South flow across the Salt Lake / Davis County line
- East / West flow in northern Davis County
- North / South flow within Weber County

Finding Future (2030) Deficiencies

An essential analytical step in the process to identify Needs is to calculate how the existing transportation system would perform in the horizon year, 2030. In other words, what will be the deficiencies of the existing transportation system? For the purposes of this analysis, the "existing" system is assumed to be the facilities on the ground plus funded projects. The highway projects included are those to be constructed by 2010 (funded projects) and the transit projects included are those in Salt Lake County to be constructed by 2015 given the recent quarter cent sales tax increase (funded projects).

The following Figures 3-5, 3-6, 3-7 identify the deficiencies of the existing transportation system through the year 2030. In each county the future (2030) travel demand (red) is compared to the existing plus funded highway capacity (blue cross hatched). Capacity deficiencies show up as flows splashing over the capacity. As one would expect, the largest deficiencies will be primarily in the currently less urbanized areas of the Wasatch Front plus the heavily traveled I-15 corridor.

FIGURE 3-5

WEBER COUNTY 2030 PM PEAK PERIOD VOLUME/2010 CAPACITY

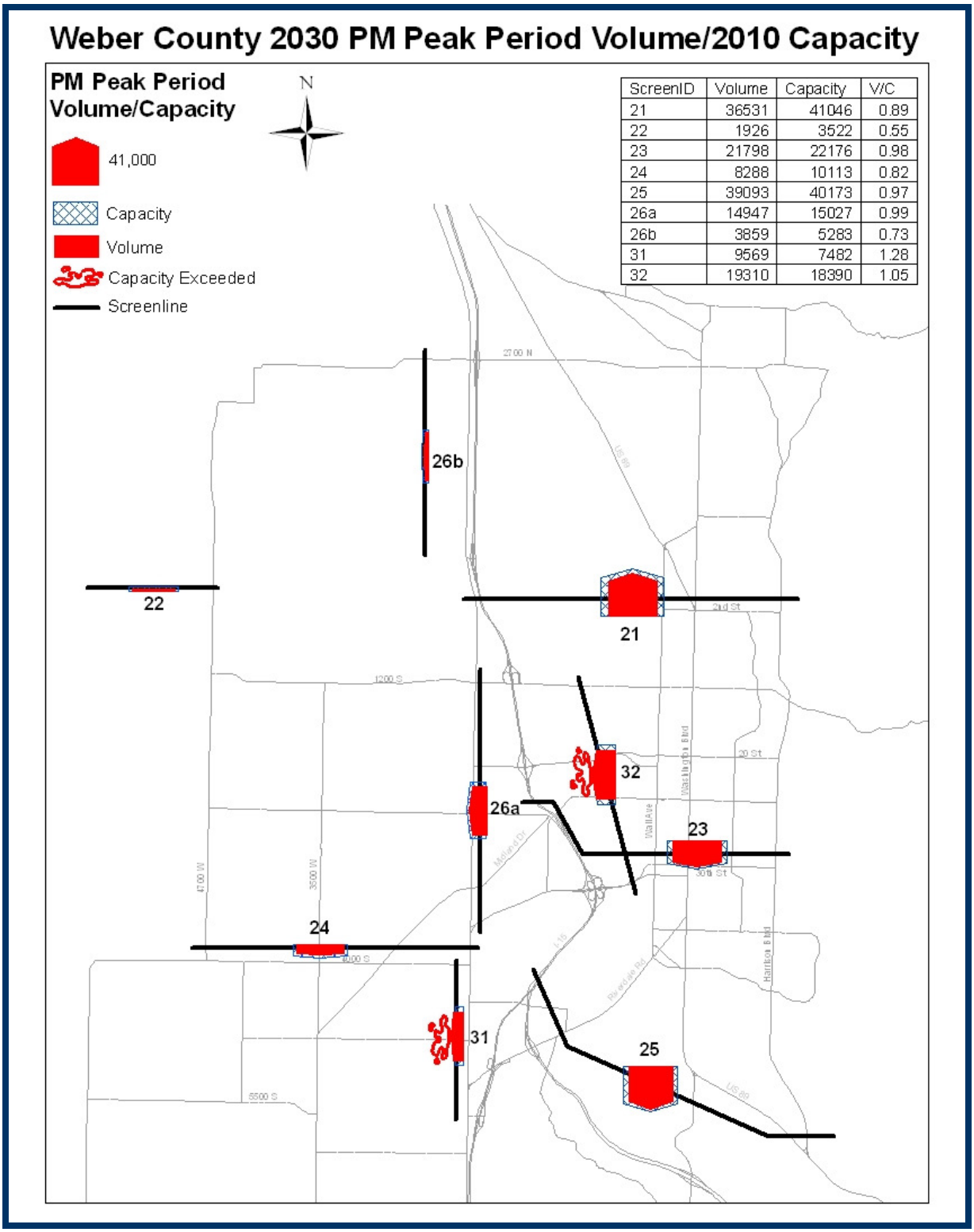
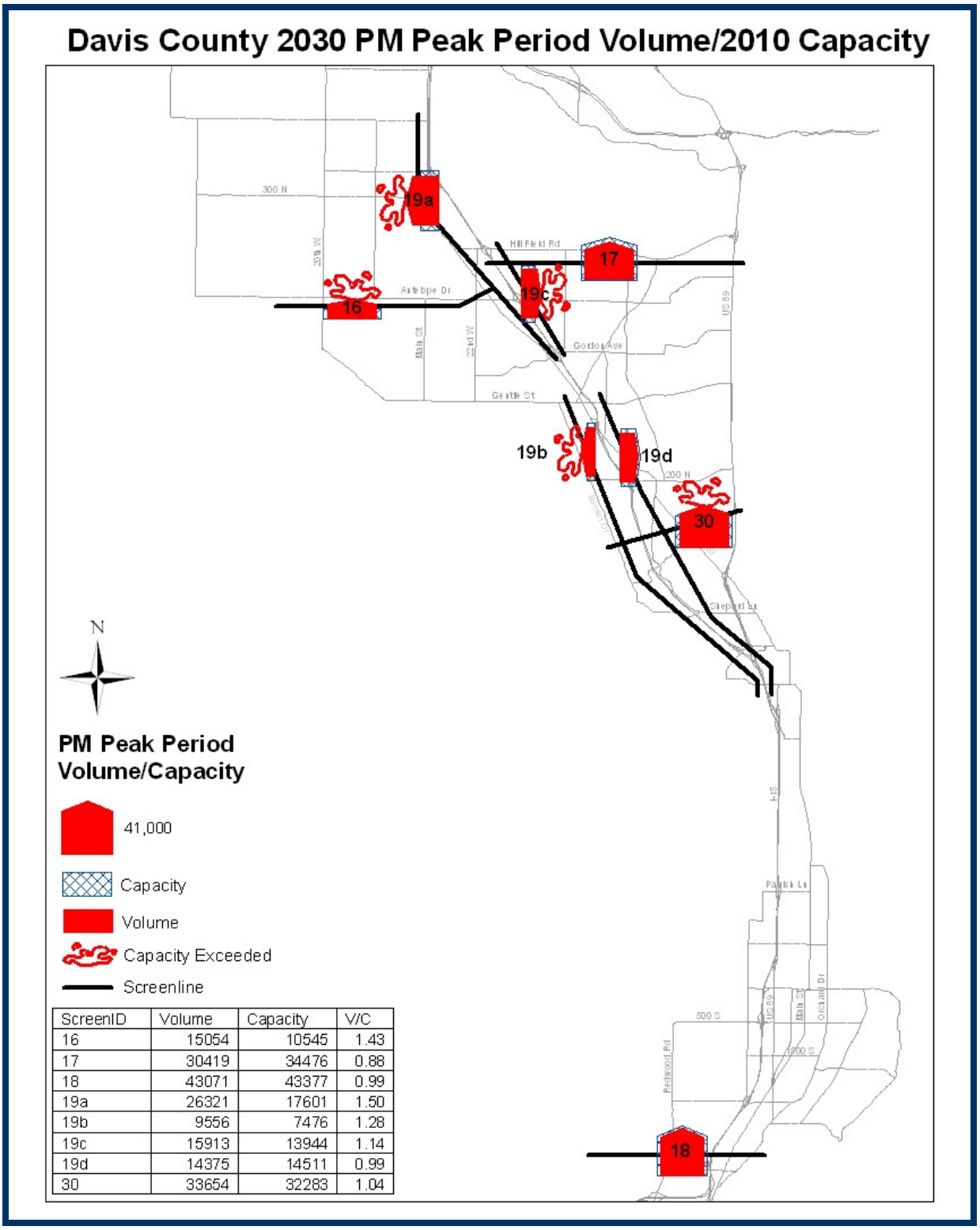


Figure 3-6

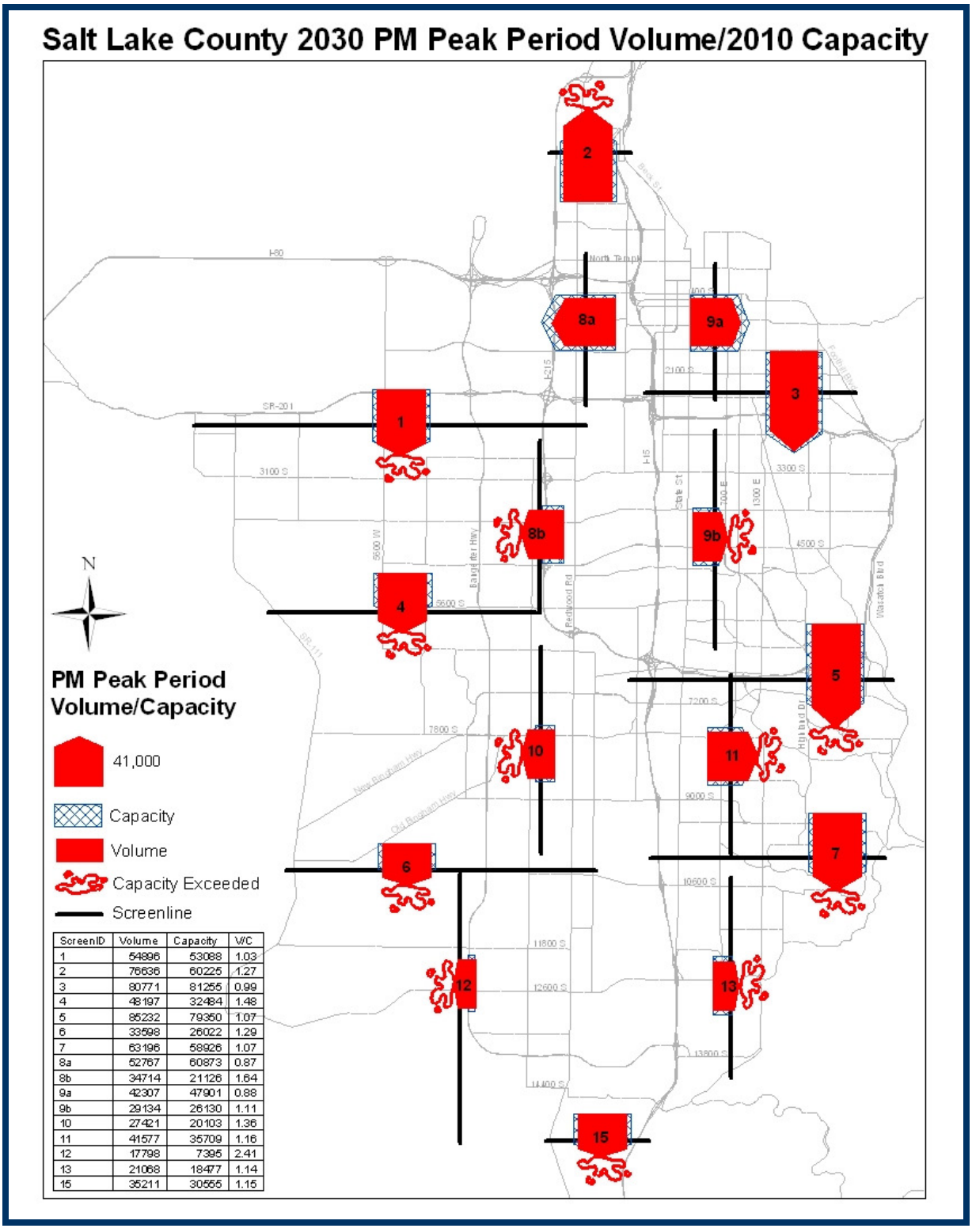
DAVIS COUNTY 2030 PM PEAK PERIOD VOLUME/2010 CAPACITY



ScreenID	Volume	Capacity	V/C
16	15054	10545	1.43
17	30419	34476	0.88
18	43071	43377	0.99
19a	26321	17601	1.50
19b	9556	7476	1.28
19c	15913	13944	1.14
19d	14375	14511	0.99
30	33654	32283	1.04

Figure 3-7

SALT LAKE COUNTY 2030 PM PEAK PERIOD VOLUME/2010 CAPACITY

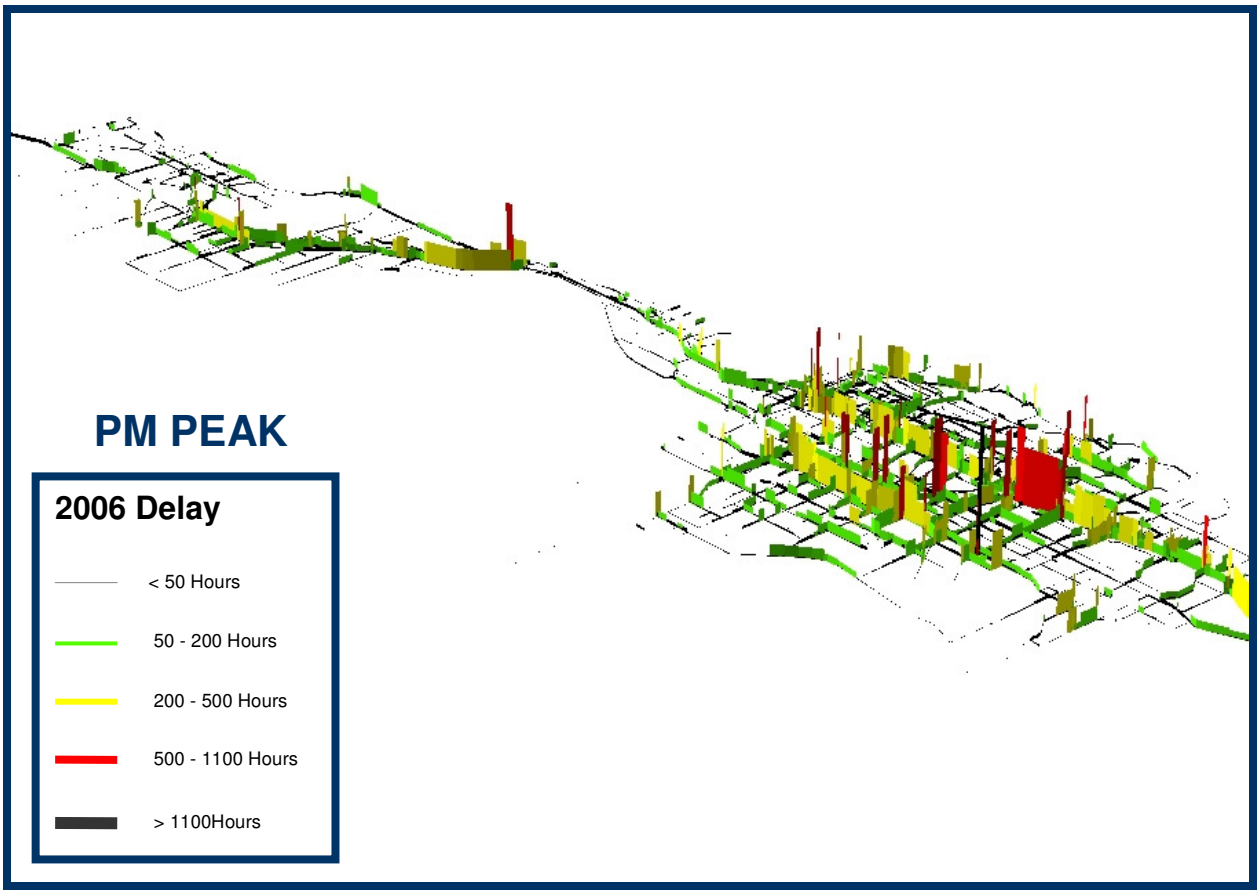


ScreenID	Volume	Capacity	V/C
1	54896	53088	1.03
2	76636	60225	1.27
3	80771	81255	0.99
4	48197	32484	1.48
5	85232	79350	1.07
6	33598	26022	1.29
7	63196	58926	1.07
8a	52767	60873	0.87
8b	34714	21126	1.64
9a	42307	47901	0.88
9b	29134	26130	1.11
10	27421	20103	1.36
11	41577	35709	1.16
12	17798	7395	2.41
13	21068	18477	1.14
15	35211	30555	1.15

Like Figure 3-3, the graphic below, Figure 3-8, shows vehicle hours of delay during a typical afternoon peak period, but this time based on 2030 travel demand on an existing plus funded transportation system. As can be seen by comparing Figures 3-3 and 3-8, delays will increase significantly without more investment in transit, highways and management strategies. Future congestion patterns are similar to existing, but greater in magnitude and extent. Figure 3-8 also illustrates the major problems in freeway performance. I-15 up and down the long greater Wasatch Front region will experience major delays and will require incremental widening and reconstruction in several areas, as it has been in Salt Lake County. However, freeway HOT lanes and the parallel Commuter Rail from Pleasant View to south Provo will provide alternatives to the congested general-purpose lanes on this freeway.

FIGURE 3-8

2030 PM PEAK DELAY



From a review of these graphics, the following six major corridors will experience the most serious mobility deficiencies.

- I-15 along the Wasatch Front in Weber, Davis and Salt Lake Counties (except south Davis and south Weber).
- East / West flow in the southwest quadrant of Salt Lake County (between 6200 South and 14600 South).

- East / West flow in the central west portion Salt Lake County (between 3100 South and 6200 South).
- North / South flow in western Salt Lake County (between Redwood Road and SR-111).
- North / South and East / West flow in northwestern Davis County.
- East / West flow in southern Weber County.

There are many needs in addition to those noted in these six corridors. They are discussed in other sections of Chapter 3, and are addressed in Chapter 6, Project Selection and Phasing, and Chapter 8, Recommended Improvements.

Testing Alternative Highway And Transit Systems

Alternative future transportation systems were tested to help quantify the needs. Three financially unconstrained highway and transit systems that may ultimately solve congestion woes in the greater Wasatch Front region were considered. The objective of this exercise was to prevent annual person hours of delay from increasing beyond what they are currently. For reference, the three systems were color-coded. The first, Blue System, would solve congestion by providing more freeways. The second, Yellow, would solve congestion by providing more transit and arterials. The third, Green, would solve congestion by a combination of freeways, arterials, and transit.

Tables 3-1 and 3-2 summarize and compare the outcomes of these unconstrained systems and a few other systems. In 2006, congestion levels created 17 annual hours of delay per person. By 2030, the Blue System resulted in 27 hours; the Yellow and Green Systems achieved 16 hours each. Average weekday vehicle miles of travel for each system are Blue – 65 million, Yellow – 57 million, and Green – 60 million, compared to 37 million today. More detailed results of this test are found in Appendix I.

TABLE 3-1

ANNUAL HOURS OF DELAY PER CAPITA

ANNUAL HOURS DELAY PER CAPITA	2006	2004 – 2030 LRP	FWY OPT (Blue)	ART OPT	ART + TRAN (Yellow)	F + A + T (Green)
Freeways	6	11	10	11	8	7
Arterials	11	18	17	9	7	8
Total	**17**	**29**	**27**	**20**	**16**	**16**

FWY = Freeway; ART = Arterial; TRAN = Transit; OPT = Optimized; F + A + T = removing some transit and arterial from Yellow, adding some freeway from Blue.

TABLE 3-2

HPMS WEEKDAY VEHICLE MILES OF TRAVEL

VEHICLE MILES OF TRAVEL (MILLIONS)	2006	2004 – 2030 LRP	FWY OPT (Blue)	ART OPT	ART + TRAN (Yellow)	F + A + T (Green)
Freeways	15	28	38	26	25	26
Arterials	19	27	22	30	28	30
Total	**37**	**59**	**65**	**60**	**57**	**60**

The totals are more than freeways plus arterials because they include local roads.

Lessons from Testing Alternatives

Since the Blue (freeway) System did not prevent annual hours of delay per person from becoming significantly worse, one can see that a focus only on freeways does not solve congestion. It can also be observed from Table 3-1 that while only widening and building arterials does better than focusing only on freeways, transit investment is required with arterial highway investment to maintain annual hours of delay per person at what it is today. Table 3-2 demonstrates that freeway widening and construction tend to increase vehicle miles of travel (VMT) more than arterials and that transit can help reduce VMT. Even though adding back some freeway in the Green System increases VMT, the Green System is more realistic than the Yellow because many more homes and businesses would have to be removed to widen the arterials by as many lanes as specified in the Yellow System. Therefore, the greater Wasatch Front transportation system needs a balance of freeways, arterials, and transit.

As shown earlier in this section, congestion levels will continue to grow rapidly in the greater Wasatch Front region. Given that the Green System is financially unconstrained, transportation funding levels need to continue to be increased and multiple strategies including those just described need to be implemented. Other tools to manage both freeway and arterial travel demand are discussed in more detail in later sections. (Refer to Sections 3.7 and 8.8.)

A Short Thesis On Congestion

Often in high growth areas, new capacity (supply) seems to be prematurely congested by recurring excess demand and nonrecurring incidences. In “supply” and “demand” terms, the travel “demand” is the number of vehicles (drivers) wanting to use the roads and the “supply” is the volume of vehicles that a road can carry in the peak period. The highway system provides exceptional mobility until it starts to break down because of daily congestion at choke points or irregular incidences such as crashes. Congestion then is compounded because as demand increases in the peak periods, supply declines when speeds are reduced.

When freeways reach capacity, they lose up to thirty percent of their through-put ability. For example, a 10-lane freeway can carry about 21,000 vehicles going at a speed of 60 miles per hour. When the situation degrades to an average speed around 20 mph, the 10-lane freeway can only carry about 15,000 vehicles. Transit (and carpooling) may be the antithesis of single occupant vehicles on highways because its’ “supply”, (i.e., passenger seats in the peak hour) can be expanded by adding rolling equipment to peak hour trains without reducing the service speed. Regional transit is better suited to the peak hour travel demand, and will best succeed where access, travel time, convenience, cost and comfort are attractive when compared with congested auto travel.

The auto / highway system will remain the dominant mode in the region but creative strategies are needed to avoid compounding highway congestion. At its most fundamental level, highway congestion results from the lack of mechanisms to efficiently manage use of highways. Therefore, this needs analysis will consider new policy choices and innovative solutions including congestion pricing measures and intelligent transportation systems to manage the peak period demand.

The Role Of Regional Growth Principles

The growth principles adopted by the Council, and described in more detail in the Wasatch Choices 2040 report, are important for protecting the quality of life in this region, even with respect to relieving congestion. For example, when regional land use patterns foster closer proximity between housing and jobs, the origins of most work trips are less dispersed, trip lengths to work and shop shorten, vehicle miles of travel decrease, and these all lead to less congestion and more opportunity for transit to offer a viable alternative.

The following sections in this chapter explore more specific needs in the greater Wasatch Front region for highways, transit, and other modes of transportation. Managing the transportation system is also discussed further, including a review of safety and security conditions.

3.3 HIGHWAY SYSTEM REVIEW

As part of the Congestion Management Process (CMP), the WFRC reviewed future congestion conditions and identified a number of locations where congestion mitigation is or will be needed. The CMP involves an evaluation of Transportation System Management (TSM) strategies, such as signal coordination, intersection widening, and access management, along with Transportation Demand Management (TDM) strategies, such as ridesharing, van pool lanes, and telecommuting, as potential solutions to regional congestion instead of increased highway capacity. Corridors have been identified where TSM and TDM strategies can delay the need for new capacity (Refer to Section 8.8 – Transportation System Improvements). Where these strategies cannot meet the travel demand, new capacity needs are noted. Whenever additional capacity is added, demand must be reduced as much as possible, and the transportation system made as efficient as possible in order to maximize the effectiveness of new capacity and minimize the need for even more highways.

For the 2030 RTP development purposes, congestion is primarily defined as occurring when level of service (LOS) "E" conditions are reached, or when operations are very unstable and there are virtually no gaps in the traffic stream. Level of service is based on volume / capacity ratios in the case of freeways and operating speeds in the case of arterials. The WFRC continues to support the actual design of facilities to meet a LOS "D" in urban areas when reasonably possible. LOS "D" occurs when the ability to maneuver within the traffic stream is more noticeably restricted. This CMP evaluation has been applied to all three phases of the RTP 2030: 2015, 2025, and 2030. A more complete definition of levels of service can be found in Appendix J.

The process for identifying congestion needs for Phase I (2007 to 2015) of the 2030 RTP begins with a model of existing highway and transit facilities plus projects committed to be built in the Transportation Improvement Program (TIP). This transportation network is then assigned 2015 traffic demand and the resulting travel model is identified as the "2015 No Build" scenario. The "2015 No Build" scenario is further modified with a series of TSM and TDM strategies and the resulting travel model identified as the "2015 No Build CMP" scenario. The specific TSM and TDM strategies applied in the modified model are limited to signal coordination, access management, pedestrian and bicycle facilities, and a combined factor for flextime, telecommuting, and growth management.

The WFRC selected these specific strategies because reasonable quantitative assumptions can be made about the impact of these strategies on speeds or capacity. The benefits of ITS, incident management and ramp metering are already included in model highway capacities. The mode choice algorithms in the model account for the trip reductions achieved by transit and rideshare. For a description of the quantitative methods to apply TSM and TDM strategies, see Appendix K.

Once the TSM and TDM strategies are applied in the model, locations where LOS "E" conditions still remain in the PM peak period are evaluated. Existing and adjusted 2030 average weekday traffic volumes are also considered, as are historical growth rates. Since the travel model is regional in nature, individual facility volumes can be adjusted to account for differences between modeled and observed base year volumes. Historical growth rates can also provide reasonableness checks. Table 3-3 below notes guidelines for average weekday traffic (AWDT) volumes, which also supplements the evaluation of LOS "E" conditions identified by the model runs.

TABLE 3-3

AVERAGE WEEKDAY TRAFFIC VOLUMES GUIDELINES

NUMBER OF LANES NEEDED	FREEWAYS	ARTERIALS
4	--	20,000
6	90,000	40,000
8	140,000	60,000

The process described above for Phase I of the RTP was repeated for Phase II (2016 to 2025) and Phase III (2026 to 2030), resulting in the following set of travel model networks:

TABLE 3-4

CMP TRAVEL MODEL SCENARIOS

MODEL SCENARIO	TRANSPORTATION NETWORK	TSM & TDM STRATEGIES	TRAVEL DEMAND YEAR
A. 2015 No Build	All existing facilities, plus projects in the TIP	None	2015
B. 2015 No Build CMP	Network (A)	Yes	2015
C. 2015 Build CMP	Network (B), plus needs found in (B)	Yes	2015
D. 2025 No Build CMP	Network (C)	Yes	2025
E. 2025 Build CMP	Network (D), plus needs found in (D)	Yes	2025
F. 2030 No Build CMP	Network (E)	Yes	2030
G. 2030 Build CMP	Network (F), plus needs found in (F)	Yes	2030

As indicated in the third column of Table 3-4 above, congestion management strategies (TSM & TDM) were applied universally in the CMP modeling scenarios. Again, if additional capacity is warranted, TSM and TDM strategies need to be incorporated with the new capacity in order to preserve the capacity added.

The following paragraphs summarize the results of this CMP analysis by RTP Phase. Several of the six corridors forecasted in section 3.2 to have the most serious mobility deficiencies are readily recognizable.

Phase I CMP Identified Capacity Needs

An inspection of the "2015 No Build CMP" scenario reveals a number of congestion problems. In southwest Weber and northwest Davis Counties, much of SR-108 is anticipated to operate at LOS "E" by 2015. East-west travel in this general area will also need congestion mitigation. Additional capacity will be required to alleviate congestion on I-15 in north Davis County. Congestion levels by 2015 on I-15 and Bangerter Highway in Salt Lake County indicate a need for a freeway facility in the Mountain View Corridor. Without new capacity, several east-west facilities in west Salt Lake Valley would operate at LOS "E". A few congested locations east of I-15 will also require more lanes.

Phase II CMP Identified Capacity Needs

An evaluation has been conducted of the "2025 No Build CMP" scenario including the projects identified from the Phase I CMP analysis. Capacity needs are evident around Weber State

University, between downtown Ogden and I-15, along 5600 South in Roy, and on 450 East in North Ogden. Congestion on I-15 in most of Davis County is evident and east-west congestion in the northwest has moved further west. The inspection of Salt Lake County congestion for Phase II shows many facilities operating at LOS "E," especially in the southwest quadrant of the Valley, but also in a few locations in the southeast and in the west.

Phase III CMP Identified Capacity Needs

An inspection of the "2030 No Build CMP" network, including the projects recommended in the Phase II CMP analysis, reveals relatively few congestion needs emerging in Phase III that had not already been manifest in earlier phases. A few freeway needs appear near the boundaries of the region, as well as through the middle of Davis County. Significant congestion levels are evident on a small number of arterials scattered through the region.

3.4 TRANSIT SYSTEM REVIEW

Transportation demand in the region has grown substantially in recent years and continues to grow at a pace exceeding expectations. In light of transit successes, it has become obvious that preservation and expansion of the transit system is essential to the region's mobility and economy.

System Preservation

For all the focus the region has had upon new major transit investments, the vast majority of transit trips in the region currently take place, and will continue to take place, on existing light-rail lines and local buses. Clearly preserving these existing services is essential to the success of transit in the region. Preservation for transit includes maintenance of capital facilities and preservation of existing transit operations.

Utah Transit Authority, which provides public transit services in the region, is divided into five business units. These business units cover the following areas of responsibility: the Ogden - Layton Urbanized Area; the paratransit service in Salt Lake County; the bus service in Salt Lake and Tooele Counties; the TRAX service in Salt Lake County; and Utah County bus service. Each of these business units and the Strategic Planning Department were surveyed as to their preservation needs. The following summarizes their responses and select information from the most recent Transit Development Program:

Capital Facilities

UTA dedicates a significant proportion of its budget to the preservation of its rail lines, bus and rail vehicles, scattered passenger facilities, maintenance facilities and real properties. Most of the existing facilities are in need of expansion and some re-designing / engineering to accommodate the growth in the fleet, workforce, and activities. Some of these needs are described below.

- **Bus Maintenance Facility Improvements** - As the composition of the fleet continues to diversify, existing bus maintenance facilities will need to be modified or expanded.

- **Office Space** - With the sales tax increases passed in the last decade, many departments have been adding positions in anticipation of service expansion. Entire departments and sections of other departments are housed at off-site locations due to space restrictions at the main administrative facility. A new administrative facility is needed in the next few years.

- **Bus Operations and Maintenance Division Capacity** - As of November 2002, UTA is storing at least 35 buses more than the design capacity of its bus operations and maintenance facilities. More storage facilities will be needed to keep up with growth in the bus fleet.

- **New Division** - Due to the current and projected geographic distribution of bus service, it is recommended that the site for a new division be located in the southern part of the Salt Lake service area, where bus service demand is projected to be greatest.

- **Riverside Division Expansion** - The Riverside Division, home of UTA's Flextrans fleet, has an existing physical design capacity for 84 paratransit vehicles. The total active and expansion fleet at the facility is now 110 vehicles. Therefore, additional storage canopies and an expanded maintenance facility are necessary at this division in order to increase the effectiveness of the Flextrans vehicle fleet. The operations facility was designed and built to accommodate 70 operators; currently there are 135 operators working out of the Riverside Division.

- **Bus Layover Facilities** - Having Tooele and Brigham City express trips originate in those cities in the a.m. and return there in the p.m. would save significant operational costs in each area. This would likely necessitate capital investment for adequate infrastructure; either at a UTA acquired site, or at a joint use site, such as a UDOT or school district facility. The operational savings would likely outweigh the up front capital costs.

Preservation Of Operations

All of UTA's bus service and, to a lesser degree, its investment in light rail lines are impacted by highway congestion. In order to keep its current service schedule in the face of increasing vehicle delays, several improvements will need to be made to the highway system in order to preserve existing bus and TRAX system operations. The techniques used for this preservation effort will likely require a combination of signal priority and queue jumpers at select traffic signals and fleet expansions. Additionally, another technique to be considered is the creation of freeway shoulders able to accommodate use by express buses to avoid freeway congestion as needed.

Many of the routes impacted by highway congestion are located in the six major corridors identified in section 3.2. These include service on and near I-15 in all three counties, east / west facilities in southern Weber County, north / south and east / west facilities in northwestern Davis County, east / west facilities in the central west portion of Salt Lake County, and north / south facilities in western Salt Lake County. Additional routes where improvements are needed to preserve operations include TRAX service to the University of Utah and the Medical Center, and routes on Foothill Boulevard and Highland Drive.

UTA is finding it difficult to keep up with current paratransit demands. The impending 'graying' of the regions' baby boomers will aggravate this situation. As part of its response, UTA is attempting to move more disabled service users from paratransit to regular service to reduce the per-trip cost,

thereby allowing UTA to provide more total service to disabled riders. Wide, barrier-free sidewalks and loading surfaces are important to providing mobility necessary for these patrons.

Service Expansions

The success of transit in the region has been due in part to broader awareness of transit, higher auto transportation costs, and changing demographics. The result is a need for both expansions of existing services to relieve capacity issues and for system expansions to reach new markets.

Capacity Issues

The recent success of transit in the region has begun to expose capacity issues in the UTA system. Below is a summary of responses from UTA service business units regarding capacity needs:

The current transit capacity needs listed by UTA for the Ogden - Layton Urbanized Area fall into three broad corridors: I-15 / Riverdale Road, US-89, and Washington Boulevard. The Commuter Rail service that will be initiated by the year 2008 will affect these corridors. It will likely address capacity needs in this corridor, but has the potential to introduce other capacity issues. Much will depend upon the station and route design serving Commuter Rail.

Current transit capacity needs for Salt Lake and Tooele Counties fall into several broad categories. These are TRAX service, Tooele County service, local transit in Salt Lake County, service to the Cottonwood Canyons, and paratransit service. The current TRAX routes are the Sandy Line and the University Line. UTA indicates that full loads are common in peak periods on both lines. There is virtually no remaining capacity at most of the Sandy Line park and rides. The opening of additional TRAX lines which operate on portions of the Sandy and University Lines has the potential to, on one hand, create both more parking capacity on their individual lines and, on the other, to create more demand on segments of the existing lines due to their increased frequency and broader coverage.

Salt Lake to Tooele Valley transit service is provided by Routes 51, 53, 54 and 75. These capacity shortfalls are likely to increase as Tooele Valley continues its rapid expansion. Demand for transit is continuing to grow in UTA's Salt Lake County local services. Specific needs will change with the implementation of the current bus system redesign and those can be monitored. UTA indicates that the region has a severe need for additional transit service in Big and Little Cottonwood Canyons. Finally, current paratransit capacity is sometimes strained by the demand for service. The future demand for paratransit and services for the elderly and disabled is anticipated to grow by about two

percent annually through 2030. This will translate into some real operational and capacity issues as requests for rides overwhelm the ability of the fleet to provide those services.

Market Expansions

Market expansions for transit can take many forms. They may be coverage to a new area or, more likely, adding a new type of service to an existing transit corridor. The three basic types of transit are inter-regional, regional, and community. The popularity of express bus and TRAX in the region has highlighted the large number of riders receptive to inter-regional (long) and regional (medium) distance transit services. Until recently these markets, especially the medium distance transit travel markets served by TRAX, went relatively untapped.

The key to continued successful transit system expansion will be to identify the home-end and destination-end markets for concentrations of inter-regional, regional, or community trips occurring at the same time of day. The highest probability for concentrated travel patterns exists with work, college, and select other trips, such as to sports arenas.

Home-End Markets

Density, in this case population density, is a principal indicator of transit success. Clearly, the more trips originating near a transit line the better the chance of attracting some of them. Home-end transit markets were identified based upon a coincidence of population density and demographic profile that indicate either a tendency to use more reliable and faster transit services, or a need for transit as a primary mode of transportation.

In Map 3-1, entitled Target Home-End Markets, the green shaded portions illustrate those areas with both more than eight persons per acre and the 'Regular Flyer' market type in the Salt Lake Valley as identified by UTA. Generally speaking, people in this market segment are less worried about comfort but highly value speed and reliability. This would indicate some preference for TRAX-like or Commuter Rail-like services that trade speed for access even if it requires making transfers. The blue in this same map illustrates those areas with both more than eight persons per acre and having a disproportionate percentage of people with no cars, low income, or who are elderly, disabled, or minorities. This market type, 'local rider', is more likely to have few mobility options other than transit and other transit choices and use transit for local trips such as going to the grocery store. Generally, individuals in this market segment are less worried about speed but highly value service reliability and comfort.

Destination-End Markets

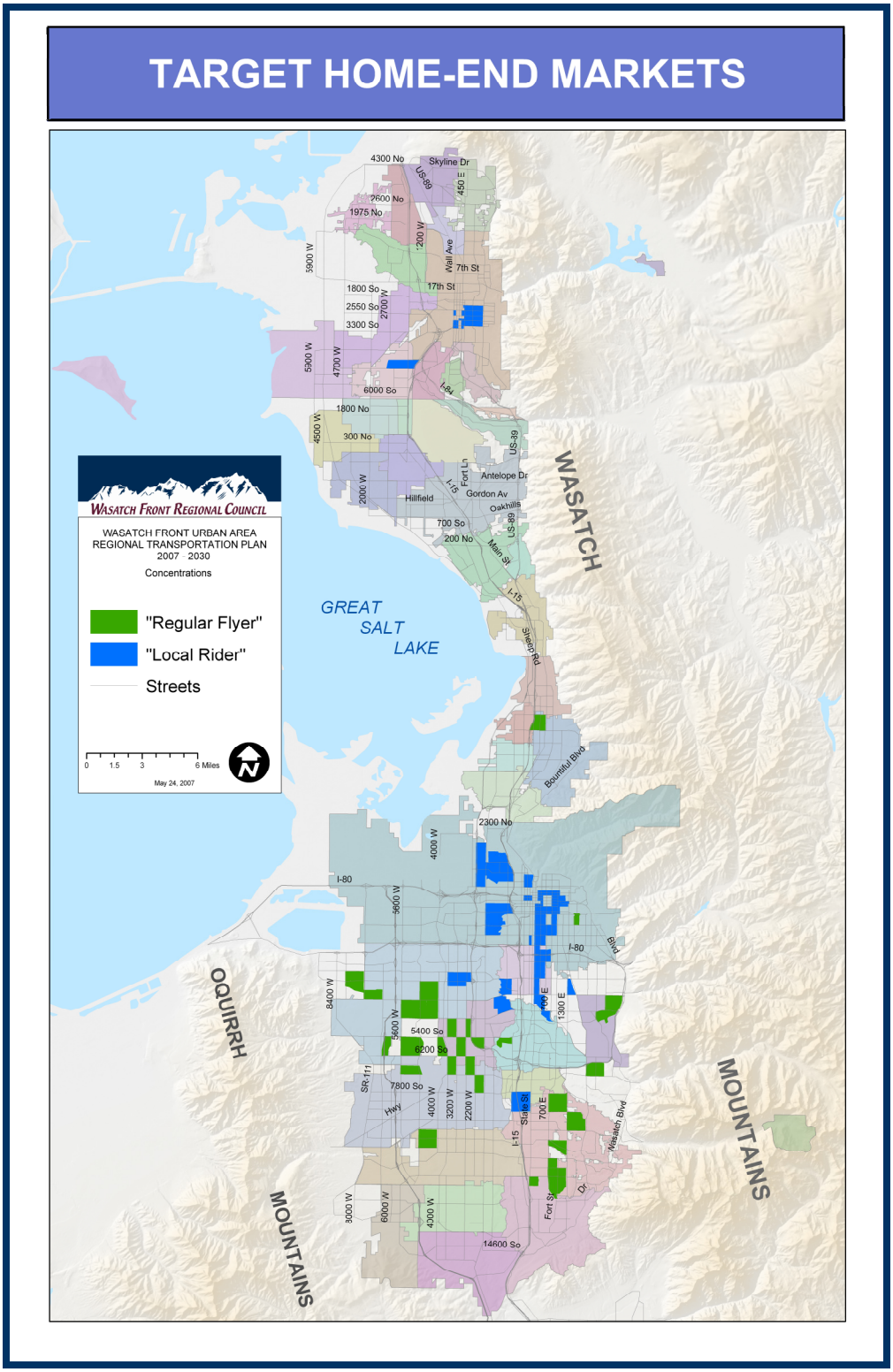
Density in this case is activity density, a chief indicator of transit success for the reasons highlighted above. Destination-end markets were identified based upon the combined density of all work trip ends, all college trip ends, and 20 percent of 'other' trip ends. These specific trip types were targeted because they are relatively easy to serve by transit. Map 3-2 illustrates the traffic analysis zones with high and moderately high concentrations of these trip ends.

Origin–Destination Paths

In an effort to identify corridors where major transit investments would be most productive, ridership for multiple lines has been tested using the regional travel model. First, potential rail lines are screened by total line ridership and perceived need. Next, those lines with good overall ridership or good potential are evaluated by line segment to get ridership per line mile. Map 3-3 shows all lines tested, those tested by segment, and those line miles outside of the Salt Lake Central Business District with 450 or more boardings per mile. There is a good correlation between lines with higher boardings and lines serving the markets identified above. Several of these lines are also in the six major corridors forecasted in Section 3.2 to experience the most serious mobility deficiencies.

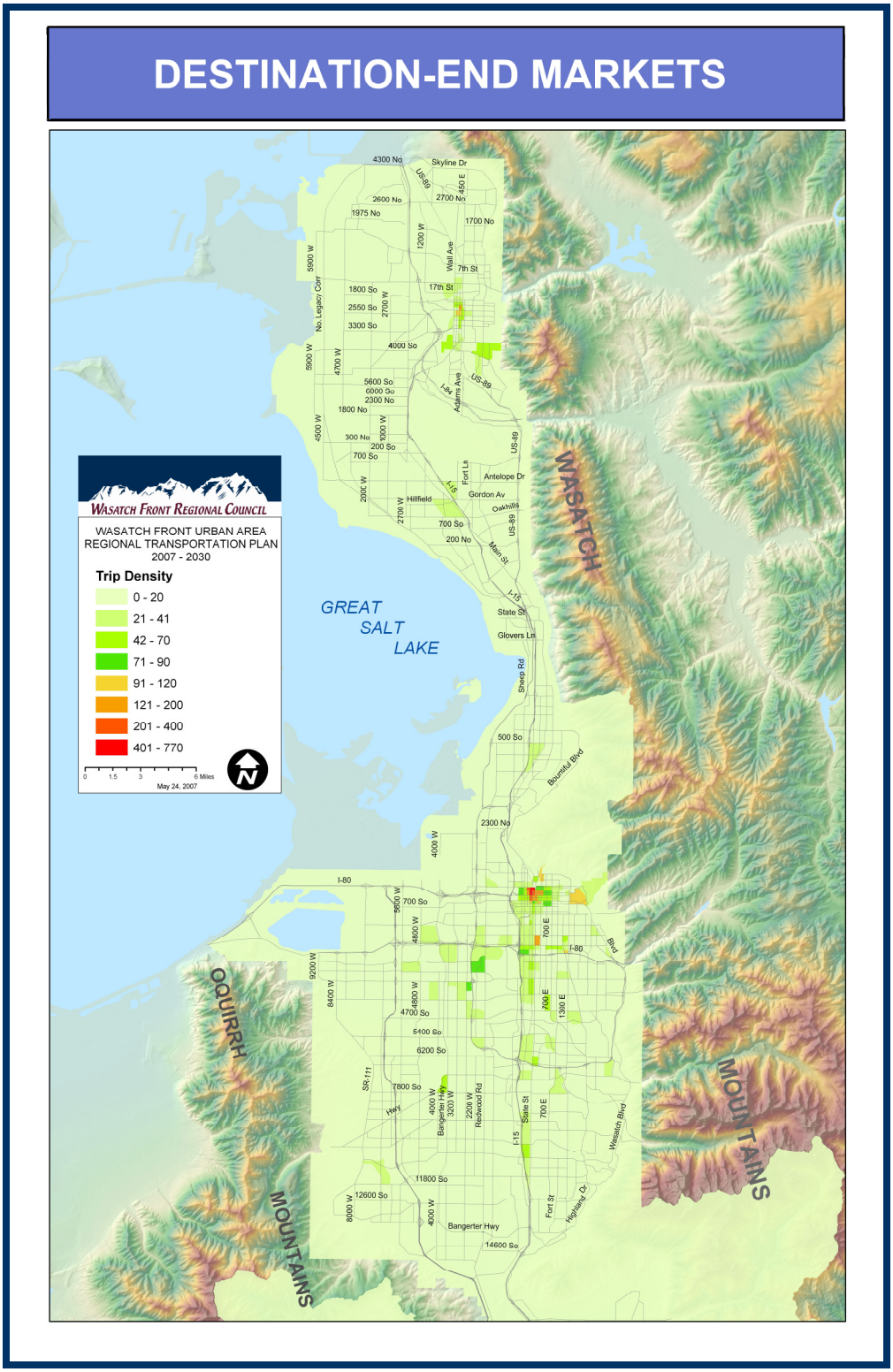
MAP 3-1

TARGET HOME-END MARKETS



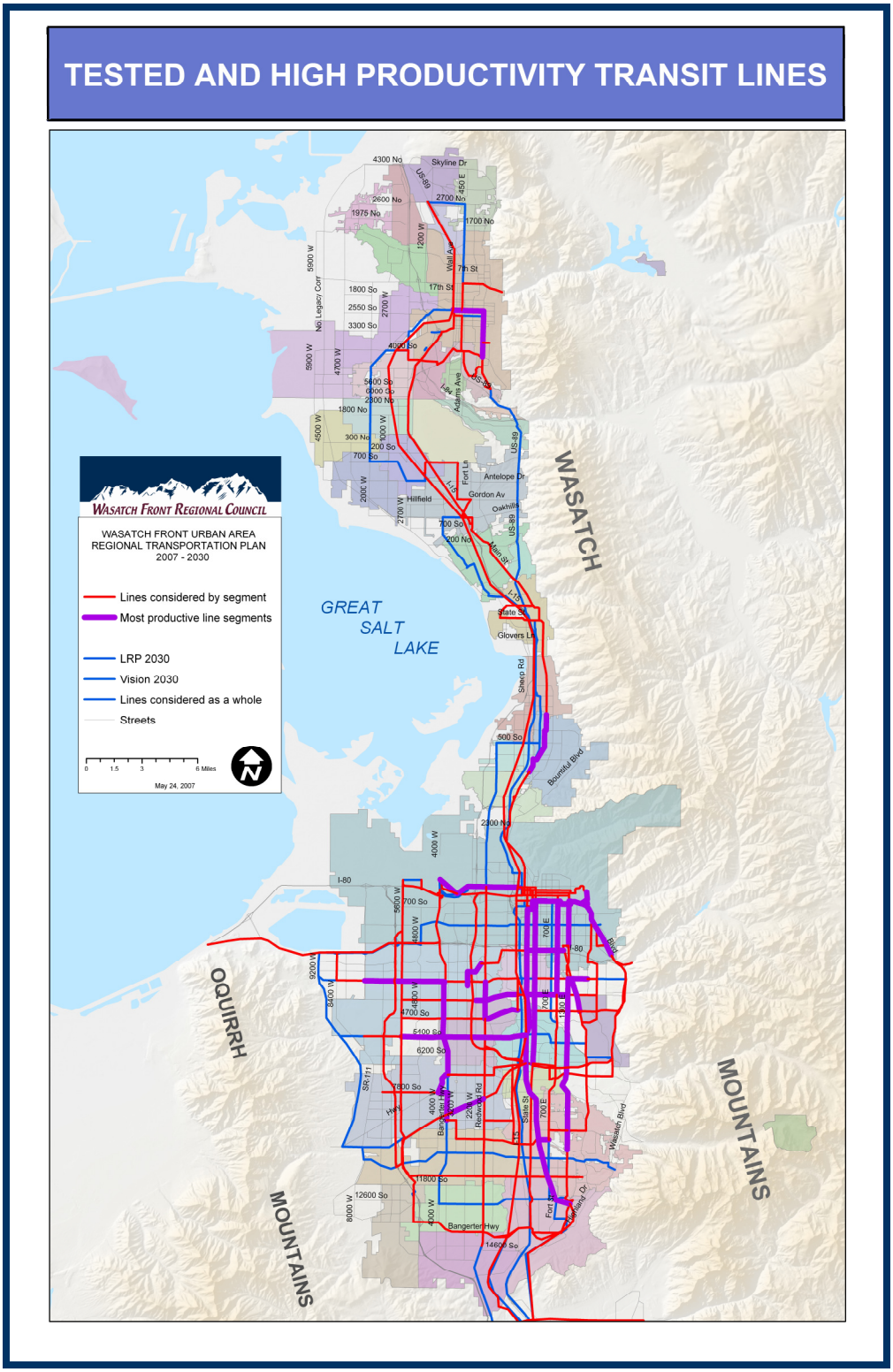
MAP 3-2

DESTINATION-END MARKETS



MAP 3-3

TESTED AND HIGH PRODUCTIVITY TRANSIT LINES



OTHER TRANSPORTATION MODE NEEDS

In addition to highways and transit, other modes are part of the region's transportation system. These other modes serve important functions, such as bicycle and pedestrian paths providing alternative transportation choices and opportunities for healthy living. Reliable movement of goods is addressed in part by the highway system, but railroads also play a vital role. The needs of these other modes, including trucks, are discussed in this section.

Pedestrians / Bicycles

According to the 2000 Census, about 1.8 percent of the work trips in the region were made by walking, while about 0.4 percent were made through the use of bicycles. While these percentages are small, it is important to provide the option of walking and biking, particularly for short trips. The demand for appropriate bicycle and pedestrian facilities has been growing. To address the growing number of bicyclists and pedestrians, WFRC recommends that state and local governments focus on east / west routes, addressing access across I-15 and other major roadways, and the connectivity of existing routes. Municipal and county governments in Salt Lake, Davis and Weber Counties have updated the existing bicycle routes shown in Map 3-4 in order to identify routes needed to bridge gaps between existing bicycle facilities. Locations of TRAX stations, near-future commuter rail stations, and major college or university campuses have been included so that routes needed to reach these destinations can be identified. Other significant areas of greater than average bicycle and pedestrian travel are secondary schools and the Salt Lake Central Business District. For a more comprehensive picture of school locations, see Map 9-1 on Page 214.

One of the primary considerations in meeting the needs of pedestrians and bicyclists must be safety. To be safe, pedestrians need adequate sidewalks and street crossing opportunities. For bicyclists, a system of separated bikeways and designated routes on safe streets that allows free movement throughout the Wasatch Front Region is needed. School children represent a special class of pedestrians and bicyclists who require unique facilities to ensure their safety. SAFETEA-LU requires that states set up a "Safe Routes to School" program. UDOT is currently developing this program.

Freight Needs

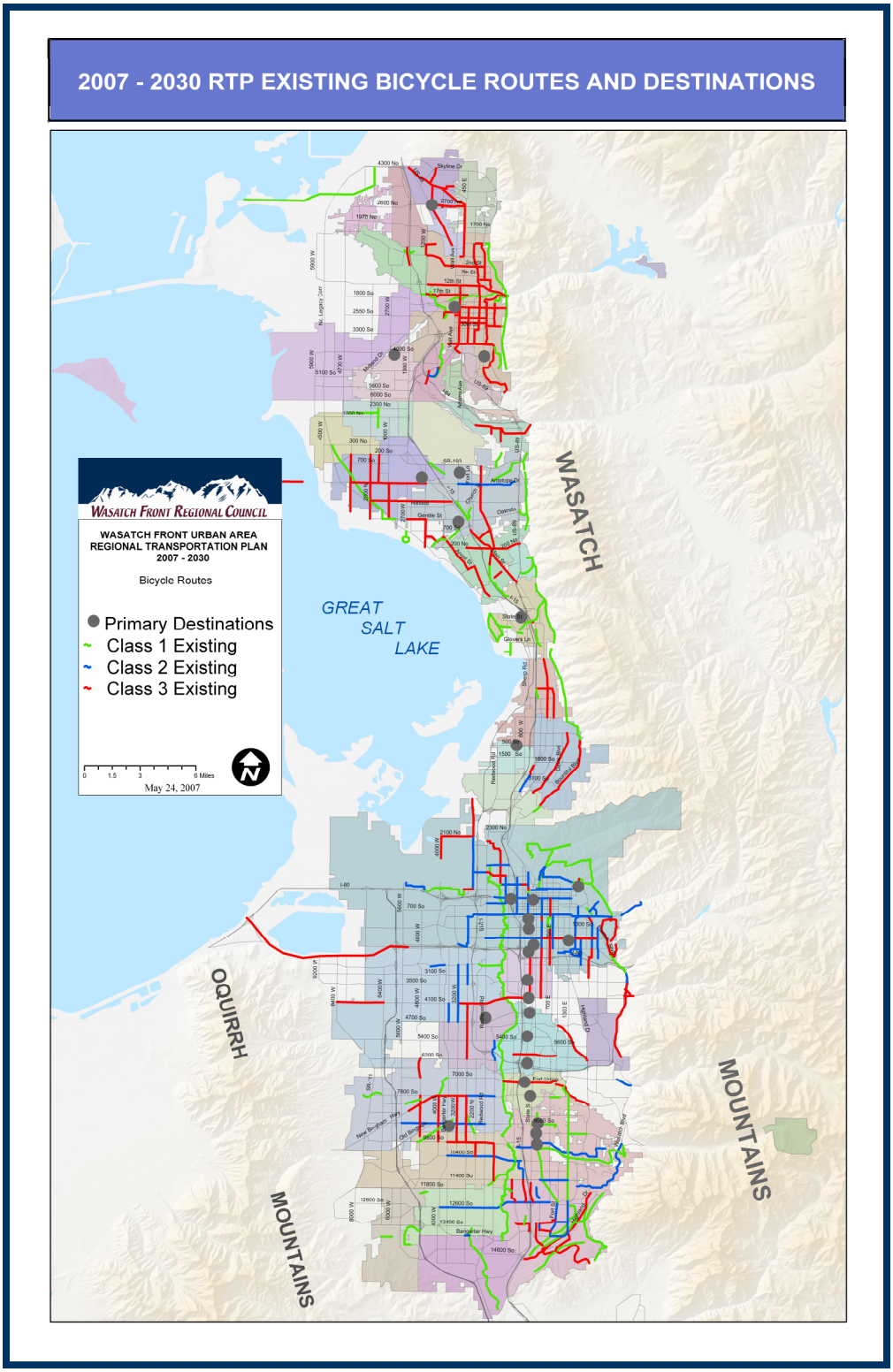
Each year over 180 billion tons of freight is shipped to and from Utah with an estimated value of nearly $100 billion. Trucks account for almost 70 percent of Utah's freight tonnage, with railroads handling approximately 25 percent. These numbers do not reflect the considerable freight tonnage passing through Utah. In discussions with trucking associations and others in the freight industry, the following trucking and railroad related needs have been identified.

Trucking

- Interchange and intersection improvements at key locations near warehouses, oil refineries and other truck facilities to provide turning radii sufficient for trucks to move through unimpeded
- Road widenings near the largest concentrations of industrial parks and warehouses
- Advance signal warning systems on more high speed expressways
- Improved access to industrial parks and oil refineries, including staging / parking facilities and signalization

MAP 3-4

2007 - 2030 RTP EXISTING BICYCLE ROUTES AND DESTINATIONS



Railroads

- Improvements to allow trains to move through the urban area more rapidly and decrease their adverse impact on vehicular mobility and neighborhoods
- Railroad crossing improvements, including grade separations to increase safety

Intermodal Freight Connectivity

- Inadequate highway capacity on SR-172 (5600 West) serving the Union Pacific intermodal facility located between SR-201 and I-80
- Poor highway access to all Salt Lake Area oil refineries and the Pioneer Pipeline terminal for both standard and long combination (LCV) oil tank trucks
- Poor access off 900 West in South Salt Lake City to the new Union Pacific automobile transload facility at Roper Yard

CANAMEX Corridor

In 1995 Congress designated as a high-priority transportation corridor the north-south highway corridor that includes I-15 through Utah and extends from Canada to Mexico, subsequently known as the CANAMEX Trade Corridor. Following the passage of the North American Free Trade Agreement (NAFTA), policy-makers and planners embarked on a study to identify opportunities for innovation along the CANAMEX corridor, looking for ways to develop safe and efficient multi-modal transportation facilities, enhancing global competitiveness and improving the quality of life.

In 2001, the Smart Tourist Corridor Initiative was developed by the Multi-State CANAMEX Corridor Coalition. With the assistance of the Western Transportation Institute at Montana State University, a scope of services for development of the CANAMEX Smart Tourist Corridor Action Plan has been identified. The purpose of this initiative is to develop new tourism themes and products along the Corridor. This initiative has five elements.

- Utilization of ITS technology and investment to enhance the safety and quality of the tourist experience
- Outreach to local tourism and economic development officials to integrate local products into regional marketing programs
- Development of a new common branding concept
- Development of new tourism products in support of that branding concept
- Cooperative marketing campaign based in part upon those products and concept. A report defining the Smart Tourist Corridor and operations plan for integrating transportation and emergency response services will be published in the first quarter of 2004.

Air Transportation

A viable system of airports is essential in promoting economic activity and the movement of goods and services to and from the Wasatch Front. Air transportation is set to become one of the biggest economic drivers in the nation, just as the Federal Interstate Highway system was in the 1950's and 1960's. Because construction of new airports in the region is not feasible, existing airports must be protected from encroachment and incompatible development. At the same time, airports must be accessible by ground transportation. Airports must be improved to take advantage of new technology and serve the air transportation and economic needs of the region, while minimizing

impacts to surrounding communities. The Wasatch Front's airports consist of the Salt Lake City International Airport, Ogden Hinckley Airport, Hill Air Force Base, Salt Lake City Airport No. 2, and Bountiful Skypark Airport.

Salt Lake City International Airport

The Salt Lake City International Airport (SLCIA) is a vital component of the state's transportation infrastructure and is the heart of the Metropolitan Airports System. The airport is located approximately five miles west of downtown Salt Lake City near the intersection of I-215 and I-80. The Salt Lake International Airport is owned by Salt Lake City and is operated by the Salt Lake City Department of Airports. The SLCIA serves the air travel needs of the majority of Utah and portions of the surrounding states of Nevada, Idaho, Wyoming, and Colorado. Since 1985, SLCIA has been classified as a large hub airport, meaning the airport enplanes more than 1 percent of the nation's total passengers. In 2000, the SLCIA ranked 24th, nationally, in passenger enplanements, while processing over 9,900,000 enplaned revenue passengers. Since 1996, changes in the Delta Airlines system have reduced the number of connecting passengers at the SLCIA slightly, while local passengers, or those with the Salt Lake City International Airport as origination or destination, have increased roughly in proportion to population growth in Utah. The net result has been a relatively constant number of total annual enplaned and deplaned passengers of approximately 19,000,000.

Air cargo consists of two types, that carried by passenger aircraft and that carried by all-cargo carriers. In term of all-cargo service, in 1999 the Salt Lake City International Airport ranked 25th nationally with 805,329 gross landed tons. This was an increase of 35.2 percent from 1994. While growth in passenger enplanements has been relatively flat during the last three years at the SLCIA, cargo enplanements have been a gradually increasing annually, although at a much slower rate than was seen during 1994 through 1997. This increase in all-cargo tonnage has, and should continue to have, a limited effect on surface routes around the airport. This is because the Salt Lake International Airport also functions as an air cargo hub, and the majority of cargo is transferred from aircraft to aircraft and does not have a local origin or destination.

Airport surface access is easy and efficient for a large hub airport. Passenger access is provided from both I-80 and I-215 as well as North Temple Street and Bangerter Highway. At present, cargo facilities at the SLCIA exist on both the north and south ends of the airport. Access for air cargo facilities on the south is via the above mentioned passenger access routes. Access to the air cargo facilities on the north is via I-215 and 2200 North. All future expansion of cargo facilities at the SLCIA is planned for the north end of the airport, and roadway access to this area of the airport is excellent. Current transit service consists of a single Utah Transit Authority bus route. Local hotel shuttles, private vans, and taxicabs are also available.

Ogden Hinckley Airport
The Ogden Hinckley Airport is located approximately two miles southwest of the Ogden City center and directly alongside I-15. The airport is owned and operated by the City of Ogden. The Ogden Hinckley Airport's role in the Metropolitan Airports System is as a general aviation reliever for Salt Lake City International Airport, and the airport's service area includes Ogden and surrounding Weber and Davis Counties. The airport's location provides direct access to nearby manufacturing and recreational sites, and it is a popular refueling stop for cross country flights.

The Ogden Hinckley Airport has three runways and an air traffic control tower which make it an ideal location for recreational, training and business flying. The current general aviation basing capacity exceeds 400 aircraft. A private air park is currently being developed on 26 acres along the south side of the airport, which will further expand basing capacity. The Ogden Hinckley Airport currently has approximately 285 based airplanes and experiences approximately 105,000 annual operations. Surface access to the airport is excellent. I-15 runs adjacent to the airport, and direct access is provided via Hinckley Drive. The Ogden Hinckley Airport can also be accessed easily from a number of arterial streets in the area, including 1900 West in Roy and Riverdale Road.

Hill Air Force Base
Hill Air Force Base (Hill AFB) is a major United State Department of Defense facility located in Davis County, approximately 20 miles north of Salt Lake City. Hill AFB is operated by the United States Air Force as a major Air Logistics Center and base for tactical aircraft. Hill AFB is Utah's largest single employer and is the center of Utah's $1.4 Billion defense industry. Access to Hill AFB is good, with direct connections to I-15 on the west and Hill Field Road on the south. US Highway 89 is located approximately three miles east of Hill Air Force Base and provides important access from eastern sections of Ogden and Davis County.

Salt Lake City Number 2 Airport
Salt Lake City No. 2 is a general aviation airport located in West Jordan, approximately nine miles south of SLCIA. The airport serves as a general aviation reliever for SLCIA and is home to the Utah Army National Guard's Aviation Support Facility. This airport serves as important role in the system by providing a convenient basing location for general aviation and military aircraft. Training, recreational, business and military flight operations prevail at this airport.

Current activity at the airport is approaching 70,000 annual operations and 235 based aircraft. Although the SLCIA is expanding the Tooele Valley Airport in Erda (Tooele County), Salt Lake City Airport No.2 will continue to attract general aviation activity because of its location. Both operations and demand for basing will continue to grow, although basing will grow at a somewhat flatter rate than operations. Current basing capacity is restricted by ordinance to 400 aircraft.

Constrained airspace is a significant problem for this airport. The Utah National Guard Aviation Support Facility has expanded and become more active. Approach and departure routes for the SLCIA air carrier runways pass directly overhead. Recent amendments to the Salt Lake City Terminal Control Airspace have provided more uncontrolled airspace to the south and west of the airport. However, aviation access to this airport is still greatly affected by airspace restrictions. These restrictions will be a major challenge as operations increase in the future. A Global Positioning System (GPS) approach is available to the airport, although conflicts with SLCIA traffic often make the approach unusable during certain traffic flow conditions. This situation is similar to that between Ogden-Hinckley and Hill AFB.

This airport, located in a suburban residential area, has seen the rapid development of housing surrounding the airport. This problem may intensify as development continues in the surrounding

communities, particularly West Jordan and Kearns. It is very possible that this airport may follow the trend of many other suburban airports and come under increasing pressure from the surrounding communities. Should this airport close, the Utah National Guard Facility would have to relocate (probably to Camp Williams) and new basing would be required for up to 400 general aviation airplanes. Future development plans include general maintenance and rehabilitation of existing pavements and expansion of aircraft basing facilities to accept more general aviation airplanes from SLCIA. Surface access to the airport is fair. The majority of trips originating from the east access the airport via I-15 and 6200 South or 7800 South, both of which are congested during peak travel times. Bangerter Highway provides a mid-valley access to these same east-west arterials. Widening of both roadways is currently included in the 5-year TIP.

Bountiful Skypark Airport
Bountiful Skypark Airport is a privately owned, public-use general aviation airport, located on Redwood Road in Woods Cross City. The airport is located six miles north-northeast of SLCIA. It serves the general aviation needs of northern Salt Lake County and Davis County. With over 160 based airplanes, and more than 50,000 annual operations, Bountiful Skypark Airport plays a vital role in the Metropolitan and State Airport Systems. Skypark Airport provides an economical and convenient niche for a large number of recreational and experimental aircraft and effectively relieves congestion at other Salt Lake Valley airports. Training, business basing, helicopter operations and aircraft maintenance are also present. Surface access to the airport is suitable for a facility of this size. Primary access is via Redwood Road, which connects to I-215 south of the Skypark Airport. Completion of the Legacy Parkway in the western portion of Davis County will improve this access even further. If local business development continues in this area of Davis County, basing demand at Bountiful Skypark Airport could exceed airport capacity within the next 10 years.

3.6 SYSTEM MANAGEMENT REVIEW

In order to maximize the life and effectiveness of transportation systems, management of those systems is needed. Pavement management facilitates extending the life of roadways. System management preserves the capacity or throughput of roadways. Demand management improves the effectiveness of the transportation system by reducing the number of vehicles using the system. These three management strategies are discussed in this section.

Pavement Management

One of the regional growth principles is to “provide public infrastructure that is efficient and adequately maintained.” This principle is in line with UDOT’s strategic goal to “take care of what we have.” One of the best ways to accomplish these objectives is through pavement management. UDOT and most cities and counties in the region employ these techniques to maintain their roadways.

Pavements represent the largest capital investment in any modern highway system. Maintaining and operating pavements on a large highway system typically involves complex decisions about how and when to resurface or apply other treatments to keep the highway performing and operating costs at a reasonable level. Traditional methods leave these decisions up to a road supervisor who would select treatments based on extensive knowledge and experience. This system is still widely practiced and works well in low traffic areas or where repair / restoration funds are not limited. In most cases, however, this is not the situation. First, rarely are there enough funds to complete all identified road repairs, and second, high traffic levels severely restrict when roads can be closed for maintenance. Pavement management brings more science into this process. A pavement management system consists of three major components as shown below.

- A system to regularly collect highway condition data
- A computer database to sort and store the collected data
- An analysis program to evaluate repair or preservation strategies and suggest cost effective projects to maintain highway conditions

In most agencies, these components are combined with planning needs and political considerations to develop annual highway repair / preservation programs.

System Management / Demand Management

Part of providing efficient public infrastructure is to ensure that unnecessary obstacles to mobility are not included or are removed from the transportation system. The congruence between the regional growth principles and UDOT's four strategic goals is again reflected, as their second goal is to "make the system work better." By providing effective transit service, the UTA works to achieve this goal. Local governments also give vital support to both system management and demand management.

Transportation System Management (TSM) strategies include incident management, ramp metering, High Occupancy Vehicle / Toll (HOV / HOT) lanes, signal coordination, access management, and ITS, which overlaps several of the previous strategies. Most of these strategies are currently applied to some degree but need to be expanded or enhanced for greater benefit to the performance of the transportation system. Putting such congestion mitigation into place helps preserve the original design capacity of the facility so the highway can accomplish its intended purpose of moving a certain volume of traffic. For example, a highway with a high density of heavily used driveways will experience diminished capacity due to side friction, accidents, and reduced speeds and this may lead to an apparent need for additional capacity, when in reality, if access management were in place, the roadway would function as intended.

Transportation Demand Management (TDM) strategies include transit service in all its forms (bus, light rail, commuter rail, and bus rapid transit), ridesharing, flextime, telecommuting, pedestrian and bicycle accommodations, growth management, and congestion pricing. Most of these strategies (with the exception of commuter rail and bus rapid transit) are currently applied as part of the existing transportation network. Increased implementation of these strategies is needed to provide sufficient options to the traveling public, as well as to decrease congestion levels on highways. The environmental, social, and financial consequences of only building and widening highways further point to the need to reduce the demand for single-occupant vehicle travel.

TSM and TDM strategies offer many benefits to the transportation system at a relatively low cost when compared to adding new travel lanes or new facilities. The benefits to the transportation system from TSM and TDM include improved operating efficiency, preserving design capacity of existing facilities, improved safety, reduced energy consumption, and reduced emissions. These benefits stem from the improved operation of existing facilities when TSM strategies are implemented and from the reduction in vehicle trips as TDM strategies are applied.

Intelligent Transportation Systems

"Non-recurring" congestion, such as that caused by traffic accidents, highway construction, or weather conditions, has been estimated to account for around 50 percent of traffic congestion in the region. Intelligent Transportation Systems (ITS) are a vital tool to manage the effects of non-recurring congestion. One element of these systems includes dynamic message signs to alert motorists of upcoming incidents so that they can take an alternate route. Communication systems to speedily alert emergency management providers, traffic control centers, dispatch, incident management personnel, the media, and others about incidents are also part of ITS. Detectors and

cameras further aid in verifying and managing these situations. The ability to implement pre-packaged signal timing plans to respond to traffic changes from incidents is another aspect of ITS.

ITS can also be used to better manage recurring congestion, such as occurs during weekday peak commuting times. This is accomplished through means such as signal timing plans on arterial streets and ramp metering to improve freeway traffic flow. Coordinating signals can reduce delays by 20 to 30 percent. Ramp metering also has significant effects in decreasing delay.

Another way in which ITS addresses both non-recurring and recurring highway congestion is through improving the efficiency and convenience of the transit system, thus increasing ridership and reducing single-occupant vehicle travel. Riders can be notified in "real-time" of bus and rail travel times and connecting transit service through electronic signs, the internet, phone systems, and other means. The transit fleet can be better managed in response to changing traffic conditions. Voice enunciators and smart card payment systems are also part of transit ITS.

If ITS applications are to be expanded in the Wasatch Front Region, more funding is needed. The majority of the existing system, known as *CommuterLink*, was funded as part of the major reconstruction of I-15 in Salt Lake County during the late 1990s. Original equipment is quickly becoming outdated, reducing the effectiveness of the system. Consequently, a priority need for ITS is to update and maintain the existing systems already implemented in the region. Without a continued effort to update signal timing plans and keep equipment working, the ability to effectively move people on the transportation system by providing information will suffer. A key component of these systems is the ability to disseminate both real-time (or near real-time) and historical travel time and other highway and transit information. The need to continue to improve and expand these capabilities will persist. As discussed above, there is a great need to reduce travel demand, and ITS improvements in the transit system play an important role in meeting this need.

Congestion Pricing

The largest travel volumes are found on freeways. As discussed in Section 3.2, the need to manage freeways is vital because their ability to move traffic is dramatically reduced as volumes approach capacity and speeds plummet. Congestion pricing on freeways prevents speeds from dropping by increasing the cost to the traveler to use the facility. Cost to use the facilities will increase based on congestion during peak periods. In order for businesses to prosper and the regional economy to be sustained, impedances to freeway travel must be minimized. Congestion pricing can be an effective tool for addressing this need. Other facilities or locations can also benefit from congestion pricing. For example, establishing fees for travel in central business districts has proven effective for managing traffic in some large metropolitan cities.

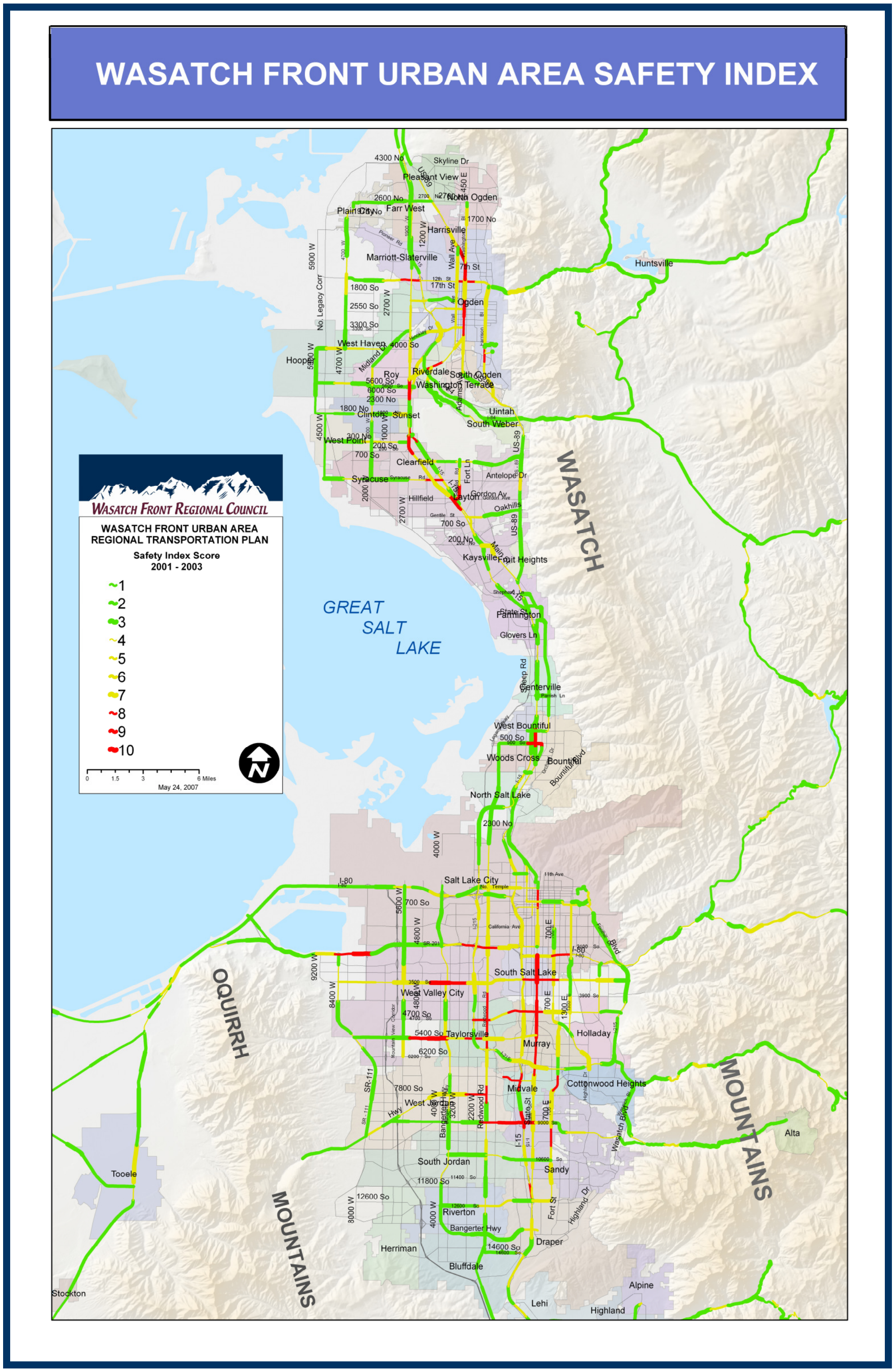
3.7 SAFETY AND HOMELAND SECURITY NEEDS

Safety

To help identify where safety improvements are needed the Safety Index was used. The "Safety Index" has been developed by UDOT. It is a value rating ranging from one to ten, which represents the degree of risk to the driver, in terms of both crash rate and severity over a three year period. The severity score is weighted three times higher than the crash rate score when the Safety Index is calculated. The Safety Index Map 3-5 currently only includes state roads, due to inconsistency in accident location reporting between state routes and local roads. The higher scores, or roadways that are not as safe, typically have higher speeds and traffic volumes, which tend to increase the severity of the accidents that occur. Freeways generally have lower crash rates than arterials, but the accidents are more severe, and so these facilities sometimes have higher scores.

MAP 3-5

WASATCH FRONT URBAN AREA SAFETY INDEX



Homeland Security

The Wasatch Front Region is often times referred to as the "cross roads of the west". Because the Rocky Mountains bisect the western portion of the United States (north-south), there are only five interstate facilities that allow east-west travel across that portion of the country. Of those facilities, I-80 is the most centrally located running through Salt Lake City and connecting New York - Chicago - Omaha - Salt Lake and San Francisco. Similarly, I-15 is one of only three north-south interstate facilities west of the Mississippi River, which extends to the northern and southern borders of the United States. Designated the Canadian - Mexican (CanaMex) transportation corridor, I-15's regional impacts along the Wasatch Front are ever increasing. Paralleling the Rocky Mountains it too passes through the Wasatch Front Region crossing I-80 in the Salt Lake Valley.

The aviation and railroad systems have an equivalent convergence similar to the interstate highways. The trans-continental railroad continues to be the major east-west rail connection across the United States. Aviation, like rail, targets a specific transportation market and has considerable influence on the inter-mountain region. The Salt Lake City International Airport is a major hub for Delta Airlines and cargo airlines. It serves a major portion of the Intermountain West as the next closest major commercial service airport is over 300 miles away.

In developing a transportation plan, the distinctive topography of the region must be taken into account. I-15, I-80 and I-84 all enter and exit the region through narrow corridors constrained by topography. On the northern end of the region, the I-15 transportation corridor narrows to one mile. This condition also occurs in Centerville, Davis County, and at the southern border of Salt Lake County. All three of these constrained locations include I-15, railroad lines, a power corridor, frontage road and one or two parallel arterials. The east –west corridors are similarly constrained by high mountain passes and the Great Salt Lake. In east Weber County is Weber Canyon. At 400 feet wide it is constrained by rock cliffs and the Weber River, and is the route of I-84 and a railroad corridor. To the east in Salt Lake County is Parley's Canyon, which is 200 feet wide, constrained by cliffs and is the route of I-80. To the west in Salt Lake County at Lake Point Junction the corridor is one-quarter mile wide and constrained by the Oquirrh Mountains and the Great Salt Lake and includes I-80, a railroad corridor, a power corridor and a frontage road.

The distinctive regional topography constraining the transportation network has a conspicuous impact on the entire region in the form of natural hazards. These hazards include earthquakes, landslides, wildfires, dam failures, flood and severe weather. With a prominent geological fault paralleling the foothills of the Wasatch Mountains throughout the region and extending through the Great Salt Lake and into north-central Salt Lake County, the affects of an earthquake and subsequent natural hazards and impacts on the transportation system must also be taken into consideration. The Wasatch Front Region's geologic faults and areas with high liquefaction potential are identified in Map 9-8 on Page 256.

The air corridors are also severely restricted as access to the Salt Lake International Airport is limited to north-south approaches. These approaches are further impacted by the confined air space bounded by mountains on the east and west. The "pinch points" affecting surface transportation in all cardinal directions from Salt Lake City and the availability of limited air space are the basis for the need for more redundancy within the transportation system throughout the region.

In considering the convergence of two interstate highways, the trans-continental railroad and an international airport along the Wasatch Front, it becomes very evident that the regional transportation facilities have national significance. This importance is further increased when consideration is given to the physical constraints of the topography and potential for natural disasters. These conditions quickly raise awareness and concern of the potential disruptions in the

regions transportation systems have for impacting not only local and regional affairs but the national transportation industry and security interests as well.

The national significance of this “cross roads of the west”, coupled with the restrictive topography and demonstrated need for additional regional transportation facilities to serve increasing regional travel demands, bolsters the rationale for long range transportation projects, improvement of current facilities, and expanded capacity in transportation corridors. In order to effectively address regional security needs, a more concerted effort must occur at all levels of government and industry within the state and metropolitan area to develop a consensus on what elements of security incident prevention and mitigation can and should be incorporated into the state and metropolitan area’s transportation planning processes.

Regional security goals at the metropolitan planning level are based, in-part, on improved communication and coordination between the increasing number of agencies involved with security and emergency preparedness. As a component of the coordination effort, several plans should be considered for update, review and integration. These plans include a Public Transit Emergency Management Operations and Recovery Plan; Fuel Shortage Plan; and Emergency Operations Plans at local, regional and state levels.

At the operational level, ITS should be improved to facilitate the expansion and responsiveness of the UDOT Traffic Operation Center (TOC) and UTA Dispatch Operations. These major components would help to preserve the reliability, robustness, and resiliency of the transportation infrastructure system and to maintain essential services needed to preserve confidence in the transportation system in the event of a man made or natural disaster.