



VE Proposal #	VE Proposal	Savings	Formal Disposition
<p>VE Proposal # P01-008</p> <p>Affected Parties: RTD, Denver, Lakewood, GSA and JeffCO</p>	<p>Proposal: Eliminate redundant platforms, where they occur, at the at-grade stations.</p> <p>Comments: Six stations have a total of 7 redundant platforms (Jeffco, Red Rocks, Fed Center, Sheridan, Knox and two at Auraria). Requires design evaluation for access and egress. This item is affected by other proposals that modify or eliminate stations.</p> <p>Advantages: Eliminates construction and maintenance cost of additional platforms.</p> <p>Disadvantages: Reduces additional access to trains and platforms; Reduces operational flexibility at stations; Reduces maintenance flexibility at stations.</p>	<p>Initial Est. Savings: \$2,000,000</p> <p>Future Est. Savings: \$0</p> <p>Total Est. Savings: \$2,000,000</p>	<p>Table for Further Study.</p>

General -VE Proposal

<p>VE Proposal # P01-091</p> <p>Affected Parties: CDOT, RTD</p>	<p>Proposal: Jack and bore tunnel under I-70 with two separate bores</p> <p>Comments: The original plan was a 'cut and cover' construction method. This alternative could have just one bore if single track to Jeffco is confirmed. Under review as part of accepting single track to JeffCo. See PO1-003 as well.</p> <p>Advantages: Detours on I-70 may not be necessary during construction; Traffic is not disrupted on I-70 during construction; Less risk to the contractor.</p> <p>Disadvantages: None reported.</p>	<p>Initial Est. Savings: \$4,000,000</p> <p>Future Est. Savings: \$0,000</p> <p>Total Est. Savings: \$4,000,000</p>	<p>Accepted with Modifications</p>
<p>VE Proposal # P01-021</p> <p>Affected Parties: RTD</p>	<p>Proposal: Move walkways from out board on bridges to the center.</p> <p>Comments: Current design has walkways on either side of the alignment 2 1/2 feet wide each. Alternative design puts the walkway in the center at 2 1/2 feet wide. Part of VE for bridge design. These walkways are used for maintenance and emergency access, not use by the general public.</p> <p>Advantages: Reduces width of ROW, allowing a girder to be removed.</p> <p>Disadvantages: Center poles would provide obstructions; Crossing track to exit would be required; Duct banks would need to be rerouted.</p>	<p>Initial Est. Savings: \$200,000</p> <p>Future Est. Savings: \$0,000</p> <p>Total Est. Savings: \$200,000</p>	<p>Table for Further Study</p>

General -VE Proposal

<p>VE Proposal # P01-012</p> <p>Affected Parties: RTD</p>	<p>Proposal: Recycle excess on-site excavation material, in lieu of purchased materials, into structural backfill locations, such as MSE Wall fill and MSE Wall subgrade replacement.</p> <p>Comments: Requires further geotech analysis to check on suitability of existing soil.</p> <p>Advantages: Sustainability; No need to purchase new fill dirt.</p> <p>Disadvantages: Unknown suitability of existing material.</p>	<p>Initial Est. Savings: \$7,800,000 to \$13,000,000</p> <p>Future Est. Savings: \$0,000</p> <p>Total Est. Savings: \$7,800,000 to \$13,000,000</p>	<p>Accepted with Modifications.</p>
<p>VE Proposal # P01-034</p> <p>Affected Parties: Denver, Lakewood, GSA, JeffCo</p>	<p>Proposal: Reduce Ballast Requirements.</p> <p>Comments: Current design criteria has ballast extending 16" past end of ties as well as between tracks in all areas. Many other properties use a 12" ballast shoulder and no ballast between tracks. Study with regard to soil stability and use of geotech mat.</p> <p>Advantages: Reduces ballast requirements and lowers cost</p> <p>Disadvantages: Exposed sub ballast may be subject to erosion; Eliminates level area for maintenance and emergency walkways; Increased weed control may be necessary; Minor risk of tracks shifting outwards on tight curves.</p>	<p>Initial Est. Savings: \$900,000</p> <p>Future Est. Savings: \$0,000</p> <p>Total Est. Savings: \$900,000</p>	<p>Accept with Modifications.</p>

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<p>VE Proposal # P01-031</p> <p>Affected Parties: RTD</p>	<p>Proposal: Reduce the minimum curve radius limits for utilization of restraining rail from 500 ft to 300 ft.</p> <p>Comments: Other systems have reduced restraining rail requirements. Under review for design criteria modification, and safety.</p> <p>Advantages: Less restraining rail needed; Less maintenance of restraining rail; Reduces train wheel wear.</p> <p>Disadvantages: Reduces protection of restraining rail used on curves.</p>	<p>Initial Est. Savings: \$400,000 Future Est. Savings: \$0,000 Total Est. Savings: \$400,000</p>	<p>Table for Further Study. Needs further review with Safety and Operations.</p>
<p>VE Proposal # P01-101</p> <p>Affected Parties: RTD</p>	<p>Proposal: RTD should consider pre-purchase rail for this project. To maximize the savings, considering the purchase all of the rail needed for Fastracks at one time.</p> <p>Comments: Under consideration and analysis.</p> <p>Advantages: No cost mark up from contractor; Better volume pricing.</p> <p>Disadvantages: RTD would take on all costs and risk of rail with no risk to contractor; Storage needs are greater.</p>	<p>Initial Est. Savings: \$400,000 Future Est. Savings: \$0,000 Total Est. Savings: \$400,000</p>	<p>Accepted.</p>

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<p>VE Proposal # P01-029</p> <p>Affected Parties: RTD</p>	<p>Proposal: Reduce minimum curve radius limit for utilization of precurved and premium (head-hardened) rail from 500 ft to 300 ft.</p> <p>Comments: Other systems have reduced restraining rail requirements. Under review for design criteria modification, and safety.</p> <p>Advantages: None reported.</p> <p>Disadvantages: Reduced life expectancy of rail curves with radii 301 to 500 feet.</p>	<p>Initial Est. Savings: \$120,000 Future Est. Savings: \$0,000 Total Est. Savings: \$120,000</p>	<p>Table for Further Study. Needs further review with Safety and Operations.</p>
<p>VE Proposal # P01-011</p> <p>Affected Parties: RTD</p>	<p>Proposal: Change the drainage design for MSE walls incorporating the use of an impervious membrane and drain system above the MSE wall fill.</p> <p>Comments: DEA and DTCCG looking at alternative materials and methods. Existing soils will expand when exposed to water so the soil would need to be protected with the use of a waterproof membrane. There are no aesthetic changes with this item.</p> <p>Advantages: Use existing soils on site - Sustainability; Saves costs of new materials.</p> <p>Disadvantages: None reported.</p>	<p>Initial Est. Savings: \$4,100,000 Future Est. Savings: \$0,000 Total Est. Savings: \$4,100,000</p>	<p>Table for Further Study. Needs further review.</p>

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<p>VE Proposal # P01-020</p> <p>Affected Parties: RTD</p>	<p>Proposal: Use highest concrete strength practical for precast concrete bridge elements</p> <p>Comments: Increasing the precast compressive strength has the potential to remove at least one bulb tee from each of the trackway bridges. Is part of basic structure design. Additional info is needed to determine whether a girder can be eliminated.</p> <p>Advantages: Reduces depth of structural elements; Reduces number of structural elements; Increases bridge span lengths.</p> <p>Disadvantages: Bridge redesign required.</p>	<p>Initial Est. Savings: \$600,000 Future Est. Savings: \$0,000 Total Est. Savings: \$600,000</p>	<p>Accepted.</p>
<p>VE Proposal # P01-053</p> <p>Affected Parties:</p>	<p>Proposal: Reduce height of concrete parapet on bridges and use steel handrail.</p> <p>Comments: The current design has 3' parapet with 3' chainlink on top. This proposal reduces the parapet height by 2 feet and substitutes and 42" high handrail. Design team will keep to minimum and look at other guard rail alternatives.</p> <p>Advantages: Less visual impact.</p> <p>Disadvantages: Reduces splash protection to below.</p>	<p>Initial Est. Savings: \$150,000 Future Est. Savings: \$0,000 Total Est. Savings: \$150,000</p>	<p>Accepted.</p>

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<p>VE Proposal # P01-069</p> <p>Affected Parties: RTD</p>	<p>Proposal: Simplify the Ballast Wall Design.</p> <p>Comments: The current design has a 12" wall stem with a spread footing. The proposal uses a thinner wall without a separate footing or reduces the depth of the wall and uses small drilled shafts. Depends on N&V analysis and safety and security input.</p> <p>Advantages: Requires less excavation; Minimizes materials used for temporary walls during construction; Minimizes materials needed for permanent walls.</p> <p>Disadvantages: Lessens safety if autos crash into wall. This needs further evaluation.</p>	<p>Initial Est. Savings: \$1,500,000</p> <p>Future Est. Savings: \$0,000</p> <p>Total Est. Savings: \$1,500,000</p>	<p>Table for Further Study.</p>
<p>VE Proposal # P02-026</p> <p>Affected Parties: RTD, Denver</p>	<p>Proposal: Provide deeper girders more widely spaced at Dry Gulch Bridge East and West.</p> <p>Comments: Deeper girders means fewer girders which may allow for faster installation. Design team evaluating based on economy of design.</p> <p>Advantages: Faster construction.</p> <p>Disadvantages: Reduced hydraulic section.</p>	<p>Initial Est. Savings: \$30,000</p> <p>Future Est. Savings: \$0,000</p> <p>Total Est. Savings: \$30,000</p>	<p>Table for Further Study.</p>
<p>VE Proposal # P01-059</p> <p>Affected Parties: RTD</p>	<p>Proposal: Lengthen Track Circuits - Reduce Boundary Blocks.</p> <p>Comments: Track circuits are based on grade, line of sight and speed. FRSC to study impacts to system, and validate cost savings.</p> <p>Advantages: Reducing boundary blocks still allows for 5 minute headways.</p> <p>Disadvantages: Closer headways than 5 minutes may not be possible.</p>	<p>Initial Est. Savings: \$7,000,000</p> <p>Future Est. Savings: \$900,000</p> <p>Total Est. Savings: \$7,900,000</p>	<p>Table for Further Study.</p>

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<p>VE Proposal # P01-025</p> <p>Affected Parties: RTD</p>	<p>Proposal: Use on-board cab aspect signaling instead of intermediate wayside signals.</p> <p>Comments: Signals would be on-board as opposed to by the tracks. Systems and operations to review; retrofitting existing fleet could be cost prohibitive.</p> <p>Advantages: Reduces need for intermediate signals.</p> <p>Disadvantages: Retrofitting existing fleet could be cost prohibitive.</p>	<p>Initial Est. Savings: \$4,900,000</p> <p>Future Est. Savings: \$600,000</p> <p>Total Est. Savings: \$5,500,000</p>	<p>Table for Further Study.</p>
<p>VE Proposal # P01-028</p> <p>Affected Parties: RTD</p>	<p>Proposal: Use Vital processors to perform logic at grade crossings instead of vital relays.</p> <p>Comments: This proposal replaces the relay-base crossing warning equipment control with vital processor based control. Savings for this proposal occur where crossings are close together and crossing approaches need to be transmitted from one crossing to another. There are 8 pairs of crossings where crossing cable is required.</p> <p>Advantages: Reduces maintenance; Eliminates need for copper cable.</p> <p>Disadvantages: None reported.</p>	<p>Initial Est. Savings: \$300,000</p> <p>Future Est. Savings: \$75,000</p> <p>Total Est. Savings: \$375,000</p>	<p>Accepted.</p>
<p>VE Proposal # P01-030</p> <p>Affected Parties: RTD</p>	<p>Proposal: Redesign tangent diamonds, at the Auraria Wye, as standard diamond layouts</p> <p>Comments: Readjusting the geometry of the tangent diamonds to become standard diamonds can reduce costs. Operations and safety review.</p> <p>Advantages: Reduced cost of materials.</p> <p>Disadvantages: More complicated design layout.</p>	<p>Initial Est. Savings: \$100,000</p> <p>Future Est. Savings: 0</p> <p>Total Est. Savings: \$100,000</p>	<p>Accepted with modifications.</p>

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<p>VE Proposal # P01-073</p> <p>Affected Parties: RTD</p>	<p>Proposal: Shift Federal Blvd. station pocket track 175' east to remove from Lakewood Gulch bridge.</p> <p>Comments: The current track design has the west turnout located on the Lakewood Gulch structure, requiring this bridge to be three tracks wide. The proposed design shifts this turnout 175' so it is off the structure allowing it to become a standard 2 track design. Track design and operations to review.</p> <p>Advantages: Bridge is narrower, reduced construction costs</p> <p>Disadvantages: Redesign needed; Profile grade changes must be reexamined; East turnout may be too close to Platte Bridge.</p>	<p>Initial Est. Savings: \$414,000 Future Est. Savings: \$0 Total Est. Savings: \$414,000</p>	<p>Table for further study.</p>
<p>VE Proposal # Staff 2</p> <p>Affected Parties: RTD</p>	<p>Proposal: Build 3-car platforms instead of 4-car.</p> <p>Comments: The current plan calls for building 4-car platforms to accommodate future growth. The proposal is to build 3 car platforms for opening day.</p> <p>Advantages: None reported.</p> <p>Disadvantages: Future expansion would require additional construction.</p>	<p>Initial Est. Savings: \$1,800,000 Future Est. Savings: \$00,000 Total Est. Savings: \$1,800,000</p>	<p>Table for Further Study.</p>
<p>VE Proposal # Staff 3</p> <p>Affected Parties: RTD</p>	<p>Proposal: Eliminate duct bank encasement.</p> <p>Comments: Currently, the duct banks are encased in concrete; we are looking to reduce the burying depth and put a concrete cap on the top.</p> <p>Advantages: None reported.</p> <p>Disadvantages: None reported.</p>	<p>Initial Est. Savings: \$3,500,000 Future Est. Savings: \$00,000 Total Est. Savings: \$3,500,000</p>	<p>Table for Further Study.</p>

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<p>VE Proposal # Staff 6</p> <p>Affected Parties: Denver, Lakewood</p>	<p>Proposal: Weathering steel for some bridges</p> <p>Comments: By using a Design Build method, the contractor could get an early start on these bridges.</p> <p>Advantages: Saves in material costs.</p> <p>Disadvantages: None reported.</p>	<p>Initial Est. Savings: \$600,000 Future Est. Savings - There are maintenance cost savings as well. Details will be forthcoming; Total Est. Savings: \$600,000</p>	<p>Table for Further Study.</p>
<p>VE Proposal # Staff 7</p> <p>Affected Parties: RTD</p>	<p>Proposal: Design Build, CML, Platte, Federal Blvd and Eldridge Bridges.</p> <p>Comments: By using a Design Build method, the contractor could get an early start on these bridges.</p> <p>Advantages: Early start item for contractor; Speeds up construction; Opens up more lineal feet of trackwork for construction; Minimizes risk to RTD.</p> <p>Disadvantages: May have Geotech concerns.</p>	<p>Initial Est. Savings: \$1,000,000 Future Est. Savings: \$00,000 Total Est. Savings: \$1,000,000</p>	<p>Table for Further Study.</p>
<p>VE Proposal # Staff 8</p> <p>Affected Parties: RTD</p>	<p>Proposal: Eliminate steel casing at drilled caissons.</p> <p>Comments: None reported.</p> <p>Advantages: None reported.</p> <p>Disadvantages: May have Geotech concerns.</p>	<p>Initial Est. Savings: \$500,000 to \$1,250,000 Future Est. Savings: \$00,000 Total Est. Savings: \$500,000 to \$1,250,000</p>	<p>Table for Further Study.</p>
<p>VE Proposal # Staff 10</p> <p>Affected Parties: RTD</p>	<p>Proposal: Copper OHC wire in lieu of bronze.</p> <p>Comments: None reported.</p> <p>Advantages: None reported.</p> <p>Disadvantages: None reported.</p>	<p>Initial Est. Savings: \$1,000,000 Future Est. Savings: \$00,000 Total Est. Savings: \$1,000,000</p>	<p>Table for Further Study.</p>

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<p>VE Proposal # Staff 11</p> <p>Affected Parties: RTD</p>	<p>Proposal: Drainage to 50 year event.</p> <p>Comments: This would design the drainage for a 50 year flood instead of a 100 year flood.</p> <p>Advantages: None reported.</p> <p>Disadvantages: None reported.</p>	<p>Initial Est. Savings: \$4,000,000</p> <p>Future Est. Savings: \$00,000</p> <p>Total Est. Savings: \$4,000,000</p>	<p>Table for Further Study.</p>
<p>VE Proposal # Staff 12</p> <p>Affected Parties:</p>	<p>Proposal: Reduce duct bank conduit from 4-4" to 2-4".</p> <p>Comments: None reported.</p> <p>Advantages: None reported.</p> <p>Disadvantages: None reported.</p>	<p>Initial Est. Savings: Costs TBD</p> <p>Future Est. Savings: Costs TBD</p> <p>Total Est. Savings: Costs TBD</p>	<p>Table for Further Study.</p>
<p>VE Proposal # Staff 13</p> <p>Affected Parties: Denver, Lakewood, Golden, Jeffco</p>	<p>Proposal: Eliminate hardware for cameras.</p> <p>Comments: None reported.</p> <p>Advantages: None reported.</p> <p>Disadvantages: None reported.</p>	<p>Initial Est. Savings: Costs TBD</p> <p>Future Est. Savings: Costs TBD</p> <p>Total Est. Savings: Costs TBD</p>	<p>Table for Further Study.</p>
<p>VE Proposal # Staff 14</p> <p>Affected Parties: Lakewood, Golden, Jeffco, Denver</p>	<p>Proposal: Eliminate hardware for VMS.</p> <p>Comments: None reported.</p> <p>Advantages: None reported.</p> <p>Disadvantages: None reported.</p>	<p>Initial Est. Savings: Costs TBD</p> <p>Future Est. Savings: Costs TBD</p> <p>Total Est. Savings: Costs TBD</p>	<p>Table for Further Study.</p>

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<p>VE Proposal # Staff 15</p> <p>Affected Parties: Denver, Lakewood, Golden, Jeffco</p>	<p>Proposal: Eliminate hardware for emergency telephones.</p> <p>Comments: None reported.</p> <p>Advantages: None reported.</p> <p>Disadvantages: None reported.</p>	<p>Initial Est. Savings: Costs TBD</p> <p>Future Est. Savings: Costs TBD</p> <p>Total Est. Savings: Costs TBD</p>	<p>Table for Further Study.</p>
<p>VE Proposal # P02-048</p>	<p>Proposal: Eliminate pocket track at Lakewood Gulch</p> <p>Comments: Operations have agreed to eliminate and replace with a double crossover</p> <p>Advantages: None reported.</p> <p>Disadvantages: None reported.</p>	<p>Initial Est. Savings: \$600,000</p> <p>Future Est. Savings: \$0,000</p> <p>Total Est. Savings: : \$600,000</p>	<p>Accepted</p>