GEOTECHNICAL INPUT - EIR
North Fork American River Trail Project
Placer County, California

Prepared by:

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February 2, 2006

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Geotechnical ■ Geo-Environmental ■ Forensics ■ Construction Services

BCI File No. 767.1
February 2, 2006

Ms. Debra Bishop
EDAW Inc.
2022 J Street
Sacramento, CA 95814

Subject: **GEOTECHNICAL INPUT - EIR**
North Fork American River Trail Project
Placer County, California

Dear Ms. Bishop:

Blackburn Consulting, Inc. (BCI) prepared this Geotechnical Report as input to the project Environmental Impact Report (EIR) for the proposed North Fork American River Trail Project. We prepared this report in accordance with our proposal dated April 14, 2005, and proposal addendum dated May 19, 2005.

Thank you for selecting BCI to provide these services. Please call if you have questions or require additional information.

Sincerely;

BLACKBURN CONSULTING, INC.

Rob Pickard, P.G.
Project Geologist

Jeff Patton, P.E.
Principal

REGISTERED GEOLOGIST
RICHARD D. SOWERS
No. 1104
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Rick Sowers, P.E., C.E.G.
Senior Project Manager

Distribution: Client (3)
Placer County Parks Division, Attn: Andy Fisher (1)

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North Fork American River Trail Project
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INTRODUCTION

Purpose

This report presents our geotechnical input to the project EIR for the proposed multiple use trail along the North Fork of the American River. The purposes of this report are to 1) evaluate the feasibility of constructing a sustainable trail, and 2) provide a "screening" of geotechnical issues along the trail alignment. This report also identifies trail areas that will require specific geotechnical input during construction, and presents options to mitigate these concerns. This report is not intended to provide comprehensive recommendations for all construction conditions, and some further geotechnical study may be required for final design at selected critical locations.

We prepared this report for EDAW Inc. Do not rely on this report for different locations or improvements without the written consent of BCI.

Scope of Services

To prepare this report, BCI:

- Reviewed published geologic, topographic and soils mapping.
- Reviewed aerial photographs of the trail alignment and surrounding area.
- Discussed the project with representatives of EDAW and with Andy Fisher, Project Manager, Placer County Parks Division.
- Performed surface geologic reconnaissance along the proposed trail alignment.
- Reviewed recently constructed trails in western Placer County under similar slope/geologic conditions.
- Performed preliminary geotechnical engineering analysis in support of the recommendations contained herein.

PROJECT LOCATION AND DESCRIPTION

The proposed trail is located along the North Fork of the American River Canyon, extending upstream approximately 12.6 miles from the confluence of the North and Middle Forks of the American River to the Ponderosa Bridge. The alignment is shown in a "Trail Plan" report prepared by North Fork Associates (September, 2003, revised September, 2004). This alignment traverses moderate to steep slopes along the south side of the canyon, positioned generally 200 to 400 feet above the river.

Placer County has proposed an approximately 6 ft wide, multi-use trail, primarily for hiking, biking and equestrian uses. Where suitable, the alignment follows existing trails and roads to minimize construction impacts, including an abandoned service road that extends under the Foresthill Bridge to the North Fork Dam of Lake Clementine. An approximately 800-1000 ft segment of this service road is unconstructed and exists as a narrow (2-3 ft wide) footpath; this path will be widened by 3-4 ft to meet the proposed trail width, and may ultimately be widened to 10 ft to accommodate emergency vehicles through this area. Construction is to minimize, to the extent possible, environmental impacts and soil erosion.

Most of the slopes along the trail alignment average about 70% gradient (35°, about 1.4H:1V), or flatter. Some segments, however, traverse slopes approaching 100% gradient (45°, 1H:1V). We expect the trail will be constructed with a narrow, track-mounted "trail-builder" machine, with 4 ft wide tracks and 5 ft blade, similar to equipment used for other county trail projects. This equipment is

capable of notching through fractured rock, track-rolling the surface to a firm condition, and (by blade adjustment) constructing a narrower section (e.g., 2-3 ft wide, if hard rock precludes reasonable removal). The trail alignment crosses 35 ephemeral streams. We expect four of these crossings will require bridges, and the remaining will be constructed as low-water crossings.

GEOLOGIC SETTING

The project is located along the western slope of the Sierra Nevada Geomorphic Province. Published geologic mapping (Wagner, D.L. et al, 1981) shows the majority of the trail alignment within a mixed rock area described as a "mélange belt," comprised of intermixed Mesozoic meta-sedimentary and meta-volcanic rock, with isolated bodies of limestone. Wagner maps the northeast section of the trail (from the Ponderosa Bridge to about one mile downstream) as Mesozoic meta-volcanic flow rocks of the Logtown Ridge Formation (predominately metamorphosed breccias, flows and pyroclastic rocks) and Mesozoic meta-sedimentary rocks of the Mariposa Formation (predominately slate, meta-graywacke and meta-conglomerate).

Livingston (1974) maps the entire project area as predominately hard, fractured, metavolcanic flow rocks. This rock structure strikes generally north-northwest, with fracture/foliation planes dipping steeply northeast. Livingston maps lesser bands of northwesterly trending metavolcanic tuffs and meta-shale crossing sections of the trail alignment; these bands tend to be intensely weathered/foliated and, in general, less competent than the flow rock. Isolated limestone bodies, typically hard and massive, are also mapped within the metavolcanic flow rock.

We show the site geology, as mapped by Livingston, on Figure 2.

SOIL PROFILES

According to the United States Department of Agriculture (USDA), Soil Survey of Placer County, Western Part (July 1980), the site is underlain by the soil types described below. We show the distribution of these soils on Figure 3.

Auburn-Sobrante-Rock outcrop complex: The Auburn soil unit is a shallow, residuum soil over fractured, vertically-tilted meta-basic bedrock, with rock outcrops. Typically 4 inches of silt loam over 16 inches of silt loam subsoil. Soil permeability is moderate, with very high erosion potential. The Sobrante soil unit is moderately deep, residuum soil over fractured, vertically-tilted meta-basic bedrock, with rock outcrops. Typically 7 inches of silt loam over 26 inches of silt loam and heavy loam with gravel. Soil permeability is moderate, with very high erosion potential. Rock is erosion resistant.

Boomer-Rock outcrop complex: Shallow, residuum soil over weathered, meta-basic bedrock, with rock outcrops. Typically 10 inches of gravelly loam over 46 inches of gravelly clay loam subsoil. Soil permeability is moderately slow, with very high erosion potential. Rock is erosion resistant.

Mariposa-Josephine complex: The Mariposa part of the soil unit is a shallow, residuum soil over weathered/fractured schist and slate, with isolated rock outcrops. Typically 6 inches of gravelly loam over 22 inches of gravelly clay loam. Soil permeability is moderate, with moderate to high erosion potential. The Josephine is a deep, residuum soil over metamorphic rock, with isolated rock outcrops. Typically 11 inches of loam over 41 inches of clay loam and silty clay loam. The soil has slow permeability, with moderate to high erosion potential. Rock is erosion resistant.

Mariposa-Rock outcrop complex: Shallow, residuum soil over fractured, vertically-tilted schist and slate, with rock outcrops. Typically 6 inches of gravelly loam over 28 inches of gravelly loam subsoil. Soil cover is moderately permeable, with moderate to high erosion potential. Rock is erosion resistant.

Maymen-Rock outcrop complex: Shallow, residuum soil over hard metamorphic rock, with rock outcrops. Typically 2 inches of gravelly loam over 10 inches of gravelly loam subsoil. Soil cover is moderately permeable, with very high erosion potential. Rock is erosion resistant.

Sites-Rock outcrop complex: Shallow, residuum soil over hard, meta-sedimentary rock, with rock outcrops. Typically 16 inches of loam and clay over 50 inches of clay (weathered rock). Soil cover is moderately permeable, with moderate to high erosion potential. Rock is erosion resistant.

For most of the trail alignment, we observed the topsoil thickness to be about 12 inches or less, with the subsoil comprised of rocky residuum derived from the underlying parent rock.

FAULTING AND SEISMICITY

The site lies within the Foothills Fault System, bounded on the west by the Bear Mountains Fault Zone and on the east by the Melones Fault Zone. Portions of this system have been seismically active in historic time, however, the Fault Activity Map of California and Adjacent Areas (Jennings, 1994) does not identify any potentially active faults crossing the trail alignment. The trail does not lie within or adjacent to an Alquist–Priolo Earthquake Fault Zone (Fault Rupture Hazard Zones; Hart, 1997).

The Weimar Fault is mapped near the northeast portion of the project (Wagner, 1981, and Jennings, 1994). This fault, shown on Figure 2, is a Pre-Quaternary fault with no evidence of movement within the last 1.6 million years. Two other unnamed faults are mapped near the Weimar Fault, also shown to be Pre-Quaternary age.

GEOLOGIC HAZARDS

Ground Rupture and Shaking

Since no active faults cross the trail alignment, we do not expect ground rupture and/or fault creep to occur at the site. The site is, however, subject to ground motion resulting from seismic activity in the region. The California Geological Survey (CGS), Probabilistic Seismic Hazards Mapping Ground Motion Page (www.consrv.ca.gov) indicates that for a seismic event with a 10% probability of exceedance in 50 years, a peak horizontal ground acceleration (PGA) of approximately 0.2g, or less, could be expected.

Liquefaction

Liquefaction can occur when loose to medium dense, granular, saturated soils (generally within 50 feet of the surface) are subjected to ground shaking. The site is underlain by consolidated meta-volcanic and meta-sedimentary rocks that are not susceptible to liquefaction. Additionally, regional groundwater levels are expected to be greater than 50 feet in depth. For these reasons, the potential for damaging liquefaction to occur is considered very low.

Landsliding and Slope Stability

Our review of published geologic mapping and aerial photos shows no deep-seated, large-scale landslides along the trail alignment. Our field review noted several areas of shallow slope instability and/or erosion; these features are typically 1-3 ft thick and restricted to within the surface soils overlying the bedrock interface. We discuss specific areas of instability in more detail, below.

Volcanic Activity

Potential hazards associated with volcanic activity are believed to be low (Miller, 1989). The closest volcanic hazard is from the Mount Lassen area located more than 100 miles north of the site.

Flooding

The Federal Emergency Management Agency (FEMA), National Flood Insurance Program, Flood Insurance Rate Maps dated June 8, 1998, indicate that the site lies outside of the 100-year floodplain. We consider the potential for earthquake induced flooding to be low, although upgradient dams could pose a risk should failure occur.

Naturally Occurring Asbestos

Some of the rock outcrops adjacent to the trail alignment are mapped as containing serpentinite, a host rock for naturally occurring asbestos. Chrysotile is a common asbestos mineral in California and belongs to the serpentine mineral group and forms crystals that are naturally fibrous, usually within small veins in serpentinite. The fibrous variety of chrysotile and other silicate minerals is generally referred to as asbestiform minerals.

The rock we observed along the trail alignment is predominately hard and blocky in texture, and we did not observe fibrous (asbestiform) minerals within the rock unit. However, the potential for naturally occurring asbestos to be encountered during construction cannot be eliminated. Within areas containing serpentinite, BCI should be on-site during grading to identify potential asbestos containing rock and conduct further testing, if necessary.

Mining

Other than the historic ditches used for transporting water, we did not observe evidence of mining activity on or adjacent to the trail alignment during our site reconnaissance. The Mineral Land Classification of Placer County (Loyd, 1995) does not show any known mining activity on or adjacent to the alignment. Based on the above information, we consider the risk of ground collapse or subsidence from past mining operations to be low.

GEOTECHNICAL CONSIDERATIONS - GENERAL

Site Grading

Prior to trail construction, strip and dispose of all surficial vegetation and debris to approximately 2 ft beyond the limits of grading. We estimate this depth at approximately 2-4 inches below ground surface. These materials should not be used within fills along the trail, but may be used as topsoil over finished slopes if debris is removed.

We consider typical cut/fill construction methods acceptable for construction of a 6 ft wide bench. The inboard side will generally be cut into weathered rock; we expect low cuts (2-3 ft high) to be

stable at gradients of 0.5H:1V, with some rounding of the upper 12 inches. The cut material, distributed uniformly onto the subjacent slope, will "adjust" to the slope and settle over time, however, we expect that track-rolling of the trail surface will, in general, provide an adequately stable bench. We show a typical cut/fill bench section as "Section A" within the Appendix.

Expect trail maintenance during the first few years after construction to level outboard areas prone to settlement. Mitigate erosion by means of vegetation planting and/or mulch application. We consider these measures to be consistent with other, recently constructed county trails, within similar terrain and using similar small dozer equipment.

Where soft, compressible soils are encountered along the outside section of the trail, or where track-rolling does not provide an adequately stable bench, remove the underlying soft soil and any disturbed material to expose firm, native ground. We estimate this depth at an average of 12-24 inches, depending on soil and slope conditions. Replace these materials with granular material to at least a depth of 12 inches, moisture condition as needed, and track or wheel-roll to a firm consistency. Low (swale) areas may encounter wet ground conditions and require drainage and/or drying of soil to achieve suitable compaction. We show a typical section of this condition as "Section B" within the Appendix.

Place the sub-excavated material in disposal areas approved by BCI, such as a widened section of a stable trail section, with erosion control. We expect that "granular" material suitable for local replacement, with adequate fines for compaction and to reduce erosion potential, will be available from native materials derived from project grading.

Rock Excavation

Within the limits of trail grading, we expect most of the encountered rock will be weathered metamorphic rock, typically intensely fractured/foliated. Rock fracture and/or foliation planes generally strike northwesterly (perpendicular to the trail alignment) and dip steeply. Based on our site observations and the County's experience with similar trail projects, we expect this rock will generally break into fragments of about 6 inches in dimension, or less, with the proposed small dozer machinery.

The flagged alignment has been selected to avoid major rock outcrops. Some areas of the trail may, however, encounter hard rock outcrops requiring special excavation techniques (such as chiseling or air tools). Alternatively, modify the trail, either by realigning local segments to avoid hard rock, or by narrowing the width of the trail to reduce exceptional effort.

Naturally Occurring Asbestos

As noted above, we do not expect extensive areas of Naturally Occurring Asbestos (NOA) within the limits of proposed grading. We recommend the following measures, consistent with best management practices (BMPs), to mitigate this potential hazard:

- Regular observation of cut areas by a geologist, or engineer familiar with identification of naturally occurring rock containing asbestos and asbestiform minerals.
- Be prepared to implement a mitigation plan, in accordance with California Air Resources Board and/or Placer County Air Pollution Control District requirements, if asbestos is encountered during construction.

- Be prepared to implement a worker health and safety program in the event that naturally occurring asbestos is encountered. The plan shall be in accordance with all regulatory requirements, including OSHA, as applicable.
- Plan to place potentially asbestos containing rock identified during construction within fills, or properly dispose these materials off-site. BMPs during construction include watering for dust suppression.

Erosion Control

To mitigate potential erosion and subsequent surficial slumping, vegetate topical areas of high erosion potential (e.g., ephemeral crossings, grade dips, etc.) as soon as possible and direct surface drainage away from the top of slopes. "Round" the uppermost 2 ft (top) of new cuts and vegetate all exposed soil areas.

Provide measures to reduce concentration of runoff where the trail gradient exceeds 5%. These measures can include waterbars, lined inboard ditches, and energy dissipaters at discharge points.

GEOTECHNICAL CONSIDERATIONS - SPECIFIC

Figures 2 and 3 show the locations of nine sites (identified as "A" through "I") noted during our field review that will require specific geotechnical input by BCI during construction. We discuss each of these sites briefly, below.

Site A

This site consists of a shallow landslide located directly above the trail alignment. This slide is approximately 60 feet wide and 80 feet long, with the toe of the slide at the trail level. No signs of recent movement are visible, and we do not consider the proposed trail construction will significantly affect this feature. The trail may, however, be affected by seasonal slide debris; therefore, expect increased maintenance in this area, especially in the first few years of trail operation.

Site B

This site consists of a shallow landslide located on the west (downslope) side of the trail. This slide is approximately 15 feet wide and extends 30 to 50 feet downslope. The slide involves the surficial soil/subsoil layer. We do not expect deeper movement to develop in the future that would affect the function of the trail; however, new fill should be avoided in this area. During construction, BCI must review this area and modify the construction method and/or alignment, as necessary. Provide support along the outboard section of the trail bench, if necessary, by low wall support, such as a gabion wall, rock wall or "mechanically-stabilized earth" (MSE) wall. We include sketches of wall options in the Appendix.

Future Service Road Between A and B

Between Sites A and B, an approximately 800-1000 ft long segment of unconstructed service road exists that may ultimately be widened to 10 ft to accommodate emergency vehicles. Due to the very steep, rocky slopes in this area, additional widening beyond the 6 ft trail width will require supplemental study. In general, these slopes are too steep (1.5H:1V, or steeper) to support new embankment fill. A full bench cut section may be feasible, although may encounter areas of hard rock

and produce cuts exceeding 20 ft in height. We estimate that a combination of low wall support, possibly along both the inboard and outboard sections, could provide the most appropriate road support. Gabion or MSE wall types may be suitable for this area, pending further studies.

Site C

This site consists of a shallow landslide located on the west (downslope) side of the trail. The slide is approximately 20 feet wide and extends 30 to 50 feet downslope. The slide involves the surficial soil/subsoil layer. Treat this site during construction similar to Site B.

Site D

This site is a washout area along the present trail alignment. A gully approximately 3 feet wide and 3 feet deep has formed along the outside section for a distance of approximately 50 feet. Erosion control measures are required in this area. These might include waterbars to reduce concentrated runoff, lined inboard ditch, fabric matting, or low dikes of rock or sand bags.

Site E

This site is the location of a shallow landslide approximately 20 feet wide 15 feet long, positioned just above the flagged trail alignment along the historic ditch area. New cuts in this area may de-stabilize the slide; therefore, use a low wall to support the outboard bench section. We consider the options presented in the Appendix (gabion wall, rock wall or MSE wall) as viable alternatives.

Site F

This site is a shallow landslide approximately 25 feet wide and 40 feet long. The scarp is located just upslope of the flagged trail alignment that parallels the historic ditch at this location. The head scarp is 8 to 18 inches high, and the ditch section shows approximately 4 to 6 inches of downward movement. We consider options such as a gabion wall, rock wall or "mechanically-stabilized earth" (MSE) wall as viable support alternatives. We include sketches of these options in the Appendix.

Site G

This site is the location of a minor rockfall along an old cut area. Loose boulders, 2-5 ft in dimension, are distributed across the proposed trail alignment. This area will require re-grading to provide a stable slope. The larger boulders may be used to support portions of the trail through the unstable zone, or as slope buttressing, with geotechnical input by BCI during construction. This area might be avoided if the trail can be re-routed downslope.

Site H

This site crosses near the head of a recent landslide approximately 60 ft in length and width. The headscarp is approximately 8 ft high. New fill in this area will surcharge the slide area and should be avoided. We recommend the trail be routed around the headscarp (upslope), and/or gabions used to provide a free-draining wall section. Use of rock from other sections of the trail (e.g., Site G) can be considered for use as a rock fill/buttress, but will require specific construction input by BCI.

Site I

This site consists of a 500-700 ft segment of native, loose, gravelly soil "perched" on a relatively steep slope. Little support is available for cast-over fill. We recommend either a full bench section or a line

of gabions to support the outboard trail. A slightly narrower trail (say, 2-3 ft) in this area may reduce the total cut and provide adequate service.

Bridge Crossings

Four bridge crossings are proposed along the trail alignment, at locations shown on Figures 2 and 3. Each of these locations cross ephemeral drainages with relatively steep banks. Metamorphic rock is exposed at each site. We expect the structures to consist of 10-25 ft long, single-span, timber-stringer bridges, supported on timber or concrete sill abutments.

We expect the bridge abutments to follow typical design procedures of the U.S. Forest Service and/or California Department of Parks and Recreation. BCI should review the designs with respect to foundation support at each bridge location and, if necessary, provide field review during construction to verify adequate bearing and stability. Excavations exposing highly fractured rock, or rock dipping out-of-slope, are examples of conditions that may require supplemental measures (e.g., additional excavation, dowels into rock, etc.).

LIMITATIONS

BCI performed services in accordance with generally accepted geotechnical engineering principles and practices currently used in this area. We do not warranty our services.

BCI based this report on the current site conditions. Since slope conditions can change over the course of each winter, BCI must review the site-specific locations identified in this report prior to construction and modify the conclusions herein, as necessary. The stabilization measures discussed in this report are based on our preliminary review of the alignment as field-staked; these measures may require further, design-level, geotechnical study prior to construction, depending on the final alignment and other trail details.

Modern design and construction are complex, with many regulatory sources/restrictions, involved parties, construction alternatives, etc. It is common to experience changes and delays. The owner should set aside a reasonable contingency fund based on complexities and cost estimates to cover changes and delays.

APPENDIX

Schematic Sections

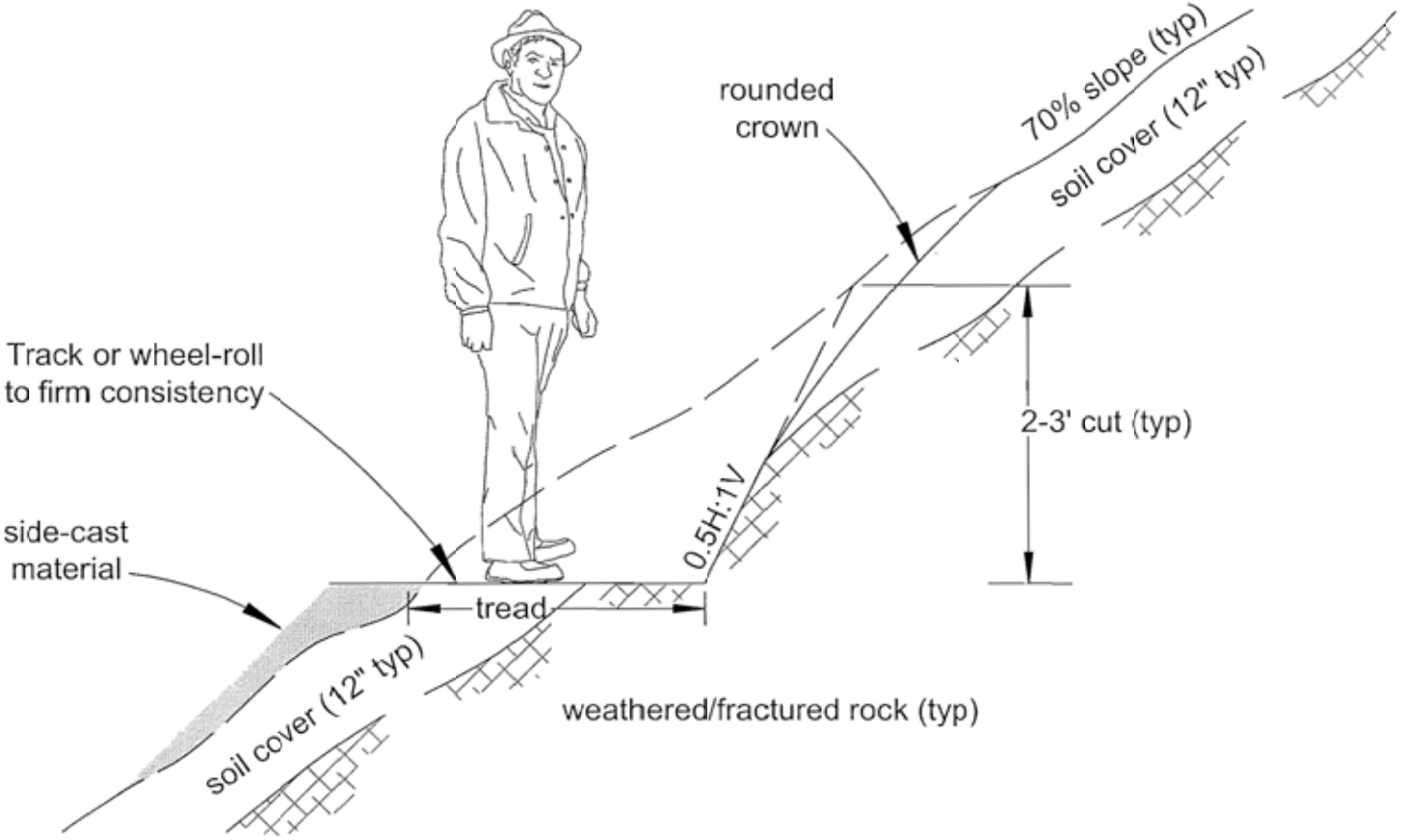
Section A: Cut/Fill

Section B: Cut/Fill with Limited Replacement

Section C: Gabion Wall

Section D: Rock Wall

Section E: MSE Wall



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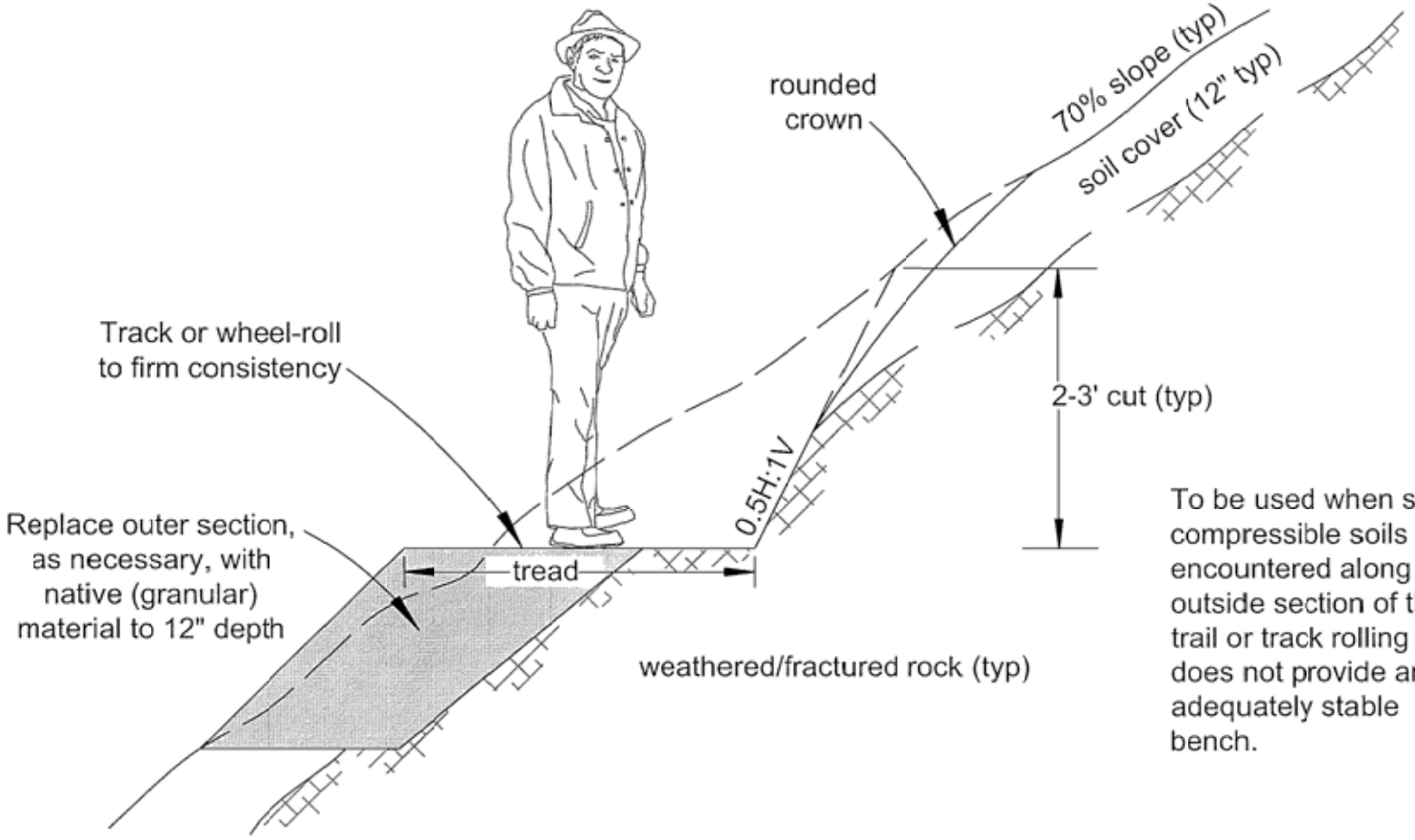
Typical Schematic Section

North Fork American River Trail

File No. 767.1

July 2006

Section A



To be used when soft compressible soils are encountered along the outside section of the trail or track rolling does not provide an adequately stable bench.

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Schematic Section - Cut/Fill with Limited Replacement
North Fork American River Trail

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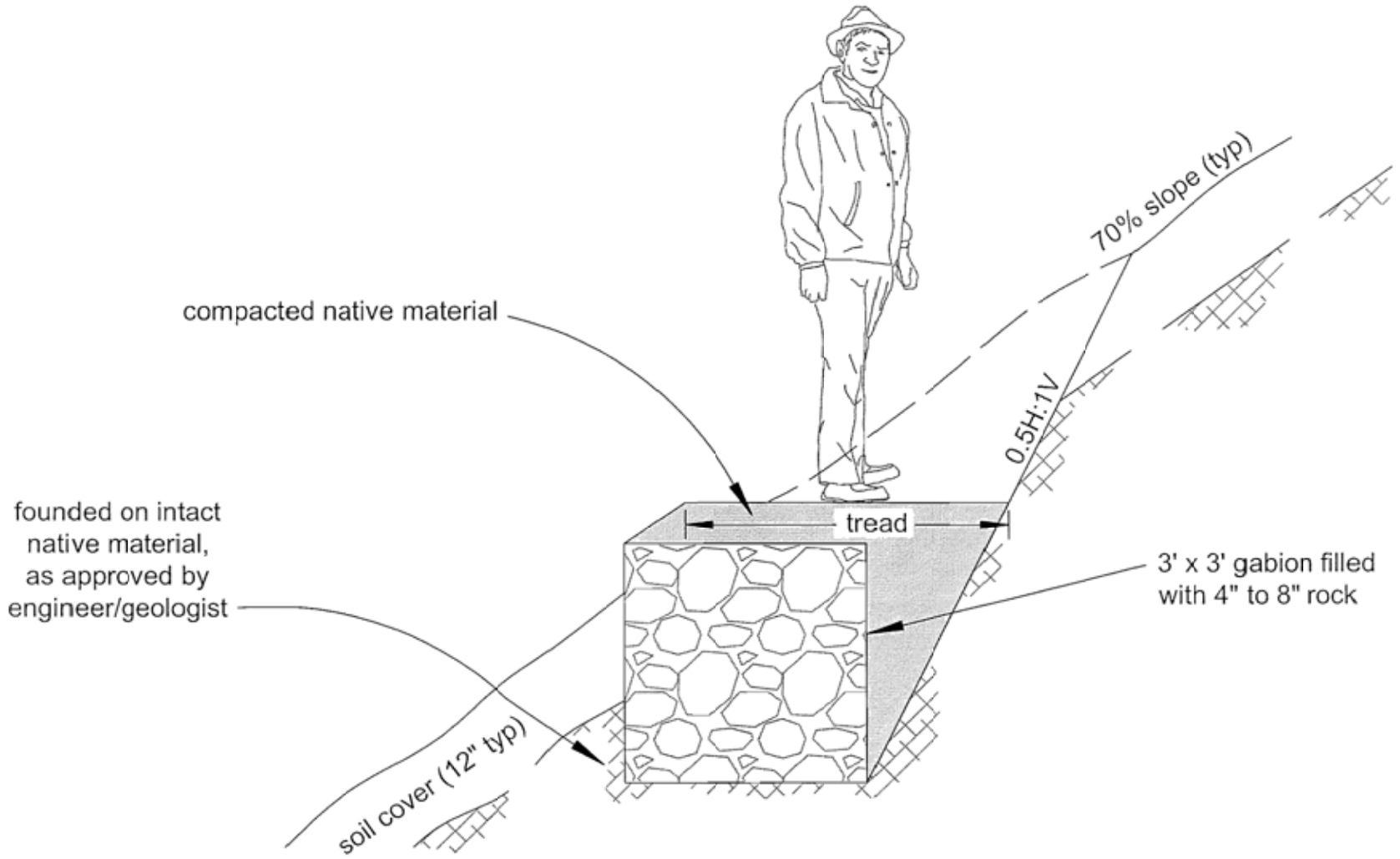
July 2006

Section B



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Schematic Section - Gabion Wall
North Fork American River Trail

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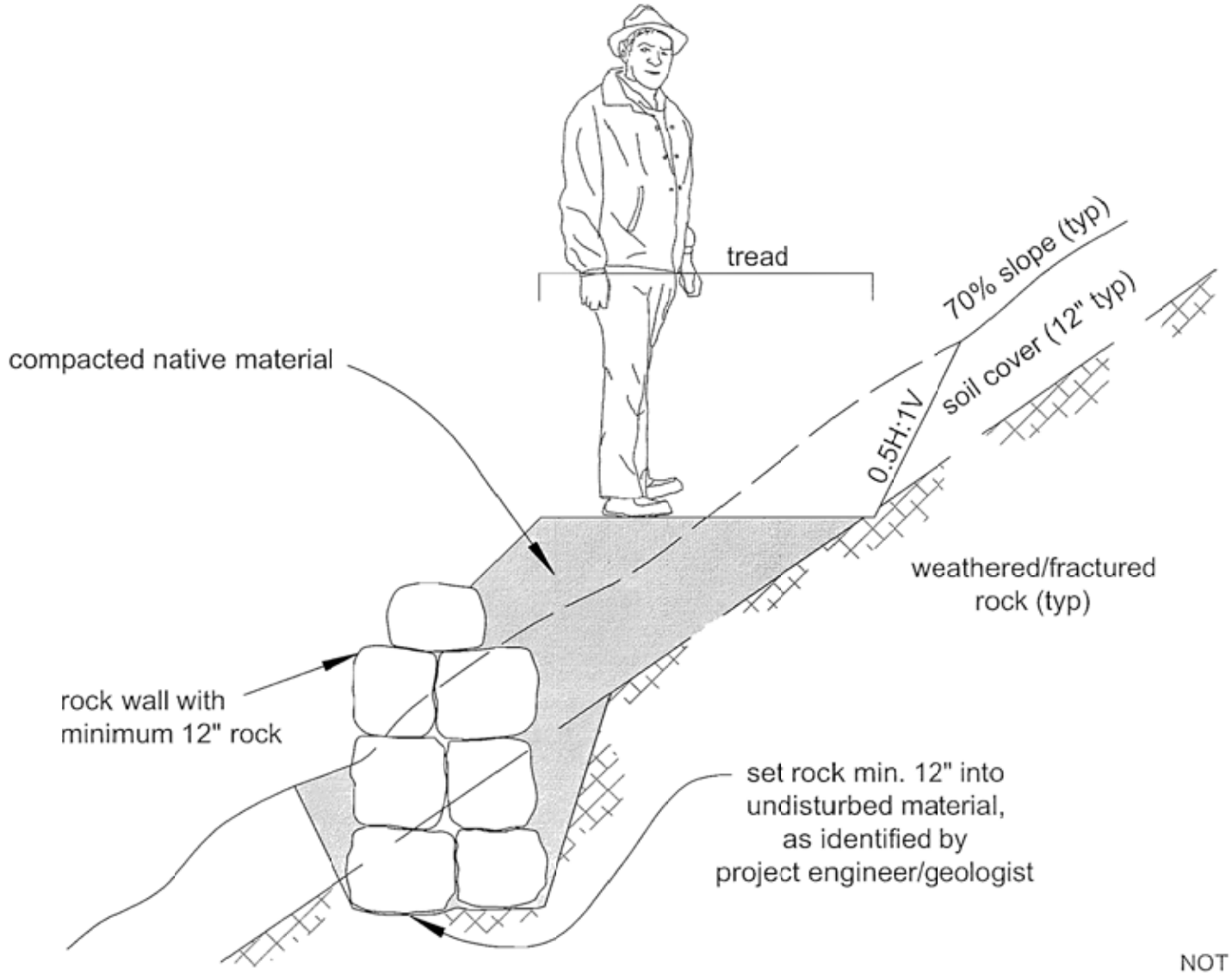
July 2006

Section C



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Schematic Section - Rock Wall

North Fork American River Trail

File No. 767.1

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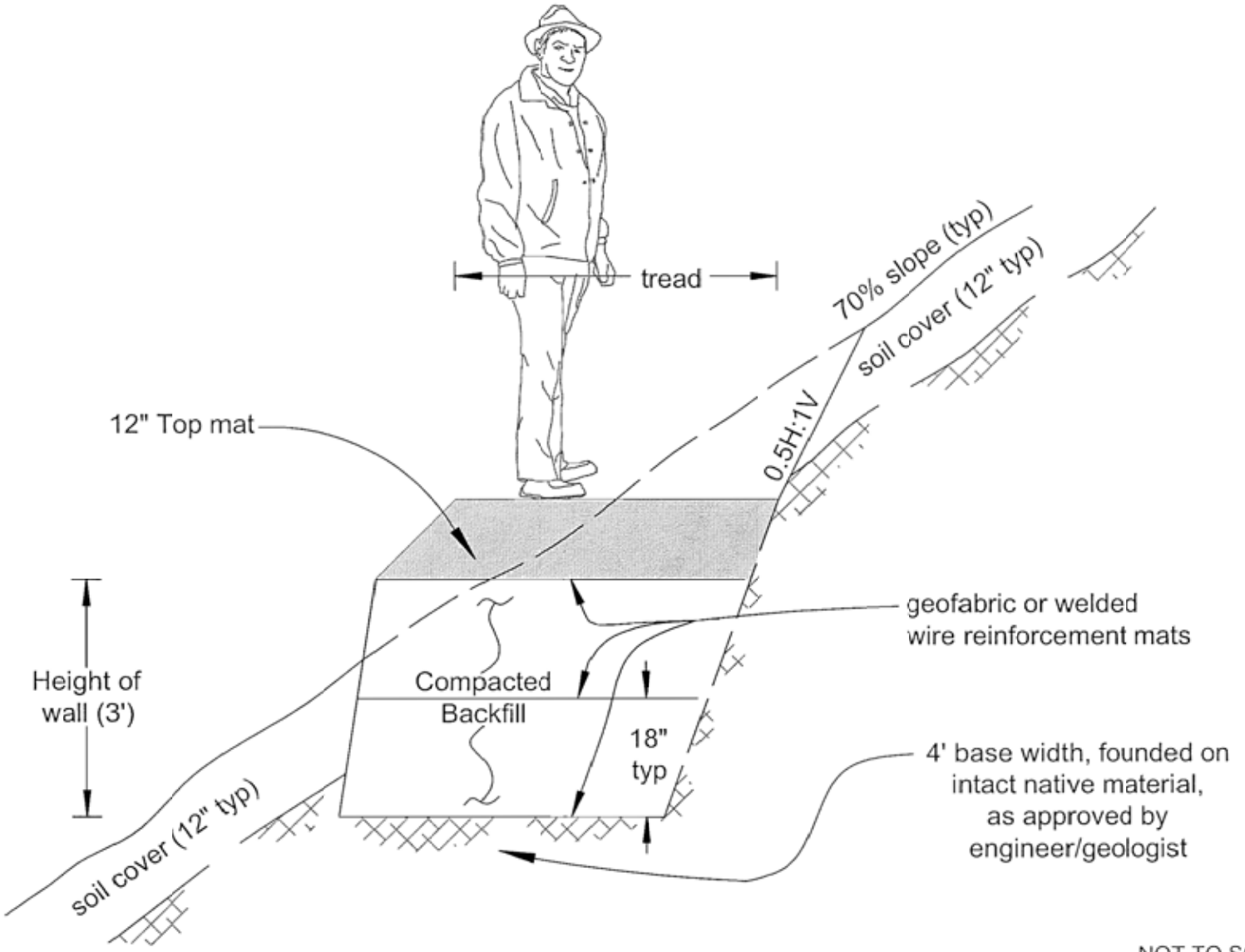
Section D



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Schematic Section - MSE Wall
North Fork American River Trail

File No. 767.1

July 2006

Section E

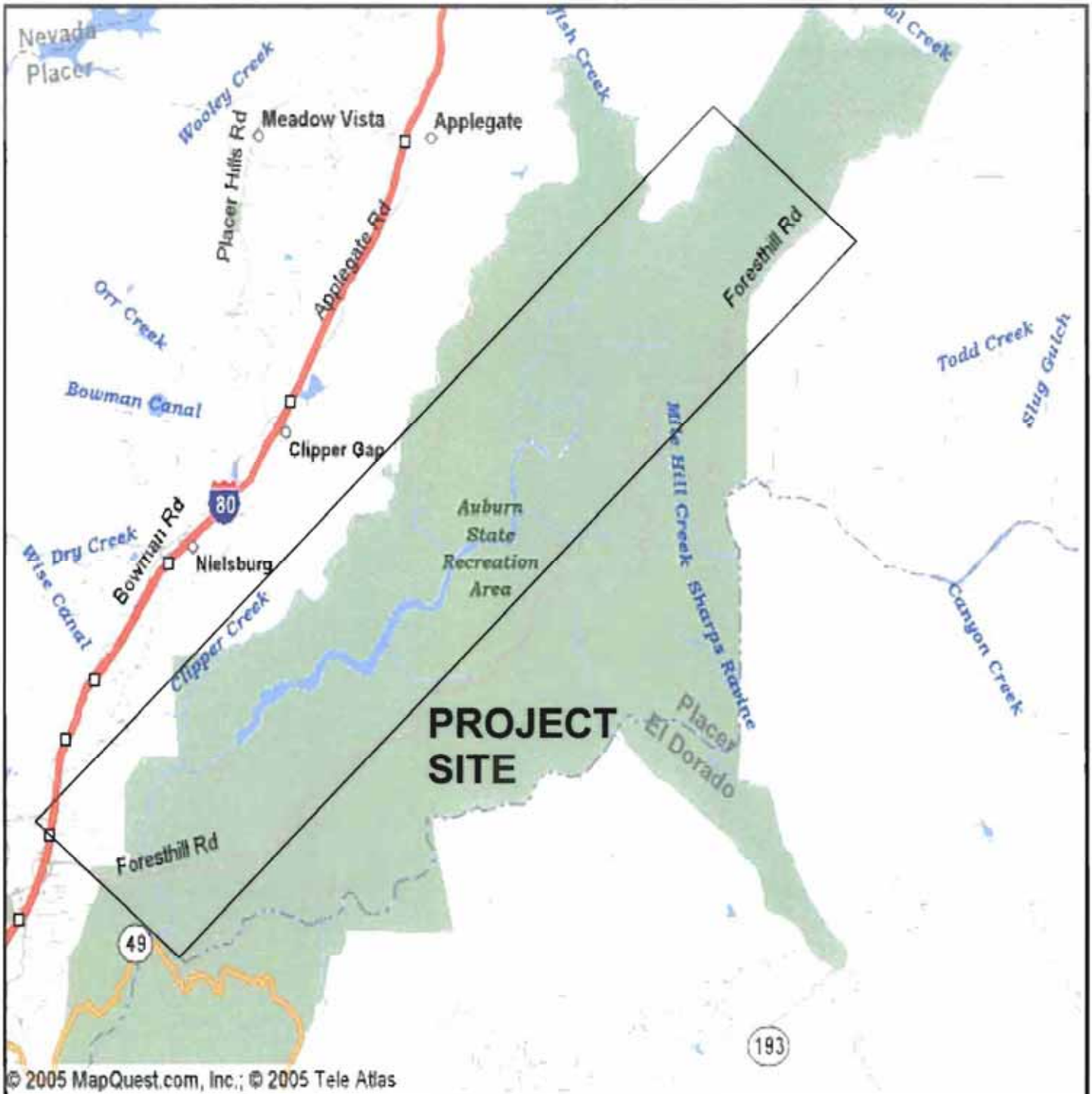
FIGURE

Figure 1 – Vicinity Map

Figure 2 – Geologic Map (2 Pages)

Figure 3 – Soils Map (2 Pages)

Soil Legend



Not to Scale

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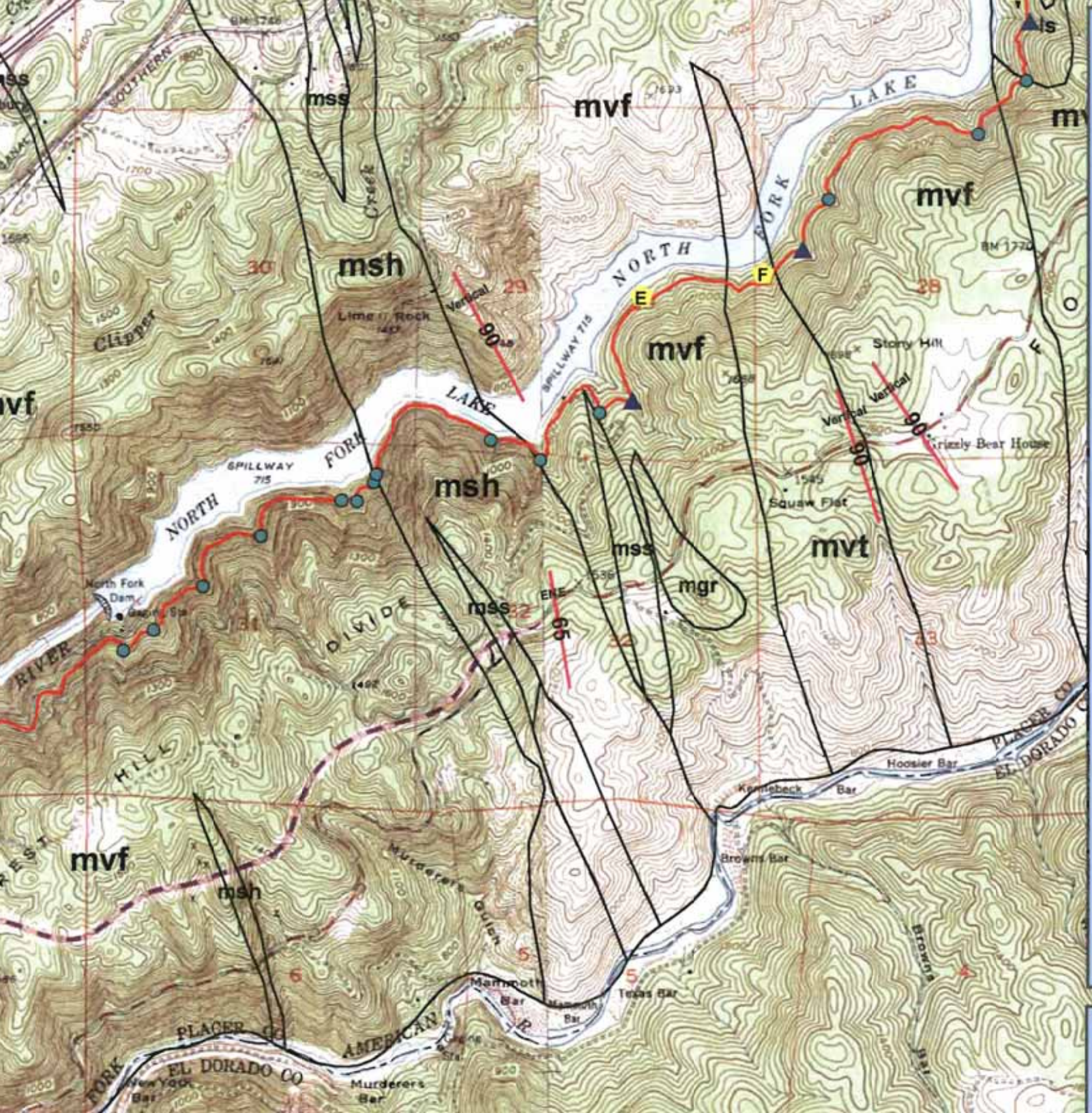
VICINITY MAP

North Fork Trail
Placer County, CA

Job: 767.1

Date: Feb. 2006

Figure: 1



Trail

Proposed Bridge Crossing

Proposed Low Water Cree

Areas Needing Special Att

Lithologic Contact

Fault Contact

Foliation 70 ENE Di

SCg	Stream Channel D
mvf	Meta-volcanic F intensely fracture
mvt	Meta-volcanic Tuf intensely weather
mss	Meta-sandstone. bedded, coarse g
msh	Meta-shale. Brit evenly bedded. I
ls	Limestone. C resistant to weath
sp	Serpentine. Ve intensely fracture

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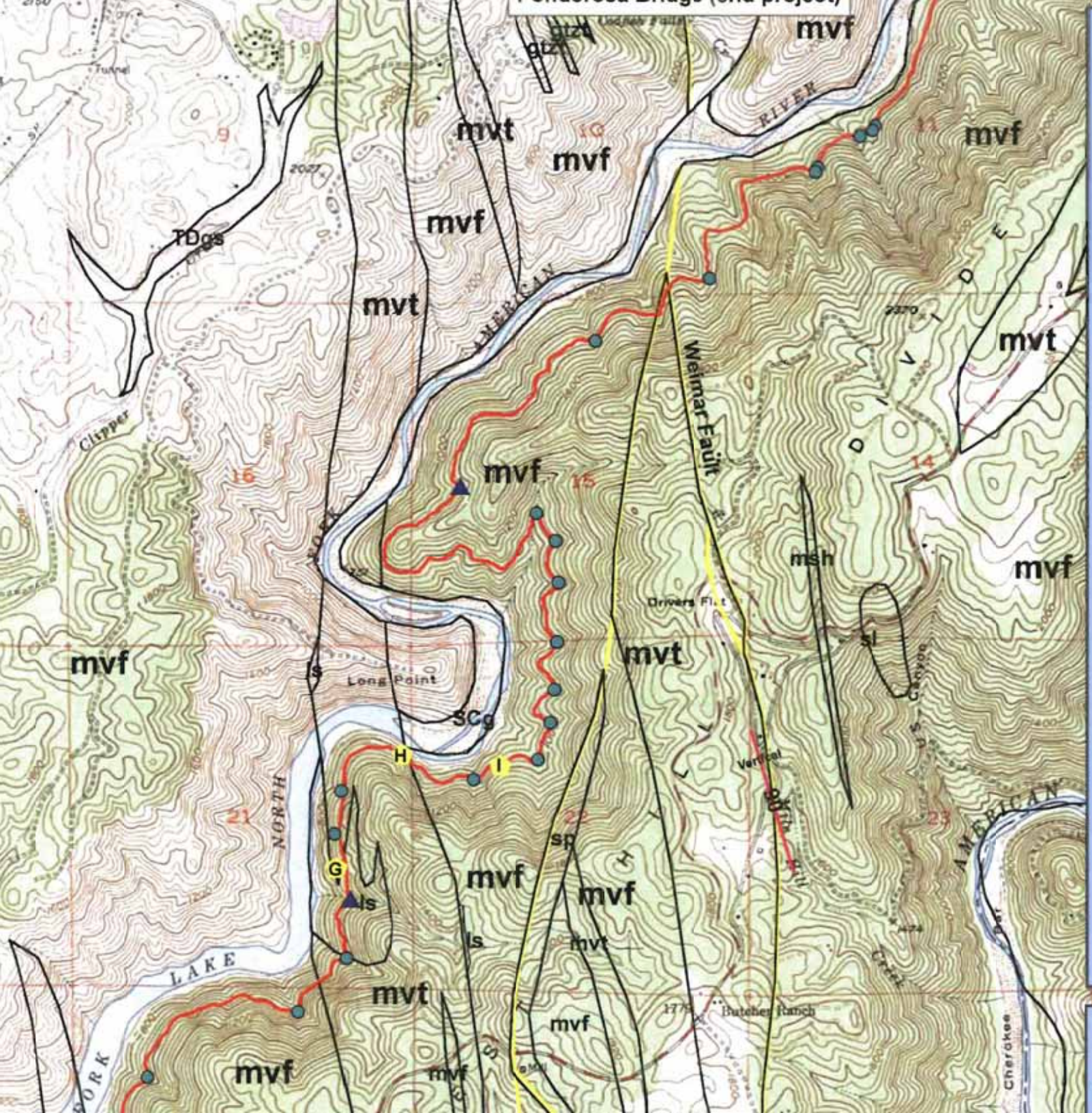

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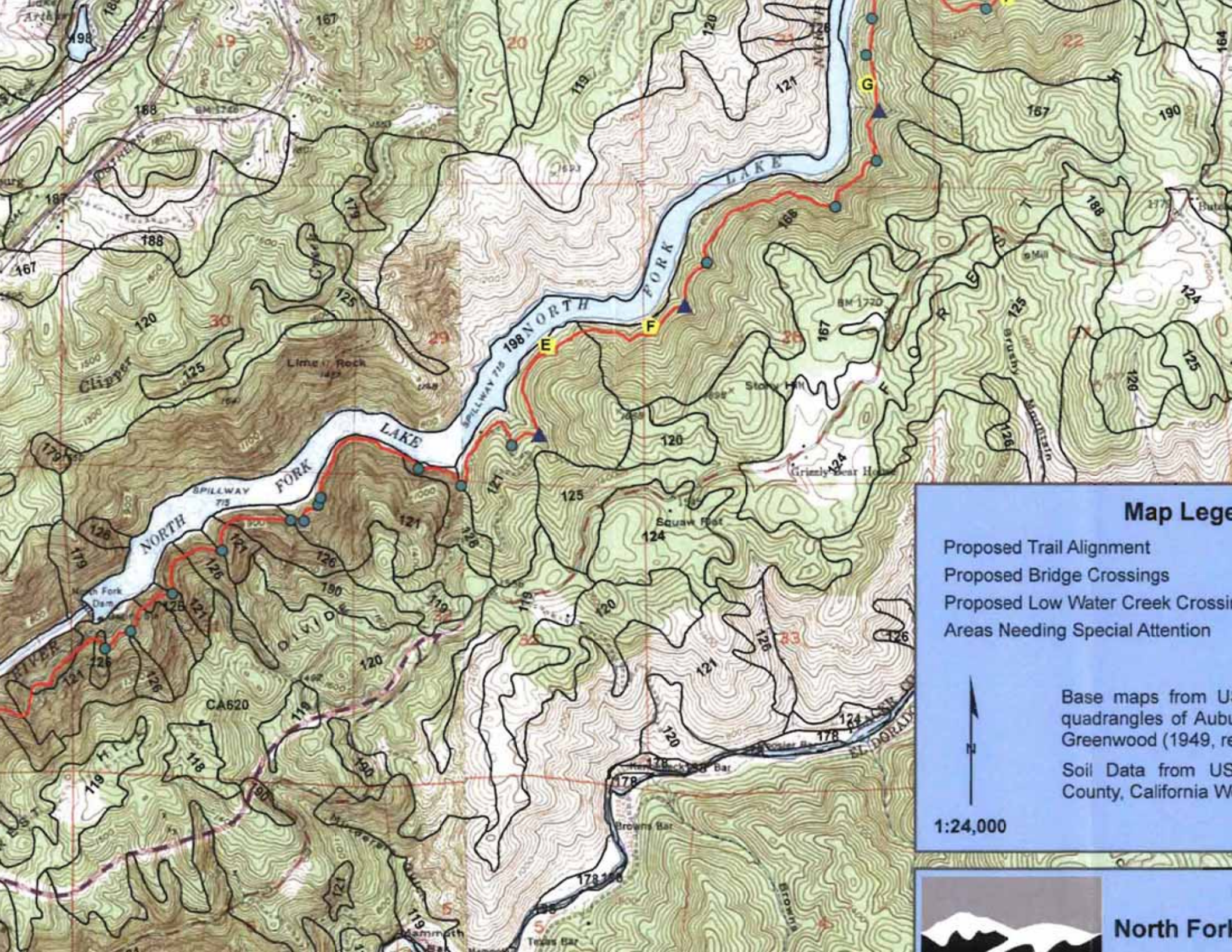
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Limerock
Clipper
Grizzly Bear Hollow
Squaw Flat
Browns Bar
Texas Bar
CA620
DIVIDE
RIVER
Map Lege
Proposed Trail Alignment
Proposed Bridge Crossings
Proposed Low Water Creek Crossi
Areas Needing Special Attention
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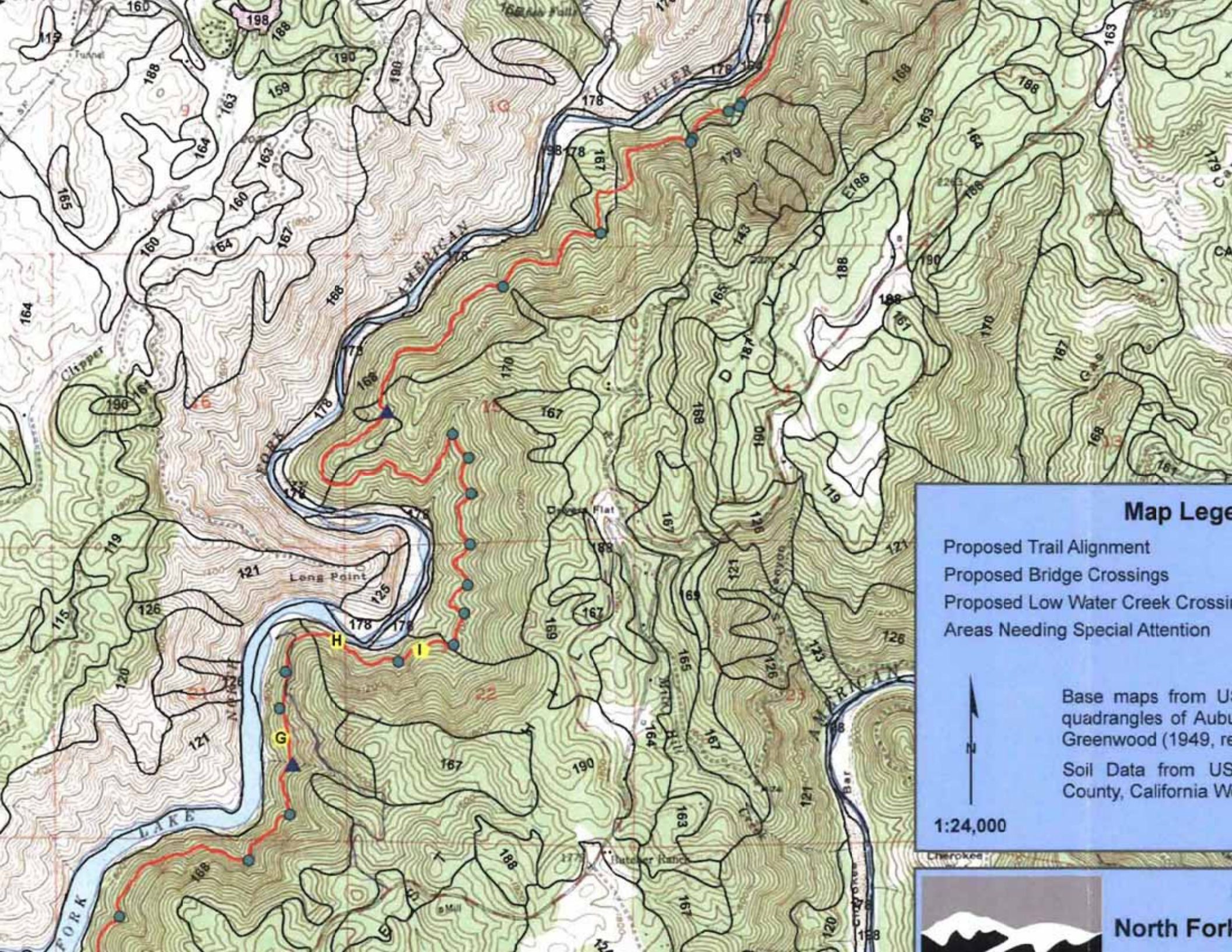
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Figure 3 Legend for USDA Soil Types Along the North Fork Trail Alignment		
Soil Type	Soil Name	Description
121	Auburn-Sobrante-Rock outcrop complex	Shallow to moderately deep, residuum soil over fractured, vertically-tilted meta-basic bedrock, with rock outcrops. The Auburn typically is 4 inches of silt loam over 20 inches of silt loam subsoil, and the Sobrante is 7 inches of of silt loam over 26 inches of silt loam and heavy loam with gravel. Soil permeability is moderate, with very high erosion potential. Rock is erosion resistant.
126	Boomer-Rock outcrop complex	Shallow, residuum soil over weathered, meta-basic bedrock, with rock outcrops. Typically 10 inches of gravelly loam over 46 inches of gravelly clay loam subsoil. Soil permeability is moderately slow, with very high erosion potential. Rock is erosion resistant.
164	Mariposa-Josephine complex	Shallow to deep, residuum soil over weathered/fractured schist and slate, with isolated rock outcrops. The Mariposa is typically 6 inches of gravelly loam over 22 inches of gravelly clay loam and the Josephine is 11 inches of loam over 41 inches of clay loam and silty clay loam. Soil permeability is moderate to moderately slow, with moderate to high erosion potential. Rock is erosion resistant.
167, 168	Mariposa-Rock outcrop complex	Shallow, residuum soil over fractured, vertically-tilted schist and slate, with rock outcrops. Typically 6 inches of gravelly loam over 28 inches of gravelly loam subsoil Soil cover is moderately permeability, with moderate to high erosion potential. Rock is erosion resistant.
170	Maymen-Rock outcrop complex	Shallow, residuum soil over hard metamorphic rock, with rock outcrops. Typically 2 inches of gravelly loam over 10 inches of gravelly loam subsoil. Soil cover is moderately permeability, with very high erosion potential. Rock is erosion resistant.
179	Rock Outcrop	Exposed, highly resistant metomorphic rock, andesitic rock, serpentine rock, or syenite rock. Outcrops on steep to very steep slopes. Surface runoff is very rapid with little or no hazard of erosion.
190	Sites-Rock outcrop complex	Shallow, residuum soil over hard, meta-sedimentary rock, with rock outcrops. Typically 16 inches of loam and clay over 50 inches of clay (weathered rock). Soil cover is moderately permeability, with moderate to high erosion potential. Rock is erosion resistant.

Auburn Office:
11521 Blocker Drive, Suite 110 • Auburn, CA 95603
(530) 887-1494 • Fax (530) 887-1495

blackburn consulting

Modesto Office (209) 522-6273
West Sacramento Office (916) 375-8706

Geotechnical • Construction Services • Forensics

BCI File No. 767.1
June 11, 2007

Ms. Debra Bishop
EDAW Inc.
2022 J Street
Sacramento, CA 95814

Subject: ***Addendum to Geotechnical Report***
North Fork American River Trail Project
Placer County, California

Dear Ms. Bishop:

We completed a field review for a realigned section of the North Fork American River Trail, and present this letter as an addendum to our report dated February 2, 2006. Our work included a review of topographic mapping and aerial photos, and site reconnaissance on May 24, 2007, with Mr. Greg Wells of North Fork Associates.

Two trail sections have been realigned and one section added to avoid private property and improve trail access. These sections are as follows:

1. An approximately 11,600 foot segment, starting at the upstream end of Lake Clementine and climbing the canyon to join the Foresthill Divide Trail prior to Upper Lake Clementine Road, then following the terrain contour for approximately 5500 feet before descending to the previous trail alignment.
2. An approximately 1000 foot segment, north of Long Point, traversing an east-west trending ridge
3. An approximately 5100 foot segment north of the confluence, climbing the east side of the canyon and crossing under the Foresthill Bridge to a new staging area on the north side of Foresthill Road.

We show each of these segments on the Modified Geologic Maps and Modified Soils Maps, attached.

Each of these segments cross steep terrain with scattered rock outcrops. We did not observe areas of specific geotechnical concern, such as landsliding, naturally occurring asbestos, or severe erosion.

Please call if you have any questions or require additional information.

Sincerely;

BLACKBURN CONSULTING

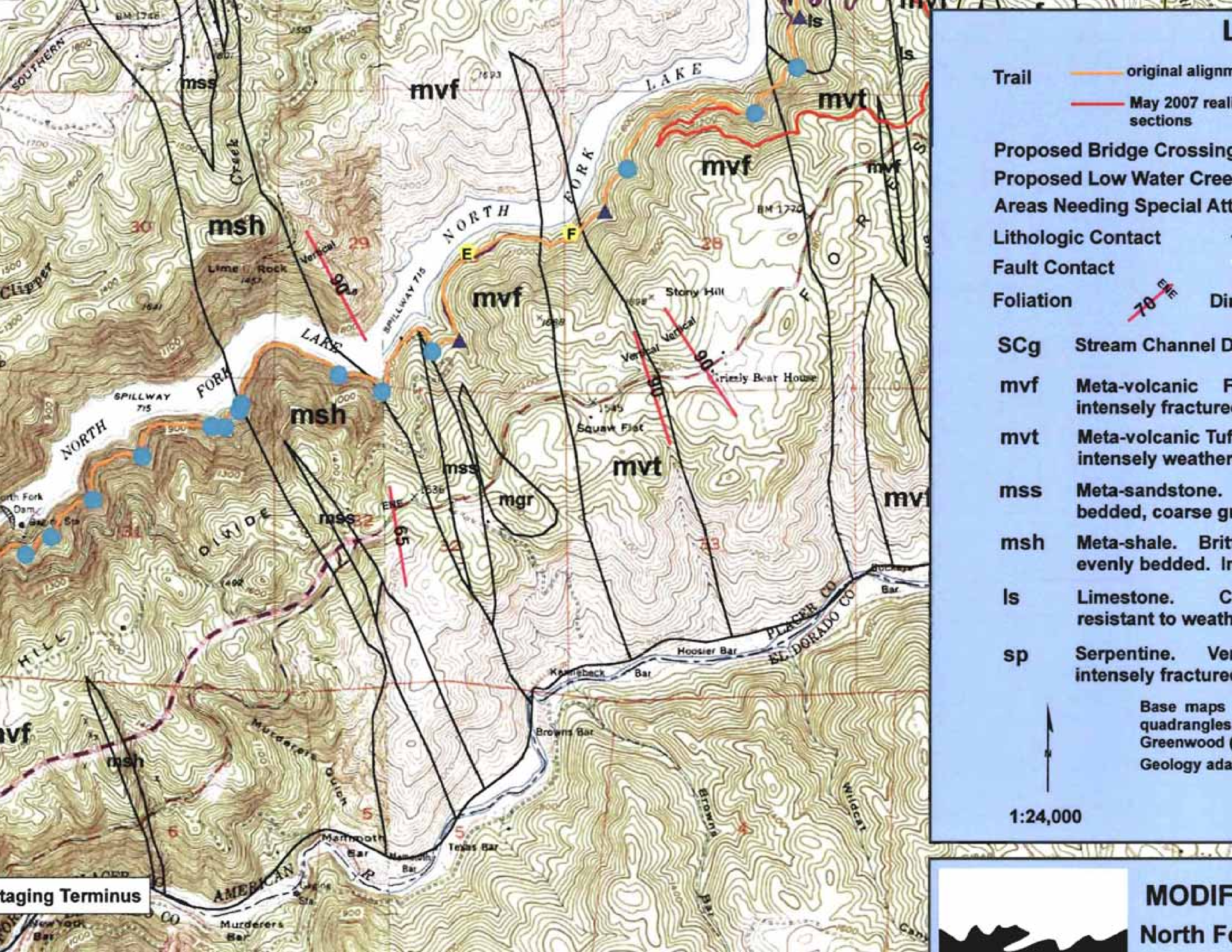
Rob Pickard, P.G.
Project Geologist

Reviewed by:

Rick Sowers, P.E., C.E.G.
Senior Project Manager

Attachment: Figure 2 - Modified Geologic Map (2 pages)
Figure 3 - Modified Soils Map (2 pages)

Cc: Andy Fisher, Placer County Parks Division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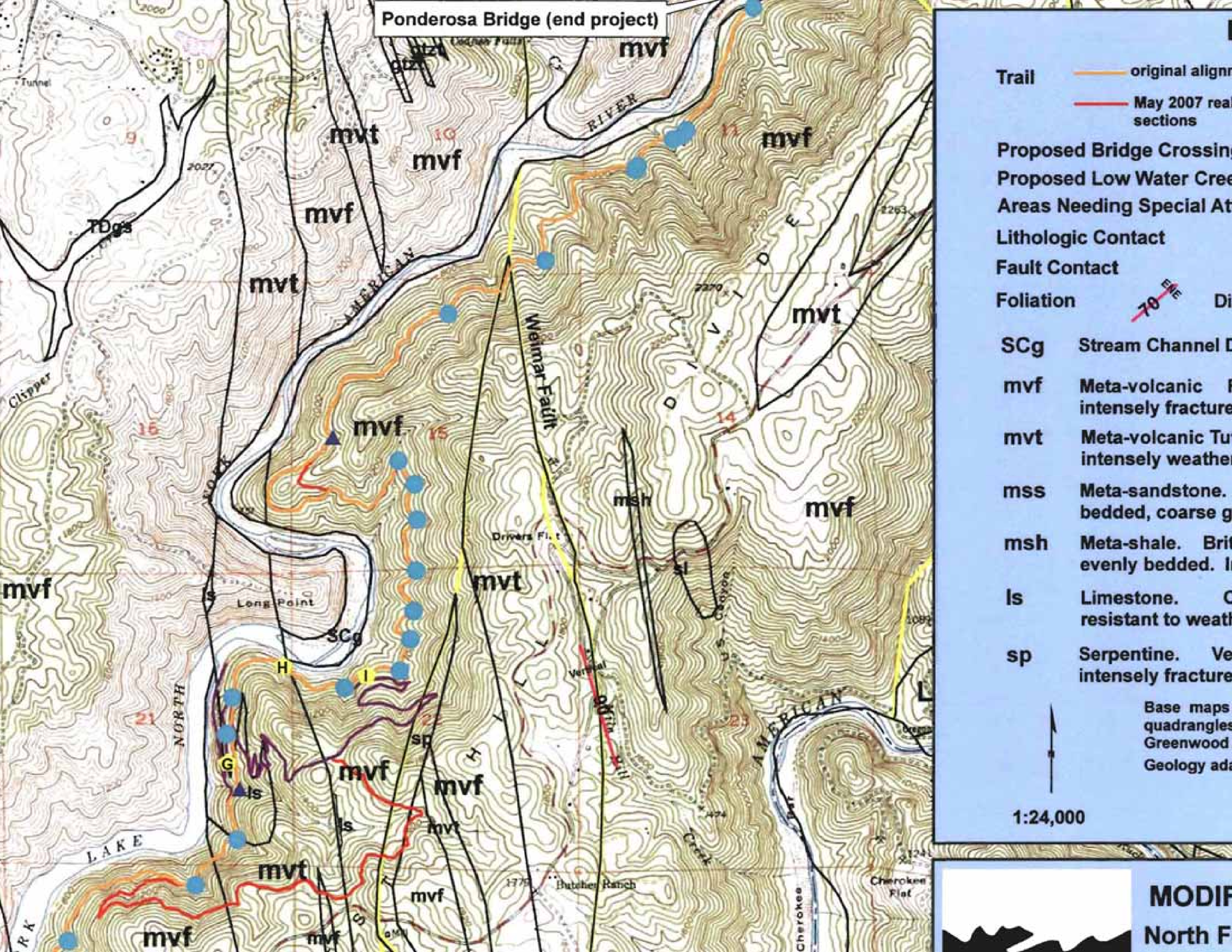

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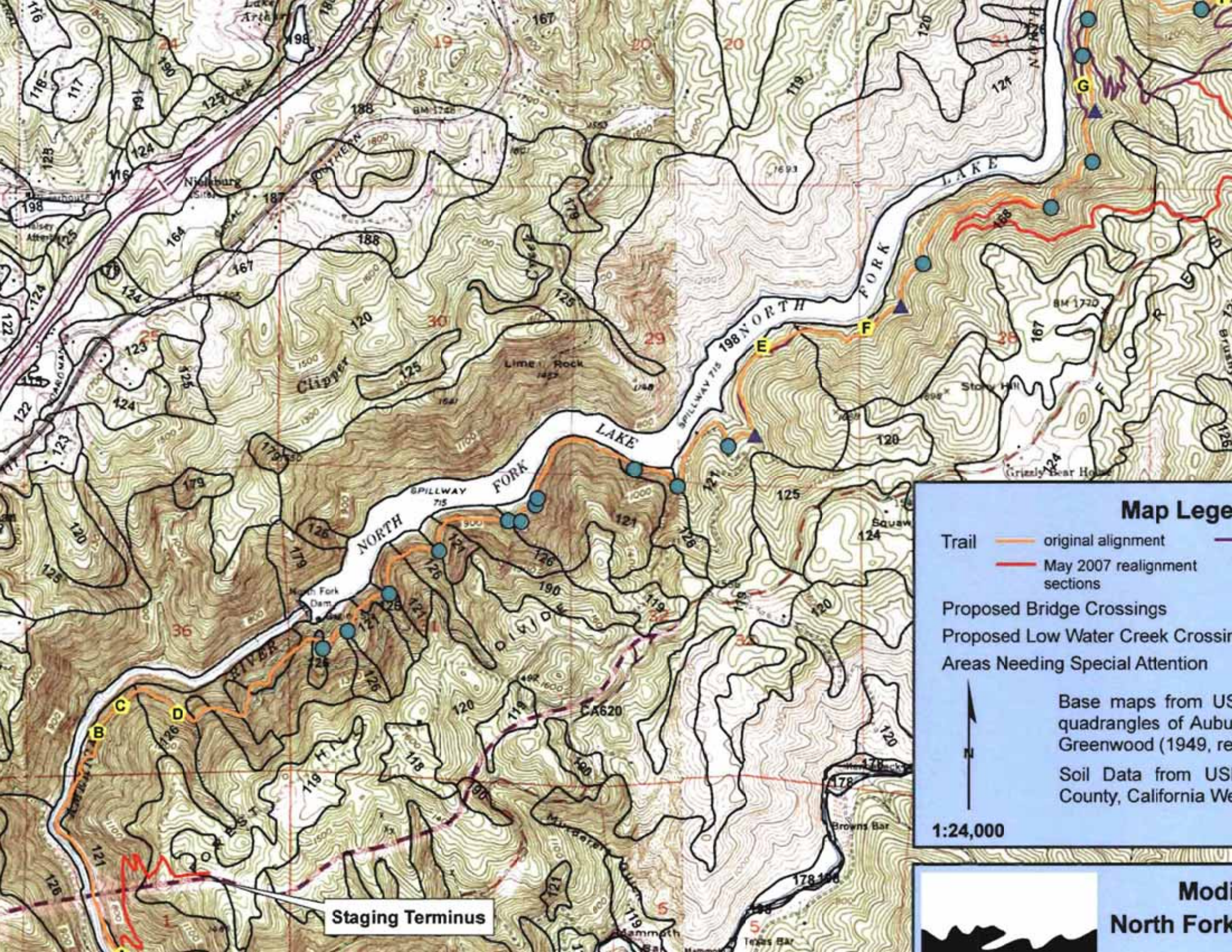
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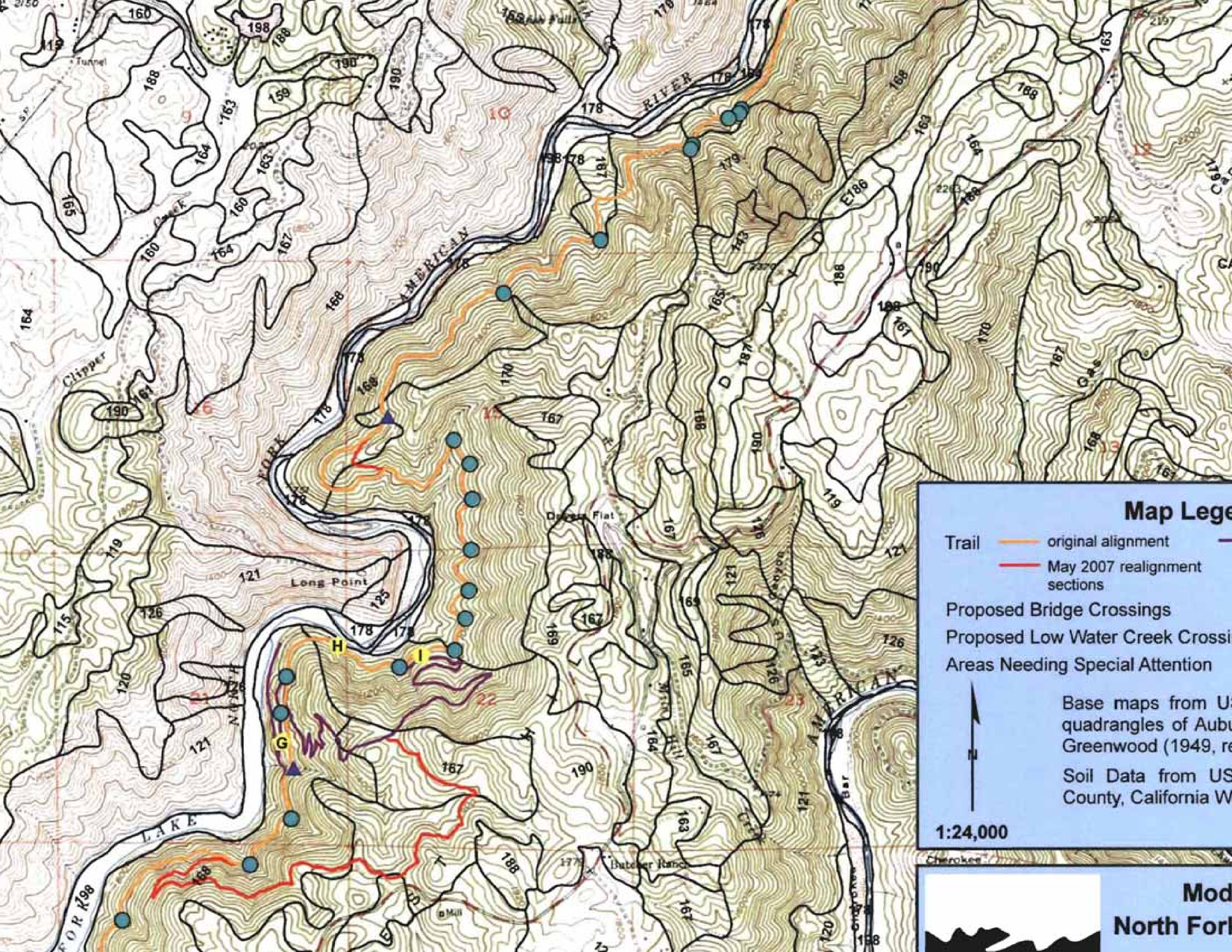

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