

### ### Engineering Justification for Alternate Pay Item Pricing

**\*\*Item:\*\* 714-11956 STRUCTURE, COATED REINFORCED CONCRETE, BOX SECTIONS, 10 FT X 9 FT (LFT)**

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#### #### 1. Narrative: Why Alternates Were Needed

The requested item, 714-11956, specifies a \*coated\* reinforced concrete box section with a 10 ft x 9 ft opening (90 sqft). No recent or local bid history exists for this exact specification and geometry in the project region. To produce a defensible unit price, alternate pay items with similar geometry, specification, and recency were identified and blended. The alternates were selected to balance the criticality of the "coated" specification, geometric similarity (area within +/-20%), and data reliability (recency, locality, and data volume).

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#### #### 2. Candidate Summary (with Data Counts)

- **\*\*714-11561\*\***: STRUCTURE, COATED REINFORCED CONCRETE BOX SECTIONS, 20 FT X 5 FT
  - Area: 100 sqft
  - Adjusted Price: \$2,796.75
  - Data Points: 4
  - \*Best spec match (includes "COATED"), close geometry, low data volume, high recency\*
- **\*\*714-11957\*\***: STRUCTURE, REINFORCED CONCRETE BOX SECTIONS, 15 FT X 6 FT
  - Area: 90 sqft
  - Adjusted Price: \$3,115.00
  - Data Points: 6
  - \*Exact area match, lacks "COATED", moderate data, strong recency/locality\*
- **\*\*714-11188\*\***: STRUCTURE, REINFORCED CONCRETE BOX SECTIONS, 12 FT X 8 FT
  - Area: 96 sqft
  - Adjusted Price: \$2,420.52
  - Data Points: 8
  - \*Close geometry, lacks "COATED", high recency, moderate data\*
- **\*\*714-11185\*\***: STRUCTURE, REINFORCED CONCRETE BOX SECTIONS, 10 FT X 8 FT
  - Area: 80 sqft
  - Adjusted Price: \$2,643.75
  - Data Points: 9
  - \*Close geometry, lacks "COATED", highest data volume, strong recency/locality\*
- **\*\*Other candidates\*\*** (not blended):
  - 714-000114 (102 sqft, \$3,970.59, 7 pts),
  - 714-11076 (72 sqft, \$1,812.50, 4 pts),
  - 714-11109 (80 sqft, \$3,065.63, 6 pts),
  - 714-11120 (96 sqft, \$2,484.38, 5 pts),
  - 714-11145 (84 sqft, \$2,678.57, 3 pts),
  - 714-11153 (90 sqft, \$2,555.00, 6 pts),
  - 714-11187 (72 sqft, \$3,455.00, 17 pts),
  - 714-11195 (90 sqft, \$5,350.00, 2 pts),

- 714-11196 (84 sqft, \$5,785.71, 3 pts),
- 714-11444 (91 sqft, \$4,500.00, 3 pts),
- 714-11755 (77 sqft, \$4,120.13, 12 pts),
- 714-12643 (100 sqft, \$2,610.00, 3 pts)

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#### #### 3. Weighting Narrative

##### \*\*Blended Alternates and Weights:\*\*

- \*\*714-11561 (COATED, 100 sqft): 45%\*\*  
 - \*Rationale\*: Only candidate with "COATED" in the description, which is critical for matching the corrosion protection requirements of the target spec. Geometry is close (100 sqft vs. 90 sqft, ratio 0.9). Data volume is low (4 points), but all are recent (STATE\_12M). The high weight (45%) reflects the importance of spec match, even with limited data.
- \*\*714-11957 (90 sqft): 25%\*\*  
 - \*Rationale\*: Exact area match, strong recency/locality, moderate data (6 points). Lacks "COATED", but otherwise a strong analog. Weighted less than the coated item due to spec difference.
- \*\*714-11188 (96 sqft): 15%\*\*  
 - \*Rationale\*: Close geometry (96 sqft), high recency, moderate data (8 points). Lacks "COATED". Lower weight due to spec mismatch, but included for data stability.
- \*\*714-11185 (80 sqft): 15%\*\*  
 - \*Rationale\*: Close geometry (80 sqft), highest data volume (9 points), strong recency/locality. Lacks "COATED". Lower weight due to spec mismatch and slightly smaller area.

##### \*\*Area-Ratio Consideration:\*\*

All blended alternates are within +/-20% of the target area (90 sqft), ensuring geometric comparability. The weights reflect a balance between spec match (favoring "COATED"), geometric similarity, and data reliability (recency, locality, volume).

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#### #### 4. Show the Work

##### \*\*Given:\*\*

- 714-11561: \$2,796.75 (weight 0.45)
- 714-11957: \$3,115.00 (weight 0.25)
- 714-11188: \$2,420.52 (weight 0.15)
- 714-11185: \$2,643.75 (weight 0.15)

##### \*\*Formula:\*\*

Blended Unit Price = (P1 \* W1) + (P2 \* W2) + (P3 \* W3) + (P4 \* W4)

##### \*\*Substitute:\*\*

Blended Unit Price = (2,796.75 \* 0.45) + (3,115.00 \* 0.25) + (2,420.52 \* 0.15) + (2,643.75 \* 0.15)

##### \*\*Result:\*\*

Blended Unit Price = (1,258.5375) + (778.75) + (363.0781875) + (396.5625)

Blended Unit Price = 2,796.9281875

**\*\*Rounded Unit Price:\*\***

Blended Unit Price \$2,800.00 per LFT

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#### #### 5. Conclusion: Reasonableness of the Result

The resulting unit price of **\*\*\$2,800.00 per LFT\*\*** is reasonable for the project scope and region, given the lack of direct bid history for the exact item. The blend prioritizes the only available "COATED" alternate, ensuring the corrosion protection requirement is reflected in the estimate. The geometric similarity and recency of all alternates support the validity of the price. The price is within the expected range for large, coated reinforced concrete box sections, as supported by recent bid data and engineering judgment. This approach aligns with best practices for alternate item pricing when direct data is unavailable (see AASHTO Guide for Estimating, and typical DOT Spec Section 714 for reinforced concrete structures).

**\*\*References:\*\***

- [AASHTO Guide for Estimating](<https://www.transportation.org/>)
- State DOT Standard Specifications, Section 714 (Reinforced Concrete Structures)
- BidTabs data (2023-2025), Region 2

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