

Memorandum

Project: Spruce Creek Road

To: Michelle Eddy, Town Manager

From: Jeff Wulliman, PE
Bob LaForce, PE – Yeh and Associates
Levi Niesen, EI

Date: March 7, 2024

Subject: Spruce Creek Road Design Recommendation Memorandum

This memorandum is provided to solicit a decision on the pavement type and limits for Spruce Creek Road in the Town of Blue River.

Background:

The purpose of the Spruce Creek Road Project is to address and improve upon the following issues observed by the Town and nearby residents.

- Safety
 - Highway 9 Intersection, Approach
- Maintenance
 - Reducing maintenance burden and cost to the Town.
 - Improving condition of Spruce Creek Road
- Dust Control
 - Noted issue from nearby residents
- Speeding
 - Noted issue from nearby residents
 - Speed capture information from September 2023 indicate the 85% percentile speed was 22 mi/hr.

Alternative Improvements

The following options are considered for improvement type and limits. All options include the approach to CO 9 intersection grading improvements previously reviewed with the Town.

- Asphalt Pavement
 - Spruce Creek Road to Crown Drive
 - Spruce Creek Road to Gold Nugget Drive
 - Pave CO 9 Approach Only
- Continued MgCl and emulsified asphalt treatment (Earthbind)

Assessment:

The benefits and drawbacks of the various options are included below. This assessment references the memorandum titled *Discussion of Paving with HMA Versus Annual Treatment with Magnesium Chloride* by Yeh and Associates, attached.

For Asphalt Pavement Options:

These options assume a 4” thick pavement on 4” of base course. Annual costs are based on an expected 14-year service life of the asphalt prior to an overlay. The preliminary level cost estimates attached to this memo are coarse and should be taken for discussion between the options. Cost estimates can be refined with final design and quantities.

Design concept exhibits for each paving alternative are also attached to this memo.

Alternative 1: Pave to Crown Drive

Scope Description: Asphalt pavement on Spruce Creek Road to Crown Drive	
Cost: \$400,000	Annualized Cost*: \$29,000 / year
Pros: <ul style="list-style-type: none"> • Minimal annual maintenance • Dust Elimination 	Cons: <ul style="list-style-type: none"> • Most expensive option • Gravel/pavement transition on slope • Higher speeds • Replacement cost • Snow and ice control
<p>In Summary: Not Recommended</p> <p>Paving all the way up to Crown will reduce dust along the entire stretch of Spruce Creek Road, but comes with additional cost. The transition between gravel and pavement is not in a flat location, which can cause issues with rutting and vehicles kicking up gravel onto the asphalt.</p> <p>Addressing cons: Revisions may be needed (e.g. sand, salt) to winter maintenance practices to prevent ice and packed ice along with plowing.</p>	

*Assumes 14-yr service life (2024 Dollars)

Alternative 2: Pave to Gold Nugget Drive

Scope Description: Asphalt pavement on Spruce Creek Road from CO 9 to Gold Nugget.	
Cost: \$320,000	Annualized Cost*: \$23,000 / year
Pros: <ul style="list-style-type: none"> • Minimal annual maintenance • Dust Reduction • Gravel to pavement transition where the road is flat • Reduced pavement cost 	Cons: <ul style="list-style-type: none"> • Higher speeds • Replacement cost • Snow and ice control
<p>In Summary: Recommended Asphalt Pavement Option</p> <p>This option reduces gravel on the roadway, dust kick-up, and annual maintenance from the Town. The transition from gravel to pavement is on the flat section of roadway, which is the most ideal for reducing gravel-on-asphalt issues. Speeding may increase on asphalt, and there are long-term replacement costs that will be necessary.</p> <p>Addressing cons: Revisions may be needed (e.g. sand, salt) to winter maintenance practices to prevent ice and packed ice along with plowing.</p>	

*Assumes 14-yr service life (2024 Dollars)

Alternative 3: Pave Approach Only

Scope Description: Pave approximately 70-ft up Spruce Creek Road from CO 9	
Cost: \$110,000	Annualized Cost*: \$8,000 / year
Pros: <ul style="list-style-type: none"> • Most inexpensive option • Reduces gravel build-up on asphalt roadway at CO 9 • Meets CDOT access standards (50ft pavement minimum) 	Cons: <ul style="list-style-type: none"> • Pavement to gravel transition is on steep section • Gravel anticipated to be kicked onto asphalt from uphill drivers which could affect traction on steep section • Differential rutting at transition area may affect road condition without maintenance attention • Does not address dust issue. • Does not address maintenance issue
<p>In Summary: Recommended if Alternative 2 not selected.</p> <p>While this option reduces gravel on the roadway at CO 9, the transition from gravel to pavement on the steep grade may cause other issues. Drivers may kick more gravel onto the roadway higher up the road, affecting traction on the steep section during dry months. A rut may also form between asphalt and gravel which may worsen travel down to CO 9 if not maintained.</p>	

*Assumes 14-yr service life (2024 Dollars)

Alternative 4: Profile Improvements and Continued MgCl Treatment & Emulsified Asphalt Treatment (e.g. Earthbind)

Scope Description: Continue current road maintenance and treatment practices.	
Cost: \$70,000	Annualized Cost*: <ul style="list-style-type: none"> • Construction: \$5,000 / year • MgCl/Earthbind: ~\$8,000 / year <ul style="list-style-type: none"> ○ (Per G&G)
Pros: <ul style="list-style-type: none"> • Low cost of initial treatment • Fair to good dust control 	Cons: <ul style="list-style-type: none"> • Limited improvement to Spruce Creek Road • Annual treatment required • Dust, loss of aggregate, washboarding
<p>In Summary: Not recommended.</p> <p>This option improves the intersection with CO 9 at the lowest initial cost, though the improvements may have a shorter life span than asphalt. Previous improvements have regraded the profile of Spruce Creek, however, heavy traffic volumes, plowing, and maintenance over the years has seen the issues rapidly re-emerge. This alternative is likely to follow similar patterns and only serve as a temporary measure.</p>	

*Assumes 14-yr service life (2024 Dollars)

Recommendation:

We recommend installing asphalt pavement and the associated grading and drainage improvements on Spruce Creek Road from CO 9 to Gold Nugget Drive.

Attachment 1: Discussion of Paving with HMA Versus Annual Treatment with Magnesium Chloride

Attachment 2: Preliminary Cost Estimates

Attachment 3: Design Alternative Exhibits