

# REQUEST FOR PROPOSALS



UTAH DEPARTMENT OF TRANSPORTATION



## 4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

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## INSTRUCTIONS TO PROPOSERS

### ITP-C:

### FORMS

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Addendum 3-4- October 1320, 2016

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FORM UC: UTILITY COSTS

Line No.	Form PA No.	Utility ID	Activity	This column not input into EBS	Lump Sum Prices (to be entered into Form PA)	
<b>6 Utility Work performed by the Design-Builder</b>						
		01	AT&T Corp.	\$ -		
		02	CenturyLink	\$ -		
		03	Comcast Cable	\$ -		
		04	Daybreak Secondary Water	\$ -		
		05	First Digital Telcom	\$ -		
		06	Granger Hunter Improvement District	\$ -		
		07	Kearns Improvement District	\$ -		
		08	Manuel Bros., Inc.	\$ -		
		09	MCI (Verizon Business)	\$ -		
		10	Questar Gas Company	\$ -		
		11	Rocky Mountain Power 5400 S (exclude Build Alternative)	\$ -		
		11	Rocky Mountain Power 7000 S	\$ -		
		11	Rocky Mountain Power 9000 S	\$ -		
		11	Rocky Mountain Power 11400 S	\$ -		
		12a	South Jordan City	\$ -		
		12b	South Jordan City Betterment	\$ -		
		13	South Valley Sewer District	\$ -		
		14	Syringa Networks, LLC	\$ -		
		15	Taylorsville City	\$ -		
		16a	Taylorsville Bennion Improvement District	\$ -		
		16b	Taylorsville Bennion Improvement District Betterment	\$ -		
		17	US Bureau of Reclamation	\$ -		
		18a	West Jordan City	\$ -		
		18b	West Jordan City Betterment - 7000 South	\$ -		
		18c	West Jordan City Betterment - 9000 South	\$ -		
		19	Zayo Group	\$ -		
		20	Welby Jacobs Canal	\$ -		
A	6	Subtotal to be entered on Form PA Item 6a (Subtotal of Utility Work performed by the Design-Builder)				\$ -
<b>7 Department's cost share responsibility for Utility Work performed by Third-Parties</b>						
		01	AT&T Corp.	\$ -		
		02	CenturyLink	\$ -		
		03	Comcast Cable	\$ -		
		05	First Digital Telcom	\$ -		
		08	Manuel Bros., Inc.	\$ -		
		09	MCI (Verizon Business)	\$ -		
		10	Questar Gas Company	\$ -		
		11	Rocky Mountain Power 5400 S (exclude Build Alternative)	\$ -		
		11	Rocky Mountain Power 7000 S	\$ -		
		11	Rocky Mountain Power 9000 S	\$ -		
		11	Rocky Mountain Power 11400 S	\$ -		
		14	Syringa Networks, LLC	\$ -		
		19	Zayo Group	\$ -		
B	7	Subtotal to be entered on Form PA Item 7 (Subtotal of Department's cost share responsibility for Utility Work performed by Third-Parties)				\$ -
<b>8 Third-Parties' cost share responsibility for Utility Work performed by Design-Builder (credit/negative \$)</b>						
		01	AT&T Corp.	\$ -		
		02	Century Link	\$ -		
		03	Comcast Cable	\$ -		
		05	First Digital Telcom	\$ -		
		08	Manuel Bros., Inc.	\$ -		
		09	MCI (Verizon Business)	\$ -		
		10	Questar Gas Company	\$ -		
		11	Rocky Mountain Power 5400 S (exclude Build Alternative)	\$ -		
		11	Rocky Mountain Power 7000 S	\$ -		
		11	Rocky Mountain Power 9000 S	\$ -		
		11	Rocky Mountain Power 11400 S	\$ -		
		12b	South Jordan City Betterment	\$ -		
		14	Syringa Networks, LLC	\$ -		
		16b	Taylorsville Bennion Improvement District Betterment	\$ -		
		18b	West Jordan City Betterment - 7000 South	\$ -		
		18c	West Jordan City Betterment - 9000 South	\$ -		
		19	Zayo Group	\$ -		
C	8	Subtotal to be entered on Form PA Item 8 (Subtotal of Third-Parties' cost share responsibility for Utility Work performed by Design-Builder (credit/negative \$))				\$ -

6. Schedule of Values Approved by the Department as required by Part 2 (General Provisions)
7. Site-specific Safety Plan
8. Quality Management Plan Approved by the Department as required by Part 3 (Quality Program)
9. Environmental Protection Program Approved by the Department as required in Part 4-05 (Environmental Compliance)
10. Traffic Management Plan, Approved by the Department as required in Part 4-10 (Maintenance of Traffic)
- ~~11. Evidence that the Design Builder has obtained the accreditation required to be obtained in accordance with Part 3 (Quality Program).~~
- ~~12.11.~~ Released for Construction Documents have been issued for that portion of the Work.
- ~~13.12.~~ Any additional conditions for construction set forth in the Contract Documents have been fully satisfied.

## 4.4 Completion Deadlines

The following are the completion deadlines for the Project.

### 4.4.1 Substantial Completion Deadline

The Design-Builder shall achieve Substantial Completion within \_\_\_\_ Calendar Days from March 6, 2017. Substantial Completion must be achieved no later than November 2, 2018. Said deadlines for Substantial Completion, as it may be extended hereunder, are referred to as the “Substantial Completion Deadline”.

### 4.4.2 Physical Completion Deadline

The Design-Builder shall achieve Physical Completion no later than 60 Days from receipt of Notice of Substantial Completion. Said deadline for Physical Completion, as it may be extended hereunder, is referred to as the “Physical Completion Deadline.”

### 4.4.3 Contract Completion Deadline

The Design-Builder shall achieve Contract Completion no later than 60 Days from receipt of Notice of Physical Completion. Said deadline for Contract Completion, as it may be extended hereunder, is referred to as the “Contract Completion Deadline.”

### 4.4.4 No Time Extensions

Except as otherwise specifically provided in Part 2, Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work), the Department shall have no obligation to extend any Completion Deadline, and the Design-Builder shall not be relieved of its obligation to comply with the Project Schedule and to achieve the applicable Completion Deadlines for any reason.

## 4.5 Project Milestones

The following are the milestones for the Project.

### 4.5.1 Start Milestones

- A. 5400 South Interchange Start Date

This is defined in Part 1 Appendix A (Acronyms and Definitions List).

Q. Do not allow water to flow over the top of or down the face of any retaining wall.  
Ditches adjacent to tops of retaining walls are required to be concrete-lined.

Q.R. Do not use slotted drains. Obtain Department approval for the use of trench drains.

#### **4D-5 Drainage Outfalls**

Meet requirements for stormwater discharges as shown in Table 4D-5 (Stormwater Discharges).  
Include both Project flows and co-mingled flows.

Facilities).

**TABLE 4D-6  
 STORAGE FACILITIES**

Interchange	Detention Basin/Storage Facility ID and Location	Status	Improvements	Approval Required for Location Change <sup>1</sup>
5400 South	54-A (3687 West Whitewood Court)	Proposed Facility	Provide 12-foot access driveway along noise wall; full perimeter access not required. Provide compacted riprap on pond bottom.	No
5400 South	54-B (3695 West Alveron Drive)	Proposed Facility	Provide 12-foot access driveway along noise wall; full perimeter access not required. Provide compacted riprap on pond bottom.	No
5400 South	54-C (3765 West 5400 South)	Proposed Facility	Provide 12-foot access driveway along noise wall and curb; full perimeter access not required road. Provide compacted riprap on pond bottom.	No
5400 South	54-D	Proposed Storage Facility	Provide storage to meet allowable discharge requirements; see Table 4D-5, Discharge Location 54-2. Subsurface storage is allowed outside pavement limits. Discharge via infiltration is not allowed.	No
7000 South	70-A (Approx. 6700 South & Bangerter Hwy.)	Existing UDOT Facility	Re-grade facility to meet requirements specified in Section 4D-5. Reconstruct emergency spillway. Provide 12-foot perimeter access road on south, east, and north sides of facility. Provide access driveway to pond bottom.	Yes
9000 South	90-A (Approx. 9600 South & 3400 West)	Existing UDOT Facility	Re-grade facility to meet requirements specified in Section 4D-5. Provide emergency spillway. Provide 12-foot access road on east, north, and west sides. Provide turn-around on west side. Provide access driveway to pond bottom. Provide separate farmer access outside of perimeter fence.	Yes
11400 South	114-A (Approx. 12000 South, East of Bangerter Hwy.)	Existing UDOT Facility	No proposed improvements; direct stormwater runoff from Bangerter Highway sag to Detention Basin 114-B to reduce runoff directed to Detention Basin 114-A.	Yes
11400 South	114-B (South Jordan City 23-DET08 at 11800 South & 3600 West)	Existing South Jordan City Facility	Re-grade facility to provide 4.3 AF of additional storage volume with a minimum pond bottom slope of 0.7% and a minimum pond bottom elevation of 4579.5 feet. Grade to facilitate recreational use and replace landscaping in kind. Modify inlet and outlet structures and low flow piping system as required to restore system functionality. Obtain South Jordan City approval for proposed improvements in accordance with Part 4-07 (Landscaping and Aesthetics). No detention basin fencing required; protect existing east wall in place.	Yes
11400 South	114-C (Tippecanoe Way)	Proposed South Jordan City Facility	Provide new detention facility to detain stormwater runoff from Jordan Heights Phase 3. Obtain South Jordan City and Jordan Heights HOA approval <del>in accordance with Part 4-07 (Landscaping and Aesthetics)</del> for proposed improvements. Provide low flow channel or other as approved by City and Jordan Heights HOA. <del>Replace detention basin landscaping in kind.</del> Locate facility outside PUE. No detention basin fencing required.	Yes

<sup>1</sup>Changes to storage facility or detention basin locations require Department approval as indicated in the table.

**TABLE 10C-10  
 SUMMARY OF MOT CLOSURE RESTRICTION**

Type of Closure	Closure Location	Traffic Movement	MOT Peak Periods	MOT Off-Peak Periods
	Highway	Through	Not allowed, except for the closure of one lane in each direction for up to 45 consecutive days at the Old Bingham Highway bridge north of 9000 South, if all existing lanes are provided within <del>500</del> 800 feet of adjacent traffic signals	Permitted - see Table 10C-1
		Right-turn	Not allowed	Not allowed
	Cross Streets	Left-turn	Not allowed	Permitted
		Through	Not allowed, except for: <ul style="list-style-type: none"> <li>The closure of flex lane system for up to 90 consecutive days - see Part 4-18 (Traffic Signals) and Section 10C-12.6</li> </ul>	Permitted - see Table 10C-2 through Table 10C-5
		Right-turn	Not allowed	Permitted

**10C-12.5 Bangerter Highway Closures**

Full Closures of all left-turn Movements at 11400 South and 7000 South are not permitted beginning with the Thanksgiving Holiday Period through the Christmas Holiday Period.

Provide right-turn lanes on Bangerter Highway at all times.

**10C-12.6 Cross Street Closures**

Do not close 7000 South during the City’s waterline project to the east when closures are taking place on 7000 South between 3200 West and 2700 West.

The flex lanes are permitted to operate in a three-one-three (three lanes each direction with a center turn lane) configuration all day for up to 90 consecutive days. Anything beyond 90 days will be considered a Partial Closure and be subject to Disincentives as identified in Table 10C-11 (MOT Closure Summary and Associated Disincentives). Notify Matt Luker at mluker@utah.gov 14 Calendar days prior to any impacts to the flex lane system. Coordinate with Matt Luker for any adjustments or impacts to the system, including the fiber optic network.

**10C-12.7 Rolling Slowdowns**

Law enforcement officers shall perform all Rolling Slowdowns. Do not use construction vehicles to perform Rolling Slowdowns.

All Rolling Slowdowns shall be Approved unless otherwise specified below.

**10C-12.8 4015 West Build Alternative**

For Work performed for the 4015 West Build Alternative on 5400 South, follow the requirements

## Appendix 1: PROJECT DESIGN CRITERIA

## PROJECT DESIGN CRITERIA - URBAN ARTERIAL - OTHER

### I. PROJECT DESCRIPTION

DATE: 7/7/2016

Project No	S-0154(12)11	Location	4 Interchanges on Bangerter Highway		
PIN	12566	Concept	4 Interchanges on Existing Freeway		

Describe the scope of the project Construct 4 New Interchanges

### II. DESIGN STANDARDS BY ROADWAY

(Complete a separate PDC for each roadway on your project)

Date of OSR: 2/18/2016

Roadway Name: SR-154 (Bangerter Hwy) - 5400 South

#### Comments

#### Roadway Characteristics

Functional Class	Urban Arterial - Other		Pavement Type	Rigid	
Current Year	2015	AADT= 56,000	Terrain	Rolling Terrain	
Design Year	2040	AADT= 109,000	% Trucks (current)	6%	
Design Vehicle	WB-67		Posted / Design Speed	55	65

Ramps A, B, C & D  
 Design Speed - 55 mph  
 300 ft along ramp beyond painted gore in the travel direction  
 Design Speed - 45 mph  
 Ramp Body  
 Design Speed - 20 mph (20 MPH design speed continues through left turn movement)  
 Within 300 ft of 5400 S

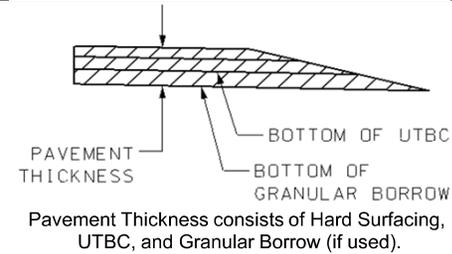
Refer to Standard Drawings DD 5 and DD 6 for design of ramp elements, use the design speeds listed above for determining superelevation, minimum radii, vertical curve k values, stopping sight distance, and clear zone. Superelevations method 2 can be used for curves at the ramp terminal

#### Proposed Roadway Characteristics

Total Number of Lanes 6  
 Shoulder Width (Typ) 12'  
 Curb & Gutter Type & Width (Typ) Type M1 (2.5')

#### Pavement Thickness

See Typical Sections in Part 7



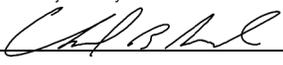
FHWA 13 Critical Elements	UDOT Standard			RFP Requirement			Design Exception	References	Date of Decision, Comments, Mitigation, etc.
Design Speed	65 mph			65 mph			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 2-1; GB pp. 2-53:58, 8-1:2	Determined by Concept Team
Lane Width	Mainline	12'	12'	12'			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD (DD & ST series); MOI 7-1, 43:47, 107; GB pp. 8-2:3	
	LT Turn Lane(s)	12'	12'	12'			<input type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved		
	RT Turn Lane(s)	12'	12'	12'			<input type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved		
Shoulder Width	Outside	Inside	Barrier Offset	Outside	Inside	Barrier Offset	<input type="checkbox"/> Not Required <input type="checkbox"/> Required <input checked="" type="checkbox"/> Approved	SD (DD & ST series); MOI 7-44:46; GB pp. 4-8:11, 8-2:3	*Design exception to reduce the outside shoulder for the SB On Ramp only.
	12'	12'	2'	*12'	12'	2'	<input type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved		
Superelevation	Maximum Superelevation			Maximum Superelevation			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 1; MOI 7-26:29; GB pp. 8-3, 3-45 (T. 3-9)	
	6%			6%			<input type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved		
Horizontal Alignment	Minimum Radii Value			Minimum Radii Value			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-30:33, 50:55; GB pp. 8-6, 3-32 (T. 3-7), 3-45 (T. 3-9)	
	1660'			1660'			<input type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved		
Vertical Alignment	Sag Curve Min. K Value	Crest Curve Min. K Value	Sag Curve Min. K Value	Crest Curve Min. K Value			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-56:60; GB pp. crest 3-155: 157 (T. 3-34:35), sag 3-161 (T. 3-36)	
	157	193	157	193			<input type="checkbox"/> Not Required <input type="checkbox"/> Required <input checked="" type="checkbox"/> Approved		
Profile Grades	% Min	% Max	% Min	% Max			<input type="checkbox"/> Not Required <input type="checkbox"/> Required <input checked="" type="checkbox"/> Approved	MOI 7-58:62; GB pp. 3-119, 8-3:4 (T. 8-1)	0.50% preferred
	0.30%	5.00%	0.30%	6.00%			<input type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved		
Cross Slope	Standard Value			Value Proposed/Used			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD (DD, DD 4); MOI 7-47:48; GB pp. 4-1:6, 8-2:3	
	2%			2%			<input type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved		
Stopping-Sight Distance	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-62; GB pp. 3-2:8, 3-106:110, 3-4 (T. 3-1)	
	645'			645'			<input type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved		
Structural Capacity	Design Loading			Design Loading			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 11-2:3; GB p. 8-4	HS-20 for existing; HL-93 for new construction
	HL-93			HL-93			<input type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved		
Bridge Width	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 9; MOI 11-3; GB p. 8-4	Bridge width per direction
	62'-10"			62'-10"			<input type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved		
Vertical Clearance*	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 8:0; MOI 11-4:5; GB p. 8-4	* Notify FHWA on any changes to Vertical Clearance on the National Highway System
	16.5' over road, 23.5' over rail			16.5'			<input type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved		
Lateral Offset to Obstruction	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 17; GB p. 8-5, 10-19:21	
	Urban environments shoulder + 2', other locations clearzone.			Urban environments shoulder + 2', other locations clearzone.			<input type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved		

Design Waivers	UDOT Standard				RFP Requirement		Design Waiver	References	Date of Decision, Comments, Mitigation, etc.
Acceleration Lanes	V 65 mph	Va 50 mph	V'a	L	Location Ramp B 0 to 65 (SB On) Ramp D 0 to 65 (NB On)	L 1410' 1410'	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Refer to Table 10-4 GB pp. 10-111:112 to adjust for grade. A part of the ramp proper may also be considered in the acceleration length as a design waiver. Table 10-3 GB p. 10-110. See also GB pp. 9-124:125, 10-107:110, 116:122; SD DD 13A:14B, ST 1; MOI 7-106	
			0	1410					
			14	1350					
			18	1310					
			22	1220					
			26	1120					
Deceleration Lanes	V 65 mph	Va 55 mph	V'a	L	Location Ramp A 65 to 0 (NB Off) Ramp C 65 to 0 (SB Off)	L 570' 570'	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Refer to Table 10-4 GB pp. 10-111:112 to adjust for grade. Table 10-5 GB p. 10-115. See also GB pp. 9-124:125, 10-107:112:120, 123:124; SD DD 13A:14B, ST 3A:3B; MOI 7-106	
			0	570					
			14	540					
			18	520					
			22	500					
			26	470					
Guardrail Bridge Connection	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.				UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD BA 4B1:4B2, UDOT Design Exception Form	
Clear Zone	Meet clear zone compliant requirements defined in Standard Drawings.				30'		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	2006 Roadside Design Guide pg. 3-6 and Figure 3.2 pg. 3-8; SD DD 4, 8, 10-12,17	
Intersection Sight Distance	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.				Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 9-28:54, MOI 7-64:67	
Ramp Terminal Sight Distance	Along the Ramp			Along the Ramp			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SSD (Stopping Sight Distance) should be at least as great as design SSD *SSD is 25% greater than minimum SSD. **DSD is Decision Sight Distance based on avoidance maneuver 'E' and is desired where feasible. Document DSD but do not obtain waiver if DSD is not met. GB p. 3-4 (T. 3-1) GB p. 3-7 (T. 3-3) GB p. 10-92	
	<u>Design Speed</u>		<u>SSD (ft)</u>	<u>Design Speed</u>		<u>SSD (ft)</u>			
	70 mph		730	65 mph		645			
	55 mph		495	55 mph		495			
	50 mph		425	45 mph		360			
	45 mph		360	25 mph		155			
	40 mph		305	20 mph		115			
	35 mph		250						
	30 mph		200						
	25 mph		155						
Along the Freeway or Street Preceding Approach Nose of Exit Ramp				Along the Freeway or Street Preceding Approach Nose of Exit Ramp					
<u>Design Speed</u>	<u>SSD (ft)*</u>	<u>DSD (ft)**</u>	<u>Location</u>	<u>SSD*</u>	<u>DSD**</u>				
70 mph	915	1445	SR-154						
55 mph	620	1135	Approaching	810'	1365'				
50 mph	535	1030	Ramp A (NB Off)						
45 mph	450	930							
40 mph	385	825	SR-154						
35 mph	315	720	Approaching	810'	1365'				
30 mph	250	620	Ramp C (SB Off)						
25 mph	200	N/A							
Shoulder/Travel way (gutter pan)	The gutter pan is not considered a part of the traveled way or shoulder.				The gutter pan is not considered a part of the traveled way or shoulder.		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 4-19, 10-103; MOI 7-1, 43:44	

Design Waivers	UDOT Standard	RFP Requirement		Design Waiver	References	Date of Decision, Comments, Mitigation, etc.	
<b>Gores</b>	Follow the key points from 2011 AASHTO: • Should be uniform along the freeway; • Geometric shape is appropriate for given speeds; • Mitigation required for major obstructions in a gore; and • Unpaved area beyond the gore nose should be graded nearly level with the roadways as practical.	Location	Meets all Requirements?	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 10-96:101; SD DD 6, ST 3A:3B		
		5400 South	YES				
<b>Ramp Terminals</b>	Platform		Platform		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Avoid left hand entrances and exits. GB pp. 10-103:104. Ramp Terminal means: 1) the exit terminal from the side street onto the freeway entrance ramp; 2) the entrance terminal onto the freeway; 3) the exit terminal from the freeway onto the exit ramp; and 4) the entrance terminal from the freeway exit ramp onto the side street. Refer to GB 10-104 for platform lengths. MOI 7-105:106	
	Location	Length	Location	Length			
	Ramp side of the approach nose or merging end.	200 ft	Ramp side of the approach nose or merging end.	200 ft			
	At-grade terminal of ramp.	Varies	t-grade terminal of ramp.	Varies			
<b>On Ramp Design</b>	Type	Parallel	Ramp Loc.	Type	Parallel	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 10-107:112; SD DD 6, ST 1; MOI p. 1-2. UDOTs preferred approach is to utilize parallel entrance ramps. See GB pp. 10-89:90; MOI 7-105:106.
	Curve Radius	1000 ft	5400 South Ramps	Curve Rad.	1000 ft		
	Dist. From Physical Nose to Ramp Control Line Terminus	200 ft		Dist.	200 ft		
	Taper	300 ft min		Taper	300'		
<b>Off Ramp Design</b>	Type	Taper	Ramp Loc.	Type	Taper	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 10-112:116; SD DD 6, ST 3A:3B; MOI p. 1-2. UDOTs preferred approach is to utilize tapered exit ramps for single lane exits. If multi lane exit, one lane must be parallel. See GB pp. 10-89:90; MOI 7-105:106.
	Divergence Angle (deg)	2-5	5400 South Ramps	Angle	2-5		
	Dist. from outer edge alignment break to ramp control line	200 ft		Dist.	200 ft		
<b>Curb Configuration</b>	2011 AASHTO p.10-103	Type M1		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Determine if the curb is appropriate for the type of facility. GB pp. 4-16:19, 10-103; SD GW 2		
<b>Traffic Control</b>	Meet Traffic Control Standard Drawings requirements	Meet Traffic Control Standard Drawings requirements		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD TC series		
<b>Rumble Strips</b>	Meet Paving Standard Drawings requirements	Meet Paving Standard Drawings requirements		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD PV 6A:8B		

Prepared by  Date 10/7/2016

Verified Only \_\_\_\_\_ Date \_\_\_\_\_  
 - Local Government Projects Only

Approved by  Charles Mason-Hill Date \_\_\_\_\_  
 2016.10.13 14:59:35 -06'00'

On local government projects that are not on a UDOT road, the Region Preconstruction Engineer signs the "Verified Only" line and the Engineer of Record signs the "Approved by" line. For all other projects, the "Verified Only" line is left blank and the Region Preconstruction Engineer signs the "Approved by" line.

## PROJECT DESIGN CRITERIA - URBAN ARTERIAL

### I. PROJECT DESCRIPTION

DATE: 7/7/2016

Project No	S-0154(12)11	Location	4 Interchanges on Bangerter Highway		
PIN	12566	Concept	4 Interchanges on Existing Freeway		

Describe the scope of the project Construct 4 New Interchanges

### II. DESIGN STANDARDS BY ROADWAY

(Complete a separate PDC for each roadway on your project)

Date of OSR: 2/18/2016

Roadway Name: 5400 South

Comments

#### Roadway Characteristics

Functional Class	Urban Arterial		Pavement Type	Rigid	
Current Yea	2015	AAADT= 38,000	Terrain	Flat	
Design Yea	2040	AAADT= 45,000	% Trucks (current)	4%	
Design Vehicle	WB-67		Posted / Design Speed	45	50

\*8' shoulders will be provided in the interchange limits (through pork chop islands between left and right hand turns on each leg of the interchange)

#### Proposed Roadway Characteristics

Total Number of Lanes	6	Park Strip Width (Typ)	5'
Shoulder Width (Typ)	0	Sidewalk Width (Typ)	4' - 6'
Curb & Gutter Type & Width (Typ)	Type B1 (2.5')		

#### Intersection #1:

Roadway Name	Dir.	# of LT Lanes	Storage Length	# of Thru Lanes	# of RT Lanes	Storage Length
5400 South	EB	2	250	3	1	N/A
5400 South	WB	2	185	3	0	N/A
NB Off Ramp	NB	2	525	0	2	525
SB Off Ramp	SB	2	450	0	1	450

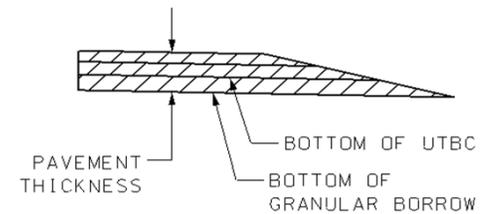
#### Curb Radius From T.B.C.

NW Curb Radius:	25'
SW Curb Radius:	68.5'
NE Curb Radius:	70.5'
SE Curb Radius:	25'

#### Pavement Thickness

See Typical Sections in Part 7

Ramp	Required Ramp Meter Storage (Lane-Feet)
SB On Ramp	3000
NB On Ramp	1200



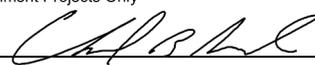
Pavement Thickness consists of Hard Surfacing, UTBC, and Granular Borrow (if used).

FHWA 13 Critical Elements	UDOT Standard			RFP Requirement			Design Exception	References	Date of Decision, Comments, Mitigation, etc.
Design Speed	50 MPH			50 MPH			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 2-1; GB pp. 2-53:58, 7-27	Determined by Concept Team
Lane Width	Mainline	12'		11'			<input type="checkbox"/> Not Required <input type="checkbox"/> Required <input checked="" type="checkbox"/> Approved	SD (DD & ST series); MOI 7-1, 43:47, 107; GB pp. 7-29:30	11' lanes allowed per existing design exception, PIN 8523
	LT Turn Lane(s)	12'		11'					
	RT Turn Lane(s)	11'		11'					
Shoulder Width	Outside	Inside	Barrier Offset	Outside	Inside	Barrier Offset	<input type="checkbox"/> Not Required <input type="checkbox"/> Required <input checked="" type="checkbox"/> Approved	SD (DD & ST series); MOI 7-44:46; GB pp. 4-8:11, 7-30	*Standard 8' shoulders must be provided within the interchange limits.
	8'	N/A	N/A	0*	N/A	N/A			
Superelevation	Maximum Superelevation			Maximum Superelevation			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 1; MOI 7-26:29; GB pp. 7-29, 3-44 (T. 3-8)	
	4%			4%					
Horizontal Alignment	Minimum Radii Value			Minimum Radii Value			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-30:33, 50:55; GB pp. 7-28, 3-32 (T. 3-7), 3-44 (T. 3-8)	
	926'			926'					
Vertical Alignment	Sag Curve Min. K Value	Crest Curve Min. K Value		Sag Curve Min. K Value	Crest Curve Min. K Value		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-56:60; GB pp. crest 3-155: 157 (T. 3-34:35), sag 3-161 (T. 3-36)	
	96	84		96	84				
Profile Grades	% Min	% Max		% Min	% Max		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-58:62; GB pp. 3-119, 7-28:29 (T. 7-4)	0.50% preferred
	0.30%	6.0%		0.30%	6.0%				
Cross Slope	Standard Value			Value Proposed/Used			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD (DD series); MOI 7-47:48; GB pp. 4-1:6, 7-29	
	2%			2%					
Stopping-Sight Distance	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-62; GB pp. 3-2:8, 3-106:110, 7-28, 7-3 (T. 7-1)	
	425'			425'					
Structural Capacity	Design Loading			Design Loading			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 11-2:3; GB p. 7-38	HS-20 for existing; HL-93 for new construction
	HL-93 for New Construction			HL-93 for New Construction					
Bridge Width	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 9; MOI 11-3; GB pp. 7-37:38	
	N/A			N/A					
Vertical Clearance*	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 8:9; MOI 11-4:5; GB p. 7-38	* Notify FHWA on any changes to Vertical Clearance on the National Highway System
	16.5' over road, 23.5' over rail			16.5'					
Lateral Offset to Obstruction	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 17; GB pp. 7-37:38	
	1.5' tangent / 3' radius			1.5' tangent / 3' radius					

Design Waivers	UDOT Standard				RFP Requirement		Design Waiver	References	Date of Decision, Comments, Mitigation, etc.
	V	Va	V'a	L	Location	L			
Acceleration Lanes	50 mph	39 mph	0	720	N/A		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Refer to Table 10-4 GB pp. 10-111:112 to adjust for grade. A part of the ramp proper may also be considered in the acceleration length as a design waiver. Table 10-3 GB p. 10-110. See also GB pp. 9-124:125, 10-107:110, 116:122; SD DD 13A:14B, ST 1; MOI 7-106	
			14	660					
			18	610					
			22	550					
			26	450					
Deceleration Lanes	50 mph	44 mph	0	435	EB Left Turn WB Left Turn WB Left Turn Onto 3900 W	*140' 435' *140'	<input type="checkbox"/> Not Required <input type="checkbox"/> Required <input checked="" type="checkbox"/> Approved	Refer to Table 10-4 GB pp. 10-111:112 to adjust for grade. Table 10-5 GB p. 10-115. See also GB pp. 9-124:125, 10-107,112:120, 123:124; SD DD 13A:14B, ST 3A:3B; MOI 7-106	*Design waiver provided
			14	405					
			18	385					
			22	355					
			26	315					
Guardrail Bridge Connection	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.				N/A		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD BA 4B1:4B2, UDOT Design Exception Form	
Clear Zone	Meet clear zone compliant requirements defined in Standard Drawings.				20'		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	2006 Roadside Design Guide pg. 3-6 and Figure 3.2 pg. 3-8; SD DD 4, 8, 10:12,17	
Intersection Sight Distance	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.				Sight triangles cases A-F and skew are met.		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 9-28:54, MOI 7-64:67	
Shoulder/Travel way (gutter pan)	The gutter pan is not considered a part of the traveled way or shoulder.				The gutter pan is not a part of the shoulder or traveled way.		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 4-19, 10-103; MOI 7-1, 43:44	
Curb Configuration	2011 AASHTO p. 10-103				Type B1, Type B5, Type M2		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Determine if the curb is appropriate for the type of facility. GB pp. 4-16:19, 10-103; SD GW 2	
Traffic Control	Meet Traffic Control Standard Drawings requirements				Meet Traffic Control Standard Drawings requirements		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD TC series	
Rumble Strips	Meet Paving Standard Drawings requirements				N/A		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD PV 6A:8B	

Prepared by  Date 10/7/2016

Verified Only \_\_\_\_\_ Date \_\_\_\_\_  
 - Local Government Projects Only

Approved by  Charles Mason-Hill Date \_\_\_\_\_  
 2016.10.13 15:00:03 -06'00'

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## PROJECT DESIGN CRITERIA - URBAN ARTERIAL - OTHER

### I. PROJECT DESCRIPTION

**DATE:** 7/6/2016

<b>Project No</b>	S-0154(12)11	<b>Location</b>	4 Interchanges on Bangerter Highway	
<b>PIN</b>	12566	<b>Concept</b>	4 Interchanges on Bangerter Highway	

Describe the scope of the project Construct 4 New Interchanges

### II. DESIGN STANDARDS BY ROADWAY

(Complete a separate PDC for each roadway on your project)

**Date of OSR:** 2/18/2016

**Roadway Name:** SR-154 (Bangerter Highway) at 7000 S Interchange

**Comments**

#### Roadway Characteristics

<b>Functional Class</b>	Urban Arterial - Other			<b>Pavement Type</b>	Rigid
<b>Current Year</b>	2015	<b>AADT=</b>	57,000	<b>Terrain</b>	Rolling Terrain
<b>Design Year</b>	2040	<b>AADT=</b>	121,000	<b>% Trucks (current)</b>	6%
<b>Design Vehicle</b>	WB-67			<b>Posted / Design Speed</b>	55    65

Ramps A2, B2, C2, & D2:\*

Design Speed (300 ft along ramp beyond the painted gore in the travel direction) - 55 mph

Design Speed (Ramp Body) - 45 mph

Design Speed (Within 300 ft of 7000 S) - 20 mph

20-mph Design Speed continues through the left turn movement

\*Refer to Standard Drawings DD 5 and DD 6 for design of ramp elements, use the design speeds listed above for determining superelevation, minimum radii, vertical curve k values, stopping sight distance, and clear zone.

#### Proposed Roadway Characteristics

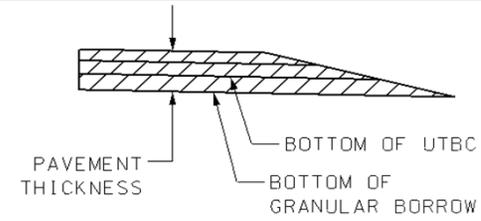
**Total Number of Lanes** 6

**Shoulder Width (Typ)** 12'

**Curb & Gutter Type & Width (Typ)** Type M1 (2.5')

#### Pavement Thickness

See Typical Sections in Part 7



Pavement Thickness consists of Hard Surfacing, UTBC, and Granular Borrow (if used).

FHWA 13 Critical Elements	UDOT Standard			RFP Requirement			Design Exception	References	Date of Decision, Comments, Mitigation, etc.
Design Speed	65 mph			65 mph			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 2-1; GB pp. 2-53:58, 8-1:2	Determined by Concept Team
Lane Width	Mainline	12'	12'	12'			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD (DD & ST series); MOI 7-1, 43:47, 107; GB pp. 8-2:3	
	LT Turn Lane(s)	12'	12'	12'					
	RT Turn Lane(s)	11'	12'	12'					
Shoulder Width	Outside	Inside	Barrier Offset	Outside	Inside	Barrier Offset	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD (DD & ST series); MOI 7-44:46; GB pp. 4-8:11, 8-2:3	Barrier offset not required for 12' shoulders
	12'	12'	2'	12'	12'	2'			
Superelevation	Maximum Superelevation			Maximum Superelevation			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 1; MOI 7-26:29; GB pp. 8-3, 3-45 (T. 3-9)	
	6%			6%					
Horizontal Alignment	Minimum Radii Value			Minimum Radii Value			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-30:33, 50:55; GB pp. 8-6, 3-32 (T. 3-7), 3-45 (T. 3-9)	
	1660'			1660'					
Vertical Alignment	Sag Curve Min. K Value	Crest Curve Min. K Value	Sag Curve Min. K Value	Crest Curve Min. K Value			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-56:60; GB pp. crest 3-155: 157 (T. 3-34:35), sag 3-161 (T. 3-36)	
	157	193	157	193					
Profile Grades	% Min	% Max	% Min	% Max			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-58:62; GB pp. 3-119, 8-3:4 (T. 8-1)	0.50% preferred
	0.30%	5.00%	0.30%	5.00%					
Cross Slope	Standard Value			Value Proposed/Used			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD (DD, DD 4); MOI 7-47:48; GB pp. 4-1:6, 8-2:3	
	2%			2%					
Stopping-Sight Distance	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-62; GB pp. 3-2:8, 3-106:110, 3-4 (T. 3-1)	
	645'			645'					
Structural Capacity	Design Loading			Design Loading			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 11-2:3; GB p. 8-4	HS-20 for existing; HL-93 for new construction
	HL-93			HL-93					
Bridge Width	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 9; MOI 11-3; GB p. 8-4	
	62'-10"			62'-10"					
Vertical Clearance*	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 8:0; MOI 11-4:5; GB p. 8-4	* Notify FHWA on any changes to Vertical Clearance on the National Highway System
	16.5' over road, 23.5' over rail			16.5'					
Lateral Offset to Obstruction	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 17; GB p. 8-5, 10-19:21	
	Urban environments shoulder + 2', other locations clearzone.			Urban environments shoulder + 2', other locations clearzone.					

Design Waivers	UDOT Standard				RFP Requirement		Design Waiver	References	Date of Decision, Comments, Mitigation, etc.		
	V	Va	V'a	L	Location	L					
Acceleration Lanes	65 mph	50 mph	0 mph	1410'	Ramp B 0 to 65 (SB On)	1410'	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Refer to Table 10-4 GB pp. 10-111:112 to adjust for grade. A part of the ramp proper may also be considered in the acceleration length as a design waiver. Table 10-3 GB p. 10-110. See also GB pp. 9-124:125, 10-107:110, 116:122; SD DD 13A:14B, ST 1; MOI 7-106			
			14 mph	1350'							
			18 mph	1310'	Ramp D 0 to 65 (NB On)	1410'					
			22 mph	1220'							
			26 mph	1120'							
Deceleration Lanes	65 mph	55 mph	0 mph	570'	Ramp A 65 to 0 (NB Off)	570'	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Refer to Table 10-4 GB pp. 10-111:112 to adjust for grade. Table 10-5 GB p. 10-115. See also GB pp. 9-124:125, 10-107, 112:120, 123:124; SD DD 13A:14B, ST 3A:3B; MOI 7-106			
			14 mph	540'							
			18 mph	520'	Ramp C 65 to 0 (SB Off)	570'					
			22 mph	500'							
			26 mph	470'							
Guardrail Bridge Connection	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.				UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD BA 4B1:4B2, UDOT Design Exception Form			
Clear Zone	Meet clear zone compliant requirements defined in Standard Drawings.				30'		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	2006 Roadside Design Guide pg. 3-6 and Figure 3.2 pg. 3-8; SD DD 4, 8, 10-12,17			
Intersection Sight Distance	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.				Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 9-28:54, MOI 7-64:67			
Ramp Terminal Sight Distance	Along the Ramp				Along the Ramp		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SSD (Stopping Sight Distance) should be at least as great as design SSD *SSD is 25% greater than minimum SSD. **DSD is Decision Sight Distance based on avoidance maneuver 'E' and is desired where feasible. Document DSD but do not obtain waiver if DSD is not met. GB p. 3-4 (T. 3-1) GB p. 3-7 (T. 3-3) GB p. 10-92			
	<u>Design Speed</u>		<u>SSD (ft)</u>		<u>Design Speed</u>					<u>SSD (ft)</u>	
	70 mph		730		65 mph					645	
	55 mph		495		55 mph					495	
	50 mph		425		45 mph					360	
	45 mph		360		20 mph					115	
	40 mph		305								
	35 mph		250								
	30 mph		200								
	25 mph		155								
Along the Freeway or Street Preceding Approach Nose of Exit Ramp				Along the Freeway or Street Preceding Approach Nose of Exit Ramp							
<u>Design Speed</u>	<u>SSD (ft)*</u>	<u>DSD (ft)**</u>	<u>Location</u>	<u>SSD*</u>	<u>DSD**</u>						
65 mph	810	1365	SR-154	810'	1365'						
55 mph	620	1135	Approaching Ram								
50 mph	535	1030									
45 mph	450	930									
40 mph	385	825	SR-154	810'	1365'						
35 mph	315	720	Approaching Ram C								
30 mph	250	620									
25 mph	200	N/A									
Shoulder/Travel way (gutter pan)	The gutter pan is not considered a part of the traveled way or shoulder.				The gutter pan is not considered a part of the traveled way or shoulder.		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 4-19, 10-103; MOI 7-1, 43:44			

Design Waivers	UDOT Standard	RFP Requirement		Design Waiver	References	Date of Decision, Comments, Mitigation, etc.	
Gores	Follow the key points from 2011 AASHTO: • Should be uniform along the freeway; • Geometric shape is appropriate for given speeds; • Mitigation required for major obstructions in a gore; and • Unpaved area beyond the gore nose should be graded nearly level with the roadways as practical.	Location	Meets all Requirements?	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 10-96:101; SD DD 6, ST 3A:3B		
		7000 South	YES				
Ramp Terminals	Platform		Platform		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Avoid left hand entrances and exits. GB pp. 10-103:104. Ramp Terminal means: 1) the exit terminal from the side street onto the freeway entrance ramp; 2) the entrance terminal onto the freeway; 3) the exit terminal from the freeway onto the exit ramp; and 4) the entrance terminal from the freeway exit ramp onto the side street. Refer to GB 10-104 for platform lengths. MOI 7-105:106	
	Location	Length	Location	Length			
	Ramp side of the approach nose or merging end.	200 ft	Ramp side of the approach nose or merging end.	200 ft			
	At-grade terminal of ramp.	Varies	At-grade terminal of ramp.	Varies			
On Ramp Design	Type	Parallel	Ramp Loc.	Type	Parallel	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 10-107:112; SD DD 6, ST 1; MOI p. 1-2. UDOTs preferred approach is to utilize parallel entrance ramps. See GB pp. 10-89:90; MOI 7-105:106.
	Curve Radius	1000 ft	7000 South Ramps	Curve Rad.	1400'		
	Dist. From Physical Nose to Ramp Control Line Terminus	200 ft		Dist.	327'		
	Taper	300 ft min		Taper	300'		
Off Ramp Design	Type	Taper	Ramp Loc.	Type	Taper	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 10-112:116; SD DD 6, ST 3A:3B; MOI p. 1-2. UDOTs preferred approach is to utilize tapered exit ramps for single lane exits. If multi lane exit, one lane must be parallel. See GB pp. 10-89:90; MOI 7-105:106.
	Divergence Angle (deg)	2-5	7000 South Ramps	Angle	2-5		
	Dist. from outer edge alignment break to ramp control line	200 ft		Dist.	200'		
Curb Configuration	2011 AASHTO p.10-103	Type M1		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Determine if the curb is appropriate for the type of facility. GB pp. 4-16:19, 10-103; SD GW 2		
Traffic Control	Meet Traffic Control Standard Drawings requirements	Meet Traffic Control Standard Drawings requirements		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD TC series		
Rumble Strips	Meet Paving Standard Drawings requirements	NA		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD PV 6A:8B		

Prepared by David Clawson 

Date 10/7/16

Verified Only \_\_\_\_\_  
 - Local Government Projects Only

Date \_\_\_\_\_

Approved by  Charles Mason-Hill  
 2016.10.13 14:58:16 -06'00'

Date \_\_\_\_\_

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## PROJECT DESIGN CRITERIA - URBAN ARTERIAL

### I. PROJECT DESCRIPTION

DATE: 7/6/2016

Project No	S-0154(12)11	Location	4 Interchanges on Bangerter Highway
PIN	12566	Concept	4 Interchanges on Bangerter Highway

Describe the scope of the project Construct 4 New Interchanges

### II. DESIGN STANDARDS BY ROADWAY

(Complete a separate PDC for each roadway on your project)

Date of OSR: 2/18/2016

Roadway Name: 7000 South

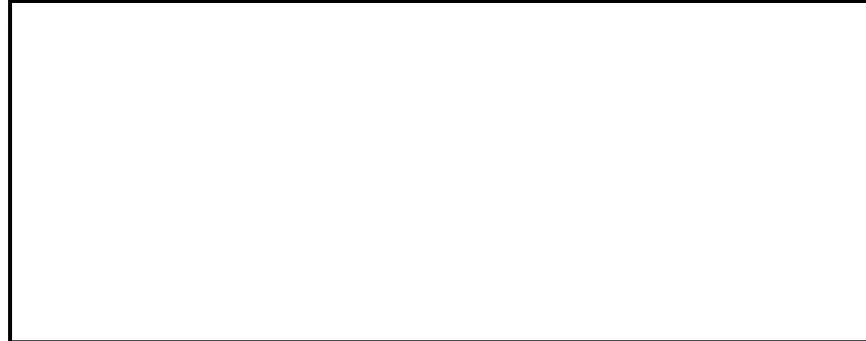
Comments

#### Roadway Characteristics

Functional Class	Urban Arterial		Pavement Type	Rigid	
Current Yea	2015	AADT= 20,000	Terrain	Rolling	
Design Yea	2040	AADT= 32,000	% Trucks (current)	3%	
Design Vehicle	WB-67		Posted / Design Speed	35	40

#### Proposed Roadway Characteristics

Total Number of Lanes	<u>5</u>	Park Strip Width (Typ)	<u>NA</u>
Shoulder Width (Typ)	<u>8'</u>	Sidewalk Width (Typ)	<u>6'</u>
Curb & Gutter Type & Width (Typ)	<u>Type B1 (2.5')</u>		



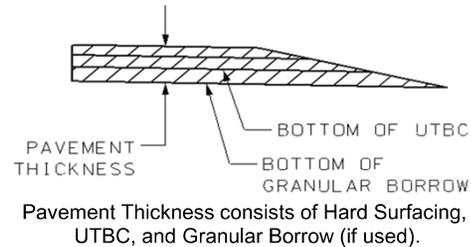
#### Intersection #1: SPUI - 7000 South & Bangerter Hwy

Roadway Name	Dir.	# of LT Lanes	Storage Length	# of Thru Lanes	# of RT Lanes	Storage Length
7000 South	EB	2	800	2	1	300
7000 South	WB	2	400	2	1	200
SB OFF Ramp	SB	2 (Including 1 Shared RT/LT Lane)	450	-	2 (Including 1 Shared RT/LT Lane)	800
NB OFF Ramp	NB	2	400	-	1	300

#### Pavement Thickness

See Typical Sections in Part 7

Ramp	Required Ramp Meter Storage (Lane-Feet)
SB On Ramp	1875
NB On Ramp	900



FHWA 13 Critical Elements	UDOT Standard			RFP Requirement			Design Exception	References	Date of Decision, Comments, Mitigation, etc.
Design Speed	40 MPH			40 MPH			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 2-1; GB pp. 2-53:58, 7-27	Determined by Concept Team
Lane Width	Mainline	12'		12'			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD (DD & ST series); MOI 7-1, 43:47, 107; GB pp. 7-29:30	
	LT Turn Lane(s)	12'		12'					
	RT Turn Lane(s)	10'		12'					
Shoulder Width	Outside	Inside	Barrier Offset	Outside	Inside	Barrier Offset	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD (DD & ST series); MOI 7-44:46; GB pp. 4-8:11, 7-30	5' Minimum outside shoulder/bike lane.
	4'8'	NA	NA	8'	NA	NA			
Superelevation	Maximum Superelevation			Maximum Superelevation			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 1; MOI 7-26:29; GB pp. 7-29, 3-44 (T. 3-8)	Use low speed urban
	2%			2%					
Horizontal Alignment	Minimum Radii Value			Minimum Radii Value			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-30:33, 50:55; GB pp. 7-28, 3-32 (T. 3-7), 3-44 (T. 3-8)	
	762			762					
Vertical Alignment	Sag Curve Min. K Value	Crest Curve Min. K Value		Sag Curve Min. K Value	Crest Curve Min. K Value		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-56:60; GB pp. crest 3-155: 157 (T. 3-34:35), sag 3-161 (T. 3-36)	
	64	44		64	44				
Profile Grades	% Min	% Max		% Min	% Max		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-58:62; GB pp. 3-119, 7-28:29 (T. 7-4)	0.50% preferred
	0.3%	6%		0.3%	6%				
Cross Slope	Standard Value			Value Proposed/Used			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD (DD series); MOI 7-47:48; GB pp. 4-1:6, 7-29	
	2%			2%					
Stopping-Sight Distance	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-62; GB pp. 3-2:8, 3-106:110, 7-28, 7-3 (T. 7-1)	
	305			305					
Structural Capacity	Design Loading			Design Loading			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 11-2:3; GB p. 7-38	HS-20 for existing; HL-93 for new construction
	HL-93 for new construction			HL-93 for new construction					
Bridge Width	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 9; MOI 11-3; GB pp. 7-37:38	
	125.833'			125.833'					
Vertical Clearance*	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 8:9; MOI 11-4:5; GB p. 7-38	* Notify FHWA on any changes to Vertical Clearance on the National Highway System
	16.5' over road, 23.5' over rail			16.5'					
Lateral Offset to Obstruction	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 17; GB pp. 7-37:38	
	1.5' tangent / 3' radius			1.5' tangent / 3' radius					

Design Waivers	UDOT Standard				RFP Requirement		Design Waiver	References	Date of Decision, Comments, Mitigation, etc.
	V	Va	V'a	L	Location	L			
Acceleration Lanes	40 mph	31 mph	0 mph	360'	N/A	N/A	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Refer to Table 10-4 GB pp. 10-111:112 to adjust for grade. A part of the ramp proper may also be considered in the acceleration length as a design waiver. Table 10-3 GB p. 10-110. See also GB pp. 9-124:125, 10-107:110, 116:122; SD DD 13A:14B, ST 1; MOI 7-106	
			14 mph	300'					
			18 mph	270'					
			22 mph	210'					
			26 mph	120'					
Deceleration Lanes	40 mph	36 mph	0 mph	320'	N/A	N/A	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Refer to Table 10-4 GB pp. 10-111:112 to adjust for grade. Table 10-5 GB p. 10-115. See also GB pp. 9-124:125, 10-107,112:120, 123:124; SD DD 13A:14B, ST 3A:3B; MOI 7-106	
			14 mph	295'					
			18 mph	265'					
			22 mph	235'					
			26 mph	185'					
Guardrail Bridge Connection	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.				UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD BA 4B1:4B2, UDOT Design Exception Form	
Clear Zone	Meet clear zone compliant requirements defined in Standard Drawings.				14'		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	2006 Roadside Design Guide pg. 3-6 and Figure 3.2 pg. 3-8; SD DD 4, 8, 10:12,17	
Intersection Sight Distance	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.				Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 9-28:54, MOI 7-64:67	
Shoulder/Travel way (gutter pan)	The gutter pan is not considered a part of the traveled way or shoulder.				The gutter pan is not considered a part of the traveled way or shoulder.		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 4-19, 10-103; MOI 7-1, 43:44	
Curb Configuration	2011 AASHTO p. 10-103				Type B1/Type B5/ Type M1/Type M2		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Determine if the curb is appropriate for the type of facility. GB pp. 4-16:19, 10-103; SD GW 2	
Traffic Control	Meet Traffic Control Standard Drawings requirements				Meet Traffic Control Standard Drawings requirements		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD TC series	
Rumble Strips	Meet Paving Standard Drawings requirements				NA		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD PV 6A:8B	

Prepared by David Clawson 

Date 10/7/16

Verified Only \_\_\_\_\_  
 - Local Government Projects Only

Date \_\_\_\_\_

Approved by  Charles Mason-Hill  
 2016.10.13 14:58:36 -06'00'

Date \_\_\_\_\_

On local government projects that are not on a UDOT road, the Region Preconstruction Engineer signs the "Verified Only" line and the Engineer of Record signs the "Approved by" line. For all other projects, the "Verified Only" line is left blank and the Region Preconstruction Engineer signs the "Approved by" line.

## PROJECT DESIGN CRITERIA - URBAN ARTERIAL - OTHER

### I. PROJECT DESCRIPTION

DATE: 10/7/2016

Project No	S-0154(12)11	Location	4 Interchanges on Bangert Highway	
PIN	12566	Concept	4 New Interchanges on Bangert Highway	

Describe the scope of the project     Construct 4 New Interchanges

### II. DESIGN STANDARDS BY ROADWAY

Date of OSR: 2/18/2016

Roadway Name: SR-154 Bangert Hwy - 9000 South

#### Comments

#### Roadway Characteristics

Functional Class	Urban Arterial - Other			Pavement Type	Rigid	
Current Year	2016	AADT=	50,000	Terrain	Rolling Terrain	
Design Year	2040	AADT=	115,000	% Trucks (current)	6%	
Design Vehicle	WB-67			Posted / Design Speed	60	65

Ramps A, B, C, & D:\*

Design Speed (300 ft along ramp beyond the painted gore in the travel direction) - 55 mph  
 Design Speed (Ramp Body) - 45 mph  
 Design Speed (Within 300 ft of 9000 S) - 20 mph  
 20-mph Design Speed continues through the left turn movement

\*Refer to Standard Drawings DD 5 and DD 6 for design of ramp elements, use the design speeds listed above for determining superelevation, minimum radii, vertical curve k values, stopping sight distance, and clear zone. Superelevation method 2 can be used for curves at the ramp terminal.

#### Proposed Roadway Characteristics

Total Number of Lanes     6

Shoulder Width (Typ)     12'

Curb & Gutter Type & Width (Typ)     Type M1 (2.5')

#### Pavement Thickness

See Part 4-11 for Pavement Requirements

FHWA 13 Critical Elements	UDOT Standard			RFP Requirement			Design Exception	References	Date of Decision, Comments, Mitigation, etc.
Design Speed	65 mph			65 mph			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 2-1; GB pp. 2-53:58, 8-1:2	Determined by Concept Team. See Comments box for Ramp Design Speeds.
Lane Width	Through Lanes	12'		12'			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD (DD & ST series); MOI 7-1, 43:47, 107; GB pp. 8-2:3	
	LT Turn Lane(s)	12'		12'					
	RT Turn Lane(s)	12'		12'					
Shoulder Width	Outside	Inside	Barrier Offset	Outside	Inside	Barrier Offset	<input type="checkbox"/> Not Required <input type="checkbox"/> Required <input checked="" type="checkbox"/> Approved	SD (DD & ST series); MOI 7-44:46;  GB pp. 4-8:11, 8-2:3	*Inside Shoulder - narrows to 3 feet (shoulder + shy) under canal/ Old Bingham Highway Bridges
	12'	12'	2'	12'	12*	2'			
Superelevation	Maximum Superelevation			Maximum Superelevation			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 1; MOI 7-26:29;  GB pp. 8-3, 3-45 (T. 3-9)	
	6.0%			6.0%					
Horizontal Alignment	Minimum Radii Value			Minimum Radii Value			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-30:33, 50:55; GB pp. 8-6, 3-32 (T. 3-7), 3-45 (T. 3-9)	
	1660'			1660'					
Vertical Alignment	Sag Curve Min. K Value	Crest Curve Min. K Value		Sag Curve Min. K Value	Crest Curve Min. K Value		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-56:60; GB pp. crest 3-155: 157 (T. 3-34:35), sag 3-161 (T. 3-36)	
	157	193		157	193				
Profile Grades	% Min	% Max		% Min	% Max		<input type="checkbox"/> Not Required <input type="checkbox"/> Required <input checked="" type="checkbox"/> Approved	MOI 7-58:62;  GB pp. 3-119, 8-3:4 (T. 8-1)	6% needed to reduce profile impacts
	0.30%	5.0%		0.30%	6.0%				
Cross Slope	Standard Value			Value Proposed/Used			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD (DD, DD 4); MOI 7-47:48;  GB pp. 4-1:6, 8-2:3	
	2.0%			2%					
Stopping-Sight Distance	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-62; GB pp. 3-2:8, 3-106:110, 3-4 (T. 3-1)	
	645'			645'					
Structural Capacity	Design Loading			Design Loading			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 11-2:3;  GB p. 8-4	HS-20 for existing; HL-93 for new construction
	HL-93			HL-93					
Bridge Width	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 9; MOI 11-3;  GB p. 8-4	
	62'-10"			62'-10"					
Vertical Clearance*	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 8:0; MOI 11-4:5;  GB p. 8-4	* Notify FHWA on any changes to Vertical Clearance on the National Highway System
	16.5' over road, 23.5' over rail			16.5'					
Lateral Offset to Obstruction	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 17; GB p. 8-5, 10-19:21	
	Edge of the Travel Lane to the Edge of the Shoulder.			Edge of the Travel Lane to the Edge of the Shoulder.					

Design Waivers	UDOT Standard				RFP Requirement		Design Waiver	References	Date of Decision, Comments, Mitigation, etc.		
Acceleration Lanes	V 65 mph	Va 50 mph	V'a	L	Location Ramp B 0 to 65 (SB On)	L 1410'	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Refer to Table 10-4 GB pp. 10-111:112 to adjust for grade. A part of the ramp proper may also be considered in the acceleration length as a design waiver. Table 10-3 GB p. 10-110. See also GB pp. 9-124:125, 10-107:110, 116:122; SD DD 13A:14B, ST 1; MOI 7-106	*5-6% Downgrade = 0.5 Adjustment Factor for 0 mph to 50 mph acceleration		
			0 mph	1410'							
			14 mph	1350'							
			18 mph	1310'							
			22 mph	1220'							
26 mph	1120'	Location Ramp D 0 to 65 (NB On)	L 1410'								
Deceleration Lanes											
V 65 mph	Va 55 mph			V'a	L	Location Ramp A 65 to 0 (NB Off)	L 570'	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Refer to Table 10-4 GB pp. 10-111:112 to adjust for grade. Table 10-5 GB p. 10-115. See also GB pp. 9-124:125, 10-107:112:120, 123:124; SD DD 13A:14B, ST 3A:3B; MOI 7-106	*3-4% Upgrade = 0.9 Adjustment Factor for 50 mph to 0 mph deceleration. **5-6% Upgrade = 0.8 Adjustment Factor for 50 mph to 0 mph deceleration.	
				0 mph	570'						
				14 mph	540'						
		18 mph	520'								
		22 mph	500'								
26 mph	470'	Location Ramp C 65 to 0 (SB Off)	L 570'								
Guardrail Bridge Connection											
UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.				UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved		SD BA 4B1:4B2, UDOT Design Exception Form		
Clear Zone											
Meet clear zone compliant requirements defined in Standard Drawings.				30'			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved		2006 Roadside Design Guide pg. 3-6 and Figure 3.2 pg. 3-8; SD DD 4, 8, 10-12,17		
Intersection Sight Distance											
Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.			Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved		GB pp. 9-28:54, MOI 7-64:67			
Ramp Terminal Sight Distance											
Along the Ramp				Along the Ramp				<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved		SSD (Stopping Sight Distance) should be at least as great as design SSD *SSD is 25% greater than minimum SSD. **DSD is Decision Sight Distance based on avoidance maneuver 'E' and is desired where feasible. Document DSD but do not obtain waiver if DSD is not met. GB p. 3-4 (T. 3-1) GB p. 3-7 (T. 3-3) GB p. 10-92	
<u>Design Speed</u>		<u>SSD (ft)</u>		<u>Design Speed</u>		<u>SSD (ft)</u>					
65 mph		645		65 mph		645'					
55 mph		495		55 mph		495'					
50 mph		425		45 mph		360'					
45 mph		360		25 mph		155'					
40 mph		305									
35 mph		250									
30 mph		200									
25 mph		155									
Along the Freeway or Street Preceding Approach Nose of Exit Ramp				Along the Freeway or Street Preceding Approach Nose of Exit Ramp							
<u>Design Speed</u>		<u>SSD (ft)*</u>	<u>DSD (ft)**</u>	<u>Location</u>	<u>SSD*</u>	<u>DSD**</u>					
65 mph		810	1365	SR-154	810'	1365'					
55 mph		620	1135	Approaching Ram							
50 mph		535	1030								
45 mph		450	930								
40 mph		385	825	SR-154	810'	1365'					
35 mph		315	720	Approaching Ramp C							
30 mph		250	620								
25 mph		195	N/								
Shoulder/Travel way (gutter pan)											
The gutter pan is not considered a part of the traveled way or shoulder.			The gutter pan is not considered a part of the traveled way or shoulder.			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved		GB pp. 4-19, 10-103; MOI 7-1, 43:44			

Design Waivers	UDOT Standard	RFP Requirement		Design Waiver	References	Date of Decision, Comments, Mitigation, etc.	
Gores	Follow the key points from 2011 AASHTO: • Should be uniform along the freeway; • Geometric shape is appropriate for given speeds; • Mitigation required for major obstructions in a gore, and • Unpaved area beyond the gore nose should be graded nearly level with the roadways as practical.	Location	Meets all Requirements?	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 10-96:101; SD DD 6, ST 3A:3B		
		9000 South	YES				
Ramp Terminals	Platform		Platform		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Avoid left hand entrances and exits. GB pp. 10-103:104. Ramp Terminal means: 1) the exit terminal from the side street onto the freeway entrance ramp; 2) the entrance terminal onto the freeway; 3) the exit terminal from the freeway onto the exit ramp; and 4) the entrance terminal from the freeway exit ramp onto the side street. Refer to GB 10-104 for platform lengths. MOI 7-105:106	
	Location	Length	Location	Length			
	Ramp side of the approach nose or merging end.	200'	Ramp side of the approach nose or merging end.	200'			
	At-grade terminal of ramp.	Varies	At-grade terminal of ramp.	Varies			
On Ramp Design	Type	Parallel	Ramp Loc.	Type	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 10-107:112; SD DD 6, ST 1; MOI p. 1-2. UDOTs preferred approach is to utilize parallel entrance ramps. See GB pp. 10-89:90; MOI 7-105:106.	
	Curve Radius	1000' min	9000 South Ramps	Curve Rad.			1000' min
	Dist. From Physical Nose to Ramp Control Line Terminus	200' min		Dist.			200' min
	Taper	L(300' min)		Taper			L(300' min)
Off Ramp Design	Type	Taper	Ramp Loc.	Type	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 10-112:116; SD DD 6, ST 3A:3B; MOI p. 1-2. UDOTs preferred approach is to utilize tapered exit ramps for single lane exits. If multi lane exit, one lane must be parallel. See GB pp. 10-89:90; MOI 7-105:106.	
	Divergence Angle (deg)	2-5	9000 South Ramps	Angle			2-5
	Dist. from outer edge alignment break to ramp control line	200'		Dist.			200'
Curb Configuration	Low Profile, Sloping Design	Type M1		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Determine if the curb is appropriate for the type of facility. GB pp. 4-16:19, 10-103; SD GW 2		
Traffic Control	Meet Traffic Control Standard Drawings requirements	Meet Traffic Control Standard Drawings requirements		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD TC series		
Rumble Strips	Meet Paving Standard Drawings requirements	NA		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD PV 6A:8B		

Prepared by Justin Beddoes *Justin Beddoes* 2016.10.07 14:57:21 -06'00'

Date \_\_\_\_\_

Verified Only \_\_\_\_\_  
- Local Government Projects Only

Date \_\_\_\_\_

Approved by *Charles Mason-Hill* Charles Mason-Hill 2016.10.13 13:31:50 -06'00'

Date \_\_\_\_\_

On local government projects that are not on a UDOT road, the Region Preconstruction Engineer signs the "Verified Only" line and the Engineer of Record signs the "Approved by" line. For all other projects, the "Verified Only" line is left blank and the Region Preconstruction Engineer signs the "Approved by" line.

## PROJECT DESIGN CRITERIA - URBAN ARTERIAL

### I. PROJECT DESCRIPTION

DATE: 10/7/2016

Project No	S-0154(12)11	Location	9000 S/Bangerter Hwy
PIN	12566	Concept	SPUI Bangerter Over 9000 S

Describe the scope of the project Construct New Interchange

### II. DESIGN STANDARDS BY ROADWAY

Date of OSR: 2/18/2016

Roadway Name: 9000 South

Comments

#### Roadway Characteristics

Functional Class	Urban Arterial		Pavement Type	Both	
Current Year	2016	AADT=29,000	Terrain	Rolling	
Design Year	2040	AADT=54,000	% Trucks (current)	4%	
Design Vehicle	WB-67		Posted / Design Speed	40	45

Intersections at 3695 W and Jordan Valley Way are right-in/right-out access only.

#### Proposed Roadway Characteristics

Total Number of Lanes	5	Park Strip Width (Typ)	NA
Shoulder Width (Typ)	8'	Sidewalk Width (Typ)	6'
Curb & Gutter Type & Width (Typ)	Type B1 (2.5')		

#### Intersection #1: 9000 South & Judd Ln

Roadway Name	Dir.	# of LT Lanes	Storage Length	# of Thru Lanes	# of RT Lanes	Storage Length
9000 South	EB	-	-	2	-	-
9000 South	WB	1	100' Lane	2	-	-
Judd Ln	NB	1 Shared	-	-	1 Shared	-

#### Intersection #2: SPUI - 9000 South & Bangerter Hwy

Roadway Name	Dir.	# of LT Lanes	Storage Length	# of Thru Lanes	# of RT Lanes	Storage Length
9000 South	EB	2	300' Each Lane	2	1	100' Lane
9000 South	WB	2	300' Each Lane	2	1	100' Lane
SB OFF Ramp	SB	2	500' Each Lane	-	2	800' Each Lane
NB OFF Ramp	NB	2	400' Each Lane	-	2	1000' Each Lane

#### Intersection #3: 9000 South & 3400 West

Roadway Name	Dir.	# of LT Lanes	Storage Length	# of Thru Lanes	# of RT Lanes	Storage Length
9000 South	EB	1	Maintain Existing	2	1	Maintain Existing
9000 South	WB	1	Maintain Existing	2	1	Maintain Existing
3400 West	SB	1	Maintain Existing	1	1	Maintain Existing
3400 West	NB	1	Maintain Existing	1	1	Maintain Existing

#### Pavement Thickness

See Part 4-11 for Pavement Requirements

Ramp	Ramp Meter Storage (Lane-Feet)
SB On Ramp	2,400
NB On Ramp	1,900

\*Inside Shoulder - narrows to 1 foot

FHWA 13 Critical Elements	UDOT Standard			RFP Requirement			Design Exception	References	Date of Decision, Comments, Mitigation, etc.
Design Speed	45 MPH			45 MPH			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 2-1; GB pp. 2-53:58, 7-27	Determined by Concept Team
Lane Width	Mainline	12'	12'	12'			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD (DD & ST series); MOI 7-1, 43:47, 107; GB pp. 7-29:30	
	LT Turn Lane(s)	12'	12'/14'	12'/14'			<input type="checkbox"/> Required <input type="checkbox"/> Approved		
	RT Turn Lane(s)	10'	12'	12'			<input type="checkbox"/> Approved		
Shoulder Width	Outside	Inside	Barrier Offset	Outside	Inside	Barrier Offset	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD (DD & ST series); MOI 7-44:46; GB pp. 4-8:11, 7-30	5' Minimum outside shoulder/bike lane.
	4'8"	NA	NA	5'	NA	NA	<input type="checkbox"/> Approved		
Superelevation	Maximum Superelevation			Maximum Superelevation			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 1; MOI 7-26:29; GB pp. 7-29, 3-44 (T. 3-8)	Use low speed urban
	2%			2%			<input type="checkbox"/> Approved		
Horizontal Alignment	Minimum Radii Value			Minimum Radii Value			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-30:33, 50:55; GB pp. 7-28, 3-32 (T. 3-7), 3-44 (T. 3-8)	
	1039			1039			<input type="checkbox"/> Approved		
Vertical Alignment	Sag Curve Min. K Value	Crest Curve Min. K Value	Sag Curve Min. K Value	Crest Curve Min. K Value			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-56:60; GB pp. crest 3-155: 157 (T. 3-34:35), sag 3-161 (T. 3-36)	
	79	61	79	61			<input type="checkbox"/> Approved		
Profile Grades	% Min	% Max	% Min	% Max			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-58:62; GB pp. 3-119, 7-28:29 (T. 7-4)	0.50% preferred
	0.3%	6%	0.5%	6%			<input type="checkbox"/> Approved		
Cross Slope	Standard Value			Value Proposed/Used			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD (DD series); MOI 7-47:48; GB pp. 4-1:6, 7-29	
	2%			2%			<input type="checkbox"/> Approved		
Stopping-Sight Distance	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-62; GB pp. 3-2:8, 3-106:110, 7-28, 7-3 (T. 7-1)	
	360			360			<input type="checkbox"/> Approved		
Structural Capacity	Design Loading			Design Loading			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 11-2:3; GB p. 7-38	HS-20 for existing; HL-93 for new construction
	HL-93 for new construction			HL-93 for new construction			<input type="checkbox"/> Approved		
Bridge Width	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 9; MOI 11-3; GB pp. 7-37:38	
	125.833"			125.833"			<input type="checkbox"/> Approved		
Vertical Clearance*	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 8:9; MOI 11-4:5; GB p. 7-38	* Notify FHWA on any changes to Vertical Clearance on the National Highway System
	16.5' over road, 23.5' over rail			16.5'			<input type="checkbox"/> Approved		
Lateral Offset to Obstruction	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 17; GB pp. 7-37:38	
	1.5' tangent / 3' radius			1.5' tangent / 3' radius			<input type="checkbox"/> Approved		

Design Waivers	UDOT Standard				RFP Requirement		Design Waiver	References	Date of Decision, Comments, Mitigation, etc.
	V	Va	V'a	L	Location	L			
Acceleration Lanes	45 mph	35 mph	0 mph	560'	NA	NA	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Refer to Table 10-4 GB pp. 10-111:112 to adjust for grade. A part of the ramp proper may also be considered in the acceleration length as a design waiver. Table 10-3 GB p. 10-110. See also GB pp. 9-124:125, 10-107:110, 116:122; SD DD 13A:14B, ST 1; MOI 7-106	
			14 mph	490'					
			18 mph	440'					
			22 mph	380'					
			26 mph	280'					
Deceleration Lanes	45 mph	40 mph	0 mph	385'	Ramp B (45-0 mph) Ramp D (45-0 mph)	385'	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Refer to Table 10-4 GB pp. 10-111:112 to adjust for grade. Table 10-5 GB p. 10-115. See also GB pp. 9-124:125, 10-107,112:120, 123:124; SD DD 13A:14B, ST 3A:3B; MOI 7-106	
			14 mph	350'					
			18 mph	325'					
			22 mph	295'					
			26 mph	250'					
Guardrail Bridge Connection	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.				UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD BA 4B1:4B2, UDOT Design Exception Form	
Clear Zone	Meet clear zone compliant requirements defined in Standard Drawings.				20'		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	2006 Roadside Design Guide pg. 3-6 and Figure 3.2 pg. 3-8; SD DD 4, 8, 10:12,17	
Intersection Sight Distance	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.				Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 9-28:54, MOI 7-64:67	
Shoulder/Travel way (gutter pan)	The gutter pan is not considered a part of the traveled way or shoulder.				The gutter pan is not considered a part of the traveled way or shoulder.		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 4-19, 10-103; MOI 7-1, 43:44	
Curb Configuration	2011 AASHTO p. 10-103				Type B1/Type M2		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Determine if the curb is appropriate for the type of facility. GB pp. 4-16:19, 10-103; SD GW 2	
Traffic Control	Meet Traffic Control Standard Drawings requirements				Meet Traffic Control Standard Drawings requirements		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD TC series	
Rumble Strips	Meet Paving Standard Drawings requirements				NA		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD PV 6A:8B	

Prepared by Justin Beddoes *Justin Beddoes* 2016.10.07 14:57:32 -06'00'

Date \_\_\_\_\_

Verified Only \_\_\_\_\_  
 - Local Government Projects Only

Date \_\_\_\_\_

Approved by *Charles Mason-Hill* Charles Mason-Hill 2016.10.13 14:37:56 -06'00'

Date \_\_\_\_\_

On local government projects that are not on a UDOT road, the Region Preconstruction Engineer signs the "Verified Only" line and the Engineer of Record signs the "Approved by" line. For all other projects, the "Verified Only" line is left blank and the Region Preconstruction Engineer signs the "Approved by" line.

## PROJECT DESIGN CRITERIA - URBAN ARTERIAL - OTHER

### I. PROJECT DESCRIPTION

**DATE:** 5/9/2016

<b>Project No</b> S-0154(12)11	<b>Location</b> 11400 S/Bangerter Hwy
<b>PIN</b> 12566	<b>Concept</b> 4 New Interchanges on Bangerter Highway

**Describe the scope of the project** Construct 4 New Interchanges

### II. DESIGN STANDARDS BY ROADWAY

(Complete a separate PDC for each roadway on your project)

**Date of OSR:** 2/18/2016

**Roadway Name:** SR-154 (Bangerter Highway) at 11400 S Interchange

**Comments**

#### Roadway Characteristics

<b>Functional Class</b>	Urban Arterial - Other			<b>Pavement Type</b>	Rigid
<b>Current Year</b>	2015	<b>AADT=</b>	43,000	<b>Terrain</b>	Rolling
<b>Design Year</b>	2040	<b>AADT=</b>	87,000	<b>% Trucks (current)</b>	6
<b>Design Vehicle</b>	WB-67			<b>Posted / Design Speed</b>	60    65

Ramps A1, B1, C1, & D1:\*

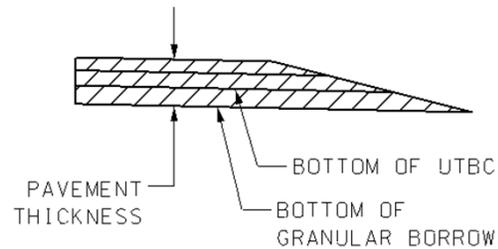
- Design Speed (300 ft along ramp beyond the painted gore in the travel direction) - 55 mph
- Design Speed (Ramp Body) - 45 mph
- Design Speed (Within 300 ft of 11400 S) - 20 mph
- 20-mph Design Speed continues through the left turn movement

\*Refer to Standard Drawings DD 5 and DD 6 for design of ramp elements, use the design speeds listed above for determining superelevation, minimum radii, vertical curve k values, stopping sight distance, and clear zone. Superelevation method 2 can be used for curves at the ramp terminal.

#### Proposed Roadway Characteristics

Total Number of Lanes	6
Shoulder Width (Typ)	12'
Curb & Gutter Type & Width (Typ)	Type M1 (2.5')

**Pavement Thickness**  
See Typical Sections in Part 7



Pavement Thickness consists of Hard Surfacing, LCBC, UTBC, and Granular Borrow.

FHWA 13 Critical Elements	UDOT Standard			RFP Requirement			Design Exception	References	Date of Decision, Comments, Mitigation, etc.
Design Speed	65 MPH			65 MPH			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 2-1; GB pp. 2-53:58, 7-27	Determined by Concept Team
Lane Width	Mainline	12'	12'	12'			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD (DD & ST series); MOI 7-1, 43:47, 107; GB pp. 7-29:30	
	LT Turn Lane(s)	12'	12'	12'					
	RT Turn Lane(s)	12'	12'	12'					
Shoulder Width	Outside	Inside	Barrier Offset	Outside	Inside	Barrier Offset	<input type="checkbox"/> Not Required <input checked="" type="checkbox"/> Required <input type="checkbox"/> Approved	SD (DD & ST series); MOI 7-44:46;  GB pp. 4-8:11, 7-30	*Increase shoulder width as necessary to accommodate stopping sight distance. Barrier Offset not required for 12' shoulders. Design Exception is for the outside shoulder for the entrance ramps only. See Design Exception for limits of reduced shoulder
	12'	12'	2'	*12'	*12'	2'			
Superelevation	Maximum Superelevation			Maximum Superelevation			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 1; MOI 7-26:29; GB pp. 7-29, 3-44 (T. 3-8)	
	6%			6%					
Horizontal Alignment	Minimum Radii Value			Minimum Radii Value			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-30:33, 50:55; GB pp. 7-28, 3-32 (T. 3-7), 3-44 (T. 3-8)	
	1660'			1660'					
Vertical Alignment	Sag Curve Min. K Value	Crest Curve Min. K Value	Sag Curve Min. K Value	Crest Curve Min. K Value			<input type="checkbox"/> Not Required <input checked="" type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-56:60; GB pp. crest 3-155: 157 (T. 3-34:35), sag 3-161 (T. 3-36)	*AASHTO Design criteria for a "Comfort" Sag curve will be allowed for the sag curve under 11400 South only, meet min k value of 157 at all other locations on SR-154. Meet AASHTO GB requirements for length of comfort sag. See RFP for Lighting Requirements.
	157	193	*157	193					
Profile Grades	% Min	% Max	% Min	% Max			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-58:62; GB pp. 3-119, 7-28:29 (T. 7-4)	0.50% preferred
	0.30%	5%	0.30%	5%					
Cross Slope	Standard Value			Value Proposed/Used			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD (DD, DD 4); MOI 7-47:48; GB pp. 4-1:6, 8-2:3	
	2%			2%					
Stopping-Sight Distance	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-62; GB pp. 3-2:8, 3-106:110, 3-4 (T. 3-1)	Adjust stopping sight distance for grades above 3% per AASHTO GB
	645			645					
Structural Capacity	Design Loading			Design Loading			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 11-2:3; GB p. 8-4	HS-20 for existing; HL-93 for new construction
	HL-93			HL-93					
Bridge Width	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 9; MOI 11-3;  GB p. 8-4	
	Traffic Lanes+Shoulders+Barrier Offset+Parapets			Traffic Lanes+Shoulders+Barrier Offset+Parapets					
Vertical Clearance*	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 8:9; MOI 11-4:5; GB p. 7-38	* Notify FHWA on any changes to Vertical Clearance on the National Highway System
	16.5' over road, 23.5' over rail			16.5'					
Lateral Offset to Obstruction	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 17; GB pp. 7-37:38	
	Edge of the Travel Lane to the Edge of the Shoulder.			Edge of the Travel Lane to the Edge of the Shoulder.					

Design Waivers	UDOT Standard				RFP Requirement		Design Waiver	References	Date of Decision, Comments, Mitigation, etc.		
	V	Va	V'a	L	Location	L					
Acceleration Lanes	65 mph	50 mph	0	1410	Ramp B 0 to 65 (SB ON)	1410'	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Refer to Table 10-4 GB pp. 10-111:112 to adjust for grade. A part of the ramp proper may also be considered in the acceleration length as a design waiver. Table 10-3 GB p. 10-110. See also GB pp. 9-124:125, 10-107:110, 116:122; SD DD 13A:14B, ST 1; MOI 7-106			
			14	1350	Ramp D 0 to 65 (NB ON)	1410'					
			18	1310							
			22	1220							
			26	1120							
Deceleration Lanes	65 mph	55 mph	0	570	Ramp A 65 to 0 (NB Off)	570'	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Refer to Table 10-4 GB pp. 10-111:112 to adjust for grade. Table 10-5 GB p. 10-115. See also GB pp. 9-124:125, 10-107,112:120, 123:124; SD DD 13A:14B, ST 3A:3B; MOI 7-106			
			14	540	Ramp C 65 to 0 (SB Off)	570'					
			18	520							
			22	500							
			26	470							
Guardrail Bridge Connection	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.				UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD BA 4B1:4B2, UDOT Design Exception Form			
Clear Zone	Meet clear zone compliant requirements defined in Standard Drawings.				30'		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	2006 Roadside Design Guide pg. 3-6 and Figure 3.2 pg. 3-8; SD DD 4, 8, 10-12,17			
Intersection Sight Distance	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.				Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 9-28:54, MOI 7-64:67			
Ramp Terminal Sight Distance	Along the Ramp				Along the Ramp		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SSD (Stopping Sight Distance) should be at least as great as design SSD *SSD is 25% greater than minimum SSD. **DSD is Decision Sight Distance based on avoidance maneuver 'E' and is desired where feasible. Document DSD but do not obtain waiver if DSD is not met. GB p. 3-4 (T. 3-1) GB p. 3-7 (T. 3-3) GB p. 10-92			
	<u>Design Speed</u>		<u>SSD (ft)</u>		<u>Design Speed</u>					<u>SSD (ft)</u>	
	65 mph	645	65 mph	645	65 mph	645				55 mph	495
	55 mph	495	50 mph	425	45 mph	360	40 mph	305			
	50 mph	425	45 mph	360	20 mph	115	35 mph	250			
	45 mph	360	40 mph	305			30 mph	200			
	40 mph	305	35 mph	250			25 mph	155			
	35 mph	250	30 mph	200							
	30 mph	200	25 mph	155							
	25 mph	155									
	Along the Freeway or Street Preceding Approach Nose of Exit Ramp				Along the Freeway or Street Preceding Approach Nose of Exit Ramp						
	<u>Design Speed</u>	<u>SSD (ft)*</u>	<u>DSD (ft)**</u>	<u>Location</u>	<u>SSD*</u>	<u>DSD**</u>					
	65 mph	810	1365	SR-154 Approaching Ramp A & C	810'	1365'					
	55 mph	620	1135								
	50 mph	535	1030								
	45 mph	450	930								
	40 mph	385	825								
	35 mph	315	720								
	30 mph	250	620								
	25 mph	200	N/								
Shoulder/Travel way (gutter pan)	The gutter pan is not considered a part of the traveled way or shoulder.				The gutter pan is not considered a part of the traveled way or shoulder.		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 4-19, 10-103; MOI 7-1, 43:44			

Design Waivers	UDOT Standard	RFP Requirement		Design Waiver	References	Date of Decision, Comments, Mitigation, etc.	
Gores	Follow the key points from 2011 AASHTO: <ul style="list-style-type: none"> <li>Should be uniform along the freeway;</li> <li>Geometric shape is appropriate for given speeds;</li> <li>Mitigation required for major obstructions in a gore; and</li> <li>Unpaved area beyond the gore nose should be graded nearly level with the roadways as practical.</li> </ul>	Location	Meets all Requirements?	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 10-96:101; SD DD 6, ST 3A:3B		
		All Gores	Yes				
Ramp Terminals	Platform		Platform		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Avoid left hand entrances and exits. GB pp. 10-103:104. Ramp Terminal means: 1) the exit terminal from the side street onto the freeway entrance ramp; 2) the entrance terminal onto the freeway; 3) the exit terminal from the freeway onto the exit ramp; and 4) the entrance terminal from the freeway exit ramp onto the side street. Refer to GB 10-104 for platform lengths. MOI 7-105:106	
	Location	Length	Location	Length			
	Ramp side of the approach nose or merging end.	200 ft	Ramp side of the approach nose or merging end.	200 ft			
	At-grade terminal of ramp.	Varies	At-grade terminal of ramp.	Varies			
On Ramp Design	Type	Parallel	Ramp Loc.	Type	Parallel	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 10-107:112; SD DD 6, ST 1; MOI p. 1-2. UDOTs preferred approach is to utilize parallel entrance ramps. See GB pp. 10-89:90; MOI 7-105:106.
	Curve Radius	1000 ft	All On Ramps	Curve Rad.	1000 ft		
	Dist. From Physical Nose to Ramp Control Line Terminus	200 ft		Dist.	200 ft		
	Taper	300 ft min		Taper	300 ft		
Off Ramp Design	Type	Taper	Ramp Loc.	Type	Taper	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 10-112:116; SD DD 6, ST 3A:3B; MOI p. 1-2. UDOTs preferred approach is to utilize tapered exit ramps for single lane exits. If multi lane exit, one lane must be parallel. See GB pp. 10-89:90; MOI 7-105:106.
	Divergence Angle (deg)	2-5	All Off Ramps	Angle	2-5		
	Dist. from outer edge alignment break to ramp control line	200 ft		Dist.	200 ft		
Curb Configuration	2011 AASHTO p.10-103	Type M1		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Determine if the curb is appropriate for the type of facility. GB pp. 4-16:19, 10-103; SD GW 2		
Traffic Control	Meet Traffic Control Standard Drawings requirements	Meet Traffic Control Standard Drawings requirements		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD TC series		
Rumble Strips	Meet Paving Standard Drawings requirements	N/A		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD PV 6A:8B		

Prepared by *Monk Bieder*

Date 10/7/2016

Verified Only \_\_\_\_\_  
 - Local Government Projects Only

Date \_\_\_\_\_

Approved by *Charles Mason-Hill* Charles Mason-Hill  
 2016.10.13 13:10:43 -06'00'

Date \_\_\_\_\_

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## PROJECT DESIGN CRITERIA - URBAN ARTERIAL

### I. PROJECT DESCRIPTION

DATE: 5/9/2016

Project No	S-0154(12)11	Location	11400 S/Bangerter Hwy		
PIN	12566	Concept	SPUI Bangerter Under 11400 S		

Describe the scope of the project Construct 4 New Interchages

### II. DESIGN STANDARDS BY ROADWAY

(Complete a separate PDC for each roadway on your project)

Date of OSR: 2/18/2016

Roadway Name: 11400 South

Comments

#### Roadway Characteristics

Functional Class	Urban Arterial			Pavement Type	Rigid
Current Year	2015	AADT=	26,000	Terrain	Level
Design Year	2040	AADT=	47,000	% Trucks (current)	3
Design Vehicle	WB-67			Posted / Design Speed	40   45

#### Proposed Roadway Characteristics

Total Number of Lanes	<u>5</u>	Park Strip Width (Typ)	<u>4</u>
Shoulder Width (Typ)	<u>8</u>	Sidewalk Width (Typ)	<u>5</u>
Curb & Gutter Type & Width (Typ)	<u>B1, 2.5'</u>		

#### Intersection #1:

Roadway Name	Dir.	# of LT Lanes	Storage Length	# of Thru Lanes	# of RT Lanes	Storage Length
11400 S	EB	-	-	-	-	-
11400 S	WB	2	85	2	1	115
4000 West	NB	-	-	-	-	-
4000 West	SB	-	-	-	-	-

#### Curb Radius From T.B.C.

NW Curb Radius:	<u>-</u>
SW Curb Radius:	<u>-</u>
NE Curb Radius:	<u>35</u>
SE Curb Radius:	<u>35</u>

#### Intersection #2:

Roadway Name	Dir.	# of LT Lanes	Storage Length	# of Thru Lanes	# of RT Lanes	Storage Length
11400 S	EB	2	250	2	1	-
11400 S	WB	2	250	2	1	-
NB Off Ramp	NB	2	300	-	1	300
SB Off Ramp	SB	2	500	-	2	500

NW Curb Radius:	<u>31.5</u>
SW Curb Radius:	<u>64.5</u>
NE Curb Radius:	<u>64.5</u>
SE Curb Radius:	<u>39.5</u>

#### Intersection #3:

Roadway Name	Dir.	# of LT Lanes	Storage Length	# of Thru Lanes	# of RT Lanes	Storage Length
11400 S	EB	1	200	2	1	200
11400 S	WB	1	200	2	1	-
River Heights	NB	1	250	1	1	100
River Heights	SB	1	150	1	1	300

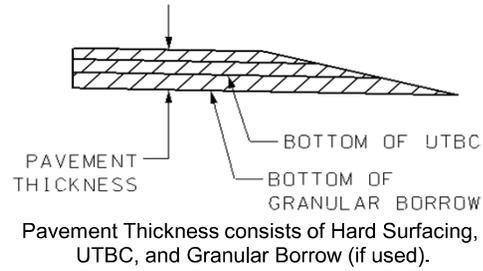
NW Curb Radius:	<u>35</u>
SW Curb Radius:	<u>35</u>
NE Curb Radius:	<u>35</u>
SE Curb Radius:	<u>35</u>

**Intersection #4:**

Roadway Name	Dir.	# of LT Lanes	Storage Length	# of Thru Lanes	# of RT Lanes	Storage Length
11400 S	EB	1	100	2	1	-
11400 S	WB	1	125	2	1	150
Summer Heights	NB	1	150	1	1	100
Summer Heights	SB	1	100	1	1	125

NW Curb Radius:	<u>35</u>
SW Curb Radius:	<u>35</u>
NE Curb Radius:	<u>35</u>
SE Curb Radius:	<u>35</u>

**Pavement Thickness**  
See Typical Sections in Part 7



FHWA 13 Critical Elements	UDOT Standard			RFP Requirement			Design Exception	References	Date of Decision, Comments, Mitigation, etc.
Design Speed	45			45			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 2-1; GB pp. 2-53:58, 7-27	Determined by Concept Team
Lane Width	Mainline	12'		12'			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD (DD & ST series); MOI 7-1, 43:47, 107; GB pp. 7-29:30	
	LT Turn Lane(s)	12'		12'					
	RT Turn Lane(s)	12'		12'					
Shoulder Width	Outside	Inside	Barrier Offset	Outside	Inside	Barrier Offset	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD (DD & ST series); MOI 7-44:46; GB pp. 4-8:11, 7-30	
	8	N/A	2	8	N/A	2			
Superelevation	Maximum Superelevation			Maximum Superelevation			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 1; MOI 7-26:29; GB pp. 7-29, 3-44 (T. 3-8)	
	6%			6%					
Horizontal Alignment	Minimum Radii Value			Minimum Radii Value			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-30:33, 50:55; GB pp. 7-28, 3-32 (T. 3-7), 3-44 (T. 3-8)	
	643			643					
Vertical Alignment	Sag Curve Min. K Value	Crest Curve Min. K Value	Sag Curve Min. K Value	Crest Curve Min. K Value	Sag Curve Min. K Value	Crest Curve Min. K Value	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-56:60; GB pp. crest 3-155: 157 (T. 3-34:35), sag 3-161 (T. 3-36)	
	79	61	79	61	79	61			
Profile Grades	% Min	% Max	% Min	% Max	% Min	% Max	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-58:62; GB pp. 3-119, 7-28:29 (T. 7-4)	0.50% preferred
	0.30%	6%	0.30%	6%	0.30%	6%			
Cross Slope	Standard Value			Value Proposed/Used			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD (DD series); MOI 7-47:48; GB pp. 4-1:6, 7-29	
	2%			2%					
Stopping-Sight Distance	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 7-62; GB pp. 3-2:8, 3-106:110, 7-28, 7-3 (T. 7-1)	
	360'			360'					
Structural Capacity	Design Loading			Design Loading			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	MOI 11-2:3; GB p. 7-38	HS-20 for existing; HL-93 for new construction
	HL-93 for New Construction			HL-93 for New Construction					
Bridge Width	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 9; MOI 11-3; GB pp. 7-37:38	
	N/A			N/A					
Vertical Clearance*	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 8:9; MOI 11-4:5; GB p. 7-38	* Notify FHWA on any changes to Vertical Clearance on the National Highway System
	16.5' over road, 23.5' over rail			16.5'					
Lateral Offset to Obstruction	Minimum			Minimum			<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD DD 17; GB pp. 7-37:38	
	1.5' tangent / 3' radius			1.5' tangent / 3' radius					

Design Waivers	UDOT Standard				RFP Requirement		Design Waiver	References	Date of Decision, Comments, Mitigation, etc.
	V	Va	V'a	L	Location	L			
Acceleration Lanes	70 mph	53 mph	22	1420	N/A		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Refer to Table 10-4 GB pp. 10-111:112 to adjust for grade. A part of the ramp proper may also be considered in the acceleration length as a design waiver. Table 10-3 GB p. 10-110. See also GB pp. 9-124:125, 10-107:110, 116:122; SD DD 13A:14B, ST 1; MOI 7-106	
			26	1350					
			36	1000					
			40	820					
			44	580					
Deceleration Lanes	70 mph	58 mph	22	550	N/A		<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Refer to Table 10-4 GB pp. 10-111:112 to adjust for grade. Table 10-5 GB p. 10-115. See also GB pp. 9-124:125, 10-107, 112:120, 123:124; SD DD 13A:14B, ST 3A:3B; MOI 7-106	
			26	520					
			36	440					
			40	390					
			44	340					
Guardrail Bridge Connection	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.		UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception				<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD BA 4B1:4B2, UDOT Design Exception Form	
Clear Zone	Meet clear zone compliant requirements defined in Standard Drawings.		20'				<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	2006 Roadside Design Guide pg. 3-6 and Figure 3.2 pg. 3-8; SD DD 4, 8, 10:12,17	
Intersection Sight Distance	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.		Sight triangles cases A-F and skew are met.				<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 9-28:54, MOI 7-64:67	
Shoulder/Travel way (gutter pan)	The gutter pan is not considered a part of the traveled way or shoulder.		The gutter pan is not considered a part of the traveled way or shoulder.				<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	GB pp. 4-19, 10-103; MOI 7-1, 43:44	
Curb Configuration	2011 AASHTO p. 10-103		Type B1				<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	Determine if the curb is appropriate for the type of facility. GB pp. 4-16:19, 10-103; SD GW 2	
Traffic Control	Meet Traffic Control Standard Drawings requirements		Meet Traffic Control Standard Drawings requirements				<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD TC series	
Rumble Strips	Meet Paving Standard Drawings requirements		Meet Paving Standard Drawings requirements				<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required <input type="checkbox"/> Approved	SD PV 6A:8B	

Prepared by *Mark Peltier* Date 10/7/2016

Verified Only \_\_\_\_\_ Date \_\_\_\_\_  
 - Local Government Projects Only

Approved by *Charles Mason-Hill* Date \_\_\_\_\_  
 Charles Mason-Hill  
 2016.10.13 13:11:22 -06'00'

On local government projects that are not on a UDOT road, the Region Preconstruction Engineer signs the "Verified Only" line and the Engineer of Record signs the "Approved by" line. For all other projects, the "Verified Only" line is left blank and the Region Preconstruction Engineer signs the "Approved by" line.

## Appendix 2: PROJECT DESIGN EXCEPTIONS & DEVIATIONS

# Utah Department of Transportation

## Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

Type of Request: (select one or both)  Design Exception  Design Waiver

### Project Information:

Project No: S-R299(210) PIN: 12566  
 Location: Bangerter Hwy; 4 Locations; 5400 South  
 Concept: New Interchange on Existing Freeway

### Roadway Characteristics and Traffic Data:

Functional Class:	Urban Arterial	Pavement Type:	Rigid
Current Year:	2016 AADT = 56,000	Current % Trucks:	6 %
Projected:	10 Years AADT = 76,000	Projected % Trucks:	6 %
Projected:	25 Years AADT = 109,000	Projected % Trucks:	6 %
Terrain:	Level	Posted Speed:	60 mph
Project Design Life:	40 Years	Design Speed:	65 mph
Design Vehicle:	WB-67		

### Geometric Data:

Number of Lanes:	6	Clear Zone Distance:	30 ft.
Pavement Width:	122 ft.	ROW Width:	150 ft.
Shoulder Width:	12 ft.	Shoulder Type:	Paved

### Accident History as documented in the OSR:

	Actual Rate	Expected Rate		
Accident History	N/A	N/A	Accident History Years:	2012-2014
Severity	N/A	N/A	Date of OSR:	2/18/2016

### Remarks:

Accident data is not applicable because the at-grade intersection will be converted to a grade separated interchange.

# Utah Department of Transportation

## Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566

S-R299(210)

Bangerter Hwy; 4 Locations; 5400 South

### **Adjoining Section Geometry Compatibility:**

Direction: North Pavement Width: 98' Shoulder Width In-12; Out-0

Shoulder Type: Inside - Paved; Outside - None

Compatibility: At reconstruction limits the shoulders will be tapered in to match existing.

Direction: South Pavement Width: 98' Shoulder Width In-12; Out-0

Shoulder Type: Inside - Paved; Outside - None

Compatibility: At reconstruction limits the shoulders will be tapered in to match existing.

### **Programmed Future Improvements:**

---

#### **Cost Data:**

Project Cost as Proposed: \$62,927,617.07

Additional Project Cost to Attain FHWA 13 Critical Elements (Design Exceptions): \$7,343,000.00

Additional Project Cost to Attain Other Standards (Design Waivers): \$5,000,000.00

Project Cost Savings Identified Using Practical Design

(This amount may be part of or all of the above amounts for Design Exceptions and/or Waivers):

Attached Detailed Estimate: \_\_\_\_\_

Comments:

None

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# Utah Department of Transportation

## Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566

S-R299(210)

Bangerter Hwy; 4 Locations; 5400 South

### Exceptions to FHWA's 13 Critical Elements:

- |                  |                            |                                   |                         |                         |
|------------------|----------------------------|-----------------------------------|-------------------------|-------------------------|
| 1. Design Speed  | 2. Lane Width              | 3. Shoulder Width                 | 4. Horizontal Alignment | 5. Vertical Alignment   |
| 6. Grades        | 7. Stopping-Sight Distance | 8. Cross Slopes                   | 9. Superelevation       | 10. Structural Capacity |
| 11. Bridge Width | 12. Vertical Clearance     | 13. Lateral Offset to Obstruction |                         |                         |
- (Notify FHWA on any changes on the NHS and STRAHNET routes. See detailed instructions for more information.)

Design Exception #1		Additional information in attached file:		
Element:	Shoulder Width	Existing	UDOT Standard	Proposed
Location:	SB On Ramp - Outside shoulder (right side based on direction of travel)	N/A	10' (Shoulder + Shy)	4' (Shoulder + Shy)

Mitigation: None

Remarks: The SB on ramp for Bangerter Hwy and 5400 South will be a three lane ramp with the ramp metering system located on the inside of the ramp due to the BOR aqueduct on the West side. The 4' (shoulder + shy) occurs for 50' along the ramp, but the shoulder is reduced from the 10' (shoulder + shy) for a total of 482' with the appropriate taper rates for the design speed. Reducing the shoulder will prevent impacts to the adjacent commercial property.

Design Exception #2		Additional information in attached file:		
Element:	Grades	Existing	UDOT Standard	Proposed
Location:	SR-154 (Bangerter Hwy); North SR-173 (5400 South)	4.16%	5.00%	6.00%

Mitigation: None

Remarks: The intersection improvements of Bangerter Hwy and 5400 South will implement a bridge over 5400 South for Bangerter travel. Currently North of the intersection the road slopes downward at 4.16%; with the addition of the bridge a steeper slope is necessary to connect the existing roadway with the design. Using a 6% grade for 434 ft will minimize the impacts to the surrounding urban environment. This grade allows for the design to tie in quicker taking advantage of the current roadway topography, reduces the amount of the retaining wall necessary, reduces the required length of aqueduct reconstruction by 380 linear feet, and prevents the total acquisition of 7 properties and 2 partial acquisitions.

# Utah Department of Transportation

## Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566                      S-R299(210)                      Bangerter Hwy; 4 Locations; 5400 South

Design Exception #3		Additional information in attached file:		
Element:	Shoulder Width	Existing	UDOT Standard	Proposed
Location:	SR-173 (5400 South)	0'	8'	0'

Mitigation: None

Remarks: Currently SR-173 (5400 South) has no shoulders along the traveled way. 8 foot shoulders would have major impacts on the surrounding urban environment. Property acquisitions would occur for each adjacent property and would cause a few businesses to close. Besides the major ROW/community impacts, there would also be major utility conflicts with the flex lane gantries and the power lines that run along SR-173. To avoid the major utility and ROW impacts with widening the road to construct the 8 foot shoulders the design will follow the existing condition of no shoulders. Standard shoulder widths will be provided within the interchange limits. This design exception is only provided for 5400 South outside of the interchange (outside of the pork chop islands separating left and right turn movements on each leg of the interchange).

# Utah Department of Transportation

## Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566

S-R299(210)

Bangerter Hwy; 4 Locations; 5400 South

### Waivers of Additional Design Criteria:

- |                                     |   |                     |                                |                                 |
|-------------------------------------|---|---------------------|--------------------------------|---------------------------------|
| 1. Acceleration Lanes               | 2. Deceleration Lanes                                 | 3. Clear Zone       | 4. Intersection Sight Distance | 5. Ramp Terminal Sight Distance |
| 6. Shoulder/Travel Way (Gutter Pan) | 7. Gores  | 8. Ramp Terminals   | 9. On Ramp Design              | 10. Off Ramp Design             |
| 11. Curb Configuration              | 12. Guardrail Bridge Connection<br>(See next section) | 13. Traffic Control | 14. Rumble Strips              |                                 |

Waiver #1		Additional information in attached file:		
Element:	Deceleration Lanes	Existing	UDOT Standard	Proposed
Location:	SR-173 (5400 South)	EB - LT : 200 ft WB - LT : 90 ft	EB - LT : 385 ft WB - LT : 385 ft	EB - LT : 140 ft WB - LT : 140 ft

Mitigation:

Remarks: The required deceleration length will not be provided for the Eastbound left turn from SR-173 (5400 South) onto SR-154 (Bangerter Hwy) and Westbound left turn from SR-173 (5400 South) onto 3900 West. For the EB left, providing the full deceleration length would extend the deceleration lane into the 3900 West intersection making it inoperative. Providing full deceleration for the WB left would have similar repercussions as the deceleration length would push the lane into the middle of the SPUI system. In order to provide the deceleration lengths required the 3900 West signal would need to be moved and redesigned. Both left turns have been designed to provide the required 140 ft gap length for the design speed and allows both intersections to operate

# Utah Department of Transportation

## Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566

S-R299(210)

Bangerter Hwy; 4 Locations; 5400 South

### Waivers of Additional Design Criteria – Bridge Rail or Parapet:

Structure Number: \_\_\_\_\_ Sufficiency Rating: (from Structures Division) \_\_\_\_\_

Mainline or Overcrossing: \_\_\_\_\_

Location: \_\_\_\_\_

### Existing Systems:

	Bridge		Approach	
Rail Type*			<input type="radio"/> Guardrail	<input type="radio"/> Precast Barrier
Height				
Attached			<input type="radio"/> Yes	<input type="radio"/> No
Meets Standards	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input type="radio"/> No
Total Width				
Lane Width				
Shoulder Width				
Condition				
3 Year Accidents	Actual Rate	Expected Rate	Actual Rate	Expected Rate

\*Attach Sketch of Rail Type

Remarks:

---

# Utah Department of Transportation Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

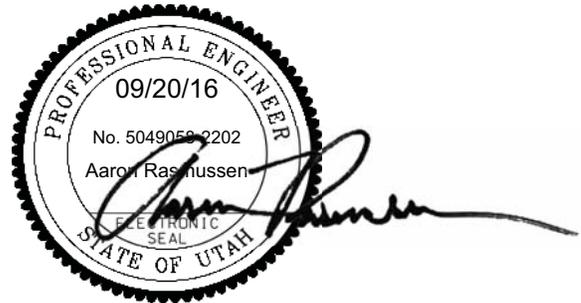
12566

S-R299(210)

Bangerter Hwy; 4 Locations; 5400 South

## Approval / Signatures:

Prepared and Submitted by: Aaron Rasmussen



**Marwan  
Farah**

Digitally signed by Marwan Farah  
DN: o=Utah Department of  
Transportation,  
email=marwan@utah.gov, cn=Marwan  
Farah  
Date: 2016.10.05 07:22:19 -06'00'

UDOT Project Manager

Comments:

Charles Mason-Hill

Region Pre-construction Engineer

Comments:

Glenn Blackwelder

Statewide Traffic and Safety Engineer

Comments:

George Lukes

2016.10.18

11:19:41 -06'00'

Statewide Pre-construction Engineer

Comments:

There are no future programmed projects.

Comments:

FHWA Approval\*

(\*If required per current Stewardship and Oversight Agreement)

Approval of Design Exceptions for all highway improvement projects on the NHS or Interstate System is considered to be a Federal Administrative Action as specified in 23 CFR 771.107, and as such must comply with the National Environmental Policy Act (NEPA). For Design Exceptions on a Federal-Aid project (or state funded project where a NEPA action was taken), the Design Exception is covered by the previous NEPA action. For Design Exceptions on projects where there has been no previous NEPA action FHWA intends to programmatically classify these actions as Categorical Exclusions (CE) pursuant to 23 CFR 771.117(a), provided there are no unusual circumstances (23 CFR 771.117(b)) or significant environmental impacts. Signature above by the Statewide Pre-construction Engineer confirms that NEPA has been completed for approved Design Exceptions.

# Utah Department of Transportation

## Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

Type of Request: (select one or both)  Design Exception  Design Waiver

### Project Information:

Project No: S-0154(12)11 PIN: 12566  
 Location: Bangerter Hwy; 4 Locations; 11400 South to 5400 South  
 Concept: New Interchange on Existing Freeway

### Roadway Characteristics and Traffic Data:

Functional Class:	<u>Urban Arterial</u>	Pavement Type:	<u>Rigid</u>
Current Year:	<u>2016</u> AADT = <u>50,000</u>	Current % Trucks:	<u>6 %</u>
Projected:	<u>10 Years</u> AADT = <u>80,000</u>	Projected % Trucks:	<u>6 %</u>
Projected:	<u>25 Years</u> AADT = <u>115,000</u>	Projected % Trucks:	<u>6 %</u>
Terrain:	<u>Rolling</u>	Posted Speed:	<u>60 mph</u>
Project Design Life:	<u>      </u> Years	Design Speed:	<u>65 mph</u>
Design Vehicle:	<u>WB-67</u>		

### Geometric Data:

Number of Lanes:	<u>6</u>	Clear Zone Distance:	<u>30 ft.</u>
Pavement Width:	<u>97 ft.</u>	ROW Width:	<u>200 ft.</u>
Shoulder Width:	<u>12 ft.</u>	Shoulder Type:	<u>Paved</u>

### Accident History as documented in the OSR:

	Actual Rate	Expected Rate						
Accident History	<table border="1"><tr><td>N/A</td><td>N/A</td></tr></table>	N/A	N/A	<table border="1"><tr><td>N/A</td><td>N/A</td></tr></table>	N/A	N/A	Accident History Years:	<u>2012-2014</u>
N/A	N/A							
N/A	N/A							
Severity	<table border="1"><tr><td>N/A</td><td>N/A</td></tr></table>	N/A	N/A	<table border="1"><tr><td>N/A</td><td>N/A</td></tr></table>	N/A	N/A	Date of OSR:	<u>2/18/2016</u>
N/A	N/A							
N/A	N/A							

Remarks:

Accident data is not applicable due the at-grade intersections will be converted to grade separated interchanges.

# Utah Department of Transportation

## Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566

S-0154(12)11

Bangerter Hwy; 4 Locations; 11400 South to 5400 South

### Adjoining Section Geometry Compatibility:

Direction: North Pavement Width: 49 Shoulder Width 0

Shoulder Type: N/A (No Shoulder)

Compatibility: Lanes are compatible

Direction: South Pavement Width: 49 Shoulder Width 0

Shoulder Type: N/A (No Shoulder)

Compatibility: Lanes are compatible

### Programmed Future Improvements:

---

#### Cost Data:

Project Cost as Proposed: \$208,000,000.00

Additional Project Cost to Attain FHWA 13 Critical Elements (Design Exceptions): \$770,000.00

Additional Project Cost to Attain Other Standards (Design Waivers):

Project Cost Savings Identified Using Practical Design

(This amount may be part of or all of the above amounts for Design Exceptions and/or Waivers):

Attached Detailed Estimate:

#### Comments:

Reduced inside shoulders for median light poles and median sign structure foundations.

Along Bangerter at:

11400 South:

2 High Mast Poles

9000 South:

3 back to back cobra head light poles on top the median barrier

1 butterfly sign structure north of 9000 S

7000 South:

5 back to back cobra head light poles on top the median barrier

---

# Utah Department of Transportation

## Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566

S-0154(12)11

Bangerter Hwy; 4 Locations; 11400 South to 5400 South

### Exceptions to FHWA's 13 Critical Elements:

- |                  |                            |                                   |                         |                         |
|------------------|----------------------------|-----------------------------------|-------------------------|-------------------------|
| 1. Design Speed  | 2. Lane Width              | 3. Shoulder Width                 | 4. Horizontal Alignment | 5. Vertical Alignment   |
| 6. Grades        | 7. Stopping-Sight Distance | 8. Cross Slopes                   | 9. Superelevation       | 10. Structural Capacity |
| 11. Bridge Width | 12. Vertical Clearance     | 13. Lateral Offset to Obstruction |                         |                         |
- (Notify FHWA on any changes on the NHS and STRAHNET routes. See detailed instructions for more information.)

Design Exception #1		Additional information in attached file:		
Element:	Shoulder Width	Existing	UDOT Standard	Proposed
Location:	Inside Shoulder Project Wide Various Locations	12'	12'	10'

Mitigation: None

Remarks: The shoulder widths at overhead sign locations will be reduced by 2 feet in both directions to accommodate the overhead signs. The shoulders will be immediately widened out to meet standards outside of the sign structure limits.

In order to meet the shoulder width standard at the overhead sign locations Bangerter Highway would need to be widened by an additional 4 ft (2 ft in each direction) at all sign locations. This would result in additional construction costs of approximately \$70,000 as well as additional impacts to right-of-way.

# Utah Department of Transportation

## Design Exception / Design Waiver from UDOT Standards

[www.udot.utah.gov/go/designexceptionprocess](http://www.udot.utah.gov/go/designexceptionprocess)

12566

S-0154(12)11

Bangerter Hwy; 4 Locations; 11400 South to 5400 South

### ***Waivers of Additional Design Criteria:***

- |                                     |   |                     |                                |                                 |
|-------------------------------------|---|---------------------|--------------------------------|---------------------------------|
| 1. Acceleration Lanes               | 2. Deceleration Lanes                                 | 3. Clear Zone       | 4. Intersection Sight Distance | 5. Ramp Terminal Sight Distance |
| 6. Shoulder/Travel Way (Gutter Pan) | 7. Gores  | 8. Ramp Terminals   | 9. On Ramp Design              | 10. Off Ramp Design             |
| 11. Curb Configuration              | 12. Guardrail Bridge Connection<br>(See next section) | 13. Traffic Control | 14. Rumble Strips              |                                 |

# Utah Department of Transportation

## Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566

S-0154(12)11

Bangerter Hwy; 4 Locations; 11400 South to 5400 South

### Waivers of Additional Design Criteria – Bridge Rail or Parapet:

Structure Number: \_\_\_\_\_ Sufficiency Rating: (from Structures Division) \_\_\_\_\_

Mainline or Overcrossing: \_\_\_\_\_

Location: \_\_\_\_\_

### Existing Systems:

	Bridge		Approach	
Rail Type*			<input type="radio"/> Guardrail	<input type="radio"/> Precast Barrier
Height				
Attached			<input type="radio"/> Yes	<input type="radio"/> No
Meets Standards	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input type="radio"/> No
Total Width				
Lane Width				
Shoulder Width				
Condition				
3 Year Accidents	Actual Rate	Expected Rate	Actual Rate	Expected Rate

\*Attach Sketch of Rail Type

Remarks:

---

# Utah Department of Transportation Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566

S-0154(12)11

Bangerter Hwy; 4 Locations; 11400 South to 5400 South

## Approval / Signatures:

Prepared and Submitted by: Justin A Beddoes



*Justin Beddoes*

Comments:

*Manan Pankh*  
UDOT Project Manager

Comments:

*Charles Mason-Hill*  
Charles Mason-Hill  
Oct 13 2016 3:09 PM  
Region Pre-construction Engineer

Comments:

*Glenn Blackwelder*  
Glenn Blackwelder  
Oct 17 2016 6:20 PM  
Statewide Traffic and Safety Engineer

No Future Planned Improvements

Comments:

*George Lukes*  
George Lukes  
2016.10.18  
11:26:27 -06'00'  
Statewide Pre-construction Engineer

Comments:

FHWA Approval\*

(\*If required per current Stewardship and Oversight Agreement)

Approval of Design Exceptions for all highway improvement projects on the NHS or Interstate System is considered to be a Federal Administrative Action as specified in 23 CFR 771.107, and as such must comply with the National Environmental Policy Act (NEPA). For Design Exceptions on a Federal-Aid project (or state funded project where a NEPA action was taken), the Design Exception is covered by the previous NEPA action. For Design Exceptions on projects where there has been no previous NEPA action FHWA intends to programmatically classify these actions as Categorical Exclusions (CE) pursuant to 23 CFR 771.117(a), provided there are no unusual circumstances (23 CFR 771.117(b)) or significant environmental impacts. Signature above by the Statewide Pre-construction Engineer confirms that NEPA has been completed for approved Design Exceptions.

# REQUEST FOR PROPOSALS



UTAH DEPARTMENT OF TRANSPORTATION



## 4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

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**CONTRACT DOCUMENTS**

**PART 7:**

**CONTRACT DRAWINGS**

---

Addendum **3-4** - October **1320**, 2016

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5. Utility Details - Revised
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8. Signing Details
9. Signal Details
10. ATMS Details
11. Partial Interchange Lighting Detail
12. Off Ramp Grading for Future Lane Detail
13. Pedestrian Bridge Location at 7000 South
14. USBOR Manway and Vault Details
15. USBOR O&M Guidelines
16. Barrier Standards

# REQUEST FOR PROPOSALS



UTAH DEPARTMENT OF TRANSPORTATION



## 4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

---

### CONTRACT DOCUMENTS

### PART 8:

### ENGINEERING DATA

---

Addendum ~~3-4~~ - October ~~1320~~, 2016

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3. Phase II Site Assessment/Utah DERR Remediation Report
4. SUE Test Hole Mapbook - Revised
- ~~5. SUE – Structures Utility Sheets moved from Reference Documents~~

PART 8 DOCUMENTATION NOT INCLUDED IN MAIN PDF DOCUMENT; INCLUDED AS SEPARATE DOCUMENTS/ELECTRONIC FILE

# REQUEST FOR PROPOSALS



UTAH DEPARTMENT OF TRANSPORTATION



## 4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

---

## REFERENCE DOCUMENTS

(RD)

---

Addendum ~~3~~4 - October ~~13~~20, 2016

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2. **Preliminary Engineering Concept (PEC) Base Build – Revised Sheets**
3. **PEC Build Alternative – 4015 West Reconstruction**
4. **Electronic Files – Revised**
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  - b) 5400 South
    1. 4015 West - Build Alternative
  - c) 7000 South
  - d) 9000 South
  - e) 11400 South
  - f) Drainage Basin .dgns
5. **Environmental Documentation**
  - a) Final State Environmental Study (SES) Bangerter Hwy & 5400 South
  - b) Final SES Bangerter Hwy & 7000 South
  - c) Final SES Bangerter Hwy & 9000 South
  - d) Final SES Bangerter Hwy & 11400 South
  - e) USBOR Aqueduct Environmental Assessment (EA) Draft
  - f) Section 404 Permit 9000 South
6. **Municipal & County Standards**
  - a) Salt Lake County Standards
  - b) South Jordan City Standards
  - c) South Valley Sewer District Standards
  - d) Taylorsville City Standards
  - e) Taylorsville Bennion Improvement District Standards
  - f) West Jordan City Standards
7. **USBOR Aqueduct Relocation Plans**
8. **Drainage Basin Maps and Supporting Information**
  - a) Drainage Basin Maps
  - b) South Jordan City Bangerter Hwy. and 9000 South Supporting Drainage and Utilities Information
  - c) South Jordan City Bangerter Hwy. and 11400 South Supporting Drainage Information
9. **As-Builts**

- a) 5400 South
- b) 7000 South
- c) 9000 South
- d) 11400 South

**21. 2015 Traffic Models**

- a) 5400 South
- b) 7000 South
- c) 9000 South
- d) 11400 South
- e) Bangerter Corridor

**22. Drainage Report SR-154 Bangerter Highway 9000 South to 12600 South**

**22,23. Aqueduct Protection and Monitoring Draft Special Provisions**

REFERENCE DOCUMENTATION NOT INCLUDED IN MAIN PDF DOCUMENT; INCLUDED AS SEPARATE DOCUMENTS/ELECTRONIC FILES.