TRANSPORTATION
SYSTEM MANAGEMENT
PLAN

El Dorado Project
FERC Project No. 184

El Dorado Irrigation District

Updated October 2017
<table>
<thead>
<tr>
<th>Page(s)</th>
<th>Description</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-11</td>
<td>Updated Tables 2-2, 2-3, and 2-4</td>
<td>10/10/12</td>
</tr>
<tr>
<td>2-12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appendix B</td>
<td>Updated Five-Year Road Maintenance and Reconstruction Plan</td>
<td>10/10/12</td>
</tr>
<tr>
<td>Appendix B</td>
<td>Updated Five-Year Road Maintenance and Reconstruction Plan</td>
<td>10/16/17</td>
</tr>
<tr>
<td>Appendix C</td>
<td>Updated documentation of consultation</td>
<td>10/16/17</td>
</tr>
</tbody>
</table>
TRANSPORTATION SYSTEM MANAGEMENT PLAN  
El Dorado Irrigation District  
FERC Project No. 184  

Table of Contents  

1.0 Introduction
   1.1 Purpose and Implementation of the Transportation System Management Plan, the Cooperative Road Maintenance Agreement, and the Five-Year Capital Improvement and Road Maintenance Plan ........................................... 1-1
   1.2 United States Forest Service and other Agency Consultation ........................................... 1-2
       1.2.1 Eldorado National Forest ........................................................................ 1-2
       1.2.2 Lake Tahoe Basin Management Unit ...................................................... 1-2
   1.3 Introduction to the Transportation System Management Plan ............................................. 1-3
       1.3.1 Use of Geographic Information Systems (GIS) and Global Positioning Systems (GPS) ............................................. 1-4

2.0 Project Roads, Traffic Safety Signs and Access Sites
   2.1 Forest Service Road Management Terms, Conditions, and Requirements ....................... 2-1
       2.1.1 Forest Service Special Use Authorization(s) Needed for the El Dorado Project ................................................. 2-9
           2.1.1.1 Background .................................................................................. 2-9
           2.1.1.2 Forest Service Special Use Definitions ........................................ 2-10
           2.1.1.3 Special Use Authorizations of the El Dorado Project (FERC Project No.184) ................................................. 2-11
           2.1.1.4 FERC Authorized Road Use versus Forest Service Authorized Road Use .................................................. 2-14
       2.2 Licensee-Maintained Roads: Levels 1 and 2, System and Non-System ................................................. 2-16
           2.2.1 Average Daily Traffic and Season of Use along Project-Related Levels 1 and 2 Roads ................................................. 2-16
           2.2.2 Conditions of Project-Related Levels 1 and 2 Roads ................................................. 2-16
           2.2.3 Safety, Signage and Bridges along Project-Related Levels 1 and 2 Roads ................................................. 2-18
   2.3 Project-Related Forest Service System Roads (Levels 3, 4, and 5) and Additional Roads to be Included in the Special Use Authorization ................................................. 2-20
       2.3.1 Maintenance, Type and Season of Use along Project Levels 3, 4 and 5 Roads ................................................. 2-20
       2.3.2 Maintenance, Type and Season of Use along Berkeley Camp Roads ................................................. 2-20
   2.4 Forest Service Notification Standards (Camino Dispatch) ................................................. 2-22
Table of Contents (continued)

3.0 Hydrology and Culvert Upgrade Plan
   3.1 Hydrology Criteria ................................................................. 3-1
   3.1.1 Characterization of Stream Types ............................................. 3-2
   3.1.2 Estimation of Peak Flows Based on the 100-Year 24-Hour Event .......... 3-3
   3.1.3 Estimation of Sediment Load .................................................. 3-4
   3.1.4 Characterization of Streambed Composition ................................. 3-5
   3.1.5 Protection of Aquatic Resources .............................................. 3-5
   3.1.6 Limitations of Study ............................................................... 3-5
   3.1.7 Applicability of Hydrologic Study Criteria ................................ 3-6

3.2 Drainage Data .................................................................................. 3-6
3.3 Hydrologic Calculations .................................................................. 3-21
3.4 Drainage Structures and Culvert Sizing Recommendations .................. 3-21

4.0 Erosion Prevention and Control
   4.1 Federal, State, and County Regulations for Water Quality ................. 4-1
      4.1.1 Forest Service Guidelines, Standards, and Protective Measures (Best Management Practices) ........................................ 4-1
      4.1.2 California and El Dorado County Standards and Protective Measures ................................................................. 4-2

   4.2 Measures to Control Erosion on El Dorado Project Roads .................. 4-2
      4.2.1 General Principles of Erosion Prevention and Control ............... 4-2
      4.2.2 Emergency Road Maintenance and Erosion Control Measures .... 4-3

5.0 Summary ......................................................................................... 5-1

References

Appendix A  Cooperative Road Maintenance Agreement
   Exhibit A-1: Road Maintenance Matrix (Levels 1 and 2)
   Exhibit A-2: Road Maintenance Matrix (Levels 3, 4 and 5)
   Exhibit A-3: Specifications

Appendix B  Five-Year Capital Improvement and Road Maintenance Plan
   Exhibit B-1: Matrix of Capital Improvements

Appendix C  Summary USFS Consultation

Appendix D  Photo Documentation: Traffic Safety and Signage on Project Roads

Appendix E  Aviation Notification Standards and Example Aviation Plan

Appendix F  Forest Service Best Management Practices Applicable to the El Dorado Project

Appendix G  Needs Assessment Worksheets (available on request)
Table of Contents (continued)

List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 2-1</td>
<td>Project Roads – Index for Figures 2-2 thru 2-7</td>
<td>2-2</td>
</tr>
<tr>
<td>Figure 2-2</td>
<td>Project Roads – Akin Powerhouse, Forebay Area</td>
<td>2-3</td>
</tr>
<tr>
<td>Figure 2-3</td>
<td>Project Roads – Camp 5, Rock Crusher Rd. Areas</td>
<td>2-4</td>
</tr>
<tr>
<td>Figure 2-4</td>
<td>Project Roads – Rock Crusher Rd., Camp 1 Areas</td>
<td>2-5</td>
</tr>
<tr>
<td>Figure 2-5</td>
<td>Project Roads – 30 Milestone, Sand Flat Areas</td>
<td>2-6</td>
</tr>
<tr>
<td>Figure 2-6</td>
<td>Project Roads – Echo Lake and Conduit Area</td>
<td>2-7</td>
</tr>
<tr>
<td>Figure 2-7</td>
<td>Project Roads – Caples Lake Area</td>
<td>2-8</td>
</tr>
<tr>
<td>Figure 2-8</td>
<td>Licensee-Maintained Roads – Index for Figures 2-9 thru 2-17</td>
<td>2-23</td>
</tr>
<tr>
<td>Figure 2-9</td>
<td>Licensee-Maintained Roads – Powerhouse Area</td>
<td>2-24</td>
</tr>
<tr>
<td>Figure 2-10</td>
<td>Licensee-Maintained Roads – Penstock Tunnel and Bullion Bend</td>
<td>2-25</td>
</tr>
<tr>
<td>Figure 2-11</td>
<td>Licensee-Maintained Roads – Pacific Tunnel, Camp 4 Areas</td>
<td>2-26</td>
</tr>
<tr>
<td>Figure 2-12</td>
<td>Licensee-Maintained Roads – Rock Crusher Road Area</td>
<td>2-27</td>
</tr>
<tr>
<td>Figure 2-13</td>
<td>Licensee-Maintained Roads – Camp 2, Plum Creek Areas</td>
<td>2-28</td>
</tr>
<tr>
<td>Figure 2-14</td>
<td>Licensee-Maintained Roads – Camp 2, Plum Creek Areas</td>
<td>2-29</td>
</tr>
<tr>
<td>Figure 2-15</td>
<td>Licensee-Maintained Roads – Whitehall &amp; 30 Milestone Areas</td>
<td>2-30</td>
</tr>
<tr>
<td>Figure 2-16</td>
<td>Licensee-Maintained Roads – Camp 1, Alder Creek Areas</td>
<td>2-31</td>
</tr>
<tr>
<td>Figure 2-17</td>
<td>Licensee-Maintained Roads – Caples Lake Area</td>
<td>2-32</td>
</tr>
<tr>
<td>Figure 3-1</td>
<td>Drainage Crossings and Watersheds – Index for Figures 3-2 thru 3-7</td>
<td>3-14</td>
</tr>
<tr>
<td>Figure 3-2</td>
<td>Drainage Crossings and Watersheds – Powerhouse Area</td>
<td>3-15</td>
</tr>
<tr>
<td>Figure 3-3</td>
<td>Drainage Crossings and Watersheds – Penstock Tunnel and Bullion Bend</td>
<td>3-16</td>
</tr>
<tr>
<td>Figure 3-4</td>
<td>Drainage Crossings and Watersheds – Pacific Tunnel, Camp 4 Areas</td>
<td>3-17</td>
</tr>
<tr>
<td>Figure 3-5</td>
<td>Drainage Crossings and Watersheds – Rock Crusher Road Area</td>
<td>3-18</td>
</tr>
<tr>
<td>Figure 3-6</td>
<td>Drainage Crossings and Watersheds – Camp 2/Plum Creek Areas</td>
<td>3-19</td>
</tr>
<tr>
<td>Figure 3-7</td>
<td>Drainage Crossings and Watersheds – Camp 1/Alder Creek Areas</td>
<td>3-20</td>
</tr>
</tbody>
</table>

List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1-1</td>
<td>Comparison of Condition 57 Text with the TSMP</td>
<td>1-5</td>
</tr>
<tr>
<td>Table 2-1</td>
<td>Maintenance Levels 1 through 5 General Descriptions</td>
<td>2-9</td>
</tr>
<tr>
<td>Table 2-2</td>
<td>El Dorado Project Roads Authorized by the Pre-1992 FERC License</td>
<td>2-11</td>
</tr>
<tr>
<td>Table 2-3</td>
<td>List of El Dorado Project Roads Requiring Forest Service</td>
<td>2-13</td>
</tr>
<tr>
<td>Table 2-4</td>
<td>List of Project-Related Helispots and Staging/Service Areas</td>
<td>2-15</td>
</tr>
<tr>
<td>Table 2-5</td>
<td>Matrix of Licensee-Maintained Project-Related Roads</td>
<td>2-17</td>
</tr>
<tr>
<td>Table 2-6</td>
<td>Summary of Needs Assessment Data</td>
<td>2-19</td>
</tr>
<tr>
<td>Table 2-7</td>
<td>Matrix of Additional Roads to be Included in the USFS</td>
<td>2-21</td>
</tr>
<tr>
<td>Table 2-8</td>
<td>Aviation Standards and Information Required by Camino Dispatch</td>
<td>2-22</td>
</tr>
<tr>
<td>Table 3-1</td>
<td>Applicability of Hydrologic Study Criteria</td>
<td>3-6</td>
</tr>
<tr>
<td>Table 3-2</td>
<td>Drainage Data</td>
<td>3-7</td>
</tr>
<tr>
<td>Table 3-3</td>
<td>Peak Flow Estimates and Recommended Minimum Culvert Diameters</td>
<td>3-22</td>
</tr>
</tbody>
</table>
**Acronyms**

<table>
<thead>
<tr>
<th>AC</th>
<th>Asphalt Concrete</th>
<th>MP</th>
<th>Milepost</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB</td>
<td>Aggregate Base</td>
<td>MUTCD</td>
<td>Manual of Uniform Traffic Control Devices</td>
</tr>
<tr>
<td>ADT</td>
<td>Average Daily Traffic</td>
<td>NFF</td>
<td>National Flood Frequency</td>
</tr>
<tr>
<td>BMP</td>
<td>Best Management Practice</td>
<td>NFS</td>
<td>National Forest System</td>
</tr>
<tr>
<td>CDFG</td>
<td>California Department of Fish and Game</td>
<td>NPDES</td>
<td>National Pollutant Discharge Elimination System</td>
</tr>
<tr>
<td>EID</td>
<td>El Dorado Irrigation District</td>
<td>OHV</td>
<td>Off-Highway Vehicles</td>
</tr>
<tr>
<td>ENF</td>
<td>Eldorado National Forest</td>
<td>RWQCB</td>
<td>Regional Water Quality Control Board</td>
</tr>
<tr>
<td>ERC</td>
<td>Ecological Resources Committee</td>
<td>SUA</td>
<td>Special Use Authorization</td>
</tr>
<tr>
<td>EPA</td>
<td>Environmental Protection Agency</td>
<td>SUP</td>
<td>Special Use Permit</td>
</tr>
<tr>
<td>FERC</td>
<td>Federal Energy Regulatory Commission</td>
<td>SPI</td>
<td>Sierra Pacific Industries</td>
</tr>
<tr>
<td>FPA</td>
<td>Federal Power Act</td>
<td>SWRCB</td>
<td>State Water Resources Control Board</td>
</tr>
<tr>
<td>FS</td>
<td>Forest Service</td>
<td>TSMP</td>
<td>Transportation System Management Plan</td>
</tr>
<tr>
<td>FSM</td>
<td>Forest Service Manual</td>
<td>Trails SMP</td>
<td>Trails System Management Plan</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic Information System</td>
<td>USDA</td>
<td>United States Department of Agriculture</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
<td>USFS</td>
<td>United States Forest Service</td>
</tr>
<tr>
<td>LTBMU</td>
<td>Lake Tahoe Basin Management Unit</td>
<td>USGS</td>
<td>United States Geological Survey</td>
</tr>
<tr>
<td>ML</td>
<td>Maintenance Level</td>
<td>UTL</td>
<td>Unable To Locate</td>
</tr>
<tr>
<td>MOU</td>
<td>Memorandum of Understanding</td>
<td>WEPP</td>
<td>Water Erosion Prediction Project</td>
</tr>
</tbody>
</table>

**Abbreviations**

**Condition 57**
One of the FPA Section 4(e) conditions for licensing the El Dorado Hydroelectric Project which requires the licensee to prepare a Transportation System Management Plan

**El Dorado Project**
El Dorado Hydroelectric Project

**Exhibit-K Drawing**
Drawings which are included in the FERC license

**FERC Project No. 184**
El Dorado Hydroelectric Project

**Forest Service**
United States Department of Agriculture, Forest Service

**Licensee**
Owner and operator of the El Dorado Hydroelectric Project FERC license

**Licensee-Maintained Road**
Forest Service road deemed the primary responsibility of the licensee

**Non-System Road**
Forest Service Unclassified Road

**Project-Related Road**
Forest Service road used to access the El Dorado Project

**System Road**
Forest Service Classified Road

---

El Dorado Irrigation District
El Dorado Project
FERC Project No. 184
1.0 Introduction

This plan is a collaborative effort and has been developed to satisfy the transportation requirements set forth in the Federal Energy Regulatory Commission (FERC) Order Issuing New License October 18, 2006, Appendix A – Section 4(e) Condition No. 57 (Condition 57) and the Project 184 Settlement Agreement (EID 2003). Condition 57 requires the licensee to submit a Transportation System Management Plan (TSMP) and a Five-Year Maintenance and Reconstruction Plan approved by the United States Forest Service (Forest Service) to FERC within one year of license issuance. The content and scope of this TSMP and the attached Cooperative Road Maintenance Agreement (Appendix A) and Five-Year Capital Improvement and Road Maintenance Plan (Appendix B) were prepared to comply with the requirements set forth in Condition 57.

1.1 Purpose and Implementation of the Transportation System Management Plan, the Cooperative Road Maintenance Agreement, and the Five-Year Capital Improvement and Road Maintenance Plan

The TSMP establishes the level of licensee maintenance responsibilities for project-related roads on National Forest System (NFS) lands, with the licensee having the primary responsibility for maintenance levels 1 and 2 roads and shared responsibility on levels 3, 4 and 5 roads. The TSMP must include maps showing those roads associated with the Project and those roads determined to be the primary responsibility of the licensee.

Condition 57 also requires the licensee to identify the project-related uses of all roads determined to be the primary responsibility of the licensee, an estimated amount of use by season, and the condition of the roads. The Culvert Upgrade Plan addresses drainage crossings of bridges and culverts for all roads determined to be the primary responsibility of the licensee. Other miscellaneous items to be addressed include an inventory of road signs and descriptions of those helicopter landing areas, staging areas, and access roads used for project maintenance and operation.

This TSMP is designed to address these and all other requirements set forth in Condition 57. This is accomplished through a combination of data gathering, analysis, and agency consultation.

1.2 United States Forest Service and other Agency Consultation

The TSMP was prepared by the licensee in consultation with Forest Service representatives from the Eldorado National Forest (ENF) and the Lake Tahoe Basin Management Unit (LTBMU) and with the Project 184 Ecological Resources Committee (ERC). The ENF administers the majority of public lands where the El Dorado Hydroelectric Project (FERC No. 184, Project 184) is located and the LTBMU administers a small number of roads near Echo Lake. The ERC holds regular meetings and is comprised of those organizations that were signatories of the Settlement Agreement.

The following sections summarize important agreements and correspondence between the licensee and the Forest Service concerning the TSMP.
1.2.1 Eldorado National Forest

On June 23, 2004, representatives from the El Dorado Irrigation District (EID) met with representatives of the ENF to discuss the TSMP. During this meeting the licensee and the Forest Service reviewed the project area maps and agreed to a list of project roads deemed the primary responsibility of the licensee (referred to hereafter as “licensee-maintained roads”). It was also agreed that the in-field data collection effort (Needs Assessment) would be limited to those road segments included in the list of licensee-maintained roads.

During the consultation meeting a number of questions arose concerning interpretation of Condition 57. At the request of the Forest Service, the licensee submitted a formal memorandum that outlined a proposed approach to address Condition 57 and requested further Forest Service clarification and approval. This memorandum was submitted to the Forest Service on September 2, 2004.

On October 18, 2004, the Forest Service responded to the September 2, 2004 memorandum. In the response, the Forest Service approved the licensee’s proposed approach to comply with Condition 57 and clarified certain sections of Condition 57.

1.2.2 Lake Tahoe Basin Management Unit

Some of the Project roads, near Echo Lake, are located on federal lands administered by the LTBMU. The LTBMU representative, Ms. Lori Allessio, provided input regarding the Echo Lake roads, as needed, by telephone in August 2004; however, the ENF provided the lead role to oversee licensee compliance with Condition 57.

1.3 Introduction to the Transportation System Management Plan

Listed below are the major topics that the TSMP must address, at a minimum. These are summarized from Condition 57 and are listed in the order presented in the TSMP. Table 1-1 compares the text of Condition 57 with the TSMP noting where each requirement is addressed in the management plan. This TSMP is laid out in five principal sections and eight appendices, as follows:

- Section 2.0 - Project Roads, Traffic Safety Signs, and Access Sites: This section:
  1. Identifies Forest Service transportation terms and Special Use Authorization;
  2. Provides maps of all Forest Service roads associated with the Project including drainage crossings, bridges, and culverts;
  3. Identifies the project-related uses of all roads by designated level, including estimates of the amount of use by season;
  4. Describes the conditions of all licensee-maintained roads based on an in-field “Needs Assessment” of each road;
  5. Discusses the conditions of safety signage with photo documentation of safety signage provided in Appendix E; and,
  6. Provides maps and narrative discussion of helispots routinely used to access project facilities on NFS lands, including staging areas and access roads connected with the helispots.
Section 3.0 – Hydrology and Culvert Upgrade Plan: This section summarizes the results of the Needs Assessment including the conditions of culverts and it addresses the hydrology and watersheds in the project vicinity.

Section 4.0 – Erosion Prevention and Control: This section outlines federal, state and county guidelines and Best Management Practices designed to reduce soil erosion on roads. This section introduces concepts for maintenance responsibilities identified in Appendix A and capital improvement needs described in Appendix B.

Section 5.0 – Conclusions: This section summarizes the overall condition of project-related roads.

References

Appendix A: Cooperative Road Maintenance Agreement Between the United States Forest Service and the El Dorado Irrigation District

Exhibit A-1 – Road Maintenance Matrix Levels 1 and 2 Roads
Exhibit A-2 – Road Maintenance Matrix Levels 3, 4, and 5 Roads
Exhibit A-3 – Specifications

Condition 57 requires that the licensee prepare a 5-year plan that identifies the maintenance and reconstruction needs for roads associated with the Project. Appendix A identifies the maintenance responsibilities for all project-related roads used to access Project 184. These maintenance responsibilities were negotiated with the Forest Service at a meeting held on January 11, 2005.

Appendix B: Five-Year Capital Improvement and Road Maintenance Plan

Exhibit B-1 – Matrix of Capital Improvements

Appendix B prioritizes construction measures needed to address erosion and sediment along all Forest Service roads determined to be the responsibility of the licensee. These road maintenance and reconstruction projects must comply with the Forest Service specifications and best management practices. The capital improvement needs for roads and road features are identified for years 2006 through 2010.

Appendix C: Summary USFS Consultation

Appendix D: Photo Documentation: Traffic Safety and Signage on Project Roads

Appendix E: Aviation Notification Standards and Example Aviation Operations Plan

Appendix F: Forest Service Best Management Practices Applicable to Project 184

Appendix G: Needs Assessment Work Sheets (e.g., field data collection sheets, available on request)
1.3.1 Use of Geographic Information Systems (GIS) and Global Positioning Systems (GPS)

All of the maps included with this report were produced from digital spatial data using GIS software. The locations of most of the Forest Service system roads (see section 2.0) had been previously documented by the Forest Service using GPS equipment and software. The locations of these roads were identified on the maps using data collected by the Forest Service. Conversely, most of the project-related Forest Service non-system roads had not been previously located using GPS equipment. As such, these roads were documented using GPS equipment and software as part of the in-field needs assessment performed on all licensee-maintained roads from June through October 2004.

As required by Condition 57, all mapping was completed using global positioning system (GPS) instrumentation. All GPS data was collected using a Leica G20 GPS receiver. Satellite GPS positions were only recorded when Positional Dilution of Precision (PDOP) values were less than or equal to a value of 8.0. Due to canopy cover and/or terrain interference or high PDOP values, GPS data could not always be collected. In these cases, which occurred on approximately 43 percent of the project roads, aerial photo interpretation was used in lieu of GPS collection in order to provide a continuous representation of the road. This is a common problem during GPS collection in forested and mountainous terrain. The aerial photography used for heads-up digitizing of these roads was flown in July 2003 and georeferenced by AirPhotoUSA. The stated positional accuracy of this photography is five to eight feet.
Table 1-1 Comparison of Condition 57 Text and the TSMP

<table>
<thead>
<tr>
<th>Section 4(e) Condition 57 Text</th>
<th>How is this requirement addressed in the TSMP?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within 1 year of license issuance, the licensee shall file with FERC a Transportation System</td>
<td>The new license was issued on October 18 2006. The TSMP is due to FERC by October 18, 2007</td>
</tr>
<tr>
<td>Management Plan that is approved by the FS for roads on or affecting National Forest System lands.</td>
<td>Appendix A and Exhibit A-1 Appendix B</td>
</tr>
<tr>
<td>The plan shall establish the level of licensee responsibility for Project-related roads. The</td>
<td>Appendix A and Exhibit A-2</td>
</tr>
<tr>
<td>licensee shall have the primary responsibility for non-system roads and for maintenance level 1 and 2 roads.</td>
<td>The Forest Service provided GIS and GPS data as requested.</td>
</tr>
<tr>
<td>There shall be shared levels of responsibility for maintenance level 3, 4, and 5 roads.</td>
<td></td>
</tr>
<tr>
<td>The FS shall make available to the licensee all information it has about these roads.</td>
<td></td>
</tr>
<tr>
<td>The licensee shall implement the plan upon approval. At a minimum the Plan shall:</td>
<td></td>
</tr>
<tr>
<td>1. Include a map showing all roads, both FS system roads (classified) and FS non-system (unclassified), associated with the Project.</td>
<td>Figures 2-1 through 2-17</td>
</tr>
<tr>
<td>2. Identify the condition of the roads described above that are determined to be the primary responsibility of the licensee, including any construction or maintenance needs. Information shall include length and width of road, location and size of culverts, grade, slope position, hydrologic connectivity, surfacing, and jurisdiction sufficient for the FS to complete the roads use permit Exhibit A and to complete any required Roads Analysis.</td>
<td>Tables 2-5, 2-6, and 3-2 Appendix B</td>
</tr>
<tr>
<td>3. Identify the project related uses of all roads described above, including an estimate of the amount of use by season of the year.</td>
<td>Sections 2.2, 2.3.1, and 2.3.2 Tables 2-6 and 2-7</td>
</tr>
<tr>
<td>4. Include a map of all roads described above that are determined to be the responsibility of the licensee. Include both safety and destination/distance information signs at major road intersections and features. An inventory of all signs, together with photographs of each sign, shall be included. Mapping shall be completed using global positioning system (GPS) instrumentation and made available as a digital format layer. Signs shall conform to Forest Service manual direction.</td>
<td>Figures 2-7 through 2-17 and Section 3.0</td>
</tr>
<tr>
<td>5. Include a map of all drainage crossings of bridges and culverts for all roads described above that are determined to be the primary responsibility of the licensee. Provide hydraulic calculations verifying that all intermittent and perennial stream crossings shall pass a 100-year storm event and associated bedload and debris, and allow fish passage through all culverts identified as fish habitat areas. The licensee shall develop a plan for FS approval to upgrade those culverts not meeting this standard. Priority for upgrading will be based on the potential impact to the ecological value of the riparian resources affected.</td>
<td></td>
</tr>
<tr>
<td>Section 4(e) Condition 57 Text</td>
<td>How is this requirement addressed in the TSMP?</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>6. Address measures to control erosion related to Project facilities on or affecting National Forest System lands, including dams, roads, penstocks, powerlines, transformer sites, reservoirs, and reaches. Consider stream sedimentation, dust, and soil movement induced by Project roads and road maintenance activities, preventing loss of roads through ongoing hillside erosion, sediment management of roads within 150 feet of any river, and diversion prevention dips in specified areas to minimize damage from culvert failure.</td>
<td>Sections 3.0 and 4.0 Appendix A Appendix B</td>
</tr>
<tr>
<td>7. Identify helispots routinely used to access Project facilities on NFS lands, including any staging areas and access roads. Include notification standards for Forest Service (Camino dispatch), including radio frequencies and N (tail) numbers.</td>
<td>Section 2.1.1.3 Table 2-4 Section 2.4 Table 2-8</td>
</tr>
<tr>
<td>Once the plan is completed, adjustments to the Project boundary may need to be made to include some of the roads.</td>
<td>Completed per FERC license Articles 202 and 203.</td>
</tr>
<tr>
<td>Every 5 years, the licensee shall prepare a 5-year plan to identify the maintenance and reconstruction needs for roads associated with the Project. The licensee shall file the plan with FERC after approval by the Forest Service. All road maintenance and construction shall meet FS specifications and best management practices.</td>
<td>Appendix B will be updated as part of the annual road maintenance meeting with EID and the Forest Service. See also Appendix A Section V.</td>
</tr>
<tr>
<td>The licensee shall construct, operate, and maintain Project facilities, including roads, parking and storage lots, reservoir shoreline, bridges, and culverts to maintain natural fluvial and colluvial sediment transport to the Project reaches, as far as feasible. All road maintenance and construction shall meet FS specifications and best management practices.</td>
<td>Sections 3.0 and 4.0 and Appendices A and B.</td>
</tr>
<tr>
<td>Within 5 years of license issuance, the licensee shall replace the gate at Caples Lake Second Dam.</td>
<td>Appendix B (Exhibit B-1)</td>
</tr>
</tbody>
</table>
2.0 Project Roads, Traffic Safety Signs, and Access Sites

2.1 Forest Service Road Management Terms, Conditions, and Requirements

Project 184 is located on the South Fork of the American River (SFAR) and its tributaries in the counties of El Dorado, Alpine, and Amador, California. The project includes four storage reservoirs (Lake Aloha, Echo Lake, Silver Lake, and Caples Lake), water conveyance facilities consisting of flumes and tunnels, a diversion dam on the SFAR, several smaller diversions on the tributaries to the SFAR, a forebay, a penstock, and a powerhouse. The area surrounding Project 184 is generally served by two-lane roads, including Highway 50 and Highway 88 and county roads that provide local access to the ENF and the LTBMU. Most of the facilities associated with Project 184 are accessed via secondary Forest Service roads that branch off nearby highways and county-maintained roadways. The conditions and management of the Forest Service roads used to access Project 184 are the primary focus of this TSMP.

Approximately 67.95 miles of National Forest “system” (Forest Service classified) and “non-system” (Forest Service unclassified) roads are used to access Project 184 facilities. According to the Eldorado National Forest Land and Resource Management Plan (1988), a “system” road is included in the Forest Service planning process and is listed in the National Forest database with a designated Forest Service number (e.g., 10N08Y). The management of system roads considers a variety of resource issues including timber, recreation resources, visual quality, and wildlife area prescriptions. The “non-system” or “unclassified” roads are not included in the Forest Service database as classified but they are inventoried and included in a separate database.

Figures 2-1 through 2-7 display all of the roads used to access Project 184, as required by Condition 57. The roads highlighted in red with a solid black line denote those roads considered the primary responsibility of the licensee (licensee-maintained roads), whereas the roads highlighted in red with black dashes include all of the Forest Service roads that are used to access Project 184 (project-related roads), but are not the primary responsibility of the licensee.

The ENF has assigned maintenance levels (designated 1 through 5) to each of the system roads on National Forest lands. The management objectives for the roads as well as the standard of the road determine the maintenance level. Maintenance levels 1 and 2 are generally low standard, native surface roads passable only by high clearance vehicles or OHVs. Maintenance levels 3, 4, and 5 roads are of a higher standard, generally graded or surfaced, and passable by low clearance vehicles such as passenger cars. Non-system roads are usually low standard roads (e.g., levels 1 and 2). All of the project-related non-system roads used to access Project 184 consist of maintenance levels 1 and 2 roads. Table 2-1 depicts the general characteristics and maintenance requirements for each of the five maintenance levels.
Map production and data management by:

Price Geographic Consulting
2004 Adobe Trail - Placerville, California 95667
(530) 626-1964 - at_price@pacbell.net

Legend
- Hellspot
- Licensee-Maintained Roads
- Project-Related Roads

OWNER
- Tahoe Basin Management Unit
- Eldorado National Forest
- Private Land

El Dorado Irrigation District
2890 Mosquito Road, Placerville, CA 95667
(530) 622-4513

FERC Project 184
Transportation System Management Plan
PROJECT ROADS
Caples Lake Area
Date: May 12, 2006
Pg 2-7 Rev: 3.3

Figure 2-7
<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level I</strong></td>
<td>This is basic custodial care as required to protect the road investment and to see that damage to adjacent land and resources is held to a minimum. Level I maintenance often requires an annual inspection to determine what work, if any, is needed to keep drainage functional and the road stable. This level is the normal prescription for roads that are not opened for traffic. Signing is to discourage or prohibit public traffic. The Highway Safety Act does not apply to this level of road.</td>
</tr>
<tr>
<td><strong>Level II</strong></td>
<td>This level is used on roads where management requires that the road be open for limited passage of traffic. Traffic is normally minor, usually consisting of one or a combination of administrative use, permitted use, or specialized traffic. Level II requires the basic care of Level I. The signing strategy for this level of road is to discourage or except traffic. The Highway Safety Act does not apply to this level of road.</td>
</tr>
<tr>
<td><strong>Level III</strong></td>
<td>This level is used on roads that are opened for public traffic. Road surface is suitable for sedans but the surface is not dust abated. Surface treatments on level 3 roads are generally native materials or an imported material such as an aggregate base. Signing to encourage public use and safety is appropriate. The Highway Safety Act applies to this level of road.</td>
</tr>
<tr>
<td><strong>Level IV</strong></td>
<td>At this level, more consideration is given to the comfort of the user. These roads are frequently surfaced with aggregate base material with some type of dust abatement, e.g., chipseal, magnesium chloride, Road Oyl, etc. Signing strategy is to encourage use. The Highway Safety Act applies to this level of road.</td>
</tr>
<tr>
<td><strong>Level V</strong></td>
<td>Roads in this category include both paved and chip-sealed. Safety and comfort are important considerations. Frequently this level of road will be double lane with moderate to high design speeds. Safety and informational signing is appropriate. The Highway Safety Act applies to this level of road.</td>
</tr>
</tbody>
</table>


2.1.1 Forest Service Special Use Authorization(s) Needed for Project 184

The following discussion concerning Forest Service Special Use Authorization is not required as part of Condition 57; however, it is included per the request of the Forest Service.

2.1.1.1 Background

Under the Energy Policy Act of 1992 (Public Law 102-486), licensees are not required to obtain a Forest Service special use authorization for project facilities (roads, diversions, power lines) occupying NFS lands that were licensed as of October 24, 1992. New projects licensed after 1992, or amendments that add NFS lands to existing licenses, do require authorization from FERC and the Forest Service (FERC Re-Licensing Road Authorizations Position Paper, August 2004). When required, a special use authorization allows occupancy, use, rights, or privileges of NFS land or facilities for specified purposes.

Forest Service system roads needed for FERC projects and for which the licensee would be responsible for maintenance (e.g., licensee-maintained roads) due to their use would be
authorized using a Forest Service Special Use Permit (FLPMA, form FS-2700-4b, 5/03). Project roads with no need for public traffic would be authorized using a Private Road Special Use Permit (FLPMA, form FS-2700-4c, 5/03).

Should the licensee require the temporary use of a Forest Service road not previously authorized under Special Use Permit, this use may be authorized using a Temporary Cost-Share Agreement Road Permit (FLMPA, form FS-2700-4d, 2/99).

Similarly, a Road Use Permit (form FS-7700-41, 10/73) may be issued to authorize the following activities:

1. Commercial use of a road closed under a Forest Order to commercial use without a permit. Commercial use is that use other than “general travel”, e.g., commercial hauling of forest products, mineral materials, etc.;
2. Maintenance, improvement, or reconstruction of a system road to meet the needs of the applicant, including snow removal where applicable; and/or,
3. Hauling of loads in excess of normal highway loadings.

2.1.1.2 Forest Service Special Use Definitions

Forest Transportation Facility. A classified road, designated trail, or designated airfield, including bridges, culverts, parking lots, log transfer facilities, safety devices, and other transportation network appurtenances under Forest Service jurisdiction, that is wholly or partially within or adjacent to NFS lands.

Road. A motor vehicle travelway over 50 inches wide, unless designated and managed as a trail. A road may be classified, unclassified, or temporary.

(1) Classified Roads. Roads wholly or partially within or adjacent to NFS lands that are determined to be needed for long-term motor vehicle access, including state roads, county roads, privately owned roads, NFS roads, and other roads authorized by the Forest Service.
(2) Temporary Roads. Roads authorized by contract, permit, lease, other written authorization, or emergency operation, which are not intended to be part of the Forest Service transportation system and not necessary for long-term resource management.
(3) Unclassified Roads. Roads on NFS lands that are not managed as part of the forest transportation system, such as unplanned roads, abandoned travelways, and off-road vehicle tracks that have not been designated and managed as trails; and those roads that were once under permit or other authorization and were not decommissioned upon the termination of the authorization.

Maintenance. The upkeep of the entire forest transportation facility including surface and shoulders, parking and side areas, structures, and such traffic-control devices as are necessary for its safe and efficient utilization.

Road Reconstruction. Activity that results in improvement or realignment of an existing classified road as defined below:

(1) Road Improvement: Activity that results in an increase of an existing road’s traffic service level, expands its capacity, or changes its original design function.
(2) Road Realignment: Activity that results in a new location of an existing road or portions of an existing road and treatment of the old roadway.
2.1.1.3 Special Use Authorizations of Project 184 (FERC Project No. 184)

The majority of project-related roads, including the licensee-maintained roads, are not currently authorized under a Forest Service Road Use Permit or other Special Use Permit. Because the FERC license was issued prior to 1992, those project-related roads or portions of roads that were included in the FERC license as of 1992 do not require Forest Service special use authorization. For Project 184, those project-related roads identified on the FERC license “Exhibit K-Drawings” as a “Project Road” and listed in the “Summary of Project Acres” table do not require Forest Service special use authorization.

Forest Service Special Use Permit(s) will be issued to cover those roads used routinely for project operations but which were not in the 1992 FERC license (i.e. project-related roads that were not identified by FERC on Exhibit K-Drawings). To the extent allowable by law, the authorizations will be issued for the same term as the license. However, should the licensee require future use of a road on NFS lands not authorized by either the FERC license or a Forest Service special use authorization (i.e. not included in this TSMP), then the licensee would apply for the use, and if approved, the appropriate use permit would be issued or amended.

FERC Authorized Project-Related Roads

The following Table 2-2 lists all of the roads authorized by the Pre-1992 FERC license. These roads do not require Forest Service Special Use Authorization.

<table>
<thead>
<tr>
<th>Road #*</th>
<th>Road Name</th>
<th>FERC License</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>12N34H</td>
<td>Powerhouse Eldorado</td>
<td>G-13</td>
<td>34.58</td>
</tr>
<tr>
<td>R91</td>
<td>Moon Lane</td>
<td>G-12</td>
<td>0.32</td>
</tr>
<tr>
<td>R92</td>
<td>Moon Lane East</td>
<td>G-12</td>
<td>0.39</td>
</tr>
<tr>
<td>R93</td>
<td>Kodiak Trail</td>
<td>G-12</td>
<td>0.30</td>
</tr>
<tr>
<td>R74</td>
<td>El Dorado Tunnel Road</td>
<td>G-6</td>
<td>w/in FERC boundary</td>
</tr>
<tr>
<td>R75</td>
<td>Camp 1</td>
<td>G-6</td>
<td>1.5</td>
</tr>
</tbody>
</table>

* The “R” roads are non-system roads assigned a temporary numbering system for reference.

Project-Related Roads Requiring Special Use Authorization

Table 2-3 includes all project-related roads on NFS lands which are not authorized under the existing FERC license and therefore require Forest Service special use authorization in the form of a Forest Road Special Use Authorization (system roads) or Private Road Special Use Authorization (non-system roads). Some project-related roads that are also used by the public may be authorized by Forest Service Regulation (36 CFR 261-70). This allows general travel of a Forest Service system road as long as that use occurs at a time of the year when the road is otherwise open to the public. Use other than general travel (e.g., commercial hauling, materials delivery) will require a Forest Service Road Use Permit.
## Table 2-3 List of Project 184 Roads Requiring Forest Service Special Use Authorization (west to east)

<table>
<thead>
<tr>
<th>Road #*</th>
<th>Road Name</th>
<th>Figure Reference</th>
<th>Road Special Use Permit Required From Forest Service</th>
<th>---</th>
<th>NFS Surfaced Roads Open to Highway Legal Vehicles Only (Includes NFS Maintenance Level 3-5) CLOSED TO 2WD VEHICLES WHEN SNOW COVERS ROAD</th>
<th>NFS Native Surfaced Road Open to Highway Legal Vehicles Only CLOSED JAN. 1 TO MAR. 31 (minimum)</th>
<th>---</th>
<th>NFS Native Surfaced Road Open to All Highway and Non-Highway Legal Vehicles CLOSED JAN. 1 TO MAR. 31 (minimum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10N50</td>
<td>Mormon Emigrant Trail</td>
<td>Figure 2-1</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11N01</td>
<td>Old Carson (Fresh Pond Tie)</td>
<td>Figure 2-2</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>R81</td>
<td>Flume 47B</td>
<td>Figure 2-3</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R82</td>
<td>Pacific Tunnel</td>
<td>Figure 2-3</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R821</td>
<td>Hazel Creek Tunnel</td>
<td>Figure 2-3</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11NY02</td>
<td>El Dorado Ditch Access</td>
<td>Figure 2-3</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10N40G</td>
<td>Highway Cut</td>
<td>Figure 2-3</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>R83</td>
<td>Spillway 33</td>
<td>Figure 2-3</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R84</td>
<td>Old Camp 4</td>
<td>Figure 2-3</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10N40</td>
<td>Plum Creek</td>
<td>Figure 2-3</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10N40N</td>
<td>El Dorado Ditch Loop</td>
<td>Figure 2-3</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R87</td>
<td>Camp 3</td>
<td>Figure 2-3</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R88</td>
<td>Camp P</td>
<td>Figure 2-3</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R89</td>
<td>Rock Crusher</td>
<td>Figure 2-3</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R71</td>
<td>Flumes 39/40</td>
<td>Figure 2-3 and 2-4</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R72</td>
<td>Camp X</td>
<td>Figure 2-4</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10NY08</td>
<td>Bull Creek, Camp Two</td>
<td>Figure 2-4</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11NY30</td>
<td>Bull Creek Road</td>
<td>Figure 2-4</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>11N53</td>
<td>Alder Creek Picnic</td>
<td>Figure 2-4</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R61</td>
<td>30 Milestone Spur</td>
<td>Figure 2-5</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11N74</td>
<td>30 Milestone</td>
<td>Figure 2-5</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11N46</td>
<td>Alder Creek</td>
<td>Figure 2-5</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road #*</td>
<td>Road Name</td>
<td>Figure Reference</td>
<td>Road Special Use Permit Required From Forest Service</td>
<td>PUBLIC NFS Surfaced Roads Open to Highway Legal Vehicles Only (Includes NFS Maintenance Level 3-5) CLOSED TO 2WD VEHICLES WHEN SNOW COVERS ROAD</td>
<td>TRAVEL NFS Native Surfaced Road Open to Highway Legal Vehicles Only CLOSED JAN. 1 TO MAR. 31 (minimum)</td>
<td>RESTRICTIONS NFS Native Surfaced Road Open to All Highway and Non-Highway Legal Vehicles CLOSED JAN. 1 TO MAR. 31 (minimum)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>-----------------</td>
<td>------------------</td>
<td>-----------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11N47</td>
<td>Carpenter Creek</td>
<td>Figure 2-5</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11N40</td>
<td>Silver Fork</td>
<td>Figure 2-5</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11N05</td>
<td>Echo Lake</td>
<td>Figure 2-6</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11N05C</td>
<td>Berkeley Camp</td>
<td>Figure 2-6</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11N05D</td>
<td>Echo North</td>
<td>Figure 2-6</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11N06</td>
<td>Johnson Pass</td>
<td>Figure 2-6</td>
<td>County Road (west end)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10NY23</td>
<td>Caples Dam Trailhead</td>
<td>Figure 2-7</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R41</td>
<td>Caples Main Dam</td>
<td>Figure 2-7</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10N68</td>
<td>Woods Creek</td>
<td>Figure 2-7</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The “R” roads are non-system roads assigned a temporary numbering system for reference.
Project-Related Heli spots with Access Roads and Staging Areas Requiring a Forest Service Special Use Authorization

Condition 57 requires the licensee to identify heli spots used routinely to access Project 184 facilities on NFS lands, including staging areas and access roads. There are a total of 15 heli spots used routinely to access Project 184 and of these, eight are also used periodically as staging/service areas to upgrade Project facilities (see Figures 2-8 through 2-17 and Table 2-4). Of the 15 heli spots, 10 are located on NFS lands and four of these are used as staging/service areas. The other five heli spots are located on private lands adjacent to NFS lands and four of these are also used as staging/service areas.

In the past, permission to use all 10 of the heli spots (including staging/service areas) on NFS lands has been obtained through a Forest Service Road Use Permit or a temporary Special Use Permit on a case-by-case basis. These areas have been used in the past for Project maintenance (e.g., Lake Aloha Dam Maintenance, El Dorado Canal Rehabilitation) and are used periodically as part of Project operations. However, all 10 of the heli spots and staging areas on NFS lands now require Special Use Authorization. Figures 2-8 through 2-17 display all of the project-related heli spots and staging/service areas used to access the El Dorado Project, including those on private land. The heli spots and staging areas on private land are included in the figures and Table 2-4 due to flight patterns that would likely cross Forest Service lands, requiring standard dispatch notification and consultation with the Forest Service.

Per telephone conversations with Placerville Ranger District Resource Officer, Ms. Cindy Oswald, use of the access roads to the heli spots, which may not already be considered a "Project-Related Road", will be authorized by Forest Service Regulation (36 CFR 261-70). This allows general travel of a Forest Service system road as long as that use occurs at a time of the year when the road is otherwise open to the public. Use other than general travel (e.g., commercial hauling, materials delivery) to heli spots or staging areas will require a Forest Service Road Use Permit (see section 2.1.1.1).

Table 2-4 describes in detail all project-related heli spots with access roads and staging areas.

2.1.1.4 FERC Authorized Road Use Versus Forest Service Authorized Road Use

Should road maintenance work, not considered routine, be required along a road authorized by the pre-1992 FERC license (e.g., hazard tree removal, culvert replacement) but located on NFS lands, the Forest Service, as the landowner, would still require notification and an environmental review process as described in the FERC Order Issuing New License, Appendices A and B (October 18, 2006). The legal authority granted to the Forest Service for this review process would stem from the Federal Power Act (the FERC license) as opposed to Special Use Authorization, but the environmental requirements would be similar (e.g., National Environmental Policy Act, Section 106 of the National Historic Preservation Act, Endangered Species Act).
<table>
<thead>
<tr>
<th>Helicopter Staging #</th>
<th>Name</th>
<th>Ownership</th>
<th>Requires FS Special Use Authorization?</th>
<th>Type of Use</th>
<th>Access Roads not included in Tables 2-2 &amp; 2-3</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-1</td>
<td>Echo Snow Park</td>
<td>FS</td>
<td>Yes</td>
<td>Helispot/Staging/Service</td>
<td>11N06A</td>
<td></td>
</tr>
<tr>
<td>H-2</td>
<td>Woods Creek Parking</td>
<td>FS</td>
<td>Yes</td>
<td>Helispot</td>
<td>10N68 (R45)</td>
<td>Not a landing site.</td>
</tr>
<tr>
<td>H-3</td>
<td>Caltrans Yard</td>
<td>FS</td>
<td>Yes</td>
<td>Helispot/Staging/Service</td>
<td>10N13D</td>
<td></td>
</tr>
<tr>
<td>H-4</td>
<td>Sandy Point</td>
<td>Private</td>
<td>No</td>
<td>Helispot/Staging/Service</td>
<td>Private</td>
<td>Same as Sandy Cove parking lot</td>
</tr>
<tr>
<td>H-5</td>
<td>SPI Spoils Site</td>
<td>Private</td>
<td>No</td>
<td>Helispot</td>
<td>11N47</td>
<td></td>
</tr>
<tr>
<td>H-6</td>
<td>Camp 1</td>
<td>FS</td>
<td>Yes</td>
<td>Helispot</td>
<td></td>
<td>Not a landing site.</td>
</tr>
<tr>
<td>H-7</td>
<td>Camp 1 House</td>
<td>FS</td>
<td>Yes</td>
<td>Helispot</td>
<td></td>
<td>Not a landing site.</td>
</tr>
<tr>
<td>H-8</td>
<td>El Dorado Tunnel</td>
<td>FS</td>
<td>Yes</td>
<td>Helispot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H-9</td>
<td>Granite Springs</td>
<td>FS</td>
<td>Yes</td>
<td>Helispot/Staging/Service</td>
<td>11N26,11N99, 11N99D</td>
<td></td>
</tr>
<tr>
<td>H-10</td>
<td>Staging 1</td>
<td>FS</td>
<td>Yes</td>
<td>Helispot/Staging/Service</td>
<td>10N09Y, 10N10Y</td>
<td></td>
</tr>
<tr>
<td>H-11</td>
<td>SPI Quarry</td>
<td>Private</td>
<td>No</td>
<td>Helispot/Staging/Service</td>
<td>10N40</td>
<td></td>
</tr>
<tr>
<td>H-12</td>
<td>Plum Creek Service Site</td>
<td>FS</td>
<td>Yes</td>
<td>Helispot/Staging/Service</td>
<td>10N40</td>
<td></td>
</tr>
<tr>
<td>H-13</td>
<td>Flumes 39/40</td>
<td>FS</td>
<td>Yes</td>
<td>Helispot</td>
<td></td>
<td>Not a landing site.</td>
</tr>
<tr>
<td>H-14</td>
<td>Five Corners</td>
<td>Private</td>
<td>No</td>
<td>Helispot/Staging/Service</td>
<td>On county road</td>
<td></td>
</tr>
<tr>
<td>H-15</td>
<td>Camp P</td>
<td>FS</td>
<td>Yes</td>
<td>Helispot</td>
<td></td>
<td>Not a landing site.</td>
</tr>
</tbody>
</table>
2.2 Licensee-Maintained Roads: Levels 1 and 2, System and Non-System

Of the 67.95 miles of roads on NFS lands used to access the El Dorado Project, about 23 percent or 15.21 miles are considered the primary responsibility of the licensee. Table 2-5 lists all of those Forest Service system and non-system licensee-maintained roads. All of these roads are maintenance levels 1 and 2 roads with the exception of Caples Auxiliary Dam (10N23Y) and Woods Creek (R45). Also included in Table 2-5 is a list of administrative information about each of these roads.

As described above, the Forest Service non-system roads do not have designated USFS road numbers assigned to them. In order to reference and describe these roads in this TSMP, an identification number and name was assigned to each non-system road. For example, R93 on Figure 2-10 refers to a small road used to access the penstock tunnel. It is expected that this reference system will change once these non-system roads are assigned permanent road numbers.

2.2.1 Average Daily Traffic and Season of Use along Project-Related Levels 1 and 2 Roads

Condition 57 requires that the TSMP include information about the project-related uses of all roads used to access the El Dorado Project, including the season of use. This section addresses the project-related uses along the licensee-maintained roads (levels 1 and 2). To address project-related uses, Table 2-5 displays the type of use or “Average Daily Traffic” (ADT) for each of the licensee-maintained roads. Because many of these roads are not used on a daily basis, the licensee’s use may be recorded by week, month, or year.

The season of use was tallied for summer and winter. Summer months generally include March 15 through October 15, depending on elevation and precipitation. Correspondingly, winter months generally begin in mid-October and end by mid-March. Most of the project-related roads above 4,000-foot elevation are closed during winter months through May due to snow and to prevent damage to the road surface.

2.2.2 Conditions of Project-Related Levels 1 and 2 Roads

Condition 57 requires the licensee to identify the conditions of licensee-maintained roads, including any construction or maintenance needs. Assessment of the conditions of these roads involved an in-field data recovery effort, or “Needs Assessment”, for all licensee-maintained roads. This field work was conducted from June 2004 through October 2004. Table 2-6 provides a summary of the needs assessment data collected for each road segment and Appendix G includes copies of the work sheets completed during the field data recovery effort. Appendix G is available upon request.
<table>
<thead>
<tr>
<th>Road Number</th>
<th>Road Name</th>
<th>Length</th>
<th>Width</th>
<th>Jurisdiction</th>
<th>Maintenance Level</th>
<th>Surface Type</th>
<th>Start</th>
<th>Terminus</th>
<th>Summer Average Daily Traffic (round trip)</th>
<th>Winter Average Daily Traffic (round trip)</th>
<th>Public Use (y/n)</th>
<th>Authorized by Existing License (y/n)</th>
<th>Remarks/Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>10N08Y</td>
<td>Bull Creek</td>
<td>0.43</td>
<td>12'</td>
<td>USFS</td>
<td>ML2</td>
<td>AB</td>
<td>10N40</td>
<td>10N08YA</td>
<td>2 trips/day</td>
<td>2 trips/day</td>
<td>yes</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>10N08YA</td>
<td>Camp Two</td>
<td>0.79</td>
<td>12'</td>
<td>USFS</td>
<td>ML2</td>
<td>Native/AB</td>
<td>10N08Y</td>
<td>Camp 2 Road</td>
<td>2 trips/day</td>
<td>2 trips/day</td>
<td>yes</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>10N23Y</td>
<td>Caples Aux. Dam</td>
<td>0.11</td>
<td>24'</td>
<td>USFS</td>
<td>ML5</td>
<td>AC</td>
<td>Highway 88</td>
<td>Parking Lot (loop)</td>
<td>1.5 trips/week</td>
<td>0</td>
<td>yes</td>
<td>no</td>
<td>Mokelumne Wilderness Trailhead</td>
</tr>
<tr>
<td>10N40G</td>
<td>Highway Cut</td>
<td>1.66</td>
<td>12'</td>
<td>USFS</td>
<td>ML1</td>
<td>Native</td>
<td>10N40</td>
<td>John Roy's Boathouse</td>
<td>1 trip/month</td>
<td>1 trip/month</td>
<td>no</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>11N02Y</td>
<td>El Dorado Ditch Loop</td>
<td>0.23</td>
<td>10'</td>
<td>USFS</td>
<td>ML2</td>
<td>Native</td>
<td>10N40</td>
<td>El Dorado Canal</td>
<td>1 trip/year</td>
<td>1 trip/year</td>
<td>yes</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>11N02Y</td>
<td>El Dorado Ditch Access</td>
<td>0.91</td>
<td>12'</td>
<td>USFS</td>
<td>ML1</td>
<td>Native</td>
<td>Park Creek Rd</td>
<td>2 trips/week</td>
<td>2 trips/week</td>
<td>no</td>
<td>no</td>
<td>NE of Old Camp 5 Bridge</td>
<td></td>
</tr>
<tr>
<td>12N34H</td>
<td>Powerhouse</td>
<td>2.86</td>
<td>10-16'</td>
<td>USFS</td>
<td>ML2</td>
<td>Native/AB</td>
<td>12N34</td>
<td>Akin Powerhouse</td>
<td>2 trips/day</td>
<td>2 trips/day</td>
<td>yes</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>R41</td>
<td>Caples Main Dam</td>
<td>0.16</td>
<td>8'</td>
<td>USFS</td>
<td>ML1</td>
<td>Native</td>
<td>Highway 88</td>
<td>Gaging Station A-6</td>
<td>1 trip/month</td>
<td>0</td>
<td>no</td>
<td>no</td>
<td>Caples Creek</td>
</tr>
<tr>
<td>R43</td>
<td>Caples House</td>
<td>0.14</td>
<td>8'</td>
<td>USFS</td>
<td>ML1</td>
<td>Native</td>
<td>Highway 88</td>
<td>Caples House</td>
<td>1 trip/week</td>
<td>0</td>
<td>no</td>
<td>no</td>
<td>Land Status</td>
</tr>
<tr>
<td>R56</td>
<td>Camp 1</td>
<td>0.53</td>
<td>10'</td>
<td>USFS</td>
<td>ML1</td>
<td>Native</td>
<td>11N53</td>
<td>Camp 1</td>
<td>4 trips/day</td>
<td>4 trips/day</td>
<td>yes</td>
<td>no</td>
<td>Includes both forks of Camp 1 Rd</td>
</tr>
<tr>
<td>R71</td>
<td>Flumes 39/40</td>
<td>0.42</td>
<td>8'</td>
<td>USFS</td>
<td>ML1</td>
<td>Native</td>
<td>10N40</td>
<td>Flumes 39/40</td>
<td>1 trip/year</td>
<td>0 *</td>
<td>no</td>
<td>yes</td>
<td>Flumes 39/40 Access</td>
</tr>
<tr>
<td>R72</td>
<td>Camp X</td>
<td>0.56</td>
<td>12'</td>
<td>USFS</td>
<td>ML1</td>
<td>Native</td>
<td>10N40</td>
<td>Camp X</td>
<td>1 trip/month</td>
<td>0 *</td>
<td>no</td>
<td>no</td>
<td>Camp X / Plum Cr Siphon</td>
</tr>
<tr>
<td>R73</td>
<td>Camp 2</td>
<td>0.54</td>
<td>8'</td>
<td>USFS</td>
<td>ML1</td>
<td>Native</td>
<td>10N08YA</td>
<td>Camp 2</td>
<td>2 trips/day</td>
<td>2 trips/day</td>
<td>no</td>
<td>no</td>
<td>Begins at Last Gate</td>
</tr>
<tr>
<td>R74</td>
<td>El Dorado Tunnel</td>
<td>0.66</td>
<td>16'</td>
<td>USFS</td>
<td>ML1</td>
<td>AC</td>
<td>11N53</td>
<td>El Dorado Tunnel</td>
<td>1 trip/day</td>
<td>1 trip/day</td>
<td>no</td>
<td>no</td>
<td>Access to El Dorado Tunnel</td>
</tr>
<tr>
<td>R75</td>
<td>Camp 1</td>
<td>0.53</td>
<td>16'</td>
<td>USFS</td>
<td>ML1</td>
<td>Native</td>
<td>11N53</td>
<td>Camp 1</td>
<td>4 trips/day</td>
<td>4 trips/day</td>
<td>yes</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>R76</td>
<td>Camp S</td>
<td>0.1</td>
<td>8'</td>
<td>USFS</td>
<td>ML1</td>
<td>Native</td>
<td>Put Road</td>
<td>Camp S</td>
<td>1 trip/week</td>
<td>0</td>
<td>no</td>
<td>no</td>
<td>0.1 mile on USFS Land near Camp S</td>
</tr>
<tr>
<td>R81</td>
<td>Flume 47B</td>
<td>0.07</td>
<td>8'</td>
<td>USFS</td>
<td>ML1</td>
<td>Native</td>
<td>11N02Y</td>
<td>Flume 47B</td>
<td>1 trip/year</td>
<td>0</td>
<td>no</td>
<td>no</td>
<td>11N02Y Spur</td>
</tr>
<tr>
<td>R82</td>
<td>Pacific Tunnel</td>
<td>0.24</td>
<td>10'</td>
<td>USFS</td>
<td>ML1</td>
<td>Native/AB</td>
<td>11N02Y</td>
<td>Pacific Tunnel</td>
<td>1 trip/month</td>
<td>1 trip/month</td>
<td>no</td>
<td>no</td>
<td>Gate at Entrance to Spur</td>
</tr>
<tr>
<td>R83</td>
<td>Hazel Creek Tunnel</td>
<td>0.18</td>
<td>8'</td>
<td>USFS</td>
<td>ML1</td>
<td>Native</td>
<td>R82</td>
<td>Hazel Creek Tunnel</td>
<td>1 trip/year</td>
<td>1 trip/year</td>
<td>no</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>R84</td>
<td>Spellway 33</td>
<td>0.28</td>
<td>12'</td>
<td>USFS</td>
<td>ML1</td>
<td>Native</td>
<td>Hazel Valley Rd</td>
<td>1 trip/month</td>
<td>0</td>
<td>no</td>
<td>no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R87</td>
<td>Camp 3</td>
<td>0.21</td>
<td>10'</td>
<td>USFS/SP1</td>
<td>ML1</td>
<td>Rock/Native</td>
<td>R88</td>
<td>Camp 3</td>
<td>1 trip/week</td>
<td>1 trip/week</td>
<td>no</td>
<td>no</td>
<td>135 ft. on USFS land</td>
</tr>
<tr>
<td>R88</td>
<td>Camp P</td>
<td>1.32</td>
<td>12'</td>
<td>USFS</td>
<td>ML2</td>
<td>Rock</td>
<td>10N40</td>
<td>Camp P</td>
<td>3 trips/week</td>
<td>3 trips/week</td>
<td>yes</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>R89</td>
<td>Rock Crusher</td>
<td>1.16</td>
<td>8-12'</td>
<td>USFS/SP1</td>
<td>ML1</td>
<td>Rock/AB</td>
<td>10N40</td>
<td>Spellway 23</td>
<td>3 trips/week</td>
<td>3 trips/week</td>
<td>no</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>R91</td>
<td>Moonlane</td>
<td>0.31</td>
<td>12'</td>
<td>USFS</td>
<td>ML1</td>
<td>Native/AB</td>
<td>Moonlane</td>
<td>Surge Chamber</td>
<td>1 trip/week</td>
<td>1 trip/week</td>
<td>no</td>
<td>yes</td>
<td>0.4 miles on USFS Land</td>
</tr>
<tr>
<td>R92</td>
<td>Moonlane East</td>
<td>0.2</td>
<td>12'</td>
<td>USFS</td>
<td>ML1</td>
<td>Native/AB</td>
<td>R91</td>
<td>Penstock</td>
<td>1 trip/month</td>
<td>1 trip/month</td>
<td>no</td>
<td>yes</td>
<td>Follows buried portion of penstock</td>
</tr>
<tr>
<td>R93</td>
<td>Kodiak Trail</td>
<td>0.21</td>
<td>8'</td>
<td>USFS</td>
<td>ML1</td>
<td>AB</td>
<td>Kodiak</td>
<td>Penstock</td>
<td>1 trip/month</td>
<td>1 trip/month</td>
<td>no</td>
<td>yes</td>
<td>0.1 mile on USFS Land</td>
</tr>
<tr>
<td>R94</td>
<td>Bend Court</td>
<td>0.41</td>
<td>10'</td>
<td>USFS</td>
<td>ML1</td>
<td>Native/AB</td>
<td>Bend Court</td>
<td>Canal</td>
<td>2 trips/week</td>
<td>2 trips/week</td>
<td>yes</td>
<td>no</td>
<td></td>
</tr>
</tbody>
</table>

* 1 trip per year in case of emergency
2.2.3 Safety, Signage, and Bridges on Project-Related Levels 1 and 2 Roads

Condition 57 requires maps be created of all roads determined to be the primary responsibility of the licensee, including both safety and destination/distance information signs and it requires the licensee to “include an inventory of all signs, together with photographs of each sign”. Figures 2-8 through 2-16 display all safety destination and distance information located along all licensee-maintained levels 1 and 2 roads.

Forest Service Manual (FSM) 7730 discourages public travel on maintenance levels 1 and 2 roads. This strategy was set forth by the Memorandum of Understanding (MOU) between the Forest Service and the Federal Highway Administration (November 29, 1982), which defines those standards of the Highway Safety Act of 1966 that apply to Forest Service roads. This MOU also sets forth the guidelines for maintenance levels 3, 4, and 5 roads.

Signing requirements for roads are based on the strategy outlined for each maintenance level (see Table 2-1). For maintenance levels 1 and 2 roads, the strategy is to prohibit, eliminate, or discourage public travel. Direction in FSM 7731.15, Forest Service Handbook 7709.58, and FSM 7709.59 indicates traffic control devices are to provide for planned traffic and appropriate traffic management strategy. Because all of the project-related roads are levels 1 and 2, with the licensee employees as the primary users, destination and safety signage is not required on these roads.

As required by Condition 57, Figures 2-8 through 2-17 display the entire list of licensee-maintained roads and associated “facilities” such as safety signs, drainage crossings, bridges, and culverts. Section 3.0 (Hydrology and Culvert Upgrade Plan) of this TSMP will describe culverts in greater detail.
<table>
<thead>
<tr>
<th>Road Number</th>
<th>Road Name</th>
<th>Grade &lt;2%</th>
<th>Grade &gt;10%</th>
<th>Slope Position</th>
<th>Surface Type</th>
<th>Number of Culverts</th>
<th>Number of Culverts &gt; 30&quot;</th>
<th>Surface Condition</th>
<th>Number of Gates</th>
<th>Number of Signs</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>10N08Y</td>
<td>Bull Creek</td>
<td>800'</td>
<td>1250'</td>
<td>Drainage bottom</td>
<td>AB</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>10N08Y/A</td>
<td>Camp Two</td>
<td>590'</td>
<td>1300'</td>
<td>Bottom</td>
<td>AB &amp; Native</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>Some rutting</td>
</tr>
<tr>
<td>10N23Y</td>
<td>Caples Aux. Dam</td>
<td>2400'</td>
<td>Midslope</td>
<td>AB &amp; Native</td>
<td>4</td>
<td>4</td>
<td>3/5</td>
<td>1</td>
<td></td>
<td></td>
<td>Gate is missing</td>
</tr>
<tr>
<td>10N40Y</td>
<td>El Dorado Ditch Loop</td>
<td>589</td>
<td>Bottom</td>
<td>AB &amp; Native</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>8</td>
<td></td>
<td></td>
<td>Gate is missing</td>
</tr>
<tr>
<td>11N02Y</td>
<td>El Dorado Ditch Access</td>
<td>15087'</td>
<td>Bottom</td>
<td>AB &amp; Native</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Rock walls</td>
</tr>
<tr>
<td>12N34H</td>
<td>Powerhouse</td>
<td>815'</td>
<td>Bottom</td>
<td>Native</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Rock wall</td>
</tr>
<tr>
<td>R41</td>
<td>Caples Main Dam</td>
<td>293'</td>
<td>Mid</td>
<td>AB &amp; Native</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Retaining wall</td>
</tr>
<tr>
<td>R43</td>
<td>Caples House</td>
<td>398'</td>
<td>Mid</td>
<td>Native</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Rock walls</td>
</tr>
<tr>
<td>R44</td>
<td>Caples Quinconset</td>
<td>2950'</td>
<td>Bottom</td>
<td>AB &amp; Spills</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Equip. access only</td>
</tr>
<tr>
<td>R45</td>
<td>Woods Creek</td>
<td>2195'</td>
<td>Mid to Bottom</td>
<td>AB</td>
<td>8</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
<td>Rock walls</td>
</tr>
<tr>
<td>R46</td>
<td>30 Milestone Spur</td>
<td>2888'</td>
<td>Mid to Bottom</td>
<td>AC Pavement</td>
<td>9</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Rock wall</td>
</tr>
<tr>
<td>R71</td>
<td>Flumes 39/40</td>
<td>589'</td>
<td>Mid</td>
<td>AB</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Retaining wall</td>
</tr>
<tr>
<td>R72</td>
<td>Camp X</td>
<td>1292'</td>
<td>Mid</td>
<td>AB &amp; Native</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Retaining wall</td>
</tr>
<tr>
<td>R73</td>
<td>Camp 2</td>
<td>962'</td>
<td>Mid</td>
<td>Native</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Retaining wall</td>
</tr>
<tr>
<td>R74</td>
<td>El Dorado Tunnel</td>
<td>1461'</td>
<td>Mid</td>
<td>Native</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Retaining wall</td>
</tr>
<tr>
<td>R75</td>
<td>Camp 1</td>
<td>985'</td>
<td>Mid</td>
<td>Tunnel Spills/Native</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Retaining wall</td>
</tr>
<tr>
<td>R76</td>
<td>Camp S</td>
<td>381'</td>
<td>Mid</td>
<td>AB &amp; Native</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Retaining wall</td>
</tr>
<tr>
<td>R81</td>
<td>Flume 47B</td>
<td>970'</td>
<td>Mid</td>
<td>Native</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Retaining wall</td>
</tr>
<tr>
<td>R82</td>
<td>Pacific Tunnel</td>
<td>962'</td>
<td>Mid</td>
<td>Native</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Retaining wall</td>
</tr>
<tr>
<td>R83</td>
<td>Spillway 33</td>
<td>1461'</td>
<td>Mid</td>
<td>Tunnel Spills/Native</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Retaining wall</td>
</tr>
<tr>
<td>R84</td>
<td>Old Camp 4</td>
<td>985'</td>
<td>Mid</td>
<td>Tunnel Spills/Native</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Retaining wall</td>
</tr>
<tr>
<td>R85</td>
<td>Camp P</td>
<td>1292'</td>
<td>Mid</td>
<td>Tunnel Spills/Native</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Retaining wall</td>
</tr>
<tr>
<td>R89</td>
<td>Rock Crusher</td>
<td>1052'</td>
<td>Mid</td>
<td>Tunnel Spills/Native</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Retaining wall</td>
</tr>
<tr>
<td>R91</td>
<td>Moorland</td>
<td>1052'</td>
<td>Mid</td>
<td>Tunnel Spills/Native</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Retaining wall</td>
</tr>
<tr>
<td>R92</td>
<td>Moonlane East</td>
<td>737'</td>
<td>Mid</td>
<td>Tunnel Spills/Native</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Retaining wall</td>
</tr>
<tr>
<td>R93</td>
<td>Kodiak Trail</td>
<td>737'</td>
<td>Mid</td>
<td>Native &amp; AB</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Retaining wall</td>
</tr>
<tr>
<td>R94</td>
<td>Bend Court</td>
<td>737'</td>
<td>Mid</td>
<td>Native</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>Retaining wall</td>
</tr>
</tbody>
</table>

* Surface Conditions Ratings  5 = Adequate  3 = Some Blading Required  1 = Needs Extensive Work
2.3 Project-Related Forest Service System Roads (Levels 3, 4, and 5) and Additional Roads to be Included in the Forest Service Special Use Authorization

2.3.1 Maintenance, Type, and Season of Use along Project Levels 3, 4, and 5 Roads

*Maintenance Responsibilities:* Condition 57 (paragraph 1) states that there shall be shared responsibility for maintenance levels 3, 4, and 5 roads. These roads are used regularly to access project facilities and they are critical to operation and maintenance of the El Dorado Project; however, they are not used primarily or exclusively by the licensee.

In negotiations with the USFS on January 11, 2005 it was deemed mutually beneficial, with one exception, to divide maintenance responsibilities by road rather than by the maintenance activity. For example, it was agreed EID would be responsible for maintenance on 10N08Y (Bull Creek) and 10N08Y A (Camp 2 Road) while the Forest Service would be responsible for maintenance on 10N40 (Plum Creek Road). The one exception involved an agreement over maintenance on 11N53 (Alder Tract Road). It was agreed that the Forest Service would maintain all project-related levels 3, 4, and 5 roads with the exception of the Alder Tract Road (11N53), which is a maintenance level 5 road. The Alder Tract Road was paved by EID as part of the construction of the Mill to Bull Tunnel in 2000. Based on EID’s use and previous contribution by paving the road, it was agreed that EID would be responsible for vegetation brushing for sight distance and the Forest Service would maintain all other aspects of road maintenance on Alder Tract Road. Appendix A, the *Cooperative Road Maintenance Agreement: Exhibits A-1 and A-2,* includes matrices designating the agreed maintenance responsibilities for the licensee and the Forest Service.

Table 2-7 includes a matrix of all project-related levels 3, 4, and 5 roads with a column asking whether the road is authorized under the existing pre-1992 FERC license (e.g., Federal Power Act). As noted in Section 2.1 of this report, those roads not authorized under the pre-1992 FERC license require Forest Service Special Use Authorization.

*Type and Season of Use:* To address project-related uses, two columns (summer/winter) in Table 2-7 display the type of use or “Average Daily Traffic” (ADT) for each of the levels 3, 4, and 5 roads. As with levels 1 and 2 roads, the ADT is divided into summer and winter use and EID’s use may be recorded by week, month, or year.

2.3.2 Maintenance, Type and Season of Use along Berkeley Camp Roads

*Maintenance Responsibilities:* There are a number of project-related level 2 roads which are not considered the primary responsibility of the licensee. These roads are located within the LTBMU in the vicinity of Echo Lake and are used occasionally to maintain the nearby project facilities. These roads are used primarily by the recreation residences and Berkeley Camp. Per Forest Service correspondence, these roads should be authorized as part of Forest Road Special Use Permit but they will not be maintained by the licensee.

*Type and Season of Use:* The ADT columns in Table 2-7 display the use by summer and winter for all Berkeley Camp roads used to access the El Dorado Project.
<table>
<thead>
<tr>
<th>Road Number</th>
<th>Road Name</th>
<th>Length</th>
<th>Width</th>
<th>Jurisdiction</th>
<th>Maintenance Level</th>
<th>Surface Type</th>
<th>Start</th>
<th>Terminus</th>
<th>Licensee Summer Average Daily Traffic</th>
<th>Licensee Winter Average Daily Traffic</th>
<th>Public Use (y/n)</th>
<th>Authorized by Existing License (y/n)</th>
<th>Remarks/Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>10N40</td>
<td>Plum Creek</td>
<td>5.5</td>
<td>14'</td>
<td>USFS</td>
<td>ML4</td>
<td>Chipseal</td>
<td>Hazel Valley Rd</td>
<td>10N08Y</td>
<td>6 trips/day</td>
<td>6 trips/day</td>
<td>yes</td>
<td>n</td>
<td>Near Pacific House</td>
</tr>
<tr>
<td>10N50</td>
<td>Mormon Emig. Trail</td>
<td>24.3</td>
<td>24'</td>
<td>USFS</td>
<td>ML5</td>
<td>AC</td>
<td>Sly Park Rd</td>
<td>Highway 88</td>
<td>1 trip/day</td>
<td>0</td>
<td>yes</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>11N01</td>
<td>Old Carson</td>
<td>0.5</td>
<td>18'</td>
<td>USFS</td>
<td>ML3/5</td>
<td>Native/AC</td>
<td>Highway 50</td>
<td>Park Creek Road</td>
<td>1 trip/month</td>
<td>1 trip/month</td>
<td>yes</td>
<td>n</td>
<td>Fresh Pond Tie</td>
</tr>
<tr>
<td>11N05</td>
<td>Echo Lake</td>
<td>1.19</td>
<td>14'</td>
<td>USFS</td>
<td>ML5</td>
<td>AC</td>
<td>Johnson Pass Rd</td>
<td>Echo Lake</td>
<td>2 trips/week</td>
<td>0</td>
<td>yes</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>11N05C</td>
<td>Berkeley Camp</td>
<td>0.13</td>
<td>10'</td>
<td>USFS</td>
<td>ML2</td>
<td>Native</td>
<td>Echo Lake Rd</td>
<td>Loop</td>
<td>1 trip/week</td>
<td>0</td>
<td>yes</td>
<td>n</td>
<td>Access to upstream end of tunnel</td>
</tr>
<tr>
<td>11N05D</td>
<td>Echo North</td>
<td>0.17</td>
<td>10'</td>
<td>USFS</td>
<td>ML2</td>
<td>Native</td>
<td>Echo Lake Rd</td>
<td>Home sites</td>
<td>1 trip/week</td>
<td>0</td>
<td>yes</td>
<td>n</td>
<td>Access to Echo Canal</td>
</tr>
<tr>
<td>11N06</td>
<td>Johnson Pass</td>
<td>1.33</td>
<td>24'</td>
<td>USFS</td>
<td>ML5</td>
<td>AC</td>
<td>Echo Lake Rd</td>
<td>Hwy 50 Eastbound</td>
<td>2 trips/week</td>
<td>0</td>
<td>yes</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>11N30Y</td>
<td>Bull Creek Tract</td>
<td>0.3</td>
<td>12'</td>
<td>USFS</td>
<td>ML4</td>
<td>Native</td>
<td>Highway 50</td>
<td>Bull Creek Tract</td>
<td>1 trip/week</td>
<td>1 trip/week</td>
<td>yes</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>11N40</td>
<td>Silver Fork</td>
<td>15.4</td>
<td>18'</td>
<td>USFS</td>
<td>ML5</td>
<td>AC/Chipseal</td>
<td>Highway 50</td>
<td>Carpenter Cr Div.</td>
<td>1 trip/week</td>
<td>1 trip/month</td>
<td>yes</td>
<td>n</td>
<td>Sand Flat Campground</td>
</tr>
<tr>
<td>11N46</td>
<td>Alder Creek</td>
<td>2.7</td>
<td>14'</td>
<td>USFS</td>
<td>ML3</td>
<td>Native</td>
<td>Highway 50</td>
<td>Carpenter Cr Div.</td>
<td>2 trips/month</td>
<td>0</td>
<td>yes</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>11N47</td>
<td>Carpenter</td>
<td>0.3</td>
<td>10'</td>
<td>USFS</td>
<td>ML5</td>
<td>AC</td>
<td>Highway 50</td>
<td>R74</td>
<td>4 trips/day</td>
<td>4 trips/day</td>
<td>yes</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>11N53</td>
<td>Alder Tract</td>
<td>0.6</td>
<td>10'</td>
<td>USFS</td>
<td>ML4</td>
<td>Native/Chipseal</td>
<td>Highway 50</td>
<td>30 Milestone Tract</td>
<td>2 trips/month</td>
<td>2 trips/month</td>
<td>yes</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>11N74</td>
<td>30 Milestone</td>
<td>0.6</td>
<td>10'</td>
<td>USFS</td>
<td>ML4</td>
<td>Native/Chipseal</td>
<td>Highway 50</td>
<td>30 Milestone Tract</td>
<td>2 trips/month</td>
<td>2 trips/month</td>
<td>yes</td>
<td>n</td>
<td></td>
</tr>
</tbody>
</table>
2.4 Forest Service Notification Standards (Camino Dispatch)

Condition 57 requires the licensee to include notification standards for Forest Service (Camino Dispatch) including radio frequencies and N (tail) numbers. Per Forest Service e-mail correspondence dated August 4, 2004, from Greg Connick, Table 2-8 lists the aviation standards and information required by Camino Dispatch.

Table 2-8 Aviation Standards and Information Required by Camino Dispatch

| - 24-hour notification from licensee Project Manager or Pilot to Camino Dispatch (530) 642-5170. |
| - Tail Number of the aircraft. |
| - Aircraft company name and phone number. |
| - Radio frequency aircraft will be monitoring |
| - Project location and flight plans. |
| - Expected duration of flight operations. |
| - Any significant changes of location or duration during flight activities shall be reported to Camino Dispatch via radio or telephone. |
| - Forest Net Radio Frequency; Receive = 171.525, Transmit 169.950 |
| - Repeater Frequencies: |
|   | Tone 1   | Alder Ridge | 110.9 |
|   | Tone 2   | Leek Springs Hill | 123.0 |
|   | Tone 3   | Bald Mountain | 131.8 |
|   | Tone 4   | Big Hill | 136.5 |
|   | Tone 5   | Pine Hill | 146.2 |
|   | Tone 6   | Echo Summit | 156.7 |
|   | Tone 7   | Mt. Reba | 167.9 |
|   | Tone 8   | Bunker Hill | 103.5 |
|   | Tone 9   | Hawkins Peak | 100.0 |
|   | Tone 10  | Walker Ridge | 107.2 |
| Not activated at this time | Tone 11 | Sourdough Hill | 114.8 (will be on line soon) |

For reference, Appendix E also includes an example Aviation Plan that was used for the Lake Aloha Dam Maintenance and Telemetry Station Installation Project. This type of information will be included for upgrade projects involving the use of aircraft on NFS lands.
Figure 2-9

El Dorado Irrigation District
2890 Mosquito Road, Placerville, CA 95667
(530) 622-4513

FERC Project 184
Transportation System Management Plan
LICENSEE-MAINTAINED ROADS
Power House Area
Date: May 12, 2005
Pg 2- Rev: 3.3

Legend
- Culverts, Proposed
- Culverts, Existing
- Signs
- Gates
- Hellspot
- Licensee-Maintained Roads
- Project-Related Roads
- Post Mile Markers (1/10mi.)
- El Dorado Canal
- Eldorado National Forest
- Private Land

Map production and data management by:
PRICE GEOGRAPHIC CONSULTING
2004 Adobe Trail - Placerville, California 95667
(530) 626-1964 - at_price@paebell.net

550 Feet
Figure 2-12

Licensee-Maintained Roads
Rock Crusher Road Area
Date: May 12, 2005

El Dorado Irrigation District
2890 Mosquito Road, Placerville, CA 95667
(530) 622-4513

Legend
- Culverts, Proposed
- Culverts, Existing
- Signs
- Gates
- Hotspot
- Licensee-Maintained Roads
- Project-Related Roads
- Post Mile Markers (1/10 mi.)
- El Dorado Canal
- Eldorado National Forest
- Private Land

El Dorado Irrigation District
2890 Mosquito Road, Placerville, CA 95667
(530) 622-4513

FERC Project 184
Transportation System Management Plan
LICENSEE-MAINTAINED ROADS
Rock Crusher Road Area
Date: May 12, 2005

2004 Adobe Trail - Placerville, California 95667
(530) 626-1964 - at_price@pachell.net

Map production and data management by:
PRICE GEOGRAPHIC CONSULTING
2004 Adobe Trail - Placerville, California 95667
(530) 626-1964 - at_price@pachell.net

Figure 2-12
3.0 Hydrology and Culvert Upgrade Plan

This section describes the hydrology criteria applicable to drainage structures that are recommended as new installations and that are recommended for replacement of existing structures. The recommendations are based on an in-field “Needs Assessment” of culverts on roads considered the primary responsibility of the licensee (see Section 2.0). The hydrology criteria outlined below were developed in coordination with the Forest Service.

Drainage structures along project roads generally either relieve water accumulating along a roadside ditch that is not associated with a stream, or water conveyed from a stream. In some cases, drainage structures may serve both purposes. The drainages have been distinguished as ephemeral, seasonal or perennial streams, with study criteria specified for peak flows, sediment yield, or protection of aquatic resources according to the type of stream.

Stream hydrology was analyzed where a new installation, or replacement of an existing drainage structure, is recommended within the first 5-year period of capital improvements/maintenance following issuance of the new FERC License (see Appendix B). Hydrology was not analyzed for ditch drains, as no streams or watersheds are associated with these facilities. Recommendations for new ditch drains conform to Forest Service standards to install either an 18-inch or 24-inch diameter round culvert, or equivalent drainage structure.

The hydrologic analyses outlined below are consistent with the Forest Service criteria described in a Forest Service memorandum from John Berry to Len Marino (Memorandum dated October 20, 2004). The Forest Service Hydrologist, Ms. Cheryl Mulder, also provided additional clarification regarding hydrologic analysis during a meeting on January 21, 2005 and as part of a follow-up telephone conversation on February 10, 2005.

3.1 Hydrology Criteria

During the Forest Service meeting on January 21, 2005, various criteria were identified to address hydrology and culverts along the licensee-maintained roads (see Table 2-5). As part of this meeting, it was agreed that hydrologic analysis would apply to a new installation or replacement of an existing drainage structure in the first cycle of the Five-Year Capital Improvement and Road Maintenance Plan (see Appendix B). As discussed in a Forest Service memorandum dated October 20, 2004, this limitation is consistent with the objectives of the 4(e) Rationale Report and the Sierra Nevada Forest Plan Amendment: Summary (2004, Section 70, page 59 of the Record of Decision, Sierra Nevada Forest Plan Amendment – Final Supplemental Environmental Impact Statement). Thus, hydraulic calculations and other hydrologic analyses were not performed for road drainage crossings only requiring maintenance. The determination of which culverts need replacement in the near term (e.g., first five-year cycle) was based on an in-field needs assessment at each culvert performed from June through October 2004 (see Section 2.0 and Appendix B).

The criteria governing hydrologic analyses was based on factors such as (1) size of the watershed area (> or ≤ than 90 acres); (2) stream types (e.g., ephemeral, seasonal or perennial), and (3) aquatic habitat (in perennial drainages only). During this first five-year cycle of the Five-Year Capital Improvement and Road Maintenance Plan (Appendix B), none of the culverts to be replaced or repaired met the criteria for a detailed hydrologic analysis. For example, none of the culverts identified as needing replacement, repair or installation in the next five years are
located in watersheds greater than 90 acres, none are greater than 24 inches in diameter, none have a defined bed and bank, and none are located in perennial streams.

However, over the life of the FERC license, most of the culverts determined to be the primary responsibility of the licensee will need to be replaced, including some culverts located in watersheds >90 acres or culverts >24 inches. As such, the following section provides a comprehensive discussion of the relevant hydrological terms and analyses for all culverts in the El Dorado Project area. Although the majority of hydrologic criteria and analyses discussed below do not apply to this initial culvert upgrade plan, they may be required for future culvert replacement or installation plans.

Presented below is a summary of the hydrologic criteria for the watersheds and drainages addressed in this TSMP. The topic areas include (1) characterization of stream types; (2) estimation of peak flows; (3) estimation of sediment loads; (4) characterization of streambed composition; and (5) protection of aquatic resources. The final section outlines the limitations of hydrologic analysis as it applies to the initial Five-Year Capital Improvement and Road Maintenance Plan.

### 3.1.1 Characterization of Stream Types

This section defines stream types found in the El Dorado Project area. Stream types are one of the criteria used to determine the types and sizes of culverts needed for road crossings of drainages.

Stream types as defined by the United States Army Corps of Engineers, and as referred to in this report, are summarized as follows:

a) **Ephemeral Stream** – An ephemeral stream has flowing water only during and for a short duration after precipitation events in a typical year. Ephemeral streambeds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

b) **Seasonal (or Intermittent) Stream** – A seasonal or intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

c) **Perennial Stream** – A perennial stream has flowing water year-round during a typical year. The water table is located above the streambed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

The Forest Service GIS layer as used by the licensee for initially characterizing the drainages and stream types is to be considered preliminary, prior to being verified in the field on an ongoing basis during project implementation. The verification will likely be performed as the culvert or drainage structures are determined to be in need of replacement over the term of the license, in coordination with any other field work necessary.
3.1.2 Estimation of Peak Flows Based on the 100-Year 24-Hour Event

This section defines watershed sizes that are used to define the type and size of culverts needed for road crossings of drainages. The criteria and analyses required differ for watersheds > or < 90 acres.

a) Drainage Areas ≤ 90 Acres

Estimates of 100-year 24-hour storm events are being performed using the Peak Discharge (Rational) Method in accordance with the El Dorado County Drainage Manual (1995).

Data required to perform the estimation of peak flow for areas ≤ 90 acres is as follows:

i) Total Area – Area of entire watershed in acres;

ii) Mean Annual Precipitation – Mean annual precipitation in inches/year as determined from map of Mean Annual Rainfall for El Dorado County provided in Sections 2 and 4 of the El Dorado County Drainage Manual;

iii) 100-year 24-hour Rainfall – Rainfall for 100-year 24-hour event in inches as provided in the County of El Dorado Drainage Manual, which is used to derive rainfall intensity i in inches/hour;

iv) Overland Flow Roughness Coefficient (n) – From Table 2.4.3 of El Dorado County Drainage Manual; Use n=0.60 for Woods - Moderate Underbrush for computing $T_c$;

v) Runoff Curve Number (CN) – From Table 2-2c, page 2-46 of El Dorado County Drainage Manual; CN=70 for soils with low infiltration rates when thoroughly wetted in woods with adequate vegetative cover;

vi) Time of Concentration ($T_c$); – $T_c$ is the time it takes for runoff to travel from the most distant part of the drainage area to the watershed outlet, and varies primarily according to the length and slope of overland surface; use $T_c = 10$ min for $L<200'$, $T_c = 30$ min for $200'<L<500'$, and $T_c = 60$ min for $L>500'$;

vii) Runoff Coefficient (C) – From Table 2.5.2, page 2-22 of El Dorado County Drainage Manual; use C=0.42 for $T_c = 10$ min, C=0.60 for $T_c = 30$ min, & C=0.66 for $T_c = 60$ min.

As noted above, none of the culverts identified for replacement, repair, or installation in the next five years are located in watersheds greater than 90 acres. However, given that future five-year plans or additions to the culvert plan may require replacement of culverts in drainages greater than 90 acres, these criteria are included for future reference.

b) Drainage Areas > 90 Acres

Where culvert capacity is observed to be an issue, or for all new or replacement culverts ≥ 30 inches diameter, estimates of the 100-year storm events are being performed using the USGS’ National Flood Frequency (NFF) Program, or an equivalent model as approved by the USFS. The NFF Model is available at the following USGS website:

http://water.usgs.gov/software/NFF.EXE.

Data required to estimate peak flow for areas > 90 acres is as follows:

i) Region – Choose Sierra Region

ii) Altitude Index – Mean elevation of watershed in 1,000s of feet

iii) Total Basin Drainage Area – Area of entire watershed in square miles
iv) Mean Annual Precipitation – Average annual rainfall in inches as determined from Mean Annual Rainfall for El Dorado County map provided in sections 2 and 4 of the County of El Dorado Drainage Manual

v) Crippen and Bue Flood Region – Choose Region 17 for California

c) Peak Flows in Combined Drainages and Spillway Channels
Peak flows in Drainages that are also spillway channels associated with the El Dorado Canal will be estimated by combining the estimate of “any season” base flows from natural runoff and the potential maximum discharge from the canal. This is consistent with the criteria used for the Bull Creek Tract Road crossing of Bull Creek as previously approved by the USFS, SWRCB and CDFG. The criteria are documented in the SWRCB’s September 2004 letter to Len Marino of EID as Condition 4 (page 3) of the amendment to the 401 Water Quality Certification for the Mill Creek to Bull Creek Tunnel. Any Season Base Flow is defined as the highest base flow that could be expected to occur between (not during) storm events during which EID may be required to make releases from its spillways. The maximum base flows are expected to occur in winter months of December through March.

3.1.3 Estimation of Sediment Load

This section describes sediment load estimation for the streams with defined bed and bank features. Streams with defined bed and bank features are expected to include all perennial and some of the seasonal streams. Based on the field work performed in support of this TSMP, it is estimated that there are approximately 17 culverts located at streams with defined bed and bank features, but none of the culverts on streams with defined beds and banks are recommended for replacement in the initial 5-Year Capital Improvement and Road Maintenance Plan. Because watershed (and therefore sediment loading) conditions can vary tremendously over time, sediment load for the 17 future culvert replacements will be estimated at the time that the culverts are identified for replacement. Therefore, no sediment load estimates are being performed for the initial five-year capital improvement/maintenance plan.

The following discussion describes the criteria and methodology for Sediment Load analysis required for the installation of a culvert on a stream with a defined bed and bank. Although these criteria do not apply to the initial five-year cycle, these criteria may apply to future culvert upgrade plans.

Annual Sediment Load will be estimated using the Water Erosion Prediction Project (WEPP) soil erosion model. The model’s routine, entitled Disturbed WEPP, is the appropriate predictor of sediment yield from a watershed. The model output provides a 30-year average annual estimate of erosion rate and sediment yield, both in units of Tons/Acre. The results will be reviewed as a general indicator for understanding the relative sediment yield, and depending on the results, may lead to adding a factor of capacity above and beyond the estimated hydraulic capacity. The WEPP Model is available at the following Washington State University/USFS cooperative website: http://forest.moscowfsl.wsu.edu/engr/info.html

Data required to perform the estimation of sediment yield is as follows:

a) Total Area – Area of entire drainage in acres before dividing into two sections for modeling purposes;
b) **Gradient** – After dividing the drainage into Section 1 (upper) & Section 2 (lower), estimate the slope at the top of slope (0% if top of hill), at the midpoints of Sections 1 and 2, and at the toe of the drainage;

c) **Horizontal Length** – Estimate the horizontal length of the drainage reach (rather than the slope length);

d) **Area of Section 1** – Area of Section 1 (upper portion of drainage);

e) **Area of Section 2** – Area of Section 2 (lower portion of drainage);

f) **Vegetative Cover** – Estimate the % vegetative cover on the surface of the ground;

g) **Rock Cover** – Estimate the % rock cover on the surface of the ground;

h) **Climate** – Select the most representative climate zone - Use Mt. Shasta, CA or custom data in Rock:Climate weather generator;

i) **Soil Texture** – Select the most representative among clay loam, silt loam, sandy loam, loam; and,

j) **Vegetative Treatment** – Select the most applicable among 20-year-old forest, 5-year-old forest, shrubs, tall grass, short grass, high severity fire, or skid trail.

### 3.1.4 Characterization of Streambed Composition

As with sediment load estimation, no streambed composition or gradation analysis is required for the initial five-year plan because none of the culverts identified for replacement, repair, or installation have defined bed and bank features. This section defines the future methodology to be used for characterizing streambed composition for the installation of a culvert in drainages with a defined bed and bank.

Streambed composition is to be characterized by gradation for those streams with defined bed and bank features. Streams with defined bed and bank features are expected to include all perennial and some of the seasonal streams. D$_{84}$, which represents the grain diameter to which 84 percent of the streambed particles are less than or equal in size, is considered an indicator of channel bed roughness.

### 3.1.5 Protection of Aquatic Resources

Protection of aquatic resources will be considered at the perennial drainages. Alder Creek is the only perennial stream on the project-related roads system. The bridge crossing at Alder Creek leading to the inlet of El Dorado Tunnel is not currently planned for replacement. No studies are required for Alder Creek due to its demonstrated hydraulic adequacy after surviving the January 1997 flood without structural damage.

If perennial stream drainage structures are to be replaced, the presence of fish habitat and potential impact to ecological value of the riparian resources will be considered as factors for prioritization. Replacement structures are to be designed and constructed to allow upstream and downstream passage for aquatic-dependent species. The drainage structures are to maintain channel bed substrate and be sized with a cross-sectional configuration to generally match the “bank full” dimensions of the stream. Examples of suitable structures for protecting aquatic resources include bottomless arch pipes and oversized round culverts with inverts set below channel bottom.
3.1.6 Limitations of Study

Hydrologic analysis has been applied to streams in cases where there is a recommendation for a new installation, or replacement of an existing drainage structure, occurring within the first 5-year period following issuance of the new FERC License. No hydrologic analysis has been performed for replacement of existing or installation of new ditch drains, as these are not associated with a natural stream and corresponding watershed. Where hydrologic analyses do apply, they have been performed consistent with the criteria specified by the USFS, resulting in recommendations for the capacity, size, and type of drainage structures accordingly.

3.1.7 Applicability of Hydrologic Study Criteria

Table 3-1 summarizes applicable hydrologic studies by stream type. For purposes of distinguishing the hydrologic study criteria by stream type, it is assumed that seasonal drainages are generally defined with bed and bank channel characteristics.

Table 3-1 Applicability of Hydrologic Study Criteria

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Replacement of New Ditch Drains</th>
<th>Installation of New Ditch Drains</th>
<th>Replacement of Existing or Installation of New Culverts in Ephemeral Drainages</th>
<th>Replacement of Existing or Installation of New Culverts in Seasonal Drainages</th>
<th>Replacement of Existing or Installation of New Culverts in Perennial Drainages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimation of Peak Flows</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Estimation of Sediment Yield</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Characterization of Streambed Composition</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Protection of Aquatic Resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

3.2 Drainage Data

Table 3-2 Drainage Data lists the locations of existing and proposed drainage structures including culverts, dips, waterbars, ditches, fords, and bridges as applicable. Each culvert is assigned a unique alphanumeric Drainage ID, which is also referenced by location in the Watershed Maps, Figures 3-1 through 3-7. Drainage IDs include a letter prefix consisting of either C for Existing Culvert, PC for Proposed Culvert, or SD for Slot Drain. For each culvert location, the stream type (as defined in Section 3.1.1), drainage area and hydrologic connectivity are listed. Stream
types are abbreviated as P for Perennial, S for Seasonal, E for Ephemeral and DD for Ditch Drain, for which the latter (DD) designation is not associated with a stream.

Hydrologic connectivity will be reviewed when analyzing the placement of a drainage structure relative to the alignment and elevations of the stream. A drainage structure that maintains hydrologic connectivity is one that generally maintains the alignment of the natural stream, and provides passage of aquatic organisms both upstream and downstream. Hydrologic Connectivity is indicated in Table 3-2 as either a yes (Y) or no (N) for stream systems or not applicable (N/A) for ditch drains. The approximate number of drainage structures by category is about 119 total consisting of about 0 perennial, 17 seasonal, 17 ephemeral, and 85 ditch drains.
<table>
<thead>
<tr>
<th>Road Number</th>
<th>Road Name</th>
<th>Milepost</th>
<th>Size of Culvert</th>
<th>Dip</th>
<th>Water Bar</th>
<th>Ditch</th>
<th>Ford</th>
<th>Bridge</th>
<th>Drainage ID</th>
<th>Drainage Area (acres)</th>
<th>Bed &amp; Bank</th>
<th>Stream Type</th>
<th>Hydrologic Connectivity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>10N08Y</td>
<td>Bull Creek</td>
<td>0</td>
<td>18”x40’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C48</td>
<td>4.68</td>
<td>Y</td>
<td>S</td>
<td>Y</td>
<td>Needs cleaning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.27</td>
<td>18”x36’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C49</td>
<td>37.79</td>
<td>Y</td>
<td>S</td>
<td>Y</td>
<td>Needs cleaning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.37</td>
<td>18”x32’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C51</td>
<td>67.71</td>
<td>Y</td>
<td>S</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>10N08YA</td>
<td>Camp Two</td>
<td>0.03</td>
<td>30”x32’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C52</td>
<td>32.62</td>
<td>Y</td>
<td>S</td>
<td>Y</td>
<td>With end section</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.11</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.18</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.2</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.23</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.25</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.27</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.28</td>
<td>36”x32’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C53</td>
<td>5.52</td>
<td>Y</td>
<td>DD</td>
<td>N/A</td>
<td>Beveled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.34</td>
<td>36”x36’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C54</td>
<td>100.68</td>
<td>Y</td>
<td>S</td>
<td>Y</td>
<td>With end section</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.43</td>
<td>18”x36’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C55</td>
<td>2.37</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.44</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Spring area</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.45</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.5</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.54</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.62</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.64</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.66</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.69</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.69</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.7</td>
<td>8”x20’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C75</td>
<td>49.61</td>
<td>Y</td>
<td>S</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.73</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.76</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10N40G</td>
<td>Highway Cut</td>
<td>0.01</td>
<td>36”x7’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C56</td>
<td>29.25</td>
<td>Y</td>
<td>S</td>
<td>Y</td>
<td>Outlet overgrown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.12</td>
<td>18”x60’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C57</td>
<td>1.54</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.2</td>
<td>18”x60’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C58</td>
<td>9.49</td>
<td>Y</td>
<td>S</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.34</td>
<td>18”x24’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C59</td>
<td>3.88</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.39</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.4</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road Number</td>
<td>Road Name</td>
<td>Milepost</td>
<td>Size of Culvert</td>
<td>Dip</td>
<td>Water Bar</td>
<td>Ditch</td>
<td>Ford</td>
<td>Bridge</td>
<td>Drainage ID</td>
<td>Drainage Area (acres)</td>
<td>Bed &amp; Bank</td>
<td>Stream Type</td>
<td>Hydrologic Connectivity</td>
<td>Remarks</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------</td>
<td>----------</td>
<td>-----------------</td>
<td>-----</td>
<td>-----------</td>
<td>-------</td>
<td>------</td>
<td>--------</td>
<td>-------------</td>
<td>------------------------</td>
<td>------------</td>
<td>-------------</td>
<td>------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>0.41</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C60-61</td>
<td>41.84</td>
<td>Y</td>
<td>S</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>0.44</td>
<td></td>
<td>36&quot;x38&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C62</td>
<td>18.88</td>
<td>Y</td>
<td>S</td>
<td>Y</td>
<td>Overflow</td>
</tr>
<tr>
<td>0.58</td>
<td></td>
<td>36&quot;x40&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC16</td>
<td>2.75</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>0.68</td>
<td></td>
<td>24&quot;x40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C64</td>
<td>5.79</td>
<td>Y</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>0.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Leadoff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.85</td>
<td></td>
<td>18&quot;x40&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C65</td>
<td>6.80</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>0.88</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C76</td>
<td>0.87</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C77</td>
<td>1.51</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>1.07</td>
<td></td>
<td>18&quot;x40&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C78</td>
<td>1.50</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>1.14</td>
<td></td>
<td>18&quot;x40&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C79</td>
<td>2.14</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Inlet crushed</td>
</tr>
<tr>
<td>1.14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C80</td>
<td>2.14</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Outlet buried</td>
</tr>
<tr>
<td>1.19</td>
<td>18&quot;x40&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C81</td>
<td>2.14</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Outlet buried</td>
</tr>
<tr>
<td>1.24</td>
<td>18&quot;x40&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C82</td>
<td>2.14</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Outlet buried</td>
</tr>
<tr>
<td>1.32</td>
<td>18&quot;x40&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C83</td>
<td>2.14</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Outlet buried</td>
</tr>
<tr>
<td>1.48</td>
<td>18&quot;x40&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C84</td>
<td>2.14</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Outlet buried</td>
</tr>
<tr>
<td>1.58</td>
<td>18&quot;x40&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C85</td>
<td>2.14</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Outlet buried</td>
</tr>
</tbody>
</table>

**NOTE:** Culverts 60 & 61 are in parallel, with one serving as overflow in same drainage.
<table>
<thead>
<tr>
<th>Road Number</th>
<th>Road Name</th>
<th>Milepost</th>
<th>Size of Culvert</th>
<th>Dip</th>
<th>Water Bar</th>
<th>Ditch</th>
<th>Ford</th>
<th>Bridge</th>
<th>Drainage ID</th>
<th>Drainage Area (acres)</th>
<th>Bed &amp; Bank</th>
<th>Stream Type</th>
<th>Hydrologic Connectivity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.45</td>
<td></td>
<td>12&quot;X25&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CO4</td>
<td>1.15</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>0.53</td>
<td></td>
<td>12&quot;X20&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CO5</td>
<td>1.00</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>0.56</td>
<td></td>
<td>6&quot;X18&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SD1</td>
<td>0.42</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>0.63</td>
<td>New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC01</td>
<td>3.56</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>0.72</td>
<td></td>
<td>10&quot;X15&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SD1</td>
<td>4.94</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>0.81</td>
<td></td>
<td>6&quot;X22&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SD7</td>
<td>4.93</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>0.82</td>
<td>New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC05</td>
<td>10.81</td>
<td>N</td>
<td>E</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>0.88</td>
<td></td>
<td>10&quot;X26&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CO6</td>
<td>2.34</td>
<td>N</td>
<td>E</td>
<td>N</td>
<td>Needs cleaning</td>
</tr>
<tr>
<td>0.94</td>
<td></td>
<td>6&quot;X20&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC08</td>
<td>3.14</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Slot drain</td>
</tr>
<tr>
<td>1.03</td>
<td></td>
<td>10&quot;X26&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC09</td>
<td>11.10</td>
<td>N</td>
<td>E</td>
<td>Y</td>
<td>Needs cleaning/repair</td>
</tr>
<tr>
<td>1.04</td>
<td>New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC10</td>
<td>18.22</td>
<td>N</td>
<td>E</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>1.13</td>
<td>End</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.22</td>
<td></td>
<td>10&quot;X30&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC20</td>
<td>1.17</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Crushed inlet</td>
</tr>
<tr>
<td>1.27</td>
<td>New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC07</td>
<td>1.94</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>1.35</td>
<td></td>
<td>12&quot;X30&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CO14</td>
<td>1.50</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Rusted</td>
</tr>
<tr>
<td>1.39</td>
<td></td>
<td>6&quot;X24&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SD3</td>
<td>2.23</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Slot drain</td>
</tr>
<tr>
<td>1.41</td>
<td>New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC08</td>
<td>2.84</td>
<td>N</td>
<td>E</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>1.46</td>
<td></td>
<td>12&quot;X24&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CO15</td>
<td>1.65</td>
<td>N</td>
<td>E</td>
<td>N</td>
<td>Needs cleaning</td>
</tr>
<tr>
<td>1.52</td>
<td>New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC09</td>
<td>4.46</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>1.58</td>
<td></td>
<td>12&quot;X24&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SD14</td>
<td>3.09</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Needs cleaning</td>
</tr>
<tr>
<td>1.64</td>
<td></td>
<td>6&quot;X20&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC04</td>
<td>2.74</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Slot drain</td>
</tr>
<tr>
<td>1.64</td>
<td>New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC10</td>
<td>1.42</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>1.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.77</td>
<td></td>
<td>6&quot;X20&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC11</td>
<td>0.60</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Slot drain</td>
</tr>
<tr>
<td>1.82</td>
<td>New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC17</td>
<td>1.94</td>
<td>N</td>
<td>E</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Roll</td>
<td></td>
<td>12&quot;X30&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC12</td>
<td>4.48</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Repair fill needs cleaning</td>
</tr>
<tr>
<td>1.9</td>
<td>New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC13</td>
<td>1.32</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2.11</td>
<td></td>
<td>18&quot;X30&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC18</td>
<td>1.28</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Poor alignment</td>
</tr>
<tr>
<td>2.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC19</td>
<td>0.98</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Inlet crushed</td>
</tr>
<tr>
<td>2.22</td>
<td></td>
<td>18&quot;X30&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC20</td>
<td>3.64</td>
<td>N</td>
<td>E</td>
<td>Y</td>
<td>Crushed inlet</td>
</tr>
<tr>
<td>2.29</td>
<td></td>
<td>18&quot;X30&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C70</td>
<td>0.41</td>
<td>N</td>
<td>E</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>2.39</td>
<td>New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC14</td>
<td>7.71</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td></td>
<td>18&quot;X26&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CO21</td>
<td>20.25</td>
<td>N</td>
<td>S</td>
<td>Y</td>
<td>Needs cleaning</td>
</tr>
<tr>
<td>2.6</td>
<td></td>
<td>10&quot;X20&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SD20</td>
<td>4.45</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Needs cleaning</td>
</tr>
<tr>
<td>2.66</td>
<td></td>
<td>6&quot;X20&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SD21</td>
<td>0.78</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Slot drain</td>
</tr>
<tr>
<td>2.69</td>
<td>UTL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SD22</td>
<td>0.09</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2.69</td>
<td>New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC15</td>
<td>2.61</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2.72</td>
<td></td>
<td>6&quot;X20&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SD6</td>
<td>0.78</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2.72</td>
<td>End</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.78</td>
<td></td>
<td>0&quot;X20&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC23</td>
<td>1.68</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2.79</td>
<td></td>
<td>0&quot;X18&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC24</td>
<td>0.33</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Rusted out</td>
</tr>
<tr>
<td>2.79</td>
<td>End</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road Number</td>
<td>Road Name</td>
<td>Milepost</td>
<td>Size of Culvert</td>
<td>Dip</td>
<td>Water Bar</td>
<td>Ditch</td>
<td>Ford</td>
<td>Bridge</td>
<td>Drainage ID</td>
<td>Drainage Area (acres)</td>
<td>Bed &amp; Bank</td>
<td>Stream Type</td>
<td>Hydrologic Connectivity</td>
<td>Remarks</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
<td>----------</td>
<td>-----------------</td>
<td>-----</td>
<td>-----------</td>
<td>-------</td>
<td>------</td>
<td>--------</td>
<td>-------------</td>
<td>------------------------</td>
<td>------------</td>
<td>-------------</td>
<td>------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>R41</td>
<td>Woods Creek</td>
<td>0.02</td>
<td>18&quot;X46'</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C73</td>
<td>2.41</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.03</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.05</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.07</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.09</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Leadoff</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.02</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.04</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.05</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.07</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.08</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.09</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.1</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.12</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.14</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.17</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.18</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.2</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.21</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.24</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R71</td>
<td>Flume 39/40</td>
<td>0.25</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C67</td>
<td>0.77</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Old iron pipe</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.26</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.28</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.32</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.34</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.36</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.41</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.42</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R72</td>
<td>Camp X</td>
<td>0.02</td>
<td></td>
<td>Leadoff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.03</td>
<td></td>
<td>Beginning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.07</td>
<td></td>
<td>End</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.08</td>
<td></td>
<td>Leadoff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.09</td>
<td></td>
<td>Beginning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.16</td>
<td></td>
<td>End</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.19</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.26</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.3</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.36</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.4</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.46</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R73</td>
<td>Camp 2</td>
<td>0.1</td>
<td></td>
<td>New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.27</td>
<td></td>
<td>PC17</td>
<td>7.86</td>
<td>N</td>
<td>E</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R74</td>
<td>El Dorado</td>
<td>0.01</td>
<td></td>
<td>Beginning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.03</td>
<td></td>
<td>End</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.07</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.08</td>
<td></td>
<td>Beginning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3-11
<table>
<thead>
<tr>
<th>Road Number</th>
<th>Road Name</th>
<th>Milepost</th>
<th>Size of Culvert</th>
<th>Dip</th>
<th>Water Bar</th>
<th>Ditch</th>
<th>Ford</th>
<th>Bridge</th>
<th>Drainage ID</th>
<th>Drainage Area (acres)</th>
<th>Bed &amp; Bank</th>
<th>Stream Type</th>
<th>Hydrologic Connectivity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>R75 Camp 1</td>
<td></td>
<td>0.00/0.04</td>
<td>8&quot;x38&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C40</td>
<td>3.20</td>
<td>Y</td>
<td>E</td>
<td>Y</td>
<td>Every cmp on this road needs replacement or maint.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.07</td>
<td>36&quot;x40&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C41</td>
<td>0.85</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Rusted out</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.09</td>
<td>8&quot;x36&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C42</td>
<td>1.21</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.13</td>
<td>8&quot;x30&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C43</td>
<td>0.44</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.16</td>
<td>8&quot;x30&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C44</td>
<td>1.12</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.21</td>
<td>New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC23</td>
<td>1.30</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Half full of sediment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.26</td>
<td>24&quot;x40&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C45</td>
<td>0.55</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>R76 Camp S</td>
<td></td>
<td>0.02</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R82 Pacific Tunnel</td>
<td>0.12</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.13</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.15</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.17</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R821 Hazel Creek Tunnel</td>
<td>0.14</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Concrete</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.16</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R83 Spillway 33</td>
<td>0.03</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.16</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.24</td>
<td>New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC18</td>
<td>2.15</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>R84 Old Camp 4</td>
<td>0.24</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R87 Camp S</td>
<td></td>
<td>0.01</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.02</td>
<td>Beginning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.04</td>
<td>End</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R75 Camp 1</td>
<td></td>
<td>0.00/0.04</td>
<td>8&quot;x38&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C40</td>
<td>3.20</td>
<td>Y</td>
<td>S</td>
<td>Y</td>
<td>Around Rockwall</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.07</td>
<td>36&quot;x40&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C41</td>
<td>0.85</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Needs replacement or maint.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.09</td>
<td>8&quot;x36&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C42</td>
<td>1.21</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.13</td>
<td>8&quot;x30&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C43</td>
<td>0.44</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.16</td>
<td>8&quot;x30&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C44</td>
<td>1.12</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.21</td>
<td>New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC23</td>
<td>1.30</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Half full of sediment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.26</td>
<td>24&quot;x40&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C45</td>
<td>0.55</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

3-12
<table>
<thead>
<tr>
<th>Road</th>
<th>Road Name</th>
<th>Size of Culvert</th>
<th>Dip</th>
<th>Water Bar</th>
<th>Ditch</th>
<th>Ford</th>
<th>Bridge</th>
<th>Drainage ID</th>
<th>Drainage Area (acres)</th>
<th>Bed &amp; Bank</th>
<th>Stream Type</th>
<th>Hydrologic Connectivity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>R88</td>
<td>Camp P</td>
<td>0.08</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.13</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>C27</td>
<td>4.18</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Old iron pipe</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.17</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>C28</td>
<td>7.72</td>
<td>N</td>
<td>E</td>
<td>Y</td>
<td>10&quot; cmp inlet; 12&quot; pvc outlet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.27</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.33</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>C29</td>
<td>10.11</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>R89</td>
<td>Rock Crusher</td>
<td>0.03</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.04</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.06</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.12</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.13</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.14</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.15</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.17</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.2</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.23</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.33</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C26</td>
<td>1.53</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
<td>Rusted iron pipe</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.37</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.39</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.41</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.44</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.48</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.52</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.62</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.64</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.68</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C25</td>
<td>57.22</td>
<td>Y</td>
<td>S</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.71</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.76</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road Number</td>
<td>Road Name</td>
<td>Milepost</td>
<td>Size of Culvert</td>
<td>Dip</td>
<td>Water Bar</td>
<td>Ditch</td>
<td>Ford</td>
<td>Bridge</td>
<td>Drainage ID</td>
<td>Drainage Area (acres)</td>
<td>Bed &amp; Bank</td>
<td>Stream Type</td>
<td>Hydrologic Connectivity</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------</td>
<td>----------</td>
<td>-----------------</td>
<td>-----</td>
<td>-----------</td>
<td>-------</td>
<td>------</td>
<td>--------</td>
<td>-------------</td>
<td>------------------------</td>
<td>------------</td>
<td>-------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>R92</td>
<td>Moonlane East</td>
<td>0.06</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.2</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R93</td>
<td>Kodiak Trail</td>
<td>0.07</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.08</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.08</td>
<td>12&quot;x30'</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C78</td>
<td>0.48</td>
<td>N</td>
<td>DD</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.09</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.1</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.11</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.16</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R94</td>
<td>Bend Court</td>
<td>0.27</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.28</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.29</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.32</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.35</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.37</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.39</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3-2 Drainage Data (3-20-05)

Legend:

Size of Culvert - If a CMP, size noted by Diameter (inches) x Length (feet); If a Slot Drain, size noted by Width (inches) x Length (feet); UTL = Unable to Locate
Drainage ID: C = Existing Culvert, PC = Proposed Culvert, SD = Slot Drain; As noted on Drainage Facilities & Watershed Maps
Drainage Area - Calculated drainage area in acres
Bed & Bank - Yes (Y) denotes the stream channel has defined bed & bank features; No (N) denotes it does not;
Stream Type - P = Perennial, S = Seasonal, E = Ephemeral, DD = Ditch Drain
Hydrologic Connectivity - Yes (Y) denotes the drainage crossing has hydrologic connectivity with the stream; No (N) denotes it does not;
Figure 3-3-A

Legend
- Culverts, Proposed
- Culverts, Existing
- Watersheds
- R01 Licensee-Maintained Roads
- R02 Project-Related Roads
- Post Mile Markers (1/10mi.)

El Dorado National Forest
Sec. 21
Sec. 22
Sec. 23
Sec. 24
Sec. 25
Sec. 26
Sec. 27
Sec. 28
Sec. 29
Sec. 30
Sec. 31
Sec. 32

PGA Plan

Figure 3-3-B

El Dorado Irrigation District
2899 Mosquito Road, Placerville, CA 95667
(530) 622-4513

FERC Project 184
Transportation System Management Plan

Drainage Crossings and Watersheds
Penstock Tunnel and Bullion Bend
Date: May 12, 2005
Pg 3- Rev.: 3.3
Figure 3-6

El Dorado Irrigation District
2890 Mosquito Road, Placerville, CA 95667
(530) 622-4613

FERC Project 184
Transportation System Management Plan

Drainage Crossings and Watersheds
Camp 2 and Plum Creek Areas
Date: May 12, 2005
Pg 3- Rev.: 3.3

Legend
PC6.15, C1.22, C12
Culverts, Proposed
Culverts, Existing
Watersheds
11N01 System Road
R82 Non-System Road
R91 Licensee-Maintained Roads
Project-Related Roads
Post Mile Markers (1/10mi.)
El Dorado Canal
Eldorado National Forest
Private Land

500 Feet

Map production and data management by:
PRICE
Geographic Consulting
2004 Adobe Trail - Placerville, California 95667
(530) 626-1964 - at_price@pacbell.net
3.3 Hydrologic Calculations

The estimate of peak flows for culverts at road crossings that are recommended for replacement or for new installations, as well as typical watershed areas ranging from 0.1 to 90 acres, are shown in Table 3-3: Peak Flow Estimates and Recommended Minimum Culvert Diameters. The flow estimates of the 100-year 24-hour storm condition are performed using the Rational Method, as all drainage areas associated with a stream are less than 90 acres for the initial 5-year capital improvement/maintenance cycle.

3.4 Drainage Structures and Culvert Sizing Recommendations

All drainage structures analyzed as part of the first Five-Year Capital Improvement Plan (Appendix B: Exhibit B-1) replacement cycle have been sized based on a condition assuming inlet control. Inlet control is appropriate for conditions where the outlet allows free flow without any backwater effect into the culvert. For all cases where a drainage structure or culvert size is currently being recommended, the inlet control condition is appropriate, as will be the case for most if not all drainages analyzed during future 5-year installation/replacement cycles. Drainage structure and culvert sizing are also subject to the localized conditions such as the depth of cover over a culvert that may or may not allow water to build in elevation above the crown of the structure. Intuitively, the higher water can build above the crown of the culvert inlet, the more capacity a given size of culvert may provide. In order to provide flexibility for installations at each drainage location, capacity values and culvert sizing recommendations are provided for head conditions assuming $H=D$, $H=1.5D$ and $H=2D$, where $H$ is the head of water at the culvert inlet and $D$ is the diameter or height of the culvert. For locations where field conditions allow the head of water at the culvert inlet to be greater than the diameter, a headwall is necessary to properly reinforce the embankment. If no headwall is used, the culvert inlet shall be mitered to conform to the ground slope. Where calculated culvert size is less than 18" diameter, a minimum size of 18" is specified consistent with USFS standards.

The 100-year 24-hour peak flow estimates and recommended minimum culvert diameters are summarized in Table 3-3, which includes values for the stream sites recommended for treatment during the first Five-Year Capital Improvement Plan (Appendix B: Exhibit B-1) as well as a list for typical drainage areas up to 90 acres.

Based on the estimates of the 100-year 24-hour peak flows and the corresponding culvert capacities, the following minimum culvert sizes will meet the drainage needs of the specified drainage areas as follows:

a) 18" diameter culvert for all drainage areas $A \leq 20$ acres
b) 24" diameter culvert for drainage areas ranging from $20 < A \leq 50$ acres
c) 30" diameter culvert for drainage areas ranging from $50 < A \leq 80$ acres
d) 36" diameter culvert for drainage areas ranging from $80 < A \leq 90$ acres
Table 3-3 Peak Flow Estimates and Recommended Minimum Culvert Diameters (inches)

<table>
<thead>
<tr>
<th>Road Name</th>
<th>Drainage ID</th>
<th>Drainage Area (acres)</th>
<th>Peak Flow (cfs)</th>
<th>Culvert Diameter for H = D Inlet Mitered to Conform to Slope (inches)</th>
<th>Culvert Diameter for H = 1.5 Inlet with Headwall (inches)</th>
<th>Culvert Diameter for H = 2D Inlet with Headwall (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camp 1</td>
<td>C40</td>
<td>3.2</td>
<td>0.69</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td>Camp 2</td>
<td>C75</td>
<td>47.5</td>
<td>11.3</td>
<td>24’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td>Powerhouse</td>
<td>PC1</td>
<td>7.63</td>
<td>1.82</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td>Camp Two</td>
<td>PC15</td>
<td>0.1</td>
<td>0.02</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td>Highway Cut</td>
<td>PC16</td>
<td>0.1</td>
<td>0.02</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td>Camp 2</td>
<td>PC17</td>
<td>7.86</td>
<td>1.87</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td>Spillway 33</td>
<td>PC18</td>
<td>0.1</td>
<td>0.02</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td>Powerhouse</td>
<td>PC19</td>
<td>18.2</td>
<td>4.34</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td>Powerhouse</td>
<td>PC20</td>
<td>1.17</td>
<td>0.25</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td>Typicals</td>
<td></td>
<td>0.1</td>
<td>0.02</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td></td>
<td>0.5</td>
<td>0.08</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>0.22</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.4</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0.6</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>0.9</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>1.2</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>1.4</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>1.7</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>1.9</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>2.1</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>2.4</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>4.8</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>7.1</td>
<td>24’’</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>9.5</td>
<td>24’’</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>11.9</td>
<td>24’’</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>14.3</td>
<td>30’’</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td>16.7</td>
<td>30’’</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td></td>
<td>80</td>
<td>19.1</td>
<td>30’’</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
<tr>
<td></td>
<td>90</td>
<td>21.4</td>
<td>36’’</td>
<td>18’’</td>
<td>18’’</td>
<td>18’’</td>
</tr>
</tbody>
</table>

Reference: Chart 2 – El Dorado County Drainage Manual, Pages 7-17

The recommended minimum culvert sizes noted above are determined based on the following assumptions:

a) The culverts are round pipes with inlet control;
b) The headwater depth is the same as the crown of the culvert (H = D);
c) The inlets are mitered to conform to the ground slope;
d) The watershed is not disturbed and there is no significant contribution of sediment; and,
e) The stream is not a perennial stream in which it would be necessary to perform culvert or drainage structure sizing and shape considerations for protection of aquatic resources.
4.0 Erosion Prevention and Control

Forest Service 4(e) Condition 57 requires the licensee to “address measures to control erosion related to Project facilities on or affecting National Forest System lands.” Condition 57 also requires the licensee to prevent stream sedimentation, dust, soil movement, and hillside erosion on all project-related roads.

This section is designed to meet the objectives of Condition 57 by (1) describing the critical regulatory requirements and guidelines designed to prevent erosion of roads in the El Dorado Project area (e.g., Best Management Practices) and by (2) providing an overview of the general principles of road management to prevent erosion, as well as acting as a guide to emergency measures that should be taken in the event of extreme wet periods. In addition, the attached Cooperative Road Maintenance Agreement (Appendix A) and the Five-Year Capital Improvement and Road Maintenance Plan (Appendix B) address specific maintenance/construction needs to prevent erosion on project-related roads.

4.1 Federal, State, and County Regulations for Water Quality

The following sections describe the federal, state and county regulations designed to prevent erosion on project-related roads. The licensee will work collaboratively with the resource agencies to secure the necessary permits for culverts, as required.

4.1.1 Forest Service Guidelines, Standards and Protective Measures (Best Management Practices)

The Forest Service handbook entitled Water Quality Management for National Forest System Lands in California: Best Management Practices (2000, USFS BMP) provides critical guidance for all Forest Service practices and procedures related to water quality management in California. It describes each Best Management Practice (BMP) used for water quality management on all NFS lands in Region Five, which includes California. All of the practices, procedures and programs outlined in the Forest Service BMPs are in conformance with the provisions, and requirements of the Federal Clean Water Act (PL 92-500) and the United States Environmental Protection Agency (EPA). The Forest Service BMPs are also within the guidelines of the State Water Resources Control Board (Basin Plans) developed by the nine Regional Water Quality Control Boards (RWQCB) which are described further in the following section 4.1.2.

The Forest Service BMPs are divided into eight resource management sections (e.g., Timber Management, Range Management). Of the eight resource management topics, the section entitled “Synopsis for Road and Building Site Construction Practices” is the most relevant to road maintenance for the El Dorado Project. The BMPs for road and building construction were formulated based on the administrative directives that guide and direct Forest Service construction and maintenance of roads, buildings, and administrative facilities. There are 28 BMPs listed in the “Index for Road and Building Site Construction Practices” of the Forest Service handbook for BMPs (2000) and, of these, 23 are deemed relevant to management of the El Dorado Project. These include:

1. General Guidelines for the Location and Design of Roads (index #1)
2. Erosion Control Plan (index #2)
3. Timing of Construction Activities (index #3)
4. Stabilization of Road Slope Surfaces and Spoil Disposal Areas (index #4)
5. Road Slope Stabilization Construction Practices (index #5)
6. Dispersion of Sub-Surface Drainage from Cut and Fill Slopes (index #6)
7. Control of Road Drainage (index #7)
8. Timely Erosion Control Measures on Incomplete Road and Stream Crossing Projects (index #9)
9. Construction of Stable Embankments (Fills) (index #10)
10. Control of Sidecast Material During Construction and Maintenance (index #11)
11. Servicing and Refueling Equipment (index #12)
12. Control of Construction and Maintenance Activities Adjacent to Stream Management Zones (index #13)
13. Controlling In-Channel Excavation (index #14)
14. Diversion of Flows Around Construction Sites (index #15)
15. Bridge and Culvert Installation (index #17)
16. Disposal of Right-of-Way and Roadside Debris (index #19)
17. Specifying Riprap Composition (index #20)
18. Maintenance of Roads (index #22)
19. Road Surface Treatment to Prevent Loss of Materials (index #23)
20. Traffic Control During Wet Periods (index #24)
21. Snow Removal Controls to Avoid Resource Damage (index #25)
22. Obliteration or Decommissioning of Roads (index #26)
23. Surface Erosion Control at Facility Sites (index #28)

For reference, Appendix F includes the complete text for each of the 23 Forest Service BMPs listed above.

4.1.2 California and El Dorado County Standards and Protective Measures

Storm water pollution, a significant source of stream sedimentation, is controlled by the Clean Water Act amendments of 1987. The amendments were authorized by the U.S. EPA to expand the National Pollutant Discharge Elimination System (NPDES) program to cover storm water discharges. The State of California has an approved EPA NPDES permitting program. Storm water runoff in El Dorado County is regulated by the Central Valley Regional Water Quality Control Board. In addition, El Dorado County has developed storm water pollution prevention guidelines for its residents. These guidelines are available on the El Dorado County website (http://www.co.el-dorado.ca.us/emd/solidwaste/storm.html). In an effort to reduce the potential for sediments and associated pollutants to enter streams as a result of construction activity, the State has also developed storm water BMPs for its CalTrans, Construction, Industrial, and Municipal Programs. Copies of these BMPs are available through the SWRCB website (http://www.swrcb.ca.gov/quality.html).

4.2 Measures to Control Erosion on El Dorado Project Roads

4.2.1 General Principles of Erosion Prevention and Control

The operation of the El Dorado Project will be conducted to minimize soil erosion at all times. The prevention of erosion involves certain principles for project management that
should be observed at all times. The Cooperative Road Maintenance Agreement (Appendix A) and the Five-Year Capital Improvement and Road Maintenance Plan (Appendix B) include detailed descriptions of the specific maintenance and improvements needs designed to prevent erosion of project-related roads. This section provides general guidelines and principles for erosion prevention, which include the following:

1. Equipment should not be operated when road or surface conditions will cause excessive damage to soil resources.

2. Erosion prevention measures may need to be adjusted depending on ground and weather conditions and the need for controlling runoff.

3. Erosion prevention and control features shall be kept current at all times and they may require additional inspections preceding expected seasonal periods of precipitation or runoff.


5. Roads that are used as all-season routes will have the surface stabilized when:
   a. The road is within 100 feet of a streamside management zone;
   b. Grades are 10 percent or greater; and/or,
   c. The road is located on soils subject to erosion and/or deformation.

6. Roads that are used only during dry conditions will be surface stabilized only when culverts, outsloping, and waterbars have been found to be ineffective.

4.2.2 Emergency Road Maintenance and Erosion Control Measures

Periods of extreme run-off could result in road, bank, ditch, or culvert failure. When it is safe to proceed, the following actions shall be taken to control erosion and prevent excessive damage to project-related roads. Care shall be taken not to cause collateral damage to roads or natural resources while accessing sites.

1. Take immediate action by deploying resources needed to prevent continued failure;

2. Employ erosion prevention methods (e.g., spread certified weed-free straw) to stabilize soil;

3. Notify the Forest Service of the nature of failure and actions taken; and,

4. The licensee will designate a representative to coordinate emergency activities with the Forest Service.
5.0 Summary

To fulfill the requirements of Forest Service 4(e) Condition 57, the licensee conducted an in-field conditions assessment or “needs assessment” of those roads that were deemed the primary responsibility of the licensee. The in-field observations undertaken as part of the needs assessment revealed no urgent outstanding safety problems with culverts except for a 36-inch culvert located along the Camp 1 road. It is recommended that this culvert be replaced in the first year of implementation of this TSMP. In general, the project-related roads and road features (e.g., gates and signs) are reasonably functional with a few exceptions as noted below.

The data and information collected during the needs assessment was used to compile Sections 2 through 4 and Appendices A and B of this TSMP. These sections include more detailed information and analysis. Listed below are summary bullet statements of the needs assessment data and summary recommendations for implementation of the TSMP.

- Approximately 67.95 miles of Forest Service roads are used to access the El Dorado Hydroelectric Project. Of these, about 22 percent, or 15.21 miles of roads, are considered the primary responsibility of the licensee (licensee-maintained roads). Of the 15.21 miles of licensee-maintained roads:

  - All 15.21 miles are designated maintenance levels 1 and 2 roads;
  - 0.96 mile is paved; and,
  - 14.25 miles are native surface or aggregate. Of these, 8.1 miles have been surfaced with aggregate base or Mill to Bull tunnel spoils. As recommended in Appendix B, in the next 5 years 3.6 miles will be replaced or freshened.

- There are a total of 73 culverts located along the licensee-maintained roads and, of these, 23 need to be replaced or repaired to meet Forest Service standards over the next five years. Of the 23 culverts that need to be replaced or repaired, none require the analysis (e.g., hydrologic and bedload and debris) or design requirements mandated by the Final 4(e) Condition 57 because:

  - 0 culverts are over 24 inches in diameter;
  - 0 culverts are located in watersheds greater than 90 acres;
  - 0 culverts have bed and bank; and,
  - 0 culverts are located in perennial streams.

- It is recommended that an additional 19 culverts be installed in the next five years to meet Forest Service standards for ditch relief or seasonal drainages. Most (16) of the recommended culverts would replace existing cross drains and culverts to improve drainage along the Powerhouse Road. Of the 19 culverts, none require the analysis (e.g., hydrologic and bedload and debris) or design requirements mandated by the Final 4(e) Condition 57 because:
- 0 culverts are over 24 inches in diameter;
- 0 culverts are located in watersheds greater than 90 acres;
- 0 culverts have bed and bank; and,
- 0 culverts are located in perennial streams.

- There are a total of two bridges located on licensee-maintained roads, including the Alder Creek Bridge and the Camp 2 Bridge. Neither of these needs to be replaced; however, both bridges need to be rated and have weight limits posted.

- There are a total of 17 gates located along the licensee-maintained roads. Of these, 15 need to be replaced or upgraded to meet Forest Service standards.

- There are a total of 21 signs located along the licensee-maintained roads. Of these, none need to be replaced or upgraded to meet Forest Service standards. However, four signs will need to be installed as part of the weight posting requirements for bridges (two at each bridge).

- There are a total of 15 helispots used to access the El Dorado Project. Of these, 10 helispots are located on NFS lands. The other five helispots are located on private lands adjacent to NFS lands.

- A total of 9 hydraulic calculations were performed to determine culvert sizing. None of these were located in watersheds >90 acres.

Appendix A includes a detailed list of maintenance requirements for all 67.95 miles of project-related roads. Appendix B includes a detailed summary of the recommended capital improvements and maintenance priorities over the next five years. It is important to note that the proposed schedule for capital improvements can change dramatically depending on field conditions. In addition, culverts will be upgraded only as needed when a culvert fails and becomes non-operational. As described in Appendix A, an annual meeting will be held between EID and Forest Service representatives to discuss maintenance and capital improvements.
References


--------2003. *Forest Service Final Terms and Conditions In Connection with the Application for: Relicensing of the El Dorado Hydroelectric Project (FERC No. 184) and El Dorado Hydroelectric Project FERC No. 184 Rational Report for Final Section 4(e) Conditions*.


R-1


http://water.usgs.gov/software/NFF.EXE
TRANSPORTATION SYSTEM MANAGEMENT PLAN

El Dorado Project
FERC Project No. 184

APPENDICES
A - G

El Dorado Irrigation District

September 2007
TABLE OF CONTENTS

Appendix A  Cooperative Road Maintenance Agreement
            Exhibit A-1: Road Maintenance Matrix (Levels 1 and 2)
            Exhibit A-2: Road Maintenance Matrix (Levels 3, 4 and 5)
            Exhibit A-3: Specifications

Appendix B  Five-Year Capital Improvement and Road Maintenance Plan
            Exhibit B-1: Matrix of Capital Improvements

Appendix C  Summary USFS Consultation

Appendix D  Photo Documentation: Traffic Safety and Signage on Project Roads

Appendix E  Aviation Notification Standards and Example Aviation Plan

Appendix F  Forest Service Best Management Practices Applicable to the El Dorado Project

Appendix G  Needs Assessment Worksheets (available on request)
Appendix A

Cooperative Road Maintenance Agreement
Between the
United States Forest Service and the El Dorado Irrigation District
El Dorado Project (FERC Project No. 184)

Exhibit A-1: Road Maintenance Matrix for Licensee-Maintained Roads (Levels 1 and 2 Roads)

Exhibit A-2: Road Maintenance Matrix for Levels 3, 4, and 5 Roads (and Echo Lake Roads)

Exhibit A-3: United States Forest Service Definitions of Maintenance Specifications
Appendix A

Cooperative Road Maintenance Agreement
Between the
United States Forest Service and the El Dorado Irrigation District

El Dorado Project
FERC Project No. 184

This agreement is entered into this _______ day of __________, 2007, by and between the El Dorado Irrigation District, hereinafter referred to as “EID” and the United States of America, by and through the Forest Supervisor, Eldorado National Forest, Forest Service, Department of Agriculture hereinafter referred to as “Forest Service”, in accordance with the 16 U.S.C. 532-538, 23 U.S.C. 205, and the regulations issued by the Secretary of Agriculture, and pursuant to the Forest Service Final Terms and Conditions In Connection with the Application for Relicensing of the El Dorado Hydroelectric Project (FERC Project No. 184) dated October 31, 2003.

WHEREAS, the El Dorado Project lies within and adjacent to the Eldorado National Forest and is situated in the counties of El Dorado, Alpine, and Amador in the State of California, within which EID has need for using Forest Service access roads to manage the Project.

WHEREAS, the parties hereto and henceforth agree to share costs for maintaining these roads and for constructing any additional mutually agreed upon improvements to these roads.

NOW THEREFORE, in accordance with these premises and in consideration of the mutual benefits to be derived, the parties agree to the following:

I. General Principles of Road Maintenance

A. This agreement shall apply to all roads shown and listed on the attached Exhibits “A-1 and A-2”.

B. It is the intent that these roads be maintained to a condition of serviceability to provide for the intended use for constructing, operating and maintaining the Project; to provide Forest Service access for administrative and timber harvest purposes on National Forest System lands; and when appropriate provide for access by the general public.

C. The roads shall be maintained to prevent and correct erosion to the roads and adjacent lands and to assure safe and effective use of the roads.

D. Road maintenance requirements will be agreed to and documented annually to update the Five-Year Capital Improvement and Road Maintenance Plan (Appendix B) hereinafter referred to as the “Plan”, as provided for in Section V.
E. EID shall manage the following bridges according to 23 CFR, Part 650, Subpart C. This sets forth the National Bridge Inspection Standards (NBIS) for bridges. Limitations on these bridges shall be signed and posted. Under this agreement EID will be responsible for the overall operation, maintenance, and safety of the following bridges:

- Alder Creek Bridge
- Camp 2 Access Bridge

The Forest Service shall be responsible for the NBIS, overall operation, and safety for all other bridges within the agreement boundary.

EID and the Forest Service will share the NBIS reports with each other when the reports are completed.

II. Responsibility for Maintenance Costs

A. Road maintenance will be shared, based on traditional use and maintenance responsibilities as shown on Exhibits “A-1 and A-2”. Traditional sharing will not take place when one party changes use patterns (i.e., logging, construction, etc.).

B. In all cases, damage caused by one party to any road listed in Exhibits “A-1 and A-2” will be that party’s responsibility to repair.

C. Proportionate use will be based on traffic data compiled by each party and mutually exchanged at periodic intervals, but not more frequently than once annually. Shares were developed based on licensee’s projected use. Increase or decrease of that projected use shall determine licensee share of maintenance.

III. Categories of Maintenance Work

A. Recurrent Maintenance

Recurrent Maintenance is work that typically must be performed on roads almost every year and is jointly determined and mutually agreed to in the Plan. Recurrent Maintenance items include but are not limited to clearing down timber from roads and ditches; blading and shaping of surface and shoulders; cleaning ditches and culverts; surface repair; maintenance of running surfaces on bridges; removal of minor slides; repair of minor slides or washouts; upkeep of signs and bridges; dust abatement when necessary; brush control; and hazardous tree removal.

B. Deferred Maintenance

Deferred Maintenance is work that must be performed periodically to keep the road and related structures in good repair and is jointly determined and mutually agreed to in the
Plan. Deferred Maintenance items include, but are not limited to, resurfacing of the road, bridge painting, redecking, and replacement.

C. Extraordinary Repairs

Repairs of an extraordinary nature, unanticipated by the Plan, such as major blowdowns, slides, slips and washouts of the road or failures of road structures, may be accomplished without written agreement if time and circumstances require. The party making repairs under these circumstances shall as soon as possible notify the other party by telephone of the need for such repairs.

D. Capital Improvements

In cases where capital improvements need to be made, such as culvert replacements, bridge replacements, surfacing upgrades, and culvert additions, the Forest Service and EID will meet to determine shares on a case by case basis. This will be accomplished as outlined in Section II. C.

IV. Emergency Road Closures and Inordinate Damage

A. Either party shall be responsible at its sole expense for repair of inordinate damage to a road caused by its use. Inordinate damage shall include, but not be limited to, damage to a road surface or related damage resulting from or caused by use under wet conditions, skidding or loading on or adjacent to the roadway, use of equipment with cleated tracks, snowplowing or other uses that result in inordinate damage.

B. In the event weather or ground conditions create the risk of undue or inordinate damage to a road, either party, at the request of the other, shall (1) prohibit use of the road by its contractors, permittees, and licensees until the risk of undue or inordinate damage has passed, or (2) assume responsibility for the repair of any resulting damage to the road. In any case, damage shall be confined to the roadway and shall not be allowed to migrate outside the road prism.

C. The Forest Service shall be responsible for enforcement of conditions in permits it issues for cutting firewood on National Forest System lands to prevent damage to a road surface and drainage structures.

V. Maintenance Plan

A. The parties shall meet annually in the spring and update the 5-Year Road Maintenance Plan documenting maintenance requirements for the year. Additional meetings may be needed as mutually agreed to by both parties. The Five-Year Capital Improvement Plan (Appendix B) should also be reviewed and made current during this meeting.

B. The parties shall share potential use for the upcoming year during the annual meeting (e.g., number of trips, type of use, duration of use). Changes in maintenance responsibilities will be determined at this time.
C. Work to be done shall be jointly determined and recorded in the Plan. The Plan will specify the party that will perform or be responsible for accomplishment of each of the work items.

D. The work will include Recurrent Maintenance and Deferred Maintenance, jointly determined and mutually agreed to for accomplishment during the period of the Plan, based on inspection of the roads and other information and experience available to the parties.

E. Road maintenance specifications are as shown in Exhibit “A-3” attached and are hereby made a part of the Plan.

F. Each party will designate an individual with authority to agree to the Plan and amendments thereto.

G. The Forest Service representative will have the final say on treatment of hazard trees, disposal and borrow sites, side casts, and other road maintenance activities on National Forest System lands outside the roadway.

VI. Commercial Use

A. In the event that either party proposes a timber sale or other use that will result in commercial use over a road, the responsible party shall require such commercial users to perform or pay for a fair share of maintenance commensurate with such use. The party proposing such use shall notify the other party in writing at least 14 days before the start of such use.

B. In the event that others propose to use a road for commercial hauling, the Forest Service will be responsible for issuing permits requiring such users to perform or pay a fair share of maintenance commensurate with such uses.

C. Established load limits on bridges shall not be exceeded unless otherwise agreed to by both parties.

D. Commercial use by EID on Forest Service surfaced roads will require EID to pay surface replacement deposits at a rate to be determined annually.

VII. Road Improvements For Those Roads Deemed the Primary Responsibility of EID

A. Upon mutual agreement by the parties, needed additional improvements to a road shall be accomplished only after written agreement between the parties. Such agreement shall
identify the extent and nature of improvements, engineering design, estimated cost, share of cost to be borne by each party, means by which such cost shall be borne, scheduling of the work, and designation of the party responsible for the construction of such improvements as provided for in Section III. D. All work must comply with the Final 4(c) Conditions and may involve an environmental review process (e.g., biological and cultural resource reviews). These requirements are also discussed in Section 2.0 of the TSMP.

B. Capital improvements will be the sole responsibility of EID. The Forest Service will need to approve any said improvements.

VIII. Method of Payment

A. When, by agreement in the Plan, both parties perform some portion of the required work listed in the Plan, but one party performs more than its commensurate share, the excess total value of work performed may be credited to that party’s share of the cost of work to be performed in the next Plan period.

B. If agreed to by both parties, one party may make payment to the other party to the extent necessary to bring each party’s cost into agreement with their commensurate share at the end of the Plan period.

C. Substantial imbalances in a party’s share of the work to be performed due to weather, unanticipated changes in use or other conditions will be adjusted by offsetting credits, cash settlement, or a revision of the Plan, provided that changes in planned work performance shall first be agreed to in writing by the parties.

D. Value of agreed to maintenance will be determined from the Forest Service design guide for Davis-Bacon projects. As provided for in Section V.A. these equipment and employee rates will be reviewed at the annual spring meeting and updated as necessary. When either the Forest Service or EID contract to a third party to perform maintenance, the total value of that contract shall be credited to the contracting agency.

E. A collection agreement to be administered by the Forest Service will be prepared by the parties hereto.

F. If agreed to by both parties, one party may provide supplies, material, labor, or equipment as their commensurate share of the Maintenance Plan (Exhibits A-1 and A-2).

IX. Special Provisions

A. Nothing herein contained shall be construed to obligate the Forest Service beyond the extent of available funds allocated or programmed for this work, or contrary to applicable laws, rules, and regulations.
B. No member of, or delegate to Congress, or Resident Commissioner shall be admitted to any share or part of this agreement or to any benefits that may arise therefrom, unless it is made with a corporation for its general benefit.

C. Where applicable, any contract, agreement or understanding entered into pursuant to this agreement providing for work to be performed shall include the requirements of applicable Federal Laws, Executive Orders, and Regulations.

X. Amendments

Upon mutual agreement by the parties, the terms and conditions of this agreement may be modified, but such amendments shall not be effective until agreed to in writing.

XI. Term

This agreement shall govern maintenance responsibilities of the parties for these roads until mutually terminated, or until either party gives notice in writing to the other, at least 90 days in advance, that this agreement shall terminate, provided that such termination shall in no way affect any obligation incurred under this agreement until a full settlement has been made.

------------------------------------------  
Ane D. Deister, General Manager  
El Dorado Irrigation District  

------------------------------------------  
Ramiro Villalvazo, Forest Supervisor  
USDA Forest Service  
Eldorado National Forest

Date  
Date
<table>
<thead>
<tr>
<th>Road Number</th>
<th>Description</th>
<th>Start</th>
<th>Terminus</th>
<th>Length</th>
<th>Width</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>10N08Y</td>
<td>Bull Creek</td>
<td>10N40</td>
<td>10N08YA</td>
<td>0.43</td>
<td>12'</td>
<td>E</td>
</tr>
<tr>
<td>10N08YA</td>
<td>Camp Two</td>
<td>10N08Y</td>
<td>R73</td>
<td>0.79</td>
<td>12'</td>
<td>E</td>
</tr>
<tr>
<td>10N23Y</td>
<td>Caples Aux, Dam</td>
<td>Highway 88</td>
<td>Parking Lot</td>
<td>0.11</td>
<td>24'</td>
<td>E</td>
</tr>
<tr>
<td>10N40G</td>
<td>Highway Cut</td>
<td>10N40</td>
<td>J. Roy's Boathouse</td>
<td>1.66</td>
<td>12'</td>
<td>E</td>
</tr>
<tr>
<td>10N40N</td>
<td>El Dorado Ditch Loop</td>
<td>10N40</td>
<td>El Dorado Canal</td>
<td>0.23</td>
<td>10'</td>
<td>E</td>
</tr>
<tr>
<td>11N02Y</td>
<td>El Dorado Ditch</td>
<td>Park Creek Road</td>
<td>USFS Boundary</td>
<td>0.91</td>
<td>12'</td>
<td>E</td>
</tr>
<tr>
<td>12N34H</td>
<td>Powerhouse</td>
<td>12N34</td>
<td>Powerhouse</td>
<td>2.86</td>
<td>10'-16'</td>
<td>E</td>
</tr>
<tr>
<td>R41</td>
<td>Caples Main Dam</td>
<td>Highway 88</td>
<td>Gaping Stage A-6</td>
<td>0.16</td>
<td>8'</td>
<td>E</td>
</tr>
<tr>
<td>R43</td>
<td>Caples House</td>
<td>Highway 88</td>
<td>Caples House</td>
<td>0.14</td>
<td>8'</td>
<td>E</td>
</tr>
<tr>
<td>R44</td>
<td>Caples Quonset</td>
<td>Highway 88</td>
<td>Caples Quonset</td>
<td>0.06</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>R45</td>
<td>Woods Creek</td>
<td>Highway 88</td>
<td>Parking Lot</td>
<td>0.19</td>
<td>24'</td>
<td>E</td>
</tr>
<tr>
<td>R61</td>
<td>30 Milestone</td>
<td>30 Milestone Tract</td>
<td>El Dorado Canal</td>
<td>0.01</td>
<td>12'</td>
<td>E</td>
</tr>
<tr>
<td>R71</td>
<td>Flumes 39/40</td>
<td>10N40</td>
<td>Flumes 39/40</td>
<td>0.42</td>
<td>8'</td>
<td>E</td>
</tr>
<tr>
<td>R72</td>
<td>Camp X</td>
<td>10N40</td>
<td>Camp X</td>
<td>0.56</td>
<td>12'</td>
<td>E</td>
</tr>
<tr>
<td>R73</td>
<td>Camp 2</td>
<td>10N08YA</td>
<td>Camp 2</td>
<td>0.54</td>
<td>8'</td>
<td>E</td>
</tr>
<tr>
<td>R74</td>
<td>El Dorado Tunnel</td>
<td>11N53</td>
<td>El Dorado Tunnel</td>
<td>0.66</td>
<td>16'</td>
<td>E</td>
</tr>
<tr>
<td>R75</td>
<td>Camp 1</td>
<td>11N53</td>
<td>Camp 1</td>
<td>0.53</td>
<td>16'</td>
<td>E</td>
</tr>
<tr>
<td>R76</td>
<td>Camp S</td>
<td>Private Road</td>
<td>Camp S</td>
<td>0.1</td>
<td>8'</td>
<td>E</td>
</tr>
<tr>
<td>R81</td>
<td>Flame 47B</td>
<td>11N027</td>
<td>Flame 47B</td>
<td>0.07</td>
<td>8'</td>
<td>E</td>
</tr>
<tr>
<td>R82</td>
<td>Pacific Tunnel</td>
<td>11N02Y</td>
<td>Pacific Tunnel</td>
<td>0.24</td>
<td>10'</td>
<td>E</td>
</tr>
<tr>
<td>R821</td>
<td>Hazel Creek Tunnel</td>
<td>R82</td>
<td>Hazel Creek Tunnel</td>
<td>0.18</td>
<td>8'</td>
<td>E</td>
</tr>
<tr>
<td>R83</td>
<td>Spillway 33</td>
<td>Hazel Valley Road</td>
<td>Spillway 33</td>
<td>0.28</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>R84</td>
<td>Old Camp 4</td>
<td>Hazel Valley Road</td>
<td>Old Camp 4</td>
<td>0.28</td>
<td>10'</td>
<td>E</td>
</tr>
<tr>
<td>R87</td>
<td>Camp 3</td>
<td>R88</td>
<td>Camp 3</td>
<td>0.21</td>
<td>10'</td>
<td>E</td>
</tr>
<tr>
<td>R88</td>
<td>Camp P</td>
<td>10N40</td>
<td>Camp P</td>
<td>1.32</td>
<td>12'</td>
<td>E</td>
</tr>
<tr>
<td>R89</td>
<td>Rock Crusher</td>
<td>10N40</td>
<td>Spillway 23</td>
<td>1.16</td>
<td>8'-12'</td>
<td>E</td>
</tr>
<tr>
<td>R91</td>
<td>Moon Lane</td>
<td>Moon Lane</td>
<td>Surge Chamber</td>
<td>0.31</td>
<td>12'</td>
<td>E</td>
</tr>
<tr>
<td>R92</td>
<td>Moon Lane East</td>
<td>R91</td>
<td>Penstock</td>
<td>0.2</td>
<td>12'</td>
<td>E</td>
</tr>
<tr>
<td>R93</td>
<td>Kodiak Trail</td>
<td>Kodiak</td>
<td>Penstock</td>
<td>0.21</td>
<td>8'</td>
<td>E</td>
</tr>
<tr>
<td>R94</td>
<td>Bend Court</td>
<td>Bend Court</td>
<td>Canal</td>
<td>0.41</td>
<td>10'</td>
<td>E</td>
</tr>
</tbody>
</table>

* S = Shared  USFS= Forest Service  E = El Dorado Irrigation District
### Exhibit A-2  Road Maintenance Matrix for Levels 3, 4, and 5 Roads (and Echo Lake Roads)

| Road Numbe | Road Name     | Start          | Terminus       | Length | Width | Maintenance Level | 801  | 802  | 803  | 804  | 805  | 806  | 807  | 808  | 810  | 811  | 812  | 813  | 814  | 815  | 816  | 817  | 818  | 819  | 820  | Remarks |
|------------|---------------|----------------|----------------|--------|-------|-------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--------|
| 10N05      | Echo Lake     | Johnson Pass   | Echo Lake      | 1.19   | 14'   | 5                 | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | Remarks |
| 10N05C     | Berkley Camp  | Echo Lake Road | Loop           | 0.13   | 10'   | 2                 | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | Remarks |
| 10N05D     | Echo North    | Echo Lake Road | Home Sites     | 0.17   | 10'   | 2                 | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | Remarks |
| 10N40      | Plum Creek    | Hazel Valley Road | 10N08Y | 5.5   | 14'   | 4                 | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | Remarks |
| 10N50      | Mormon Ensign, Trail | Sly Park Road | Highway 88 | 24.3  | 24'   | 5                 | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | Remarks |
| 11N01      | Old Carson    | Park Creek Road | Forest Bdry    | 0.5   | 18'   | 5                 | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | Remarks |
| 11N06      | Johnson Pass  | Highway 50     | Caltrans Yard  | 1.33  | 24'   | 5                 | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | Remarks |
| 11N30Y     | Bull Creek Tract | Highway 50 | T71            | 0.3   | 12'   | 4                 | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | Remarks |
| 11N40      | Silver Fork   | Highway 50     | 10N50          | 15.4  | 18'   | 5                 | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | Remarks |
| 11N46      | Alder Creek   | Highway 50     | Carpenter Creek | 0.3   | 16'   | 5                 | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | Remarks |
| 11N47      | Carpenter Creek | 11N46          | New Gaging Site | 2.7   | 14'   | 3                 | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | Remarks |
| 11N53      | Alder Tract   | Highway 50     | R74            | 0.3   | 10'   | 5                 | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | Remarks |
| 11N74      | 30 Milestone  | Highway 50     | R61            | 0.6   | 10'   | 4                 | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | USFS | Remarks |

* S = Shared  USFS = Forest Service  EID = El Dorado Irrigation District
### MAINTENANCE SPECIFICATIONS (FOR ROAD USE PERMITS)

<table>
<thead>
<tr>
<th>SPECIFICATION</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>800</td>
<td>Definitions</td>
</tr>
<tr>
<td>801</td>
<td>Slide &amp; Slump Repair</td>
</tr>
<tr>
<td>802</td>
<td>Ditch Cleaning</td>
</tr>
<tr>
<td>803</td>
<td>Surface Blading</td>
</tr>
<tr>
<td>804</td>
<td>Surfacing Repair</td>
</tr>
<tr>
<td>805</td>
<td>Drainage Structures</td>
</tr>
<tr>
<td>806</td>
<td>Dust Abatement</td>
</tr>
<tr>
<td>806A</td>
<td>Water Abatement</td>
</tr>
<tr>
<td>807</td>
<td>Roadside Vegetation</td>
</tr>
<tr>
<td>808</td>
<td>Miscellaneous Structures</td>
</tr>
<tr>
<td>809</td>
<td>Waterbars</td>
</tr>
<tr>
<td>810</td>
<td>Barriers</td>
</tr>
<tr>
<td>811</td>
<td>Surface Replacement</td>
</tr>
<tr>
<td>812</td>
<td>Preventive Maintenance (Put-to-bed Road)</td>
</tr>
<tr>
<td>813</td>
<td>Preventive Maintenance</td>
</tr>
<tr>
<td>814</td>
<td>Temporary Road Closure</td>
</tr>
<tr>
<td>815</td>
<td>Landing Clean-Up</td>
</tr>
<tr>
<td>816</td>
<td>Vegetative Soil Stabilization</td>
</tr>
<tr>
<td>817</td>
<td>Winterizing</td>
</tr>
<tr>
<td>818</td>
<td>Snow Removal</td>
</tr>
<tr>
<td>819</td>
<td>Aggregates</td>
</tr>
<tr>
<td>820</td>
<td>Liquid Asphalt</td>
</tr>
</tbody>
</table>

Note: Whenever a spec refers to drawings or other references, there are no standard electronic copies available. This will require separate preparation for inclusion with individual permits to suit local preferences.
Wherever the following terms or pronouns are used in Specifications 801 through 820, the intent and meaning shall be interpreted as follows:

These specifications have been developed in anticipation of those problem areas and have provided that such changes will be by agreement.

It is intended that drawings and specifications will govern unless "on-the-ground" conditions warrant otherwise, when specifications call for "agreement", "agreed", or "approval" such agreement or approval shall be promptly confirmed in writing.

**Base Course.** Material used to reinforce subgrade or, as shown on drawings, placed on subgrade to distribute wheel loads.

**Berm.** Curb or dike constructed to prevent roadway run-off water from discharging onto embankment slope.

**Borrow.** Select material taken from designated borrow sites.

**Crown, Inslope and Outslope.** The cross slope of the traveled way to aid in drainage and traffic maneuverability.

**Culverts.** A conduit or passageway under a road, trail or other obstruction. A culvert differs from a bridge in that it is usually entirely below the elevation of the traveled way.

**Drainage Dip.** A dip in the traveled way which intercepts surface runoff and diverts the water off the traveled way. A drainage dip does not block the movement of traffic.

**Drainage Structures.** Manufactured structures which control the runoff of water from the roadway including culverts, overside drains, aprons, flumes, down-drains, downpipes, and the like.

**Dust Abatement Plan.** A table which lists the road, dust palliative, application rates and estimated number of subsequent applications.

**Lead-off Ditches.** A ditch used to transmit water from a drainage structure or drainage dip outlet to the natural drainage area.

**Material.** Any substances specified for use in the performance of the work.

**Roadbed.** The portion of a road between the intersection of subgrade and sideslopes, excluding that portion of the ditch below subgrade.

**Road Maintenance Plan.** A table which shows applicable road maintenance specifications to be performed by permittee on specific roads.

**Roadside.** A general term donating the area adjoining the outer edge of the roadway.

**Roadway.** The portion of a road within the limits of excavation and embankment.

**Shoulder.** That portion of roadway contiguous with traveled way for accommodation of stopped vehicles, for emergency use, and lateral support of base and surface course, if any.
Slash. All vegetative material not meeting utilization standards such as logs, limbs and brush.

Slide. A concentrated deposit of materials from above or on backslope extending onto the traveled way or shoulders, whether caused by mass land movements or accumulated ravelling.

Slough. Material eroded from backslope which partially or completely blocks the ditch, but does not encroach on the traveled way so as to block passage of traffic.

Slump. A localized portion of the roadbed which has slipped or otherwise become lower than that of the adjacent roadbed and constitutes a hazard to traffic.

Special Project Specifications. Specifications which detail conditions and requirements peculiar to the individual project.

Subgrade. Top surface of roadbed upon which base course or surface course is constructed. For roads without base course or surface course, that portion of roadbed prepared as the finished wearing surface.

Surface Course. The material placed on base course or subgrade primarily to resist abrasion and the effects of climate. Surface course may be referred to as surfacing.

Surface Treatment Plan. A table which lists the roads and surface treatments to be applied.

Traveled Way. That portion of roadway, excluding shoulders, used for the movement of vehicles.

Turnouts. That portion of the traveled way constructed as additional width on single lane roads to allow for safe passing of vehicles.

Water Source. A place designated on the Road Maintenance Map for acquiring water for road maintenance purposes.

Waterbar. A structure used on roads closed to traffic. A dip in the traveled way which intercepts surface runoff and diverts the water off the roadway.
SPECIFICATION - 801 SLIDE AND SLUMP REPAIR

DESCRIPTION

1.1 Slide removal is the removal from roadway and disposal of any material, such as soil, rock, and vegetation that cannot be routinely handled by a motor grader during Ditch Cleaning, 802, and Surface Blading, 803 operations.

Slump repair is the filling of depressions or washouts in roadway which cannot be routinely filled by a motor grader during Surface Blading, 803 operations.

Slide removal and slump repair includes excavation, loading, hauling, placing, and compacting of waste or replacement material. This includes the development of disposal or borrow areas.

REQUIREMENTS

3.1 Slide material, including soil, rock and vegetative matter which encroaches into the roadway, shall be removed. The slope which generated the slide material shall be reshaped during the removal of the slide material with the excavation and loading equipment. Slide material deposited on the fill slope and below the traveled way will not be removed unless needed for slope stability or to protect adjacent resources.

Surface and Base Courses shall not be excavated during slide removal operations.

Slide material which cannot be used for other beneficial purposes shall be disposed of at disposal sites agreed to by District Ranger.

3.2 When filling slumps or washouts, material shall be moved from agreed locations or borrow sites and placed in layers, and compacted by the equipment performing the work.

Existing aggregate surfacing shall be salvaged when practical and relaid after depressions have been filled.

Damaged aggregate base, aggregate surfacing, and bituminous pavement shall be repaired under Specification 804 Surfacing Repair.

The repaired areas of the slump shall conform to the cross section which existed prior to the slump and shall blend with the adjacent undisturbed traveled way.
SPECIFICATION - 802 DITCH CLEANING

DESCRIPTION

1.1 Ditch cleaning is removing and disposing of all slough material from roadside ditches to provide a free-draining waterway.

REQUIREMENTS

3.1 Ditch cleaning shall be repeated during the year as often as necessary to facilitate proper drainage.

3.2 All slough material or other debris which might obstruct water flow in the roadside ditch shall be removed. Slough material removed from the ditch, if suitable, may be blended into existing native road surface or shoulder or placed in designated berms in conjunction with Surface Blading 803 operations.

Slough material that is not by agreement blended into existing roads or placed in berms shall be removed from the ditch, loaded and hauled to the disposal site designated by the District Ranger.

3.3 Roadway backslope or berm shall not be undercut.
SPECIFICATION - 803 SURFACE BLADING

DESCRIPTION

1.1 Surface blading is keeping a native or aggregate roadbed in a condition to facilitate traffic and provide proper drainage. It includes maintaining the crown, inslope or outslope of traveled way, shoulder; drainage dips; lead-off ditches; berms; turnouts; approach road intersections and cleaning of bridge decks.

REQUIREMENTS

3.1 Surface blading shall be performed before, during, and after Permittee's use as often as necessary to facilitate traffic and proper drainage.

3.2 The surface blading shall preserve the existing cross section. Surface irregularities shall be eliminated and the surface left in a free draining state and to a smoothness needed to facilitate traffic. Surface material which has been displaced from the traveled way to the shoulders of the roadbed shall be returned to the traveled way. The blading operation shall be conducted to prevent the loss of surface material and to provide for a thorough mixing of the material being worked.

3.3 Water, taken from water sources agreed to by the District Ranger, shall be applied during blading if sufficient moisture is not present to cut, mix, and compact the surface material.

3.4 On native surfaced roads, material generated from backslope sloughing and ditch cleaning may be blended with the surface material being worked. On aggregate surfaced roads this material shall not be blended with surface or base course material unless agreed otherwise.

3.5 Roadway backslopes or berms shall not be undercut nor shall new berms be established unless agreed otherwise.

Berms shall be repaired by placing material as needed to restore the berm to reasonably blend with existing line, grade, and cross section.

3.6 Drainage dips and lead-off ditches shall be cleaned and maintained to reasonably blend with existing line, grade, and cross section.

3.7 Intersection roads shall be bladed for a distance of 50 feet to assure proper blending of the two riding surfaces.

3.8 Rocks or other material remaining on the traveled way after the final blading that fail to pass a 4-inch sieve or are larger than the maximum size of imported surfacing shall be removed from the traveled way. The oversized material shall be disposed of by sidecasting. Sidecasting into streams, lakes or water courses will not be permitted.

3.9 Material resulting from work under this specification shall not remain on or in structures, such as culverts, overside drains, cattleguards, ditches, drainage dips, and the like.

3.10 Material resulting from work under this specification plus any accumulated debris shall be removed from bridge decks and the deck drains opened.
DESCRIPTION

1.1 Surfacing repair is repairing potholes or small, soft areas in the traveled way. It includes area preparation and furnishing and placing all necessary materials, including base, and other work necessary to repair the surface.

MATERIAL

2.1 Material used in the repair of soft areas on aggregate or native surfaced roads may be acquired from approved commercial sources or approved Forest Service borrow areas. The quality and quantity of the imported material used in the repair will be limited to that needed to provide a stable traveled way for hauling and to minimize damage to the road and adjacent resources. The quantity of imported surface repair material used will be agreed to prior to use. However, the magnitude of the work may vary depending on Permittee’s hauling schedule and ground conditions.

2.2 Material used in the repair of bituminous pavements may be acquired from local commercial sources. If a mixing table is required, the location shall be approved by the Forest Service. The bituminous mixture to be used by the Permittee shall be approved by the Forest Service. The Permittee’s share of the quantity of bituminous mixture used will be agreed to prior to use. However, Permittee’s share of the work may vary depending on Permittee’s hauling schedule, ground conditions, other traffic, etc.

REQUIREMENTS

3.1 Work under this specification shall be performed in a timely manner to reduce further deterioration of the traveled way.

3.2 Soft spots on aggregate or native surfaces shall be repaired by placing the imported surface course on top of the soft spot. Layers of imported material shall be placed until a firm surface is produced.

3.3 BITUMINOUS PAVEMENT REPAIRS. The areas to receive bituminous pavement repairs will be marked on the road surface by the Forest Service just prior to Permittee performing the work.

   a. Potholes (deep patch). Remove the surface course and base course as deep as necessary to reach firm support; extend horizontally at least 6 inches into good asphalt surfacing surrounding the cracked area. Make the cut square or rectangular with faces straight and vertical. Material removed shall be hauled to an approved disposal site. Tack the faces with a slow-setting emulsified asphalt. Backfill the hole with bituminous mix and compact. Use 2-inch layers, if the hole is more than 4 inches deep. Compact each layer thoroughly with hand or mechanical tampers or rollers. Compaction shall not be done with equipment wheels.

   The patch, when completed and compacted, shall be 1/4 to 1/2 inch above the level of the adjacent pavement.
b. **Skin Patches.** Minor depressions, light ravelling, or surface checking at scattered locations shall be treated by applying a skin patch. Carefully broom from the surface all loose material and apply a tack coat with a slow-setting emulsified asphalt at the rate of 1/10-gallon per square yard. Place bituminous mix, distribute uniformly, and feather the edges with asphalt rakes or motor grader so the patch, when compacted, will be flush with the adjoining surface. Roll thoroughly with a portable roller or loaded truck wheels.

3.4 **ASPHALT DIKES.** Asphalt material in the damaged length of dike shall be removed to the approved disposal site. Clean and repair asphalt foundation as necessary. Square off the exposed ends of existing dike. Tack all surfaces with a slow-setting emulsified asphalt. Bituminous mix shall be placed and compacted so that it is in reasonable conformity with the previous line, grade, and cross section of the original dike.
DESCRIPTION

1.1 This work consists of maintaining drainage structures and related items such as inlet and outlet channels, existing riprap, trash racks and drop inlets.

MATERIALS

2.1 All materials used in the maintenance of drainage structures shall conform by type and specification to the material in the structure being maintained.

REQUIREMENTS

3.1 Drainage structures and related items shall be cleared of all foreign material which has been deposited above the flowline and all vegetative growth which interferes with the flow pattern. Material removed that cannot be incorporated into maintenance work shall be hauled to a disposal site approved by the Forest Service.

3.2 If outlet or inlet riprap was installed by the Permittee as a construction item or existed prior to purchaser's haul, it shall be maintained in good condition including the replacement of riprap if necessary to previous line, grade, and cross section.

3.3 Perform maintenance to insure the proper functioning of the head walls, aprons, inlet assemblies, overside drains, riprap, trash racks, and other facilities related to the drainage structure.
SPECIFICATION - 806 DUST ABATEMENT

DESCRIPTION

1.1 This work shall consist of preparing traveled way and furnishing and applying materials to abate dust.

MATERIALS

2.1 The roads requiring dust abatement, type of dust abatement material to be used, the rates of application, and frequency of applications will be SHOWN ON THE DUST ABATEMENT PLAN. The Dust Abatement Plan may be changed by written agreement.

2.2 WATER. Water locations will be agreed to by the Forest Service.

2.3 Dust abatement materials shall be approved by the Forest Service.

2.4 ACCEPTANCE OF MATERIALS. Certification and sampling of bituminous materials and lignin sulfonate shall be in accordance with appropriate AASHTO requirements.

REQUIREMENTS

3.1 GENERAL. Dust abatement materials shall be applied to the road surface as necessary to control road surface loss, provide for road user safety, and minimize damage to adjacent resources.

3.2 COMPACTION. When the methods listed below specify compaction, traveled way shall be compacted by an 8 to 10 ton pneumatic, steel-wheeled or equivalent vibrating roller making 2 passes over the full traveled way and shoulder width.

3.3 PREPARATION FOR DUST ABATEMENT MATERIALS OTHER THAN WATER. The following applies to all methods of preparation:

Bituminous residue shall be scarified and pulverized to produce loosened material not exceeding 4 inches in greatest dimension.

Traveled way shall be bladed in accordance with 803.

Prior to applying DO-6BA, or DO-8 the top 2 inches of traveled way shall contain not less than 80 percent nor more than 120 percent of optimum moisture as determined by AASHTO T-99, Method C. Prior to applying other bituminous material traveled way shall have a moisture content between 1 and 3 percent. If surface dusting prevents the bituminous material from penetrating, a light application of water shall be applied just prior to applying the bituminous material.

Lignin Sulfonate shall be applied when the top 1 inch of traveled way contains not less than 3 percent moisture nor more than 120 percent of optimum moisture as determined by AASHTO T-99, Method C.

Moisture content will be determined in accordance with AASHTO T-217 or 239.
One or more of the following methods shall be used as specified in the RMP.

**Method 1.** Compact traveled way and apply the dust abatement material.

**Method 2.** Develop a layer of loose material approximately one inch in depth for the full width of traveled way. Apply the dust abatement material to this loose material and compact after penetration. If traffic makes maintenance of the loose material difficult, one inch of the material may be bladed into a windrow along the shoulder. The specified moisture content shall be maintained in the windrow and the top one inch of traveled way. The windrow shall be bladed to a uniform depth across traveled way just prior to applying the dust abatement material. When the dust abatement material has penetrated, traveled way shall be compacted.

**Method 3.** Blade one inch of material from traveled way into a windrow along the shoulder. Maintain the specified moisture content in the windrow and the top inch of traveled way. Apply half the dust abatement material. When the dust abatement material has penetrated, the windrow shall be bladed to a uniform depth across dust abatement traveled way, and the remaining dust abatement material shall be applied. Traveled way shall be compacted.

**Method 4.** Develop a layer of loose material approximately 2 inches in depth for the full width of traveled way. Apply half the dust abatement material to thee loose material. Blade the top 2 inches into a windrow along the shoulder. Apply the remaining dust abatement material to traveled way and the berm. Spread the berm evenly across traveled way and compact.

### 3.4 PREPARATION FOR DUST ABATEMENT WITH WATER

Traveled way shall be prepared in accordance with Specification 803 Surface Blading, when required.

### 3.5 APPLICATION TOLERANCE

Dust abatement materials other than water shall be applied within 0.04 gallons per square yard of the rate specified.

### 3.6 MIXING REQUIREMENTS

DO-6BA, DO-6PA, and DO-8 shall be thoroughly circulated in the distributor within one hour of application.

### 3.7 WEATHER LIMITATION

Dust abatement materials shall not be applied when it is raining.

Bituminous material shall be applied when the surface temperature of traveled way is 50 degrees Fahrenheit or higher.

Lignin sulfonate shall be applied when the atmospheric temperature is 40 degrees Fahrenheit or higher.

### 3.8 BLOTTER MATERIAL

Blotter material shall be spread in a sufficient quantity to prevent tire pickup.
SPECIFICATION - 806A WATER ABATEMENT

DESCRIPTION

1.1 This work consists of applying water to the traveled way to abate dust.

MATERIALS

2.1 WATER. Water locations to be used on Government land will be approved by the Forest Service.

REQUIREMENTS

3.1 Complete abatement once for each hauling day, except when production exceeds 50 MBF per operating day, water shall be applied to dusting roads through the day while hauling at the rate of one additional complete abatement per 50 MBF unless otherwise agreed.
DESCRIPTION

1.1 Roadside vegetation includes removal of brush and trees from within the roadway limits.

REQUIREMENTS

3.1 Vegetative matter within the roadway which impedes vehicular travel or interferes with road maintenance operations shall be removed. Downed timber meeting utilization standards shall be cut in appropriate lengths and decked along the roadside in locations where the traveled way or sight distances will not be impaired.

3.2 Vegetative matter removed from the roadway shall be treated by the specified method required by the Forest Service.

3.3 The Holder shall maintain the right-of-way clearing by means of chemicals only after specific written approval has been given by the Forest Supervisor. Application for such approval must be in writing and specify the time, method, chemicals, and the exact portion of the right-of-way to be chemically treated.
DESCRIPTION

1.1 Maintenance of miscellaneous structures includes cattleguards, gates, and other similar structures that have been previously installed to insure the safe and efficient operation of the road.

MATERIALS

2.1 Any materials needed in the maintenance of miscellaneous structures shall be similar in type and quality to the material in the structure being maintained.

REQUIREMENTS

3.1 CATTLEGUARDS. Loose rails shall be welded or bolted back in place. Excess material carried into the cattleguard shall be removed when drainage is blocked or when it reaches 6 inches from the bottom of the cattleguard frame. Drainage into and from the cattleguard shall be kept open.

3.2 GATES. Gates shall be kept in good repair and made to swing easily. Hinges or latches shall be repaired if not operating properly. Hinges shall be oiled.

Brush and debris shall be removed from within the swing radius.
SPECIFICATION - 809 WATERBARS

DESCRIPTION

1.1 This work consists of installing or removing waterbars in the roadbed.

REQUIREMENTS

3.1 Waterbars shall be installed on roads in accordance with the direction from the Forest Service.

All material excavated shall be used in the installation of the waterbar. Bermed material shall be compacted by operating heavy equipment over the length and width of the berm.

3.2 Waterbars shall be removed by blading the berm into the adjacent depression to form a smooth transition along the traveled way. The length and width of the fill material shall be compacted by the equipment performing the work.

3.3 Waterbars may be required to be installed between seasons of use and then removed when haul is resumed.
SPECIFICATION - 810 BARRIERS

DESCRIPTION

1.1 This work shall consist of furnishing, installing, or removing barriers.

MATERIALS

2.1 Materials for barriers shall meet the requirements AS SHOWN ON THE ATTACHED DRAWINGS.

REQUIREMENTS

3.1 Barriers shall be installed in accordance with the ATTACHED DRAWINGS.

The location of barriers to be removed or installed will be flagged on the ground. Installation or removal may occur as often as road use is terminated and resumed.
SPECIFICATION - 811 SURFACE TREATMENT

DESCRIPTION

1.1 This work shall consist of applying a chip seal, sand seal, or fog seal to a traveled way. Chip seals may consist of single or double applications of bituminous material and cover aggregate.

MATERIALS

2.1 The roads requiring surface treatments, the type of seal coat to be applied, the rate of application, and type and grade of bituminous material, and the rate of application and grading of cover aggregate will be SHOWN ON THE SURFACE TREATMENT PLAN.

2.2 Emulsions used for fog seals shall be diluted with an equal amount of water and shall be applied at the diluted application rate SHOWN ON THE SURFACE TREATMENT PLAN.

2.3 Seal coat materials shall meet the requirements of the Forest Service.

2.4 The cover aggregate shall be surface damp at the time of application when using emulsified asphalt and dry when using an asphalt cement or liquid asphalt. Excess water on the aggregate surface will not be permitted.

MAINTENANCE REQUIREMENTS

3.1 SAFETY. Unless otherwise agreed in writing, when Permittee's operations are in progress adjacent to or on Forest Service controlled roads and trails open to public travel, Permittee shall furnish, install and maintain all temporary traffic controls which provide the user with adequate warning of hazardous or potentially hazardous conditions associated with Permittee's operations. A specific traffic control plan for each individual project shall be agreed to by Permittee and Forest Service prior to commencing operations. Devices shall be appropriate to current conditions and shall be covered or removed when not needed, and as shown on drawings, road maintenance map, or in specifications attached hereto.

3.2 WEATHER LIMITATIONS. Fog seal and chip seal shall not be applied when the weather is foggy or rainy.

Seal coats requiring cover aggregate shall not be applied when the temperature of the surface being treated is below 70 degrees Fahrenheit in the shade.

Fog seal costs shall not be applied when temperature is below 40 degrees Fahrenheit in the shade.

3.3 EQUIPMENT. The following equipment or its equivalent shall be used.

A distributor truck equipped to spread the material uniformly at the designated rate, within the temperature range specified and within 0.04 gallons per square yard at the rate specified. The distributor shall be equipped with a thermometer and a hand hose with spray nozzle.

A rotary power broom and/or blower.
When cover aggregates are applied: A pneumatic tire roller, 8-ton minimum weight with all tires equally inflated to a pressure of at least 90 pounds per square inch. Rollers shall be equipped with devices for applying water to the tires.

Self-propelled aggregate spreader supported by at least four wheels equipped with pneumatic tires on two axles, situated so that at no time will the tires contact the uncovered bituminous materials. The aggregate spreader shall be equipped with positive controls so that the required amount of materials will be deposited uniformly over the full width.

Trucks with spreading attachments shall not be used.

3.4 PREPARATION OF SURFACE. Immediately before applying the bituminous material, the surface to be sealed shall be cleaned of all foreign and loose material.

3.5 APPLICATION OF BITUMINOUS MATERIAL. Bituminous material shall be applied in a uniform, continuous spread. The distributor shall be moving forward at proper application speed at the time the spray bar is opened. Skipped areas or deficiencies shall be corrected prior to the application of cover aggregate.

The spread of bituminous material shall not be more than 6 inches wider than the width to be covered by the cover aggregate. Operations shall not proceed if the bituminous material is allowed to cool, set up, dry, or otherwise impair retention of cover aggregate.

Fog seal shall be allowed to penetrate and dry before traffic is permitted on the sealed portion.

The surfaces of structures and trees adjacent to the area being treated shall be protected to prevent their being spattered or marred.

3.6 APPLICATION OF COVER AGGREGATE AND BLOTTER. Immediately following the application of the bituminous material, cover aggregate shall be spread at the specified rate. Joints between adjacent applications of cover aggregate shall be approximately in the center of two-lane roads.

The aggregate spreader shall not be operated at speeds which cause the aggregate to roll over after striking the bituminous material. The cut-off of aggregate shall be complete, and any excess aggregate shall be removed from the surface prior to resuming operations. Immediately after the cover aggregate has been spread, any piles, ridges, and uneven distribution shall be corrected.

Cover aggregate may be applied by hand in areas inaccessible to spreading equipment.

Rolling shall begin immediately after spreading the cover aggregate and shall consist of a minimum of two complete coverages.

The second treatment of a double chip seal shall not be applied until at least 24 hours after completion of a first treatment, when an emulsion or asphalt cement is used. If a medium cure liquid asphalt is used, 10 days shall be allowed between applications. Prior to the second treatment, any loose cover aggregate remaining on the surface after the first treatment shall be removed in such a manner that the cover aggregate set in the bituminous material will not be displaced.
After rolling, traffic shall be controlled to a maximum speed of 15 miles per hour for a period of 4 hours.

The day following the final application of cover aggregate, any concentrations of loose cover aggregate shall be redistributed without disturbing the embedded aggregate. Four days after the final application of cover aggregate all excess cover aggregate shall be removed. During this period, any bituminous material that comes to the surface shall be covered with additional cover aggregate or approved blotter material.

3.7 Blotter material for fog seals shall be spread in sufficient quantity to prevent tire pickup.
SPECIFICATION - 812 PREVENTIVE MAINTENANCE  
(Put-to-Bed Road)

DESCRIPTION

1.1 Preventive maintenance is minimizing weather damage to the roadbed during the non-hauling period. It includes outsloping roadbed, removal of berms and ruts, cleaning or removal of ditches and effectively blocking the road to normal vehicular traffic where feasible.

REQUIREMENTS

3.1 Preventive maintenance shall be performed at the end of the permittees hauling season.

3.2 The existing roadbed, including turnouts, shall be bladed to remove ruts, berms and other irregularities which would interfere with normal runoff of water. Culverts and ditches will be cleaned and restored to their design condition unless otherwise agreed upon. The road will be effectively blocked to normal vehicular traffic where feasible under existing terrain conditions. The permittee will construct cross ditches and waterbars as staked or otherwise marked on the ground by the District Ranger or his representative.

3.3 Completion of the above REQUIREMENTS will be approved by the District Ranger or his representative.
DESCRIPTION

1.1 Preventive maintenance is minimizing weather damage to the roadbed during the non-hauling period. It includes outsloping roadbed, removal of berms and ruts, cleaning or removal of ditches.

REQUIREMENTS

3.1 Preventive maintenance shall be performed at the end of the Permittee's hauling season.

3.2 The existing roadbed, including turnouts, shall be bladed to remove ruts, berms and other irregularities which would interfere with normal runoff of water. Culverts and ditches will be cleaned and restored to their design condition unless otherwise agreed upon. The road will be effectively blocked to normal vehicular traffic where feasible under existing terrain conditions. The permittee will construct cross ditches and waterbars as staked or otherwise marked on the ground by the District Ranger or his representative.

3.3 Performance of the above REQUIREMENTS will be approved by the District Ranger or his representative.
Prior to termination of this permit, the Permittee shall restore the roadway to as nearly a natural condition as is reasonably possible. This will be done by removing all structures, opening all natural drainage channels, pulling fills into the roadway to restore the ground to a near natural slope, constructing leadoff and water barriers to prevent erosion, and re-establishing vegetative cover where possible.

Performance of the above REQUIREMENT will be approved by the District Ranger or his representative.
DESCRIPTION

1.1 All vegetative debris associated with loading of logs shall be treated by one of the following methods.

REQUIREMENTS

2.1 REMOVE: All vegetative debris shall be moved or hauled to locations approved by the District Ranger or his representative.

2.2 BURYING: All vegetative debris shall be buried where agreed to by the District Ranger or his representative in borrow areas, pits, trenches or other locations reasonably near the area of origin. The final surface shall be sloped to drain and be relatively smooth.
SPECIFICATION - 816 VEGETATIVE SOIL STABILIZATION

Where soil has been disturbed by Permittee operations and the establishment of vegetation is needed to minimize erosion, Permittee shall take appropriate measures normally used to establish an adequate cover of grass or other vegetation acceptable to Forest Service or take other agreed stabilization measures. Forest Service shall designate on the ground such disturbed areas.

Forest Service, upon request, shall provide advice as to soil preparation and the application of suitable seed mixtures, mulch and fertilizer and the timing of such work.
DESCRIPTION

1.1 Winterizing maintenance is minimizing weather damage to the roadbed during the non-hauling period. It includes outsloping roadbed, removal of berms and ruts, cleaning or removal of ditches.

REQUIREMENTS

3.1 Winterizing maintenance shall be performed at the end of the Permittee's hauling season.

3.2 The existing roadbed, including turnouts, shall be bladed to remove ruts, berms and other irregularities which would interfere with normal runoff of water. Culverts and ditches will be cleaned and restored to their design condition unless otherwise agreed upon.

3.3 Performance of the above REQUIREMENTS will be approved by the District Ranger or his representative.
SPECIFICATION - 818 SNOW REMOVAL

DESCRIPTION

1.1 Snow removal is that operation performed to clear roadway surfaces for winter time use. It includes plowing snow to the sides, clearing drainage structures, opening banks in the edges of the road to allow drainage from the plowed surface, protecting the adjacent brush and trees from damage due to snow pushed off the sides and sanding the road surface when icing is present.

REQUIREMENTS

3.1 Snow removal shall be repeated during the year as often as necessary to facilitate traffic and proper drainage.

3.2 Except as provided in 3.6 the existing roadbed, including turnouts, shall be bladed. Snow shall be pushed off to the side where it may be stored along existing shoulders or on existing hill slopes. Removal shall be performed in a manner which will minimize damage to adjacent vegetation. The resulting banks of snow from the plowing operation shall be notched to allow drainage from the road surface at intervals not to exceed 200 feet on grades up to 5% and shall be notched at intervals not greater than 100 feet on grades greater than 5%.

3.3 Culvert inlets shall be opened so water can enter the inlets.

3.4 Snow removal shall be performed to minimize damage to any part of the roadway structure.

3.5 Damages created by winter snow plowing operations both on the roadway surface and the ditches and other drainage structures and in the adjacent vegetation shall be repaired to the satisfaction of the District Ranger or his representative.

3.6 At the discretion of the District Ranger, a single lane with turnouts may be plowed provided the turnouts for passing traffic are intervisible.

3.7 Where snow plowing is done on aggregate surfaced roads, a cushion of one to two inches of snow will be left on top of the aggregate to avoid plowing the aggregate off the road.

3.8 Permittee shall be responsible for maintaining drainage structures in workable condition throughout the snow season to insure that water does not damage the facility.

3.9 Crawler type tractors will not be acceptable as snow plowing units on paved surfaces unless they are equipped with street type pads or the District Ranger agrees that the operator may keep the machine one foot above the paved surface to remove drifts.

4.0 Salt or calcium chloride will not be used without written permission from the District Ranger.
SPECIFICATION - 819 AGGREGATES

Base Course

Crushed aggregate base course shall conform to the following requirements:

- Resistance Value (R-Value)*, AASHTO T-190: 78 Minimum
- Sand Equivalent, AASHTO T-176: 30 Minimum
- Durability Index, AASHTO T-210: 35 Minimum

*The R-Value requirement will be waived provided the aggregate material conforms to the specified grading and durability and has a sand equivalent value of 35 or greater.

Aggregate shall conform to the grading requirements listed below, as determined by AASHTO T-11 and T-27 test methods.

<table>
<thead>
<tr>
<th>Sieve Sizes</th>
<th>3/4&quot; Maximum</th>
<th>3&quot; Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>3&quot;</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td>2&quot;</td>
<td>-</td>
<td>65-95</td>
</tr>
<tr>
<td>1&quot;</td>
<td>100</td>
<td>-</td>
</tr>
<tr>
<td>¾&quot;</td>
<td>90-100</td>
<td>40-75</td>
</tr>
<tr>
<td>No. 4</td>
<td>35-55</td>
<td>22-45</td>
</tr>
<tr>
<td>No. 30</td>
<td>10-30</td>
<td>8-22</td>
</tr>
<tr>
<td>No. 200</td>
<td>2-9</td>
<td>2-10</td>
</tr>
</tbody>
</table>

Preparation of Roadbed

The roadbed, including shoulders, shall be graded to a smooth compact surface before aggregate is placed upon it.

Mixing and Placing

The aggregate shall be spread on the prepared roadbed then mixed with water to achieve the optimum moisture. The aggregate shall then be spread and compacted to a minimum depth as directed by Forest representative. Compaction shall be accomplished by rolling with steel wheeled or pneumatic tired rollers to achieve a density of 90% of the maximum density as measured by AASHTO test T-180.

Cover Aggregates, Sand

Aggregate used for sand seal shall be aggregate passing the No. 4 sieve and shall consist of natural sand or crushed screenings, free of deleterious material, conforming to the requirements shown on the drawings.

Blotter

Aggregate for blotter material shall be aggregate passing the No. 4 sieve and shall consist of natural sand or crushed screening, free of deleterious material.
This work shall consist of treating an existing surface with bituminous material, and blotter material if required, in accordance with these specifications.

**Bituminous Material**

The bituminous material shall be Liquid Asphalt Grade MC-70 conforming to AASHTO M-82. The liquid asphalt shall be applied at a temperature between 105°F - 185°F Fahrenheit. Application rate shall be 0.5 gallon per square yard.

**Application of Bituminous Material**

The bituminous material shall be uniformly applied with a pressure distributor. The surfaces of trees and adjacent structures shall be protected to prevent spattering or marring. No bituminous material shall be discharged into a borrow pit or water channel.

The bituminous material shall be applied only when the surface to be treated is dry or slightly damp, when the surface temperature in the shade is above 55°F and rising or above 60°F if falling, when the weather is not foggy or rainy, and when the temperature of the aggregate surface is above 40°F.
Appendix B: Update

Five-Year Road Maintenance and Reconstruction Plan for Project-Related Roads on National Forest System Lands

Exhibit B-1: Five-Year Road Maintenance and Reconstruction Plan
Appendix B: Update- October 2017

Five-Year Road Maintenance and Reconstruction Plan for Project-Related Roads on National Forest System Lands

El Dorado Project  
FERC Project No. 184  
El Dorado Irrigation District (District)

B.1 Introduction

This appendix provides an update to the Five-Year Transportation Maintenance Plan as required by 4(e) Condition 57. The maintenance and upgrades described herein are the result of an in-field “needs assessment” that was performed from June through October 2004 along all project-related roads located on National Forest System lands identified as the primary responsibility of the licensee (licensee-maintained roads). The needs assessment included an evaluation of the road surfaces, drainage systems, and road features such as culverts, gates, and signs to determine whether they met the criteria for Forest Service standards per the Forest Service Manual (FSM 7730), the Forest Service Engineering Handbook (1968) and the Federal Highway Administration Manual of Uniform Traffic Control Devices. The Five-Year Road Maintenance Plan should be reviewed as part of the annual maintenance meeting (see Appendix A: Section V.A.).

It is important to note that the recommended upgrades as outlined in Exhibit B-1: Update should be field verified prior to project implementation. The conditions of roads and road features are subject to constant change depending on weather conditions and, as such, the needs assessment represents a ‘snapshot’ view of the road conditions. Similarly, the priorities for road improvements should be re-evaluated in the event of extreme weather conditions (e.g., flood) or other catastrophic events (e.g., wildfire, landslide).

B.2 Five-Year Priorities for Road Upgrades

The following matrix, Exhibit B-1: Update, identifies the priorities for road improvements for the next five years following FERC approval of the Update.

The recommended road improvements were prioritized based on three criteria including:

1) **Safety.** The safety of EID and Forest Service personnel as well as public safety is considered the first priority (e.g. weight limit postings for road signs on bridges). All recommended improvements that are considered “safety issues” are listed in the first year of upgrades.

2) **Environmental/Resource Damage.** This criterion refers to conditions that could result in adverse impacts to watersheds, streams, aquatic habitats, archaeological sites and/or other environmental resources (e.g., culvert spacing and upgrades to improve drainage and reduce erosion). The majority of the recommended road improvements are due to the potential adverse impacts to environmental resources. As such, this prioritization criterion is further divided based on the following categories:
• road position in relation to perennial streams (e.g., closer to perennial stream = higher priority);
• road grade (e.g., steeper grade = higher priority);
• drainage facilities (condition and spacing of drainage facilities to meet Forest Service standards); and,
• visible evidence of resource damage.

The more of these categories that a recommended improvement addressed, the higher the priority became for improvement.

3) **Mission.** This criterion refers to adverse impacts on the mission or objectives of either EID or the Forest Service (e.g., failure or collapse of a culvert could cause significant delay in access to critical El Dorado Project facilities).

The improvements recommended for safety purposes are considered the highest priority. In addition, road improvements that could affect the mission of EID are also considered high priority. To provide for a cost-effective Five-Year Road Maintenance and Reconstruction Plan, lower priority projects were sometimes included with higher priority projects in order to reduce move-in and move-out costs.

The District has completed the preponderance (16 out of 19) of improvement projects identified in the approved Transportation System Management Plan which was approved by FERC on October 12, 2007. The remaining four projects are scheduled to be completed during this five-year period. The initial five year plan focused on replacement and reconstruction needs and the District is now transitioning into a program focused primarily on maintenance of existing facilities. Ongoing maintenance activities include periodic inspections, repairs and replacement as needed to maintain transportation facilities in accordance with manufacturer's recommendations and/or regulatory guidelines.

Current standards will be reviewed and applied as needed when a transportation facility or feature is identified as in need of repair or replacement.
Exhibit B-1: 2017 Update

Five-Year Road Maintenance and Reconstruction Plan

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Map Reference</th>
<th>Action</th>
<th>Criteria Addressed</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>R73</td>
<td>Camp Two</td>
<td>Figure 2-4</td>
<td>Rate bridge and post; add object markers to bridge; add cmp at 0.02</td>
<td>Safety</td>
<td>Bridge was removed with a retaining wall installed in its place.</td>
</tr>
<tr>
<td>10NY08</td>
<td>Bull Creek, Camp 2 Access Road</td>
<td>Figure 2-4</td>
<td>Buttress slipout in Plum Creek with rip rap</td>
<td>Environmental/Resource Damage</td>
<td>No improvements recommended based on field inspection</td>
</tr>
<tr>
<td>R89</td>
<td>Rock Crusher Road</td>
<td>Figure 2-3</td>
<td>Improvements per project plans.</td>
<td></td>
<td>Completed in 2014.</td>
</tr>
<tr>
<td>R45</td>
<td>Woods Creek</td>
<td>Figure 2-7</td>
<td>Parking lot surface repairs</td>
<td>Environmental/Resource Damage</td>
<td>This parking area was re-evaluated and it was determined repairs are not needed.</td>
</tr>
<tr>
<td>R75</td>
<td>El Dorado</td>
<td></td>
<td>Road work consists of grading, ditching, and adding base rock where appropriate.</td>
<td>Resource Protection</td>
<td>Completed in 2017.</td>
</tr>
<tr>
<td>R88</td>
<td>Old Camp 4</td>
<td></td>
<td>Road work consists of grading, ditching, and adding base rock where appropriate. Done in 2017</td>
<td>Resource Protection</td>
<td>Completed in 2017.</td>
</tr>
<tr>
<td>Number</td>
<td>Name</td>
<td>Map Reference</td>
<td>Action</td>
<td>Criteria Addressed</td>
<td>Status</td>
</tr>
<tr>
<td>---------</td>
<td>-------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------</td>
<td>--------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>12N34H</td>
<td>Powerhouse</td>
<td>Figure 2-2</td>
<td>Improvements per project plans.</td>
<td>Environmental/Resource Damage</td>
<td>Scheduled in 2017</td>
</tr>
<tr>
<td>R89</td>
<td>Rock Crusher Road</td>
<td>Figure 2-3</td>
<td>Improvements per project plans.</td>
<td>Environmental/Resource Damage</td>
<td>Hazard rocks removed, road bed regraded and road base added where needed. Scheduled October 2017, to repair storm damage as part of Flume 44 replacement 2018.</td>
</tr>
<tr>
<td>R75</td>
<td>Camp 1</td>
<td>Figure 2-4</td>
<td>Address erosion at culvert.</td>
<td>Environmental/Resource Damage</td>
<td>EID is currently working with a geotechnical engineering company to draw up plans for this task. This work is scheduled to be completed in 2018.</td>
</tr>
<tr>
<td>11NY02</td>
<td>El Dorado Ditch Access</td>
<td>Figure 2-3</td>
<td>Future road work at 11N02Y grading, ditching, and road base.</td>
<td>Resource Protection</td>
<td>Scheduled for 2018.</td>
</tr>
</tbody>
</table>

This Five-Year Road Maintenance and Reconstruction Plan will be reviewed at the annual consultation meeting per Section V of Appendix A. Priorities could change based on conditions.
Appendix C

USFS Consultation for the Transportation System Management Plan
Appendix C: USFS Consultation for the Transportation System Management Plan

<table>
<thead>
<tr>
<th>CONTACT</th>
<th>DATE</th>
<th>TOPIC OF CONSULTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>EID, USFS, and EN2 Resources, Inc.</td>
<td>6/23/2004</td>
<td>Final Meeting Notes, Transportation and Trails System Management Plan</td>
</tr>
<tr>
<td>EID, USFS, and EN2 Resources, Inc.</td>
<td>8/31/2004</td>
<td>Field Inventory Roads (Roads deemed to have some or all EID maintenance responsibility)</td>
</tr>
<tr>
<td>USFS, C. Oswald</td>
<td>8/24/2004</td>
<td>FERC Re-Licensing Road Authorizations Position Paper</td>
</tr>
<tr>
<td>Email from G. Connick to K. Quidachay</td>
<td>7/17/2004</td>
<td>Email regarding radio frequencies</td>
</tr>
<tr>
<td>Email from K. Quidachay to B. McKoy</td>
<td>9/24/2004</td>
<td>Email regarding consulting the Basin on TSMP</td>
</tr>
<tr>
<td>Letter from L. Marino to K. Hardy</td>
<td>9/2/2004</td>
<td>Letter regarding USFS Clarification of 4(e) Condition 57 requiring a Transportation System Management Plan for FERC Project 184</td>
</tr>
<tr>
<td>Letter from J. Berry to L. Marino</td>
<td>10/20/2004</td>
<td>Response to Sept. 9, 2004 letter to K. Hardy requesting clarification and approval regarding 4(e) Condition 57</td>
</tr>
<tr>
<td>USFS and EN2 Resources, Inc.</td>
<td>1/11/2005</td>
<td>Preliminary Draft Meeting Minutes, Transportation System Management Plan</td>
</tr>
<tr>
<td>Email from K. Quidachay to L. Taylor</td>
<td>1/23/2005</td>
<td>Email regarding Draft Meeting Minutes, 1/11/05</td>
</tr>
<tr>
<td>Email from K. Quidachay to C. Mulder, L. Taylor, and K. Hardy</td>
<td>1/23/2005</td>
<td>Email regarding revised meeting minutes from 1/21/05</td>
</tr>
<tr>
<td>Email from C. Oswald to K. Quidachay</td>
<td>1/27/2005</td>
<td>Draft Section 1.3 of TSMP - SUA</td>
</tr>
</tbody>
</table>
Documentation of Consultation

- Meeting agenda from August 28, 2012 meeting with FS
- Meeting notes from September 20, 2012 meeting with FS
- Email correspondence
AGENDA

PROJECT: El Dorado Hydroelectric Project (FERC Project No. 184)
El Dorado Irrigation District
Five Year Updates to Transportation, Trails and Facilities Management Plans

DATE: Tuesday August 28, 2012
TIME: 9:00am – 11:00am
LOCATION: Silver Lake Conference Room
ATTENDEES: Cindy Oswald (Eldorado National Forest), Brian Deason (EID), Steve Lindstrom (EID), Karen Quidachay (GANDA)

PURPOSE: The objective of this meeting is to review the proposed five year updates to the Road Maintenance and Reconstruction Plan, Trails Maintenance Plan, and Facilities Maintenance, Reconstruction and Removal Plan as required by 4(e) Conditions 57, 58 and 59, respectively.

1) BACKGROUND AND STATUS OF 2007/2008 MANAGEMENT PLANS (see handouts)
   - Review proposed updates to Five-Year Road Maintenance and Reconstruction Plan
   - Review proposed updates to Five-Year Trail Maintenance Plan
   - Review proposed updates to Table 2: Five-Year Facilities Maintenance, Reconstruction and Removal Plan

2) REVIEW SCHEDULE

3) NEXT STEPS/ACTION ITEMS

Handouts:
   - Agenda
   - Five-Year Road Maintenance and Capital Improvement Plan - Years One through Five (October 12, 2007)
   - Proposed updates to Five-Year Road Maintenance and Reconstruction Plan (in tracked changes)
   - Five-Year Trail Maintenance and Capital Improvement Plan - Years One through Five (January 14, 2008)
   - Proposed updates to Five-Year Trail Maintenance Plan (in tracked changes)
   - Table 2: Five-Year Facilities Maintenance, Reconstruction and Removal Plan (June, 2008)
   - Proposed Updates to Table 2: Five-Year Facilities Maintenance, Reconstruction and Removal Plan (in tracked changes)
Meeting Minutes and Action Items

PROJECT: El Dorado Hydroelectric Project (FERC Project No. 184)  
El Dorado Irrigation District  
Five Year Updates to Transportation, Trails and Facilities Management Plans

DATE: Wednesday, September 20, 2012
TIME: 1:00pm – 3:00pm
LOCATION: Placerville Ranger District
ATTENDEES: Cindy Oswald (Eldorado National Forest), Karen Quidachay (GANDA)

PURPOSE: The objective of this meeting was to review the Eldorado National Forest Public Wheeled Motorized Travel Management EIS and discuss Updates to the EID Transportation System Management Plan in accordance with this Plan.

Items Discussed/Noted

- C. Oswald agreed to a two-year plan for removal of buildings across from Powerhouse per Facilities Management Plan with permit, plan, and implementation to follow within years 3, 4 and 5.
- C. Oswald provided electronic copies of revised Tables 2-2 and 2-3 for Special Use Authorization and reviewed with K. Quidachay updated tables road by road. Edits to be made per notes.
- C. Oswald will be sole FS reviewer at this time but actual Special Use Authorization of roads will require input from Lake Tahoe Basin Management Unit and Amador Ranger District (they may have other items not discussed at this time).

Action Items

- K. Quidachay to check if the two Caples Roads (R43, R44) are still needed by EID.
- K. Quidachay to check if EID needs to routine use any of the roads during winter when closed by Forest Order. (e.g., Plum Creek Road (remember $300/acre fee))
- K. Quidachay to check if there are gates installed on R71 (Flume 39/40) or R81 (Flume 47B) roads.

REVIEWED SCHEDULE

EID to provide C. Oswald updated plans in tracked changes the first week of October, 2012. C. Oswald will be only FS reviewer at this time. C. Oswald requires approximately 3 business days to complete her review in time for FERC submittal by October 12, 2012.
I agree to the changes made. Thanks for pointing me to 2-8.

Cindy Oswald
(530) 647-5320
coswald@fs.fed.us

Hi Cindy,

Thank you for the comments. I made a few revisions in track changes in the attached and provided some notes in your email below. Please let me know if these changes are agreeable.

Thanks!

Brian Deason
Hydroelectric Compliance Analyst
El Dorado Irrigation District
2890 Mosquito Road
Placerville, CA 95667
PHONE: 530-642-4064
FAX 530-622-6197

I’ve gone through the Transportation Updates –

Table 2-2 to 2-4 I’ve attached tracked changes. Besides those changes, I have 3 items to double-check with you if you want to include––

11NY02 El Dorado Ditch Access – your 9-27-12 table did not have an “X” as needing a special use
permit - yes, added to list
H-4 Sandy Point – I’m not familiar with, and I didn’t find on the map – located at Silver Lake – see Figure 2-8
H-9 Granite Springs - while not on a map, this is on the north side of the canyon, used to deposit tunnel borings – District would like to retain use of this for future activities – it is depicted on Figure 2-8

Appendix B (no track changes made)

Table 1 – the first entry of roads, the road number no longer lines up with the road name - fixed
11NY02 – nothing entered in Action column - fixed
Last page, R45. – Status – what about: “Develop a plan and implement in 2013” – see suggested changes in attached. I modified the action to “Parking lot surface repairs” so we can evaluate the current condition and specify the appropriate actions to take at this location. I also incorporated your suggested language to “Develop a plan and implement in 2013”

I hope to review Trails and Facilities later today.

Cindy Oswald
(530) 647-5320
c Oswald@fs.fed.us

From: Deason, Brian [mailto:bdeason@eid.org]
Sent: Monday, October 01, 2012 3:20 PM
To: Oswald, Cindy -FS
Subject: Updated Trails, Transportation, and Facility Plans

Hi Cindy,

Please see attached for the updates to the Trails, Transportation, and Facility Plans. These are the clean versions without all the track changes markup. Please let me know if you would like the track changes versions. I’d like to file these with FERC on or before the due date of October 18, 2012. Thanks again for all your assistance to expedite the updates to these plans.

Brian Deason
Hydroelectric Compliance Analyst
El Dorado Irrigation District
2890 Mosquito Road
Placerville, CA 95667
PHONE: 530-642-4064
FAX 530-622-6197
Documentation of Consultation

- Meeting agenda from September 11, 2017 meeting with FS
- Email correspondence
AGENDA

PROJECT: Update Trails, Transportation and Facilities Management Plans
DATE: Monday September 11, 2017
TIME: 3:00pm – 5:00pm
LOCATION: SO
ATTENDEES: Katy Parr and Teresa Fraser (FS), Brian Deason, Matt Heape, and Dan Gibson (EID), and Karen Quidachay (EID Consultant)

PURPOSE: The objective of this meeting is to review and receive initial feedback on the proposed updates to the 5-year Project No. 184 Trails, Transportation, and Facility Plans.

1) REVIEW BACKGROUND AND PROPOSED EDITS TO 2017 MANAGEMENT PLANS

- Proposed Updates to Trails System Management Plan (review handout)
- Proposed Updates to Transportation System Management Plan (review handout)
- Proposed Updates to Facilities Management Plan (review handout)

2) MILESTONES AND SCHEDULE: To include the following milestones and meetings:

<table>
<thead>
<tr>
<th>Task</th>
<th>Completion Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. EID Submit to FS Proposed Updates in Tracked Changes</td>
<td>August 30, 2017</td>
</tr>
<tr>
<td>2. Forest Service Meeting</td>
<td>September 11, 2017</td>
</tr>
<tr>
<td>3. Receive Final Forest Service Comments</td>
<td>October 2, 2017</td>
</tr>
<tr>
<td>4. Submit Final Updates to FERC</td>
<td>October 12, 2017</td>
</tr>
</tbody>
</table>

3) NEXT STEPS/ACTION ITEMS

Handouts:

- Agenda
- Tracked Edits Updates to Plans (Karen to bring 6 copies)
Brian, The Forest Service provided comments and had the opportunity to review the Project No. 184 Trails System Management Plan, Transportation System Management Plan, and Facilities Management Plan during our meeting on September 11, 2017. Our discussion and comments have been reflected in the updated plans.


Teresa Fraser
Resource Officer
Forest Service
Eldorado National Forest,
Placerville Ranger District
p: 530-647-5392
c: 530-363-4029
f: 530-647-5311
tfraser@fs.fed.us
4260 Eight Mile Road
Camino, CA 95709
www.fs.fed.us
Caring for the land and serving people

Hi Teresa/Katy,

This is a follow-up to our September 11, 2017 meeting to review the proposed 5-year updates to the Project No. 184 Trails System Management Plan, Transportation System Management Plan, and
Facilities Management Plan. The attached updates incorporate comments discussed at the meeting. There are final versions and a track changes versions for each plan. Please let me know via email if these updates are approved by the FS. I would appreciate FS response by October 10, 2017 to allow time for me to file these updates with FERC before the due date of October 18, 2017.

Thanks,

Brian Deason
Hydroelectric Compliance Analyst
El Dorado Irrigation District
2890 Mosquito Road
Placerville, CA 95667
530-642-4064

This electronic message contains information generated by the USDA solely for the intended recipients. Any unauthorized interception of this message or the use or disclosure of the information it contains may violate the law and subject the violator to civil or criminal penalties. If you believe you have received this message in error, please notify the sender and delete the email immediately.
Appendix D

Photo Documentation: Traffic Safety and Signage on Project Roads
Photo Documentation:
Traffic Safety and Signage on Project Roads

Photo Documentation 11-2-04

Road-12N34H; Station-0+48; Type-Road Number Sign
Road-12N34H; Station-0+25; Type-Address Sign

Road-12N34H; Station-0+92; Type-Gate
Road-12N34H; Station-3+21; Type-15 MPH Sign

Road-12N34H; Station-59+70; Type-Private Road Sign
Road-12N34H; Station-62+40; Type-15 MPH Speed Limit Sign

Road-12N34H; Station-62+40; Type-15 MPH Speed Limit Sign
Road-10N40G; Station-2+46; Type-Gate

Road-10N40N; Station-12+00; Type-Gate
Road-R74; Station-0+66; Type-Gate

Road-R84; Station-0+43; Type-Gate
Road-R87; Station-0+33; Type-Gate

Road-R88; Station-58+54; Type-Gate
Road-R89; Station-0+70; Type-Gate

Road-R72; Station-0+42; Type-Gate
Photo Documentation 11-09-04

Road-11N02Y; Station-1+32; Type-Gate

Road-R82; Station-0+40; Type-Gate
Road-R83; Station-0+65; Type-Gate

Road-10N08Y; Station-4+12; Type-Gate
Road-R73; Station-0+00; Type-Gate

Road-R73; Station0+40 Type-Camp 2 Location Sign
Road-R45; Station-0+00; Type-Stop Sign

Road-R43; Station-0+27; Type-Gate
Photo Documentation 11-15-04

Road-R93; Station-0+63; Type-Informational Sign

Road-R93; Station-1+08; Type-Gate
Appendix E

Aviation Notification Standards and Example Aviation Operations Plan
For Reference

Example

AVIATION OPERATIONS PLAN

Scope
The purpose of the Lake Aloha Dam Maintenance and Telemetry Project is to seal the face of the Main Dam as well as Auxiliary Dams 4, 6, and 7. In addition, vegetation will be removed from around the dams and a rodent control program initiated.

To accomplish this task, EID will use various power and hand tools. A mortar (sealant) will be mixed on-site and applied to the face of the dams to reduce leakage and improve safety.

Logistics
Due to the remote location, the Lake Aloha Dam Maintenance and Telemetry Project will require the transportation of supplies and materials to the site via helicopter. The following is a breakdown of the types of helicopters to be used and an estimate of the number of trips at different stages of the project.

Mobilization
From the Granite Springs Staging Area (T11N, R16E, Sec. 17) a Bell UH-1B or UH-1H will be used to transport equipment and supplies to the Lake Aloha Staging 1, at the east end of the Main Dam, or to Staging 2 at Auxiliary Dam 4. It is estimated that 14-16 sorties will be needed to complete the mobilization process.

Project Implementation
During project implementation, the periodic re-stocking of supplies and the removal of construction and biological waste will be required. These administrative flights will amount to 10 sorties using a Bell 204IL.

Demobilization
From Staging Areas 1 and 2, all construction equipment associated with the repairs of the dams and the installation of the telemeter station will be flown back to the Granite Springs Staging Area. All biological and construction waste will be contained and flown to the Granite Springs Staging Area as well. A Bell UH-1B or UH-1H will be used for demobilization. It is estimated this demobilization will take 10-12 sorties to complete.

Flight Logs
Each project associated flight will require the completion of a Flight Log Form (Copy Attached). These Flight Logs will be turned in to EID daily. Copies of the Flight Logs will be forwarded to the Forest Service on a weekly basis or on a schedule to be determined by the Forest Service.
Logistics Summary
To accomplish this project, there is a potential for 38 sorties between the Granite Spring Staging and Aloha Staging 1 and 2. This is felt to be the maximum number of flights given the availability of the before mentioned helicopters, their capabilities, predicted weather conditions, and the project staying within the stated parameters.

Notification
Twenty-four (24) hours prior to operation, the Project Manager or Pilot will contact Camino Dispatch at (530) 642-5170. Information to be supplied to Camino Dispatch will include
- Tail number of the aircraft
- Aircraft company name and phone number
- Radio frequency aircraft will be monitoring
- Project location and flight paths
- Expected duration of flight operations

Any significant changes to the location or duration of flight activities shall be reported to Camino Dispatch via telephone or radio.

Communications
Radio Frequencies
The radio frequencies to be used when contacting Camino Dispatch are.
Receive = 171.525  Transmit = 169.950
Radio repeaters used by Camino Dispatch and their frequencies.
- Tone 1  Alder Ridge*  110.9
- Tone 2  Leek Springs  123.0
- Tone 3  Bald Mountain  131.8
- Tone 4  Big Hill*  136.5
- Tone 5  Pine Hill  146.2
- Tone 6  Echo Summit*  156.7
- Tone 7  Mt. Reba  167.9
- Tone 8  Bunker Hill  103.5
- Tone 9  Hawkins Peak  100.0
- Tone 10  Walker Ridge  107.2

Camino Dispatch Phone Numbers
Emergency ...................... 911
Administrative ............. (530) 642-1570

EID Phone Numbers
Len Marino (Project Manager) ............. (530) 642-4092
Dan Downey (Project Manager) ............. (530) 647-5152

On-site Satellite Phone ...................... (xxx) xxx-xxxx

PJ Helicopters ...................... (xxx) xxx-xxxx
Karen,

After speaking with the folks at Camino Dispatch they are requesting the following information for aircraft activity notification.

24 hour notification from Project Manager or Pilot to Camino Dispatch
(530) 642-5170.
Tail Number of aircraft.
Company supplying aircraft.
Radio frequency aircraft will be monitoring.
Project location.
Expected duration of flight operations.
Any significant changes of location or duration during flight activities shall be reported to Camino Dispatch via radio or telephone.

Forest Net Radio Frequency: Receive = 171.5250 , Transmit 169.950

Repeater Frequencies:

<table>
<thead>
<tr>
<th>Tone</th>
<th>Repeater</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tone 1</td>
<td>Alder Ridge</td>
<td>110.9</td>
</tr>
<tr>
<td>Tone 2</td>
<td>Leek Springs Hill</td>
<td>123.0</td>
</tr>
<tr>
<td>Tone 3</td>
<td>Bald Mountain</td>
<td>131.8</td>
</tr>
<tr>
<td>Tone 4</td>
<td>Big Hill</td>
<td>136.5</td>
</tr>
<tr>
<td>Tone 5</td>
<td>Pine Hill</td>
<td>146.2</td>
</tr>
<tr>
<td>Tone 6</td>
<td>Echo Summit</td>
<td>156.7</td>
</tr>
<tr>
<td>Tone 7</td>
<td>Mt. Reba</td>
<td>167.9</td>
</tr>
<tr>
<td>Tone 8</td>
<td>Bunker Hill</td>
<td>103.5</td>
</tr>
<tr>
<td>Tone 9</td>
<td>Hawkins Peak</td>
<td>100.0</td>
</tr>
<tr>
<td>Tone 10</td>
<td>Walker Ridge</td>
<td>107.2</td>
</tr>
</tbody>
</table>

Not activated at this time
Tone 11 Sourdough Hill 114.8
will be on line soon.
Appendix F

Copies of the USFS Best Management Practices Applicable to the El Dorado Project

- 12.21 Index for Road and Building Site Construction Practices
- 12.22 Road and Building Site Construction Best Management Practices
- General Guidelines for the Location and Design of Roads (PRACTICE: 2-1)
- Erosion Control Plan (PRACTICE: 2-2)
- Timing of Construction Activities (PRACTICE: 2-3)
- Stabilization of Road Slope Surfaces and Spoil Disposal Areas (PRACTICE: 2-4)
- Road Slope Stabilization Practices (PRACTICE: 2-5)
- Dispersion of Subsurface Drainage from Cut and Fill Slopes (PRACTICE: 2-6)
- Control of Road Drainage (PRACTICE: 2-7)
- Constraints Related to Pioneer Road Construction (PRACTICE: 2-8)
- Timely Erosion Control Measures on Incomplete Roads and Stream Crossing Projects (PRACTICE: 2-9)
- Construction of Stable Embankments (Fills) (PRACTICE: 2-10)
- Control of Sidecast Material During Construction and Maintenance (PRACTICE: 2-11)
- Servicing and Refueling of Equipment (PRACTICE: 2-12)
- Control of Construction and Maintenance Activities Adjacent to SMZs (PRACTICE: 2-13)
- Controlling In-Channel Excavation (PRACTICE: 2-14)
- Diversion of Flows Around Construction Sites (PRACTICE: 2-15)
- Stream Crossings on Temporary Roads (PRACTICE: 2-16)
- Bridge and Culvert Installation (PRACTICE: 2-17)
- Regulation of Streamside Gravel Borrow Areas (PRACTICE: 2-18)
- Disposal of Right-of-Way and Roadside Debris (PRACTICE: 2-19)
- Specifying Riprap Composition (PRACTICE: 2-20)
- Water Source Development Consistent with Water Quality Protection (PRACTICE: 2-21)
- Maintenance of Roads (PRACTICE: 2-22)
- Road Surface Treatment to Prevent Loss of Materials (PRACTICE: 2-23)
- Traffic Control During Wet Periods (PRACTICE: 2-24)
- Snow Removal Controls to Avoid Resource Damage (PRACTICE: 2-25)
- Obliteration or Decommissioning of Roads (PRACTICE: 2-26)
- Restoration of Borrow Pits and Quarries (PRACTICE: 2-27)
- Surface Erosion Control at Facility Sites (PRACTICE: 2-28)
12.21 Index for Road and Building Site Construction Practices

1. General Guidelines for the Location and Design of Roads 2-1
2. Erosion Control Plan 2-2
3. Timing of Construction Activities 2-3
4. Stabilization of Road Slope Surfaces and Spoil Disposal Areas 2-4
5. Road Slope Stabilization Construction Practices 2-5
6. Dispersion of Subsurface Drainage from Cut and Fill Slopes 2-6
7. Control of Road Drainage 2-7
8. Constraints Related to Pioneer Road Construction 2-8
9. Timely Erosion Control Measures on Incomplete Road and Stream Crossing Projects 2-9
10. Construction of Stable Embankments (Fills) 2-10
11. Control of Sidecast Material During Construction and Maintenance 2-11
12. Servicing and Refueling Equipment 2-12
13. Control of Construction and Maintenance Activities Adjacent to SMZs 2-13
14. Controlling In-Channel Excavation 2-14
15. Diversion of Flows Around Construction Sites 2-15
16. Stream Crossings on Temporary Roads 2-16
17. Bridge and Culvert Installation 2-17
18. Regulation of Streamside Gravel Borrow Areas 2-18
19. Disposal of Right-of-Way and Roadside Debris 2-19
20. Specifying Riprap Composition 2-20
21. Water Source Development Consistent with Water Quality Protection 2-21
22. Maintenance of Roads 2-22
23. Road Surface Treatment to Prevent Loss of Materials 2-23
24. Traffic Control During Wet Periods 2-24
25. Snow Removal Controls to Avoid Resource Damage 2-25
26. Obliteration or Decommissioning of Roads 2-26
27. Restoration of Borrow Pits and Quarries 2-27
28. Surface Erosion Control at Facility Sites 2-28
12.22 Road and Building Site Construction Best Management Practices

The following are the BMPs for the control of non-point source pollution associated with road and building site construction activities. Each BMP was formulated based on the administrative directives that guide and direct the Forest Services' construction and maintenance of roads, buildings, and administrative facilities on NFS land.

The line officer on each administrative subunit is responsible for fully implementing the directives that require water quality protection and improvement during road and facilities construction and maintenance. The directives referenced in Section 13, provide details on methods to incorporate water quality controls into each phase of the road and facility construction and maintenance program. The BMPs synthesize the direction into a "process" to be followed.

Trained and qualified earth scientists, and other professional employees, are available to provide the engineering work force with technical assistance to identify beneficial uses and the most recent state-of-the-art water quality control methods and techniques; and to evaluate results. Publications and training sessions provide road construction and maintenance engineers with knowledge of the latest proven water quality protection methods.
1. General Guidelines for the Location and Design of Roads (PRACTICE: 2-1)

a. **Objective:** To locate and design roads with minimal resource damage.

b. **Explanation:** The following are some general considerations, which must be incorporated into the planning process of road location and design. These measures are preventive, apply to all transportation activities, and indirectly protect water quality.

1) A basic requirement for transportation facility development and operation is the formulation and evaluation of alternatives that will best meet the resource management objectives with the least adverse effect on environmental values.

2) The location, design, and construction of roads include the use of IDTs. These teams include professional personnel with skills in road, resources and water quality management. The team evaluates the effects of road system development or modification proposals on the environment, and formulates alternative.

3) All resource-coordinating instructions for the protection and prevention of damage to NFS lands, resources, and ecological systems, including wetlands and floodplains will apply to the planning, development, and operation of transportation facilities. The following instructions apply to permanent roads:

a) Locate roads to complete the area transportation system, to fit the terrain, and to minimize damage to improvements and resources. Avoid sensitive areas such as wetlands, inner gorges and unstable ground to the extent practical.

b) Base road design standards on design criteria such as traffic requirements of a timber sale, or the overall transportation plan, road management objectives or resource objectives, and minimize the effects on Forest resources including water quality.

c) Design stream crossing structures to provide the most cost efficient drainage facility consistent with resource protection, facility needs, and legal obligations. The design involves a hydrologic analysis to determine runoff volumes, flood conditions, velocities, scour, and open channel shapes. An economic comparison of various flood frequencies versus structure sizes and types is also done to meet resource and legal requirements and cost/benefit comparisons. All crossings will be designed to provide for unobstructed flows and fish passage, and to minimize diversion potential and alteration of stream channels.

c. **Implementation:** The IDT is selected by the line officer to assist in locating the road to best fit resource objectives, and to develop detailed mitigation
measures. For force account projects, Forest engineers will be responsible for developing and meeting design specifications.

For some timber sales awarded to small businesses, the purchaser may request that the Forest Service construct the roads. Under present guidelines, such work is normally done by contracting with a road construction contractor.

The COR, ER or FSR ensures compliance with project plan requirements and the operating plan.
2. Erosion Control Plan (PRACTICE: 2-2)

a. **Objective:** To limit and mitigate erosion and sedimentation through effective planning prior to initiation of construction activities and through effective contract administration during construction.

b. **Explanation:** Land disturbing activities can result in short term erosion. By effectively planning for erosion control, sedimentation can be controlled or prevented. Within a specified period after award of a contract (presently 60 days prior to the first operating season in Timber Sale Contracts, per C6.3) the purchaser will submit a general plan which, among other things, sets forth erosion control measures. Operations cannot begin until the Forest Service has given written approval of the plan. The plan recognizes the mitigation required in the contract. A similar plan is required of miners and special use permittees.

c. **Implementation:** Design engineers develop detailed mitigation using an IDT. The detailed mitigations are reflected in the contract specifications and provisions. The intent of mitigation is to prevent construction-generated erosion, as well as that generated from the completed road, from entering watercourses. Contracted projects are implemented by the contractor or operator. Compliance with contract specifications and operating plans is ensured by the COR, ER, or FSR through inspection.

This practice is commonly applied to all road construction through contract clauses and specifications and will apply to road construction for timber sales, mining, recreation, special uses and other roadwork on NFS lands.
3. Timing of Construction Activities (PRACTICE: 2-3)

a. **Objective:** To minimize erosion by conducting operations during minimal runoff periods.

b. **Explanation:** The amount of erosion and sedimentation from road construction are affected by the magnitude of water runoff. An essential element of effective erosion control is to schedule operations during the dry season or when rain and runoff are unlikely. Purchasers will be required to schedule and conduct operations during the dry season or when rain and runoff are unlikely. Purchasers will be required to schedule and conduct operations to minimize erosion and sedimentation. Equipment will not be allowed to operate when ground conditions are such that excessive rutting and soil compaction could result. Such conditions will be identified by the COR or ER with the assistance of an earth scientist or other specialists as needed.

Erosion control work will be kept as current as practicable on active road construction projects. Construction of drainage facilities and performance of other contract work to control erosion and sedimentation will be required in conjunction with earthwork projects. The operator should limit the amount of area being graded at a site at any one time, and should minimize the time that an area is laid bare. Erosion control work must be kept current when road construction occurs outside of the normal operating season.

c. **Implementation:** Detailed mitigations developed by design engineers and an IDT will be included in the environmental analysis and in subsequent project plans and contracts.

Project crew leaders and supervisors will be responsible for implementing force account projects to construction specifications and as specified in the project plan. Contracted projects are implemented by the contractor, or operator. Compliance with plans, specifications, and the operating plan will be achieved by the COR or ER through inspection.
4. Stabilization of Road Slope Surfaces and Spoil Disposal Areas
(PRACTICE: 2-4)

a. **Objective:** To minimize erosion from exposed cut slopes, fill slopes, and spoil disposal areas.

b. **Explanation:** This is a preventive practice using bioengineering and other techniques to prevent or minimize erosion. Depending on site factors such as slope angle, soil type, climate, and proximity to waterways, many fill slopes, some cut slopes, and some spoil disposal areas will require vegetative and/or mechanical measures to provide surface soil stability. The level of stabilization effort needed is determined on a case-by-case basis by trained and qualified employees.

Revegetation includes the seeding of plant species grass, legumes, or browse species—or the planting of brush, or trees. Revegetation may also include fertilizer, soil amendments, and mulching or even watering to ensure success. A combination of plant types with both woody root systems and fibrous root systems usually produce better results than a single plant type such as grass. Native species are preferred and used wherever feasible. Where local native seed is not available, not economically feasible or native plants would be ineffective in controlling erosion sterilized grass or cereal grain seed is applied.

Mechanical measures may include, but are not limited to: wattles, erosion nets, terraces, side drains, blankets, mats, riprapping, mulch, tackifiers, pavement, soil seals, and windrowing construction slash at the toe of fill slopes.

c. **Implementation:** Vegetative measures are generally a supplementary device, used to improve the effectiveness of mechanical measures, but can be effective and complete by themselves. They may not take effect for several seasons, depending on the timing of project completion in relation to the growing season.

Mechanical and vegetative surface stabilization measures will be periodically inspected to determine effectiveness. In some cases, additional work will be needed to ensure that the vegetative and/or mechanical surface stabilization measures continue to function as intended.

Initial project location, mitigation measures and management requirements are developed during the environmental analysis process. These are translated into project plans, contract provisions and specifications.

Project road inspectors, and their supervisors monitor work accomplishment and effectiveness, to ensure that design standards, project plan management requirements, and mitigation measures are met.
5. Road Slope Stabilization Construction Practices (PRACTICE: 2-5)

a. **Objective:** To reduce sedimentation by minimizing erosion from road slopes and slope failure along roads.

b. **Explanation:** This is an administrative and construction practice. It is prohibitively expensive to immediately and completely prevent erosion from road cut and fill slopes. However, plan all road construction considering adequate stabilization needs. The first planning requirement is an adequate soils and geologic investigation, to provide data necessary for proper cut and fill design such as:

1) The correct cut and fill slope steepness according to the stable angle of repose for the type of material.

2) Methods to handle surface and subsurface runoff.

3) Necessary compaction standards and surfacing needs.

A prerequisite for stabilization is to provide basic mechanical stability of the soils, using data from soils and geologic investigations to develop requirements for proper slope angles, compaction, and adequate drainage.

c. **Implementation:** Include erosion prevention considerations in planning for all road construction contracts. Application is commonly in conjunction with practice 2-4.

Complete most, if not all, of the stabilization measures prior to the first winter rains. At especially critical locations, with a high erosion and/or sedimentation potential, extensive and reliable remedies will be necessary. Determine a project location and detailed mitigation measures during the environmental analysis and included them in the project plan.

Project crew leaders and supervisors will be responsible for ensuring that force account projects meet design standards and project criteria. Contracted projects are implemented by the contractor or operator. Compliance with project plan requirements and the operating plan is ensured by the COR, or ER through inspection.
6. Dispersion of Subsurface Drainage From Cut and Fill slopes
(PRACTICE: 2-6)

a. **Objective:** To minimize the possibilities of cut or fill slope failure and the subsequent production of sediment.

b. **Explanation:** This is a preventive practice. Roadways may change the subsurface drainage characteristics of a slope. Since the angle and height of cut and fill slopes can increase the risk of instability, it is often necessary to provide subsurface drainage to avoid moisture saturation and subsequent slope failure. Where ground water dispersion is necessary because of slopes, soil, aspect, precipitation amounts, inherent instability, or other related characteristics, dispersion methods would include:

1) Underdrains or subdrains (e.g. pipes, geotextiles)

2) Horizontal drains or chimney drains

Dispersal of collected water will be accomplished in an area capable of withstanding increased flows. On erosive soils, energy dissipaters or other slope stabilization treatments or conveyance devices need to be placed below pipes carrying large volumes of water. Road surface may be designed to dissipate the intercepted water in a uniform manner along the road.

c. **Implementation:** Project location and detailed mitigation will be determined by design engineers and the IDT, documented and incorporated into subsequent project plans and contracts.

Project crew leaders and supervisors will be responsible for implementing force account projects to construction specifications as specified in the environmental analysis. Contracted projects are implemented by the contractor or timber sale operator. Compliance with project plan requirements and operating plans is ensured by the COR, FSR, or ER.
Control of Road Drainage (PRACTICE: 2-7)

a. **Objective:** Is to minimize the erosive effects of water concentrated by road drainage features; to disperse runoff from disturbances within the road clearing limits; to lessen the sediment yield from roaded areas; to minimize erosion of the road prism by runoff from road surfaces and from uphill areas.

b. **Explanation:** This is a preventive practice. A number of treatments can be used, alone, or in combination, to control unacceptable effects of road drainage. Methods used to reduce erosion include but are not limited to such controls as construction of properly spaced cross drains, water bars or rolling dips; installing energy dissipaters, apron, downspouts, gabions, flumes, overside drains and debris racks; armoring of ditches, drain inlets and outlets and removing or adding berms to control runoff. Accomplish dispersal of runoff on the road surface by such means as rolling the grade, outsloping or crowning. Installing water spreading ditches or contour trenching can disperse road water after the water leaves the road surface.

Dispersal of runoff reduces downstream peak flows and associated scouring of the channels and sediment transport.

Reduce sediment loads from road surfaces by adding aggregate or paving surfaces or by installing such controls as: sediment filters, settling ponds, and contour trenches. Soil stabilization can reduce sedimentation by lessening erosion on borrow and waste areas, on cut and fill slopes, and on road shoulders.

c. **Implementation:** Project location, design criteria and detailed mitigation are determined and documented during the environmental analysis process. These are then incorporated into the project plan.

Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications, and project criteria. Contracted projects are implemented by the contractor, or operator. Compliance with plans, specifications, and operating plans is ensured by the COR, ER, or FSR.

This practice is required in contracts when the need is identified in the project planning process.
8. Constraints Related to Pioneer Road Construction (PRACTICE: 2-8)

a. **Objective:** To minimize sediment production and mass wasting from pioneer road construction.

b. **Explanation:** Pioneer roads are built to allow equipment access for construction of planned roadways. Pioneering is usually done within the roadway construction corridor of the planned road. To meet the objective of minimizing sediment the following constraints will be followed:

1) Confine construction of pioneer roads to the planned roadway construction limits unless otherwise specified or approved by the ER or COR.

2) Locate and construct pioneering roads to prevent undercutting of the designated final cut slope, avoid deposition of materials outside the designated roadway limits, and accommodate drainage with temporary culverts or log crossings.

3) Complete erosion control work prior to the rainy season and in accordance with contract, or project plan requirements.

4) Dewater sites on live streams crossed by pioneer roads with diversion devices (see Practice 2-15).

c. **Implementation:** Determine and document project location and describe mitigations set forth during the environmental analysis process. Incorporate them into subsequent project plans and/or contracts.

Project crew leaders and supervisors will be responsible for implementing force account projects according to construction specifications and as specified in the project plan. Contracted projects are implemented by the contractor, or timber sale operator. Compliance with plans, specifications, and operating plans is ensured by the COR, FSR, or ER.
9. Timely Erosion Control Measures on Incomplete Roads and Stream Crossing Projects (PRACTICE: 2-9)

a. **Objective:** To minimize erosion and sedimentation from disturbed ground on incomplete projects.

b. **Explanation:** The best drainage design can be ineffective if erosion control has not been completed by the end of the normal operating season. Affected areas can include roads, road fills, tractor trails, skid trails, landings, stream crossings, bridge excavations, and firelines.

Preventive measures include:

1) Removal of temporary culverts, culvert plugs, diversion dams, or elevated stream crossings.

2) Installation of temporary culverts, side drains, flumes, cross drains, diversion ditches, energy dissipaters, dips, sediment basins, berms, debris racks, or other facilities needed to control erosion.

3) Removal of debris, obstructions and spoil material from channels and floodplains.

4) Planting vegetation, mulching, and/or covering exposed surfaces with jute mats or other protective material.

c. **Implementation:** Apply protective measures to all areas of disturbed, erosion-prone, unprotected ground that is not to be further disturbed in the present year. When conditions permit operations outside of the normal operating season, update the operating plan as necessary and keep erosion control measures sufficiently current with ground disturbance to allow rapid closure when weather conditions deteriorate. Do not leave project areas for the winter with remedial measures incomplete.

Develop project mitigation measures and layout requirements during the environmental analysis process. Incorporate them into subsequent project plans and/or contracts.

Project crew leaders and supervisors are responsible for ensuring that force account projects meet construction specifications and project criteria.

Contracted projects are implemented by the contractor or operator. Compliance with project plan criteria, contract specifications and operating plans is ensured by the COR, ER, or FSR.
10. Construction of Stable Embankments (Fills) (PRACTICE: 2-10)

a. **Objective:** To construct embankments with materials and methods, which minimize the possibility of failure and subsequent water quality degradation.

b. **Explanation.** The failure of road embankments and the subsequent deposition of material into waterways may result from the incorporation of slash, or other organic matter into fills, from a lack of compaction during the construction of the embankment, or use of inappropriate placement methods.

   To minimize fill failures, design and construct the roadway as a stable and durable earthwork structure with adequate strength to support the roadway, shoulders, subgrade and the roads traffic loads. Proper slope ratio design will promote stable embankments. Adjacent to SMZs construct and place embankments of inorganic material by methods 2 to 6 below. Construct or place other embankments of inorganic material by one, or more of the following methods:

   1) Sidecasting and end dumping
   2) Layer placement
   3) Layer placement (roller compaction)
   4) Controlled compaction
   5) Special project controlled compaction
   6) In some situations it will be necessary to minimize fill volumes and/or strengthen fills using retaining walls, confinement systems, plantings or a combination of techniques.

   On projects, where required densities are specified, some type of moisture compaction control will be necessary. Where outer faces of embankments are not stabilized, due to equipment access difficulty, unfinished slopes subject to erosion and slipping will be stabilized following Practice 2-4.

c. **Implementation:** Project requirements and mitigation measures are developed and documented during the environmental analysis and road design process, by the IDT. The appropriate method of embankment placement is chosen during this process.

   Project crew leaders and supervisors will be responsible for implementing force account projects, to construction specifications and project criteria. Contracted projects are implemented by the contractor, or operator. Compliance with project plan specifications, and the operating plan is ensured by the COR, CI and ER through inspection.
11. Control of Sidecast Material During Construction and Maintenance

(PRACTICE: 2-11)

a. Objective: To minimize sediment production originating from sidecast material during road construction or maintenance.

b. Explanation: Unconsolidated materials including rocks and boulders that are cast over the side of the road shoulder can roll directly into streams, damage downslope vegetation and create bare areas that are difficult to stabilize with vegetation. Where spoil does not directly reach a stream, it is still highly susceptible to erosion, dry ravel and mass instability, and subsequently can directly deliver sediment to a nearby stream. Site-specific limits and controls for side casting or end hauling are developed and documented during environmental analysis. Loose, unconsolidated sidecast material must not be permitted to enter SMZs, (see Practice 2-17).

Sidecasting is an unacceptable construction alternative in areas where it can adversely impact water quality. Prior to the start of construction, or maintenance activities, waste areas must be located where excess material can be deposited and stabilized. During road maintenance operations, potential sidecast and other waste material will be utilized on the road surface or removed to designated disposal sites.

The roadway will be constructed within reasonable limits of the lines, grades, and dimensions given in the engineering drawings and designated on the ground. Provisions for waste material disposal are included in every road construction and maintenance contract.

c. Implementation: Project location, selected disposal areas, and mitigation will be developed and documented during the environmental analysis.

Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications and project criteria. Road maintenance plans are developed for each forest and include slide and slump repairs and disposal site locations for excess material.

Contracted projects are implemented by the contractor or timber sale operator. Compliance with project criteria, contract specifications, and operating plans will be enforced by the COR, ER, or FSR. Standard maintenance specifications have been prepared which include disposal area operation, disposal methods, and surface treatment.

Timber sale contracts include clause C5.4 to address temporary road maintenance specifications, which includes slide and slump repair, surface blading, and side casting during road maintenance.
12. Servicing and Refueling of Equipment (PRACTICE: 2-12)

a. **Objective:** To prevent pollutants such as fuels, lubricants, bitumens and other harmful materials from being discharged into or near rivers, streams and impoundments, or into natural or man-made channels.

b. **Explanation:** During servicing and refueling of logging and road construction equipment, any spilled pollutants can be transported by runoff to surface waters. If the volume of fuel exceeds 660 gallons in a single container, or if total storage at a site exceeds 1,320 gallons, project Spill Prevention, Containment and Counter Measures (SPCC) plans are required. Contaminated upland soils can be a long-term threat to surface and ground water quality. This threat must be managed by disposing of waste material properly, selecting service and refueling areas well away from wet areas and surface water; by using berms around such sites and by utilizing impermeable liners or other techniques to contain spills according to the Forest SPCC plan.

c. **Implementation:** The COR, ER, CI, or TSA are authorized to designate the location, size and allowable uses of service and refueling areas. Operators are required to remove service residues, waste oil and other materials from National Forest land. They must also be prepared to take responsive actions in case of a hazardous substance spill, according to the Forest SPCC plan.
13. Control of Construction and Maintenance Activities Adjacent to SMZs

(PRACTICE: 2-13)

a. **Objective:** To protect water quality by controlling construction and maintenance actions within and adjacent to any streamside management zone so that the following SMZ functions are not impaired:

1) Acting as an effective filter for sediment generated by erosion from bare surfaces, road fills, dust drift, and oil traces;

2) Maintaining shade, riparian habitat (aquatic and terrestrial), and channel stabilizing effects;

3) Keeping the floodplain surface in a resistant, undisturbed condition to slow water velocities and limit erosion by flood flows.

b. **Explanation:** Construction and maintenance fills, sidecast, and end-hauled materials are kept out of SMZs except at designated sites to minimize effects on the aquatic environment. Factors such as stream class, channel stability, sideslope steepness, ground cover, and sideslope stability are taken into account in developing zone widths. In some situations, SMZ widths are established by records of decision and by EIS standards and guidelines (e.g. PACFISH EA, Northwest Forest Plan ROD). It is also necessary to stabilize fill slopes to prevent sediment accumulations in the streamside zone.

SMZs are determined and documented during the environmental analysis process by the IDT, which includes hydrologists, fishery biologists, and other specialists as required.

c. **Implementation:** Project location alternatives are formulated, and mitigation measures developed by the IDT are included into the contract by design engineers. Project crew leaders and supervisors are responsible for ensuring that force account projects meet maintenance and construction specifications and project criteria.

Contracted projects are implemented by the contractor, or operator. Compliance with mitigation measures, contract specifications, and operating plans is ensured by the COR, FSR, or ER.
14. Controlling In-Channel Excavation (PRACTICE: 2-14)

a. **Objective:** To minimize stream channel disturbances and related sediment production.

b. **Explanation:** During construction, heavy equipment may need to cross, or work in and near streams or lakes. This is permitted only as necessary in the construction, or removal of culverts and bridges and other facilities (e.g. water sources, boat ramp/launching sites, etc.) and only under specific protection requirements. The Engineering Representative (ER) is authorized to designate the location of crossings or work sites and coordinate with the contractor to manage heavy equipment.

Excavation during the installation of instream structures must follow all of the following minimum water quality protection requirements.

1) Unless otherwise approved, no excavation will be made outside of caissons, cribs, cofferdams, or sheet piling.

2) The natural streambed or lake bottom adjacent to the structure will not be disturbed without prior approval of the ER or COR.

3) If any excavation, or dredging is made at the site of the structure before caissons, cribs, or cofferdams are sunk in place, all such excavations will be restored to the original surface and the streambed or lake bottom must be protected with suitable stable material.

4) Material deposited within the stream or lake area from foundation, or other excavation will not be discharged directly into live streams or lakes, but will be put into settling areas as shown on the engineering drawings or as approved by the ER, or COR. (See Practice 2-15)

5) If the channel or lake bottom is disturbed during construction, it must be restored to its original configuration while minimizing any additional disturbance.

6) Disturbances of stream or lake banks are kept to a minimum. Disturbed banks are stabilized.

c. **Implementation.** Mitigation measures developed by the IDT are set forth in the environmental documentation and incorporated into the contract by design engineers. Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications and project criteria.

Contracted projects are implemented by the contractor or operator. Compliance with mitigation measures, contract specifications, and operating plans is enforced by the CI, COR, FSR or ER.
15. Diversion of Flows Around Construction Sites (PRACTICE: 2-15)

a. Objective: To ensure that all stream diversions are carefully planned, to minimize downstream sedimentation, and to restore stream channels to their natural grade, condition, and alignment as soon as possible.

b. Explanation: Streamflow must be diverted around construction sites such as bridges, culverts and dams. The streamflow will be diverted for all live streams according to the instructions of the ER. The diverted flows are returned to their natural streamcourse as soon as possible after construction or at least prior to the rainy season. All disturbed areas are stabilized prior to the rainy season or as needed.

c. Implementation: This practice is required by contract clauses. The NEPA and design process will identify where diversions are required, and the design will include mitigation necessary to protect instream values and downstream beneficial uses of the water. Planning must include environmental analysis to identify and prevent unacceptable effects to the beneficial uses of the water. The planning process may require project review and/or issuance of permits or certifications by other Federal, State, or local agencies and, where appropriate, private parties. Case by case determinations must be made during project planning as to out-service review and consultation needs. Coordination with California Department of Fish and Game (CDFG) is initiated in most all cases.

Project location, bypass design, and detailed mitigation will be developed in the design and planning process to meet project criteria. Project crew leaders and supervisors will be responsible for implementing force account projects to construction specifications and to meet project criteria.

Contracted projects are implemented by the contractor, or operator. Compliance with project criteria, contract specifications and operating plans is enforced by the CI, COR, ER, or SA.
16. Stream Crossings on Temporary Roads (PRACTICE: 2-16)

a. **Objective**: To ensure that temporary roads do not unduly damage stream channels and to ensure that fish passage is unimpeded by stream crossing structures.

b. **Explanation**: Stream crossing structures (e.g. culverts, bridges) are required on all temporary roads where it is necessary to cross designated channels. Means of crossing will include but not be limited to, culverts, bridges, coarse rock fills, hardened fords, (using such features as rocked approaches), and low water crossings. Identifying locations to cross streams will be accomplished using an IDT. Such crossings are designed to provide for unobstructed flows and the passage of fish, and to minimize damages to stream channels and water quality.

The number of crossings is kept to the minimum needed for access. Channel crossings will be as perpendicular to stream courses as possible. Streambank excavation will be kept to the minimum needed for use of the crossings, and entry and exit ramps may need to be rocked. Fords and turnpike crossings hardened with washed rock, concrete planks, slabs or geogrid are sometimes an acceptable alternative, depending on water quality, fishery and hydrological considerations.

Temporary crossing facilities will be removed and the site stabilized prior to the rainy season each year or when the facility is no longer needed, which ever is earliest.

c. **Implementation**: This practice is required when documented in the project plan. In timber sales, stream crossing are located, and mitigation is implemented by the SA, using instructions in the TSA Handbook, supplemental Forest guidelines, and considering IDT recommendations. Mitigation at sensitive stream crossings must be assessed, and controls prescribed during the environmental analysis by the IDT.

Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications and project criteria.

Contracted projects are implemented by the contractor, or operator. Compliance with the requirements in the project plan, contract and/or operating plan is ensured by the CI, COR, FSR, SA, or ER.
17. Bridge and Culvert Installation (PRACTICE: 2-17)

a. **Objective:** To minimize sedimentation and turbidity resulting from excavation for in-channel structures.

b. **Explanation:** Excavation is a common requirement for the installation of bridges, culverts, weirs, check dams, riprappings and other structures. Spoil material generated during construction should neither obstruct the stream course (including natural floodplains) nor impair the efficiency of the associated structures. Preventive measures include:

1) Keep excavated materials out of channels.
2) Remove any materials stacked, or stockpiled on floodplains prior to the rainy season.
3) Divert flowing water around work sites to minimize erosion and sedimentation.
4) Suitably locate bypass roads and develop plans for their subsequent obliteration and stabilization.
5) In some cases, fill material may have to be imported for better soil compaction. Original fill may have to be exported to a disposal site.

Streams identified as important for fisheries or other aquatic resources may require that the channel not be disturbed except during flow periods specified in the project plan. Normally, this work would occur during low flow periods. Work would not be allowed during spawning periods, or other periods critical to aquatic resources. Downstream sediment basins or other sediment reduction facilities or techniques will be necessary to mitigate impacts.

c. **Implementation:** Project location and detailed mitigation measures will be developed during the design process to meet project criteria, using an interdisciplinary process.

Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications and project criteria.
18. Regulation of Streamside Gravel Borrow Areas (PRACTICE: 2-18)

a. **Objective:** To limit channel disturbances and sediment production associated with gravel source development.

b. **Explanation:** Materials deposited along channels by storm runoff often provide a source of gravel. With adequate planning gravel can be removed with minimal impact on water resources and channel stability. Gravel removal can alter streamflow characteristics and consequently affect channel stability and create a new sediment source. Borrowing will be limited to material deposited above the bankfull line. Borrow area shaping or other special drainage reconfiguration actions are taken to maintain channel function.

Excavation will not take place below the water table unless sediment basins are built to contain, or catch the resulting sediment. Sediment basins should not be subject to washouts. If excess sediment accumulates in basins, the basin will be cleaned and the sediment deposited and stabilized at approved sites outside the area where it could re-enter the stream.

Wash water or waste from concrete batching, or aggregate operations will not be allowed to enter streams prior to treatment by filtration, flocculation, settling, and/or other means. (See also Practice 3-3)

c. **Implementation:** Project location, stability and the limits for disturbance and sediment production will be developed through the environmental analysis and the IDT and in consultation with State Fish and Game or other pertinent agency. Detailed mitigation measures will be developed by the design engineer to meet project criteria.

Project crew leaders and supervisors will be responsible for implementing force account projects to construction specifications and project criteria.

Contracted projects are implemented by the contractor or operator. Compliance with project criteria, contract specifications, and operating plans is ensured by the CI, FSR, COR, or ER.

Special us permits issued for gravel bar excavation will include the above requirements, an operating plan and reclamation plan if warranted. District Rangers or their representatives will be responsible for ensuring compliance.
19. Disposal of Right-of-Way and Roadside Debris (PRACTICE: 2-19)

a. **Objective:**
   1) To ensure that organic debris generated during road construction is kept out of streams so that channels and downstream facilities are not obstructed.
   2) To ensure debris dams are not formed which obstruct fish passage, or which could result in downstream damage from high water flow surges after dam failure.

b. **Explanation:** As a preventive measure, construction debris and other newly generated roadside slash developed along roads in the streamside management zone is disposed of by the following means as applicable: (See also Practice 2-11)
   1) **On Site:**
      a) Piling and burning
      b) Burying
      c) Chipping
      d) Scattering
      e) Disposal in cutting units
      f) Windrowing at the base of fill slopes
      g) Incorporation (only in temporary roads)
   2) Removal to agreed upon locations (especially stumps from the road prism).
   3) A combination of the above.
   4) Large limbs and cull logs are removed to designated sites outside the SMZ or relocated within the zone to meet aquatic resource management objectives.

c. **Implementation:** Criteria for the disposal of right-of-way and roadside debris will be established during onsite evaluation by an IDT. Project location and detailed mitigation measures are also developed and set forth in the environmental analysis and incorporated into project plans and/or contracts.

Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications.

Contracted projects are implemented by the contractor or operator. Compliance with plans, specifications, and operating plans is ensured by the CI, COR, or ER.
20. Specifying Riprap Composition (PRACTICE: 2-20)

a. **Objective:** To minimize sediment production associated with the installation and utilization of riprap material.

b. **Explanation:** Riprap is commonly used to armor streambanks and drainage ways from the erosive forces of flowing water. Riprap must be sized and installed in such a way that it effectively resists erosive water velocities. On occasion, this may require the use of filter blankets, or other methods to prevent undermining. Stone used for riprap will be free of weakly structured rock, soil, organic material and other material not resistant to streamflow that would only serve as sediment sources. Outlets of drainage facilities on erodible soils commonly require riprapping for energy dissipation. The Corps of Engineers and Federal Highway Administration procedures are commonly used for designing riprap structures.

c. **Implementation:** Project location and detailed mitigation will be developed through the planning and design process to meet the mitigation measures and requirements of the project plan.

Project crew leaders and supervisors will be responsible for implementing force account projects to construction specifications and project criteria.

Contracted projects are implemented by the contractor or operator. Compliance with project criteria and operating plans is ensured by the COR, or ER.
21. Water Source Development Consistent with Water Quality Protection  
(PRACTICE: 2-21)

a. Objective: To supply water for roads and fire protection while maintaining existing water quality.

b. Explanation: Water source development is normally needed to supply water for road construction and maintenance, dust control, and fire control. Problems may arise when cofferdams or water holes are built in streams. Use of earth fill for dam construction will be avoided as it creates sediment problems during installation and removal. Cofferdams and water holes will be built out of sandbags filled with clean sand, or gravel, or other methods that will not contribute to nonpoint source pollution. At no time will downstream water flow be reduced to a level that will be detrimental to aquatic resources, fish passage, other established uses. The structure is not allowed to create a situation where dam failure would occur due to excessive impoundment flow.

Water source developments are aimed toward the construction of a limited number of durable, long-term water sources rather than the construction of a succession of hasty, expedient developments that are rapidly abandoned. Permanently designed sources, such as small piped diversions to off-site storage tanks or ponds will result in the lowest, long-term effects. Water rights applications are filed or if riparian or reserved water right, a notification of Diversion and Use is filed with the State.

Damage to resources at such locations caused by purchaser's, or contractor's operations, or fire suppression activities will be repaired by purchaser, contractor, or fire suppression crews in a timely and agreed upon manner to the extent practical to restore and prevent further resource damage.

Overflow from water holding developments will be returned to the stream.

Access approaches will be as near perpendicular to the stream as possible and will be gravel surfaced or otherwise stabilized as appropriate. Streambank excavation will be kept to a minimum needed for entry and exit.

c. Implementation: Engineering representatives and the TSA working with hydrologists and fishery biologists should evaluate streams in which water developments are proposed. Water holes and other improvements will be restored to a stable condition, prior to the end of the normal operating season. Project location and detailed mitigation will be developed by the design engineer, using the interdisciplinary approach to meet project criteria.

Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications and project criteria.
Contracted projects are implemented by the contractor, or operator. Compliance with project criteria, and the operating plan is ensured by the CI, COR, or ER.
22. Maintenance of Roads (PRACTICE: 2-22)

a. **Objective:** To maintain roads in a manner which provides for water quality protection by minimizing rutting, failures, sidecasting, and blockage of drainage facilities all of which can cause erosion and sedimentation, and deteriorating watershed conditions.

b. **Explanation:** Roads normally deteriorate because of use and weather. This deterioration can be corrected by adequate maintenance and/or restriction of use occasionally new groundwater springs and seeps appear after a wildfire or unusually wet periods and saturate road surfaces. All roads are maintained to at least the following level:

1) Provide the basic maintenance required to protect the road investment and to ensure that damage to adjacent land and resources is prevented. This level of maintenance often requires an annual inspection to determine what work, if any is needed to keep ditches, culverts and other drainage facilities functional and the road stable. This level is the normal prescription for roads closed to traffic.

2) As a minimum measure, maintenance must protect drainage facilities and runoff patterns. Higher levels of maintenance will be chosen to respond to greater use or resource administrative needs.

3) Additional maintenance measures include surfacing and resurfacing, outsloping, clearing debris from dips and cross drains, armoring of ditches, spot rock, culvert replacement and installing new drainage features.

For maintenance of all roads on active timber sales and other projects the responsible FSR and the purchaser or user agree on an Annual Road Maintenance Plan outlining responsibilities and timing of maintenance, before the beginning of the operating season. If the road is subjected to other commercial use, the Forest Service may collect deposits of facilitate road maintenance and to equitably assess maintenance cost of each user.

c. **Implementation:** Work is managed by the Forest Engineer who develops a road condition survey and a maintenance plan. Maintenance levels are designated for each road in a timber sale area, as part of the TSPP, with road maintenance levels documented in the sale plan. Maintenance is a timber purchaser or user responsibility, and compliance is administered by the ER and SA.

On system roads outside of active timber sales, project crews, or contract crews perform road maintenance under supervision of a crew leader.

58
23. Road Surface Treatment to Prevent Loss of Materials (PRACTICE: 2-23)

a. **Objective:** To minimize the erosion of road surface materials and consequently reduce the likelihood of sediment production from those areas.

b. **Explanation:** Unconsolidated road surface material is susceptible to erosion during precipitation events. Likewise, dust derived from road use may settle onto adjacent water bodies and streamcourses. Contractors, purchasers, special users and Forest Service project Leaders undertake measures to minimize loss of road material when the need for such action is identified.

   Road surface treatments include watering, dust oiling, penetration oiling, sealing, aggregate surfacing, chip-sealing, or paving, depending on traffic, soils, geology, and road design specifications.

c. **Implementation:** Project location and detailed mitigation will be developed by the design engineer, using an interdisciplinary approach, to meet project criteria.

   Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications and project criteria.

   Contracted projects are implemented by the contractor, or operator. Compliance with project criteria, contract specifications, and operating plans is ensured by the COR, CI, ER, or FSR.
24. Traffic Control During Wet Periods (PRACTICE: 2-24)

a. **Objective:**

1) To reduce road surface disturbance and rutting of roads.

2) To minimize sediment washing from disturbed road surfaces.

b. **Explanation:** The unrestricted use of many NFS roads during the rainy season often results in rutting and churning of the road surfaces. Runoff from such disturbed road surfaces often carries a high sediment load. The damage and maintenance cycle for roads that are frequently used during wet periods can create a disturbed road surface that is a continuing sediment source.

Roads that must be used during wet periods should have a stable surface and sufficient drainage provided to allow such use while at the same time maintaining water quality. Rocking, oiling, paving, and armoring are measures that will be necessary to protect the road surface and reduce soil loss. Where wet season field operations are planned, roads may need to be upgraded, use restricted to low ground pressure vehicles or frozen ground conditions, or maintenance intensified to handle the traffic without creating excessive erosion and damage to the road surface.

Roads not needed for wet weather access are closed to use during the wet season.

c. **Implementation:** Road closures and traffic control measures will be used outside of active timber sale areas. Timber sale implementation procedures can be enforced by District personnel. Hauling activity can be controlled by the FSR, ER, or TSA within active timber sales. The decision by the TSA for closure is based on local soil moisture conditions and other criteria.

Detailed mitigation is developed by design engineers, using an interdisciplinary approach as necessary. Project crew leaders and supervisors will be responsible for implementing force account projects according to construction specifications. Contracted projects are implemented by the contractor, or operator. Compliance with plans, specifications, and operating plans is ensured by the COR, or ER.
25. Snow Removal Controls to Avoid Resource Damage (PRACTICE: 2-25)

a. **Objective:** To minimize the impact of snowmelt runoff on road surfaces and embankments and to consequently reduce the probability of sediment production resulting from snow removal operations.

b. **Explanation:** This is a preventive measure used to protect resources and indirectly to protect water quality. Forest roads are sometimes used throughout the winter for a variety of reasons. For such roads, the following measures are employed to meet the objectives of this practice:

1. The contractor will be responsible for snow removal in a manner, which will protect roads and adjacent resources.

2. Rocking or other special surfacing and drainage measures will be necessary, before the operator is allowed to use the roads.

3. Snow berms will be removed where they result in accumulation or concentration of snowmelt runoff on the road and erosive fill slopes.

4. Snow berms will be installed where such placement will preclude concentration of snowmelt runoff and serve to rapidly dissipate melt water. If the road surface is damaged during snow removal, the purchaser, or contractor will be required to replace lost surface material with similar quality material and repair structures damaged in removal operations as soon as practicable, or unless otherwise agreed to in writing.

c. **Implementation:** Project location and detailed mitigation will be developed by the IDT during the environmental analysis and incorporate into the project plan and/or contracts. Project crew leaders and supervisors will be responsible for implementing force account projects to construction specifications and project criteria. (See also Practice 2-24)

Contracted projects are implemented by the contractor, or operator. Compliance with criteria in the project plan specifications, and the operating plan is ensured by the COR, ER and FSR.
26. Obliteration or Decommissioning of Roads (PRACTICE: 2-26)

a. **Objective:** To reduce sediment generated from temporary roads or unneeded system roads by obliterating or decommissioning them at the completion of their intended use.

b. **Explanation:** System roads will be identified during transportation planning for decommissioning/obliteration. These roads will be analyzed under the NEPA process for removal from the transportation system or downgraded in maintenance level. Temporary roads are constructed for a specific short-term purpose and other roads will be found to no longer be necessary. For example, ski area development roads and logging spurs on a timber sale. In order to prevent continued low level casual use, such roads will be obliterated at the completion of their intended use. Use of any roads beyond its prescribed time should not be permitted, as the road would be subject to continued, uncorrected damage, and could become a chronic sediment source.

Effective decommissioning and obliteration is generally achieved through a combination of these measures:

1. Road is effectively drained (e.g. waterbars, rolling dips, outsloping and treated to return the road prism to near natural hydrologic function).
2. Road is effectively blocked to vehicle access.
3. Crossings are removed and natural drainage restored. (See also Practice 2-16)
4. Treated surfaces are stabilized through tillage, ripping, fertilization and/or revegetation.
5. Slideslopes are reshaped and stabilized.

c. **Implementation:** For timber sales, temporary road closure stabilization and removal of temporary structures are accomplished by the timber purchaser. Compliance with plans and TSC will be enforced by the SA.

Obliteration or decommissioning of the road to the level that it is blocked to vehicular traffic, culverts and bridges removed, and the roadway stabilized as required by the TSC. Further revegetation needs are addressed in sale area improvement plans to achieve resource production above that required for stabilization of the road bed surface.

Temporary road location and stabilization measures are determined by the SA by agreement with the purchaser. The SA may request the advice of an earth scientist in determining the most appropriate location for stabilization measures and which measures are required.
Project crew leaders and supervisors will be responsible for ensuring that other temporary roads, developed by force account, meet construction, specifications and project criteria. Temporary roads on NFS lands that are allowed through special use permits, or easements will be subject to the same obliteration or decommissioning requirements as temporary roads on timber sales. District Rangers or their representatives will be responsible for assuring the obliteration or decommissioning of such roads is accomplished.
27. Restoration of Borrow Pits and Quarries (PRACTICE: 2-27)

a. **Objective:** To minimize sediment production from borrow pits and quarry sites.

b. **Explanation:** Borrow pits and quarries are often susceptible to erosion due to steep sideslopes and lack of vegetation. When required for site revegetation and prior to excavation of the site, topsoil will be removed and stockpiled for surface dressing in the post-operation, rehabilitation period. Once excavation has been completed on all or part of the area, the sides will be sloped and graded to ensure proper drainage, and the general pit area smoothed and stabilized. Finer material will be spread over the bottom of the pit prior to spreading stockpiled or imported topsoil.

Seeding, soil amendments and mulching may be required and will be carried on as referenced in Standard Specification Section 625. Installation of sediment basins and/or upslope diversions and berms or other sediment reduction measures will be considered. Temporary access roads to the site will be obliterated or decommissioned according to Practice 2-26 unless other treatment is required by design. System roads to quarries or borrow pits are maintained in accordance with Practice 2-22.

c. **Implementation:** Project location and mitigation will be developed through environmental analysis. Project crew leaders and supervisors will be responsible for conducting force account projects according to construction specifications and project criteria.

Contracted projects are implemented by the contractor, or operator. Compliance with project criteria, contract specifications, and operating plans is ensured by the CI, COR, FSR, or ER.
28. **Surface Erosion Control at Facility Sites (PRACTICE: 2-28)**

a. **Objective:** Reduce the amount of surface erosion taking place on developed sites and the amount of soil entering streams.

b. **Explanation:** On lands developed for administrative sites, ski areas, campgrounds, parking areas, or waste disposal sites, substantial acreage may be cleared of vegetation. Erosion control methods must be implemented to keep the soil in place, and to minimize suspended sediment delivery to streams. Some examples of erosion control methods that could be applied at a site for keeping the soil in place would be applying grass seed, erosion blankets, tackifiers, hydromulch, paving, or rocking of roads, water bars, cross drains, or retaining walls.

To control the amount of soil entering streams, the natural drainage pattern of the area should not be changed; sediment basins and sediment filters will be established to filter surface runoff; and diversion ditches, and berms will be built to divert surface runoff around bare areas. Construction activities will be scheduled to avoid periods of the year when heavy runoff is likely to occur.

c. **Implementation:** This management practice is used as a preventative and remedial measure for any site development project that will remove the existing vegetation and ground cover and leave exposed soil. This practice is applied during the planning phase for NFS projects, or by special use permit requirements for private development on public land.

Mitigation measures will be developed by the IDT and incorporated in the project by the design engineer. Project crew leaders and supervisors will be responsible for implementing force account projects to construction specifications and project criteria.

Contracted projects are implemented by the contractor, or operator. Compliance with plans, specifications, and operating plans is ensured by the COR, ER, and FSR.
Appendix G

Needs Assessment Worksheets