



Flood Hazard Assessment Report Rist Canyon, Larimer County, Colorado

February 26, 2013

Prepared by: Al Albin, Dave Drouillard, and Dave Wolff.

Purpose: The purpose of this report is to summarize the findings of our (NRCS) site evaluation of the Rist Canyon Area in relation to potential flooding that could be expected from the Watershed after the High Park fire.

Background: Wildfire burned 259 homes and approximately 87,000 acres of forest land west of Fort Collins, Colorado in June 2012. Larimer County asked NRCS for assistance in evaluating the risk to structures in the Rist Canyon area and make recommendations for mitigation of potential losses.

NRCS Evaluation Team: Al Albin, Dave Drouillard, and Dave Wolff.

Rist Canyon Watershed: Rist Canyon drain a large watershed of over 8 square miles. Much of the watershed burned and many homes were lost in the Whale Rock and Davis Ranch Areas. Rist Canyon Watershed flows West to East along CR 52E - Rist Canyon Road. From Davis Ranch Road to CR 27E the flow is confined in a narrow canyon and stream channel.

Investigative activities: A reconnaissance of Rist Canyon from Davis Ranch Road to CR 27E was conducted. Six cross-sectional profiles were measured at home locations in Rist Canyon. Potential site for debris control structure was identified west of Davis Ranch Road and approximately 200 feet South of the Rist Canyon Road. A profile was surveyed at the location selected for the structure. Members of the investigative team met with several of the potentially affected residents. The extent of previous flooding observed and reported by residents was documented. Hydrologic data developed using post fire conditions were used to estimate flooding potential along Rist Canyon at the profile locations. The potential extent of flooding was estimated along the gulch and adjacent properties for the 25 year-1 hour flood event, 1.8 inches of rain in 1 hour, estimated to produce a flow of 970-1400 cubic feet per second (cfs).

Assets and Resources at Risk: Rist Canyon Road is at risk to potential flooding. Rainfall in excess of 0.5 inches in one hour will cause many access road culverts to be overtopped and cause flooding on Rist Canyon Road. Travel would be hazardous and many access roads have the potential to be washed out and/or plugged with debris. Rist Canyon Road would be impacted by flood water potentially causing damage to the roadway along with the deposition of sediment and debris. This would pose a hazard to travelers and require cleanup and repair. Sediment, debris, and contaminants transported

to the Poudre River by flood flows would negatively impact the resource which includes municipal and irrigation water supplies.

One residence, two garages, and a storage shed are at risk from potential flooding from a 25 yr -1 hr storm of 970-1400 cfs (see Plan Map).

Assessment of the Conditions: A large precipitation event occurred a few weeks after the fire. At Davis Ranch Road, water and debris overflowed onto Rist Canyon Road causing the road to be closed for a short period. Discussion with a landowner in the canyon indicated water and debris overtopped his driveway culvert and flowed down Rist Canyon Road. Erosion around the culvert headwall was apparent. It appears that several other driveway culverts were overtopped and a large amount of debris was deposited near 8801 Rist Canyon Road.

Recommendations: When rainfall exceeds 0.5 inch in 1 hour, consider closing traffic along Rist Canyon Road between Davis Ranch and CR 27E due to potential flooding and debris on the roadway creating hazardous conditions. Ensure adequate signage is posted in the canyon to move to higher ground in the event of flash flooding.

Debris Control: Flood flows in Rist Canyon are capable of transporting large rocky and woody debris. The construction of a debris control structure should be considered to prevent large material from being transported onto people's property and/or potentially blocking flows and washing out bridges and private road crossings. The suggested location for the debris control structure was identified west of Davis Ranch Road and approximately 200 feet south of Rist Canyon Road.

Debris Removal: Considerable debris exists in the Rist Creek flow channel. The specific concern is that the transported debris will plug downstream culverts causing overtopping that results in erosion of roadway slopes along Rist Canyon Road (CR 52E) and damage to private properties. The proposal is to remove all dead and downed woody debris one inch (1") in diameter and larger from the Rist Creek channel between Davis Ranch Road and CR 27E

Structures at Risk: The house at 10454 Rist Canyon, on the North side of roadway, appears to be at the greatest risk of flooding and damage from debris. While a survey of the property was not completed, the estimated flow width and depth at the residence shows it to be at risk. The property should be evacuated if a large storm event appears eminent. Significant effort will be required to protect this home. A sandbag barrier constructed 3 feet high (0.5 feet above the entrance on the upstream and sides of the house) should protect this structure from the direct force of the 25 year 1 hour event estimated at 970 cubic feet per second.

Structures at Risk: The new garage at 9469 Rist Canyon appears to be at risk from a 25 year-1 hour storm event of 970 cfs. The 3 x 2 Corrugated Metal Pipe in the driveway is estimated to flow 50 cfs. The over flow from the culvert will outlet onto and down Rist Canyon Road. Recommend the culvert be replaced with a bridge that would carry the natural stream flow. In lieu of constructing a bridge, the garage should be protected with 1 foot of sandbags above the entrance level for protection from the 25 yr – 1 hr storm event. Also the equipment stored in the stream overflow area should be relocated out of the flow path so it doesn't travel down Rist Canyon Road unattended.

Structures at Risk: The garage with potential living space above the garage at 9431 Rist Canyon Road appears to be at risk from a 25 year-1 hour storm event of 970 cfs. A sandbag barrier constructed 3 feet above the entrance and along the stream and road sides of the garage should protect this structure from the direct force of the flood water. The propane tanks on the North side of the garage should be secured by running a chain or cable through one of the feet, preferably on the upstream side and attaching it to a secure anchor point such as a large tree, a concrete footing, or a large boulder. The valve on the propane tank should be shut off when flooding is imminent.

Structures at Risk: A storage shed at 8527 Rist Canyon Road is at risk from a 25 year-1 hour storm event of 1400 cfs. Recommend the storage shed be relocated to higher ground out of the floodplain or anchored and sandbagged to 2.5 feet above the ground.

Cost Estimate: A summary of recommended flood protection measures and cost estimates is listed below. These figures are based on prevailing contract costs.

John Andrews
State Conservation Engineer

Rist Canyon – Summary of Recommended Flood Protection Measures		
Location	Recommendations	Estimated Cost
Davis Ranch Road to N CR 27E	Potential Flash Flooding Signs	4 signs @ \$400 each Total Cost - \$1,600
Davis Ranch Road and Rist Canyon Road	Debris Control Structure	90 feet@ \$600/ft Total Cost - \$54,000
Davis Ranch Road to N CR 27E	Debris Removal from stream channel	Low Bid Quote – 3 bids Total Cost - \$90,750
8527, 9431, 9469, 10454 Rist Canyon Road	Plastic & Sandbags to protect structures from flooding	4000 bags @ \$1.50 Total Cost - \$6,000
9431 Rist Canyon Road	Cable down propane tank	Total Cost - \$100
		Total Cost - \$152,450

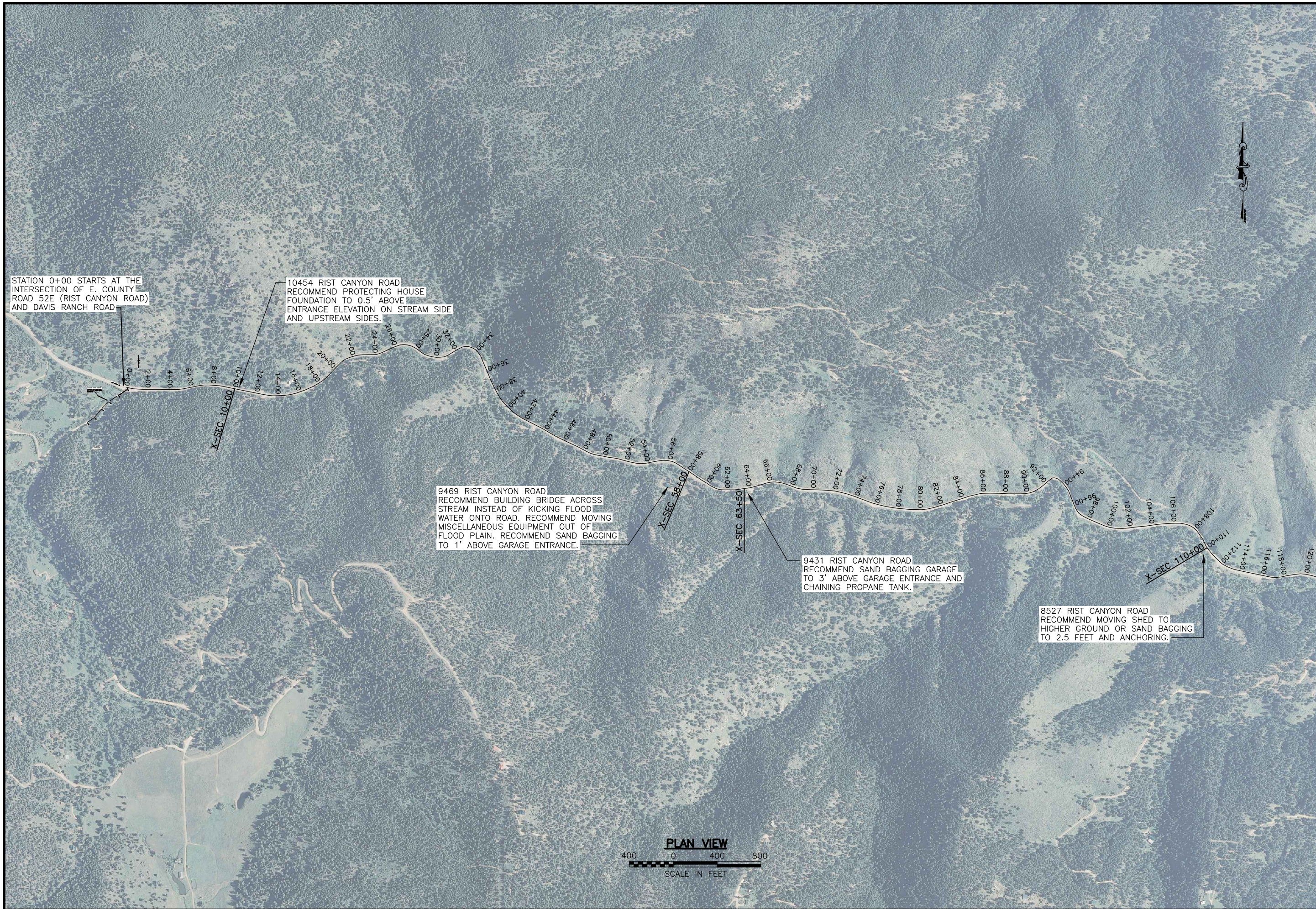


DESIGNED	D. WOLFF	DATE	02/13
DRAWN	D.D. DROULLARD		02/13
CHECKED	A. ALBIN		02/13
APPROVED			

SITE PLAN
CHANNEL DEBRIS BARRIER
 RIST CANYON
 HIGH PARK BURN AREA
 LARIMER COUNTY



FILE NO.	
DRAWING NO.	
SHEET 2 OF 5	



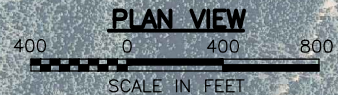
STATION 0+00 STARTS AT THE INTERSECTION OF E. COUNTY ROAD 52E (RIST CANYON ROAD) AND DAVIS RANCH ROAD

10454 RIST CANYON ROAD
RECOMMEND PROTECTING HOUSE FOUNDATION TO 0.5' ABOVE ENTRANCE ELEVATION ON STREAM SIDE AND UPSTREAM SIDES.

9469 RIST CANYON ROAD
RECOMMEND BUILDING BRIDGE ACROSS STREAM INSTEAD OF KICKING FLOOD WATER ONTO ROAD. RECOMMEND MOVING MISCELLANEOUS EQUIPMENT OUT OF FLOOD PLAIN. RECOMMEND SAND BAGGING TO 1' ABOVE GARAGE ENTRANCE.

9431 RIST CANYON ROAD
RECOMMEND SAND BAGGING GARAGE TO 3' ABOVE GARAGE ENTRANCE AND CHAINING PROPANE TANK.

8527 RIST CANYON ROAD
RECOMMEND MOVING SHED TO HIGHER GROUND OR SAND BAGGING TO 2.5 FEET AND ANCHORING.

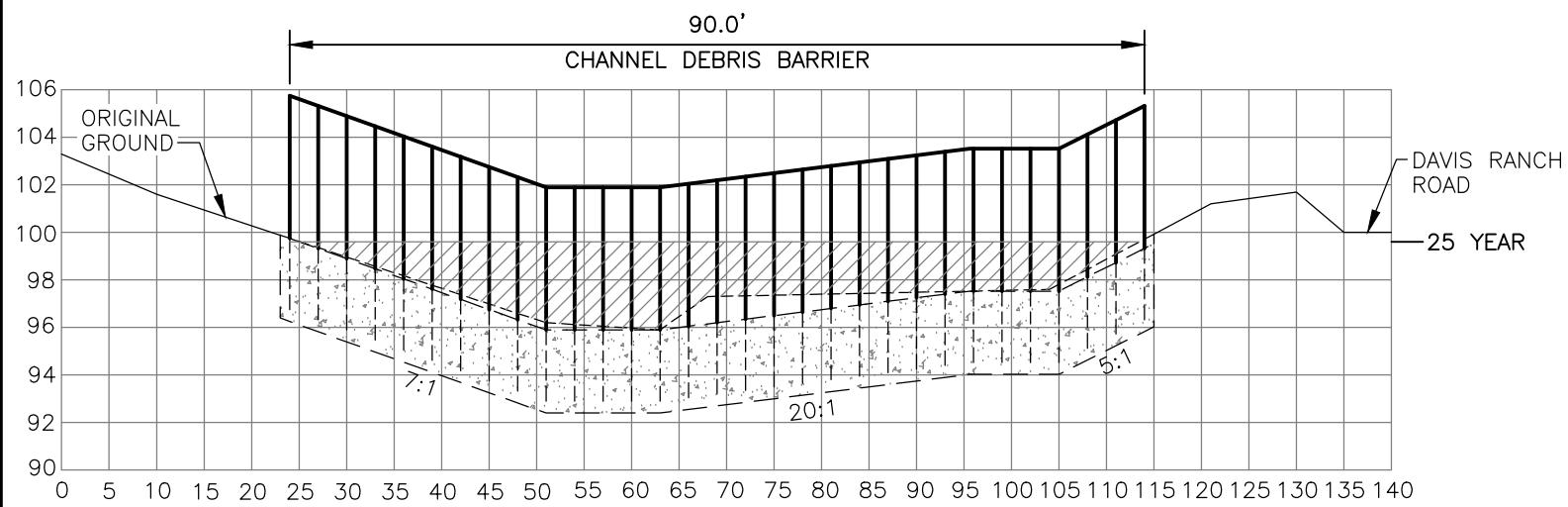


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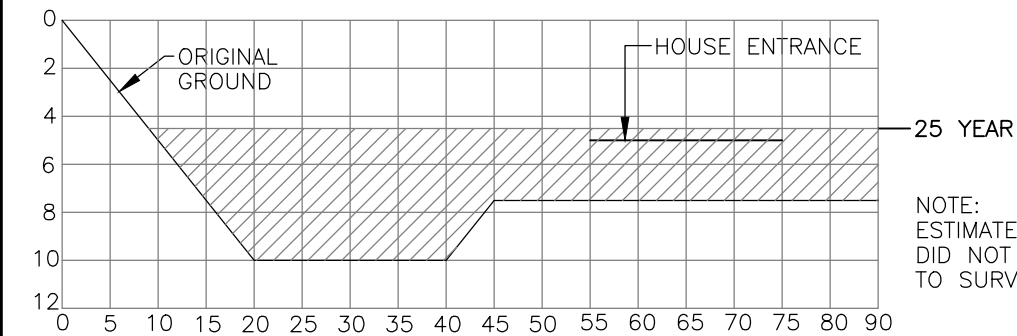
SITE PLAN
RIST CANYON CROSS SECTIONS
RIST CANYON
HIGH PARK BURN AREA

LARIMER COUNTY
COLORADO



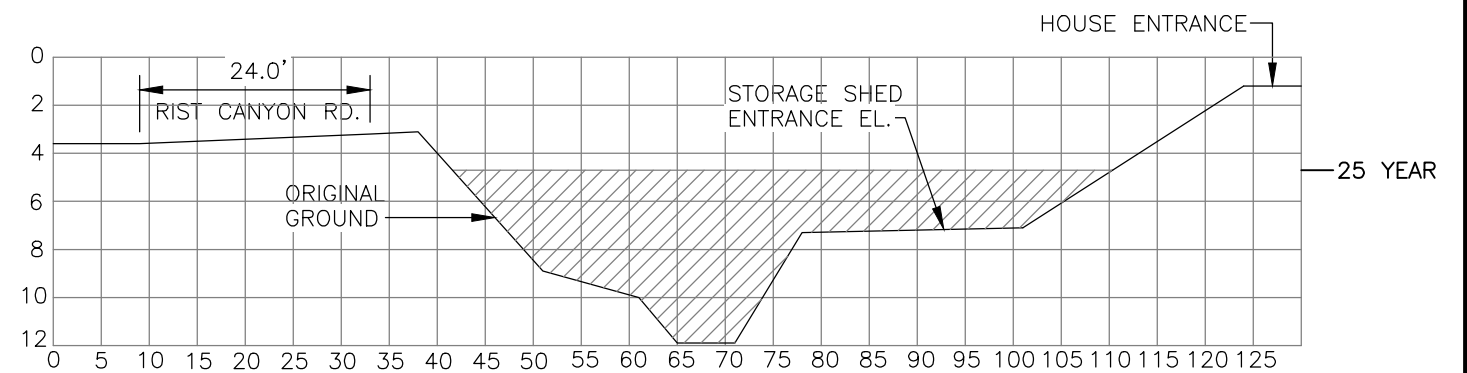


X-SEC 2+00 ALONG DAVIS RANCH ROAD
(CHANNEL DEBRIS BARRIER LOCATION)

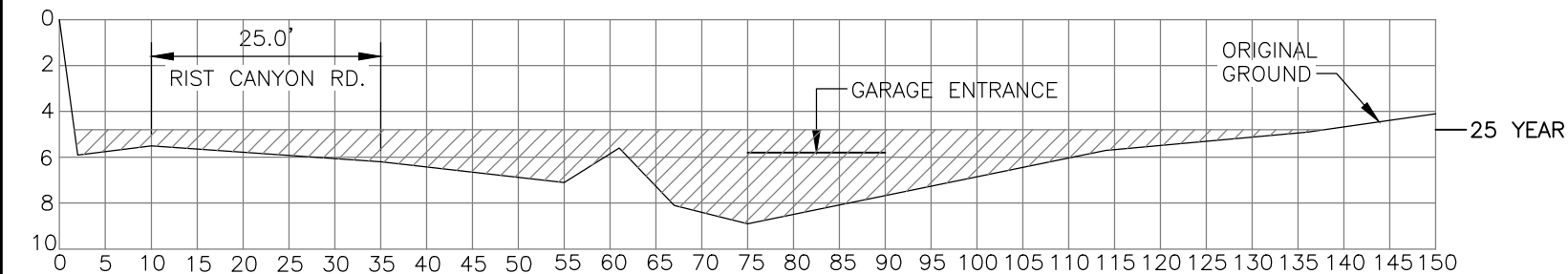


X-SEC 10+00
(10454 RIST CANYON ROAD)

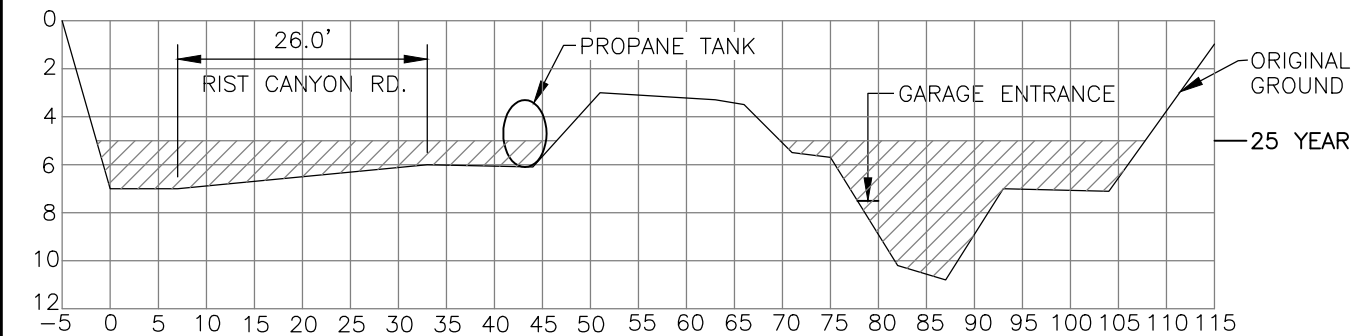
NOTE:
ESTIMATED CROSS-SECTION
DID NOT HAVE PERMISSION
TO SURVEY PROPERTY.



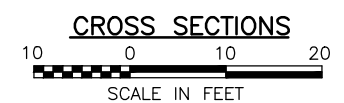
X-SEC 110+00
(8527 RIST CANYON ROAD)



X-SEC 58+00
(9469 RIST CANYON ROAD)



X-SEC 63+50
(9431 RIST CANYON ROAD)

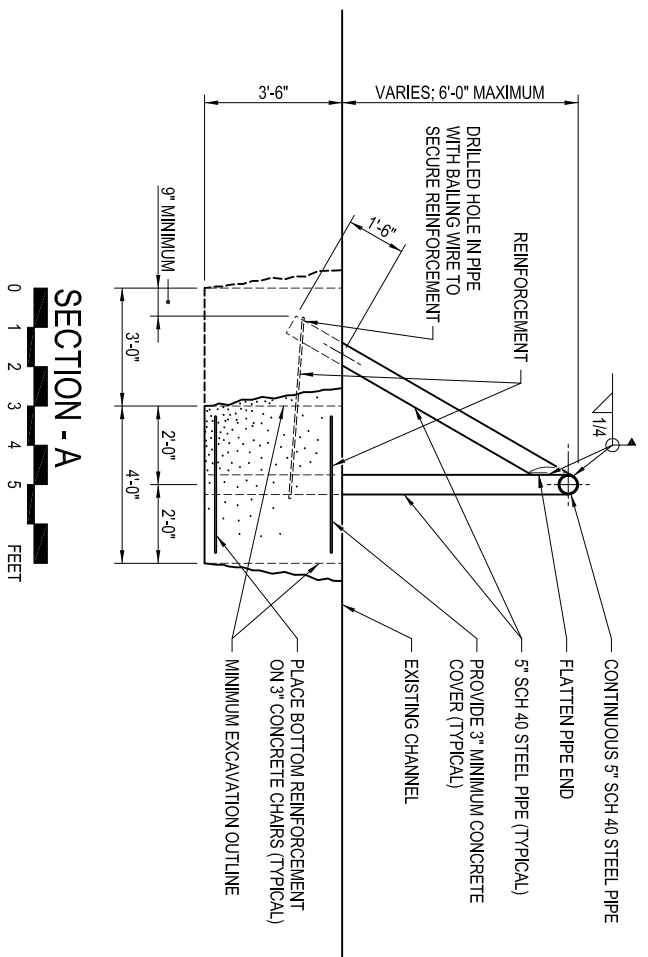


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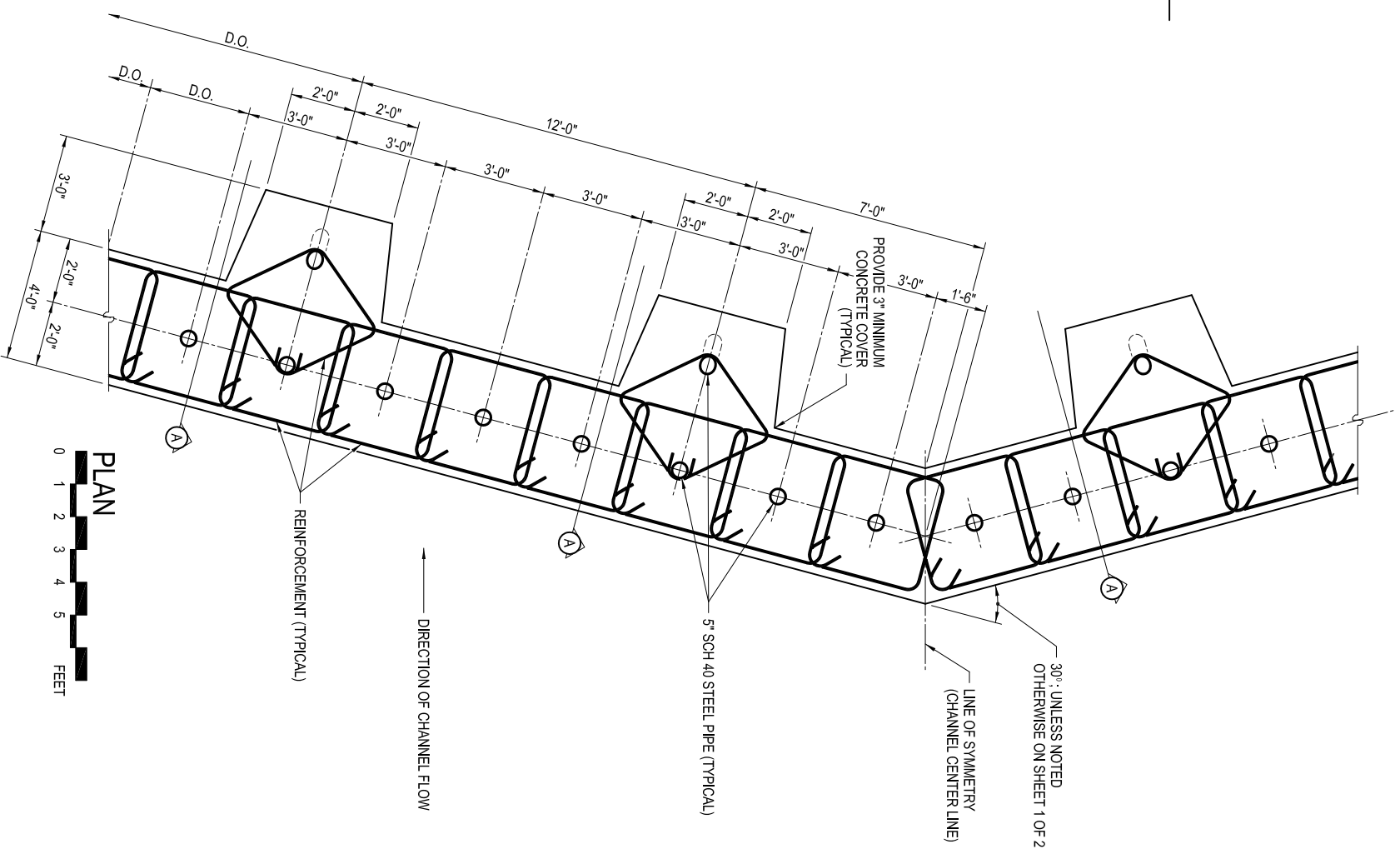
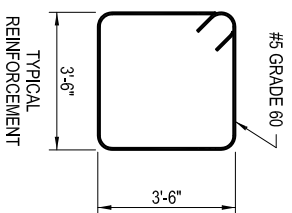
CROSS SECTIONS
RIST CANYON
HIGH PARK BURN AREA

LARIMER COUNTY
COLORADO





- NOTES
1. LENGTH AND ALIGNMENT OF STRUCTURE TO BE DETERMINED ON A SITE SPECIFIC BASIS. SEE SHEET 1 OF 2 FOR DIMENSIONS AND ELEVATIONS.
 2. IN LIEU OF 5" SCH 40 STEEL PIPE, STRUCTURAL STEEL TUBE SHAPES HAVING A SECTION MODULUS OF AT LEAST 4.5 IN⁴ MAY BE USED, OR W⁸ OR I⁸ SHAPES HAVING A SECTION MODULUS OF AT LEAST 4.9 IN⁴ MAY BE USED.
 3. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 LB/IN² AND SHALL HAVE A SLUMP BETWEEN 3 AND 5 INCHES. ALL CONCRETE SHALL BE VIBRATED, EXPOSED CONCRETE SURFACES SHALL BE COATED WITH CURING COMPOUND, OR WET CURED FOR 28 DAYS.



	Designed	Drawn	Checked	Approved	Date
	Stambaugh	Stambaugh	Marine	Andrews	AUG 2012
					AUG 2012
					AUG 2012
					AUG 2012

CHANNEL DEBRIS BARRIER

DETAILS, REINFORCEMENT, AND SECTION
6-FOOT MAXIMUM HEIGHT

