Collaborative Construction Oversight Between Engineers and Ecologists

Improving Erosion Control and Project Success in Riparian Restoration Projects

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INTRODUCTION

Why Does Collaboration Matter in Riparian Restoration?

Flashy storms, limited water, and slow establishment timelines make every construction decision critical. When design and construction oversight are often siloed, good designs can fail during construction.

Our Roles

- **Haley:** Ecological restoration & revegetation oversight
- **Adam:** Civil/ engineering construction oversight

What We'll Share

Lessons from our field experience on how these two perspectives come together —or clash —and what that means for erosion control and vegetation success.

Why Does Collaboration Matter during Construction?

The construction phase is the critical gap where design intent for ecological restoration is most often lost. Decisions made dur ing this period have a **disproportionate impact on project success.**

Common Field Issues That Derail Restoration Goals:

- Compacted soils → Decreased plant establishment
- Mismanaged topsoil → Decreased soil nutrients and microbes, weedy seed bank
- Sequencing errors → Loss of topsoil due to incorrect timing or order of activities
- Grading errors → Immediate failure points, reduced stability, noncompliance with wetland mitigation permits

The cost of misalignment: rework, delayed revegetation, and lost seedbank potential —all preventable with better oversight.

LESSONS LEARNED

What Happens Without Collaboration

When engineers and ecologists work in silos, the result is **costly rework** —not just in dollars, but in lost ecological potential and project timelines. The cascading failure cycle is predictable and preventable.

Erosion Begins

Grading or sequencing mistakes expose bare soil and start the deterioration process.

Weed Invasion

Open ground is quickly colonized by opportunistic invasive species that outcompete natives.

Native Seedlings Choked

Young plants fail to establish under invasive cover and altered site conditions.

Costly Rework & Delays

Re-seeding, erosion repair, and extended monitoring extend timelines and budgets.

COMPLEMENTARY ROLES

Engineer vs. Ecologist: Same Slope, Different Priorities

Both perspectives are valid and both are essential. The overlap is where collaboration matters most, because erosion control is both structural ***and*** biological.

🔧 Engineer's Focus:

- Grading accuracy
- Drainage & stability
- Erosion control specs
- Hydrology modeling

🌿 Ecologist's Focus:

- Topsoil management & amendments
- Grading for wetland establishment
- Seedbed prep & mulch application
- Vegetation establishment & weed management
- Habitat outcomes

Structural Stability	Successful Restoration	Biological Function

PRACTICAL GUIDE

When One of Us Takes the Lead

Clear roles and mutual trust are the foundation. Knowing **who leads when** eliminates confusion in the field and ensures the right expertise drives each decision. In the field, ambiguity costs time —here's how we divide responsibility clearly.

Field Issue	Lead Discipline	Why
Slope failure	🔧 Engineer	Structural stability expertise
Seedbed preparation	🌿 Ecologist	Soil biology & germination knowledge
Mulch & Erosion Control Blanket	🔧 + 🌿 Both	Must protect soil AND allow germination
Weed management	🌿 Ecologist	Species ID & treatment timing, topsoil and pre-con practices
Drainage realignment	🔧 Engineer	Hydrology & grading precision
Topsoil sourcing	🔧 + 🌿 Both	Quality, origin, meeting specs, and placement all matter

CASE STUDIES

Lessons from the Field

Real examples showing how collaboration solved field challenges —and what happens when the right people aren't involved at the right time.

1 Lena Gulch

Changing plans in the field —a joint decision to deviate from the plans helped meet project goals and improve maintenance post-construction.

2 Topsoil Management

Poor stockpile handling or sourcing without ecological input —and the costly consequences of working in silos.

3 Dad Clark Gulch

Blanket & mulch installation —cross-discipline communication that that improved seed germination rates.

CASE STUDY 1

Lena Gulch: Changing Plans in the Field

A mid-construction decision to substitute pine mulch for erosion blanket, made jointly by the engineer and ecologist.

1

Problem Identified

Erosion blanket in plans did not meat maintenance goals for the project.

2

Joint Field Review

Engineer and ecologist assessed conditions together on site, sharing perspectives in real time.

3

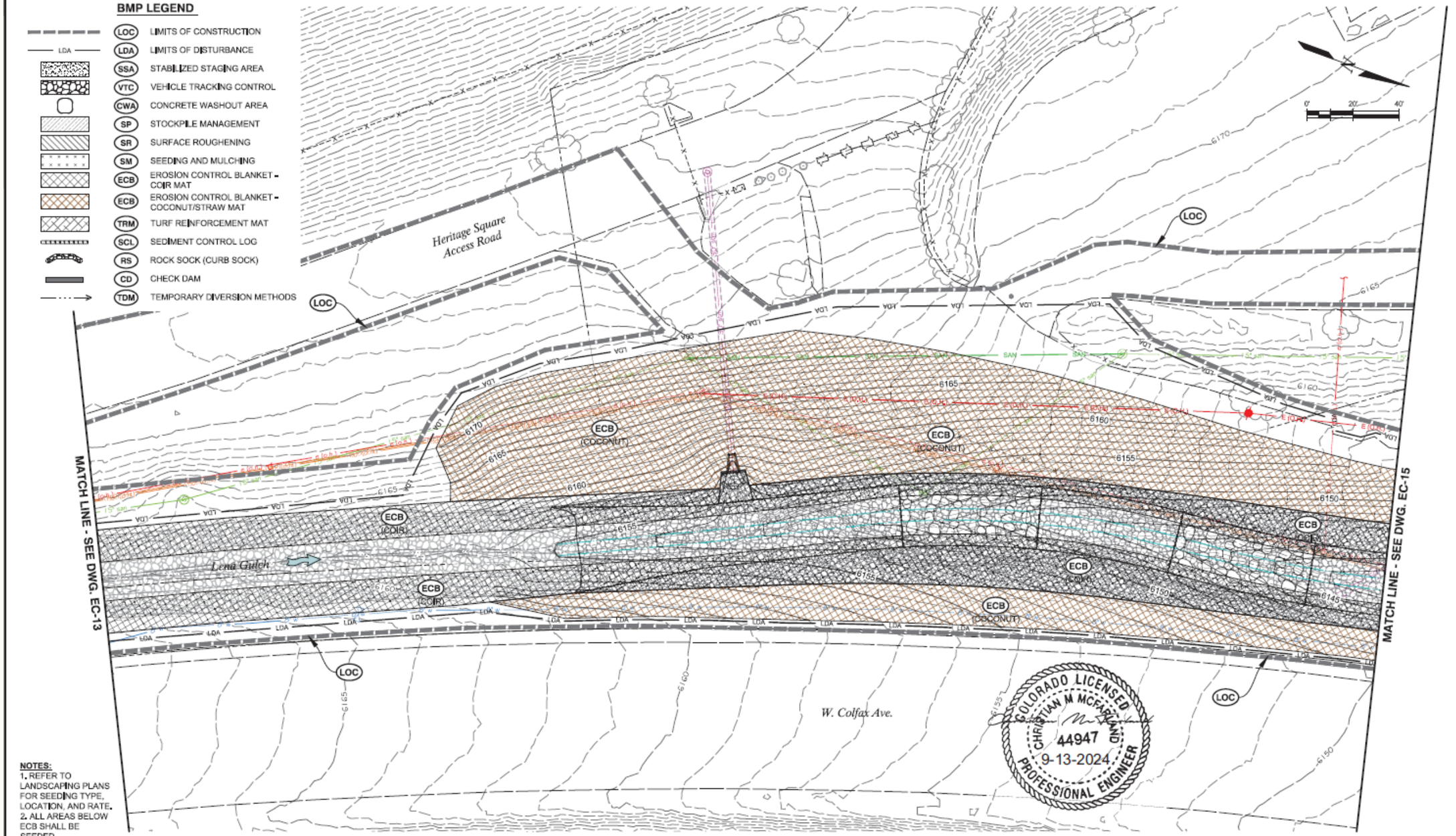
Collaborative Decision

Pine mulch selected as substitute; met both engineering and ecological criteria for the site.

4

Positive Outcome

Erosion controlled, adaptive management tasks became easier and more effective, and project closeout stayed on schedule.



PREPARED UNDER THE SUPERVISION OF

DESIGNED: MAB
DRAWN: LRL
CHECKED: CMM/ALR

FOR CONSTRUCTION

PROJECT NO. 21-047.01

SHEET REVISIONS

NO.	DATE	DESCRIPTION	BY

MULLER ENGINEERING COMPANY
777 S. WADSWORTH BLVD. 4-100 LAKEWOOD, COLORADO 80226

City of Golden

MHFD
MILE HIGH FLOOD DISTRICT

LENA GULCH IMPROVEMENTS (UPSTREAM OF C-470)
PHASE 1, REACH 2

EROSION CONTROL

FINAL EROSION CONTROL PLAN (SHEET 2 OF 4)

DATE: 9/13/2024
DRAWING NO.: EC-14
SHEET NO.: 58 OF 72

Case Study: Dad Clark Gulch

CASE STUDY

Topsoil & Stockpile Mismanagement

- The origin of import soil is often a mystery
- Meeting texture specs without knowing biology of soil
- Blindly amending soils (over - or under - amending)
- Stripping to standard depths and stockpiling topsoil long - term
- Sequencing between soil prep and reveg activities

> In arid systems, sequencing is everything: **Grading → Topsoil → Seeding → Erosion Control.** Skip a step and the whole system fails.

COCONUT BLANKET (C400B)	0.8	ACRES
COIR BLANKET (NEDIA 700)	2.8	ACRES
HYDROMULCH	6.1	ACRES
WETLAND PLUGS	9,900	
SHRUBS (2-GAL)	270	
SHRUBS (2-5AL)	440	
WILLOWS STAKES	3,200	
COTTONWOOD STAKES	17	
TREES (1-IN)	73	

TAKE ACTION

Framework for Collaboration: Practical Tips to Implement Now

1

Joint Pre-Construction Meetings

Include construction phase team members —not just designers. Align on expectations, roles, and critical sequencing before equip ment hits the ground.

2

Share Field Inspection Schedules

Coordinate site visits so both disciplines observe conditions together. Shared eyes catch what solo inspections miss.

3

Clear Decision Tree

Establish a "who leads when" flow chart for on -site decisions. Eliminate ambiguity before it creates delays.

4

Share Resources, Inspection Checklists, etc.

Knowing what the other parties are looking for on their inspections helps proactively solve problems together

5

Early Corrective Authority

Empower field staff to make corrections before problems compound. Waiting for approvals costs time and soil.

6

Contractor Education

Train crews on both engineering and ecological objectives and roles so everyone on site understands the goals of each specifi c project.

TAKE ACTION

The Results of Collaboration

When engineers and ecologists work together from the start, the outcomes speak for themselves. These aren't aspirational goals —they're documented outcomes from the projects we've shared today.

Less Rework

Fewer costly corrections during and after construction. Problems caught early are resolved faster and cheaper.

Better Erosion Control

Structural and biological solutions working in tandem create more resilient slope and channel protection.

Team Trust

Shared field experience builds lasting professional relationships and smoother future project coordination.

Higher Vegetation Success

Native plants establish faster and more reliably when construction respects ecological sequencing and soil health.

KEY TAKEAWAYS

Lessons Learned & Final Thoughts

Early Collaboration Saves Time, Money, and Ecosystems

Collaboration prevents costly fixes later. The investment in communication upfront pays dividends throughout the project lifecycle, from grading through monitoring.

Complementary, Not Competing

The most resilient restoration projects are built through **communication and respect** for each discipline's role. Engineers and ecologists fill each other's blind spots.

Resilience Is Built During Construction

With climate variability and intense storms increasing, better construction means better recovery capacity. The construction phase is where long-term resilience is won or lost.

Honest reflection: Some challenges are systemic and hard to adjust, budgets, timelines, and contracting structures. Others simply need more practice to implement. Both deserve acknowledgment as we continue improving.

THANK YOU

Questions & Discussion

We welcome questions from **either** perspective, engineering, ecology, or anywhere in between. Let's continue the conversation!

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Thank you to all who make this work possible. We'd love to connect —find us after the session or reach out by email.