

JUL 19 1988

B. NO. 82
FA. NO. 1-1

THE STATE DEPARTMENT OF HIGHWAYS
DIVISION OF HIGHWAYS - STATE OF COLORADO DENVER COLORADO
PROJECT IR 70-3(162) SUBACCOUNT 86153
LOCATED ON I. 70 AT EISENHOWER TUNNEL EAST AND WEST
VENTILATION BUILDINGS
SUMMIT AND CLEAR CREEK COUNTIES
CONSISTING OF UPDATING ELECTRICAL EQUIPMENT WHICH
INCLUDES REPLACING AND DISPOSING OF EXISTING
ELECTRICAL EQUIPMENT CONTAINING PCB
COMPLETION BY MAY 25, 1989
JULY 14, 1988 10:15 AM

DISTRICT 1

MOUNTAINOUS TERRAIN

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	ENGINEERS ESTIMATE	UNIT PRICE	AMOUNT	AVERAGE OF 1 LOW BIDS	UNIT PRICE	AMOUNT	786A WESTINGHOUSE ELEC. GATEWAY CENTR 11 STAN PITTSBURGH, PENN.	UNIT PRICE	AMOUNT
202000500	REM PCB	L S	1.00	300000.0000	300000.00	300000.00	108000.0000	108000.00	108000.00	108000.0000	108000.00	108000.00
613503500	POWER TRANSFORMER	L S	1.00	400000.0000	400000.00	400000.00	482000.0000	482000.00	482000.00	482000.0000	482000.00	482000.00
626000000	MOBILIZATION	L S	1.00	60000.0000	60000.00	60000.00	139556.0000	139556.00	139556.00	139556.0000	139556.00	139556.00
	TOTALS				760000.00	760000.00		729556.00	729556.00		729556.00	729556.00
	INDEX				100.00	100.00		95.99	95.99		95.99	95.99

AWARD SET

JUL 19 1988

DATE JUNE 20, 1988 PROJECT NO. IR 70-3(162)

**THIS IS A COMPLETE
REPRINTING FOR THE ABOVE
PROJECT:**

PLANS SPECS
 SCHEDULE ESTIMATE

**DESTROY
CORRESPONDING
DOCUMENTS
PREVIOUSLY
RECEIVED**

June 20, 1988

STATE DEPARTMENT OF HIGHWAYS
DIVISION OF HIGHWAYS - STATE OF COLORADO
SPECIAL PROVISIONS
COLORADO PROJECT NO. IR 70-3(162)
EISENHOWER TUNNEL POWER SUPPLY

The following Special Provisions take precedence over Standard Specifications, Supplemental Specifications and Plans, and modify or supplement the Standard Specifications for Road and Bridge Construction, dated 1986, which is used to control construction of this project.

REQUIRED PROVISIONS ON FEDERAL-AID CONTRACTS-Form FHWA 1273 Rev. 10-87

PROJECT SPECIAL PROVISIONS

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STATE DEPARTMENT OF HIGHWAYS
DIVISION OF HIGHWAYS - STATE OF COLORADO
SPECIAL PROVISIONS
COLORADO PROJECT NO. IR 70-3(162)
EISENHOWER TUNNEL POWER SUPPLY

STANDARD SPECIAL PROVISIONS

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Revision of Section 102-Material Guaranty	(Sept. 8, 1986)	1
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Revision of Section 108-Liquidated Damages	(Feb. 19, 1988)	1
Revision of Section 109-Equipment Rental Rates	(April 29, 1988)	1
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Minimum Wages Colorado, U.S. Department of Labor Decision No. CO88-1, Mod. 2, Heavy and Highway Construction, Statewide	(June 24, 1988)	8
Miscellaneous Contract Requirements	(Sept. 8, 1986)	1

June 20, 1988

NOTICE TO BIDDERS
COLORADO PROJECT NO. IR 70-3(162)

The proposal guaranty shall be a certified check, cashier's check, or bid bond in the amount of 5 percent of the Contractor's total bid.

Pursuant to Subsection 102.05, it is recommended that bidders on this project review the work site and plan details with an authorized Division representative. Prospective bidders shall contact one of the following listed authorized Division representatives at least 12 hours in advance of the time they wish to go over the project.

- Construction Engineer - Rick Yowell
Aurora, Colorado
Office Phone: 757-9654
- Resident Engineer - Wes Goff
Frisco, Colorado
Office Phone: 463-0367 Summit County
569-3291 Clear Creek County
Home Phone: 668-3583
- Project Engineer - As designated by the Resident Engineer

The above referenced individuals are the only representatives of the Division with authority to provide any information, clarification, or interpretation regarding the plans, specifications, and any other contract documents or requirements. Contact with any other employee of the Division regarding this project is not authorized. Any information obtained from other than authorized Division representatives shall be considered invalid in the preparation of a proposal for this project.

June 20, 1988

COMMENCEMENT AND COMPLETION OF WORK
COLORADO PROJECT NO. IR 70-3(162)

The Contractor shall commence work under his contract on or before the 20th day following the date of award unless such time for beginning the work is changed by the Chief Engineer in the "Notice to Proceed." The Contractor shall complete all work by May 25, 1989, in accordance with the "Notice to Proceed."

The Contractor shall have the ventilation building roofs sealed from the weather by September 5, 1988, unless otherwise approved in writing by the Engineer.

The Contractor shall perform work which would require removing one or more transformers from service only during the periods of September 6, 1988, through October 31, 1988, and April 3, 1989, through May 25, 1989.

The Contractor's Progress Schedule shall reflect those items shown on the CPM's which are included in the plans.

June 20, 1988

CONTRACT GOALS
COLORADO PROJECT NO. IR 70-3(162)

The Division has determined that Disadvantaged Business Enterprises (DBEs) will participate by contracting for a part of the work of this contract. Contract goals, for participation in this contract by MBEs certified by the Department, have been established as follows:

DBE 0 Percent

The percentages will be calculated from proposals received for this project according to the following formula:

$$\text{Percentage} = 100 \times \frac{\text{*Dollar amount of work to be contracted to MBEs}}{\text{Total dollar amount of the original contract amount}}$$

*Based on DBE contract unit prices rather than prime contract unit prices.

INCENTIVE PAYMENT

An incentive payment will be made to the Contractor for work that is contracted to DBEs in accordance with the following:

- (1) To be eligible for incentive payment, the Contractor shall have contracted work to DBEs equal or greater than the contract goal. The dollar amount of the work contracted to DBEs will be the actual contract dollar totals reported to the Division on DOH Form No. 713. Only contracted work that complies with (d) Counting DBE Participation Toward Goals of the Standard Special Provision titled "Disadvantaged Business Enterprise Definitions and Requirements" will be counted toward the contract goal.
- (2) Incentive payment will be equal to 10 percent of that portion of the actual dollar payment made to DBEs that exceeds the dollar amount obtained by multiplying the contract goal percentage for DBE by the original prime contract amount.
- (3) Incentive payment will be included in the final payment to the Contractor. However, before the incentive payment is made, the Contractor shall certify the dollar amount of payment(s) to DBEs on DOH Form No. 17. This certification shall include a co-signature by each DBE and may be audited by the Division.
- (4) The total value of incentive payment will not exceed \$21,000.

June 20, 1988

REVISION OF SECTION 101
DEFINITIONS AND TERMS
COLORADO PROJECT NO. IR 70-3(162)

Section 101 of the Standard Specifications is hereby revised for this project as follows:

In Subsection 101.01 add the following:

- EPA - Environmental Protection Agency
- OSHA - Occupational Safety and Health Administration
- RCRA - Resource Conservation and Recovery Act
- DOT - Department of Transportation
- PCB - Poly Chlorinated Biphenyl
- ICEA - Insulated Cable Engineers Association

All abbreviations or terminology used in the National Electrical Code or commonly used by the National Electrical Manufacturers Association are incorporated in these specifications by reference.

June 20, 1988

REVISION OF SECTION 102
BIDDING REQUIREMENTS AND CONDITIONS
COLORADO PROJECT NO. IR 70-3(162)

Section 102 of the Standard Specifications is hereby revised for this project as follows:

In Subsection 102.03 delete paragraph (a) and replace with the following:

- (a) Lack of experience in the handling of 2000 KVA or larger transformers and also in the handling of PCB materials, adequate machinery, plant and other equipment, as revealed in the financial statement and experience questionnaires required under Subsection 102.01.

June 20, 1988

REVISION OF SECTION 107
LIABILITY INSURANCE
COLORADO PROJECT NO. IR 70-3(162)

Section 107 of the Standard Specifications is hereby revised for this project as follows:

In Subsection 107.15 delete the second paragraph and replace with the following:

The Contractor shall procure and maintain at the Contractor's own expense, until final acceptance by the Engineer of the work covered by the contract, insurance for liability for damages imposed by law, of the kinds and in the amounts herein provided, with insurance companies authorized to do business in the State, covering all operations under the contract, shall furnish certificates of insurance which shall be attached to and made a part of the contract, in the form satisfactory to the Division, showing compliance with this subsection and which certify that the policies will not be changed or cancelled until thirty days written notice has been given to the Division.

The types and minimum limits of insurance are as follows:

- (1) Workers Compensation Insurance in accordance with prevailing laws
- (2) Environmental Impairment Expense \$5,000,000 per occurrence, \$10,000,000 Aggregate and covering sudden and accidental spills of hazardous waste material
- (3) Comprehensive General Liability \$5,000,000 Combined Single Limit Bodily Injury and Property Damage
- (4) Automobile Liability \$500,000 Combined Single Limit Bodily Injury and Property Damage

June 20, 1988

REVISION OF SECTION 107
LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC
COLORADO PROJECT NO. IR 70-3(162)

Section 107 of the Standard specifications is hereby revised for this project as follows:

In Subsection 107.01, add the following:

The requirements, regulations, and standards established by the following agencies or documents shall be strictly adhered to by the Contractor. Nothing in these specifications is to be construed as permitting work not conforming to the requirements of these agencies or documents.

EPA - Environmental Protection Agency

OSHA - Occupational Safety and Health Administration

NEC - National Electrical Code

NEMA - National Electrical Manufacturers Association

RCRA - Resource Conservation and Recovery Act

TSCA - Toxic Substances and Control Act

DOT - Department of Transportation

All other applicable federal, state, county and city codes, standards and regulations

The Contractor is cautioned that he is responsible for ascertaining the extent to which the requirements of these agencies or documents affect the operations resulting from these specifications and to comply therewith.

In Subsection 107.02 add the following:

The Contractor shall obtain or arrange for all hazardous waste permits for disposal and transportation of the materials covered by these specifications. The Contractor shall prepare and provide hazardous waste shipping manifests to the Engineer.

June 20, 1988

REVISION OF SECTION 108
PROSECUTION AND PROGRESS
COLORADO PROJECT NO. IR 70-3(162)

Section 108 of the Standard Specifications is hereby revised for this project as follows:

In Subsection 108.05 add the following:

The Contractor shall provide the services of a qualified PCB Service Supervisor and shall provide documentation of experience and training listed below.

All PCB related work, including draining, flushing, pumping, and handling of PCB items of fluids of any type, shall be under the direct supervision of a qualified PCB Services Supervisor. No movement or handling of PCB fluids, solids, or other PCB items or material shall take place unless so directed by the PCB Supervisor.

The qualifications of the PCB Supervisor shall include but are not limited to the following:

Prior attendance at and satisfactory completion of an examination following a documented formalized training course on regulations and procedures for handling, marking, transportation, disposal, spill prevention, cleanup, safety precautions, and testing of PCB items.

Minimum of two years experience working for a transformer manufacturer in areas of installation, repair, maintenance, testing, high voltage electrical safety, or other servicing of transformers and other electrical equipment, including work involving the successful removal and disposal of PCB transformers and fluids.

Training in and awareness of obligations and responsibilities for the protection of people, property, and environment from hazardous waste exposure or contamination.

A field representative trained by a transformer manufacturer shall be present during all on-site work involving movement or servicing of the PCB transformers to provide advice and counsel should problems arise.

A field representative trained by a transformer manufacturer shall be present during installation of the new transformers to provide advice and counsel. In addition, he shall perform all required on-site testing.

June 20, 1988

REVISION OF SECTION 202
REMOVAL AND DISPOSAL OF PCB'S
COLORADO PROJECT NO. IR 70-3(162)

Section 202 of the Standard Specifications is hereby revised for this project as follows:

Subsection 202.08 through Subsection 202.23 are hereby added to the Standard Specifications for this project as follows:

DESCRIPTION

202.08 These specifications cover the requirements for removal, servicing, disposal, and replacement of PCB items, PCB articles, PCB transformers, and/or PCB contaminated electrical equipment.

MATERIALS

202.09 Unless otherwise indicated, the materials to be furnished under this specification shall be standard products of manufacturers regularly engaged in the production of such equipment, ~~equal to or superior to material specified,~~ and shall be the manufacturer's latest standard design that complies with the specification requirements.

All materials shall meet or exceed the specifications and drawings set forth in these material and product specifications. The Contractor shall provide ~~all necessary documentation to substantiate that the material and products meet or exceed the specification for consideration by the Engineer.~~

All electrical components and materials, as well as the installation of all electrical components and materials, shall be ~~warranted for a period common in the industry or six months, whichever is greater.~~ The warranty period shall commence at the date of acceptance by the Engineer.

All containers used for the storage and/or transporting of PCB solids or liquids shall be as specified by EPA regulations.

Solvents and cleaners shall be xylene, toluene, kerosene, or other fluids recognized for their high degree of PCB solubility and shall be as allowed by EPA regulations.

Acceptable sorbents shall include granular material, powdered clay, imbibers, blankers/pillows of non-woven fiber, amorphous inorganic foam particle pillows, or approved equal.

Pumps shall be equipped with an automatic shutoff device sensing drum level and an electrical shutoff controllable by the operator while filling the drum.

Pumps shall restrict flow to a rate of 16 gallons per minute or less when pumping into drums. Pumps shall have an adjustable pressure bypass set to a maximum pressure of 40 psi.

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REVISION OF SECTION 202
REMOVAL AND DISPOSAL OF PCB'S
COLORADO PROJECT NO. IR 70-3(162)

Hoses shall be compatible with the material to be pumped and shall be reinforced construction, rated at 120 psi or greater.

Quick shutoff valves shall be installed on the transformer tank during draining and shall be a 90° ball valve.

CONSTRUCTION REQUIREMENTS

202.10 PROJECT ORGANIZATION. The Contractor shall appoint a Superintendent as required by Section 105.05 of the Standard Specifications and identify the individual prior to commencing work. The Superintendent shall be responsible for coordination of all work covered by this bid. Typical Superintendent resumes shall be included with the Contractor's proposal.

The Contractor shall submit with his bid a project organizational chart showing interrelationships of each position in the Contractor's organization and how each position relates to the others in the performance of PCB work.

If subcontractors are to be used, the organizational chart shall show the interrelationships of all subcontractors.

The Contractor shall be fully responsible for all work performed as covered by this specification, including work performed by subcontractors if such are employed.

The Contractor shall submit with his bid an experience list itemizing the Contractor's experience with similar PCB projects.

If subcontractors are to be used, an experience list shall also be submitted itemizing the Contractor's experience using the proposed subcontractors for similar PCB projects.

A listing of all proposed subcontractors shall be submitted with the bid. The list shall include all firms involved with servicing, handling, transporting, storing, and disposing of the PCB liquids and solids covered by this specification.

202.11 SCOPE OF WORK INVOLVING PCB FLUIDS.

- (a) The Contractor shall provide all labor, material, and equipment required for removal, servicing, disposal, and replacement of the following items:
- (b) Removal and disposal of 8 transformers containing PCB fluids, 99 capacitors containing PCB fluids.

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REVISION OF SECTION 202
REMOVAL AND DISPOSAL OF PCB'S
COLORADO PROJECT NO. IR 70-3(162)

Description of Transformers:

Location: Eisenhower Tunnel, West and East Buildings,
Electrical Equipment Rooms

Manufacturer: General Electrical Co.

Serial Numbers, (4): H 884991A-B, C & D

KVA Rating: 2000/2300 OA/FA

Fluid Type: Pyranol (PCB)

Voltage: 24900-2400Y/1385

Approx. Weight (Full): 12,750#

Gallons of Fluid: 390

Approx. Dimensions: 62" W x 89" D x 90" H

Accessories: Fans

Description of Transformers

Location: Eisenhower Tunnel, West and East Buildings,
Electrical Equipment Rooms

Manufacturer: General Electric Co.

Serial Numbers (4): F 964816A,B,C & D

KVA Rating: 2000 OA, 55°C, 2240 OA, 65°C

Fluid Type: Pyranol (PCB)

Voltage: 24900-460Y/266

Approx. Weight (Full): 22,700#

Gallons of Fluid: 760 in Tank, 50 in H.V. Terminal Box

Approx. Dimensions: 120" W x 71" D x 117" H

Accessories: H.V. Terminal Box filled with PCB

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REVISION OF SECTION 202
REMOVAL AND DISPOSAL OF PCB'S
COLORADO PROJECT NO. IR 70-3(162)

Description of Capacitors

Location: Eisenhower Tunnel, West and East Buildings,
Fan Room Floors at 440 Volt Motors

Manufacturer: General Electric Co.

Catalog Number: IV 37F608G2

KVAR Rating: 300/250T, 480V, 60 hz
3 single phase, Delta

Connection Diagram: 161 C 5261

Fluid Type: Pyranol (PCB)

Individual Units: Five in each enclosure,
rated 50 KVAR, Cat. #55F347AC

Total Number 50 KVAR Units
+ 7 spares: $16 \times 5 = 80 + 7 = 87$

Description of Capacitors

Location: Eisenhower Tunnel, West and East Buildings,
Electrical Equipment Rooms on top of 2.3
KV voltage starters

Manufacturer: General Electric Co.

Catalog Number: 57 F 20615

KVAR Rating: 75 KVAR

Fluid Type: Pyranol (PCB)

Individual Units: 12

Total Number: $16 \times 5 + 7 + 12 = 99$

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REVISION OF SECTION 202
REMOVAL AND DISPOSAL OF PCB'S
COLORADO PROJECT NO. IR 70-3(162)

- (c) The Contractor shall examine the equipment to be removed and familiarize himself with all conditions (including actual capacitor dimensions and transformer dimensions, weights, gallons of fluid, and containment wall and other structures) which may affect his work. Failure to do so shall not lessen his responsibility or entitle him to additional compensation for work not included in his estimate.

Furnish and install eight transformers in place of existing transformers. Furnish and install eighty 50 KVAR capacitor units.

Replacement transformers and other materials shall be in accordance with Section 613 of these specifications and accompanying drawings.

- (d) In addition to paragraph (c), the work, in general, includes but is not limited to the following tasks:

Pumping of PCB fluids from existing transformers into EPA specified containers shall be performed at the legally permitted servicing facility. No PCB fluids shall be pumped from the transformers at the site or on CDOH property. PCB fluids shall be transported still fully contained within the transformer housings. The legally permitted servicing facility shall be located within 100 highway miles of the Eisenhower Tunnel.

Spill cleanup if spills occur. This shall be performed according to Federal Register/Vol. 52, No. 63/Thursday, April 2, 1987/Rules and Regulations as amended.

All PCB solids, liquids, and/or PCB-contaminated items which are part of or result from the work activity shall be placed in EPA specified containers and disposed of properly.

Marking, labeling, and manifesting of all PCB articles, items, and containers.

Transportation of all PCB articles, items, and containers to approved disposal and/or servicing facilities meeting all regulatory requirements.

Flushing of all PCB Transformers in accordance with EPA regulations including draining of flush mixtures into EPA specified containers.

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REVISION OF SECTION 202
REMOVAL AND DISPOSAL OF PCB'S
COLORADO PROJECT NO. IR 70-3(162)

Disposal of all PCB items in accordance with federal, state, and local regulations.

Labeling and record keeping in accordance with all applicable laws and regulations.

- (e) The on-site work covered by this specification shall be performed according to the CPM drawing schedules shown on the plans.

All work requiring an electrical outage shall be performed during specific outage periods as identified on the CPM drawing.

All complete outages shall be scheduled with the Engineer and shall only be performed during the hours 10 PM to 6AM each day Sunday night through Friday morning.

CDOH personnel will operate and disable all switchgear, motor controls, and power switching equipment as necessary for the work. At no time will the Contractor operate any of the above equipment himself.

202.12 FLUID HANDLING PRECAUTIONS. Prior to commencing any fluid handling operations, the work area shall be properly barricaded and identified.

All operators and personnel shall have donned protective clothing as described in subsection 202.18 (d).

Prior to commencing any pumping operations, secondary containment shall be provided around the drums to be filled. In addition, sorbents, in amounts adequate to absorb a multigallon spill, shall be placed within the work area.

Prior to commencing any PCB pumping operations, the integrity of the pumping equipment shall be confirmed by conducting test using nontoxic materials.

Two trained personnel from the Contractor Spill Prevention Control and Countermeasures Team shall be present and fully equipped during all pumping and handling of PCB fluids and equipment containing PCB fluids.

Drums shall not be filled in excess of 95 percent of capacity, to provide for expansion.

All liquid filled drums shall be loaded on the transport vehicle by using a hoist or lift truck utilizing a 2-point drum lifter.

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REVISION OF SECTION 202
REMOVAL AND DISPOSAL OF PCB'S
COLORADO PROJECT NO. IR 70-3(162)

All drums shall be labeled and capped immediately after filling in accordance with subsection 202.13 of this special provision.

202.13 CONTAINERIZATION AND MARKING. All liquids as a result of work activities and cleanup operations shall be placed in EPA specified containers.

All solids as sorbents, rags, disposable protective clothing, soils, and other incidentals shall be placed in EPA specified containers.

All drums and article containers where used shall be properly sealed, marked, labeled, and dated.

202.14 TRANSFORMER FLUSHING. Following removal of PCB fluids, transformers shall be filled with a suitable flush fluid and allowed to stand for a minimum of 18 hours before draining.

All flush fluids shall be acceptable by the EPA and upon removal from the transformer shall be placed in EPA specified containers.

Transformer flushing shall be performed at a legally permitted servicing facility complying with all governmental regulatory requirements. No transformer flushing shall be performed on-site at the Eisenhower Tunnel. The legally permitted servicing facility shall be located within 100 highway miles of the Eisenhower Tunnel.

202.15 TRANSPORTATION TO DISPOSAL/SERVICING FACILITIES. All drums, containers, capacitors and transformer carcasses shall be transported to a legally permitted servicing/storage facility and/or an EPA approved disposal facility. No PCB item, with the exception of properly decontaminated tools and pumping equipment used in the course of work activities, shall be transported elsewhere.

Prior to loading drums and other PCB fluid filled containers on the transport vehicle, the vehicle shall be properly prepared with secondary containment. In addition, transformer carcasses shall be wrapped in a nonabsorbent tarp.

All drums, containers, and transformer carcasses shall be secured to the transport vehicle to prevent movement in transport.

The Contractor or subcontractor shall be licensed for the transportation and hauling of extremely hazardous wastes, as required by the appropriate regulatory agencies or documents, including but not limited to those described in Section 107 of the specifications.

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REVISION OF SECTION 202
REMOVAL AND DISPOSAL OF PCB'S
COLORADO PROJECT NO. IR 70-3(162)

Driver of transportation vehicle shall be trained in the laws, rules, and regulations governing PCB's.

Vehicles used for the transportation of PCB items must be licensed, as required by Section 107 of these specifications for the transporting of extremely hazardous waste.

Vehicles used for the transportation of PCB items must be plainly marked as specified in EPA regulations.

The operators of the transport vehicles shall provide the Engineer with copies of all shipping manifests required by Section 107 of these specifications prior to any hazardous materials or wastes leaving the tunnel work site.

202.16 DISPOSAL. The Contractor shall provide all labor, materials, equipment, and services necessary for the disposal of all PCB fluids and solids removed and generated as part of this specification.

All disposals shall conform to 40 CFR Part 761, Subpart D, except as indicated herein.

Liquids other than mineral oil dielectric fluid containing a PCB concentration of 50 ppm or greater shall be disposed by an EPA approved incinerator. The incinerator shall be approved under the provisions of 40 CFR 761.70.

Fluids containing PCB concentrations of less than 50 ppm shall be disposed of by an approved procedure complying with EPA regulations and all the local, state, and federal regulations governing such disposal of refuse. Among other things, these fluids may not be used as a sealant, coating, dust control agent, road oiling agent, pesticide, herbicide carrier, or rust preventative on pipes.

PCB transformer carcasses shall be disposed of by either incineration or in an approved waste landfill that is approved by the EPA, provided the transformer is drained and flushed in accordance with EPA regulations.

PCB containers and PCB solids shall be disposed of in accordance with EPA regulations.

202.17 CLEANUP OF WORK AREA. After completion of on-site work, all hoses, pumps, drip pans, tools, and equipment used shall be decontaminated in accordance with applicable EPA regulations and properly secured.

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REVISION OF SECTION 202
REMOVAL AND DISPOSAL OF PCB'S
COLORADO PROJECT NO. IR 70-3(162)

Any contamination on the exterior surfaces of equipment to be moved which may contaminate the work area during performance of the work shall be removed prior to movement of the equipment.

All concrete (or other surfaces) which have come in contact with PCB's or PCB contaminated fluids in the course of the work shall be thoroughly scrubbed using a combination of sorbents, solvents, and cleaners. A swab test shall be performed by the Contractor at no additional expense to the CDOH. The Contractor shall provide the engineer with documentation of the results of the swab test substantiating that the PCB level is less than 10 micrograms per 100 square centimeters. The post cleanup sampling scheme shall be that delineated in EPA-560/5-85-026, "Verification of PCB Spill Cleanup by Sampling and Analysis."

All soils which have been contaminated as a result of work related activities shall be removed at the Contractor's expense.

202.18 SAFETY

- (a) The Contractor shall take all precautions and measures required to protect all employees and the general public from exposure to PCB solids, liquids, and vapors.

All personnel authorized for entry into the work area shall be instructed in proper procedures for high voltage electrical and PCB-related work.

- (b) A Spill Prevention Control and Countermeasure plan (SPCC) shall be developed. The plan shall include:

List of vehicles, equipment, and personnel to be used in accomplishing the work.

The emergency spill plan shall encompass all steps the Contractor will take in the event of a spill or other emergency.

Safety procedures shall cover all phases of operations, including but not limited to handling, loading, transporting, securing PCB loads, and first aid procedures.

A copy of the Contractor's SPCC plan shall be made available for inspection.

- (c) After removal of PCB and PCB contaminated fluids from transformers has begun, the work area shall not be left unattended until all fluids and solids which have come in contact with PCB's are properly sealed in EPA specified non-leaking drums and the work area is secured.

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REVISION OF SECTION 202
REMOVAL AND DISPOSAL OF PCB'S
COLORADO PROJECT NO. IR 70-3(162)

In general, PCB related activities shall be scheduled such that all PCB articles and items are transported to the servicing or storage facility as soon as the PCB and PCB contaminated fluid is removed and sealed in EPA specified containers as identified herein. In no event shall the PCB containers or empty PCB transformers be left at the servicing/storage facility longer than thirty days after removal of the PCB liquid.

Prior to commencing any PCB related work activities, barricades, roping, and warning signs shall be put in place to clearly identify and guard against unauthorized entry into the work area.

All equipment such as pumps, containers, etc., shall be confined to the work area until containers are sealed and equipment such as pumps are decontaminated in accordance with EPA regulations and properly secured for transport.

- (d) At all times when PCB or PCB contaminated fluids in any volume are not sealed in drums, containers, or electrical equipment, all workers shall wear protective clothing which shall include at a minimum:

disposable, nonporous gloves

disposable coveralls

disposable shoe covers

eye protection to insure that eyes are protected from liquid splatter or exposure to concentrated vapors or fumes

in confined areas breathing apparatus to provide protection from exposure to vapors or fumes

Upon exiting the work area, all disposable protective clothing shall be placed in EPA specified containers, sealed, and disposed of with other PCB solids.

- (e) The Contractor's personnel shall be properly trained in both high-voltage electrical and PCB procedures, laws, and regulations.

The Contractor shall certify to the Engineer in writing that all applicable employees have been trained in the handling of PCB's and working with high voltage equipment.

A copy of the Contractors training materials shall be made available for inspection.

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REVISION OF SECTION 202
REMOVAL AND DISPOSAL OF PCB'S
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202.19 QUALITY ASSURANCE. The Contractor shall provide written evidence that as a major part of his business the Contractor has been engaged in PCB related activities, including the pumping, draining, flushing, removal, spill cleanup, transportation, servicing, and storage of high and low concentrations of PCB fluids and solids.

The Contractor shall provide written proof of current licensing for the transportation and hauling of PCB fluids and solids.

The Contractor shall have a quality assurance plan covering all aspects of PCB work-related activities and shall make the plan available for review with the bid submittal.

The Contractor shall provide with his bid a copy of his contract with an incineration firm guaranteeing incineration of materials within time constraints required by EPA regulations.

202.20 RECORD KEEPING. Upon completion of all PCB work-related activities, the Contractor shall provide a complete record of such activities and storage data. The following information must be included in the documentation provided:

Name, telephone number, and location of firm involved in removal of PCB fluids from subject equipment

Name, telephone number, and location of firm responsible for handling and/or rigging of subject PCB equipment

Name, telephone number, and location of firm responsible for transportation of PCB fluids and solids

Name, telephone number, and location of firm responsible for servicing of transformers and/or other PCB containers

Name, telephone number, and location of firm(s) responsible for ultimate final disposal of transformer carcasses, drums of fluid, and other materials such as capacitors

Transformer data such as weight, manufacturer, serial number, date removed from service, date transported to servicing facility, date transformer transported to disposal facility

Drum size, type, weight, contents, and date transported to servicing and/or disposal facility

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Written certification that the items being disposed of were delivered to and accepted by the disposal facility. Certificate shall be signed by the person authorized by the disposal facility to accept PCB items for disposal.

202.21 RESPONSIBILITIES OF CDOH. CDOH will provide access to the equipment covered by this contract.

CDOH will schedule all outages, de-energize, and re-energize the electrical equipment on which work will be performed.

Unless otherwise specified herein, CDOH will be responsible for the adequacy of the design of the existing switchgear bus, etc., to withstand the ampacity and short-circuit duty of the new transformers.

CDOH will provide owner's EPA I.D. number and date the equipment was removed from service for EPA record keeping purposes.

CDOH shall provide the Contractor information pertaining to owner's safety practices and regulations affecting the equipment and work site.

Unless otherwise specified herein, CDOH shall be responsible for the cleanup and decontamination of the work areas necessitated by spills or other incidents occurring prior to start of Contractor's on-site work.

METHOD OF MEASUREMENT

202.22 Work will be measured in two stages. The first stage will measure the completion of removing PCB's and PCB contaminated materials and equipment from the site. The second stage will be determined to be complete when proof of disposal of the PCB's and PCB contaminated materials and equipment is submitted to the engineer.

BASIS OF PAYMENT

202.23 Payment will be made at the contract lump sum price for the removal and disposal of items listed in Subsection 202.11

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Removal of PCB	Lump Sum

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Partial payments will be made in accordance with the following schedule:

- (a) Monthly payments of up to 20 percent of the contract bid amount will be made on the basis of paid vouchers or receipted paid invoices from the Contractor after PCB's and PCB contaminated materials and equipment have been removed from the project site.
- (b) Final payment of 80 percent of the contract bid amount will be made when proof of disposal of PCB's and PCB contaminated materials and equipment is submitted to and approved by the Engineer. Proof of disposal shall include all documentation required by these specifications and by the appropriate regulatory agencies or documents, including but not limited to those described in Section 107 of the specifications.

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REVISION OF SECTION 613
INSTALLATION AND TESTING OF TRANSFORMERS
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Section 613 of the Standard Specifications is hereby revised for this project as follows:

Subsection 613.12 through Subsection 613.30 is hereby added to the Standard Specifications for this project as follows:

DESCRIPTION

613.12 The work in this section includes the installation and testing of non-PCB transformers, capacitors, and other related hardware. Locations and other construction details will be as shown on the plans.

MATERIALS

613.13 TRANSFORMER MATERIALS TO BE FURNISHED BY CONTRACTOR. All material supplied is to be suitable for operations at 11,000 feet and maximum ambient temperature of 30°C. These specifications contain some sole source items. Substitutions will be evaluated on an item-by-item basis as outlined in subsection 202.09 of these specifications. It is believed that the items listed are unequaled by other material available in the market. All replacement work shall be performed in strict conformance with the CPM drawing schedules shown on the plans. Only one transformer shall be removed from service at any one given time. The replacement unit shall be installed, tested, and accepted before the next transformer is removed.

- (a) The four replacement 24.9 KV delta to 2400-volt resistance grounded wye transformers shall duplicate the existing flange to flange dimensions. The existing incoming high-voltage air-filled compartment and 25 KVA cables and terminations are to be undisturbed as to location. The high voltage bushings of the new transformers shall have the same location dimensions so as to match and line up with the existing cable terminations.

The low voltage bushings shall have the same dimensions and location as the existing transformers. This is to insure that the existing air-filled transition auxiliary compartment and electrical bus connections to the 5 KV circuit breaker equipment will match and line up.

- (b) Note that the West Building transformers have serial numbers H884991C, H844991D and have left and right hand arrangements. The Contractor shall confirm arrangements.

Note that the East Building transformers have serial numbers H884991A, H844991B and have left and right hand arrangements. The Contractor shall confirm arrangements.

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REVISION OF SECTION 613
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- (c) The transformers shall be designed and built in accordance with the latest applicable NEMA and NASI standards. They shall be silicone-filled, self-cooled, and rated: OA/FA-60 hz, 3-phase, 2000 KVA continuous 55°C, self-cooled; 2300 KVA continuous 55°C forced air; 2576 KVA continuous 65°C forced air.

The transformers are to be operated at an 11,000-foot altitude, and the maximum ambient temperature is 30°C. The fan cooling is to permit 2000 KVA operation without derating for altitude.

Transformers A & B (East Building) are to be manufactured with standard 5.5 percent impedance and to be suitable for parallel operation.

Transformers C & D (West Building) are to be manufactured with standard 5.5 percent impedance and to be suitable for parallel operation.

The transformers shall not weigh in excess of 12,750 pounds each. **ANTE**


The transformers shall have voltage connections for polarity and phase relationship that duplicates the existing transformers.

- (d) Fixed Taps: The transformers shall be equipped with four full KVA capacity, 24.9 KV based taps, two 2-1/2 percent above and two 2-1/2 percent below installed in the high voltage winding. These taps shall be available by means of an externally operated manual tap changer for operation only when the transformer is de-energized. Provisions for pad locking the tap changer are required.
- (e) The transformer shall have a completely sealed tank to withstand a full vacuum bleeder and pressure relief device. The pressure relief device shall reclose automatically to prevent the entrance of moisture.

The base shall be suitable for skidding and shall be supplied with provisions for pulling the transformer in either direction.

Lugs located at the top and bottom of the tank for lifting the transformer complete with silicone liquid shall be provided.

The tank color shall match the existing substation switchgear. One quart of touch-up paint shall be supplied.

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- (f) Accessories: As specified in the latest revision of the ANSI C57.12.00, the accessories shall include but not be limited to the following:

- Diagrammatic nameplate - stainless steel
- Pressure-vacuum gage
- Metal instruction book container
- Hand hole on cover
- Drain valve and sampling device
- Top filling connection
- Pressure relief device
- Liquid level gage (with alarm contacts)
- Dial-type thermometer (with alarm contacts)
- Grounding pads
- Winding temperature indicator

Fans for auxiliary cooling are mounted on tubes. Control for automatic control for forced air are operated from the winding temperature.

- (g) Insulating Fluid: The transformer insulating fluid shall conform to the following:

- Less flammable silicone liquid dielectric coolant
- Nontoxic and fully biodegradable UL classified
- Fire point not less than 300°C per ASTM D-92-85
- High dielectric strength per ASTM D-877

Heat release rates per Factory Mutual Data Sheet 5-45/14-8S, heat release rate-convection equal to or less than 349 BTU/sq. ft.-min. and radiative 137 BTU/sq. ft.-min.

- (h) Short-Circuit Strength: The transformer core and coils shall be designed and built to meet the requirements of "Distribution and Power Transformers Short-Circuit Test Code" ANSI C57.12.90. The manufacturer shall demonstrate that the transformer proposed to be furnished under this specification shall have sufficient mechanical strength to withstand, without failure, all through-fault currents.

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REVISION OF SECTION 613
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- (i) Tests: All tests shall be made in accordance with ANSI C57.12.90, latest revision. The tests shall include but not be limited to the following:

Resistance of all windings
Times-turns ratio test on all tap connections
Polarity and phase relation test
No load loss at rated voltage
Full-load loss at rated voltage
Impedance
Applied voltage
Induced potential
Temperature rise test shall be made only when there is not a record available of a temperature test on an essentially duplicate unit
Exciting current at rated and 100% rated voltage
Impulse test
RIV induced potential test level

- (j) ~~The contractor shall use rollers on steel plates under the transformers~~ when removing the existing PCB transformers and installing the replacement transformers. This applies to movement in the electrical equipment rooms to protect the floor.

613.14 TRANSFORMER MATERIALS TO BE FURNISHED BY THE CONTRACTOR.

- (a) The four replacement transformers rated 24.9 KV delta to 480-volt solid grounded wye are to replace existing 24.9 KV to 460-volt transformers. The existing serial numbers are SNF964816 A, B, C, D.

The replacement transformers shall not weigh in excess of 22,700 pounds each. The replacement transformers shall have overall width and height dimensions not to exceed 103" W x 117" H. The access to the vault for placement is 10' H x 9'11" W. The Contractor may remove a 6-inch curb if required. If removed, the curb shall be reinstalled by the Contractor at no additional cost to the CDOH.

- (b) The existing transformers have radiators only on one side of the tank. The replacement transformers may have radiators on both front and back of the tank if the design requires. However, there are high voltage and low voltage connection restraints. The low voltage (480-volt) connections are to match and line up with existing 3000 Amp, General Electric Model LVD4NA10 bus duct with 1500 Amp neutral. Note that in the East Building the low voltage connections are on the right hand side of the transformers (north) while in the West Building the low voltage connections are on the left hand side of the transformers (north). The Contractor shall provide all necessary bus and fittings to connect the bus duct to the transformer.

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- (c) The existing high voltage (24.9 KV) connections to the transformer now terminate with 34.5 KV class G&W pot heads from under the slab into a throat box on the transformers. The cables are exposed. The replacement transformers shall have an air-filled, high-voltage terminal compartment extending to the floor. The existing pot heads extend into a throat chamber containing PCB liquid. In order to eliminate any spillage of PCB, the existing cables shall be severed below the pot heads. The throat chamber with the pot heads shall not be removed from the existing transformer when it is removed for disposal. Note that the existing transformer has an overall width of 120", including this throat box. Suitable terminations shall then be made on the supply cable ends with "Raychem" Type HVT, 34.5 KV class, heat-shrinkable stress control material/system. The Contractor shall submit for the Engineer's approval the method and plans for connecting to the high voltage bushings of the transformers. Refer to specification Section 613.18 on cable terminations.
- (d) The transformers shall be designed and built in accordance with the latest NEMA and ANSI standards. They shall be silicone filled, self-cooled and rated: OA/FA, 60 hz, 3-phase, 2000 KVA continuous 55°C rise self-cooled; 2300 KVA continuous 55°C forced air; 2576 KVA continuous 65°C forced air. The transformers are to be operated at 11,000-foot altitude, and the maximum ambient temperature is 30°C. The fan cooling will permit 2000 KVA operation without derating for altitude.

The 208-volt, 1-phase power for the fans shall come from panel P2ES in the East Building and panel P2WS in the West Building. The Contractor shall run the conduit and wires and make all necessary connections from spare circuit breakers in the panels to the fan control junction box on the transformers.

Transformers A and B are to be manufactured with standard 5.75 percent impedance and be suitable for parallel operation.

Transformers C and D are to be manufactured with standard 5.75 percent impedance and be suitable for parallel operation.

The transformers shall have voltage connections for polarity and phase relationship that duplicate the existing transformers.

Fixed Taps: The transformers shall be equipped with four full KVA capacity, 24.9 KV based taps, two 2-1/2 percent above and two 2-1/2 percent below installed in the high voltage winding. These taps shall be available by means of an externally operated manual tap change for operation only when the transformer is de-energized. Provisions for pad locking the tap changer is required.

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The transformer shall have a completely sealed tank to withstand a full vacuum bleeder and pressure relief device. The pressure relief device shall reclose automatically to prevent the entrance of moisture.

The base shall be suitable for skidding and shall be supplied with provisions for pulling the transformer in either direction.

Lugs located at the top and bottom of the tank for lifting the transformer complete with silicone liquid shall be provided.

The tank color shall match the existing substation switchgear. One quart of touch-up paint shall be supplied.

- (e) Accessories: As specified in the latest revision of the ANSI C57.12.00, the accessories shall include but not be limited to the following:

- Diagrammatic nameplate - stainless steel
- Pressure-vacuum gage
- Metal instruction book container
- Hand hole on cover
- Drain valve and sampling device
- Top filling connection
- Pressure relief device
- Liquid level gage (with alarm contacts)
- Dial-type thermometer (with alarm contacts)
- Grounding pads
- Winding temperature indicator

Fans for auxiliary cooling are mounted on tubes. Control for automatic control for forced air is operated from the winding temperature.

- (f) Insulation Fluid: The transformer insulating fluid shall conform to the following:

- Less flammable silicone liquid dielectric coolant
- Nontoxic and fully biodegradable UL classified
- Fire point not less than 300°C per ASTM D-92-72
- High dielectric strength per ASTM D-877

Heat release rates per Factory Mutual Data Sheet 5-45/14-8S, heat release rate-convection equal to or less than 349 BTU/sq. ft.-min. and radiative 137 BTU/sq. ft.-min.

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- (g) Short-Circuit Strength: The transformer core and coils shall be designed and built to meet the requirements of "Distribution and Power Transformers Short-Circuit Test Code" ANSI C57.12.90. The manufacturer shall demonstrate that the transformer proposed to be furnished under this specification shall have sufficient mechanical strength to withstand, without failure, all through-fault currents.
- (h) Tests: All tests shall be made in accordance with ANSI C57.12.90, latest revision. The tests shall include but not be limited to the following:
- Resistance of windings
 - Times-turns ratio test on all tap connections
 - Polarity and phase relation test
 - No load loss at rated voltage
 - Full-load loss at rated voltage
 - Impedance
 - Applied voltage
 - Induced potential
 - Temperature rise test shall be made only when there is not a record available of a temperature test on an essentially duplicate unit.
 - Exciting current at rated and 110 percent rated voltage
 - Impulse test
 - RIV induced potential test level
- (i) The Contractor shall use rollers on steel plates under the transformers when removing the existing PCB transformers and installing the replacement transformers. This applies to movement in the electrical equipment rooms to protect the floor.

613.15 CABLE AND CONDUIT TO BE FURNISHED BY THE CONTRACTOR.

- (a) General. The single conductor cable furnished under this specification shall be rated 28 KV. Cable shall be suitable for normal installation, indoors or outdoors, in air or conduit, intermittent or continuous submersion in water, and direct burial. All cable shall be in complete accordance with this specification. The cable shall have a nominal O.D. of 1.273", 204 ampacity per ICEA, #1/0 AWG stranded copper conductors.
- (b) Conductors. All conductors shall be uncoated soft or annealed copper with concentric-lay Class B round stranding in accordance with the current requirements of ASTM Standard Specification B-8 or B-33. Compressed stranding in accordance with the current requirements of ASTM Stranded Specifications only may be used.

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- (c) Stress Control Layer. The stress control layer shall be a non-conductive extruded material meeting the current requirements of ICEA Standard Publication S-68-516, paragraph 2.7.1.2. The minimum average thickness shall be 18 mils (.018). After being extruded onto the conductor, the stress control layer shall be tested at 1 KV dc between test electrodes and the conductor to prove its electrical integrity.
- (d) Insulation. The primary insulation shall be a high quality ozone and discharge resistant thermosetting rubber-based compound. The insulation shall be extruded directly over the stress control layer, and its outer surface shall be cylindrical and smooth.

The insulation must be compounded and extruded at the same location. The minimum average thickness of the insulation shall be in accordance with Table One. Minimum thickness at any point shall not be less than 90 percent of the minimum average.

Table One

Voltage Class	Thickness (Mils)	Test Voltage (KV) Applied for 5 Minutes	
		AC	DC
28 KV	280	59	118

The insulation shall be suitable for use at conductor temperatures not exceeding 90°C for normal operation, 130°C for emergency overload conditions, and 250°C for short-circuit conditions.

- (e) Preliminary Tank Test. Each individual insulated length of conductor, after extrusion of the insulation layer and prior to any further processing, shall be immersed in a water tank for a minimum period of 24 hours. At the end of 16 hours (minimum), while immersed, each length of insulated conductor shall withstand without failure a DC voltage withstand test for a period of five minutes. Test voltage is specified in Table One.

At the end of the 24-hour immersion (minimum), while still immersed, each length of insulated conductor shall withstand without failure an AC voltage withstand test for a period of five minutes. Test voltage is specified in Table One.

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Following the 5-minute AC voltage withstand test, a 1-minute 500-volt DC insulation resistance (R) test of each length of insulated conductor shall be conducted and corrected to 15.6°C (60°F) and 1000 feet. This resistance shall not be less than the value of R as calculated from the following formula:

$$R = K \text{ LOG } 10 D/d \text{ in megohms/kilofoot}$$

Where K = 21,000 megohms/kilofoot
 D = Diameter over insulation
 d = Conductor diameter

- (f) Nonmetallic Insulation Shield. The nonmetallic insulation shield shall consist of an extruded layer of black thermoplastic semi-conducting material extruded directly over the insulation. The minimum average thickness of the insulation shield shall be in accordance with that specified in Table Two.

Table Two

Diameter Over Insulation (Inches)	Insulation Shield Thickness (Mils)
1.001 to 1.500	40

- (g) Metallic Shield. The metallic shield shall be made up of a helically applied 5-mil uncoated copper tape directly over the nonmetallic extruded insulation shield. The tape shall have a minimum average overlap of 20 percent.
- (h) Overall Jacket. A continuous extruded jacket of moisture, heat, oil, and abrasion resistant black PVC shall be applied over the metallic tape shield. The minimum average thickness shall be as noted in the following Table Three. The minimum thickness at any point shall not be less than 80 percent of the minimum average value.

Table Three

Diameter Under Jacket (Inches)	Thickness (Mils)
0.70. - 1.500	80

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- (i) Sealing. Cable ends shall be effectively sealed to prevent the entrance of moisture into the cable.
- (j) Testing. The completed cable, while on the final shipping reel, shall be tested at room temperature at the test voltages and times specified in Table One. The insulation resistance shall also be measured, and the insulation resistance constant shall not be less than 21,000 megohms/1000 feet corrected to 60°C.

The conductor resistance and shield continuity shall be measured on each shipping length of cable and recorded. Each end of every shipping length shall also be inspected for water in strands and checked dimensionally for conformance with the above standards.

- (k) Qualification Test. Certification shall be provided to show that samples of cable insulated with the same insulation as that to be supplied have been subjected to and passed the following test:

As described in the current requirements of ICEA Standard Publication S-68-516, paragraph 6.23.3, with the energy source equal to a minimum of 240 volts/mil of insulation thickness; cable shall withstand this test for a minimum of 1000 hours without failure.

The tests shall be made on #2 (7 strand) AWG copper conductor insulated with an inner stress control layer and 175 mils average wall of thermosetting rubber-based material.

613.16 STEP VOLTAGE REGULATORS TO BE FURNISHED BY THE CONTRACTOR. Six 288 KVA, 10 percent regulators, General Electric Co. Cat. #33D7288, Type VR-1 shall be furnished, or an approved equal. These shall be outdoor station-type for 14,400 line to neutral volts and 24,940 grounded wye phase volts. Each regulator shall be standard rated 200 amps at 10 percent regulation, 3300-foot altitude, 40°C ambient, oil-immersed, Class OA, 55°C rise. The regulators approved for installation shall be compatible with mounting configuration designated on DWG. S-1.

The application is at 11,000-foot altitude with a maximum ambient of 30°C (86°F) and an average of the maximum and minimum daily temperature that does not exceed 24°C (75°F). The minimum low temperature is minus 40°C (-40°F).

The control devices, components, and all operating mechanism of the regulator shall be suitable for the low temperature specified above.

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The regulators shall have a 65°C rise insulation system that permits 12 percent additional KVA capacity for short time overloads of 4-hour duration in a 24-hour period.

The regulators shall have provisions for reducing the regulation range to permit 60 percent more current capacity at 5 percent regulation in five possible load current ratings.

The regulators shall have a minimum expected operations life of 1,150,000 hours at twice rated current. The regulators are to have thirty-two 5/8 percent steps, 16 steps raised, and 16 steps lower.

The internal series winding surge protection shall be by a MOV bypass resistor or MOV surge protector inside the regulator tank.

The regulators shall have suitable bushings to maintain the air dielectric at 11,000-foot altitude for 150 KV BIL.

The regulators shall have short circuit withstand capabilities of 8000 RMS symmetrical amps for 0.8 seconds without injury.

The regulators shall have the following accessories:

- Control Cabinet
- Ratio transformers
- Manual/automatic control switch
- Test rheostat
- Panel-mounted fuses
- Voltmeter terminals
- External source terminals
- Internal-external source switch
- Neutral light
- Band edge indicators
- Operations counter
- Bandwidth adjustment
- Voltage level adjustments
- Line-drop compensator adjustments
- Time delay adjustment
- Solid-state circuit board with all control functions
- Visible potential disconnects
- Visible current transformer shorting disconnect (forget)

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Tap changer with motor and power supply
Position indicator with add-amp adjustment
Nameplate
Lifting lugs
Provision for oil drain and sampling device
Mounting provisions for shunt arrestors
Substation base
Liquid level indicator
Automatic pressure-relief valve
Handhole
→ Voltmeter

613.17 LIGHTNING ARRESTORS TO BE FURNISHED BY THE CONTRACTOR. Six distribution class surge arrestors incorporating gapless zinc-oxide (MOV) technology shall be furnished for mounting on the regulators and connected to the S bushings. They shall be General Electric Co. Cat. #9L24ETG138BC, or approved equal, rated 18 KV RMS, with a maximum continuous line to ground operating voltage of 15.3 KV RMS. Approved lightning arrestors shall have compatible mounting configuration as shown on Dwg. E-1.

They shall be nonfragmenting units, including bird caps and transformer brackets.

These distribution arrestors shall be designed and tested to meet or exceed the requirements of ANSI/IEEE C62.11.

The arrestors shall be rated for application to 12,000-foot altitude. The nonfragmenting provisions shall provide pressure relief capability up to 20,000 amps symmetrical and include a retaining system which holds hot parts in the housing should the arrestor vent.

CONSTRUCTION REQUIREMENTS

613.18 CABLE TERMINATIONS - GENERAL.

- (a) Termination kits shall be capable of properly terminating a 28 KV (single) conductor polymeric-insulated 1/0 AWG. Kits shall meet Class 1 requirements and be design-proof tested per IEEE 48-1975 and be capable of passing a test sequence per draft and revisions of IEEE 404. Kits as specified shall accommodate any common form of cable shielding/ construction without the need for special adaptors or accessories and also be capable of being properly installed on out-of-round or out-of-tolerance cable as per relevant ICEA standards. Kits shall accommodate commercially available connectors.

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Terminations for single-conductor cables shall consist of heat-shrinkable stress control and outer non-tracking insulation tubings, along with a high relative permittivity stress relief mastic for insulation shield cutback treatment with a heat activated sealant for environmental sealing.

The manufacturer shall, upon request, be able to demonstrate 15 years of actual field experience and suitable accelerated and real-time testing of weathering resistance. Test reports shall also be available, upon request, which verify device stability with time, temperature, and stress variations.

Termination kits shall be manufactured by Raychem Corporation or approved equal.

Thirty-six compression terminals total, for copper, are required. Terminals/lugs with open ended barrels or inspection holds are not acceptable.

The Contractor shall select the terminal/lug configurations to match the apparatus to be connected.

There are six required (total for east and west) high voltage terminations for the cables connecting to the top of the G&W pot heads in the S&C, 34.5 KV incoming compartments. These cables are to go to the step voltage regulators on the roof. Refer to Figure 1.

Note that the existing lightning arrestor connections shall remain as now connected.

Note that the existing buss connections from the top of the pot heads to the horizontal buses supported by the structure stand-off insulators are to be removed and abandoned. See Figure 1.

These are six required (total) terminations for the return cables connecting to the buses at the stand-off insulators. Note that the existing PT's shall also be reconnected to the buses at this circuit location.

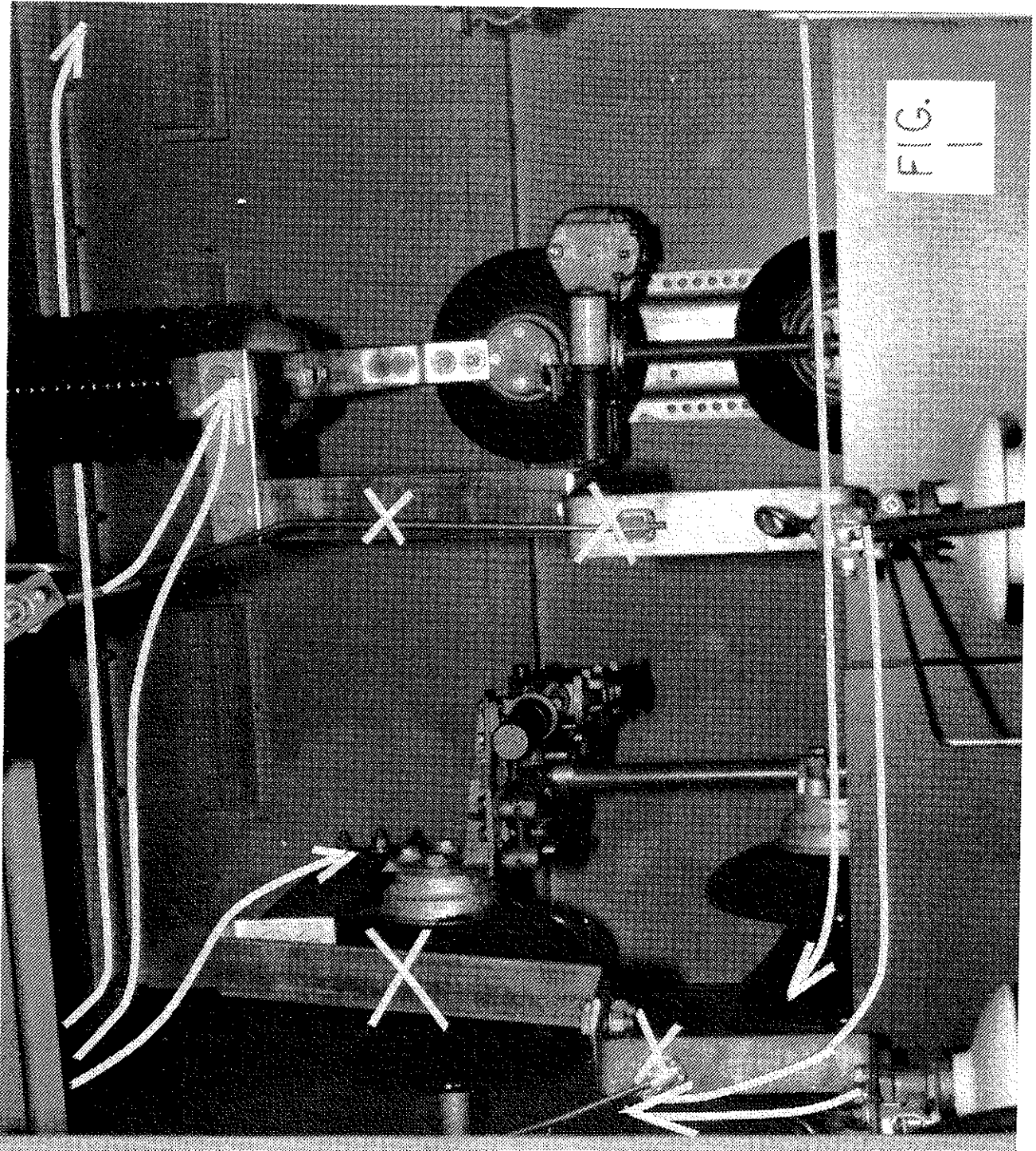
The ground shield braid from the terminations shall be electrically connected to the ground bus in the S&C compartment.

- (b) The cables shall exit and enter the top of the S&C compartments. They shall be suitably clamped and supported to the left side sheets of the incoming compartments. The training bend of each cable to its termination shall not be less than 16-inch radius. The bearing surface of the block clamps shall not be less than 1-1/2 inches wide. Refer to Figure 1.

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There are 12 required (total for east and west) terminations/lugs for the cables to and from the regulator bypass and disconnect switches. They shall have four skirts each for outdoor application.

- (c) The three 1/2-inch vertical conduits containing the cables to and from the regulators (on the roof) shall be sealed with sealing boots for cable breakouts, "Raychem" Type CB, with Type A adhesive (four required). Refer to 613.19(e) for cable pulling limitations in conduit.

There are 12 required (total east and west) terminations and lugs for the transformer primaries for the north bore. These shall be "Raychem" HVT-352. The Contractor shall provide the necessary insulators, insulated bus, or cable to connect to the new transformer's high voltage bushings in the floor height air-filled terminal compartment. Refer also to 613.14(c).

613.19 GENERAL: 3 1/2" RIGID STEEL CONDUIT FOR THE 28 KV 1/0 CABLE RUNS.

- (a) Installation. Cable shall not be installed in any conduit until conduit installation and all work of any nature that may cause damage to the conductors has been completed. The conduits shall be cleaned out by first pulling a swab through, prior to pulling wires. Care shall be exercised in the pulling of cables to avoid damage to insulation or conductors. Oil or grease shall not be used to lubricate wire. Only approved lubricating materials, as listed in these specifications, shall be used to facilitate cable pulling.

The following ready-to-use pulling compounds are recommended for use with all Kerite cables. Only Slip-X 300 is kept in stock at the Kerite factory.

1. Slip-X 300 compound is available from the American Colloid Co. of Skokie, IL.. A winter grade compound suitable for use at all temperatures down to 0°F (-18°C). Slip-X 300 replaced the former Slip-X 100 and Slip-X 200 materials.

For information purposes, the Slip-X 300 number is a basic one and varies, depending upon packaging size, as follows:

Slip-X 301 - 1 quart squeeze bottle
Slip-X 302 - 1 quart wide-mouth bottle
Slip-X 303 - 1 gallon can
Slip-X 304 - 5 gallon pail
Slip-X 305 - 55 gallon drum

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The numbers may also appear as SX301, SX304, etc., on the supplier's invoices and packing lists and are merely abbreviated code numbers.

In each case, the material is the same for the series of compound involved and is approved.

2. Bishop No. 45 Cable Pulling Lubricant is a summer grade material limited to use at temperatures above freezing. It is available from Bishop Electric, a unit of General Signal, located in Cedar Grove, NJ, in 5-gallon containers of 33 pounds net weight.
3. MacLube No. CA-51, manufactured by Mac Products, Inc., 60 Pennsylvania Avenue, Kearny, NJ 07032, is a winter grade lubricant suitable for use at all temperatures down to 0°F (-18°C). It is available in 5-gallon pails and 55-gallon drums.
4. Minerallac H-2B, manufactured by Minerallac Electric Co., 24 North Peoria Street, Chicago, IL 60607, is a summer grade lubricant limited to use at temperatures above freezing. The compound is available in 5-gallon and 50-gallon quantities.
5. Winter Grade No. 7437-PC, manufactured by General Machine Products Co., Inc., Trevoise, PA, is a winter grade lubricant suitable for use at all temperatures down to 0°F (-18°C). Obtainable from any Graybar Electric Co. distributor.
6. Gel-Lube 7-5, obtainable from Cable Associates, Inc., 253 Veterans Blvd., Carlstadt, NJ 07072, is a winter grade lubricant suitable for use at all temperatures down to 0°F (-18°C).
7. Polywater lubricants "A," "C," and "G," obtainable from American Polywater Corp., PO Box 53, Stillwater, MN 55082.

Lube "A" is a general purpose water-base liquid type limited to use at temperatures above freezing.

Lube "C" is a water-alcohol base winter grade lubricant suitable for use at all temperatures down to -10°F (-23°C).

Lube "G" is a water-base with gellant additive for a "hands-on" application of heavy coating for complex pulls. This is a summer grade lubricant limited to use at temperatures above freezing.

The A, C, and G materials are available in 5-gallon pails.

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- (b) Conduit runs shall be galvanized rigid steel protected against corrosion by an even coating of zinc applied by the hot dip process.

Conduit shall have a protective coating of enamel or lacquer applied to the inside of the conduit over the zinc coating. Each length of conduit shall be threaded and reamed on both ends and bear name of manufacturer and Underwriters' Laboratories label.

All bends shall be sweep with minimum radius of 36 inches.

Exposed conduits shall be rigidly secured in position and shall be installed straight and true with reference to adjacent work in a workmanlike manner. Spacing of supports shall be as required with maximum spacing of 9'-0" and at least one support between couplings. Unless specifically located, the conduit runs may require location to suit equipment purchased and field variations. Pull boxes shall be provided as required. Not more than three 90° (sweep with 36" minimum radius) bends or equivalent shall be provided between pull boxes. Field bends where required shall not have smaller radius than 36" radius sweep bends and shall be smooth with no deformation of the conduit wall. Field cut ends of conduit shall be square and shall be threaded and reamed to remove all burrs. Conduit attachment to structures shall be one-hold clamps with clamp backs, "U" bolts, beam clamps approved for the service, framing channel, and clamps as required.

Conduits shall be kept tightly sealed during course of construction to avoid entrance of foreign materials and moisture. Any conduit found to contain foreign material or moisture shall be swabbed clean before pulling-in of wire.

Conduit entering the S&C switchgear shall be equipped with grounding bushings and grounded to the ground bus of the enclosure.

- (c) Pull boxes shall be 10-gauge steel with gasketed screw cover, continuous welded seams, watertight, hot-dip galvanized, without knockouts.
- (d) The Contractor shall inspect the site for determination of the conduit routing, distances involved, cable lengths, and pull box arrangement. A minimum of one pull box shall be required in each building.

The following locations and dimensions are approximate. The Contractor shall verify them for his work. The lettered and numbered location are building coordinates as shown on existing CDOH drawings.

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EAST BUILDING

1. From the left top of the S&C incoming unit at location (H-10', 5-2') the Contractor shall provide a 20-inch-high pull box. From the top of the pull box, the conduits (2-3 1/2") will go vertically with gradual sweep bends. See Dwg. E-E1. The pull box in the East Building is to allow the existing 3000-amp bus way to be serviced and provide at least 16-inch bend radius for the cable installation.
2. The gradual sweep bends east and south will penetrate the Electric Room ceiling to a Fan Room column at location (G,5). See Dwg. S-E6. Continue vertically up the column to the Fan Room ceiling. See Dwg. SE-8.
3. Bend horizontal to the north along the west side of beams at (G). Slight sweep bends shall be made to pass through the transfer air openings in the duct divider wall at (G+5, 3+18'). See Dwg. A-E12 and S-WE14.
4. Continue north along west side of beam at (G) to (2-2').
5. Vertical bend and penetrate roof at north side of girder (2).
6. Slight bend above roof to traverse up the "A" frame leg on the east side (right side).

WEST BUILDING

1. From the top of the S&C incoming unit at location (H-10', 5-10') sweep bends vertically and penetrate ceiling to Fan Room floor at column (G,5). See Dwg. S-W4. The sweep past the 3000 Amp bus is not critical as there is not interference in the West Building. See Dwg. E-W1.
2. Continue vertically up the column to the fan room ceiling. See Dwg. S-W4.
3. Bend horizontal to the north along the east side of the beams at (G). Slight sweep bends shall be made to pass through the transfer air openings in the duct divider wall at (G+5, 3+19 1/2'). See Dwg. A-W11 and A-W3.
4. Continue north along east side of beam (G) to (2-2'). See Dwg. A-W3.
5. Vertical bend and penetrate roof at north side of girder (2).
6. Slight bend above roof to traverse up the "A" frame leg on the west side (left side).

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- (e) The maximum pulling tension per single conductor by the conductor is 845 pounds. The Contractor shall pull the cable from the roof downward. Suitable pull boxes shall be located so as not to exceed the maximum tension of 845 pounds and minimum bending radius of the cable.
- (f) The penetrations through the Fan Room floor and the Fan Room ceiling shall have 5-inch diameter galvanized rigid conduit sleeves grouted in by nonshrinking grout. The sleeves shall be cleaned with a suitable solvent for bonding.

The void surfaces between the 5-inch sleeve and the 3-1/3-inch conduit shall be first cleaned of loose dirt and oil with a suitable solvent following the manufacturer's instructions.

A damming material of mineral wood or fiberglass shall be caulked into the annular space at least 2 inches. At least 1 inch of 3M Fire Barrier Caulk CP-25 or Putty 303 shall be applied in the void above the damming material and be flush with the top surface of the penetration sleeve.

- (g) The Contractor shall take appropriate action to protect against asbestos contamination and worker exposure when penetrating the electric room ceiling (Fan Room floor) in the West and East buildings.

The ceilings of these rooms have approximately 1/2 inch of sprayed on asbestos covered by approximately 1 inch of foil-backed fiberglass insulation.

The core drilling of these ceilings for the two 5-inch conduit sleeves in each building represents less than 160 square feet of renovation involving friable asbestos materials per The National Emission Standards for Hazardous Air Pollutants (NESHAP). This also represents less than 32 square feet or the volume equivalent of a 55-gallon drum of renovation involving friable asbestos per the Colorado Department of Health requirements which is the agency to administer the NESHAP standards. No permits from the agencies are therefore required per Colorado House Bill 1239.

The Federal Register/Vol. 51, No. 119, June 20, 1986/ Rules and Regulations 1926.58 (6)(iv) allows for an exception as follows:

"For small-scale, short duration operations such as installing electrical conduits, the employer is not required to comply with the requirements of paragraph (e)(6) of Section 1926.58."

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- (h) The Contractor shall therefore employ the following procedure when penetrating the electric room ceilings for the conduit sleeves:

The worker shall wear disposable coveralls.

The asbestos surface underneath the fiberglass batts on the ceiling shall be wetted sufficiently to prevent emission of airborne fibers. The wetted fiberglass and wetted asbestos layers shall be removed from an area not to exceed 1 foot x 2 foot.

The wetted asbestos that is removed shall be immediately sealed in a leak-tight container bag while wet.

The conduit sleeve holes shall be located and drilled so as to penetrate the slab in the 1 ft. x 2 ft. area and not disturb unremoved asbestos.

The Contractor may sleeve the holes in advance of the conduits being run.

The conduits or sleeve penetrations shall be sealed per 613.19(f).

The fiberglass batting shall be replaced and taped over the remaining exposed ceiling.

The leak-tight bag containers from all the four penetrations and worker's disposable coveralls shall then be sealed in one leak-tight impermeable container.

The leak-tight impermeable container shall be labeled in letter of sufficient size and contrast to be readily visible and legible as follows:

CAUTION

Contains Asbestos Fibers

Avoid Opening or Breaking Container

Breathing Asbestos Is Hazardous To Your Health

The leak-tight impermeable container shall be promptly disposed of in an acceptable waste disposable site which covers the material at the end of each operating day with at least 6 inches of compacted non-asbestos-containing material.

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- (i) The conduit penetrations through the Fan Room ceiling to the roof surface shall be sealed through the structural slab as per 613.19(f). The integrity of the roof for water shall be maintained by the use of "3M Scotch Clad" coating systems "V" as now exists on the roof. The grit shall be removed to expose the coating surface. The Scotch roof coating sealant shall be tooled to form a cove or fillet to the conduit and allowed to cure. A base coat at least .025 inches thick shall be applied to the Scotch clad coating. Subsequently, two top coats at least .013 inches thick shall be applied. The coatings shall extend up the conduit 4 inches. The top coats shall be applied at least 16 hours after the base coat. "Scotch-clad" metal primer shall be used on the conduit before applying the coating system.

613.20 GENERAL: REMOVAL OF PCB POWER FACTOR CAPACITORS AND INSTALLATION OF NEW POWER FACTOR CAPACITORS.

- (a) The existing twelve 75-KVAR capacitors now mounted on top of the 2400-volt south bore motor starters shall be removed. The lead connections are in flexible (flex) conduit into the top of the starter units. The leads themselves are taped up and not connected inside. The top flex entrance hole shall be covered by steel snap-in blanks after removal of the flex and leads.

The existing eighty 50-KVAR units are General Electric Co. and are in groups of five mounted and connected within an enclosure. They shall be directly replaced by General Electric Cat. #55L347RH units because they must be both electrically and mechanically compatible with the mounting and electrical arrangement, including using the existing fuses. An approved equal that meets all the above requirements may be accepted by the Engineer. However, under no circumstances shall the Contractor "exchange out" the capacitor cabinets and hardware. There are seven existing spare 50-KVAR units which are not to be replaced but disposed of.

Note: Only one bank of capacitors for one ventilation fan shall be removed at any one time for replacement. When the replacement capacitor bank is installed, tested, and accepted, then the next bank of capacitors may be removed. In this way, only one ventilation fan shall be effected at a time.

- (b) The replacement capacitors shall be of the film/foil construction utilizing capacitor grade polypropylene and high purity aluminum foil.

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REVISION OF SECTION 613
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The non-PCB dielectric fluid shall meet or exceed the following physical properties:

Specific Gravity, 25°C	0.983
Refractive Index, 25°C	1.564
Dielectric Constant, 25°C	2.54
Dielectric Strength, KV	60+
Flash Point, COC, degrees C	149
Fire Point, COC, degrees C	160
Auto-ignition Temp., degrees C	> 375
Viscosity, cs/25°C	8.5
Pour Point, degrees C	-47
Solubility in H2O, 25°C	10-5
Initial Boiling Point, mmHg, °C	98
Boiling range, atm pressure, °C	290-300

The capacitors shall average less than 10 watts per 50 KVAR unit at 480 volts 60 hz.

613.21 STRUCTURE TO BE FURNISHED BY THE CONTRACTOR.

- (a) Two "A" frame structures shall be furnished and installed as shown on drawings S-1 and S-2.

All electrical components, materials connections, as shown on Drawing E-1, shall be furnished and installed by the Contractor.

The regulator bypass switches shown on Drawing E-1 shall be "Southern States, Inc.," Cat. #PBOR 34600, or approved equal. The switches shall be rated 34.5 KV, 600 amp, 30°C rise, 200 KV-BIL, 40,000 amp momentary.

- (b) The Contractor shall not utilize any cranes or other self-propelled equipment on the roofs of the ventilation buildings. The placement and/or erection of the "A" frame structures, including the regulators and cable reels, shall be by a suitable crane located at the top of the loop road. The Contractor shall provide protection to the roof surfaces from damage by tools or other items. Any damage shall be repaired by the Contractor at no additional cost to the CDOT.

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- (c) Refer to Drawing S-2 detail concerning roof penetration for column legs. The integrity of the roof for water shall be maintained by the use of "3M Scotch Clad" coating systems "V" as now exists on the roof. The existing roofing shall be removed to expose only the concrete surface at the locations for the column plates. After placement of "A" frame, the exposed concrete and metal surfaces shall be primed according to the manufacturer's instructions. A .025" base coat shall be applied of the Scotch Clad coating. Subsequently, two .013" top coats shall be applied that extend up the column legs at least 4 inches. The top coats shall be applied at least 16 hours after the base coat.

613.22 TRANSFORMER TESTING AT STAGING LOCATION.

- (a) Testing on each transformer shall be performed by the Contractor at the indoor staging location prior to final delivery to the site. The staging location shall be within 100 highway miles of the tunnel site. The test shall be as follows:
1. The silicone insulating liquid shall be tested for a moisture PPM content test in accordance with ANSI/ASTM D 1533.
 2. Dielectric KV breakdown test of the silicone insulating fluid in accordance with ANSI/ASTM D-877
 3. Visual inspection for shipping damage and leaks
 4. Nitrogen pressure above the silicone liquid
 5. Transformer turns-ratio, including all winding configurations as the transformers have no-load tap-changers
 6. Winding insulation resistance by D.C. Megger for checking and for any future periodic tests and trend comparison
 7. A "Doble" insulation power factor test shall be performed and documented for any future periodic tests and trend comparison.
- (b) Prior to installation, the Contractor shall provide certification of the non-PCB condition for all new transformers' dielectric fluid as tested at the staging location.

All tests shall be documented and submitted to the Engineer for review.

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REVISION OF SECTION 613
INSTALLATION AND TESTING OF TRANSFORMERS
COLORADO PROJECT NO. IR 70-3(162)

613.23 TRANSFORMER TESTING AT SITE. Testing on each transformer shall be performed by the Contractor at the site prior to and after energization, as appropriate.

- (a) The tests shall be duplicated and as specified in 613.22(a)1 through 613.22(a)6, prior to energization.

An additional "Doble" insulation power factor test shall be performed and documented for any future periodic tests and trend comparison on each replacement transformer, prior to energization.

- (b) The CODH will electrically load each transformer for 12 hours at approximately 2000 KVA and periodically log/document the top oil temperature to confirm for acceptance the adequate performance of the transformer for capacity.

As the 480-volt bus involves parallel transformer operation, under no circumstances will one existing 24.9 KV/460-volt transformer be paralleled with one replacement 24.9 KV/480-volt transformer.

When both replacement 24.9 KV/480-volt transformers have been installed and tested separately, they will be paralleled and loaded to approximately 2000 KV for 12 hours. Top oil temperatures of each transformer shall be monitored and logged hourly. These temperatures shall be within 10 percent of each other as an indication of acceptance.

- (c) The Contractor shall utilize suitable instrumentation on the low voltage buses of both the 2400-volt and 460-volt equipment to substantiate proper phase rotation before removal of the existing transformers and addition of the replacement transformers.

All tests shall be documented and submitted to the Engineer for review.

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REVISION OF SECTION 613
INSTALLATION AND TESTING OF TRANSFORMERS
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613.24 REGULATOR TESTING AT STAGING LOCATION. Testing on each regulator shall be performed by the Contractor at the indoor staging location prior to final delivery to the site. The tests shall be as follows:

1. Visual inspection for shipping damage, leaks, oil level
2. Verify that the reversing switch is in the neutral position with the regulator on neutral and perform an internal visual check of all parts via the hand hole cover.
3. Dielectric KV breakdown test of the oil insulating fluid in accordance with ANSI/IEEE C57.106-1977
4. Regulator turns-ratio for all positions of the tap changer
5. Winding insulation resistance by D.C. Megger for checking and for any future periodic tests and trend comparison
6. Check controls and operation using an external 120-volt source following the manufacturer's safety instructions.
7. A "Doble" insulation power factor test shall be performed and documented for any future periodic tests and trend comparison.

Prior to installation, the Contractor shall provide certification of the non-PCB condition of all new regulators' dielectric fluid as tested at the staging location.

All tests shall be documented and submitted to the Engineer for review.

613.25 REGULATOR TESTING AT SITE. Testing on each regulator shall be performed by the Contractor at the site prior to energization. This shall be done after regulators are installed on the supporting structure but before the shunt arrestors are connected.

- (a) Visual inspection for shipping and handling damage, leaks

Winding insulation resistance by D.C. Megger and compared to 613.24.5 data

A "Doble" insulation power factor test shall be documented for future periodic tests and trend comparison and compared to 613.24.7.

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- (b) The final connection of the shunt arrestors and energization of the regulators shall take place in the time frame as shown on the CPM. The first exercise in placing the regulators on line shall be performed under a short time outage so that the Contractor can demonstrate the switching procedure and check the operation of each regulator. The bypass switches and the S&C primary switch shall be opened to accomplish the outage.

The initial settings of the regulator controls are as follows:

Resistance (R) @ 3.1 volts
Reactance (X) @ 15.2 volts
Band width @ 2% ^{1.5}
Time delay @ 30 seconds
Control volts @ 120 volts ₁₁₃

get change

During the outage the completely de-energized taps on the replacement transformers shall be initially set as follows:

The 24.9KV/480 Volt transformers shall be set on Tap 5.
The 24.9KV/2400 Volt transformers shall be set on Tap 2.

The regulators shall then be energized by the switches connecting the source winding only. The regulators shall then be run through the range manually--per the manufacturer's instructions. Subsequently, the load side switches shall be closed to provide regulated power to the tunnel incoming primary S&C switch.

~~613.26 CAPACITOR TESTING AT SITE BY CONTRACTOR. The Contractor shall field test each of the 480-volt capacitors as follows:~~

1. ~~Each replacement 50 KVAR capacitor unit shall be visually inspected for leakage and mechanical damage before being mounted in the group enclosure.~~
2. ~~Each replacement 50 KVAR capacitor unit shall be D.C. Megger-tested for insulation resistance between the terminals and case before being connected to its fuse in the group enclosure for an individual ventilation fan motor. The two terminals shall be wired together for this test. Appropriate safety procedures shall be employed to discharge the capacitors after the test.~~
3. ~~Each ventilation fan motor and its replacement capacitor bank shall be successfully run for at least one hour.~~

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REVISION OF SECTION 613
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613.27 CABLE TESTING AT SITE BY CONTRACTOR. The Contractor shall perform a D.C. Hi-pot voltage proof test on the 28 KV installed cables, including any splices and terminations. This shall be done before connection to the S&C equipment and step regulators.

- (a) The field test voltage shall be 84 KV or the manufacturer's recommendation, whichever is less.

The procedure for the tests shall be as recommended by the cable manufacturer, including all safety equipment.

- (b) The Contractor, at his discretion, may perform field testing on receipt of the cable before installation. Movement, storage, and handling of cables shall be performed following the manufacturer's instructions.

The manufacturer's field testing and handling instructions shall be included with the submittals for review by the Engineer.

613.28 TESTING AFTER ACCEPTANCE. The Contractor shall perform tests to demonstrate the continued satisfactory operation of the replacement transformers, the regulating equipment, and replacement capacitors. This shall be performed for a subsequent 3-month period after acceptance, as follows:

The replacement transformers and step regulators shall have a visual check for leaks and an audio check for abnormal sounds.

The replacement transformers and step regulators shall have liquid dielectric tests, including checking the moisture content. Refer to 613.24.1 to 613.24.3.

"Thermovision" scanning shall be performed on the bushing connections and terminations (both high and low) and radiators on the replacement transformers.

"Thermovision" scanning shall be performed on the terminations and connections for the regulators and bypass switches.

"Thermovision" scanning shall be performed on the terminations and connections of the new 28 KV cable in the S&C incoming compartments.

Visual checks shall be performed on pressure relief devices, and all gauges of the replacement transformers.

Any of these tests which require de-energization of equipment shall require scheduling and operation by CDOH personnel.

Each power factor capacitor shall be visually inspected for leaks and case distortion. The fuses for each capacitor unit shall be checked to see if any are blown.

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REVISION OF SECTION 613
INSTALLATION AND TESTING OF TRANSFORMERS
COLORADO PROJECT NO. IR 70-3(162)

METHOD OF MEASUREMENT

613.29 Work in this section will be paid in three stages. The first stage will be determined complete after the transformers, capacitors, and other related hardware have been ordered. The second stage will be considered complete when the transformers are on the project site. The final stage is to be considered complete after all transformers have been installed, tested, and are operational.

BASIS OF PAYMENT

613.30 Payment will be made at the contract lump sum price for the installation and testing of non-PCB transformers, capacitors, and other related hardware required by these specifications.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Power Transformer	Lump Sum

Partial payments will be made in accordance with the following schedule:

- (a) Monthly payments of up to 60 percent of the contract bid amount will be made on the basis of paid vouchers or receipted paid invoices from the Contractor after the transformers, capacitors, and other related hardware have been ordered.
- (b) Payment will be made of an additional 10 percent of the contract bid amount after delivery of all the transformers to the project site.
- (c) Final payment of 30 percent of the contract bid amount will be made upon acceptance of the installation by the Engineer. Acceptance or rejection of the installation by the Engineer will be done in writing based on the following:
 1. All of the transformers, capacitors, and other related hardware shall have been installed, tested, and be operational as determined by the Engineer.
 2. All documentation of all testing shall have been presented to the Engineer for his review.
 3. The Engineer will have inspected the equipment and installation for conformance with these plans, specifications, and manufacturer's specifications and recommendations.

June 20, 1988

REVISION OF SECTION 626
MOBILIZATION
COLORADO PROJECT NO. COLORADO PROJECT NO. IR 70-3(162)

Section 626 of the Standard Specifications is hereby revised for this project as follows:

In Subsection 626.02 delete parts (A), (B), (C), and (D) and replace with the following:

- (a) When 5 percent of the original contract amount is earned, 25 percent of the amount bid for mobilization or 2-1/2 percent of the original contract amount, whichever is less, will be paid.
- (b) When 10 percent of the original contract amount is earned, 50 percent of the amount bid for mobilization or 5 percent of the original contract amount, whichever is less, will be paid.
- (c) When 25 percent of the original contract amount is earned, 60 percent of the amount bid for mobilization or 6 percent of the original contract amount, whichever is less, will be paid.
- (d) When 50 percent of the original contract amount is earned, 100 percent of the amount bid for mobilization or 10 percent of the original contract amount, whichever is less, will be paid.
- (e) Upon completion of all work on the project, payment of any amount bid for mobilization in excess of 10 percent of the original contract amount will be paid.
- (f) The total sum of all payments shall not exceed the original contract amount bid for the item, regardless of the fact that the Contractor may have, for any reason, shut down his work on the project or moved equipment away from the project and then back again.

June 20, 1988

FORCE ACCOUNT ITEMS
COLORADO PROJECT NO. IR 70-3(162)

DESCRIPTION

This provision consists of the Division's estimate for force account items included in the Contract. This work shall be performed as directed by the Engineer.

BASIS OF PAYMENT

Payment will be made in accordance with Subsection 109.04. Payment will constitute full compensation for all work necessary to complete the item.

Force account work valued at \$5,000 or less, that must be performed by a licensed journeyman in order to comply with federal, state, or local codes, may be paid for after receipt of an itemized statement endorsed by the Contractor.

FORCE ACCOUNT

<u>F/A No.</u>	<u>Pay Item</u>	<u>Quantity</u>	<u>Estimated Amount</u>
01	Minor Contract Revisions	F.A.	\$25,000
02	DBE Incentive Pavement	F.A.	As Per Specifications

REVISION OF SECTION 102
MATERIAL GUARANTY

Section 102 of the Standard Specifications is hereby revised for this project as follows:

Subsection 102.14 shall include the following:

All manufacturing processes for all steel products permanently incorporated in the work shall have occurred in the United States of America. All manufacturing processes are defined as, "all processes required to change the raw ore or scrap metal into the finished, in-place steel product". This requirement will not prevent a minimal use of foreign steel provided the total project delivered cost of all such steel, which includes the cost of delivering the steel to the project, does not exceed one-tenth of one percent of the total contract cost or \$2,500, whichever is greater.

The Contractor shall certify on each required mill test report that all manufacturing processes either have or have not occurred in the United States of America. The lack of such certification will be justification for rejection of the material represented by that mill test report.

Upon completion of the project, the Contractor shall certify in writing his compliance with this specification and provide evidence of the project delivered cost of all foreign steel permanently incorporated into the project.

June 13, 1985

REVISION OF SECTIONS 103 AND 107
CONSIDERATION OF PROPOSALS

Sections 103 and 107 of the Standard Specifications are hereby revised for this project as follows:

Subsection 103.01 shall include the following:

Prior to the award of the contract, the low responsible bidder shall submit a PERFORMANCE CAPABILITY STATEMENT (sample attached). The completed STATEMENT shall be submitted to the Award Officer prior to 4:30 P.M. on the 5th calendar day after the bid opening. Failure to submit the STATEMENT may result in the denial of award to the apparent low responsible bidder and forfeiture of the proposal guaranty.

In subsection 107.22, delete the next to last sentence and replace with the following:

The original of the signed affidavit relative to collusion shall be submitted by the Contractor with the bid proposal. The bid proposal will be rejected and will not be read if it does not contain the signed affidavit.

REVISION OF SECTIONS 103 AND 107
CONSIDERATION OF PROPOSALS

Project No. _____

Date _____

PERFORMANCE CAPABILITY STATEMENT

I, acting in my capacity as officer of a bidder/bidders (if a joint venture) on this project request that I be allowed to remain in competition for the contract. I am submitting the following information to show my capability to perform on this project.

1. Identity of Partnerships or Joint Ventures on this project.

a. _____

b. _____

c. _____

2. Identify any decreases in fiscal or workmanship qualifications compared to last prequalification submission to CDOH.

List key personnel changes: _____

List key equipment changes: _____

List fiscal capability changes (Legal actions, etc.): _____

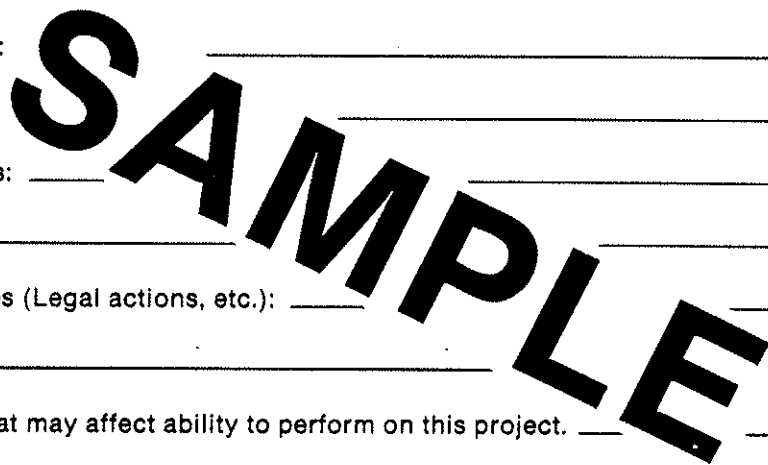
Any other circumstances that may affect ability to perform on this project. _____

NOTE: Write "None" if it appropriately answers any above listed item. If more space is needed for answers to the above listed items, attach additional sheets.

I DECLARE UNDER PENALTY OF PERJURY IN THE SECOND DEGREE, AND ANY OTHER APPLICABLE STATE OR FEDERAL LAWS, THAT THE STATEMENTS MADE ON THIS DOCUMENT ARE TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

SIGNATURE: _____ DATE: _____

FIRM NAME: _____



REVISION OF SECTION 108
LIQUIDATED DAMAGES

Section 108 of the Standard Specifications is hereby revised for this project as follows:

In subsection 108.07 delete the schedule of liquidated damages and replace with the following:

The schedule of liquidated damages will be:

Original Contract Amount		Daily Charge
From	To and	
More than	Including	
\$ 0	\$ 25,000	\$ 270
25,000	50,000	465
50,000	100,000	540
100,000	500,000	950
500,000	1,000,000	1250
1,000,000	2,000,000	1400
2,000,000	4,000,000	1750
4,000,000	8,000,000	1970
8,000,000	10,000,000	2050

Over \$10,000,000, daily charge will increase by \$100 increments for each \$2,000,000 over \$10,000,000.

REVISION OF SECTION 109
EQUIPMENT RENTAL RATES

Section 109 of the Standard Specifications is hereby revised for this project as follows:

In subsection 109.01 delete the twenty-eighth paragraph and replace with the following:

Rental of equipment will be measured by time in hours of actual working time and necessary traveling time of the equipment within the limits of the project unless special equipment has been ordered by the Engineer in connection with force account work, in which case travel time and transportation to the project will be measured. If equipment has been ordered held on the job on a standby basis by the Engineer, and is not otherwise utilized by the Contractor, standby rental rates for the equipment will be paid at the rates hereinafter specified.

Delete subsection 109.04(d) and replace with the following:

- (d) **Equipment.** For any machinery or special equipment (other than small tools), the use of which has been authorized by the Engineer, the Contractor will be paid for the use of equipment in the manner hereinafter specified.

Rental rates will be from the current edition of the Rental Rate Blue Book for Construction Equipment and will be determined as follows:

Hourly rate

$$RR = (ADJ\ BB/176)(RF)(SAF) + EOC$$

Standby rate

$$RR = (OC)(RF)(SAF)$$

Where: RR = Hourly rental rate
ADJ BB/176 = Blue Book Monthly Rate adjusted for year of manufacture/176
RF = Regional Factor of 1.06
SAF = State Adjustment Factor of 1.05
EOC = Estimated Hourly Operating Costs from Blue Book
OC = Ownership Costs

REVISION OF SECTION 109
FORCE ACCOUNT WORK

Section 109 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 109.04(c) and replace with the following:

- (c) When extra work on a force account basis is performed on the project by a subcontractor or specialty firm for the prime contractor, including utilities and railroads, a percentage based on the following table will be included in the total compensation due as calculated under this subsection. This additional percentage is to totally reimburse the prime contractor for all of the administrative expenses incurred in connection with the extra work. This administrative loading will only be applied to force account work performed by subcontractors or specialty firms and will not be applied to any work covered by bid items or compensated at negotiated unit prices. Percentages allowed will be applied to each individual billing for extra work not to exceed one billing per month. Approval of this additional percentage will be made after certified invoices are furnished by the Contractor.

To \$1,000	10%
Over \$1,000 to \$10,000	\$100 plus 5% of excess over \$1,000
Over \$10,000.....	\$550 plus 3% of excess over \$10,000

AFFIRMATIVE ACTION REQUIREMENTS

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EQUAL EMPLOYMENT OPPORTUNITY

A. AFFIRMATIVE ACTION REQUIREMENTS

Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246)

1. The Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Goals and Timetable for Minority Utilization

Timetable - Until Further Notice			
Economic Area	Standard Metropolitan Statistical Area (SMSA)	Counties Involved	Goal
157 (Denver)	2080 Denver-Boulder	Adams, Arapahoe, Boulder, Denver, Douglas, Gilpin, Jefferson	13.8%
	2670 Fort Collins	Larimer	6.9%
	3060 Greeley	Weld	13.1%
	Non SMSA Counties	Cheyenne, Clear Creek, Elbert, Grand, Kit Carson, Logan, Morgan, Park, Phillips, Sedgwick, Summit, Washington & Yuma	12.8%
158 (Colo. Spgs. - Pueblo)	1720 Colorado Springs	El Paso, Teller	10.9%
	6560 Pueblo	Pueblo	27.5%
	Non SMSA Counties	Alamosa, Baca, Bent, Chaffee, Conejos, Costilla, Crowley, Custer, Fremont, Huerfano, Kiowa, Lake, Las Animas, Lincoln, Mineral, Otero, Prowers, Rio Grande, Saguache	19.0%
159 (Grand Junction)	Non SMSA	Archuleta, Delta, Dolores, Eagle, Garfield, Gunnison, Hinsdale, La Plata, Mesa, Moffit, Montezuma, Montrose, Ouray, Pitkin, Rio Blanco, Routt, San Juan, San Miguel	10.2%
156 (Cheyenne-Casper, Wy)	Non SMSA	Jackson County, Colorado	7.5%

GOALS AND TIMETABLES FOR FEMALE UTILIZATION

Until Further Notice 6.9% -- Statewide

AFFIRMATIVE ACTION REQUIREMENTS

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EQUAL EMPLOYMENT OPPORTUNITY

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.
4. As used in this specification, and in the contract resulting from this solicitation, the "covered area" is the county or counties shown on the Invitation for Bids and on the plans. In cases where the work is in two or more counties covered by differing percentage goals, the highest percentage will govern.

AFFIRMATIVE ACTION REQUIREMENTS

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EQUAL EMPLOYMENT OPPORTUNITY

B. STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS

Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246)

1. As used in these Specifications:
 - a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
 - b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
 - c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
 - d. "Minority" includes:
 - (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
 - (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
 - (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
 - (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any office of Federal Contract Compliance Programs Office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

AFFIRMATIVE ACTION REQUIREMENTS

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5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
 - a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
 - b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its union have employment opportunities available, and maintain a record of the organization's responses.
 - c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source of community organization and of what action was taken with respect to each individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.
 - d. Provide immediate written notification to the Director when the union with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
 - e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.
 - f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations: by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc., by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the Contractor's EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

AFFIRMATIVE ACTION REQUIREMENTS

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EQUAL EMPLOYMENT OPPORTUNITY

- g. Review, at least annually, the Contractor's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foreman, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
- i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
- j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.
- k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
- l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc. such opportunities.
- m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
- n. Ensure that all facilities and Contractor's activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
- o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
- p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligation.

AFFIRMATIVE ACTION REQUIREMENTS

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8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goal and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.
9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).
10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The Contractor in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form, however, to the degree that existing records satisfy this requirement, Contractors shall not be required to maintain separate records.
15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

AFFIRMATIVE ACTION REQUIREMENTS

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EQUAL EMPLOYMENT OPPORTUNITY

C. SPECIFIC EQUAL EMPLOYMENT OPPORTUNITY RESPONSIBILITIES.

1. *General.*

- a. Equal employment opportunity requirements not to discriminate and to take affirmative action to assure equal employment opportunity as required by Executive Order 11246 and Executive Order 11375 are set forth in Required Contract Provisions (Form PR-1273 or 1316, as appropriate) and these Special Provisions which are imposed pursuant to Section 140 of Title 23, U.S.C., as established by Section 22 of the Federal-Aid Highway Act of 1968. The requirements set forth in these Special Provisions shall constitute the specific affirmative action requirements for project activities under this contract and supplement the equal employment opportunity requirements set forth in the Required Contract Provisions.
- b. The Contractor will work with the State highway agencies and the Federal Government in carrying out equal employment opportunity obligations and in their review of his/her activities under the contract.
- c. The Contractor and all his/her subcontractors holding subcontracts not including material suppliers, of \$10,000 or more, will comply with the following minimum specific requirement activities of equal employment opportunity: (The equal employment opportunity requirements of Executive Order 11246, as set forth in Volume 6, Chapter 4, Section 1, Subsection 1 of the Federal-Aid Highway Program Manual, are applicable to material suppliers as well as contractors and subcontractors.) The Contractor will include these requirements in every subcontract of \$10,000 or more with such modification of language as is necessary to make them binding on the subcontractor.

2. *Equal Employment Opportunity Policy.* The Contractor will accept as his operating policy the following statement which is designed to further the provision of equal employment opportunity to all persons without regard to their race, color, religion, sex, or national origin, and to promote the full realization of equal employment opportunity through a positive continuing program:

It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, or national origin. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, preapprenticeship, and/or on-the-job training.

3. *Equal Employment Opportunity Officer.* The Contractor will designate and make known to the State highway agency contracting officers and equal employment opportunity officer (hereinafter referred to as the EEO Officer) who will have the responsibility for and must be capable of effectively administering and promoting an active contractor program of equal employment opportunity and who must be assigned adequate authority and responsibility to do so.

4. *Dissemination of Policy.*

- a. All members of the Contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the Contractor's equal employment opportunity policy and contractual responsibilities to provide equal employment opportunity in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

- (1) Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the Contractor's equal employment opportunity policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

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- (2) All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer or other knowledgeable company official, covering all major aspects of the Contractor's equal employment opportunity obligations within thirty days following their reporting for duty with the Contractor.
 - (3) All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer or appropriate company official in the contractor's procedures for locating and hiring minority group employees.
- b. In order to make the Contractor's equal employment opportunity policy known to all employees, prospective employees and potential sources of employees, i.e., schools, employment agencies, labor unions (where appropriate), college placement officers, etc., the Contractor will take the following actions:
- (1) Notices and posters setting forth the Contractor's equal employment opportunity policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.
 - (2) The Contractor's equal employment opportunity policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.
5. *Recruitment.*
- a. When advertising for employees, the Contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be published in newspapers or other publications having a large circulation among minority groups in the area from which the project work force would normally be derived.
 - b. The Contractor will unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants, including, but not limited to, State employment agencies, schools, colleges and minority group organizations. To meet this requirement, the Contractor will, through his EEO Officer, identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to the Contractor for employment consideration.
- In the event the Contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the Contractor's compliance with equal employment opportunity contract provisions. (The U.S. Department of Labor has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the Contractor to do the same, such implementation violates Executive Order 11246, as amended.)
- c. The Contractor will encourage his present employees to refer minority group applicants for employment by posting appropriate notices or bulletins in areas accessible to all such employees. In addition, information and procedures with regard to referring minority group applicants will be discussed with employees.
6. *Personnel Actions.* Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, or national origin. The following procedures shall be followed:
- a. The Contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

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- b. The Contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.
 - c. The Contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the Contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.
 - d. The Contractor will promptly investigate all complaints of alleged discrimination made to the Contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the Contractor will inform every complainant of all of his avenues of appeal.
7. *Training and Promotion.*
- a. The Contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.
 - b. Consistent with the Contractor's work force requirements and as permissible under Federal and State regulations, the Contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event the Training Special Provision is provided under this contract, this subparagraph will be superseded as indicated in Attachment 2.
 - c. The Contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.
 - d. The Contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.
8. *Unions.* If the Contractor relies in whole or in part upon unions as a source of employees, the Contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the Contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:
- a. The Contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.
 - b. The Contractor will use best efforts to incorporate an equal employment opportunity clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, or national origin.
 - c. The Contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the Contractor, the Contractor shall so certify to the State highway department and shall set forth what efforts have been made to obtain such information.

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- d. In the event the union is unable to provide the Contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the Contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, or national origin; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The U.S. Department of Labor has held that it shall be no excuse that the union with which the Contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the Contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such Contractor shall immediately notify the State highway agency.

9. *Subcontracting.*

- a. The Contractor will use his best efforts to solicit bids from and to utilize minority group subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of minority-owned construction firms from State highway agency personnel.
- b. The Contractor will use his best efforts to ensure subcontractor compliance with their equal employment opportunity obligations.

10. *Records and Reports.*

- a. The Contractor will keep such records as are necessary to determine compliance with the Contractor's equal employment opportunity obligations. The records kept by the Contractor will be designed to indicate:
 - (1) The number of minority and nonminority group members and women employed in each work classification on the project.
 - (2) The progress and efforts being made in cooperation with unions to increase employment opportunities for minorities and women (applicable only to contractors who rely in whole or in part on unions as a source of their work force).
 - (3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees, and
 - (4) The progress and efforts being made in securing the services of minority group subcontractors or subcontractors with meaningful minority and female representation among their employees.
- b. All such records must be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the State highway agency and the Federal Highway Administration.
- c. The Contractors will submit an annual report to the State highway agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form PR 1391. If on-the-job training is being required by "Training Special Provisions", the Contractor will be required to furnish Form FHWA 1409.

BIDDING AND SUBLETTING OF CONTRACT

Participation by Foreign Contractors, Subcontractors and Products.

The Division will not consider for award any bid proposals submitted by any contractor, and will not consent to subletting any portions of the contract to any subcontractor, of a foreign country during any period in which such foreign country is listed by the United States Trade Representative as discriminating against United States firms in conducting procurements for public works projects. In addition, no product of any such listed country shall be permanently incorporated into the project.

This special provision applies to the participation of contractors, subcontractors and products of the country of Japan which has been listed by the United States Trade Representative.

Any contractor or subcontractor who is a citizen or national of a foreign country or is controlled directly or indirectly by citizens or nationals of a foreign country, shall be considered to be a contractor or subcontractor of such foreign country. The terms contractor and subcontractor also include any partner in a joint venture.

Any product, of which fifty percent or more of its cost is attributable to production or manufacturing in a foreign country, shall be considered to be a product of such foreign country.

DISADVANTAGED BUSINESS ENTERPRISE
DEFINITIONS AND REQUIREMENTS

(a) **Definitions**

For the purpose of this special provision the following terms are defined:

1. **Disadvantaged Business Enterprise (DBE).** A small business concern that is certified as being:
 - A. At least 51 percent owned by one or more socially and economically disadvantaged individuals or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more socially and economically disadvantaged individuals; and
 - B. Whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it.
 - C. **"Socially and Economically Disadvantaged Individuals"** means those individuals who are citizens or lawfully admitted permanent residents of the United States and who are:
 - (1) "Black Americans," which includes persons having origins in any of the Black racial groups of Africa;
 - (2) "Hispanic Americans," which includes persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;
 - (3) "Native Americans," which includes persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians;
 - (4) "Asian-Pacific Americans," which includes persons whose origins are from Japan, China, Taiwan, Korea, Vietnam, Laos, Cambodia, the Phillipines, Samoa, Guam, The U.S. Trust Territories of the Pacific, and the Northern Marianas;
 - (5) "Asian-Indian Americans," which includes persons whose origins are from India, Pakistan, and Bangladesh.
 - (6) Female; or
 - (7) Any other minorities or individuals found to be disadvantaged by the Small Business Administration pursuant to Section 8(a) of the Small Business Act.
2. **DBE Joint Venture.** Means an association of two or more businesses formed to carry out a single business enterprise for profit for which purposes they combine their property, capital, efforts, skills and knowledge. DBE joint ventures must be certified as a joint venture.
 - A. For those projects set-aside for bidding by DBEs only; all of the partners in a joint venture must be DBEs and certification of the joint venture will not be required.
 - B. For all projects other than the set-aside projects discussed in A. above; one of the partners in a joint venture must be a DBE. The DBE percentage of the joint venture will be determined at the time of certification.
3. **Contract Goals.** Goals that the Department feels should appropriately be met by the successful bidder. Contract goal will be the percentage stated in the Invitation for Bids and in the Project Specifications. Successful bidders that are awarded a contract based on sufficient reasonable efforts will be expected to make Good Faith Efforts, through the period of time that work on the project is in process, to provide for additional DBE participation toward meeting the goal.
4. **Sufficient Reasonable Efforts.** To demonstrate sufficient reasonable efforts to meet the contract goal, prior to award of contract, the Contractor shall document to the Division by use of CDOH Form No. 718, DBE Sufficient Reasonable Effort Documentation (sample attached), the efforts made including but not limited to the efforts listed on CDOH Form No. 718.

DISADVANTAGED BUSINESS ENTERPRISE
DEFINITIONS AND REQUIREMENTS

5. **Good Faith Efforts.** To demonstrate Good Faith Efforts to meet the contract goal throughout the performance of the contract, the Contractor shall document to the Division the steps taken including, but not limited to the following:
- A. Seek out and consider DBEs as potential subcontractors.
 - (1) Contact two or more DBEs for each category of work that is being subcontracted.
 - (2) Affirmatively solicit their interest, capability, and price quotations.
 - (3) Provide equal time for all prospective subcontractors to prepare their proposals.
 - (4) Provide at least as much time to DBEs in assisting them to prepare their bids for subcontract work as to non DBE contractors.
 - (5) Award subcontracts to DBEs where DBE quotations are reasonably competitive with other quotations received.
 - B. Maintain documentation of DBEs contacted and their responses.
 - (1) Maintain a list of DBEs contacted as prospective subcontractors.
 - (2) Maintain thorough documentation of criteria used to select each subcontractor.
 - (3) Where a DBE expressed an interest in a subcontract and made a quotation, and where the work was not awarded to a DBE, furnish a detailed letter explaining the reasons.

(b) **Certification as a DBE by the Department**

1. Any contractor may apply to the Department of Regulatory Agencies (DORA) for status as a DBE. Application shall be made on forms provided by the DORA for certification of DBEs. Application need not be made in connection with a particular bid. Only work contracted to DBE contractors or subcontracted to DBEs and independently performed by DBEs shall be considered toward contract goals as established elsewhere in these specifications.
2. It shall be the Contractor's responsibility to submit applications so that the DORA has sufficient time to render decisions. The DORA will review applications in a timely manner but is not committed to approve DBE status within any given period of time.
3. The Department will prepare, publish or make available from time to time a list of DBE contractors, vendors and suppliers for the purpose of providing a reference source to assist any bidder in identifying DBEs. Bidders will be solely responsible for verifying the Certification of DBEs they intend to use prior to submitting a proposal. The External EEO Unit of the Division will maintain a current list of eligible DBEs.
4. In meeting the requirements of this bid condition, bidders are in no way limited to the DBE directory referred to in 3. above in seeking out and negotiating with DBE contractors and determining which items of work shall be subcontracted to DBE contractors. Bidders shall exercise their own judgments in selecting any subcontractor to perform any portion of the work.
5. Permission for a DBE/non-DBE joint venture to bid on a specific project may be obtained from the Division based on information provided by the proposed joint venture on CDOH Form No. 893, "Information For Determining Joint Venture Eligibility". Joint venture applications should be submitted well in advance of bid openings.

(c) **Bidding Requirements**

1. Potential contractors shall submit a fully executed CDOH Form No. 714 with their proposal and a fully executed CDOH Form No. 715 (sample attached) no later than five calendar days after the date of bid opening, to the External EEO Unit in the Division's Staff Construction Branch.

**DISADVANTAGED BUSINESS ENTERPRISE
DEFINITIONS AND REQUIREMENTS**

2. The award of contract, if awarded, will be made to the lowest responsible bidder that will meet or exceed the contract goal or, if the goal will not be met, is able to demonstrate that sufficient reasonable efforts were made to meet the goal. Sufficient reasonable efforts are explained in (a)4 of this special provision.
3. The use of a DBE firm named on a CDOH Form No. 715, for the items of work described, is a condition of award. The replacement of a named DBE firm will be allowed only as provided for in (e) of this special provision. Failure to comply will constitute grounds for default and termination of the contract.
4. **Contractor's DBE Obligation.** The prime Contractor bidding on construction projects advertised by the Division agrees to ensure that Disadvantaged Business Enterprises (DBEs), as defined in this special provision and in the STURAA of 1987, have the maximum opportunity to participate in the performance of contracts or subcontracts financed in whole or in part with Federal or State funds. The prime Contractor shall not discriminate on the basis of race, color, national origin, or sex in the bidding process or the performance of contracts.

To ensure that DBEs are offered maximum opportunity to participate in the performance of contracts, it is the responsibility of the prime Contractor to offer and to provide assistance to DBEs related to the DBE performance of the subcontract. However, the DBE must independently perform a commercially useful function on the project.

(d) Counting DBE Participation Toward Goals

1. Once a firm has been certified as a DBE the total dollar amount of the contract awarded to the firm shall be counted toward the contract goal as explained below.
2. The actual dollar total of a proposed subcontract, supply or service contract with a DBE firm will be reported to the Department using CDOH Form No. 713. A CDOH Form No. 713 for subcontracts is to be submitted with the CDOH Form No. 205 and receipt will be a condition of approval. A CDOH Form No. 713 for a supply or service contract is to be submitted once a contract has been fully executed so the Division will be able to report the DBE participation in a timely manner. The eligibility of a proposed DBE subcontractor will be finally established based on the firm's status at the time of CDOH Form No. 205 approval. The eligibility of a DBE supplier or service firm will be finally established as of the date the CDOH Form No. 713 is received by the Division. If a firm becomes certified as a DBE during performance under a fully executed contract with CDOH but prior to the DBE performing any work, then 100% of the work performed by the firm under that contract may be claimed as eligible work. No work performed by a DBE firm can be counted toward DBE participation prior to CDOH approval on CDOH Form No. 205.
3. A Contractor may count toward its contract goal the percentage of the total dollar amount of a contract with a Department certified joint venture that equals the percentage of the ownership and controls of the DBE partner in a joint venture.
4. A. A Contractor may count toward its contract goal only that percentage of expenditures to DBEs which independently perform a commercially useful function in the work of a contract. A DBE is considered to be performing a commercially useful function by actual performing, managing, and supervising the work involved. To determine whether a DBE is performing a commercially useful function, the Division will evaluate the amount of work subcontracted, work performed solely by the DBE, industry practices, and other relevant factors.

DISADVANTAGED BUSINESS ENTERPRISE
DEFINITIONS AND REQUIREMENTS

- B. A DBE may enter into subcontracts consistent with normal industry practices. If a DBE contractor subcontracts over 51% of the work of the contract the DBE shall be presumed not to be performing a commercially useful function. The DBE may present evidence to rebut this presumption to the Division.
5. A Contractor may count toward its contract goal the percentage of expenditures for materials and supplies obtained from DBE suppliers (regular dealers) and manufacturers, provided that the DBEs assume the actual and contractual responsibility for and actually provide the materials and supplies.
- A. The Contractor may count 100 percent of its expenditures to a DBE manufacturer. A DBE manufacturer is a certified firm that operates or maintains a factory or establishment that produces on the premises the materials or supplies obtained by the Contractor.
 - B. The Contractor may count 60 percent of its expenditures to DBE suppliers that are not manufacturers, provided that the DBE supplier performs a commercially useful function in the supply process. A supplier is a certified firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials or supplies required for the performance of the contract are bought, kept in stock, and regularly sold to the public in the usual course of business. To be a supplier the firm must engage in, as its principal business and in its own name, the purchase and sale of the products in question. A supplier in such bulk items as steel, cement, gravel, stone, and petroleum products need not keep such products in stock, if it owns or operates distribution equipment. Brokers and packagers shall not be regarded as manufacturers or suppliers within the meaning of this section.
 - C. The Contractor may count toward its DBE goal the following expenditures to certified DBE firms that are not manufacturers or suppliers:
 - (1) The fees or commissions charged for providing a bona fide service, such as professional, technical, consultant or managerial services and assistance in the procurement of essential personnel, facilities, equipment, materials or supplies required for performance of the contract, provided that the fee or commission is determined by the Division to be reasonable and not excessive as compared with fees customarily allowed for similar services.
 - (2) The fees charged for delivery of materials and supplies required on a job site (but not the cost of the materials and supplies themselves) when the hauler, trucker, or delivery service is not also the manufacturer of or a supplier of the materials and supplies, provided that the fee is determined by the Division to be reasonable and not excessive as compared with fees customarily allowed for similar services.
 - (3) The fees or commissions charged for providing any bonds or insurance specifically required for the performance of the contract, provided that the fee or commission is determined by the Division to be reasonable and not excessive as compared with fees customarily allowed for similar services.
6. To determine the goal achieved under this contract the DBE participation as described in (d) of this special provision shall be divided by the original prime contracted amount and multiplied by 100 to determine the percentage of performance. The Contractor shall maintain records of payment that show amounts paid to DBEs. Upon completion of the project, the Contractor shall submit a CDOH Form No. 17 listing all DBEs that engaged in this contract, the work performed by each, and report the total dollar amount paid to each. The Contractor shall certify the amount paid. This certification shall include a co-signature by the DBE and may be audited by the Division. When there is no participation by DBEs the Contractor shall submit a CDOH Form No. 17 that indicates no participation and give reasons why there was no participation.

DISADVANTAGED BUSINESS ENTERPRISE
DEFINITIONS AND REQUIREMENTS

(e) **Replacement of DBE Subcontractors**

Based upon a showing of good cause the Contractor may request that a DBE named on a CDOH Form No. 715 be replaced with another DBE pursuant to the terms and conditions of this special provision. Replacements will be allowed only with prior written approval of the Division.

1. If a replacement is to be requested prior to the time that the named DBE has begun to effectively prosecute the work under a fully executed subcontract, the Contractor shall furnish to the Division the following:
 - A. Written permission of the named DBE. Written permission may be waived only if such permission cannot be obtained for reasons beyond the control of the Contractor.
 - B. A full written disclosure of the circumstances making it impossible for the Contractor to comply with the condition of award.
 - C. Documentation of the Contractor's assistance to the DBE named on CDOH Form No. 715.
 - D. Copies of any pertinent correspondence and documented verbal communications between the Contractor and the named DBE.
 - E. Documentation of the Good Faith Efforts in finding a replacement DBE subcontractor and the results of the efforts. It is within the control of the Contractor to locate, prior to award, DBEs that offer reasonable prices and that could reasonably be expected to perform the work. For this reason, increased cost shall not, by itself, be considered sufficient reason for not providing an in-kind replacement.

In the event that the Contractor is able to both document the need and to offer a replacement DBE who can perform the work at a reasonable cost, the Division will approve the replacement at no additional cost to the Division.

2. In the event a DBE subcontractor begins to prosecute the work and is unable to satisfactorily complete performance of the work, the Contractor shall furnish to the Division the following:
 - A. Documentation that the subject DBE subcontractor did not perform in a satisfactory manner.
 - B. Documentation of the Contractor's assistance to the DBE subcontractor prior to finding the DBE subcontractor in default.
 - C. A copy of the certified letter finding the DBE to be in default or a letter from the DBE stating that it cannot complete the work and it is turning the work back to the Contractor.
 - D. Copy of the contract between the Contractor and the DBE subcontractor, plus any modifications thereto.
 - E. Documentation of the Good Faith Efforts in finding a replacement DBE subcontractor and the results of the efforts.

In the event the Contractor is able to locate a replacement DBE who can perform the work at a reasonable cost to the Contractor, and also demonstrates to the satisfaction of the CDOH that prior to bid it had reason to believe that the named DBE firm was responsible and not expected to default, the Division may modify or renegotiate the contract to compensate the

DISADVANTAGED BUSINESS ENTERPRISE
DEFINITIONS AND REQUIREMENTS

Contractor for any reasonable extra costs, because of a higher price in the proposal of the replacement DBE subcontractor than that of the original DBE subcontractor who failed to perform.

Provided, however, that the Division will not be obligated to participate in any increased cost to the Contractor if the DBE that fails to perform has a recent history of performance failure(s) or default that was either known, or should have been known, to the Contractor prior to award.

3. If the Contractor is unable to locate a DBE replacement that is both interested in and capable of performing the work at a reasonable cost, the Division may waive the requirement that the work be performed by a DBE and the Contractor shall provide for the satisfactory completion of the work at no additional cost to the Division.

(f) **Sanctions**

It is the obligation of the Contractor to provide DBE firms with the maximum opportunity to participate in the performance of the work.

It is the responsibility of DBE firms to perform their work in a responsible manner fully consistent with the intent of the DBE program, and in substantial compliance with the terms and conditions of these DBE definitions and requirements.

DBE firms which fail to perform their work in a responsible manner, fail to perform a commercially useful function as described in subsection (d)4 of these DBE definitions and requirements or operate in a manner which is not consistent with the intent of the DBE program may be subject to revocation of certification.

A finding by the Division that the Contractor has failed to comply with the terms and conditions of these DBE definitions and requirements shall constitute sufficient grounds for default and termination of the contract in accordance with subsection 108.08 of the Standard Specifications.

Attachments:
CDOH Form No. 715
CDOH Form No. 718

COLORADO DEPARTMENT OF HIGHWAYS DBE PARTICIPATION

Project No. _____
Location _____
Date _____
Sheet _____ of _____ Sheets

NOTE: Submit separate sheets for each proposed DBE.

Acting in my capacity as officer of a bidder (bidders if a joint venture) on this contract, I request that we be allowed to remain in competition for this contract. I assure that the contract goals as established for this contract will be met or that I have attached to this form my documentation establishing that I have demonstrated sufficient reasonable efforts to meet the goals. The following work under this contract will be performed by:

NAME OF FIRM: _____

Check appropriate box or boxes

This work is to be counted toward the contract goal for:

Cert. No. _____ Exp. Date _____

Items of work to be subcontracted

* * Note: Dollar values are to be actual subcontract dollars and not prime contract prices.

* * Total Dollar Value of this Proposed Subcontract Applicable toward Contract Goal	<input type="text"/>	A*
Total Dollar Value of Proposed Subcontracts Applicable toward Contract Goals from Prior Sheets	_____	B
Accumulative Value of Proposed Subcontracts Applicable to Contract Goal	_____	C
Original Contract Bid Total	_____	D
Accumulative Percent of Contract Bid Total Subcontracted to DBEs	_____	E

INSTRUCTIONS TO CONTRACTORS:
1. Keep last copy (goldenrod) for your records
2. Send remaining copies to:
STAFF CONSTRUCTION (External EEO Unit)
Colorado Department of Highways
4201 E. Arkansas Ave.
Denver, Colorado 80222

Distribution
White - Staff Construction Project File
Canary - District EEO Representative
Pink - Project Engineers File
Goldenrod - Contractor's Copy

*A + B = C C ÷ D = E

CERTIFICATION: My signature on this form certifies:

1. That my company has accepted a proposal from the firm named above; and
2. That my company has notified the firm named above of this commitment; and
3. That my company understands that use of the above named firm for the items of work listed is a condition of award; and
4. That my company will invite the above named firm to attend the preconstruction conference; and
5. That substitutions will not be allowed except as stipulated in the DBE Definitions and Requirements for the above named firm's failure to perform under a fully executed subcontract. In that case, I shall make good faith efforts to subcontract the work to an alternate DBE. The Department may cooperate by modifying or renegotiating the contract if it is necessary due to reasonable extra costs incurred by my company which are directly related to subcontracting the above referenced items with a replacement DBE.
6. That I understand that failure to comply will constitute grounds for termination of the contract.

I declare under penalty of perjury in the second degree, and any other applicable state or federal laws, that the statements made on this document are true and complete to the best of my knowledge.

By: _____

COMPANY NAME

Title: _____

**COLORADO DEPARTMENT OF HIGHWAYS
DBE SUFFICIENT REASONABLE
EFFORT DOCUMENTATION**

Project

Location

Date

The contractor who is the apparent low bidder on a CDOH construction project and has failed to meet the DBE contract goals shall document on this form and all attachments the sufficient reasonable efforts made by said Contractor to attempt to meet these goals to date.

Each portion of this form is to be addressed in the spaces provided. Attach support documentation as required. Use attached sheets to supplement space provided. This completed form and required attachments are to be submitted to the CDOH Staff Construction Branch prior to 4:30 PM on the fifth calendar day after the day bids are opened.

I. List the bid items (including portions of bid items) you identified as subcontract items to be performed by DBEs to achieve the established DBE participation goals. Does the total of subcontract items equal or exceed the goal percentage established by CDOH? If not, why not?

II. What efforts were made to solicit bids from certified DBEs for the identified work items? At a minimum, provide copies of letters sent to all DBEs and responses; copy of telephone log of calls made to DBEs and responses; and copies of ads run in general circulation, trade association and minority focus media (ads must be project specific and state the type of work for which proposals are being solicited). Provide detailed explanation for failure to include any of the above.

III. Provide a list of minority community organizations, minority contractor groups and other organizations contacted that provided assistance in recruitment and placement of DBEs. What assistance was received?

IV. List the DBE bids received for each bid item and the name of the successful bidder. If the DBE bids were not used, give reasons for each case. If the reason is cost difference, provide the dollar difference or percent difference between the low bid and the DBE bid. (Note: Cost alone may not be adequate justification for failure to use a DBE bid.)

V. Describe additional efforts to assist DBEs, such as providing needed assistance in obtaining bonding and/or insurance, or any other relevant efforts on the part of the contractor to increase DBE contract participation.

THE CONTRACTOR UNDERSTANDS THAT DEMONSTRATION OF GOOD FAITH EFFORTS IN ACHIEVING THE DBE GOALS ESTABLISHED BY CDOH IS REQUIRED THROUGHOUT THE PERFORMANCE OF THE CONTRACT.

COMPANY

By

Title

MINIMUM WAGES COLORADO, U.S. DEPT. OF LABOR DECISION NO. C088-1
HEAVY AND HIGHWAY CONSTRUCTION, STATEWIDE

Decision No. C088-1 dated Jan. 8, 1988 supersedes Decision No. C087-1 dated January 2, 1987	Modifications Mod. 1, 4-22-88, pages 1,3,7,8 Mod. 1, 5-18-88, errata page 3 Mod. 2, 6-17-88, page 1	1 E 2
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Code	Classification	Basic Hourly Rate	Fringe Benefits	
2	CARPENTERS	\$14.00	\$ 3.50	2
3B	CEMENT MASONS	12.40	3.79	
	ELECTRICIANS:			
	Area 1:			
4	Electricians	16.85	2.10+ 3.3%	
5	Cable Splicers	17.10	2.10+ 3.3%	
	Area 2:			
6	Electricians	16.00	1.50+ 4%	
7	Cable Splicers	16.25	1.50+ 4%	
	Area 3:			
	Contracts over \$100,000.00:			
55	Electricians	15.49	2.00+ 4.5%	
56	Cable Splicers	17.04	2.00+ 4.5%	
57	Electricians on electrical contracts less than \$100,000.00	11.50	1.80+ 4.5%	
	Area 4:			
14	Electricians	16.37	2.31+ 3%	
	IRONWORKERS:			
18	Structural, Ornamental & Reinforcing	15.23	3.55	1
	LINE CONSTRUCTION:			
106	Cable Splicers	18.55	2.00+ 3%	
108	Journeyman Lineman, Gas Fitter Welder	16.88	2.00+ 3%	
109	Line Equipment Operator, Line Truck Crew Class 1	13.33	2.00+ 3%	
111A	Groundman	10.28	2.00+ 3%	
	PAINTERS:			
	Area 1:			
19	Brush	14.92	2.33	
20	Spray, Swing Stage	15.52	2.33	
	Area 2:			
21	Brush	13.01	1.88	
22B	Spray, Swing Stage	13.61	1.88	
	Area 3:			
24	Brush	11.92	1.88	
25A	Spray, Swing Stage	12.52	1.88	

Code	Classification	Basic Hourly Rate	Fringe Benefits
	PLUMBERS:		
26A	Montezuma County	\$ 17.45	\$ 2.65
	LABORERS:		
112	Flaggers/Traffic Directors	6.72	2.59
113	Group 1	10.02	2.59
114	Group 2	10.07	2.59
115	Group 3	10.57	2.59
	TUNNEL LABORERS:		
118	Group 1	10.02	2.59
119	Group 2	10.92	2.59
120	Group 3	11.02	2.59
121	Group 4	11.12	2.59
122	Group 5	11.17	2.59
123	Group 6	12.07	2.59
	SHAFTS, RAISES, MISSILE SILOS AND ALL UNDERGROUND WORK OTHER THAN TUNNELS:		
124	Group 1	11.02	2.59
125	Group 2	11.17	2.59
126	Group 3	11.27	2.59
127	Group 4	11.52	2.59
128	Group 5	11.62	2.59
129	Group 6	12.22	2.59

Code	Classification	Basic Hourly Rate	Basic Hourly Rate
		ZONE 1	ZONE 2
	POWER EQUIPMENT OPERATORS: (Other than for work in Tunnels, Shafts, and Raises):		
130	Group 1	\$ 12.41	\$ 13.08
131	Group 2	12.76	13.43
132	Group 3	13.11	13.78
133	Group 4	13.26	13.93
134	Group 5	13.41	14.08
135	Group 6	13.56	14.23
	(For work in Tunnels, Shafts, and Raises):		
136	Group 1	14.56	15.23
137	Group 2	14.91	15.58
138	Group 3	15.01	15.68
139	Group 4	15.26	15.93
140	Group 5	15.41	16.08
141	Group 6	15.81	16.48
142	Group 7	15.56	16.23
	<u>FRINGE BENEFITS:</u> \$3.77 per hour		

Code	Classification	Basic Hourly Rate	Basic Hourly Rate	
	TRUCK DRIVERS:	<u>ZONE 1</u>	<u>ZONE 2</u>	
28	Group 1	\$ 13.61	\$ 12.28	1
29	Group 2	13.71	13.01	1
30	Group 3	13.81	13.14	E
31	Group 4	13.91	13.21	1
32	Group 5	15.51	13.26	1
92	Group 6	15.56	13.33	1
34	Group 7	15.61	13.38	1
93	Group 8	15.66	13.45	1
94	Group 9	15.71	13.58	1
38	Group 10	15.76	13.64	1
39	Group 11	15.86	13.76	1
40	Group 12	15.91	14.01	1
41	Group 13	16.01	14.06	1
36	Group 14	16.16	14.13	1
42	Group 15	16.21	14.27	1
95	Group 16	16.31	14.51	1
43	Group 17	16.41	14.77	1
44	Group 18	16.51	15.51	1
45	Group 19	16.61	15.76	1
46	Group 20	16.81		1
	<u>FRINGE BENEFITS:</u> \$3.64 per hour			

WELDERS - receive rate prescribed for craft performing operation to which welding is incidental.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR, 5.5(a)(1)(ii)).

ELECTRICIANS:

- Area 1: Adams, Arapahoe, Boulder, Clear Creek, Denver, Douglas, Eagle, Gilpin, Grand, Jackson, Jefferson, Lake, Larimer, Logan, Morgan, Phillips, Sedgwick, Summit, Washington, Weld and Yuma Counties.
- Area 2: Delta, Dolores, Garfield, Gunnison, Hinsdale, La Plata, Mesa, Moffat, Montezuma, Montrose, Ouray, Pitkin, Rio Blanco, Routt, San Juan and San Miguel Counties.
- Area 3: Alamosa, Archuleta, Baca, Bent, Chaffee, Crowley, Custer, Fremont, Huerfano, Kiowa, Las Animas, Mineral, Otero, Prowers, Pueblo, Rio Grande and Saguache Counties.
- Area 4: Cheyenne, Elbert, El Paso, Kit Carson, Lincoln, Park and Teller Counties.

PAINTERS:

- Area 1: Adams, Arapahoe, Boulder, Clear Creek, Delta, Denver, Douglas, Eagle, Elbert, Garfield, Gilpin, Grand, Gunnison, Jackson, Jefferson, Lake, Larimer, Logan, Mesa, Moffat, Montrose, Morgan; Park County (northern half); Phillips, Pitkin, Rio Blanco, Routt, Sedgwick, Summit, Washington and Weld Counties.
- Area 2: Baca, Bent, Crowley, Costilla, Custer, Huerfano, Kiowa, Las Animas, Otero, Prowers and Pueblo Counties.

Area 3: Alamosa, Archuleta, Chaffee, Cheyenne, Dolores, El Paso, Fremont, Hinsdale, Kit Carson, La Plata, Lincoln, Mineral, Montezuma, Ouray; Park County (southern half); Rio Grande, Saguache, San Juan, San Miguel and Teller Counties.

LABORERS:

- Group 1: Minimum labor, including caissons to 8'; carrying reinforcing rods; dowel bars; fence erectors; fire watcher on power plants and oil refineries; gabion basket and reno mattresses; signaling, metal mesh; nursery man, including seeding; mulching and planting trees; pipe plants and yards; shrubs and flowers; stake chaser; tie bars and chairs in concrete paving; waterproofing concrete.
- Group 2: Air, gas, hydraulic tools and electrical tool operators; barco hammers; cutting torches; drill; diamond and core drills; electric hammers; jackhammers; hydraulic jacks; tampers; air tampers; boring machines; air hydraulic boring machines; automatic concrete power curbing machines; concrete processing material; form-setters; highways, streets, and airports runways; operators of concrete saws on pavement (other than gangsaws); power operated concrete buggies; hot asphalt labor; asphalt curb machines; paving breakers; transverse concrete conveyor operator; cofferdams; boxtenders; caissons 8' to 12'; caissons over 12'; jackhammer operators in caissons over 12'; labor applicable to pipe coating or wrapping; pipe wrappers, plant and yard; relining pipe; hydroliner (a plastic may be used to waterproof); pipelayer on underground bores; sewer, water, gas, oil and telephone conduit; enamalers or pipe, inside and out, mechanical grouters; monitors; jeep holiday detector men; pump operators, rakers; vibrators; hydro-broom, mixer man; gunnite nozzlemen; shotcrete operator; timbermen, timber and chain saws; sand blasters; licensed powdermen; powdermen and blasters; siphons; signalmen.
- Group 3: Plug and galleys in dams; scalers; and work on or off bridges 40' above the ground performed by laborers' working from a bos'n chair, swinging stage, life belt, or block and tackle as a safety requirement. All lines and safety belts used shall be of a type approved by state and federal laws.

LABORERS (TUNNEL):

- Group 1: Outside Labor.
- Group 2: Minimum Tunnel Labor, Dry Houseman.
- Group 3: Cable or Hose Tenders, Chuck Tenders, Concrete Laborers, Dumpmen, Whirley Pump Operators.
- Group 4: Tenders on Shotcrete, Gunniting and Sand Blasting; Tenders, Core and Diamond Drills; Pot Tenders.
- Group 5: Cement Finisher Tender, applying of concrete processing materials.
- Group 6: Collapsible Form Movers and Setters, Miners, Machine Men and Bit Grinders, Nippers, Powdermen and Blasters, Reinforcing Steel Setters, Timbermen (steel or wood tunnel support, including the placement of sheeting when required) and all cutting and welding that is incidental to the Miner's work; Tunnel Liner Plate Setters; Vibrator Men, internal and external; Unloading, stopping and starting of Moran Agitator Cars; Diamond and Core Drill Operators; Cement Finisher (underground); Shotcrete Operator; Gunnite Nozzlemen, Sand Blasters, Pump Concrete Placement Men.

LABORERS (Shafts, Raises, Missile Silos and All Underground Work
other than Tunnels):

- Group 1: Laborers, Topmen, Bottommen and Cagers.
- Group 2: Chucktenders, Concrete Laborers, Whirley Pump Operators.
- Group 3: Tenders in Shotcrete Guniting and Sand Blasting; Tenders on Core and Diamond Drills; Pot Tenders; Cement Finisher Tenders, applying concrete processing materials.
- Group 4: Diamond and Core Drill Operators; Cement Finisher (underground); Gunitite Nozzlemen; Shotcrete Operators; Sand Blasters and Pump Concrete Placement Men.
- Group 5: Any employee performing work underground from a Bos'n Chair, Swinging Stage, Life Belt or Block and Tackle as a safety requirement. All lines and safety belts used shall be of a type approved by State and Federal Laws.
- Group 6: Collapsible Form Movers and Setters, Miners, Machine Men and Bit Grinders, Nippers, Powdermen and Blasters, Reinforcing Steel Setters, Timbermen (steel or wood tunnel support, including the placement of sheeting when required) and all cutting and welding that is incidental to the Miner's work; Liner Plate Setters; Vibrator Men, internal and external.

POWER EQUIPMENT OPERATORS - ZONE DEFINITIONS

Counties entirely within Zone 1:

Alamosa	Conejos	Douglas	Jefferson	Morgan	Sedgwick
Archuleta	Costilla	El Paso	La Plata	Otero	Teller
Bent	Crowley	Fremont	Larimer	Phillips	Weld
Boulder	Custer	Garfield	Logan	Prowers	
Chaffee	Delta	Gilpin	Mesa	Pueblo	
Clear Creek	Denver	Huerfano	Montezuma	Rio Grande	

Counties entirely within Zone 2:

Baca	Gunnison	Kit Carson	Moffat	Rio Blanco	San Miguel
Cheyenne	Hinsdale	Lake	Ouray	Routt	Summit
Dolores	Jackson	Lincoln	Park	Saguache	Yuma
Grand	Kiowa	Mineral	Pitkin	San Juan	

Legal description of the portions of Adams, Arapahoe, Eagle, Elbert, Las Animas, Montrose, and Washington Counties which are included within Zone 1, as follows:

All of Adams, Arapahoe, Elbert and Las Animas Counties lying west of the Township Line between R59W and R60W of the 7th Guide Meridian West; and all of Eagle County lying west of the Township line between R80W and R81W of the North line of Ouray County and said North line extended west to the Township line between R11W and R12W, said part lying east of said Township Line of the New Mexico Principal Meridian, and all of Washington County lying north of the 40 degree 00 minutes 00 seconds Latitude Base Line.

Legal description of the portions of Adams, Arapahoe, Eagle, Elbert, Las Animas, Montrose and Washington Counties which are included within Zone 2, as follows:

All of Adams, Arapahoe, Elbert and Las Animas Counties lying east of the Township Line between R59W and R60W of the 7th Guide Meridian West, and all of Eagle County lying East of the Township Line between R80W and R81W of the 9th

Guide Meridian West, and all of Montrose County except that part lying Northerly of the North Line of Ouray County and said North line extended west to the Township line between R11W and R12W, said point being East of said Township Line of the New Mexico Principal Meridian, and all of Washington County lying South of the 40 degree 00 minutes 00 seconds Latitude Base Line.

POWER EQUIPMENT OPERATORS

- Group 1: Air Compressor; Asphalt Screed; Oiler; Brakeman; Drill Operator - smaller than Williams MF and similar; Tender to Heavy Duty Mechanic and/or Welder; Operators of 5 or more light plants, Welding Machines, Generators, single unit conveyor; Pumps; Vacuum Well Point System; Tractor, under 70 HP with or without attachments, Compressors, 360 C.F.M. or less.
- Group 2: Conveyor, handling building materials; Ditch Witch and similar Trenching Machine; Fireman or Tank Heater, road; Forklift; Haulage Motor Man; Pugmill; Portable Screening Plant with or without a spray bar; Screening Plants, with classifier; Self-propelled Roller, rubber-tired under 5 tons.
- Group 3: Asphalt Plant; Backfiller, Bituminous Spreader or Laydown Machine; Cableway Signalman; Caisson Drill; Williams MF, similar and larger; C.M.I. and similar; Concrete Batching Plants; Concrete Finish Machine; Concrete Gang Saws on concrete paving; Concrete Mixer, less than 1 yd.; Concrete Placement Pumps, under 8 inches; Distributors, Bituminous Surfaces; Drill, Diamond or Core; Drill Rigs, Rotary, Churn, or Cable Tool; Elevating Graders, Equipment Lubricating and service Engineer; Engineer Fireman; Grout Machine; Gunnite Machine; Hoist, 1 drum; Hydraulic Backhoes, wheel mounted under 3/4 yd.; Loader, Barber Green, etc.; Loader up to and including 6 cu. yds.; Motor Grader/Blade, rough; Road Stabilization Machine; Rollers, self-propelled, all types over 5 tons; Sandblasting Machine; single unit portable crusher, with or without washer; Tie Tamper, wheel mounted; Tractor, 70 HP and over with or without attachments; Trenching Machine Operator; Welder; Winch on truck.
- Group 4: Cable operated Crane, track mounted; Cable operated power Shovels, Draglines, Clamshells and Backhoes, 5 cu. yds. and under; Concrete Mixer over 1 cu. yd.; Concrete Paver 34E or similar; Concrete Placement Pumps, 8 in. and over; Crane, 50 tons and under; Hoist, two drums; Hydraulic Backhoe, 3/4 yd. and over; Loader, over 6 cu. yds.; Machine Doctor; Mechanic; Mixer Mobile; Motor Grader/blade, finish; Multiple unit portable Crusher, with or without washer; Piledriver; Scrapers, single bowl under 40 cu. yds.; Self-propelled Hydraulic Crane; Tractor with sideboom; Truck mounted Hydraulic Crane; Welder.
- Group 5: Cable operated power Shovels, Draglines, Clamshells and Backhoes over 5 cu. yds.; Crane 50 to 90 tons carrier mounted; Derrick; Electric rail type Tower Crane; Hoist, 3 drum or more; Quad Nine and similar push unit; Scrapers single bowl including pups 40 cu. yds. and tandem bowls and over; Mechanic-Welder (heavy-duty).
- Group 6: Cableway; Crane (90 tons and over); Climbing Tower Crane; Crawler or truck mounted Tower Crane; Wheel Excavator, Tower Crane, rail type.

POWER EQUIPMENT OPERATORS

(For work in Tunnels, Shafts and Raises)

- Group 1: Brakeman.
- Group 2: Motorman.
- Group 3: Compressor (900 CFM and over) serving Tunnels, Shafts and Raises.
- Group 4: Air Tractors; Grout Machine; Gunnite Machine; Jumbo Form; Mechanic; Welder.
- Group 5: Concrete Placement Pumps, 8" and over discharge; Mucking Machines and Front End Loaders, underground, Slusher; Mine Hoist Operator.
- Group 6: Mole.
- Group 7: Mechanic - Welder, heavy duty.

TRUCK DRIVERS - ZONE DEFINITIONS

COUNTIES WITHIN ZONE 1:

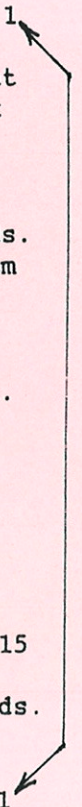
Alamosa, Archuleta, Baca, Bent, Cheyenne, Conejos, Costilla, Crowley, Dolores, Eagle, Grand, Gunnison, Hinsdale, Jackson, Kiowa, Kit Carson, Lake, LaPlata, Lincoln, Logan, Mineral, Moffat, Montezuma, Morgan, Otero, Ouray, Park, Phillips, Pitkin, Prowers, Rio Blanco, Rio Grande, Routt, Saguache, San Juan, San Miguel, Sedgewick, Summit, Yuma, Washington.

COUNTIES WITHIN ZONE 2:

Adams, Arapahoe, Boulder, Chaffee, Clear Creek, Custer, Delta, Denver, Douglas, Elbert, El Paso, Fremont, Garfield, Gilpin, Huerfano, Jefferson, Larimer, Las Animas, Mesa, Montrose, Pueblo, Teller and Weld.

TRUCK DRIVERS ZONE 1

- Group 1: Pickup, truck driver tenders, dumpmen, greasemen.
- Group 2: Dump truck driver to and including 6 cubic yards, sweeper truck, flat rack single axle, and manhaul, shuttle truck or bus, liquid and bulk tankers - single axle.
- Group 3: Flat rack tandem axle battery men, mechanics tenders.
- Group 4: Fork lift driver.
- Group 5: Dump truck driver over 6 cubic yards, to and including 14 cubic yards.
- Group 6: Straddle truck driver, lumber carrier, liquid and bulk tankers-tandem axle.
- Group 7: Truck drivers-fuel truck, grease truck, combination fuel and grease.
- Group 8: Cement mixer-agitator truck to and including 10 cubic yards, distributor truck driver liquid and bulk tankers-semi or combination.
- Group 9: Multi purpose truck-speciality and hoisting.
- Group 10: Dump truck driver over 14 cubic yards, to and including 29 cubic yards, highboy, lowboy, floats, semi cab operated distributor truck driver - semi liquid and bulk tankers - euclid - electric or similar truck driver dumptor type, youngbuggy, jumbo and similar type equipment.
- Group 11: Truck driver, snow plow.
- Group 12: Cement mixer - agitator truck over 10 cubic yards, to and including 15 cubic yards.
- Group 13: Dump truck driver over 29 cubic yards, to and including 39 cubic yards.
- Group 14: Cement mixer - agitator truck over 15 cubic yards.
- Group 15: Tireman dump truck driver over 39 cubic yards, to and including 54 cubic yards.



- Group 16: Mechanic
Group 17; Dump truck driver over 54 cubic yards, to and including 79 cubic yards.
Group 18: Heavy duty diesel mechanic, body men, welders or combination men.
Group 19: Dump truck driver over 79 cubic yards, to and including 104 cubic yards.
Group 20: Dump truck driver over 104 cubic yards.

TRUCK DRIVERS ZONE 2

- Group 1: Pickup, truck driver tenders, dumpmen, greasemen.
Group 2: Dump truck driver to and including 6 cubic yards, sweeper truck, flat rack single axle, and manhaul, shuttle truck or bus, liquid and bulk tankers - single axle.
Group 3: Flat rack tandem axle battery men, mechanics tenders liquid and bulk tankers - tandem axle dump truck driver over 6 cubic yards, to and including 14 cubic yards.
Group 4: Straddle truck driver, lumber carrier.
Group 5: Fork lift driver, truck drivers-fuel truck, grease truck, combination fuel.
Group 6: Cement mixer - agitator truck to and including 10 cubic yards, distributor truck driver.
Group 7: Multi purpose truck - specialty and hoisting.
Group 8: Dump truck driver over 14 cubic yards, to and including 29 cubic yards, cab operated distributor truck driver - semi liquid and bulk tankers - euclid electric or similar truck driver dumptor type, youngbuggy, jumbo and similar type equipment liquid and bulk tankers - semi or combination (Water truck drivers required to puddle-rate plus 10 cents).
Group 9: Truck driver, snow plow.
Group 10: Cement mixer - agitator truck over 10 cubic yards, to and including 15 cubic yards.
Group 11: Dump truck driver over 29 cubic yards, to and including 39 cubic yards.
Group 12: Tireman dump truck driver over 39 cubic yards, to and including 54 cubic yards.
Group 13: Cement mixer - agitator truck over 15 cubic yards.
Group 14: Mechanic
Group 15: Dump truck driver over 54 cubic yards, to and including 79 cubic yards.
Group 16: Dump truck driver over 79 cubic yards, to and including 104 cubic yards.
Group 17: Dump truck driver over 104 cubic yards.
Group 18: Heavy duty diesel mechanic, body men, welders or combination men.
Group 19: Highboy, lowboy, floats, semi.

MISCELLANEOUS CONTRACT REQUIREMENTS

(July 24, 1978)

CONSTRUCTION SAFETY AND HEALTH STANDARDS

It is a condition of this contract, and shall be made a condition of each subcontract entered into pursuant to this contract, that the Contractor and any subcontractor shall not require any laborer or mechanic employed in performance of the contract to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health or safety, as determined under construction safety and health standards (Rules and Regulations of the Federal Occupational Safety and Health Act of 1970 (OSHA) and as amended).

(November 8, 1985)

Form FHWA-47: STATEMENT OF MATERIALS AND LABOR USED BY CONTRACTORS
ON HIGHWAY CONSTRUCTION INVOLVING FEDERAL FUNDS

Form FHWA-47 shall be submitted to the Engineer for each Federal-Aid Primary, Urban, and Interstate System Project involving construction performed under contract awarded by competitive bidding, except for the following cases:

- (1) Projects for which the total final construction costs for roadway are less than \$500,000.
- (2) Projects consisting primarily of the installation of protective devices at railroad grade crossings.
- (3) Projects consisting primarily of highway beautification.

The report will include data for all subcontractors, which may be combined by the prime Contractor into one report.

Forms are available from the Resident Engineer. Preparation instructions on the back of the form should be followed.

STATE DEPARTMENT OF HIGHWAYS DIVISION OF HIGHWAYS—STATE OF COLORADO

PLAN AND PROFILE OF ~~PROPOSED~~ AS CONSTRUCTED
FEDERAL AID PROJECT NO. IR 70-3(162)
STATE HIGHWAY NO. 70
SUMMIT & CLEAR CREEK COUNTIES

LARGE SET
OR
RACK

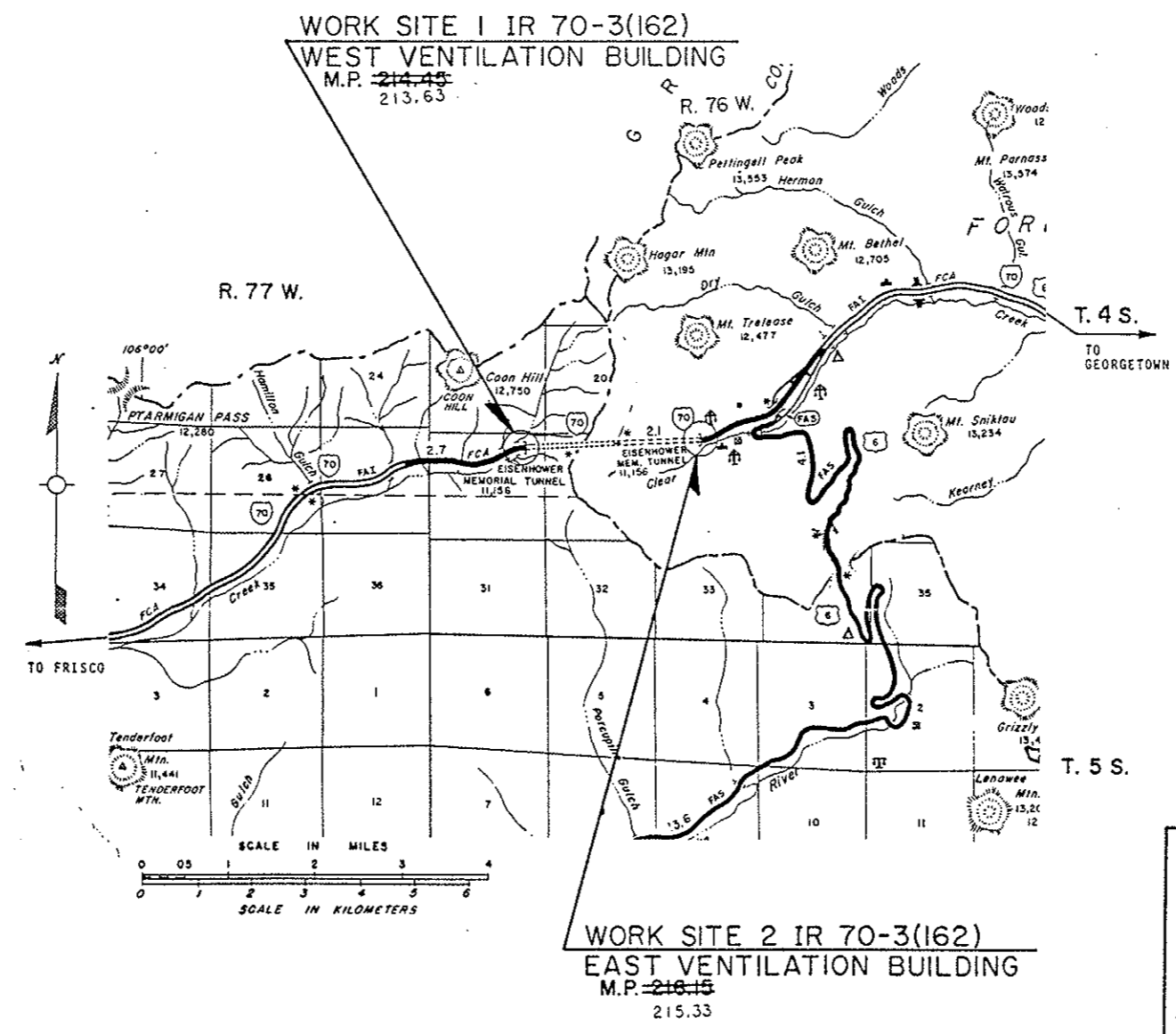
FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
VIII	COLORADO	IR 70-3(162)	1

AS CONSTRUCTED			
NO REVISIONS		REVISED <u>7-30-90</u>	VOID

REVISIONS			
NO.	DATE	DESCRIPTION	

SHEET NO.	INDEX OF SHEETS
1	TITLE SHEET
2	SUMMARY OF APPROXIMATE QUANTITIES
3 - 4	C.P.M. SCHEDULES
5 - 7	ARCHITECTURAL DRAWINGS
8 - 11	ELECTRICAL DIAGRAMS
12 - 17	STRUCTURAL DRAWINGS
3, 4, 15, 16	VOID BY CONSTRUCTION
12	No REVISIONS

DESCRIPTION OF PROJECT
REPLACE AND UPGRADE
PC TRANSFORMERS AND
CAPACITORS



DIVISION OF HIGHWAYS

APPROVED:

James E. Siebel 5-17-88
ASST. CHIEF ENGINEER DATE

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED:

DIVISION ADMINISTRATOR DATE

AS CONSTRUCTED INFORMATION

CONTRACTOR WESTINGHOUSE ELEC. CORP.
RESIDENT ENGINEER WES GOFF
(Project or Resident)

PROJECT STARTED AUG 9, 1988
PROJECT COMPLETED June 30, 1990

AS CONSTRUCTED PLANS APPROVED *[Signature]*
Asst. Eng. 9/12/90
TITLE DATE

FINAL SUMMARY OF APPROXIMATE QUANTITIES

AS CONSTRUCTED

NO REVISIONS REVISED 7-30-90 VOID

FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.
VIII	COL.	IR 70-3(162)	2

INDEX			CONTRACT ITEM NO.	CONTRACT ITEM	UNIT	TUNNEL BUILDINGS										PROJECT TOTALS		DIFF. +/-	PLAN.
						PLAN	AS CONST.	PLAN	AS CONST.	PLAN	AS CONST.	PLAN	AS CONST.	PLAN	AS CONST.	PLAN	AS CONST.		
BOOK	PAGE	SHEET																	
305			202	TRANSFORMER CARCASSES DESTRUCTION (MCR *1)	L S	1	1									1	1		
305			202	REMOVAL OF PCB	L S	1	1									1	1		
305			204	24.9KV/480V PRIMARY FEEDER CABLE DESTRUCTION & CONDUIT SEALING (MCR *1, LINE ITEM *2)	L S	1	1									1	1		
305			613	24.9KV/480V PRIMARY FEEDER CONDUIT (MCR *1, LINE ITEM *2)	EACH	4	4									4	4		
305			613	POWER TRANSFORMER	L S	1	1									1	1		
305			613	24.9KV/480V TRANSFORMER PRIMARY FEEDER CONDUITS (CABLES (CMO *2)	L S	1	1									1	1		
305			619	TURBIDITY INSTRUMENTS (MCR *1, LINE ITEM *1)	L S	1	1									1	1		
ESTIMATE			626	MOBILIZATION (MCR *1, LINE ITEM *2)	L S	1	1									1	1		
				<u>FORCE ACCOUNTS</u>															
			F/A 01	MINOR CONTRACT REVISIONS (MCR *1)	F A	1	1												
			F/A 02	DBE INCENTIVE PAYMENT	F A	1	0												
288	II		613	STATE FURNISHED MATERIALS (CMO *2)	F A	1	1												

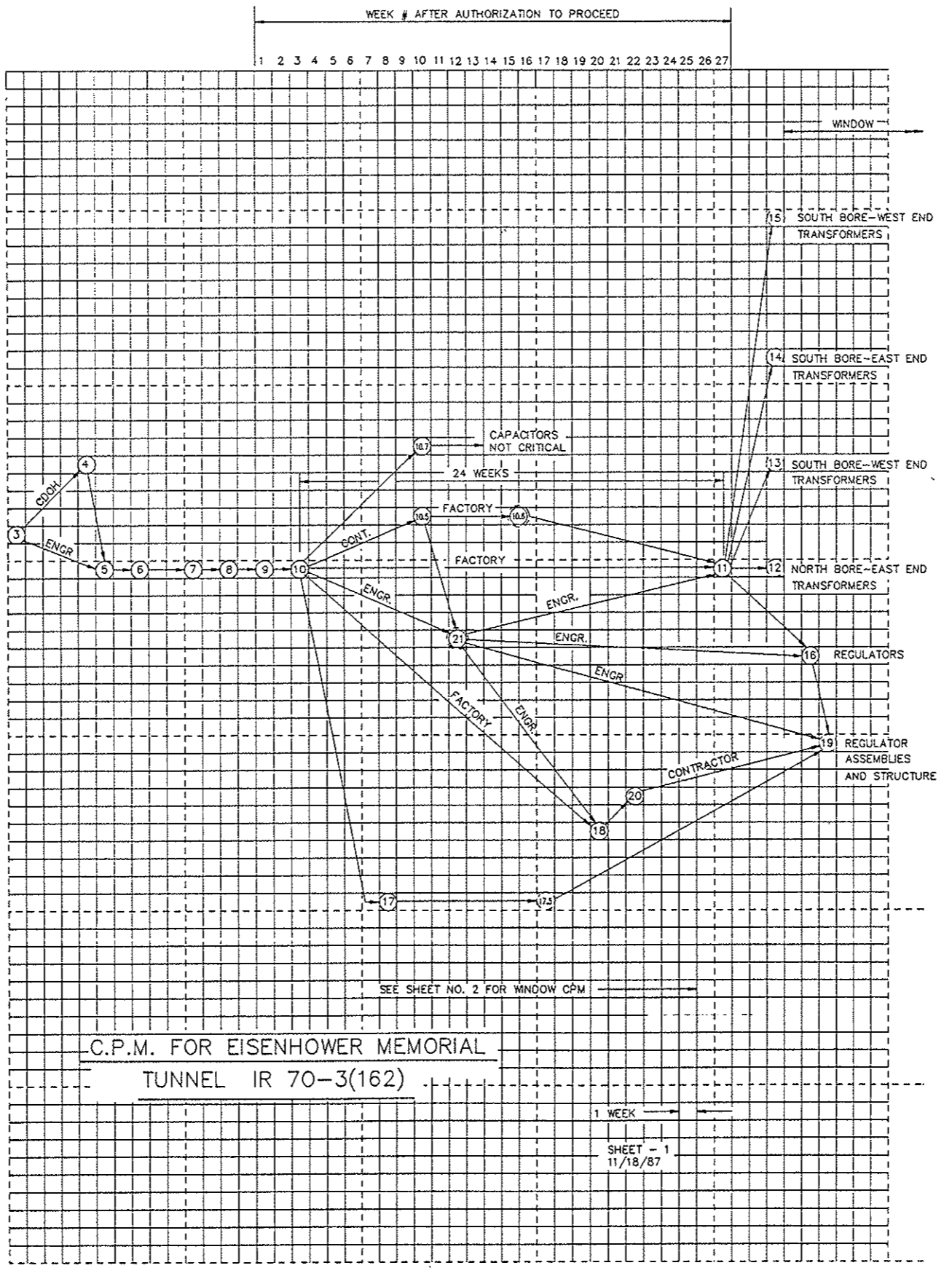
AS CONSTRUCTED

NO REVISIONS [] REVISED [] VOID 7-30-90

FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.	SHEET TOTALS
VIII	COLO.	IR 70 - 3(162)	3	17

LEGEND

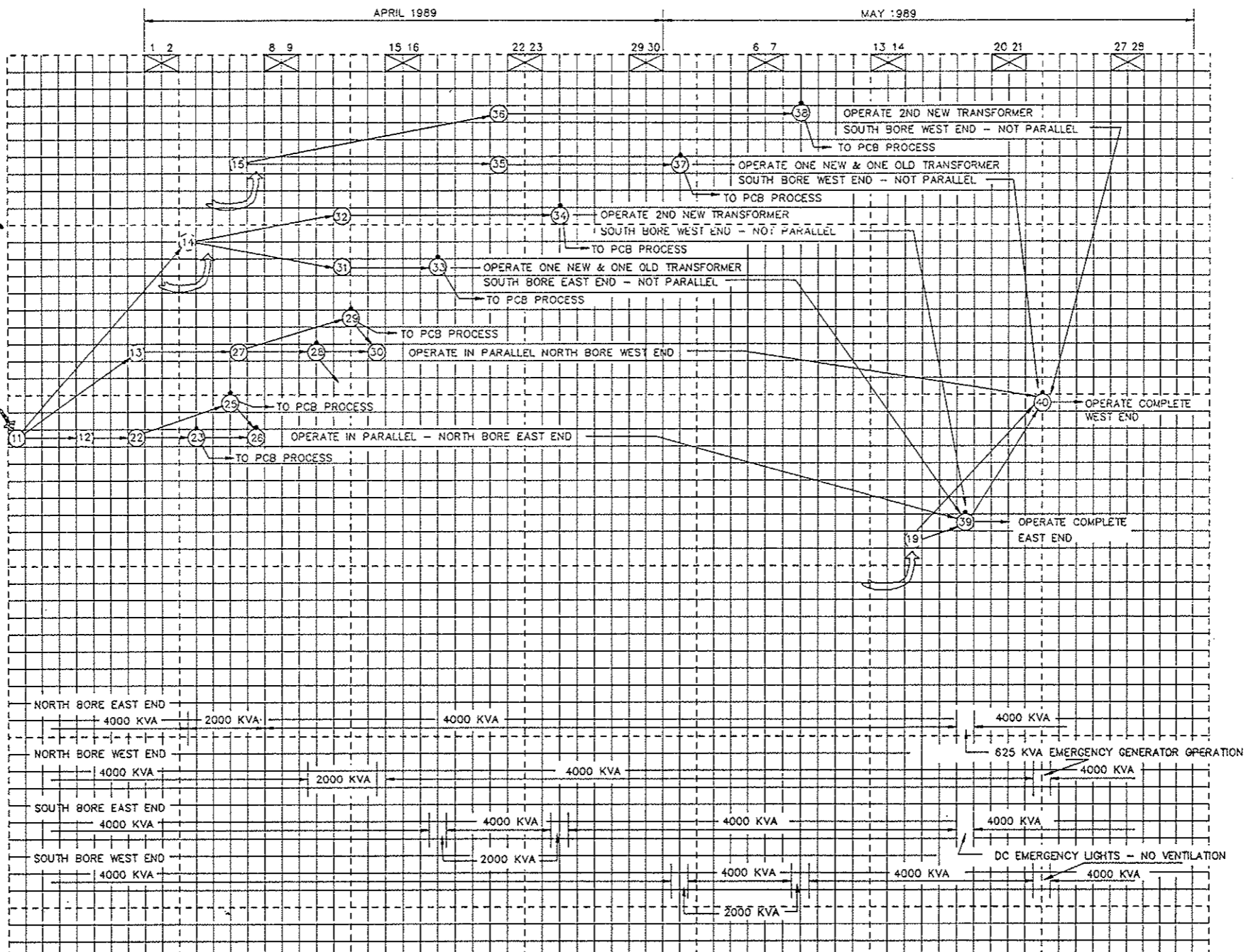
- ③ - ④ COOH PREPARE BID REQUIREMENTS--GENERAL / LEGAL
- ③ - ⑤ PHASE II TECHNICAL PROCUREMENT SPECIFICATIONS BY ENGINEER - FINAL REVISIONS
- ⑤ - ⑥ COMBINE FOR BIDDING AND ISSUE ● ⑥
- ⑥ - ⑦ RECEIVE BIDS BY ⑦
- ⑦ - ⑧ EVALUATE AND AWARD
- ⑧ - ⑨ AUTHORIZE TO PROCEED
- ⑨ - ⑩ ORDER PROCESSING MATERIAL BY CONTRACTOR
- ⑩ - ⑪ FACTORY DELIVERY TIMES TRANSFORMERS AND REGULATORS
- ⑩ - ⑱ FACTORY DELIVERY TIMES - HV CABLE
- ⑪ - ⑫ - ⑬ - ⑭ - ⑮ - ⑯ STAGING/STORING IN DENVER FOR PRELIMINARY TEST AND DELIVERY TO SITE AS NEEDED
- ⑩ - ⑰ ORDER "A" FRAMES & SWITCHES, ETC.
- ⑰ - ⑰.2 COMPLETE STRUCTURE, CONDUIT, SWITCHES FOR REGULATORS ON ROOF
- ⑱ - ⑲.1 CABLE - INSTALL EXCEPT DO NOT CONNECT TO S&C SWITCHGEAR
- ⑩ - ⑲.2 REVIEW SUBMITTALS
- ⑩ - ⑰.3 REVIEW SUBMITTALS
- ⑱ - ⑲.3 INSPECT
- ⑲.1 - ⑲.2 INSPECT
- ⑩ - ⑱.3 CONTRACTOR - LAYOUT - ORDER 3000 A BUS CONNECTIONS AND FITTINGS FOR NORTH BORE TRANSFORMERS
- ⑱.3 - ⑱.4 DELIVERY 3000 A BUS CONNECTIONS AND FITTINGS OR FABRICATION
- ⑩ - ⑱.4 ORDER CAPACITORS FOR NORTH BORE
- DOTTED MILESTONES / (ACTIVITIES) INDICATE APPROXIMATE DATES



DRAWING G-1

LEGEND

- TRANSFORMERS DELIVERED TO STAGING IN DENVER - PRELIMINARY CHECK-TESTED
- STAGGERED RECEIPT AND TRANSPORT TO SITE AS REQUIRED
- 12-22 TWO NEW TRANSFORMERS, NORTH BORE - EAST END IN BLD'G. - READY FOR INSTALLATION
- 23 REMOVE ONE EXISTING - SET ASIDE - INSTALL ONE NEW TRANSFORMER - TEST - ENERGIZE OPERATE NEW
- 24 NOT USED
- 25 REMOVE SECOND EXISTING SET ASIDE - INSTALL, TEST - ENERGIZE NEW
- 26 PARALLEL OPERATION
- 13-27 TWO NEW TRANSFORMERS, NORTH BORE WEST END IN BLD'G. - READY FOR INSTALLATION
- 28 REMOVE ONE EXISTING - SET ASIDE INSTALL THE NEW TRANSFORMER, TEST - ENERGIZE
- 29 REMOVE SECOND EXISTING, SET ASIDE - INSTALL, TEST, ENERGIZE NEW
- 30 PARALLEL OPERATION
- 14-31 & 14-32 SOUTH BORE EAST END TRANSFORMERS IN BLD'G. READY TO INSTALL
- 33 & 34 REMOVE EXISTING TRANSFORMER - SET ASIDE, INSTALL NEW ONE, TEST - ENERGIZE - NOT PARALLEL
- 15-35 & 15-36 SOUTH BORE WEST END, TRANSFORMERS IN BLD'G. READY TO INSTALL
- 37 & 38 REMOVE EXISTING TRANSFORMER - SET ASIDE, INSTALL NEW ONE, TEST - ENERGIZE - NOT PARALLEL
- 39 TEST CABLE - CUT IN CABLE TO EAST REGULATOR AND PRIMARY MAIN - ADJUST REGULATORS AND TRANSFORMER TAPS
- 40 TEST CABLE - CUT IN CABLE TO WEST REGULATOR AND PRIMARY MAIN - ADJUST REGULATORS AND TRANSFORMER TAPS
- INDICATES WORK TO BE DONE BETWEEN 8 PM & 8 AM NUMBERS 23,25,26,28,29,33,34,37,38,39,40. WHEN COMPLETE POWER OUTAGES REQ'D 10PM TO 6AM.
- INDICATES WEEKENDS
- 19 STEP REGULATORS SET, CONNECTED AND TESTED



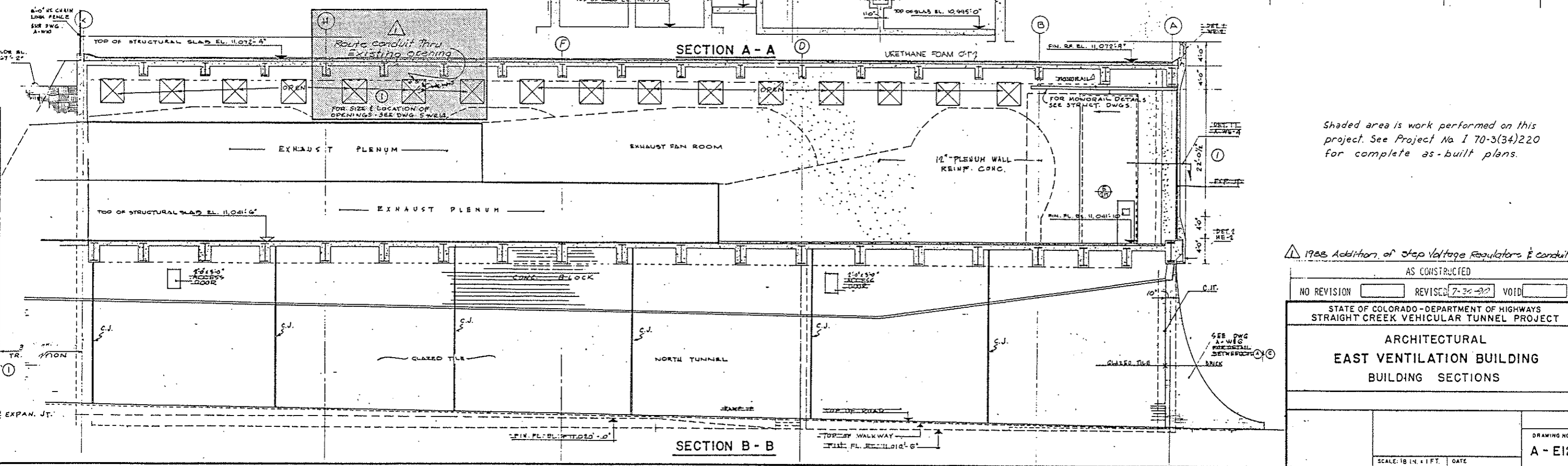
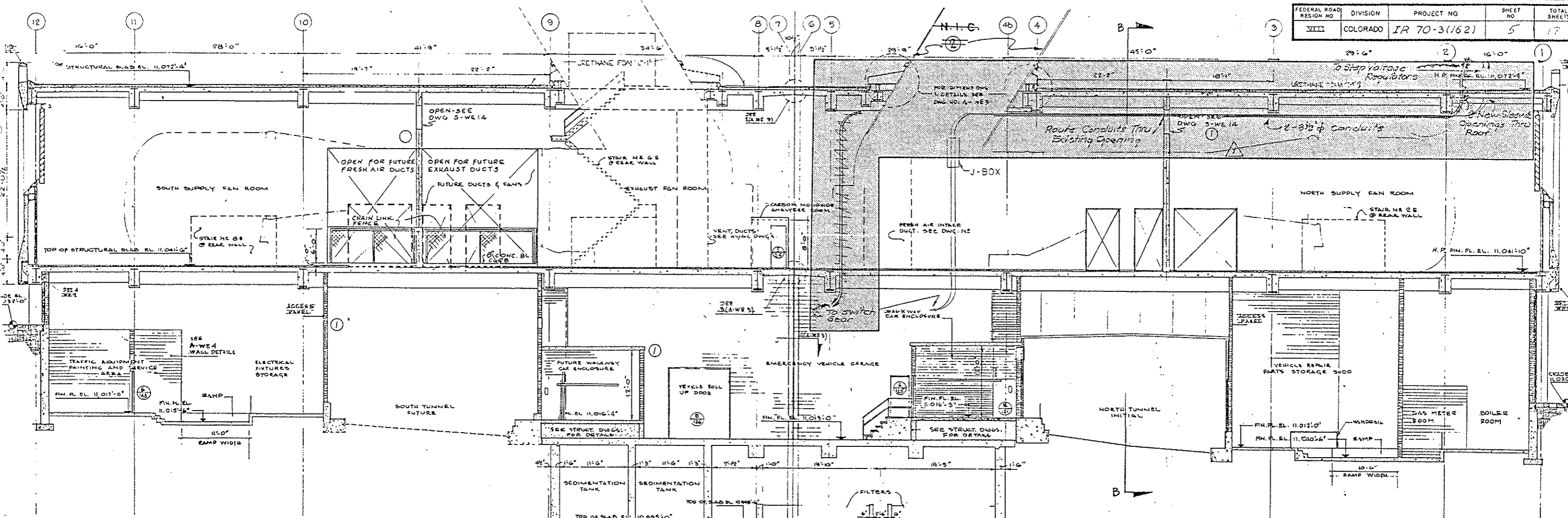
WINDOW C.P.M. AND LOAD CAPABILITY CHART
 FOR EISENHOWER MEMORIAL TUNNEL

SHEET - 2
 11/18/87

IR 70 - 3(162) SCALE 1 DAY



FEDERAL ROAD REGION NO	DIVISION	PROJECT NO	SHEET NO	TOTAL SHEETS
VIII	COLORADO	IR 70-3(162)	5	17



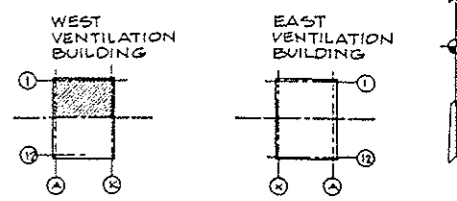
Shaded area is work performed on this project. See Project No. I 70-3(34)220 for complete as-built plans.

1983 Addition of Step Voltage Regulators & conduit Run

AS CONSTRUCTED		
NO REVISION	REVISED 7-31-83	VOID
STATE OF COLORADO - DEPARTMENT OF HIGHWAYS STRAIGHT CREEK VEHICULAR TUNNEL PROJECT		
ARCHITECTURAL EAST VENTILATION BUILDING BUILDING SECTIONS		
DRAWING NO.		A - E12
SCALE: 1/8" = 1'-0"		DATE

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
XIII	COLORADO	IR 70-3(162)	6	17

AS CONSTRUCTED
 NO REVISIONS [] REVISED 7-30-90 VOID []



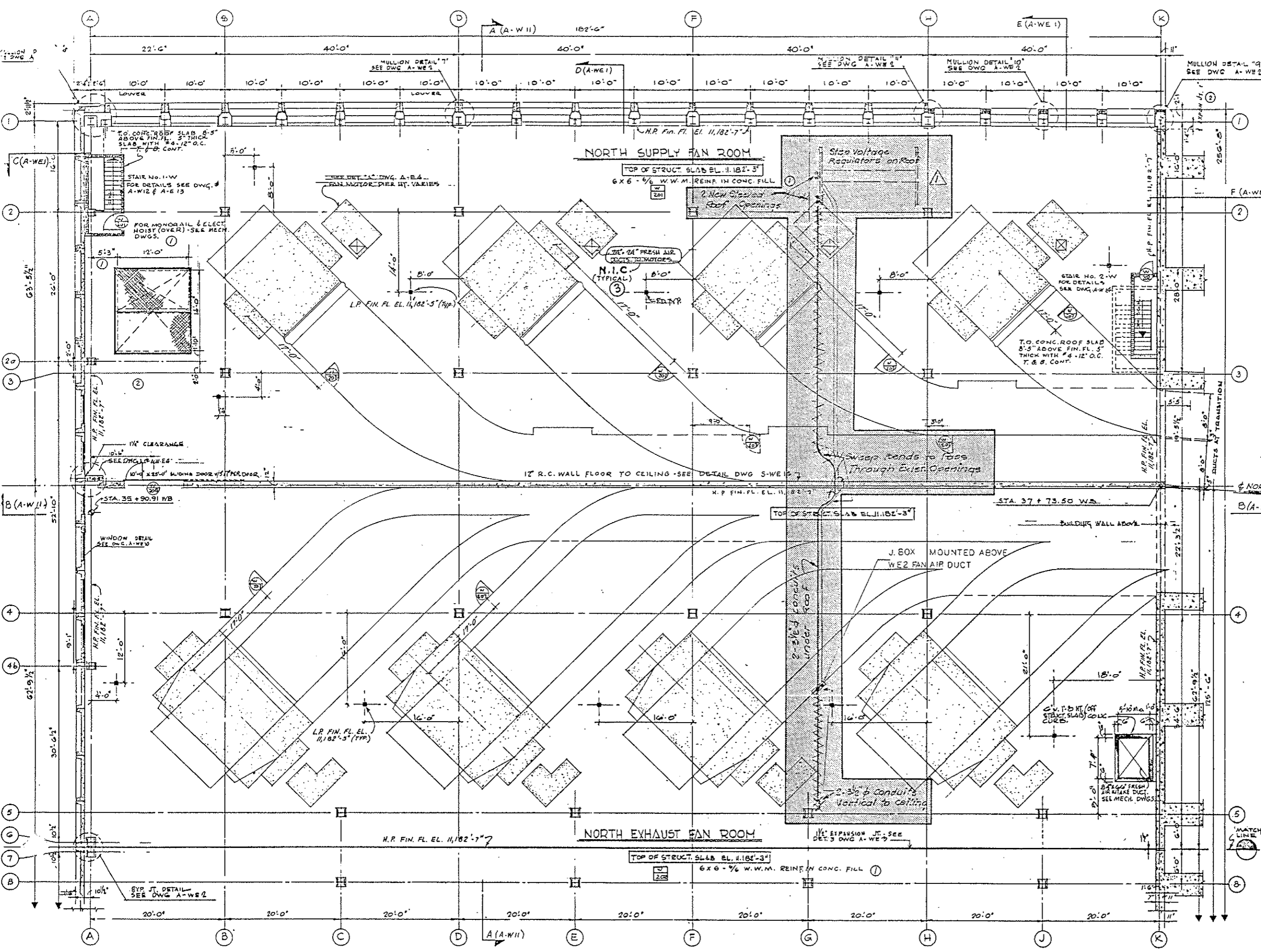
1988 Addition of Step Voltage Regulators & Conduit Runs

Shaded area is work performed on this project. See Project No I 70-3(34)220 for complete as-built plans.

STATE OF COLORADO - DEPARTMENT OF HIGHWAYS
 STRAIGHT CREEK VEHICULAR TUNNEL PROJECT

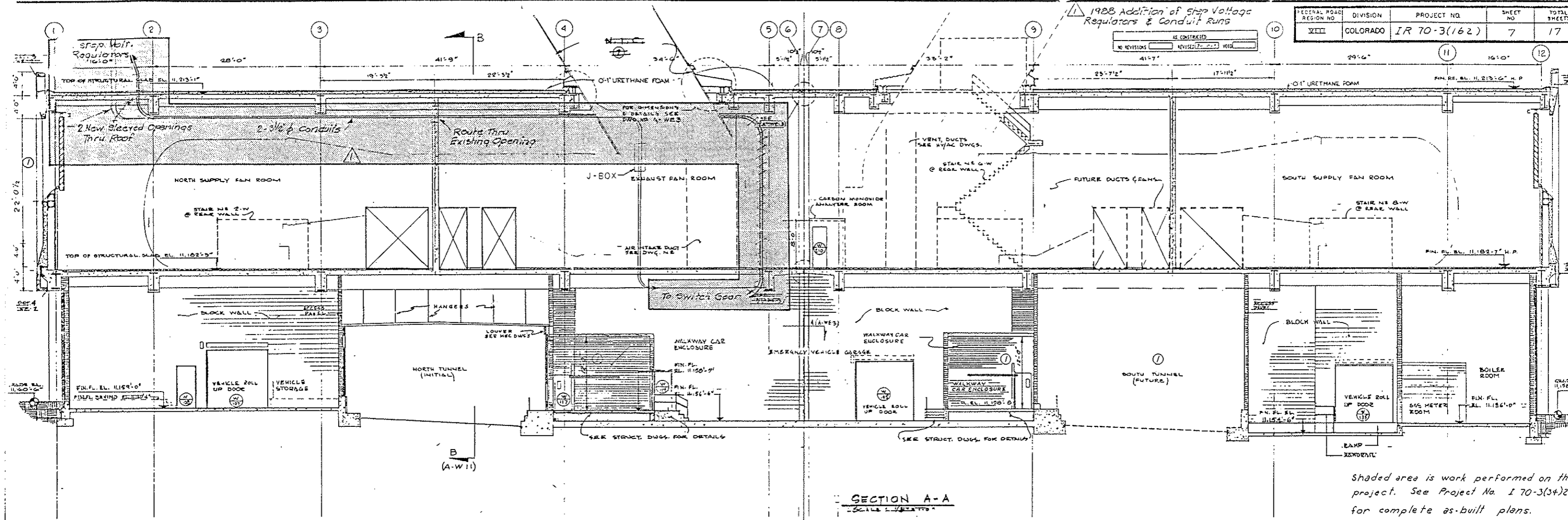
ARCHITECTURAL
 WEST VENTILATION BUILDING
 FAN ROOM FLOOR PLAN - NORTH

DRAWING NO. A-W3
 SCALE: 1/8" = 1' FT. DATE:



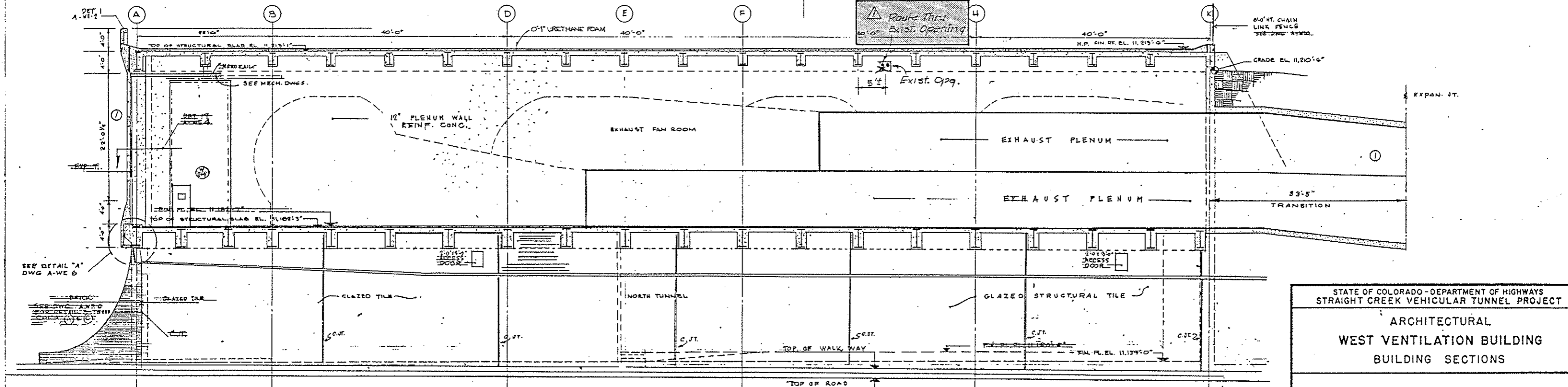
1988 Addition of Step Voltage Regulators & Conduit Runs

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
VIII	COLORADO	IR 70-3(162)	7	17



SECTION A-A
SCALE: 1/8"=1'-0"

Shaded area is work performed on this project. See Project No. I 70-3(34)22 for complete as-built plans.

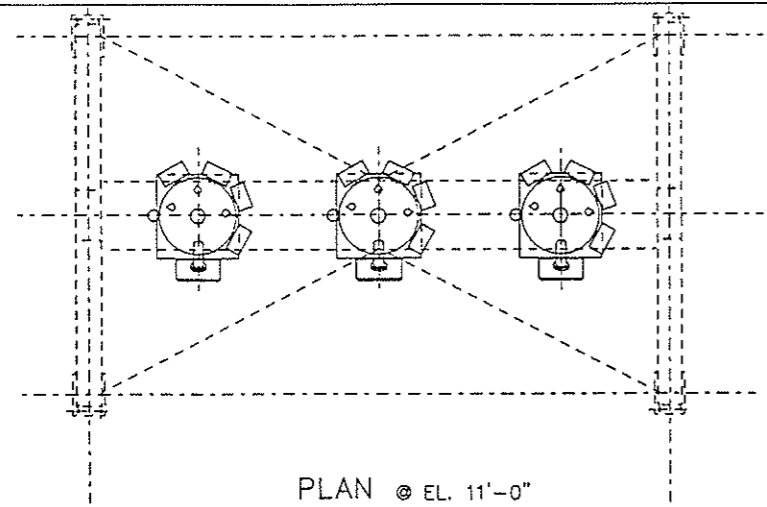


SECTION B-B
SCALE: 1/8"=1'-0"

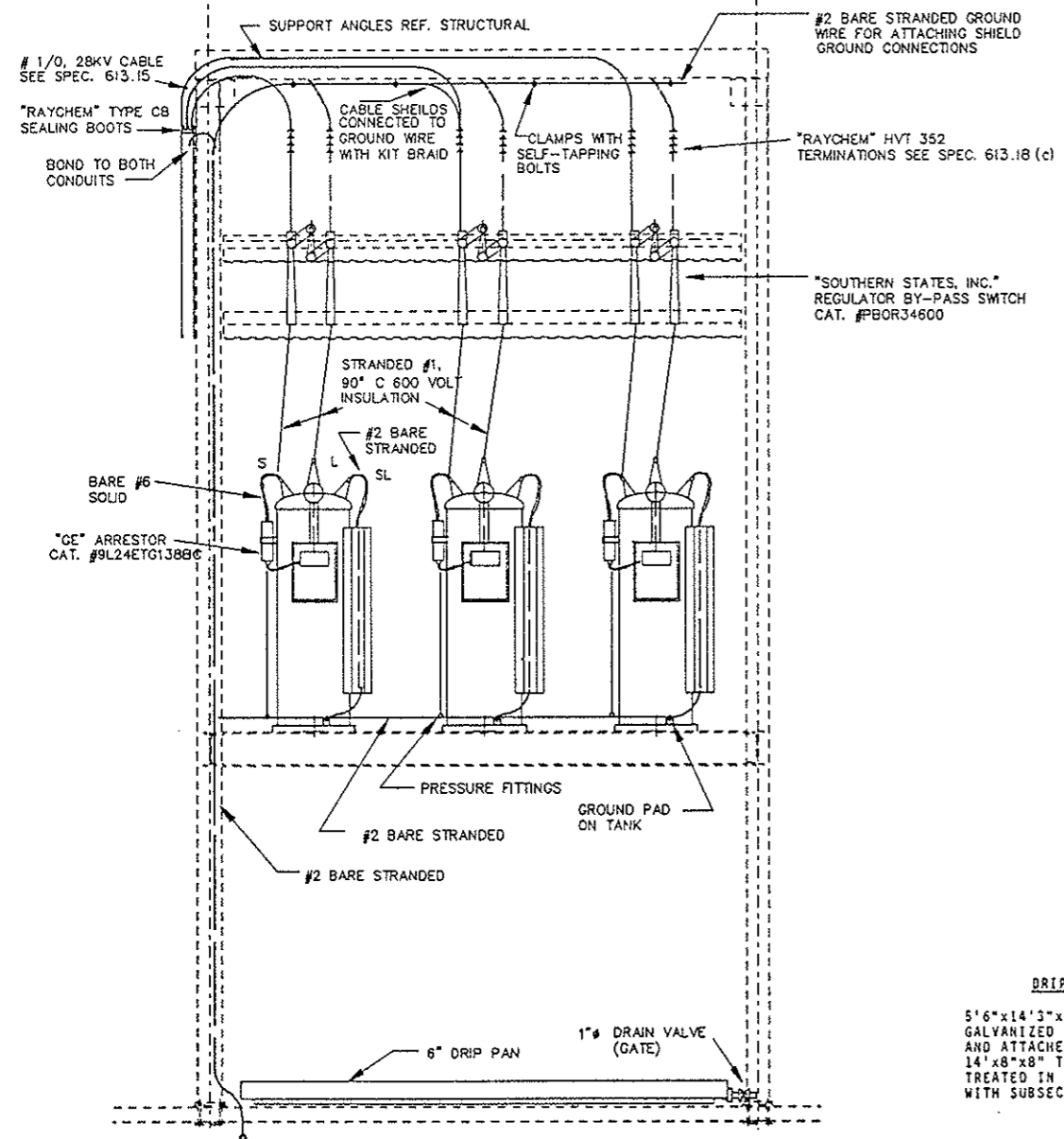
STATE OF COLORADO - DEPARTMENT OF HIGHWAYS
STRAIGHT CREEK VEHICULAR TUNNEL PROJECT
ARCHITECTURAL
WEST VENTILATION BUILDING
BUILDING SECTIONS

AS CONSTRUCTED
 NO REVISIONS [] REVISED 7-30-90 VOID []

FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.	SHEET TOTALS
VIII	COLO.	IR 70 - 3(162)	8	17

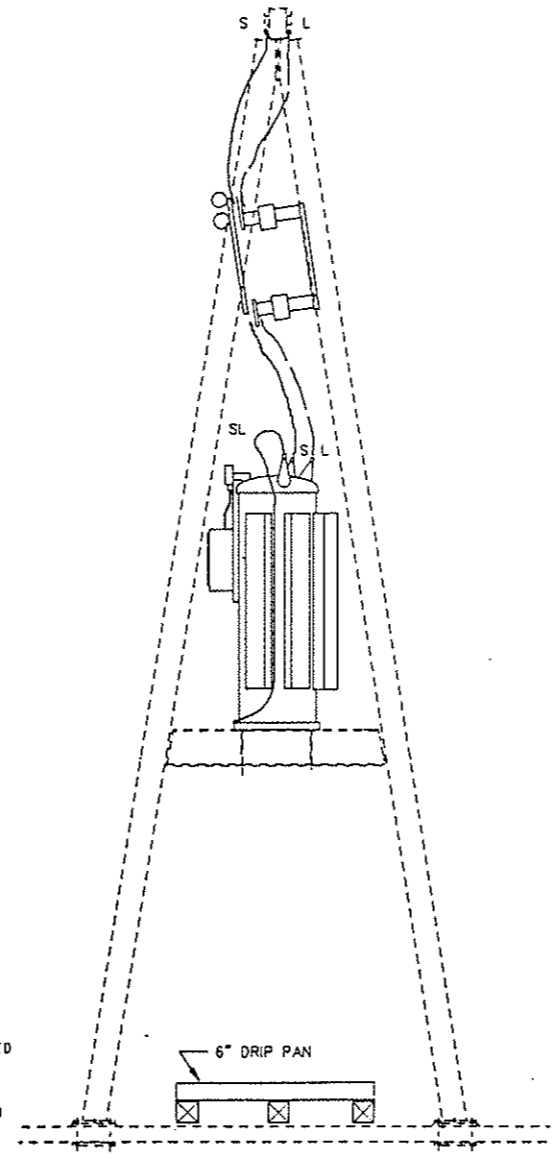


PLAN @ EL. 11'-0"

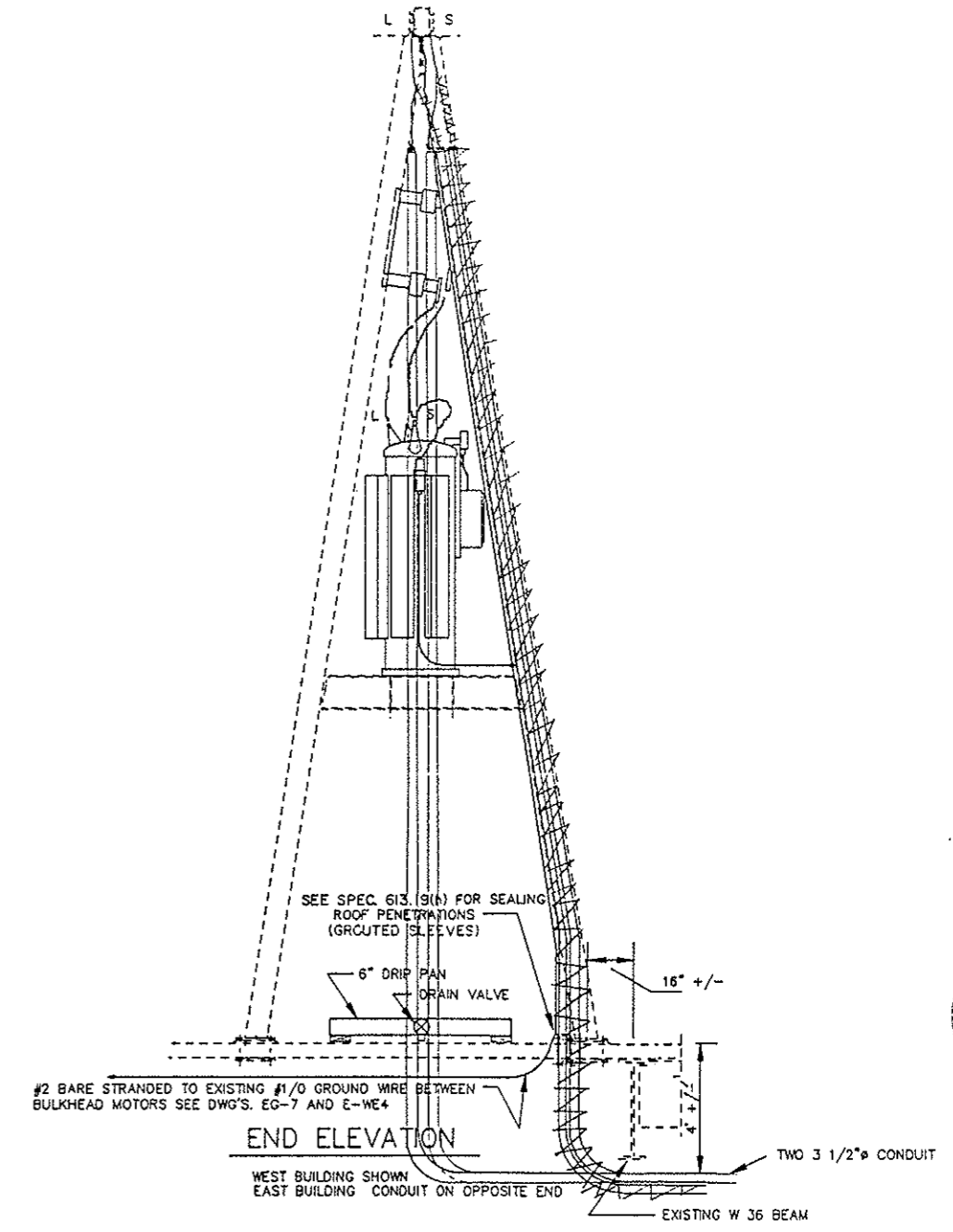


ELEVATION

DRIP PAN
 5'6"x14'3"x6" 10 GAGE GALVANIZED STEEL MOUNTED AND ATTACHED TO THREE 14'x8"x8" TIMBERS TREATED IN ACCORDANCE WITH SUBSECTION 710.080



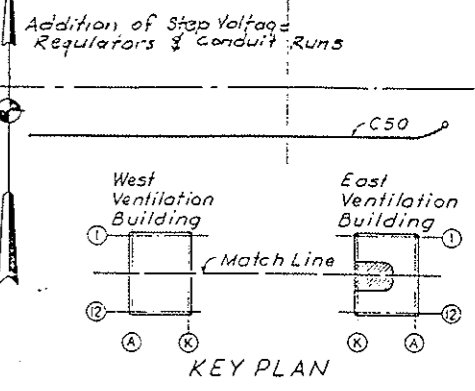
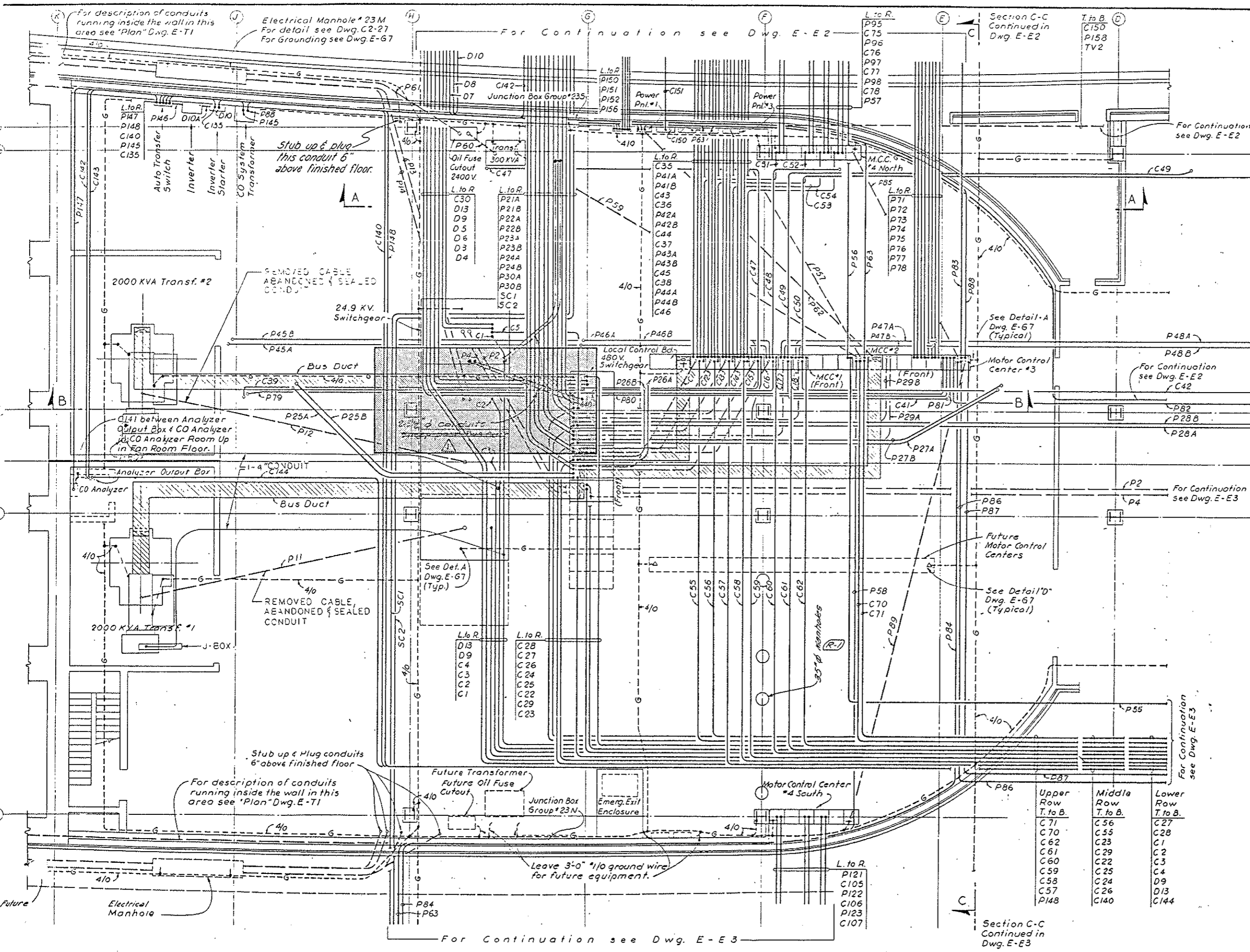
SECTION



END ELEVATION



FEDERAL ROAD DISTRICT NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
VIII	COLORADO	IR 70-3(162)	9	17



- NOTES:
1. For Telephone Riser Diagram see Dwg. E-58.
 2. For Symbol Legend see Dwg. E-54 & E-55.
 3. For Conduit & Cable runs from Power Panels see Panel Schedule Dwg. E-610 & E-611.
 4. For Conduit & Cable Schedule see Dwg. E-WE5 to E-WE9 inclusive, E-E9 & E-T7.
 5. Exact routing of conduits to be determined by Field.
 6. For Conduits or Equipment not shown or identified and for Sections see Dwg. E-WE3.

Shaded area is work performed on this project. See Project No. 170-3(34)220 for complete as-built plans.

AS CONSTRUCTED		
NO REVISIONS	REVISED 7-30-90	VOID

STATE OF COLORADO - DEPARTMENT OF HIGHWAYS
 STRAIGHT CREEK VEHICULAR TUNNEL PROJECT
**ELECTRICAL
 EAST VENTILATION BUILDING
 ELECTRICAL EQUIPMENT ROOM
 POWER & CONTROL - PLAN**

DESIGNED:	DRAWN:	CHECKED:	SUBMITTED:	DRAWING NO.
				E-E1
SCALE: 3/16"=1'-0"				DATE:

Upper Row T. to B.	Middle Row T. to B.	Lower Row T. to B.
C71	C56	C27
C70	C55	C28
C62	C23	C1
C61	C29	C2
C60	C22	C3
C59	C25	C4
C58	C24	D9
C57	C26	D13
P148	C140	C144

For description of conduits running inside the wall in this area see "Plan" Dwg. E-T1

Electrical Manhole #23M
 For detail see Dwg. C2-27
 For Grounding see Dwg. E-67

For Continuation see Dwg. E-E2

Section C-C Continued in Dwg. E-E2

For Continuation see Dwg. E-E2

Addition of Step Voltage Regulators & Conduit Runs

Stub up & plug this conduit 6" above finished floor.

REMOVED CABLE ABANDONED & SEALED CONDUIT

24.9 KV. Switchgear

CL41 between Analyzer Output Box & CO Analyzer in CO Analyzer Room Up in Fan Room Floor.

REMOVED CABLE, ABANDONED & SEALED CONDUIT

REMOVED CABLE, ABANDONED & SEALED CONDUIT

Stub up & Plug conduits 6" above finished floor

For description of conduits running inside the wall in this area see "Plan" Dwg. E-T1

Future Transformer Future Oil Fuse Cutout

Junction Box Group #23N

Emerg. Exit Enclosure

Motor Control Center #4 South

Leave 3'-0" #1/0 ground wire for future equipment.

Section C-C Continued in Dwg. E-E3

For Continuation see Dwg. E-E3

FEDERAL ROAD DISTRICT NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
VIII	COLORADO	IR 70-3(162)	10	17

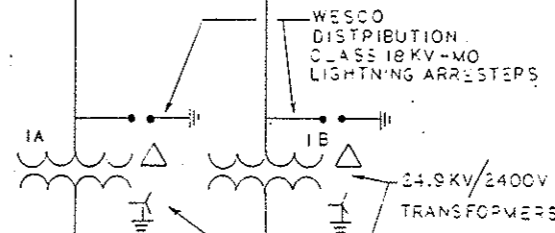
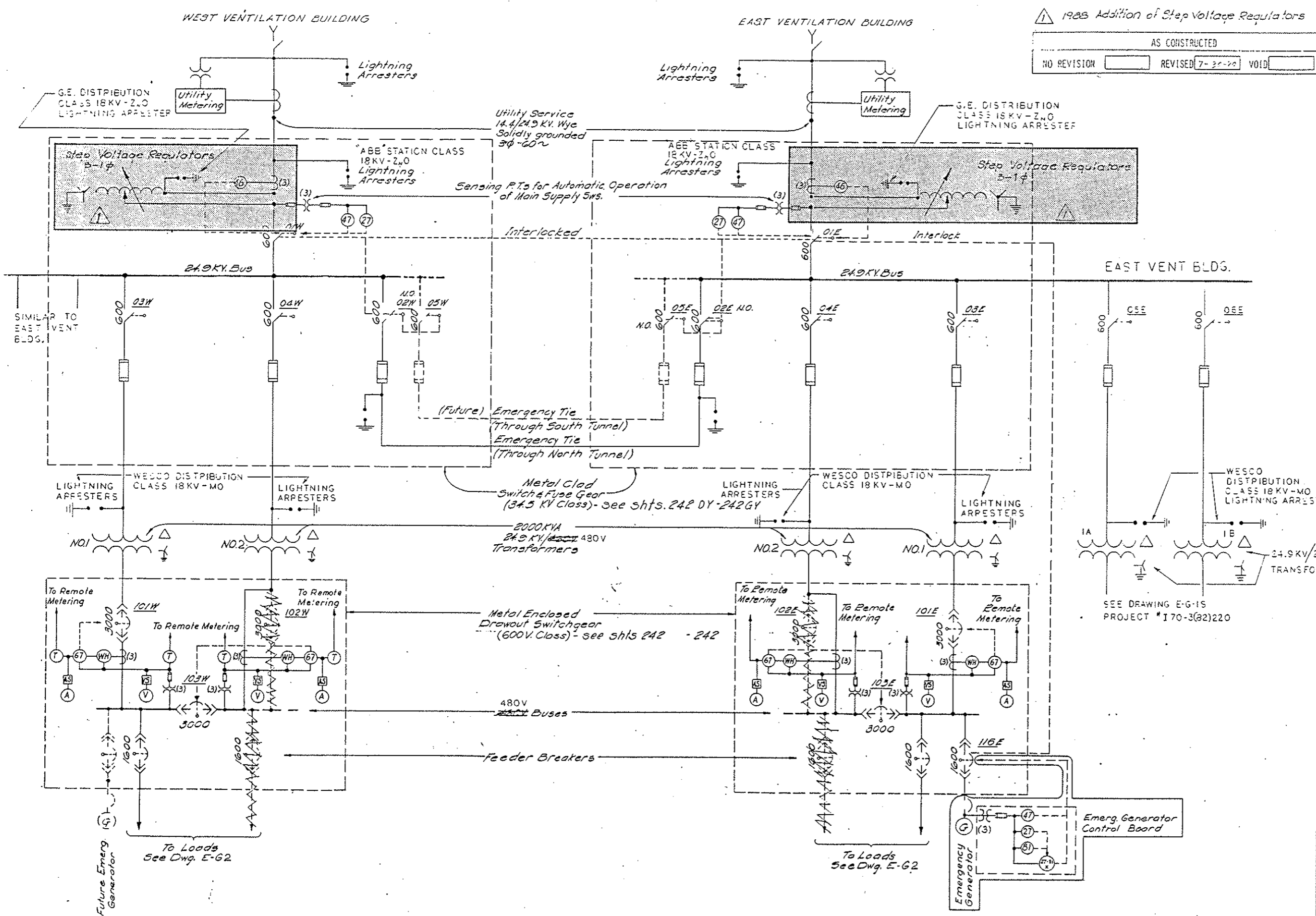
1988 Addition of Step Voltage Regulators

AS CONSTRUCTED

NO REVISION [] REVISED 7-27-88 VOID []

LEGEND

- Electrically Operated Drawout Low Voltage Power Air Circuit Breaker Dual Magnetic Trip Frame Size as Indicated
- Fuse
- Electrically Operated Load Break Switch
- Initial Connections
- Future Connections
- Reverse Phase Voltage Relay
- Reverse Power Relay
- Teleductors or Transducers for Remote Telemetry
- UV Relay
- Current Balance Relay (For Single Phasing Protection)
- Frequency Relay
- Frequency & Undervoltage Aux. Relay

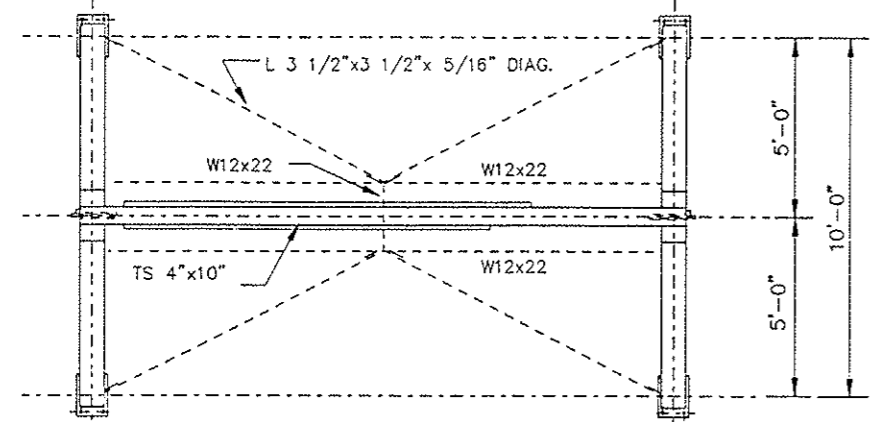


- NOTES:**
- On the 24.9KV Switchgear, Sws. *01W, 02W, 01E and 02E are Interlocked to permit closure of only 3 Switches at one time (For Present Installation)
 - All Main Electrical Switches and Circuit Breakers are operated from respective Building Battery Supply.

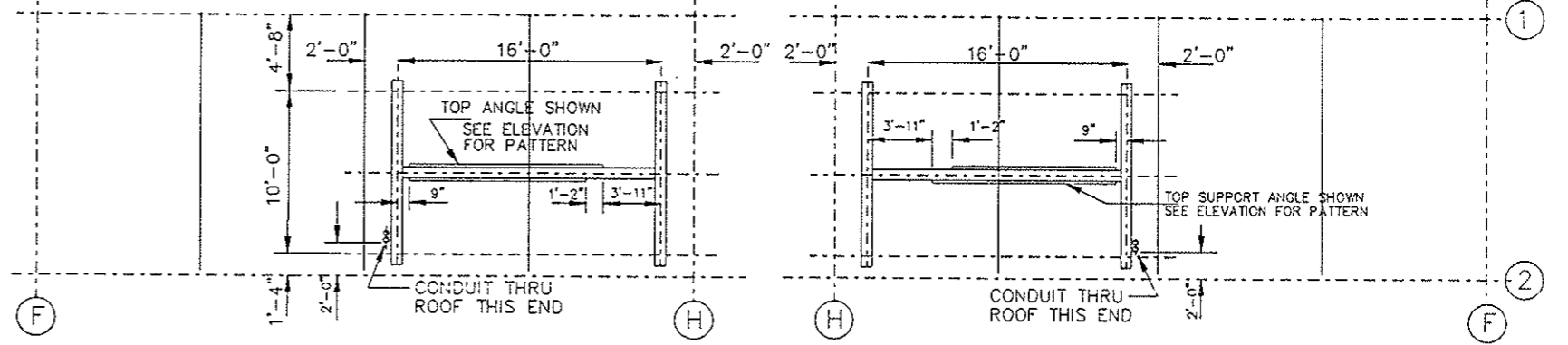
Shaded area is work performed on this project. See Project No. I 70-3(34)220 for complete as-built plans.

STATE OF COLORADO - DEPARTMENT OF HIGHWAYS STRAIGHT CREEK VEHICULAR TUNNEL PROJECT	
ELECTRICAL POWER SUPPLY SINGLE LINE DIAGRAM GENERAL ARRANGEMENT	
DESIGNED: DRAWN: CHECKED: SUBMITTED:	DRAWING NO. E-G-1
SCALE: NONE	DATE:

AS CONSTRUCTED		FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.	SHEET TOTALS
NO REVISIONS 7-30-90		REVISED	VOID	IR 70 - 3(162)	12	17
		VIII	COLO.			

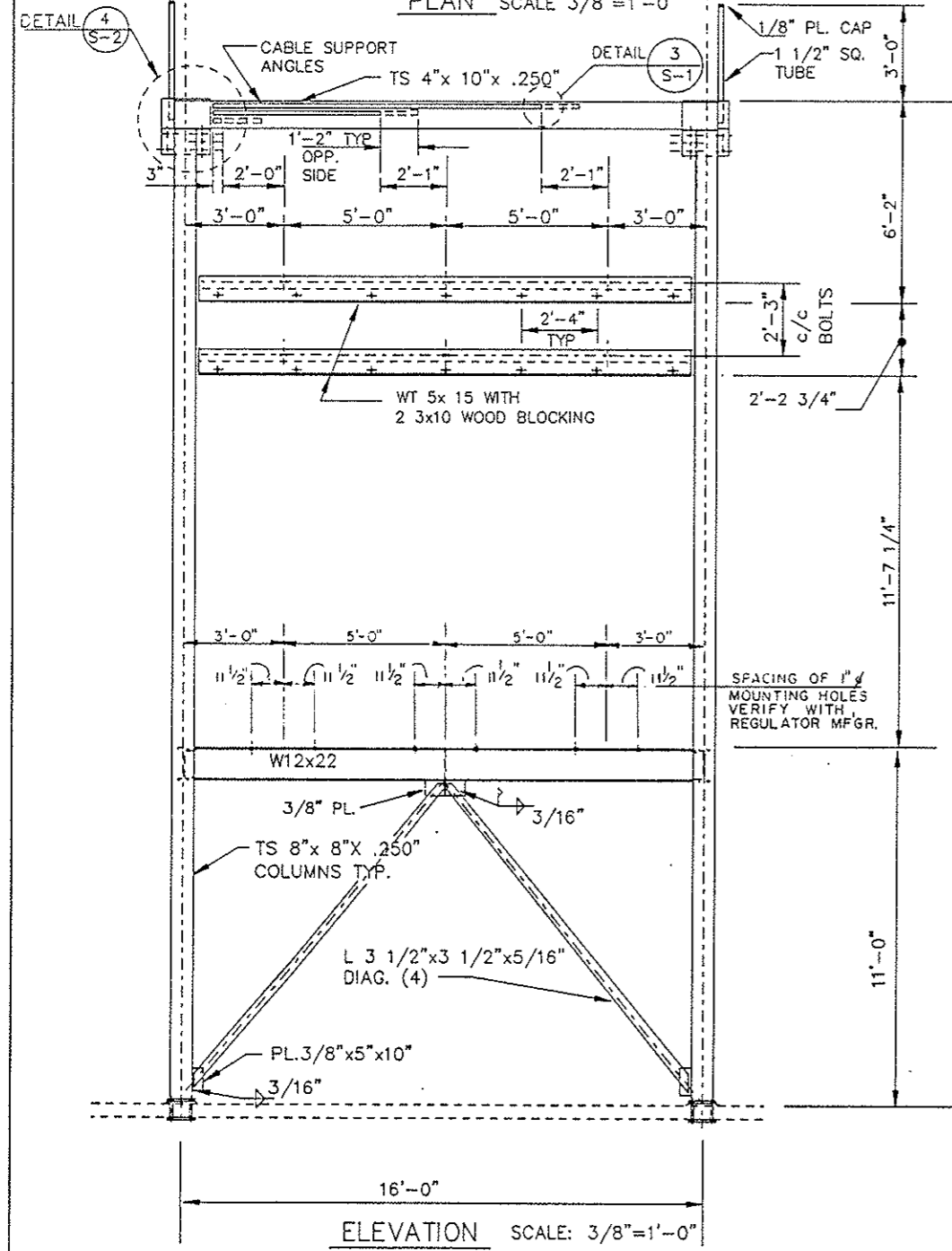


PLAN SCALE 3/8"=1'-0"

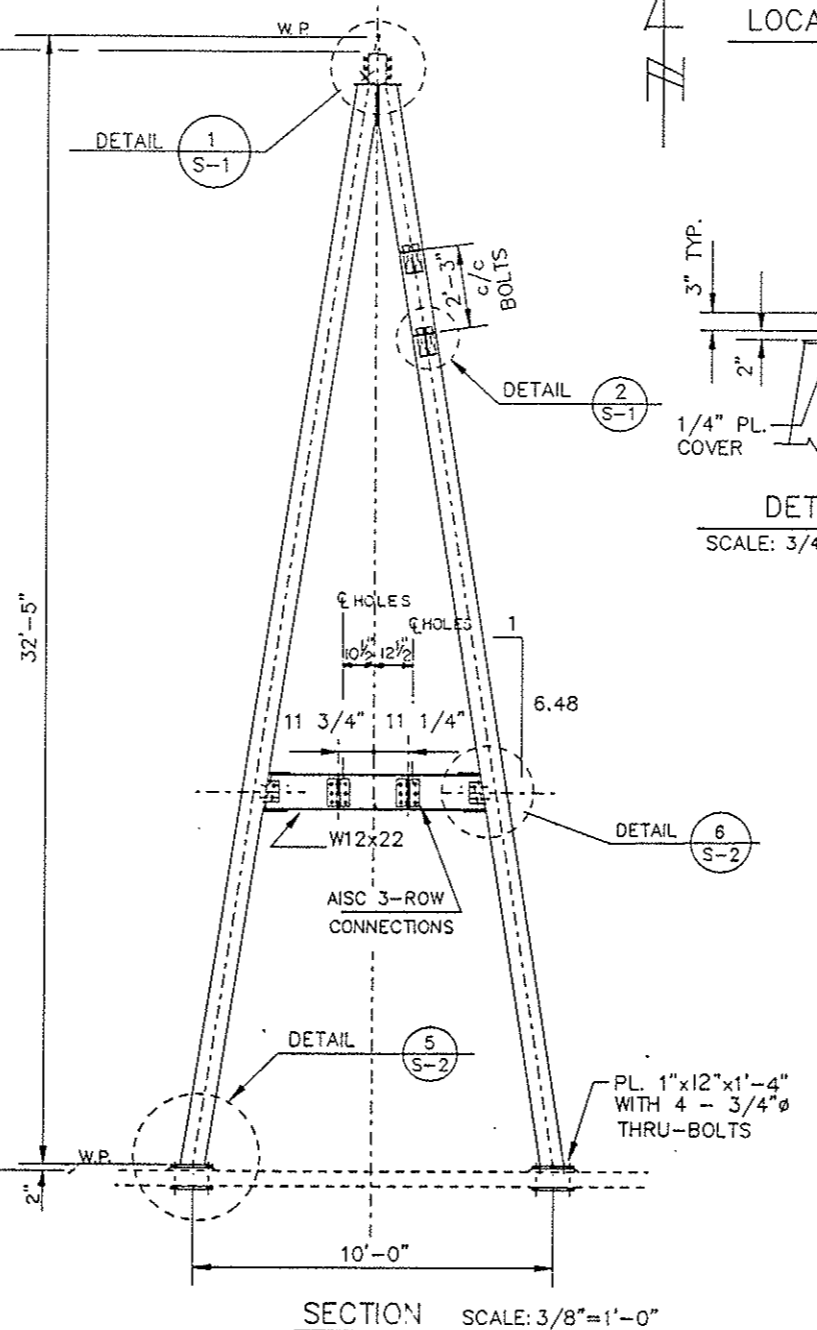


WEST BUILDING EAST BUILDING

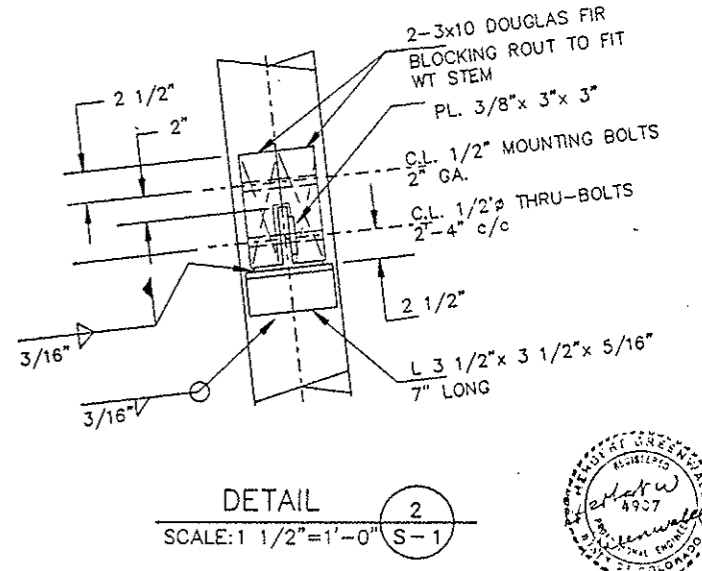
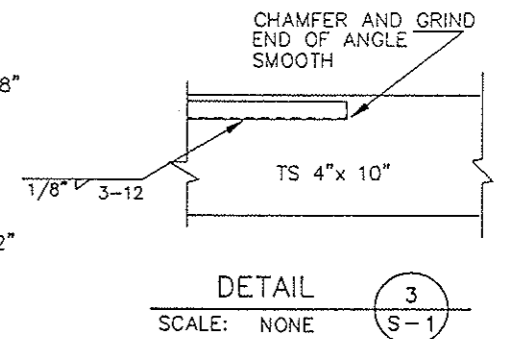
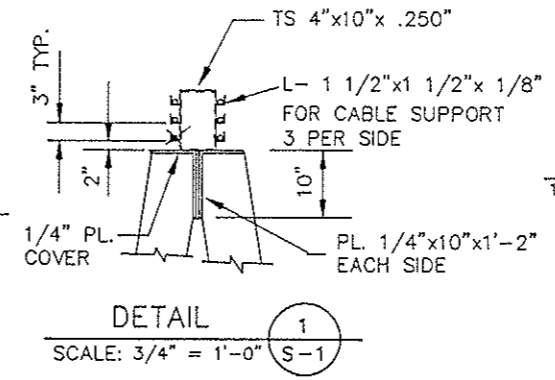
LOCATION PLANS



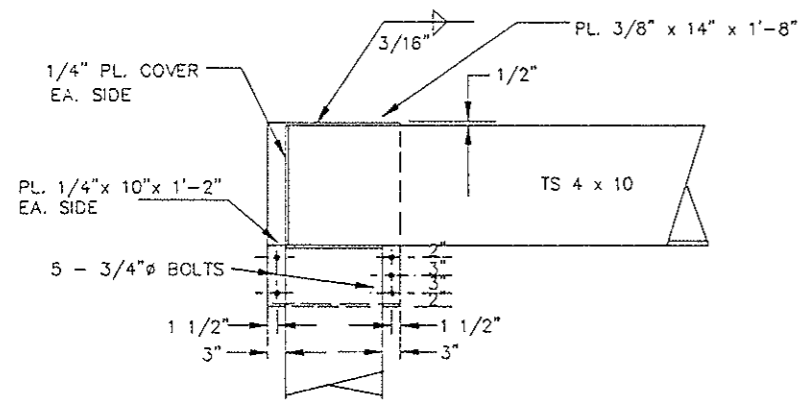
ELEVATION SCALE: 3/8"=1'-0"



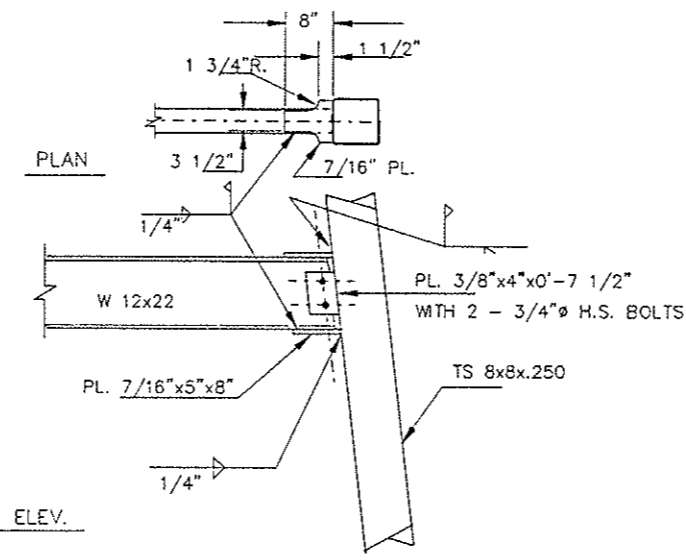
SECTION SCALE: 3/8"=1'-0"



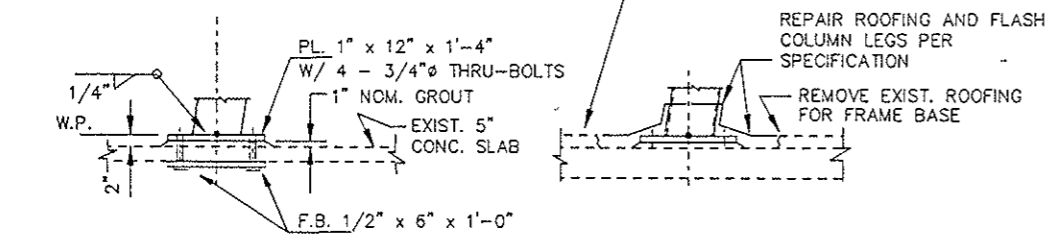
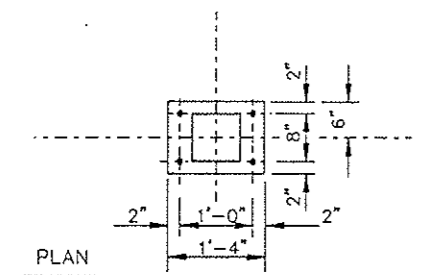
AS CONSTRUCTED		FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.	SHEET TOTALS
NO REVISIONS	REVISED 7-30-90	VOID	VIII	COLO.	IR 70 - 3(162)	13 17



DETAIL 4
SCALE: 1 1/2" = 1'-0" S-2



ELEV. DETAIL 6
SCALE: 3/4" = 1'-0" S-2



ELEVATION DETAIL 5
SCALE: 3/4" = 1'-0" S-2

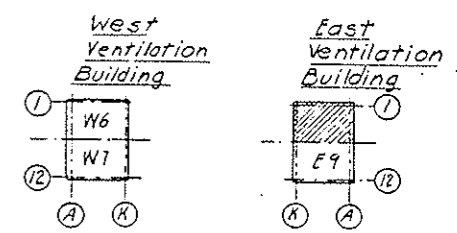
GENERAL NOTES:

- STRUCTURAL STEEL
STRUCTURAL STEEL TO BE ASTM A-36 WITH MINIMUM Fy=36000PSI EXCEPT TUBE STEEL TO BE ASTM A500 GRADE B WITH Fy=46000 PSI WELDING TO BE DONE BY CERTIFIED WELDERS USING E-70 ELECTRODES IN ACCORDANCE WITH THE LATEST AWS SPECIFICATION
- BOLTING
BOLTS FOR CONNECTIONS TO BE ASTM A-325 HIGH STRENGTH BOLTS FOR SECURING THE WOOD BLOCKING AND THE ANCHOR BOLTS THROUGH THE ROOF TO BE ASTM A-307 GRADE B.
- PAINTING
STRUCTURAL STEEL TO BE DELIVERED TO THE PROJECT WITH A LIGHT SAND-BLASTING TO REMOVE MILL SCALE, CLEAN AND DRY SURFACE. A LIGHT FIRM OR SOUND RUST FILM IS ACCEPTABLE.
PAINT TO BE 2 PART STEEL SURFACE EPOXY PAINT WITH ~~VAL-CREME~~ DUPONT 25P HIGH SOLIDS EPOXYMASTIC 75 SERIES, FOREST BROWN COLOR #75-D-444 ~~AS DISTRIBUTED BY KWAL-HOWELLS~~. TO BE THE SAME COLOR AS NOW EXISTS ON THE EXHAUST STACKS.



1988 Addition of Step Voltage Regulators and Conduit Runs

AS CONSTRUCTED
NO REVISIONS REVISED VOID 7-30-90



KEY PLAN

LEGEND

- B.P. Beam Wall Bearing Plates. See schedule on Dwg. # 5-WE12.
- U.N. Unless otherwise noted.
- L.A. Low Alloy Steel.

NOTES

1. For Notes, and Reference Dwg. see Dwg. 5-E9.
2. Reinforcement around Openings #1, #2, #3, #4 similar to Reinf. around Opening #2, as shown on Dwg. 5-W6. (Replaces Note #8 on Dwg. 5-E9)

Shaded area is work performed on this project. See Project No. I 70-3(34)220 for complete as-built plans.

STATE OF COLORADO - DEPARTMENT OF HIGHWAYS
STRAIGHT CREEK VEHICULAR TUNNEL PROJECT

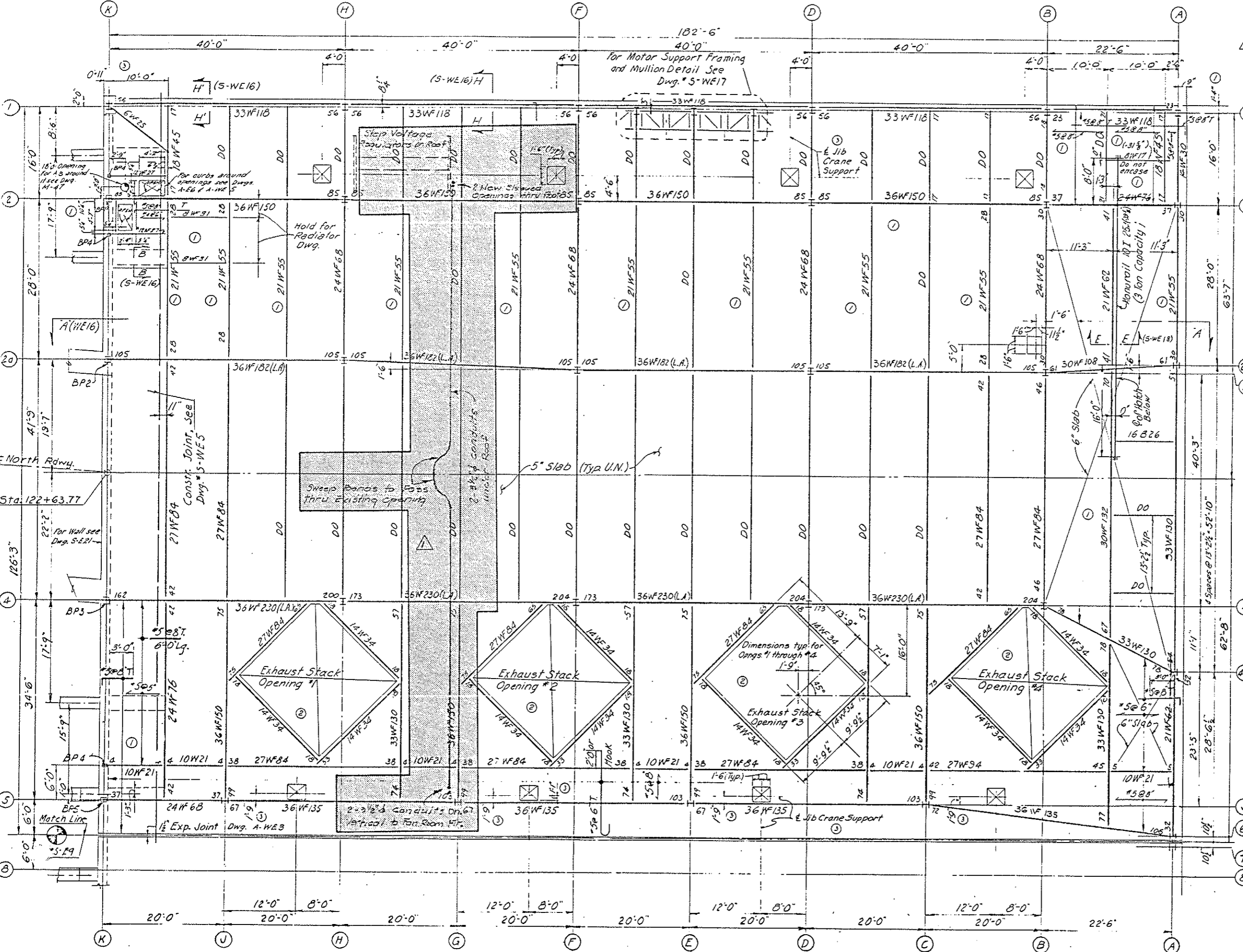
STRUCTURAL
EAST VENTILATION BUILDING
ROOF PLAN
NORTH

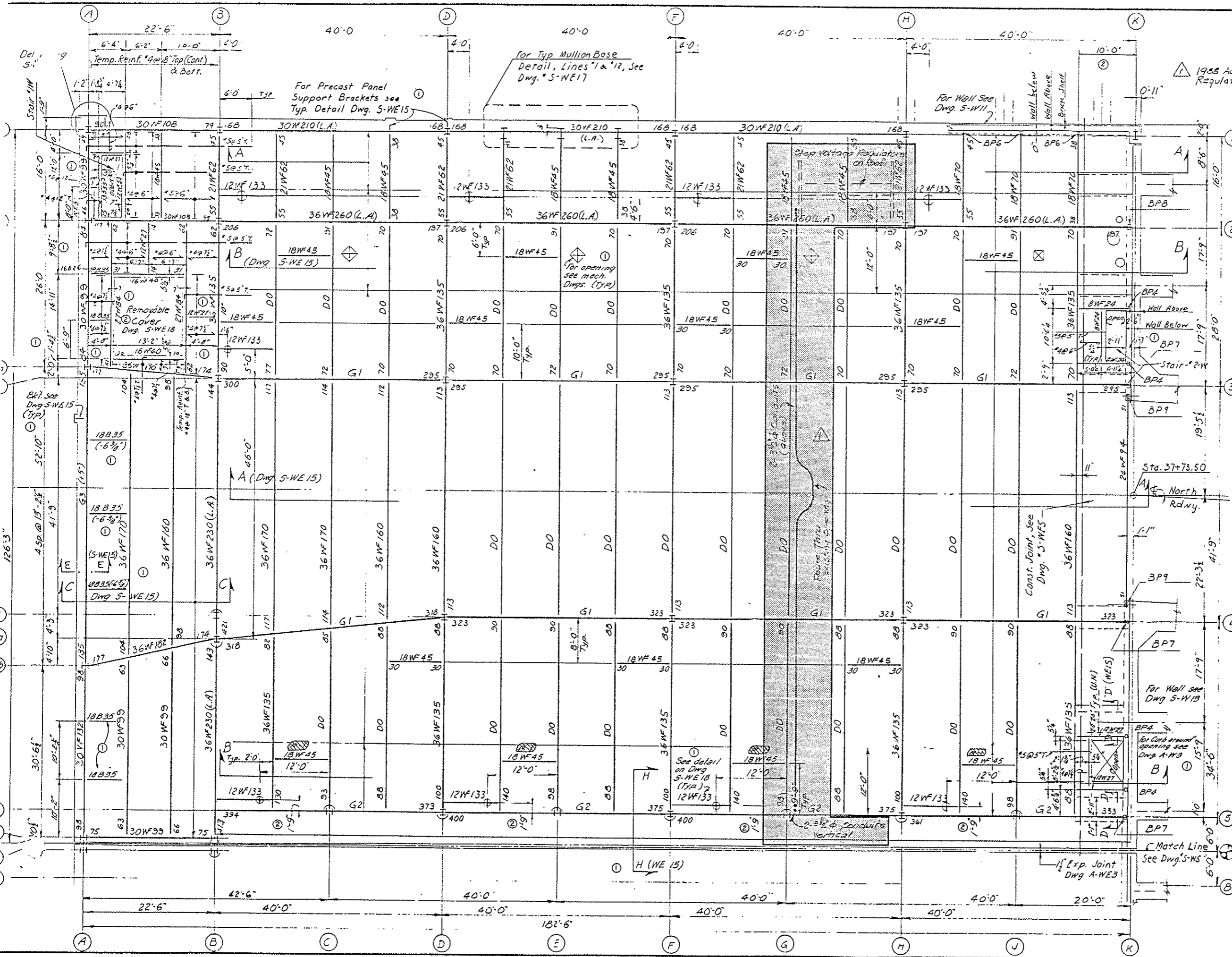
DESIGNED:
DRAWN:
CHECKED:
SUBMITTED:

DRAWING NO.

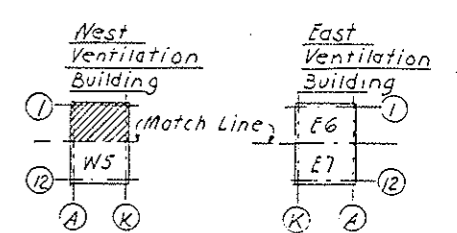
S-E8

SCALE 1/8"=1'-0" DATE





1988 Addition of Step Voltage Regulators & Conduit Runs



KEY PLAN

Girder Schedule					
See Dwg. No. S-WE12 For Welds & Cov. Pl. Details					
Mark	Section	Size	Approx. Length	Location	Remarks
G1	36W245	19-1/2	33'-0"	Bot. Flg. Low Alloy	
G2	36W300	20-1/2	33'-0"	T.&B. Flg. Low Alloy	
G3	36W300	14-1/2 x 2	49'-0"	T.&B. Flg. ABG	

Legend

- L.A. - Low Alloy Steel.
 - I - Column passes Thru Floor.
 - I - Column Above Only.
 - I - Column Below Only.
 - ⊕ - Jib Crane Support.
 - B.P. - Wall Bearing Plate (Schedule on S-WE12)
 - UN. - Unless otherwise noted.
- For Notes and Ref. Dngs, see Dwg. S-W5.
- Shaded area is work performed on this project. See Project No. I 70-3(34)220 for complete as-built plans.

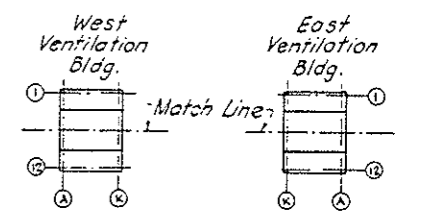
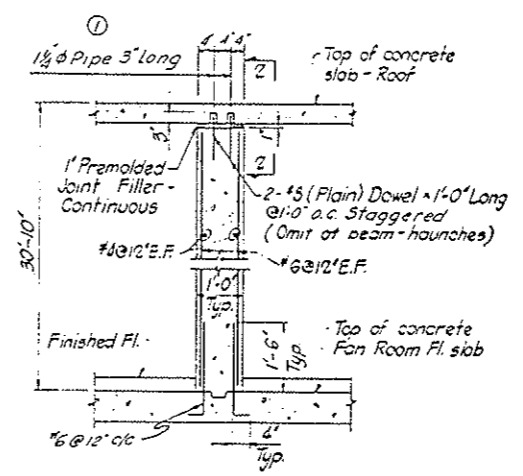
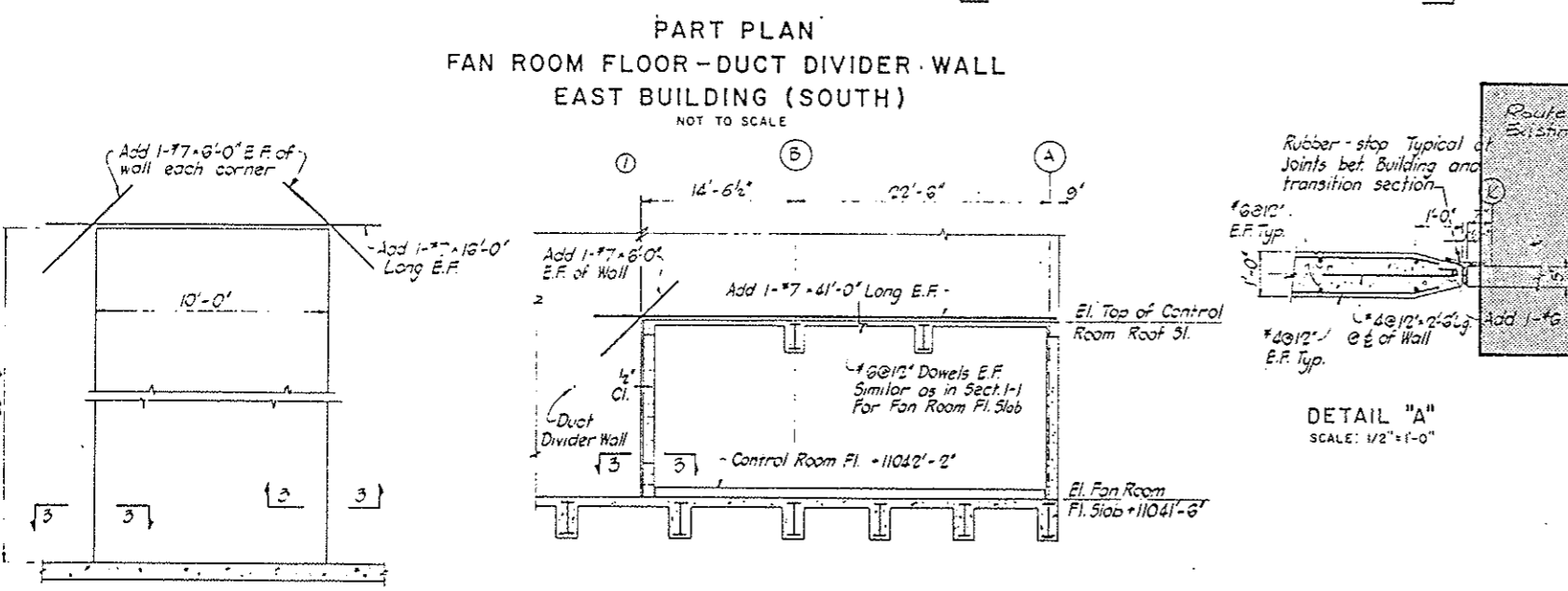
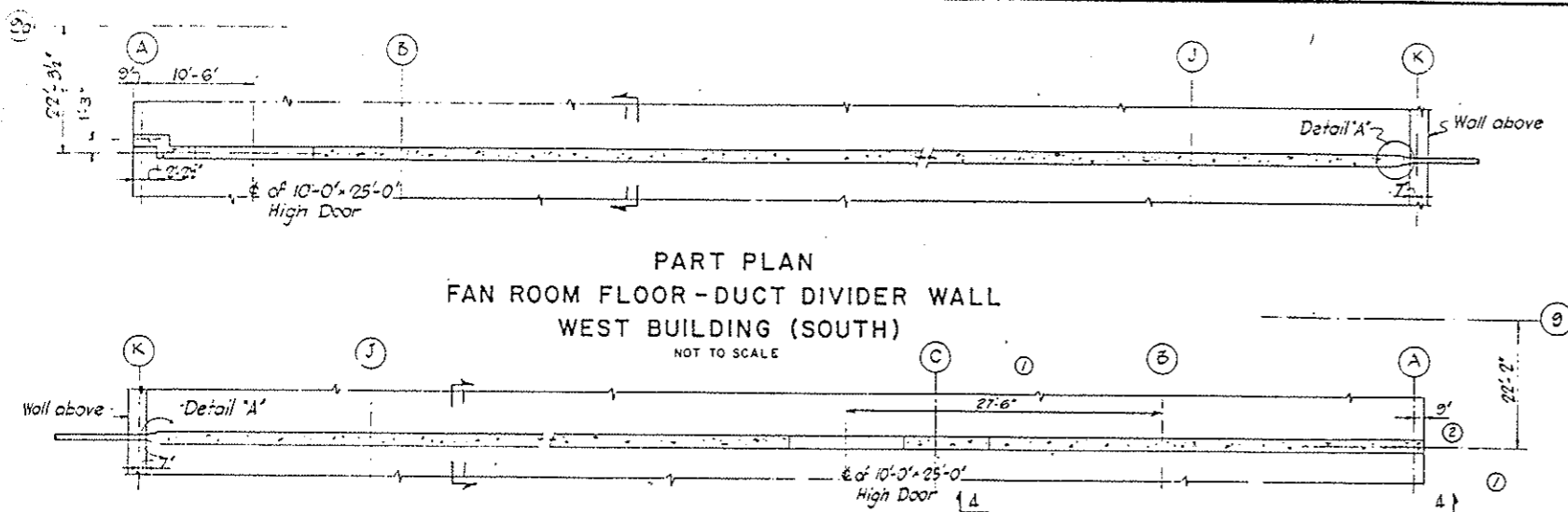
AS CONSTRUCTED		
NO REVISIONS	REVISED	VOID 7-30-90

STATE OF COLORADO - DEPARTMENT OF HIGHWAYS
 STRAIGHT CREEK VEHICULAR TUNNEL PROJECT

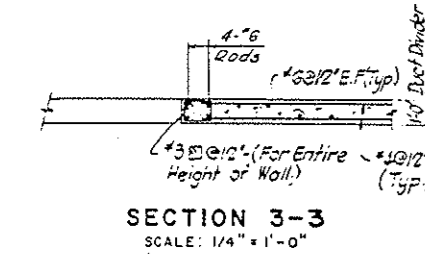
STRUCTURAL
WEST VENTILATION BUILDING
FAN ROOM FLOOR PLAN
NORTH

FEDERAL ROAD REGION NO	DIVISION	PROJECT NO	SHEET NO	TOTAL SHEETS
VIII	COLORADO	IR 70-3(162)	17	17

AS CONSTRUCTED
 NO REVISIONS
 REVISION: 7-29-90 101D

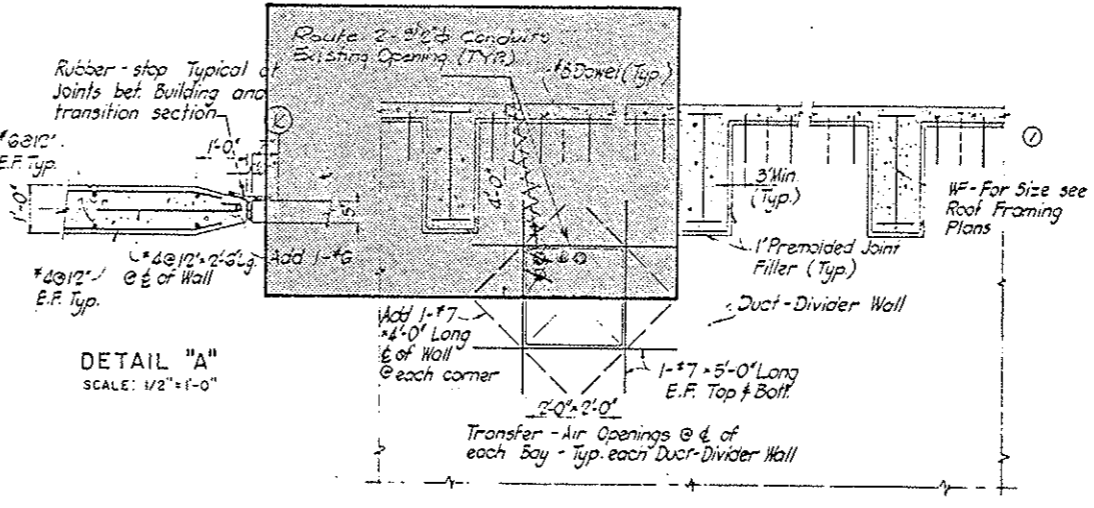


KEY PLAN

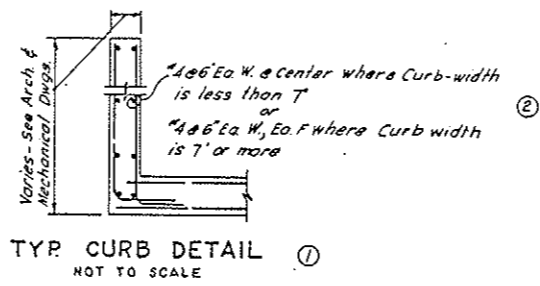


NOTE: Use this detail at the end of the wall of Col. Line A

SECTION 4-4 SCALE: 1/8" = 1'-0"



SECTION 2-2 SCALE: 1/2" = 1'-0"



- NOTES:
- See Dwg. 5W9 and 5E24 for Location of Duct-Divider Walls in North half of East & West Buildings.
 - Use Light-weight aggregate concrete in Duct-Divider Wall.

Shaded area is work performed on this project. See Project No. I 70-3(34)220 for complete as-built plans.

1988 Addition of Step Voltage Regulators & Conduit Runs

STATE OF COLORADO - DEPARTMENT OF HIGHWAYS
 STRAIGHT CREEK VEHICULAR TUNNEL PROJECT
 STRUCTURAL
 WEST AND EAST VENTILATION BUILDINGS
 FAN DUCTS - SECTIONS AND DETAILS
 SHEET 2

SCALE: AS NOTED	DATE	DRAWING NO. S-WE14
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