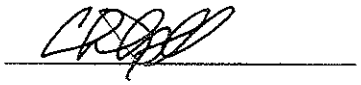
Juneau Access

Engineer's Estimate – Unit Price Analysis Update

Prepared by



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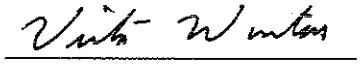

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Project Update

The 2007 Engineer's Estimate – Unit Price Analysis (Analysis) was for Juneau Access Alternatives 2B. Since the date of the Record of Decision all engineering has focused on the Selected Alternative 2B. This 2009 Engineer's Estimate – Unit Price Analysis Update (Update) is for Alternative 2B only and supersedes the 2007 Engineer's Estimate.

Since October of 2007 when the last engineering estimate was released, the construction industry experienced rapid cost increases due to increased prices for petroleum products and raw materials which dramatically increased infrastructure construction costs. Over the last several months, construction costs began declining due to material and labor cost decreases associated with the U.S. economic recession and global economic slowdown. These cost decreases have not yet been fully realized in Alaska, and many of the numbers in this estimate reflect collections of bid prices received during the last construction season. Therefore, this cost estimate may prove overly conservative for 2009 because of its inability to predict imminent cost decreases associated with the following factors:

- Crude oil prices spiked in mid year 2008 resulting in significant inflation of overall costs for construction. Crude oil has since dropped to near 2004 levels.
- Diesel fuel prices have fallen which should lead to reduced equipment operating costs.
- A global recession will reduce demand for steel which should cause a decline in steel prices.
- Nationwide residential construction starts have decreased relieving demand for related materials and labor.
- Fewer project starts are occurring and competition among contractors should increase.

Estimate of Quantities Update

The estimate of quantities for Zones 1,2,3, & 5 remain essentially the same as the 2007 update. No additional engineering was completed on these areas. In order to develop a more accurate cost estimate, additional preliminary engineering occurred during the months of November – December 2008 to refine the alignment through Zone 4. A team of engineers and geologists from DOT&PF and Golder & Associates, Inc. reviewed segments of the Zone 4 alignment. Through collaboration the project team developed a preferred preliminary alignment for the entire route. The resulting alignment reduced excavation, eliminated rock cuts much greater than 200 feet in height, identified additional bridge locations, and added two short tunnels. Major changes to the estimate of quantities for Zone 4 are summarized below:

Item Number	Description	Unit	2007 Quantity	2009 Quantity
203 (2)	Rock Excavation	Cubic Yard	4,118,500	3,098,880
		Total =	4,118,500	3,098,880

The 2007 update differentiated between general and difficult rock excavation. All rock excavation is now included under the Rock Excavation pay item.

Item Number	Description	Unit	2007 Quantity	2009 Quantity
203 (3)	Unclassified Excavation	Cubic Yard	954,200	317,560
		Total =	954,200	317,560

The 2009 update includes an overall reduction in the excavation quantity. The addition of bridges, two short tunnels, and grade changes has eliminated several sizeable areas of excavation.

Item Number	Description	Unit	2007 Quantity	2009 Quantity
203 (13)	Stabilization - Rock Bolt	Each	-	2,050
		Total =	0	2,050

Rock bolts were not included in the 2007 Zone 4 estimate of quantities; this update has added them as a pay item. The estimate of rock bolts was generated using a conservative bolting pattern (20 foot centers for cuts greater than 30 feet in height).

Item Number	Description	Unit	2007 Quantity	2009 Quantity
301 (1)	Aggregate Base Course	Ton	-	115,450
		Total =	0	115,450

Aggregate base course was not included as a separate pay item in the 2007 estimate of quantities; this update has added it as a pay item. The revised typical section includes 4" of aggregate base course, overlain by 2" of asphalt treated base and 2" of asphalt concrete.

Item Number	Description	Unit	2007 Quantity	2009 Quantity
501 (13)	Zone 4 Bridges	Linear Foot	2,000	-
501 (13a)	Zone 4 Bridges, Standard	Linear Foot	-	2,145
501 (13b)	Zone 4 Bridges, Special	Linear Foot	-	789
501 (13c)	Zone 4 Bridges, Heavy Duty	Linear Foot	-	400
		Total =	2,000	3,334

The 2007 estimate identified a single bridge type. The current estimate identifies three different bridge types to reflect site conditions and anticipated bridge requirements. Zone 4 Bridges, Standard represent standard bridge construction. Zone 4 Bridges, Special represent bridges with more difficult substructure construction or span lengths greater than 145'. Zone 4 Bridges, Heavy Duty represent bridges with both more difficult substructure construction and greater span lengths. These changes are in addition to the overall increase in estimated bridge lengths due to additional bridge locations.

Item Number	Description	Unit	2007 Quantity	2009 Quantity
514 (1)	Tunnel, Dual Lane/Bi-Directional (300' to <800')	Linear Foot	-	1,250
		Total =	0	1,250

As a result of the additional alignment review for Zone 4, the new preliminary alignment includes two tunnel locations identified to eliminate extreme height rock cuts and avoid mega talus areas.

Unit Price Update

This update adjusts the unit prices from the 2007 Engineer's Estimate for inflation and uses recent bid data where applicable. The analysis looks at trends in materials cost increases, labor cost increases, and equipment cost increases (including operating costs), shipping cost increases, and overhead and profit costs. The unit price was then broken down into the component percentages for material, labor, equipment, overhead and profit based on the *RS Means 2008 Heavy Construction* as applicable. For items not covered by the RS Means document, engineering judgment was used to determine the percentages. The percentage change for the year in material and labor cost was obtained from *Engineering News Record* (July-September, 2008) published data. An additional shipping cost was added to items with a large shipping component for materials. The overall cost increase was then applied to the 2007 unit price and rounded as appropriate. Major items were analyzed in detail and minor items were adjusted for an approximate 6-10% increase in overall construction costs. The unit prices for the January 2009 Unit Price Analysis are based in part on bid prices from the summer of 2008. Both this data and data from the 2008 RS Means document may be conservative in light of recent economic events. Major changes are identified below:

Item Number	Description	Unit	2007 Unit Price	2009 Unit Price
203 (2)	Rock Excavation	Cubic Yard	$7	$12

The increased unit price for rock excavation includes the effect of the reduced quantities estimated.

Item Number	Description	Unit	2007 Unit Price	2009 Unit Price
203 (3)	Unclassified Excavation	Cubic Yard	$4	$5

The increased unit price for unclassified excavation includes the effect of the reduced quantities estimated.

Item Number	Description	Unit	2007 Unit Price	2009 Unit Price
203 (13a)	15-foot Rock Bolt	Each	$2,500	-
203 (13b)	25-foot Rock Bolt	Each	$3,500	-
203 (13)	Stabilization - Rock Bolt	Each	-	$1,500

The estimated unit price for rock bolts was determined by DOT&PF geotechnical staff by considering the rock bolt requirements, length, quantity, and other considerations required to complete the work.

Item Number	Description	Unit	2007 Unit Price	2009 Unit Price
301 (1)	Aggregate Base Course	Ton	-	$25

The unit price for aggregate base course is based on previous bids and the expectation this item will generate some reduced cost from economy of scale due to the large quantity involved.

Item Number	Description	Unit	2007 Unit Price	2009 Unit Price
501 (13)	Zone 4 Bridges	Linear Foot	$5,000	-
501 (13a)	Zone 4 Bridges, Standard	Linear Foot	-	$8,250
501 (13b)	Zone 4 Bridges, Special	Linear Foot	-	$11,500
501 (13c)	Zone 4 Bridges, Heavy Duty	Linear Foot	-	$16,500

Differing bridge types were identified to account for anticipated site conditions and bridge requirements. Zone 4 Bridges, Standard represent standard bridge construction and are based on a cost of $250/square foot. Zone 4 Bridges, Special represent bridge costs with more difficult substructure construction or span lengths greater than 145' and are based on a cost of $350/square foot. Zone 4 Bridges, Heavy Duty represent bridge costs with both more difficult substructure construction and greater span lengths and are based on a cost of $500/square foot.

Item Number	Description	Unit	2007 Unit Price	2009 Unit Price
511 (1)	MSE Wall	Square Foot	$35	$50

The unit price for mechanically stabilized earth (MSE) walls was increased to account for the difficult access and foundation preparation required to begin wall construction.

Item Number	Description	Unit	2007 Unit Price	2009 Unit Price
514 (1)	Tunnel, Dual Lane/Bi-Directional (300' to <800')	Linear Foot	-	$9,200

The unit price for tunnel construction has been set at $9,200 per Linear Foot. The unit price reflects the estimated cost for tunneling through competent rock. Based on consideration of all available information the rock for the project area is considered to be competent.

Contingency

The contingencies used for the different project zones are based on the amount of available information and the level of engineering design.

The construction contingency for Zones 1-3 has been set at 5% and represents an appropriate level given the near final design and existing geotechnical information.

The Transportation Research Board publication *Guidance for Cost Estimation and Management for Highway Projects During Planning, Programming, and Preconstruction* recognizes that contingency percentages should be higher for projects in the planning stages and decrease as the project progresses through design. Example post feasibility study percentages (from *Caltrans Project Development Procedures Manual)* range from 10 to 25 percent. The construction contingency for Zone 4 has been set at 15% due to the preliminary nature of the design, the complex geology and difficult terrain involved, and the cost estimate methodology. While the preliminary engineering to date has been based

primarily on surficial geology and field observation, the current design methodology for this segment represents a relatively conservative cost approach, in that the estimate reflects the higher end of anticipated costs. Therefore a 15 percent contingency provides a sufficient amount to cover remaining unknowns.

The construction contingency for Zone 5 has been set at 5% due to its apparent simple geology, flat terrain, and straightforward construction design.