

Title 210 – National Engineering Manual
Part 501 – Authorizations
Subpart A – Review and Approval

PIA501.1 Scope

- A. All employees are expected to work to the limits of their capabilities. Policy stated in this section of the NEM is not intended to limit initiative or the activities of any person. Employees are encouraged to gather basic data and prepare engineering plans beyond their delegated engineering job approval authority (EJAA). However, their work is to be reviewed and approved by an individual with authority for that level of work. Conversely, employees are not required to approve work falling within their delegated EJAA when complexities are encountered that exceed their expertise. Employees with or without the necessary EJAA for a particular project should request technical assistance or review as needed.
- B. Delegation of authority will not be issued to non-NRCS professional engineers in Hawaii, Guam or the Commonwealth of the Northern Mariana Islands (CNMI). These engineers will certify that their work meets NRCS standards and specifications in accordance with NEM Part 505.

PIA501.3 Compliance of Engineering Work with Laws and Regulations

- B. All PIA NRCS engineers are encouraged to become registered in the state or territory where they are stationed.
- C. Most NRCS work does not require a professional engineering seal. NRCS PIA will typically not seal design work. When a permitting agency requires design drawings to be sealed by a registered professional engineer, NRCS will do the I&E and construction certification, but will not perform the design work. In these cases, a private engineering firm will be needed to complete the design and seal the drawings. Providers must comply with the policy set forth in National Engineering Manual, Part 505, Subpart B, 505.11. NRCS will review designs according to NEM State Supplement PIA505.11.

PIA501.4 Engineering Job Approval Authority

- A. This policy applies to all individuals having planning, design, or installation responsibility. I&E, design, and construction of engineering practices must be approved by a person with appropriate EJAA before alternatives are presented to the landowner, designs are released to the landowner or construction is certified. Review and approval of engineering jobs is to be accomplished in the same manner, regardless of program cost sharing.
- B. State Engineering Job Approval Authority (Classes I – V)
- (2) Engineering job review and approval should be provided by the person closest to the job with technical responsibility for that location. Where personnel with appropriate EJAA are not available in the field office, the engineer assigned to provide assistance to that field office shall review and approve the job. If higher EJAA is needed, the job shall be submitted to the Area Engineer for review and approval. Jobs above the Area Engineer's EJAA shall have the SCE's concurrence during the planning stage and prior to commitment of NRCS resources.
- (3) All field personnel working in conservation programs should be assigned engineering job approval authority for the practices applicable to the geographic area they service. Review and approval authority may be changed at any time as the employee gains new knowledge or experience and will not be limited by their grade. Employees or their supervisors will advise the responsible engineer when they feel an employee's job approval limit should be changed between reviews.

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- (4) NRCS professional engineers registered in Hawaii, Guam or CNMI will be delegated EJAA Class IV. Job approval above Class IV will be based on the person’s training, experience, and demonstrated competence.
- (5) In general, EJAA will be delegated as noted below:

Delegee	Delegated by
State Office Engineers, Area Engineers All Field Staff	State Conservation Engineer Area Engineer

The employee’s supervisor must concur with the delegation of their EJAA. In the case where the delegating engineer is also the supervisor, he or she will sign the PIA-ENG-1 as both the responsible engineer and the employee supervisor. The original EJAA document will be given to the employee and copies will be sent to the responsible engineer, the employee’s supervisor and the State Conservation Engineer.

- E. Documentation of Design Review and Engineering Job Approval
 All plans and drawings that have not been given final approval will be watermarked "PRELIMINARY – Not for Construction" when released to cooperators, or other non-NRCS personnel. Technical approval shall be indicated by the following statements located on the first sheet of the design package:

Approved by: _____ (Signature) Date: _____
 Practice Code: _____ Engineering Class: _____

PIA501.5 Engineering Job Review

A. Design Reviews

- (1) Design reviews for Class I – V practices will be determined by the Area Engineer.
- (2) The following shall be independently checked according to NEM 511.5, A:
 - (i) Any practice which, in the event of failure, could pose a threat to human safety
 - (ii) Class V designs falling into any of the following categories:
 - 1. Roofs and Covers
 - 2. Water control structures
 - 3. Embankments

B. Post Reviews

- (1) The following will constitute post reviews:
 - (i) Spot checking – The State Conservation Engineer will conduct spot checks in accordance with General Manual 450-407.
 - (ii) Field Office Quality Assurance Reviews – The State Conservation Engineer will review a sample of completed engineering projects as part of all field office quality assurance reviews.

PIA501.7 Engineering Job Approval Authority

See attached EJAA chart, PIA-ENG-1.

PACIFIC ISLANDS AREA ENGINEERING JOB APPROVAL AUTHORITY

Employee Name: John Doe Title: Soil Con Tech GS - 7

Delegated by: _____ Date: _____

Title: _____ *Signature - Responsible Engineer*

Concurred by: _____ Date: _____

Title: _____ *Signature - Employee Supervisor*

Received/reviewed by: _____ Date: _____ ** EJAA must be reviewed annually for those in their present position less than 3 years, and at least every 3 years for all others.*

Signature - Employee

DEFINITIONS OF MAXIMUM APPROVAL LIMITS:

Inventory and Evaluation (I&E) – Onsite review of an exploratory nature and preparation of sound engineering alternative solutions of sufficient scope and intensity for the landowner to make treatment decisions. I&E may require assistance from engineers with higher engineering job approval authority for large or Design – Designing and checking all aspects of supporting data, drawings, and specifications to ensure that the planned practice will meet the purpose for which it is installed. Also includes determining and setting any specific requirements for the site conditions.

Construction – Includes survey construction layout, inspections of construction materials, and construction inspection including performing required tests to determine that the job meets the requirements of the plans and specifications.

Standard Designs – Standard designs are developed to function satisfactorily based on a set of design parameters. The person responsible for design and approval shall verify that the standard design is adaptable to the site and the design limitations are not exceeded.

Hazard Class – All practices are limited to LOW hazard class, NEM Part 501.7C. The hazard classification of a dam is determined by the potential hazard from failure, not the criteria. Refer to NEM 520.21 for a more detailed explanation.

NOTES:

1/ Approval of engineering work within the limits of the engineering job approval authority places the full responsibility on the individual for planning, design, construction layout, and certification of the practice. Any engineering practice may involve complexities, such as geology or hydrology, with which the employee may be unfamiliar. Employees shall request assistance when complexities are encountered which exceed their expertise. The individual approving the engineering design, plans and specifications must be satisfied that (1) adequate field investigations have been performed; (2) the plans conform to NRCS standards and policy; (3) the layout is suitable; and (4) installations, if constructed in accordance with the plans and specifications, will function properly. The cover sheet of the plans shall clearly display the engineering job class. Each sheet of the engineering plans shall be signed and dated by the person approving the engineering plans. Refer to NEM Part 501 for additional details.

2/ NRCS assistance in the PIA cannot be provided where erosion is caused by wave action on the open and unprotected shores of the ocean fronts, NEM Part 501.51.

3/ For Irrigation Water Management (Code 449) and Waste Recycling (Code 633), requirements for implementation would often be included as O&M for the design of the system bringing water or nutrients to the plants. These can be annual practices and can be performed independent of an irrigation or waste transfer system installation. After one-time planning and design, certification authority for annual implementation is governed by the "construction" EJAA column.

4/ Effective height of dam is the difference in elevation in feet between the lowest open channel auxiliary spillway crest and the lowest point in the original profile along the centerline of the dam. If there is no open channel auxiliary spillway, the top of the dam becomes the upper limit.

5/ Total head is measured from the crest of the auxiliary spillway to the elevation at the centerline of the pipe outlet.

6/ Not Allowed for Any Practice: 1) Embankments or structures over active faults, 2) Altering the visual resources of beaches or shorelines on oceans.

Code	Practice Name	Controlling Factors	Units	Engineering Job Class					Approval Limits		
				I	II	III	IV	V	I&E	Des	Cons
--	Cooperator Assistance	Government Agencies	--	Town	County	State	Country	All			
560	Access Road	Refer to Dams & Structures Section	----	----	----	----	----	----			
560	Access Road	Surface Treatment	Material	Soil	Gravel	Asphalt	Concrete	All			
560	Access Road	Length of Road	Feet	300	1,000	5,000	10,000	All			
560	Access Road	Maximum Grade	%	3	6	10	15	All			
309	Agrichemical Handling Facility	Tank Storage Volume	Gallons	250	500	1,000	2,500	5,000			
366	Anaerobic Digester	Liquid Volume	CF	100	200	400	1,000	All			
366	Anaerobic Digester	Animal Unit (1000 lb)	AU	2	5	10	20	All			
316	Animal Mortality Facility	Design Capacity	CF	100	1,000	3,000	5,000	All			
575	Animal Trails and Walkways	Surface Treatment	Material	Soil	Gravel	Asphalt	Concrete	All			
575	Animal Trails and Walkways	Length of Trail	Feet	100	500	2,000	5,000	All			
397	Aquaculture Ponds	Refer to Dams & Structures Section	----	----	----	----	----	----			
397	Aquaculture Ponds	Surface Area	Acres	1	3	5	10	20			
584	Channel Bed Stabilization	Design Capacity	CFS	200	400	600	800	1,000			
584	Channel Bed Stabilization	Design Velocity	F/S	2	4	6	8	10			
326	Clearing & Snagging	Length of Reach	Feet	200	500	1,000	2,000	All			
326	Clearing & Snagging	Low Bank Channel Depth	Feet	3	6	9	12	All			
372	Combustion system Improvement	Power	kW	1	5	15	50	100			
317	Composting Facility	Design Capacity	CF	100	1,000	3,000	5,000	All			
656	Constructed Wetlands	Refer to Dams & Structures Section	----	----	----	----	----	----			
656	Constructed Wetlands	Area	Acres	1	2	3	5	All			
402	Dam	Refer to Dams & Structures Section	----	----	----	----	----	----			
356	Dike (Hazard Class III Only)	Water Height	Feet	2	4	6	8	12			
362	Diversion	Capacity	CFS	25	100	300	500	All			
362	Diversion	Drainage Area	Acres	5	20	40	100	All			
374	Farmstead Energy Improvement	Pre-Audit Peak Monthly Energy Use	kW-h	5,000	10,000	25,000	50,000	All			
410	Grade Stabilization Structure	Refer to Dams & Structures Section	----	----	----	----	----	----			
412	Grassed Waterway	Capacity	CFS	20	50	100	300	All			
561	Heavy Use Area Protection	Area Treated	SF	250	1,000	2,500	10,000	All			
561	Heavy Use Area Protection	Surface Treatment	Material	Gravel	Asphalt	Concrete	Pavers	All			
423	Hillside Ditch	Total Length of System	Feet	100	500	1,000	3,000	All			
464	Irrigation Land Leveling	Irrigated Area	Acres	1	5	10	50	All			
430	Irrigation Pipeline	Capacity (All Pressures)	GPM	50	250	750	2,000	3,500			
436	Irrigation Reservoir	Refer to Dams & Structures Section	----	----	----	----	----	----			
436	Irrigation Reservoir	Storage Capacity	Gallons	5,000	25,000	200,000	1,000,000	5,000,000			
441	Irrigation System, Microirrigation	Area Served	Acres	1	5	20	50	All			
441	Irrigation System, Microirrigation	Slope	%	3	6	9	12	All			
442	Irrigation System, Sprinkler	System Area	Acres	5	20	50	100	All			
442	Irrigation System, Sprinkler	Slope	%	3	6	9	12	All			
449	Irrigation Water Management ^{3/}	Area Irrigated	Acres	1	10	40	160	All			
460	Land Clearing	Area Treated	Acres	1	5	20	50	All			
466	Land Smoothing	Area Treated	Acres	1	5	20	50	All			

Code	Practice Name	Controlling Factors	Units	Engineering Job Class					Approval Limits		
				I	II	III	IV	V	I&E	Des	Cons
453	Landslide Treatment	Area	Acres	0.2	0.4	0.6	0.8	1			
453	Landslide Treatment	Depth	Feet	2	4	6	8	10			
453	Landslide Treatment	Slope	%	10	20	30	40	50			
670	Lighting System Improvement	Power	Watts	500	1,500	3,000	6,000	All			
468	Lined Waterway or Outlet	Design Capacity	CFS	10	50	200	500	All			
590	Nutrient Management	Area Treated	Acres	1	5	10	25	All			
500	Obstruction Removal	Moderate to High	Acres	0.25	1	5	10	All			
582	Open Channel	Capacity	CFS	50	200	350	750	1,000			
582	Open Channel	Velocity	F/S	4	5	6	8	10			
516	Livestock Pipeline	Length	Feet	1,000	2,000	5,000	15,000	All			
516	Livestock Pipeline	Inside Diameter	Inch	0.5	1	2	4	All			
516	Livestock Pipeline	Operating Pressure	PSI	50	100	150	225	300			
378	Pond	Refer to Dams & Structures Section	-----	-----	-----	-----	-----	-----			
521	Pond Sealing/Lining, Geo/Clay Mem	Area Treated	Acres	0.25	0.5	1	3	All			
462	Precision Land Forming	Area Treated	Acres	0.5	5	20	50	All			
533	Pumping Plant	Axial Flow Pump Capacity	GPM	500	2,500	10,000	30,000	50,000			
533	Pumping Plant	Centrifugal & Turbine Pump Capacity	GPM	50	200	500	1,500	3,500			
533	Pumping Plant	Centrifugal Pump Static Head	Feet	50	100	200	250	350			
533	Pumping Plant	Turbine Pump Static Head	Feet	50	100	200	300	500			
555	Rock Barrier	Area Treated	Acres	0.25	1	5	10	All			
558	Roof Runoff Structure	Roof Area	SF	500	2,000	5,000	10,000	All			
367	Roofs and Covers	Roof Area	SF	100	2,500	5,000	10,000	All			
557	Row Arrangement	Area Treated	Acres	0.5	1	5	10	All			
350	Sediment Basin	Refer to Dams & Structures Section	-----	-----	-----	-----	-----	-----			
574	Spring Development	Capacity	GPH	2	5	10	20	All			
578	Stream Crossing	Refer to Dams & Structures Section	-----	-----	-----	-----	-----	-----			
578	Stream Crossing	Bankfull Flow	CFS	25	50	100	300	All			
578	Stream Crossing	Ford	Material	Concrete	Grout Rk	Rock	Geocell	All			
580	Streambank & Shoreline Protection	Bankfull Capacity	CFS	100	500	1,000	2,000	5,000			
580	Streambank & Shoreline Protection	Bankfull Velocity	F/S	4	5	6	8	10			
580	Streambank & Shoreline Protection	Water Height Above Shoreline	Feet	1	1.5	2	2.5	3			
587	Structure for Water Control	Refer to Dams & Structures Section	-----	-----	-----	-----	-----	-----			
607	Surface Drainage, Field Ditch	Area Drained	Acres	2	5	10	40	All			
608	Surface Drainage, Main or Lateral	Design Capacity	CFS	20	100	200	500	1000			
608	Surface Drainage, Main or Lateral	Design Velocity	F/S	4	5	6	8	10			
600	Terrace	Drainage Area of System	Acres	1	5	10	50	All			
600	Terrace	Storage Type - Channel Depth	Feet	1	2	3	5	All			
600	Terrace	Gradient Type - Discharge	CFS	10	25	50	100	All			
568	Trails and Walkways	Length	Feet	100	500	2,000	5,000	All			
620	Underground Outlet	Pipe Diameter	Inch	6	12	18	24	All			
635	Vegetated Treatment Area	Area of VTA	SF	1,000	2,000	5,000	10,000	All			
633	Waste Recycling ^{3/}	Area Treatment	Acres	5	10	20	30	All			

Code	Practice Name	Controlling Factors	Units	Engineering Job Class					Approval Limits		
				I	II	III	IV	V	I&E	Des	Cons
632	Waste Separation Facility	Settling Area	SF	100	500	2,000	10,000	All			
313	Waste Storage Facility	Refer to Dams & Structures Section	----	----	----	----	----	----			
313	Waste Storage Facility	Storage Capacity	CF	200	2,000	20,000	200,000	2,000,000			
634	Waste Transfer	Refer to Dams & Structures Section	----	----	----	----	----	----			
634	Waste Transfer	Capacity	GPM	100	250	400	600	All			
634	Waste Transfer	Capacity	CF	500	1,000	20,000	50,000	All			
629	Waste Treatment	Animal Unit (1000 lb)	AU	1	10	100	500	All			
359	Waste Treatment Lagoon	Refer to Dams & Structures Section	----	----	----	----	----	----			
359	Waste Treatment Lagoon	Aerobic - Surface Area	Acres	0.25	1	5	10	25			
359	Waste Treatment Lagoon	Anaerobic - Volume	MGal	0.01	1	2	5	14			
900	Water Facility, Solar Distiller	Total System Capacity	Gal/D	5	15	25	40	All			
636	Water Harvesting Catchment	Refer to Dams & Structures Section	----	----	----	----	----	----			
636	Water Harvesting Catchment	Catchment Area	SF	2,000	10,000	50,000	100,000	All			
636	Water Harvesting Catchment	Storage Volume	Gallons	750	4,000	20,000	40,000	All			
638	Water & Sediment Control Basin	Fill Height	Feet	3	6	9	12	15			
638	Water & Sediment Control Basin	Drainage Area	Acres	1	5	10	20	All			
614	Watering Facility	Capacity	Gallons	500	3,000	15,000	25,000	All			
658	Wetland Creation	Refer to Dams & Structures Section	----	----	----	----	----	----			
658	Wetland Creation	Area	Acres	1	2	3	5	All			
659	Wetland Enhancement	Refer to Dams & Structures Section	----	----	----	----	----	----			
659	Wetland Enhancement	Area	Acres	1	2	3	5	All			
657	Wetland Restoration	Refer to Dams & Structures Section	----	----	----	----	----	----			
657	Wetland Restoration	Area	Acres	1	2	3	5	All			
----- DAMS & STRUCTURES -----											
	Embankments	Drainage Area	sq mi	50	200	2,000	5,000	20			
	Embankments	Effective Height ^{4/}	Feet	5	10	15	25	35			
	Embankments	Storage Volume	Gallons	5,000	25,000	200,000	1,000,000	5,000,000			
	Embankments	Over Active Fault	-	None	None	None	None	None			
	Open Channel Spillways	Design Capacity	CFS	50	200	350	750	1,000			
	Open Channel Spillways	Velocity	F/S	4	6	8	10	12			
	Permanent Pool	Volume	Ac-Feet	3	5	50	100	All			
	Conduits, All Materials	Circular Pipe Inside Diameter	Inch	8	15	24	36	48			
	Conduits, All Materials	Box Culvert Opening Area	SF	2.5	4	9	13	16			
	Conduits, All Materials	Design Capacity	CFS	10	50	100	300	All			
	Conduits, All Materials	Total Head ^{5/}	Feet	5	10	20	30	40			
	Drop & Chute Structures	Net Drop	Feet	3	6	9	12	15			
	Drop & Chute Structures	Weir Capacity	CFS	50	100	200	300	500			
	Drop & Chute Structures	Weir Depth	Feet	1	1.5	2	2.5	4			
	Concrete or CMU Tanks	Std Des-Tank Span Above Ground	Feet	6	10	14	16	All			
	Concrete or CMU Tanks	Std Des-Tank Span Below Ground	Feet	6	10	14	16	All			
	Concrete or CMU Tanks	Non-Standard Design Volume	CF	5,000	10,000	25,000	50,000	All			