# Appendix F

## *Construction Cost Estimates*

## TABLE A-1

### Estimate of Probable Construction Costs

*Merrifield Road Red River Bridge Feasibility Study*

**Element: Cole Creek Drainway (Stand Alone)**

| Item | Unit | Est. Unit Price | Option 1-A South Alignment Bridge at 840.0 Qty. | Option 1-A Cost | Option 1-B South Alignment Bridge at 820.5 Qty. | Option 1-B Cost | Option 2-A North Alignment Bridge at 845.0 Qty. | Option 2-A Cost | Option 2-B North Alignment Bridge at 820.5 Qty. | Option 2-B Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Excavation | C.Y. | $ 2.00 | 381000 | $ 762,000 | 381000 | $ 762,000 | 473000 | $ 946,000 | 473000 | $ 946,000 |
| Common Fill - Twp Road | C.Y. | $ 2.00 | 19000 | $ 38,000 | 0 | $ - | 5400 | $ 10,800 | 0 | $ - |
| Common Fill - Merrifield | C.Y. | $ 2.00 | 78260 | $ 156,520 | 78260 | $ 156,520 | 78260 | $ 156,520 | 78260 | $ 156,520 |
| Common Fill - On Site Waste | C.Y. | $ 1.50 | 200000 | $ 300,000 | 200000 | $ 300,000 | 200000 | $ 300,000 | 200000 | $ 300,000 |
| Wasted Fill - Off Site | C.Y. | $ 3.00 | 83740 | $ 251,220 | 102740 | $ 308,220 | 189340 | $ 568,020 | 194740 | $ 584,220 |
| Bridge: Precast Beam [1] | S.F. | $ 95.00 | 15050 | $ 1,429,750 | 6475 | $ 615,125 | 15050 | $ 1,429,750 | 6475 | $ 615,125 |
| 12x7 Box Culvert | L.F. | $ 1,000.00 | 600 | $ 600,000 | 600 | $ 600,000 | 600 | $ 600,000 | 600 | $ 600,000 |
| Box End Treatment | EA | $ 10,000.00 | 2 | $ 20,000 | 2 | $ 20,000 | 2 | $ 20,000 | 2 | $ 20,000 |
| Hydraulic Drop Structure | EA | $ 500,000.00 | 1 | $ 500,000 | 1 | $ 500,000 | 1 | $ 500,000 | 1 | $ 500,000 |
| 9" Concrete Pavement | S.Y. | $ 40.00 | 3225 | $ 129,000 | 3225 | $ 129,000 | 3225 | $ 129,000 | 3225 | $ 129,000 |
| 24"Aggregate Base (Class V) | C.Y. | $ 15.00 | 2150 | $ 32,250 | 2150 | $ 32,250 | 2150 | $ 32,250 | 2150 | $ 32,250 |
| Geotextile Fabric | S.Y. | $ 1.50 | 3225 | $ 4,838 | 3225 | $ 4,838 | 3225 | $ 4,838 | 3225 | $ 4,838 |
| Turf Establishment | S.Y. | $ 0.50 | 30000 | $ 15,000 | 30000 | $ 15,000 | 30000 | $ 15,000 | 30000 | $ 15,000 |
| Contingency (15%) | | | | $ 635,787 | | $ 516,443 | | $ 706,827 | | $ 585,443 |
| **ESTIMATED ELEMENT TOTAL** | | | | **$ 4,874,364** | | **$ 3,959,395** | | **$ 5,419,004** | | **$ 4,488,395** |

Source: HDR Engineering, Inc. & CPS, Ltd.

Notes

1. Bridge at 820.5 estimated 185 feet, bridge at 845.0 estimated 430 feet, both with a width of 35 feet
2. All estimates are shown in Y2004 US$

## TABLE A-2

**Estimate of Probable Construction Costs**

*Merrifield Road Red River Bridge Feasibility Study*

**Element: Merrifield Bridge at 840.0 feet (Stand Alone)**

| Item | Unit | Est. Unit Price | Option 1 North Alignment Qty. | Option 1 North Alignment Cost | Option 2 Central Alignment Qty. | Option 2 Central Alignment Cost | Option 3 South Alignment Qty. | Option 3 South Alignment Cost | Options 1-3 B Curved Connection to County 58 [3] Qty. | Options 1-3 B Curved Connection to County 58 [3] Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Common Fill - ND Side | C.Y. | $ 5.00 | 320000 | $ 1,600,000 | 320000 | $ 1,600,000 | 280000 | $ 1,400,000 | 0 | $ - |
| Common Fill - MN Side | C.Y. | $ 5.00 | 130000 | $ 650,000 | 210000 | $ 1,050,000 | 230000 | $ 1,150,000 | 28000 | $ 140,000 |
| Bridge: Precast Concrete [1] | S.F. | $ 120.00 | 49600 | $ 5,952,000 | 49600 | $ 5,952,000 | 57350 | $ 6,882,000 | 0 | $ - |
| Bridge: Cole Creek [4] | S.F. | $ 120.00 | 18600 | $ 2,232,000 | 18600 | $ 2,232,000 | 18600 | $ 2,232,000 | 0 | $ - |
| 9" Concrete Pavement | S.Y. | $ 40.00 | 38667 | $ 1,546,667 | 37111 | $ 1,484,444 | 37022 | $ 1,480,889 | 5133 | $ 205,333 |
| 24"Aggregate Base (Class V) | C.Y. | $ 15.00 | 25907 | $ 388,600 | 24864 | $ 372,967 | 24805 | $ 372,073 | 3439 | $ 51,590 |
| Geotextile Fabric | S.Y. | $ 1.50 | 38667 | $ 58,000 | 37111 | $ 55,667 | 37022 | $ 55,533 | 5133 | $ 7,700 |
| Turf Establishment | S.Y. | $ 0.50 | 214815 | $ 107,407 | 206173 | $ 103,086 | 205679 | $ 102,840 | 28519 | $ 14,259 |
| Contingency (15%) | | | | $ 1,880,201 | | $ 1,927,525 | | $ 2,051,300 | | $ 62,832 |
| **ESTIMATED ELEMENT TOTAL** | | | | **$ 14,414,875** | | **$ 14,777,689** | | **$ 15,726,635** | | **$ 481,715** |

Source: HDR Engineering, Inc. & CPS, Ltd.

Notes

1. Bridge based on length of 800 feet for Options 1 & 2 and 925 feet for Option 3
2. All estimates are shown in Y2004 US$
3. Costs to be added to any Option if the curved connection is selected
4. Cole Creek bridge assumed to be identical in cross section to Red River Bridge with similar treatments

## TABLE A-3

### Estimate of Probable Construction Costs

*Merrifield Road Red River Bridge Feasibility Study*

**Element: Merrifield Bridge at 845.0 feet (Stand Alone)**

| Item | Unit | Est. Unit Price | Option 1 North Alignment Qty. | Option 1 North Alignment Cost | Option 2 Central Alignment Qty. | Option 2 Central Alignment Cost | Option 3 South Alignment Qty. | Option 3 South Alignment Cost | Options 1-3 B Curved Connection to County 58 [3] Qty. | Options 1-3 B Curved Connection to County 58 [3] Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Common Fill - ND Side | C.Y. | $ 5.00 | 448000 | $ 2,240,000 | 448000 | $ 2,240,000 | 392000 | $ 1,960,000 | 0 | $ - |
| Common Fill - MN Side | C.Y. | $ 5.00 | 182000 | $ 910,000 | 294000 | $ 1,470,000 | 322000 | $ 1,610,000 | 39200 | $ 196,000 |
| Bridge: Precast Concrete [1] | S.F. | $ 120.00 | 49600 | $ 5,952,000 | 49600 | $ 5,952,000 | 57350 | $ 6,882,000 | 0 | $ - |
| Bridge: Cole Creek [4] | S.F. | $ 120.00 | 18600 | $ 2,232,000 | 18600 | $ 2,232,000 | 18600 | $ 2,232,000 | | |
| 9" Concrete Pavement | S.Y. | $ 40.00 | 38667 | $ 1,546,667 | 37111 | $ 1,484,444 | 37022 | $ 1,480,889 | 5133 | $ 205,333 |
| 24"Aggregate Base (Class V) | C.Y. | $ 15.00 | 25907 | $ 388,600 | 24864 | $ 372,967 | 24805 | $ 372,073 | 3439 | $ 51,590 |
| Geotextile Fabric | S.Y. | $ 1.50 | 38667 | $ 58,000 | 37111 | $ 55,667 | 37022 | $ 55,533 | 5133 | $ 7,700 |
| Turf Establishment | S.Y. | $ 0.50 | 429630 | $ 214,815 | 412346 | $ 206,173 | 411358 | $ 205,679 | 57037 | $ 28,519 |
| Contingency (15%) | | | | $ 2,031,312 | | $ 2,101,988 | | $ 2,219,726 | | $ 73,371 |
| **ESTIMATED ELEMENT TOTAL** | | | | **$ 15,573,394** | | **$ 16,115,238** | | **$ 17,017,901** | | **$ 562,513** |

Source: HDR Engineering, Inc. & CPS, Ltd.

Notes

1. Bridge based on length of 800 feet for Options 1 & 2 and 925 feet for Option 3
2. All estimates are shown in Y2004 US$
3. Costs to be added to any Option if the curved connection is selected, does not include raise of County 58 to 845.0
4. Cole Creek bridge assumed to be identical in cross section to Red River Bridge with similar treatments

## TABLE A-4

### Estimate of Probable Construction Costs

*Merrifield Road Red River Bridge Feasibility Study*

**Element: Merrifield Bridge at 840.0 feet with Drainway South Alignment at 820.5 Crossing (1-B)**

| Item | Unit | Est. Unit Price | Option 1 North Alignment Qty. | Option 1 North Alignment Cost | Option 2 Central Alignment Qty. | Option 2 Central Alignment Cost | Option 3 South Alignment Qty. | Option 3 South Alignment Cost | Options 1-3 B Curved Connection to County 58 [3] Qty. | Options 1-3 B Curved Connection to County 58 [3] Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Excavation | C.Y. | $ 2.00 | 381000 | $ 762,000 | 381000 | $ 762,000 | 381000 | $ 762,000 | 0 | $ - |
| Common Fill - ND Side | C.Y. | $ 3.00 | 320000 | $ 960,000 | 320000 | $ 960,000 | 280000 | $ 840,000 | 0 | $ - |
| Common Fill - MN Side | C.Y. | $ 4.00 | 130000 | $ 520,000 | 210000 | $ 840,000 | 230000 | $ 920,000 | 28000 | $ 112,000 |
| Bridge: Precast Concrete [1] | S.F. | $ 120.00 | 49600 | $ 5,952,000 | 49600 | $ 5,952,000 | 57350 | $ 6,882,000 | 0 | $ - |
| Bridge: Precast Beam [4] | S.F. | $ 95.00 | 6475 | $ 615,125 | 6475 | $ 615,125 | 6475 | $ 615,125 | 0 | $ - |
| 12x 7 Box Culvert | L.F. | $ 1,000.00 | 600 | $ 600,000 | 600 | $ 600,000 | 600 | $ 600,000 | 0 | $ - |
| Box Ends | EA | $ 10,000.00 | 2 | $ 20,000 | 2 | $ 20,000 | 2 | $ 20,000 | 0 | $ - |
| Hydraulic Drop Structure | EA | $ 500,000.00 | 1 | $ 500,000 | 1 | $ 500,000 | 1 | $ 500,000 | 0 | $ - |
| 9" Concrete Pavement | S.Y. | $ 40.00 | 38667 | $ 1,546,667 | 37111 | $ 1,484,444 | 37022 | $ 1,480,889 | 5133 | $ 205,333 |
| 24"Aggregate Base (Class V) | C.Y. | $ 15.00 | 25907 | $ 388,600 | 24864 | $ 372,967 | 24805 | $ 372,073 | 3439 | $ 51,590 |
| Geotextile Fabric | S.Y. | $ 1.50 | 38667 | $ 58,000 | 37111 | $ 55,667 | 37022 | $ 55,533 | 5133 | $ 7,700 |
| Turf Establishment | S.Y. | $ 0.50 | 429630 | $ 214,815 | 412346 | $ 206,173 | 411358 | $ 205,679 | 57037 | $ 28,519 |
| Contingency (15%) | | | | $ 1,820,581 | | $ 1,855,256 | | $ 1,987,995 | | $ 60,771 |
| **ESTIMATED ELEMENT TOTAL** | | | | **$ 13,957,787** | | **$ 14,223,632** | | **$ 15,241,295** | | **$ 465,913** |

Source: HDR Engineering, Inc. & CPS, Ltd.

Notes

1. Bridge based on length of 800 feet for Options 1 & 2 and 925 feet for Option 3
2. All estimates are shown in Y2004 US$
3. Costs to be added to any Option if the curved connection is selected, does not include raise of County 58 to 845.0
4. Bridge estimated at 185 feet in length and 35 feet in width

## TABLE A-5

**Estimate of Probable Construction Costs**

*Merrifield Road Red River Bridge Feasibility Study*

**Element: Merrifield Bridge at 845.0 feet with Drainway South Alignment at 820.5 Crossing (1-B)**

| Item | Unit | Est. Unit Price | Option 1 North Alignment Qty. | Option 1 North Alignment Cost | Option 2 Central Alignment Qty. | Option 2 Central Alignment Cost | Option 3 South Alignment Qty. | Option 3 South Alignment Cost | Options 1-3 B Curved Connection to County 58 [3] Qty. | Options 1-3 B Curved Connection to County 58 [3] Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Excavation | C.Y. | $ 2.00 | 381000 | $ 762,000 | 381000 | $ 762,000 | 560000 | $ 1,120,000 | 0 | $ - |
| Common Fill - ND Side | C.Y. | $ 3.00 | 448000 | $ 1,344,000 | 448000 | $ 1,344,000 | 392000 | $ 1,176,000 | 0 | $ - |
| Common Fill - MN Side | C.Y. | $ 4.00 | 182000 | $ 728,000 | 294000 | $ 1,176,000 | 322000 | $ 1,288,000 | 39200 | $ 156,800 |
| Bridge: Precast Concrete [1] | S.F. | $ 120.00 | 49600 | $ 5,952,000 | 49600 | $ 5,952,000 | 57350 | $ 6,882,000 | 0 | $ - |
| Bridge: Precast Beam [4] | S.F. | $ 95.00 | 6475 | $ 615,125 | 6475 | $ 615,125 | 6475 | $ 615,125 | 0 | $ - |
| 12x 7 Box Culvert | L.F. | $ 1,000.00 | 600 | $ 600,000 | 600 | $ 600,000 | 600 | $ 600,000 | 0 | $ - |
| Box Ends | EA | $ 10,000.00 | 2 | $ 20,000 | 2 | $ 20,000 | 2 | $ 20,000 | 0 | $ - |
| Hydraulic Drop Structure | EA | $ 500,000.00 | 1 | $ 500,000 | 1 | $ 500,000 | 1 | $ 500,000 | 0 | $ - |
| 9" Concrete Pavement | S.Y. | $ 40.00 | 38667 | $ 1,546,667 | 37111 | $ 1,484,444 | 37022 | $ 1,480,889 | 5133 | $ 205,333 |
| 24"Aggregate Base (Class V) | C.Y. | $ 15.00 | 25907 | $ 388,600 | 24864 | $ 372,967 | 24805 | $ 372,073 | 3439 | $ 51,590 |
| Geotextile Fabric | S.Y. | $ 1.50 | 38667 | $ 58,000 | 37111 | $ 55,667 | 37022 | $ 55,533 | 5133 | $ 7,700 |
| Turf Establishment | S.Y. | $ 0.50 | 429630 | $ 214,815 | 412346 | $ 206,173 | 411358 | $ 205,679 | 57037 | $ 28,519 |
| Contingency (15%) | | | | $ 1,909,381 | | $ 1,963,256 | | $ 2,147,295 | | $ 67,491 |
| **ESTIMATED ELEMENT TOTAL** | | | | **$ 14,638,587** | | **$ 15,051,632** | | **$ 16,462,595** | | **$ 517,433** |

Source: HDR Engineering, Inc. & CPS, Ltd.

Notes

1. Bridge based on length of 800 feet for Options 1 & 2 and 925 feet for Option 3
2. All estimates are shown in Y2004 US$
3. Costs to be added to any Option if the curved connection is selected, does not include raise of County 58 to 845.0
4. Bridge estimated at 185 feet in length and 32 feet in width

## TABLE A-6

### Summary: Estimate of Probable Construction Costs - Stand Alone Projects

*Merrifield Road Red River Bridge Feasibility Study*

| **Stand Alone Project 1: Cole Creek Diversion** | **Option 1A:** South Alignment & Township Road Crossing at 840.0 | **Option 1B:** South Alignment & Township Road Crossing at 820.5 | **Option 2A:** North Alignment & Township Road Crossing at 840.0 | **Option 2B:** North Alignment & Township Road Crossing at 820.5 |
|---|---|---|---|---|
| Drainage Elements | $ 2,085,203 | $ 2,150,753 | $ 2,661,123 | $ 2,679,753 |
| Township Road & Bridge | $ 1,687,913 | $ 707,394 | $ 1,656,633 | $ 707,394 |
| Merrifield Road & Box Culvert | $ 1,101,249 | $ 1,101,249 | $ 1,101,249 | $ 1,101,249 |
| **Subtotal: Project 1** | **$ 4,874,364** | **$ 3,959,395** | **$ 5,419,004** | **$ 4,488,395** |

| **Stand Alone Project 2: Merrifield Road Bridge Crossing (840.0)** | **Option 1:** North Alignment | **Option 2:** Central Alignment | **Option 3:** South Alignment | **Options 1-3 Add On:** Curved Alignment to CR 58 |
|---|---|---|---|---|
| Bridge over Cole Creek | $ 2,566,800 | $ 2,566,800 | $ 2,566,800 | $ - |
| Bridge over Red River | $ 6,844,800 | $ 6,844,800 | $ 7,914,300 | $ - |
| Earthwork - ND Side | $ 1,840,000 | $ 1,840,000 | $ 1,610,000 | $ - |
| Earthwork - MN Side | $ 747,500 | $ 1,207,500 | $ 1,322,500 | $ 161,000 |
| Road Construction - ND Side | $ 1,328,676 | $ 1,328,676 | $ 1,387,821 | $ 192,429 |
| Road Construction - MN Side | $ 1,087,099 | $ 989,912 | $ 925,214 | $ 128,286 |
| **Subtotal: Project 2** | **$ 14,414,875** | **$ 14,777,689** | **$ 15,726,635** | **$ 481,715** |

| **Stand Alone Project 3: Merrifield Road Bridge Crossing (845.0)** | **Option 1:** North Alignment | **Option 2:** Central Alignment | **Option 3:** South Alignment | **Options 1-3 Add On:** Curved Alignment to CR 58 |
|---|---|---|---|---|
| Bridge over Cole Creek | $ 2,566,800 | $ 2,566,800 | $ 2,566,800 | $ - |
| Bridge over Red River | $ 6,844,800 | $ 6,844,800 | $ 7,914,300 | $ - |
| Earthwork - ND Side | $ 2,576,000 | $ 2,576,000 | $ 2,254,000 | $ - |
| Earthwork - MN Side | $ 1,046,500 | $ 1,690,500 | $ 1,851,500 | $ 225,400 |
| Road Construction - ND Side | $ 1,396,612 | $ 1,396,612 | $ 1,458,780 | $ 202,268 |
| Road Construction - MN Side | $ 1,142,682 | $ 1,040,527 | $ 972,520 | $ 134,845 |
| **Subtotal: Project 3** | **$ 15,573,394** | **$ 16,115,238** | **$ 17,017,901** | **$ 562,513** |

Source: HDR Engineering, Inc. & CPS, Ltd.

Notes: 1. Stand Alone projects all include Bridge over Cole Creek at given elevation instead of box culvert

## TABLE A-7

**Summary: Estimate of Probable Construction Costs - Combined Projects**

*Merrifield Road Red River Bridge Feasibility Study*

| **Combined Project 1: Merrifield Road Bridge Crossing (840.0) w/ S. Diversion & 820.5 Township Crossing** | **Option 1:** North Alignment | **Option 2:** Central Alignment | **Option 3:** South Alignment | **Options 1-3 Add On:** Curved Alignment to CR 58 |
|---|---|---|---|---|
| Bridge over Red River | $ 6,844,800 | $ 6,844,800 | $ 7,914,300 | $ - |
| Township Road Crossing | $ 707,394 | $ 707,394 | $ 707,394 | $ - |
| Diversion (& Merrifield Box) | $ 2,164,300 | $ 2,164,300 | $ 2,164,300 | $ - |
| Earthwork - ND Side | $ 1,104,000 | $ 1,104,000 | $ 966,000 | $ - |
| Earthwork - MN Side | $ 598,000 | $ 966,000 | $ 1,058,000 | $ 128,800 |
| Merrifield Road - ND Side | $ 1,396,612 | $ 1,396,612 | $ 972,520 | $ - |
| Merrifield Road - MN Side | $ 1,142,682 | $ 1,040,527 | $ 1,458,780 | $ 337,113 |
| **Subtotal: Project 1** | **$ 13,957,787** | **$ 14,223,632** | **$ 15,241,295** | **$ 465,913** |

| **Combined Project 2: Merrifield Road Bridge Crossing (845.0) w/ S. Diversion & 820.5 Township Crossing** | **Option 1:** North Alignment | **Option 2:** Central Alignment | **Option 3:** South Alignment | **Options 1-3 Add On:** Curved Alignment to CR 58 |
|---|---|---|---|---|
| Bridge over Red River | $ 6,844,800 | $ 6,844,800 | $ 7,914,300 | $ - |
| Township Road Crossing | $ 707,394 | $ 707,394 | $ 707,394 | $ - |
| Diversion (& Merrifield Box) | $ 2,164,300 | $ 2,164,300 | $ 2,576,000 | $ - |
| Earthwork - ND Side | $ 1,545,600 | $ 1,545,600 | $ 1,352,400 | $ - |
| Earthwork - MN Side | $ 837,200 | $ 1,352,400 | $ 1,481,200 | $ 180,320 |
| Merrifield Road - ND Side | $ 1,396,612 | $ 1,396,612 | $ 972,520 | $ - |
| Merrifield Road - MN Side | $ 1,142,682 | $ 1,040,527 | $ 1,458,780 | $ 337,113 |
| **Subtotal: Project 2** | **$ 14,638,587** | **$ 15,051,632** | **$ 16,462,595** | **$ 517,433** |

Source: HDR Engineering, Inc. & CPS, Ltd.

Notes: 1. Stand Alone projects all include Bridge over Cole Creek at given elevation instead of box culvert