UVU Exit Improvement

Karlee Floyd and Ali Shaaban

Project Location

This project is located at the NB I-15 University Parkway Exit near UVU. The affected roads will include I-15, College Drive, and University Parkway.



Cost Estimate

PROJECT NAME: UVU Box Undercrossing
Cost Estimate - Concept Level

Prepared By: Karlee Floyd & Ali Shabaan **Date** 4/3/2023

Proposed Project Scope: **UVU Box Undercrossing and Associated Road Work (off ramp, on ramp, and College Drive)**

Approximate Route Reference Mile Post (BEGIN) =		(END) =	
Project Length =	0.417	miles	2,200 ft
Current Year =	2022		
Assumed Construction Year =	2024		
Construction Items Inflation Factor =	1.16		2 yrs for inflation
Assumed Yearly Inflation for Engineering Services (PE and CE) (%/yr) =	3.75%		
Assumed Yearly Inflation for Right of Way (%/yr) =	4.0%		
Items not Estimated (% of Construction) =	20.0%		
Preliminary Engineering (% of Construction + Incentives) =	8.0%		
Construction Engineering (% of Construction + Incentives) =	10.0%		

Construction Items		Cost	Remarks
Public Information Services		$54,951	
Roadway and Drainage		$6,061,603	
Traffic and Safety		$743,308	
Structures		$12,280,620	
Environmental Mitigation		$29,699	
ITS		$30,000	
	Subtotal	$19,200,181	
	Items not Estimated (20%)	$3,840,036	
	Construction Subtotal	**$23,040,217**	
P.E. Cost	**P.E. Subtotal**	**$1,845,047**	8%
C.E. Cost	**C.E. Subtotal**	**$2,306,309**	10%
Right of Way	**Right of Way Subtotal**	$0	
Utilities	**Utilities Subtotal**	$145,000	
Incentives	**Incentives Subtotal**	$22,877	
Miscellaneous	**Miscellaneous Subtotal**	**$0**	

Cost Estimate (ePM screen 505)		2022	2024
	P.E.	$1,845,000	$1,986,000
	Right of Way	$0	$0
	Utilities	$145,000	$168,000
	Construction	$23,040,000	$26,625,000
	C.E.	$2,306,000	$2,482,000
	Incentives	$23,000	$27,000
	Aesthetics 0.75%	$173,000	$200,000
	Change Order Contingency 9.00%	$2,089,000	$2,414,000
	UDOT Oversight	$0	$0
	Miscellaneous	$0	$0
	TOTAL	$29,621,000	TOTAL $33,902,000

PROPOSED COMMISSION REQUEST	TOTAL	$29,621,000	TOTAL	$33,902,000

Total project cost and cost breakdown by category.

Roadway and Drainage

PROJECT NAME: UVU Box Undercrossing

Item #	Item	Quantity	Units	Price	Cost	Remarks
Roadway						
015017010	Mobilization	1	Lump	$1,538,639.91	$1,538,638.91	Usually 7-10% of construction
015547005	Traffic Control	1	Lump	$439,611.10	$467,311.90	Usually 3-5% of construction
015727020	Dust Control and Watering	334	1000 gal	$41.97	$14,017.98	
020567015	Granular Borrow (Plan Quantity)	4,384	cu yd	$85.30	$373,955.20	
023167020	Roadway Excavation (Plan Quantity)	38,030	cu yd	$38.07	$1,447,802.10	
027217010	Untreated Base Course	5,445	Ton	$49.64	$270,289.80	
027417050	HMA - 1/2 Inch	4,015	Ton	$211.00	$847,165.00	
027447040	SMA - 1/2 Inch	1,095	Ton	$209.12	$228,986.40	
027487040	Emulsified Asphalt CSS-1	9	Ton	$700.00	$6,300.00	Tack Coat
027767025	Concrete Curb and Gutter Type B1	3,217	ft	$38.66	$124,381.48	
027767010	Concrete Sidewalk	5,935	sq ft	$15.70	$93,180.00	
027877020	Bonded Wearing Course - Type B	13,152	sq yd	$9.07	$119,288.64	
Roadway Subtotal					**$5,531,317**	
Drainage						
026107386	Drainage Pipe - 18 inch, Smooth, Leak-Resistant	3,229	ft	$117.00	$377,757.78	
026337340	Drop Inlet, Type A - CB 6A	16	ea	$9,533.00	$152,528.00	
Drainage Subtotal					**$530,286**	
PI						
015407010	Public Information Services	1	Lump	$54,951.39	**$54,951**	Usually 0.25% of construction

Cost Breakdown for items in the Roadway and Drainage Sections of the cost estimate. Unit Pricing was provided by UDOT for each item and the quantities are based off the plans.

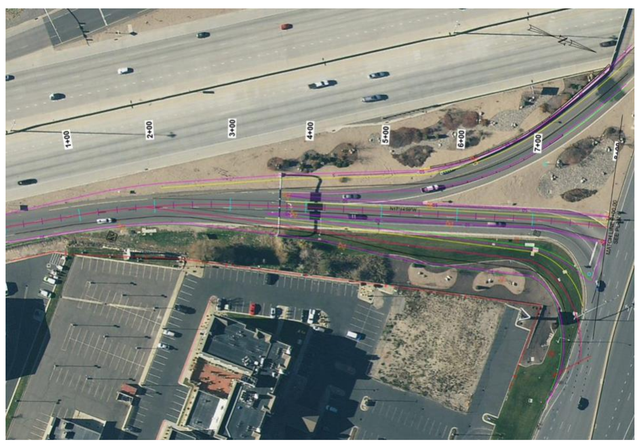
Construction Sheets

This spreadsheet is an Item Summary that will be included in the finalized construction documents. Other spreadsheets that are going to be included provide more details for each item including location and quantity.

SUMMARY OF ITEMS

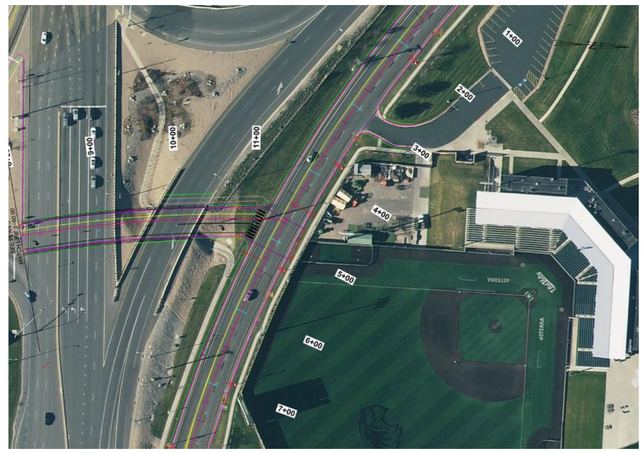
BID ITEM	BID ITEM NUMBER	PAY ITEM NAME	UNIT	QUANTITY	SHEET NUMBER	CALLOUT LOCATION
1	-	Overhead Sign Structure	LUMP	1	SM-5	
2	-	Geotech Report	LUMP	1	SM-5	
3	-	Relocate Power Box	EA	9	SM-5	
4	-	Relocate/Install Light Poles	EA	6	SM-5	
5	-	Relocate Traffic Camera (ATMS)	EA	1	SM-5	
6	-	Relocate Traffic Light (Small)	EA	3	SM-5	
7	00007601*	Pavement Smoothness Incentive	LUMP	1	SM-5	
8	00007602*	Hot Mix Asphalt (HMA) Incentive	LUMP	1	SM-5	
9	015017010	Mobilization	LUMP	1	SM-5	
10	015407010	Public Information Services	LUMP	1	SM-5	
11	015547005	Traffic Control	LUMP	1	SM-5	
12	015727020	Dust Control and Watering	1000 GAL	334	SM-5	
13	020567015	Granular Borrow (Plan Quantity)	CU YD	4384	SM-4	
14	023167020	Roadway Excavation (Plan Quantity)	CU YD	38030	SM-4	
15	026107386	Drainage Pipe - 18 inch, Smooth, Leak-Resistant	FT	3217	SM-3	
16	026337340	Drop Inlet, Type A - CB 6A	EA	16	SM-3	
17	027217010	Untreated Base Course	TON	5445	SM-9	
18	027417050	HMA - 1/2 Inch	TON	4015	SM-9	
19	027447040	SMA - 1/2 Inch	TON	1095	SM-9	
20	027487040	Emulsified Asphalt CSS-1	TON	9	SM-5	
21	027657050	Pavement Marking Paint	GAL	128	SM-6	
22	027687105	Pavement Message (Preformed Thermoplastic)	EA	2	SM-5	
23	027687110	Pavement Message (Preformed Thermoplastic Stop Line, Crosswalks - 12 inch)	EA	5	SM-5	
24	027767010	Concrete Sidewalk	SQ FT	5935	SM-2	
25	027767025	Concrete Curb and Gutter Type B1	FT	3217	SM-2	
26	027877020	Bonded Wearing Course - Type B	SQ YD	13152	SM-5	
27	028447111	Precast Concrete Barrier – 32 inch F-Shape, No Stabilization Pins	FT	457	SM-2	
28	028617075	Precast Retaining/Noise Wall 7 ft and less	FT	5664	SM-8	
29	028917061	Sign Type A-1, 36 inch X 30 inch	EA	1	SM-7	
30	028917065	Sign Type A-1, 36 inch X 36 inch	EA	2	SM-7	
31	028917115	Sign Type A-2, 30 inch X 30 inch	EA	1	SM-7	
32	028917265	Remove Overhead Sign	EA	3	SM-5	
33	028917320	Slipbase sign base (B3)	EA	2	SM-7	
34	02892701D	Traffic Signal System _____	LUMP	1	SM-5	
35	02892701D	Traffic Signal System _____	LUMP	1	SM-5	
36	029117010	HECP Type 1	ACRE	0.1982	SM-5	
37	029127010	Contractor Furnished Topsoil	SQ YD	960	SM-5	
38	029227030	Broadcast Seed	ACRE	0.1982	SM-5	
39	033107011	Structural Concrete	CU YD	6391	SM-8	
40	135567010	Closed Circuit Television (CCTV) Assembly System	LUMP	1	SM-5	
41	16525701D	Highway Lighting System _____	LUMP	1	SM-5	

The figure below shows a plan sheet for curb and gutter, Right of Way, pavement markings, and concrete barriers for the NB Exit 269 onto University Parkway.



Project Design

This shows the design for the undercrossing going in under University Parkway and changes made to College Drive



The PDC was a tool given to us by UDOT to ensure that we followed the standards for all of the roadways involved with our design.

ROADWAY NAME I-15

ROADWAY CHARACTERISTICS AND TRAFFIC DATA

Functional Class	Ramp			**Pavement Type**	PCCP		
Design Vehicle	Passenger Car (P)			**Terrain**	Level		
Latest Year	2023	**AADT=**	**N/A**	**Latest Truck %**	N/A		
Design Year	2043	**AADT=**	**N/A**	**Projected Truck %**	N/A		
Posted Speed	70	**mph**		**Design Speed**	75	**mph**	
No. of Lanes (Typ)	2			**Curb & Gutter (Typ)**	Type M1		
Pavement Width (Typ)	50	**ft**		**Park Strip Width (Typ)**	N/A	**ft**	
Shoulder Width (Typ)	8	**ft**		**Sidewalk Width (Typ)**	N/A	**ft**	

Comments

Refer to the Document Priority Section in the Introduction of the Roadway Design Manual for Design Criteria Order of Precedence

FHWA Controlling Criteria		Existing	UDOT Standard	Proposed/ Used	Design Exception	References	Date of Decision, Comments
Design Speed (mph)	**Speed**	70 mph	50 to 80 mph	70 mph	Not Required	**RDM** 10.9.6; **DM** 10.1, 10.2; **GB** 10-105:107 (T. 10-1)	Determined by Concept Team
Design Loading Structural Capacity	**Design Loading**	HS-20	HS-20 for existing	HS-20	Not Required	**GB** 8-5	HS-20 for existing; HL-93 for new construction
Lane Width (ft)	**Mainline**	12.0 ft	9 to 12 ft	12.0 ft	Not Required	**DM** 4.1, 10.1, 10.2; **GB** 3-109 (T. 3-29), 10-121:122	
	Med/TWLTL	N/A	N/A	N/A			
	LT/RT Turn	12.0 ft	12.0 ft	12.0 ft			
	Climb/Pass	N/A	N/A	N/A			
Shoulder Width (ft)	**Outside**	8.0 ft	2 to 8 ft	8.0 ft	Not Required	**DM** 4.1; **GB** 10-121:122	Barrier shoulder width is shy distance and should never be reduced below 2 ft min.
	Inside	6.0 ft	2 to 8 ft	6.0 ft			
	Barrier Shy	N/A	N/A	N/A			
Horizontal Curve Radius (ft)	**Min Radii (Super)**	N/A	N/A	N/A	Not Required	**RDM** 3.3; **DM** 10.1; **GB** 3-33:35 (T. 3-7, F. 3-10), 42 (T.3-8), 43 (T.3-9)(Any Facility),10-107:109	
Superelevation Rate (%)	**Max Superelev Rate**	6.0%	<10%	6.0%	Not Required	**RDM** 3.3; **GB** 3-31:33, 3-42 (T. 3-8), 3-43:44 (T. 3-9), 10-111:112	
Maximum Grade (%)	**Max Grade**	3.0%	<7%	3.0%	Not Required	**RDM** 10.9.6; **GB** 10-109:111	
Cross Slope (%)	**Cross Slope**	2.0%	1.5% to 2%	2.0%	Not Required	**RDM** 3.3.8, 4.2.2; **GB** 4-2:7 (T. 4-1), 7-38:39, 10-111:112	
Stopping-Sight Distance (ft)	**Min**	815 ft	820 ft	820 ft	Not Required	**RDM** 3.2; **GB** 3-2:8, 3-113:119,10-109	
Vertical Clearance* (ft)	**Min**	N/A	16.5 ft over road, 23.83 ft over rail, 17.5 ft ped over rd	N/A	Not Required	**DM** 4.2; **GB** 4-60:62 (F. 4-13), 8-4	* Notify FHWA of any changes to Vertical Clearance on the National Highway System

UDOT Design Documentation		Existing	UDOT Standard	Proposed/ Used	References	Date of Decision, Comments
Lateral Offset to Obstruction (ft)	**Min**	4.0 ft	4 ft on tangents/ 6 ft on curves	4.0 ft	**RDM** 4.6.2; **RDG** 10-3; **GB** 4-18, 7-49:50, 10-121:122	Curbed roadways shown.
Vertical Alignment (K-Value)	**Sag Curve Min. K**	N/A	N/A	N/A	**GB** Crest 3-155:157 (T. 3-34:35), Sag 3-161 (T. 3-36); **MOI** 7-56:59	
	Crest Min. K	311.6	320	320		
Clear Zone (ft)	**CZ Dist.**	N/A	N/A	N/A	**RDM** 4.6.1; **RDG** 3-6 (F. 3.2), 3-8	Design Clear Zone and Max Required Clear Zone are different values.
	Obstacle Distance	N/A	N/A	N/A		
Intersection Sight Distance (#, ft)	**Case, Dist**	N/A	N/A	N/A	**GB** 9-35:59	List case (A-F) and minimum sight distance
	Case, Dist	N/A	N/A	N/A		