

National Park Service  
U.S. Department of the Interior

Zion National Park  
Utah



---

# ZION CANYON TRANSPORTATION SYSTEM TECHNICAL ANALYSIS

National Park Service IDIQ for Transportation Services

Contract No. C2000070500

Task Order No. T2051080099

September 2009



In collaboration with Nelson|Nygaard Consulting  
and The Volpe Center



# CONTENTS



<b>Executive Summary</b>		<b>ES-1</b>
	Zion Canyon Transportation System Background Information	ES-1
	It's Time for a Check Up	ES-2
	Technical Analysis Focus	ES-2
	Financial Analysis and Related Service Planning Scenarios	ES-3
	Parking Capacity and Efficiency	ES-5
	Parking Survey Results	ES-6
	Parking Recommendations	ES-6
	Visitor Wayfinding and Communications Recommendations	ES-8
	Park Road and Springdale Streetscape Conditions	ES-8
	Pedestrian and Bicycle Connectivity, Mobility, and Safety	ES-9
	Traffic Congestion at the South Gate to Zion NP	ES-12
	Regional Transportation Planning Opportunities	ES-13
	A Call for Partnerships and Stewardship	ES-13
	How Will All These Needs Be Met?	ES-13
<b>Section 1:</b>	<b>Introduction and Background</b>	<b>I-1</b>
	Technical Analysis Background	I-1
	Overarching Purpose and Objectives of the Technical Analysis	I-2
	Overall Approach to the Project	I-3
	Elements Addressed in this Report	I-4
	Technical Advisors	I-4
	Documents Reviewed	I-4
	Overview of the Zion Canyon Shuttle System	I-4
	Context of the Technical Analysis	I-5
	Park Visitation	I-5
	Stakeholder and Community Involvement Summary	I-5
	Benefits of the Zion Canyon Shuttle System	I-II
<b>Section 2:</b>	<b>Wayfinding and Visitor Information – Analysis and Recommendations</b>	<b>2-1</b>
	Section Overview	2-1
	Objective of Analysis	2-1
	Analysis Approach	2-1
	Observations and Findings	2-2
	Springdale Parking Activities Committee	2-2
	Recommendations	2-8
<b>Section 3:</b>	<b>Parking Utilization – Analysis and Recommendations</b>	<b>3-1</b>
	Section Overview	3-1
	Objective of Analysis	3-1
	Analysis Approach	3-1
	Observations and Findings	3-2
	Recommendations	3-14

<b>Section 4: Springdale Streetscapes and Multi-Modal Connectivity – Analysis and Recommendations</b>	<b>4-1</b>
Section Overview	4-1
Objective of Analysis	4-1
Analysis Approach	4-1
Observations and Findings	4-2
Recommendations	4-10
<b>Section 5: Zion Canyon (Park) Multi-Modal Connectivity – Analysis and Recommendations</b>	<b>5-1</b>
Section Overview	5-1
Objective of Analysis	5-1
Analysis Approach	5-1
Observations and Findings	5-2
Recommendations	5-2
Additional Recommendations and Considerations	5-3
Trail Surfacing and Design Treatments	5-4
Zion Canyon Trail – A Regional Opportunity	5-4
Visual Simulations of the Potential Pa’ rus Extension	5-5
<b>Section 6: Shuttle System – Analysis and Recommendations</b>	<b>6-1</b>
Section Overview	6-1
Objective of Analysis	6-1
Analysis Approach	6-1
Observations and Findings	6-2
Recommendations	6-6
<b>Section 7: Park Entrance Area Congestion – Analysis and Recommendations</b>	<b>7-1</b>
Section Overview	7-1
Objective of Analysis	7-1
Analysis Approach	7-2
Observations and Findings	7-2
Recommendations	7-4
<b>Section 8: Partnerships and Stewardship; Regional Transportation System Connectivity</b>	<b>8-1</b>
Section Overview	8-1
Objective of Analysis	8-1
Analysis Approach	8-1
Observations and Findings	8-2
Recommendations	8-9
<b>Section 9: Financial Analysis, Action Plan, and Potential Funding Sources and Opportunities</b>	<b>9-1</b>
Section Overview	9-1
Financial Analysis and Related Service Planning Scenarios	9-1
Shuttle Vehicle Replacement	9-5
Cost Estimates for Potential Capital Projects	9-5
Funding Sources and Opportunities	9-18
<b>Section 10: References and Resources</b>	<b>10-1</b>
<b>Appendix A: Springdale Streetscape, Parking, and Shuttle Stop Inventory</b>	<b>A-1</b>
<b>Appendix B: Ridecheck &amp; Timecheck Data Sheets</b>	<b>B-1</b>
<b>Appendix C: Zion Bike on Bus Memo 1</b>	<b>C-1</b>
<b>Appendix D: Notes from Workshops</b>	<b>D-1</b>
<b>Appendix E: Photography</b>	<b>E-1</b>



## FIGURES

Figure ES-1	Scenario A	ES-3
Figure ES-2	Scenario B	ES-3
Figure ES-3	A stronger sense of entry to the Zion National Park experience could be created in Springdale	ES-7
Figure ES-4A	Visual simulation of digital sign in advance of Lion Boulevard	ES-9
Figure ES-4B	Visual simulation of “real time” variable message direct visitors to parking at south end of Springdale	ES-9
Figure ES-5	Visual simulation of improved shuttle stop signing	ES-10
Figure ES-6	Example of a more detailed parking map that could be created for Springdale	ES-10
Figure ES-7A	Visual simulation showing creation of a shared pathway along the shoulder in Zion Canyon as an extension of the Pa’ rus Trail	ES-II
Figure ES-7B	Visual simulation of the extension of the Pa’ rus Trail further up Zion Canyon	ES-II
Figure I-1	Technical Analysis Process and Schedule	I-3
Figure I-2	Zion Canyon Shuttle System Route Map	I-6
Figure I-3	Project Vicinity Map	I-7
Figure I-4	Regional Context Map	I-8
Figure I-5	Zion National Park Average Monthly Visitation, 2004-2008	I-9
Figure I-6	Zion National Park Annual Visitation, 1994-2008 (last 15 years)	I-9
Figure 2-1	Map Showing Existing Signs and Proposed Information Kiosk Locations	2-17
Figure 2-2	Improved gateway signs would create a stronger sense of entry to the Zion National Park experience in Springdale	2-10
Figure 2-3	Recommended parking area signs could help visitors and customers more readily find appropriate locations for parking	2-12
Figures 2-4 & 2-5	“Real time” variable messaging signs can direct visitors to parking and strengthen identity	2-13
Figure 2-6	Shuttle stop signs could be improved to be more legible to shuttle passengers	2-14 & 15
Figure 2-7	Example of a detailed map that could be created to help visitors find parking in Springdale	2-16
Figure 3-1	Town of Springdale Shuttle Parking Locations (North)	3-7
Figure 3-2	Town of Springdale Shuttle Parking Locations (South)	3-8
Figure 3-3	Town of Springdale Parking Area Usage - Saturday, May 26, 2007 (Memorial Day weekend)	3-10 & 11
Figure 3-4	Town of Springdale Parking Area Usage - Wednesday, July 25, 2007	3-12 & 13
Figure 3-5	Potential Springdale Parking Locations (South)	3-19
Figure 3-6	Potential Springdale Parking Locations (Central)	3-20
Figure 3-7	Potential Springdale Parking Locations (North)	3-21
Figure 4-1	Springdale Pedestrian Crossing and Shuttle Stop Recommendations	4-15
Figure 5-1	Pa’ rus Trail Extension Alignment Options: Canyon Junction to Court of the Patriarchs	5-13
Figure 5-2	Pa’ rus Trail Extension Alignment Options: Zion Lodge to Temple of Sinawava	5-14
Figure 5-3	Pa’ rus Trail Extension Alignment Options: Existing Pa’ rus Trail to Canyon Junction	5-15
Figure 5-4	Pa’ rus Trail Extension Alignment Options: Segment 1 - Canyon Junction to Court of the Patriarchs	5-16
Figure 5-5	Pa’ rus Trail Extension Alignment Options: Segment 1 - Canyon Junction to Court of the Patriarchs	5-17
Figure 5-6	Pa’ rus Trail Extension Alignment Options: Segment 1 - Canyon Junction to Court of the Patriarchs	5-18
Figure 5-7	Pa’ rus Trail Extension Alignment Options: Segment 1 - Canyon Junction to Court of the Patriarchs and Segment 2 - Court of the Patriarchs to Zion Lodge	5-19

## FIGURES CONTINUED

Figure 5-8	Pa' rus Trail Extension Alignment Options: Segment 2 - Court of the Patriarchs to Zion Lodge	5-20
Figure 5-9	Pa' rus Trail Extension Alignment Options: Segment 2 - Court of the Patriarchs to Zion Lodge and Segment 3 - Zion Lodge to the Grotto	5-21
Figure 5-10	Pa' rus Trail Extension Alignment Options: Segment 3 - Zion Lodge to the Grotto	5-22
Figure 5-11	Pa' rus Trail Extension Alignment Options: Segment 3 - Zion Lodge to the Grotto and Segment 4 - the Grotto to Weeping Rock	5-23
Figure 5-12	Pa' rus Trail Extension Alignment Options: Segment 4 - The Grotto to Weeping Rock	5-24
Figure 5-13	Pa' rus Trail Extension Alignment Options: Segment 4 - The Grotto to Weeping Rock and Segment 5 - Weeping Rock to Big Bend	5-25
Figure 5-14	Pa' rus Trail Extension Alignment Options: Segment 5 - Weeping Rock to Big Bend	5-26
Figure 5-15	Pa' rus Trail Extension Alignment Options: Segment 6 - Big Bend to Temple of Sinawava	5-27
Figure 5-16	Pa' rus Trail Extension Alignment Options: Segment 6 - Big Bend to Temple of Sinawava	5-28
Figure 6-1	Park Shuttle Boardings Map	6-4
Figure 6-2	Town (Springdale) Shuttle Boarding Map	6-5
Figure 8-1	VISION DIXIE plan – Making a Better Washington County, 2007	8-4
Figure 8-2	Proposed Zion Canyon Trail in Springdale	8-7
Figure 9-1	Scenario A	9-3
Figure 9-2	Scenario B	9-3
Figure 9-3	Scenario C	9-3

## TABLES

Table ES-1	Memorial Day Weekend 2007 Parking Survey Results	ES-6
Table I-1	Issues Prioritization (Listed in Order of Most-Often Discussed/Mentioned)	I-10
Table 3-1	Springdale Parking Availability Estimation	3-9
Table 4-1	Sidewalk Gaps Inventory (1 of 5)	4-4
Table 4-1	Sidewalk Gaps Inventory (2 of 5)	4-5
Table 4-1	Sidewalk Gaps Inventory (3 of 5)	4-6
Table 4-1	Sidewalk Gaps Inventory (4 of 5)	4-7
Table 4-1	Sidewalk Gaps Inventory (5 of 5)	4-8
Table 5-1	Options for Extending the Pa' rus Trail – Segment 1	5-6 & 7
Table 5-2	Options for Extending the Pa' rus – Segment 2	5-8
Table 5-3	Options for Extending the Pa' rus – Segment 3	5-9
Table 5-4	Options for Extending the Pa' rus – Segment 4	5-10
Table 5-5	Options for Extending the Pa' rus – Segment 5	5-11
Table 5-6	Options for Extending the Pa' rus – Segment 6	5-12
Table 6-1	Park Route Stop-by-Stop Boardings and Maximum Loads	6-2
Table 6-2	Town (Springdale) Shuttle Stop-by-Stop Boardings and Maximum Loads	6-3
Table 8-1	Perspectives on Partner Roles and Responsibilities	8-5
Table 9-1	Estimated Capital Project Costs	9-6
Table 9-2	Action Plan	9-8 – 9-17

