

# Results of the Benefit-Cost Analyses

Jan 10, 2014

Prepared for: Nevada Department of Transportation

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## Summary of Results

This report provides a summary of results of benefit-cost analyses on several federally funded projects sponsored by the Nevada Department of Transportation (NDOT).

The analyses were formed from existing project reports and NDOT databases that contained project data. The benefit-cost analyses were performed using Cal-B/C with parameter and rate adjustments based on local conditions for Nevada and their respective counties.

The following performance measures were considered in the evaluation of benefits and costs:

- Travel Time Savings
- Accident Reductions
- Vehicle Operating Costs
- Vehicle Emission Reductions
- Pavement Roughness
- Project Capital Costs
- Project Operation & Maintenance Costs

These analyses all use a 20-year horizon to enable comparisons among each other. The analyses use a real discount rate of 7% as recommended by the Office of Management and Budget (OMB) Circular A-94.

Summary and detailed results of the benefit-cost analyses are shown in Exhibits 1 and 2. Projects are prioritized by their net present value benefit-cost (B/C) ratios. The project with the strongest expected return on investment is the I-15 North: Package D-Capacity Improvements: Craig Rd. to Speedway with a B/C ratio of 7.10.

Exhibit 1: Summary Result of Benefit-Cost Analyses

S.No	Project Title	Project Description	Total Cost (Millions)	Total Benefits (Millions)	B/C
1	I-15 North: Package D- Capacity Improvements: Craig Rd. to Speedway	This project package includes the widening of I-15 from 4 lanes to 6 lanes from Craig Road to Speedway Boulevard and to provide auxiliary lanes between interchanges for a total length of 4.8 miles. The improvements will be constructed within the existing right of way. In addition, the project scope also includes widening 4 bridges over UPRR crossing.	\$31.2	\$221.6	7.10
2	Project Neon-Phase I: HOV/Managed Lane Connector	Project NEON-Phase I consists of a continuous HOV facility along a segment of I-15 and US-95. Specifically, the analysis focused on the benefits of Phase I that would provide a connection from the I-15 Express Lane project, which ends near Sahara, to the recently constructed US 95 HOV lanes, which currently end west of Rancho Drive.	\$200.0	\$1159.5	5.80
3	US 95 North-Phase 2A (Ann Road to Durango Drive)	The project is divided into two sections including both the southbound and northbound directions. The first section goes from Ann Road to Centennial Parkway while the second section goes from Centennial Parkway to Durango Drive. The project consists of adding various lanes to US 95 as follows. In the first section, in the southbound direction, one HOV lane will be added. In the first section, in the northbound direction, one general purpose lane and one HOV lane will be added. In the second section, one general purpose, one HOV a one auxiliary lane will be added in both directions.	\$47.3	\$196.7	4.20
4	Project Neon-Phase IV: Southbound Direct Connect Ramp	Project NEON-Phase IV involves the construction and reconstruction of various facilities to improve the southbound connectivity between US 95 and I-15. Details about the construction and reconstruction are provided in the report.	\$128.2	\$368.1	2.90
5	SR 593 Tropicana Avenue: Dean Martin Drive to Boulder Highway	The project starts at Dean Martin Drive and ends at SR 582 Boulder Highway (SR 593 CL-3.50 to -10.85). The project scope includes rehabilitating the existing structural pavement section, replacing deteriorated and substandard roadway appurtenances, repairing bridge structures, upgrading signage, improving drainage, enhancing roadway operations and improving safety. This project will repave both directions of the existing 7.35-mile section, which encompasses a 6- to 8-lane arterial facility.	\$14.2	\$35.8	2.50
6	Project Neon-Phase V: I-15 Reconstruction south of Oakey Boulevard and the Northbound Direct Connect Ramp	Project NEON-Phase V includes the Reconstruction of I-15 south of Oakey Boulevard and the construction of a Northbound Direct Connect Ramp from I-15 to US-95. The combination of the northbound direct connect ramp and braided ramps eliminates areas of intense weaving, improving operations and safety.	\$332.3	\$717.3	2.20
7	Project Neon-Phase III: Charleston Boulevard Interchange Improvements	Project NEON-Phase III consists of reconstructing the Charleston Boulevard interchange into a tight-diamond configuration and full I-15 widening north of Oakey Boulevard/Wyoming Avenue.	\$399.6	\$797.9	2.00
8	Boulder City Bypass Phase II: US-93/US-95 Interchange to West of the Hoover Dam Bypass	Boulder City Bypass Phase II consists of a continuous four-lane, controlled-access, divided highway passing from proposed US-93/US-95 Interchange (south of the existing US-93/US-95 Interchange) to West of the Hoover Dam Bypass.	\$406.1	\$387.5	0.95
9	Boulder City Bypass Phase I: Foothills Drive to US 93/US 95	Boulder City Bypass Phase I consists of a continuous four-lane, controlled-access, divided highway passing south of Boulder City. This analysis focused on the benefits of Phase I from Foothills Drive to the proposed US-93/US-95 interchange south of the existing US-93/US-95 interchange.	\$146.7	\$134.3	0.90
10	Pavement Rehabilitation: US 95 from MP CL 121.80 to 135.91 through MP NY 0.00 to 6.86	The project consists of Pavement Rehabilitation of the US 95 from MP CL 121.80 to 135.91, in Clark County, Nevada, through MP NY 0.00 to 6.86, in Nye County, Nevada. The project scope includes rehabilitating the existing structural pavement, enhancing roadway operations and improving safety. This project will repave both directions of the existing 20.97-mile section, which encompasses a 4-lane freeway facility.	\$23.0	\$10.0	0.40
11	Project Neon-Phase II: Oakey Blvd./Wyoming Ave. railroad grade separation, and the Martin Luther King/Industrial connection	Project NEON-Phase II includes: (i) a bridge (connector) over I-15 and arterial segments that connect Martin Luther King (MLK) Boulevard and Industrial Road, and (ii) a bridge (grade separation) over the Union Pacific Railroad at Oakey Boulevard and Wyoming Avenue.	\$296.4	\$44.2	0.15

Source: Benefit-Cost Analysis Results. Transportation Research Center at University of Nevada, Las Vegas. Dec 2013.

Included in the detailed results is scoring of qualitative benefit measures. Projects with lower benefit-cost ratios, such as the Boulder City Bypass Phase 1: Foothills Drive to US 93/US 95 and Project Neon-Phase II: Oakey Blvd./Wyoming Ave. railroad grade separation, and the Martin Luther King/Industrial connection have qualitative benefits such as interregional connectivity that are not captured in the quantitative analysis. All analyses predict that the list of projects will be good investments.

Additional documentation and analysis on each project is provided in their individual reports.

Exhibit 2: Detailed Result of Benefit-Cost Analyses

Project Description	Life-Cycle Benefits					Life-Cycle Costs	Net Present Value	Benefit Cost Ratio	Qualitative Benefits				
	Travel Time	Vehicle Operating Costs	Accident Reductions	Vehicle Emissions	Total				Interregional Connectivity	Transit Connectivity	Goods Movement Corridor	Access Management	Seismic Retrofit
I-15 North: Package D-Capacity Improvements: Craig Rd. to Speedway	\$192.3M	\$18.0M	\$9.8M	\$1.6M	\$221.6M	\$31.2M	\$190.4M	7.10	●		●	●	●
Project Neon-Phase I: HOV/Managed Lane Connector	\$865.2M	\$227.4M	\$37.3M	\$29.6M	\$1159.5M	\$200.0M	\$959.5M	5.80	●		●	●	
US 95 North-Phase 2A (Ann Road to Durango Drive)	\$144.1M	\$29.3M	\$20.6M	\$2.6M	\$196.7M	\$47.3M	\$149.5M	4.20	●		●	●	
Project Neon-Phase IV: Southbound Direct Connect Ramp	\$171.6M	\$163.2M	\$15.2M	\$18.1M	\$368.1M	\$128.2M	\$240.0M	2.90	●		●	●	
SR 593 Tropicana Avenue: Dean Martin Drive to Boulder Highway	\$17.1M	\$18.2M	\$0.1M	\$0.4M	\$35.8M	\$14.2M	\$21.5M	2.50	●			●	
Project Neon-Phase V: I-15 Reconstruction south of Oakley Boulevard and the Northbound Direct Connect Ramp	\$559.1M	\$120.3M	\$22.0M	\$15.9M	\$717.3M	\$332.3M	\$385.0M	2.20	●		●	●	
Project Neon-Phase III: Charleston Boulevard Interchange Improvements	\$686.7M	\$73.7M	\$27.5M	\$10.0M	\$797.9M	\$399.6M	\$398.3M	2.00	●		●	●	
Boulder City Bypass Phase II: US-93/US-95 Interchange to West of the Hoover Dam Bypass	\$279.4M	\$77.4M	\$24.3M	\$6.4M	\$387.5M	\$406.1M	-\$18.6M	0.95	●		●	●	
Boulder City Bypass Phase I: Foothills Drive to US 93/US 95	\$130.5M	-\$3.9M	\$8.3M	-\$0.6M	\$134.3M	\$146.7M	-\$12.4M	0.90	●			●	
Pavement Rehabilitation: US 95 from MP CL 121.80 to 135.91 through MP NY 0.00 to 6.86	\$6.0M	-\$5.1M	\$9.7M	-\$0.5M	\$10.0M	\$23.0M	-\$12.9M	0.40				●	
Project Neon-Phase II: Oakley Blvd./Wyoming Ave. railroad grade separation, and the Martin Luther King/Industrial connection	\$17.4M	\$22.6M	\$2.4M	\$1.9M	\$44.2M	\$296.4M	-\$252.2M	0.15	●			●	

Source: Benefit-Cost Analysis Results. Transportation Research Center at University of Nevada, Las Vegas. Dec. 2013.