

GENERAL STRUCTURAL NOTES

1 - GENERAL REQUIREMENTS

- 1.01 Details shown on Structural drawings are typical. Similar details apply to similar conditions. Dimensions take precedence over scale. Notes on the drawings take precedence over General Notes. Conditions requiring construction different from that shown shall be reported to the Engineer. Whenever there is a conflict between requirements shown on the drawings, the more stringent requirement shall govern.
- 1.02 These Structural drawings represent the finished structure, and unless otherwise indicated, they do not show the method of construction. Provide all measures necessary to protect the structure, workmen, and other persons during construction. Provide temporary bracing for structural elements of sufficient strength and stiffness to resist all imposed loads, including wind and seismic loads. Contractor is solely responsible for the above measures, and visits to the site by the Engineer shall not include observation of these measures.
- 1.03 Building Codes: Construction shall conform to the applicable sections of the latest edition of the following codes, these Structural Notes, and to local ordinances. Whenever there is a conflict between codes, the more stringent requirements shall govern.
 - A. Uniform Building Code (UBC).
 - B. State of California, Department of Transportation, Standard Specifications.

1.04 Observation:

- A. The Contractor shall inform the Engineer 24 hours in advance of the following construction stages.
 1. Demolition and excavation complete, ready for placement of forms and reinforcing.
 2. Reinforcing steel in place.
 3. Concrete placing operations.
- B. Special Inspection: The Owner shall retain a Special Inspector for full time inspection of concrete placement and periodic inspection of reinforcing placement for concrete walls and roof. Proposed Inspector's name, qualifications and experience shall be submitted for acceptance prior to the commencement of the work to be inspected. Inspector shall submit sign reports of all inspections to the Engineer. Reports shall include notation of elements inspected and deviations from the plans. Contractor shall advise the Owner at least two weeks prior to the need for a Special Inspector.

1.05 Existing Construction:

- A. The Contractor is presumed to have visited the site and familiarized himself with existing conditions prior to submitting a bid.
- B. Existing construction shown on the plans is shown schematically and may not exist exactly as shown. Any existing construction encountered which requires construction different from that shown shall be reported to the Engineer.
- C. All structural elements noted are new and shall be provided unless specifically noted to be existing.
- D. Dimensions: Verify all dimensions in the field. It is the intent of these drawings that the new construction be installed in alignment with existing construction as indicated. Dimensions shown are approximate only and shall be adjusted in the field as required to accomplish this intent.

2 - CLEARING AND EARTHWORK

- 2.01 Unexpected Soil Conditions: Allowable values and foundation design are based upon assumed uniform, competent soil conditions. Actual soil conditions which will require construction appreciably different from that shown on the drawings shall be reported to the Engineer immediately.
- 2.02 Demolition: Remove existing paving in the vicinity of the existing wood culvert. Sawcut pavement back to undisturbed surface around structure site. Remove the existing wood culvert and its concrete foundations. All material so demolished shall be removed from the site and disposed of by the Contractor.
- 2.03 Compaction Requirements:
 - A. Reference test: Field tests performed in accordance with ASTM D1556 or ASTM D2922 and D3017 with reference to the maximum dry density determined by the modified AASHTO test for compaction. ASTM D1557, method A (4" mold, 5 layers, 10 lb. hammer, 18" drop, 25 blows per layer).
 - B. Compaction requirements: The uppermost 1'-0" of soil under culvert invert, and all backfill materials shall be at a minimum of 90% relative density.
 - C. Jetting of soils to obtain compaction is prohibited.
 - D. All swamping soils shall be removed and replaced as directed by the Engineer, regardless of compaction test results.
- 2.04 Clearing and stripping: All trees, shrubs, stumps, rubbish, weeds, grass, and all soil containing organic or other deleterious matter, shall be stripped and removed from the structure site.
- 2.05 Grading:
 - A. Mass Excavation: If subgrade is found to be saturated, or otherwise unsuitable, in the opinion of the Engineer, perform mass excavation as follows. Within the limits of the structure area and for a distance of 2 feet outside of the perimeter, remove existing soils to a depth of 1' below the bottom of the culvert invert. Prepare the bottom of the excavation as specified for fill. Place 1'-0" layer of rock base and compact.

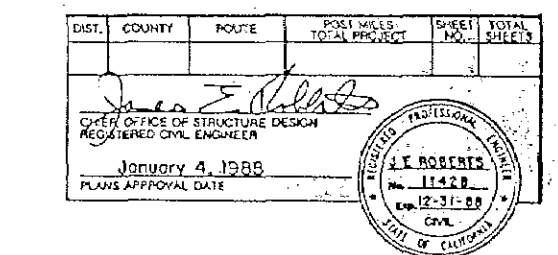
- B. Structure Excavation: Excavate for culvert to lines and dimensions shown on drawings. Remove debris and loose material from all excavations. De-water foundation excavations as required to maintain dry working conditions.

2.06 Fill and Backfill:

- A. Materials:
 1. General: All backfill materials are subject to acceptance by the Engineer. Walls shall not be backfilled until concrete has reached design strength, or at least 7 days after concrete has been placed whichever is sooner.
 2. Site Material: Existing site materials except those removed under Section 2.04 above are acceptable for backfilling.
 3. Import materials: Granular, non-expansive, free of organic matter, deleterious substances and rock or lumps over 2" in diameter, and having an expansion index less than 20.
 4. Rock base under invert: 3/4 x 4 gravel.
- B. Preparation: Scarify the uppermost 1'-0" of subgrade, bring to within 3% of optimum moisture, and compact.
- C. Placement: Place backfill in lifts not exceeding 6". Fill material shall be within 3% of optimum moisture.

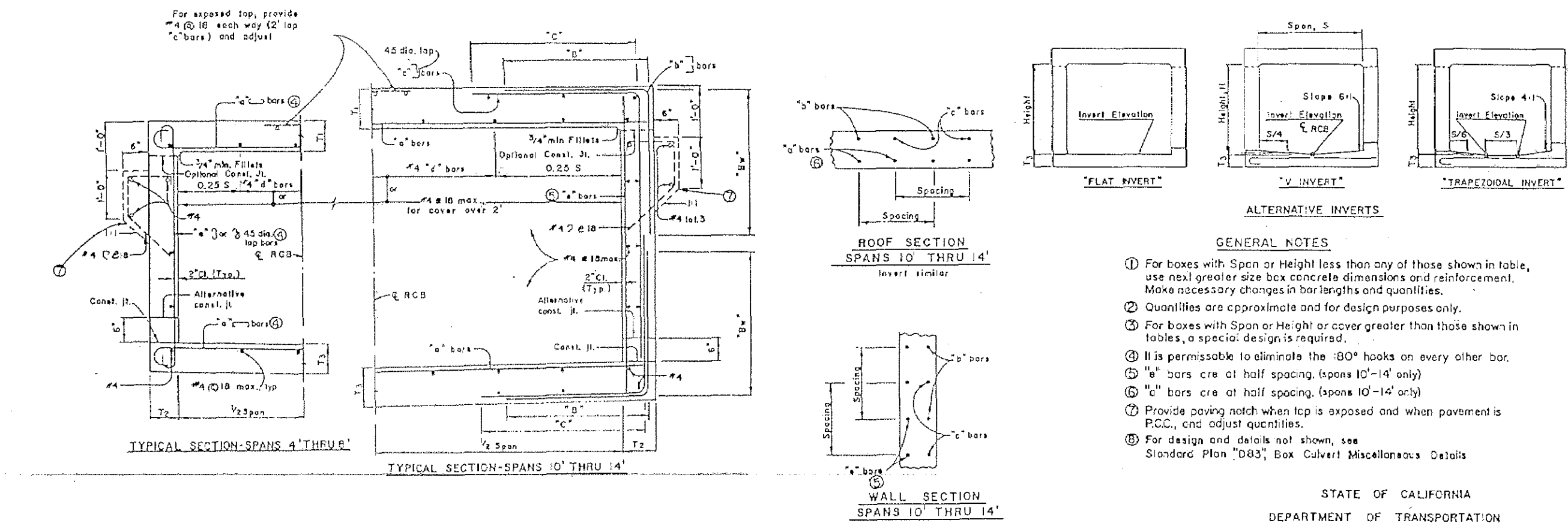
3 - CONCRETE

- 3.01 General: All concrete work shall be done in accordance with the latest editions of the ACI Building Code (ACI 318-77) and the ACI Manuals of Concrete Practice.
- 3.02 Reinforcing Materials: ASTM A615 Grade 60.
- 3.03 Concrete Materials:
 - A. Cement: Portland, type II, ASTM C150.
 - B. Fine aggregate: ASTM C33.
 - C. Coarse aggregate: ASTM C33, 3/4" or 1".
 - D. Water: Potable, clean, and pure. This requirement applies to water used in mix as well as to water for aggregate washing and for curing.
 - E. Ready-mixed concrete: ASTM C94.
 - F. Water reducing admixture: Pozzolith 300R at the rate of 5 oz. per sack or Zeecon at the rate of 6.8 oz. per sack. With the acceptance of the Engineer Pozzolith 300N or 322N at the rate of 5 oz. per sack or Zeecon H at the rate of 6 oz. per sack may be used.
- 3.04 Concrete Strength: 3000 psi @ 28 days.
- 3.05 Concrete Consistency: Maximum slump 4 1/2" per ASTM C143.
- 3.06 Concrete Proportioning:
 - A. Mix Design: Submit for review by the Engineer.
 - B. Maximum water-cement ratio: 6 gal. per sack.
 - C. Minimum Cement Content: 6.0 sacks per yard.
- 3.07 Miscellaneous materials:
 - A. Non-shrink grout: Por-Rok or acceptable equivalent.
 - B. Curing compound: White pigmented liquid membrane curing compound conforming to ASTM C309, Type 2.
- 3.08 Welding of reinforcing steel: Reinforcing steel shall not be heated or welded unless specifically directed by the Engineer.
- 3.09 Lap splices: 40 bar diameters or 1'-6" whichever is greater.
- 3.10 Concrete curing: Keep unformed concrete continuously wet for 7 days, or apply curing compound.
- 3.11 Form removal: Remove forms in accordance with the following schedule:
 - A. Side forms of invert: Minimum 1 days.
 - B. Walls: Minimum 7 days. Wall forms may be removed after 4 days if curing is performed as specified for unformed surfaces.
 - C. Suspended slab: Minimum 10 days provided specified strength is reached.
- 3.12 Vibration: Vibrate all concrete in place with a mechanical vibrator used by experienced personnel.
- 3.14 Testing:
 - A. Laboratory: The Owner shall retain and pay for the services of a Testing Laboratory, acceptable to the Engineer, where samples will be tested in accordance with these structural notes and applicable standards of ASTM. Work under this section to be performed by the Contractor includes the following:
 1. Make, store and deliver samples to the laboratory.
 2. Provide field storage facilities for compression test cylinders.
 - B. Samples: Make 3 test cylinders for each day's pour.
 - C. Testing of samples: Test each batch of 3 cylinders as follows: one at 7 days; two at 28 days.
 - D. Test reports: A copy of all test reports shall be submitted to the Structural Engineer.



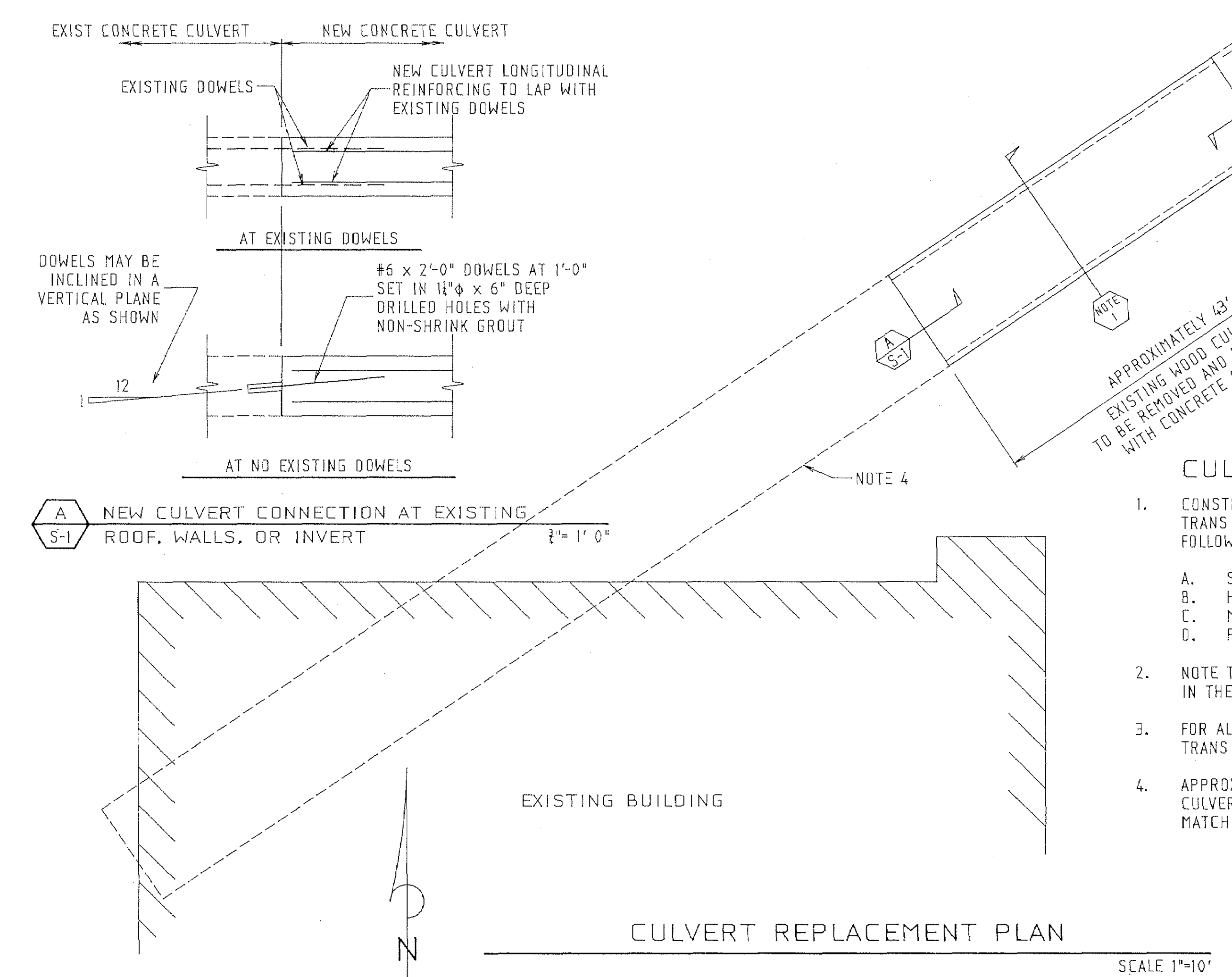
"6" bars for earth covers of 2' and less	
Span	Number
4'	5
5'	6
6'	7
7'	8
8'	9
10'	10
12'	11
14'	12

SPAN		HEIGHT	
4'	5'	5'	5'
5'	6'	6'	6'
6'	7'	7'	7'
7'	8'	8'	8'
8'	9'	9'	9'
10'	10'	10'	10'
12'	11'	11'	11'
14'	12'	12'	12'

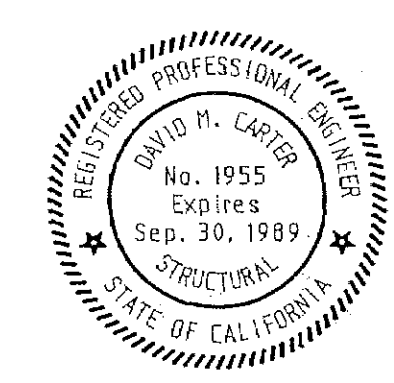


- GENERAL NOTES**
1. For boxes with Span or Height less than any of those shown in table, use next greater size box concrete dimensions and reinforcement. Make necessary changes in bar lengths and quantities.
 2. Quantities are approximate and for design purposes only.
 3. For boxes with Span or Height or cover greater than those shown in tables, a special design is required.
 4. It is permissible to eliminate the "60" hooks on every other bar.
 5. "6" bars are at half spacing, (spaces 10'-14" on).
 6. "6" bars are at half spacing, (spaces 10'-14" on).
 7. Provide pouring notch when top is exposed and when pavement is PCC, and adjust quantities.
 8. For design and details not shown, see Standard Plan "083", Box Culvert Miscellaneous Details.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
SINGLE BOX CULVERT
D80



- CULVERT NOTES**
1. CONSTRUCT BOX CULVERT IN ACCORDANCE WITH CAL TRANS STANDARD PLAN D80 AS SHOWN HEREON AS FOLLOWS:
 - A. SPAN = 10'
 - B. HEIGHT = 5'
 - C. MAXIMUM EARTH COVER = 20'
 - D. FLAT INVERT
 2. NOTE THAT SPACING OF A AND E BARS IS 6" IN THE ABOVE REFERENCED PLAN.
 3. FOR ALL ITEMS NOT SHOWN OR NOTED, SEE CAL TRANS STANDARD PLAN B83, NOT SHOWN HEREON.
 4. APPROXIMATE LINE OF EXISTING CONCRETE CULVERT TO REMAIN. NEW CULVERT SHALL MATCH ALIGNMENT OF EXISTING CULVERT



Contractor shall assume sole and complete responsibility for the job site conditions during the course of this project, including safety of all persons and property. This requirement shall apply continuously, and shall not be limited to the construction phase of the project. The Contractor shall be held responsible for any and all liability, cost or damage, in connection with performance of work on this project except for liability arising from the sole negligence of the Engineer or Owner. These plans and specifications, and the ideas and designs incorporated herein, are instruments of service prepared for the construction of the work shown hereon, are the property of Applied Engineering, and shall not be used in whole or in part for any other project without written authority of Applied Engineering. Copyright © 1988 Applied Engineering. All rights reserved. Copies of this drawing shall have this notice.

CULVERT REPLACEMENT
THE MARKET PLACE
 FOR: GEORGE MARTINEZ
 SAN LUIS OBISPO, CALIFORNIA

APPLIED ENGINEERING
 P.O. Box 1445
 290 Pismo Street
 San Luis Obispo, California 95423
 805/544-5684

BY: DC
 DATE: 27-SEP-88
 JOB: 288064
SHEET
 S-1

SCALE 1"=10'

THE MARKET PLACE
CULVERT REPLACEMENT

FOR: GEORGE MARTINEZ

**APPLIED
ENGINEERING**
P.O. Box 4644 290 Flame Street
San Luis Obispo, California 93403
805/564-3884

CONSIDER CAL TRANS STANDARD SINGLE
BOX CULVERT (DWG D80) W/ \emptyset COVER, 10' SPAN

LOADS

DL. - CONC. SAY $\frac{10.5}{12} \times 1.5 = .131$
ASPHALT $.035$

$$M = \frac{.166 \times 10.67^2}{8} = 2.36 \text{ K} \quad .166 \text{ K/ft}$$

LL USE HS20 WHEEL LOAD 16K

CASE A $M = \left(\frac{10+2}{32} \right) 16 = 6 \text{ K-ft}$

$$I = \frac{50}{10+12.5} = .37 \text{ USE } .3 \times 6 = 1.8 \text{ K-ft}$$

$$M_u = 1.3 [2.36 + 1.67 (6 + 1.8)] = 20 \text{ K} \text{ SIMPLE}$$

w/ $t = 8''$, $d = 5.5''$, $A_s = \#6 @ 6'' = .88 \text{ GR } 60$

$$T = .88 \times 60 = 52.8 \quad a = \frac{52.8}{.85 \times 3 \times 12} = 1.72$$

$$M_u = \frac{.9}{12} 52.8 \left(5.5 - \frac{1.72}{2} \right) = 18.4 \text{ K} \text{ N.G. W/ 10' COVER COL}$$

w/ $t = 10.5''$, $d = 8''$, $A_s = \#7 @ 6'' = 1.2 \text{ GR } 60$

$$T = 1.2 \times 60 = 72 \quad a = \frac{72}{.85 \times 3 \times 12} = 2.35$$

$$M_u = \frac{.9}{12} 72 \left(8 - \frac{2.35}{2} \right) = 36.8 \text{ K} \text{ OK W/ 20' COVER COLUMN}$$

USE CULVERT GEOMETRY & REINF. AS
SHOWN FOR 10' SPAN, 5' HEIGHT, 20' COVER

