Forest Management Plan Criteria (California)
Practice/Activity Code 106

1. Definition

A Forest Management Plan is a site specific plan developed for a client, which addresses one or more resource concerns on land where forestry-related conservation activities or practices will be planned and applied. The Forest Management Plan will:

a) Meet Natural Resources Conservation Service (NRCS) quality criteria for the identified resource concern(s).

b) Comply with federal, state, tribal, and local laws, regulations, and permit requirements.

c) Meet the client's objectives.

2. Forest Management Plan Criteria

This section establishes the minimum criteria to be addressed in the development of Forest Management Plans.

A. General Criteria

1. A Forest Management Plan shall be developed by certified technical service providers (TSPs). The specific criteria required for certification is located on the TSP registry (TechReg) web site at: http://techreg.usda.gov/
2. An Environmental Evaluation (EE) (CPA-52 form) is to be prepared for all activity plans to demonstrate NRCS compliance with the National Environmental Policy Act, National Historic Preservation Act, Endangered Species Act, Environmental Justice, Air Quality, and other designated environmental concerns and environmental laws.

B. Plan Background and Site Information

1. Landowner information – name, address, contact info, operation, size
2. Location and plan map of parcel
3. Existing infrastructure (access, water, buildings),
4. Past management/harvest history and past conservation practices
5. Property history and pre history context

C. Client Objectives, which may include these and others

1. Income opportunities (timber, non-timber, carbon, ecosystem services, biomass)
2. Forest stand improvement and establishment
3. Wildlife habitat/riparian areas

4. Recreation
5. Livestock

D. Resource Inventory of Existing Conditions

1. Identify resource concerns based on an inventory and land owner objectives to assess these concerns and opportunity for treatment. The inventory will typically specify the following:

    a. Forest structure by unit/stand –

        1. Overstory – Gross stocking by species including BA, average diameter, trees per acre (TPA), diameter range, % species, approximate age, and existing pest/disease.
        2. Understory – Regeneration TPA, average diameter, diameter range, regeneration, % species, pest/disease, brush density (% canopy), brush species composition, invasive species, down woody debris, fine fuels/fuels hazard, and T&E habitat.

    b. Soil resources –

        Site class, erosion ratings and hazards (slips, creep mass movement, erosion features, road/landings, drainages, cross drains/stream crossing), and equipment limitations.

    c. Water resources -

        Riparian features, CDF stream classes, 303d status, in channel woody debris, meadows, fens, vernal pools, and wetlands

    d. Wildlife resources –

        Habitat features, rare/ declining habitat, threatened and endangered and other notable Natural Diversity Database (NDDB) species

    e. Air resources –

        Smoke management and carbon sequestration values

    f. Human resources

        Cultural resources, cultural/ religious management concerns, ethno-botanical potential, aesthetics, and community forest values

E. Desired Future Conditions

1. Identify alternative practices and systems of practices to address resource concerns and achieve resource quality criteria (defined in Section III, California eFOTG), and present to landowner for decision-making. Include alternatives and decisions on access/transportation and fuels management.

a. Identify alternative practices and systems of practices (utilizing list of practices in Section IV, eFOTG)

b. Evaluate effects of practices/system of practices on landowner objectives and identified resource concerns (including cultural resources and threatened and endangered species). Use the Conservation Practice Physical Effects database in Section V, eFOTG, as a guide in determining effects.

c. Present alternatives, including a resource management system alternative that addresses all resource concerns, for landowner decision.

F. Forest Management Plan Documentation and Plan

1. Forest Management Plan maps

   a. Cover type map

   b. Property access and infrastructure map

   c. Treatment units and planned practices

   d. Soil map with Site class

   Maps will include title, landowner name, boundaries, scale, north arrow, appropriate map symbols, and legend. Scale will not exceed 1:24000

2. Access / Transportation Component

   The access/transportation section of the plan will describe the design, conditions, and capacities of roads, existing major skid trails, condition of permanent erosion control features and condition of culverts, stream crossings, and road surface drainage.

3. Fire and Fuels Management Component

   This section of the management plan will identify fuel accumulation concerns, fire emergency access, probable ignition points, stand level fuels treatment, and feasible fuel break construction.

4. Development of Conservation Plan Utilizing Customer Service Tookit Plug-In or MsWord Document (record of decisions)

   The Forest Management Plan, or conservation plan, document will be created using either the Customer Service Toolkit Plug-In, or MsWord software. The plan document represents the record of final decisions made by the landowner with the TSP, and will include the planned practice(s), the amounts to be applied, the schedule for implementation, and the appropriate site specific specifications and/or job/practice requirement sheet for each practice. A Forest Management Plan may include, but is not limited to, the conservation practices listed below:

   1. **Access Control** (472)

2. **Access Road** (560)
3. **Structure for Water Control** (587-includes water bar, rolling dip, culvert, rock riprap)
4. **Critical Area Planting** (342)
5. **Mulching** (484)
6. **Forest Stand Improvement** (666)
7. **Road/Trail/Landing Closure and Treatment** (654)
8. **Forest Trails and Landings** (655)
9. **Forest Slash Treatment** (384)
10. **Firebreak** (394)
11. **Fuel Break** (383)
12. **Multi-Story Cropping** (379)
13. **Prescribed Burning** (338)
14. **Riparian Forest Buffer** (391)
15. **Silvopasture Establishment** (791)
16. **Tree/Shrub Site Preparation** (490)
17. **Tree/Shrub Establishment** (612)
18. **Tree/Shrub Pruning** (660)
19. **Alley Cropping** (311)
20. **Windbreak/Shelterbelt Establishment** (380)
21. **Windbreak/Shelterbelt Renovation** (650)

3. Deliverables for the Client – a hardcopy of the plan that includes:

a. Cover page – name, address, phone number of client and TSP; total acres of the plan, signature blocks for the TSP, producer, and a signature block for the NRCS acceptance.

b. A clearly written description (including maps, tables, inventory data, etc.) of items 2. A through F, listed above.

c. Management practices included in the conservation plan will have appropriate site specific job sheets and/or practice requirements completed. Practice priorities, scheduling and potential costs for the first 5 years must be noted in the plan as well as on the NRCS practice spreadsheet. This data file will have the practice to be applied (month and year), the extent (acres or number) that will be applied and the cost of implementation.

d. Whenever feasible, treatment intensities (*i.e. light, moderate, heavy*) as defined by cost list scenarios will be specified and justified.

e. Vegetative/engineering/structural practices included in the conservation plan will have applicable specifications, practice requirements, and drawings attached.

4. Deliverables for NRCS Field Office:

a. Complete Hardcopy and Electronic copy of the client's plan (MsWord/ PDF copy) and/or completion of the plan document in Customer Service Toolkit.

b. Digital Plan Map with boundaries/fields, features, and structural practices located on a series of shape files(.shp)/or a .mxd file that can be read by NRCS GIS data base program.

c. Digital Soils Map using the NRCS soil data mart.

d. Completed Environmental Evaluation (EE), CPA-52 form, and appropriate worksheets.

e. The planned conservation practices will be reviewed by the TSP for both T&E species and cultural resources at a scoping level (i.e. archaeological and T&E species data records searches, and a description of the potential habitat and historical context). The results of the review will be confidentially documented in an addendum to the plan, and conclusions noted on the EE (CPA-52 form). Digital shape files of all data records will be provided to NRCS, if available.

Appendix A

General

The following is additional background information for completion of the Forest Management Plan.

The criteria for the 106 Forest Management Plan activity were developed to implement Section 1240 (A) of the Food, Conservation and Energy Act of 2008, which allows for the development of forest management plans as one of the purposes of the Environmental Quality Incentives Program (EQIP).

In accordance with Section 1240 (A), the Environmental Quality Incentive Program (EQIP) program provides funding support through contracts with eligible producers to obtain services of certified Technical Service Providers (TSPs) for development a Forest Management Plan (FMP).

Environmental Evaluation requirements under NEPA

1. The environmental effects from the activity plans on environmental resource concerns should be clearly documented on the EE (CPA-52 form). The following is abbreviated guidance for preparation of the EE:
   a. Planners and TSPs should follow the EE guidance delineated in the NRCS National Environmental Compliance Handbook.
   b. The EE describes the existing conditions for all applicable resource concerns.
   c. The EE will assess the resources potentially impacted by the no action, proposed action and any reasonable alternatives.
   d. Guide sheets will accompany the EE, as needed, to provide information on how to assess and deal with special environmental concerns. Proposed mitigations to actions shall be documented and supported in appendices.
   e. The findings section of the EE is to identify whether NRCS has determined, based on the analysis of the EE: (1) that a site specific environmental assessment (EA) or an environmental impact statement (EIS) should be prepared based on the significance of potential impacts, or (2) the EE can be tiered to a state, regional, or national programmatic EA or EIS because the proposed effects have been sufficiently analyzed in a state, regional, national programmatic EA or EIS.

TSP and planners are required to complete NRCS' Level I Environmental Compliance training prior to preparing any EE CPA-52.

<u>Forest Stewardship Plans</u>

Through the U.S. Forest Service's Forest Stewardship Program, State forestry agencies annually receive financial and technical assistance that allows them to help landowners develop Forest Stewardship Plans (FSP) for their nonindustrial private forest land. FSP are prepared by foresters employed by State forestry agencies or by private consulting foresters under the direction of those State agencies. FSP are developed for the

landowner's entire forested ownership and/or any land that will be planted to forest vegetation.

Forest Stewardship Plans will continue to be developed for private landowners by State forestry agencies, with financial and technical assistance provided by the U.S. Forest Service through the Forest Stewardship Program. With the provisions in the new Farm Bill there is an opportunity for NRCS to provide financial assistance through EQIP that increases the planning and application of forestry-related conservation practices. NRCS will coordinate and cooperate with State forestry agencies in the delivery of forestry assistance to private landowners.

Forest Management Plan

To complement the planning assistance provided by State forestry agencies (i.e., Forest Stewardship Plans), NRCS is using a different term to describe the planning assistance that will be provided to clients through EQIP. NRCS will use the term "Forest Management Plan (FMP)". The FMP criteria described above were developed in cooperation with the U.S. Forest Service to insure alignment with the national standards for a Forest Stewardship Plan. A few criteria were added to ensure compliance with NRCS requirements (e.g., National Environmental Policy Act). These criteria replace the Prescribed Forestry – 409 National Practice Standard, which will be rescinded and removed from the National Handbook of Conservation Practices (NPCH) and the California eFOTG, Section IV.

Integrated Pest Management Plan Criteria
Practice/Activity Code (114) (No.)

1. Definition:

Integrated Pest Management (IPM) is an ecosystem-based strategy that is a sustainable approach to manage pests using a combination of techniques such as chemical tools biological control, habitat manipulation, and modification of cultural practices and use of resistant varieties. Methods of chemical applications are selected in a manner that minimizes risks to human health, beneficial and non-target organisms, and the environment. Integrated Pest Management:

- Manages pests economically;
- Minimizes the risk associated with pest suppression;
- Produces quality commodities;
- Meets NRCS quality criteria for soil, water, air and plant quality;
- Complies with Federal, State, tribal, and local laws, regulations and permit requirements; and
- Addresses operator's objectives.

2. IPM Plan Criteria

This section establishes the minimum criteria to be addressed in the development and implementation of Integrated Pest Management Plans.

A. General Criteria

1. An Environmental Evaluation (EE) (CPA 52) is to be prepared for all activity plans to demonstrate NRCS compliance with the National Environmental Policy Act, National Historic Preservation Act, Endangered Species Act, Environmental Justice, Air Quality, and other designated environmental concerns and environmental laws. The environmental effects from the activity plans on environmental resource concerns should be clearly documented on the EE (CPA-52 form). The following is abbreviated guidance for preparation of the EE:

   (i) Planners and TSPs should follow the EE guidance delineated in the National Environmental Compliance Handbook.

   (ii) The EE describes the existing conditions for all applicable resource concerns.

   (iii) The EE will assess the resources potentially impacted by the no action, proposed action and any reasonable alternatives.

   (iv) Guide sheets will accompany the EE, as needed, to provide information on how to assess and deal with special environmental concerns.

   (v) The findings section of the EE is to identify whether NRCS has determined based on the analysis of the EE: (1) that a site specific environmental assessment (EA) or an environmental impact statement (EIS) should be prepared based on the significance of potential impacts, or (2) the EE can be

tiered to a state, regional, or national programmatic EA or EIS because the proposed effects have been sufficiently analyzed in a State, regional, national programmatic EA or EIS.

(vi) TSP and planners are required to complete NRCS' Level I Environmental Compliance training prior to prepare any EE CPA 52.

2. An Integrated Pest Management Plan shall be developed by certified Technical Service Providers (TSPs). In accordance with Section 1240 (A), the Environmental Quality Incentive Program (EQIP) program provides funding support through contracts with eligible producers to obtain services of certified TSPs for development of Integrated Pest Management Plans. The specific TSP criteria required for Integrated Pest Management Plan development is located on the TSP registry (TechReg) Web site at: http://techreg.usda.gov/.

B. The planner shall address the following items during the IPM Conservation Plan development process:

(i) Background and site information;

(ii) Site specific assessment of environmental risk associated with existing and alternative pest suppression system;

(iii) Monitoring guidelines;

(iv) State University's IPM guidelines for specific crops (optional);

(v) Record Keeping;

(vi) Conservation plan (record of decisions) to address the identified environmental risks associated with pest suppression activities with implementation specifications and other resource concerns; and

(vii) References, if needed.

C. **IPM Specific Element Criteria**

Each of the IPM elements will address the specific criteria below. The degree to which these criteria are addressed in the development of a site-specific IPM plan is determined by the General Criteria and the specific criteria provided for each element of the IPM plan below.

1. **Background and Site Information.** This element provides a brief description of:

(i) Name of owner/operator;

(ii) Tract and field(s) location;

(iii) Soil map units;

(iv) Resource concerns;

(v) Present site use and general management being applied;

(vi) History of pest management activities

2. **Site Specific Assessment of Environmental Risks Associated with Existing**

and Alternative Pest Management System. This element provides a brief description and maps including:

(i) Conservation Plan Map;

(ii) Field locations of planned areas;

(iii) Soil type and characteristics; note potential for runoff or permeability;

(iv) Site conditions risk description;

(v) Identification of pests, crop, plant community condition and degree of infestation;

(vi) Irrigation system and management (where appropriate);

(vii) Locations of sensitive resource areas identified on the plan map to include;

(viii) Streams, drains, surface waters, wetlands, wells, groundwater, drains, grassed waterways and existing buffer practices;

(ix) Sensitive wildlife habitat (on and off-site), food plots;

(x) Potential off-target drift areas;

(xi) Identification of beneficial predators and parasites;

(xii) Consideration for pollinator habitat and pollinator protection;

(xiii) Other risk mitigation practices in use.

3. **Monitoring Guidelines:** This element addresses monitoring strategies that utilize damage and economic thresholds to prevent pest resistance and potential harmful effects on human health and the environment. The monitoring should include:

   (i) List of crops to be maintained;

   (ii) Scouting for insects (both beneficial and pest), disease, weeds with dates and results;

   (iii) Soil test results;

   (iv) Weather forecasting;

   (v) Degree-day prediction of pest life cycle events;

   (vi) Other methods of monitoring and results, such as pheromone traps

4. **State University IPM guidelines for specific crops**. This element addresses individual State University Year Round Integrated Pest Management Programs to be utilized by planners:

   (i) Where available use State Agricultural University issued crop specific Integrated Pest Management guidance for individual crops that indicate activities to be undertaken throughout the year based on the crop production cycle. For example; monitoring may be prescribed for a particular pest or pests during pre-plant, pre-emergence, rapid growth,

dormancy, bud-break, bloom, fruit set, maturation, harvesting, postharvest and storage periods;

(ii) Where available, use State Agricultural University issued Integrated Pest Management guidance for individual crops, pests and diseases. These differ from year round programs in that they may only refer to management of a single pest

(iii) Note: There are non-State university organizations that likewise provide credible guidelines (i.e. Rodale Institute, Kutztown, PA).

5. **Recordkeeping.** This element addresses list of records that shall be maintained detailing:

   (i) Date of monitoring;

   (ii) Results of monitoring;

   (iii) Identification of both vertebrate and invertebrate pests;

   (iv) Identification of beneficial insects enlisted;

   (v) Identification of specific raptors and/or bats enlisted;

   (vi) Identification of crop and/or plant community condition;

   (vii) Threshold of infestation;

   (viii) Strategies implemented with dates;

   (ix) All required records required by State and Federal requirements;

   (x) Records required or needed as part of the State University IPM guidelines being used.

6. **Conservation plan** (record of decisions) *(Utilizing Customer Service Toolkit – Plug-In or MsWord Document)* to address the identified environmental risks associated with pest suppression activities with implementation specifications and other resource concerns. The record of decisions shall include the planned practice(s), schedule for implementation, and site specific specifications to apply the conservation practice. The site specific specifications for the non-engineering type practices can be on an NRCS Jobsheet available for the conservation practice or in a narrative form in a document. Planned engineering type practices shall include the conservation practice, schedule of implementation, and identified on the plan map. The plan may include, but are not limited to the conservation practices listed below:

   (i) Brush Management (314);

   (ii) Cover Crop (340);

   (iii) Conservation Cover (327);

   (iv) Early Successional Habitat Development/Management (647);

   (v) Field Border (386);

(vi) Filter Strip (393);

(vii) Forest Stand Improvement (666);

(viii) Hedgerow Planting (422);

(ix) Herbaceous Weed Control (315);

(x) Irrigation System, Microirrigation (441);

(xi) Irrigation Water Management (449);

(xii) Land Smoothing (466);

(xiii) Mulching (484);

(xiv) Nutrient Management (590);

(xv) Pasture and Hayland Planting (512);

(xvi) Prescribed Grazing (528);

(xvii) Residue and Tillage Management, Mulch Till (345);

(xviii) Residue Management, No Till/Strip Till/Direct Seed (329);

(xix) Residue Management, Ridge Till (346);

(xx) Residue Management, Seasonal (344);

(xxi) Stripcropping (585);

(xxii) Terrace (600);

(xxiii) Upland Wildlife Habitat Management (645); and

(xxiv) Windbreak/Shelter Belt Establishment (380).

7. **References:** USDA NRCS Field Office Technical Guide.

3. Deliverables for the Client – a hardcopy of the plan that includes:

- Cover page – name, address, phone of client and TSP; Total Acres of the Plan, signature blocks for the TSP, producer, and a signature block for the NRCS acceptance.
- Soils map and appropriate soil descriptions.
- Resource assessment results (wind and water erosion, water availability, soil fertility, and others that may be needed).
- For management practices. The planned practices and the site specific specifications on how each practice will be applied; when the practice will be applied, and the extent (acres or number) that will be applied.
- For engineering/structural practices. The planned practice when it will be applied and extent, and located on the conservation plan map.

4. Deliverables for NRCS Field Office:

- Complete Hardcopy and Electronic copy of the client's plan (MS Word

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opy).

- Digital Conservation Plan Map with fields, features, and structural practices located.
- Digital Soils Map.
- Completed CPA 52 and appropriate worksheets.

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

IRRIGATION SYSTEM, SPRINKLER

(No. and Ac.)

CODE 442

DEFINITION

An irrigation system in which all necessary equipment and facilities are installed for efficiently applying water by means of nozzles operated under pressure.

PURPOSE

This practice may be applied as part of a conservation management system to achieve one or more of the following:

- Efficiently and uniformly apply irrigation water to maintain adequate soil water for the desired level of plant growth and production without causing excessive water loss, erosion, or water quality impairment.
- Climate control and/or modification.
- Applying chemicals, nutrients, and/or waste water.
- Leaching for control or reclamation of saline or sodic soils.
- Reduction in particulate matter emissions to improve air quality.

CONDITIONS WHERE PRACTICE APPLIES

The sprinkler method of water application is suited to most crops, irrigable lands, and climatic conditions where irrigated agriculture is feasible. Areas must be suitable for irrigation or sprinkler water application and have an adequate supply of suitable quality water available for the intended purpose(s).

This standard applies to the planning and design of the overall water application through sprinkler discharge systems. This standard pertains to the planning and functional design of all sprinkler components except for special structures, such as permanently installed main and lateral pipelines or pumping plants. Other components shall meet appropriate NRCS Conservation Practice Standards.

This standard does not include criteria for mini- or micro-sprinkler systems, which are covered by NRCS Conservation Practice Standard 441 – Irrigation System, Microirrigation.

CRITERIA

General Criteria Applicable to All Purposes

The criteria for the design of components not addressed in NRCS practice standards shall be consistent with sound engineering principles.

Each sprinkler discharge system must be designed as an integral part of an overall plan of conservation land use and treatment for the intended purpose(s) based on the capabilities of the land and the needs of the operator. The selected system shall be based on a site evaluation, expected operating conditions and verification that soils and topography are suitable for the intended purpose(s).

Flow Measurement. A method of flow measurement (i.e. a meter) shall be in place or installed to facilitate irrigation scheduling and for ongoing evaluation of system performance [1]. Multiple flow measurement locations may be necessary. For the area served by the system, the producer must have the capability to measure water applications to each field larger than five acres that may be managed differently (i.e. crop type, planting/harvest dates, etc.). Flow measuring equipment shall display flow rate (i.e. gpm, cfs) and total

volume (ac-ft). Manufacturer's recommendations must be followed regarding proper location in the system to achieve required flow conditions for accurate readings.

Flow measurement is not required under this standard for sprinklers on irrigated range or temporary applications such as establishing vegetation for windbreaks and critical area treatment.

In lieu of a flow measuring device, sprinkler systems used only for manure application on non-irrigated fields may include an alternative method of quantifying liquid applications. Alternative methods must be practical, fully developed and guidance provided to the operator.

Depth of Application. Net depth of application shall meet criteria for the intended purpose, not exceeding the available soil water holding capacity and meeting the land user's management plan for the intended purpose.

Capacity. The sprinkler irrigation system shall be designed with adequate capacity to accomplish the primary purpose(s) of the system.

Design Application Rate. Rates shall be selected such that runoff, translocation, and unplanned deep percolation are minimized.

Additional conservation measures, such as furrow diking, dammer diking, in-furrow chiseling, conservation tillage or residue management shall be applied as needed and appropriate.

Distribution Patterns, Nozzle Spacing, and Height. A combination of sprinkler spacing, nozzle size, and operating pressure that provides the design application rate and distribution shall be selected.

Coefficient of Uniformity (CU) data or distribution uniformity (DU) shall be used in selecting sprinkler spacing, nozzle size, and operating pressure. Definitions of each of these uniformity values can be found in the NRCS National Engineering Handbook, Part 652, Irrigation Guide.

Pipelines. The design of main lines, submains, and supply lines shall insure that required water quantities can be conveyed to all operating lateral lines at required pressures. For detailed criteria, see NRCS Conservation Practice Standard 430 – Irrigation Pipeline.

Pump and Power Unit. Where required, pump and power units shall be adequate to efficiently operate the sprinkler system at design capacity and total dynamic head. For detailed criteria, see NRCS Conservation Practice Standard 533 – Pumping Plant.

Management Plan. An Irrigation Water Management plan, meeting NRCS Conservation Practice Standard 449 – Irrigation Water Management, shall be developed for this practice, unless the purpose of the practice is waste water application. Where implemented for waste application, as a component of a Comprehensive Nutrient Management Plan (CNMP), a waste utilization plan and/or nutrient management plan shall be developed that meets the requirements of NRCS Conservation Practice Standard 633 – Waste Utilization and 590 - Nutrient Management, as appropriate.

Additional Criteria Applicable to Center Pivot or Linear-Move Sprinkler Systems

Design Capacity. Sprinkler systems shall be designed to have the capacity to meet the primary purpose. For the purpose of crop irrigation, sprinkler irrigation systems shall have either (1) a design capacity adequate to meet peak water demands of all irrigated crops in the design area, or (2) adequate capacity to meet requirements of selected irrigations during critical crop growth periods when less than full irrigation is planned.

In computing capacity requirements, allowance must be made for reasonable application water losses.

Distribution Patterns, Nozzle Spacing, and Height. Pivot system (Heermann-Hein) or Linear (Christensen) CU shall not be less than 85% (76% DU), except as noted in criteria for a Low Energy Precision Application (LEPA) system. In lieu of the manufacturer's CU

information, simulation modeling shall use Agricultural Research Service model Center Pivot Evaluation and Design (CPED) or similar modeling software. Manufacturer's information on nozzle packaging, allowing exclusion of the end gun and the first 12 percent of pivot length, not to exceed 250 feet, shall be considered acceptable documentation of system CU.

In the absence of CU data, sprinkler performance tables provided by the manufacturer shall be used in selecting nozzle size, operating pressure, and wetted diameter for the required sprinkler discharge. To the extent possible, low pressure spray nozzles shall be at uniform heights along the length of the lateral, with the exception of height adjustment to increase wetted diameter for runoff control. From a point midway between the first and second tower to the distal end of a center pivot, spray nozzle spacing along lateral lines shall not exceed 25% of the effective wetted diameter and impact sprinkler spacing shall not exceed 50 percent of the effective wetted diameter. The effective wetted diameter shall be determined from manufacturer's information for the nozzle height.

Lower elevation nozzle application systems, typically less than 7 feet from ground surface, that discharge water in the crop canopy for a considerable length of time during the growing season shall also meet the criteria of a Low Pressure in Canopy (LPIC) system as defined in this standard.

Additional Criteria Applicable to LEPA and Low Elevation Spray Application (LESA) Center Pivot or Linear-Move Sprinkler Systems

Distribution Patterns. For center pivot systems, nozzle discharge CU using the Heermann-Hein weighted area method shall be used in selecting sprinkler spacing, nozzle size, and operating pressure. Nozzle discharge CU shall not be less than 94% of the calculated design flow rate needed at the discharge point. For linear systems, discharge shall be based on equivalent unit areas.

Nozzle Spacing. Nozzle spacing shall not be greater than two times the row spacing of the crop, not to exceed 80 inches.

Specific Additional Criteria for LEPA

Discharge Height. Water shall discharge through a drag sock or hose on the ground surface, or through a nozzle equipped with a bubble shield or pad at a uniform height not to exceed 18 inches.

Row Arrangement and Storage. LEPA systems are only applicable on crops planted with furrows or beds. LEPA systems shall have row patterns that match the lateral line movement (i.e., circular for center pivots). Water shall not be applied in the tower wheel track of a LEPA system. Runoff and translocation under LEPA systems shall be eliminated by providing surface basin storage such as furrow dikes, dammer dikes, or implanted reservoirs.

Slope. The slope for a LEPA system shall not exceed 1.0 percent on more than 50 percent of the field.

Systems that utilize bubble pads or shields, or drag hoses for a portion of the crop year and then spray nozzles at uniform height not exceeding 18 inches for a portion of the crop year shall meet LESA criteria.

Specific Additional Criteria for LESA

Discharge Height. LESA Systems shall discharge water through a spray nozzle at uniform heights not to exceed 18 inches.

Row Arrangement and Storage. LESA Systems are applicable on crops flat planted, drilled, or planted with furrows or beds. LESA Systems should employ some method of providing surface basin storage such as furrow dikes, dammer dikes, or implanted reservoirs, or farming practices such as conservation tillage, in-furrow chiseling, and/or residue management to prevent runoff.

Land Slope. The slope for LESA systems shall not exceed 3.0 percent on more than 50 percent of the field.

Additional Criteria Applicable to LPIC and Mid Elevation Spray Application (MESA) Center Pivot or Linear-Move Sprinkler Systems

Systems that utilize bubble pads or shields or drag hoses for a portion of the crop year and spray nozzles for a portion of the crop year not meeting all of the LEPA or LESA criteria shall meet LPIC criteria.

Distribution Patterns, Nozzle Spacing and Height. For row crops, when nozzles operate in canopy for 50 percent or more of the growing season, nozzle spacing shall not exceed every other crop row. In-canopy heights shall be such that areas of high leaf concentration are avoided (i.e., corn near the ear height (approximately 4 feet)). Local research and Extension Service information with applicable crops may serve as a guide for establishing appropriate nozzle spacing, height, and row arrangement.

CU (Heermann–Hein CU for center pivots) shall not be less than 90% for all LPIC and MESA Systems with nozzle heights less than 7 feet.

CU shall not be less than 85% (76% DU) for MESA Systems with nozzle heights 7 feet or greater.

Land Slope. The slope for LPIC and MESA systems shall not exceed 3.0 percent on more than 50 percent of the field for fine textured soils and not exceed 5 percent on more than 50 percent of the field on coarse textured soils.

Additional Criteria Applicable to Fixed-Solid-set, Big Gun and Periodic Move Sprinkler Systems

Design Capacity. Sprinkler irrigation systems shall have either (1) a design capacity adequate to meet peak water demands of all crops to be irrigated in the design area, or (2) adequate capacity to meet requirements of selected water applications during critical crop growth periods when less than full irrigation is planned. In computing capacity requirements, allowance must be made for reasonable application water losses.

Design Application Rate. The design application rate shall be within a range established by the minimum practical application rate under local climatic conditions, and the maximum application rate consistent with soil intake rate, slope, and conservation practices used on the land. If two or more sets of conditions exist in the design area, the lowest maximum application rate for areas of significant size shall apply.

Lateral Lines. Unless pressure reducers or regulators are installed at each outlet, or other pressure compensating or flow control devices are used, lateral lines shall be designed so that the pressure variation or flow variation at any sprinkler, resulting from friction head and elevation differential, does not exceed 20 percent of the design operating pressure or 10 percent of the design flow of the sprinklers, respectively.

Distribution Patterns and Spacing. A combination of sprinkler spacing, nozzle size, and operating pressure that provides the design application rate and distribution shall be selected.

If available, CU (or DU) data shall be used in selecting sprinkler spacing, nozzle size, and operating pressure. CU shall not be less than the following:

75 % (60% DU) for deep-rooted (4 feet or more) field and forage crops where fertilizers and pesticides are not applied through the system.

85 % (76% DU) for high-value or shallow-rooted crops and for any crop where fertilizer or pesticides are applied through the system.

In the absence of CU data, maximum lateral and nozzle spacing shall comply with the following criteria:

1. For low (2-35 pounds/square inch (psi))-, moderate (36-50 psi)-, and medium (51-75 psi)-pressure sprinkler nozzles, the spacing along lateral lines shall not exceed 50 percent of the wetted diameter, as given in the manufacturer's performance tables, when the sprinkler is operating at

design pressure. The spacing of laterals along the main line shall not exceed 65 percent of this wetted diameter.

If winds that can affect the distribution pattern are likely during critical crop growth periods, spacing should be reduced to 60 percent for average velocities of 1 to 5 miles per hour (mph), to 50 percent for average velocities of 6 to 10 mph, and to 45 percent for average velocities greater than 10 mph.

2. For high-pressure and big gun type sprinklers (>75 psi), the maximum distance (diagonal) between two sprinklers on adjacent lateral lines shall not exceed two-thirds of the wetted diameter under favorable operating conditions

If winds that can affect the distribution pattern are likely during critical crop growth periods, the diagonal spacing should be reduced to 50 percent of the wetted diameter for average velocities of 5 to 10 mph and to 30 percent for average velocities greater than 10 mph. Guidance for towpath spacing of travelers in Table 11-31 of NEH-15, Irrigation, Chapter 11, Sprinklers.

3. Sprinkler spacing requirements for orchards, including subtropical fruits:

a) Triangular pattern. The spacing along lateral lines shall not exceed 65 percent of the effective wetted diameter. The spacing of laterals along the main line shall not exceed 70 percent of the effective wetted diameter.

b) Square or rectangular pattern. The nozzle spacing along the lateral and the lateral spacing along the main line shall not exceed 65 percent of the effective wetted diameter at the design operating pressure.

c) Spacing between sprinklers and lateral lines shall be reduced by 2.5 percent for each mph over 3 mph average wind velocity normally occurring during planned hours of operation.

Risers. Except for under-tree operation, riser pipes used on lateral lines shall be high enough to prevent interference with the distribution pattern when the tallest crop is irrigated. Riser heights shall not be less than shown below:

Sprinkler discharge *(gallons/minute)*	Riser length *(inches)*
Less than 10	6
10-25	9
25-50	12
50-120	18
More than 120	36

Risers over 3 feet in height shall be anchored and stabilized.

Additional Criteria Applicable to Traveling Sprinkler Irrigation Systems

The towpath spacing shall follow the recommendations in Table 11-31, National Engineering Handbook (NEH) Section 15, Irrigation, Chapter 11, Sprinkler Irrigation.

Additional Criteria Applicable to Climate Control and/or Modification

Design Capacity. For temperature control, the sprinkler irrigation system shall have sufficient capacity to satisfy the evaporative demand on a minute-by-minute basis throughout the peak use period. NEH, Part 623, Chapter 2 contains guidance on using sprinkler irrigation systems for temperature control.

For frost protection, the system shall be capable of applying the necessary rate, based on the minimum temperature, maximum anticipated wind speed, and relative humidity, in a uniform manner. The capacity shall be sufficient to supply the demand for the entire crop being protected. NEH, Part 623, Chapter 2 contains guidance on using sprinkler irrigation systems for frost protection.

Additional Criteria Applicable to Chemical, Nutrient and/or Waste Water Application

The installation and operation of a sprinkler irrigation system for the purpose of chemical or nutrient application (chemigation) shall comply with all federal, state, and local laws, rules and regulations. This includes backflow and anti-siphon prevention measures. Additionally, surface waters shall also be protected from direct application.

Injectors (chemical, fertilizer, or pesticides) and other automatic operating equipment shall be located adjacent to the pump and power unit and installed in accordance with state regulations, or lacking the same, in accordance with manufacturer's recommendation. The chemical injection device shall be within 1 percent of maximum injection rates and easily calibrated and adjustable for all chemicals at the required injection rate.

Sprinkler irrigation systems used to apply waste shall be designed with sprinkler nozzles of sufficient size to prevent clogging. Treatment of the wastewater using solid separators, two stage lagoons, two-stage waste holding ponds, etc., may be needed to reduce percent solids.

Design Application Rate and Timing. Application rates shall meet the levels specified in General Criteria. Timing of chemical applications shall be the minimum length of time it takes to deliver the chemicals and flush the pipelines at rates specified by the label.

Coefficient of Uniformity. If available, CU (or DU) data shall be used in selecting sprinkler spacing, nozzle size, and operating pressure. The CU shall not be less than 70% for wastewater and not less than 85% (76% DU) for chemigation or fertigation. If CU data is not available, distribution patterns and spacing requirements shall be in keeping with the appropriate specific criteria of this standard.

Nutrient and Pest Management. Chemicals, fertilizers, and liquid manure shall be applied in accordance with appropriate NRCS Practice Standards: 590 – Nutrient Management, 595 – Pest Management, 633 – Waste Utilization and 634 – Manure Transfer. Chemical or nutrient application amounts shall not exceed these standards.

NEH, Part 623, Chapter 2 contains guidance on using sprinkler irrigation systems for chemigation.

Additional Criteria Applicable to Leaching

Design Application Rate and Depth. Application rates shall meet the levels specified in General Criteria. Design depth shall be determined as defined in NRCS, National Engineering Handbook, Part 623, Chapter 2, Irrigation Water Requirements.

Management or Reclamation Plan. A plan shall be developed conforming to the requirements contained in NRCS Practice Standard 610 – Salinity and Sodic Soil Management.

Additional Criteria Applicable to Reduction in Particulate Matter Emissions to Improve Air Quality

These criteria pertains to sprinkler systems used to improve air quality by controlling dust emissions from confined animal pen areas and other critical areas such as unpaved roads, staging areas, and equipment storage yards.

Installation of fixed solid set sprinklers or periodic move sprinkler systems for dust control shall conform to the criteria stated above, unless described by criteria in this section. The installation and operation of Sprinkler Systems for dust control on confined animal pen areas shall provide application coverage on the majority of pen areas occupied by livestock, except for feed bunk aprons. The quality of discharge water shall be pathogen free and fit for animal consumption.

Capacity and Application Rate. For dust control, the sprinkler irrigation system shall have sufficient capacity and operational flexibility to apply the design application depth every three days or less. When determining capacity requirements, allowance shall be

made for reasonable water losses during application.

The minimum design application rate shall meet the maximum total daily wet soil evaporation rate, with allowances for moisture input to pen areas from animal manure and urine.

Open-lot management practices shall be applied that include scraping and removal of manure in pens between occupations, and shaping of the holding areas to prevent water ponding and chronic wet areas.

Over-application and excessive sprinkler overlap shall be avoided to minimize runoff and reduce odor and fly problems.

Water Amendments. Appropriately labeled chemicals for pest control or dust suppression may be applied through the sprinkler system when designed, installed, and operated with appropriate backflow prevention and anti-siphon devices. When chemicals are applied through the sprinkler system, surface waters and livestock watering facilities shall be protected from direct application unless chemical labels indicate that direct application will not negatively impact animal health or water quality.

Distribution Patterns and Spacing. A combination of sprinkler spacing, nozzle size, and operating pressure that provides the design application rate and distribution pattern shall be selected.

Maximum spacing of sprinklers along laterals shall not be greater than 75 percent, and no closer than 50 percent of wetted diameter listed in manufacturer's performance tables. Spacing between lateral shall comply with the following criteria:

1. For medium (51-75 psi)-pressure sprinkler nozzles, the spacing of laterals along the main line shall be no more than 90 percent, and no closer than 70 percent of wetted diameter.

2. For high-pressure sprinklers (>75 psi), the maximum distance between two sprinklers on adjacent lateral lines shall not exceed 100% of wetted diameter.

If winds impact distribution patterns during critical dust emission periods, the system shall be equipped with timer overrides and have the flexibility to be operated manually during periods of lesser wind, such as late evening and early morning.

Risers. Riser pipes used in lateral lines shall be high enough to minimize interference with the distribution pattern. The risers shall be constructed in a manner that provides protection from corrosive soils, equipment damage, and livestock damage. Riser heights shall place the discharge sprinkler not less than 6 feet above ground surface. Risers shall be anchored and stabilized.

System Valves and Controllers. Due to high application rates inherent with large sprinkler nozzle diameters, an automatic irrigation control system shall be utilized for all nozzles greater than 0.5-inch diameter. The automated control system shall utilize electro-hydraulic valves facilitating automatic operation. The valves shall be of a size and quality consistent with standard engineering practice. The operating system shall provide the flexibility to change sprinkling duration in one-minute increments and have a minimum of six start times per-day to provide for adjustment for climate conditions.

Systems shall be equipped with a rain sensor connected to the control valve network set to prohibit system operation during rainfall events.

Manual zone isolation valves shall be incorporated to isolate laterals allowing partial system operation during periods of maintenance and repair.

In areas of uneven or sloping terrain a control valve or low-head drainage device shall be incorporated at each sprinkler to ensure that line drainage to the lowest sprinkler is minimized.

CONSIDERATIONS

When planning this practice the following items should be considered, where applicable:

Application rates near the end of a center pivot may exceed soil intake rate. Light, frequent applications can reduce runoff problems, but may increase soil surface evaporation. Nozzle offsets or booms can be used to reduce peak application rates.

For low suspended nozzle application systems, row arrangement, nozzle spacing, discharge nozzle type and configuration, along with height all impact CU. System design and field management should complement each other to yield the highest CU. In general, circular rows for center pivot systems and straight rows for linear move systems provide higher CU's.

Some aspects of non-uniformity tend to average out throughout the irrigation season while others tend to accumulate. Factors that tend to average out during the irrigation season are climatic conditions and uneven travel speed for systems that start and stop. Factors that tend to accumulate during the irrigation season are nozzle discharge variances due to pressure or elevation differences, surface movement of water, and poor water distribution around field boundaries.

Consider the effects of a center pivot end gun operation on CU. A large end gun may reduce the average CU by 1 percent for each 1 percent of the area covered past the main system hardware.

Consider the on and off effects of center pivot corner arm units and end guns on overall sprinkler performance. Discharges reduce flow in the main tower, significantly lowering the CU.

Beneficial effects of conservation practices applied to limit surface redistribution of water and runoff may diminish over the irrigation season.

The velocity of prevailing winds and the timing of occurrence should be considered when planning a sprinkler system. Systems designed to operate in varied time increments aid in balancing the effects of day and night wind patterns.

Consider filtering or screening the irrigation water before it enters the system if it contains particulate matter, algae, or other material that could plug the sprinkler nozzles.

Drop tubes should be installed alternately on both sides of the mainline and when used in-crop they should have a flexible joint between the gooseneck pipes and the application device. Drops should be weighted or secured in windy areas.

Consider different sprinkler application depths and application rates with hand move and center pivot systems. With hand move systems, the application rates more nearly match the soil infiltration rate so that large irrigations can be applied and the number of hand moves reduced. With an automated system, such as a center pivot, hand labor is not a major consideration and small applications at high rates are normal.

Fertilizer and chemical application amounts may vary from prior application methods and rates, due to precise applications possible with some sprinkler irrigation systems.

Management of sprinkler irrigation systems normally include utilizing soil water stored in the root zone, especially during critical crop growth stages.

Deflection of spans on center pivots and linear-move systems is common when the lateral is loaded (filled with water). This should be considered when determining nozzle heights. Wheel track depth will also affect nozzle height.

Water distribution is greatly affected by nozzle spacing and height for LPIC and MESA systems. In general, smaller, more closely spaced nozzles will yield a higher uniformity than larger, more widely spaced nozzles.

On center pivot or linear move systems, nozzles should be diverted away from wheel tracks to avoid rutting.

Low pressure systems (35 psi or less) are sensitive to small changes in nozzle pressure. Consider using pressure regulators on all low pressure systems where elevation differences, pumping depth variations, and end gun or corner arm operation can significantly change nozzle discharge and sprinkler uniformity. Also consider installing a pressure gauge at both ends of the sprinkler system to monitor system pressure.

Consider system effects on the water budget, especially the volume and rate of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.

Consider system effects on erosion and movement of sediment, and soluble and sediment-attached substances carried by runoff.

Consider system effects on soil salinity, soil water or downstream water quality including subsurface drains. Crops may be more sensitive to salts applied to plant foliage during sprinkling than to similar water salinities applied by surface irrigation, subirrigation, and microirrigation. Information on foliar injury from saline water applied by sprinkler irrigation is contained in NEH, Part 623, Chapter 2. If the salt content of the irrigation water is high, other irrigation methods should be considered.

Where wastewater is used for irrigation, timing of irrigation based on prevailing winds should be considered to reduce odor. In areas of high visibility, irrigating at night should be considered. The use of wastewater may reduce the life of the system due to corrosion or abrasion.

When utilized for particulate matter reduction, check to assure adequate animal feeding operation water supplies are available to meet other operating needs, during sprinkler system operation.

Irregularly shaped pen areas that are impractical to treat with a sprinkler system and where potential dust sources may occur should be treated for dust control with tanker water trucks equipped with hoses, or nozzles designed to apply water at rates similar to an equivalent sprinkler system.

Open-feedlot management practices that minimize thickness of loose manure will reduce water demands for dust control, as well as, reduce wet areas and ponding that could increase ammonia emissions.

Cultural Resources

NRCS policy is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice or associated practices in the plan could have an effect on cultural resources. The National Historic Preservation Act may require consultation with the California State Historic Preservation Officer.

http://www.nrcs.usda.gov/technical/cultural.html is the primary website for cultural resources information. The California Environmental Handbook and the California Environmental Assessment Worksheet also provide guidance on how the NRCS must account for cultural resources. The e-Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

Endangered Species

If during the Environmental Assessment NRCS determines that installation of this practice, along with any others proposed, will have an effect on any federal or state listed Rare, Threatened or Endangered species or their habitat, NRCS will advise the client of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the client selects one of the alternative conservation treatments for installation; or with concurrence of the client, NRCS initiates consultations concerning the listed species with the U.S. Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game.

PLANS AND SPECIFICATIONS

Plans and specifications for constructing irrigation sprinkler systems shall be in keeping with this standard and shall describe the requirements for properly installing the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

An operation and maintenance plan must provide specific instructions for operating and maintaining the system to insure that it functions properly. It should also provide information regarding periodic inspections and prompt repair or replacement of damaged components. The plan, at minimum, shall include provisions to address the following:

- Periodic checks and removal of debris and sediment as necessary from nozzles to assure proper operation.
- Inspection or testing of all pipeline and pumping plant components and appurtenances, as applicable.
- Regular testing of pressures and flow rates to assure proper operation.
- Periodic checks of all nozzles and spray heads for proper operation and wear.
- Routine maintenance of all mechanical components in accordance with the manufacturer's recommendations.
- Prior to retrofitting any electrically powered irrigation equipment, electrical service must be disconnected and the absence of stray electrical current verified.

REFERENCE:

1. Sprinkler Irrigation Systems. MWPS – 30, First Edition, 1999.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

442 - IRRIGATON SYSTEM, SPRINKLER

I. SCOPE

The work will consist of furnishing and installing materials as required to provide a complete sprinkler irrigation system for the tract of land as shown on the drawings.

II. SOURCE OF WATER

The source of water shall be as shown on the drawings, and as previously determined by the landowner. Water rights for the use of the water are the responsibility of the landowner. The source shall provide the full capacity as may be needed for the system being installed.

III. INSTALLATION

The materials shall be fabricated in accordance with the manufacturer's instructions. The system shall be tested to determine if the system is in proper working order, and will deliver the required capacity to meet the crop consumptive use, and the specified uniformity distribution rate.

IV. BASIS OF ACCEPTANCE

The basis of acceptance shall be the ability of the system to deliver the required amount of water to meet the peak consumptive use of the crop, with a distribution uniformity rate of 80% or greater.

V. OPERATION AND MAINTENANCE ITEMS

A properly operated and maintained sprinkler irrigation system is an asset to your farm. This irrigation system was designed and installed to apply irrigation water to meet the needs of the crops without causing erosion or runoff. The estimated life span of this installation is at least 10 years. The life of this system can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic maintenance and may also require operational items to maintain satisfactory performance. Here are some recommendations to help you develop a good operation and maintenance program.

Operate the system according to the design parameters for the area.

Only operate the system when needed to furnish water for plant growth, the soil may also be used to store moisture within the rooting depth of the plant.

Operate the system at the pressure discharge rate, duration, and frequency as designed.

Periodically check the sprinkler heads for wear, and replace when defective or excessive wear is found with proper parts.

Monitor the crop noting areas of moisture stress and repair or adjust system operation.

Promptly repair all leaks, by replacing gaskets or worn parts.

During non-seasonal use place the system in an area where it will not be damaged but secure, if necessary.

Maintain all pumps, agitators, piping, valves and other electrical and mechanical equipment in good operating condition following the manufacturers' recommendations

Do not allow livestock near equipment or in area during operation.

Immediately repair any vandalism, vehicular or livestock damage.

Other items specific to your project are listed on the "Practice Requirement" sheet.

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

SOLID/LIQUID WASTE SEPARATION FACILITY

(No.)

CODE 632

DEFINITION

A filtration or screening device, settling tank, settling basin, or settling channel used to separate a portion of solids from a liquid waste stream.

PURPOSE

To partition solids, liquids and their associated nutrients as part of a conservation management system to:

- improve or protect air quality.
- improve or protect water quality.
- improve or protect animal health.
- meet management objectives.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where solid/liquid separation will:

- remove solids from the liquid waste stream as a primary treatment process and allow further treatment processes to be applied such as composting and anaerobic digestion.
- allow partly digested feed to be separated from the liquid waste stream so that it can be used as a feed supplement or for bedding.
- reduce problems associated with solids accumulation in liquid storage facilities.
- reduce solids in stored liquids so liquids can be recycled for other uses (i.e. flush water).
- reduce solids in stored liquids to better facilitate land application of liquids using irrigation techniques.
- assist with partitioning nutrients in the waste stream to improve nutrient management.

CRITERIA

General Criteria Applicable to All Purposes

Laws and regulations. Waste treatment facilities must be planned, designed, and constructed to meet all federal, state, and local regulations.

Location. Solid/Liquid separation facilities shall be located so that the waste stream can be safely routed to and from the facility.

Solid/Liquid Separator Selection. Table 1 provides guidance on the different types of solid/liquid separators available. Capture efficiency varies widely for each type of separator depending on the type and consistency of the waste to be treated. The type of solid/liquid separator selected shall be based on site-specific data for the liquid waste stream and management conditions where specific management objectives are to be met.

Solid/Liquid Separation Efficiency. The volume of solids separated shall be based on estimates of daily wastewater volume and the total solids capture efficiency for the type of solid/liquid separation device selected. Where manufacturer information or local data concerning total solids capture efficiencies are not available for the type of solid/liquid separation device selected, the efficiencies in Table 1 can be used to estimate the volume of separated solids generated.

Chemical Amendments. Guidance for the addition of chemicals to the liquid waste stream for improving total solids capture efficiencies is given in Conservation Practice Standard 591, Amendments for Treatment of Agricultural Waste.

Table 1

Solid/Liquid Separators	Total Solids Capture Efficiency
Static Inclined Screen	10-20%
Inclined Screen with Drag Chain	10-30%
Vibratory Screen	15-30%
Rotating Screen	20-40%
Centrifuge	20-45%
Screw or Roller Press	30-50%
Settling Basin	40-65%
Weeping Wall	50-85%
Dry Scrape	50-90%
Geotextile Container	50-98%

Storage of Separated Solids. Adequate storage areas shall be provided for separated solids so they can be properly managed. Temporary storage areas shall be provided for separated solids unless they are transported directly from the separator to the final utilization location (i.e. offsite composter).

Storage facilities for separated solids shall be designed in accordance with requirements of Conservation Practice Standard 313, Waste Storage Facility.

All seepage from solid storage facilities shall be directed to short or long term liquid storage facilities.

Outlets. The outlet capacity for a solid/liquid separation facility shall be capable of safely conveying the design capacity to a storage or utilization location.

Outlets may include pipelines, perforated or slotted pipe risers, porous plank walls or dams, or screened walls. Screening used to separate solids at the outlet of settling basins should provide at least 10% open area.

Emergency overflow appurtenances such as notched weirs, or pipe bypasses can be used to control flows exceeding design capacity. Emergency overflow appurtenances shall be designed to pass the peak runoff from the drainage area of the facility for a 25 year-24 hour storm frequency plus the normal waste stream discharge. Any discharge from the solid/liquid separation facility must be captured in a waste storage or treatment structure unless it meets local, state, and federal regulations regarding discharge to surface and ground waters.

Additional Criteria for Filtration or Screening Devices

Flow rate. The design flow rate (combined flow of solid and liquid waste) for filtration and screening devices shall be in accordance with the manufacturer's recommendations.

Velocity. The liquid waste stream velocity through filtration and screening devices shall be in accordance with the manufacturer's recommendations.

Structural Design. Structural supports for filtration and screening devices shall be designed in accordance with the requirements of Conservation Practice Standard 313, Waste Storage Facility.

Structural supports for elevated equipment shall be designed by a registered Civil Engineer, Structural Engineer or Architect, licensed to practice in California, to meet all state, county and local building codes. It shall be suitable for the site and designed to meet all site-specific requirements as well as any safety requirements.

The engineer or architect shall provide construction plans, specifications and Operation and Maintenance guidance.

The design shall consider all anticipated loads, including live loads, dead loads, wind, snow, ice and seismic loads that influence the performance of the structure.

General Criteria Applicable to Settling Basins

Velocity. The liquid waste stream velocity through settling basins shall not exceed 1.5 feet per second.

Depth. The total depth for settling basins that are to be cleaned out using conventional front-end loading equipment shall be 5 feet or less. Safety concerns during cleanout by other means shall be addressed where the total depth for settling basins will exceed 5 feet.

The total depth of earthen settling basins shall be based on the sum of the depth needed for liquids and solids storage plus 1 foot of freeboard.

The total depth of concrete settling basins shall be based on the sum of the depth needed for liquids and solids storage.

The minimum liquid depth of settling basins shall be based on a minimum hydraulic retention time and the solids settling rate. A minimum hydraulic retention time of 30 minutes shall be used except where sand is a major component of the liquid waste stream. Where sand is a major component in the liquid waste stream the hydraulic retention time shall be a minimum of 3 minutes and a maximum of 5 minutes.

The maximum solids settling rate used for design shall be 4 feet per hour for settling basins with a total storage depth greater than 2 feet and 2 feet per hour for settling basins with a total storage depth equal to or less than 2 feet.

Bottom Width. The minimum bottom width for settling basins shall be 10 feet.

Where settling basins are not used for dewatering, an earthen bottom can be used (i.e. level diversion).

Settling basins used for dewatering shall be constructed of concrete and/or lined with a geosynthetic, compacted soil, or geomembrane liner meeting applicable local laws and regulations. A settling basin not utilizing a concrete slab for the basin floor shall be designed to provide adequate support for clean out equipment. A settling basin constructed according to these criteria shall also meet appropriate criteria in Conservation Practice Standard 313, Waste Storage Facility.

Access. The minimum top width of earthen embankments for settling basins shall be 15 feet where equipment access is needed for clean out. Where no access is needed for clean out, the minimum top width shall be governed by the equipment used to construct the embankment or berm, but shall not be less than 4 feet.

The side slopes of earthen embankments shall be 2 horizontal to 1 vertical (2:1) or flatter. For earthen embankments greater than 3 feet in height, the side slopes shall be no steeper than 3:1 on the outside and 2:1 on the inside of the embankment.

Access ramps to allow entry into the basin for clean out by normal front end loading equipment shall be no steeper than 10:1. Steeper slopes shall be allowed where special surfacing of the ramp is done for traction purposes and the equipment used can accommodate the steeper slope but in no case shall the access ramp be steeper than 4:1.

Additional Criteria for Settling Basins Receiving Lot Runoff

Settling basins used in conjunction with or without screening to remove waste solids from process generated liquid waste streams (i.e. flush water from covered freestall barns, or milking parlor waste water) that include significant external drainage fall into this category.

Flow rate. The design flow rate for a settling basin that receives lot runoff shall be based on the normal liquid waste stream discharge from the operation plus the peak runoff from the drainage area of the basin computed using a 10 year-1 hour storm frequency.

Volume. The design volume for settling basins receiving lot runoff shall be based on the total depth needed for liquid and solids storage and the minimum surface area required for the basin. Where no specific information is available on sludge accumulation rates from lot surfaces, use 0.05 cubic feet per square foot-Month for unpaved lots and 0.01 cubic feet per square foot-Month for paved lots. These values should be increased by 50% if lots are steep or poorly maintained.

Additional Criteria for Settling Basins that Exclude Lot Runoff

Settling basins used in conjunction with or without screening to remove waste solids from process generated liquid waste streams (i.e. flush water from covered freestall barns, or

milking parlor waste water) and do not receive significant external drainage fall into this category.

Flow rate. The design capacity for a settling basin that excludes lot runoff shall be based on the normal liquid waste stream discharge from the operation.

Volume. The design volume for settling basins that exclude lot runoff shall be the volume needed to provide solids storage for a specified treatment period plus temporary liquid storage necessary during dewatering. Minimum temporary liquid storage shall be based on the volume of the liquid waste stream for one-day.

CONSIDERATIONS

Location. Locating solid/liquid separation facilities should consider elevation and distance from the source of material to be separated and the location of long-term liquid and solid waste storage facilities. Location of solid/liquid separation facilities should take advantage of gravity flow wherever possible.

Other considerations for locating solid/liquid separation facilities include vehicle access, wind direction, neighboring dwellings, proximity of streams and floodplains, and visibility.

Weeping Walls. To maximize drainage and solid/liquid separation, weeping walls should be used on the entire perimeter of the waste to be treated and drainage paths maintained to and through the walls. Ensure drainage is transferred to a liquid storage facility.

Waste Water Transfer Piping. It is standard practice to route flow to and from a solid/liquid separation facility using underground and above ground pipe. Refer to Conservation Practice Standard 634, Manure Transfer for guidance in designing pipelines for wastewater transfer.

Visual Screening. Consider vegetative screens or other methods to shield solids separation facilities from public view and for more aesthetic conditions.

Rainfall. Rainfall falling on the solids storage areas associated with solid/liquid separation facilities can result in increased wastewater discharge into the long-term storage facility. Consider covering solids storage facilities in locations where high rainfall amounts occur.

Cultural Resources

NRCS policy is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice or associated practices in the plan could have an effect on cultural resources. The National Historic Preservation Act may require consultation with the California State Historic Preservation Officer.

http://www.nrcs.usda.gov/technical/cultural.html is the primary website for cultural resources information. The California Environmental Handbook and the California Environmental Assessment Worksheet also provide guidance on how the NRCS must account for cultural resources. The e-Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

Endangered Species Considerations

If during the Environmental Assessment NRCS determines that installation of this practice, along with any others proposed, will have an effect on any federal or state listed Rare, Threatened or Endangered species or their habitat, NRCS will advise the client of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the client selects one of the alternative conservation treatments for installation; or with concurrence of the client, NRCS initiates consultations concerning the listed species with the U.S. Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game.

OPERATION AND MAINTENANCE

Where sand is a major component of the liquid waste stream, special emphasis should be given to abrasion resistant waste transfer piping and pumps to reduce frequency of repairs.

The owner and operator should understand the level of operation and maintenance (O&M) required ensuring the type of separator selected will be operated as intended.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared in accordance with the criteria of this standard and good engineering practice. The plans and specifications shall include all details necessary for construction and completion of the solid/liquid separation facilities.

As a minimum, the plans and specifications shall provide the following:

1. Layout of waste production facilities, waste collection points, waste transfer pipelines, waste treatment and storage facilities.
2. Location of all inflow and discharge pipelines and a description of pipeline materials, diameter, and slope.
3. Details of support systems for solid/liquid separation devices.
4. Fencing and signage as appropriate for safety purposes.
5. Operating characteristics.

Warranties. The contractor shall provide a one-year warranty on all construction. If a manufactured solid/liquid separation device is installed, the manufacturer shall provide a warranty that describes the design life of the device and what the warranty covers.

OPERATION AND MAINTENANCE

An operation and maintenance (O&M) plan shall be developed and reviewed with the owner and operator prior to constructing the solid/liquid separation facility. The O&M plan shall be consistent with the purposes of the solid/liquid separation device chosen, its intended life, safety requirements, and the criteria for its design. The plan shall contain operation and maintenance requirements including but not limited to:

1. Documentation of design assumptions.
2. Design capacity for the facility.
3. A description of normal operation of the facility, safety issues, and normal maintenance items.
4. Alternative operation procedures in the event of equipment failure.
5. Daily inspection of the following:
   - Separation device and support structure.
   - Screens and outlets.
   - Remaining capacity in storage facilities.

REFERENCES

1. USDA/NRCS, National Engineering Handbook, Part 651, Agricultural Waste Management Field Handbook.1992, Last revised, June 1999.
2. Mid West Plan Services Handbook 18, Livestock Waste Facilities Handbook, Third Edition, 1993.
3. Burns, R.T. and Moody, L.B.. 2003. Development of a Standard Method for Testing Mechanical Manure Solids Separators. ASAE-CIGR Meeting Paper No. 034131. St. Joseph, MI.: ASAE

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

ROAD/TRAIL/LANDING CLOSURE AND TREATMENT

(Ft.)

CODE 654

DEFINITION

The closure, decommissioning, or abandonment of roads, trails, and/or landings and associated treatment to achieve conservation objectives.

PURPOSE

To minimize various resource concerns associated with existing roads, trails, and/or landings by closing them and treating to a level where one or more the following objectives are achieved:

- Controlling erosion (road, sheet and rill, gully, wind), chemical residues and off-site movement, sediment deposition and damage, accentuated storm runoff, and particulate matter generation;
- Restoring land to a productive state by reestablishing adapted plants and habitat (wildlife food, cover, and shelter), reconnecting wildlife habitat and migration corridors including streams and riparian areas, and controlling noxious and invasive species;
- Reestablishing drainage patterns that existed prior to construction of the road, trail, or landing to restore the form and integrity of associated hill slopes, channels and floodplains and their related hydrologic and geomorphic processes;
- Minimizing human impacts to the closure area to meet safety, aesthetic, sensitive area protection, or wildlife habitat requirements.

CONDITIONS WHERE PRACTICE APPLIES

On roads, trails, and landings designated for closure including cut-and-fill slopes, sidecast areas and associated drainage structures.

CRITERIA

Roads, trails, and landings will be designated into one of three levels of treatment:

1) Closure and treatment to a level that facilitates future use for management activities.
2) Closure, treatment, and reconnection to applicable drainage networks (usually involves culvert removal which limits potential for future use).
3) Closure, removal and reshaping to natural contours, treatment and stabilization, and natural landscape and drainage restoration.

Determine the appropriate level of treatment based on the associated severity of environmental effects of existing roads, trails, and landings; future access requirements; and short-term disturbance effects during closure and treatment activities.

Treatment shall result in physical conditions and a configuration that achieve the stated purpose and objective(s). Approved technology tools will be used to support design and specifications development such as prediction models for erosion, hydrology and hydraulics, soil mechanics and slope stability, and wildlife/habitat interactions.

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your Natural Resources Conservation Service State Office or visit the Field Office Technical Guide.

Closure and treatment activities and final conditions and configuration will minimize adverse onsite and off-site effects such as water and wind erosion including particulate matter/dust generation, concentrated flows to unprotected areas, destabilization of slopes and mass wasting, riparian area or wetland degradation, stream channel and streambank damage, barriers to aquatic organism and wildlife movement or migration, hydrologic modification, or other water resource damage. Any seep or spring that is on or associated with the area to be treated shall not be buried under fill nor have its drainage concentrated through unarmored fill areas. Seeps and springs shall be reconnected to appropriate drainage networks.

Equipment types will be sufficient to implement treatments to the designated level. Treatment and construction techniques will be scheduled to minimize soil erosion, displacement, compaction, aesthetics degradation, safety concerns, barriers to wildlife movement, or unacceptable damage to adjacent areas.

All levels of treatment will utilize measures applicable to that level such as but not limited to:

- Permanent or temporary traffic barriers and caution signage In accordance with Conservation Practice Standard 472, Access Control.
- Excavation and reshaping of roads, trails, landings, and drainage ways to natural conditions including culvert removal and reconnection of the site areas to appropriate drainage networks.
- Ripping to improve infiltration and vegetation root growth.
- Topsoil stockpiling and respreading and, in some cases, importing.
- Rolling grades to disperse runoff of selected road and trail segments to be closed.
- Control of nuisance, noxious or invasive species.
- Reestablishing adapted vegetation including mulch and soil amendments as necessary to enhance establishment in accordance with Conservation Practice Standard 342 Critical Area Planting.

Treatments to restore natural topography and surface hydrology will result in stable slopes and be compatible with existing land uses in the vicinity.

Minimize indirect adverse impacts or effects of the practice on species with declining populations, particularly aquatic species in streams or wetlands downslope of project area.

Sites containing hazardous material shall be cleaned prior to the establishment of this practice following all local, state, and federal regulatory requirements. Appropriate actions to clean sites suspected of containing hazardous wastes shall be based on soil tests.

To control emissions of particulate matter to the air during closure and treatment operations, utilize a dust palliative or other method of dust control on bare and disturbed surfaces.

Design, construction criteria, and specifications of other practices used in combination with this practice shall be integrated and compatible to conduct closure and treatment activities and achieve specified final conditions and configuration. Criteria for design of components not addressed in NRCS practice standards shall be consistent with professional engineering practices.

CONSIDERATIONS

For roads, trails, or landings deemed unsuitable as candidates for closure and treatment, consider upgrading specifications and operation-maintenance provisions of the existing practices Access Road-560 and/or Forest Trails and Landings-655 to achieve conservation objectives. In these cases, install complementary practices and measures concurrently while upgrading road, trails, and/or landings.

Compacted areas will need bulk density tests at various depths to assure treatment specifications are adequate to reestablish hydrologic function and vegetation.

Use native species when establishing vegetation, especially those having multiple values, e.g., biomass, nuts, fruit, browse, nesting, and aesthetics. Avoid use of introduced or exotic species that could become nuisances.

In areas where steepness of slope and severity of cut and fill operation preclude

returning sidecast to create a rooting medium, assess the road base for ripping and usage as a rooting medium. If not suitable as a rooting medium, suitable haul-in topsoil/fill material may be needed. Assure that such material is free of weeds seeds and/or contaminants.

Road sites are typically nutrient poor. Consider soil amendments or organic matter, as appropriate, to accelerate the rate of revegetation.

Cultural Resources

NRCS policy is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice or associated practices in the plan could have an effect on cultural resources. The National Historic Preservation Act may require consultation with the California State Historic Preservation Officer.

http://www.nrcs.usda.gov/technical/cultural.html is the primary website for cultural resources information. The California Environmental Handbook and the California Environmental Assessment Worksheet also provide guidance on how the NRCS must account for cultural resources. The e-Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

Endangered Species

If during the Environmental Assessment NRCS determines that installation of this practice, along with any others proposed, will have an effect on any federal or state listed Rare, Threatened or Endangered species or their habitat, NRCS will advise the client of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the client selects one of the alternative conservation treatments for installation; or with concurrence of the client, NRCS initiates consultations concerning the listed species with the U.S. Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game.

PLANS AND SPECIFICATIONS

Plans and specifications for this practice shall be prepared for the specific site conditions in accordance with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. These items shall describe the location; the designated level of treatment; the kind, amount and quality of materials and acceptable equipment to be used; and the sequence, timing and details of closure-treatment activities.

OPERATION AND MAINTENANCE

Operation and maintenance shall include periodic monitoring and weather event-based patrolling of completed sites to determine adverse environmental effects and the condition of vegetation established on disturbed areas. Dying or dead vegetation shall be replaced as necessary. Control of nuisance, noxious, or invasive species will be continued.

Initial monitoring and patrolling shall be conducted during water and/or wind erosive period(s) as needed until the site is determined to be stable. Stabilizing measures and additional treatment will be applied when and where necessary.

REFERENCES

- Borlander, P. and A. Yamada. 1999. Dust palliative selection and application guide. Project Report 9977-1207-SDTDC San Dimas Technology Development Center, USDA, Forest Service, San Dimas, CA. Available at http://www.fs.fed.us/eng/pubs/html/99771207/99771207.html
- Merrill, B.R. and E. Casaday. 2001. Field techniques for forest and range road removal. California State Parks, Sacramento, CA. Available at: http://www.parks.ca.gov/pages/23071/files/field%20techniques%20for%20road%20removal%20part%202.pdf.
- Moll, J. 1996. A guide for road closure and obliteration in the Forest Service. San Dimas Technology and Development Center, USDA Forest Service, San Dimas, CA.
- Switalski, T.A., et al. Benefits and impacts of road removal. The Ecological Society of America, Front. Ecol. Environ. 2004. 2(1): 21–28. Available at http://www.fs.fed.us/rm/pubs_other/rmrs_2004_switalski_t001.pdf.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

654 - ROAD/TRAIL/LANDING CLOSURE AND TREATMENT

I. SCOPE

This work consists of furnishing materials and installing measures to close, decommission, or abandon roads, trails and/or landings at the locations and to the lines and grades as shown on the drawings or staked in the field. It also includes the safe disposal of all fills and the stabilization of all excavated and filled areas as a result of these operations.

II. POLLUTION CONTROL

Erosion control and sediment control measures shall be as shown on the drawings and minimally meet the requirements of permits.

III. SITE PREPARATION

The areas specified for excavation and placement of spoil shall be cleared of all vegetation and organics including trees, stumps, roots, brush and other debris. These materials shall be stockpiled for later use as mulch or hauled away as required by the plans and specifications

Excess or unused organics shall not be buried in fill areas on site. Disposal methods shall be in accordance with state and county laws with regard to the safety of persons and property.

Site disturbance should be kept to the minimum possible. Protect all trees in place unless flagged or marked for removal.

IV. DRAINAGE STRUCTURE AND APPURTENANCE REMOVAL

Remove all culverts, culvert headwalls, downpipe, anchors, drop inlets and other structures as shown on the drawings and as marked in the field. All drainage structure and appurtenance materials shall be disposed of off-site in accordance with state and county laws.

V. EXCAVATION

Excavation shall be based on the lines and grades as shown on the drawings or staked in the field. The limits of excavation as staked in the field or shown on the drawings are a guide to the final excavation. The final limits of excavation shall be as approved by the NRCS Representative.

VI. EARTHFILL

Fill material shall come from required excavations and be free of organics, other perishable or otherwise unsuitable materials.

The fill material shall be placed on the prepared surfaces of areas designated for fill placement in approximately horizontal layers beginning at the lowest elevation for fill placement. Fill material shall not be placed on springs or seeps, either noted on the plans or become visible during construction.

Earthfill placement (lift thickness), compaction and moisture content shall be in accordance with the required class of compaction identified in the Practice Requirements summary sheet and described below:

Class I Compaction, Compacted Fill or Slopes

a. Maximum lift thickness shall not exceed 12 inches prior to compaction.

b. Compaction requirement per lift is a minimum of 3 passes of the dozer tracks (D8) or equivalent over 80 percent of the entire area or an approved method of compaction.

c. Moisture content of the fill shall be such that a ball of soil squeezed by hand maintains it’s shape.

Class II Compaction, Uncompacted Fill or Slopes.

a. Fill shall be spread in 18 inch maximum lift thickness

b. Minimal compaction of 1 pass of the dozer equipment over 80 percent of the area is required.

c. No special moisture control is required.

VII. RIPPING

Ripping is a thorough decompaction of a road or landing. This works shall consist of ripping the existing roadbed or landing surface with a shank type

ripper. Rippers will have a minimum of two shanks, and the distance between shanks will not exceed 36 inches. A sufficient number of passes will be made to attain a maximum spacing of 2 feet between ripper shank paths. The minimum ripping depth is 12 inches.

VIII. FINAL GRADING

Grade the finished surface to eliminate berms or depressions on the fill that can collect runoff and cause gullying or failure. The interface between the natural slope and the recontoured fill shall be smooth and free of any ridges or depressions.

IX. ADDITIONAL STABILIZING MEASURES

Any additional required stabilizing measures such as rock riprap, grade stabilizers, drop structures or other measures shall be constructed to conform to the specifications listed on the Practice Requirements sheet and the drawings.

Any temporary measures installed to minimize erosion and sedimentation prior to or during construction shall be removed from the site prior to acceptance of the project.

X. VEGETATIVE REQUIREMENTS

All disturbed areas will be re-vegetated in accordance with the requirements of Practice Specification 342, Critical Area Planting, or other applicable specifications and as shown on the drawings.

XI. SPECIAL MEASURES

Spread stockpiled soil and organics evenly over finished grades of disturbed areas.

XII. CONSTRUCTION OPERATIONS

Construction operations shall be done in such a manner that erosion, sedimentation, air, and water pollution are minimized and held within legal limits. The owner, operator, Contractor or other persons will conduct all work and operations in accordance with proper safety codes for the type of construction being performed with due regards to the safety of all persons and property.

The completed job shall be workmanlike and present a good appearance.

OPERATION AND MAINTENANCE ITEMS

Road/landing/trail closure and treatment is an asset to your farm. This measure was designed and installed to control erosion, restore land to a productive state, reestablishment of drainage patterns that existed prior to the construction of the road, minimize human impacts to the area and to meet safety, aesthetics, sensitive area protection or wildlife habitat requirements. The estimated life span of this installation is at least 10 years. The life of this installation can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic operation to maintain satisfactory performance. Here are some recommendations to help you develop a good operation and maintenance program.

Check the area after all major storms and at least twice per year. Immediately repair any eroded areas.

Maintain vigorous growth of vegetative coverings. This includes reseeding, fertilization, and application of herbicides when necessary. Periodic mowing may also be needed to control height.

Maintain fences to prevent unauthorized or livestock entry.

Immediately repair any vandalism, vehicular, or livestock damage the area.

Inspect for damage from rodents or burrowing animals. Repair any damage. Take appropriate corrective actions to alleviate further damage.

Other items specific to your project are listed on the "Practice Requirement" sheet.

U.S DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
CALIFORNIA

PRACTICE REQUIREMENTS
FOR
654 - ROAD/TRAIL/LANDING CLOSURE AND TREATMENT

FOR: Business Name_____

Job Location_____

County_____ RCD_____ Farm/Tract No._____

Referral No._____Prepared By_____ Date_____

IT SHALL BE THE RESPONSIBILITY OF THE OWNER TO OBTAIN ALL NECESSARY PERMITS AND/OR RIGHTS, AND TO COMPLY WITH ALL ORDINANCES AND LAWS PERTAINING TO THIS INSTALLATION.

Installation shall be in accordance with the following drawings, specifications and special requirements. NO CHANGES ARE TO BE MADE IN THE DRAWINGS OR SPECIFICATIONS WITHOUT PRIOR APPROVAL OF THE NRCS TECHNICIAN.

1. Drawings, No._____

2. Practice Specifications_____,_____,_____

3. Level of Treatment _____

4. Earthfill Compaction: (Additional Specifications, If Necessary)_____

_____

_____

5. Special Requirements:_____

_____

_____

_____

6. Special Maintenance Requirements:_____

_____

_____

PRACTICE APPROVAL:

Job Classification: (Ref: Section 501 NEM)

Show the limiting elements for this job. This job is classified as, Class _____

Limiting elements:

_____ _____

_____ _____

_____ _____

_____ _____

Approved by:_____ Date:_____

LANDOWNER's/OPERATOR'S ACKNOWLEDGEMENT:

The landowner/operator acknowledges that:

A. He/she has received a copy of the construction drawings and specification, and that he/she has an understanding of the contents, and the requirements.

B. He/she has obtained all the necessary permits.

C. No changes will be made in the installation of the job without prior concurrence of the NRCS technician.

D. Maintenance of the installed work is necessary for proper performance during the project life.

Accepted by:_____ Date:_____

Practice Completion:

I have made an on site inspection of the site (or I am accepting owner/contractor documentation), and have determined that the job as installed does conform to the drawings and practice specifications.

Completion Certification by:

/s/_____ Date: _____

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

654 – ROAD/LANDING/TRAIL CLOSURE AND TREATMENT

OPERATION AND MAINTENANCE

Sponsor/Land user: _____ Date: _____

Address: _____

_____

Location GPS Coordinates Map Datum: _____ E _____ N _____

Quad Sheet Name _____ SEC _____ T _____ R _____

Road/landing/trail closure and treatment is an asset to your farm. This measure was designed and installed to control erosion, restore land to a productive state, reestablishment of drainage patterns that existed prior to the construction of the road, minimize human impacts to the area and to meet safety, aesthetics, sensitive area protection or wildlife habitat requirements. The estimated life span of this installation is at least 10 years. The life of this installation can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic operation and maintenance to maintain satisfactory performance. Additional permits may be required to perform this work. Here are some recommendations to help you develop a good operation and maintenance program.

GENERAL RECOMMENDATIONS

- Check the area after all major storms and at least twice per year. Immediately repair any eroded areas.
- Maintain vigorous growth of vegetative coverings. This includes reseeding, fertilization, and application of herbicides when necessary. Periodic mowing may also be needed to control height.
- If fences are installed, they shall be maintained to prevent unauthorized or livestock entry.
- Immediately repair any vandalism, vehicular, or livestock damage the area.
- Inspect for damage from rodents or burrowing animals. Repair any damage. Take appropriate corrective actions to alleviate further damage.

SPECIFIC RECOMMENDATIONS FOR ROAD/LANDING/TRAIL CLOSURE AND TREATMENT PROJECT

CONTACT YOUR LOCAL NATURAL RESOURCES CONSERVATION SERVICE OFFICE FOR ANY ADDITIONAL TECHNICAL ASSISTANCE YOU MIGHT NEED FOR IMPLEMENTATION OF THIS OPERATION AND MAINTENANCE PLAN FOR YOUR ROAD/LANDING/TRAIL CLOSURE AND TREATMENT PROJECT.

STATEMENT OF WORK
Road/Trail/Landing Closure and Treatment (654)

These deliverables apply to this individual practice. For other planned practice deliverables refer to those specific Statements of Work.

DESIGN

Deliverables:

1. Design documents that demonstrate criteria in NRCS practice standard have been met and are compatible with planned and applied practices.
    a. Practice purpose(s) as identified in the conservation plan (specified products, environmental services, and/or mitigating actions to maintain resource concerns at acceptable levels)
    b. List of required permits to be obtained by the client
    c. Practice standard criteria-related computations and analyses to develop plans and specifications including but not limited to:
        i. Design level (1-to facilitate future management, 2-reconnect drainages, 3-landscape restoration).
        ii. Itemization and description of all treatment measures.
        iii. Adverse onsite and off-site effects and mitigation activities for each.
        iv. Description of structural and vegetative treatment outcomes and configuration.
2. Written plans and specifications including sketches and drawings shall be provided to the client that adequately describe the requirements to install the practice and obtain necessary permits.
3. Documentation of needed operation and maintenance.
4. Certification that the design meets practice standard criteria and comply with applicable laws and regulations.
5. Design modifications during installation as required.

INSTALLATION

Deliverables

1. Pre-application conference with client.
2. Verification that client has obtained required permits.
3. Layout and, as applicable, field staking or marking of the practice, measure or activity according to plans and specifications including applicable layout notes.
4. Application guidance as needed.
5. Facilitate and implement required design modifications with client and original designer.
6. Advise client/NRCS on compliance issues with all federal, state, tribal and local laws, regulations and NRCS policies during installation.
7. Certification that the application process and materials meet design and permit requirements.

CHECK OUT

Deliverables

1. Records of application.
    a. Extent of practice units applied
    b. Actual mitigation measures used and applied
2. Certification that the application meets NRCS standards and specifications and is in compliance with permits.
3. Progress reporting.

REFERENCES

- NRCS Field Office Technical Guide (eFOTG), Section IV, Practice Standard – Road/Trail/Landing Closure and Treatment, 654
- NRCS National Environmental Compliance Handbook, NRCS Cultural Resources Handbook

STATEMENT OF WORK
Road/Trail/Landing Closure and Treatment (654)