

APPENDIX D5: NORTH DAVIS COUNTY

Safety Summary

Tech Memo #1 Safety Analysis

Case Study Project Information Sheets

Case Study Project Location Map

Equity Index Map

NORTH DAVIS COUNTY SAFETY SUMMARY

CSAP OVERVIEW

“A plan to provide local governments the means to make strategic roadway safety improvements”

Wasatch Front Regional Council (WFRC) is preparing a regional Comprehensive Safety Action Plan (CSAP). The CSAP will present a **holistic, well-defined strategy to reduce roadway fatalities and serious injuries** in the Wasatch Front region.

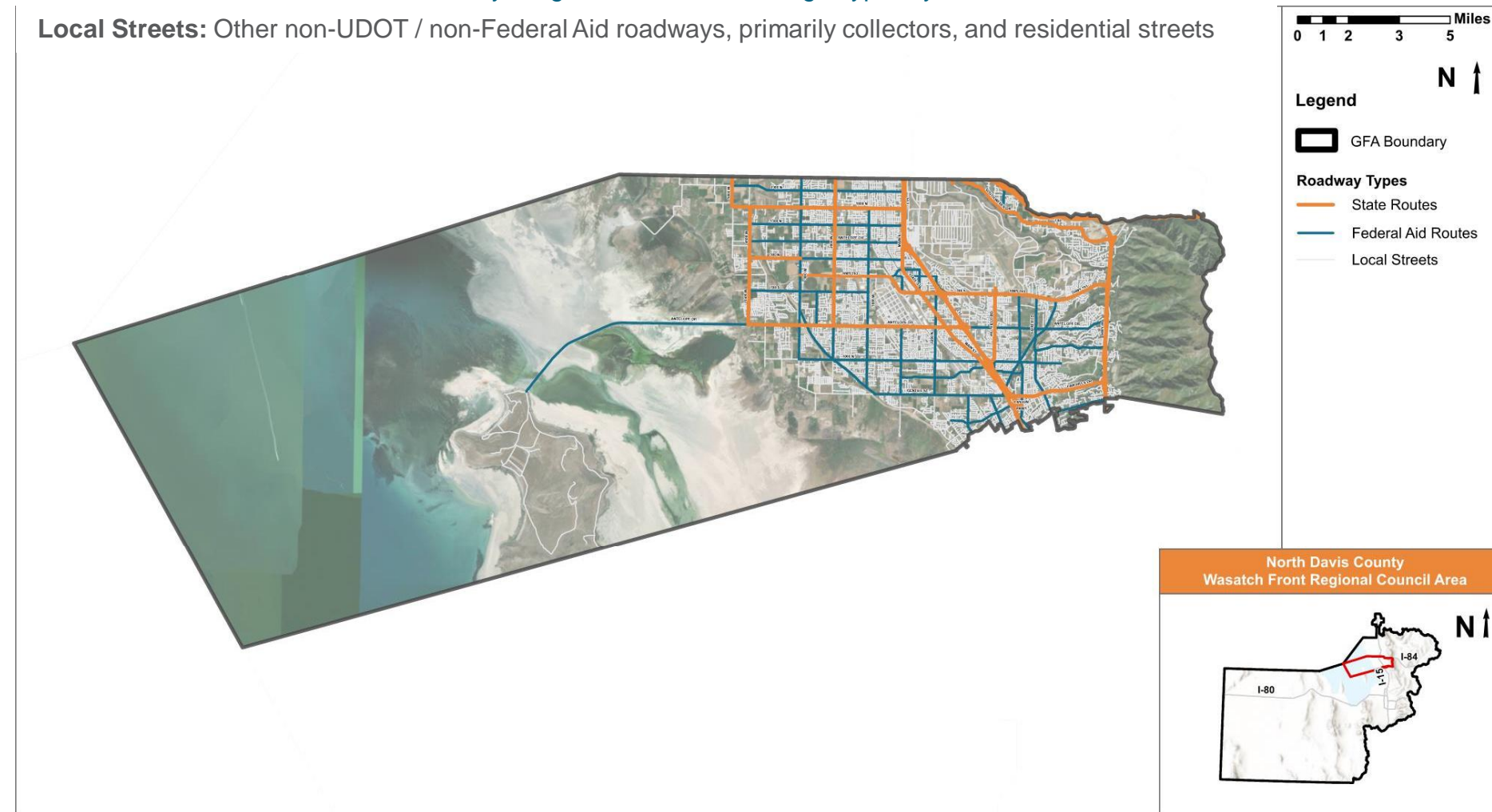
The CSAP will **analyze** safety needs, **identify** high-risk locations and factors contributing to crashes, and **prioritize** strategies to address them.

The CSAP will meet eligibility requirements that allow local jurisdictions to apply for **Implementation Grants** from the United States Department of Transportation (USDOT) Safe Streets and Roads for All (SS4A) discretionary grant program. The grant program was established by the Bipartisan Infrastructure Law (BIL) with \$5 billion in appropriated funds, 2022-2026. A Safety Action Plan must include the following elements, as specified by FHWA to satisfy eligibility requirements to apply for an implementation grant:

State Route: Roadways owned, operated, and maintained by UDOT

Federal-Aid Route: Non-UDOT roadways eligible for federal funding – typically minor arterials and collectors

Local Streets: Other non-UDOT / non-Federal Aid roadways, primarily collectors, and residential streets



Self-Certification Checklist

Plan must include the following:

Safety Analysis

- Existing conditions and historical trends
- Crashes by location, severity, and contributing factor
- Systemic and specific safety needs
- Geospatial identification of higher risk locations

Identification of comprehensive set of projects and strategies

...And must complete 4 of the 6 elements to the right:

- | | |
|---|--|
| <p>1. Leadership Commitment</p> <ul style="list-style-type: none"> <input type="checkbox"/> Governing body publicly commit to a zero fatalities and serious injury goal | <p>4. Equity</p> <ul style="list-style-type: none"> <input type="checkbox"/> Data-driven, inclusive, and representative processes |
| <p>2. Plan Development</p> <ul style="list-style-type: none"> <input type="checkbox"/> Committee charged with plan development, implementation, and monitoring | <p>5. Policies, Plans, Guidelines, and/or Standards</p> <ul style="list-style-type: none"> <input type="checkbox"/> Assessment policies, plans, guidelines, and/or standards |
| <p>3. Development Activities</p> <ul style="list-style-type: none"> <input type="checkbox"/> Engagement with public and relevant stakeholders | <p>6. Progress</p> <ul style="list-style-type: none"> <input type="checkbox"/> Description on how progress will be measured over time |

Safe System Approach

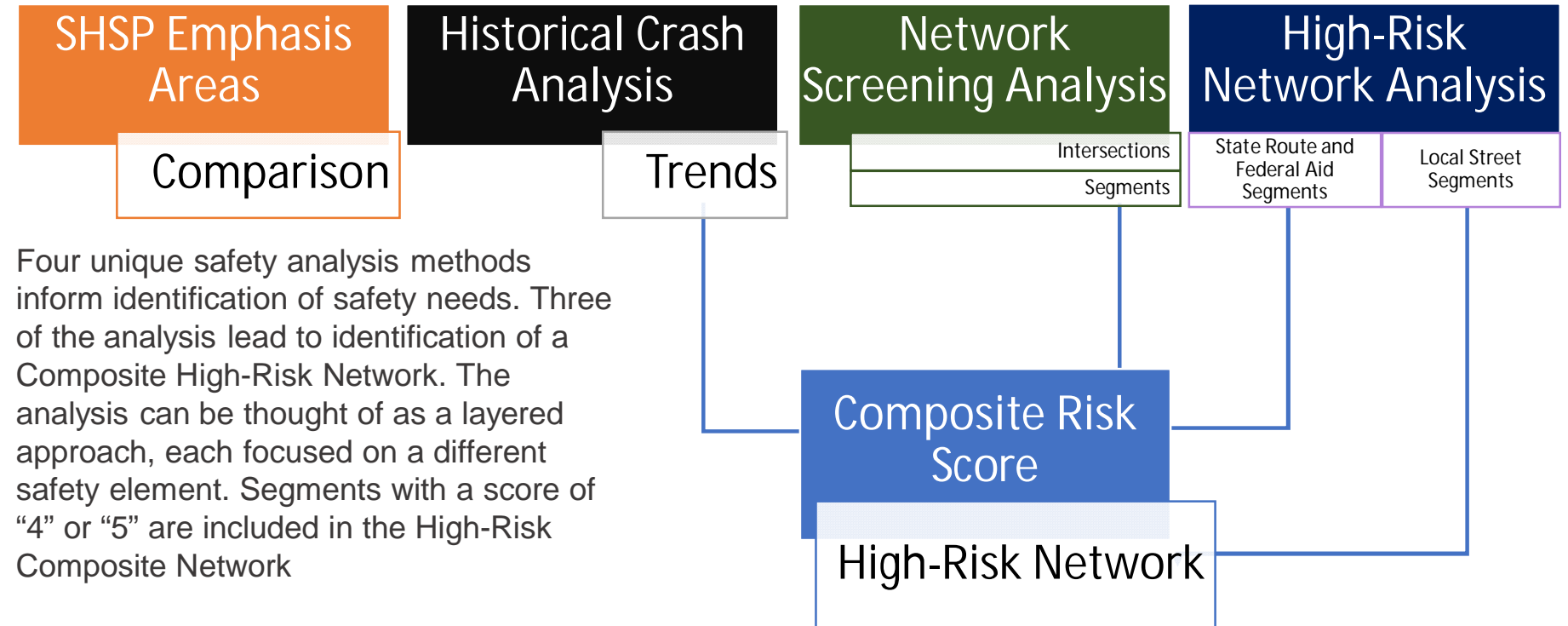
Implementing a Safe System Approach requires moving away from traditional safety paradigms.

- ❑ The Safe System approach seeks to prevent death and serious injuries.
- ❑ The Safe System approach designs for human mistakes and limitations.
- ❑ The Safe System approach focuses on speed management and strategies to reduce system kinetic energy.
- ❑ The Safe System approach aims to share responsibility among system users, managers, and others.
- ❑ The Safe System approach proactively identifies and addresses risks



| Traditional Approach to Safety | Safe System Approach Paradigm |
|--------------------------------|--|
| Prevent crashes | Prevent death and serious injury |
| Improve human behavior | Design for human mistakes/limitations |
| Control speeding | Reduce system kinetic energy |
| Individuals are responsible | Share responsibility |
| React based on crash history | Proactively identify and address risks |

Safety Analysis Methodology



Four unique safety analysis methods inform identification of safety needs. Three of the analysis lead to identification of a Composite High-Risk Network. The analysis can be thought of as a layered approach, each focused on a different safety element. Segments with a score of “4” or “5” are included in the High-Risk Composite Network

| Analysis | Composite High Risk Score Element | Value |
|--|--|----------|
| Historical Crash Analysis | Segment 5-Year Crash Totals \geq 3 Crashes | 1 |
| Network Screening Analysis | Positive CCR Differential | 1 |
| High-Risk Network Analysis | Crash Profile Risk Score \geq 20 | 1 |
| | usRAP Vehicle Star Rating = 1-2 Stars | 1 |
| | usRAP Pedestrian Star Rating = 1-2 Stars | 0.5 |
| | usRAP Bicycle Star Rating = 1-2 Stars | 0.5 |
| Total Possible Composite Risk Score | | 5 |

Strategic Highway Safety Plan (SHSP) Emphasis Area Comparison

Based on a comparison of fatal and serious injuries for each Utah SHSP Emphasis area, the following emphasis areas should be considered when developing safety improvement projects specific to the **North Davis County** GFA.

- Intersection
- Motorcycle
- Teen Driver
- Speed-Related
- Roadway Departure

Intersection, Roadway Departure, and Speed-Related emphasis areas rank highest in terms of number of fatal and serious injuries at the Statewide and WFRC Levels.

In addition to Intersection, Roadway Departure, and Speed-Related emphasis areas within the **North Davis County** GFA, Teen Driver and Motorcycle are also identified as top emphasis areas.

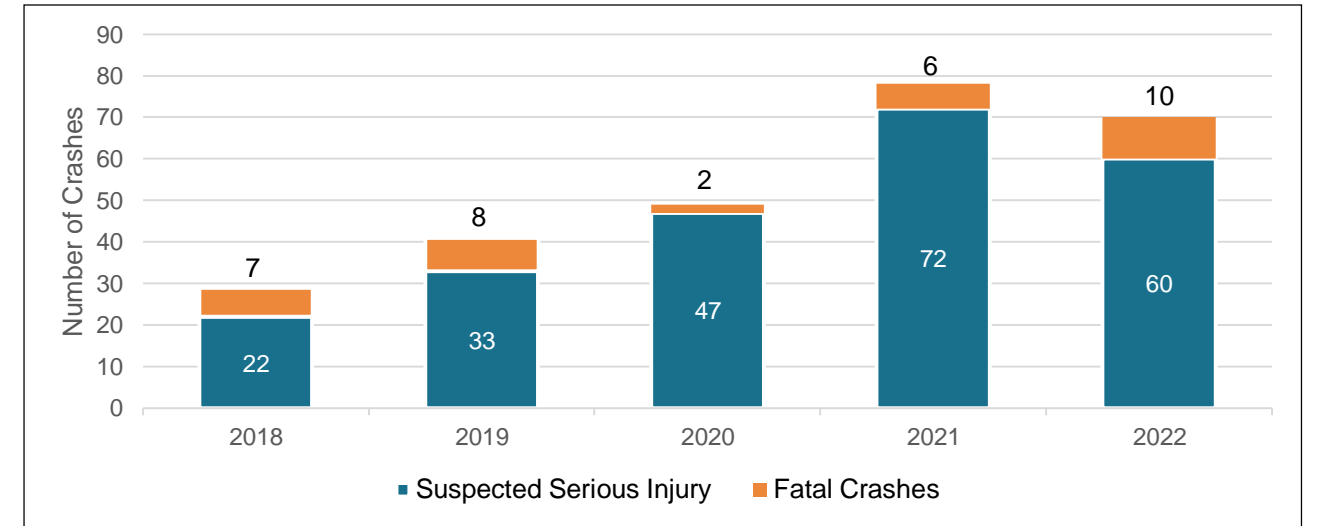
Strategic Highway Safety Plan Emphasis Area Comparison

| Category | Utah SHSP Safety Emphasis Area | Statewide Totals | | WFRC Totals | | North Davis County Totals | | |
|---------------|--------------------------------|--------------------------|------|--------------------------|------|---------------------------|------|--------------------------|
| | | Fatal and Serious Injury | Rank | Fatal and Serious Injury | Rank | Fatal and Serious Injury | Rank | Change in Rank From WFRC |
| Driver | Teen Driver | 1,640 | 4 | 751 | 4 | 63 | 3 | 1 |
| | Older Driver | 1,508 | 6 | 700 | 6 | 56 | 6 | 0 |
| | Speed-Related | 2,133 | 3 | 936 | 3 | 63 | 4 | -1 |
| | Aggressive Driving | 555 | 11 | 297 | 10 | 17 | 11 | -1 |
| | Distracted Driving | 718 | 10 | 286 | 11 | 31 | 9 | 2 |
| | Impaired Driving | 1,184 | 8 | 623 | 8 | 29 | 10 | -2 |
| | No Safety Restraints | 1,542 | 5 | 599 | 9 | 32 | 8 | 1 |
| Roadway | Intersection | 3,567 | 1 | 2,163 | 1 | 174 | 1 | 0 |
| | Roadway Departure | 2,931 | 2 | 1,014 | 2 | 58 | 5 | -3 |
| Special Users | Motorcycle | 1,457 | 7 | 750 | 5 | 66 | 2 | 3 |
| | Pedestrian | 912 | 9 | 636 | 7 | 44 | 7 | 0 |
| | Bicycle* | 280 | 12 | 167 | 12 | 12 | 12 | 0 |

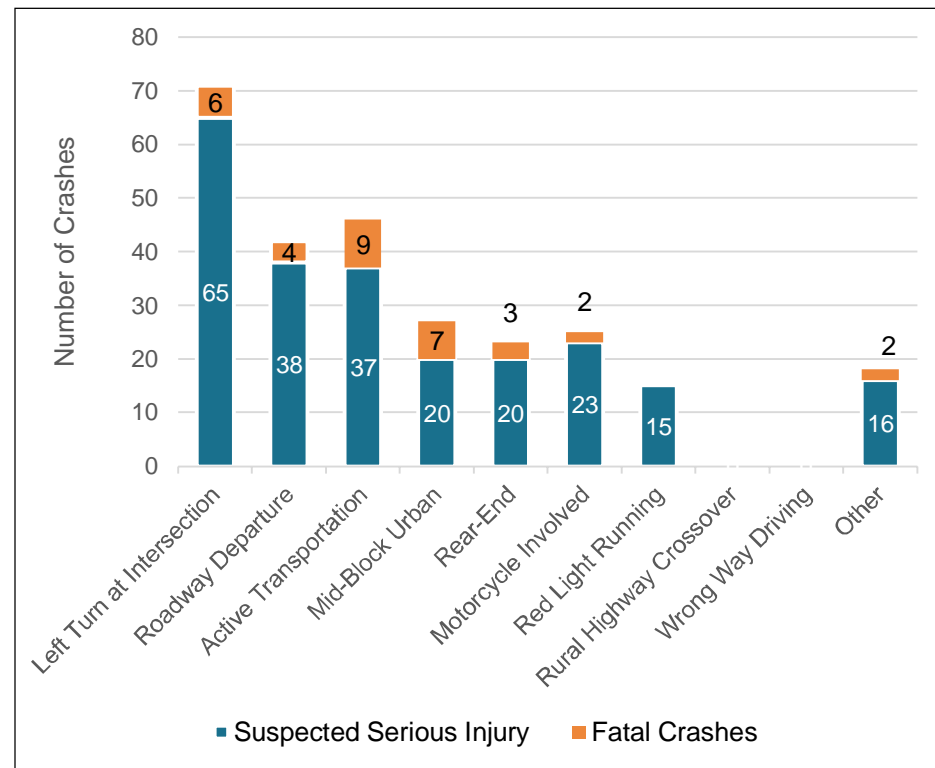
*While Bicycles are not one of the eleven Utah SHSP emphasis areas, they are included as part of the CSAP safety analysis.

5-Year Historical Crash Trends in North Davis County GFA

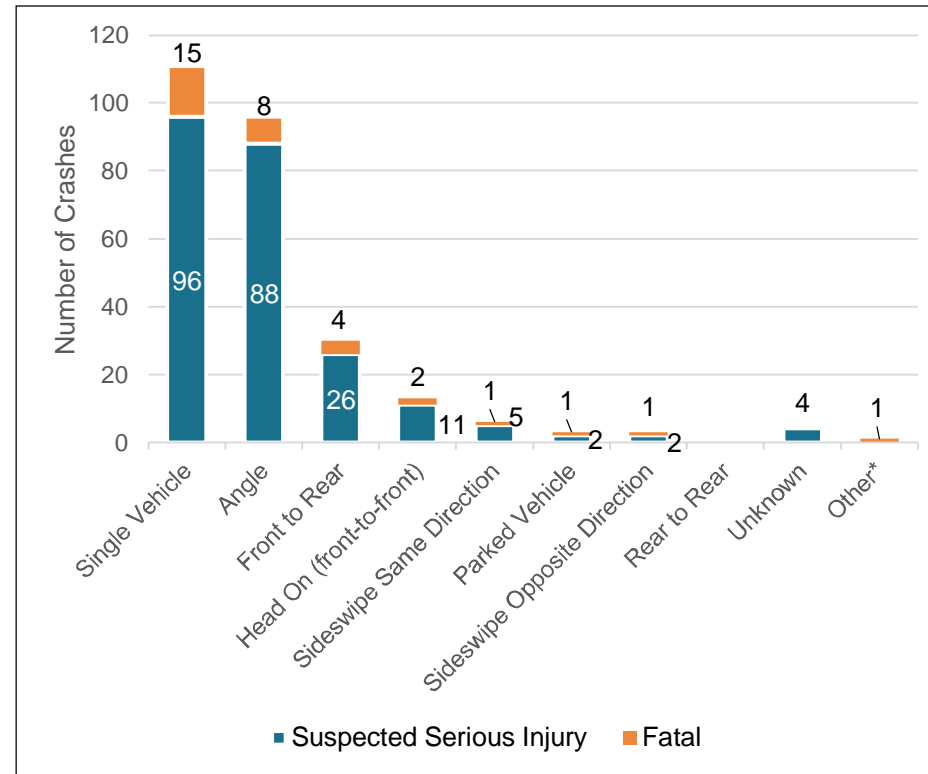
| Route Type | State Route | | Federal Aid Route | | Local Street | | Overall Total | | % of WFRC |
|----------------------------------|--------------|-------------|-------------------|-------------|--------------|-------------|---------------|--------------|-------------|
| Crash Severity | Crashes | | Crashes | | Crashes | | Crashes | | % |
| | # | % | # | % | # | % | # | % | |
| Fatal | 29 | 0% | 3 | 0% | 1 | 0% | 33 | 0.2% | 0.0% |
| Suspected Serious Injury | 151 | 2% | 59 | 2% | 24 | 2% | 234 | 1.8% | 0.1% |
| Suspected Minor Injury | 1,176 | 13% | 403 | 15% | 154 | 10% | 1,733 | 13.0% | 1.0% |
| Possible Injury | 1,683 | 19% | 507 | 19% | 173 | 11% | 2,363 | 17.8% | 1.3% |
| No Injury / Property Damage Only | 6,026 | 66% | 1,727 | 64% | 1,172 | 77% | 8,925 | 67.2% | 4.9% |
| Route Total | 9,065 | 100% | 2,699 | 100% | 1,524 | 100% | 13,288 | 100% | 7.4% |



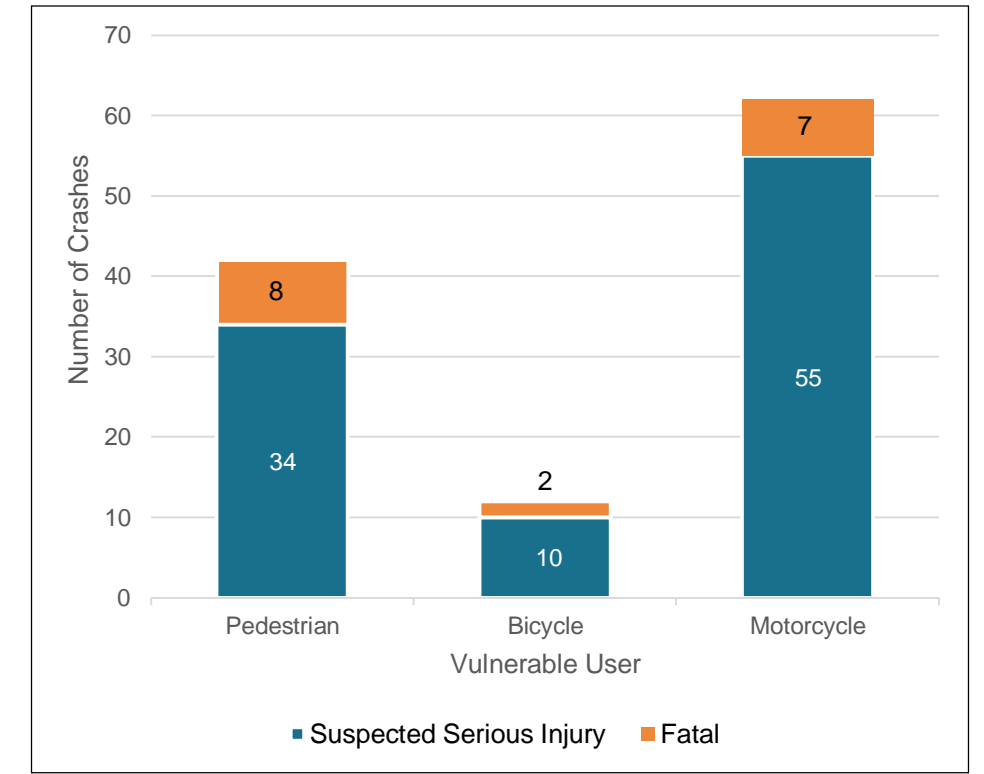
Annual Fatal and Serious Injury Crashes (2018-2022)



Crash Type



Manner of Collision



Active Transportation

Historical Crash Analysis Trends

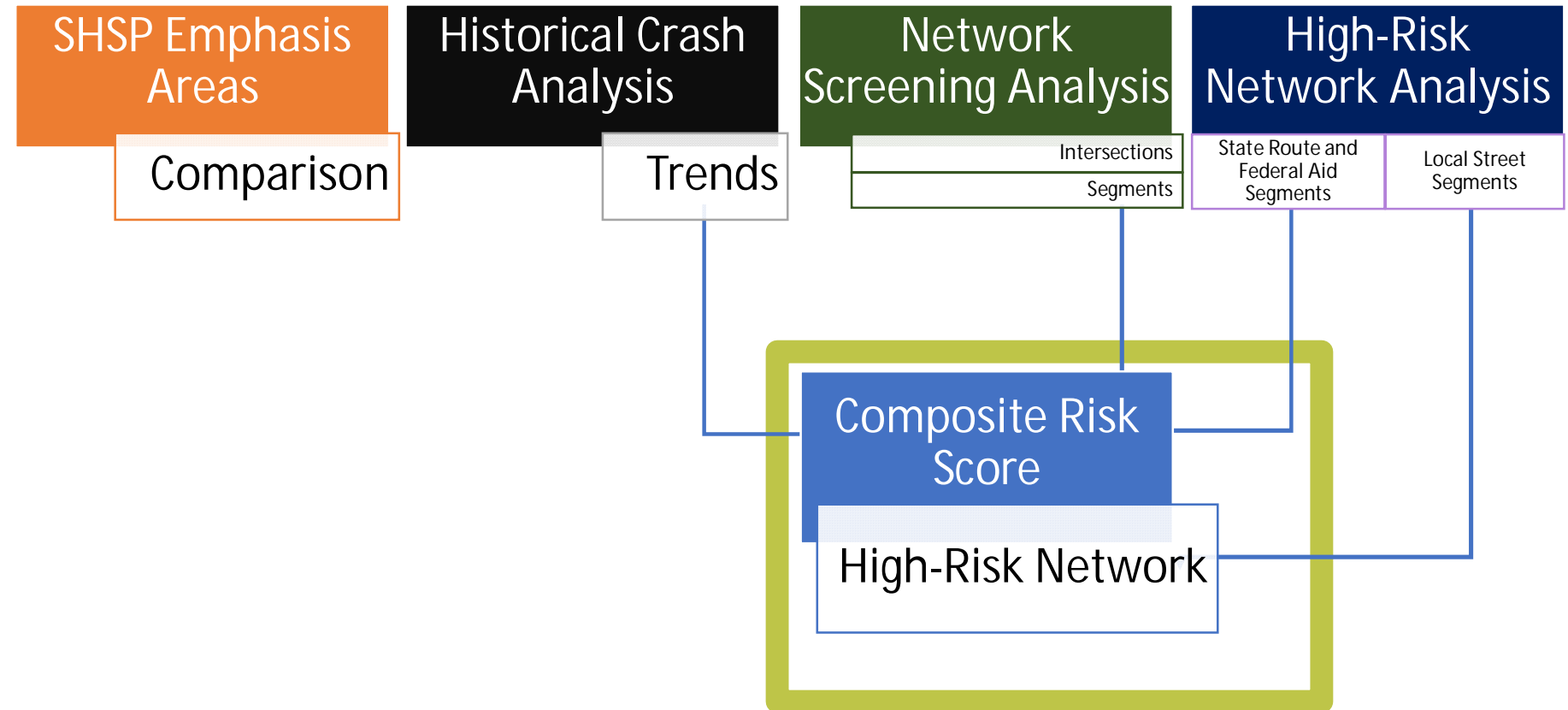
Composite High-Risk Roadway Network

Each of the completed safety analysis methodologies identified segments or intersections that are **candidates for safety improvements** to reduce fatalities and serious injury crashes.

To provide focused information for jurisdictional decisions regarding **prioritization of safety improvements**, an analysis was performed to identify overlapping segments from each of the analysis methodologies. A **composite risk score**, from zero to five, was assigned to each State Highway or Federal Aid Route segment in the region. State Route or Federal Aid Route segments with a score of “4” or higher are included in the Composite High-Risk Network. These represent the top 10% of State Route and Federal Aid Route segments for the entire WFRC area.

The Composite High Risk Network map on page 8 includes State Route and Federal Aid Route segments with a score of “4” or higher.

A list of locally-owned and maintained Federal Aid Route segments in the **North Davis County** GFA Composite High-Risk Network is included on the next page. Streets operated and maintained by local agencies are an emphasis of the SS4A program.



| Analysis | Composite High Risk Score Element | Value |
|--|--|----------|
| Historical Crash Analysis | Segment 5-Year Crash Totals ≥ 3 Crashes | 1 |
| Network Screening Analysis | Positive Local CCR Differential | 1 |
| High Risk Network Analysis | Crash Profile Risk Score ≥ 20 | 1 |
| | usRAP Vehicle Star Rating = 1-2 Stars | 1 |
| | usRAP Pedestrian Star Rating = 1-2 Stars | 0.5 |
| | usRAP Bicycle Star Rating = 1-2 Stars | 0.5 |
| Total Possible Composite Risk Score | | 5 |

Composite Risk Score

Composite High-Risk Network (Segments)

Composite High-Risk Network (State Route/Federal Aid) and Local Street Risk Network

| Facility | Limits | Functional Classification | City | Length (miles) | RISK TYPE | | | | | | Local Street Risk Assessment |
|-----------------------------------|---------------------------------|---------------------------|----------------------------|----------------|--------------------------------|-----------------------------|-----------------------------|--------------------------|---------------------------|---------------------|------------------------------|
| | | | | | usRAP - Pedestrian Star Rating | usRAP - Bicycle Star Rating | usRAP - Vehicle Star Rating | Crash Profile Risk Score | CCR Differential Analysis | Significant Crashes | |
| State Route | | | | | | | | | | | |
| 200 West (SR-108) | 6000 South to 1700 South | Other Principal Arterial | Clinton, Roy, Syracuse, W | 4.5 | X | X | X | X | X | X | |
| State Street/ Main Street (SR-12) | 600 South to Layton Pkwy | Other Principal Arterial | Clearfield, Layton, Roy, S | 8.0 | X | X | X | X | X | X | |
| Hill Field Road (SR-232) | Bernard Fisher Hwy to 1000 N | Minor Arterial | Layton | 2.0 | X | X | X | X | | X | |
| 1800 North (SR-37) | 225 West to Main Street | Minor Arterial | Clinton, Sunset | 2.2 | X | X | X | X | X | X | |
| Bernard Fisher Hwy (SR-193) | 1000 West to Highway 39 | Other Principal Arterial | Layton, Clearfield | 8.0 | X | X | X | X | | X | |
| Antelope Drive (SR-108) | 3400 West to I-15 | Other Principal Arterial | Clearfield, Syracuse | 5.5 | X | X | X | X | | X | |
| Gentile Street/ Oaks Hills Drive | Fort Lane to James V Hansen Hwy | Other Principal Arterial | Clearfield | 3.5 | X | X | X | X | | X | |
| Federal Aid Routes | | | | | | | | | | | |
| 800 N | 50 W to Main St | Major Collector | Clearfield | 0.1 | X | X | X | | X | X | |
| 1000 W | 300 N to Antelope Dr | Major Collector | Clearfield | 2.0 | X | X | X | X | | X | |
| 2000 W | 1700 S to 1900 S | Major Collector | Syracuse | 0.2 | X | X | X | X | X | X | |
| Main St | 1800 S to 1900 S | Major Collector | Clearfield | 0.1 | X | X | X | X | | X | |
| Hill Field Rd | 825 N to Main St | Minor Arterial | Layton | 0.5 | X | X | | X | X | X | |
| Gentile St | 3200 W to 575 W | Major Collector | Layton | 2.5 | X | X | X | | X | X | |
| Fairfield Rd | Gentile St to Rosewood Ln | Minor Arterial | Layton | 0.2 | X | X | X | | X | X | |
| Main St | Rosewood Way to Clearway Dr | Minor Arterial | Layton | 0.1 | X | X | X | | X | X | |

State Route and Federal Aid segments in the **North Davis County GFA Composite High-Risk Network** are listed at left. Each of these segments received a composite risk score of “4” or higher. These segments provide a focus for local jurisdictions or for coordination with UDOT. Each of these segments are shown on the map on page 8.

Composite Risk Score

Composite High-Risk Network (Segments)

Composite High-Risk Network (State Route/Federal Aid) and Local Street Risk Network

| Facility | Limits | Functional Classification | City | Length (miles) | RISK TYPE | | | | | | |
|-----------------|------------------------------|---------------------------|-------------------|----------------|---|-----------------------------|-----------------------------|--------------------------|---------------------------|---------------------|------------------------------|
| | | | | | usRAP - Pedestrian Star Rating | usRAP - Bicycle Star Rating | usRAP - Vehicle Star Rating | Crash Profile Risk Score | CCR Differential Analysis | Significant Crashes | Local Street Risk Assessment |
| Local Streets | | | | | Local Street Risk Assessment | | | | | | |
| Hill Field Road | 2500 West to SR-126 | Minor Arterial | Layton | 1.9 | The Local Street Risk Assessment considered factors such as locations of crashes, proximity to schools, and hard-braking. | | | | | | X |
| 1000 East | 450 South to 2200 South | Major Collector | Clearfield | 1.7 | | | | | | | X |
| 1000 East | 2200 South to Gentile Street | Major Collector | Clearfield | 1.5 | | | | | | | X |
| 1200 West | I-15 to 1000 North | Local | Layton | 0.6 | | | | | | | X |
| Wasatch Drive | SR-109 to 850 East | Local | Layton | 0.8 | | | | | | | X |
| 300 North | SR-126 to I-15 | Local | Clearfield | 0.4 | | | | | | | X |
| Main Street | 7th Street to Gentile Street | Major Collector | Layton/Clearfield | 2.1 | | | | | | | X |
| 700 South | 2300 West to 1400 West | Minor Collector | Syracuse | 0.9 | | | | | | | X |
| Center Street | SR-193 to 400 East | Major Collector | Clearfield | 0.9 | | | | | | | X |
| 1700 West | 1500 South to 1960 North | Local | Layton/Clearfield | 0.4 | | | | | | | X |

Local Streets are also listed at left. These segments were identified through a separate analysis that considered factors such as crash location, proximity to schools, and hard braking.

Composite Risk Score

Composite High-Risk Network (Segments)



Composite High-Risk Roadway Network



Legend

 GFA Boundary

Composite High-Risk Network

-  State Routes
-  Federal Aid Routes
-  Local Streets

North Davis County Wasatch Front Regional Council Area



Composite Risk Score

Composite High-Risk Network (Segments)

Network Screening - Intersections

Network Screening is one of the inputs to the Composite High-Risk Network. Network screening is based on Critical Crash Rate Differential analysis as documented in the Highway Safety Manual. This analysis identified intersections where historical crash rates exceed those which can be expected for similar facilities.

A list of the top-10 intersections on State Routes, Federal Aid Routes, and Local (Non-Federal Aid) Streets in the **North Davis County** GFA are listed at right, along with their associated number of crashes.

For each intersection, the Critical Crash Rate (CCR) Differential and Equivalent Property Damage Only (EDPO) value is listed. These intersections represent those with the highest potential for safety improvements and can be considered as project candidate locations.

Signalized and unsignalized intersections in the **North Davis County** GFA with a positive Critical Crash Rate Differential (rate exceeds expected rate) are mapped on page 9.

| Intersection | FID | City | Crashes | Critical Crash Rate Differential | EPDO ¹ | Fatal | Suspected Serious Injury | Suspected Minor Injury | Possible Injury | No Injury/PDO | Angle | Front to Rear | Head On | Parked Vehicle | Single Vehicle | Rear to Rear | Rear to Side | Sideswipe (Same Direction) | Sideswipe (opposite Direction) | Other/Unknown | Pedestrian | Bicycle | Motorcycle |
|--|-------|------------|---------|----------------------------------|-------------------|-------|--------------------------|------------------------|-----------------|---------------|-------|---------------|---------|----------------|----------------|--------------|--------------|----------------------------|--------------------------------|---------------|------------|---------|------------|
| Signalized Intersections | | | | | | | | | | | | | | | | | | | | | | | |
| Woodland Park Dr & Heritage Park Blvd | 39940 | Layton | 11 | 8.8 | 11 | 0 | 0 | 0 | 0 | 11 | 10 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Main St & 800 N | 42215 | Clearfield | 120 | 0.9 | 732 | 0 | 0 | 20 | 18 | 82 | 39 | 67 | 5 | 3 | 0 | 0 | 0 | 1 | 5 | 0 | 1 | 0 | 1 |
| 1000 E & 700 S | 41106 | Clearfield | 75 | 0.6 | 560 | 0 | 0 | 15 | 16 | 44 | 34 | 27 | 2 | 10 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 3 | 0 |
| State St & State St | 41313 | Clearfield | 110 | 0.5 | 875 | 0 | 1 | 17 | 30 | 62 | 43 | 45 | 5 | 7 | 1 | 0 | 0 | 1 | 6 | 2 | 6 | 0 | 1 |
| Main St & 650 N | 42120 | Clearfield | 107 | 0.4 | 692 | 0 | 2 | 11 | 16 | 78 | 42 | 39 | 1 | 4 | 0 | 0 | 0 | 1 | 20 | 0 | 2 | 1 | 0 |
| Fort Ln & Gentile St | 38701 | Layton | 64 | 0.2 | 429 | 0 | 1 | 6 | 14 | 43 | 30 | 15 | 2 | 12 | 1 | 0 | 0 | 1 | 2 | 1 | 2 | 1 | 2 |
| 1000 W & HWY 193 | 40412 | Layton | 154 | 0.2 | 2245 | 1 | 3 | 25 | 38 | 87 | 89 | 42 | 3 | 7 | 0 | 0 | 0 | 2 | 6 | 5 | 2 | 3 | 3 |
| 1000 W & 200 S | 41615 | Clearfield | 34 | 0.2 | 425 | 0 | 0 | 14 | 9 | 11 | 16 | 12 | 2 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Main St & 1800 N | 42960 | Sunset | 77 | 0.2 | 1604 | 1 | 2 | 16 | 11 | 47 | 45 | 23 | 2 | 5 | 0 | 0 | 0 | 1 | 1 | 0 | 3 | 1 | 2 |
| Hill Field Rd & Antelope Dr | 40453 | Layton | 97 | 0.1 | 632 | 0 | 1 | 12 | 18 | 66 | 48 | 30 | 4 | 3 | 2 | 0 | 0 | 0 | 8 | 2 | 1 | 0 | 1 |
| Unsignalized Intersections | | | | | | | | | | | | | | | | | | | | | | | |
| King St & Olsen Plaza Dr | 39108 | Layton | 6 | 23.6 | 16 | 0 | 0 | 0 | 1 | 5 | 0 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Layton Hills Pkwy & Heritage Park Blvd | 39937 | Layton | 19 | 4.8 | 40 | 0 | 0 | 1 | 0 | 18 | 16 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Angel St & 1650 N | 40128 | Layton | 3 | 4.1 | 24 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 50 E & 50 E | 38303 | Layton | 3 | 3.3 | 24 | 0 | 0 | 1 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Us 89 Nb X402 Off Gordon Ave Ramp & 1200 N | 39556 | Layton | 4 | 2.2 | 25 | 0 | 0 | 1 | 0 | 3 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| South Ring Rd & Southeast Entrance | 39544 | Layton | 3 | 1.4 | 3 | 0 | 0 | 0 | 0 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Emerald Dr & Oakridge Dr | 39460 | Layton | 3 | 1.1 | 24 | 0 | 0 | 1 | 0 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Evergreen Ln & Cherry Ln | 39717 | Layton | 3 | 1.0 | 24 | 0 | 0 | 1 | 0 | 2 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3000 W & 1800 N | 42980 | Clinton | 28 | 1.0 | 300 | 0 | 1 | 5 | 7 | 15 | 21 | 4 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 500 E & 450 S | 41480 | Clearfield | 8 | 1.0 | 39 | 0 | 0 | 0 | 3 | 5 | 4 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

1. Equivalent Property Damage Only Crashes

| | |
|---|---|
| | = 90 - 100% probability that crash type is over-represented |
| | = 80 - 90% probability that crash type is over-represented |
| | = 70 - 80% probability that crash type is over-represented |



Network Screening - Intersections



Legend

 GFA Boundary

Critical Crash Rate Differential (> 0.0)

-  Signalized
-  Unsignalized

North Davis County Wasatch Front Regional Council Area



- Network Screening Analysis
- Intersections
- Segments

Supporting Information



High-Risk Roadway Segments (Federal Aid Routes)

| Facility | Limits | City | RISK TYPE | | | | | | |
|---------------------------|-------------------------------|---------------------|-------------------------------|-----------------------------|----------------------------|--------------------------|---------------------------|---------------------|-------------------------------|
| | | | usRAP- Pedestrian Star Rating | usRAP - Bicycle Star Rating | usRAP- Vehicle Star Rating | Crash Profile Risk Score | CCR Differential Analysis | Significant Crashes | Local Streets Risk Assessment |
| Federal Aid Routes | | | | | | | | | |
| 475 East | South Weber Drive to I-84 | South Weber | X | X | X | | | | |
| 2300 North / 2425 North | 4500 West to Crainefield Road | Hooper | X | X | X | | | | |
| 2300 North | 3600 West to 1700 West | Clinton | X | | X | | | | |
| 2300 North | 1700 West to 75 West | Sunset | | | X | | | | |
| 1300 North | 4500 West to 2350 West | West Point | X | X | X | | | | |
| 1300 North | 2350 West to Main Street | Clinton, Clearfield | | | X | | | | |
| 1000 West | 1300 North to 1800 North | Clinton | X | X | X | | | | |
| 1000 West | 800 North to 1075 North | Clinton | X | X | X | | | | |
| 800 North | 4500 West to 3000 West | West Point | X | X | | | | | |
| 800 North | 3000 West to 2300 West | Clinton | X | X | X | | | | |
| 800 North | 2300 West to 1000 West | Clinton | X | | | | | | |
| 800 North | 1000 West to Main Street | Clearfield | X | X | X | | | | |
| 1000 West | 300 North to 800 North | Clearfield | | X | X | | | | |
| 1000 West | 200 South to 300 North | Clearfield | | X | X | | | | |
| 300 North | 3000 West to Cambridge Park | West Point | | X | X | | | | |
| 300 North | Cambridge Park to 825 West | West Point | | X | X | | | | |
| 300 North | 825 West to Main Street | Clearfield | | | X | | | | |

A list of Federal Aid segments in the **North Davis County GFA** identified from each of the safety analysis methods is listed in the table at left. An “x” is placed to identify the analysis that flagged the segment:

- **usRAP** Star Ratings (Vehicle, Bicycle, Pedestrian)
- **Crash Profile** Risk Score
- **Network Screening**, applying Critical Crash Rate (CCR) and Significant Crashes (three or more crashes over 5-year period)

The maps on page 17 through 21 depict each of these segments identified by the respective analysis.

Composite Risk Score

High-Risk Network

High-Risk Roadway Segments (Federal Aid Routes), Cont'd

| Facility | Limits | City | RISK TYPE | | | | | | |
|---------------------------|------------------------------|------------|-------------------------------|-----------------------------|----------------------------|--------------------------|---------------------------|---------------------|-------------------------------|
| | | | usRAP- Pedestrian Star Rating | usRAP - Bicycle Star Rating | usRAP- Vehicle Star Rating | Crash Profile Risk Score | CCR Differential Analysis | Significant Crashes | Local Streets Risk Assessment |
| Federal Aid Routes | | | | | | | | | |
| Center Street | State Street to 450 East | Clearfield | | | X | | | | |
| 500 East | State Street to Maple Street | Clearfield | | | X | | | | |
| Main Street | 575 South to Park Circle | Clearfield | X | | X | | | | |
| 200 South | 150 West to Main Street | Clearfield | X | | X | | | | |
| 3000 West | 1700 South to 700 South | Syracuse | X | | | | | | |
| 1000 West | 1700 South to 200 South | Syracuse | X | X | X | | | | |
| 1000 East | Antelope Drive to 700 South | Layton | | | X | | | | |
| 700 South | 4500 West to Killarney Drive | West Point | X | X | | | | | |
| Fairfield Road | 320 South SR-193 | Layton | X | X | X | | | | |
| Bluff Road | 3000 West to 2000 West | Syracuse | X | | X | | | | |
| Bluff Road | 2000 West to Gentile Street | Syracuse | X | | | | | | |
| 3000 West | 2700 South to 1700 South | Syracuse | X | | | | | | |
| 2000 West | 2700 South to 1700 South | Syracuse | X | X | X | | | | |
| 1000 West | 2700 South to 1700 South | Syracuse | X | X | X | | | | |
| Main Street | 1000 North to Antelope Drive | Layton | X | X | X | | | | |
| 2200 West | 1000 North to Antelope Drive | Layton | | | X | | | | |
| Antelope Drive | I-15 to Alder Street | Layton | X | | | | | | |
| 2700 South | 3000 West to 2000 West | Syracuse | X | X | | | | | |

A list of Federal Aid segments in the **North Davis County GFA** identified from each of the safety analysis methods is listed in the table at left. An “x” is placed to identify the analysis that flagged the segment:

- **usRAP** Star Ratings (Vehicle, Bicycle, Pedestrian)
- **Crash Profile** Risk Score
- **Network Screening**, applying Critical Crash Rate (CCR) and Significant Crashes (three or more crashes over 5-year period)

The maps on page 17 through 21 depict each of these segments identified by the respective analysis.

Composite Risk Score

High-Risk Network



High-Risk Roadway Segments (Federal Aid Routes), Cont'd

| Facility | Limits | City | RISK TYPE | | | | | | |
|---------------------------|-------------------------------------|-------------|-------------------------------|-----------------------------|----------------------------|--------------------------|---------------------------|---------------------|-------------------------------|
| | | | usRAP- Pedestrian Star Rating | usRAP - Bicycle Star Rating | usRAP- Vehicle Star Rating | Crash Profile Risk Score | CCR Differential Analysis | Significant Crashes | Local Streets Risk Assessment |
| Federal Aid Routes | | | | | | | | | |
| 2700 South | 2000 West to 1000 West | Syracuse | X | X | | | | | |
| 2700 South | 1000 West to 3700 West | Syracuse | | X | | | | | |
| Cherry Lane | Fairfield Road to 2800 East | Layton | | | X | | | | |
| 400 West | Francis Street to Barbara Street | Layton | | | X | | | | |
| Golden Avenue | 400 West to Gordon Street | Layton | | | X | | | | |
| 1000 North | Hill Field Road to Emerald Drive | Layton | X | | | | | | |
| 1000 West | Bluff Road to 1000 North | Layton | X | X | X | | | | |
| 3200 West | Gentile Street to 1000 North | Layton | X | X | | | | | |
| Hill Field Road | 3200 West to 2200 West | Layton | X | X | X | | | | |
| Hill Field Road | 2200 West to Main Street | Layton | X | X | | | | | |
| Gentile Street | Bluff Road to Main Street | Syracuse | X | X | X | | | | |
| Angel Street | South GFA Extents to Gentile Street | Layton | X | X | X | | | | |
| Flint Street | South GFA Extents to Gentile Street | Layton | X | X | X | | | | |
| 475 East | South Weber Drive to I-84 | South Weber | X | X | X | | | | |
| 300 North | 2000 West to State Street | West Point | | | | X | | | |
| Main Street | 575 South to Park Circle | Layton | | | | X | | | |
| Hill Field Road | 3200 West to Main Street | Layton | | | | X | | | |

A list of Federal Aid segments in the **North Davis County GFA** identified from each of the safety analysis methods is listed in the table at left. An “x” is placed to identify the analysis that flagged the segment:

- **usRAP** Star Ratings (Vehicle, Bicycle, Pedestrian)
- **Crash Profile** Risk Score
- **Network Screening**, applying Critical Crash Rate (CCR) and Significant Crashes (three or more crashes over 5-year period)

The maps on page 17 through 21 depict each of these segments identified by the respective analysis.

Composite Risk Score

High-Risk Network



High-Risk Roadway Segments (Federal Aid Routes), Cont'd

| Facility | Limits | City | RISK TYPE | | | | | | |
|-----------------------------|--|-------------|-------------------------------|-----------------------------|----------------------------|--------------------------|---------------------------|---------------------|-------------------------------|
| | | | usRAP- Pedestrian Star Rating | usRAP - Bicycle Star Rating | usRAP- Vehicle Star Rating | Crash Profile Risk Score | CCR Differential Analysis | Significant Crashes | Local Streets Risk Assessment |
| Federal Aid Routes | | | | | | | | | |
| 3000 West | 2700 South to 1700 South | Syracuse | | | | X | | | |
| 1000 West | Bluff Road to Bernard Fisher Highway | Syracuse | | | | X | | | |
| Antelope Drive | 1200 West to Alder Street | Layton | | | | X | | | |
| 3200 West / Main Street | Gentile Street to Antelope Drive | Syracuse | | | | X | | | |
| Bluff Road / Gentile Street | 2700 South to 575 West | Layton | | | | X | | | |
| 1300 North | 4500 West to 3455 West | West Point | | | | X | | | |
| 800 North | 3500 West to 2000 West | West Point | | | | X | | | |
| 2325 North / 2300 North | 5000 West to 2740 West | Hooper | | | | X | | | |
| 800 North | 4500 West to 3000 West | West Point | | | | X | | | |
| 700 South | 4500 West to Killarney Drive | West Point | | | | X | | | |
| 475 East | SR-60 to I-84 | South Weber | | | | X | | | |
| Bluff Road | Gentile Street to 3150 South | Layton | | | | X | | | |
| 1000 E | 1000 S to Hwy 193 | Clearfield | | | | | X | X | |
| Antelope Dr | Hobbs Creek Dr to Hwy 89 | Layton | | | | | X | X | |
| 1000 E | Antelope Dr to Hidden Cove Bach Apartmen | Clearfield | | | | | X | X | |
| 1000 E | 1225 S to 1150 S | Clearfield | | | | | X | X | |
| 1300 N | 2000 W to 2090 W | Clinton | | | | | X | X | |

A list of Federal Aid segments in the **North Davis County GFA** identified from each of the safety analysis methods is listed in the table at left. An “x” is placed to identify the analysis that flagged the segment:

- **usRAP** Star Ratings (Vehicle, Bicycle, Pedestrian)
- **Crash Profile** Risk Score
- **Network Screening**, applying Critical Crash Rate (CCR) and Significant Crashes (three or more crashes over 5-year period)

The maps on page 17 through 21 depict each of these segments identified by the respective analysis.

Composite Risk Score

High-Risk Network



High-Risk Roadway Segments (Federal Aid Routes), Cont'd. & Network Screening – Segments (Local Streets)

| Facility | Limits | City | RISK TYPE | | | | | |
|---------------------------|---|------------|-------------------------------|----------------------------|----------------------------|--------------------------|---------------------------|---------------------|
| | | | usRAP- Pedestrian Star Rating | usRAP- Bicycle Star Rating | usRAP- Vehicle Star Rating | Crash Profile Risk Score | CCR Differential Analysis | Significant Crashes |
| Federal Aid Routes | | | | | | | | |
| 1000 E | 15254 S to 1450 S | Clearfield | | | | | X | X |
| 1000 E | Hidden Cove Bach Apartments to Oakstone | Clearfield | | | | | X | X |
| 1000 E | Express Dr to State St | Clearfield | | | | | X | X |
| 2200 W | 2200 S to Access Road | Layton | | | | | X | X |
| 200 S | State St to Marilyn Dr | Clearfield | | | | | X | X |
| Local Streets | | | | | | | | |
| H St | 13th St to 11th St | Clearfield | | | | | X | X |
| 900 W | Antelope Dr to 1600 S | Clearfield | | | | | X | X |
| 550 N | 1350 W to 1300 W | Clearfield | | | | | X | X |
| 650 N | Main St to James St | Clearfield | | | | | X | X |
| Oakstone Apartments | Entire Loop | Clearfield | | | | | X | X |
| 1500 E | 800 S to Hwy 193 | Clearfield | | | | | X | X |
| King St | Olsen Plz to Main St | Layton | | | | | X | X |
| Olsen Plaza Dr | Kings St to Main St | Layton | | | | | X | X |
| King St | King Cir to Cook Dr | Layton | | | | | X | X |
| 400 W | 1985 N to 450 W | Sunset | | | | | X | X |

A list of Federal Aid and Local Street segments in the **North Davis County GFA** identified from each of the safety analysis methods is listed in the table at left. An “x” is placed to identify the analysis that flagged the segment:

- **usRAP** Star Ratings (Vehicle, Bicycle, Pedestrian)
- **Crash Profile** Risk Score
- **Network Screening**, applying Critical Crash Rate (CCR) and Significant Crashes (three or more crashes over 5-year period)

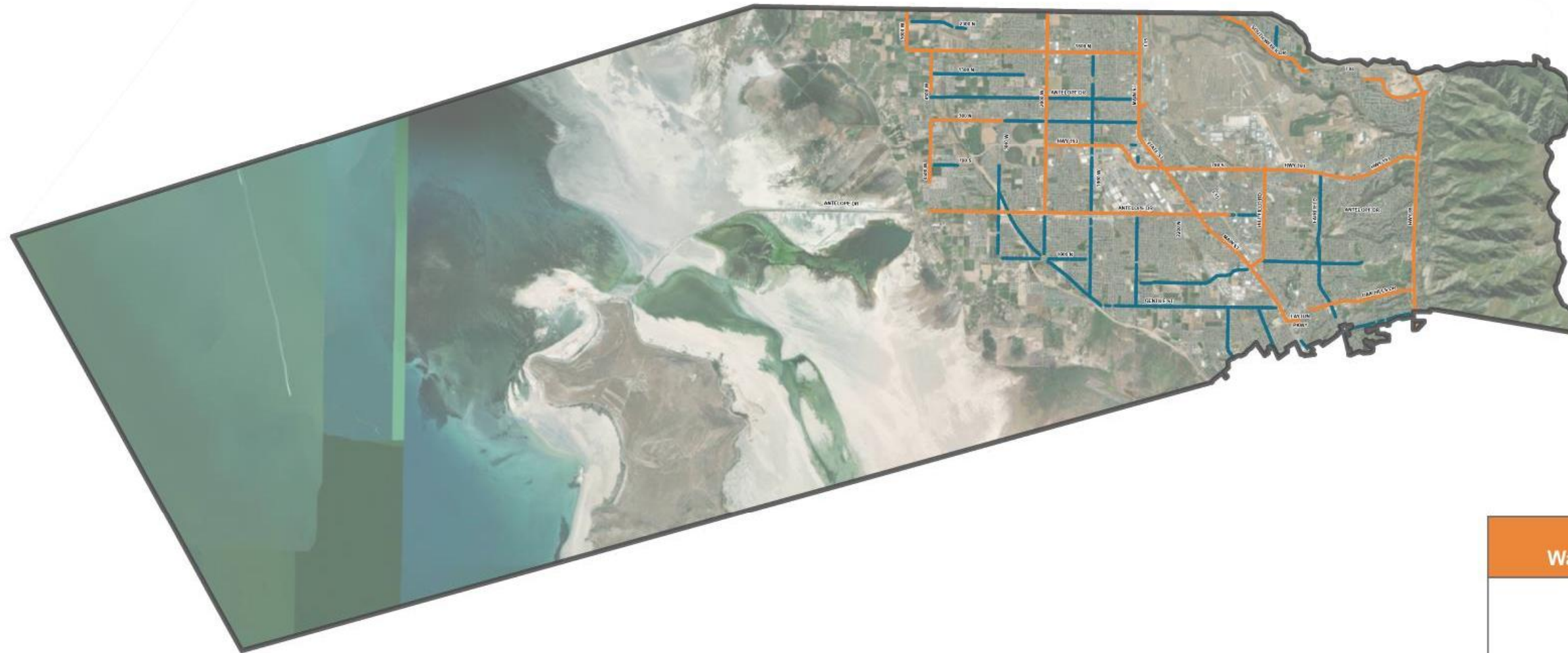
The maps on page 17 through 21 depict each of these segments identified by the respective analysis.

A list of Local Street segments in the **North Davis County GFA** identified from Network Screening, applying Critical Crash Rate (CCR) and Significant Crashes (three or more crashes over 5-year period), is shown at left.

Composite Risk Score

High-Risk Network

usRAP Pedestrian Star Rating - Segments



Legend

GFA Boundary

Pedestrian Star Rating (1-2)

State Routes

Federal Aid Routes

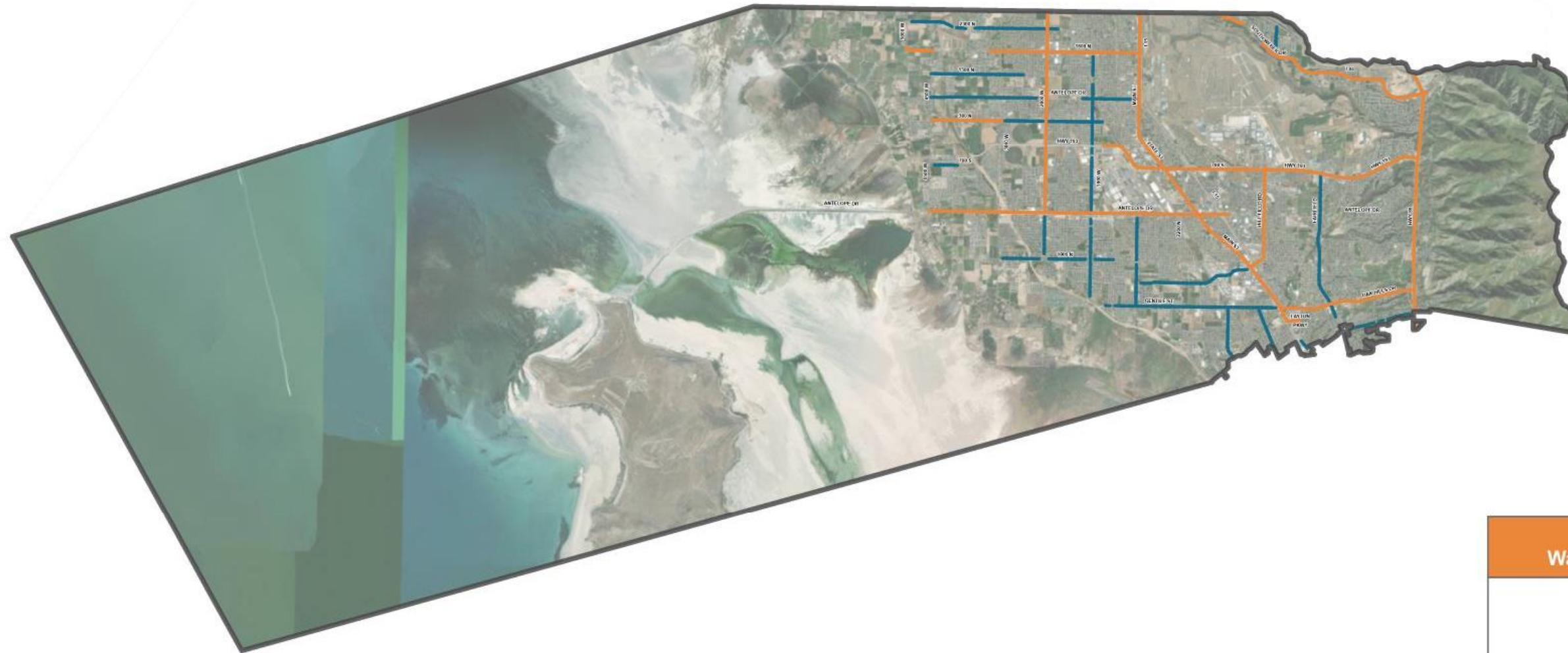
North Davis County
Wasatch Front Regional Council Area



High-Risk Network Analysis

| | |
|--------------------------------------|-----------------------|
| State Route and Federal Aid Segments | Local Street Segments |
|--------------------------------------|-----------------------|

usRAP Bicycle Star Rating - Segments



Legend

GFA Boundary

Bicycle Star Rating (1-2)

State Routes

Federal Aid Routes

North Davis County
Wasatch Front Regional Council Area



High-Risk Network Analysis

| | |
|--------------------------------------|-----------------------|
| State Route and Federal Aid Segments | Local Street Segments |
|--------------------------------------|-----------------------|

usRAP Vehicle Star Rating - Segments



Legend

GFA Boundary

Vehicle Star Rating (1-2)

State Routes

Federal Aid Routes

North Davis County
Wasatch Front Regional Council Area



High-Risk Network Analysis

| | |
|--------------------------------------|-----------------------|
| State Route and Federal Aid Segments | Local Street Segments |
|--------------------------------------|-----------------------|

Crash Profile Risk - Segments



Legend

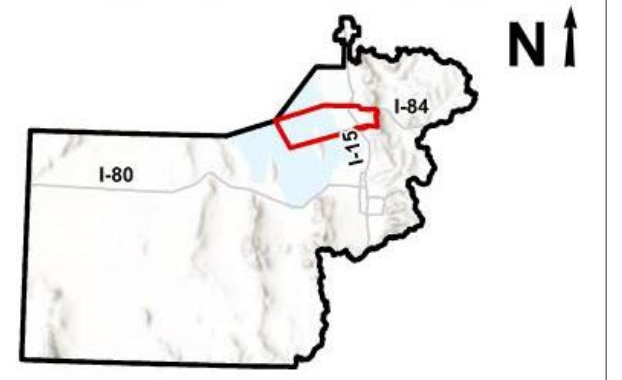
GFA Boundary

Crash Profile Risk (> 20)

State Routes

Federal Aid Routes

North Davis County
Wasatch Front Regional Council Area



High-Risk
Network Analysis

State Route and Federal Aid Segments Local Street Segments

Network Screening - Segments



Legend

GFA Boundary

Critical Crash Rate Differential (> 0.0)

State Routes

Federal Aid Routes

Local Streets

**North Davis County
Wasatch Front Regional Council Area**



**High-Risk
Network Analysis**

State Route and Federal Aid Segments Local Street Segments

NORTH DAVIS COUNTY TECH MEMO #1 SAFETY ANALYSIS

TECHNICAL MEMORANDUM #1

APPENDIX A5 - NORTH DAVIS COUNTY GEOGRAPHIC FOCUS AREA ANALYSIS

December 2023

Statutory Notice

23 U.S.C. § 409: US Code - Section 409: Discovery and admission as evidence of certain reports and surveys

Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway- highway crossings, pursuant to sections 130, 144, and 148 of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

File name: Appendix A5 - North Davis County GFA - Safety Analysis

Table of Contents

| | |
|--|-----------|
| 1. Introduction..... | 5 |
| 1.1. Safety Analysis | 5 |
| 1.2. Appendix Organization..... | 5 |
| 2. Study Area..... | 6 |
| 3. SHSP Emphasis Area Analysis..... | 9 |
| 4. Historical Crash Analysis..... | 10 |
| 4.1. Overall Crashes | 10 |
| 4.2. Fatal and Serious Injury Crashes by Year | 10 |
| 4.3. Fatal and Serious Injury Crashes by Location | 10 |
| 4.4. Fatal and Serious Injury Crashes by Crash Type | 15 |
| 4.5. Fatal and Serious Injury Vulnerable User Crashes..... | 17 |
| 4.6. Fatal and Serious Injury Crashes by Manner of Collision | 19 |
| 4.7. Fatal and Serious Injury Intersection Crashes..... | 21 |
| 4.8. Fatal and Serious Injury Crashes by Functional Class | 23 |
| 4.9. Fatal and Serious Injury Crash Trees Diagrams..... | 25 |
| 5. Crash and Network Screening Analysis..... | 29 |
| 6. Roadway Characteristic Risk Analysis | 37 |
| 6.1. Crash Profile Risk Assessment | 37 |
| 6.2. usRAP Risk Assessment | 40 |
| 6.3. Local Street Risk Assessment..... | 48 |
| 7. Safety Analysis Summary | 50 |
| 7.1. Common Risk Characteristics | 50 |
| 7.2. Composite High-Risk Roadway Network..... | 50 |

List of Figures

| | |
|--|----|
| Figure 2.1 – North Davis County GFA Study Area | 7 |
| Figure 2.2 – North Davis County GFA Roadway Network | 8 |
| Figure 4.1 – Fatal and Serious Injury Crashes by Year | 11 |
| Figure 4.2 – Annual Fatal Crashes by Roadway Ownership | 12 |
| Figure 4.3 – Annual Serious Injury Crashes by Roadway Ownership..... | 12 |
| Figure 4.4 – Fatal and Serious Injury Crashes | 13 |
| Figure 4.5 – Fatal and Serious Injury Crash Density | 14 |
| Figure 4.6 – Fatal and Serious Injury Crashes by Crash Type | 15 |
| Figure 4.7 – Fatal Crashes by Crash Type and Roadway Ownership | 16 |
| Figure 4.8 – Serious Injury Crashes by Crash Type and Roadway Ownership..... | 16 |
| Figure 4.9 – Fatal and Serious Injury Crashes by Vulnerable User | 17 |
| Figure 4.10 – Fatal Crashes by Vulnerable User and Roadway Ownership..... | 18 |
| Figure 4.11 – Serious Injury Crashes by Vulnerable User and Roadway Ownership | 18 |
| Figure 4.12 – Fatal and Serious Injury Crashes by Manner of Collision | 19 |
| Figure 4.13 – Fatal Crashes by Manner of Collision and Roadway Ownership | 20 |
| Figure 4.14 – Serious Injury Crashes by Manner of Collision and Roadway Ownership..... | 20 |
| Figure 4.15 – Fatal and Serious Injury Crashes by Intersection | 21 |
| Figure 4.16 – Fatal Crashes by Intersection and Roadway Ownership | 22 |
| Figure 4.17 – Serious Injury Crashes by Intersection and Roadway Ownership..... | 22 |
| Figure 4.18 – Fatal and Serious Injury Crashes by Functional Class | 23 |
| Figure 4.19 – Fatal Injury Crashes by Functional Class and Roadway Ownership..... | 24 |
| Figure 4.20 – Serious Injury Crashes by Functional Class and Roadway Ownership..... | 24 |
| Figure 4.21 – Fatal and Serious Injury Crash Tree Diagram (Crash Type)..... | 26 |
| Figure 4.22 – Fatal and Serious Injury Crash Tree Diagram (Manner of Collision)..... | 27 |
| Figure 4.23 – Fatal and Serious Injury Crash Tree Diagram (Active Transportation)..... | 28 |
| Figure 5.1 – CCR Differential – Segments (State Routes)..... | 30 |
| Figure 5.2 – CCR Differential – Segments (Federal Aid Routes)..... | 31 |
| Figure 5.3 – CCR Differential – Segments (Local Routes) | 32 |
| Figure 5.4 – CCR Differential – Intersections (Signalized) | 34 |
| Figure 5.5 – CCR Differential – Intersections (Unsignalized)..... | 35 |
| Figure 6.1 – Crash Profile Risk Assessment Results (State Routes)..... | 38 |

Figure 6.2 – Crash Profile Risk Assessment Results (Federal Aid Routes)..... 39

Figure 6.3 – Vehicle Star Rating (State Routes)..... 42

Figure 6.4 – Vehicle Star Rating (Federal Aid Routes)..... 43

Figure 6.5 – Pedestrian Star Rating (State Routes) 44

Figure 6.6 – Pedestrian Star Rating (Federal Aid Routes)..... 45

Figure 6.7 – Bicycle Star Rating (State Routes)..... 46

Figure 6.8 – Bicycle Star Rating (Federal Aid Routes) 47

Figure 6.9 – Local Street Risk Assessment Results..... 49

Figure 7.1 – North Davis County High-Risk Roadway Network (State Routes) 52

Figure 7.2 – North Davis County High-Risk Roadway Network (Federal Aid Routes)..... 53

List of Tables

Table 3.1 – SHSP Emphasis Areas Analysis 9

Table 4.1 – Crashes by Severity by Roadway Ownership..... 10

Table 5.1 – Crash and Network Screening Analysis Results - Segments..... 33

Table 5.2 – Crash and Network Screening Analysis Results - Intersections..... 36

Table 6.1 – WFRC Risk Segments (Federal Aid Routes)..... 37

Table 6.2 – usRAP Risk Segments (Federal Aid Route) 40

Table 6.3 – Local Street High Priority Segments..... 48

Table 7.1 – Composite High-Risk Roadway..... 51

Table 7.2 – North Davis County High-Risk Roadway Network (State Routes and Federal Aid Routes) 51

1. Introduction

Appendix A5 summarizes the safety analysis performed for the North Davis County Geographic Focus Area (GFA) for the Wasatch Front Area Comprehensive Safety Action Plan (CSAP).

The analysis of available safety related data informs identification of a potential project locations that may be further considered in the development of safety related projects and project types.

1.1. Safety Analysis

The following safety analysis methodologies were completed for the North Davis County GFA:

- Strategic Highway Safety Plan (SHSP) Emphasis Area Analysis
- Historical Crash Analysis
- Crash and Network Screening Analysis
- Roadway Characteristic Risk Analysis
 - Crash Profile Risk Assessment
 - usRAP Risk Factors Analysis
 - Local Street Risk Assessment

An overview on the methodologies used to perform these safety analyses are described in Technical Memorandum #1: Safety Analysis Results Summary. **Appendix A5** summarizes the results of the analyses for the North Davis County GFA.

1.2. Appendix Organization

This Appendix is organized into the following sections:

- **Section 1** - Introduction
- **Section 2** - North Davis County GFA Study Area and Roadway Network.
- **Section 3** - Strategic Highway Safety Plan (SHSP) Emphasis Area Analysis.
- **Section 4** - Historical Crash Analysis
- **Section 5** - Crash and Network Screening Analysis based on Highway Safety Manual (HSM).
- **Section 6** - Roadway Characteristic Risk Analysis
- **Section 7** - Common Risk Characteristics and Composite High-Risk Roadway Network

2. Study Area

The CSAP study area includes each jurisdiction within the WFRC area. To organize the large number of jurisdictions within the WFRC area into manageable analysis areas, jurisdictions are organized into Geographic Focus Areas (GFA). The North Davis County GFA (**Figure 2.1**) is located entirely within Davis County and includes the following agencies and jurisdictions:

- Clearfield
- Clinton
- Layton
- South Weber
- Sunset
- Syracuse
- West Point

The safety analyses presented in this Technical Memorandum are specific to the North Davis County GFA.

Figure 2.2 highlights the roadway network within the North Davis County GFA study area. Roadways within the study area are divided into the following three categories:

- State Routes: UDOT-maintained roads
- Federal Aid Routes: Jurisdiction-maintained roads eligible for federal funding
- Local Streets: Local Jurisdiction-maintained roads that are not Federal Aid routes.

NOTE ON CRASH DATA ANALYSIS: All crash data presented in this Technical Memorandum are specific to the North Davis County GFA, for the years 2018-2022. Crash data was obtained from the Utah Department of Transportation.



Figure 2.1 – North Davis County GFA Study Area



Figure 2.2 – North Davis County GFA Roadway Network

3. SHSP Emphasis Area Analysis

The SHSP emphasis area analysis ranks the frequency of fatal and serious injury crashes in the North Davis County GFA for each of the eleven Utah SHSP emphasis areas. The rankings of the emphasis areas are compared for the North Davis County GFA, statewide (all public roads statewide), and the WFRC study area totals. Each reported crash can have more than one emphasis area identified. The results of the SHSP emphasis area analysis are displayed in **Table 3.1**. The top five ranked emphasis areas are highlighted in the table with the top five for the North Davis County GFA listed below:

- Intersections
- Motorcycle
- Teen Driver
- Speed-Related
- Roadway Departure

Table 3.1 – SHSP Emphasis Areas Analysis

| Category | Utah SHSP Safety Emphasis Area | Statewide Totals | | WFRC Totals | | North Davis County Totals | | |
|---------------|--------------------------------|--------------------------|------|--------------------------|------|---------------------------|------|--------------------------|
| | | Fatal and Serious Injury | Rank | Fatal and Serious Injury | Rank | Fatal and Serious Injury | Rank | Change in Rank From WFRC |
| Driver | Teen Driver | 1,640 | 4 | 751 | 4 | 63 | 3 | 1 |
| | Older Driver | 1,508 | 6 | 700 | 6 | 56 | 6 | 0 |
| | Speed-Related | 2,133 | 3 | 936 | 3 | 63 | 4 | -1 |
| | Aggressive Driving | 555 | 11 | 297 | 10 | 17 | 11 | -1 |
| | Distracted Driving | 718 | 10 | 286 | 11 | 31 | 9 | 2 |
| | Impaired Driving | 1,184 | 8 | 623 | 8 | 29 | 10 | -2 |
| | No Safety Restraints | 1,542 | 5 | 599 | 9 | 32 | 8 | 1 |
| Roadway | Intersection | 3,567 | 1 | 2,163 | 1 | 174 | 1 | 0 |
| | Roadway Departure | 2,931 | 2 | 1,014 | 2 | 58 | 5 | -3 |
| Special Users | Motorcycle | 1,457 | 7 | 750 | 5 | 66 | 2 | 3 |
| | Pedestrian | 912 | 9 | 636 | 7 | 44 | 7 | 0 |
| | Bicycle* | 280 | 12 | 167 | 12 | 12 | 12 | 0 |

*Bicyclists aren't one of the eleven Utah SHSP emphasis areas but was included as part of the CSAP safety analysis.

4. Historical Crash Analysis

A historical crash data analysis was conducted for the most recent complete 5-year period from 2018 to 2022. This historical crash analysis is primarily focused on fatal and serious injury crashes. Overall Crashes

4.1. Overall Crashes

Table 4.1 provides an overview of overall crashes by severity and roadway ownership within the North Davis County GFA. The data shows the following:

- State Routes recorded 68% of the total crashes in this GFA
- Federal Aid routes recorded 20% of fatal and serious injury crashes in this GFA
- Local Streets (non-Federal Aid) recorded 11% of fatal and serious injury crashes in this GFA

Table 4.1 – Crashes by Severity by Roadway Ownership

| Route Type | State Route | | Federal Aid Route | | Local Street | | Overall Total | | % of WFRC |
|----------------------------------|--------------|-------------|-------------------|-------------|--------------|-------------|---------------|--------------|-------------|
| Crash Severity | Crashes | | Crashes | | Crashes | | Crashes | | % |
| | # | % | # | % | # | % | # | % | |
| Fatal | 29 | 0% | 3 | 0% | 1 | 0% | 33 | 0.2% | 0.0% |
| Suspected Serious Injury | 151 | 2% | 59 | 2% | 24 | 2% | 234 | 1.8% | 0.1% |
| Suspected Minor Injury | 1,176 | 13% | 403 | 15% | 154 | 10% | 1,733 | 13.0% | 1.0% |
| Possible Injury | 1,683 | 19% | 507 | 19% | 173 | 11% | 2,363 | 17.8% | 1.3% |
| No Injury / Property Damage Only | 6,026 | 66% | 1,727 | 64% | 1,172 | 77% | 8,925 | 67.2% | 4.9% |
| Route Total | 9,065 | 100% | 2,699 | 100% | 1,524 | 100% | 13,288 | 100% | 7.4% |

4.2. Fatal and Serious Injury Crashes by Year

Figure 4.1 through **Figure 4.3** provide an overview of fatal and serious injury crashes by year and roadway ownership for the North Davis County GFA. The data shows the following:

- Fatal crashes have increased during the 5-year period (2018-2022), with ten fatal crashes occurring in 2022, up from 7 in 2018
- Serious injury crashes have increased during the 5-year period (2018-2022)
- Year 2021 recorded highest number of serious crashes during the 5-year period (2018 – 2022)
- Most (27 of 33) of the fatal and serious injury crashes occurred on state routes

4.3. Fatal and Serious Injury Crashes by Location

Figure 4.4 shows the locations of the fatal and serious injury crashes within the North Davis County GFA.

Figure 4.5 is a density map of fatal and serious injury crashes within the North Davis County GFA.

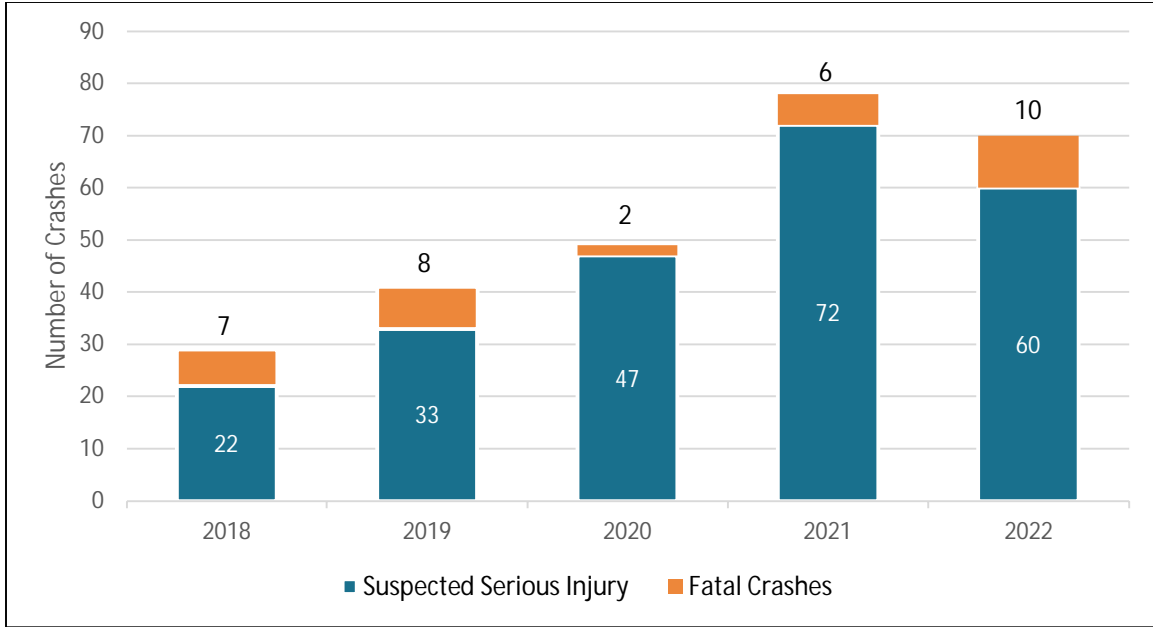


Figure 4.1 – Fatal and Serious Injury Crashes by Year

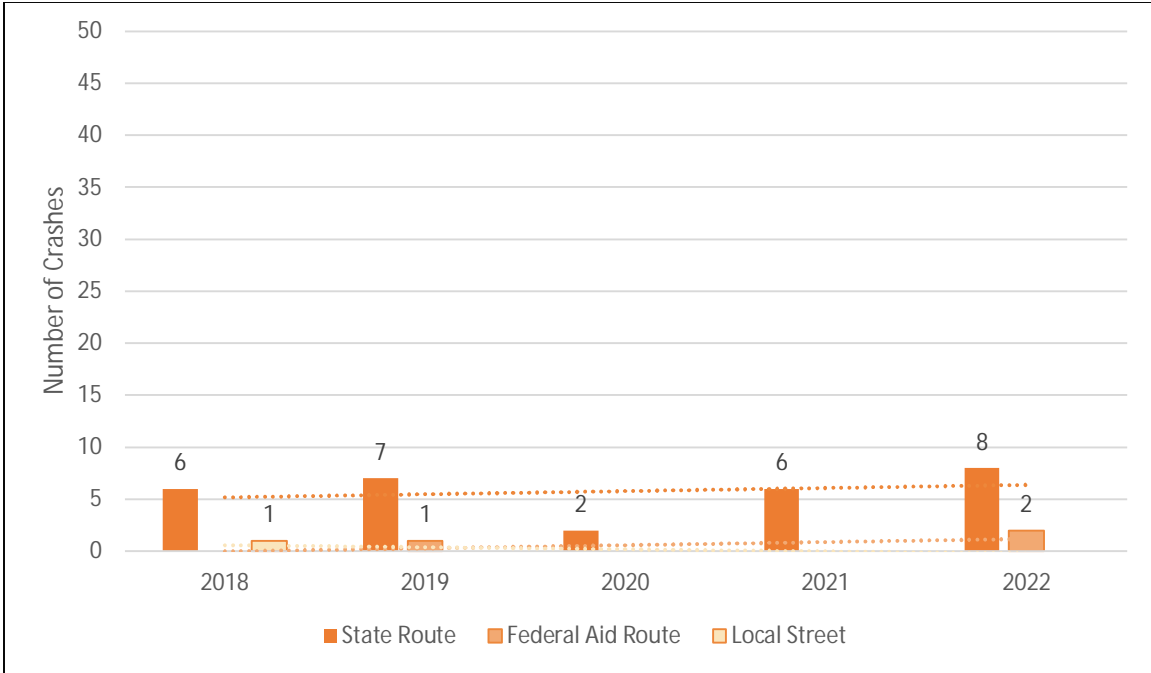


Figure 4.2 – Annual Fatal Crashes by Roadway Ownership

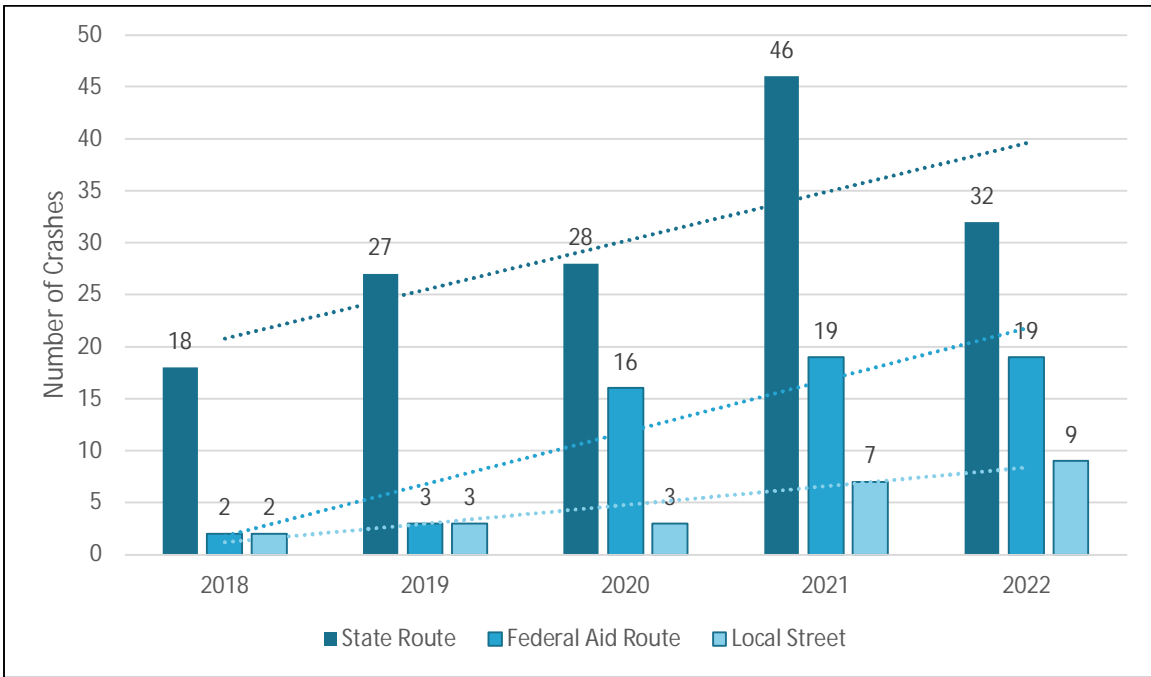


Figure 4.3 – Annual Serious Injury Crashes by Roadway Ownership

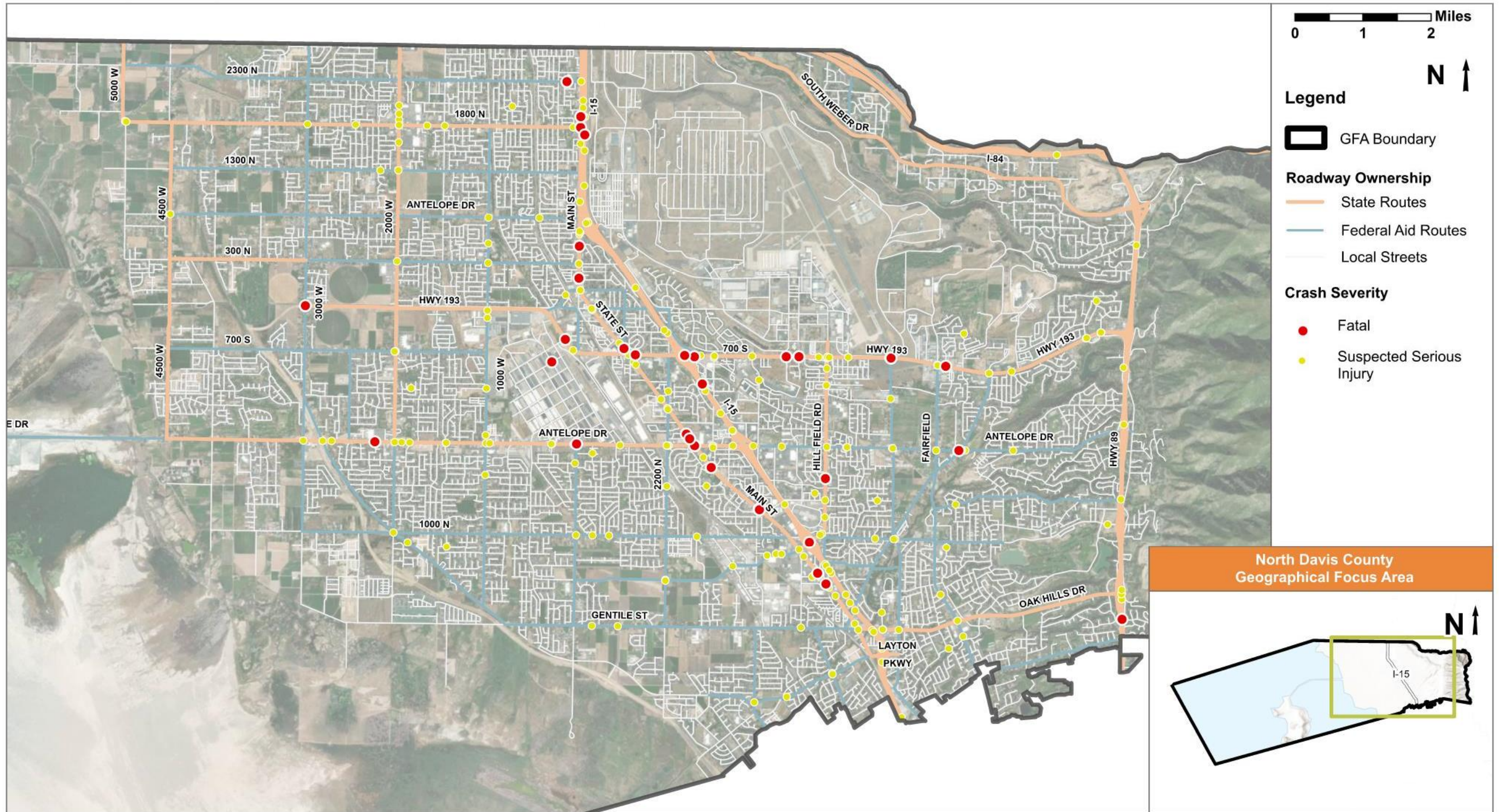


Figure 4.4 – Fatal and Serious Injury Crashes

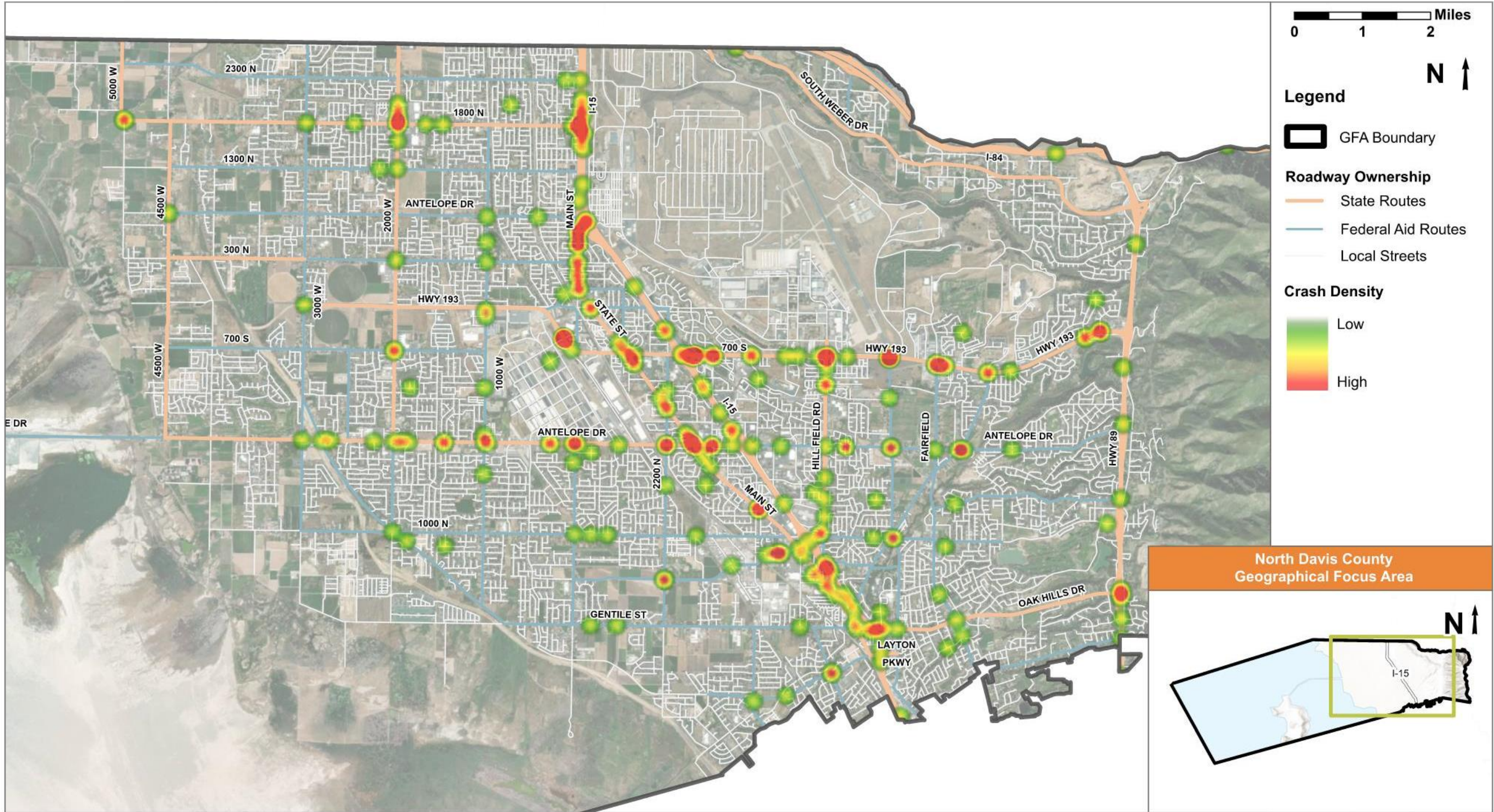


Figure 4.5 – Fatal and Serious Injury Crash Density

4.4. Fatal and Serious Injury Crashes by Crash Type

Figure 4.6 through Figure 4.8 provide an overview of fatal and serious injury crashes by crash type and roadway ownership for the North Davis County GFA. The data shows the following:

- The Left-Turn at Intersection crash type has the highest number of total fatal and serious injuries with 71 crashes
- Other prominent crash types are Active Transportation, and Roadway Departure
- There were eight Active Transportation fatal crashes on State Routes, and one Active Transportation fatal crash on a Federal Aid route
- 29 of 33 fatal and serious injury crashes occurred on State Routes

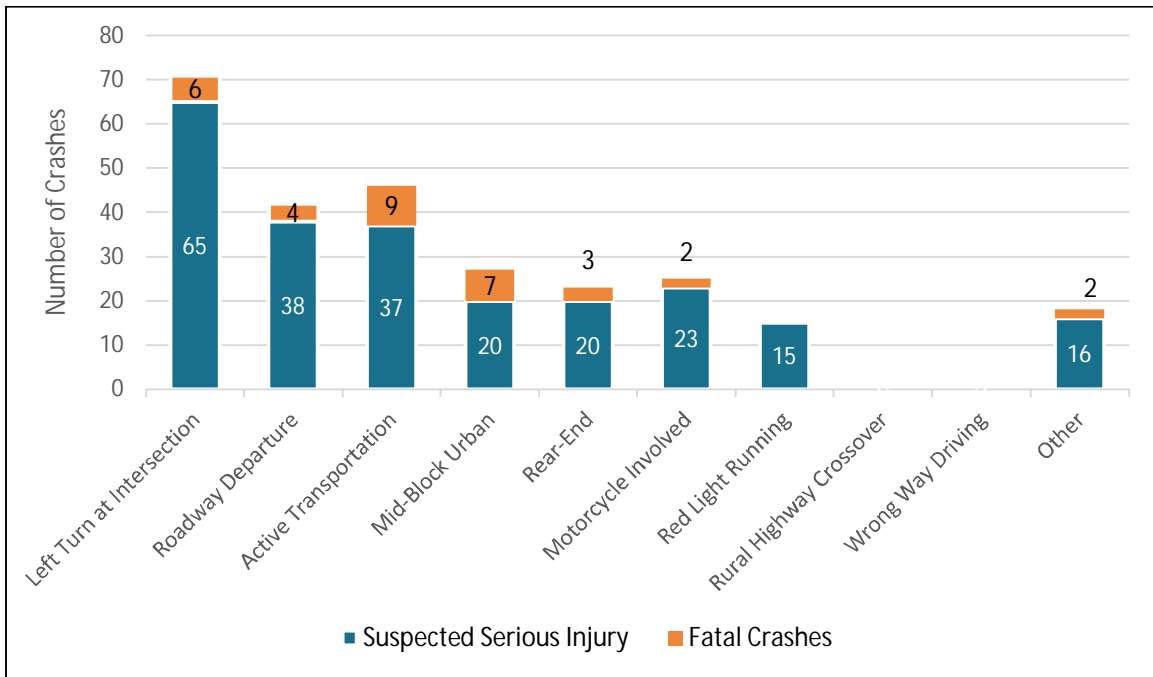


Figure 4.6 – Fatal and Serious Injury Crashes by Crash Type

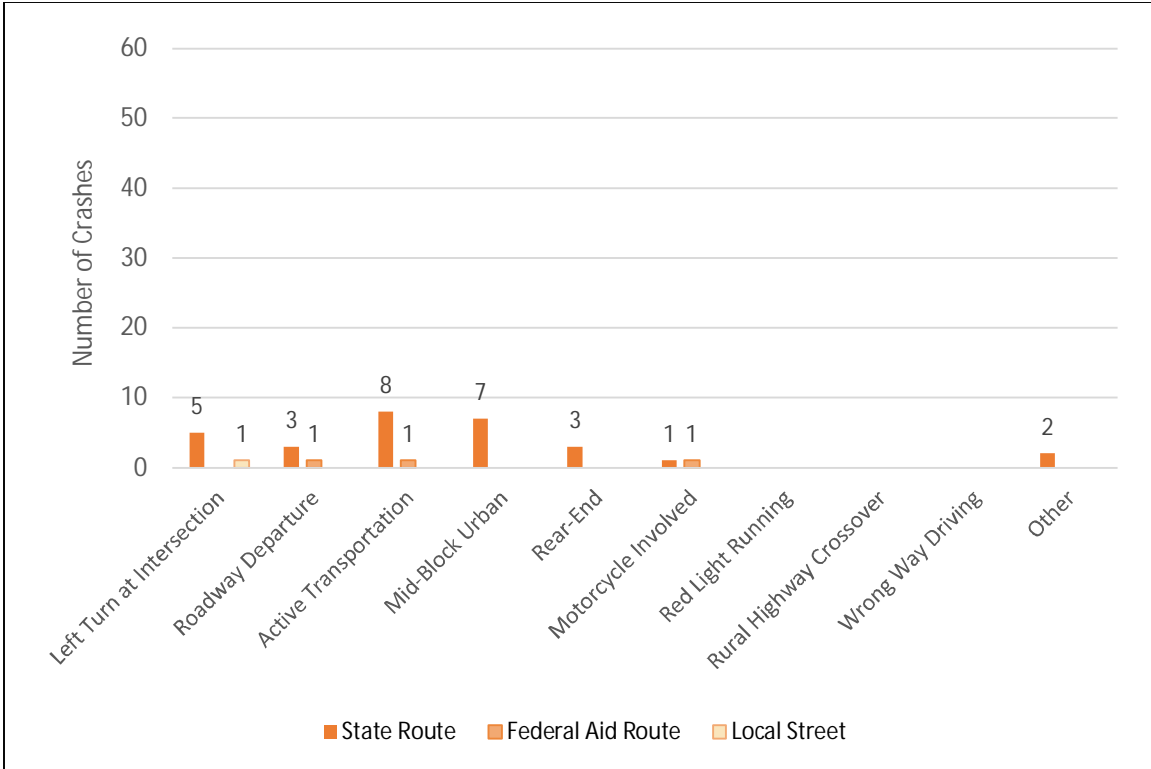


Figure 4.7 – Fatal Crashes by Crash Type and Roadway Ownership

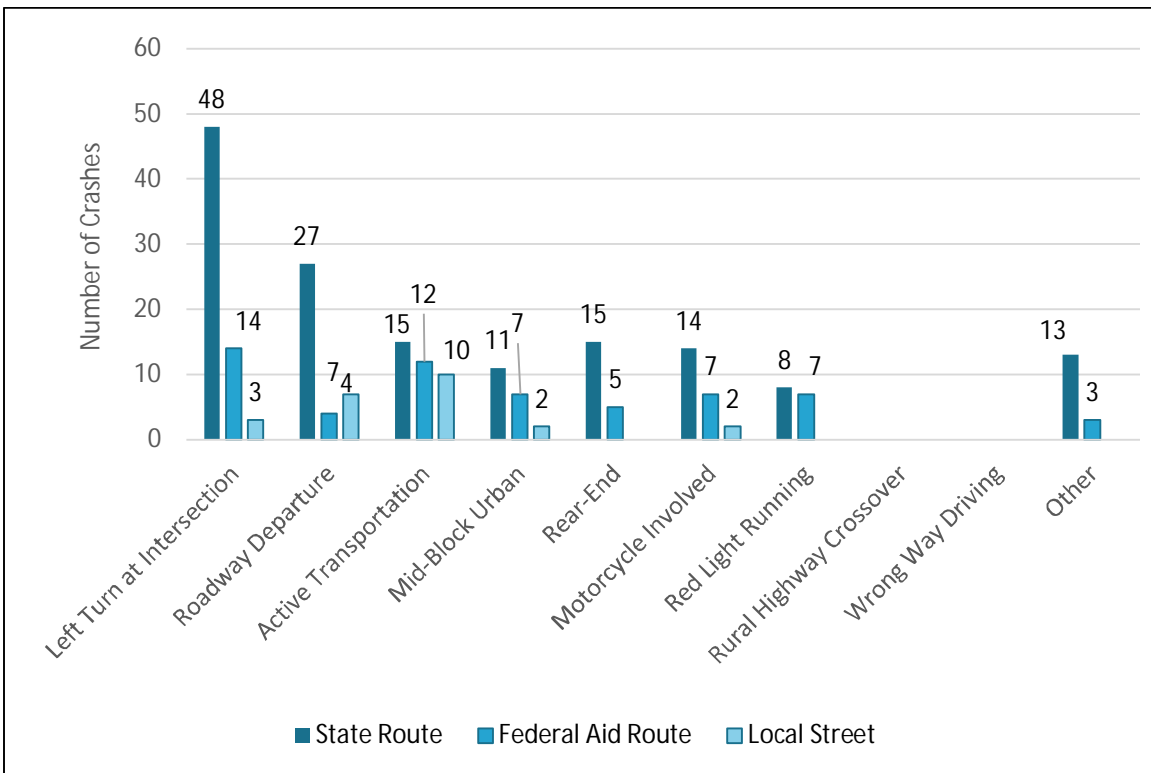


Figure 4.8 – Serious Injury Crashes by Crash Type and Roadway Ownership

4.5. Fatal and Serious Injury Vulnerable User Crashes

Figure 4.9 through Figure 4.11 provide an overview of fatal and serious injury crashes by vulnerable road user and roadway ownership for the North Davis County GFA. The data shows the following:

- There were 8 pedestrian fatal crashes and two bicycle fatal crashes over the five-year analysis period

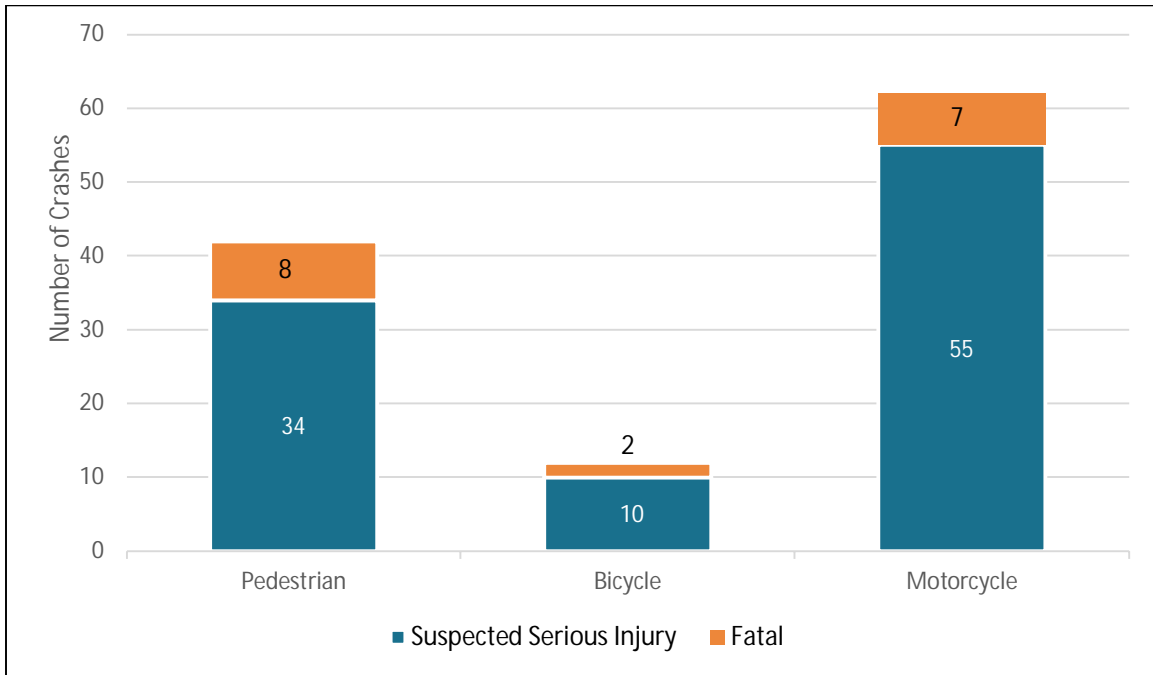


Figure 4.9 – Fatal and Serious Injury Crashes by Vulnerable User

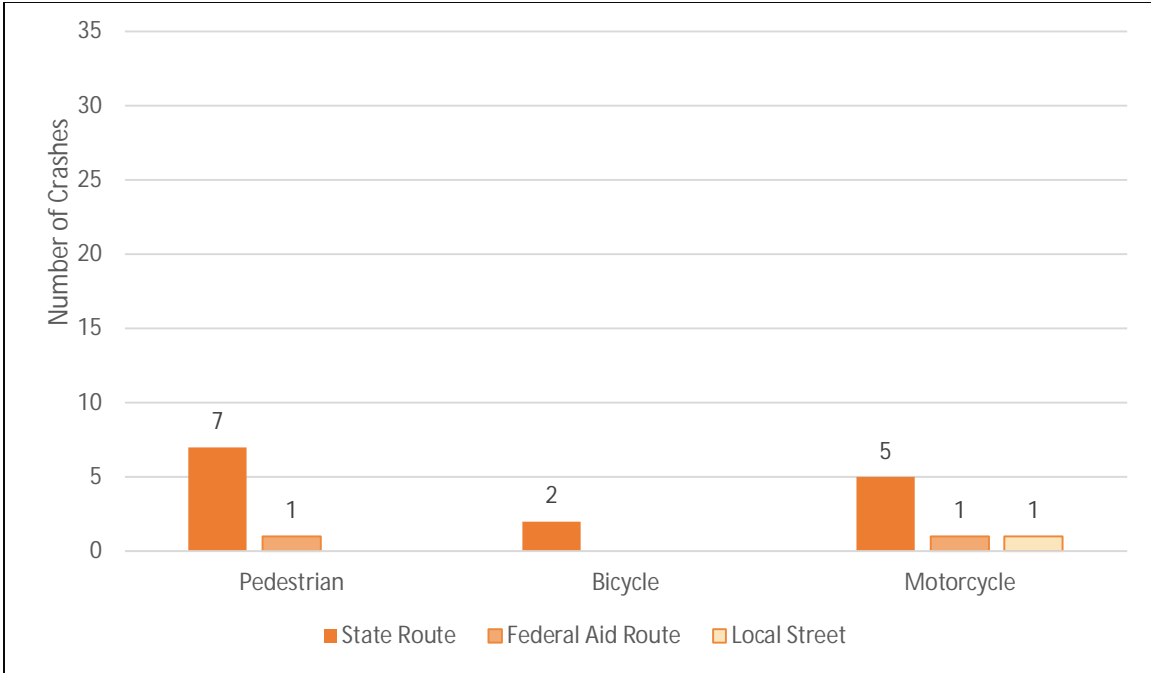


Figure 4.10 – Fatal Crashes by Vulnerable User and Roadway Ownership

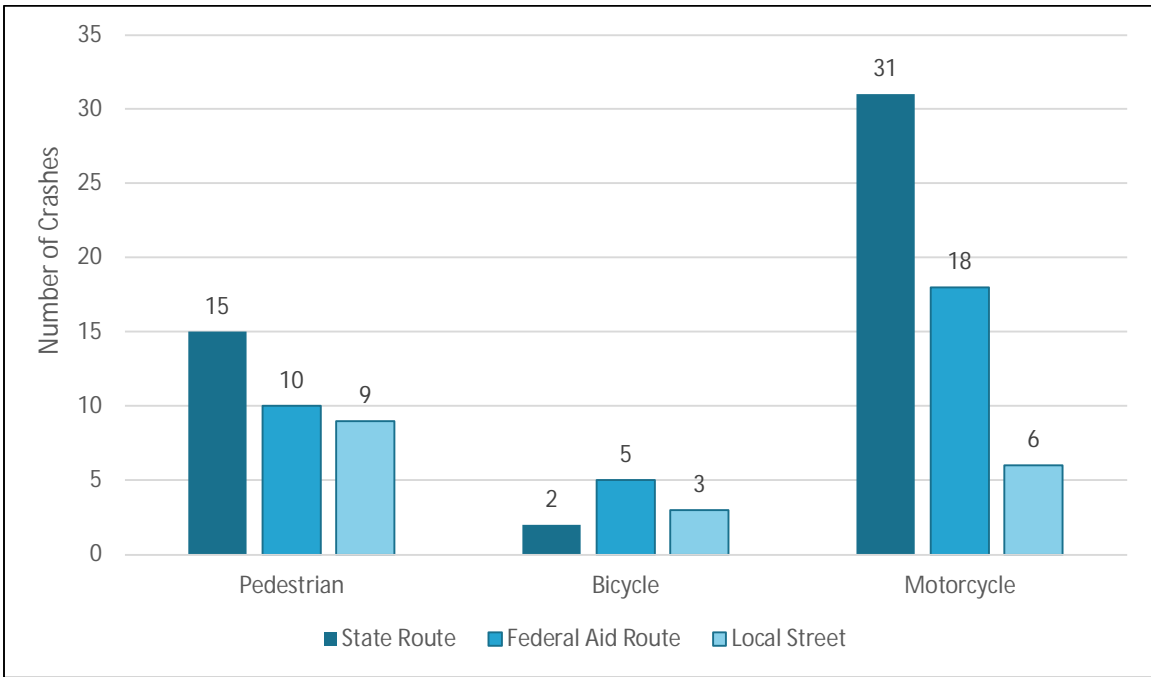


Figure 4.11 – Serious Injury Crashes by Vulnerable User and Roadway Ownership

4.6. Fatal and Serious Injury Crashes by Manner of Collision

Figure 4.12 through Figure 4.14 provide an overview of fatal and serious injury crashes by manner of collision and roadway ownership for the North Davis County GFA. The data shows the following:

- Single vehicle and angle crash types resulted in the largest number of fatal and serious injury crashes in this GFA
- No other crash types exceeded four fatal crashes
- 11 of 15 single-vehicle fatal crashes occurred on State Routes, three on Federal Aid routes, and one on a Local Street

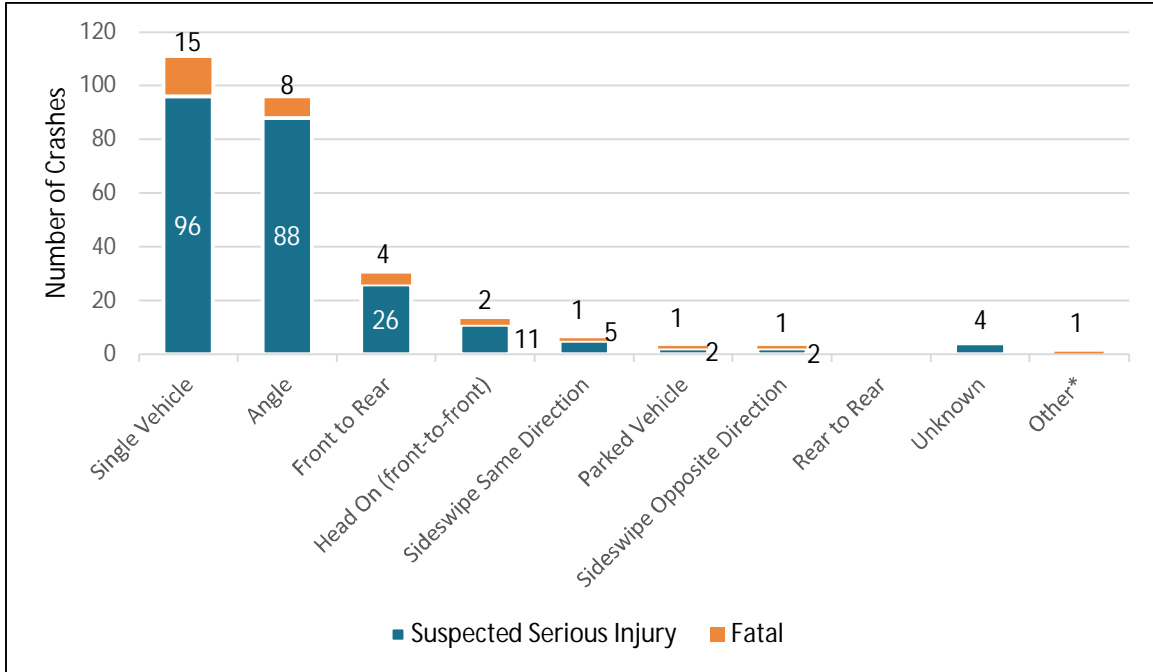


Figure 4.12 – Fatal and Serious Injury Crashes by Manner of Collision

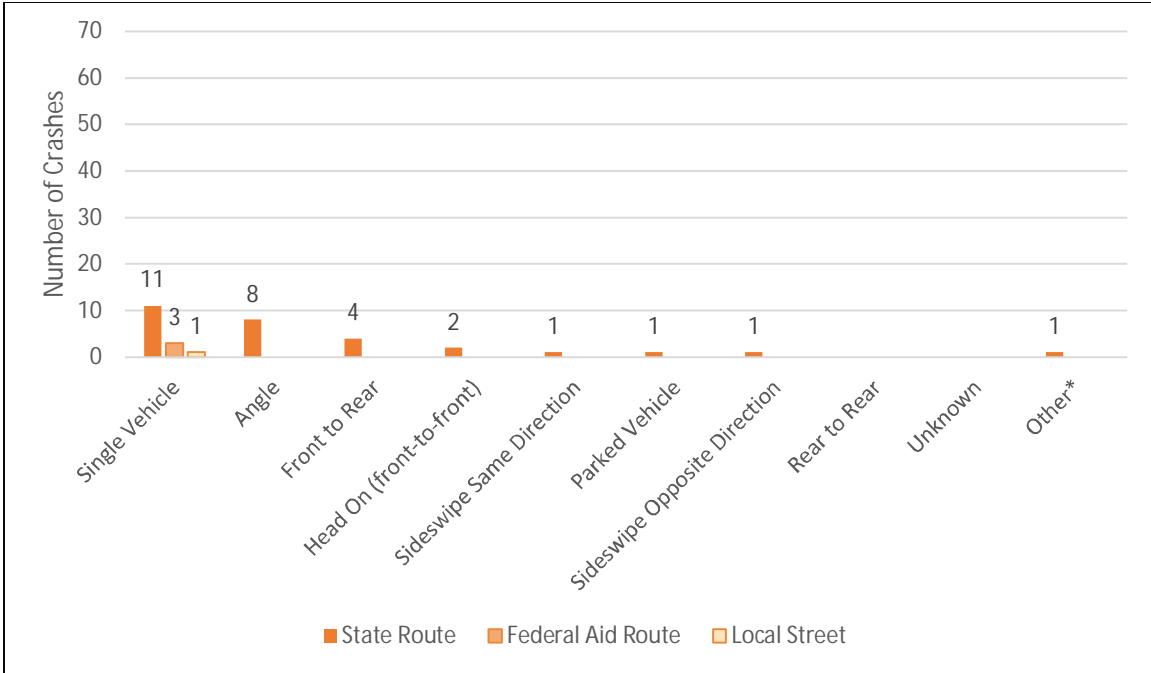


Figure 4.13 – Fatal Crashes by Manner of Collision and Roadway Ownership

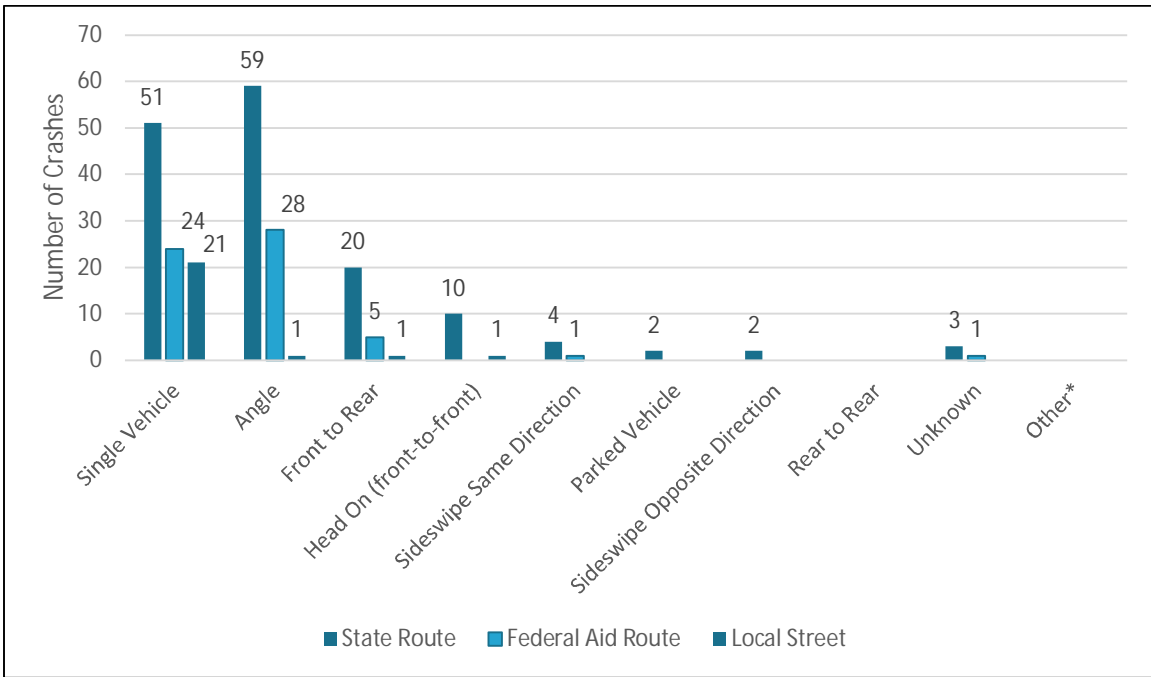


Figure 4.14 – Serious Injury Crashes by Manner of Collision and Roadway Ownership

4.7. Fatal and Serious Injury Intersection Crashes

Figure 4.15 through Figure 4.17 provide an overview of fatal and serious injury crashes by intersection and roadway ownership for the North Davis County GFA. The data shows the following:

- Not intersection involved fatal crashes are double the number intersection involved crashes.
- However, there the total number of fatal and serious injury crashes at intersections exceeds that of non-intersections.
- 20 of 22 fatal not intersection involved crashes occurred on State Routes.

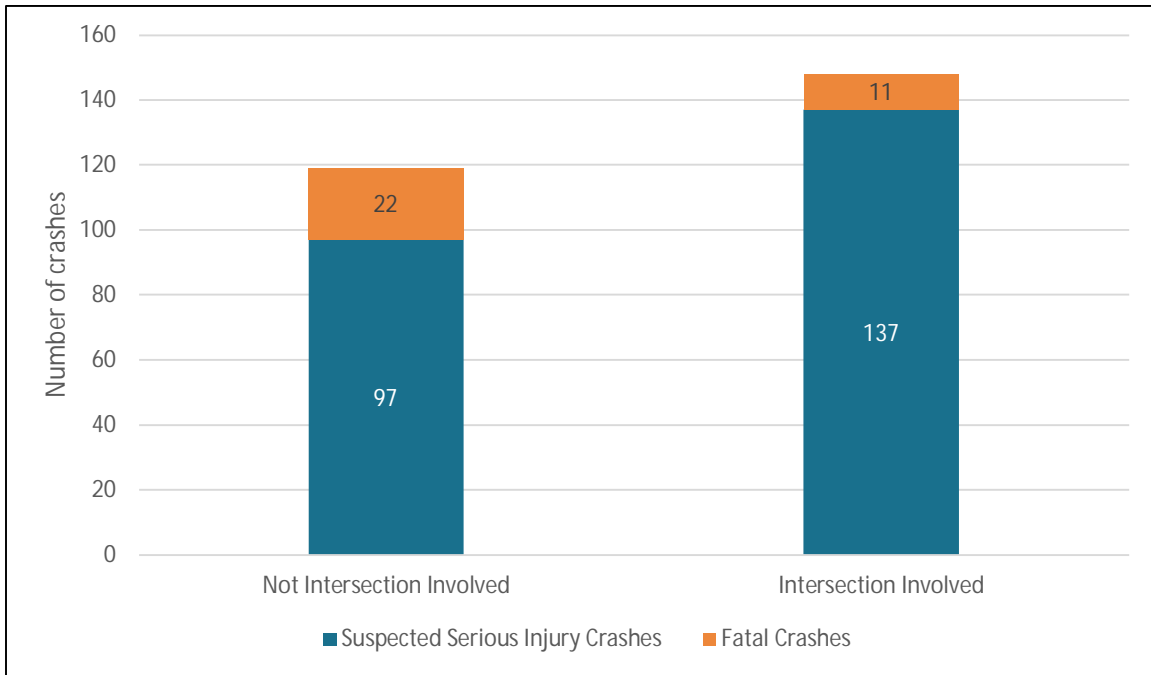


Figure 4.15 – Fatal and Serious Injury Crashes by Intersection

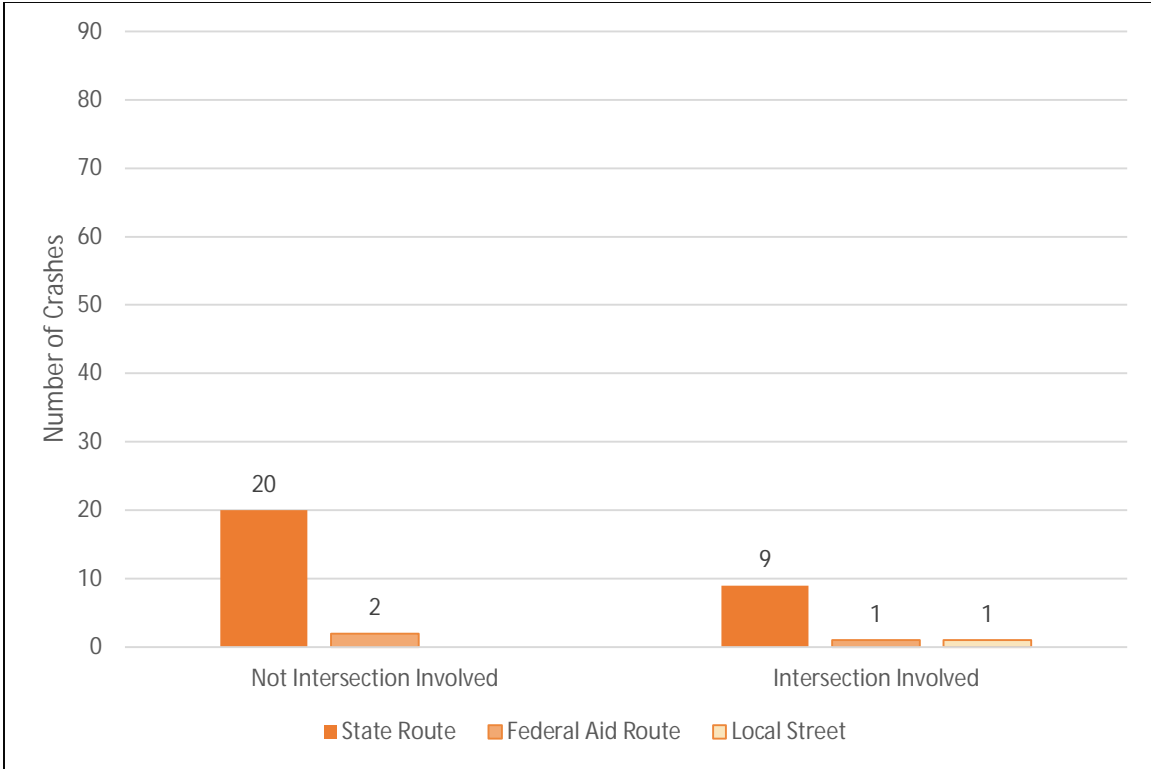


Figure 4.16 – Fatal Crashes by Intersection and Roadway Ownership

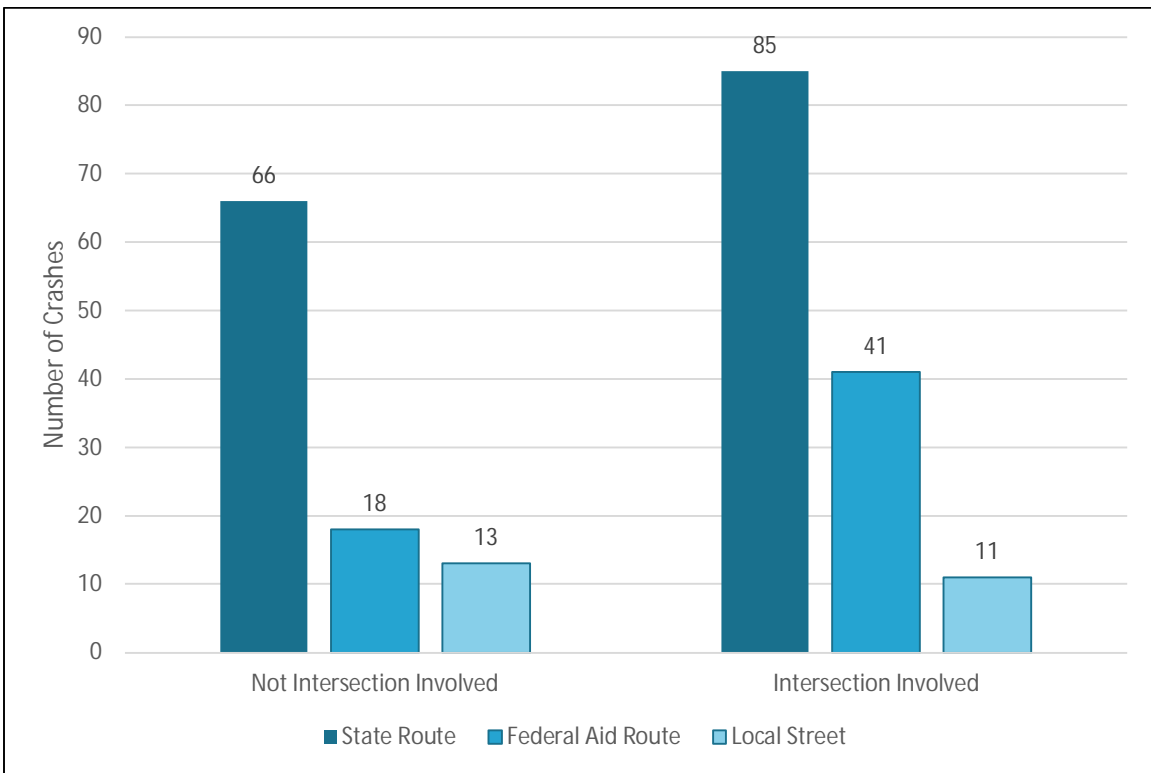


Figure 4.17 – Serious Injury Crashes by Intersection and Roadway Ownership



4.8. Fatal and Serious Injury Crashes by Functional Class

Figure 4.18 through Figure 4.20 provide an overview of fatal and serious injury crashes by functional class and roadway ownership for the North Davis County GFA. The data shows the following:

- Principal Arterial recorded the highest total number of fatal and serious injury crashes (23); all of the Principal Arterials are State Routes
- Three fatal crashes occurred on Interstate, and four on minor arterials

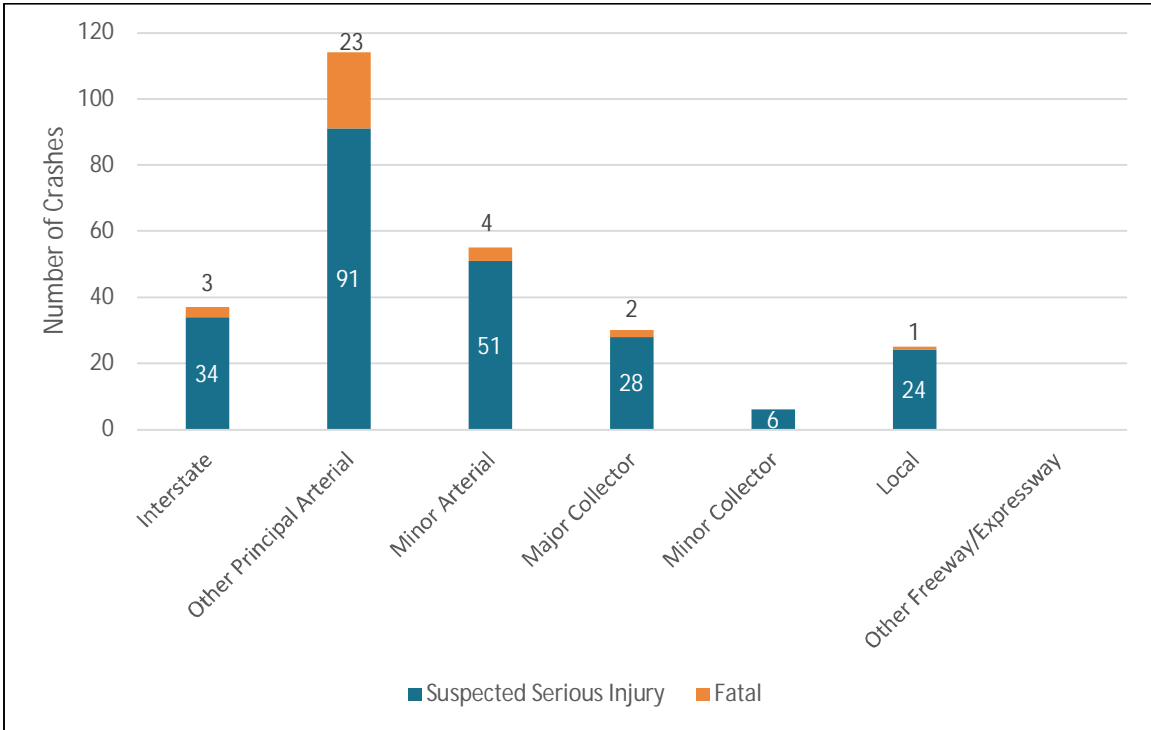


Figure 4.18 – Fatal and Serious Injury Crashes by Functional Class



Figure 4.19 – Fatal Injury Crashes by Functional Class and Roadway Ownership

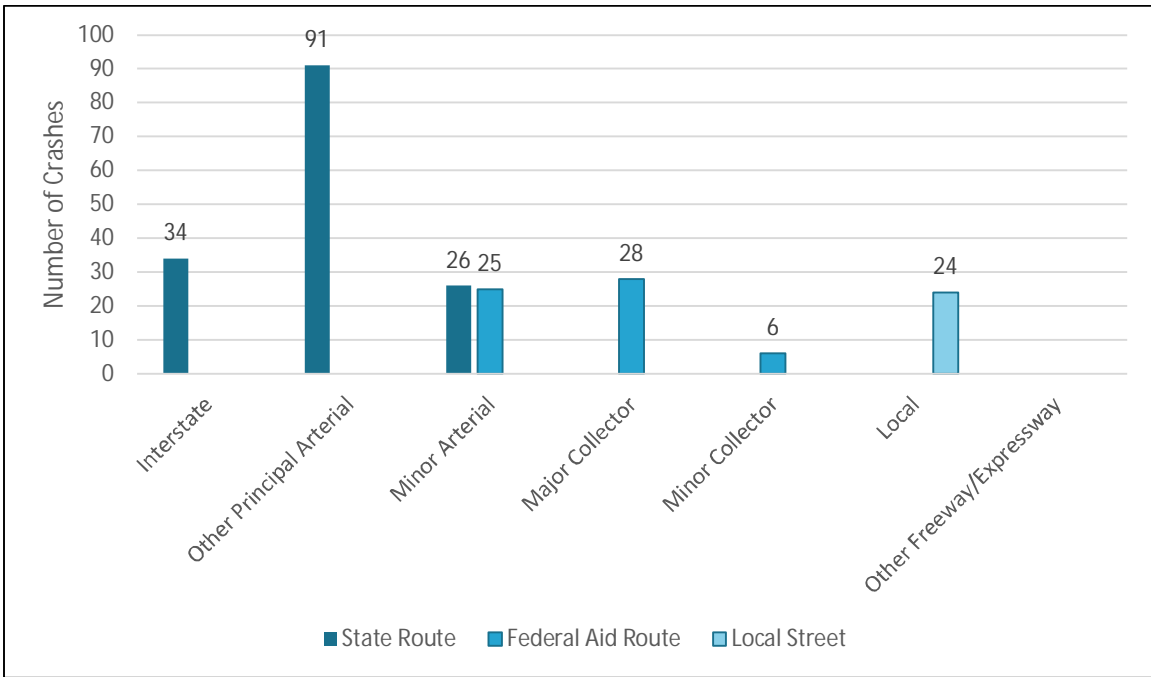


Figure 4.20 – Serious Injury Crashes by Functional Class and Roadway Ownership



4.9. Fatal and Serious Injury Crash Trees Diagrams

Fatal and serious injury crash tree diagrams were generated for the North Davis County GFA. These crash tree diagrams are presented in **Figure 4.23** through **Figure 4.22**.

The crash trees are limited to the top 3 categories for crash type and manner of collision. Each crash tree diagram displays the total fatal and serious injury crashes (T), fatal crashes (K), and serious injury crashes (A). The data shows the following:

- State Routes recorded the highest number of crashes
- Most crashes occurred in urban areas
- Higher number of non-intersection related crashes were recorded on all three roadway types (State Route, Federal Aid, Local)
- On Federal Aid routes in urban areas, prominent crash types are left-turn at intersection, red-light running, and active transportation



CRASH TYPE

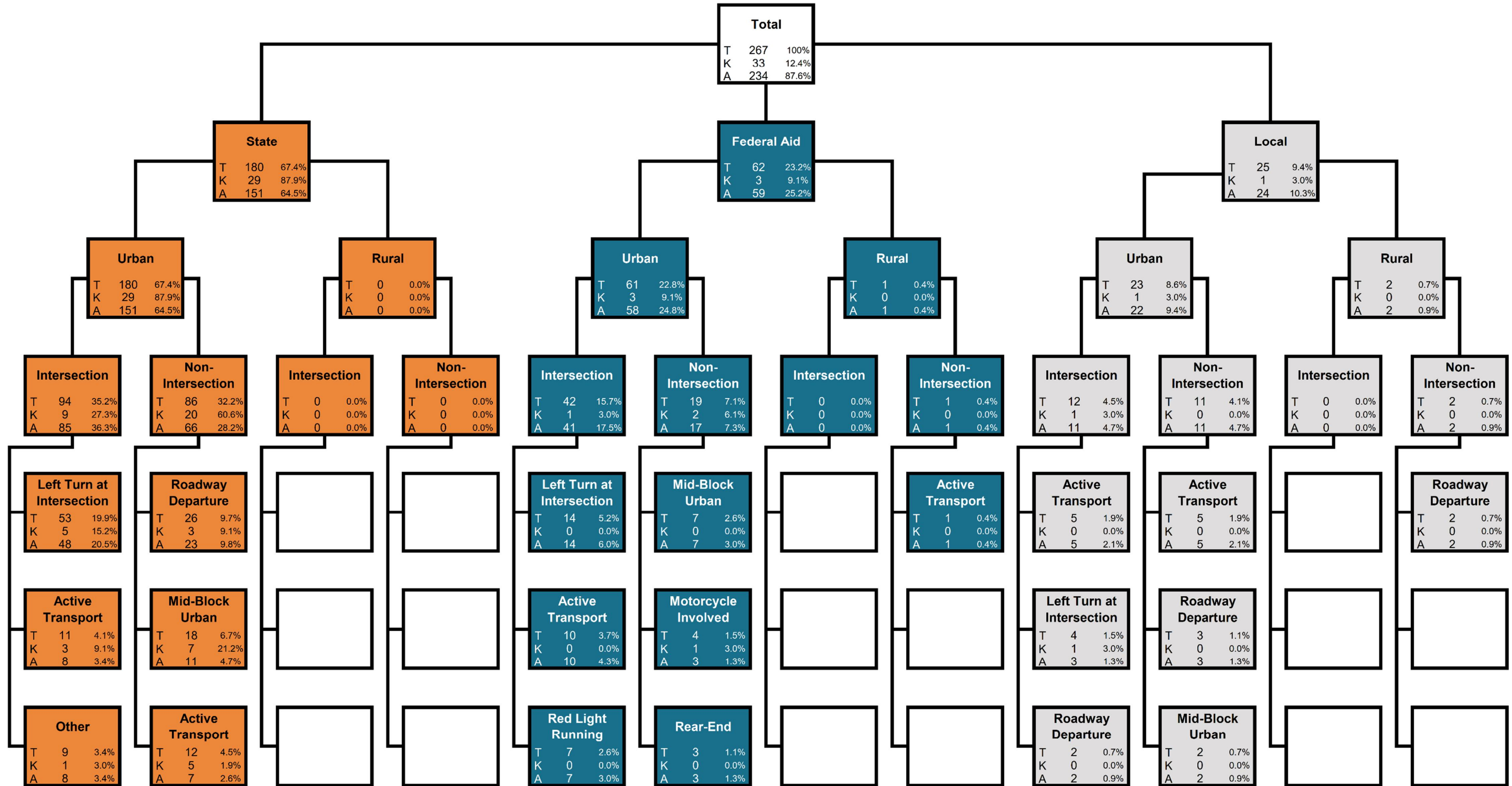


Figure 4.21 – Fatal and Serious Injury Crash Tree Diagram (Crash Type)

MANNER OF COLLISION

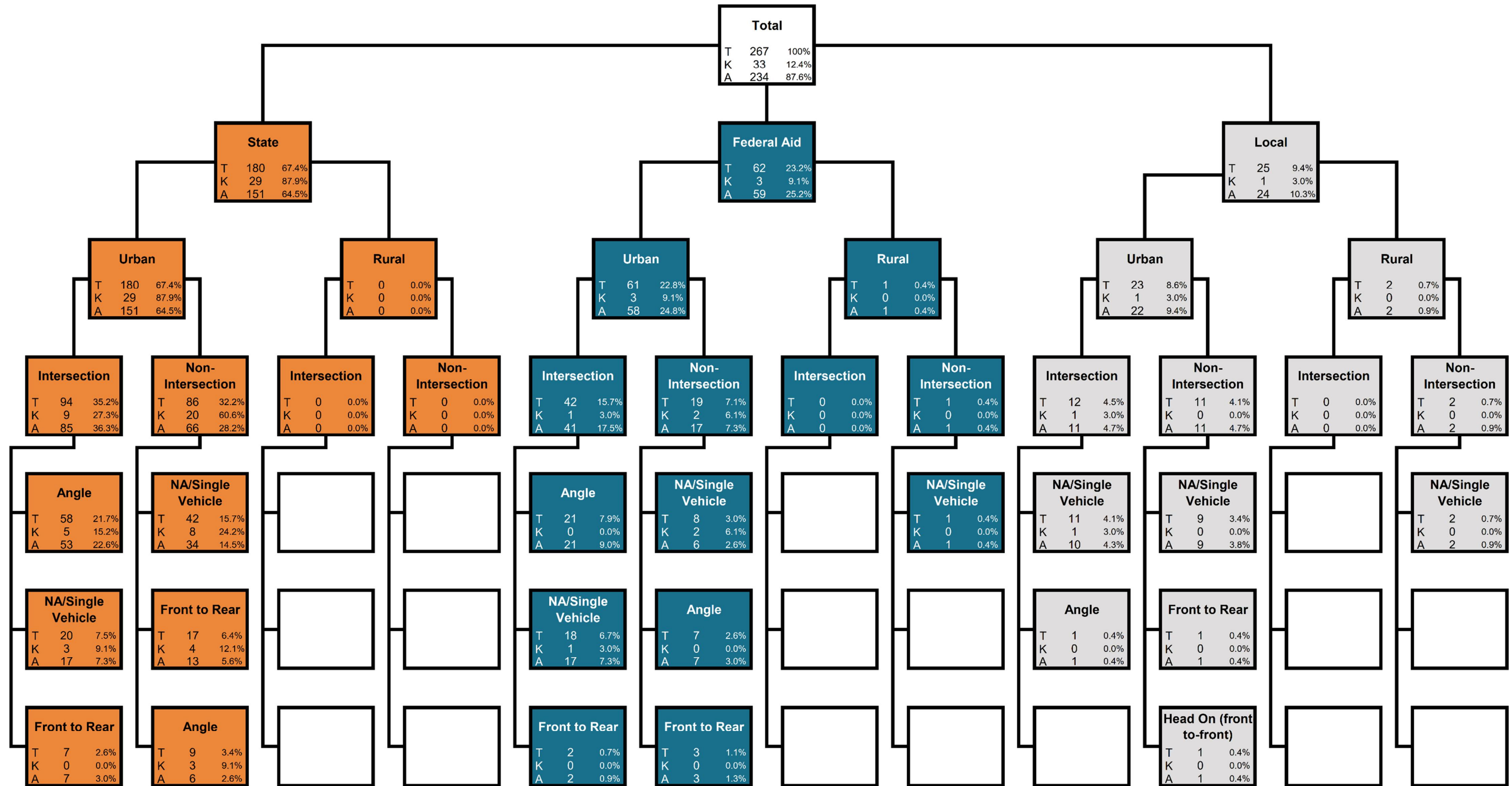


Figure 4.22 – Fatal and Serious Injury Crash Tree Diagram (Manner of Collision)

ACTIVE TRANSPORTATION

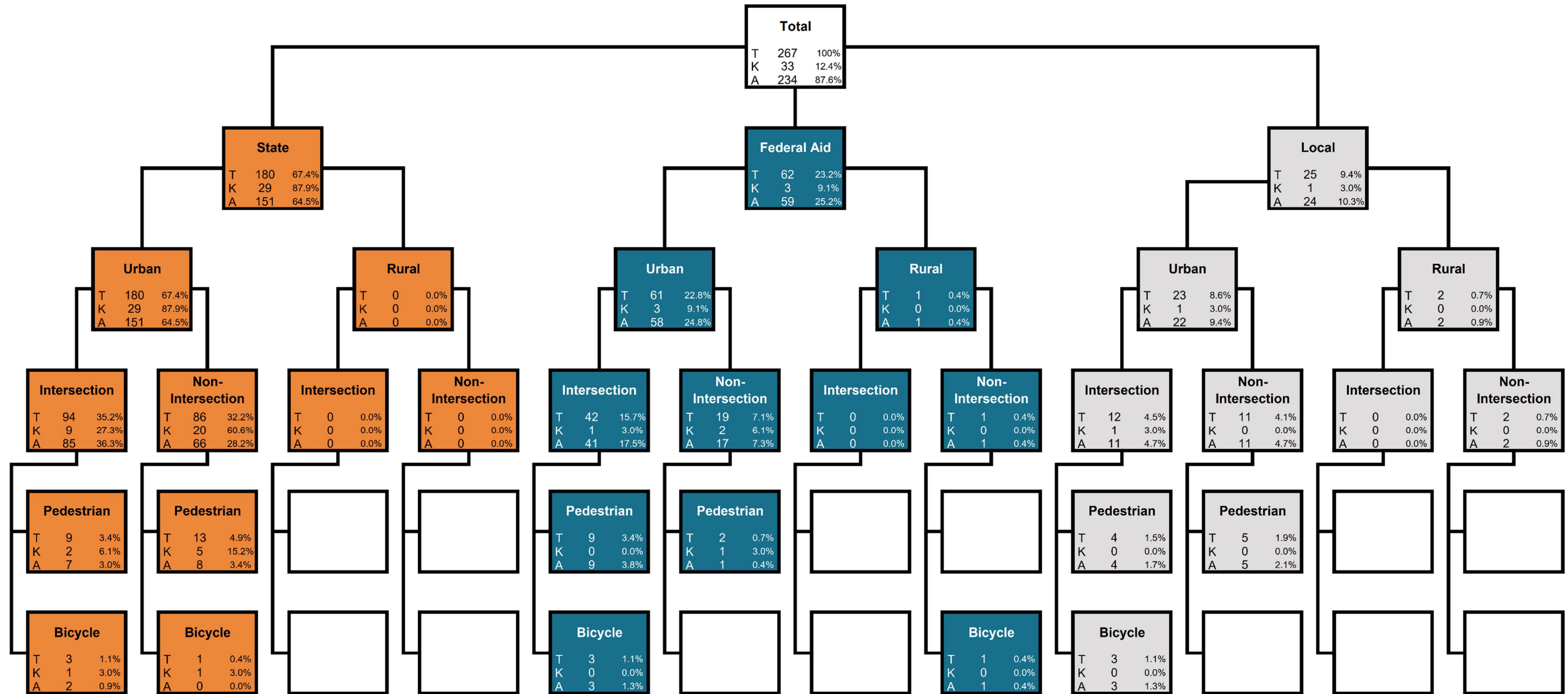


Figure 4.23 – Fatal and Serious Injury Crash Tree Diagram (Active Transportation)

5. Crash and Network Screening Analysis

A crash and network screening analysis was prepared for the North Davis County GFA informed by four sub-analyses:

- Number of Crashes
- Critical Crash Rate (CCR)
- Probability of a Specific Crash Type Exceeding Threshold Proportion
- Equivalent Property Damage Only (EPDO)

CCR Differential by roadway ownership are mapped in the following figures:

- **Figure 5.1** – CCR Differential – Segments (State Routes)
- **Figure 5.2** – CCR Differential – Segments (Federal Aid Routes)
- **Figure 5.3** – CCR Differential – Segments (Local Routes)

A positive Local CCR Differential is an indication of a location with a potential for safety improvement (PSI).

A list of the top 10 CCR Differential segments and intersections for the North Davis County GFA are located in **Table 5.1** and **Table 5.2** along with their associated number of crashes, probability of a specific crash type exceeding threshold proportion, and EPDO analysis results.

These locations represent those with the highest potential for safety improvements and can be considered as project candidate locations.



Figure 5.1 – CCR Differential – Segments (State Routes)



Figure 5.2 – CCR Differential – Segments (Federal Aid Routes)



Figure 5.3 – CCR Differential – Segments (Local Routes)

Table 5.1 – Crash and Network Screening Analysis Results - Segments

| Facility | Limits | Functional Classification | City | Crashes | Critical Crash Rate Differential | EPDO ¹ | Fatal | Suspected Serious Injury | Suspected Minor Injury | Possible Injury | No Injury/PDO | Angle | Front to Rear | Head On | Single Vehicle | Parked Vehicle | Rear to Rear | Rear to Side | Sideswipe (Same Direction) | Sideswipe (opposite Direction) | Other/Unknown | Pedestrian | Bicycle | Motorcycle |
|---------------------------|---------------------------------------|---------------------------|------------|---------|----------------------------------|-------------------|-------|--------------------------|------------------------|-----------------|---------------|-------|---------------|---------|----------------|----------------|--------------|--------------|----------------------------|--------------------------------|---------------|------------|---------|------------|
| State Routes | | | | | | | | | | | | | | | | | | | | | | | | |
| SR-193 | James V Hansen Hwy | Other Principal Arterial | Layton | 8 | 10.5 | 51 | 0 | 0 | 2 | 0 | 6 | 0 | 5 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oak Hills Dr (SR-109) | Hwy 89 to Eastside Dr | Minor Arterial | Layton | 6 | 6.8 | 16 | 0 | 0 | 0 | 1 | 5 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| Main St (SR-126) | North Villa Dr to 650 N | Other Principal Arterial | Clearfield | 42 | 4.8 | 493 | 0 | 1 | 11 | 12 | 18 | 16 | 16 | 0 | 3 | 1 | 0 | 0 | 0 | 6 | 0 | 1 | 0 | 3 |
| Hill Field Rd (SR-126) | Antelope Dr to Quail Cove Apartments | Minor Arterial | Layton | 23 | 3.9 | 44 | 0 | 0 | 0 | 2 | 21 | 13 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 |
| 2000 W (SR-208) | 1300 N to 1520 N | Other Principal Arterial | Clinton | 32 | 3.1 | 273 | 0 | 0 | 5 | 13 | 14 | 0 | 30 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 2000 W (SR-208) | 1630 N to 1800 N | Other Principal Arterial | Clinton | 25 | 2.9 | 140 | 0 | 0 | 1 | 9 | 15 | 12 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 2000 W (SR-208) | 1520 N to 1630 N | Other Principal Arterial | Clinton | 16 | 2.9 | 79 | 0 | 0 | 2 | 2 | 12 | 5 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Main St (SR-126) | Villa Dr to North Villa Dr | Other Principal Arterial | Clearfield | 13 | 2.7 | 1098 | 1 | 1 | 3 | 4 | 4 | 3 | 6 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |
| Hill Field Rd (SR-232) | 2675 N to 2875 N | Minor Arterial | Layton | 9 | 2.6 | 41 | 0 | 0 | 1 | 1 | 7 | 0 | 5 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Main St (SR-126) | King St to Hill Villa Dr | Other Principal Arterial | Layton | 22 | 2.4 | 222 | 0 | 0 | 5 | 9 | 8 | 12 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 6 | 1 | 0 | 0 | 2 |
| Federal Aid Routes | | | | | | | | | | | | | | | | | | | | | | | | |
| 1000 E | 1000 S to Hwy 193 | Major Collector | Clearfield | 22 | 50.7 | 106 | 0 | 0 | 2 | 4 | 16 | 5 | 9 | 0 | 2 | 1 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 1 |
| Antelope Dr | Hobbs Creek Dr to Hwy 89 | Minor Arterial | Layton | 7 | 43.4 | 17 | 0 | 0 | 0 | 1 | 6 | 0 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 1000 E | Antelope Dr to Hidden Cove Bach Apart | Major Collector | Clearfield | 4 | 28.4 | 14 | 0 | 0 | 0 | 1 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 |
| 1000 E | 1225 S to 1150 S | Major Collector | Clearfield | 4 | 25.4 | 25 | 0 | 0 | 0 | 2 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 1300 N | 2000 W to 2090 W | Minor Collector | Clinton | 6 | 23.8 | 6 | 0 | 0 | 0 | 0 | 6 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1000 E | 15254 S to 1450 S | Major Collector | Clearfield | 4 | 23.8 | 25 | 0 | 0 | 1 | 0 | 3 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 1000 E | Hidden Cove Bach Apartments to Oakst | Major Collector | Clearfield | 4 | 23.3 | 25 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 1000 E | Express Dr to State St | Major Collector | Clearfield | 4 | 22.1 | 14 | 0 | 0 | 0 | 1 | 3 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 2200 W | 2200 S to Access Road | Major Collector | Layton | 3 | 14.6 | 3 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 200 S | State St to Marilyn Dr | Minor Collector | Clearfield | 3 | 13.9 | 3 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Streets | | | | | | | | | | | | | | | | | | | | | | | | |
| H St | 13th St to 11th St | Local | Clearfield | 3 | 5803.9 | 3 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 900 W | Antelope Dr to 1600 S | Local | Clearfield | 3 | 2141.9 | 3 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 550 N | 1350 W to 1300 W | Local | Clearfield | 3 | 993.0 | 3 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 650 N | Main St to James St | Local | Clearfield | 5 | 280.8 | 47 | 0 | 0 | 1 | 2 | 2 | 3 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Oakstone Apartments | | Local | Clearfield | 4 | 90.5 | 25 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1500 E | 800 S to Hwy 193 | Local | Clearfield | 4 | 78.1 | 107 | 0 | 1 | 0 | 1 | 2 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| King St | Olsen Plz to Main St | Local | Layton | 3 | 76.9 | 13 | 0 | 0 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Olsen Plaza Dr | Kings St to Main St | Local | Layton | 5 | 73.0 | 98 | 0 | 1 | 0 | 0 | 4 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| King St | King Cir to Cook Dr | Local | Layton | 3 | 67.4 | 3 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 400 W | 1985 N to 450 W | Local | Sunset | 3 | 46.9 | 3 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

1. Equivalent Property Damage Only Crashes

| | |
|---|---|
| | = 90 - 100% probability that crash type is over-represented |
| | = 80 - 90% probability that crash type is over-represented |
| | = 70 - 80% probability that crash type is over-represented |

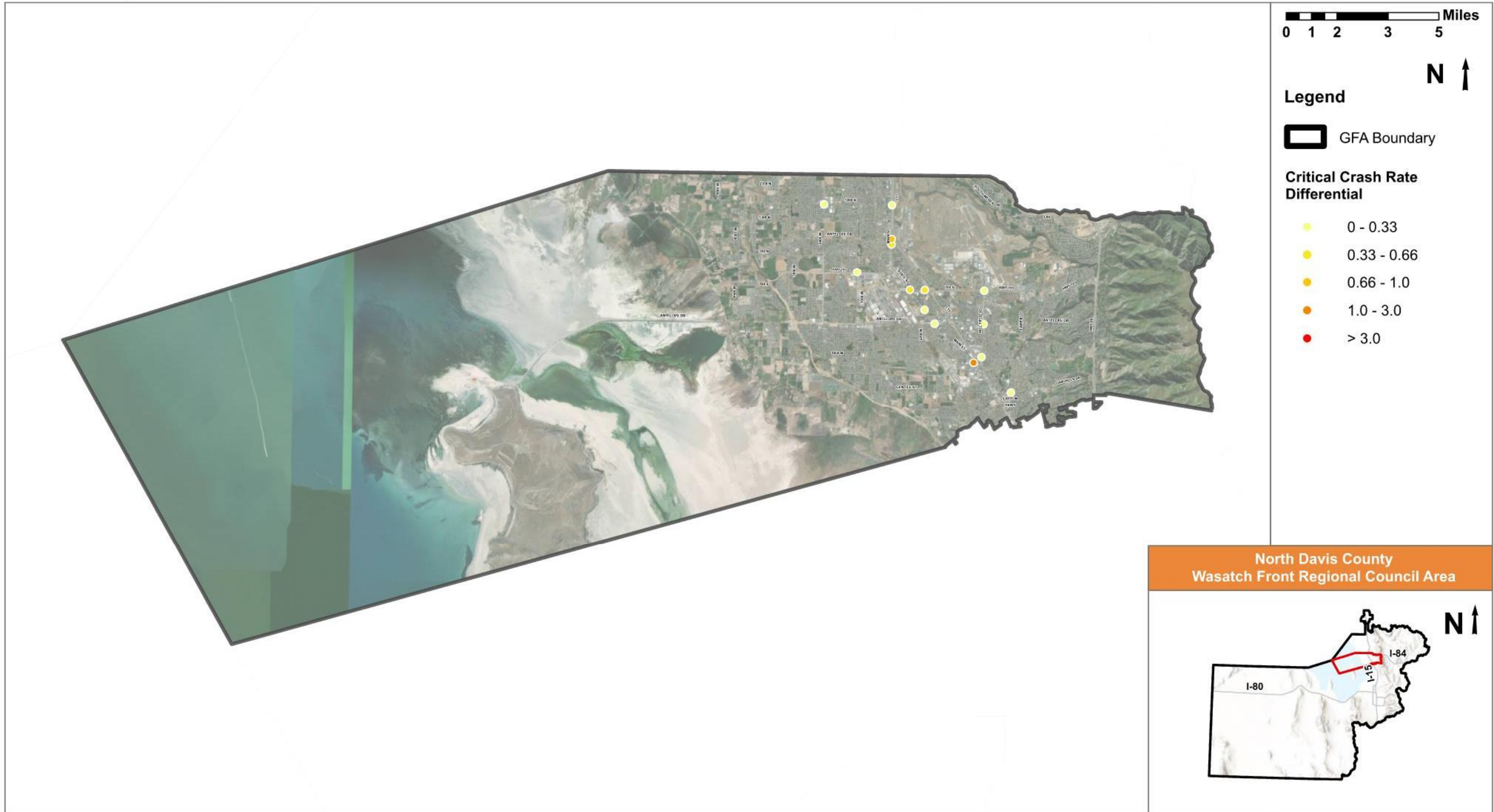


Figure 5.4 – CCR Differential – Intersections (Signalized)

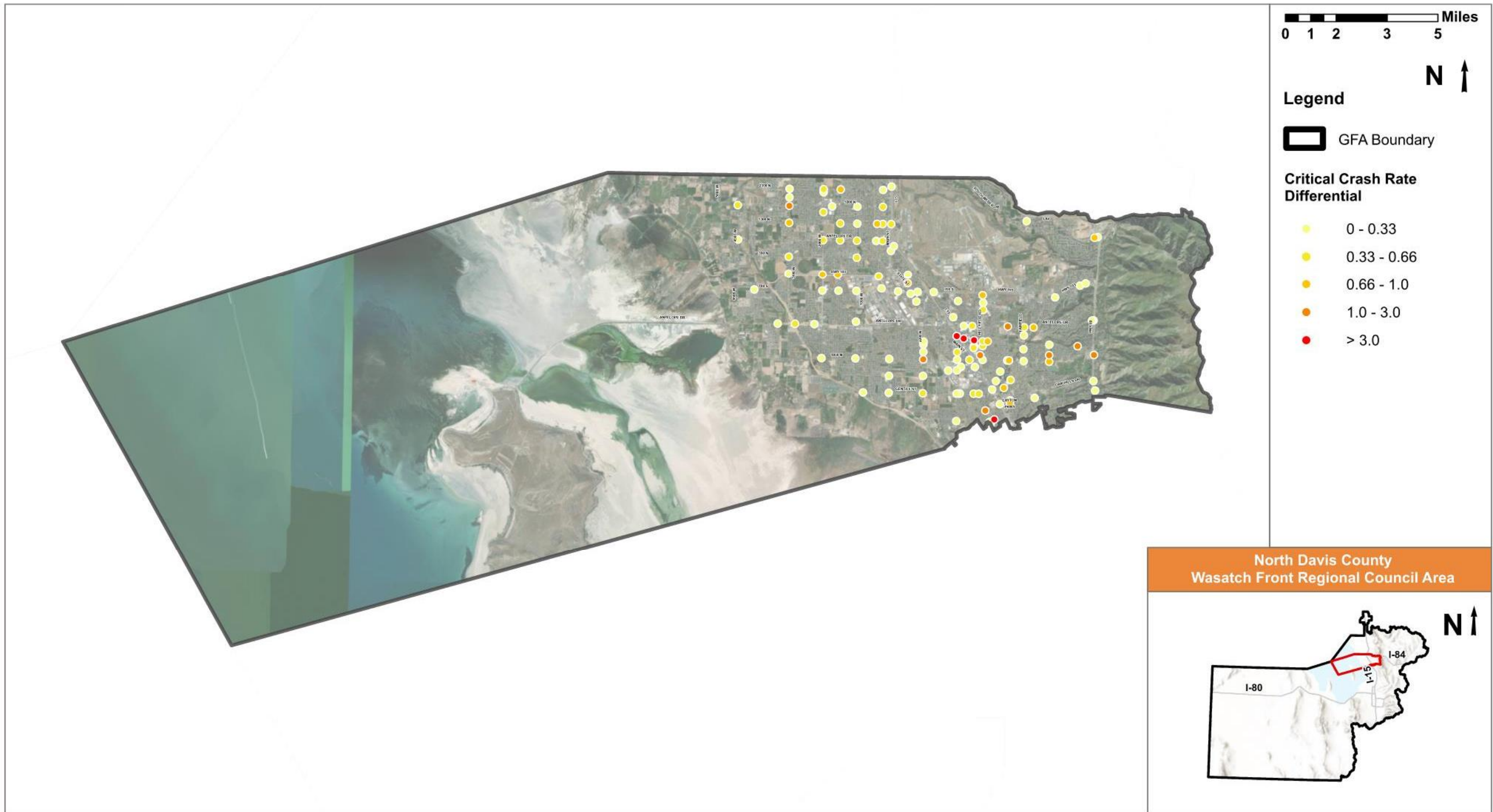





Figure 5.5 – CCR Differential – Intersections (Unsignalized)

Table 5.2 – Crash and Network Screening Analysis Results - Intersections

| Intersection | FID | City | Crashes | Critical Crash Rate Differential | EPDO ¹ | Fatal | Suspected Serious Injury | Suspected Minor Injury | Possible Injury | No Injury/PDO | Angle | Front to Rear | Head On | Parked Vehicle | Single Vehicle | Rear to Rear | Rear to Side | Sideswipe (Same Direction) | Sideswipe (opposite Direction) | Other/Unknown | Pedestrian | Bicycle | Motorcycle |
|--|-------|------------|---------|----------------------------------|-------------------|-------|--------------------------|------------------------|-----------------|---------------|-------|---------------|---------|----------------|----------------|--------------|--------------|----------------------------|--------------------------------|---------------|------------|---------|------------|
| Signalized Intersections | | | | | | | | | | | | | | | | | | | | | | | |
| Woodland Park Dr & Heritage Park Blvd | 39940 | Layton | 11 | 8.8 | 11 | 0 | 0 | 0 | 0 | 11 | 10 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Main St & 800 N | 42215 | Clearfield | 120 | 0.9 | 732 | 0 | 0 | 20 | 18 | 82 | 39 | 67 | 5 | 3 | 0 | 0 | 0 | 1 | 5 | 0 | 1 | 0 | 1 |
| 1000 E & 700 S | 41106 | Clearfield | 75 | 0.6 | 560 | 0 | 0 | 15 | 16 | 44 | 34 | 27 | 2 | 10 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 3 | 0 |
| State St & State St | 41313 | Clearfield | 110 | 0.5 | 875 | 0 | 1 | 17 | 30 | 62 | 43 | 45 | 5 | 7 | 1 | 0 | 0 | 1 | 6 | 2 | 6 | 0 | 1 |
| Main St & 650 N | 42120 | Clearfield | 107 | 0.4 | 692 | 0 | 2 | 11 | 16 | 78 | 42 | 39 | 1 | 4 | 0 | 0 | 0 | 1 | 20 | 0 | 2 | 1 | 0 |
| Fort Ln & Gentile St | 38701 | Layton | 64 | 0.2 | 429 | 0 | 1 | 6 | 14 | 43 | 30 | 15 | 2 | 12 | 1 | 0 | 0 | 1 | 2 | 1 | 2 | 1 | 2 |
| 1000 W & HWY 193 | 40412 | Layton | 154 | 0.2 | 2245 | 1 | 3 | 25 | 38 | 87 | 89 | 42 | 3 | 7 | 0 | 0 | 0 | 2 | 6 | 5 | 2 | 3 | 3 |
| 1000 W & 200 S | 41615 | Clearfield | 34 | 0.2 | 425 | 0 | 0 | 14 | 9 | 11 | 16 | 12 | 2 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Main St & 1800 N | 42960 | Sunset | 77 | 0.2 | 1604 | 1 | 2 | 16 | 11 | 47 | 45 | 23 | 2 | 5 | 0 | 0 | 0 | 1 | 1 | 0 | 3 | 1 | 2 |
| Hill Field Rd & Antelope Dr | 40453 | Layton | 97 | 0.1 | 632 | 0 | 1 | 12 | 18 | 66 | 48 | 30 | 4 | 3 | 2 | 0 | 0 | 0 | 8 | 2 | 1 | 0 | 1 |
| Unsignalized Intersections | | | | | | | | | | | | | | | | | | | | | | | |
| King St & Olsen Plaza Dr | 39108 | Layton | 6 | 23.6 | 16 | 0 | 0 | 0 | 1 | 5 | 0 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Layton Hills Pkwy & Heritage Park Blvd | 39937 | Layton | 19 | 4.8 | 40 | 0 | 0 | 1 | 0 | 18 | 16 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Angel St & 1650 N | 40128 | Layton | 3 | 4.1 | 24 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 50 E & 50 E | 38303 | Layton | 3 | 3.3 | 24 | 0 | 0 | 1 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Us 89 Nb X402 Off Gordon Ave Ramp & 1200 N | 39556 | Layton | 4 | 2.2 | 25 | 0 | 0 | 1 | 0 | 3 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| South Ring Rd & Southeast Entrance | 39544 | Layton | 3 | 1.4 | 3 | 0 | 0 | 0 | 0 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Emerald Dr & Oakridge Dr | 39460 | Layton | 3 | 1.1 | 24 | 0 | 0 | 1 | 0 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Evergreen Ln & Cherry Ln | 39717 | Layton | 3 | 1.0 | 24 | 0 | 0 | 1 | 0 | 2 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3000 W & 1800 N | 42980 | Clinton | 28 | 1.0 | 300 | 0 | 1 | 5 | 7 | 15 | 21 | 4 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 500 E & 450 S | 41480 | Clearfield | 8 | 1.0 | 39 | 0 | 0 | 0 | 3 | 5 | 4 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

1. Equivalent Property Damage Only Crashes

| | |
|---|---|
|  | = 90 - 100% probability that crash type is over-represented |
|  | = 80 - 90% probability that crash type is over-represented |
|  | = 70 - 80% probability that crash type is over-represented |

6. Roadway Characteristic Risk Analysis

A roadway characteristic risk analysis was performed using the following three sub-analysis:

- Crash Profile Risk Assessment
- usRAP Risk Assessment
- Local Street Risk Assessment

6.1. Crash Profile Risk Assessment

This risk assessment sub-analysis identifies common roadway characteristics for fatal and serious injury crashes that occurred within the WFRC study area. Based on the scoring of the various roadway characteristic risks identified from analysis of crash reports, a risk score was assigned to all state and federal aid routes within the North Davis County GFA consistent with the methodology described in Tech Memo #1 Section 3.4. The results of the Crash Profile Risk Assessment are mapped in the following figures:

- **Figure 6.1** – Crash Profile Risk Assessment Results (State Routes)
- **Figure 6.2** – Crash Profile Risk Assessment Results (Federal Aid Routes)

Table 6.1 provides an overview of urban and rural segments with the highest risk scoring. Up to ten urban and rural segments are listed if the segment received at least 67% of the overall total risk score.

Table 6.1 – WFRC Risk Segments (Federal Aid Routes)

| Area Type | Road Segment | Extents | Risk Score |
|-----------|-----------------------------|--------------------------------------|--------------|
| Urban | 300 North | 2000 West to State Street | 21.8 to 24.5 |
| Urban | Main Street | 575 South to Park Circle | 24 |
| Urban | Hill Field Road | 3200 West to Main Street | 21.9 to 23.8 |
| Urban | 3000 West | 2700 South to 1700 South | 21 to 23.3 |
| Urban | 1000 West | Bluff Road to Bernard Fisher Highway | 21 to 22.8 |
| Urban | Antelope Drive | 1200 West to Alder Street | 22 to 22.4 |
| Urban | 3200 West / Main Street | Gentile Street to Antelope Drive | 21.2 to 22.1 |
| Urban | Bluff Road / Gentile Street | 2700 South to 575 West | 21 to 22 |
| Urban | 1300 North | 4500 West to 3455 West | 21 |
| Urban | 800 North | 3500 West to 2000 West | 21 |
| Rural | 2325 North / 2300 North | 5000 West to 2740 West | 21.5 to 23.5 |
| Rural | 800 North | 4500 West to 3000 West | 23.2 |
| Rural | 700 South | 4500 West to Killarney Drive | 21.5 |
| Rural | 475 East | SR-60 to I-84 | 21.1 |
| Rural | Bluff Road | Gentile Street to 3150 South | 21 |



Figure 6.1 – Crash Profile Risk Assessment Results (State Routes)



Figure 6.2 – Crash Profile Risk Assessment Results (Federal Aid Routes)

6.2. usRAP Risk Assessment

A roadway characteristic risk assessment was performed using roadway feature data collected for Utah state and federal aid routes. The risk assessment was performed using the usRAP tool. The output of the usRAP tool is a star rating or risk rating for vehicle, pedestrian, and bicyclist features. The results of the usRAP risk assessment by star rating are mapped in the following figures:

- **Figure 6.3** – Vehicle Star Rating (State Routes)
- **Figure 6.4** – Vehicle Star Rating (Federal Aid Routes)
- **Figure 6.5** – Pedestrian Star Rating (State Routes)
- **Figure 6.6** – Pedestrian Star Rating (Federal Aid Routes)
- **Figure 6.7** – Bicycle Star Rating (State Routes)
- **Figure 6.8** – Bicycle Star Rating (Federal Aid Routes)

A summary of the highest risk segments (1-2 Stars) for federal aid routes in the North Davis County GFA are located in **Table 6.2**.

Table 6.2 – usRAP Risk Segments (Federal Aid Route)

| Road Segment | Extents | Vehicle Risk | Pedestrian Risk | Bicycle Risk |
|-------------------------|-------------------------------|--------------|-----------------|--------------|
| 475 East | South Weber Drive to I-84 | X | X | X |
| 2300 North / 2425 North | 4500 West to Crainefield Road | X | X | X |
| 2300 North | 3600 West to 1700 West | X | X | |
| 2300 North | 1700 West to 75 West | X | | |
| 1300 North | 4500 West to 2350 West | X | X | X |
| 1300 North | 2350 West to Main Street | X | | |
| 1000 West | 1300 North to 1800 North | X | X | X |
| 1000 West | 800 North to 1075 North | X | X | X |
| 800 North | 4500 West to 3000 West | | X | X |
| 800 North | 3000 West to 2300 West | X | X | X |
| 800 North | 2300 West to 1000 West | | X | |
| 800 North | 1000 West to Main Street | X | X | X |
| 1000 West | 300 North to 800 North | X | | X |
| 1000 West | 200 South to 300 North | X | | X |
| 300 North | 3000 West to Cambridge Park | X | | X |
| 300 North | Cambridge Park to 825 West | X | | X |
| 300 North | 825 West to Main Street | X | | |
| Center Street | State Street to 450 East | X | | |
| 500 East | State Street to Maple Street | X | | |
| Main Street | 575 South to Parck Circle | X | X | |
| 200 South | 150 West to Main Street | X | X | |



| Road Segment | Extents | Vehicle Risk | Pedestrian Risk | Bicycle Risk |
|-----------------|-------------------------------------|--------------|-----------------|--------------|
| 3000 West | 1700 South to 700 South | | X | |
| 1000 West | 1700 South to 200 South | X | X | X |
| 1000 East | Antelope Drive to 700 South | X | | |
| 700 South | 4500 West to Killarney Drive | | X | X |
| Fairfield Road | 320 South SR-193 | X | X | X |
| Bluff Road | 3000 West to 2000 West | X | X | |
| Bluff Road | 2000 West to Gentile Street | | X | |
| 3000 West | 2700 South to 1700 South | | X | |
| 2000 West | 2700 South to 1700 South | X | X | X |
| 1000 West | 2700 South to 1700 South | X | X | X |
| Main Street | 1000 North to Antelope Drive | X | X | X |
| 2200 West | 1000 North to Antelope Drive | X | | |
| Antelope Drive | I-15 to Alder Street | | X | |
| 2700 South | 3000 West to 2000 West | | X | X |
| 2700 South | 2000 West to 1000 West | | X | X |
| 2700 South | 1000 West to 3700 West | | | X |
| Cherry Lane | Fairfield Road to 2800 East | X | | |
| 400 West | Francis Street to Barbara Street | X | | |
| Golden Avenue | 400 West to Gordon Street | X | | |
| 1000 North | Hill Field Road to Emerald Drive | | X | |
| 1000 West | Bluff Road to 1000 North | X | X | X |
| 3200 West | Gentile Street to 1000 North | | X | X |
| Hill Field Road | 3200 West to 2200 West | X | X | X |
| Hill Field Road | 2200 West to Main Street | | X | X |
| Gentile Street | Bluff Road to Main Street | X | X | X |
| Angel Street | South GFA Extents to Gentile Street | X | X | X |
| Flint Street | South GFA Extents to Gentile Street | X | X | X |
| 475 East | South Weber Drive to I-84 | X | X | X |



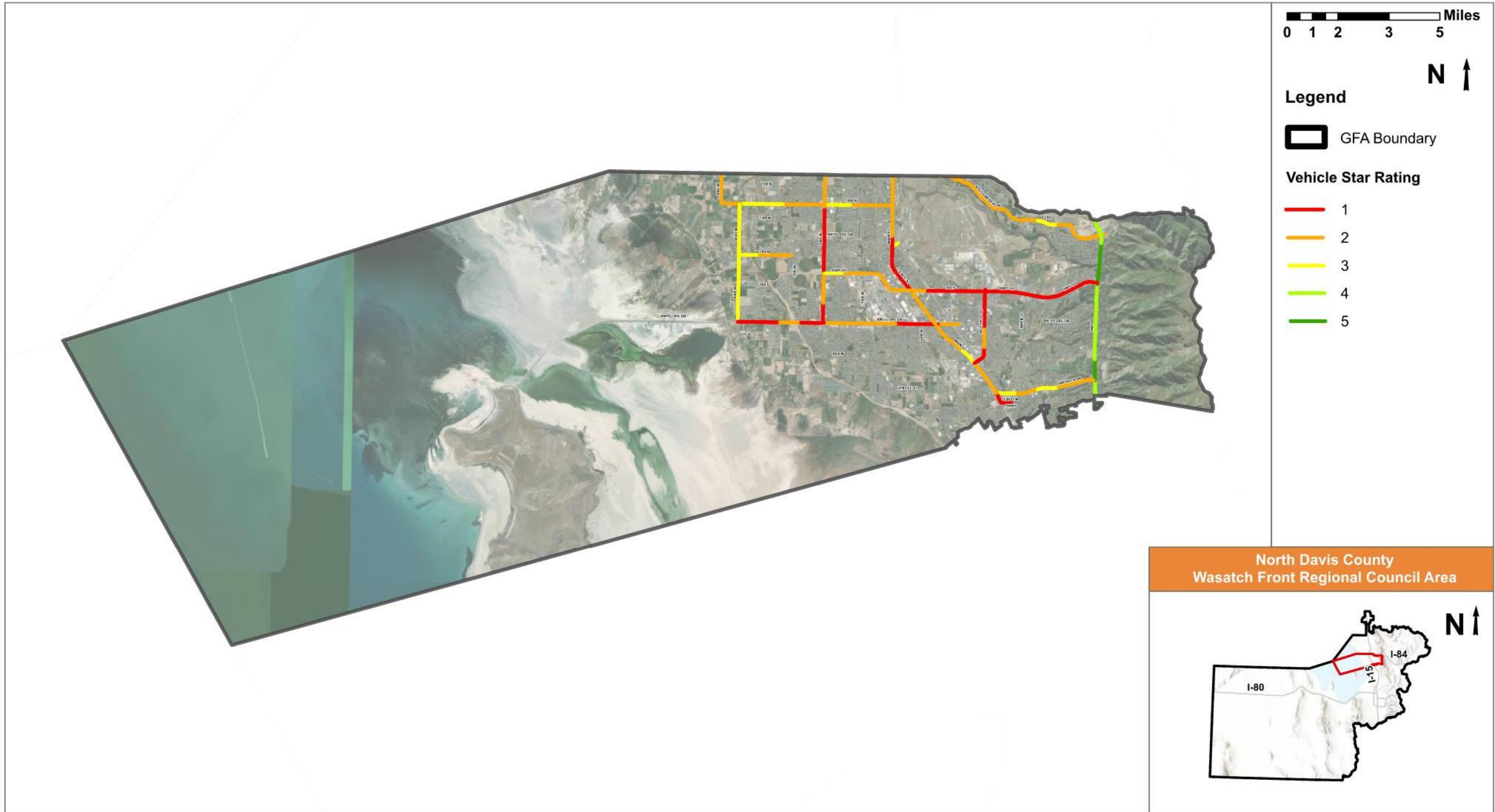


Figure 6.3 – Vehicle Star Rating (State Routes)



Figure 6.4 – Vehicle Star Rating (Federal Aid Routes)



Figure 6.5 – Pedestrian Star Rating (State Routes)

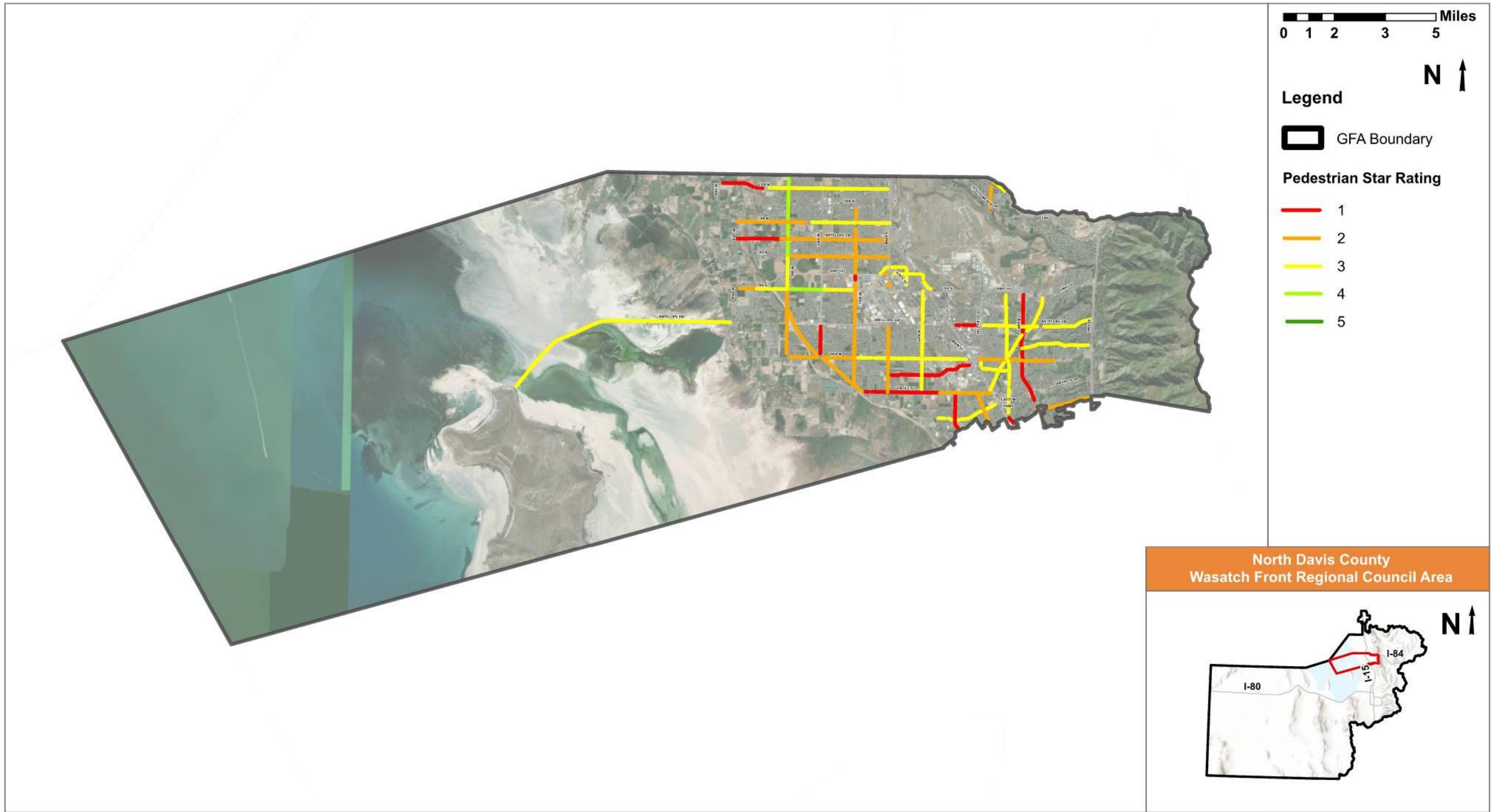


Figure 6.6 – Pedestrian Star Rating (Federal Aid Routes)



Figure 6.7 – Bicycle Star Rating (State Routes)

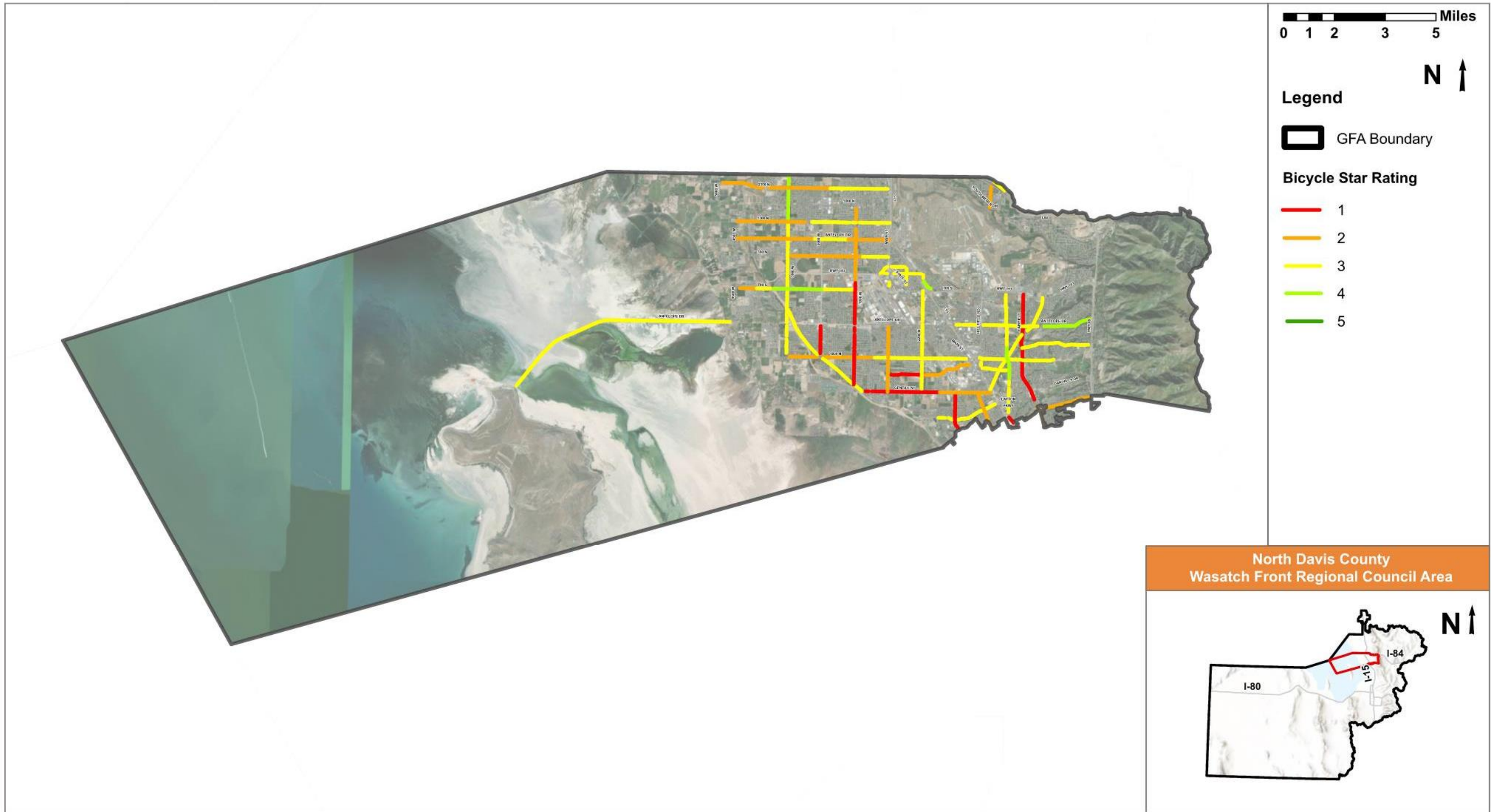


Figure 6.8 – Bicycle Star Rating (Federal Aid Routes)

6.3. Local Street Risk Assessment

A local street risk assessment was performed for all local roads within WFRC that are not included in the usRAP network. The results of the local street risk assessment are summarized in **Table 6.3** and **Figure 6.9**. Mapped segments include the top 5% risk segments within the WFRC study area and the top 10 segments or high priority segments within the North Davis County GFA.

Table 6.3 – Local Street High Priority Segments

| Road Segment | Extents |
|-----------------|-----------------------------|
| Hill Field Road | 2500 West – SR-126 |
| 1000 East | 450 South – 2200 South |
| 1000 East | 2200 South – Gentile Street |
| 1200 West | I-15 – 1000 North |
| Wasatch Drive | SR-109 – 850 East |
| 300 North | SR-126 – I-15 |
| Main Street | 7th Street – Gentile Street |
| 700 South | 2300 West – 1400 West |
| Center Street | SR-193 – 400 East |
| 1700 West | 1500 South – 1960 North |



Figure 6.9 – Local Street Risk Assessment Results

7. Safety Analysis Summary

This section summarizes the safety analysis performed for the North Davis County GFA by identifying common risk characteristics and a composite high-risk roadway network.

7.1. Common Risk Characteristics

Based on the SHSP Emphasis Area Analysis and the Historical Crash Analysis summarized above, the following are common risk characteristics that should be considered when developing safety improvement projects specific to the North Davis County GFA:

- Intersections
 - 55.6% of all fatal and serious injuries
- Motorcycle
 - 21.19% of all fatal and serious injuries
 - 9.4% of all fatal and serious injury crashes
- Teen Driver
 - 20.1% of all fatal and serious injuries
- Speed-Related
 - 20.1% of all fatal and serious injury crashes
- Roadway Departure
 - 18.5% of all fatal and serious injuries
 - 15.7 % of all fatal and serious injury crashes
- Active Transportation
 - 17.2% of all fatal and serious injury crashes
- Left Turn at Intersection
 - 26.6% of all fatal and serious injury crashes

7.2. Composite High-Risk Roadway Network

Each of the safety analysis methodologies completed identified segments that can be improved to reduce fatalities and serious injuries.

To identify an overall high-risk roadway network and provide focused information for jurisdictional decisions regarding prioritization of safety improvements, an analysis was performed to identify overlapping segments from each of the analysis methodologies. A composite score, from zero to five, was determined using the approach in **Table 7.1**. The high-risk roadway network is a composite of the various risks as presented in **Section 4** through **Section 6** of Tech Memo #1. The top 10% of roadway segments for the entire WFRC area are included in the Composite High-Risk Network. These segments have a composite risk value of four or higher.

The North Davis County GFA Composite High-Risk Network for Federal Aid routes is summarized in **Table 7.2**.

The results are also mapped in **Figure 7.1** (State Routes) and **Figure 7.2** (Federal Aid Routes).

7. Safety Analysis Summary

This section summarizes the safety analysis performed for the North Davis County GFA by identifying common risk characteristics and a composite high-risk roadway network.

7.1. Common Risk Characteristics

Based on the SHSP Emphasis Area Analysis and the Historical Crash Analysis summarized above, the following are common risk characteristics that should be considered when developing safety improvement projects specific to the North Davis County GFA:

- Intersections
 - 50.2% of all fatal and serious injuries
- Left Turn at Intersection
 - 39.4% of all fatal and serious injury crashes
- Roadway Departure
 - 27.6% of all fatal and serious injuries
 - 23.3 % of all fatal and serious injury crashes
- Teen Driver
 - 23.2% of all fatal and serious injuries
- Active Transportation
 - 25.6% of all fatal and serious injury crashes
- Distracted Driving
 - 22.9% of all fatal and serious injuries
- Impaired Driving
 - 21.9% of all fatal and serious injuries

7.2. Composite High-Risk Roadway Network

Each of the safety analysis methodologies completed identified segments that can be improved to reduce fatalities and serious injuries.

To identify an overall high-risk roadway network and provide focused information for jurisdictional decisions regarding prioritization of safety improvements, an analysis was performed to identify overlapping segments from each of the analysis methodologies. A composite score, from zero to five, was determined using the approach in **Table 7.1**. The high-risk roadway network is a composite of the various risks as presented in **Section 4** through **Section 6** of Tech Memo #1. The top 10% of roadway segments for the entire WFRC area are included in the Composite High-Risk Network. These segments have a composite risk value of four or higher.

The North Davis County GFA Composite High-Risk Network for State Routes and Federal Aid Routes is summarized in **Table 7.2**.

The results are also mapped in **Figure 7.1** (State Routes) and **Figure 7.2** (Federal Aid Routes).

A summary of findings was presented to the GFA groups and is provided in **Attachment A**. Refer to **Attachment A** for additional information on high-risk roadways not included in the composite network and an overview of the safety analysis methodology.

Table 7.1 – Composite High-Risk Roadway

| Analysis | Risk Type | Approach | Value |
|--|-----------------------|------------------------------------|----------|
| Historical Crash Analysis | Historical Crash Risk | 5-Year Crash Totals ≥ 3 Crashes | 1 |
| Crash and Network Screening Analysis | Systemic Crash Risk | Positive Local CCR Differential | 1 |
| WFRC Risk Assessment | Roadway Risk | Risk Score ≥ 20 | 1 |
| usRAP Risk Assessment | Vehicle Risk | Vehicle Star Rating = 1-2 Stars | 1 |
| usRAP Risk Assessment | Pedestrian Risk | Pedestrian Star Rating = 1-2 Stars | 0.5 |
| usRAP Risk Assessment | Bicycle Risk | Bicycle Star Rating = 1-2 Stars | 0.5 |
| Total Possible Composite Risk Score | | | 5 |

The greater the overlap the higher the likelihood that the segment has risk factors that should be addressed to reduce and/or eliminate fatal and serious injury crashes at that location. The top 10% of roadway segments for the entire WFRC area are considered high-risk segments. These segments have a composite risk value of four or higher. A summary of the composite high-risk roadway network for federal aid routes is summarized in **Table 7.2**. The results are also mapped in **Figure 7.1** and **Figure 7.2**.

Table 7.2 – North Davis County High-Risk Roadway Network (State Routes and Federal Aid Routes)

| Facility | Limits | Functional Classification | City | Length (miles) | RISK TYPE | | | | | | |
|-----------------------------------|---------------------------------|---------------------------|----------------------------|----------------|--------------------------------|-----------------------------|-----------------------------|--------------------------|---------------------------|---------------------|------------------------------|
| | | | | | usRAP - Pedestrian Star Rating | usRAP - Bicycle Star Rating | usRAP - Vehicle Star Rating | Crash Profile Risk Score | CCR Differential Analysis | Significant Crashes | Local Street Risk Assessment |
| State Route | | | | | | | | | | | |
| 200 West (SR-108) | 6000 South to 1700 South | Other Principal Arterial | Clinton, Roy, Syracuse, W | 4.5 | X | X | X | X | X | X | |
| State Street/ Main Street (SR-12) | 600 South to Layton Pkwy | Other Principal Arterial | Clearfield, Layton, Roy, S | 8.0 | X | X | X | X | X | X | |
| Hill Field Road (SR-232) | Bernard Fisher Hwy to 1000 N | Minor Arterial | Layton | 2.0 | X | X | X | X | | X | |
| 1800 North (SR-37) | 225 West to Main Street | Minor Arterial | Clinton, Sunset | 2.2 | X | X | X | X | X | X | |
| Bernard Fisher Hwy (SR-193) | 1000 West to Highway 39 | Other Principal Arterial | Layton, Clearfield | 8.0 | X | X | X | X | | X | |
| Antelope Drive (SR-108) | 3400 West to I-15 | Other Principal Arterial | Clearfield, Syracuse | 5.5 | X | X | X | X | | X | |
| Gentile Street/ Oaks Hills Drive | Fort Lane to James V Hansen Hwy | Other Principal Arterial | Clearfield | 3.5 | X | X | X | X | | X | |
| Federal Aid Routes | | | | | | | | | | | |
| 800 N | 50 W to Main St | Major Collector | Clearfield | 0.1 | X | X | X | | X | X | |
| 1000 W | 300 N to Antelope Dr | Major Collector | Clearfield | 2.0 | X | X | X | X | | X | |
| 2000 W | 1700 S to 1900 S | Major Collector | Syracuse | 0.2 | X | X | X | X | X | X | |
| Main St | 1800 S to 1900 S | Major Collector | Clearfield | 0.1 | X | X | X | X | | X | |
| Hill Field Rd | 825 N to Main St | Minor Arterial | Layton | 0.5 | X | X | | X | X | X | |
| Gentile St | 3200 W to 575 W | Major Collector | Layton | 2.5 | X | X | X | | X | X | |
| Fairfield Rd | Gentile St to Rosewood Ln | Minor Arterial | Layton | 0.2 | X | X | X | | X | X | |
| Main St | Rosewood Way to Clearway Dr | Minor Arterial | Layton | 0.1 | X | X | X | | X | X | |



Figure 7.1 – North Davis County High-Risk Roadway Network (State Routes)



Figure 7.2 – North Davis County High-Risk Roadway Network (Federal Aid Routes)



**NORTH DAVIS COUNTY CASE STUDY
PROJECT INFORMATION SHEETS**

Project Description/How is safety improved?

This project addresses speed management to address front to rear crashes, intersection improvements to reduce left turn crashes, and access management to address sideswipe and head on crashes. Improvements include raised medians along the entire length of the corridor. An Intersection Control Evaluation (ICE) is recommended at locations with high frequency of crashes and at existing High-T configurations (1700 E., 2400 E., Fort Ln., Haven J Barlow Pkwy, 1500 E., Frontage Rd., & H St.). Minor street access should be evaluated to determine locations where access can be managed including consolidation or elimination. Protected intersection are proposed to reduce pedestrian crashes at Fort Ln. and Frontage Rd. Signal upgrades are proposed at Fairfield Rd. Church St. & H St.

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Corridor Access Management



Reduced Left-Turn Conflict Intersections

Opinion of Probable Construction Cost

Segment Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|--|------|--------------------|----------|------|------------|--------------|
| Install Raised Medians on Roadways with Existing TWLTL | 0.29 | All Crashes | 7.24 | MILE | \$ 928,000 | \$ 6,718,720 |
| Install Driver Feedback Speed Limit Signs | NA | All Crashes | 4.00 | EACH | \$ 10,000 | \$ 40,000 |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |

Intersection Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|--|-------------|--------------------|----------|------|------------|--------------|
| Perform an Intersection Control Evaluation and Implement | NA | All Crashes | 7.00 | INT | \$ 225,000 | \$ 1,575,000 |
| Change a 5-section "Doghouse" to Flashing Yellow Arrow | 0.75 - 0.93 | Left-Turn | 1.00 | INT | \$ 8,000 | \$ 8,000 |
| Change Permissive Left-Turn to Protected or Protected/Permissive | 0.79 - 0.95 | Left-Turn | 2.00 | INT | \$ 8,000 | \$ 16,000 |
| Protected Intersection | NA | All Crashes | 2.00 | INT | \$ 650,000 | \$ 1,300,000 |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |

| | |
|--|---------------|
| Improvements Subtotal: | \$ 9,657,720 |
| Mobilization: (% +/-)* 10% | \$ 75,000 |
| Traffic Control: (% +/-) 5% | \$ 482,886 |
| Items Not Estimated / Contingency: (% +/-) 30% | \$ 2,897,316 |
| Estimated Construction Cost: | \$ 13,112,922 |

Local Match[†]: 20% \$ 3,330,800

[†] Toward SS4A Implementation Grants

| | | |
|-------------------------------------|-----|----------------------|
| Preconstruction Engineering/Design | 12% | \$ 1,573,551 |
| Utilities** | | \$ - |
| ROW** | | \$ - |
| Construction Engineering/Management | 15% | \$ 1,966,938 |
| Estimated Project Total: | | \$ 16,654,000 |

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: Set Appropriate Speed Limits for All Road Users
- Additional Improvements #2: _____
- Additional Improvements #3: Implement 3/4 access at unsignalized locations with median installation where feasible
- Additional Improvements #4: _____
- Additional Improvements #5: _____

Disclaimer:

Disclaimer: The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Project Description/How is safety improved?

Portions of this project are within the new West Davis Corridor with an interchange at Antelope Drive. Project assumes that no improvements within the West Davis project limits are required between 3000 W and 2000 S. This project installs medians east of 3000 W. Other systemic countermeasures include sidewalk infill, shoulder paving (west of 3300 W.), and bicycle lane extension (east of 1000 W.). Intersection improvements include replacing existing "doghouse" signal heads with FYA signal heads (1000 W.), upgrading pedestrian crossings at Doral Dr. with installation of an RRFB, and systemic stop-controlled improvements at 3300 W.

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Bicycle Lanes



Corridor Access Management



Rectangular Rapid Flashing Beacons (RRFB)



Stop-Controlled Intersection Systemic Countermeasures



Walkways

Opinion of Probable Construction Cost

Segment Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|--|--------------|--------------------|----------|------|------------|--------------|
| Provide 2-Ft Paved Shoulder on Rural 2-Lane Roadways | 0.66 - 0.89 | All Crashes | 0.71 | MILE | \$ 298,000 | \$ 211,580 |
| Install Sidewalk or Walkways | NA | Pedestrian | 0.43 | MILE | \$ 634,000 | \$ 272,620 |
| Install Raised Medians on Roadways with Existing TWLTL | 0.29 | All Crashes | 2.52 | MILE | \$ 928,000 | \$ 2,338,560 |
| Install Bicycle Lane | 0.51 - 0.694 | Bicycle | 0.51 | MILE | \$ 21,000 | \$ 10,710 |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |

Intersection Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|--|-------------|--------------------|----------|----------|------------|-----------|
| Systemic Low-Cost Countermeasures at Stop-Control Intersection | 0.73 - 0.9 | All Crashes | 2.00 | INT | \$ 19,000 | \$ 38,000 |
| Install a Rectangular Rapid Flashing Beacons (RRFB) | 0.526 | Pedestrian | 1.00 | XING (2) | \$ 15,000 | \$ 15,000 |
| Change a 5-section "Doghouse" to Flashing Yellow Arrow | 0.75 - 0.93 | Left-Turn | 1.00 | INT | \$ 8,000 | \$ 8,000 |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |

| | | |
|--|-----------|------------------|
| Improvements Subtotal: | \$ | 2,894,470 |
| Mobilization: (% +/-)* | 10% | \$ 75,000 |
| Traffic Control: (% +/-) | 5% | \$ 144,724 |
| Items Not Estimated / Contingency: (% +/-) | 30% | \$ 868,341 |
| Estimated Construction Cost: | \$ | 3,982,535 |

Local Match[†]: 20% \$ 1,011,600

[†] Toward SS4A Implementation Grants

| | | |
|-------------------------------------|-----|---------------------|
| Preconstruction Engineering/Design | 12% | \$ 477,904 |
| Utilities** | | \$ - |
| ROW** | | \$ - |
| Construction Engineering/Management | 15% | \$ 597,380 |
| Estimated Project Total: | | \$ 5,058,000 |

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: Set Appropriate Speed Limits for All Road Users
- Additional Improvements #2: _____
- Additional Improvements #3: _____
- Additional Improvements #4: _____
- Additional Improvements #5: _____

Disclaimer:

Disclaimer: The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Project Description/How is safety improved?

This project includes improvements along 1000 E to address an overrepresentation of rear-end and parked vehicle collisions: lane narrowing through parked area striping and wider lane striping; removal of southbound through lane from 700 S to approximately 900 S; implementation of bulbouts at crossing south of 900 S; RRFB's at Campbell Heights and 1525 S, including bulb outs and raised crossings. The following intersection improvements are recommended to address an overrepresentation of ped/bike, rear-end and parked vehicle collisions: 700 S/1000 E, protected intersection improvements.

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Appropriate Speed Limits for All Road Users



Crosswalk Visibility Enhancements



Rectangular Rapid Flashing Beacons (RRFB)



Road Diets (Roadway Configuration)

Opinion of Probable Construction Cost

Segment Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|---|-------------|--------------------|----------|----------|------------|------------|
| Traffic Calming - Lane Narrowing | 0.68 | All Crashes | 0.99 | MILE | \$ 39,000 | \$ 38,610 |
| Traffic Calming - Wider Lane Lines | 0.68 | All Crashes | 0.99 | MILE | \$ 21,000 | \$ 20,790 |
| 4-Lane to 3-Lane Road Diet Conversion | 0.53 - 0.81 | All Crashes | 0.19 | MILE | \$ 22,000 | \$ 4,180 |
| Install a Rectangular Rapid Flashing Beacons (RRFB) | 0.526 | Pedestrian | 2.00 | XING (2) | \$ 15,000 | \$ 30,000 |
| Traffic Calming - Bulbouts | 0.68 | All Crashes | 12.00 | EACH | \$ 36,000 | \$ 432,000 |
| Install Raised Crosswalk | NA | Pedestrian | 2.00 | EACH | \$ 71,000 | \$ 142,000 |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |

Intersection Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|--------------------------|-------------|--------------------|----------|------|------------|------------|
| Protected Intersection | NA | All Crashes | 1.00 | INT | \$ 650,000 | \$ 650,000 |
| Provide Right-Turn Lanes | 0.74 - 0.86 | All Crashes | 2.00 | LANE | \$ 150,000 | \$ 300,000 |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |

Improvements Subtotal: \$ 1,617,580

Mobilization: (% +/-)* 10% \$ 75,000

Traffic Control: (% +/-) 5% \$ 80,879

Items Not Estimated / Contingency: (% +/-) 30% \$ 485,274

Estimated Construction Cost: \$ 2,258,733

Local Match[†]: 20% \$ 573,800

[†] Toward SS4A Implementation Grants

Preconstruction Engineering/Design 12% \$ 271,048

Utilities** \$ -

ROW** \$ -

Construction Engineering/Management 15% \$ 338,810

Estimated Project Total: \$ 2,869,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: Set Appropriate Speed Limits for All Road Users
- Additional Improvements #2: Safe Routes to School
- Additional Improvements #3: _____
- Additional Improvements #4: _____
- Additional Improvements #5: _____

Disclaimer:

Disclaimer: The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Project Description/How is safety improved?

This project upgrades existing signals to include flashing yellow arrows (FYA) at 800 N, 1300 N, 2300 N, and 6000 S. The project includes driver feedback speed limit signs to address speeding associated with front to rear crashes. The project includes shoulder widening, new sidewalks (800 N to 1300 N and 2300 N to 6000 S), and installs bicycle lanes.

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Appropriate Speed Limits for All Road Users



Bicycle Lanes



Walkways

Opinion of Probable Construction Cost

Segment Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|---|--------------|--------------------|----------|------|------------|------------|
| Install Driver Feedback Speed Limit Signs | NA | All Crashes | 3.00 | EACH | \$ 10,000 | \$ 30,000 |
| Shoulder Widening on Rural Roads | 0.771 | All Crashes | 0.75 | MILE | \$ 32,000 | \$ 24,000 |
| Install Sidewalk or Walkways | NA | Pedestrian | 0.75 | MILE | \$ 634,000 | \$ 475,500 |
| Install Bicycle Lane | 0.51 - 0.694 | Bicycle | 1.50 | MILE | \$ 21,000 | \$ 31,500 |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |

Intersection Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|--|-------------|--------------------|----------|------|------------|-----------|
| Change a 5-section "Doghouse" to Flashing Yellow Arrow | 0.75 - 0.93 | Left-Turn | 2.00 | INT | \$ 8,000 | \$ 16,000 |
| Change a permissive only to Flashing Yellow Arrow | 0.5 - 0.6 | Left-Turn | 2.00 | INT | \$ 8,000 | \$ 16,000 |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |

| | | |
|--|-----|------------|
| Improvements Subtotal: | \$ | 593,000 |
| Mobilization: (% +/-)* | 10% | \$ 59,300 |
| Traffic Control: (% +/-) | 5% | \$ 29,650 |
| Items Not Estimated / Contingency: (% +/-) | 30% | \$ 177,900 |
| Estimated Construction Cost: | \$ | 859,850 |

Local Match[†]: 20% \$ 218,600

[†] Toward SS4A Implementation Grants

| | | |
|-------------------------------------|-----|---------------------|
| Preconstruction Engineering/Design | 12% | \$ 103,182 |
| Utilities** | | \$ - |
| ROW** | | \$ - |
| Construction Engineering/Management | 15% | \$ 128,978 |
| Estimated Project Total: | | \$ 1,093,000 |

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: _____
- Additional Improvements #2: _____
- Additional Improvements #3: _____
- Additional Improvements #4: _____
- Additional Improvements #5: _____

Disclaimer:

Disclaimer: The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Project Description/How is safety improved?

This majority of this project corridor is located near residential housing including two elementary schools. This project focuses on systemic safety improvement that help reduce vehicle speeds and improve active transportation along the corridor. Traffic calming measures include lane narrowing, installing wider lane lines, and driver feedback speed limit signs near the elementary schools. Bicycle lanes will also be installed along the corridor. The school crossing at 1200 West near Clinton Elementary will be upgraded to include RRFB signage, high visibility crosswalk enhancements, and a pedestrian refuge island. Sidewalk infill is also included as part of this project. Upgrading left-turn signal timings and installing flashing yellow area type signal heads area included (at 3000 W. 1500 W. and 1000 W). *This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.*

Proposed Proven Safety Countermeasures



Bicycle Lanes



Crosswalk Visibility Enhancements



Medians and Pedestrian Refuge Islands in Urban & Suburban Areas



Rectangular Rapid Flashing Beacons (RRFB)



Walkways

Opinion of Probable Construction Cost

Segment Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|---|--------------|--------------------|----------|------|------------|------------|
| Install Sidewalk or Walkways | NA | Pedestrian | 0.21 | MILE | \$ 634,000 | \$ 133,140 |
| Install Bicycle Lane | 0.51 - 0.694 | Bicycle | 2.47 | MILE | \$ 21,000 | \$ 51,870 |
| Traffic Calming - Lane Narrowing | 0.68 | All Crashes | 2.47 | MILE | \$ 39,000 | \$ 96,330 |
| Traffic Calming - Wider Lane Lines | 0.68 | All Crashes | 1.92 | MILE | \$ 21,000 | \$ 40,320 |
| Install Driver Feedback Speed Limit Signs | NA | All Crashes | 4.00 | EACH | \$ 10,000 | \$ 40,000 |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |

Intersection Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|---|------------|--------------------|----------|----------|------------|-----------|
| Install a Rectangular Rapid Flashing Beacons (RRFB) | 0.526 | Pedestrian | 1.00 | XING (2) | \$ 15,000 | \$ 15,000 |
| Upgrade Existing Crosswalk to High-Visibility Crosswalk | 0.6 - 0.75 | Pedestrian | 1.00 | XING | \$ 37,000 | \$ 37,000 |
| Install Pedestrian Refuge Island | 0.54 | Pedestrian | 1.00 | EACH | \$ 30,000 | \$ 30,000 |
| Change a permissive only to Flashing Yellow Arrow | 0.5 - 0.6 | Left-Turn | 3.00 | INT | \$ 8,000 | \$ 24,000 |
| Adequate Number/Visibility of Signal Heads | 0.85 | All Crashes | 3.00 | INT | \$ 24,000 | \$ 72,000 |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |

| | | |
|--|-----|------------|
| Improvements Subtotal: | \$ | 539,660 |
| Mobilization: (% +/-)* | 10% | \$ 53,970 |
| Traffic Control: (% +/-) | 5% | \$ 26,983 |
| Items Not Estimated / Contingency: (% +/-) | 30% | \$ 161,898 |
| Estimated Construction Cost: | \$ | 782,511 |

Local Match[†]: 20% \$ 198,800

[†] Toward SS4A Implementation Grants

| | | |
|-------------------------------------|-----|-------------------|
| Preconstruction Engineering/Design | 12% | \$ 93,901 |
| Utilities** | | \$ - |
| ROW** | | \$ - |
| Construction Engineering/Management | 15% | \$ 117,377 |
| Estimated Project Total: | | \$ 994,000 |

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: Set Appropriate Speed Limits for All Road Users
- Additional Improvements #2: _____
- Additional Improvements #3: _____
- Additional Improvements #4: _____
- Additional Improvements #5: _____

Disclaimer:

Disclaimer: The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Project Description/How is safety improved?

This project focuses on systemic active transportation and signalized intersections improvements. Improvements include roadway/shoulder widening (Hill Field Road to Gentile Street), sidewalk infill along the entire length of the corridor, lane narrowing, and striping a bicycle lane. Signalized intersection improvements include retroreflective backplates (Gentile Street & Hill Field Road) and replacing existing "doghouse" signal heads with a flashing yellow arrow (FYA) signal head (Hill Field Road, Gordon Avenue/1000 North, & Antelope Drive). Unsignalized intersections improvements are recommended for 2200 South. These countermeasures help address the over-representation of pedestrian and bicycle crashes and front to rear speeding type crashes.

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Backplates with Retroreflective Borders



Bicycle Lanes



Walkways

Opinion of Probable Construction Cost

Segment Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|--|--------------|--------------------|----------|------|---------------|---------------|
| Install Sidewalk or Walkways | NA | Pedestrian | 0.66 | MILE | \$ 634,000 | \$ 418,440 |
| Provide 2-Ft Paved Shoulder on Rural 2-Lane Roadways | 0.66 - 0.89 | All Crashes | 0.39 | MILE | \$ 298,000 | \$ 116,220 |
| Shoulder Widening on Rural Roads | 0.771 | All Crashes | 0.39 | MILE | \$ 32,000 | \$ 12,480 |
| Install Bicycle Lane | 0.51 - 0.694 | Bicycle | 2.00 | MILE | \$ 21,000 | \$ 42,000 |
| Traffic Calming - Lane Narrowing | 0.68 | All Crashes | 2.00 | MILE | \$ 39,000 | \$ 78,000 |
| Pedestrian Overpass over the Railroad | NA | NA | 1.00 | EACH | \$ 12,000,000 | \$ 12,000,000 |
| | | | | | \$ | - |
| | | | | | \$ | - |
| | | | | | \$ | - |
| | | | | | \$ | - |
| | | | | | \$ | - |

Intersection Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|--|-------------|--------------------|----------|------|------------|-----------|
| Install Retroreflective Backplates/Boards | 0.85 | All Crashes | 16.00 | EACH | \$ 275 | \$ 4,400 |
| Change a 5-section "Doghouse" to Flashing Yellow Arrow | 0.75 - 0.93 | Left-Turn | 3.00 | INT | \$ 8,000 | \$ 24,000 |
| Systemic Low-Cost Countermeasures at Stop-Control Intersection | 0.73 - 0.9 | All Crashes | 1.00 | INT | \$ 19,000 | \$ 19,000 |
| | | | | | \$ | - |
| | | | | | \$ | - |
| | | | | | \$ | - |
| | | | | | \$ | - |
| | | | | | \$ | - |
| | | | | | \$ | - |
| | | | | | \$ | - |

| | |
|--|----------------------|
| Improvements Subtotal: | \$ 12,714,540 |
| Mobilization: (% +/-)* 10% | \$ 75,000 |
| Traffic Control: (% +/-) 5% | \$ 635,727 |
| Items Not Estimated / Contingency: (% +/-) 30% | \$ 3,814,362 |
| Estimated Construction Cost: | \$ 17,239,629 |

Local Match[†]: 20% \$ 4,379,000

[†] Toward SS4A Implementation Grants

| | |
|---|----------------------|
| Preconstruction Engineering/Design 12% | \$ 2,068,755 |
| Utilities** | \$ - |
| ROW** | \$ - |
| Construction Engineering/Management 15% | \$ 2,585,944 |
| Estimated Project Total: | \$ 21,895,000 |

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: Evaluate signalization at warranted intersections _____
- Additional Improvements #2: _____
- Additional Improvements #3: _____
- Additional Improvements #4: _____
- Additional Improvements #5: _____

Disclaimer:

Disclaimer: The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Project Description/How is safety improved?

This project is focused on systemic bicycle and pedestrian improvements to mitigate the over-representation of that type of crash. This is accomplished by installing medians with pedestrian refuge islands, narrowing lane widths to slow vehicle speeds, and installing a bicycle lane along the corridor. These improvements are proposed from 1225 North to SR 193, approximately. Signalized intersection improvements are also recommended to replace "doghouse" signal heads with flashing yellow arrow (FYA) signal heads (1225 North & 2475 North) and provide leading pedestrian interval (LPI) at signalized school crossings near Northridge High School (Antelope Drive & 2475 North). Unsignalized intersections recommended for improvement are 1550 North and 2675 North.

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Bicycle Lanes



Corridor Access Management



Leading Pedestrian Interval



Medians and Pedestrian Refuge Islands in Urban & Suburban Areas

Opinion of Probable Construction Cost

Segment Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|--|--------------|--------------------|----------|-----------|------------|--------------|
| Install Medians and Pedestrian Refuge Islands in Urban Areas | 0.44 | Pedestrian | 1.84 | LE (URBA) | \$ 958,000 | \$ 1,762,720 |
| Traffic Calming - Lane Narrowing | 0.68 | All Crashes | 1.77 | MILE | \$ 39,000 | \$ 69,030 |
| Install Bicycle Lane | 0.51 - 0.694 | Bicycle | 1.77 | MILE | \$ 21,000 | \$ 37,170 |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |

Intersection Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|--|-------------|--------------------|----------|------|------------|------------|
| Change a 5-section "Doghouse" to Flashing Yellow Arrow | 0.75 - 0.93 | Left-Turn | 2.00 | INT | \$ 8,000 | \$ 16,000 |
| Include a Leading Pedestrian Interval (LPI) | 0.87 | Pedestrian | 2.00 | INT | \$ 3,000 | \$ 6,000 |
| Systemic Low-Cost Countermeasures at Stop-Control Intersection | 0.73 - 0.9 | All Crashes | 2.00 | INT | \$ 19,000 | \$ 38,000 |
| Install Pedestrian Hybrid Beacons (PHB) or HAWK | 0.453 | Pedestrian | 2.00 | EACH | \$ 200,000 | \$ 400,000 |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |

| | |
|--|---------------------|
| Improvements Subtotal: | \$ 2,328,920 |
| Mobilization: (% +/-)* 10% | \$ 75,000 |
| Traffic Control: (% +/-) 5% | \$ 116,446 |
| Items Not Estimated / Contingency: (% +/-) 30% | \$ 698,676 |
| Estimated Construction Cost: | \$ 3,219,042 |

Local Match[†]: 20% \$ 817,800

[†] Toward SS4A Implementation Grants

| | | |
|-------------------------------------|-----|---------------------|
| Preconstruction Engineering/Design | 12% | \$ 386,285 |
| Utilities** | | \$ - |
| ROW** | | \$ - |
| Construction Engineering/Management | 15% | \$ 482,856 |
| Estimated Project Total: | | \$ 4,089,000 |

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: _____
- Additional Improvements #2: _____
- Additional Improvements #3: _____
- Additional Improvements #4: _____
- Additional Improvements #5: _____

Disclaimer:

Disclaimer: The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Project Description/How is safety improved?

This project is focused on systemic improvements to reduce the number of angled, speed-related, bicycle, and pedestrian crashes. Countermeasures include installing medians with pedestrian refuge islands along the entire corridor and looking for opportunities to restrict access along the minor streets where possible. Installation of medians along with narrow lane widths, buffered bicycle lanes, and removing on-street parking are to act as traffic calming and systemic bicycle and pedestrian improvements. Intersection improvements include leading pedestrian intervals (Antelope Drive, 1600 North, Angel Street, & 500 North), additional right-turn lanes at 500 North, and additional flashing yellow arrow (FYA) signal heads at Gordon Avenue.

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Medians and Pedestrian Refuge Islands in Urban & Suburban Areas



Corridor Access Management



Leading Pedestrian Interval



Bicycle Lanes

Opinion of Probable Construction Cost

Segment Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|--|------|--------------------|----------|-----------|------------|--------------|
| Install Medians and Pedestrian Refuge Islands in Urban Areas | 0.44 | Pedestrian | 2.23 | LE (URBA) | \$ 958,000 | \$ 2,136,340 |
| Traffic Calming - Lane Narrowing | 0.68 | All Crashes | 3.06 | MILE | \$ 39,000 | \$ 119,340 |
| Install Buffered Bicycle Lane | NA | Bicycle | 3.06 | MILE | \$ 26,000 | \$ 79,560 |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |

Intersection Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|---|-------------|--------------------|----------|------|------------|------------|
| Change a permissive only to Flashing Yellow Arrow | 0.5 - 0.6 | Left-Turn | 1.00 | INT | \$ 8,000 | \$ 8,000 |
| Provide Right-Turn Lanes | 0.74 - 0.86 | All Crashes | 1.00 | LANE | \$ 150,000 | \$ 150,000 |
| Include a Leading Pedestrian Interval (LPI) | 0.87 | Pedestrian | 4.00 | INT | \$ 3,000 | \$ 12,000 |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |

| | | |
|--|-----|------------|
| Improvements Subtotal: | \$ | 2,505,240 |
| Mobilization: (% +/-)* | 10% | \$ 75,000 |
| Traffic Control: (% +/-) | 5% | \$ 125,262 |
| Items Not Estimated / Contingency: (% +/-) | 30% | \$ 751,572 |
| Estimated Construction Cost: | \$ | 3,457,074 |

Local Match[†]: 20% \$ 878,200

[†] Toward SS4A Implementation Grants

| | | |
|-------------------------------------|-----|---------------------|
| Preconstruction Engineering/Design | 12% | \$ 414,849 |
| Utilities** | | \$ - |
| ROW** | | \$ - |
| Construction Engineering/Management | 15% | \$ 518,561 |
| Estimated Project Total: | | \$ 4,391,000 |

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: Set Appropriate Speed Limits for All Road Users
- Additional Improvements #2: _____
- Additional Improvements #3: Eliminate on-street parking
- Additional Improvements #4: Evaluate unsignalized intersection to become 3/4 access and right-in/right-out location with median installation
- Additional Improvements #5: UDOT funded three (3) PHBs

Disclaimer:

Disclaimer: The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Project Description/How is safety improved?

This project improves safety by installing raised medians along the corridor and sidewalk infill on the east side of the corridor. Systemic bicycle improvements include adding bicycle treatments at key intersections along the corridor (800 N., 1300 N., 1800 N., 2300 N., 6000 S.). These countermeasures help address over-represented head-on and pedestrian/bicycle crashes.

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Bicycle Lanes



Corridor Access Management



Walkways

Opinion of Probable Construction Cost

Segment Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|--|------|--------------------|----------|------|------------|--------------|
| Install Raised Medians on Roadways with Existing TWLTL | 0.29 | All Crashes | 2.01 | MILE | \$ 928,000 | \$ 1,865,280 |
| Install Sidewalk or Walkways | NA | Pedestrian | 1.18 | MILE | \$ 634,000 | \$ 747,728 |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |

Intersection Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|--|-------------|--------------------|----------|------|------------|-----------|
| Add Bicycle Treatments at Intersections | NA | All Crashes | 5.00 | INT | \$ 9,000 | \$ 45,000 |
| Change a 5-section "Doghouse" to Flashing Yellow Arrow | 0.75 - 0.93 | Left-Turn | 1.00 | INT | \$ 8,000 | \$ 8,000 |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |

| | |
|--|--------------|
| Improvements Subtotal: | \$ 2,666,008 |
| Mobilization: (% +/-)* 10% | \$ 75,000 |
| Traffic Control: (% +/-) 5% | \$ 133,300 |
| Items Not Estimated / Contingency: (% +/-) 30% | \$ 799,802 |
| Estimated Construction Cost: | \$ 3,674,110 |

Local Match[†]: 20% \$ 933,400

[†] Toward SS4A Implementation Grants

| | | |
|-------------------------------------|-----|---------------------|
| Preconstruction Engineering/Design | 12% | \$ 440,893 |
| Utilities** | | \$ - |
| ROW** | | \$ - |
| Construction Engineering/Management | 15% | \$ 551,117 |
| Estimated Project Total: | | \$ 4,667,000 |

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: Set Appropriate Speed Limits for All Road Users
- Additional Improvements #2: Remove on street parking to ensure upgrade to buffered bicycle lane fits with existing width
- Additional Improvements #3: _____
- Additional Improvements #4: _____
- Additional Improvements #5: _____

Disclaimer:

Disclaimer: The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Project Description/How is safety improved?

Portions of this project have been under recent construction as part of the West Davis Corridor, specifically a new interchange at Antelope Drive. These project improvements are based on the assumption that when construction is completed it will match the existing roadway cross-section east of 2000 W., which includes bicycle lanes. This project focuses on the systemic countermeasure of installing medians east of 3000 W. Other systemic countermeasures include sidewalk infill, shoulder paving (west of 3300 W.), and bicycle lane extension (east of 1000 W.). Intersection improvements include replacing existing "doghouse" signal heads with FYA signal heads (1000 W.), upgrading pedestrian crossings at Doral Dr. with installation of an RRFB, and systemic stop-controlled improvements at 3300 W. and 4000 W.

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Bicycle Lanes



Corridor Access Management



Rectangular Rapid Flashing Beacons (RRFB)



Stop-Controlled Intersection Systemic Countermeasures



Walkways

Opinion of Probable Construction Cost

Segment Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|--|--------------|--------------------|----------|------|------------|--------------|
| Provide 2-Ft Paved Shoulder on Rural 2-Lane Roadways | 0.66 - 0.89 | All Crashes | 0.71 | MILE | \$ 298,000 | \$ 211,580 |
| Install Sidewalk or Walkways | NA | Pedestrian | 0.43 | MILE | \$ 634,000 | \$ 272,620 |
| Install Raised Medians on Roadways with Existing TWLTL | 0.29 | All Crashes | 2.52 | MILE | \$ 928,000 | \$ 2,338,560 |
| Install Bicycle Lane | 0.51 - 0.694 | Bicycle | 0.51 | MILE | \$ 21,000 | \$ 10,710 |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |

Intersection Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|--|-------------|--------------------|----------|----------|------------|-----------|
| Systemic Low-Cost Countermeasures at Stop-Control Intersection | 0.73 - 0.9 | All Crashes | 3.00 | INT | \$ 19,000 | \$ 57,000 |
| Install a Rectangular Rapid Flashing Beacons (RRFB) | 0.526 | Pedestrian | 1.00 | XING (2) | \$ 15,000 | \$ 15,000 |
| Change a 5-section "Doghouse" to Flashing Yellow Arrow | 0.75 - 0.93 | Left-Turn | 1.00 | INT | \$ 8,000 | \$ 8,000 |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |

| | | |
|--|-----|------------|
| Improvements Subtotal: | \$ | 2,913,470 |
| Mobilization: (% +/-)* | 10% | \$ 75,000 |
| Traffic Control: (% +/-) | 5% | \$ 145,674 |
| Items Not Estimated / Contingency: (% +/-) | 30% | \$ 874,041 |
| Estimated Construction Cost: | \$ | 4,008,185 |

Local Match[†]: 20% \$ 1,018,200

[†] Toward SS4A Implementation Grants

| | | |
|-------------------------------------|-----|---------------------|
| Preconstruction Engineering/Design | 12% | \$ 480,982 |
| Utilities** | | \$ - |
| ROW** | | \$ - |
| Construction Engineering/Management | 15% | \$ 601,228 |
| Estimated Project Total: | | \$ 5,091,000 |

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: Set Appropriate Speed Limits for All Road Users
- Additional Improvements #2: _____
- Additional Improvements #3: _____
- Additional Improvements #4: _____
- Additional Improvements #5: _____

Disclaimer:

Disclaimer: The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Project Description/How is safety improved?

This project is focused on implementing systemic safety countermeasure to ensure proper speeds through the residential neighborhoods and improve the overall bicycle and pedestrian experience along the corridor. Speed related countermeasures include driver feedback speed limit signs and traffic calming in the form of narrower lane widths and wider lane lines. Buffered bicycle lanes are proposed along the entire length of the corridor. The intersection of 1900 South is proposed to be upgraded with high visibility crosswalks and intersection lighting.

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Appropriate Speed Limits for All Road Users



Bicycle Lanes



Crosswalk Visibility Enhancements



Lighting

Opinion of Probable Construction Cost

Segment Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|---|------|--------------------|----------|------|------------|-----------|
| Install Driver Feedback Speed Limit Signs | NA | All Crashes | 4.00 | EACH | \$ 10,000 | \$ 40,000 |
| Traffic Calming - Lane Narrowing | 0.68 | All Crashes | 0.99 | MILE | \$ 39,000 | \$ 38,610 |
| Install Buffered Bicycle Lane | NA | Bicycle | 0.99 | MILE | \$ 26,000 | \$ 25,740 |
| Traffic Calming - Wider Lane Lines | 0.68 | All Crashes | 0.99 | MILE | \$ 21,000 | \$ 20,790 |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |

Intersection Improvements

| Item Description | CMF | Applicable Crashes | Quantity | Unit | Unit Price | Item Cost |
|---|-------------|--------------------|----------|------|------------|------------|
| Upgrade Existing Crosswalk to High-Visibility Crosswalk | 0.6 - 0.75 | Pedestrian | 3.00 | XING | \$ 37,000 | \$ 111,000 |
| Install Intersection Lighting | 0.62 - 0.67 | Nighttime | 1.00 | INT | \$ 31,000 | \$ 31,000 |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |
| | | | | | | \$ - |

| | | |
|--|-----|-----------|
| Improvements Subtotal: | \$ | 267,140 |
| Mobilization: (% +/-)* | 10% | \$ 26,720 |
| Traffic Control: (% +/-) | 5% | \$ 13,357 |
| Items Not Estimated / Contingency: (% +/-) | 30% | \$ 80,142 |
| Estimated Construction Cost: | \$ | 387,359 |

Local Match[†]: 20% \$ 98,400

[†] Toward SS4A Implementation Grants

| | | |
|-------------------------------------|-----|-------------------|
| Preconstruction Engineering/Design | 12% | \$ 46,483 |
| Utilities** | | \$ - |
| ROW** | | \$ - |
| Construction Engineering/Management | 15% | \$ 58,104 |
| Estimated Project Total: | | \$ 492,000 |

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: Set Appropriate Speed Limits for All Road Users
- Additional Improvements #2: _____
- Additional Improvements #3: _____
- Additional Improvements #4: _____
- Additional Improvements #5: _____

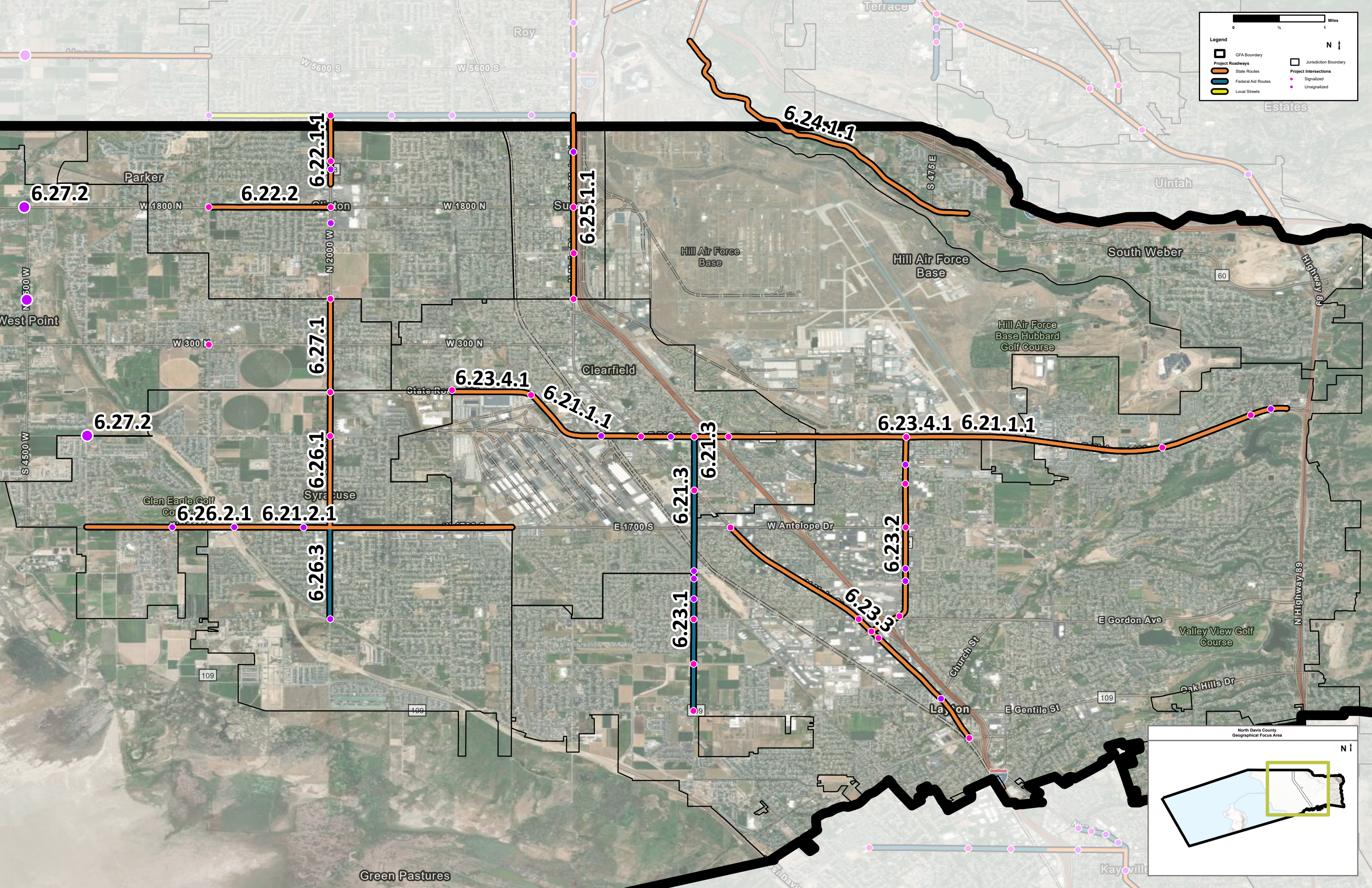
Disclaimer:

Disclaimer: The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Additional Information

This project identifies the following intersection improvements to address an overrepresentation of sideswipe, serious injury and angle collisions: 1800 N/4500 W, perform an intersection control evaluation to address the offset between the north and south legs and consider roundabout control; 800 N/4500 W and 700 S/4500 W, provide sight distance, visibility and lighting improvements (including advanced warning signage and striping) for all approaches to these intersections, in addition to adding left- and right-turn lanes on the major approaches to these intersections.

**NORTH DAVIS COUNTY CASE STUDY
PROJECT LOCATION MAP**



0 1/2 1 Miles

Legend

- GFA Boundary
- Project Roadways
- State Routes
- Federal Aid Routes
- Local Streets
- Jurisdiction Boundary
- Project Intersections
 - Signalized
 - Unsignalized

N ↓

North Davis County
Geographical Focus Area

N ↓

6.27.2

6.22.2

6.22.1.1

6.25.1.1

6.24.1.1

6.27.1

6.23.4.1

6.21.1.1

6.27.2

6.23.4.1

6.21.1.1

6.26.1

6.26.2.1

6.21.2.1

6.21.3

6.21.3

6.23.2

6.26.3

6.23.1

6.23.3

Green Pastures

NORTH DAVIS COUNTY EQUITY INDEX MAP

North Davis County
Equity Need Areas

- High
- Medium
- Low

