



Riparian Habitat Restoration



AARK Stream Restorations, LLC.

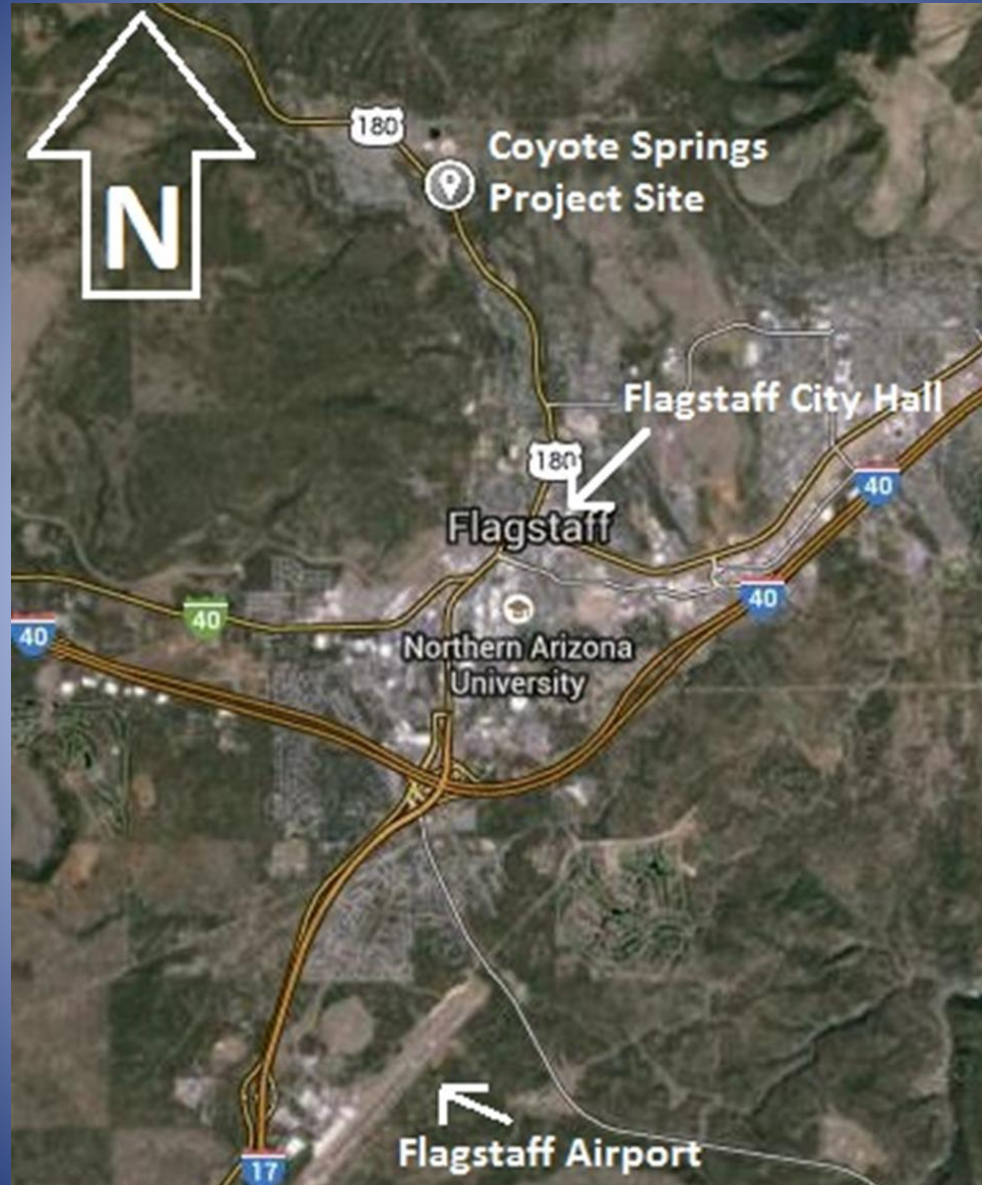
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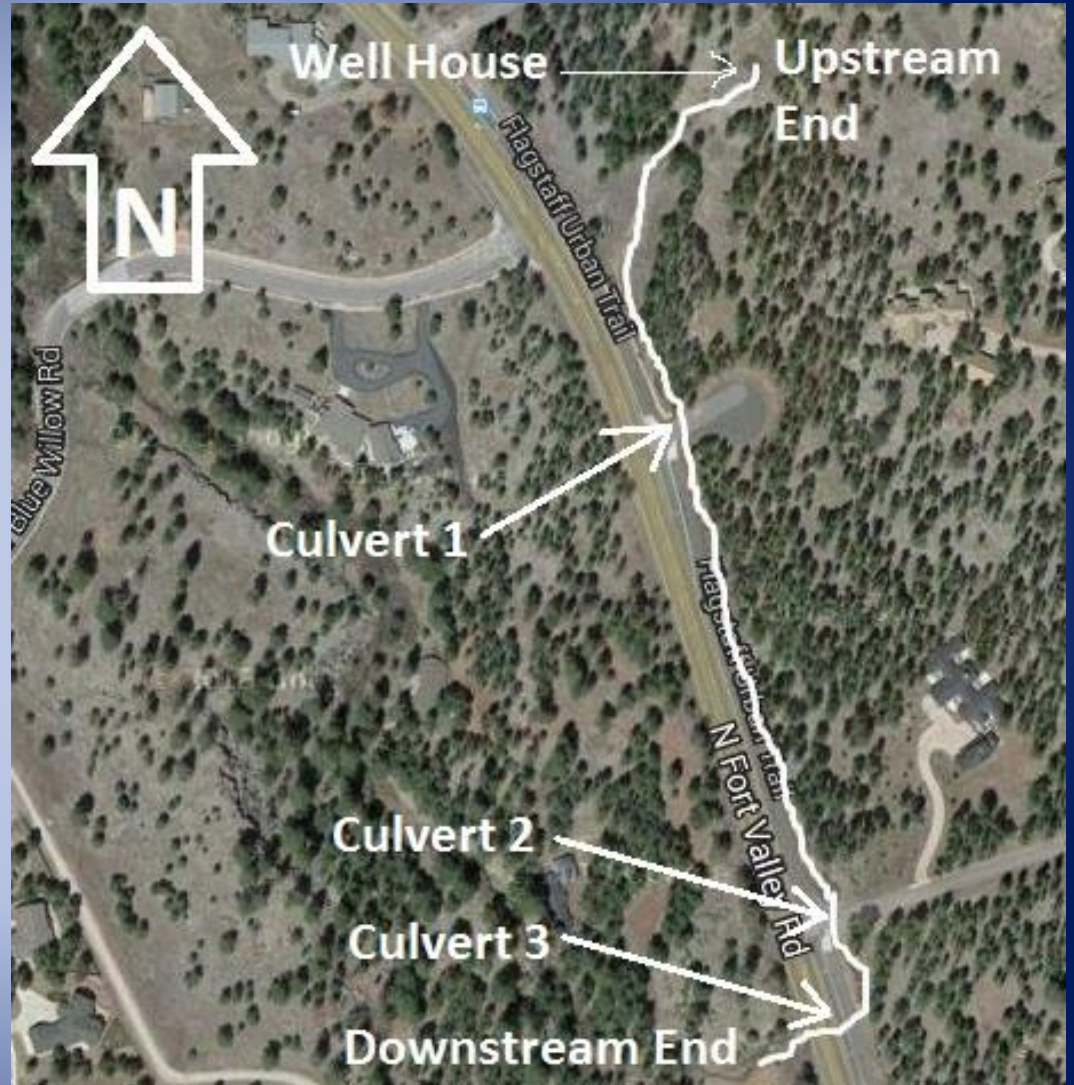
Coyote Springs Location



Site Location

Coyote Springs Site

- Perennial flow
- ~1,650 ft narrow stream reach



Start and End of Design Reach for Coyote Springs

Project Understanding

- Client: Cindy Perin, HOA
- Riparian habitat assessment
- Overgrown Vegetation
- Sediment Build up
- Design and analyze stream reach, outlet, ponding area, and channel



Southern End of Project Site

Scope of Services

- Task 1.0 - Field Evaluation
- Task 2.0 - Coordination
- Task 3.0 - Permitting, Standards, and Codes
- Task 4.0 - Hydrological Analysis
- Task 5.0 - Hydraulic Analysis
- Task 6.0 - Site Analysis
- Task 7.0 - Hydrologic Design
- Task 8.0 - Hydraulic Design
- Task 9.0 - Site Design
- Task 10.0 - Final Predictions
- Task 11.0 - Project Management



<http://www.actiom.net/hrscope.html>

Technical Considerations

- Coyote Springs HOA
- Property standards
- City of Flagstaff
- Arizona Department of Transportation
 - National Register of Historic Places
 - Arizona Historic Preservation Act of 1966
- Environmental Protection Agency
- Construction requirements
- Hydrologic & Hydraulic
- Arizona Department of Environmental Quality
- Arizona Department of Water Resources

Stakeholders

- Client: Cindy Perin
- Museum of Northern Arizona
- ADOT
- City of Flagstaff
- Arizona Game and Fish
- Coyote Springs HOA



Hydrologic/Hydraulic Analysis

- Watershed delineation
- Rainfall and snowfall
- Spring and stream discharge
- Stream and culverts surveyed
- Channel



Upstream Channel

Hydrologic/Hydraulic Design

- Design for discharge
- Account for irregular storms and events
- Slope and sinuosity
- Minimal aggradation or degradation
- Minimal pooling
- HEC-RAS



Culvert with Aggradation

Site Analysis/Design

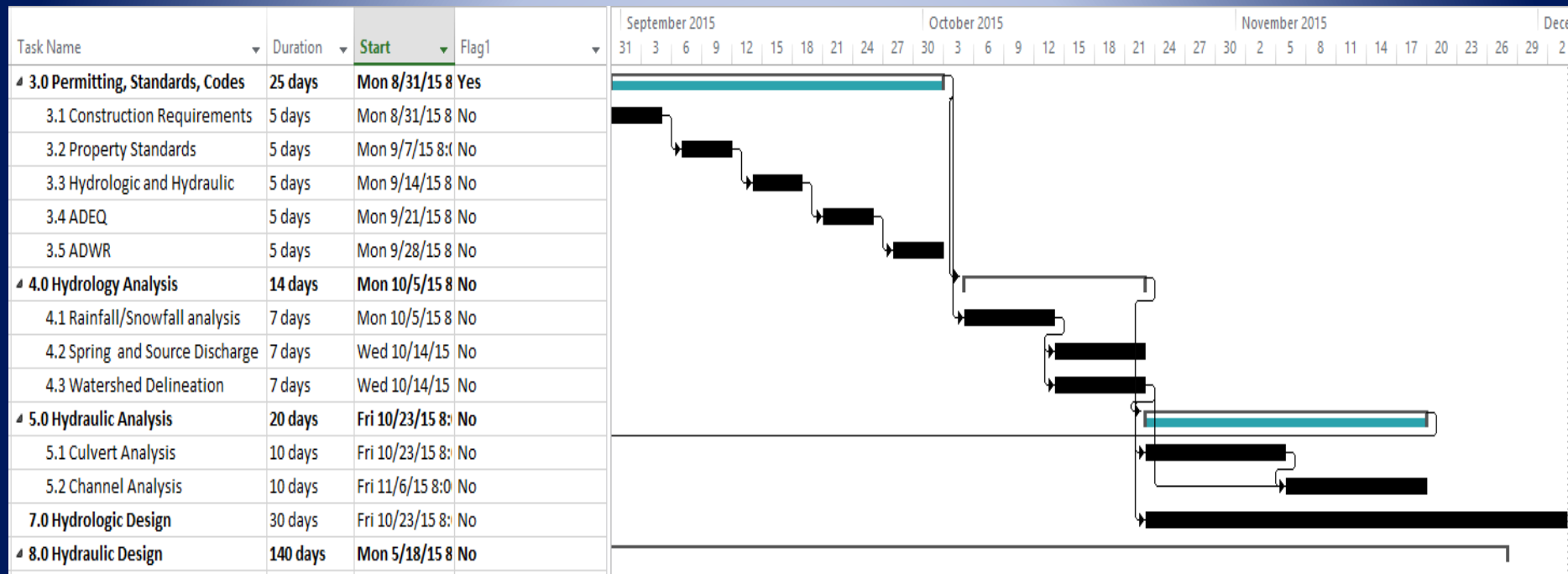
- Geological report
- Utilities report
- Plant classification
- Landscape
 - Natural
 - Aesthetic
 - Remove non-native species



Downstream View of Stream Reach Along HWY 180

Critical Path

- August 31st through December 4th



Critical Path Derived from Gantt Chart

Engineering Services

- Flagstaff, Arizona rates for personnel
- Total \$63,900.00

	Classification	Hours	\$ Rate/Hour	Cost
1.0 Personnel	SENG	38	\$130.00	\$4,940.00
	ENG	312	\$100.00	\$31,200.00
	EIT	176	\$75.00	\$13,200.00
	INT	75	\$50.00	\$3,750.00
	Total Personnel			\$53,090.00
2.0 Overhead				\$10,800.00
3.0 Total				\$63,890.00

Staffing and Overhead Cost Breakdown

Overview

- Coyote Springs
- Riparian habitat assessment
- Design and analyze stream reach, outlet, ponding area, and channel
- Naturally and aesthetically pleasing



Coyote Spring Well House at Northern End of Project Site