ALTERNATIVE ANALYSIS

Green Springs Road
Telegraph Street to Buena Vista Drive

Washington City, Utah

January 2008

URS

APPENDIX B
PRELIMINARY COST ESTIMATES

GREEN SPRINGS ROAD
TELEGRAPH STREET TO BUENA VISTA
PRELIMINARY COST ESTIMATE ALTERNATIVE 1

ITEM	QUANTITY	UNIT	PRICE	TOTAL
Excavation	270	yd^3	$ 10.00	$ 2,702.78
Remove Concrete Sidewalk	240	yd^2	$ 12.00	$ 2,880.00
Remove Concrete Curb and Gutter	295	Lin ft	$ 7.00	$ 2,065.00
Remove Concrete Driveway	1	Each	$ 150.00	$ 150.00
Asphalt Pavement	2,085	ft^2	$ 5.00	$ 10,425.00
Concrete Sidewalk	200	yd^2	$ 36.00	$ 7,200.00
Concrete Curb and Gutter Type B1	330	Lin ft	$ 13.00	$ 4,290.00
Disabled Pedestrian Ramp	1	Each	$ 1,100.00	$ 1,100.00
Concrete Driveway	1	Each	$ 1,200.00	$ 1,200.00
Signing & Striping	1	Lump	$ 10,000.00	$ 10,000.00
Drainage	1	Lump	$ 20,000.00	$ 20,000.00
Landscaping	1	Lump	$ 5,000.00	$ 5,000.00
Traffic Control	1	Lump	$ 10,000.00	$ 10,000.00
Construction Survey	1	Lump	$ 5,000.00	$ 5,000.00
			SUBTOTAL (Rounded)	$ 82,000.00
	10%		MOBILIZATION	$ 8,200.00
	30%		CONTINGENCIES	$ 24,600.00
			TOTAL CONSTRUCTION	$ 114,800.00
Preliminary Engineering (10% of Construction)				$ 11,500.00
Construction Engineering (10% of Construction)				$ 11,500.00
Commercial Right-of-Way Acquisition	2,660	ft^2	$ 20.00	$ 53,200.00
			ALTERNATIVE 1 TOTAL	**$ 200,000.00**

GREEN SPRINGS ROAD
TELEGRAPH STREET TO BUENA VISTA
PRELIMINARY COST ESTIMATE ALTERNATIVE 3

ITEM	QUANTITY	UNIT		PRICE		TOTAL
Excavation	4,320	yd^3	$	10.00	$	43,199.07
Borrow	10,250	yd^3	$	30.00	$	307,500.00
Remove Concrete Sidewalk	63	yd^2	$	12.00	$	760.00
Remove Concrete Curb and Gutter	365	Lin ft	$	7.00	$	2,555.00
Remove Asphalt Pavement	5,125	ft^2	$	1.50	$	7,687.50
Asphalt Pavement	33,325	ft^2	$	5.00	$	166,625.00
Concrete Sidewalk	100	yd^2	$	36.00	$	3,600.00
Concrete Curb and Gutter Type B1	65	Lin ft	$	13.00	$	845.00
Disabled Pedestrian Ramp	1	Each	$	1,100.00	$	1,100.00
Signing & Striping	1	Lump	$	100,000.00	$	100,000.00
Drainage	1	Lump	$	100,000.00	$	100,000.00
Landscaping & Lighting	1	Lump	$	200,000.00	$	200,000.00
Traffic Control	1	Lump	$	25,000.00	$	25,000.00
Construction Survey	1	Lump	$	25,000.00	$	25,000.00
				SUBTOTAL (Rounded)	$	983,900.00
	10%			MOBILIZATION	$	98,390.00
	30%			CONTINGENCIES	$	295,170.00
				TOTAL CONSTRUCTION	$	1,377,460.00
Preliminary Engineering (10% of Construction)					$	137,800.00
Construction Engineering (10% of Construction)					$	137,800.00
Alternative 1 Total Cost					$	200,000.00
				ALTERNATIVE 3 TOTAL COST	**$**	**1,860,000.00**

GREEN SPRINGS ROAD
TELEGRAPH STREET TO BUENA VISTA
PRELIMINARY COST ESTIMATE ALTERNATIVE 6

ITEM	QUANTITY	UNIT	PRICE	TOTAL
Excavation	270	yd^3	$ 10.00	$ 2,702.78
Remove Concrete Sidewalk	240	yd^2	$ 12.00	$ 2,880.00
Remove Concrete Curb and Gutter	295	Lin ft	$ 7.00	$ 2,065.00
Remove Concrete Driveway	1	Each	$ 150.00	$ 150.00
Asphalt Pavement	2,085	ft^2	$ 5.00	$ 10,425.00
Concrete Sidewalk	200	yd^2	$ 36.00	$ 7,200.00
Concrete Curb and Gutter Type B1	330	Lin ft	$ 13.00	$ 4,290.00
Disabled Pedestrian Ramp	1	Each	$ 1,100.00	$ 1,100.00
Concrete Driveway	1	Each	$ 1,200.00	$ 1,200.00
Signing & Striping	1	Lump	$ 20,000.00	$ 20,000.00
Drainage	1	Lump	$ 20,000.00	$ 20,000.00
Landscaping	1	Lump	$ 5,000.00	$ 5,000.00
Traffic Control	1	Lump	$ 10,000.00	$ 10,000.00
Construction Survey	1	Lump	$ 5,000.00	$ 5,000.00
			SUBTOTAL (Rounded)	$ 92,000.00
	10%		MOBILIZATION	$ 9,200.00
	30%		CONTINGENCIES	$ 27,600.00
			TOTAL CONSTRUCTION	$ 128,800.00
Preliminary Engineering (10% of Construction)				$ 12,900.00
Construction Engineering (10% of Construction)				$ 12,900.00
Commercial Right-of-Way Acquisition	2,660	ft^2	$ 25.00	$ 66,500.00
			ALTERNATIVE 6 TOTAL	**$ 230,000.00**

GREEN SPRINGS ROAD
TELEGRAPH STREET TO BUENA VISTA
PRELIMINARY COST ESTIMATE ALTERNATIVE 7

ITEM	QUANTITY	UNIT		PRICE		TOTAL
Excavation	5,315	yd^3	$	10.00	$	53,148.15
Borrow	5,000	yd^3	$	30.00	$	150,000.00
Remove Concrete Sidewalk	510	yd^2	$	12.00	$	6,120.00
Remove Concrete Curb and Gutter	1,625	Lin ft	$	7.00	$	11,375.00
Remove Asphalt Pavement	11,000	ft^2	$	1.50	$	16,500.00
Asphalt Pavement	41,000	ft^2	$	5.00	$	205,000.00
Concrete Sidewalk	470	yd^2	$	36.00	$	16,920.00
Concrete Curb and Gutter Type B1	1,530	Lin ft	$	13.00	$	19,890.00
Concrete Curb Type B5 (Median)	850	Lin ft	$	25.00	$	21,250.00
Disabled Pedestrian Ramp	5	Each	$	1,100.00	$	5,500.00
Concrete Driveway	2	Each	$	1,200.00	$	2,400.00
Signing & Striping	1	Lump	$	40,000.00	$	40,000.00
Drainage	1	Lump	$	50,000.00	$	50,000.00
Landscaping & Lighting	1	Lump	$	50,000.00	$	50,000.00
Traffic Control	1	Lump	$	40,000.00	$	40,000.00
Construction Survey	1	Lump	$	30,000.00	$	30,000.00
				SUBTOTAL (Rounded)	$	718,100.00
	10%			MOBILIZATION	$	71,810.00
	30%			CONTINGENCIES	$	215,430.00
				TOTAL CONSTRUCTION	$	1,005,340.00
Preliminary Engineering (10% of Construction)					$	100,600.00
Construction Engineering (10% of Construction)					$	100,600.00
Residential Relocation	1	Lump	$	500,000.00	$	500,000.00
Residential Right-of-Way Acquisition	13,000	ft^2	$	15.00	$	195,000.00
Commercial Right-of-Way Acquisition	16,500	ft^2	$	25.00	$	412,500.00
Alternative 1 Total Cost					$	200,000.00
				TOTAL INTERSECTION COST	**$**	**2,520,000.00**

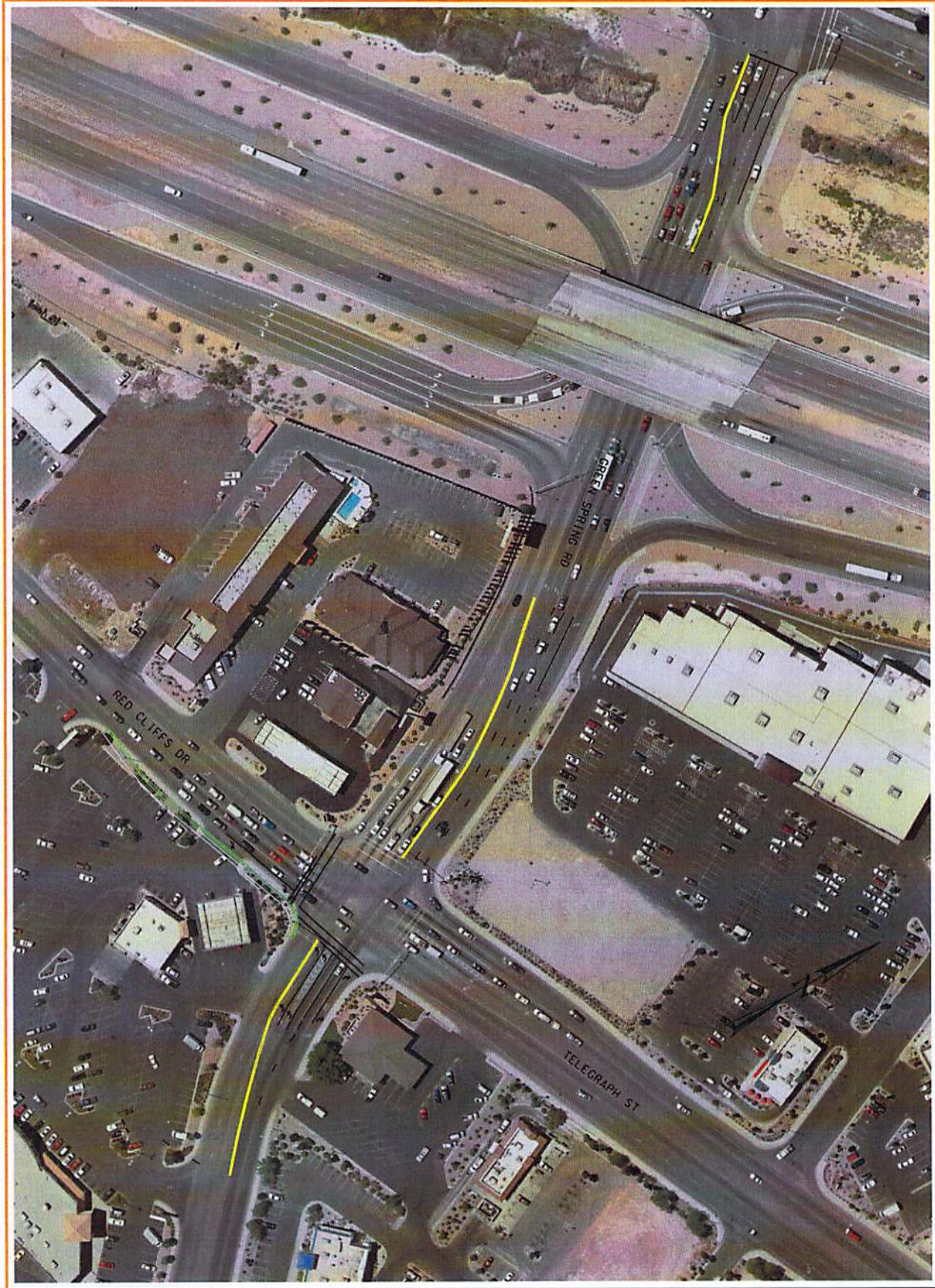
GREEN SPRINGS ROAD TELEGRAPH TO BUENA VISTA ALTERNATIVE 7b	WASHINGTON CITY, UTAH				
WASHINGTON COUNTY	APPROVAL RECOMM. DATE PROJECT DESIGN ENGINEER	DESIGN XXX MM/YY	CHECK XXX MM/YY	REVIEW	
		DRAWN XXX MM/YY	CHECK XXX MM/YY	DATE MM/DD/YY	
PROJECT NUMBER	APPROVED FOR USE BY UDOT DATE PRECONSTRUCTION ENGINEER	QUANT. XXX MM/YY	CHECK XXX MM/YY	BY XXX	
SHEET NO. 7b					

NO.	DATE	DESIGN REQ'D	MAPS COMP'D	PARCELS APPROVED	REQUEST BY	REMARKS
		ORIGINAL SUBMISSION FOR AUTHORIZATION				
	DATE	REVISIONS				

NOTE:
1. SEE SHEET 1 FOR TELEGRAPH INTERSECTION IMPROVEMENTS FOR THIS ALTERNATIVE.

SHEET NO. 7a	WASHINGTON COUNTY	GREEN SPRINGS ROAD TELEGRAPH TO BUENA VISTA ALTERNATIVE 7a	WASHINGTON CITY, UTAH		
		PROJECT NUMBER	APPROVAL RECOMM. DATE PROJECT DESIGN ENGINEER	DESIGN XXX MM/YY CHECK XXX MM/YY	REVIEW
				DRAWN XXX MM/YY CHECK XXX MM/YY	DATE MM/DD/YY
			APPROVED FOR USE BY UDOT DATE PRECONSTRUCTION ENGINEER	QUANT. XXX MM/YY CHECK XXX MM/YY	BY XXX

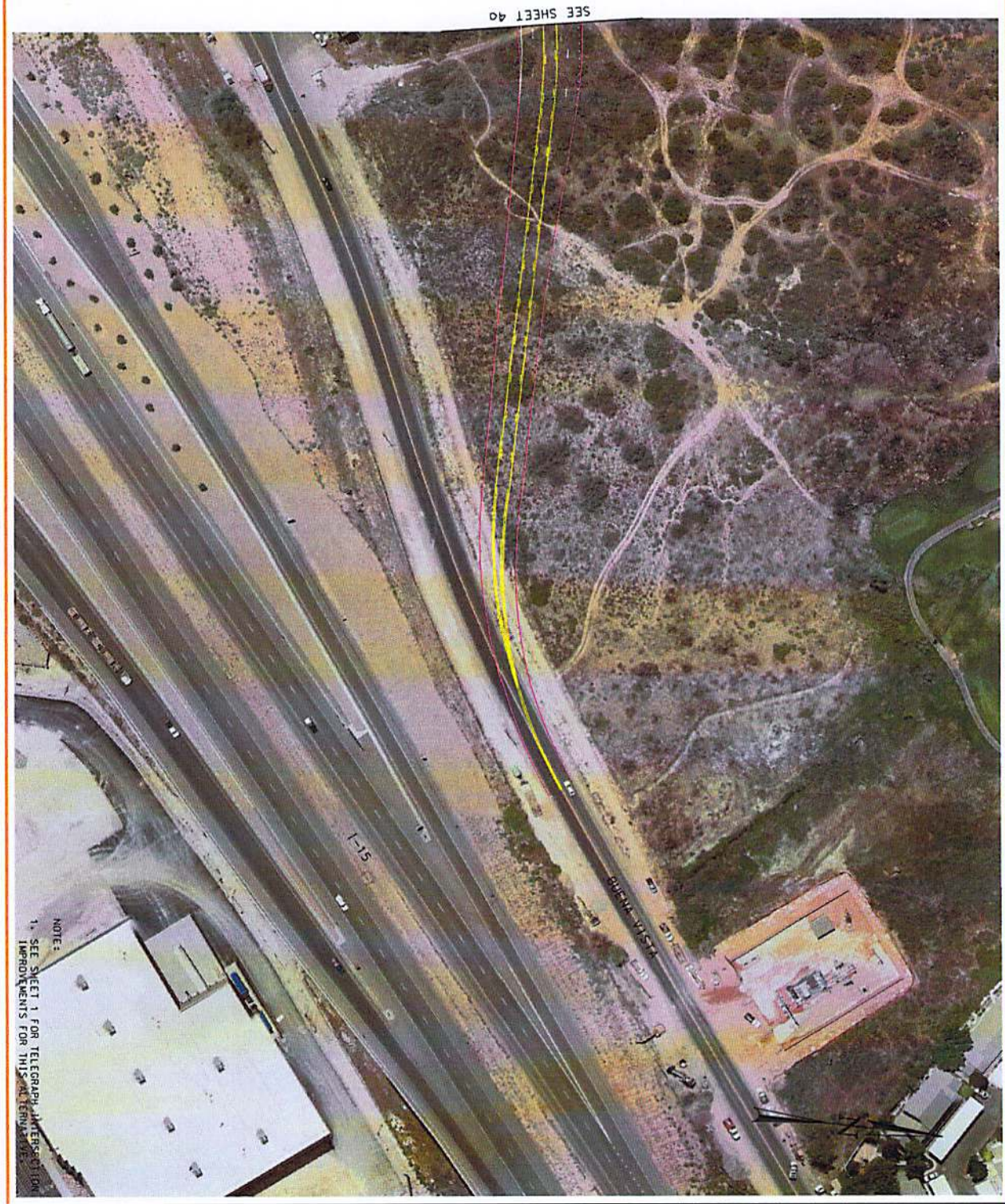
NO.	DATE	DESIGN MAP NO.	MAPS BY CONS.	PARCELS AFFECTED	REQUEST BY	REMARKS
		ORIGINAL SUBMISSION FOR AUTHORIZATION				
	DATE	REVISIONS				



SHEET NO. 5	WASHINGTON COUNTY	GREEN SPRINGS ROAD TELEGRAPH TO BUENA VISTA ALTERNATIVE 6	WASHINGTON CITY, UTAH				
		PROJECT NUMBER	APPROVAL RECOMM. DATE PROJECT DESIGN ENGINEER APPROVED FOR USE BY UDOT DATE PRECONSTRUCTION ENGINEER	DESIGN XXX MM/YY DRAWN XXX MM/YY QUANT. XXX MM/YY	CHECK XXX MM/YY CHECK XXX MM/YY CHECK XXX MM/YY	REVIEW DATE MM/DD/YY BY XXX	

NO.	DATE	DESIGN REV. BY	MAPS COMP. BY	PARCELS AFFECTED	REQUEST BY	REMARKS
		ORIGINAL SUBMISSION FOR AUTHORIZATION				
	DATE	REVISIONS				

| | | |



NOTE:
1. SEE SHEET 1 FOR TELEGRAPH INTERSECTION IMPROVEMENTS FOR THIS ALTERNATIVE.

SHEET NO. 4b	WASHINGTON COUNTY	GREEN SPRINGS ROAD TELEGRAPH TO BUENA VISTA ALTERNATIVE 4	WASHINGTON CITY, UTAH									
		PROJECT NUMBER	APPROVAL RECOMM. DATE PROJECT DESIGN ENGINEER	DESIGN XXX MM/YY	CHECK XXX MM/YY	REVIEW	NO.	DATE	DESIGN REQ.BY	MAPS COMP.BY	PARCELS REJECTED	REQUEST BY	REMARKS
			APPROVED FOR USE BY UDOT DATE PRECONSTRUCTION ENGINEER	DRAWN XXX MM/YY	CHECK XXX MM/YY	DATE MM/DD/YY			ORIGINAL SUBMISSION FOR AUTHORIZATION				
				QUANT. XXX MM/YY	CHECK XXX MM/YY	BY XXX		DATE	REVISIONS				

TABLE OF CONTENTS

1.0 INTRODUCTION 1-1

2.0 PURPOSE 2-1

3.0 DESCRIPTION OF STUDY AREA 3-1

3.1 Telegraph Street/Red Cliffs Dr 3-1
3.2 I-15 Ramps 3-1
3.3 Middleton Drive/Buena Vista 3-1
3.4 Truck Traffic and Corridor Land Use 3-1

4.0 EXISTING CONDITIONS 4-1

4.1 Traffic Volumes 4-1
4.2 Current Level of Service 4-1

5.0 FUTURE CONDITIONS 5-1

6.0 FUTURE CORRIDOR ALTERNATIVES 6-1

6.1 Alternative 1 6-1
6.2 Alternative 2 6-1
6.3 Alternative 3 6-1
6.4 Alternative 4 6-2
6.5 Alternative 5 6-2
6.6 Alternative 6 6-2
6.7 Alternative 7 6-2
6.8 Alternative 8 6-3

7.0 ALTERNATIVES LEVEL OF SERVICE ANALYSIS 7-1

7.1 2017 Level of Service Analysis 7-1
7.2 2007 and 2012 Delay and Level of Service 7-7

8.0 CONCEPTUAL COST ANALYSIS 8-1

9.0 CONCLUSIONS AND RECOMMENDATIONS 9-1

APPENDIX A CONCEPTUAL PLANS

APPENDIX B PRELIMINARY COST ESTIMATES

LIST OF TABLES

Table 4-1 – Intersection Peak Hour Volumes *4-1*
Table 4-2 – Intersection Level of Service Criteria *4-1*
Table 4-3 – 2007 AM & PM Delay - Existing Configuration *4-2*
Table 5-1 - 2012 AM & PM Delay - Existing Configuration *5-1*
Table 5-2 – 2017 AM & PM Delay - Existing Configuration *5-2*
Table 7-1 – Green Springs @ Buena Vista 2017 AM Peak *7-1*
Table 7-2 – Green Springs @ I-15 Ramps 2017 AM Peak *7-2*
Table 7-3 – Green Springs @ Telegraph 2017 AM Peak *7-3*
Table 7-4 – Green Springs @ Buena Vista 2017 PM Peak *7-4*
Table 7-5 – Green Springs @ I-15 Ramps 2017 PM Peak *7-5*
Table 7-6 – Green Springs @ Telegraph 2017 PM Peak *7-6*
Table 7-7 – 2017 Total Network Performance *7-7*
Table 7-8 – 2007 AM Peak Alternative 1 ..... *7-1*
Table 7-9 – 2007 PM Peak Alternative 1 ..... *7-1*
Table 7-10 – 2012 AM Peak Alternative 1 ..... *7-2*
Table 7-11 – 2012 AM Peak Alternative 1 ..... *7-2*
Table 7-12 – 2007 AM Peak Alternative 3 ..... *7-3*
Table 7-13 – 2007 PM Peak Alternative 3 ..... *7-3*
Table 7-14 – 2012 AM Peak Alternative 3 ..... *7-4*
Table 7-15 – 2012 PM Peak Alternative 3 ..... *7-4*
Table 7-16 – New SB I-15 Ramp Intersection @ Buena Vista - Alternative 3 ..... *7-5*
Table 7-17 – 2007 AM Peak Alternative 4 ..... *7-5*
Table 7-18 – 2007 PM Peak Alternative 4 ..... *7-5*
Table 7-19 – 2012 AM Peak Alternative 4 ..... *7-6*
Table 7-20 – 2012 PM Peak Alternative 4 ..... *7-6*
Table 7-21 – 2007 AM Peak Alternative 6 ..... *7-7*
Table 7-22 – 2007 PM Peak Alternative 6 ..... *7-7*
Table 7-23 – 2012 AM Peak Alternative 6 ..... *7-8*
Table 7-24 – 2012 PM Peak Alternative 6 ..... *7-8*
Table 7-25 – 2007 AM Peak Alternative 7 ..... *7-9*
Table 7-26 – 2007 PM Peak Alternative 7 ..... *7-9*
Table 7-27 – 2012 AM Peak Alternative 7 ..... *7-10*
Table 7-28 – 2012 PM Peak Alternative 7 ..... *7-10*
Table 8-1 – Conceptual Cost Estimates *8-1*
Table 9-1– Construction Cost per Second of Delay Saved *9-1*

1.0 INTRODUCTION

Green Springs Road between Buena Vista Drive and Telegraph Street is a part of State Road 212. This section of Green Springs is a highly congested corridor with three closely spaced signalized intersections. The main entrance into Washington City is the intersection of Green Springs Drive and Telegraph Street. It is congested because of all the commercial businesses located along Telegraph Street and Red Cliffs Drive. The NB left-turn at Buena Vista Drive is also congested which causes backups for traffic on NB Green Springs, traffic turning right from the I-15 SB Exit Ramp and traffic turning left from the I-15 NB Exit Ramp.

2.0 PURPOSE

URS is under contract with Washington City, Utah to prepare an alternative analysis for Green Springs Drive from Middleton/Buena Vista Drive to Telegraph Street/Red Cliffs Drive. The portion of Green Springs Drive within the study area includes three signalized intersections: Telegraph Street/Red Cliffs Drive; I-15 interchange ramps and Middleton/Buena Vista Drive. The purpose of this study is to analyze and evaluate the current and future conditions along this corridor and to develop alternatives that will improve both safety and capacity. Turning movement counts were obtained by Washington City in 2007. These turning movement counts were projected out to the year 2012 and 2017. A level of service (LOS) analysis was performed for existing conditions utilizing the latest methodologies for signalized intersections found in chapter 16 of the Transportation Research Board's Highway Capacity Manual (HCM). The Alternative Analysis for the Green Springs Corridor does not include any increase in traffic for future developments along or near the corridor.

GREEN SPRINGS ROAD
TELEGRAPH STREET TO BUENA VISTA
PRELIMINARY COST ESTIMATE ALTERNATIVE 4

ITEM	QUANTITY	UNIT		PRICE		TOTAL
Excavation	16,468	yd^3	$	10.00	$	164,681.48
Remove Concrete Sidewalk	1,225	yd^2	$	12.00	$	14,700.00
Remove Concrete Curb and Gutter	2,200	Lin ft	$	7.00	$	15,400.00
Remove Concrete Driveway	3	Each	$	150.00	$	450.00
Remove Asphalt Pavement	97,700	ft^2	$	1.50	$	146,550.00
Asphalt Pavement	127,040	ft^2	$	5.00	$	635,200.00
Concrete Sidewalk	2,115	yd^2	$	36.00	$	76,140.00
Concrete Curb and Gutter Type B1	3,325	Lin ft	$	13.00	$	43,225.00
Disabled Pedestrian Ramp	6	Each	$	1,100.00	$	6,600.00
Concrete Driveway	4	Each	$	1,200.00	$	4,800.00
Business Sign Relocation	1	Each	$	4,000.00	$	4,000.00
Signing & Striping	1	Lump	$	75,000.00	$	75,000.00
Drainage	1	Lump	$	100,000.00	$	100,000.00
Landscaping	1	Lump	$	500,000.00	$	500,000.00
Traffic Control	1	Lump	$	75,000.00	$	75,000.00
Signalization (Including State Furnished Items)	1	Lump	$	125,000.00	$	125,000.00
Construction Survey	1	Lump	$	40,000.00	$	40,000.00
				SUBTOTAL (Rounded)	$	2,026,700.00
	10%			MOBILIZATION	$	202,670.00
	30%			CONTINGENCIES	$	608,010.00
				TOTAL CONSTRUCTION	$	2,837,380.00
Preliminary Engineering (10% of Construction)					$	283,800.00
Construction Engineering (10% of Construction)					$	283,800.00
Commercial Right-of-Way Acquisition	121,000	ft^2	$	25.00	$	3,025,000.00
Residential Relocation	1	Lump	$	500,000.00	$	500,000.00
Comercial On Site Relocation (Gas Station - NW Corner Buena Vista)	1	Lump	$	500,000.00	$	500,000.00
Alternative 1 Total Cost					$	200,000.00
				ALTERNATIVE 4 TOTAL COST	**$**	**7,630,000.00**

3.0 DESCRIPTION OF STUDY AREA

The following is a description of the intersections with Green Springs Road:

3.1 Telegraph Street/Red Cliffs Dr

- North Leg (Green Springs Road): one right-turn lane, two thru lanes and dual left-turn lanes.
- West Leg (Red Cliffs Dr): one shared thru-right lane, one thru lane and dual left-turn lanes.
- South Leg (Green Springs Road): one right-turn lane, two thru lanes and one left-turn lane.
- East Leg (Telegraph St): one free right lane, two thru lanes and two left-turn lanes.

3.2 I-15 Ramps

- North Leg (Green Springs Road): one free right-turn lane, two thru lanes, and two left-turn lanes.
- West Leg (I-15 NB Exit Ramp): two signalized right-turn lanes and two left-turn lanes.
- South Leg (Green Springs Road): one free right-turn lane, two thru lanes, and two left-turn lanes.
- East Leg (I-15 SB Exit Ramp): one stop controlled right-turn lane and two left-turn lanes.

3.3 Middleton Drive/Buena Vista

- North Leg (Green Springs Road): one right-turn lane, two thru lanes, and one left-turn lane.
- West Leg (Middleton Drive): one right-turn lane, one thru lane and one left-turn lane.
- South Leg (Green Springs Road): one right-turn lane, one thru lane, and two left-turn lanes.
- East Leg (Buena Vista): one shared thru/right-turn lane and one left-turn lane.

3.4 Truck Traffic and Corridor Land Use

According to UDOT's 2006 Annual Average Daily Traffic data, 9% of traffic consisted of single unit trucks and 4% of traffic consisted of combination trucks. Single unit trucks are light/heavy trucks contained on a single frame, including buses. Combination unit trucks are tractor-trailer combinations.

The land use south of the Buena Vista intersection through the Telegraph Street intersection is commercial, with several big box stores and a hotel in the area. The area north of Buena Vista is primarily residential with the exception of two gas stations/convenience stores on the northwest and northeast corners.

4.0 EXISTING CONDITIONS

4.1 Traffic Volumes

Washington City collected turning movement counts for all three intersections in November 2007. Table 4-1 summarizes the peak hour turning movement counts for each of the three intersections.

Table 4-1 – Intersection Peak Hour Volumes

Intersection	Northbound			Eastbound			Southbound			Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Telegraph (AM Peak)	293	489	272	302	374	392	198	344	194	182	314	200
Telegraph (PM Peak)	345	545	366	382	521	344	153	461	117	399	679	107
I-15 Ramps (AM Peak)	472	581	130	222	N/A	278	81	318	371	194	N/A	120
I-15 Ramps (PM Peak)	454	323	269	182	N/A	377	113	377	283	133	N/A	96
Buena Vista (AM Peak)	549	344	222	15	58	258	44	335	63	231	237	76
Buena Vista (PM Peak)	265	211	137	84	283	547	60	300	55	82	98	90

Source: Washington City, November 2007

4.2 Current Level of Service

A signal optimization and level of service analysis was performed for the existing conditions along the corridor using a combination of Synchro traffic modeling software and SimTraffic simulation software. Table 4-2 outlines the level of service criteria for signalized intersections.

Table 4-2 – Intersection Level of Service Criteria

LOS	Signalized Delay (sec/vehicle)	Description
A	≤10	Favorable progression
B	>10 and ≤20	Good progression
C	>20 and ≤35	Fair progression
D	>35 and ≤55	Noticeable congestion
E	>55 and ≤80	Limit of acceptable delay
F	>80	Unacceptable delay

Source: Highway Capacity Manual, Transportation Research Board, 2000

The 2007 peak hour average delays and levels of service, with the existing geometry, are shown on Table 4-3. The optimized level of service and average delays may be different than current conditions.

Table 4-3 – 2007 AM & PM Delay - Existing Configuration

2007 AM Existing Configuration							
Traffic Movement		Beuna Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	41.7	D	37.3	D	65.9	E
	THRU	36.2	D	N/A	N/A	32.1	C
	RIGHT	6.6	A	2.1	A	22.2	C
WB	LEFT	40.8	D	28.4	C	34.4	C
	THRU	30.4	C	N/A	N/A	28.1	C
	RIGHT	21.4	C	3.2	A	16.8	B
NB	LEFT	47.8	D	16.2	B	32.6	C
	THRU	22.1	C	13.7	B	29.8	C
	RIGHT	5.6	A	3.8	A	5.1	A
SB	LEFT	33.9	C	36.3	D	35.7	D
	THRU	26.9	C	15.3	B	19.1	B
	RIGHT	15.6	B	1.5	A	6.1	A
INTERSECTION		28.6	C	19.9	B	28.0	C

2007 PM Existing Configuration							
Traffic Movement		Beuna Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	22.2	C	36.0	D	165.3	F
	THRU	25.2	C	N/A	N/A	55.4	E
	RIGHT	6.9	A	2.6	A	46.9	D
WB	LEFT	24.9	C	31.2	C	59.5	E
	THRU	28.6	C	N/A	N/A	38.9	D
	RIGHT	15.0	B	1.5	A	10.3	B
NB	LEFT	32.5	C	10.6	B	75.6	E
	THRU	15.2	B	3.6	A	34.8	C
	RIGHT	4.0	A	2.6	A	12.2	B
SB	LEFT	46.1	D	41.0	D	55.0	D
	THRU	26.8	C	21.8	C	28.4	C
	RIGHT	16.7	B	1.3	A	9.2	A
INTERSECTION		20.0	B	17.6	B	51.5	D

* Total intersection delay is for all movements excluding right-turn movements.

5.0 FUTURE CONDITIONS

The 2007 turning movement counts were projected out to the years 2012 and 2017. The projected growth rate was based on the traffic history in the area obtained from UDOT's Annual Average Daily Traffic data from 1985 to 2006. To obtain the projected volumes, a growth rate of 2.6% per year was applied to the turning movement counts for all three intersections. The three intersections were analyzed for the no-build alternative and are shown in Table 5-1 and Table 5-2.

Table 5-1 - 2012 AM & PM Delay - Existing Configuration

2012 AM Existing Configuration							
Traffic Movement		Beuna Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	18.8	B	72.6	E	98.2	F
	THRU	28.7	C	N/A	N/A	51.4	D
	RIGHT	6.7	A	2.6	A	42.9	D
WB	LEFT	49.2	D	26.6	C	63.8	E
	THRU	33.8	C	N/A	N/A	29.1	C
	RIGHT	22.3	C	33.2	C	55.2	E
NB	LEFT	48.6	D	17.6	B	50.3	D
	THRU	25.6	C	16.8	B	41.7	D
	RIGHT	8.7	A	94.0	F	9.8	A
SB	LEFT	35.1	D	27.0	C	35.6	D
	THRU	28.9	C	14.4	B	21.8	C
	RIGHT	27.1	C	2.1	A	7.5	A
INTERSECTION		30.5	C	24.6	C	42.3	D

2012 PM Existing Configuration							
Traffic Movement		Beuna Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	33.3	C	61.3	E	138.9	F
	THRU	30.0	C	N/A	N/A	92.8	F
	RIGHT	8.8	A	2.5	A	88.3	F
WB	LEFT	46.8	D	45.4	D	118.9	F
	THRU	32.0	C	N/A	N/A	66.4	E
	RIGHT	30.1	C	2.7	A	29.7	C
NB	LEFT	61.1	E	17.4	B	81.7	F
	THRU	32.7	C	7.0	A	60.5	E
	RIGHT	9.7	A	2.4	A	19.1	B
SB	LEFT	49.4	D	51.9	D	65.9	E
	THRU	32.5	C	27.3	C	42.4	D
	RIGHT	26.5	C	1.4	A	13.3	B
INTERSECTION		29.6	C	26.9	C	73.1	E

* Total intersection delay is for all movements excluding right-turn movements.

Table 5-2 – 2017 AM & PM Delay - Existing Configuration

2017 AM Existing Configuration							
Traffic Movement		Beuna Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	33.5	C	33.3	C	167.7	F
	THRU	20.0	B	N/A	N/A	70.7	E
	RIGHT	10.3	B	2.1	A	67.1	E
WB	LEFT	40.2	D	29.0	C	54.5	D
	THRU	38.6	D	N/A	N/A	30.6	C
	RIGHT	28.0	C	256.2	F	16.6	B
NB	LEFT	40.5	D	13.5	B	58.9	E
	THRU	23.1	C	13.4	B	49.8	D
	RIGHT	4.4	A	12.3	B	9.4	A
SB	LEFT	44.2	D	30.0	C	29.6	C
	THRU	39.4	D	16.6	B	17.4	B
	RIGHT	33.3	C	2.3	A	8.6	A
INTERSECTION		29.5	C	18.2	B	50.9	D

2017 PM Existing Configuration							
Traffic Movement		Beuna Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	29.0	C	49.0	D	138.5	F
	THRU	23.5	C	N/A	N/A	93.8	F
	RIGHT	17.4	B	99.9	F	93.7	F
WB	LEFT	52.8	D	53.2	D	128.3	F
	THRU	29.4	C	N/A	N/A	91.7	F
	RIGHT	23.7	C	2.6	A	47.5	D
NB	LEFT	48.3	D	11.4	B	104.3	F
	THRU	31.2	C	2.1	A	46.7	D
	RIGHT	12.3	B	2.7	A	18.1	B
SB	LEFT	66.1	E	50.5	D	84.9	F
	THRU	41.8	D	24.4	C	39.0	D
	RIGHT	38.5	D	1.7	A	13.3	B
INTERSECTION		29.6	C	23.7	C	80.3	F

* Total intersection delay is for all movements excluding right-turn movements.

6.0 FUTURE CORRIDOR ALTERNATIVES

The following alternatives were chosen for further analysis. These alternatives describe improvements made to the legs of each intersection. If a leg of an intersection is not described it maintains existing configuration as outlined in sections 3.1 to 3.3.

6.1 Alternative 1

This alternative includes restriping the three NB traffic lanes north of Telegraph Street such that the left traffic lane is an exclusive left-turn lane to SB I-15 and the right two traffic lanes are thru lanes. A right-turn lane is developed for NB I-15 traffic.

Telegraph Street/Red Cliffs Dr

- West Leg (Red Cliffs Dr): one right-turn lane, two thru lanes and dual left-turn lanes.
- South Leg (Green Springs Road): one right-turn lane, two thru lanes and two left-turn lanes.

This alternative will increase capacity for traffic making the EB right-turn from Telegraph to Green Springs. All right-turning traffic will have an additional protected green phase (during non-opposing left turn phases) to complete their turns.

Currently traffic at Buena Vista is backing through the I-15 interchange which is preventing the left-turn lanes from queuing properly. By making the left thru lane an exclusive left-turn lane between Telegraph and I-15, it will improve storage for traffic turning left-onto SB I-15.

6.2 Alternative 2

This alternative includes improvements made in Alternative 1 in addition to the following improvements at the Buena Vista intersection.

Middleton Drive/Buena Vista Dr

- East Leg (Buena Vista Dr): one right-turn lane, two thru lanes, and one left-turn lane.

This alternative will improve capacity for WB Buena Vista traffic turning right on Green Springs or continuing thru the intersection, allowing more green time for the other movements at the intersection.

6.3 Alternative 3

This alternative includes improvements made in Alternative 2 in addition to the construction of a slip ramp intersecting with Buena Vista 500' to the east of Green Springs. This slip ramp will remove the SB I-15 right-turn movement onto Green Springs, thus eliminating the NB weaving between the I-15 Ramps and Buena Vista. The slip ramp will be stop controlled with a left turn and right turn lane.

6.4 Alternative 4

This alternative will include the Alternative 1 improvements and a realignment of the Buena Vista intersection to the north of the gas stations/convenience stores. This alternative will require the relocation of the gas station/convenience store on the northwest corner of the intersection. The following is a description of the new realigned intersection.

Middleton Drive/Buena Vista

- North Leg (Green Springs Road): one right-turn lane, two thru lanes, and one left-turn lane.
- West Leg (Middleton Drive): one right-turn lane, two thru lanes and one left-turn lane.
- South Leg (Green Springs Road): One right-turn lane, two thru lanes, and two left-turn lane.
- East Leg (Buena Vista): One right-turn lane, two thru lanes, and one left-turn lane.

This alternative will increase the weaving length between the I-15 Ramps and Buena Vista intersections, thus decreasing delay.

6.5 Alternative 5

The alternative will include the Alternative 2 improvements and the following improvement to the I-15 intersection.

Middleton Drive/Buena Vista

- East Leg (I-15 SB Exit Ramp): two signalized right-turn lanes and two left-turn lanes. Traffic in the left right-turn lane will be required to turn left at the Buena Vista intersection.

This alternative will better manage weaving movements between the I-15 Ramps and Buena Vista intersections. It will also decrease delay for traffic turning right from the SB I-15 Exit Ramp and wanting to either turn right onto or go thru Buena Vista Drive.

6.6 Alternative 6

The alternative will include the Alternative 2 improvements and the NB lanes will be restriped between the I-15 Ramps intersection and Buena Vista. The left thru lane will become one of the two left turn-lanes while the right thru lane will be required to go through the intersection. A right-turn lane will be developed 100' prior to the intersection. This alternative will provide greater capacity for traffic turning left onto Buena Vista, and provide less delay for NB thru traffic at Buena Vista.

6.7 Alternative 7

This alternative includes the improvements in Alternative 2. A left turn bypass, for NB to WB left turns at the Buena Vista intersection, will also be constructed north of the convenience store on the northwest corner of the intersection. The bypass will loop

around the convenience store on the north and west and tie in to Buena Vista Drive about 400' West of the Green Springs intersection. The lane types at the intersections are as follows:

Middleton Drive/Buena Vista

- North Leg (Green Springs Road): Two thru lanes, and one left-turn lane.
- South Leg (Green Springs Road): One right-turn lane and two thru lanes.

Left Turn Bypass Road

- North Leg (Green Springs Road): One right-turn lane and two thru lanes.
- West Leg (Bypass Road): One-Way Street for WB traffic only.
- South Leg (Green Springs Road): Two thru lanes, and one left-turn lane.

This alternative will decrease the NB left turn delay at Buena Vista, will decrease the SB I-15 Ramp right-turn delay, and will also decrease the delay for traffic turning left from the NB I-15 Ramp.

6.8 Alternative 8

This alternative includes the improvements in Alternative 1 with the construction of a 3rd WB and EB lane on Telegraph Street prior to and following the intersection with Green Springs. The I-15 ramps and Buena Vista intersections will maintain existing configurations with this alternative. This alternative will decrease the delay for EB and WB traffic on Telegraph Street and the intersection as a whole. Green times will be increased for the other phases, due to increase capacity for WB and EB traffic.

7.0 ALTERNATIVES LEVEL OF SERVICE ANALYSIS

7.1 2017 Level of Service Analysis

Each of the eight alternatives mentioned in Section 6 were analyzed for the year 2017 using Synchro for signal optimization and SimTraffic for simulation. These alternatives were compared with 2017 traffic using existing configurations. Tables 7-1 to 7-6 show the 2017 LOS and Delay for each movement at each intersection for each alternative. Table 7-7 show the total AM and PM Peak Corridor Delay and the average of both.

Table 7-1 – Green Springs @ Buena Vista 2017 AM Peak

Traffic Movement		Alternative 1		Alternative 2		Alternative 3		Alternative 4	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	20.8	C	23.3	C	34.4	C	38.2	D
	THRU	23.9	C	24.4	C	34.1	C	27.2	C
	RIGHT	15.4	B	12.6	B	12.1	B	9.2	A
WB	LEFT	47.2	D	63.5	E	40.1	D	86.0	F
	THRU	26.3	C	27.2	C	19.3	B	40.2	D
	RIGHT	18.8	B	5.4	A	2.8	A	7.5	A
NB	LEFT	80.5	F	72.7	E	77.2	E	47.1	D
	THRU	42.1	D	40.8	D	13.3	B	15.9	B
	RIGHT	21.5	C	18.7	B	6.4	A	4.8	A
SB	LEFT	70.5	E	39.7	D	47.5	D	49.4	D
	THRU	34.0	C	56.3	E	63.7	E	59.9	E
	RIGHT	39.4	D	64.2	E	83.3	F	23.8	C
INTERSECTION		32.2	C	42.9	D	37.5	D	38.1	D
Traffic Movement		Alternative 5		Alternative 6		Alternative 7		Alternative 8	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	14.4	B	29.6	C	34.6	C	25.1	C
	THRU	24.4	C	26.6	C	18.0	B	28.9	C
	RIGHT	15.1	B	13.9	B	10.2	B	11.6	B
WB	LEFT	38.0	D	36.7	D	25.6	C	51.1	D
	THRU	21.5	C	24.0	C	24.1	C	43.6	D
	RIGHT	3.9	A	6.0	A	3.8	A	41.2	D
NB	LEFT	83.6	F	129.3	F	45.3 **	D	54.2	D
	THRU	44.1	D	49.1	D	7.7	A	24.4	C
	RIGHT	11.7	B	54.5	D	2.8	A	4.9	A
SB	LEFT	43.3	D	40.2	D	28.7	C	48.9	D
	THRU	50.5	D	44.4	D	12.5	B	38.3	D
	RIGHT	52.0	D	52.7	D	5.7 **	A	32.3	C
INTERSECTION		40.5	D	52.0	D	12.9	B	35.2	D

** Peak Hour Delay for the turning movements at the Bypass Road.

Table 7-2 – Green Springs @ I-15 Ramps 2017 AM Peak

Traffic Movement		Alternative 1		Alternative 2		Alternative 3		Alternative 4	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	87.9	F	281.7	F	37.3	D	27.6	C
	THRU	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	RIGHT	4.5	A	17.4	B	20.7	C	2.4	A
WB	LEFT	28.3	C	40.9	D	25.2	C	28.6	C
	THRU	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	RIGHT	98.1	F	73.3	E	†	F	2.4	A
NB	LEFT	9.1	A	12.7	B	13.4	B	9.8	A
	THRU	4.5	A	33.5	C	40.6	D	4.1	A
	RIGHT	2.7	A	167.5	F	218.1	F	3.7	A
SB	LEFT	41.0	D	29.9	C	36.2	D	31.9	C
	THRU	22.9	C	12.3	B	20.5	C	14.5	B
	RIGHT	2.1	A	2.2	A	2.1	A	2.9	A
INTERSECTION*		24.8	C	53.6	D	27.7	C	14.2	B
Traffic Movement		Alternative 5		Alternative 6		Alternative 7		Alternative 8	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	211.3	F	390.2	F	28.1	C	42.7	D
	THRU	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	RIGHT	13.3	B	23.5	C	2.6	A	4.4	A
WB	LEFT	39.4	D	51.6	D	27.3	C	24.1	C
	THRU	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	RIGHT	291.0	F	536.8	F	3.5	A	131.7	F
NB	LEFT	24.5	C	16.1	B	11.5	B	13.5	B
	THRU	40.0	D	30.4	C	3.6	A	18.8	B
	RIGHT	236.8	F	46.7	D	3.3	A	29.6	C
SB	LEFT	36.6	D	34.7	C	36.8	D	33.2	C
	THRU	17.9	B	16.7	B	19.5	B	18.0	B
	RIGHT	1.6	A	1.9	A	3.5	A	1.7	A
INTERSECTION*		56.8	E	51.6	D	14.9	B	21.8	C

* Total intersection delay is for all movements excluding right-turn movements.

† - The SB I-15 (WB) right turn is relocated to a new intersection with Buena Vista Drive. Under this option there is no WB or EB delay at the new intersection. NB Left delay is 20.7 sec/veh (C) and NB Right Delay is 5.6 sec/veh (A).

Table 7-3 – Green Springs @ Telegraph 2017 AM Peak

Traffic Movement		Alternative 1		Alternative 2		Alternative 3		Alternative 4	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	160.7	F	313.2	F	320.9	F	39.2	D
	THRU	70.9	E	104.7	F	125.4	F	31.2	C
	RIGHT	46.7	D	34.6	C	38.2	D	10.8	B
WB	LEFT	71.2	E	244.6	F	119.3	F	33.6	C
	THRU	63.9	E	183.9	F	117.4	F	33.5	C
	RIGHT	24.4	C	520.9	F	169.3	F	9.7	A
NB	LEFT	86.2	F	36.3	D	30.8	C	26.2	C
	THRU	58.4	E	74.8	E	99.8	F	23.8	C
	RIGHT	34.3	C	37.7	D	46.7	D	7.6	A
SB	LEFT	74.0	E	135.6	F	228.1	F	33.8	C
	THRU	31.9	C	21.4	C	24.3	C	19.6	B
	RIGHT	11.8	B	9.8	A	10.4	B	9.9	A
INTERSECTION		64.9	E	100.6	F	99.3	F	23.3	C
Traffic Movement		Alternative 5		Alternative 6		Alternative 7		Alternative 8	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	363.2	F	123.7	F	48.6	D	134.3	F
	THRU	114.2	F	56.1	E	29.3	C	28.9	C
	RIGHT	27.1	C	19.4	B	11.6	B	15.0	B
WB	LEFT	119.7	F	83.7	F	36.9	D	69.1	E
	THRU	103.9	F	64.5	E	31.3	C	49.5	D
	RIGHT	494.9	F	87.9	F	10.6	B	119.1	F
NB	LEFT	38.4	D	28.3	C	24.4	C	72.6	E
	THRU	98.9	F	39.9	D	26.8	C	74.1	E
	RIGHT	46.0	D	23.9	C	13.6	B	51.7	D
SB	LEFT	122.3	F	45.5	D	31.9	C	117.4	F
	THRU	24.6	C	20.0	B	23.1	C	23.7	C
	RIGHT	9.9	A	9.1	A	12.5	B	6.0	A
INTERSECTION		102.3	F	47.9	D	25.2	C	59.9	E

Table 7-4 – Green Springs @ Buena Vista 2017 PM Peak

Traffic Movement		Alternative 1		Alternative 2		Alternative 3		Alternative 4	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	20.8	C	19.6	B	22.8	C	21.0	C
	THRU	23.9	C	21.1	C	22.3	C	23.4	C
	RIGHT	15.4	B	13.2	B	13.5	B	16.0	B
WB	LEFT	47.2	D	50.7	D	36.8	D	49.6	D
	THRU	26.3	C	20.5	C	17.3	B	29.1	C
	RIGHT	18.8	B	2.9	A	3.5	A	5.3	A
NB	LEFT	80.5	F	82.2	F	85.7	F	48.1	D
	THRU	42.1	D	44.7	D	21.6	C	15.3	B
	RIGHT	21.5	C	19.2	B	8.0	A	8.4	A
SB	LEFT	70.5	E	55.3	E	50.9	D	59.8	E
	THRU	34.0	C	36.9	D	32.3	C	33.3	C
	RIGHT	39.4	D	25.1	C	20.3	C	8.6	A
INTERSECTION		32.2	C	30.6	C	26.3	C	24.2	C
Traffic Movement		Alternative 5		Alternative 6		Alternative 7		Alternative 8	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	21.4	C	20.8	C	22.2	C	17.9	B
	THRU	21.5	C	20.7	C	14.9	B	19.2	B
	RIGHT	13.3	B	14.2	B	16.3	B	13.4	B
WB	LEFT	47.7	D	44.2	D	128.7	F	22.2	C
	THRU	20.1	C	20.4	C	17.4	B	23.4	C
	RIGHT	3.1	A	3.1	A	5.1	A	12.0	B
NB	LEFT	78.2	E	88.9	F	9.2 **	A	64.2	E
	THRU	47.8	D	40.0	D	30.0	C	33.8	C
	RIGHT	5.6	A	24.1	C	7.1	A	14.2	B
SB	LEFT	57.4	E	52.6	D	131.4	F	42.3	D
	THRU	36.3	D	38.7	D	21.7	C	29.5	C
	RIGHT	24.6	C	31.2	C	4.7 **	A	24.5	C
INTERSECTION		29.9	C	31.9	C	25.6	C	25.5	C

** Peak Hour Delay for the turning movements at the Bypass Road.

Table 7-5 – Green Springs @ I-15 Ramps 2017 PM Peak

Traffic Movement		Alternative 1		Alternative 2		Alternative 3		Alternative 4	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	87.9	F	187.3	F	85.9	F	38.0	D
	THRU	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	RIGHT	4.5	A	6.1	A	2.6	A	2.4	A
WB	LEFT	28.3	C	41.8	D	31.7	C	41.4	D
	THRU	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	RIGHT	98.1	F	10.5	B	†	N/A	1.7	A
NB	LEFT	9.1	A	10.7	B	8.8	A	10.3	B
	THRU	4.5	A	11.4	B	4.2	A	3.1	A
	RIGHT	2.7	A	2.6	A	2.4	A	2.6	A
SB	LEFT	41.0	D	44.3	D	41.3	D	33.6	C
	THRU	22.9	C	19.3	B	21.8	C	20.2	C
	RIGHT	2.1	A	2.3	A	1.6	A	3.9	A
INTERSECTION*		24.8	C	31.8	C	24.3	C	18.2	B
Traffic Movement		Alternative 5		Alternative 6		Alternative 7		Alternative 8	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	146.2	F	168.5	F	41.9	D	41.3	D
	THRU	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	RIGHT	8.7	A	4.5	A	2.6	A	2.4	A
WB	LEFT	76.6	E	43.5	D	35.3	D	28.3	C
	THRU	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	RIGHT	15.8	B	32.4	C	3.9	A	4.5	A
NB	LEFT	11.6	B	13.3	B	11.2	B	14.4	B
	THRU	14.3	B	9.2	A	8.8	A	17.6	B
	RIGHT	2.7	A	3.0	A	2.5	A	3.5	A
SB	LEFT	46.6	D	46.1	D	39.7	D	28.5	C
	THRU	20.2	C	21.0	C	20.2	C	14.0	B
	RIGHT	2.3	A	2.0	A	1.7	A	1.5	A
INTERSECTION*		32.9	C	35.3	D	19.9	B	19.2	B

* Total intersection delay is for all movements excluding right-turn movements.

† - The SB I-15 (WB) right turn is relocated to a new intersection with Buena Vista Drive. Under this option there is no WB or EB delay at the new intersection. NB Left delay is 13.6 sec/veh (B) and NB Right Delay is 8.8 sec/veh (A).

Table 7-6 – Green Springs @ Telegraph 2017 PM Peak

Traffic Movement		Alternative 1		Alternative 2		Alternative 3		Alternative 4	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	160.7	F	163.9	F	78.5	E	119.8	F
	THRU	70.9	E	59.4	E	40.1	D	76.9	E
	RIGHT	46.7	D	36.6	D	19.7	B	66.1	E
WB	LEFT	71.2	E	60.5	E	76.4	E	70.1	E
	THRU	63.9	E	56.4	E	78.2	E	60.9	E
	RIGHT	24.4	C	25.3	C	46.6	D	23.4	C
NB	LEFT	86.2	F	84.9	F	77.9	E	95.4	F
	THRU	58.4	E	57.0	E	49.9	D	56.2	E
	RIGHT	34.3	C	35.9	D	29.4	C	30.5	C
SB	LEFT	74.0	E	74.2	E	64.4	E	108.7	F
	THRU	31.9	C	52.4	D	31.4	C	28.9	C
	RIGHT	11.8	B	20.5	C	14.7	B	15.0	B
INTERSECTION		64.9	E	63.3	E	52.9	D	64.2	E
Traffic Movement		Alternative 5		Alternative 6		Alternative 7		Alternative 8	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	159.6	F	136.4	F	176.3	F	141.0	F
	THRU	62.1	E	73.4	E	69.9	E	62.0	E
	RIGHT	38.6	D	47.8	D	46.1	D	44.1	D
WB	LEFT	60.1	E	61.2	E	63.5	E	69.9	E
	THRU	57.9	E	53.1	D	49.7	D	58.4	E
	RIGHT	24.1	C	26.0	C	17.7	B	8.7	A
NB	LEFT	95.6	F	86.8	F	90.4	F	91.6	F
	THRU	54.6	D	57.5	E	59.8	E	55.7	E
	RIGHT	33.2	C	35.6	D	36.5	D	23.2	C
SB	LEFT	74.2	E	73.0	E	68.9	E	42.8	D
	THRU	53.2	D	47.4	D	31.1	C	30.7	C
	RIGHT	21.2	C	15.4	B	13.5	B	13.5	B
INTERSECTION		64.0	E	62.9	E	61.8	E	59.0	E

Table 7-7 – 2017 Total Network Performance

	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
AM PEAK	136.7	F	245.3	F	191.7	F	43.3	D
PM PEAK	136.7	F	116.7	F	72.7	E	117.7	F
Avg Peak Delay	136.7	F	181.0	F	132.2	F	80.5	F
	Alternative 5		Alternative 6		Alternative 7		Alternative 8	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
AM PEAK	267.1	F	141.8	F	36.6	D	78.1	E
PM PEAK	113.0	F	101.9	F	100.8	F	98.9	F
Avg Peak Delay	190.1	F	121.9	F	68.7	E	88.5	F

7.2 2007 and 2012 Delay and Level of Service

Utilizing the information in Table 7-7, 5 alternatives were chosen for the further evaluation with a conceptual design and cost estimate. The alternatives chosen are 1, 3, 4, 6 and 7. Alternatives 2 and 5 were not chosen for further development and analysis because of the high average corridor delay compared to the existing configuration. Even though the delay was low compared to the existing configuration, Alternative 8 was not chosen for further development due to the high cost and impacts to property. Table 7-8 thru Table 7-28 shows the 2007 and 2012 AM and PM Peak delay and LOS for each alternative advanced.

Table 7-8 – 2007 AM Peak Alternative 1

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	17.4	B	37.7	D	64.1	E
	THRU	24.7	C	N/A	N/A	28.0	C
	RIGHT	5.6	A	2.4	A	6.0	A
WB	LEFT	29.8	C	26.0	C	39.9	D
	THRU	26.2	C	N/A	N/A	30.5	C
	RIGHT	17.9	B	4.0	A	23.4	C
NB	LEFT	33.2	C	15.9	B	23.6	C
	THRU	13.6	B	9.3	A	22.7	C
	RIGHT	4.8	A	3.4	A	8.0	A
SB	LEFT	45.1	D	31.8	C	33.8	C
	THRU	28.5	C	14.5	B	21.7	C
	RIGHT	21.7	C	1.8	A	8.0	A
INTERSECTION		22.1	C	17.7 *	B	25.4	C

* Total intersection delay is for all movements excluding right-turn movements.

Table 7-9 – 2007 PM Peak Alternative 1

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	26.1	C	61.4	E	44.1	D
	THRU	21.1	C	N/A	N/A	27.7	C
	RIGHT	7.9	A	2.1	A	10.9	B
WB	LEFT	18.3	B	26.7	C	35.1	C
	THRU	23.0	C	N/A	N/A	28.0	C
	RIGHT	12.0	B	301.3	F	5.9	A
NB	LEFT	78.4	E	16.4	B	33.9	C
	THRU	39.9	D	9.3	A	28.9	C
	RIGHT	4.6	A	2.5	A	12.2	B
SB	LEFT	38.5	D	25.7	C	47.8	D
	THRU	25.2	C	13.0	B	20.8	C
	RIGHT	12.2	B	1.2	A	8.7	A
INTERSECTION		26.8	C	19.6 *	B	27.0	C

* Total intersection delay is for all movements excluding right-turn movements.

Table 7-10 – 2012 AM Peak Alternative 1

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	37.3	D	31.0	C	102.0	F
	THRU	29.6	C	N/A	N/A	32.1	C
	RIGHT	6.6	A	2.3	A	7.7	A
WB	LEFT	26.9	C	27.6	C	47.9	D
	THRU	21.1	C	N/A	N/A	31.2	C
	RIGHT	16.2	B	739.6	F	25.9	C
NB	LEFT	44.9	D	18.2	B	27.5	C
	THRU	24.8	C	11.4	B	21.6	C
	RIGHT	4.6	A	2.7	A	9.2	A
SB	LEFT	39.7	D	34.7	C	38.0	D
	THRU	30.9	C	14.1	B	19.2	B
	RIGHT	21.5	C	1.7	A	6.4	A
INTERSECTION		26.5	C	18.0 *	B	30.2	C

* Total intersection delay is for all movements excluding right-turn movements.

Table 7-11 – 2012 AM Peak Alternative 1

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	17.6	B	40.5	D	156.3	F
	THRU	21.3	C	N/A	N/A	36.2	D
	RIGHT	9.6	A	2.6	A	18.7	B
WB	LEFT	30.4	C	27.2	C	38.8	D
	THRU	16.1	B	N/A	N/A	36.5	D
	RIGHT	5.8	A	330.8	F	12.3	B
NB	LEFT	96.0	F	12.7	B	56.8	E
	THRU	39.6	D	11.3	B	54.5	D
	RIGHT	7.7	A	2.9	A	26.3	C
SB	LEFT	41.8	D	29.2	C	39.0	D
	THRU	28.0	C	13.7	B	22.1	C
	RIGHT	13.5	B	1.2	A	14.3	B
INTERSECTION		28.6	C	16.7 *	B	44.8	D

* Total intersection delay is for all movements excluding right-turn movements.

Table 7-12 – 2007 AM Peak Alternative 3

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	33.6	C	39.0	D	102.2	F
	THRU	32.2	C	N/A	N/A	34.6	C
	RIGHT	6.6	A	2.1	A	9.2	A
WB	LEFT	49.4	D	22.4	C	56.8	E
	THRU	19.3	B	N/A	N/A	43.4	D
	RIGHT	3.5	A	†	N/A	72.6	E
NB	LEFT	81.9	F	19.6	B	32.1	C
	THRU	13.0	B	26.8	C	37.1	D
	RIGHT	6.6	A	40.7	D	14.4	B
SB	LEFT	29.6	C	33.3	C	45.7	D
	THRU	22.4	C	13.7	B	21.3	C
	RIGHT	15.8	B	1.8	A	9.1	A
INTERSECTION		30.7	C	24.0 *	C	38.0	D

* Total intersection delay is for all movements excluding right-turn movements.
† See Table 7-16 for new ramp intersection delay.

Table 7-13 – 2007 PM Peak Alternative 3

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	13.9	B	34.0	C	41.3	D
	THRU	24.0	C	N/A	N/A	24.3	C
	RIGHT	7.9	A	2.0	A	8.7	A
WB	LEFT	27.9	C	31.5	C	42.1	D
	THRU	16.0	B	N/A	N/A	28.8	C
	RIGHT	2.8	A	†	N/A	6.9	A
NB	LEFT	46.7	D	15.8	B	33.8	C
	THRU	12.5	B	1.4	A	24.7	C
	RIGHT	7.3	A	2.3	A	7.0	A
SB	LEFT	38.5	D	32.5	C	43.6	D
	THRU	24.7	C	13.1	B	19.4	B
	RIGHT	13.0	B	1.3	A	11.1	B
INTERSECTION		18.4	B	16.4 *	B	25.9	C

* Total intersection delay is for all movements excluding right-turn movements.
† See Table 7-16 for new ramp intersection delay.

Table 7-14 – 2012 AM Peak Alternative 3

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	21.7	C	264.5	F	46.5	D
	THRU	31.1	C	N/A	N/A	29.3	C
	RIGHT	8.4	A	9.4	A	7.7	A
WB	LEFT	30.3	C	33.2	C	43.0	D
	THRU	23.1	C	N/A	N/A	32.3	C
	RIGHT	5.8	A	†	N/A	17.8	B
NB	LEFT	90.4	F	15.1	B	24.3	C
	THRU	15.0	B	23.8	C	24.5	C
	RIGHT	14.4	B	9.1	A	9.1	A
SB	LEFT	43.3	D	32.5	C	39.6	D
	THRU	32.3	C	17.1	B	18.8	B
	RIGHT	31.4	C	1.7	A	7.3	A
INTERSECTION		33.1	C	43.3 *	D	24.6	C

* Total intersection delay is for all movements excluding right-turn movements.
† See Table 7-16 for new ramp intersection delay.

Table 7-15 – 2012 PM Peak Alternative 3

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	18.2	B	85.8	F	51.1	D
	THRU	24.3	C	N/A	N/A	38.8	D
	RIGHT	10.0	A	2.3	A	18.2	B
WB	LEFT	27.1	C	21.8	C	44.1	D
	THRU	16.7	B	N/A	N/A	36.4	D
	RIGHT	3.2	A	†	N/A	19.9	B
NB	LEFT	76.3	E	12.9	B	45.2	D
	THRU	16.2	B	3.5	A	35.8	C
	RIGHT	5.0	A	2.7	A	17.1	B
SB	LEFT	40.1	D	31.2	C	36.7	D
	THRU	20.9	C	16.7	B	23.7	C
	RIGHT	7.4	A	1.2	A	10.5	B
INTERSECTION		21.7	C	23.0 *	C	33.5	C

* Total intersection delay is for all movements excluding right-turn movements.
† See Table 7-16 for new ramp intersection delay.

Table 7-16 – New SB I-15 Ramp Intersection @ Buena Vista - Alternative 3

Traffic Movement		2007 AM Peak		2007 PM Peak		2012 AM Peak		2012 PM Peak	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB THRU		1.0	A	1.9	A	0.9	A	1.9	A
WB THRU		0.4	A	0.1	A	0.4	A	0.1	A
NB	LEFT	9.3	A	11.5	B	15.3	B	11.2	B
	RIGHT	2.8	A	6.9	A	5.7	A	5.7	A
INTERSECTION		1.6	A	2.2	A	2.1	A	2.2	A

Table 7-17 – 2007 AM Peak Alternative 4

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	16.4	B	27.0	C	27.3	C
	THRU	28.3	C	N/A	N/A	22.0	C
	RIGHT	5.8	A	2.3	A	7.6	A
WB	LEFT	67.3	E	27.2	C	34.7	C
	THRU	24.7	C	N/A	N/A	28.5	C
	RIGHT	3.5	A	1.9	A	7.2	A
NB	LEFT	17.9	B	16.0	B	27.5	C
	THRU	7.4	A	3.6	A	21.3	C
	RIGHT	4.7	A	2.9	A	5.4	A
SB	LEFT	44.3	D	20.9	C	28.9	C
	THRU	24.7	C	8.7	A	15.7	B
	RIGHT	10.2	B	2.4	A	8.5	A
INTERSECTION		19.8	B	13.6 *	B	19.4	B

* Total intersection delay is for all movements excluding right-turn movements.

Table 7-18 – 2007 PM Peak Alternative 4

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	25.4	C	29.6	C	47.7	D
	THRU	21.8	C	N/A	N/A	29.3	C
	RIGHT	6.8	A	2.0	A	13.2	B
WB	LEFT	27.9	C	30.5	C	31.9	C
	THRU	23.2	C	N/A	N/A	30.2	C
	RIGHT	4.6	A	2.4	A	9.5	A
NB	LEFT	131.1	F	7.6	A	33.5	C
	THRU	11.5	B	1.8	A	28.9	C
	RIGHT	8.2	A	2.9	A	11.5	B
SB	LEFT	53.6	D	30.2	C	37.1	D
	THRU	23.0	C	16.4	B	17.4	B
	RIGHT	8.1	A	2.7	A	7.3	A
INTERSECTION		30.6	C	13.5 *	B	26.8	C

* Total intersection delay is for all movements excluding right-turn movements.

Table 7-19 – 2012 AM Peak Alternative 4

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	21.4	C	25.2	C	40.2	D
	THRU	24.1	C	N/A	N/A	24.4	C
	RIGHT	7.1	A	2.3	A	10.3	B
WB	LEFT	84.7	F	23.6	C	28.3	C
	THRU	31.4	C	N/A	N/A	26.8	C
	RIGHT	5.9	A	1.8	A	7.7	A
NB	LEFT	36.0	C	17.5	B	26.2	C
	THRU	8.5	A	2.9	A	24.9	C
	RIGHT	4.8	A	3.0	A	7.4	A
SB	LEFT	51.1	D	22.8	C	27.9	C
	THRU	25.0	C	10.5	B	18.8	B
	RIGHT	15.7	B	2.8	A	7.2	A
INTERSECTION		28.1	C	13.2 *	B	21.3	C

* Total intersection delay is for all movements excluding right-turn movements.

Table 7-20 – 2012 PM Peak Alternative 4

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	28.6	C	34.2	C	75.2	E
	THRU	26.5	C	N/A	N/A	39.1	D
	RIGHT	9.2	A	2.8	A	20.3	C
WB	LEFT	39.3	D	33.4	C	47.9	D
	THRU	22.1	C	N/A	N/A	45.5	D
	RIGHT	2.6	A	1.6	A	14.3	B
NB	LEFT	62.3	E	9.5	A	78.6	E
	THRU	11.9	B	3.1	A	58.3	E
	RIGHT	6.7	A	2.5	A	34.9	C
SB	LEFT	51.2	D	31.9	C	61.9	E
	THRU	23.2	C	18.1	B	22.5	C
	RIGHT	7.4	A	2.9	A	9.7	A
INTERSECTION		23.3	C	15.3 *	B	44.3	D

* Total intersection delay is for all movements excluding right-turn movements.

Table 7-21 – 2007 AM Peak Alternative 6

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	36.4	D	48.8	D	30.4	C
	THRU	31.0	C	N/A	N/A	25.3	C
	RIGHT	8.5	A	1.8	A	7.4	A
WB	LEFT	58.6	E	20.5	C	35.6	C
	THRU	24.9	C	N/A	N/A	26.8	C
	RIGHT	4.8	A	1026.1	F	8.0	A
NB	LEFT	75.2	E	13.0	B	26.7	C
	THRU	18.0	B	10.5	B	22.8	C
	RIGHT	4.8	A	3.6	A	6.9	A
SB	LEFT	40.0	D	27.2	C	24.9	C
	THRU	26.4	C	13.8	B	13.1	B
	RIGHT	19.5	B	1.7	A	6.7	A
INTERSECTION		33.6	C	17.3 *	B	19.6	B

* Total intersection delay is for all movements excluding right-turn movements.

Table 7-22 – 2007 PM Peak Alternative 6

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	13.7	B	31.9	C	35.4	C
	THRU	22.9	C	N/A	N/A	30.8	C
	RIGHT	8.4	A	1.9	A	12.4	B
WB	LEFT	26.7	C	29.3	C	40.9	D
	THRU	17.3	B	N/A	N/A	33.1	C
	RIGHT	3.7	A	4.3	A	5.7	A
NB	LEFT	64.8	E	14.2	B	34.3	C
	THRU	14.5	B	4.7	A	25.6	C
	RIGHT	7.9	A	2.7	A	10.8	B
SB	LEFT	42.1	D	28.9	C	39.5	D
	THRU	24.9	C	11.6	B	21.7	C
	RIGHT	11.4	B	1.2	A	8.2	A
INTERSECTION		22.6	C	15.3 *	B	27.3	C

* Total intersection delay is for all movements excluding right-turn movements.

Table 7-23 – 2012 AM Peak Alternative 6

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	24.3	C	211.0	F	41.5	D
	THRU	32.3	C	N/A	N/A	32.7	C
	RIGHT	10.0	A	8.1	A	10.8	B
WB	LEFT	50.7	D	36.4	D	38.5	D
	THRU	29.2	C	N/A	N/A	31.0	C
	RIGHT	5.8	A	299.3	F	10.5	B
NB	LEFT	87.9	F	17.2	B	25.9	C
	THRU	35.6	C	17.8	B	22.3	C
	RIGHT	25.6	C	3.8	A	9.6	A
SB	LEFT	44.0	D	26.1	C	37.5	D
	THRU	38.0	D	16.8	B	20.2	C
	RIGHT	29.2	C	1.9	A	9.1	A
INTERSECTION		42.8	D	39.8 *	D	24.1	C

* Total intersection delay is for all movements excluding right-turn movements.

Table 7-24 – 2012 PM Peak Alternative 6

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	16.0	B	89.3	F	53.1	D
	THRU	20.0	B	N/A	N/A	37.7	D
	RIGHT	11.8	B	2.2	A	25.0	C
WB	LEFT	23.9	C	29.7	C	40.7	D
	THRU	21.2	C	N/A	N/A	32.7	C
	RIGHT	3.2	A	308.6	F	14.2	B
NB	LEFT	115.5	F	13.8	B	65.8	E
	THRU	15.4	B	15.2	B	41.1	D
	RIGHT	25.7	C	3.6	A	14.7	B
SB	LEFT	41.8	D	29.1	C	41.9	D
	THRU	26.5	C	12.7	B	24.3	C
	RIGHT	19.1	B	1.4	A	10.6	B
INTERSECTION		29.1	C	24.1 *	C	35.8	C

* Total intersection delay is for all movements excluding right-turn movements.

Table 7-25 – 2007 AM Peak Alternative 7

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	15.5	B	25.3	C	36.0	C
	THRU	21.7	C	N/A	N/A	21.1	C
	RIGHT	7.3	A	2.1	A	6.8	A
WB	LEFT	17.8	B	23.7	C	30.2	C
	THRU	20.9	C	N/A	N/A	27.4	C
	RIGHT	3.4	A	2.1	A	7.3	A
NB	LEFT	16.2 **	B	14.3	B	24.5	C
	THRU	5.1	A	3.5	A	20.3	C
	RIGHT	2.4	A	2.7	A	5.9	A
SB	LEFT	25.6	C	28.8	C	33.2	C
	THRU	8.3	A	12.3	B	19.9	B
	RIGHT	5.6 **	A	1.6	A	6.8	A
INTERSECTION		9.5	A	13.6 *	B	19.7	B

* Total intersection delay is for all movements excluding right-turn movements.
** Peak Hour Delay for the turning movements at the Bypass Road.

Table 7-26 – 2007 PM Peak Alternative 7

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	18.2	B	34.3	C	42.8	D
	THRU	19.0	B	N/A	N/A	27.7	C
	RIGHT	7.2	A	2.1	A	11.3	B
WB	LEFT	34.6	C	29.7	C	46.5	D
	THRU	21.1	C	N/A	N/A	48.2	D
	RIGHT	3.6	A	1.7	A	15.9	B
NB	LEFT	6.1 **	A	16.6	B	34.1	C
	THRU	9.7	A	4.0	A	27.2	C
	RIGHT	3.0	A	2.3	A	8.4	A
SB	LEFT	29.6	C	27.8	C	32.9	C
	THRU	12.0	B	13.9	B	21.8	C
	RIGHT	4.9 **	A	1.0	A	13.5	B
INTERSECTION		12.4	B	16.2 *	B	30.0	C

* Total intersection delay is for all movements excluding right-turn movements.
** Peak Hour Delay for the turning movements at the Bypass Road.

Table 7-27 – 2012 AM Peak Alternative 7

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	16.2	B	25.7	C	35.6	C
	THRU	17.8	B	N/A	N/A	22.7	C
	RIGHT	7.3	A	2.3	A	11.8	B
WB	LEFT	16.8	B	24.2	C	38.4	D
	THRU	19.4	B	N/A	N/A	27.3	C
	RIGHT	2.8	A	2.0	A	7.3	A
NB	LEFT	17.6 **	B	15.8	B	28.8	C
	THRU	5.2	A	3.8	A	24.7	C
	RIGHT	3.1	A	3.0	A	6.6	A
SB	LEFT	25.2	C	29.8	C	30.5	C
	THRU	9.8	A	14.1	B	18.2	B
	RIGHT	5.8 **	A	1.4	A	6.7	A
INTERSECTION		9.3	A	14.5 *	B	21.8	C

* Total intersection delay is for all movements excluding right-turn movements.
** Peak Hour Delay for the turning movements at the Bypass Road.

Table 7-28 – 2012 PM Peak Alternative 7

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	21.0	C	29.4	C	60.9	E
	THRU	13.7	B	N/A	N/A	34.6	C
	RIGHT	7.2	A	1.9	A	21.0	C
WB	LEFT	27.7	C	26.9	C	45.0	D
	THRU	16.2	B	N/A	N/A	38.1	D
	RIGHT	4.7	A	1.6	A	12.8	B
NB	LEFT	7.7 **	A	14.9	B	55.6	E
	THRU	13.9	B	1.4	A	34.8	C
	RIGHT	3.3	A	2.7	A	11.9	B
SB	LEFT	39.2	D	26.6	C	36.7	D
	THRU	16.2	B	14.2	B	23.8	C
	RIGHT	4.7 **	A	1.1	A	14.5	B
INTERSECTION		13.2	B	14.8 *	B	35.0	C

* Total intersection delay is for all movements excluding right-turn movements.
** Peak Hour Delay for the turning movements at the Bypass Road.

8.0 CONCEPTUAL COST ANALYSIS

Conceptual layouts were developed and used to prepare a cost estimate for each alternative chosen to advance. The conceptual designs can be found in Appendix A. The following tables outline the costs associated with these alternatives. Breakdowns of the costs are included in Appendix B. The unit prices used in the cost estimates were derived from The Utah Department of Transportation's 2007 average low unit bid prices for Washington County.

Table 8-1 – Conceptual Cost Estimates

Alternative	1	3	4	6	7
Conceptual Cost Estimate	$200,000	$1,860,000	$7,630,000	$230,000	$2,520,000

9.0 CONCLUSIONS AND RECOMMENDATIONS

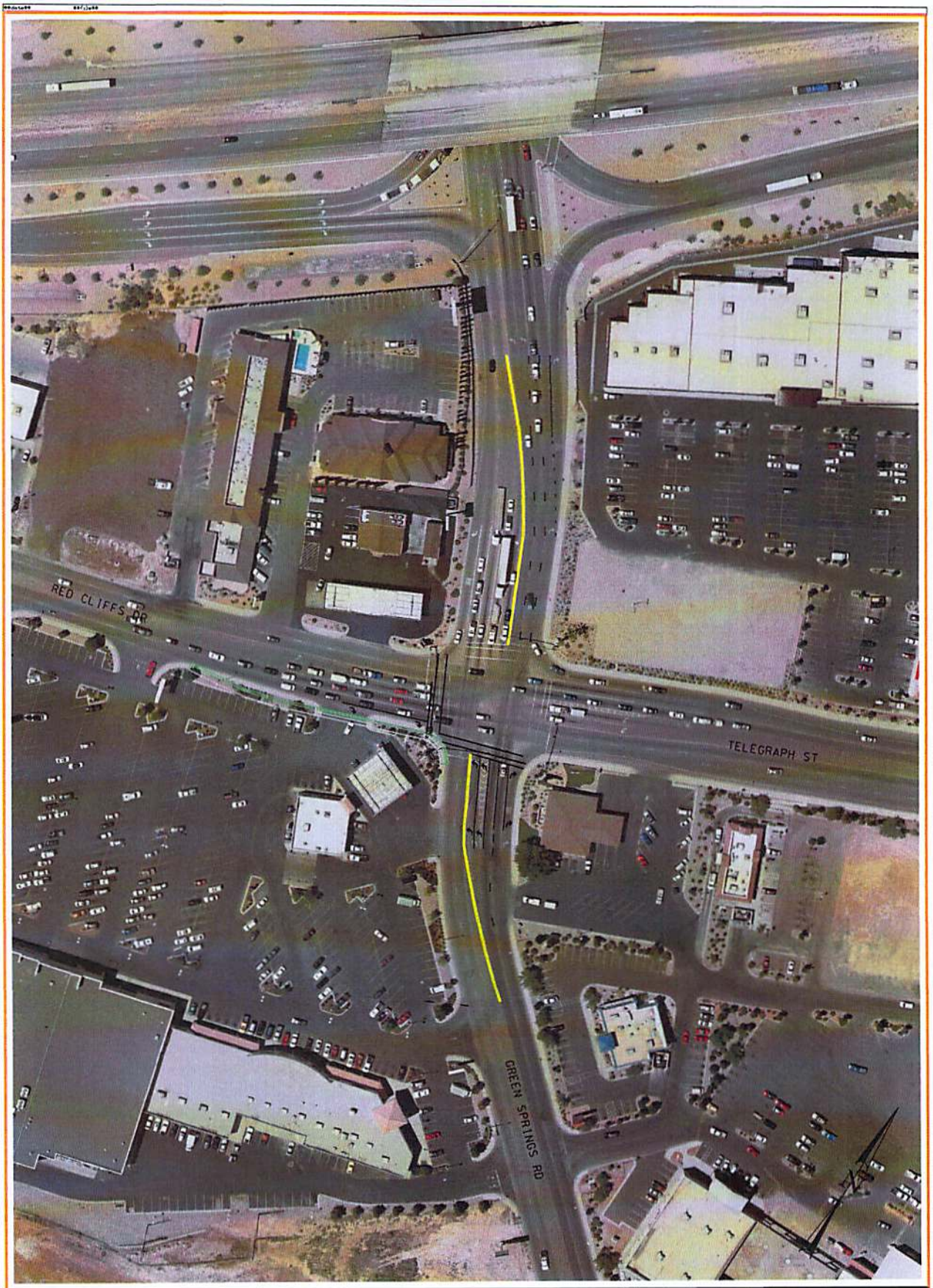
To obtain a better representation of the best alternative the average corridor delay saved was calculated. This was calculated using the average corridor delays of the AM and PM peak for existing conditions and for each alternative in 2017. The average corridor delay saved is the difference between the existing conditions delay and the particular alternative delay. This average delay saved was divided into the total construction cost for each Alternative to obtain the construction cost per sec of delay saved, as shown in Table 9-1.

Table 9-1– Construction Cost per Second of Delay Saved

Alternative	Existing	1	3	4	6	7
Total Construction Cost	N/A	$200,000	$1,860,000	$7,630,000	$230,000	$2,520,000
Avg Corridor Delay	190.6 s/veh	136.7 s/veh	72.7 s/veh	117.7 s/veh	101.9 s/veh	100.8 s/veh
Avg Corridor Delay Savings	N/A	53.9 s/veh	117.9 s/veh	72.9 s/veh	88.7 s/veh	89.8 s/veh
Cost/sec Delay Saved	N/A	$3,714	$15,783	$104,736	$2,594	$28,078

Based upon this table the cheapest alternative to construct would be Alternative 6. The recommended alternative, however, is Alternative 3. Constructing Alternative 3 will decrease the delay occurring due to the high NB left-turn volume at Buena Vista and better decrease the overall delay for vehicles traveling through the corridor.

APPENDIX A
CONCEPTUAL PLANS



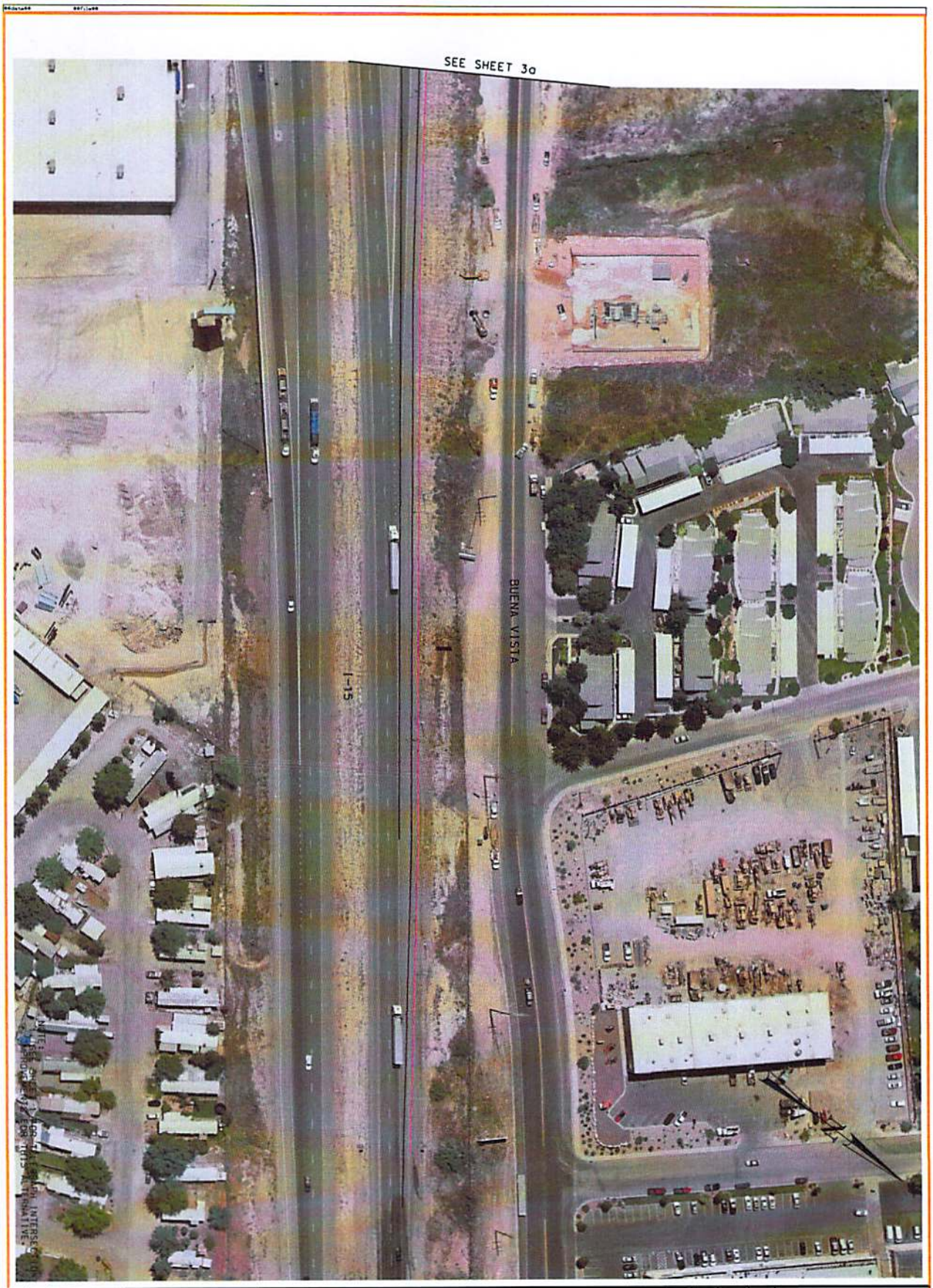
SHEET NO. 1	WASHINGTON COUNTY	GREEN SPRINGS ROAD TELEGRAPH TO BUENA VISTA ALTERNATIVE 1	WASHINGTON CITY, UTAH		
		PROJECT NUMBER	APPROVAL RECOMM. DATE PROJECT DESIGN ENGINEER APPROVED FOR USE BY UDOT DATE PRECONSTRUCTION ENGINEER	DESIGN XXX MM/YY CHECK XXX MM/YY DRAWN XXX MM/YY CHECK XXX MM/YY QUANT. XXX MM/YY CHECK XXX MM/YY	REVIEW DATE MM/DD/YY BY XXX

NO.	DATE	DESIGN CHANGE REQ. BY	MAPS CORR. BY	PARCELS AFFECTED	REQUEST BY	REMARKS
		ORIGINAL SUBMISSION FOR AUTHORIZATION				
	DATE	REVISIONS				

NOTE:
SEE SHEET 1 FOR TELEGRAPH INTERSECTION IMPROVEMENTS FOR THIS ALTERNATIVE.

SHEET NO. 3a	WASHINGTON COUNTY	GREEN SPRINGS ROAD TELEGRAPH TO BUENA VISTA ALTERNATIVE 3	WASHINGTON CITY, UTAH		
		PROJECT NUMBER	APPROVAL RECOMM. DATE PROJECT DESIGN ENGINEER APPROVED FOR USE BY UDOT DATE PRECONSTRUCTION ENGINEER	DESIGN XXX MM/YY DRAWN XXX MM/YY QUANT. XXX MM/YY CHECK XXX MM/YY CHECK XXX MM/YY CHECK XXX MM/YY	REVIEW DATE MM/DD/YY BY XXX

NO.	DATE	DESIGN REV. BY	MAPS CORR. BY	PARCELS AFFECTED	REQUEST BY	REMARKS
		ORIGINAL SUBMISSION FOR AUTHORIZATION				
	DATE	REVISIONS				



SHEET NO. 3b	WASHINGTON COUNTY	GREEN SPRINGS ROAD TELEGRAPH TO BUENA VISTA ALTERNATIVE 3b	WASHINGTON CITY, UTAH		
		PROJECT NUMBER	APPROVAL RECOMM. DATE PROJECT DESIGN ENGINEER APPROVED FOR USE BY UDOT DATE PRECONSTRUCTION ENGINEER	DESIGN XXX MM/YY CHECK XXX MM/YY DRAWN XXX MM/YY CHECK XXX MM/YY QUANT. XXX MM/YY CHECK XXX MM/YY	REVIEW DATE MM/DD/YY BY XXX

NO.	DATE	DESIGN REV. BY	MAPS COMP. BY	PARCELS INTERCOM.	REQUEST R/W	REMARKS
						ORIGINAL SUBMISSION FOR AUTHORIZATION
	DATE					REVISIONS

NOTE:
1. SEE SHEET 1 FOR TELEGRAPH INTERSECTION IMPROVEMENTS FOR THIS ALTERNATIVE.

SHEET NO. 4D	WASHINGTON COUNTY	GREEN SPRINGS ROAD TELEGRAPH TO BUENA VISTA ALTERNATIVE 4	WASHINGTON CITY, UTAH
		PROJECT NUMBER	APPROVAL RECOMM. DATE PROJECT DESIGN ENGINEER APPROVED FOR USE BY UDOT DATE PRECONSTRUCTION ENGINEER

DESIGN XXX MM/YY	CHECK XXX MM/YY	REVIEW	
DRAWN XXX MM/YY	CHECK XXX MM/YY	DATE MM/DD/YY	
QUANT. XXX MM/YY	CHECK XXX MM/YY	BY XXX	

NO.	DATE	DESIGN REQ. BY	MAPS COMP. BY	PARCELS APPROVED	REQUEST BY	REMARKS
		ORIGINAL SUBMISSION FOR AUTHORIZATION				
	DATE	REVISIONS				

Table 7-21 – 2007 AM Peak Alternative 6

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	36.4	D	48.8	D	30.4	C
	THRU	31.0	C	N/A	N/A	25.3	C
	RIGHT	8.5	A	1.8	A	7.4	A
WB	LEFT	58.6	E	20.5	C	35.6	C
	THRU	24.9	C	N/A	N/A	26.8	C
	RIGHT	4.8	A	1026.1	F	8.0	A
NB	LEFT	75.2	E	13.0	B	26.7	C
	THRU	18.0	B	10.5	B	22.8	C
	RIGHT	4.8	A	3.6	A	6.9	A
SB	LEFT	40.0	D	27.2	C	24.9	C
	THRU	26.4	C	13.8	B	13.1	B
	RIGHT	19.5	B	1.7	A	6.7	A
INTERSECTION		33.6	C	17.3 *	B	19.6	B

* Total intersection delay is for all movements excluding right-turn movements.

Table 7-22 – 2007 PM Peak Alternative 6

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	13.7	B	31.9	C	35.4	C
	THRU	22.9	C	N/A	N/A	30.8	C
	RIGHT	8.4	A	1.9	A	12.4	B
WB	LEFT	26.7	C	29.3	C	40.9	D
	THRU	17.3	B	N/A	N/A	33.1	C
	RIGHT	3.7	A	4.3	A	5.7	A
NB	LEFT	64.8	E	14.2	B	34.3	C
	THRU	14.5	B	4.7	A	25.6	C
	RIGHT	7.9	A	2.7	A	10.8	B
SB	LEFT	42.1	D	28.9	C	39.5	D
	THRU	24.9	C	11.6	B	21.7	C
	RIGHT	11.4	B	1.2	A	8.2	A
INTERSECTION		22.6	C	15.3 *	B	27.3	C

* Total intersection delay is for all movements excluding right-turn movements.

Table 7-23 – 2012 AM Peak Alternative 6

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	24.3	C	211.0	F	41.5	D
	THRU	32.3	C	N/A	N/A	32.7	C
	RIGHT	10.0	A	8.1	A	10.8	B
WB	LEFT	50.7	D	36.4	D	38.5	D
	THRU	29.2	C	N/A	N/A	31.0	C
	RIGHT	5.8	A	299.3	F	10.5	B
NB	LEFT	87.9	F	17.2	B	25.9	C
	THRU	35.6	C	17.8	B	22.3	C
	RIGHT	25.6	C	3.8	A	9.6	A
SB	LEFT	44.0	D	26.1	C	37.5	D
	THRU	38.0	D	16.8	B	20.2	C
	RIGHT	29.2	C	1.9	A	9.1	A
INTERSECTION		42.8	D	39.8 *	D	24.1	C

* Total intersection delay is for all movements excluding right-turn movements.

Table 7-24 – 2012 PM Peak Alternative 6

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	16.0	B	89.3	F	53.1	D
	THRU	20.0	B	N/A	N/A	37.7	D
	RIGHT	11.8	B	2.2	A	25.0	C
WB	LEFT	23.9	C	29.7	C	40.7	D
	THRU	21.2	C	N/A	N/A	32.7	C
	RIGHT	3.2	A	308.6	F	14.2	B
NB	LEFT	115.5	F	13.8	B	65.8	E
	THRU	15.4	B	15.2	B	41.1	D
	RIGHT	25.7	C	3.6	A	14.7	B
SB	LEFT	41.8	D	29.1	C	41.9	D
	THRU	26.5	C	12.7	B	24.3	C
	RIGHT	19.1	B	1.4	A	10.6	B
INTERSECTION		29.1	C	24.1 *	C	35.8	C

* Total intersection delay is for all movements excluding right-turn movements.

Table 7-25 – 2007 AM Peak Alternative 7

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	15.5	B	25.3	C	36.0	C
	THRU	21.7	C	N/A	N/A	21.1	C
	RIGHT	7.3	A	2.1	A	6.8	A
WB	LEFT	17.8	B	23.7	C	30.2	C
	THRU	20.9	C	N/A	N/A	27.4	C
	RIGHT	3.4	A	2.1	A	7.3	A
NB	LEFT	16.2 **	B	14.3	B	24.5	C
	THRU	5.1	A	3.5	A	20.3	C
	RIGHT	2.4	A	2.7	A	5.9	A
SB	LEFT	25.6	C	28.8	C	33.2	C
	THRU	8.3	A	12.3	B	19.9	B
	RIGHT	5.6 **	A	1.6	A	6.8	A
INTERSECTION		9.5	A	13.6 *	B	19.7	B

* Total intersection delay is for all movements excluding right-turn movements.
** Peak Hour Delay for the turning movements at the Bypass Road.

Table 7-26 – 2007 PM Peak Alternative 7

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	18.2	B	34.3	C	42.8	D
	THRU	19.0	B	N/A	N/A	27.7	C
	RIGHT	7.2	A	2.1	A	11.3	B
WB	LEFT	34.6	C	29.7	C	46.5	D
	THRU	21.1	C	N/A	N/A	48.2	D
	RIGHT	3.6	A	1.7	A	15.9	B
NB	LEFT	6.1 **	A	16.6	B	34.1	C
	THRU	9.7	A	4.0	A	27.2	C
	RIGHT	3.0	A	2.3	A	8.4	A
SB	LEFT	29.6	C	27.8	C	32.9	C
	THRU	12.0	B	13.9	B	21.8	C
	RIGHT	4.9 **	A	1.0	A	13.5	B
INTERSECTION		12.4	B	16.2 *	B	30.0	C

* Total intersection delay is for all movements excluding right-turn movements.
** Peak Hour Delay for the turning movements at the Bypass Road.

Table 7-27 – 2012 AM Peak Alternative 7

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	16.2	B	25.7	C	35.6	C
	THRU	17.8	B	N/A	N/A	22.7	C
	RIGHT	7.3	A	2.3	A	11.8	B
WB	LEFT	16.8	B	24.2	C	38.4	D
	THRU	19.4	B	N/A	N/A	27.3	C
	RIGHT	2.8	A	2.0	A	7.3	A
NB	LEFT	17.6 **	B	15.8	B	28.8	C
	THRU	5.2	A	3.8	A	24.7	C
	RIGHT	3.1	A	3.0	A	6.6	A
SB	LEFT	25.2	C	29.8	C	30.5	C
	THRU	9.8	A	14.1	B	18.2	B
	RIGHT	5.8 **	A	1.4	A	6.7	A
INTERSECTION		9.3	A	14.5 *	B	21.8	C

* Total intersection delay is for all movements excluding right-turn movements.
** Peak Hour Delay for the turning movements at the Bypass Road.

Table 7-28 – 2012 PM Peak Alternative 7

Traffic Movement		Buena Vista		I-15 Ramps		Telegraph	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
EB	LEFT	21.0	C	29.4	C	60.9	E
	THRU	13.7	B	N/A	N/A	34.6	C
	RIGHT	7.2	A	1.9	A	21.0	C
WB	LEFT	27.7	C	26.9	C	45.0	D
	THRU	16.2	B	N/A	N/A	38.1	D
	RIGHT	4.7	A	1.6	A	12.8	B
NB	LEFT	7.7 **	A	14.9	B	55.6	E
	THRU	13.9	B	1.4	A	34.8	C
	RIGHT	3.3	A	2.7	A	11.9	B
SB	LEFT	39.2	D	26.6	C	36.7	D
	THRU	16.2	B	14.2	B	23.8	C
	RIGHT	4.7 **	A	1.1	A	14.5	B
INTERSECTION		13.2	B	14.8 *	B	35.0	C

* Total intersection delay is for all movements excluding right-turn movements.
** Peak Hour Delay for the turning movements at the Bypass Road.

8.0 CONCEPTUAL COST ANALYSIS

Conceptual layouts were developed and used to prepare a cost estimate for each alternative chosen to advance. The conceptual designs can be found in Appendix A. The following tables outline the costs associated with these alternatives. Breakdowns of the costs are included in Appendix B. The unit prices used in the cost estimates were derived from The Utah Department of Transportation's 2007 average low unit bid prices for Washington County.

Table 8-1 – Conceptual Cost Estimates

Alternative	1	3	4	6	7
Conceptual Cost Estimate	$200,000	$1,860,000	$7,630,000	$230,000	$2,520,000

9.0 CONCLUSIONS AND RECOMMENDATIONS

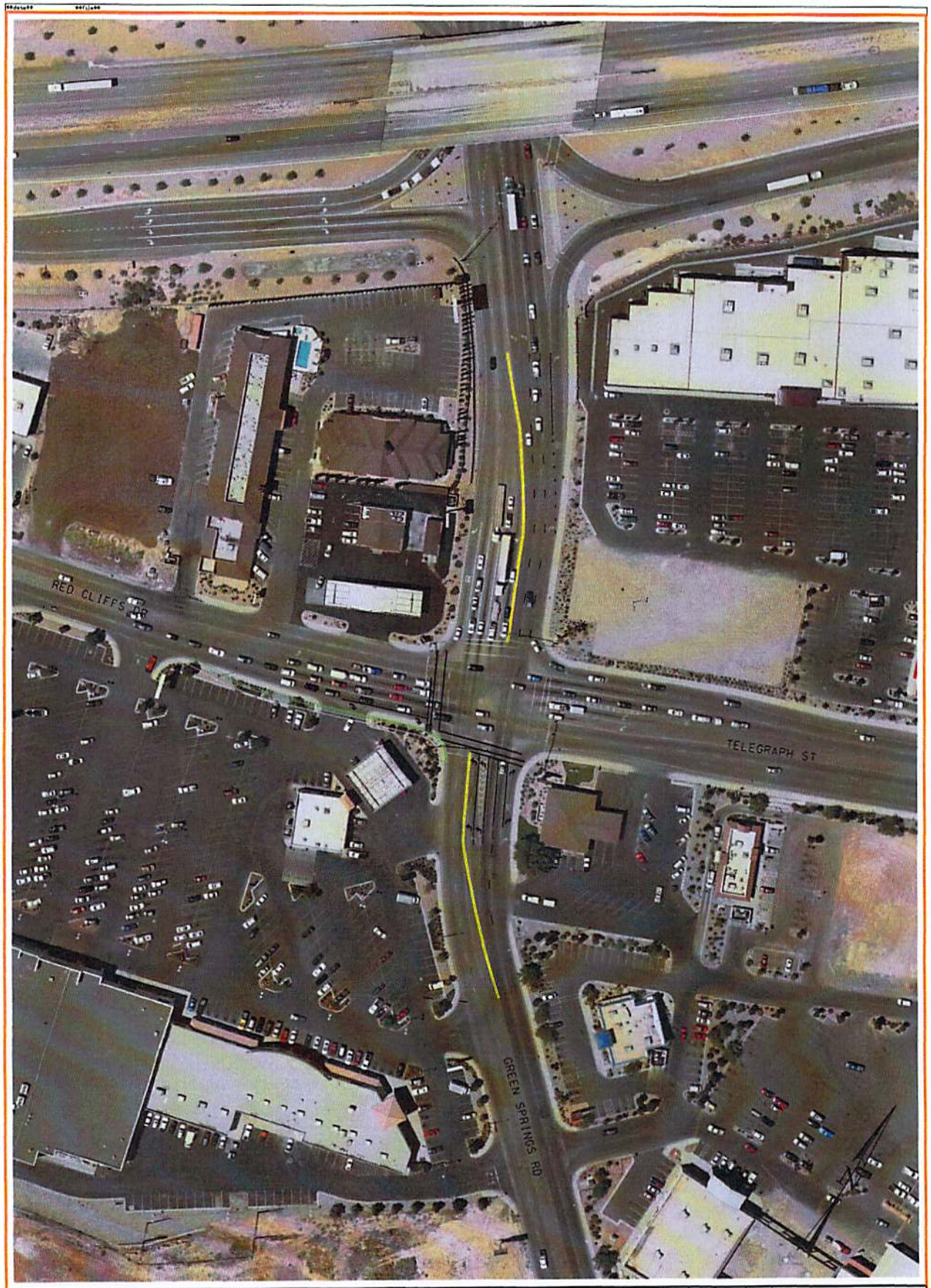
To obtain a better representation of the best alternative the average corridor delay saved was calculated. This was calculated using the average corridor delays of the AM and PM peak for existing conditions and for each alternative in 2017. The average corridor delay saved is the difference between the existing conditions delay and the particular alternative delay. This average delay saved was divided into the total construction cost for each Alternative to obtain the construction cost per sec of delay saved, as shown in Table 9-1.

Table 9-1– Construction Cost per Second of Delay Saved

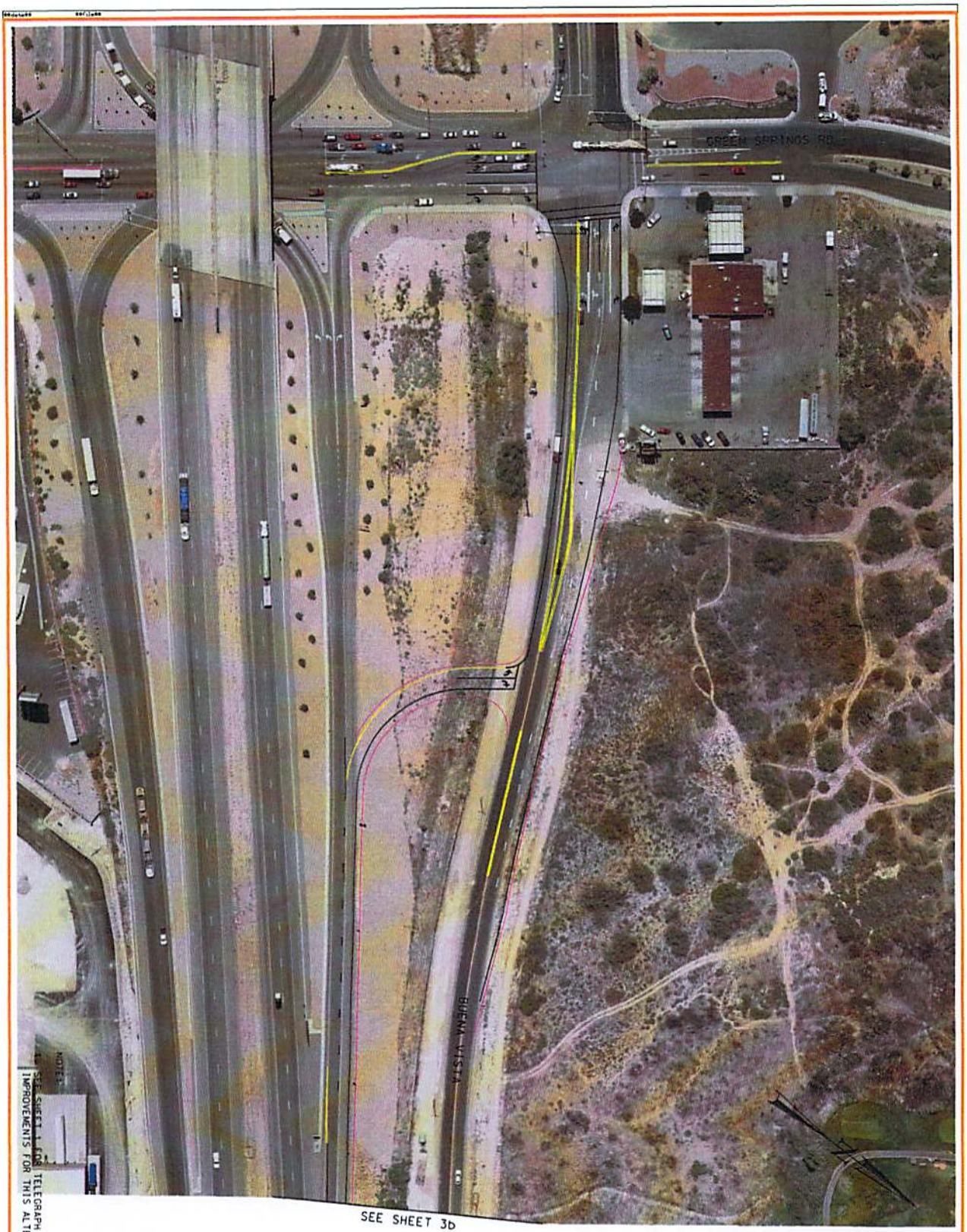
Alternative	Existing	1	3	4	6	7
Total Construction Cost	N/A	$200,000	$1,860,000	$7,630,000	$230,000	$2,520,000
Avg Corridor Delay	190.6 s/veh	136.7 s/veh	72.7 s/veh	117.7 s/veh	101.9 s/veh	100.8 s/veh
Avg Corridor Delay Savings	N/A	53.9 s/veh	117.9 s/veh	72.9 s/veh	88.7 s/veh	89.8 s/veh
Cost/sec Delay Saved	N/A	$3,714	$15,783	$104,736	$2,594	$28,078

Based upon this table the cheapest alternative to construct would be Alternative 6. The recommended alternative, however, is Alternative 3. Constructing Alternative 3 will decrease the delay occurring due to the high NB left-turn volume at Buena Vista and better decrease the overall delay for vehicles traveling through the corridor.

APPENDIX A
CONCEPTUAL PLANS



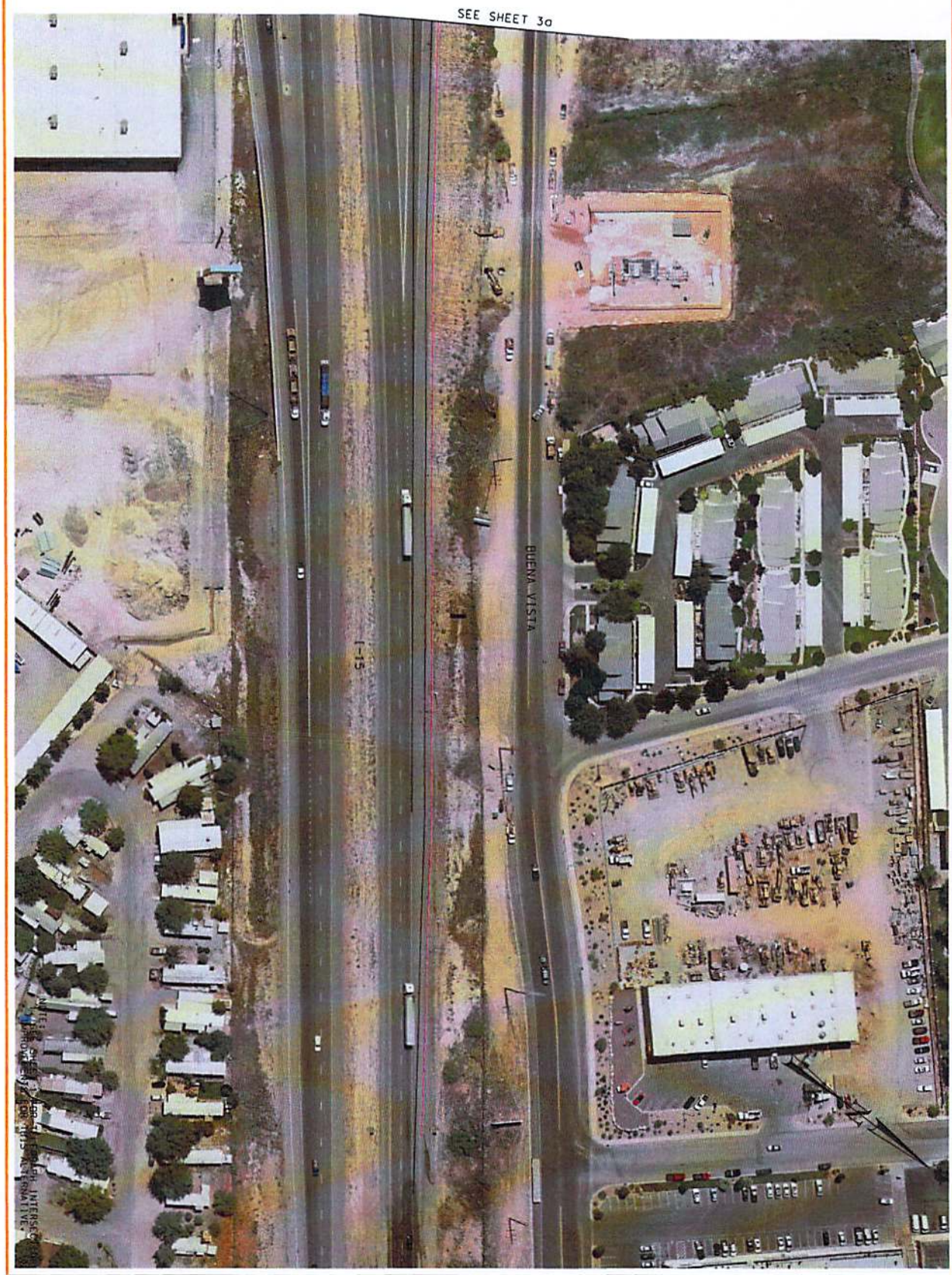
SHEET No. 1	WASHINGTON COUNTY	GREEN SPRINGS ROAD TELEGRAPH TO BUENA VISTA ALTERNATIVE 1	WASHINGTON CITY, UTAH										
		PROJECT NUMBER	APPROVAL RECOMM. DATE PROJECT DESIGN ENGINEER	DESIGN XXX MM/YY	CHECK XXX MM/YY	REVIEW	NO.	DATE	DESIGN REV. BY	MAPS COMP. BY	PARCELS AFFECTED	REQUEST BY	REMARKS
			APPROVED FOR USE BY UDOT DATE PRECONSTRUCTION ENGINEER	DRAWN XXX MM/YY	CHECK XXX MM/YY	DATE MM/DD/YY			ORIGINAL SUBMISSION FOR AUTHORIZATION				
				QUANT. XXX MM/YY	CHECK XXX MM/YY	BY XXX		DATE	REVISIONS				



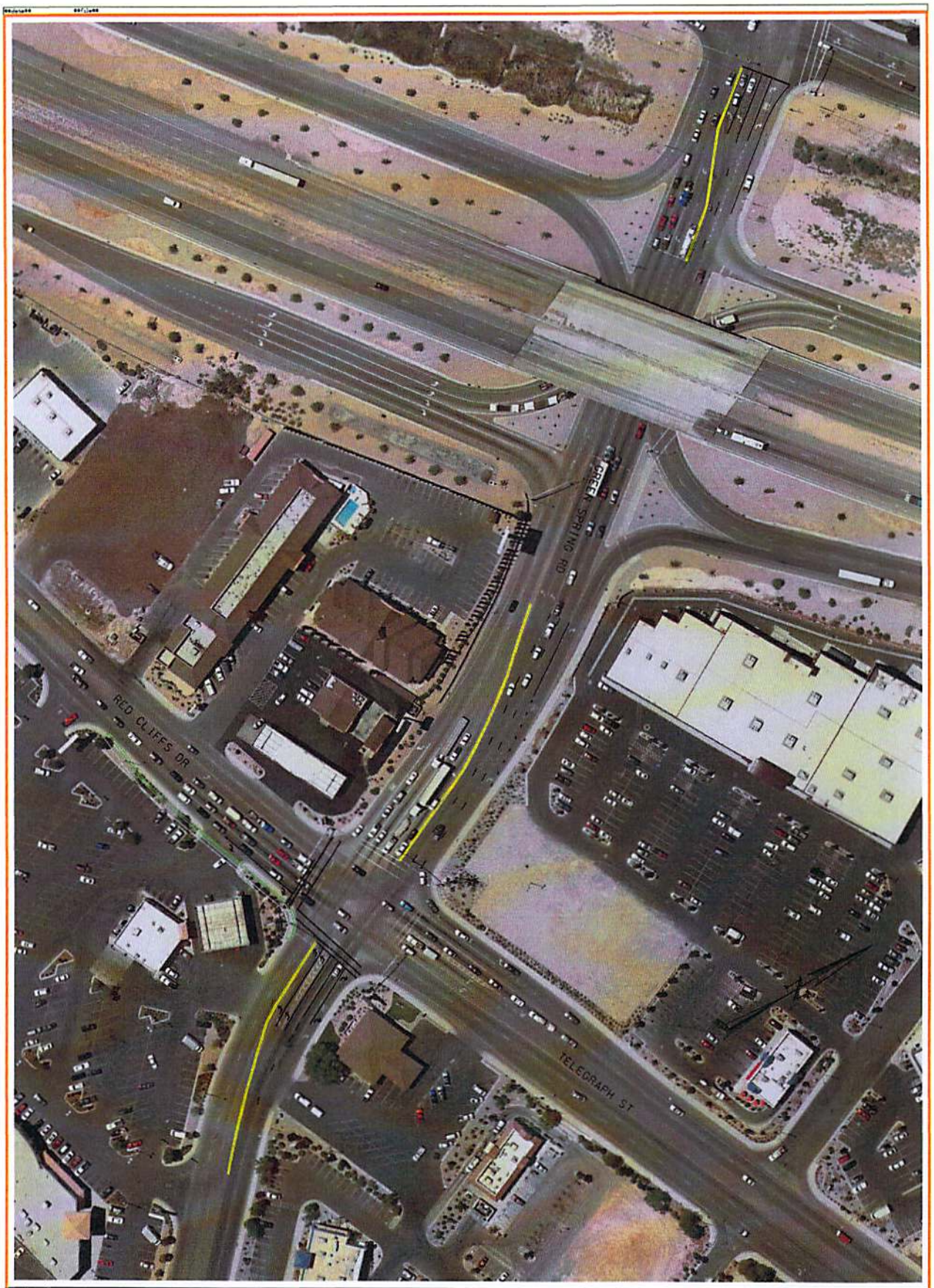
NOTE:
1. SEE SHEET 1 FOR TELEGRAPH INTERSECTION IMPROVEMENTS FOR THIS ALTERNATIVE.

SHEET NO. 3a	WASHINGTON COUNTY	GREEN SPRINGS ROAD TELEGRAPH TO BUENA VISTA ALTERNATIVE 3	WASHINGTON CITY, UTAH		
		PROJECT NUMBER	APPROVAL RECOMM. DATE PROJECT DESIGN ENGINEER APPROVED FOR USE BY UDOT DATE PRECONSTRUCTION ENGINEER	DESIGN XXX MM/YY CHECK XXX MM/YY DRAWN XXX MM/YY CHECK XXX MM/YY QUANT. XXX MM/YY CHECK XXX MM/YY	REVIEW DATE MM/DD/YY BY XXX

NO.	DATE	DESIGN REV. BY	MAPS CORR. BY	PARCELS AFFECTED	REQUEST BY	REMARKS
		ORIGINAL SUBMISSION FOR AUTHORIZATION				
	DATE	REVISIONS				



SHEET NO. 3b	WASHINGTON COUNTY	GREEN SPRINGS ROAD TELEGRAPH TO BUENA VISTA ALTERNATIVE 3b	WASHINGTON CITY, UTAH	APPROVAL RECOMM. DATE PROJECT DESIGN ENGINEER	DESIGN XXX MM/YY	CHECK XXX MM/YY	REVIEW	NO.	DATE	DESIGN REV. BY	MAPS COMP. BY	PARCELS AFFECTED	REQUEST BY	REMARKS
		PROJECT NUMBER		APPROVED FOR USE BY UDOT DATE PRECONSTRUCTION ENGINEER	DRAWN XXX MM/YY	CHECK XXX MM/YY	DATE MM/DD/YY			ORIGINAL SUBMISSION FOR AUTHORIZATION				
					QUANT. XXX MM/YY	CHECK XXX MM/YY	BY XXX		DATE	REVISIONS				



SHEET NO. 5	WASHINGTON COUNTY	GREEN SPRINGS ROAD TELEGRAPH TO BUENA VISTA ALTERNATIVE 6	WASHINGTON CITY, UTAH									
		PROJECT NUMBER	APPROVAL RECOMM. DATE PROJECT DESIGN ENGINEER	DESIGN XXX MM/YY	CHECK XXX MM/YY	REVIEW	NO.	DATE	DESIGN REV. BY	MAPS CORR. BY	PARCELS AFFECTED	REQUEST BY	REMARKS
			APPROVED FOR USE BY UDOT DATE PRECONSTRUCTION ENGINEER	DRAWN XXX MM/YY	CHECK XXX MM/YY	DATE MM/DD/YY			ORIGINAL SUBMISSION FOR AUTHORIZATION				
				QUANT. XXX MM/YY	CHECK XXX MM/YY	BY XXX		DATE	REVISIONS				

NOTE:

1. SEE SHEET 1 FOR TELEGRAPH INTERSECTION IMPROVEMENTS FOR THIS ALTERNATIVE.

GREEN SPRINGS ROAD
TELEGRAPH TO BUENA VISTA
ALTERNATIVE 7a

WASHINGTON CITY, UTAH

DESIGN XXX MM/YY	CHECK XXX MM/YY	REVIEW	
DRAWN XXX MM/YY	CHECK XXX MM/YY	DATE MM/DD/YY	BY XXX
QUANT. XXX MM/YY	CHECK XXX MM/YY		

APPROVAL RECOMM.	DATE	PROJECT DESIGN ENGINEER	
APPROVED FOR USE BY USDT	DATE	PRECONSTRUCTION ENGINEER	

WASHINGTON COUNTY

PROJECT NUMBER

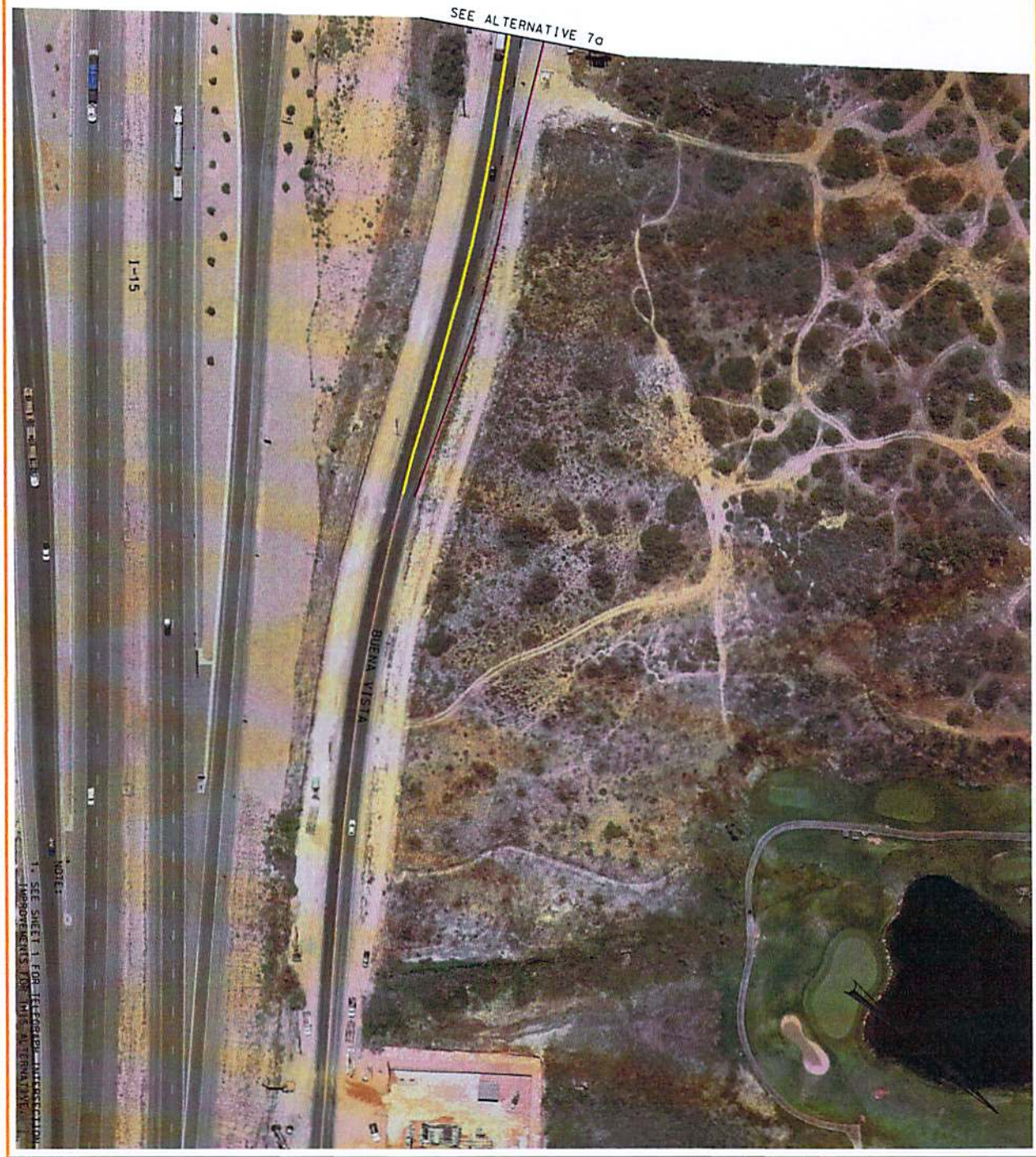
SHEET NO. 7a

REVISIONS

NO.	DATE	DESIGN BY	CHECK BY	REVIEW BY	REMARKS

ORIGINAL SUBMISSION FOR AUTHORIZATION

DATE



SHEET NO. 7b	WASHINGTON COUNTY	GREEN SPRINGS ROAD TELEGRAPH TO BUENA VISTA ALTERNATIVE 7b	WASHINGTON CITY, UTAH								
		PROJECT NUMBER	APPROVAL RECOMM. DATE PROJECT DESIGN ENGINEER	DESIGN XXX MM/YY	CHECK XXX MM/YY	REVIEW	NO.	DATE	DESIGN MAPS PARCELS REQUEST BY REV.BY COMP.BY MTS/CTD BY	REMARKS	
			APPROVED FOR USE BY UDOT DATE PRECONSTRUCTION ENGINEER	DRAWN XXX MM/YY	CHECK XXX MM/YY	DATE MM/DD/YY			ORIGINAL SUBMISSION FOR AUTHORIZATION		
				QUANT. XXX MM/YY	CHECK XXX MM/YY	BY XXX		DATE	REVISIONS		

APPENDIX B
PRELIMINARY COST ESTIMATES

GREEN SPRINGS ROAD
TELEGRAPH STREET TO BUENA VISTA
PRELIMINARY COST ESTIMATE ALTERNATIVE 1

ITEM	QUANTITY	UNIT	PRICE	TOTAL
Excavation	270	yd^3	$ 10.00	$ 2,702.78
Remove Concrete Sidewalk	240	yd^2	$ 12.00	$ 2,880.00
Remove Concrete Curb and Gutter	295	Lin ft	$ 7.00	$ 2,065.00
Remove Concrete Driveway	1	Each	$ 150.00	$ 150.00
Asphalt Pavement	2,085	ft^2	$ 5.00	$ 10,425.00
Concrete Sidewalk	200	yd^2	$ 36.00	$ 7,200.00
Concrete Curb and Gutter Type B1	330	Lin ft	$ 13.00	$ 4,290.00
Disabled Pedestrian Ramp	1	Each	$ 1,100.00	$ 1,100.00
Concrete Driveway	1	Each	$ 1,200.00	$ 1,200.00
Signing & Striping	1	Lump	$ 10,000.00	$ 10,000.00
Drainage	1	Lump	$ 20,000.00	$ 20,000.00
Landscaping	1	Lump	$ 5,000.00	$ 5,000.00
Traffic Control	1	Lump	$ 10,000.00	$ 10,000.00
Construction Survey	1	Lump	$ 5,000.00	$ 5,000.00
			SUBTOTAL (Rounded)	$ 82,000.00
	10%		MOBILIZATION	$ 8,200.00
	30%		CONTINGENCIES	$ 24,600.00
			TOTAL CONSTRUCTION	$ 114,800.00
Preliminary Engineering (10% of Construction)				$ 11,500.00
Construction Engineering (10% of Construction)				$ 11,500.00
Commercial Right-of-Way Acquisition	2,660	ft^2	$ 20.00	$ 53,200.00
			ALTERNATIVE 1 TOTAL	**$ 200,000.00**

GREEN SPRINGS ROAD
TELEGRAPH STREET TO BUENA VISTA
PRELIMINARY COST ESTIMATE ALTERNATIVE 3

ITEM	QUANTITY	UNIT		PRICE		TOTAL
Excavation	4,320	yd^3	$	10.00	$	43,199.07
Borrow	10,250	yd^3	$	30.00	$	307,500.00
Remove Concrete Sidewalk	63	yd^2	$	12.00	$	760.00
Remove Concrete Curb and Gutter	365	Lin ft	$	7.00	$	2,555.00
Remove Asphalt Pavement	5,125	ft^2	$	1.50	$	7,687.50
Asphalt Pavement	33,325	ft^2	$	5.00	$	166,625.00
Concrete Sidewalk	100	yd^2	$	36.00	$	3,600.00
Concrete Curb and Gutter Type B1	65	Lin ft	$	13.00	$	845.00
Disabled Pedestrian Ramp	1	Each	$	1,100.00	$	1,100.00
Signing & Striping	1	Lump	$	100,000.00	$	100,000.00
Drainage	1	Lump	$	100,000.00	$	100,000.00
Landscaping & Lighting	1	Lump	$	200,000.00	$	200,000.00
Traffic Control	1	Lump	$	25,000.00	$	25,000.00
Construction Survey	1	Lump	$	25,000.00	$	25,000.00
				SUBTOTAL (Rounded)	$	983,900.00
		10%		MOBILIZATION	$	98,390.00
		30%		CONTINGENCIES	$	295,170.00
				TOTAL CONSTRUCTION	$	1,377,460.00
Preliminary Engineering (10% of Construction)					$	137,800.00
Construction Engineering (10% of Construction)					$	137,800.00
Alternative 1 Total Cost					$	200,000.00
				ALTERNATIVE 3 TOTAL COST	**$**	**1,860,000.00**

GREEN SPRINGS ROAD
TELEGRAPH STREET TO BUENA VISTA
PRELIMINARY COST ESTIMATE ALTERNATIVE 6

ITEM	QUANTITY		UNIT		PRICE		TOTAL
Excavation	270		yd^3	$	10.00	$	2,702.78
Remove Concrete Sidewalk	240		yd^2	$	12.00	$	2,880.00
Remove Concrete Curb and Gutter	295		Lin ft	$	7.00	$	2,065.00
Remove Concrete Driveway	1		Each	$	150.00	$	150.00
Asphalt Pavement	2,085		ft^2	$	5.00	$	10,425.00
Concrete Sidewalk	200		yd^2	$	36.00	$	7,200.00
Concrete Curb and Gutter Type B1	330		Lin ft	$	13.00	$	4,290.00
Disabled Pedestrian Ramp	1		Each	$	1,100.00	$	1,100.00
Concrete Driveway	1		Each	$	1,200.00	$	1,200.00
Signing & Striping	1		Lump	$	20,000.00	$	20,000.00
Drainage	1		Lump	$	20,000.00	$	20,000.00
Landscaping	1		Lump	$	5,000.00	$	5,000.00
Traffic Control	1		Lump	$	10,000.00	$	10,000.00
Construction Survey	1		Lump	$	5,000.00	$	5,000.00
					SUBTOTAL (Rounded)	$	92,000.00
		10%			MOBILIZATION	$	9,200.00
		30%			CONTINGENCIES	$	27,600.00
					TOTAL CONSTRUCTION	$	128,800.00
Preliminary Engineering (10% of Construction)						$	12,900.00
Construction Engineering (10% of Construction)						$	12,900.00
Commercial Right-of-Way Acquisition	2,660		ft^2	$	25.00	$	66,500.00
					ALTERNATIVE 6 TOTAL	**$**	**230,000.00**

GREEN SPRINGS ROAD
TELEGRAPH STREET TO BUENA VISTA
PRELIMINARY COST ESTIMATE ALTERNATIVE 7

ITEM	QUANTITY	UNIT		PRICE		TOTAL
Excavation	5,315	yd^3	$	10.00	$	53,148.15
Borrow	5,000	yd^3	$	30.00	$	150,000.00
Remove Concrete Sidewalk	510	yd^2	$	12.00	$	6,120.00
Remove Concrete Curb and Gutter	1,625	Lin ft	$	7.00	$	11,375.00
Remove Asphalt Pavement	11,000	ft^2	$	1.50	$	16,500.00
Asphalt Pavement	41,000	ft^2	$	5.00	$	205,000.00
Concrete Sidewalk	470	yd^2	$	36.00	$	16,920.00
Concrete Curb and Gutter Type B1	1,530	Lin ft	$	13.00	$	19,890.00
Concrete Curb Type B5 (Median)	850	Lin ft	$	25.00	$	21,250.00
Disabled Pedestrian Ramp	5	Each	$	1,100.00	$	5,500.00
Concrete Driveway	2	Each	$	1,200.00	$	2,400.00
Signing & Striping	1	Lump	$	40,000.00	$	40,000.00
Drainage	1	Lump	$	50,000.00	$	50,000.00
Landscaping & Lighting	1	Lump	$	50,000.00	$	50,000.00
Traffic Control	1	Lump	$	40,000.00	$	40,000.00
Construction Survey	1	Lump	$	30,000.00	$	30,000.00
				SUBTOTAL (Rounded)	$	718,100.00
	10%			MOBILIZATION	$	71,810.00
	30%			CONTINGENCIES	$	215,430.00
				TOTAL CONSTRUCTION	$	1,005,340.00
Preliminary Engineering (10% of Construction)					$	100,600.00
Construction Engineering (10% of Construction)					$	100,600.00
Residential Relocation	1	Lump	$	500,000.00	$	500,000.00
Residential Right-of-Way Acquisition	13,000	ft^2	$	15.00	$	195,000.00
Commercial Right-of-Way Acquisition	16,500	ft^2	$	25.00	$	412,500.00
Alternative 1 Total Cost					$	200,000.00
				TOTAL INTERSECTION COST	**$**	**2,520,000.00**

NOTE:
1. SEE SHEET 1 FOR TELEGRAPH INTERSECTION IMPROVEMENTS FOR THIS ALTERNATIVE.

SHEET NO. 4a	WASHINGTON COUNTY	GREEN SPRINGS ROAD TELEGRAPH TO BUENA VISTA ALTERNATIVE 4	WASHINGTON CITY, UTAH		
		PROJECT NUMBER	APPROVAL RECOMM. DATE PROJECT DESIGN ENGINEER APPROVED FOR USE BY UDOT DATE PRECONSTRUCTION ENGINEER	DESIGN XXX MM/YY DRAWN XXX MM/YY QUANT. XXX MM/YY CHECK XXX MM/YY CHECK XXX MM/YY CHECK XXX MM/YY	REVIEW DATE MM/DD/YY BY XXX

NO.	DATE	DESIGN MOD. BY	MAPS CORR. BY	PARCELS AFFECTED	REQUEST BY	REMARKS
		ORIGINAL SUBMISSION FOR AUTHORIZATION				

DATE REVISIONS

GREEN SPRINGS ROAD
TELEGRAPH STREET TO BUENA VISTA
PRELIMINARY COST ESTIMATE ALTERNATIVE 4

ITEM	QUANTITY	UNIT		PRICE		TOTAL
Excavation	16,468	yd^3	$	10.00	$	164,681.48
Remove Concrete Sidewalk	1,225	yd^2	$	12.00	$	14,700.00
Remove Concrete Curb and Gutter	2,200	Lin ft	$	7.00	$	15,400.00
Remove Concrete Driveway	3	Each	$	150.00	$	450.00
Remove Asphalt Pavement	97,700	ft^2	$	1.50	$	146,550.00
Asphalt Pavement	127,040	ft^2	$	5.00	$	635,200.00
Concrete Sidewalk	2,115	yd^2	$	36.00	$	76,140.00
Concrete Curb and Gutter Type B1	3,325	Lin ft	$	13.00	$	43,225.00
Disabled Pedestrian Ramp	6	Each	$	1,100.00	$	6,600.00
Concrete Driveway	4	Each	$	1,200.00	$	4,800.00
Business Sign Relocation	1	Each	$	4,000.00	$	4,000.00
Signing & Striping	1	Lump	$	75,000.00	$	75,000.00
Drainage	1	Lump	$	100,000.00	$	100,000.00
Landscaping	1	Lump	$	500,000.00	$	500,000.00
Traffic Control	1	Lump	$	75,000.00	$	75,000.00
Signalization (Including State Furnished Items)	1	Lump	$	125,000.00	$	125,000.00
Construction Survey	1	Lump	$	40,000.00	$	40,000.00
				SUBTOTAL (Rounded)	$	2,026,700.00
	10%			MOBILIZATION	$	202,670.00
	30%			CONTINGENCIES	$	608,010.00
				TOTAL CONSTRUCTION	$	2,837,380.00
Preliminary Engineering (10% of Construction)					$	283,800.00
Construction Engineering (10% of Construction)					$	283,800.00
Commercial Right-of-Way Acquisition	121,000	ft^2	$	25.00	$	3,025,000.00
Residential Relocation	1	Lump	$	500,000.00	$	500,000.00
Comercial On Site Relocation (Gas Station - NW Corner Buena Vista)	1	Lump	$	500,000.00	$	500,000.00
Alternative 1 Total Cost					$	200,000.00
				ALTERNATIVE 4 TOTAL COST	**$**	**7,630,000.00**