MEMORANDUM

TO: Myron Lee, Dixie MPO

FROM: Horrocks Engineering Group

DATE: June 19, 2024

SUBJECT: Preliminary Northern Corridor Cost Estimates

The purpose of this memo is to describe assumptions used to develop the cost estimates for the Northern Corridor alternatives in support of the Supplemental Environmental Impact Statement (SEIS) being performed by the Bureau of Land Management (BLM). All unit prices are based on the recent work UDOT performed to develop the UDOT Alignment and bid prices received on the I-15 MP 10-13 Widening and Interchange 11 project by UDOT currently under construction.

COST ESTIMATE ASSUMPTIONS

Northern Corridor – T-Bone Mesa Alignment

No analysis was done beyond the initial concept developed for this alignment as part of the original EIS. Quantities were developed using high-level roadway modeling based on 2' contour interval mapping from Washington County. No investigations into utilities, environmental mitigation, drainage, structures, geotechnical, etc. were completed with the conceptual layout. Therefore, there is a high margin for error in the quantities since the engineering effort to develop them was based on less than 10% design completion. This is reflected in the high contingency amounts. Unit prices were updated based on those used to develop the Plan-in-Hand cost estimate for the UDOT Alignment in Spring 2024.

Northern Corridor – UDOT Alignment

The quantities and unit prices for this alignment are based on the Plan-in-Hand (50% complete) design plans that UDOT completed in 2023. Unit prices were updated in Spring 2024. The unit prices were developed by the design engineers by initially reviewing bid prices of similar items of work from other projects in the Washington County area, then adjusting these prices based on location, inflation, complexity, familiarity, risk, and specialty equipment required for construction. Finally, these unit prices were reviewed and adjusted by UDOT's third-party construction estimating experts to the prices shown.

Since significantly more effort was spent in the development of this alignment than any other, the quantities are much more accurate though there were still several unknowns such as potential utility conflicts, geotechnical design requirements for structure foundations, environmental mitigations, etc. The unit prices for this alignment were used as the basis for the rest of the alignments.

Northern Corridor – Southern Alignment

No analysis was done beyond the initial concept developed for this alignment as part of the original EIS. Quantities were developed using high-level roadway modeling based on 2' contour interval mapping from Washington County. No investigations into utilities, environmental mitigation, drainage, structures, geotechnical, etc. were completed with the conceptual layout. Therefore, there is a high margin for error in the quantities since the engineering effort to develop them was based on less than 10% design

completion. This is reflected in the high contingency amounts. Unit prices were updated based on those used to develop the Plan-in-Hand cost estimate for the UDOT Alignment in Spring 2024.

Northern Corridor – Red Hills Pkwy Expressway

The Red Hills Parkway (RHP) Expressway layout assumed that the major intersections of 200 East and 1000 East would have full grade separation for all provided movements with no traffic signals. The full grade separation concept for the expressway eliminated the possibility for WB RHP traffic to turn left at 200 East due to the physical and topographical constraints of the area. A WB to SB ramp was analyzed but would not work within practical design tolerances. The WB LT Turn to SB 200 East can only be accommodated if a signalized intersection is allowed. The third lane shown between 200 East and 1000 East is intended to be used as an acceleration/deceleration lane for vehicles using the adjacent parking lots and accesses. No stakeholders were consulted regarding the layout of the RHP Expressway and as such brings a significant risk to all aspects of the cost of this concept. The estimate was developed with the following assumptions:

- The flyovers for the I-15 SB Exit Ramp to WB RHP and EB RHP to I-15 NB are more complex structures, similar to the complexity of the structures shown in the UDOT Alignment estimate over the large washes. These would require curved steel girders which are more costly than concrete girders.
- Other structures were assumed to be less complex and similar to the recent bridges constructed along the I-15 and SR-7 corridors through the St George to Hurricane area in recent years. The unit prices shown for these approximately matches unit prices of the most recent bridge being constructed on I-15 over Washington Main St.
- Braided ramps were added to the estimate under the assumption that a 200 ft weave zone between the 1000 East ramps and I-15 ramps would be inadequate.
- Retaining walls are assumed to be needed in the area of the 200 East and 1000 East interchanges. Unit prices for these also reflect the most recent I-15 projects in Washington City.
- Utility impacts were not looked at in the concept, but there is likely to be significant utility impacts due to the amount of utilities located within the corridor. Many of the utilities in the RHP corridor are significant/large connections that have several constraints as to how and when they could be impacted. This is especially true around the 1000 East interchange. No coordination with utility providers was conducted so the estimate shows a large utility contingency in an attempt to address these unknowns.
- Contingencies are shown at 50% due to the significant number of unknown impacts for this alternative. Some effort was spent in developing a conceptual layout, but it was not carried out to a point to be able to analyze all potential impacts. Given the urban environment of this corridor, it was assumed a high likelihood for impacts that the design engineers were unable to account for at this time since less than 10% engineering design was performed.
- Right of way costs were developed based on the experience of UDOT Acquisition agents who have helped purchase similar properties both in the Washington County area and areas of Davis, Salt Lake, and Utah counties that are similar to these businesses. Unit prices for these properties reflect the assumed cost to purchase the property and any associated relocation costs. No appraisals were performed and no discussions with property owners were held so there are substantial potential risks related to these assumptions. If a building was impacted or if reasonable access could not be provided, a total acquisition of the property was assumed. If

reasonable access could be provided and only minor property impacts occurred, then a partial property acquisition was assumed.

Northern Corridor – St. George Blvd/100 South One-Way Couplet

The St. George Blvd/100 South One-Way Couplet concept was never fully developed, and less than 10% engineering design effort was expended. No drawings exist except for the split interchange concept that connects St. George Blvd to 100 South via one-way frontage roads adjacent to I-15 and adds a SB entrance ramp and a NB Exit ramp to 100 South. The cost estimate was developed on the following assumptions:

- The existing medians on St George Blvd will need to be removed and paved.
- All intersections will need some kind of layout and signal modification. These costs were captured in the Traffic & Safety section of the estimate.
- No work assumed on Tabernacle St or the north-south streets between St. George Blvd and 100 S. It is recognized that the one-way couplet would change the way traffic moves on Tabernacle St and the north-south streets which may trigger additional improvements to intersections along these roads, which were not captured in the estimate.
- The existing width of 100 South is sufficient to accommodate the lanes and shoulders needed.
- The existing pavement section of 100 South is sufficient for the traffic volumes and will not require reconstruction.
- The properties with accesses from S.t George Blvd and 100 South will not incur damages due to the changed traffic patterns.
- The cross section of 100 south at the I-15 bridge over 100 South has not been developed, so the bridge shown in the estimate assumes that even with the funded project coming soon to replace the bridge, it would need further modifications to accommodate the split interchange configuration.
- A project contingency of 30% was used, which is greater than the 20% used in the T-Bone, UDOT, and Southern Alignments, due to the increased number of unknowns in reconfiguring these corridors to one-way streets. Less effort was spent in developing this concept, thus the increase in risk and unknowns.

Northern Corridor
T-Bone Mesa Alignment

PROJECT COST ESTIMATE **1/31/2024**

ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL
ROAD IMPROVEMENTS				
Earthwork (Cut & Fill)	CU. YD.	515,900	$ 16.75	$ 8,641,325.00
Subgrade Preparation	SQ. FT.	2,950,000	$ 0.25	$ 737,500.00
6" Aggregate Base (Type II)	SQ. FT.	1,815,000	$ 0.68	$ 1,234,200.00
7" Sub Base (Type I)	SQ. FT.	1,815,000	$ 0.66	$ 1,197,900.00
5" Asphalt Paving	SQ. FT.	1,815,000	$ 3.15	$ 5,717,250.00
Striping	LIN. FT.	132,500	$ 0.25	$ 33,125.00
10' Path	SQ. FT.	232,700	$ 2.50	$ 581,750.00
Tortoise Crossing	LUMP			$ 3,996,400.00
DRAINAGE				
			21%	$ 4,649,284.50
BRIDGE				
Bridge 1	SQ. FT.	133,000	$ 480.00	$ 63,840,000.00
Bridge 2	SQ. FT.	86,250	$ 480.00	$ 41,400,000.00
Tortoise / Trail Crossings	LUMP			$ 6,000,000.00
UTILITIES				
Utility Modifications/Relocations			2%	$ 442,789.00
TRAFFIC CONTROL				
			1%	$ 692,357.62
MOBILIZATION				
			10%	$ 13,847,152.35
SUBTOTAL (CONSTRUCTION COSTS)				**$ 153,011,033.47**
CONTINGENCIES				
			20%	$ 30,602,206.69
RIGHT OF WAY				
	SQ. FT.	50,000	$ 5.00	$ 250,000.00
ENGINEERING				
			20%	$ 30,602,206.69
GRAND TOTAL				**$ 214,465,446.85**

2024 COST (+/-20%)	**$171,000,000.00 - $257,000,000.00**
2025 COST (+/-20%)	**$183,000,000.00 - $274,000,000.00**
2026 COST (+/-20%)	**$193,000,000.00 - $290,000,000.00**

Northern Corridor
UDOT Alignment

PROJECT COST ESTIMATE **1/31/2024**

ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL
ROAD IMPROVEMENTS				
Earthwork (Cut & Fill)	CU. YD.	865,000	$ 16.75	$ 14,488,750.00
Subgrade Preparation	SQ. FT.	3,165,000	$ 0.25	$ 791,250.00
6" Aggregate Base (Type II)	SQ. FT.	1,925,000	$ 0.68	$ 1,309,000.00
7" Sub Base (Type I)	SQ. FT.	1,925,000	$ 0.65	$ 1,251,250.00
5" Asphalt Paving	SQ. FT.	1,925,000	$ 3.15	$ 6,063,750.00
Striping	LIN. FT.	135,000	$ 0.25	$ 33,750.00
10' Path	SQ. FT.	251,000	$ 2.50	$ 627,500.00
Tortoise Crossing	LUMP			$ 3,996,400.00
DRAINAGE				
			21%	$ 5,997,946.50
BRIDGE				
Bridge 1	SQ. FT.	111,000	$ 480.00	$ 53,280,000.00
Bridge 2	SQ. FT.	111,100	$ 480.00	$ 53,328,000.00
Tortoise / Trail Crossings	LUMP			$ 6,000,000.00
UTILITIES				
Utility Modifications/Relocations			2%	$ 571,233.00
TRAFFIC CONTROL				
			1%	$ 738,694.15
MOBILIZATION				
			10%	$ 14,773,882.95
SUBTOTAL (CONSTRUCTION COSTS)				**$ 163,251,406.60**
CONTINGENCIES				
			20%	$ 32,650,281.32
RIGHT OF WAY				
	SQ. FT.	8,000	$ 5.00	$ 40,000.00
ENGINEERING				
			20%	$ 32,650,281.32
GRAND TOTAL				**$ 228,591,969.24**

2024 COST (+/-20%)	**$183,000,000.00 - $274,000,000.00**
2025 COST (+/-20%)	**$195,000,000.00 - $293,000,000.00**
2026 COST (+/-20%)	**$206,000,000.00 - $310,000,000.00**

Northern Corridor
Southern Alignment

PROJECT COST ESTIMATE **1/31/2024**

ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL
ROAD IMPROVEMENTS				
Earthwork (Cut & Fill)	CU. YD.	249,900	$ 16.75	$ 4,185,825.00
Subgrade Preparation	SQ. FT.	3,775,500	$ 0.25	$ 943,875.00
6" Aggregate Base (Type II)	SQ. FT.	2,350,000	$ 0.68	$ 1,598,000.00
7" Sub Base (Type I)	SQ. FT.	2,350,000	$ 0.65	$ 1,527,500.00
5" Asphalt Paving	SQ. FT.	2,350,000	$ 3.15	$ 7,402,500.00
Striping	LIN. FT.	160,000	$ 0.25	$ 40,000.00
10' Path	SQ. FT.	292,500	$ 2.50	$ 731,250.00
Tortoise Crossing	LUMP			$ 3,996,400.00
DRAINAGE				
			21%	$ 4,289,323.50
BRIDGE				
Bridge 1	SQ. FT.	120,000	$ 480.00	$ 57,600,000.00
Bridge 2	SQ. FT.	110,000	$ 480.00	$ 52,800,000.00
Tortoise / Trail Crossings	LUMP			$ 6,000,000.00
UTILITIES				
Utility Modifications/Relocations			2%	$ 408,507.00
TRAFFIC CONTROL				
			1%	$ 707,615.90
MOBILIZATION				
			10%	$ 14,152,318.05
SUBTOTAL (CONSTRUCTION COSTS)				**$ 156,383,114.45**
CONTINGENCIES				
			20%	$ 31,276,622.89
RIGHT OF WAY				
	SQ. FT.	100,000	$ 5.00	$ 500,000.00
ENGINEERING				
			20%	$ 31,276,622.89
GRAND TOTAL				**$ 219,436,360.23**

2024 COST (+/-20%)	**$175,000,000.00 - $263,000,000.00**
2025 COST (+/-20%)	**$187,000,000.00 - $280,000,000.00**
2026 COST (+/-20%)	**$198,000,000.00 - $297,000,000.00**

Northern Corridor
Red Hills Pkwy Expressway

PROJECT COST ESTIMATE **6/6/2024**

ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL
ROAD IMPROVEMENTS				
Earthwork (Cut & Fill)	CU. YD.	200,000	$ 16.75	$ 3,350,000.00
Subgrade Preparation	SQ. FT.	1,400,000	$ 0.25	$ 350,000.00
6" Aggregate Base (Type II)	SQ. FT.	853,000	$ 0.68	$ 580,040.00
7" Sub Base (Type I)	SQ. FT.	853,000	$ 0.66	$ 562,980.00
5" Asphalt Paving	SQ. FT.	853,000	$ 3.15	$ 2,686,950.00
Striping	LIN. FT.	61,500	$ 0.25	$ 15,375.00
10' Path	SQ. FT.	75,000	$ 2.50	$ 187,500.00
30" Curb & Gutter w/ Base	LIN. FT.	11,150	$ 52.00	$ 579,800.00
Concrete Walk w/ Base	SQ. FT.	4,450	$ 11.00	$ 48,950.00
DRAINAGE				
			45%	$ 3,762,717.75
STRUCTURE				
200 E Structure	SQ. FT.	6,000	$ 350.00	$ 2,100,000.00
1000 E Structure	SQ. FT.	9,000	$ 350.00	$ 3,150,000.00
SB I-15 Bridge to Red Hills Pkwy	SQ. FT.	19,936	$ 480.00	$ 9,569,280.00
Red Hills Pkwy to NB I-15 Bridge	SQ. FT.	15,262	$ 480.00	$ 7,325,760.00
EB Braid Structure	SQ. FT.	2,000	$ 350.00	$ 700,000.00
WB Braid structure	SQ. FT.	2,000	$ 350.00	$ 700,000.00
Box Culvert Extension	LUMP	1	$ 150,000.00	$ 150,000.00
WALLS				
Retaining Walls	SQ. FT.	222,500	$ 110.00	$ 24,475,000.00
UTILITIES				
Utility Modifications/Relocations			30%	$ 2,508,478.50
TRAFFIC CONTROL				
			15%	$ 9,420,424.69
MOBILIZATION				
			10%	$ 6,280,283.13
SUBTOTAL (CONSTRUCTION COSTS)				**$ 78,503,539.06**
CONTINGENCIES				
			50%	$ 39,251,769.53
RIGHT OF WAY				
	SQ. FT.	100,000	$ 25.00	$ 2,500,000.00
845 E Red Hills Pkwy	LUMP	1	$ 3,500,000.00	$ 3,500,000.00
Panda Garden	LUMP	1	$ 3,500,000.00	$ 3,500,000.00
St George Suntran	LUMP	1	$ 3,500,000.00	$ 3,500,000.00
Motel 6 Saint George	LUMP	1	$12,100,000.00	$ 12,100,000.00
The Point at Switchpoint	LUMP	1	$10,100,000.00	$ 10,100,000.00
Tropical Smoothie Café	LUMP	1	$ 2,300,000.00	$ 2,300,000.00
7 Businesses Strip mall	LUMP	1	$ 3,750,000.00	$ 3,750,000.00
Utah Safe Company building	LUMP	1	$ 3,500,000.00	$ 3,500,000.00
Switchpoint Boutique building	LUMP	1	$ 3,500,000.00	$ 3,500,000.00
Lava Rock Veterinary Hospital	LUMP	1	$ 100,000.00	$ 100,000.00
USI Superior	LUMP	1	$10,500,000.00	$ 10,500,000.00
St George Shuttle	LUMP	1	$20,500,000.00	$ 20,500,000.00
Beehive Rental & Sales LLC	LUMP	1	$ 4,500,000.00	$ 4,500,000.00
Win Supply (Damages only)	LUMP	1	$ 100,000.00	$ 100,000.00
ENGINEERING				
			20%	$ 15,700,707.81
GRAND TOTAL				**$ 217,406,016.41**

2024 COST (+/-20%)	**$173,925,000 - $260,887,000**
2025 COST (+/-20%)	**$185,543,000 - $278,314,000**
2026 COST (+/-20%)	**$196,274,000 - $294,411,000**

Northern Corridor
SG Blvd/100 S One-Way Couplet

PROJECT COST ESTIMATE **6/6/2024**

ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL
ROAD IMPROVEMENTS				
Earthwork (Cut & Fill)	CU. YD.	70,000	$ 16.75	$ 1,172,500.00
Subgrade Preparation	SQ. FT.	790,000	$ 0.25	$ 197,500.00
6" Aggregate Base (Type II)	SQ. FT.	490,700	$ 0.68	$ 333,676.00
7" Sub Base (Type I)	SQ. FT.	490,700	$ 0.66	$ 323,862.00
5" Asphalt Paving	SQ. FT.	490,700	$ 3.15	$ 1,545,705.00
Striping	LIN. FT.	40,500	$ 0.25	$ 10,125.00
30" Curb & Gutter w/ Base	LIN. FT.	6,000	$ 52.00	$ 312,000.00
Concrete Walk w/ Base	SQ. FT.	29,600	$ 11.00	$ 325,600.00
Median Reconfiguration	SQ. FT.	90,000	$ 7.00	$ 630,000.00
DRAINAGE				
			20%	$ 970,193.60
TRAFFIC & SAFETY				
		17	$ 100,000.00	$ 1,700,000.00
		21	$ 25,000.00	$ 525,000.00
		4	$ 300,000.00	$ 1,200,000.00
		1	$ 900,000.00	$ 900,000.00
BRIDGE				
I-15 Bridge over 100 S	SQ. FT.	19,500	$ 350.00	$ 6,825,000.00
UTILITIES				
Utility Modifications/Relocations			10%	$ 582,116.16
TRAFFIC CONTROL				
			15%	$ 2,632,991.66
MOBILIZATION				
			10%	$ 1,755,327.78
SUBTOTAL (CONSTRUCTION COSTS)				**$ 21,941,597.20**
CONTINGENCIES				
			30%	$ 6,582,479.16
RIGHT-OF-WAY				
	SQ. FT.	95,832	$ 25.00	$ 2,395,800.00
	SQ. FT.	917,662	$ 20.00	$ 18,353,235.00
ENGINEERING				
			20%	$ 4,388,319.44
GRAND TOTAL				**$ 53,661,430.80**

2024 COST (+/-20%)	**$42,929,000 - $64,394,000**
2025 COST (+/-20%)	**$45,797,000 - $68,695,000**
2026 COST (+/-20%)	**$48,446,000 - $72,668,000**