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UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

GUIDELINE TRANSMITTAL SHEET

GUIDELINE NUMBER	TITLE	RELEASE NO.
NPS-10	DRAWING FORMAT AND DRAFTING PRACTICES GUIDELINE FOR DESIGN AND CONSTRUCTION DRAWINGS	2
OFFICE OF ORIGIN: Graphic Systems Division, Denver Service Center		AMENDMENT NO.
		DATE: May 1986

Explanation of material transmitted:

Transmitted herewith is a revised Drawing Format and Drafting Practices Guideline for Design and Construction Drawings, NPS-10. This guideline replaces the drafting guideline released in 1981. Please keep this transmittal sheet and all future transmittal sheets in the front of this guideline for ready reference.

Copies of this guideline should be issued to all National Park Service personnel who prepare design and construction drawings. Copies should also be given to A/E contractors who produce design and construction drawings for the National Park Service.

Richard E. Stowers

Assistant Director, Personnel & Administrative Services

DRAWING FORMAT AND DRAFTING PRACTICES GUIDELINE

NPS-10

RELEASE NO. 2

DRAWING FORMAT
AND DRAFTING PRACTICES
GUIDELINE

NPS-10

CONTENTS

1. INTRODUCTION

The following guideline is intended for National Park Service employees as well as architectural and engineering (A&E) contractors for use in the preparation of NPS comprehensive design, preliminary, construction, and as-constructed drawings. To maintain uniformity of work and to facilitate review of both A&E submissions and NPS-generated products, these requirements should be met for all such drawings, including historic structure construction drawings. Drawings that do not meet these requirements will be considered unacceptable. If some special condition seems to make it impractical or impossible to conform to any of these requirements, the problem should be referred either to the chief, Graphic Systems Division, Denver Service Center, or in the case of park- or region-produced projects, to the official responsible for the project.

2. DRAWING FORMAT

STANDARD SHEETS

Standard preprinted NPS drawing sheets are used for comprehensive design, preliminary, construction, and as-constructed drawings. They have been designed to allow for both individuality of presentation and conformity of sheet size and general appearance. More than one sheet should be used if a drawing is congested. Reduced-size samples of standard drawing sheets, showing overall sheet size and trim lines are shown in exhibit 2-A. The exhibit also shows where to place the approval and revision block Stanpats, when they are required.

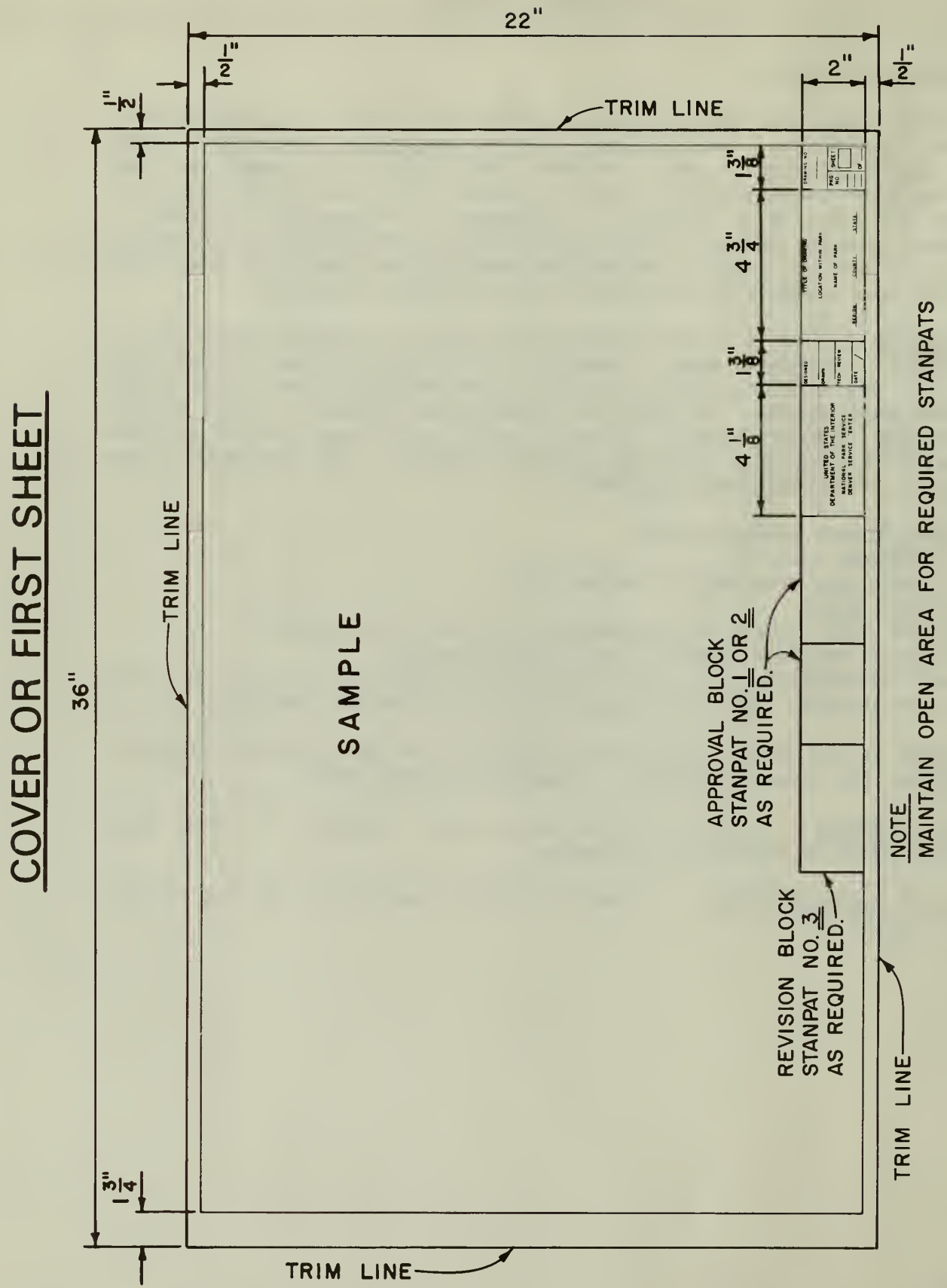
First Sheet (called a cover sheet when used in a multiple-sheet set of drawings). Standard cover sheets with vicinity and park maps have been, or are in the process of being, predrafted for each unit of the national park system. A catalog of these cover sheets is in the Branch of Drafting, Denver Service Center. These cover sheets should be used for all NPS projects, including projects done by A&E contractors (see chapter 7, "Materials and Supplies").

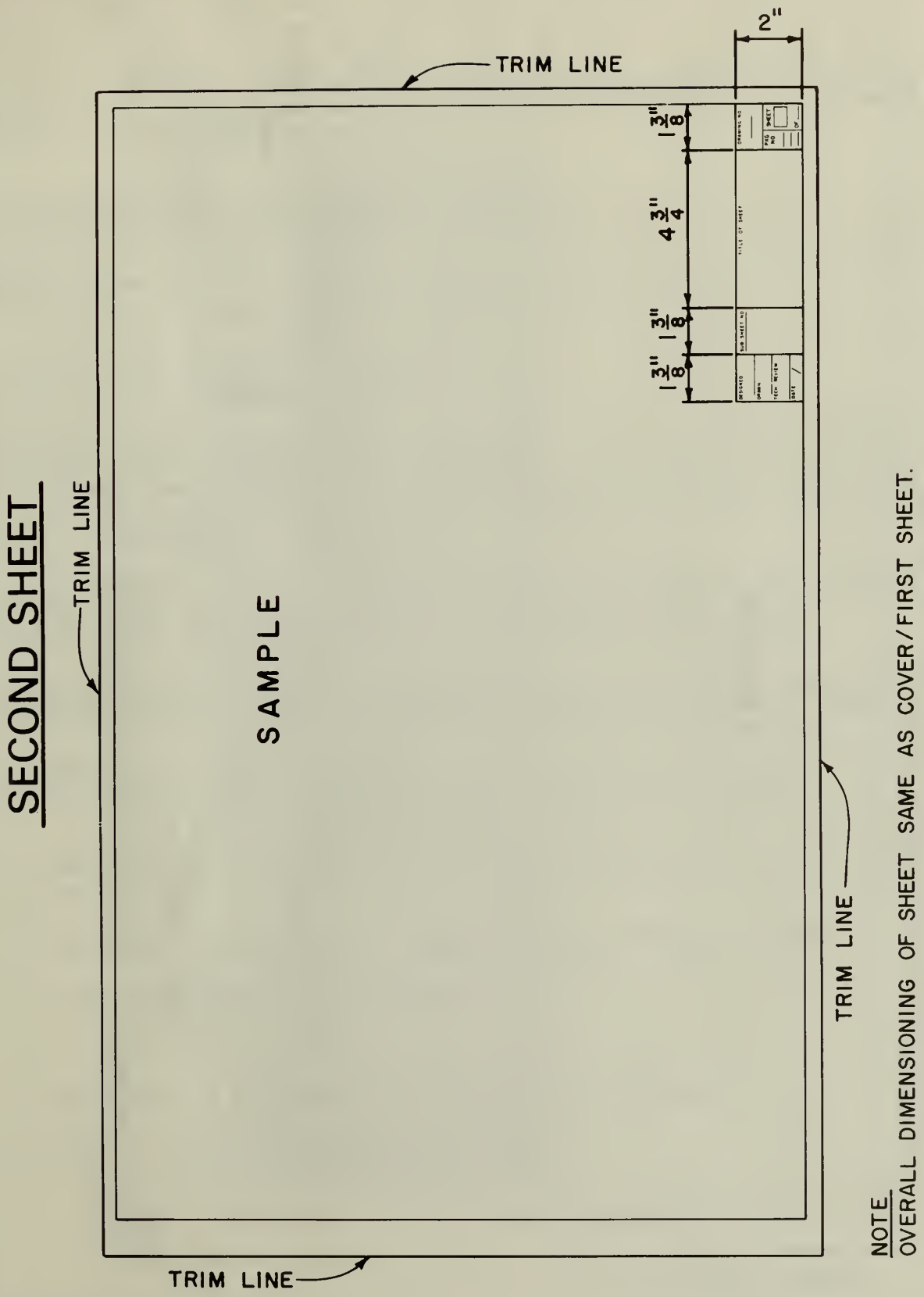
All cover sheets should contain
- a vicinity map
- a park map showing the project site
- a title block
- basic data (source of information and date of preparation)
- various required approval and revision blocks
- an invitation-for-bid (IFB) number (on drawings prepared for bid)
- a construction contract number (on as-constructed drawings)

An index to the sheets in the set is added to the cover sheet if possible; otherwise, the index is placed on a separate second sheet.

Second Sheet(s). These sheets have been designed to allow more drafting space to complete the drawing.

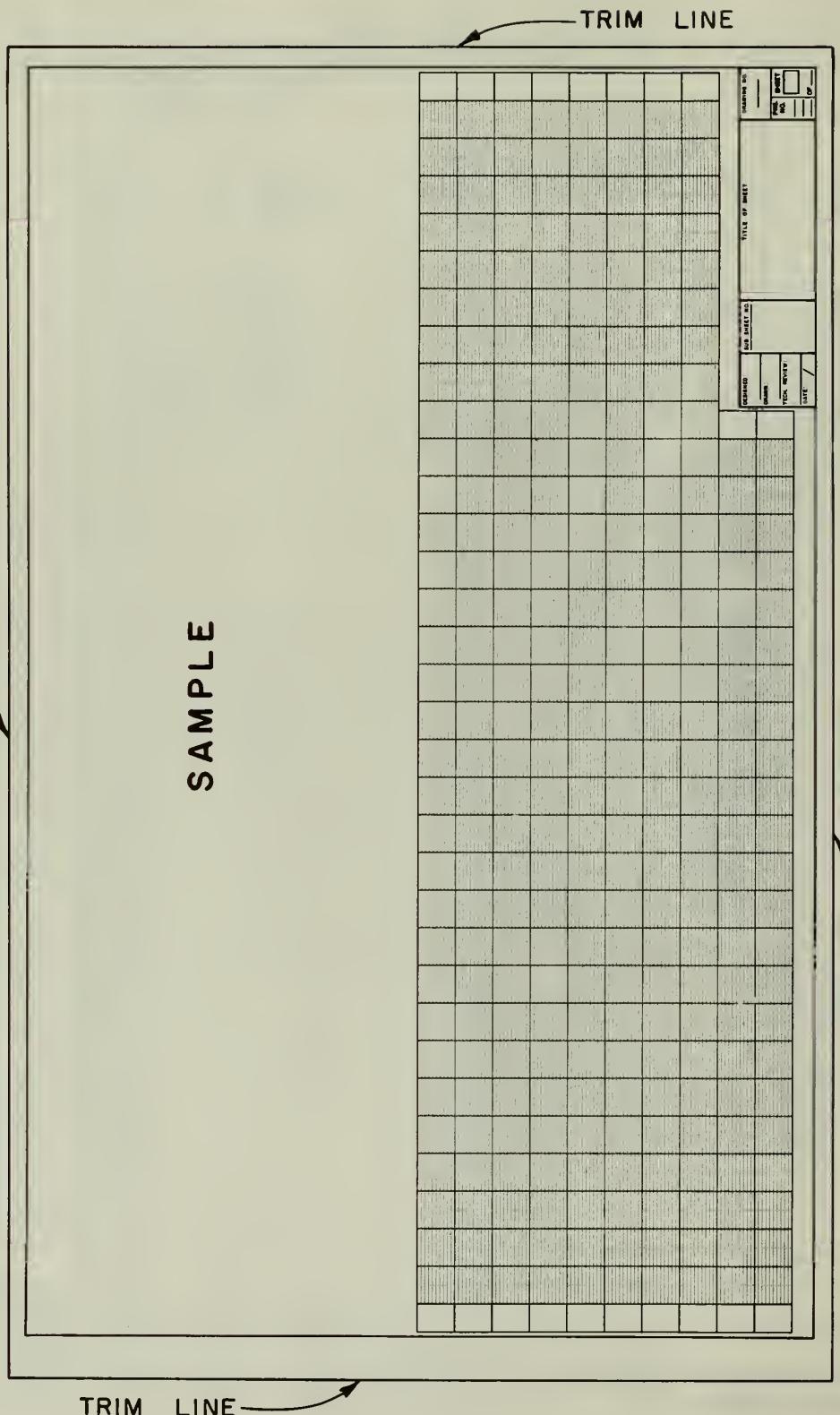
Plan and Profile Sheet(s). These are only preprinted with the second sheet title block.


COVER OR FIRST SHEET
22"
36"
1 1/2"
1/2"
2"
1/2"
TRIM LINE
TRIM LINE
TRIM LINE
TRIM LINE
SAMPLE
1 3/8"
4 3/4"
1 3/8"
4 1/8"
APPROVAL BLOCK
STANPAT NO. 1 OR 2
AS REQUIRED.
REVISION BLOCK
STANPAT NO. 3
AS REQUIRED.
NOTE
MAINTAIN OPEN AREA FOR REQUIRED STANPATS
1 3/4"



NOTE
OVERALL DIMENSIONING OF SHEET SAME AS COVER/FIRST SHEET.

PLAN & PROFILE SHEET



NOTE
OVERALL DIMENSIONING OF SHEET SAME AS COVER/FIRST SHEET.

TITLE BLOCKS

Title blocks on cover sheets include the project title, specific location within the park, park name, region, county, and state. (If the park is in more than one county, show only the county in which the particular project is located.) Title blocks on second sheets contain only the title of the sheet. The samples in exhibit 2-B show how to prepare the title blocks for first and second sheets.

IFB OR CONSTRUCTION CONTRACT NUMBERS

Exhibit 2-B shows the proper size and placement of these numbers, which appear above the title block on drawings prepared for bid (IFB number) or on as-constructed drawings (construction contract number).

APPROVAL AND REVISION BLOCKS

Approval and revision blocks are preprinted on pressure-sensitive polyester sheets (Stanpats) and are affixed to the cover or first sheet, as required (see exhibit 2-C). These blocks are the only adhesive-back material accepted on any drawing and are available from DSC Supply (see chapter 7, "Materials and Supplies").

Approval Block. Use on all drawings that are approved by a regional director. (All construction drawings prepared by parks, regions, or the Denver Service Center require the regional director's approval.)

Compliance Block. Use on construction drawings that have been preceded by an approved comprehensive design or preliminary drawing.

Revision Block. Use on drawings that have been revised (either before or after award). The information in the revision block includes

an identifying mark (a triangle with a number or letter, used to key the information in the revision block to the part of the drawing it pertains to)

the sheet number(s) of the sheets with that change or addition

a brief description of the revision

the date of the revision

the initials of the person responsible for the revision

A completed block is shown in exhibit 5-B.

The information in the revision block is keyed to the drawings by circling the affected part of each drawing, preferably on the back side of the sheet, and placing a revision mark on or within the circle (see chapter 3, "Drafting Procedures").

DRAWINGS REISSUED FOR BID

Reissued bid packages are drawings and specifications that, for whatever reason, did not make it through a successful first bid and are subsequently rebid. How this is noted on the drawings will vary, depending on whether the drawings and/or the specifications have to be revised.

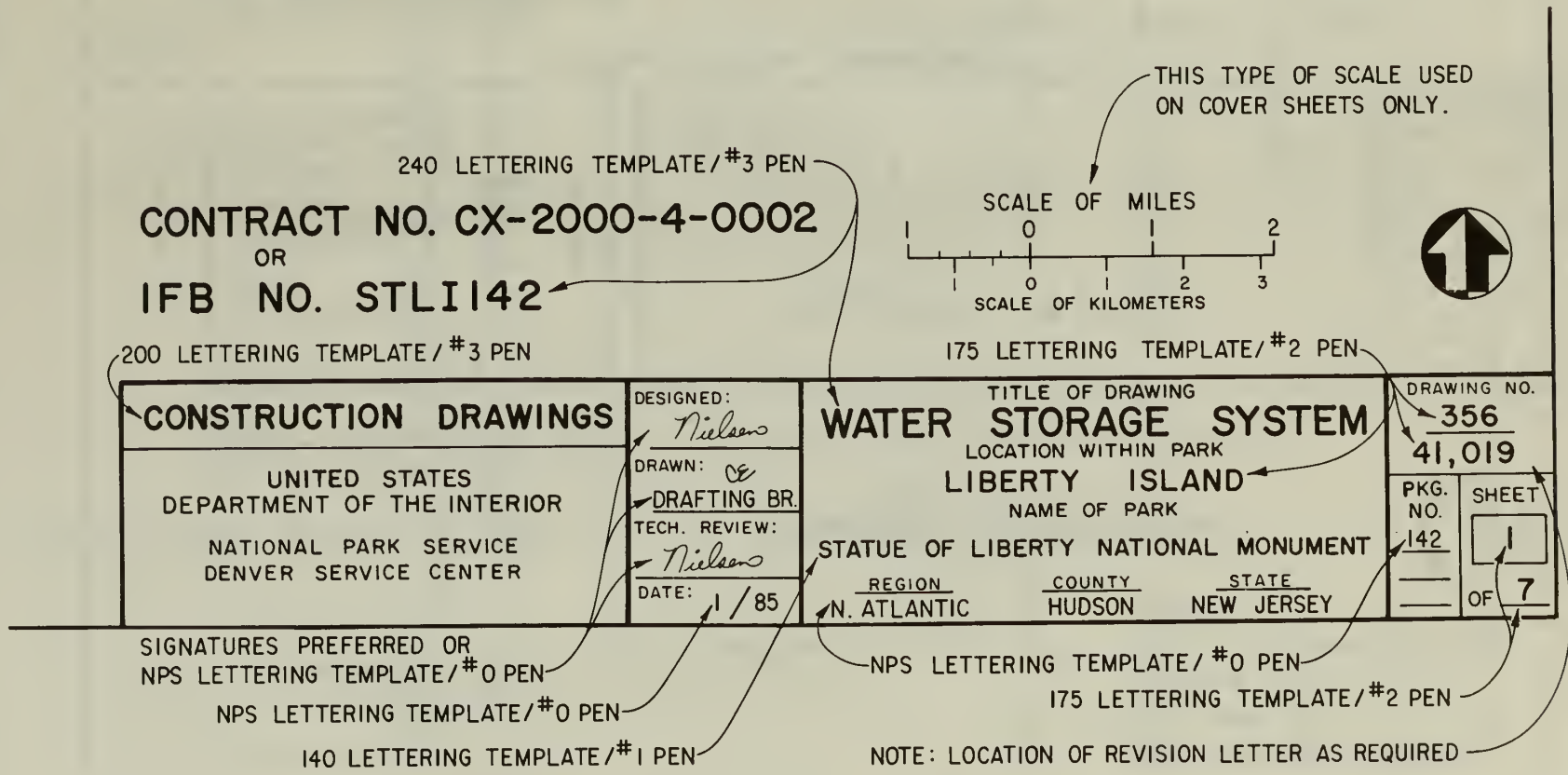
No changes to drawings or specifications: Since there are no changes to the drawings, there is no need to change the drawing number. The IFB number is followed by "-R" (JELA-342-R) to indicate that the bid package has been rebid. The reissuance is also noted in the revision block by the words "Reissued by amendment" and the date.

No changes to drawings but changes to specifications: Since there are no changes to the drawings, the drawing number remains unchanged. The IFB number is followed by "-R." The change is noted in the revision block as "Reissued for bid, no changes to drawings" and the date.

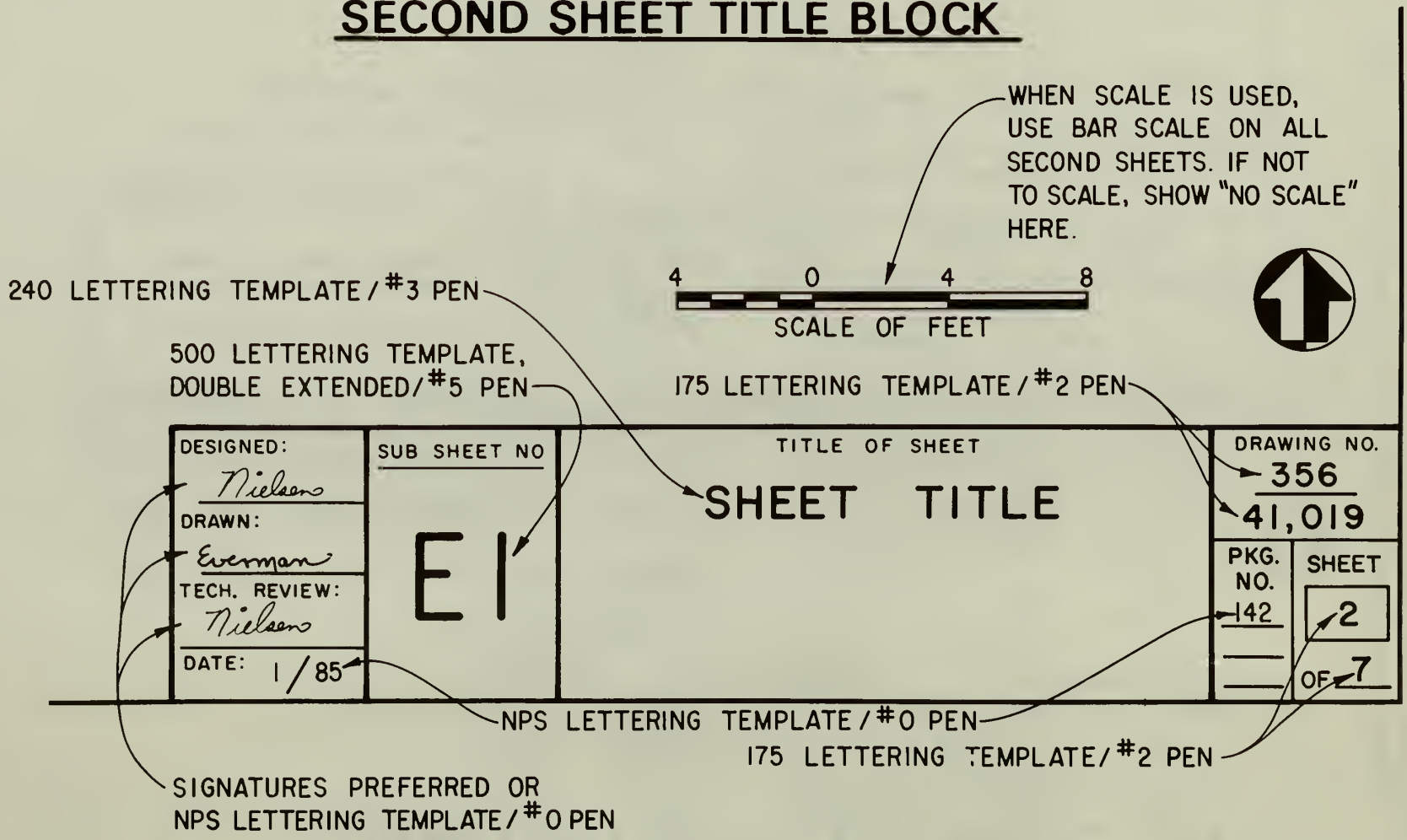
Changes to both drawings and specifications: A revision letter is added to the drawing number to indicate that the drawings have been revised. The IFB number is followed by "-R". The revision block notes both the reissuance and the drawing revisions as "Reissued for bid. Revised sheets x, x, x" and the date.

If the drawings themselves are not revised, only the cover has to be changed to reflect the new information and reproduced (see exhibit 5-B). If the drawings are revised, the entire set is revised and reproduced.

COVER/FIRST SHEET TITLE BLOCK



SECOND SHEET TITLE BLOCK



APPROVAL BLOCK, STANPAT NO. 1

RECOMMENDED

_____ _____
Assistant Manager Date

_____ _____
Superintendent Date

APPROVED _____ _____
Director – Region Date

COMPLIANCE BLOCK, STANPAT NO. 2

This drawing has been prepared in compliance with Preliminary / Comprehensive Design Drawing No. _____

Approved by _____

_____ on _____
Title Date

_____ _____
Assistant Manager Date

REVISION BLOCK, STANPAT NO. 3

Mark	Sheet	REVISION	Date	Initial

NORTH ARROWS AND SCALES

When possible, the drawings should be laid out so that north is toward the top of the sheet. Also, the orientation of north should be maintained throughout a set of drawings, if possible. North arrows have not been preprinted on the sheets because some drawings do not require them. If required, north arrows are normally placed in the lower right-hand corner above the title block (see exhibit 2-B). A recommended style for north arrows appears in exhibit 2-D. When more than one north arrow is used on the same sheet, each arrow should be placed near (preferably above or to the right of) the title of the specific view it orients (see "Specific View Titles," below).

Graphic scales must be used on all drawings. They are generally placed in the lower right-hand corner above the title block (see page 2 of exhibit 2-B). The standard scales to be used on all NPS work are shown in exhibit 2-E. If the drawings are not to scale, the term "No Scale" should appear above the title block. When two or more bar scales are used on the same sheet, they normally are placed below the title of each specific view (see "Specific View Titles," below). However, if the same scale applies to more than one view on the same sheet, it should not be repeated; instead, all the bar scales should be grouped (above the title block, if possible), labeled scale A, scale B, etc., and referenced below the title of each view (see page 3 of exhibit 2-E). If a specific detail is not drawn to scale, the term "No Scale" should be shown below the title.

When views are enlarged, the new scale should exactly double or redouble the original scale. This will make it easier to get back to the original scale, if necessary, by making a half-size print. Make sure that work to be enlarged to more than twice its original size is fully redoubled from the original scale. For example, if the original scale is ¼", the range of scales for enlargements is ½", 1", 2", etc. Similarly, if the original scale is 3/4", the range of scales for enlargements is 1½", 3", etc.

SPECIFIC VIEW TITLES

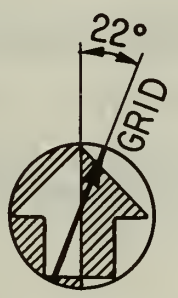
Section or detail titles and symbols should be consistent in size and format throughout the set of drawings. Instructions for drawing section or detail symbols are provided in exhibit 2-F.

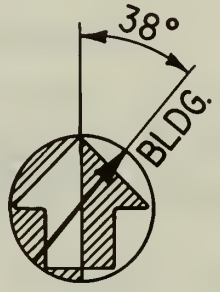
Exhibit 2-G shows typical labeling, scale, and north arrow samples for specific details, sections, and plans.

SUGGESTED NORTH ARROWS

WHEN NORTH ARROW APPLIES TO ENTIRE DRAWING AND IS SHOWN ABOVE TITLE BLOCK, USE TEMPLATE NO. 1002 OR NO. 1002P BY PICKETT. USE LARGEST ARROW AND A $\frac{3}{4}$" CIRCLE.

TRUE NORTH

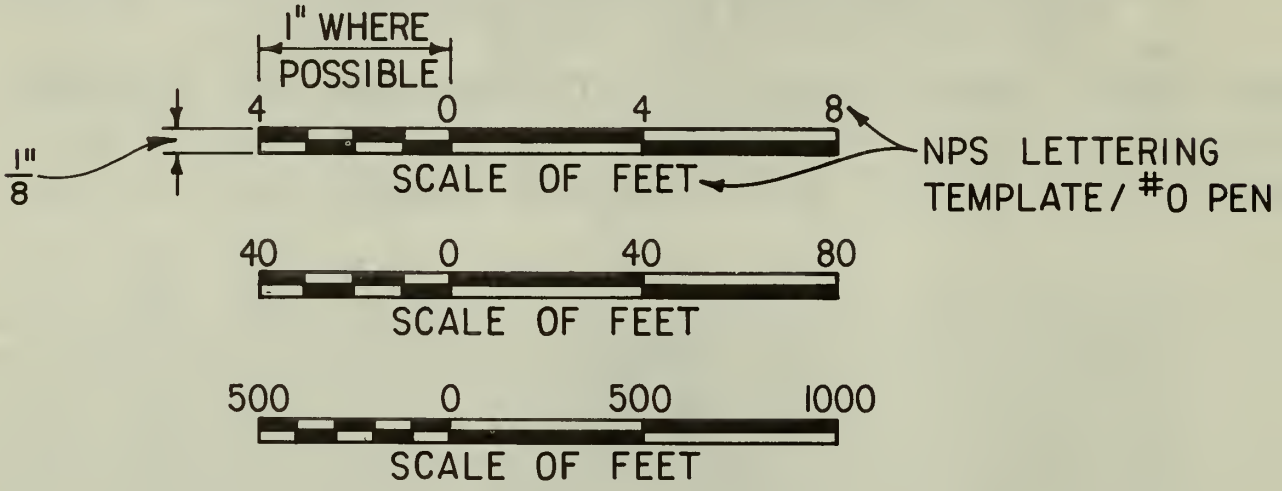




WHEN NORTH ARROW APPLIES ONLY TO PORTIONS OF A DRAWING, IT SHOULD BE SHOWN IN VICINITY OF SPECIFIC PLAN TITLE WITH PICKETT TEMPLATE NO. 1002P MIDDLE ARROW, AND A $\frac{1}{2}$" CIRCLE.

STANDARD GRAPHIC SCALE

(COMMON ARCHITECTURAL & CIVIL ENGINEERING SCALES



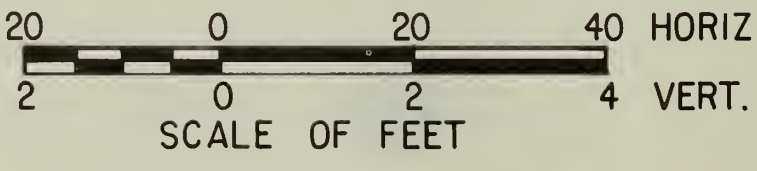
PROFILE SCALES

PROFILES ARE USUALLY DRAWN WITH DIFFERENT HORIZONTAL AND VERTICAL SCALES. THIS IS DONE TO EXAGGERATE THE VERTICAL DIMENSIONS SO THE PROFILE CAN BE EASILY DRAWN AND READ.

A FEW COMMON SCALES:

1" = 100' HORIZ. 10' VERT. 1" = 20' HORIZ. 2' VERT. 1" = 40' HORIZ. 4' VERT. 1" = 50' HORIZ. 5' VERT.

THESE SHOULD ALWAYS BE SHOWN WITH A GRAPHIC SCALE AS IN THIS EXAMPLE:

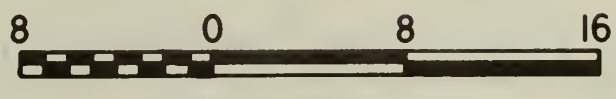


BAR SCALES SHOULD BE SHOWN ON DRAWING. SCALES SHOULD NOT BE CALLED OUT AS 1/4" = 1'-0", ETC.

STANDARD BAR SCALES

COMMON ARCHITECTURAL & CIVIL ENGINEERING SCALES

$\frac{1}{8}$" = 1'-0"



SCALE OF FEET

$\frac{1}{4}$" = 1'-0"

SCALE OF FEET

$\frac{1}{2}$" = 1'-0"

SCALE OF FEET

$\frac{3}{4}$" = 1'-0"

SCALE OF FEET

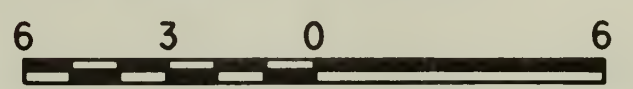
1" = 1'-0"

SCALE OF FEET

1$\frac{1}{2}$" = 1'-0"

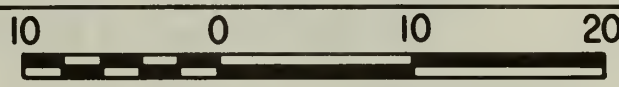
SCALE OF INCHES

3" = 1'-0"



SCALE OF INCHES

1" = 10'

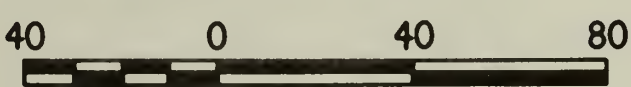


SCALE OF FEET

1" = 20'

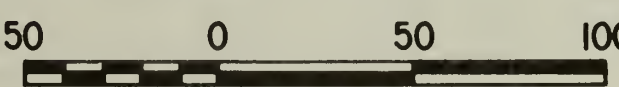
SCALE OF FEET

1" = 40'



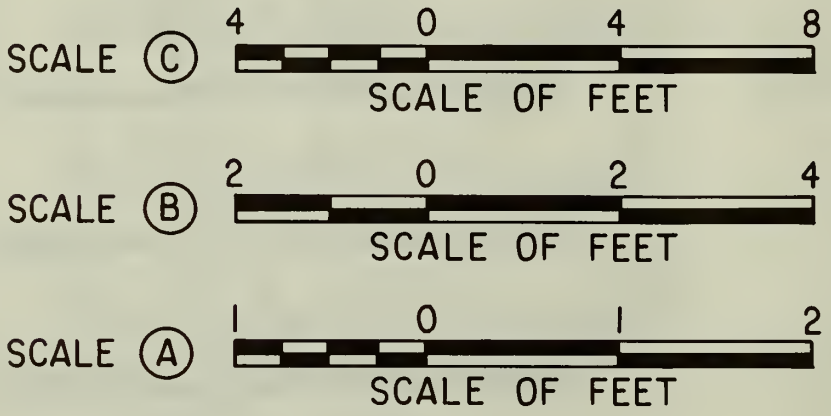
SCALE OF FEET

1" = 50'



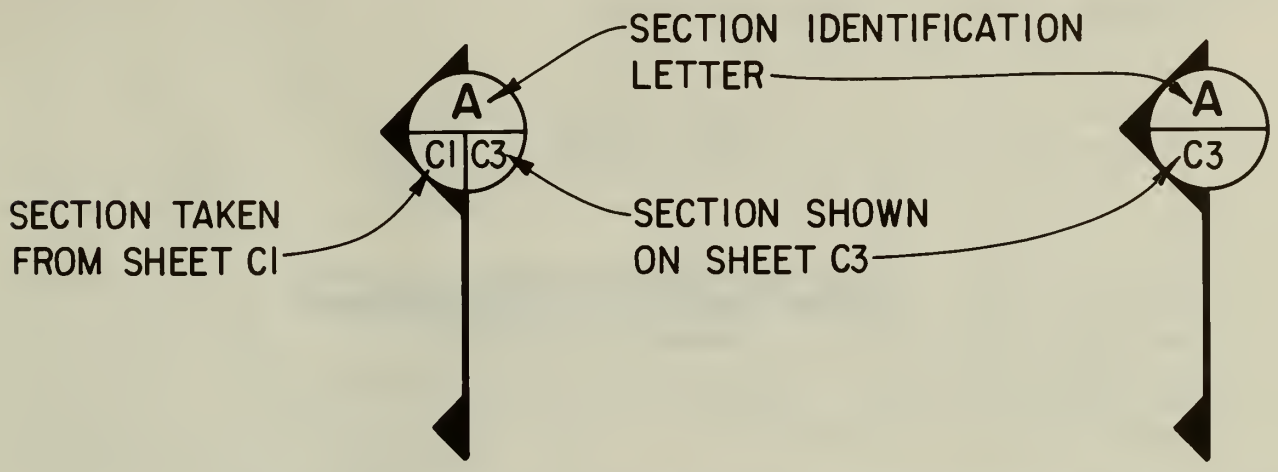
SCALE OF FEET

GROUPING REPETITIVE SCALES



REFERENCE TO SCALES

SECTION OR DETAIL IDENTIFICATION SYMBOLS



WHEN SECTION IS SHOWN ON DIFFERENT SHEET

WHEN SECTION IS SHOWN ON SAME SHEET

DETAIL OR SECTION REFERENCES LOCATED IN ANY NOTE FORM SHALL BE SHOWN AS FOLLOWS:

SEE DETAIL **A** SHEET C2.

SEE SECTION **D** THIS SHEET.

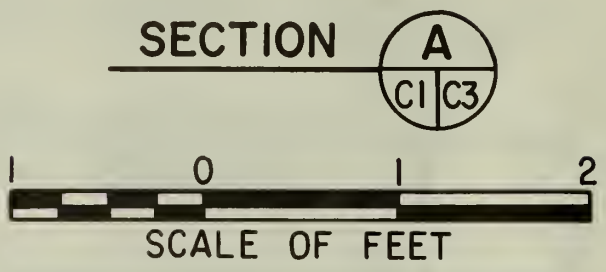
IDENTIFICATION LETTER AND SHEET NUMBERS SHOULD ALWAYS READ FROM THE BOTTOM OF THE SHEET, AS SHOWN BELOW:

NOTE

CIRCLES ARE $\frac{5}{8}$"; DETAIL OR SECTION LETTER CALL OUTS ARE 175 LETTERING TEMPLATE / NO. 2 PEN; SHEET NUMBER REFERENCES ARE NPS LETTERING TEMPLATE / NO. 0 PEN.

TYPICAL TITLES

TYPICAL TITLE FOR A SECTION:



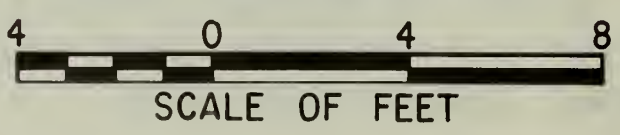
TYPICAL TITLES FOR A DETAIL:

CONCRETE VALVE BOX

NO SCALE

TYPICAL TITLE FOR A PLAN WHEN NORTH ARROW ONLY APPLIES TO ONE PART OF THE DRAWING:

MECHANICAL PLAN



3. DRAFTING PRACTICES

All NPS drawings are entered into a unitized microfilm system (part of the Technical Information Center at the Denver Service Center). Therefore, they must be capable of being reproduced as clear and legible half-size prints. This is particularly important for construction drawings because they are issued to prospective bidders as economical half-size prints. The construction contractor or maintenance worker may never see the original drawing, only a reproduction of it.

Consistent line density and clear legible lettering are essential. The finest camera and the most carefully controlled processing cannot produce good results unless the original is of high quality. Good prints begin on the drafting table. Keep in mind the drawing you are working on is going to be reduced and read as a half-size print. Originals or photographic duplicates that cannot be reproduced as clear, legible half-size prints are unacceptable.

GENERAL

These drafting practices are to be followed:

Maintain even line weight.

Avoid line congestion.

Match line weight when making additions or changes.

Keep drawings clean and uncreased.

Keep erasures at a minimum, with no ghosting.

Maintain dark, clear, sharp, solid uniform lines to ensure good reproduction and microfilm.

Differentiate outlines and section lines by varying the width or thickness of lines, not by changing densities; the density of the line should be constant.

Use line work techniques for distinctive symbols and crosshatching.

Do not use pencil shading or toning.

Ensure open spacing of lines and lettering.

Use mechanical or clear legible hand lettering. All-mechanical lettering (LeRoy) makes revisions simpler and reproductions clearer.

Use only one type of lettering style, preferably vertical and all uppercase.

Maintain a minimum lettering height of 1/8"; when possible, use 3/16" or 1/4".

USE OF INK OR PENCIL

Aqueous (waterproof) ink is recommended for drafting on polyester film. Regular drafting pencils should not be used; if pencils are used, they should be plastic lead pencils designed for drawing on polyester materials.

Ink and pencil should not be used on the same drawing for reproduction and clarity purposes. Final original drawings that will not reproduce clearly are unacceptable.

Soft black pencils should be used on the backs of drawings to identify revisions (revision procedures are outlined in chapter 2). Grease pencils should not be used, even on the backs of drawings, because a grease pencil eventually penetrates a drawing and cannot be erased.

PEN AND LETTERING TEMPLATE SIZES

The following pen and lettering template sizes are recommended for half-size reduction. All standard base lettering should be done with the special NPS lettering template (see chapter 7, "Materials and Supplies").

Title Block	Pen Size	Lettering Template No.
Title of drawing set and sheet title	#3	240
Preliminary, comprehensive, construction, and as-constructed drawings	#3	200
Drawing number, location in park, and sheet number	#2	175
Name of park	#1	140
Region, county, state, package number, designed, drawn, checked, and date	#0	NPS template
Scale, feet, meters, and numbers	#0	NPS template
Minimum Lettering Sizes		
Profiles	#0	NPS template
View titles	#2	175
Subtitles	#1	140
Detail lettering	#0	NPS template

COLOR CODES

Additions, changes, and corrections must be marked on check prints and as-constructed prints using the following color code:

red--indicates additions
green--indicates deletions
blue--indicates general notation or specific instruction

LAYOUT LINES

Layout lines and guidelines used in preparing originals must be very light, regardless of the color used, because no color is invisible to all the various types of reproduction processes.

ADHESIVE-BACKED MATERIALS

No adhesive-backed material other than the Stanpats furnished for approval and revision blocks will be accepted on any final original.

DIMENSIONS

All dimensions 1'-0" and over should be called out in feet and inches. If a measurement other than feet and inches is accepted industrywide to describe a product, the common measure should be used. For example

48" pipe (not 4'-0" pipe)
16" o.c. (not 1'-4" o.c.)

ABBREVIATIONS

Words written in full are preferred. However, abbreviations may be used if necessary to conserve space and ensure neatness and readability. Abbreviations should only be used if their meaning is unquestionably clear; if a possibility of doubt exists, the word or term should be spelled out in full. Refer to American National Standard Abbreviations for the correct abbreviations to use on drawings.

SYMBOLS

Preferred symbols for some of the most common drawing elements are provided in chapter 4. Refer to the American National Standards for additional symbols not included in this guideline.

4. STANDARD SYMBOLS (GENERAL, CIVIL, STRUCTURAL, MECHANICAL, ELECTRICAL, RADIO)

This chapter contains the symbols commonly used by the National Park Service, organized as follows:

Exhibit 4-A	General Drawing Symbols
Exhibit 4-B	Civil Drawing Symbols
Exhibit 4-C	Structural Drawing Symbols
Exhibit 4-D	Mechanical Drawing Symbols
Exhibit 4-E	Electrical Drawing Symbols
Exhibit 4-F	Radio System Drawing Symbols

LINE SYMBOLS, LINE WEIGHTS AND LETTERING ORIENTATION

LINE SYMBOLS

CENTER LINE

PHANTOM LINE

DIMENSIONS & EXTENSIONS

BUILDING LINE

INVISIBLE OR HIDDEN CONSTRUCTION

COMPLETE BREAK *

PARTIAL BREAK **

LINE WEIGHTS

VERY LIGHT 000

00

0 (NPS BASE WEIGHT)

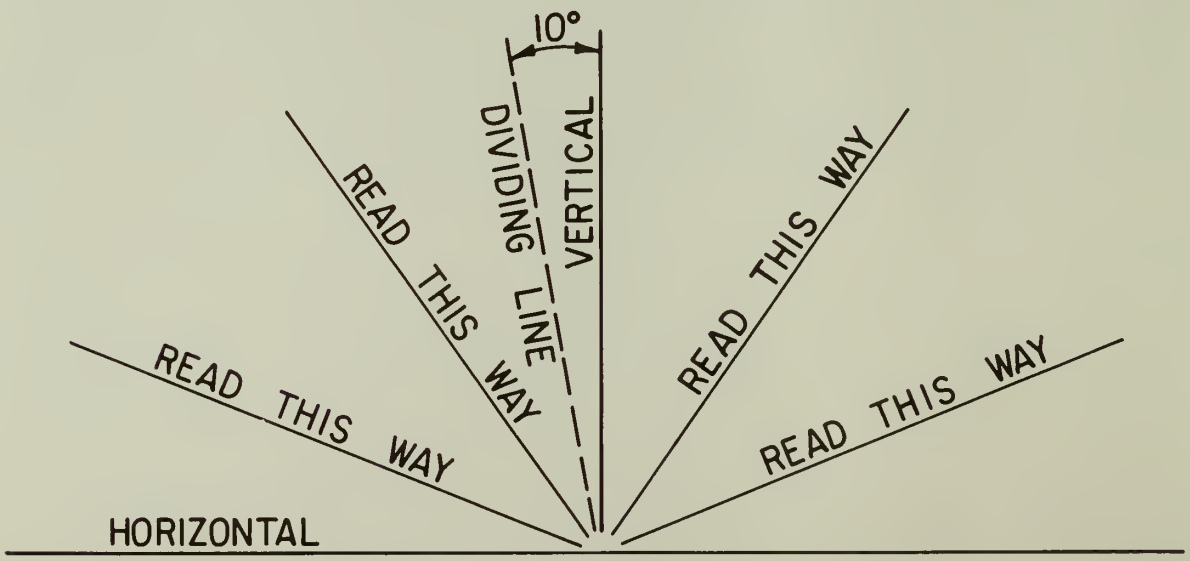
1

2

3

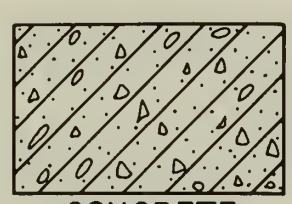
VERY HEAVY 5

* USE TO SHOW LIMITS OF VIEW
** USE TO EXPOSE HIDDEN

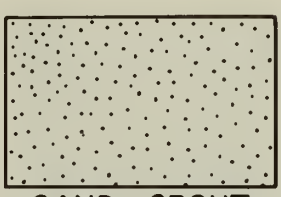


GENERAL MATERIALS SYMBOLS

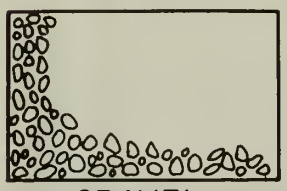
CONCRETE
FIRST STAGE



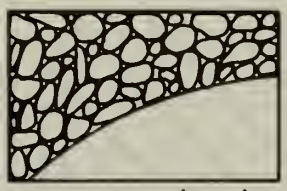
CONCRETE
SECOND STAGE



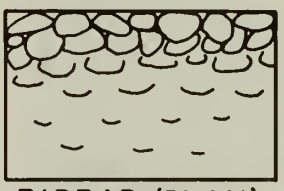
SAND, GROUT
OR MORTAR



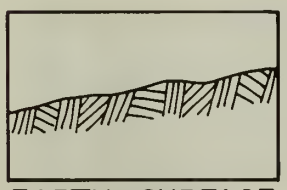
GRAVEL



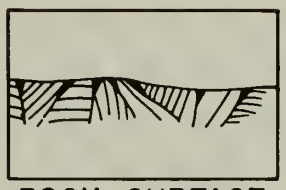
RIPRAP (EL.)



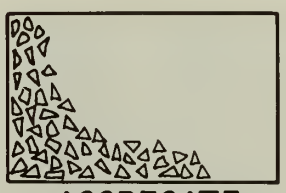
RIPRAP (PLAN)



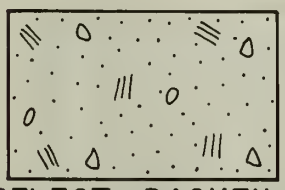
EARTH SURFACE



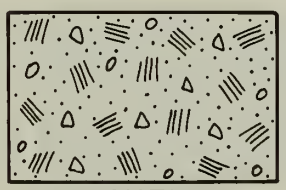
ROCK SURFACE



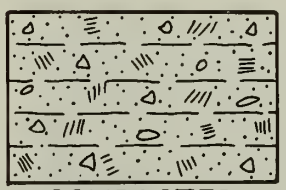
AGGREGATE



SELECT BACKFILL



BACKFILL

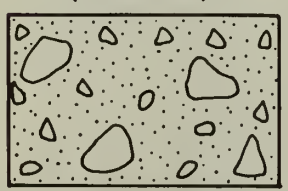


COMPACTED
BACKFILL

CUT SLOPE
(EARTH)

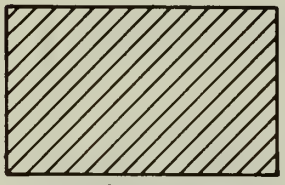
CUT SLOPE
(ROCK)

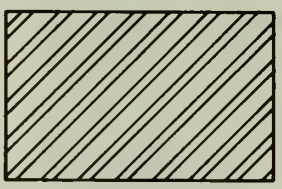
CUT SLOPE
(CONCRETE)

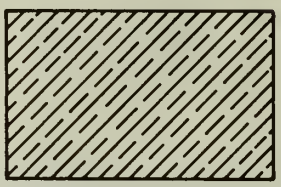


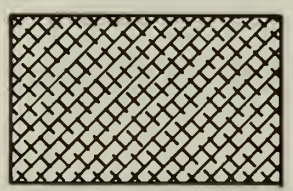
BOULDERS, COBBLES
AND SAND

GENERAL MATERIALS SYMBOLS

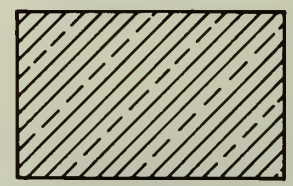

CAST IRON

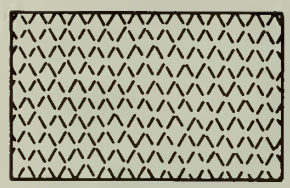

STEEL

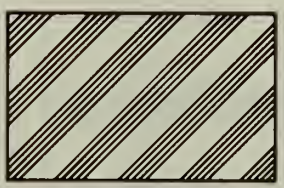

COPPER, BRONZE OR BRASS

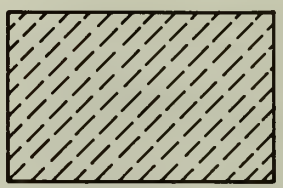

ALUMINUM

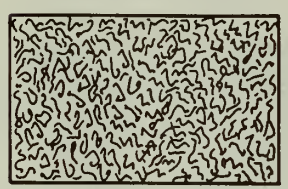

STAINLESS STEEL

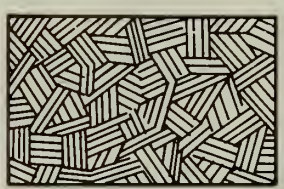

NICKEL-COPPER ALLOY

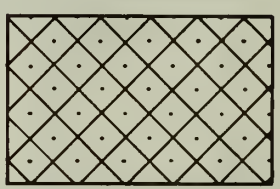

CHECKERED FLOOR PLATE


RUBBER

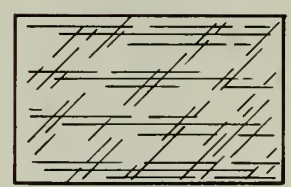

CLAY

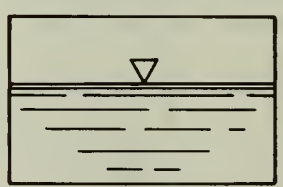

ROCK WOOL INSULATION OR JOINT FILLER

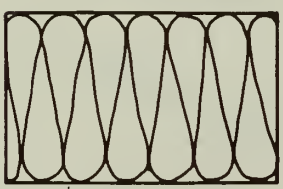

FIBER

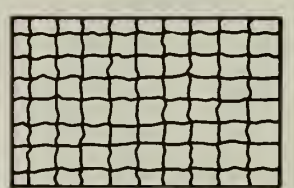

ASPHALT COMPOUND (ROAD BLACK TOP)

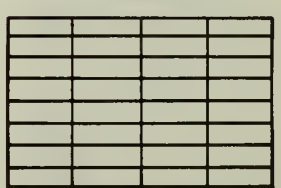

GLASS


PLASTIC

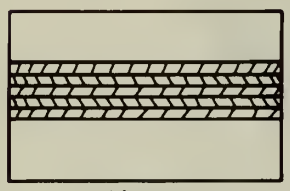

LIQUID


INSULATION

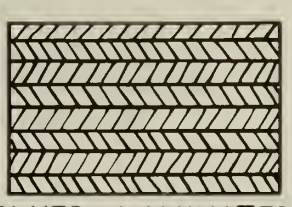

INSULATION-SOLID

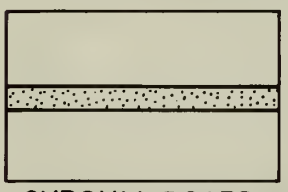

GRATING

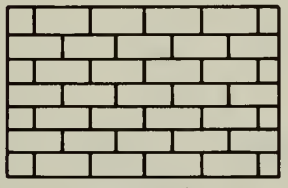
GENERAL MATERIALS SYMBOLS


PLYWOOD

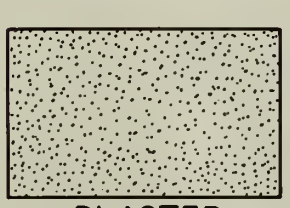

WOOD POCHÉ


GLUED-LAMINATED WOOD


GYPSUM BOARD


BRICK

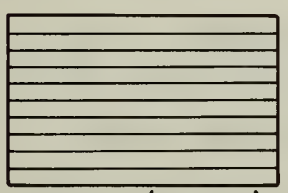

BLOCK

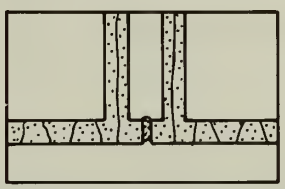

PLASTER

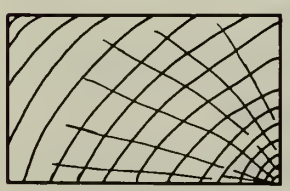

BRICK (SECTION)

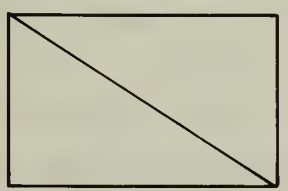

CONCRETE MASONRY VERTICAL SECTION

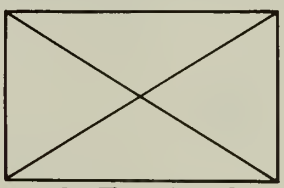

STONE


BRICK (ELEV.)


CONCRETE MASONRY HORIZONTAL SECTION


WOOD (FINISHED)


BLOCKING MEMBER


CONTINUOUS MEMBER

GENERAL MAPPING SYMBOLS

BOUNDARIES AND MONUMENTS

INTERNATIONAL BOUNDARY

STATE LINE

COUNTY LINE

RESERVATION LINE

LAND GRANT LINE

CITY BOUNDARY (LARGE)

TOWNSHIP LINE

SECTION LINE

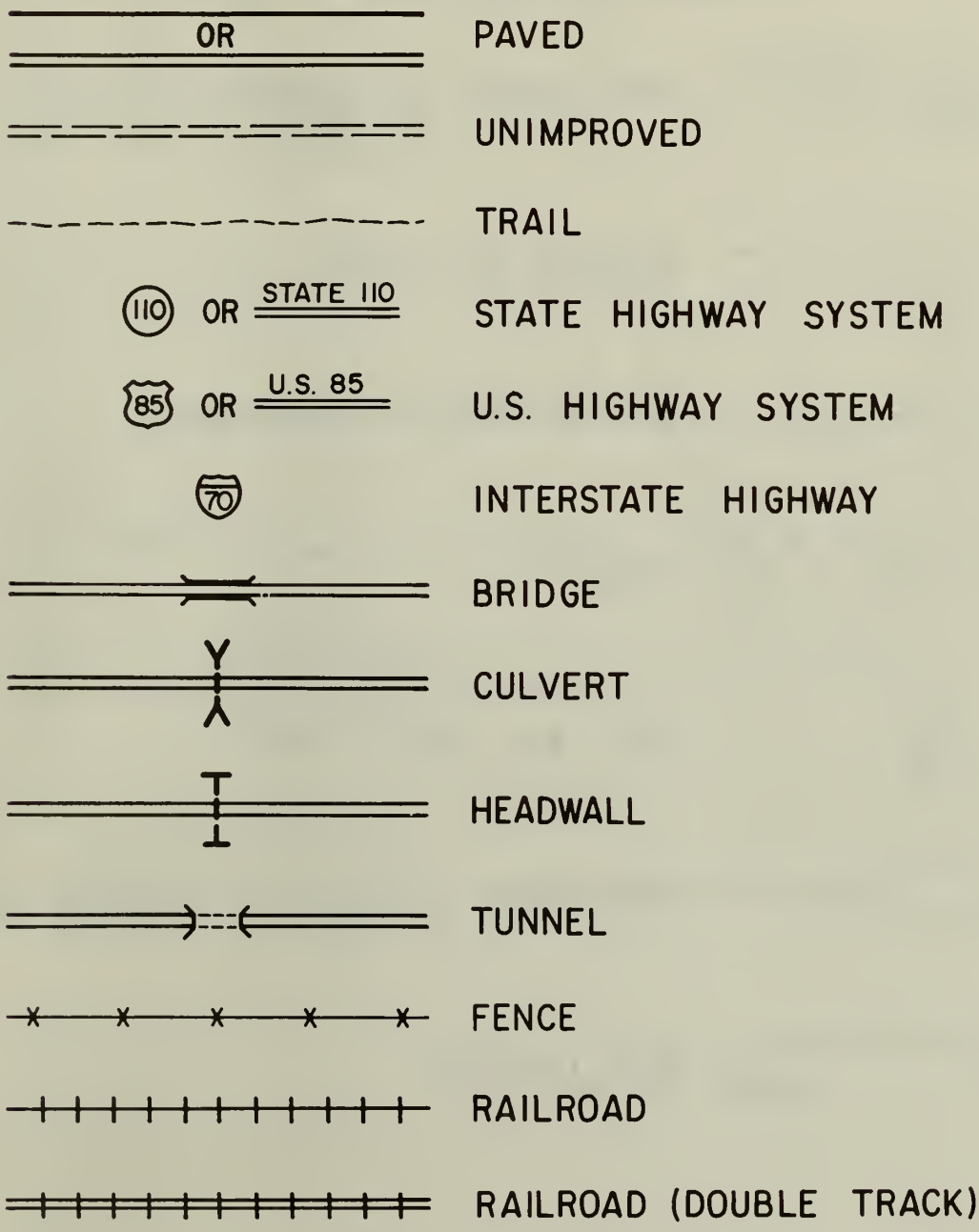
BASIN BOUNDARY OR
RIGHT OF WAY BOUNDARY

U.S. LAND SURVEY CORNER
FOUND IN FIELD (DESCRIBE)

ASSUMED SURVEY CORNER
(USED WITH COORDINATE SYSTEM ONLY)

GENERAL MAPPING SYMBOLS

ROADS AND RELATED SYMBOLS



GENERAL MAPPING SYMBOLS

TOPOGRAPHIC RELIEF

SAND DUNES OR DESERT

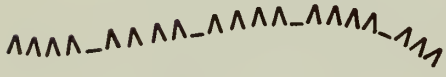
MEADOW OR GRASS

AREA OF TREES AND SHRUBBERY

TREES

TYPE AND SIZE OF TREE

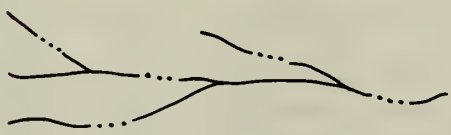
DEPRESSION CONTOURS OR BORROW AREA



ROCK OUTCROP

GENERAL MAPPING SYMBOLS
DRAINAGE AND PERTINENT WORKS

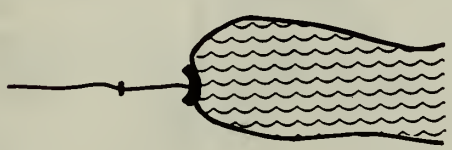
RIVER



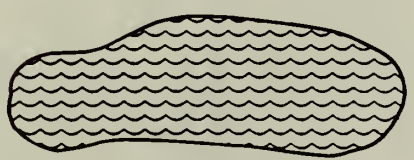
STREAMS

SPRING

CANAL



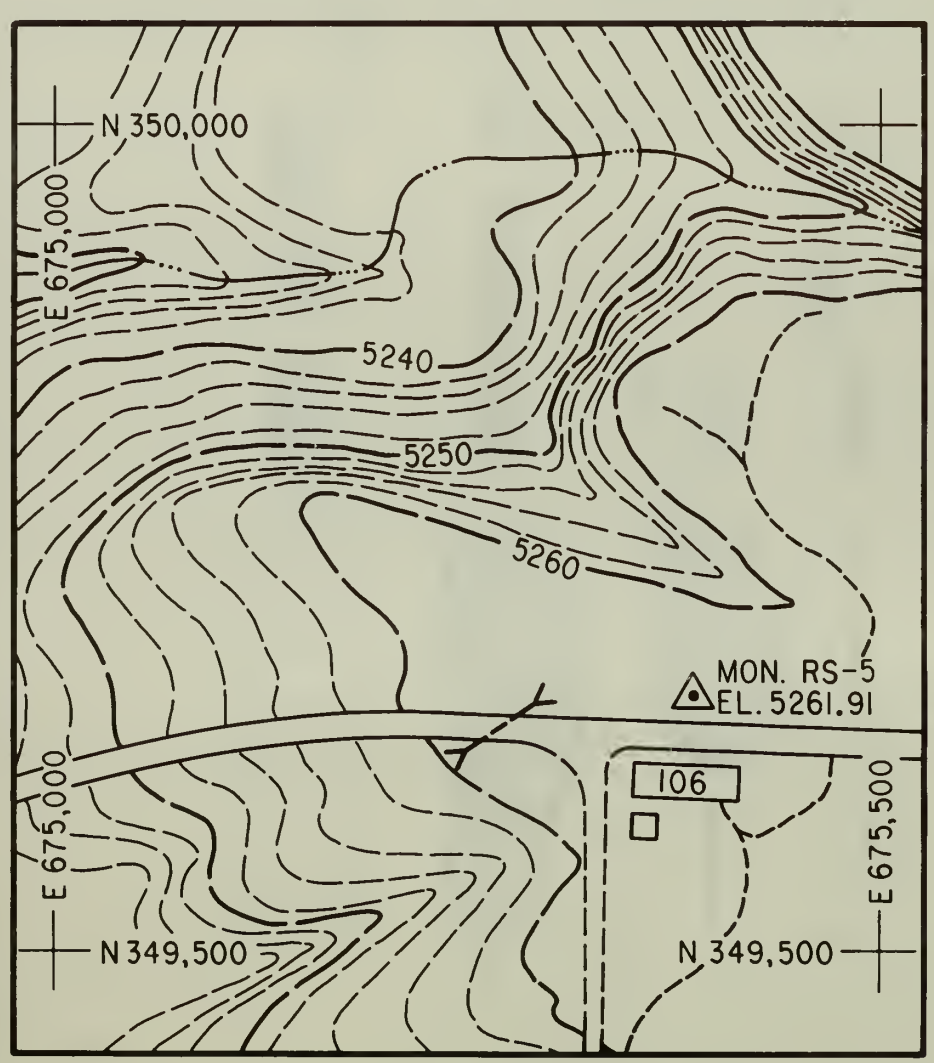
DAMS



RESERVOIR OR LAKE

MARSH OR SWAMP

TOPOGRAPHIC SYMBOLS



LEGEND

5220 — EVERY 5TH CONTOUR #2 PEN

INTERMEDIATE CONTOUR #0 PEN

STREAM OR DRAINAGE DITCH #0 PEN

TRAIL #1 PEN

BENCHMARK, BRASS CAP OR MONUMENT

N 350,000 / E 675,000 — COORDINATES SHOWN WITH A "—" EVERY 500 OR 1000 FEET DEPENDING ON SCALE OF DRAWING. AT LEAST 3 POINTS NEED TO BE LABELED AND SHOWN.

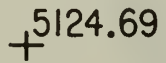
PAVED ROAD

DIRT OR GRAVEL ROAD

CULVERT WITH FLARED END SECTIONS

106 — BUILDING

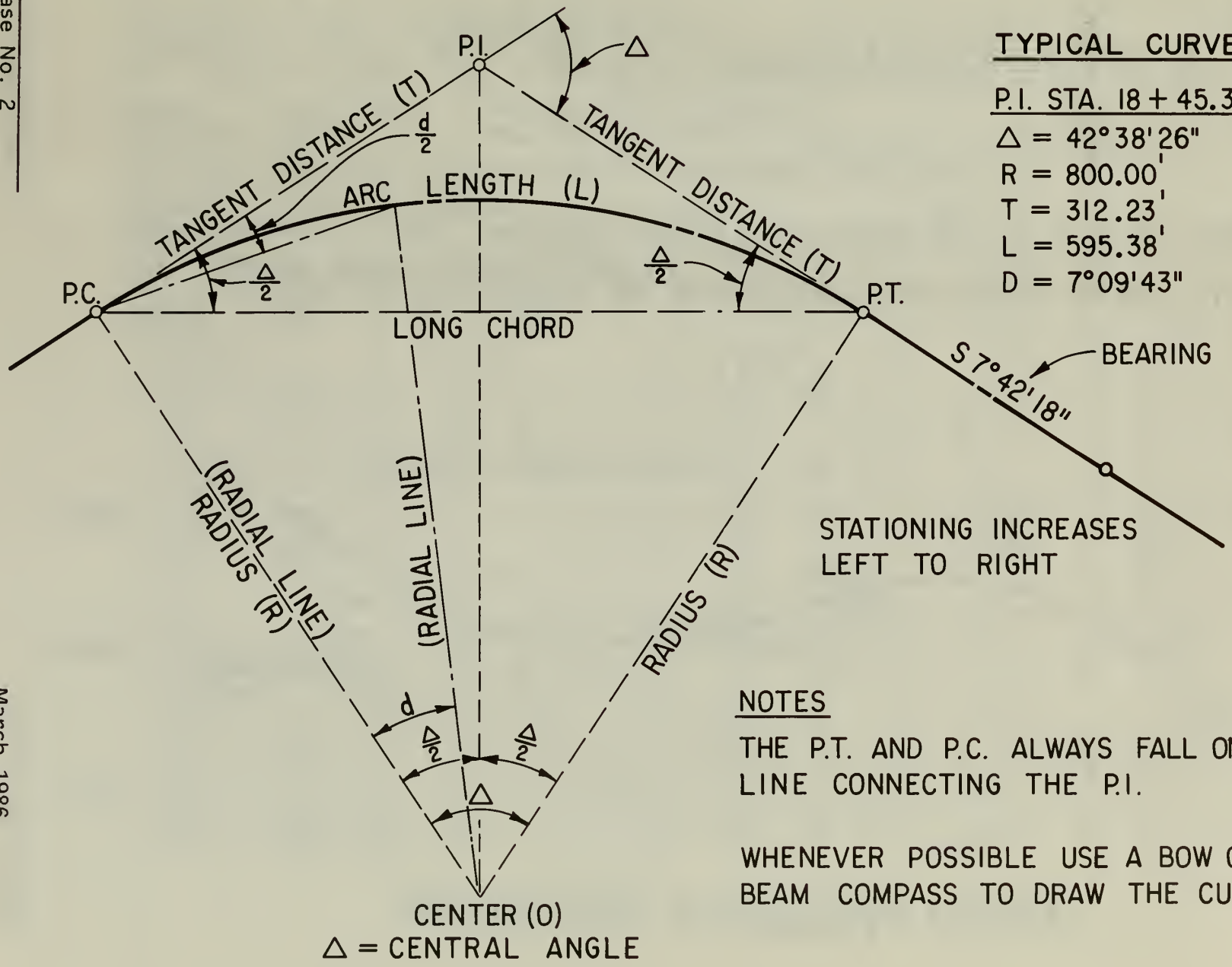
STANDARD UTILITY SYMBOLS

NEW	EXISTING	
		FIRE HYDRANT
		WATER HYDRANT
		DRINKING FOUNTAIN
	SAME AS NEW	CONCRETE VALVE BOX
	SAME AS NEW	CAST IRON VALVE BOX
	SAME AS NEW	CLEAN OUT
		MANHOLE
		WELL
		TRANSFORMER
	SAME AS NEW	METER
	SAME AS NEW	SPOT ELEVATION

UTILITY LINE SYMBOLS

———W———	WATER LINE
——-—S——-—	SEWER LINE (GRAVITY OR FORCE MAIN)
——--—ST——-—	STORM SEWER LINE
———— DR————	DRAIN LINE
—— ——G—— ——	GAS LINE
——-----C——----—	CHLORINE LINE
———A———	AIR LINE
——-—BW——-—	BACKWASH LINE
——----AIΦ——--—	AERIAL POWER (SINGLE PHASE)
——----UIΦ——----—	UNDERGROUND POWER (SINGLE PHASE)
———AT———	AERIAL TELEPHONE
——— UT———	UNDERGROUND TELEPHONE
—— —— CC—— ——	CONTROL CABLE
—— ——— ——	SURVEY BASE LINE
——-——-——	ROADWAY CENTER LINE

LAYING OUT A HORIZONTAL CURVE



TYPICAL CURVE DATA

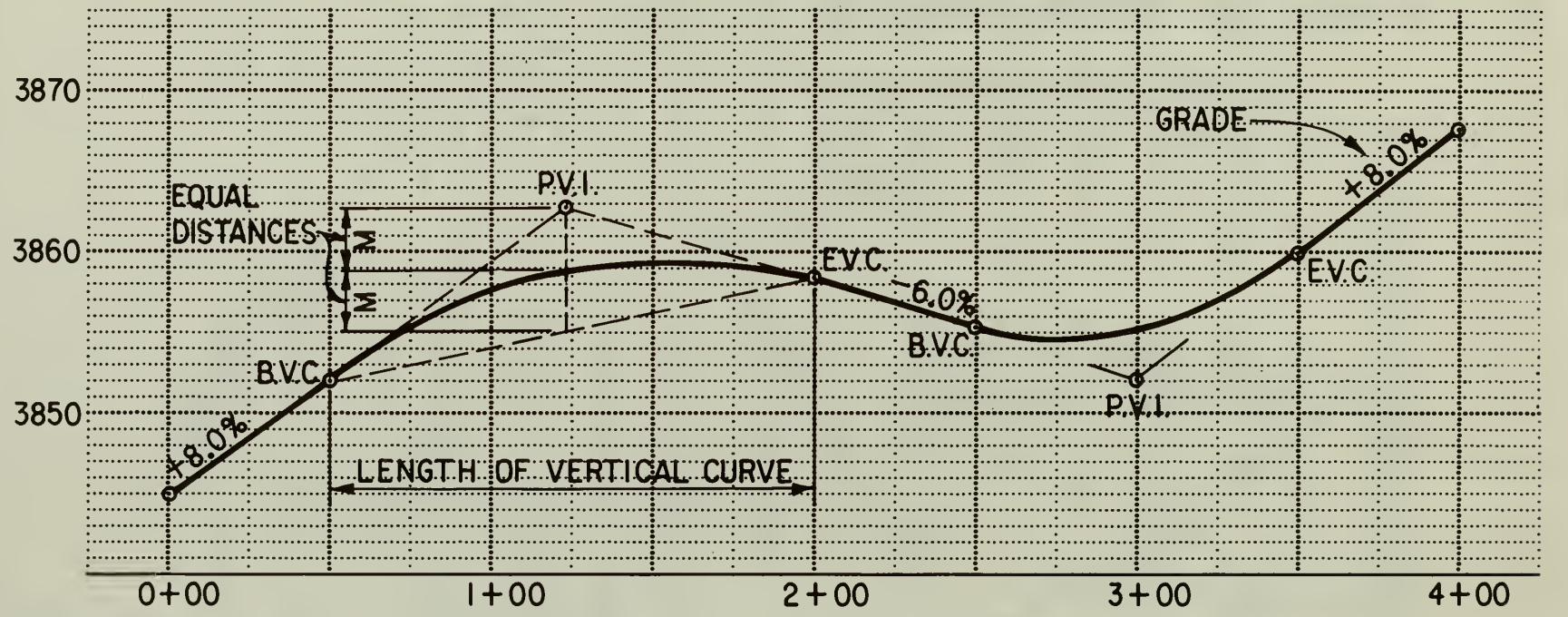
P.I. STA. 18 + 45.30
Δ = 42°38'26"
R = 800.00'
T = 312.23'
L = 595.38'
D = 7°09'43"

NOTES

THE P.T. AND P.C. ALWAYS FALL ON THE LINE CONNECTING THE P.I.

WHENEVER POSSIBLE USE A BOW OR BEAM COMPASS TO DRAW THE CURVE.

LAYING OUT A VERTICAL CURVE



NOTES

ALL MEASUREMENTS ON A PROFILE ARE MADE EITHER HORIZONTALLY OR VERTICALLY ON THE GRID AND NEVER ALONG A SLOPE.

PROFILES USUALLY HAVE DIFFERENT SCALES FOR HORIZONTAL AND VERTICAL. SEE STANDARD SHEET OF TYPICAL PROFILE SCALES.

THE E.V.C. AND B.V.C. ALWAYS FALL ON THE LINE CONNECTING THE P.V.I.

VERTICAL CURVES ARE DRAWN WITH A FRENCH CURVE, OR IN THE CASE OF A VERY LONG CURVE A ROAD CURVE TEMPLATE CAN BE USED.

THE CENTER OF THE CURVE IS FOUND BY CONNECTING THE B.V.C. AND E.V.C. WITH A LINE. A VERTICAL LINE IS DRAWN FROM THE P.V.I. TO THE B.V.C./E.V.C. CONNECTING LINE, DIVIDING IT INTO TWO EQUAL DISTANCES.

DEFINITIONS OF PLAN AND PROFILE TERMS

HORIZONTAL CURVES

Horizontal Curve - A curve shown in plan view.

P.C. - Point of Curvature; beginning point of a horizontal curve.

P.T. - Point of Tangency; end point of a horizontal curve.

P.I. - Point of Intersection; the point at which two tangents to the curve intersect.

T - Tangent; the distance from the P.I. to the P.C. or the P.T. (the distance between the P.T. of a curve and the P.C. of the next curve is also known as the tangent, but is not to be confused with the Curve Tangent).

Δ - Delta or Deflection; the angle between the tangents, which is equal to the angle at the center of the curve.

D or Dc - Degree of Curve; the angle whose arc or chord on the circle of a given radius equals 100 feet.

P.C.C. - Point of Compound Curvature; a point where the P.T. of a curve equals the P.C. of the next curve in the same direction.

P.R.C. - Point of Reverse Curvature; the point where the P.T. of a curve equals the P.C. of the next curve in the opposite direction.

VERTICAL CURVES

Vertical Curve - A curve shown in profile.

B.V.C. - Beginning of vertical curvature.

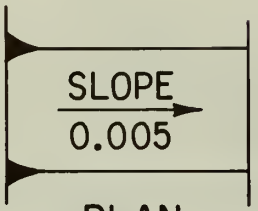
E.V.C. - End of vertical curvature.

P.V.I. - Point of Vertical Intersection; the point at which the tangents intersect.

P.V.C.C. - Point of Vertical Compound Curvature; the point where the E.V.C. of a curve equals the B.V.C. of the next curve in the same direction.

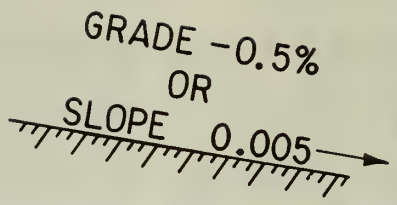
P.V.R.C. - Point of Vertical Reverse Curvature; the point where the E.V.C. of a curve equals the B.V.C. of the next curve in the opposite direction.

SLOPES

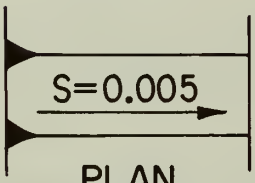


PLAN

ARROWS POINT DOWN

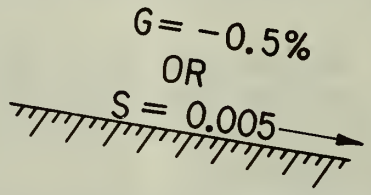


SECTION OR ELEVATION



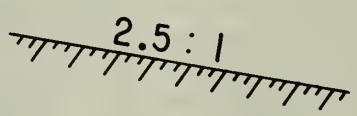
PLAN

WHEN CROWDED



SECTION OR ELEVATION

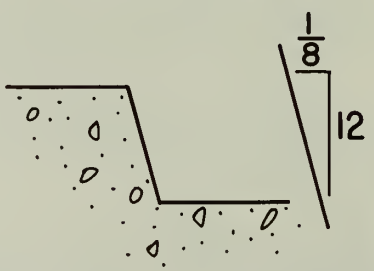
PLAN



SECTION OR ELEVATION

NOTES
GRADE EXPRESSED IN PERCENT IS BASED ON RISE OR FALL IN FEET PER HUNDRED.
SLOPE IS BASED ON RISE OR FALL IN FEET PER FOOT.

BATTER



SECTION OR ELEVATION

NOTE
GIVE BATTER AS A RATIO OF THE HORIZONTAL OFFSET IN A VERTICAL RISE.

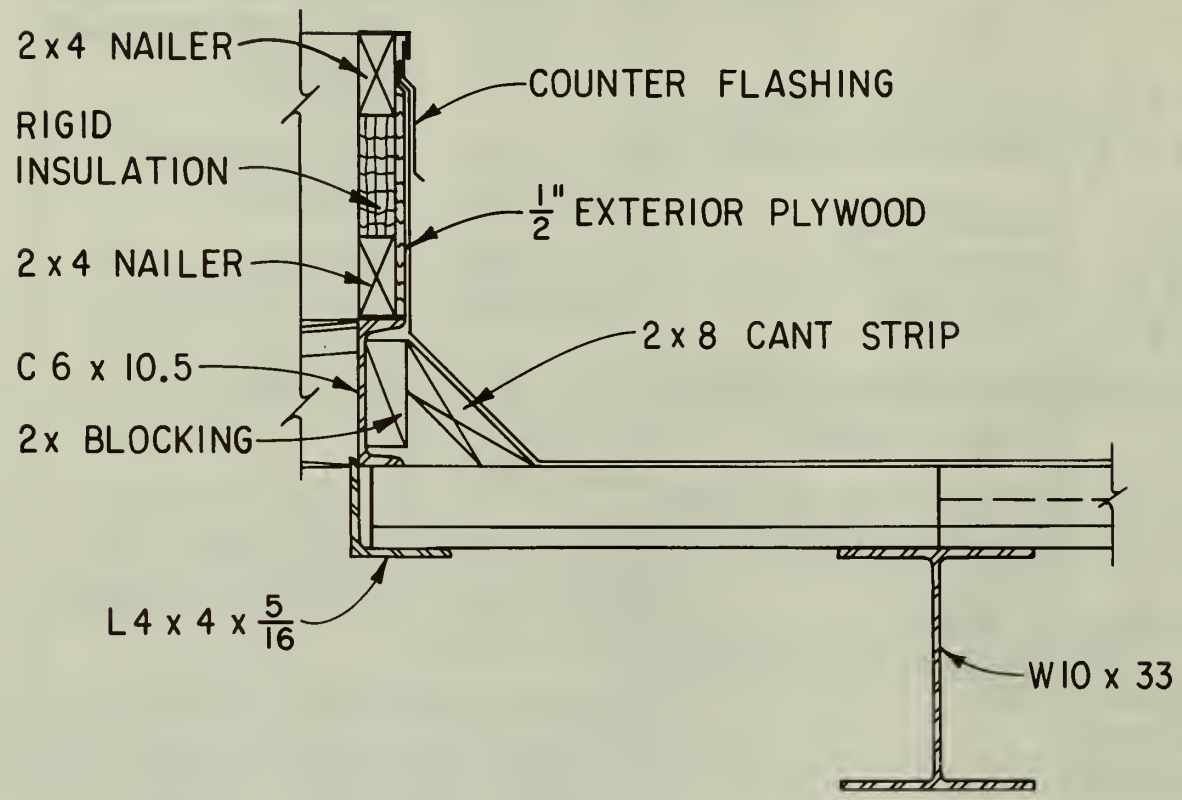
STRUCTURAL STEEL SHAPE DESIGNATIONS

DESIGNATION	TYPE OF SHAPE
PL $\frac{1}{2}$ x 18	PLATE
L 6 x 6 x $\frac{3}{4}$	EQUAL LEG ANGLE
L 6 x 4 x $\frac{5}{8}$	UNEQUAL LEG ANGLE
BAR 1 □	SQUARE BAR
BAR 1$\frac{1}{4}$ Φ	ROUND BAR
BAR 2$\frac{1}{2}$ x $\frac{1}{2}$	FLAT BAR
ST 12 x 50	STRUCTURAL TEE CUT FROM S SHAPE
WT 12 x 38 WT 7 x 13	STRUCTURAL TEE CUT FROM W SHAPE
S 24 x 100	S SHAPE
PIPE 4 STD. PIPE 4x-STRG. PIPE 4xx-STRG.	PIPE
HP 14 x 73	HP SHAPE

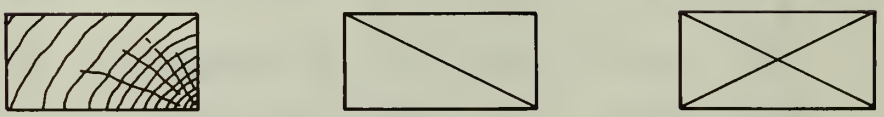
DESIGNATION	TYPE OF SHAPE
C 12 x 20.7	AMERICAN STANDARD CHANNEL
MC 12 x 45 MC 12 x 10.6	MISCELLANEOUS CHANNEL
W 24 x 76 W 14 x 26	W SHAPE
M 8 x 18.5 M 10 x 9 M 8 x 34.3	M SHAPE
MT 4 x 9.25 MT 5 x 4.5 MT 4 x 17.15	STRUCTURAL TEE CUT FROM M SHAPE
TS 4 x 4 x .375	STRUCT. TUBING: SQ.
TS 5 x 3 x .375	STRUCT. TUBING: REC.
TS 3 OD x .250	STRUCT. TUBING: CIRC.

STANDARD ABBREVIATIONS AS GIVEN IN THIS TABLE ARE FOR DESIGNATING ROLLED STEEL SECTIONS ON DRAWINGS THAT WILL IDENTIFY THE SECTION GROUP WITHOUT REFERENCE TO THE MANUFACTURER. WHEN THE LENGTH OF A ROLLED MEMBER IS GIVEN, USE FEET AND INCHES THUS: W 24 x 76 x 6'-10", OR 2 L^{S} - 3$\frac{1}{2}$ x 3$\frac{1}{2}$ x $\frac{1}{4}$ x 1'-11$\frac{1}{2}$", OR 2 L^{S} - 6 x 4 x $\frac{1}{2}$ x 0'-8", OR 1 - PL $\frac{1}{2}$ x 10 x 0'-11$\frac{1}{2}$".
FOR PRACTICALLY ALL OTHER DIMENSIONS ON STRUCTURAL STEEL (EXCEPT DEPTH OF SECTIONS, PIPE DIAMETERS, HOLES, ETC.) USE FEET AND INCHES WHEN 1'-0" OR OVER, AND INCHES ONLY WHEN LESS THAN ONE FOOT; THUS 7$\frac{1}{2}$.

ROOFING SUPPORT

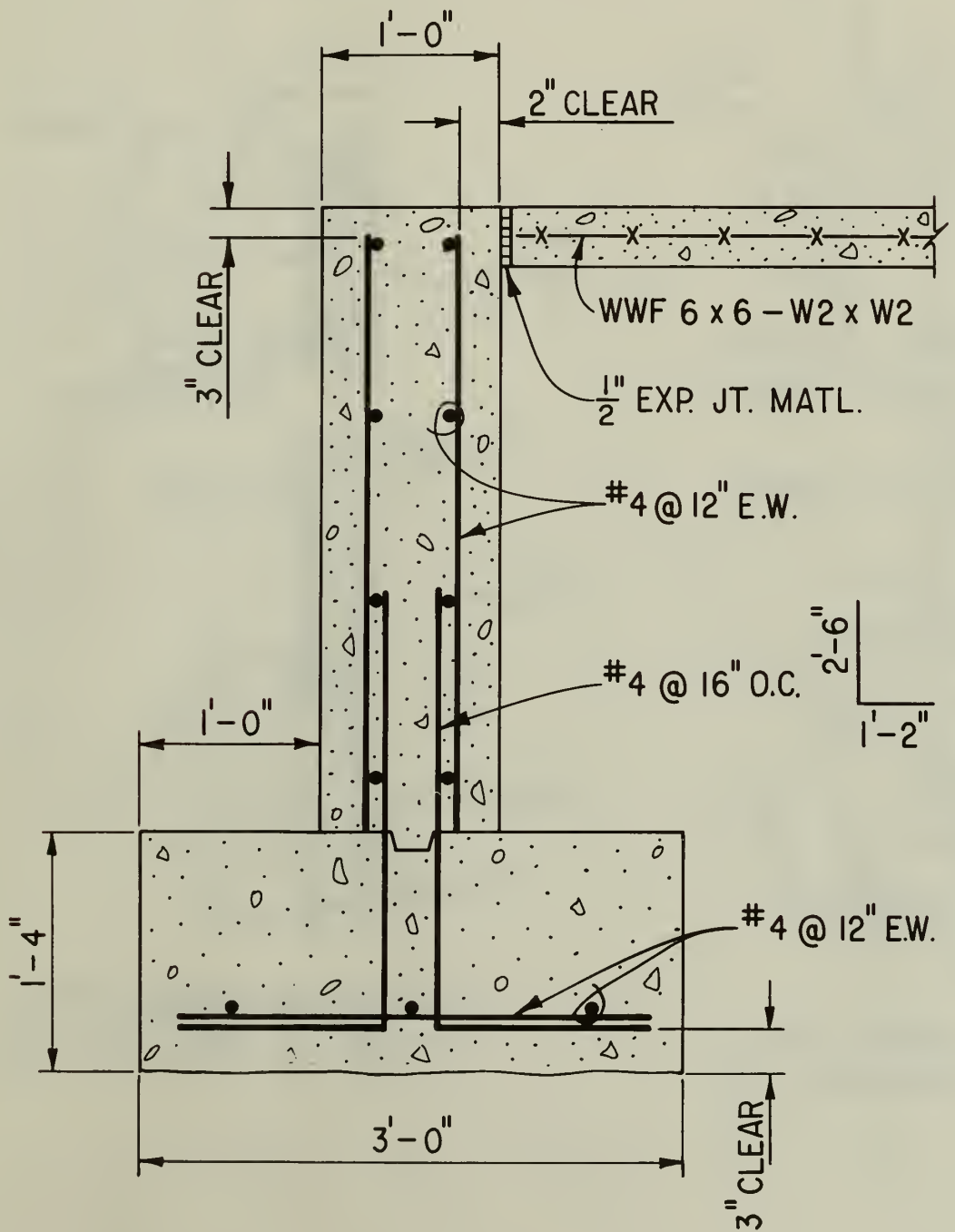


LEGEND FOR TIMBER

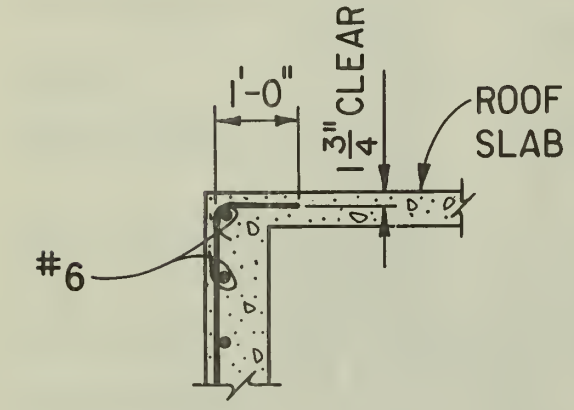


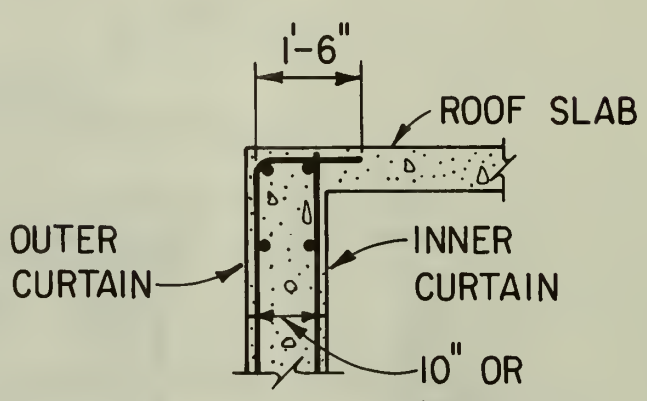
WOOD (FINISHED) | BLOCKING MEMBER | CONTINUOUS MEMBER

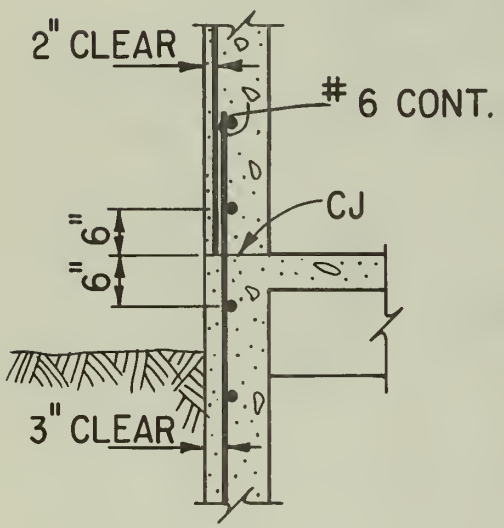
TYPICAL FOOTING AND FOUNDATION WALL SECTION



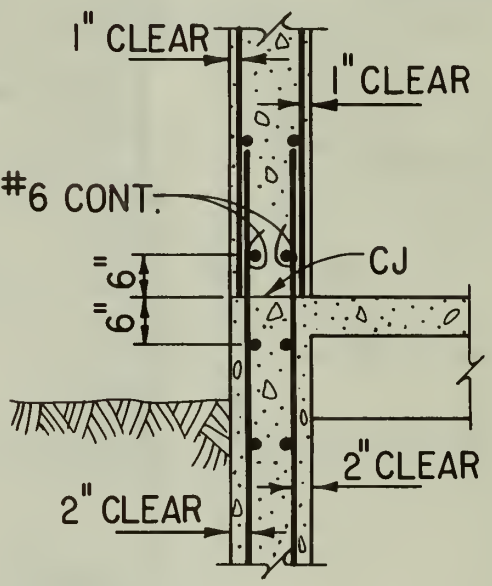
VERTICAL SECTIONS OF WALL STEEL





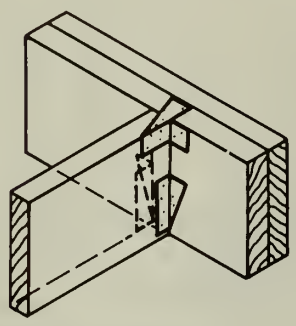


SINGLE CURTAIN

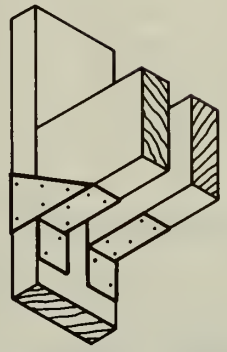


DOUBLE CURTAIN

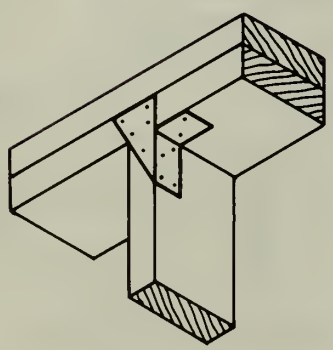
TYPICAL FRAMING CLIPS



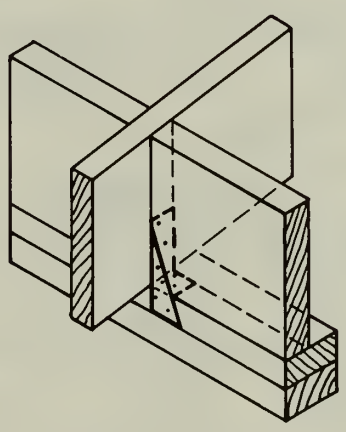
JOIST TO HEADER



SUPPORT FOR HEADER BEAMS



CONNECTION FOR TOP AND BOTTOM OF STUDS



TIE DOWN FOR RAFTERS

STANDARD WELDING SYMBOLS

Basic Welding Symbols and Their Location Significance

Location Significance	Fillet	Plug or Slot	Spot or Projection	Seam	Back or Backing	Surfacing	Scarf for Brazed Joint	Flange Edge
Arrow Side					Groove weld symbol			
Other Side					Groove weld symbol	Not used		
Both Sides		Not used	Not used	Not used	Not used	Not used		Not used
No Arrow Side or Other Side Significance	Not used	Not used			Not used	Not used	Not used	Not used

Supplementary Symbols Used with Welding Symbols

Convex Contour Symbol

Convex contour symbol indicates face of weld to be finished to convex contour

Finish symbol (user's standard) indicates method of obtaining specified contour but not degree of finish

Weld-All-Around Symbol

Weld-all-around symbol indicates that weld extends completely around the joint

Joint with Backing

With groove weld symbol

Note: Material and dimensions of backing as specified

Joint with Spacer

With modified groove weld symbol

Double bevel groove

Note: Material and dimensions of spacer as specified

Melt-Thru Symbol

Any applicable weld symbol

1 mm

Melt-thru symbol is not dimensioned (except height)

Flush Contour Symbol

Flush contour symbol indicates face of weld to be made flush. When used without a finish symbol, indicates weld without subsequent finishing

Finish symbol (user's standard) indicates method of obtaining specified contour but not degree of finish

Multiple Reference Lines

First operation shown on reference line nearest arrow

Second operation, or supplementary data

Third operation, or test information

Field Weld Symbol

Field Weld symbol indicates that weld is to be made at a place other than that of initial construction

Complete Penetration

Indicates complete penetration regardless of type of weld or joint preparation

Supplementary Symbols

Weld-All-Around	Field Weld	Melt-Thru	Backing, Spacer	Contour: Flush	Contour: Convex	Contour: Concave

Location of Elements of a Welding Symbol

Finish symbol
Contour symbol
Root opening, depth of filling for plug and slot welds
Effective throat
Depth of preparation, size or strength for certain welds
Specification, process, or other reference
Tail (Tail omitted when reference is not used)
Basic weld symbol or detail reference
Groove angle, included angle of countersink for plug welds
Length of weld
Pitch (center-to-center spacing) of welds
Field weld symbol
Arrow connecting reference line to arrow side member of joint
Weld-all-around symbol
Reference line
Elements in this area remain as shown when tail and arrow are reversed
(N) Number of spot or projection welds

F A R S (E) (BOTH SIDES) (ARROW SIDE) (OTHER SIDE) L – P

Basic Joints—Identification of Arrow Side and Other Side of Joint

Butt Joint

Arrow of welding symbol
Arrow side of joint
Other side of joint

Corner Joint

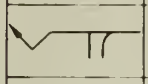
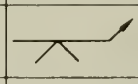
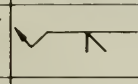
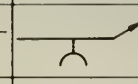
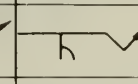
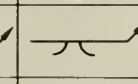
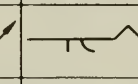
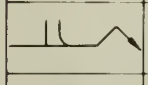
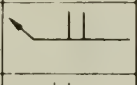
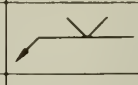
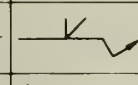
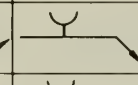
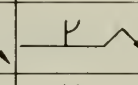
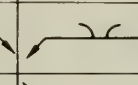
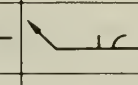
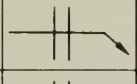
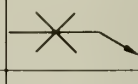
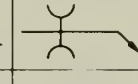
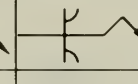
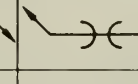
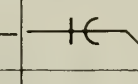
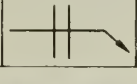
Arrow side of joint
Arrow of welding symbol
Other side of joint

T-Joint

Arrow of welding symbol
Arrow side of joint
Other side of joint

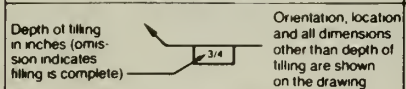
STANDARD WELDING SYMBOLS

Basic Welding Symbols and Their Location Significance

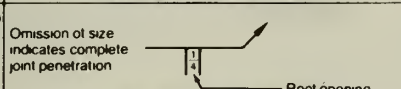
Flange	Groove							Location Significance
Corner	Square	V	Bevel	U	J	Flare-V	Flare-Bevel	
								Arrow Side
								Other Side
Not used								Both Sides
Not used		Not used	Not used	Not used	Not used	Not used	Not used	No Arrow Side or Other Side Significance

Typical Welding Symbols

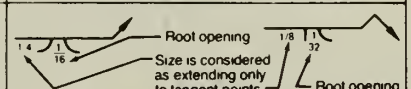
Slot Welding Symbol



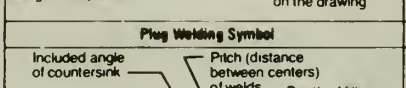
Square-Groove Welding Symbol



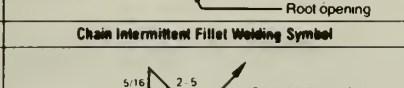
Flare-V and Flare-Bevel-Groove Welding Symbols



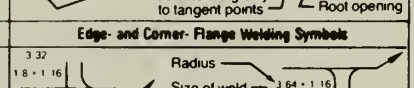
Plug Welding Symbol



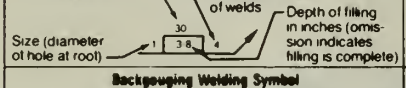
Chain Intermittent Fillet Welding Symbol



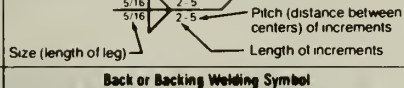
Edge- and Corner- Flange Welding Symbols



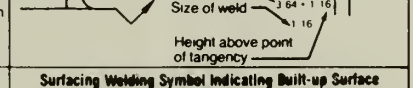
Backgouging Welding Symbol



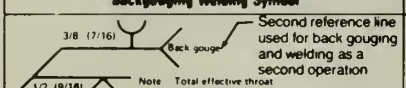
Back or Backing Welding Symbol



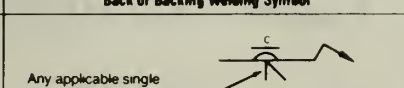
Surfacing Welding Symbol Indicating Built-up Surface



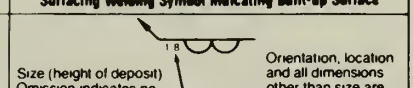
Flash or Upset Welding Symbol



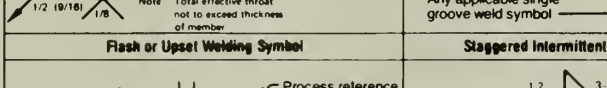
Staggered Intermittent Fillet Welding Symbol



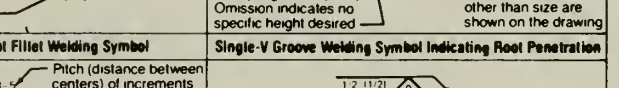
Single-V Groove Welding Symbol Indicating Root Penetration



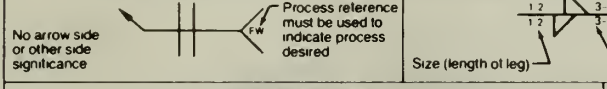
Spot Welding Symbol



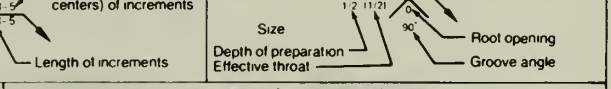
Double-Bevel-Groove Welding Symbol



Seam Welding Symbol



Projection Welding Symbol



Welding Symbols for Combined Welds

Double-Fillet Welding Symbol

Basic Joints—Identification of Arrow Side and Other Side of Joint

Lap Joint

Edge Joint

Sizes of Standard Weld Symbols

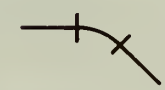
PIPING SYMBOLS (THREADED)

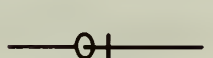
FITTINGS

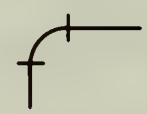

BUSHING


CAP


CROSS


ELBOW – 45°


ELBOW – 45° TURNED DOWN

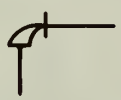

ELBOW – 90°

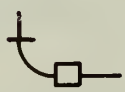

ELBOW – 90° TURNED DOWN


ELBOW – 90° TURNED UP


ELBOW – BASE


ELBOW – DOUBLE BRANCH


ELBOW – REDUCING

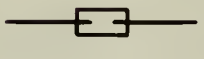

ELBOW – STREET

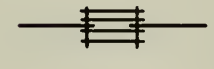
PIPING SYMBOLS (THREADED)

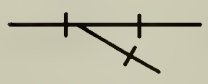
FITTINGS

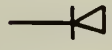

ELBOW – SIDE OUTLET DOWN

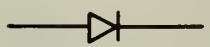

ELBOW – SIDE OUTLET UP

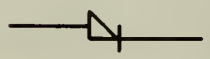

EXPANSION JOINT

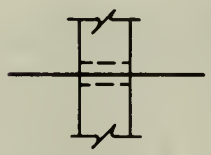

FLEXIBLE JOINT

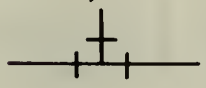

LATERAL

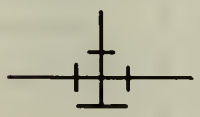

PLUG


REDUCER – CONCENTRIC


REDUCER – ECCENTRIC

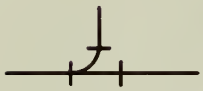

SLEEVE – THROUGH WALL


TEE – STRAIGHT

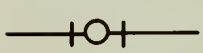

TEE – STRAIGHT BASE

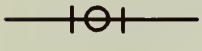
PIPING SYMBOLS (THREADED)

FITTINGS


TEE – SINGLE SWEEP

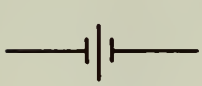

TEE – DOUBLE SWEEP


TEE – OUTLET UP


TEE – OUTLET DOWN

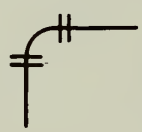
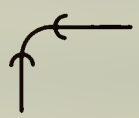
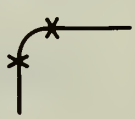
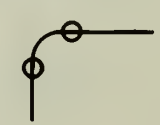

TEE – SIDE OUTLET UP


TEE – SIDE OUTLET DOWN


UNION

USE APPROPRIATE SYMBOL FOR DIFFERENT TYPES OF PIPE.

EXAMPLE

	FLANGED	BELL & SPIGOT	WELDED	SOLDERED
90° ELBOW				

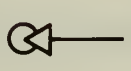
PIPING SYMBOLS

VALVES

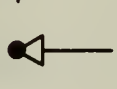

AIR VENT VALVE


ANGLE VALVE – CHECK

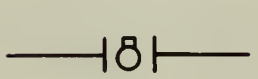

ANGLE VALVE – GATE

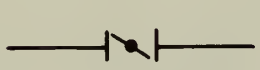

ANGLE VALVE – GATE (PLAN)


ANGLE VALVE – GLOBE

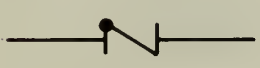

ANGLE VALVE – GLOBE (PLAN)

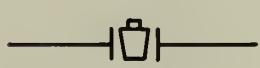

BACKFLOW PREVENTER (VACUUM BREAKER)


BALL VALVE


BUTTERFLY VALVE


BY–PASS VALVE – AUTOMATIC


CHECK VALVE


COCK VALVE

PIPING SYMBOLS

VALVES


DIAPHRAGM VALVE

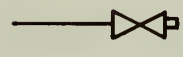

FLOAT VALVE


GATE VALVE – HAND OPERATED


GATE VALVE – CHAIN OPERATED


GLOBE VALVE


HOSE BIB ANGLE VALVE


HOSE BIB GATE VALVE


HOSE BIB GLOBE VALVE


LOCK SHIELD VALVE

MOTOR OPERATED GATE VALVE

MOTOR OPERATED GLOBE VALVE


PLUG VALVE

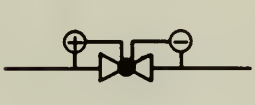
PIPING SYMBOLS

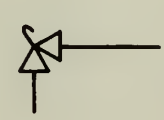
VALVES


PRESSURE EQUALIZING VALVE


PRESSURE REDUCING OR PRESSURE REGULATING


QUICK OPENING VALVE


RATE OF FLOW VALVE


SAFETY VALVE – ANGLE


SAFETY VALVE – GATE


SOLENOID VALVE


3–WAY VALVE

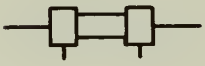
PIPING SYMBOLS

EQUIPMENT

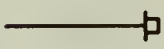

CENTRIFUGAL PUMP


DISCHARGE TO DRAINAGE SYSTEM


FLEXIBLE PIPE

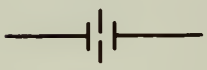

HEAT EXCHANGER

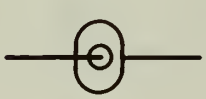

HEAT TRANSFER COIL


HOSE CONNECTION


JET EDUCTOR


MOISTURE SEPARATOR


ORIFICE


ROTARY PUMP


SINGLE STRAINER


DUPLEX STRAINER

PIPING SYMBOLS
INSTRUMENTS

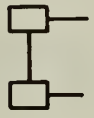
FLOW DETECTOR, OPEN SIGHT

FLOW FUNNEL

FLOW INDICATOR (VANE OR SPINNER)

FLOW SIGHT

FLUID METER



GAGE GLASS

INDICATING THERMOMETER

INDUSTRIAL THERMOMETER

PRESSURE GAGE

DUPLEX PRESSURE GAGE

PRESSURE SWITCH

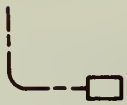
PIPING SYMBOLS
INSTRUMENTS

RATE OF FLOW INDICATOR

RATE OF FLOW METER

RECORDING PRESSURE GAGE

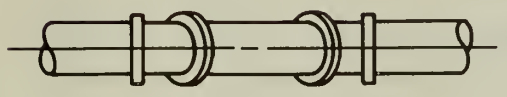
RECORDING THERMOMETER



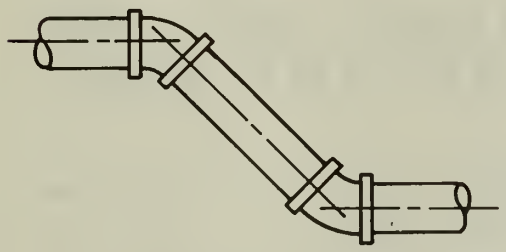
TEMPERATURE RESPONSIVE BULB

TEMPERATURE SWITCH

PIPING SYMBOLS
CONVENTIONS SCREWED

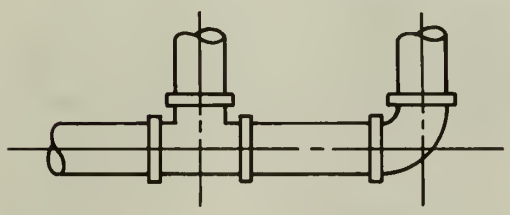


PLAN VIEW

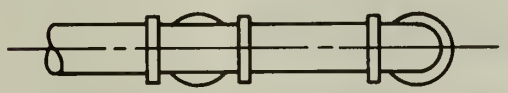


OFFSET 45° ELBOWS. ANGLES OTHER THAN 45° OR 90° TO BE SO MARKED.

ELEVATION



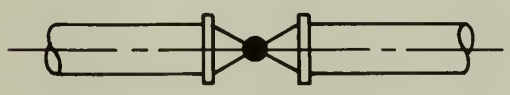
PLAN VIEW



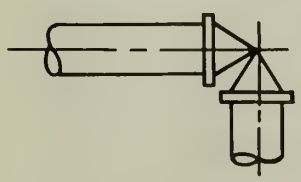
FRONT VIEW

BACK VIEW

GATE VALVE



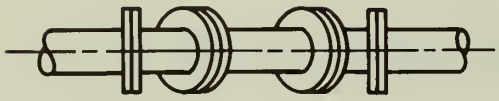
GLOBE VALVE



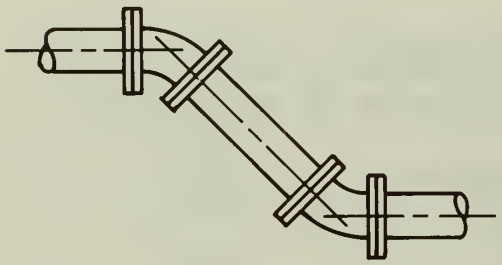
ANGLE VALVE

CHECK VALVE

PIPING SYMBOLS
CONVENTIONS FLANGED

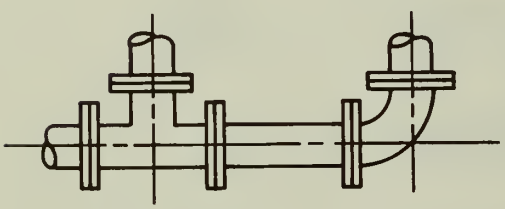


PLAN VIEW

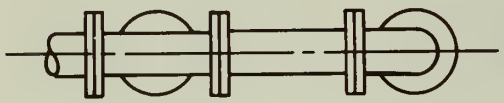


OFFSET 45° ELBOWS. ANGLES OTHER THAN 45° OR 90° TO BE SO MARKED.

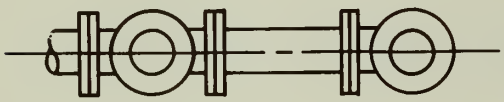
ELEVATION



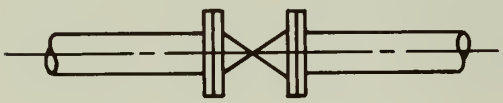
PLAN VIEW



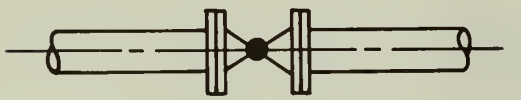
FRONT VIEW



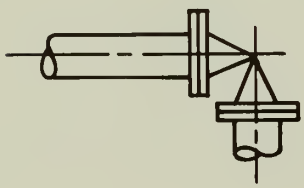
BACK VIEW



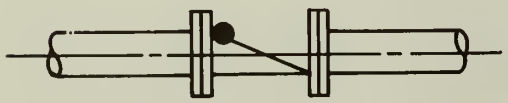
GATE VALVE



GLOBE VALVE



ANGLE VALVE



CHECK VALVE

AIR CONDITIONING LINE SYMBOLS

———BR———	BRINE RETURN
———B———	BRINE SUPPLY
———CCS———	CIRCULATING CHILLED WATER FLOW
— — — CCR — — —	CIRCULATING CHILLED WATER RETURN
———CHS———	CIRCULATING HOT WATER FLOW
— — — CHR — — —	CIRCULATING HOT WATER RETURN
———C———	CONDENSER WATER FLOW
———CR———	CONDENSER WATER RETURN
———D———	DRAIN
——-——H——-——	HUMIDIFICATION LINE
——-———-——	MAKE-UP LINE
———RD———	REFRIGERANT DISCHARGE LINE
———RL———	REFRIGERANT LIQUID
———RS———	REFRIGERANT SUCTION

HEATING LINE SYMBOLS

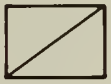
——— — ———	AIR-RELIEF LINE
-— — — — — — -	BOILER BLOW OFF
———A———	COMPRESSED AIR
--0—-0--—0—-	CONDENSATE OR VACUUM PUMP DISCHARGE
—00—-00--—00—	FEEDWATER DISCHARGE LINE
———FOF———	FUEL-OIL FLOW
———FOR———	FUEL-OIL RETURN
———FOV———	FUEL-OIL VENT
— -//- — — -//- —	HIGH-PRESSURE RETURN
—//——//——//	HIGH-PRESSURE STEAM
— — — — — — —	HOT WATER HEATING RETURN
———————	HOT WATER HEATING SUPPLY
— — — — — —	LOW-PRESSURE RETURN
———————	LOW-PRESSURE STEAM
——-———-——	MAKE-UP WATER
— -/- — — -/- —	MEDIUM PRESSURE RETURN
——/——/——/——	MEDIUM PRESSURE STEAM

PLUMBING LINE SYMBOLS

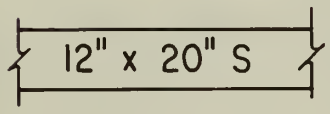
ACID	ACID WASTE
	COLD WATER
A	COMPRESSED AIR
	DRINKING – WATER FLOW
	DRINKING – WATER RETURN
F F	FIRE LINE
G G	GAS LINE
	HOT WATER
	HOT WATER RETURN
	SOIL, WASTE OR LEADER (ABOVE GRADE)
	SOIL, WASTE OR LEADER (BELOW GRADE)
V V	VACUUM CLEANING
	VENT

VENTILATION AND AIR CONDITIONING SYMBOLS

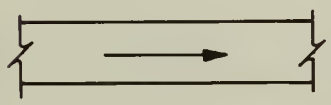
DUCT SECTION (SUPPLY)



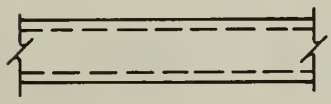
DUCT SECTION (RETURN)



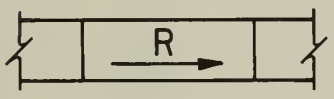
DUCT (1ST FIGURE, SIDE SHOWN–
2ND FIGURE, SIDE NOT SHOWN)



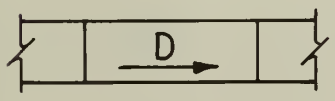
DIRECTION OF FLOW



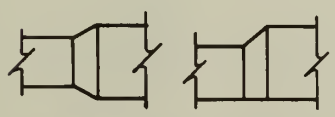
ACOUSTICAL LINING. DUCT DIMENSIONS
FOR NET FREE AREA.



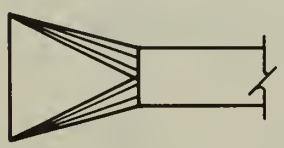
INCLINED RISE (R). ARROW IN DIRECTION
OF AIR FLOW



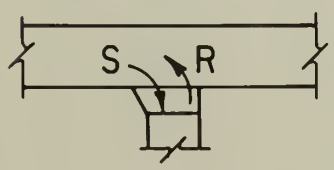
INCLINED DROP (D). ARROW IN DIRECTION
OF AIR FLOW.



TRANSITIONS

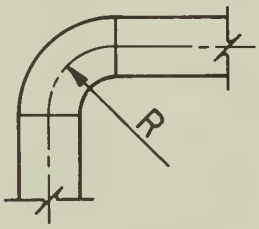


RECTANGULAR TO ROUND TRANSITION

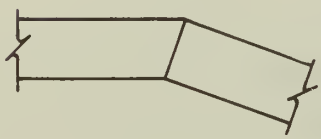


STANDARD BRANCH FOR SUPPLY AND RETURN

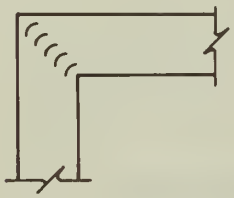
VENTILATION AND AIR CONDITIONING SYMBOLS



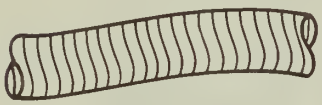
DUCT BEND (R BASED ON $\frac{\text{WIDTH}}{\text{DEPTH}}$ RATIO)



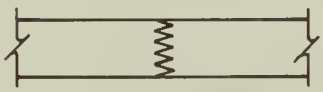
DUCT BEND (MITER TYPE). TO BE USED ONLY WHEN ANGLE IS 30° OR LESS.



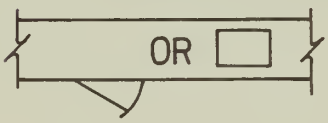
TURNING VANES



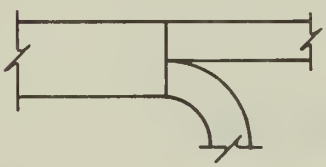
FLEXIBLE DUCT



FLEXIBLE CONNECTION



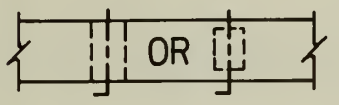
ACCESS DOOR (AD)
ACCESS PANEL (AP)



DEFLECTING DAMPER, SPLITTER DAMPER

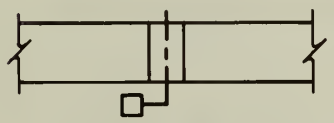
DOOR LOUVER

VENTILATION AND AIR CONDITIONING SYMBOLS



VOLUME DAMPER, MANUAL OPERATION

MULTIPLE LOUVER DAMPER, MANUAL OPERATION



MULTIPLE LOUVER DAMPER. AUTOMATIC OR MOTOR OPERATED.

FIRE DAMPER AND SLEEVE

BACKDRAFT DAMPER

THERMOSTAT

HUMIDISTAT

AQUASTAT

AIRSTAT

PRESSURE SWITCH

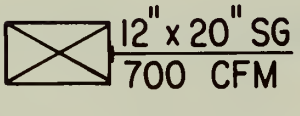
STATIC PRESSURE REGULAR

VENTILATION AND AIR CONDITIONING SYMBOLS

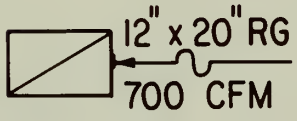
GRILL – SIDE VIEW

GRILL OR REGISTER – FRONT VIEW

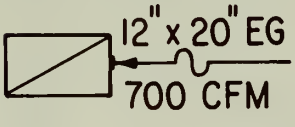
REGISTER – SIDE VIEW



SUPPLY GRILL (SG)



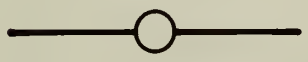
RETURN GRILL (RG)



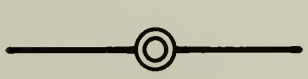
EXHAUST GRILL (EG)

FIRE SPRINKLER SYSTEMS


SPRINKLER, GENERAL


UPRIGHT SPRINKLER


PENDANT SPRINKLER


UPRIGHT SPRINKLER, NIPPLED UP


PENDANT SPRINKLER, ON DROP NIPPLE


SPRINKLER WITH GUARD


SIDEWALL SPRINKLER


OUTSIDE SPRINKLER


SPECIAL SPRAY NOZZLE


SPRINKLER PIPING AND BRANCH LINE


SPRINKLER RISER

FIRE SPRINKLER SYSTEMS

VALVE, GENERAL

CHECK VALVE, GENERAL

ALARM CHECK VALVE

DRY-PIPE VALVE

DRY-PIPE VALVE WITH QUICK OPENING DEVICE
ACCELERATOR OR EXHAUSTER

DELUGE VALVE

TYPICAL PANELBOARD SCHEDULE

PANELBOARD ___ SCHEDULE

_____ VOLTS ___ Φ ___ W ____ A. BUS ____ A. MAIN C.B. _____ MOUNT
SYM. A.I.R. (MAIN C.B. _____, BRANCH C.B. _____), _____ NEUTRAL BUS, PROVIDE GROUND BUS
_____ BRANCH C.B. NEMA _____ ENCLOSURE MANUFACTURER AND CAT. NO. _____

LOAD VA	DESCRIPTION		DESCRIPTION	LOAD VA	BUS LOAD (VA) L1	L2	L3
		1 2					
		* 3 4					
		5 6					
		7 8					
		9 10					
		11 12					
		13 14					
		15 16					
		17 18					
		19 20					
		21 22					
		23 24					
		25 26					
		27 28					
		29 30					
		31 32					
		33 34					
		35 36					
		37 38					
		39 40					
		41 42					

* GFI TYPE BREAKER

BUS LOAD TOTALS (KVA)
TOTAL LOAD (KVA)
ESTIMATED MAXIMUM DEMAND (KVA)

BASIC CONTACT ASSEMBLIES

NORMALLY OPEN (N.O.) CONTACT. R-1 INDICATES RELAY

NORMALLY CLOSED (N.C.) CONTACT

SINGLE-THROW SWITCH (OPEN)

NORMALLY OPEN, MOMENTARY CLOSED CONTACT PUSHBUTTON SWITCH

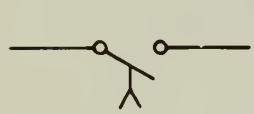
NORMALLY CLOSED, MOMENTARY OPEN CONTACT PUSHBUTTON SWITCH

GENERAL SELECTOR OR MULTIPOSITION SWITCH. ANY NUMBER OF TRANSMISSION PATHS MAY BE SHOWN

SELECTOR SWITCH, MULTIPOSITION ROTARY
- H HAND
- O OFF
- A AUTOMATIC

LIMIT SWITCH (NORMALLY OPEN) DIRECTLY ACTUATED AND SPRING RETURNED

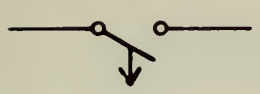
LIMIT SWITCH (NORMALLY CLOSED) DIRECTLY ACTUATED AND SPRING RETURNED



TIME-DELAY CONTACT (NORMALLY OPEN) TIME-DELAY CLOSING ON ACTIVATION

TIME-DELAY CONTACT (NORMALLY CLOSED) TIME-DELAY OPENING ON ACTIVATION

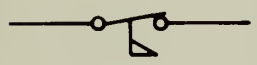
BASIC CONTACT ASSEMBLIES



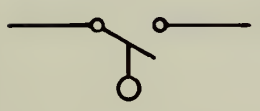
TIME-DELAY CONTACT (NORMALLY OPEN) TIME-DELAY OPENING ON DEACTIVATION (TIME-DELAY OFF)

TIME-DELAY CONTACT (NORMALLY CLOSED) TIME-DELAY CLOSING ON DEACTIVATION (TIME-DELAY OFF)

FLOW-ACTUATED SWITCH, CLOSES ON INCREASE IN FLOW

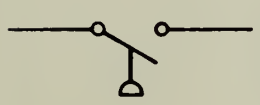


FLOW-ACTUATED SWITCH, OPENS ON INCREASE IN FLOW



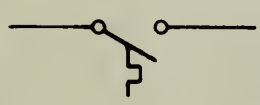
LIQUID-LEVEL-ACTUATED SWITCH, CLOSES ON RISING LEVEL

LIQUID-LEVEL-ACTUATED SWITCH, OPENS ON RISING LEVEL



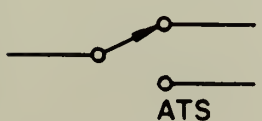
PRESSURE- OR VACUUM-ACTUATED SWITCH, CLOSES ON RISING PRESSURE

PRESSURE- OR VACUUM-ACTUATED SWITCH, OPENS ON RISING PRESSURE



TEMPERATURE-ACTUATED SWITCH, CLOSES ON RISING TEMPERATURE

TEMPERATURE-ACTUATED SWITCH, OPENS ON RISING TEMPERATURE

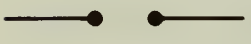


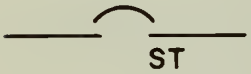
TRANSFER SWITCH
ATS AUTOMATIC TRANSFER SWITCH
MTS MANUAL TRANSFER SWITCH

CIRCUIT PROTECTORS


FUSE (GENERAL)


FUSED SWITCH (OPEN)


LIGHTNING ARRESTER (GENERAL)



CIRCUIT BREAKER (GENERAL). ST INDICATES SHUNT TRIP


THERMAL ELEMENT, MOTOR OVERLOAD


GROUND

LAMPS AND VISUAL SIGNALING DEVICES

PILOT, SIGNALING, INDICATING OR SWITCHBOARD LIGHT
LETTER INDICATES LENS COLOR;

A	AMBER
B	BLUE
C	CLEAR
G	GREEN
OP	OPALESCENT
P	PURPLE
R	RED
W	WHITE
Y	YELLOW

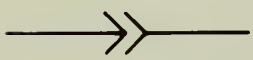
METER INSTRUMENT
LETTER INDICATES METER TYPE;

A	AMPERES
D	DEMAND
ET	ELAPSED TIME
RT	RUN TIME
F	FREQUENCY
KWH	KILOWATT HOUR
PF	POWER FACTOR
T°	TEMPERATURE
V	VOLT
VA	VOLT-AMPERES
VAR	VOLT AMPERES REACTIVE

TERMINALS AND CONNECTORS


CONDUCTORS, CROSSING AND ELECTRICALLY CONNECTED


CONDUCTORS, CROSSING BUT NOT CONNECTED

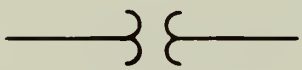

SEPARABLE CONNECTOR (ENGAGED)


TERMINAL

TRANSFORMERS, INDUCTORS AND WINDINGS


TRANSFORMER (GENERAL)


CURRENT TRANSFORMER


POTENTIAL TRANSFORMER (METERING)

RELAYS

RELAY COIL

LR LATCHING RELAY

LATCH

UNLATCH

IR-1 INDUCTION RELAY (TYPICAL)

PRIMARY

SECONDARY

ADJUSTABLE TIME DELAY RELAY

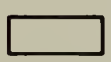
UNDERVOLTAGE RELAY, LOP INDICATES LOSS OF PHASE

MISCELLANEOUS

PROBE

BATTERY

CONDUIT SEAL, EP INDICATES EXPLOSION PROOF



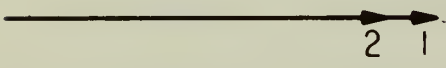
HEATER

ARCHITECTURAL CIRCUITING

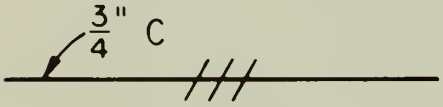
WIRING CONCEALED IN CEILING OR WALL.

WIRING CONCEALED IN FLOOR.

WIRING (EXPOSED).



BRANCH CIRCUIT HOME RUN TO PANELBOARD. ARROWS INDICATE NUMBER OF CIRCUITS. NUMERAL AT EACH ARROW IDENTIFIES CIRCUIT NUMBER.



$\frac{3}{4}$" CONDUIT CONCEALED IN CEILING OR WALL CONTAINING 3 WIRES.

WIRING TURNED UP.

WIRING TURNED DOWN.

ELECTRICAL EQUIPMENT

(TS) TIME SWITCH

(F) FAN

(M) MOTOR

(G) GENERATOR

(PC) PHOTO CELL RELAY

(T) THERMOSTAT

(H) HUMIDISTAT

[HD] HAND DRYER

[EH] ELECTRIC HEATER

ELECTRICAL OUTLETS

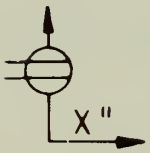
SINGLE RECEPTACLE

DUPLEX RECEPTACLE

TRIPLEX RECEPTACLE

SINGLE SPECIAL-PURPOSE RECEPTACLE

SINGLE SPECIAL-PURPOSE CONNECTION



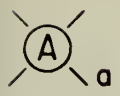
MULTIOUTLET ASSEMBLY. ARROWS INDICATE LIMIT OF INSTALLATION, INDICATES DUPLEX RECEPTACLES AND X" INDICATES SPACING OF OUTLETS IN INCHES.

JUNCTION BOX

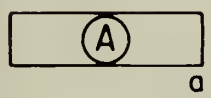
TELEPHONE OUTLET

SQUARE AROUND ANY SYMBOL INDICATES FLOOR MOUNTED.

LIGHTING FIXTURES



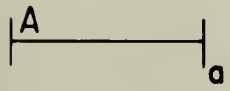
CEILING OR PENDANT MOUNTED INCANDESCENT, MERCURY-VAPOR OR SIMILAR LIGHT FIXTURE. A INDICATES FIXTURE TYPE AND a INDICATES SWITCHING CIRCUIT.



CEILING OR PENDANT MOUNTED FLUORESCENT LIGHT FIXTURE.

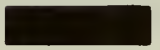
CEILING OR PENDANT MOUNTED EXIT LIGHT. ARROW INDICATES DIRECTION TO EXIT.

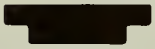
WALL MOUNTED LIGHT FIXTURE.

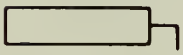


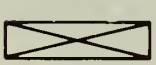
FLUORESCENT STRIP LIGHT.

PANELBOARDS, SWITCHBOARDS AND RELATED EQUIPMENT


SURFACE MOUNTED PANELBOARD


FLUSH MOUNTED PANELBOARD


DISCONNECT SWITCH


MOTOR STARTER


COMBINATION STARTER AND DISCONNECTING MEANS

SWITCHES

S SINGLE-POLE SWITCH

S_3 THREE-WAY SWITCH

S_4 FOUR-WAY SWITCH

S_K KEY OPERATED
MS MANUAL MOTOR STARTER
P PILOT LIGHT
D DIMMER
CL CLOCK
a SWITCHING

SITE (ELECTRICAL)

——U3ΦS—— – – —— ELECTRICAL LINE

U	UNDERGROUND	1Φ	SINGLE PHASE
A	AERIAL	3Φ	THREE PHASE
P	PRIMARY	T	TELEPHONE
S	SECONDARY		

△ POLE MOUNTED TRANSFORMER

[T] PAD MOUNTED TRANSFORMER

[PB]$_1$ PULLBOX, 1 INDICATES PULLBOX NUMBER

[MH] MANHOLE


GROUND ROD

FIRE AND INTRUSION FIXTURES

[IA] INTRUSION ALARM CONTROL PANEL

[FA] FIRE ALARM CONTOL PANEL

[I] INTRUSION DETECTOR

- U ULTRASONIC
- IRP INFRARED PASSIVE
- IRAT INFRARED ACTIVE TRANSMITTER
- IRAR INFRARED ACTIVE RECEIVER

▬ MAGNETIC SWITCH

[D] DOOR HOLDER, MAGNETIC

[F] FIRE DETECTOR

- FT FIXED TEMPERATURE
- RA RATE ANTICIPATION
- RR RATE OF RISE
- I IONIZATION
- PE PHOTOELECTRIC

[F]◁ HORN, F INDICATES FIRE AND I INDICATES INTRUSION

[I]○ BELL

[MS] MANUAL STATION

NOTE
SUBSCRIPT NUMBERS OR LETTERS ARE USED TO FURTHER DEFINE SYMBOLS.

ABBREVIATIONS (ELECTRICAL)

AFF	ABOVE FINISHED FLOOR
AGL	ABOVE GRADE LEVEL
C	CONDUIT
EF	EXHAUST FAN
EMT	ELECTRICAL METALLIC TUBING
EP	EXPLOSION PROOF
GFI	GROUND FAULT INTERRUPTER
KV	KILOVOLTS
KVA	KILOVOLT AMPERES
KW	KILOWATTS
NIC	NOT IN CONTRACT
PC	PULL CHAIN
PVC	POLYVINYL CHLORIDE
RGS	RIGID GALVANIZED STEEL
SF	SUPPLY FAN
ST	SHUNT TRIP
UNG	UNGROUNDED
WP	WEATHERPROOF

LEGEND FOR RADIO SYSTEMS

(1) = RECEIVER, FREQUENCY 1

[2] = TRANSMITTER, FREQUENCY 2

◇A = TONE CONTROL – ENCODER OR DECODER, TONE A

—x→ = CONTROL, TURN ON

—o→ = CONTROL, TURN OFF

[RC] = REMOTE CONTROL CONSOLE (2 OR 4 WIRE)

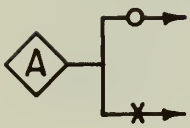
[C–3] = CAVITY–3, INDICATES A 3 SECTION CAVITY

[VS] = VOTING SELECTOR (COMPARATOR)

[D] = DUPLEXER

$\frac{100'}{6}$● = OMNIDIRECTIONAL ANTENNA, 100' INDICATES ANTENNA ELEVATION ABOVE GROUND, 6 INDICATES ANTENNA GAIN IN dB.

$\frac{35'}{8}$▶ = DIRECTIONAL ANTENNA, 35' INDICATES ANTENNA ELEVATION ABOVE GROUND, 8 INDICATES ANTENNA GAIN IN dB.



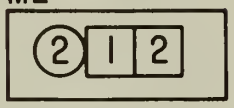
= TONE DECODER WITH NORMALLY CLOSED AND NORMALLY OPEN CONTACTS. SHOWN IN OPERATED POSITION.

[DS] = DESK SET REMOTE

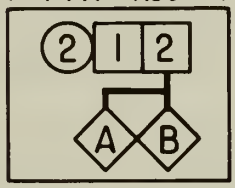
[RC] / $ = REMOTE WITH SCRAMBLER.

MOBILES AND PORTABLES

MOBILES & PORTABLES
ML

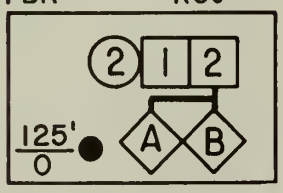


MOBILES & PORTABLES
FB/FX KOJ758

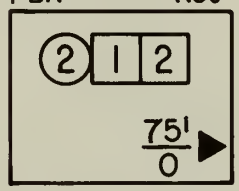


BASE

HEADQUARTERS
FBR KOJ

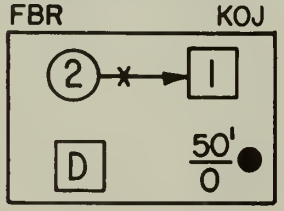


RANGER STA.
FBR KOJ

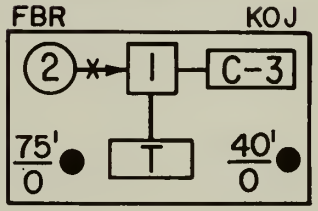


VARIOUS FORMS OF REPEATERS

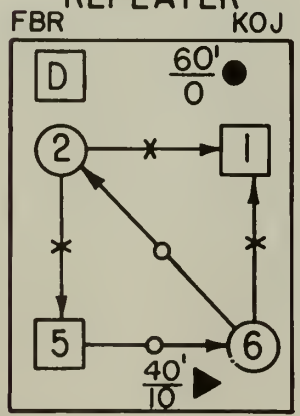
INSCRIPTION ROCK REPEATER
FBR KOJ



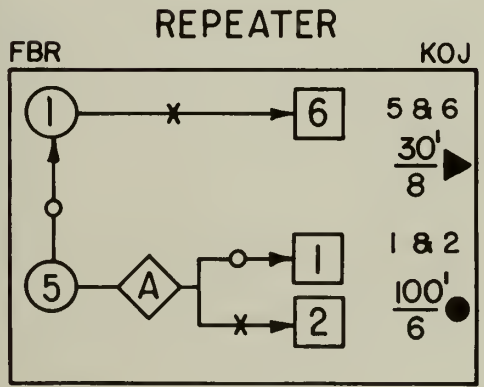
REPEATER
FBR KOJ



REPEATER
FBR KOJ



REPEATER
FBR KOJ

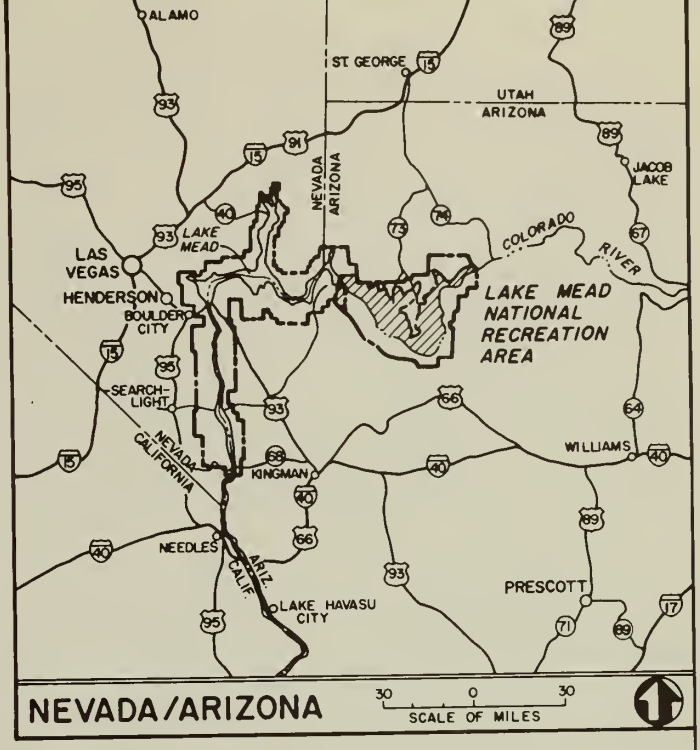


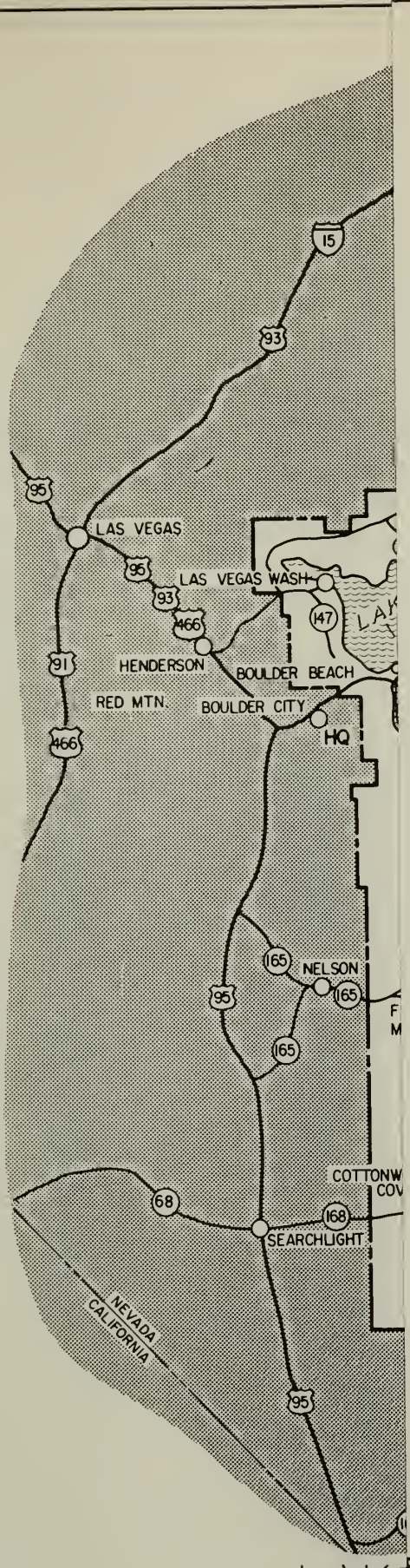
5. SAMPLE SET OF CONSTRUCTION DRAWINGS, REVISED COVER SHEET FOR AMENDED OR MODIFIED DRAWINGS, AND REVISED COVER SHEET FOR AS-CONSTRUCTED DRAWINGS

Exhibit 5-A contains a complete sample set of construction drawings including cover sheet, architectural elevations and details, road plan, plan and profile, sewage system plan and details, bridge elevations and details, piping plan and details, heating plan, electrical plan and schematic, and landscaping details.

Exhibit 5-B is a sample of an original construction cover sheet showing information needed to reflect an amendment or a modification.

Exhibit 5-C is a sample of an original construction cover sheet showing information needed to reflect a set of as-constructed drawings.





INDEX

EXHIBIT 5-A

SCALE OF MILES
6 0 6 12
9 0 9 18
SCALE OF KILOMETERS

LAKE 108

AWINGS

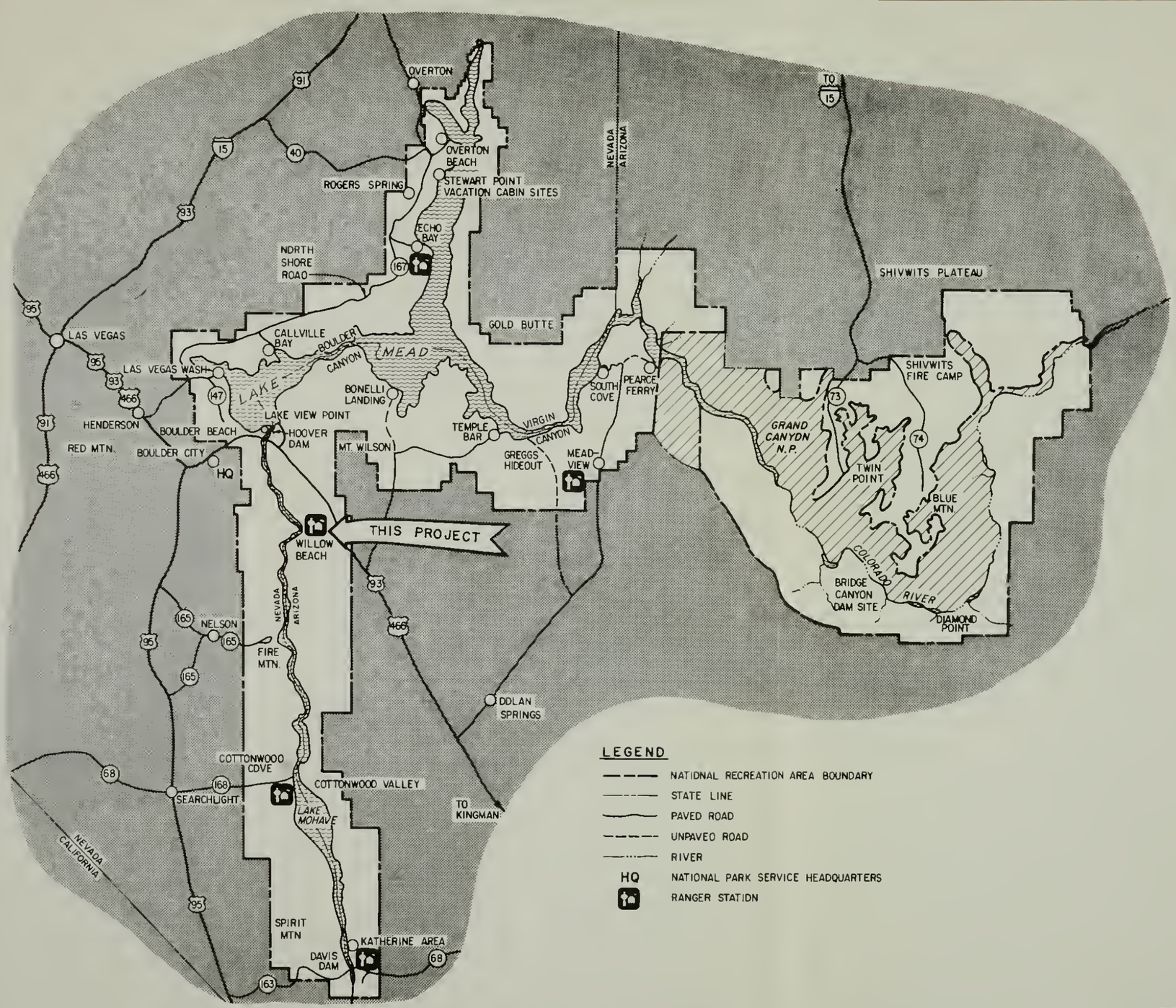
TERIOR
VICE
TER

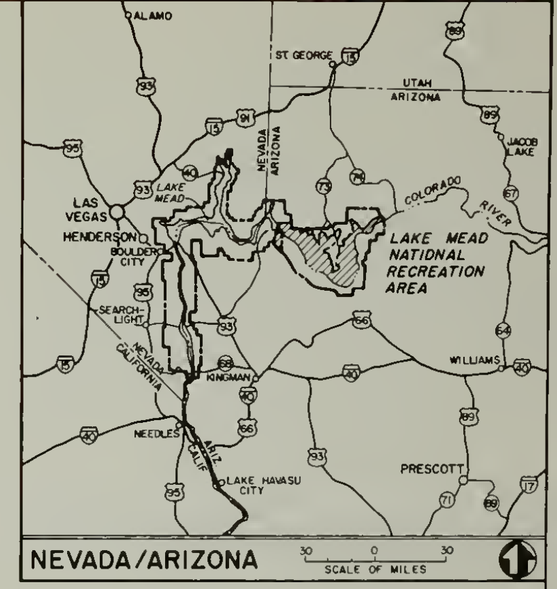
DESIGNED: DSC
DRAWN: DRAFTING BR.
TECH REVIEW: NIELSEN
DATE: 10/85

TITLE OF DRAWING
STANDARD DRAWING FORMAT
LOCATION WITHIN PARK
WILLOW BEACH
NAME OF PARK
LAKE MEAD NATIONAL RECREATION AREA
REGION: WESTERN
COUNTY: CLARK
STATE: ARIZ./NEV.

DRAWING NO. 999 41,001
PKG. NO. 108
SHEET 1 OF 17

BASIC DATA NRA-LM 2101-0,2113-C, BUR OF REC OWG. X-300-101 TO 110 & 329.





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- RIVER
- HQ — NATIONAL PARK SERVICE HEADQUARTERS
- RANGER STATION

EXHIBIT 5-A

SCALE OF MILES
6 0 6 12
9 0 9 18
SCALE OF KILOMETERS

LAKE MEAD NATIONAL RECREATION AREA

IFB NO. LAME 108

A&E FIRM NAME AND/OR SEAL

Mark	Sheet	REVISION	Date	Initial

(USE REVISION STANPAT 3 AS REQUIRED)

This drawing has been prepared in compliance with Preliminary/Comprehensive Design Drawing No ____
Approved by ____ on ____
Title ____ Date ____
Assistant Manager ____ Date ____

(USE STANPAT 1 OR 2 AS REQUIRED)

RECOMMENDED
Assistant Manager ____ Date ____
Superintendent ____ Date ____
APPROVED
Director – Region ____ Date ____

CONSTRUCTION DRAWINGS

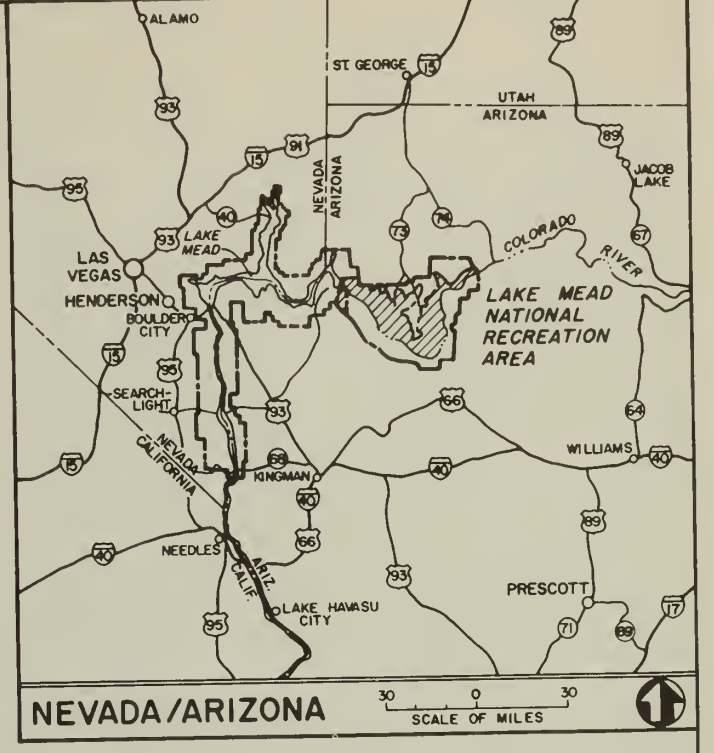
UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
DENVER SERVICE CENTER

DESIGNED DSC
DRAWN DRAFTING BR.
TECH REVIEW NIELSEN
DATE 10/85

TITLE OF DRAWING
STANDARD DRAWING FORMAT
LOCATION WITHIN PARK
WILLOW BEACH
NAME OF PARK
LAKE MEAD NATIONAL RECREATION AREA
REGION WESTERN | COUNTY CLARK | STATE ARIZ/NEV

DRAWING NO 999 41,001
PKG NO 108
SHEET 1 OF 17

BASIC DATA NRA-LM 2101-D,2113-C, BUR OF REC DWG X-300-101 TO 110 & 329, REVISED AND REDRAWN 2/84



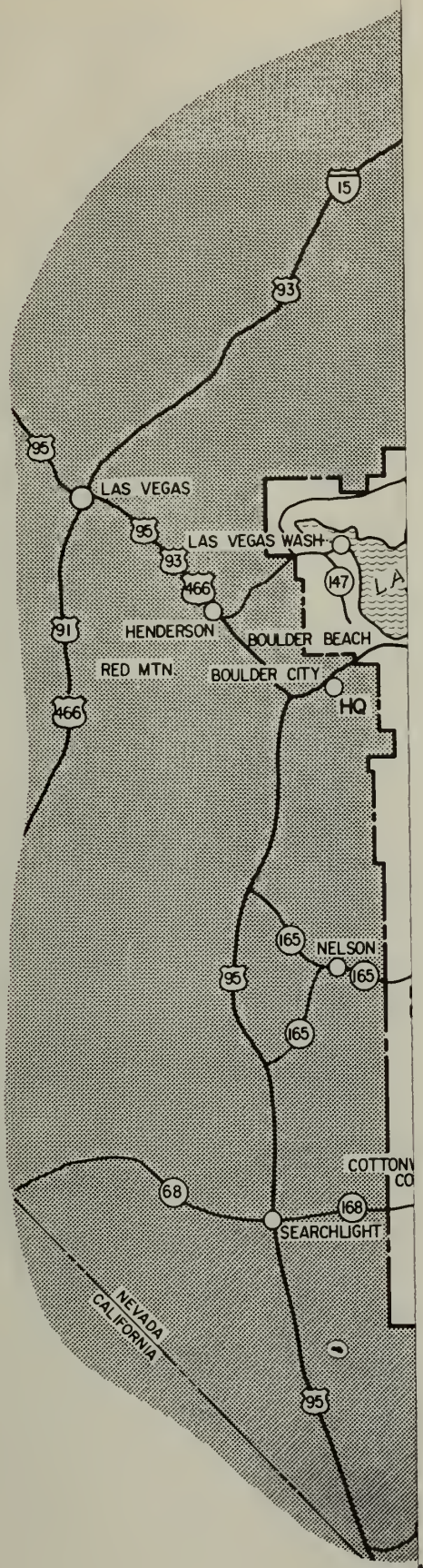


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EXHIBIT 5-B
SAMPLE COVER FOR AMENDMENT OR MODIFICATION

SCALE OF MILES
6 0 6 12
9 0 9 18
SCALE OF KILOMETERS

LAK E 108

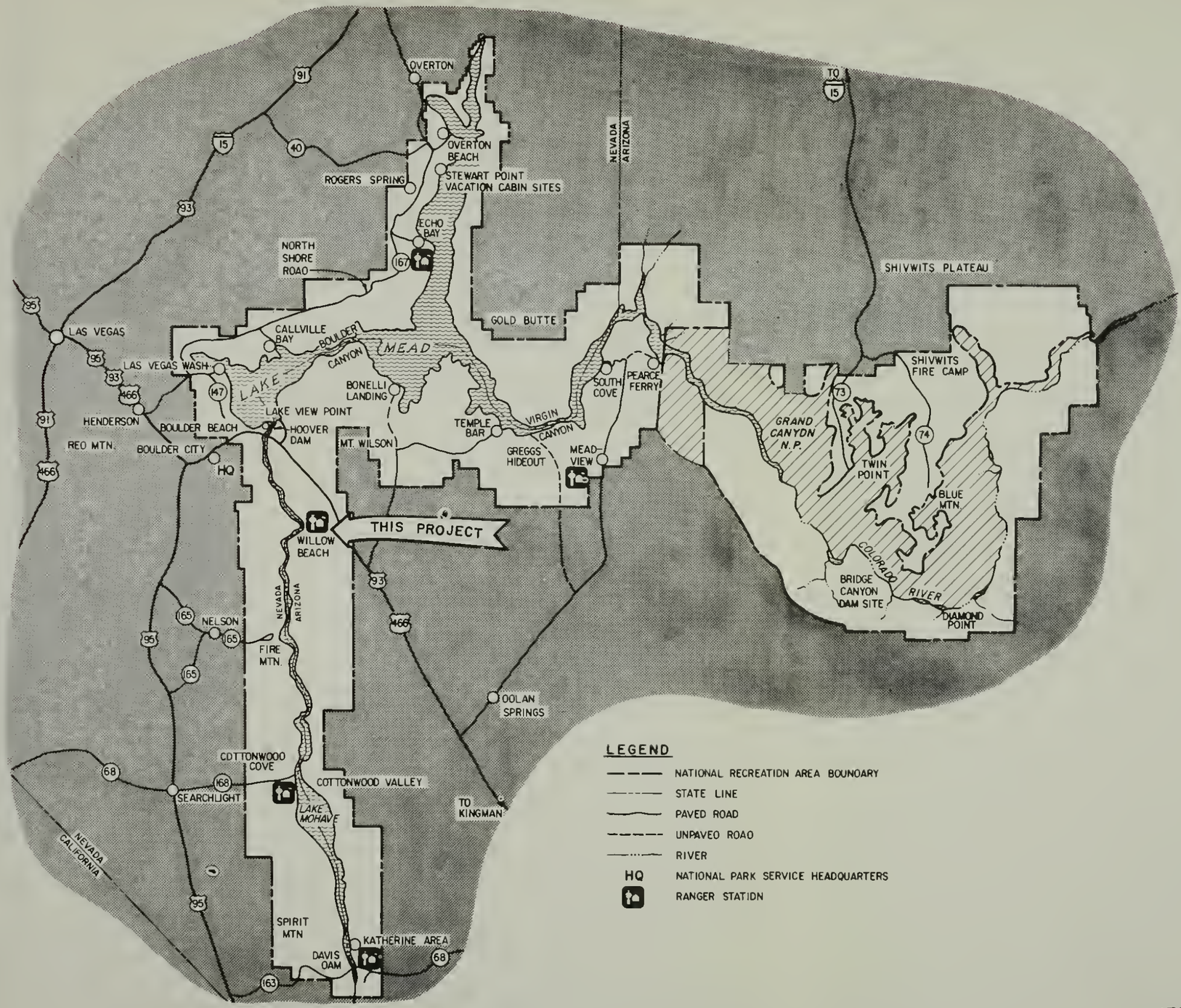
RAWINGS
S
NTERIOR
RVICE
NTER

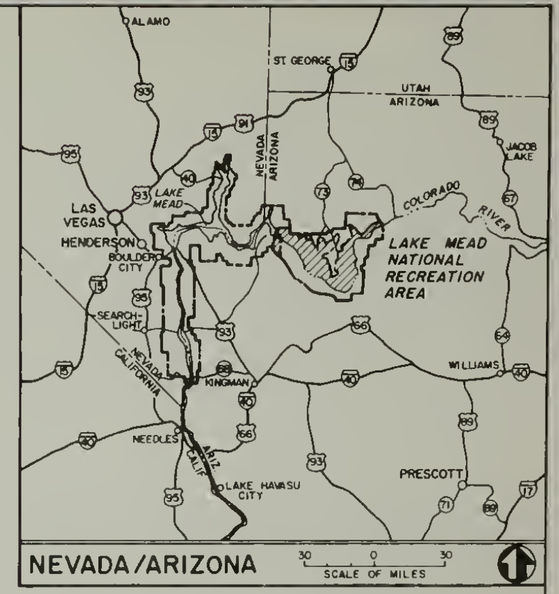
DESIGNED DSC
DRAWN: DRAFTING BR.
TECH. REVIEW: NIELSEN
DATE: 10/85

TITLE OF DRAWING
STANDARD DRAWING FORMAT
LOCATION WITHIN PARK
WILLOW BEACH
NAME OF PARK
LAKE MEAD NATIONAL RECREATION AREA
REGION WESTERN | COUNTY CLARK | STATE ARIZ/NEV.

DRAWING NO. 999 41,001
PKG. NO. 108
SHEET 1A OF 17

BASIC DATA: NRA-LM 2101-0, 2113-C, BUR. OF REC. DWG. X-300-101 TO 110 & 329





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- RANGER STATION

EXHIBIT 5-B
SAMPLE COVER FOR AMENDMENT OR MODIFICATION

SCALE OF MILES
6 0 6 12
9 0 9 18
SCALE OF KILOMETERS

LAKE MEAD NATIONAL RECREATION AREA

IFB NO. LAME 108

Mark	Sheet	REVISION	Date	Initial
▽	1A, 4A, 7A	AMENDMENT OR MODIFICATION NO 1. REVISED SHT. 4,7	11/85	L.E.N.

RECOMMENDED
Assistant Manager — Date
Superintendent — Date
APPROVED
Director – Region — Date

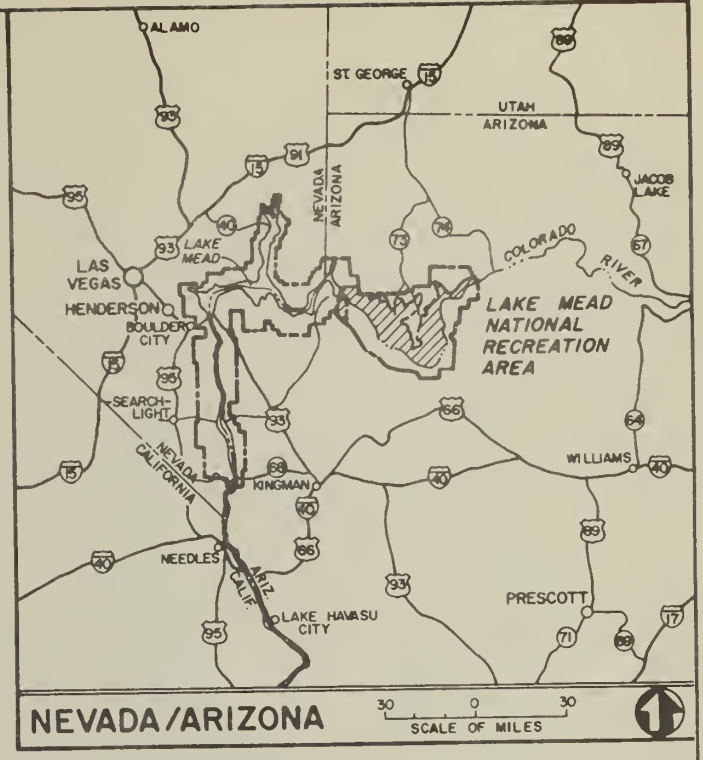
CONSTRUCTION DRAWINGS
UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
DENVER SERVICE CENTER

DESIGNED DSC
DRAWN DRAFTING BR.
TECH REVIEW NIELSEN
DATE 10/85

TITLE OF DRAWING
STANDARD DRAWING FORMAT
LOCATION WITHIN PARK
WILLOW BEACH
NAME OF PARK
LAKE MEAD NATIONAL RECREATION AREA
REGION WESTERN | COUNTY CLARK | STATE ARIZ/NEV

DRAWING NO. 999 41,001
PKG. NO 108
SHEET 1A OF 17

BASIC DATA NRA-LM 2101-0,2113-C, BUR OF REC DWG. X-300-101 TO 110 & 329, REVISED AND REDRAWN 2/84



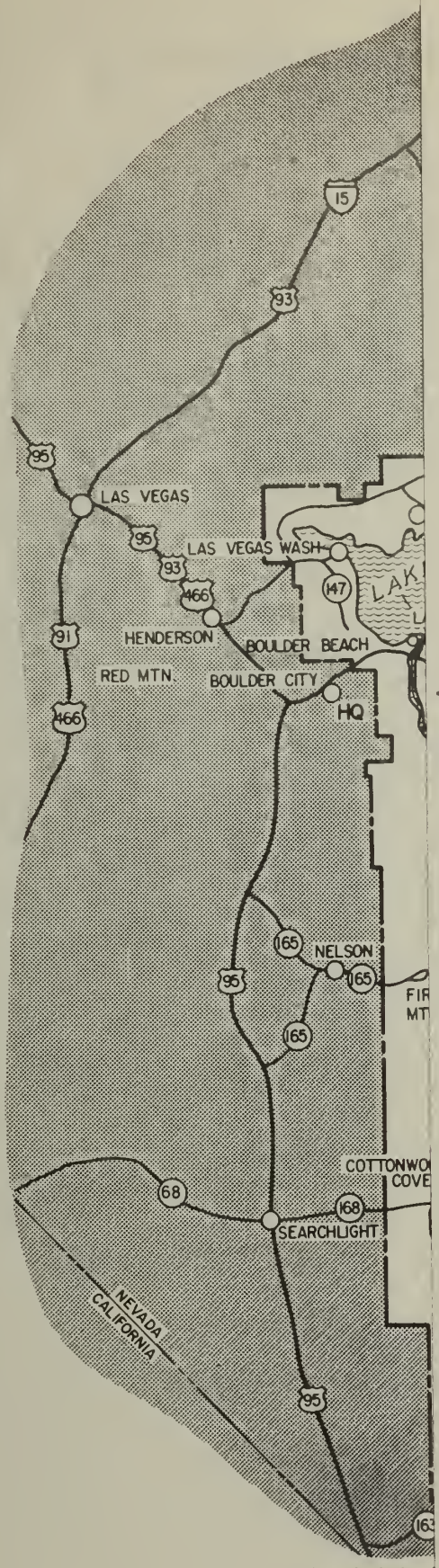


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EXHIBIT 5-C
SAMPLE COVER FOR AS-CONSTRUCTED

SCALE OF MILES
6 0 6 12
9 0 9 18
SCALE OF KILOMETERS

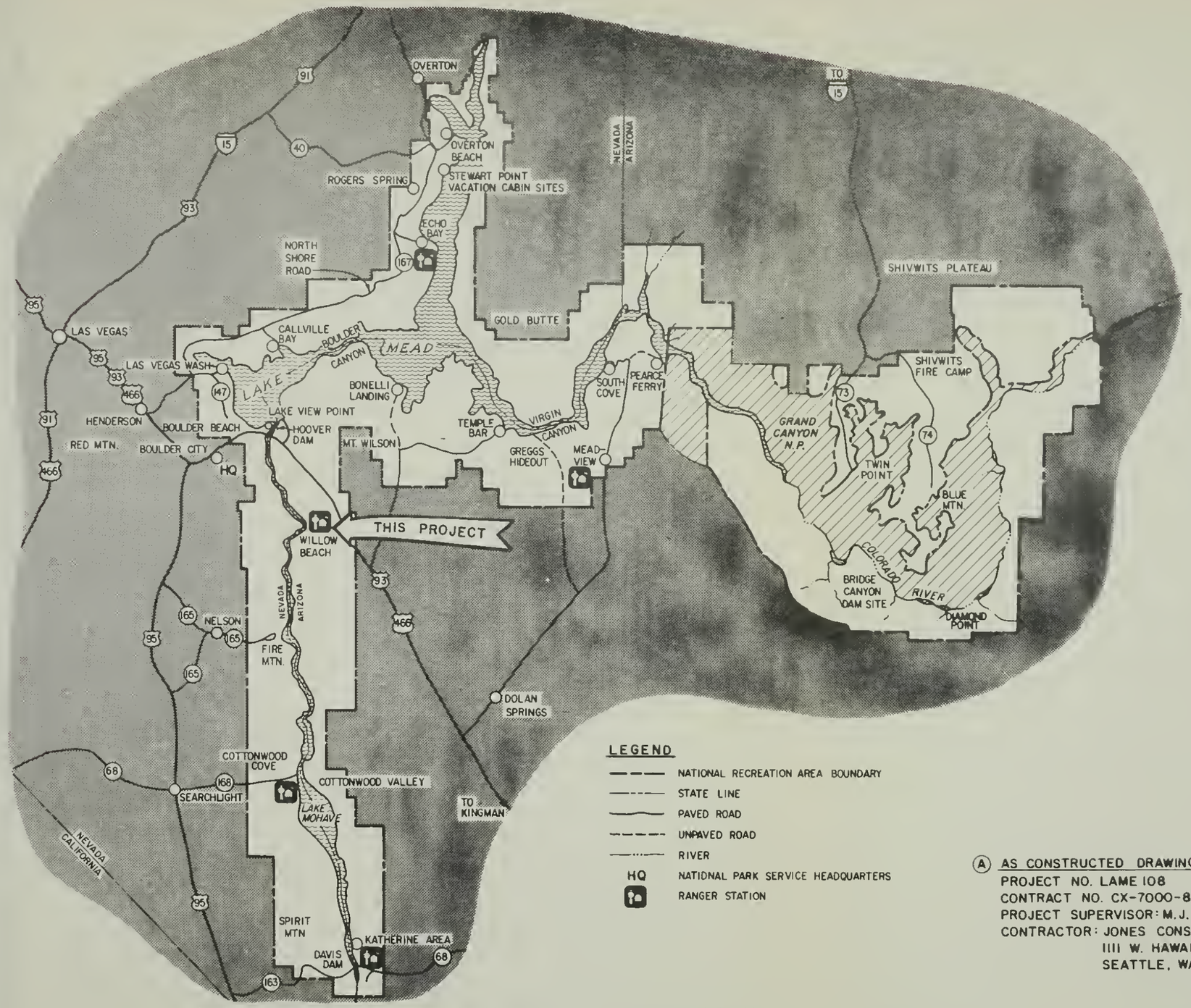
AWINGS
ERIOR
ICE
ER

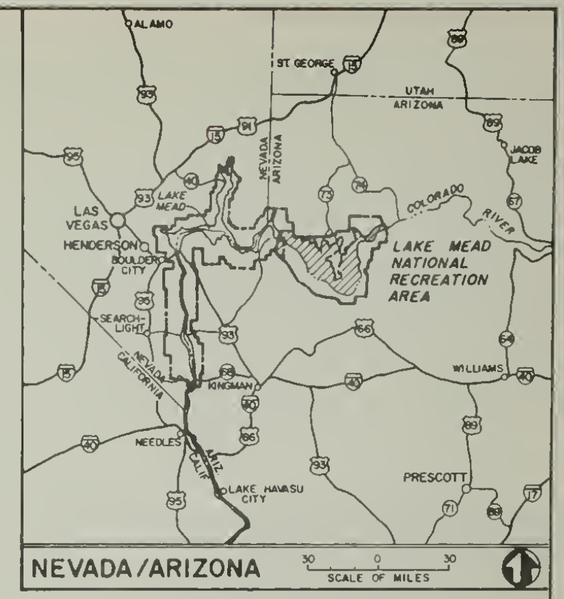
DESIGNED: DSC
DRAWN: DRAFTING BR.
TECH. REVIEW: NIELSEN
DATE: 10/85

TITLE OF DRAWING
STANDARD DRAWING FORMAT
LOCATION WITHIN PARK
WILLOW BEACH
NAME OF PARK
LAKE MEAD NATIONAL RECREATION AREA
REGION: WESTERN
COUNTY: CLARK
STATE: ARIZ./NEV.

DRAWING NO. 999 41,001 A
PKG. NO. 108
SHEET 1 OF 17

BASIC DATA: NRA-LM 2101-0,2113-C, BUR. OF REC. DWG. X-300-101 TO 110 & 329;





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(A) AS CONSTRUCTED DRAWING
PROJECT NO. LAME 108
CONTRACT NO. CX-7000-8-9056
PROJECT SUPERVISOR: M.J. SMITH
CONTRACTOR: JONES CONSTRUCTION
1111 W. HAWAII
SEATTLE, WASHINGTON

EXHIBIT 5-C
SAMPLE COVER FOR AS-CONSTRUCTED

SCALE OF MILES
6 0 6 12
9 0 9 18
SCALE OF KILOMETERS

LAKE MEAD NATIONAL RECREATION AREA

Mark	Sheet	REVISION	Date	Initial
V	1A, 4A, 7A	AMENDMENT NO 1, REVISED SHEETS 4,7	11/85	L.E.N.
V	13	MODIFICATION NO 1; REVISED SHEET 13.	12/85	L.E.N.
A		AS-CONSTRUCTED	1/86	L.E.N.

RECOMMENDED
Assistant Manager — Date
Superintendent — Date
APPROVED Director - Region — Date

AS-CONSTRUCTED DRAWINGS
UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
DENVER SERVICE CENTER

DESIGNED DSC
DRAWN DRAFTING BR.
TECH REVIEW NIELSEN
DATE 10/85

TITLE OF DRAWING
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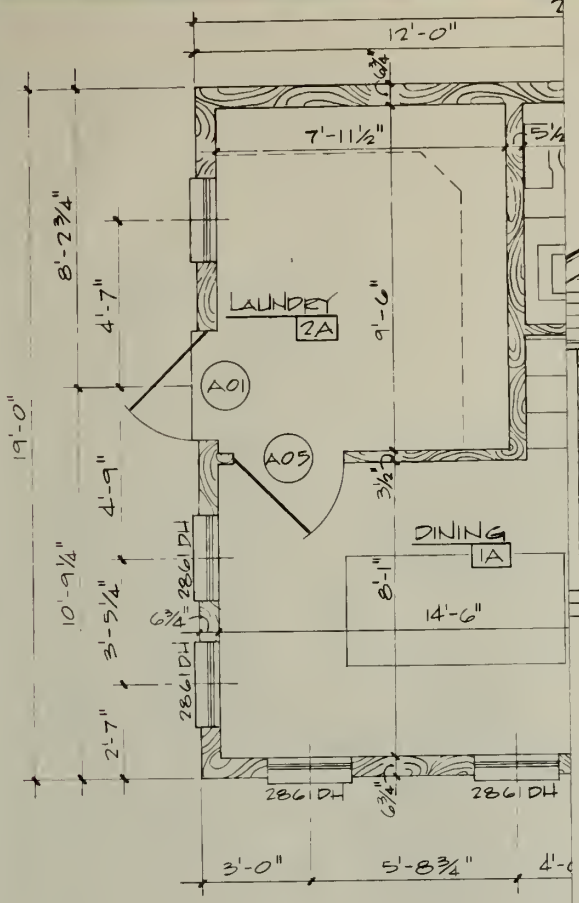
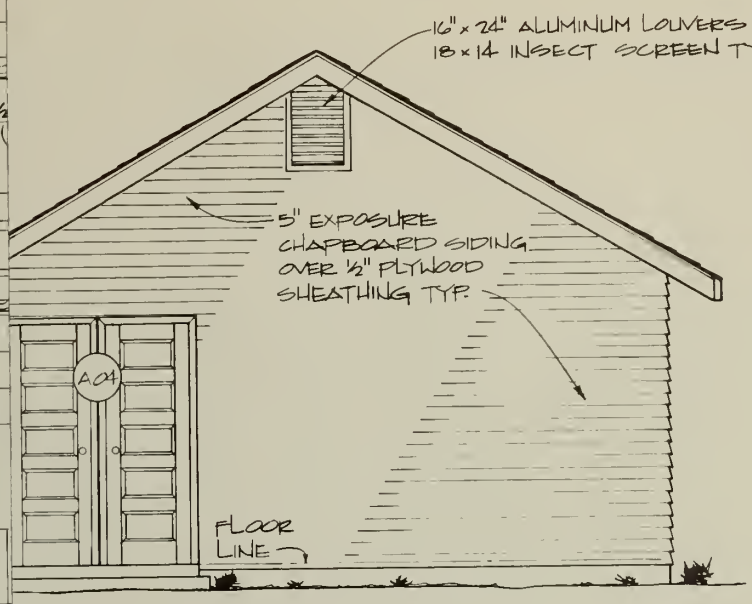
NAME OF PARK
LAKE MEAD NATIONAL RECREATION AREA
REGION WESTERN | COUNTY CLARK | STATE ARIZ/NEV

DRAWING NO 999 41,001 A
PKG. NO 108
SHEET 1 OF 17

BASIC DATA NRA-LM 2101-D, 2113-C, BUR OF REC. DWG X-300-101 TO 110 & 329, REVISED AND REDRAWN 2/84





EAST ELEVATION

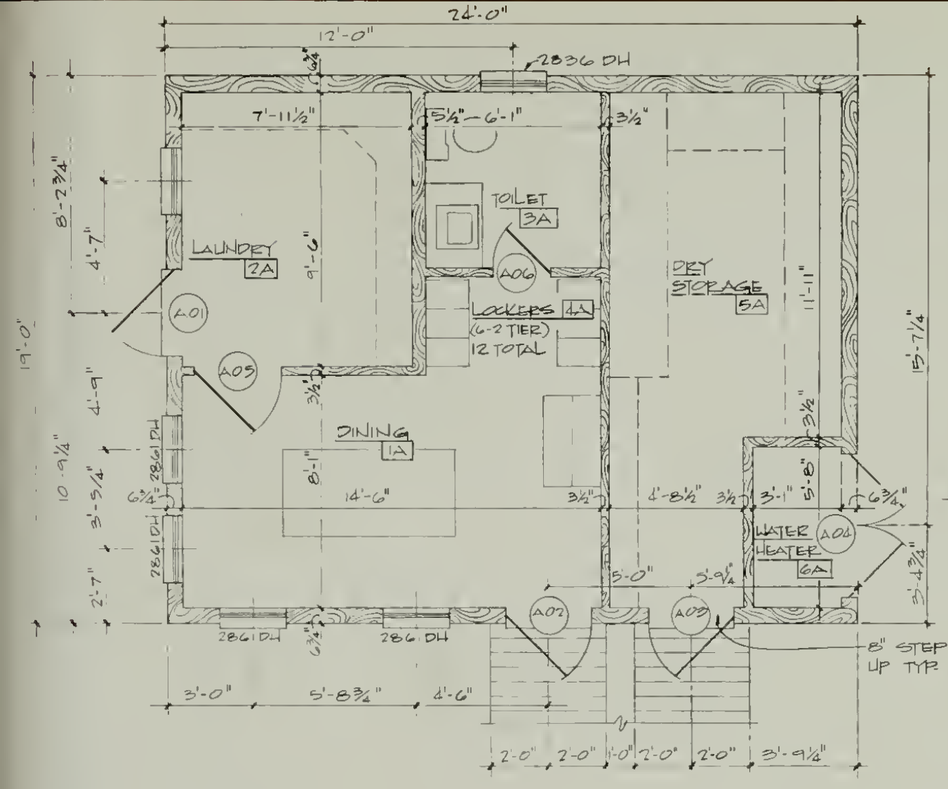
KITCHEN

WEST ELEVATION

ONS

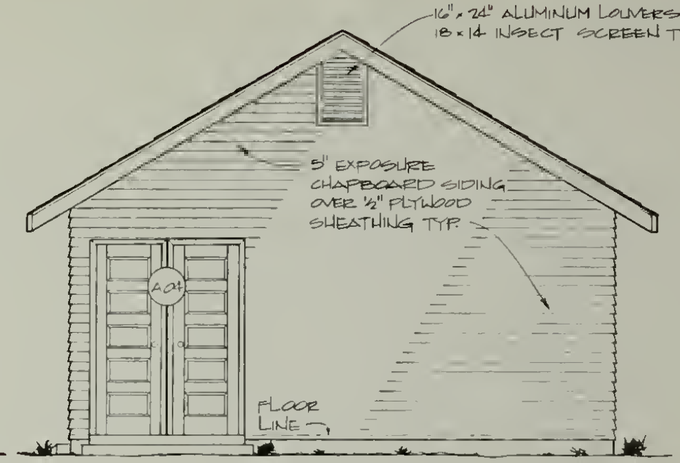
2 0 2 4 6
SCALE OF FEET

DESIGNED: DSC DRAWN: D.J. SIKES TECH. REVIEW: NIELSEN DATE: 10/85	SUB SHEET NO. A1	TITLE OF SHEET: ARCHITECTURAL ELEVATIONS	DRAWING NO. 999 41,001 PKG. NO. 108 SHEET 2 OF 17	

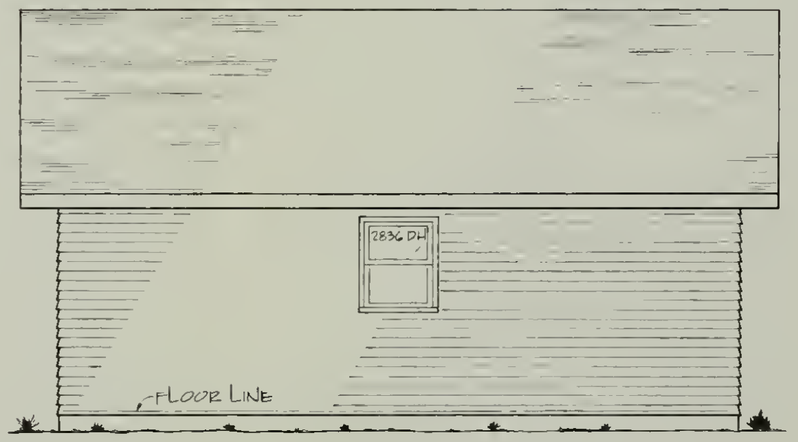


KITCHEN ANNEX FLOOR PLAN

SOUTH ELEVATION



EAST ELEVATION



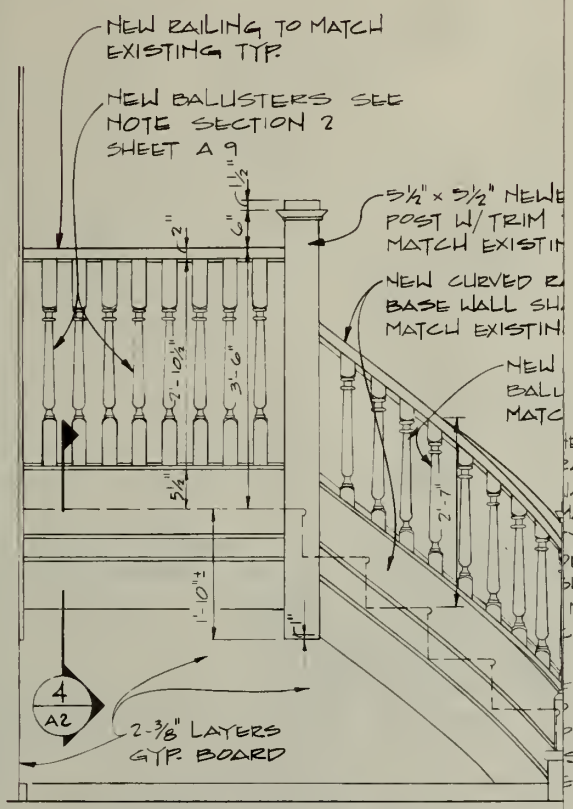
NORTH ELEVATION

WEST ELEVATION

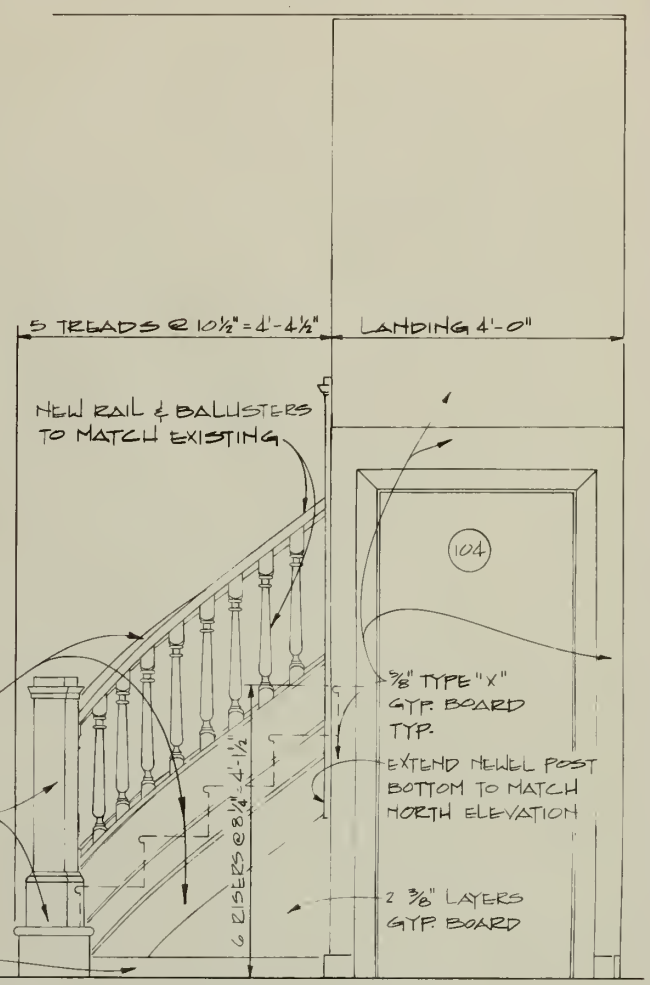
KITCHEN ANNEX ELEVATIONS

2 0 2 4 6
SCALE OF FEET

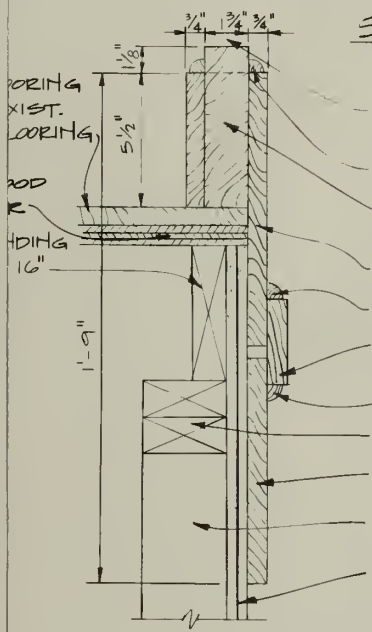
DESIGNED: DSC DRAWN: D.J. SIKES TECH. REVIEW: NIELSEN DATE: 10/85	SUB SHEET NO A1	TITLE OF SHEET ARCHITECTURAL ELEVATIONS	DRAWING NO 999 41.001 PKG. NO. 108 SHEET 2 OF 17



NORTH ELEVATION (1 / A2)



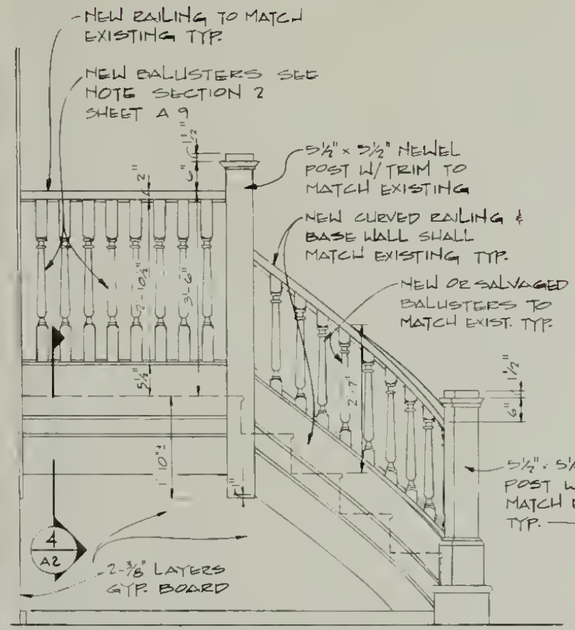
SOUTH ELEVATION (3 / A2)



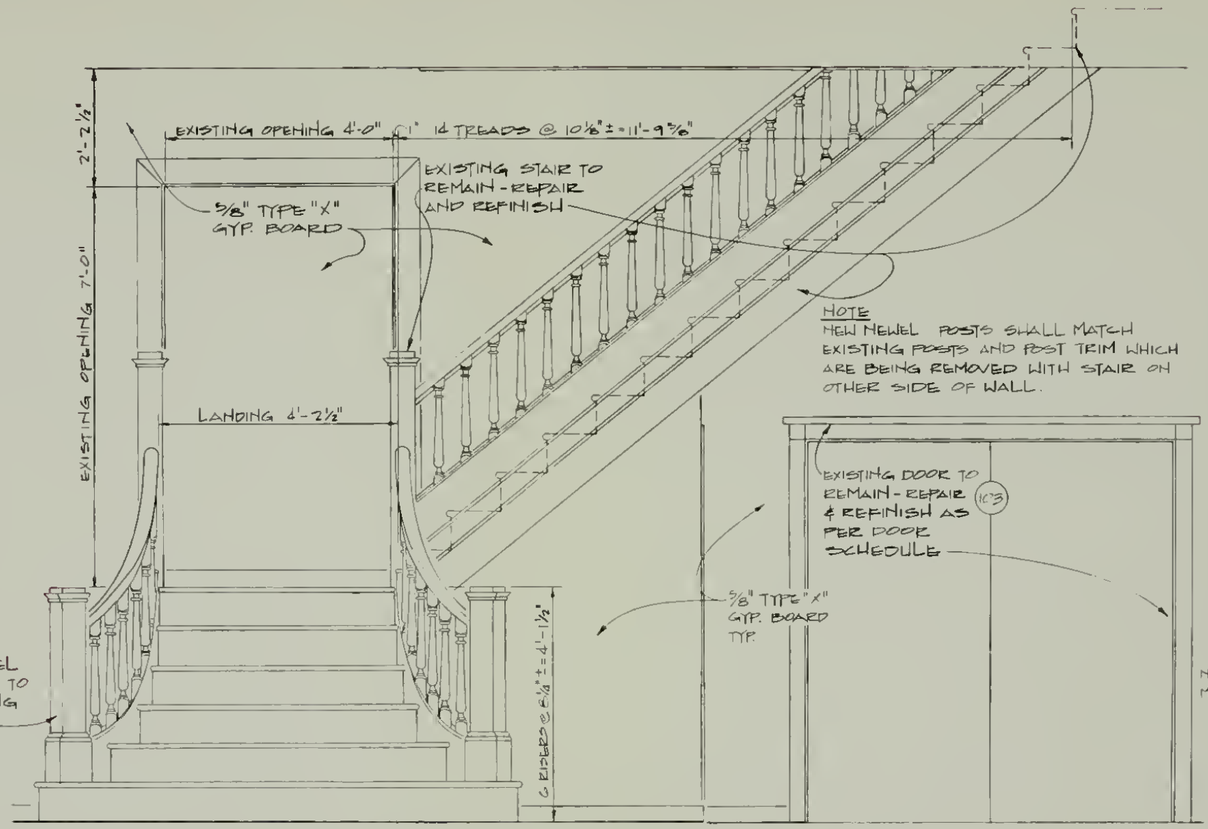
- NEW RAILING BALUSTER SEE NOTE SECTION 2 SHT A 9
- 5/8" QUARTER ROUND TYP.
- 1¾" × 6 5/8" BASE NOTCHED TO RECEIVE BALUSTERS TYP.
- CONT. ¾" × 11¼" WOOD TRIM
- CONT. 5/8" QUARTER ROUND TYP.
- CONT. ¾" × 3½" WOOD TRIM LOCATED TO MATCH EXISTING SHOWN ON WEST ELEV.
- CONT. 5/8" QUARTER ROUND TYP.
- 2-2×4 TOP PL TYP.
- CONT. ¾" × 9⅛" WOOD TRIM
- 2×4 STUDS @ 16" O.C
- 2-LAYERS OF 3/8" GYP. BOARD LAMINATED TOGETHER TO MATCH CURVED WALL.

LANDING TRIM SECTION (4 / A2)

DESIGNED: DSC DRAWN: D.J. SIKES TECH. REVIEW: NIELSEN DATE: 10/85	SUB SHEET NO. A2	TITLE OF SHEET: ARCHITECTURAL STAIR DETAILS	DRAWING NO. 999 41,001 PKG. NO. 108 SHEET 3 OF 17

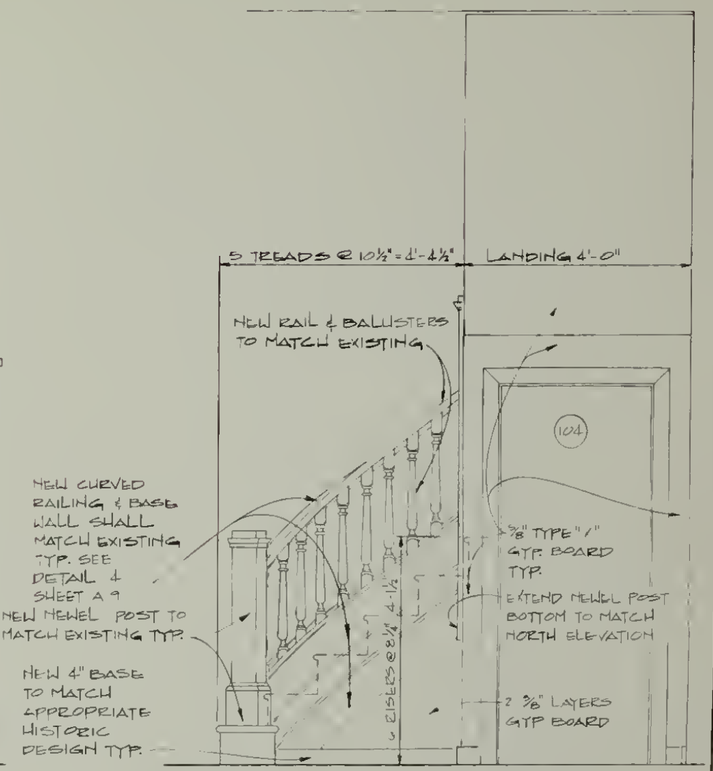


NORTH ELEVATION (1 A2)

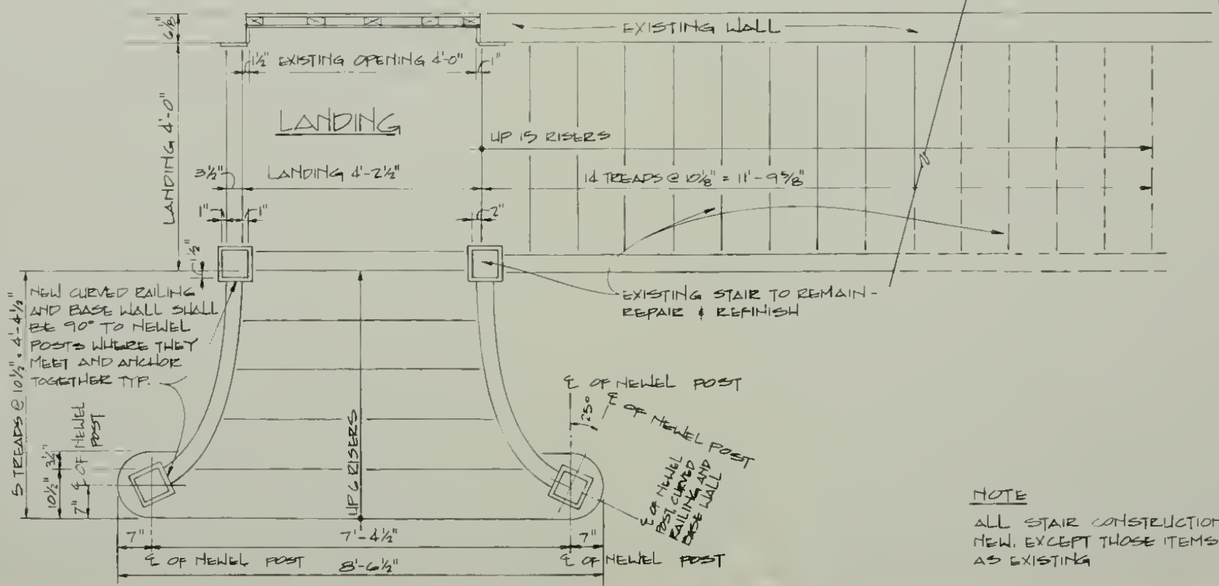


WEST ELEVATION (2 A2)

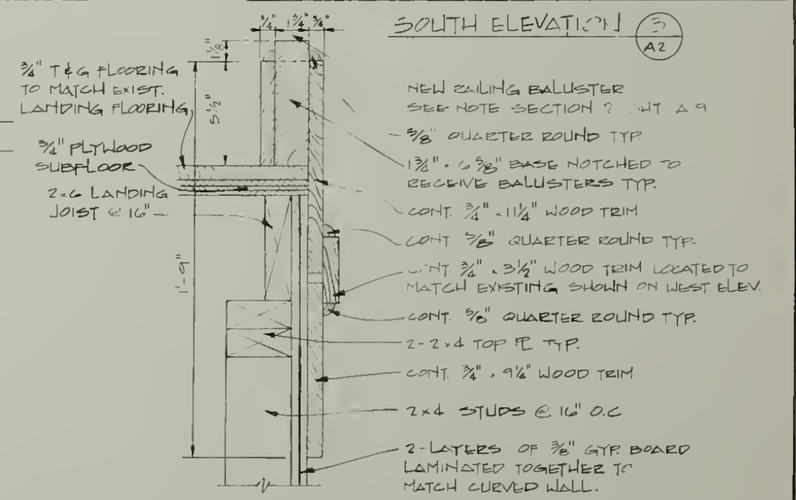
NOTE
NEW NEWEL POSTS SHALL MATCH EXISTING POSTS AND POST TRIM WHICH ARE BEING REMOVED WITH STAIR ON OTHER SIDE OF WALL.



SOUTH ELEVATION (3 A2)



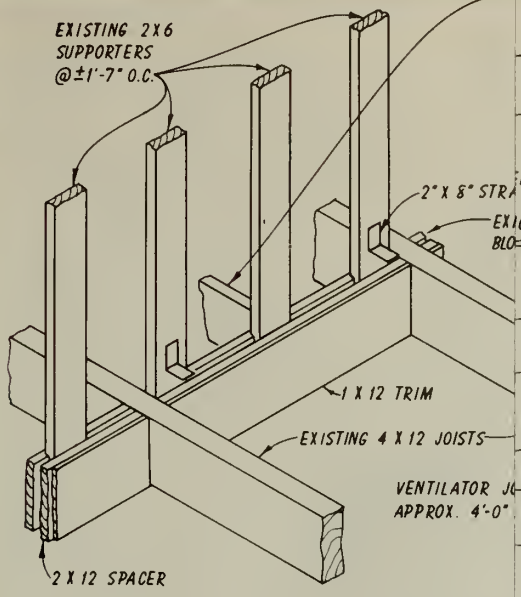
FLOOR PLAN (5 A2)



LANDING TRIM SECTION (4 A2)

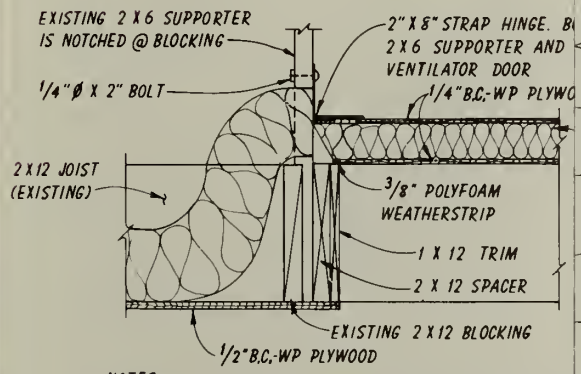
NOTE
ALL STAIR CONSTRUCTION IS NEW, EXCEPT THOSE ITEMS NOTED AS EXISTING

DESIGNED DSC DRAWN: D.J. SIKES TECH. REVIEW: NIELSEN DATE 10/85	SUB SHEET NO A2	TITLE OF SHEET ARCHITECTURAL STAIR DETAILS	DRAWING NO 999 41,001 PKG. NO. 108	SHEET 3 OF 17



NOTE
VENT DOOR, CA
AND INSULATION
FROM ISOMETRI

ISOMETRIC

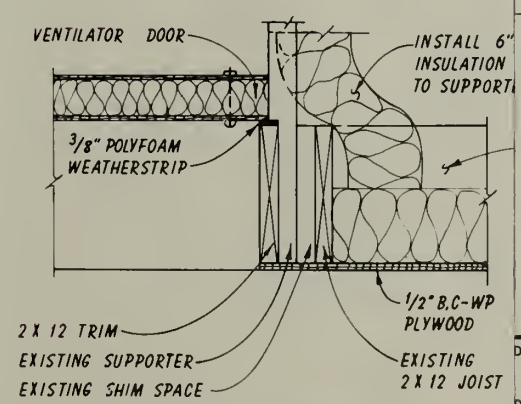


NOTES
1. WRAP CANVAS OVER PLYWOOD AND OVER FACE AND TOP OF 1 X 12 TRIM. TURN 6" INSULATION UP TO SUPPORT
2. ENTIRELY WRAP DOORS WITH CANVAS.

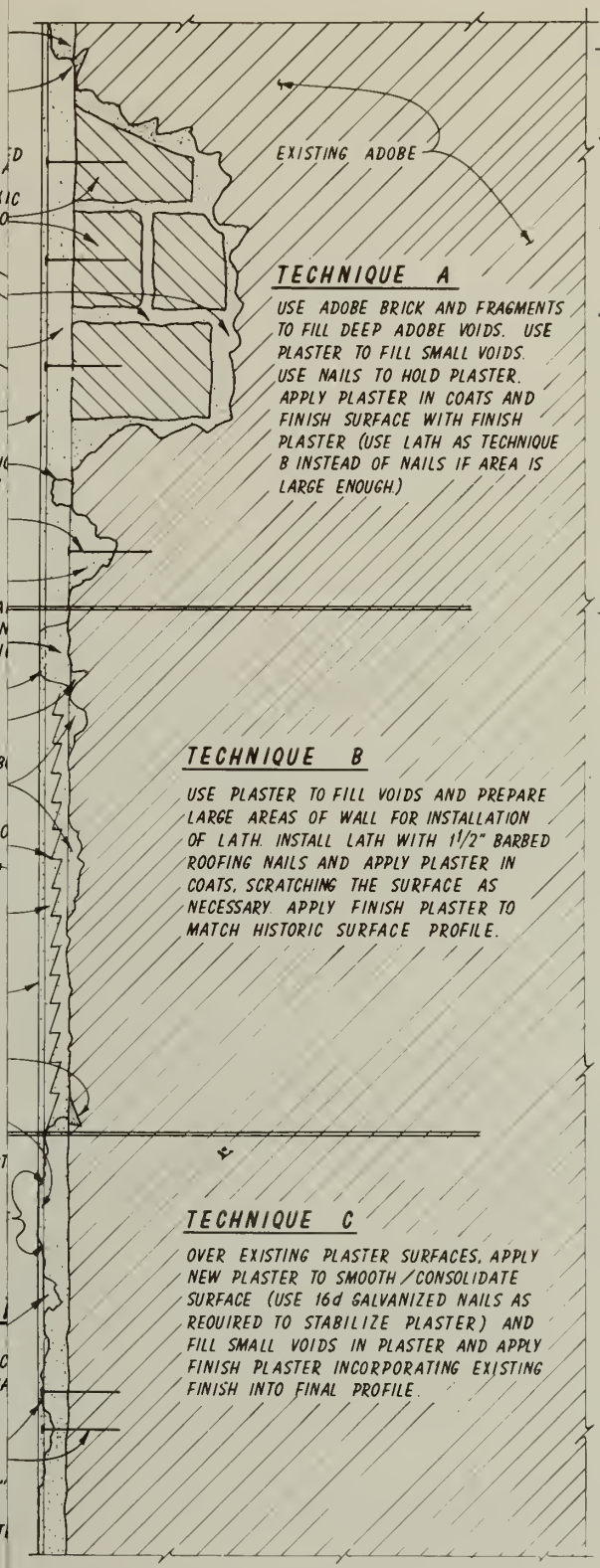
SECTION A / A3

VENTILATO

NOTES
1. INSTALL ALL C
UNLESS INDICA



END VENTILATOR BAY 5 / A3



TECHNIQUE A

USE ADOBE BRICK AND FRAGMENTS TO FILL DEEP ADOBE VOIDS. USE PLASTER TO FILL SMALL VOIDS. USE NAILS TO HOLD PLASTER. APPLY PLASTER IN COATS AND FINISH SURFACE WITH FINISH PLASTER (USE LATH AS TECHNIQUE B INSTEAD OF NAILS IF AREA IS LARGE ENOUGH)

TECHNIQUE B

USE PLASTER TO FILL VOIDS AND PREPARE LARGE AREAS OF WALL FOR INSTALLATION OF LATH. INSTALL LATH WITH 1 1/2" BARBED ROOFING NAILS AND APPLY PLASTER IN COATS, SCRATCHING THE SURFACE AS NECESSARY. APPLY FINISH PLASTER TO MATCH HISTORIC SURFACE PROFILE.

TECHNIQUE C

OVER EXISTING PLASTER SURFACES, APPLY NEW PLASTER TO SMOOTH / CONSOLIDATE SURFACE (USE 16d GALVANIZED NAILS AS REQUIRED TO STABILIZE PLASTER) AND FILL SMALL VOIDS IN PLASTER AND APPLY FINISH PLASTER INCORPORATING EXISTING FINISH INTO FINAL PROFILE.

WALL REPAIR TECHNIQUES, TYP. 7 / A3

FOR LOCATION OF RECOMMENDED TECHNIQUES, SEE SHEET A4.

NOTES
1. WHERE POSSIBLE KEY NEW PLASTER INTO ADOBE.
2. USE EXISTING FINISH PLASTER TO ESTABLISH FINISH PROFILE.
3. SAVE ALL EXISTING PLASTER AND EXISTING FINISH PLASTER WHERE POSSIBLE.
4. FINAL SURFACE MAY BE SPOTTY ALTHOUGH NEW FINISH SHOULD-AS CLOSELY AS POSSIBLE-DUPLICATE APPEARANCE OF ORIGINAL FINISH SURFACE.

MATERIALS

PLASTER:
3 PART SAND
1 PART GYPSUM (GYPSOLITE OR FIBERED GYPSUM ASTM C-28)
±11 GALLONS WATER
(OR ADOBE MUD)

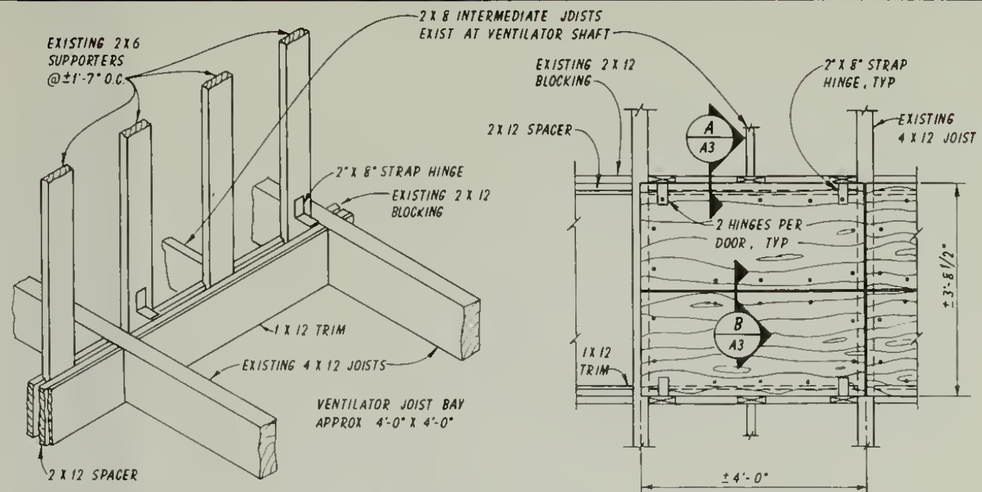
FINISH PLASTER:
1 PART GAUGING
6 LIME PUTTY *
1 1/2 GALLONS WATER
* FINISHING HYDRATED LIME TYPE N (ASTM C-6) +7 GALLONS WATER PER SACK. SLAKE 24 HOURS.

LATH:
5/16" X 9/16" DIAMOND MESH 16" WIDE. 1" END AND 1/2" SIDE OVERLAP.

ADOBE BRICK:
AS MANUFACTURED USING LOCAL MATERIALS

MORTAR:
USE ADOBE MUD OR SPECIFIED PLASTER EXPERIMENT TO OBTAIN BEST RESULTS

DESIGNED: DSC DRAWN: DELIN TECH. REVIEW: NIELSEN DATE: 10/85	SUB SHEET NO. A3	TITLE OF SHEET: ARCHITECTURAL DETAILS	DRAWING NO. 999 / 41,001 PKG. NO. 108 SHEET 4 OF 17

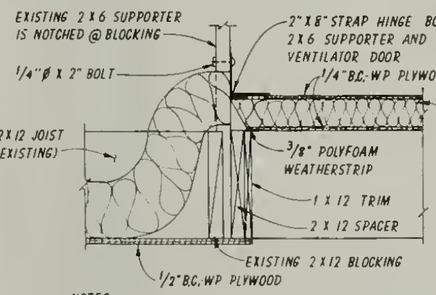


NOTE
VENT DOOR, CANVAS CLG AND INSULATION OMITTED FROM ISOMETRIC FOR CLARITY

ISOMETRIC

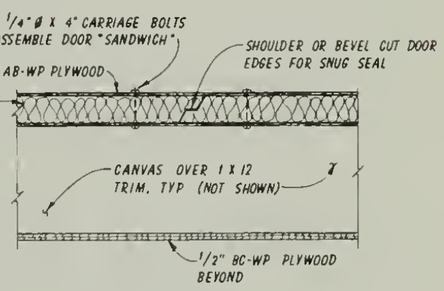
NOTE
CANVAS NOT SHOWN IN PLAN

PLAN



NOTES
1 WRAP CANVAS OVER PLYWOOD AND OVER FACE AND TOP OF 1 X 12 TRIM. TURN 6" INSULATION UP TO SUPPORTERS.
2 ENTIRELY WRAP DOORS WITH CANVAS

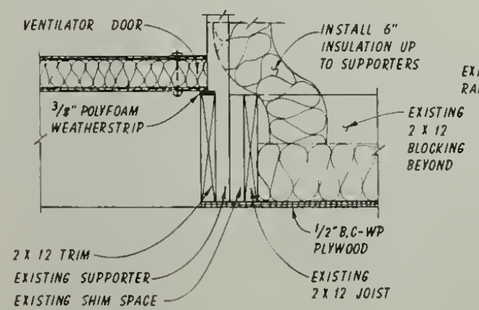
SECTION A A3



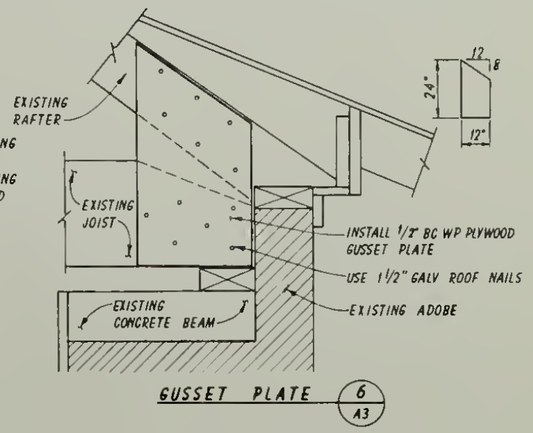
SECTION B A3

VENTILATOR DOOR AND CEILING DETAILS

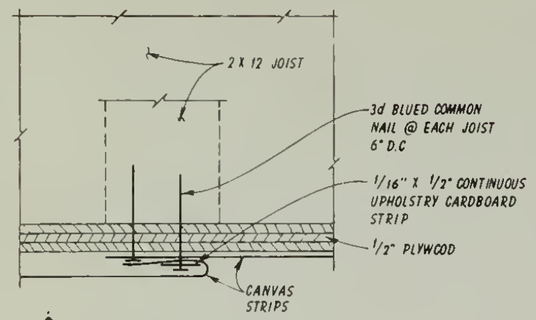
NOTES
1 INSTALL ALL CONSTRUCTION MATERIALS UNLESS INDICATED AS EXISTING
2 FOR END VENTILATOR BAY CONDITION, SEE DETAIL 5 THIS SHT.
3 FOR ALTERNATE CEILING APPROACH SEE DETAIL 4 THIS SHT.



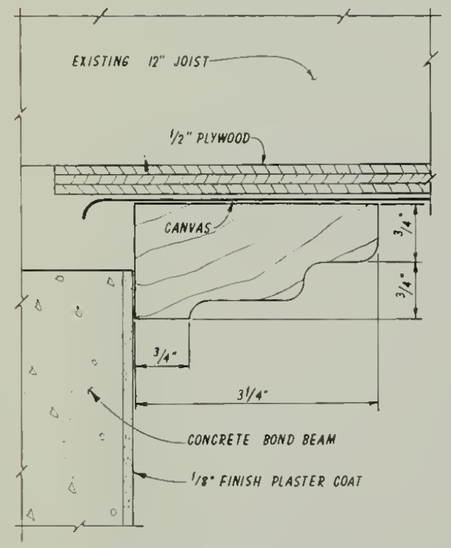
END VENTILATOR BAY 5 A3



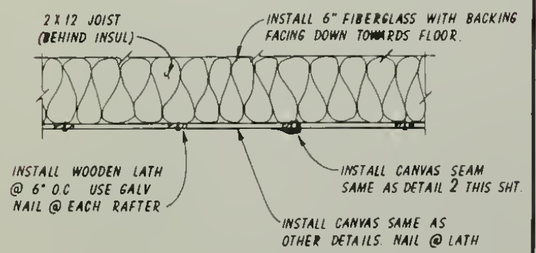
GUSSET PLATE 6 A3



CANVAS SEAM 2 A3

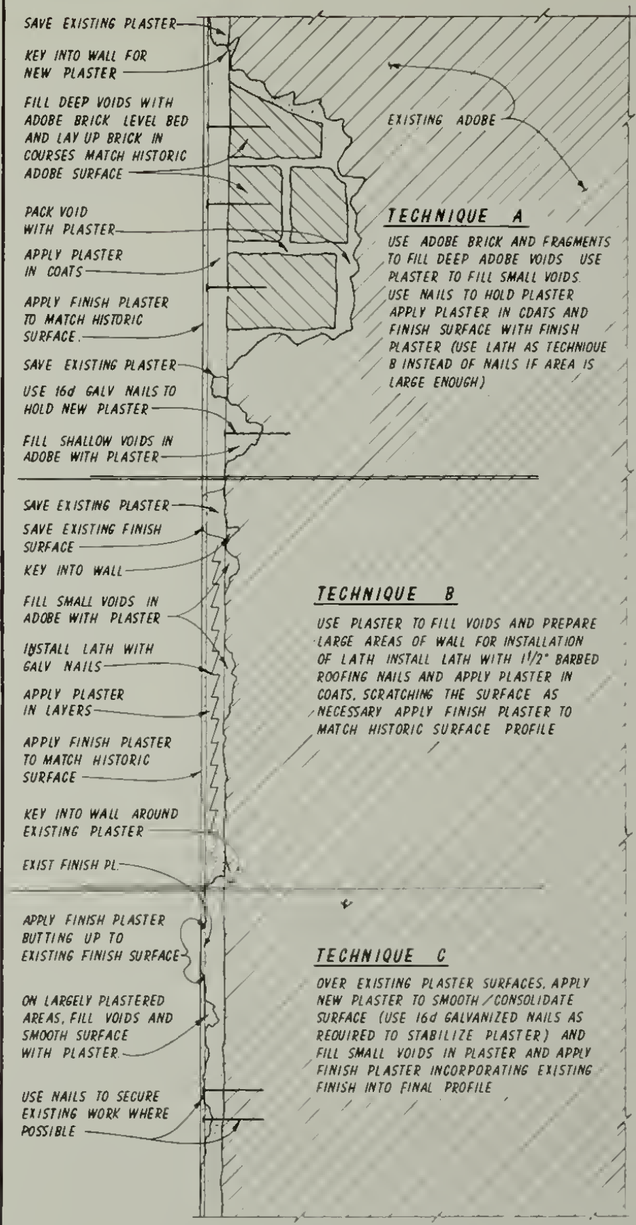


CANVAS CEILING EDGE TRIM 3 A3



ALTERNATE CEILING APPROACH 7 A3

NOTE
IN ALTERNATE APPROACH ALL DETAILS ARE SAME EXCEPT SUBSTITUTE LATH STRIPS FOR 1/2" PLYWOOD



NOTES
1 WHERE POSSIBLE KEY NEW PLASTER INTO ADOBE.
2 USE EXISTING FINISH PLASTER TO ESTABLISH FINISH PROFILE
3 SAVE ALL EXISTING PLASTER AND EXISTING FINISH PLASTER WHERE POSSIBLE
4 FINAL SURFACE MAY BE SPOTTY ALTHOUGH NEW FINISH SHOULD - AS CLOSELY AS POSSIBLE - DUPLICATE APPEARANCE OF ORIGINAL FINISH SURFACE

MATERIALS

PLASTER
3 PART SAND
1 PART GYPSUM (GYPSOLITE OR FIBERED GYPSUM ASTM C-28)
±11 GALLONS WATER (OR ADOBE MUD)

FINISH PLASTER
1 PART GAUGING
6 LIME PUTTY *
1 1/2 GALLONS WATER
* FINISHING HYDRATED LIME TYPE N (ASTM C-6) +7 GALLONS WATER PER SACK SLAKE 24 HOURS

LATH:
5/16" X 9/16" DIAMOND MESH 16" WIDE 1" END AND 1/2" SIDE OVERLAP

ADOBE BRICK:
AS MANUFACTURED USING LOCAL MATERIALS

MORTAR:
USE ADOBE MUD OR SPECIFIED PLASTER EXPERIMENT TO OBTAIN BEST RESULTS

WALL REPAIR TECHNIQUES, TYP. 7 A3

FOR LOCATION OF RECOMMENDED TECHNIQUES, SEE SHEET A4.

DESIGNED DSC DRAWN DELIN TECH. REVIEW NIELSEN DATE 10/85	SUB SHEET NO. A3	TITLE OF SHEET: ARCHITECTURAL DETAILS	DRAWING NO. 999 41,001 PKG. NO. 108 SHEET 4 OF 17

CURVE #	P.I.	Δ	R	T	L
C-1	1+97.26	52°30' LT	400'	197.26'	366.52'
C-2	5+06.43	24°23'57" RT	550'	118.91'	234.22'
L2-1	1+11.00	57°00' RT	50'	27.15'	49.74'
L2-2	1+67.44	60°00' LT	40'	23.09'	41.89'
L2-3	3+27.15	120°00' RT	50'	86.60'	104.72'
L2-4	4+32.67	56°00' LT	60'	31.90'	58.64'
L2-5	5+21.51	62°00' LT	50'	30.04'	54.11'
L2-6	5+72.54	51°30' RT	50'	24.12'	44.94'
L2-7	6+60.24	37°00' LT	60'	20.08'	38.75'
L2-8	7+71.83	11°00' LT	60'	5.78'	11.52'
L2-9	8+41.79	30°00' RT	85'	22.78'	44.51'
L2-10	9+24.74	21°00' LT	100'	18.99'	37.52'
L2-11	9+65.21	43°30' RT	55'	21.94'	41.76'
L2-12	10+52.74	102°00' LT	50'	61.74'	89.01'
L2-13	11+74.27	94°00' LT	50'	53.62'	82.03'
L2-14	13+33.06	37°00' RT	100'	33.46'	64.58'
L2-15	14+11.72	55°00' LT	50'	26.03'	48.00'
L2-16	16+42.86	6°30' RT	60'	3.41'	6.81'
L2-17	17+52.46	38°30' LT	50'	17.46'	33.60'

40 0 40 80
SCALE OF FEET

ESIGNED: DSC
RAWN: MOORE
ECH. REVIEW: NIELSEN
ATE: 10/85

SUB SHEET NO. C1

TITLE OF SHEET
ROAD "C" AND LOOP 2 PLAN

DRAWING NO. 999 41,001
PKG. NO. 108
SHEET 5 OF 17

CURVE #	PI	Δ	R	T	L
C-1	1+97.26	52°30' LT	400'	197.26'	366.52'
C-2	5+06.43	24°23'57" RT	550'	118.91'	234.22'
L2-1	1+11.00	57°00' RT	50'	27.15'	49.74'
L2-2	1+67.44	60°00' LT	40'	23.09'	41.89'
L2-3	3+27.15	120°00' RT	50'	86.60'	104.72'
L2-4	4+32.67	56°00' LT	60'	31.90'	58.64'
L2-5	5+21.51	62°00' LT	50'	30.04'	54.11'
L2-6	5+72.54	51°30' RT	50'	24.12'	44.94'
L2-7	6+60.24	37°00' LT	60'	20.08'	38.75'
L2-8	7+71.83	11°00' LT	60'	5.78'	11.52'
L2-9	8+41.79	30°00' RT	85'	22.78'	44.51'
L2-10	9+24.74	21°00' LT	100'	18.99'	37.52'
L2-11	9+65.21	43°30' RT	55'	21.94'	41.76'
L2-12	10+52.74	102°00' LT	50'	61.74'	89.01'
L2-13	11+74.27	94°00' LT	50'	53.62'	82.03'
L2-14	13+33.06	37°00' RT	100'	33.46'	64.58'
L2-15	14+11.72	55°00' LT	50'	26.03'	48.00'
L2-16	16+42.86	6°30' RT	60'	3.41'	6.81'
L2-17	17+52.46	38°30' LT	50'	17.46'	33.60'

FOR CONTINUATION SEE SHT R5

STA 6+01 "C" = 0+00 LOOP 2

N10°10'35"E

N 515,000

E 1,536,500

S88°00'E

PT 6+21.74

PI 1+11.00 CURVE #L2-1

PC 1+44.35

PT 1+86.24

S31°00'E

PC 0+83.85

PT 1+33.59

PI 1+67.44 CURVE #L2-2

N89°00'E

PC 2+40.55

PT 3+45.27

PI 5+06.43 CURVE #C-2

4+88.52

ROAD "B"

TRAIL

611.5

592.

607.5

604.

N14°13'22"W

PC 3+87.52

PT 3+66.52

PI 1+97.26 CURVE #C-1

590.3

PI 3+27.15 CURVE #L2-3

S80°30'W

530.5

PI 17+52.46 CURVE #L2-17

N 515,000

E 1,537,000

592.6

N6°00'W

PT 16+46.26

PC 16+39.45

PT 17+68.60

PC 17+35.00

E.O.L 18+18.60

S29°00'W

PC 4+00.77

PI 4+32.67 CURVE #L2-4

PT 4+59.41

PC 4+91.47

595.0

S27°00'E

PT 5+45.58

PI 5+72.54 CURVE #L2-6

PI 5+21.51 CURVE #L2-5

PC 5+48.42

PT 5+93.36

S89°00'E

592.2

S37°30'E

PC 6+40.16

PT 6+78.91

PI 6+60.24 CURVE #L2-7

S74°30'E

PC 7+66.05

PT 7+77.57

PI 7+71.83 CURVE #L2-8

+594.2

S85°30'E

PC 8+19.01

PI 8+41.79 CURVE #L2-9

PT 8+63.52

S55°30'E

P.C. 9+05.75

P.R.C. 9+43.27

PI 9+24.74 CURVE #L2-10

PI 9+65.21 CURVE #L2-11

PC 9+91.00

PT 9+85.03

S33°30'E

PI 10+52.74 CURVE #L2-12

PT 14+33.89

PI 14+11.72 CURVE #L2-15

PC 13+85.69

N12°30'W

PT 13+64.18

PI 13+33.06 CURVE #L2-14

600

601.6

592.8

PC 12+99.60

592.3

N49°30'W

PT 12+02.68

PC 11+20.65

PI 11+74.27 CURVE #L2-13

N44°30'E

PI 16+42.86 CURVE #L2-16

N67°30'W

PT 16+39.45

N 514,500

E 1,537,000

P.O.C 0+06 ROAD "C" = 0+00 LOOP 1

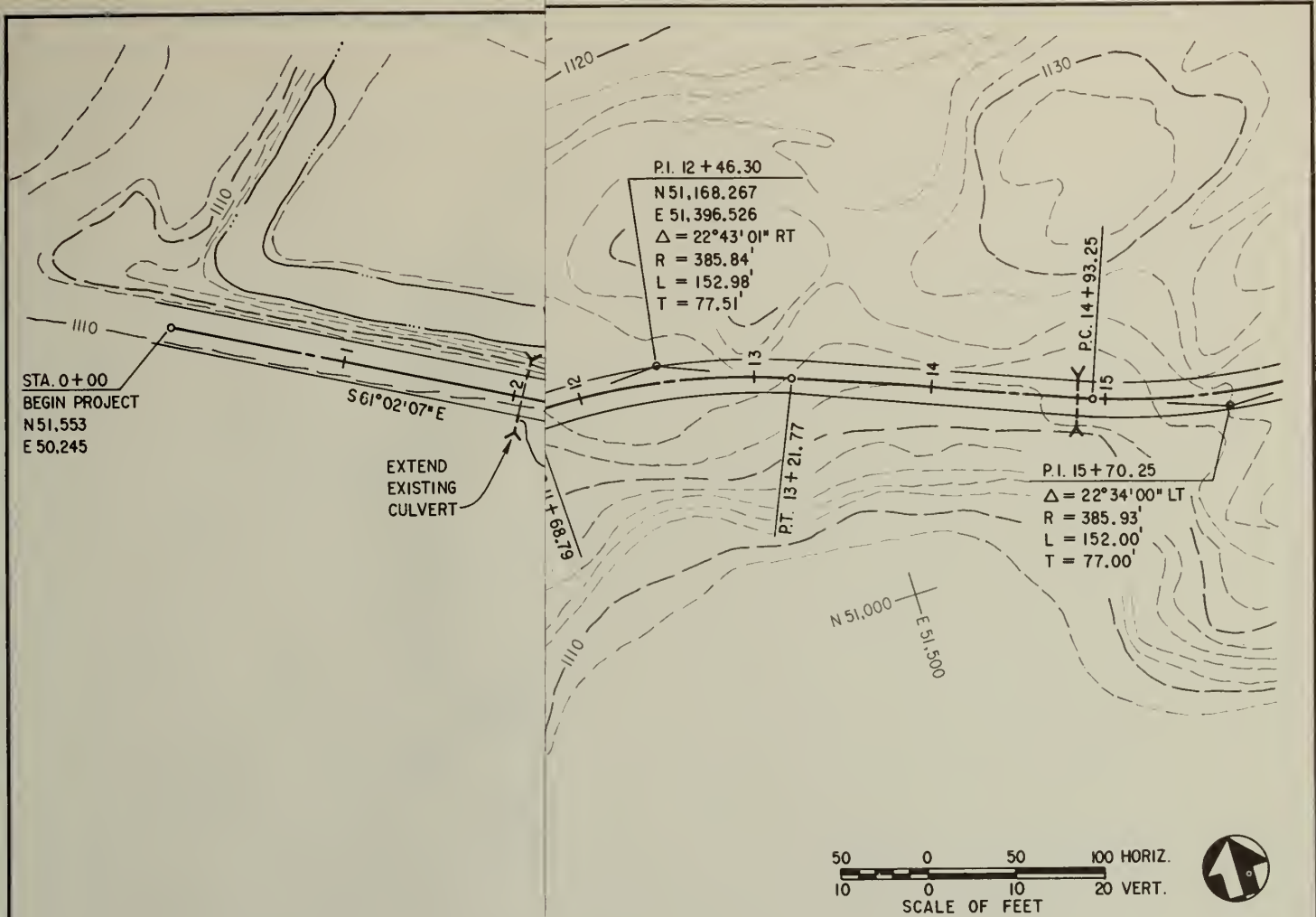
P.C. 0+00 BEGIN ROAD "C"

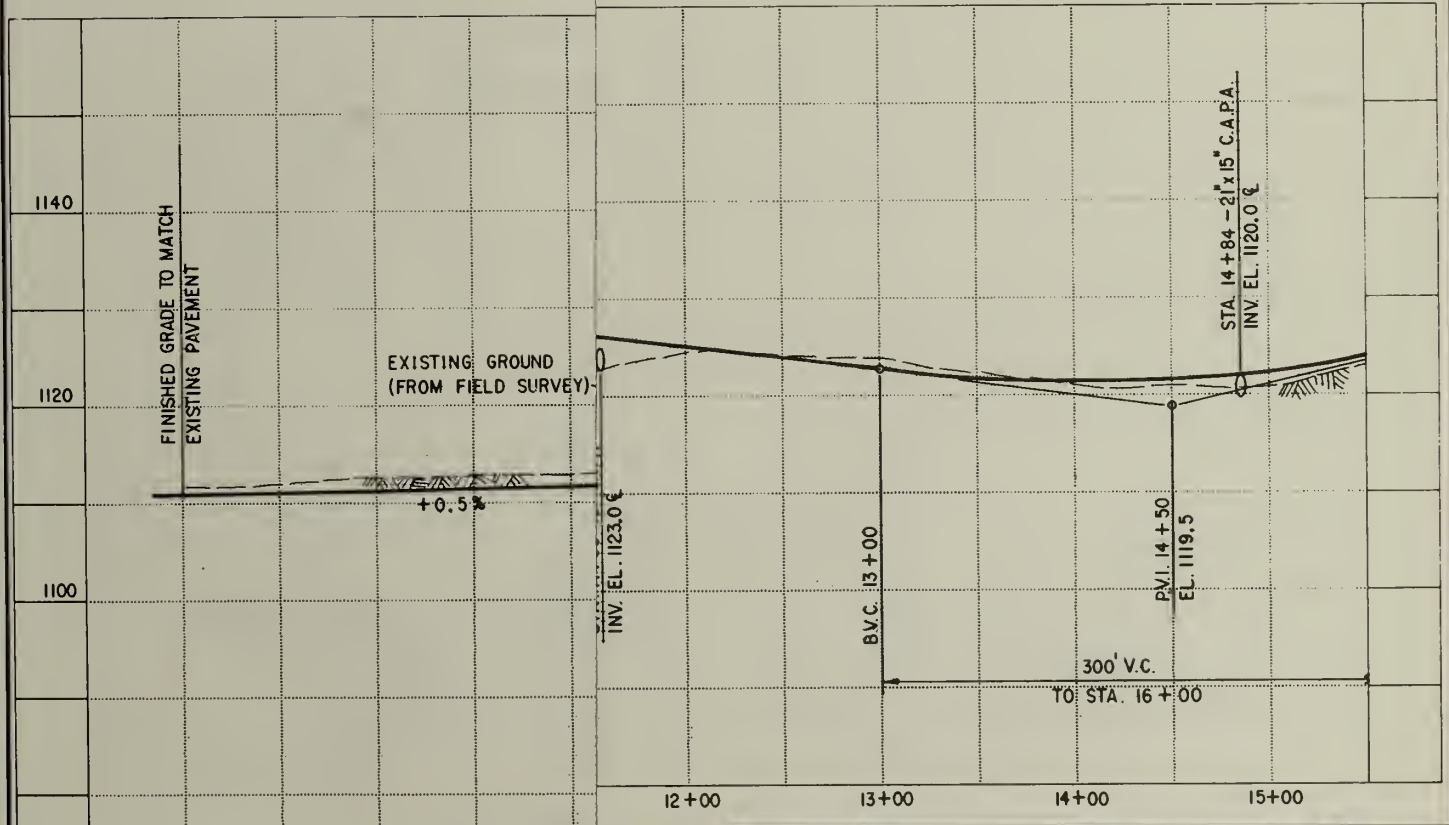
N38°16'38"E

40 0 40 80

SCALE OF FEET

DESIGNED: OSC DRAWN: MOORE TECH. REVIEW: NIELSEN DATE: 10/85	SUB SHEET NO.: C1	TITLE OF SHEET: ROAD "C" AND LOOP 2 PLAN	DRAWING NO: 999 41,001 PKG NO: 108 SHEET: 5 OF 17





DESIGNED: D.S.C.	SUB SHEET NO. C2	TITLE OF SHEET PLAN – PROFILE	DRAWING NO. 999 / 41,001
DRAWN: DELIN			PKG. NO. 108
TECH. REVIEW: NIELSEN			SHEET 6 OF 17
DATE: 10/85			

STA 0+00
BEGIN PROJECT
N51,553
E 50,245

S61°02'07"E

EXTEND
EXISTING
CULVERT

N51,500
E50,500

STA 4+40 =
0+00 COUNTY RD. SPUR

R=40'

P.C. 0+70

S28°57'53"W

R=40'

22' PAVEMENT WITH
3' STABILIZED TURF
SHOULDERS

P.I. 1+48.86
Δ = 13°30'24"
R = 666'
L = 157'
T = 78.86'

100' TRANSITION

PT. 2+27
END PAVEMENT

P.C. 6+49.67

P.I. 8+25.18
N 51,153.391
E 50,966.961
Δ = 30°56'53" LT
R = 634.00'
L = 342.45'
T = 175.51'

P.T. 9+92.12

P.C. 11+68.79

P.I. 12+46.30
N 51,168.267
E 51,396.526
Δ = 22°43'01" RT
R = 385.84'
L = 152.98'
T = 77.51'

P.T. 13+21.77

P.C. 14+93.25

P.I. 15+70.25
Δ = 22°34'00" LT
R = 385.93'
L = 152.00'
T = 77.00'

N51,000
E51,500

N51,000
E51,000

50 0 50 100 HORIZ.
10 0 10 20 VERT.
SCALE OF FEET

FINISHED GRADE TO MATCH
EXISTING PAVEMENT

EXISTING GROUND
(FROM FIELD SURVEY)

SUBGRADE
PROFILE

+0.5%

+8.31%

-2.39%

B.V.C. 2+70

P.V.I. 3+45
EL. 1112.8

E.V.C. 4+20

B.V.C. 4+50

P.V.I. 6+60
EL. 1138.4

E.V.C. 8+70

STA 11+55 18" C.A.P.
INV. EL. 1123.0 ℄

B.V.C. 13+00

P.V.I. 14+50
EL. 1119.5

STA 14+84 - 2[15" C.A.P.A.
INV. EL. 1120.0 ℄

150' V.C.

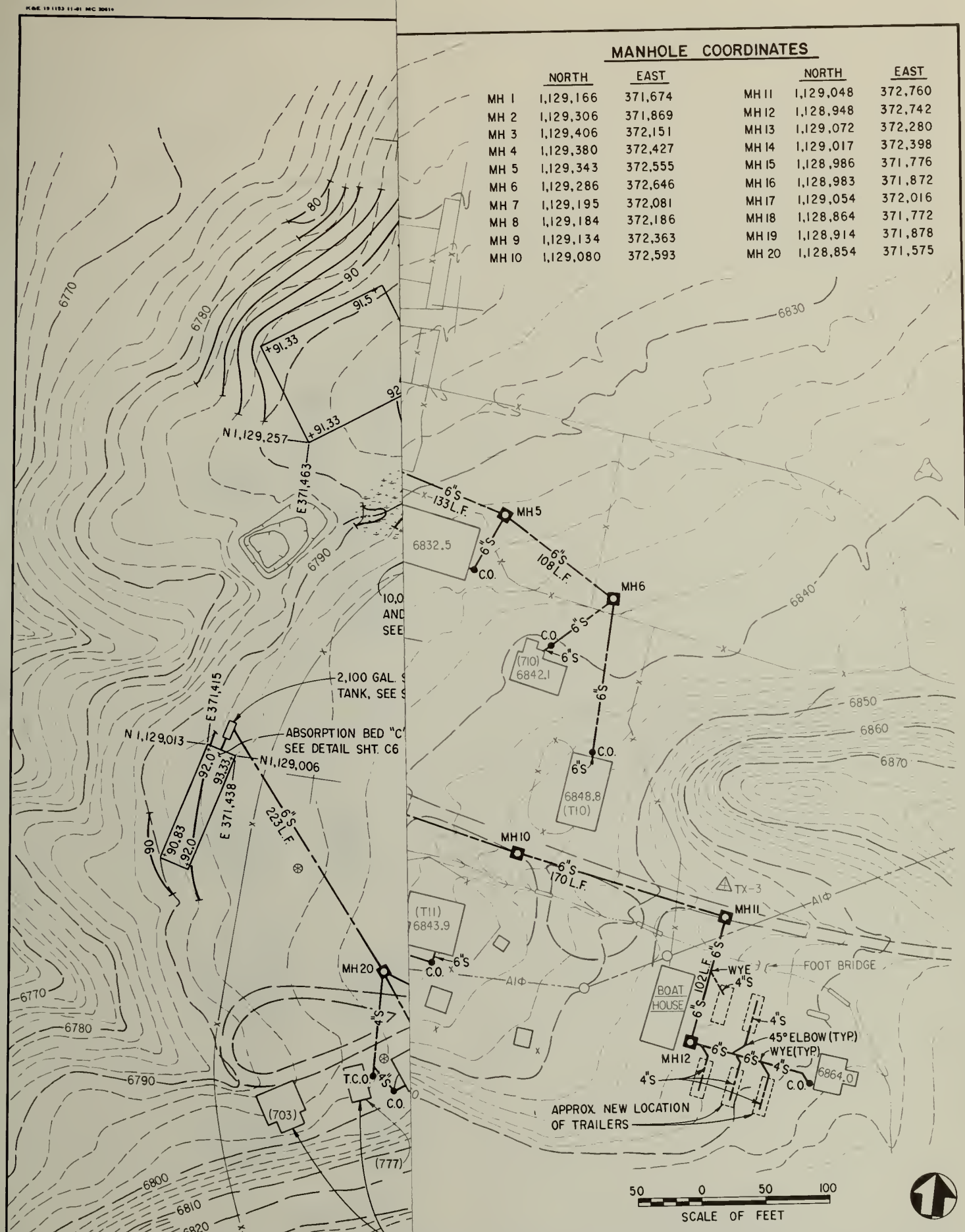
420' V.C.

300' V.C.
TO STA 16+00

0+00 1+00 2+00 3+00 4+00 5+00 6+00 7+00 8+00 9+00 10+00 11+00 12+00 13+00 14+00 15+00

1140 1120 1100

DESIGNED: OSC	SUB SHEET NO C2	TITLE OF SHEET PLAN – PROFILE	DRAWING NO. 999 41,001
DRAWN: OELIN			PKG. NO. 108
TECH REVIEW: NIELSEN			SHEET 6 OF 17
DATE: 10/85			



DESIGNED: DSC	SUB SHEET NO. C3	TITLE OF SHEET: SEWAGE COLLECTION/ DISPOSAL SYSTEM	DRAWING NO. 999 41,001
DRAWN: SAVAGE			PKG. NO. 108
TECH. REVIEW: NIELSEN			SHEET 7 OF 17
DATE: 10/85			

MANHOLE COORDINATES

	NORTH	EAST		NORTH	EAST
MH 1	1,129,166	371,674	MH 11	1,129,048	372,760
MH 2	1,129,306	371,869	MH 12	1,128,948	372,742
MH 3	1,129,406	372,151	MH 13	1,129,072	372,280
MH 4	1,129,380	372,427	MH 14	1,129,017	372,398
MH 5	1,129,343	372,555	MH 15	1,128,986	371,776
MH 6	1,129,286	372,646	MH 16	1,128,983	371,872
MH 7	1,129,195	372,081	MH 17	1,129,054	372,016
MH 8	1,129,184	372,186	MH 18	1,128,864	371,772
MH 9	1,129,134	372,363	MH 19	1,128,914	371,878
MH 10	1,129,080	372,593	MH 20	1,128,854	371,575

FINISHED GROUND ELEVATION (TYP.)

APPROXIMATE LOCATION OF EXISTING DISPOSAL FIELD

N1,129,380 E371,677

ABSORPTION BEDS "A" & "B" SEE DETAIL SHT C6

N1,129,257 E371,463

MARSH AREA

REROUTE STREAM AS DIRECTED BY CONTRACTING OFFICER

10,000 GAL. SEPTIC TANK AND DOSING CHAMBER, SEE SHT. S6.

2,100 GAL. SEPTIC TANK, SEE SHT. S6

N1,129,013 E371,415

N1,129,006 E371,438

ABSORPTION BED "C" SEE DETAIL SHT. C6

TANKS

GREASE TRAP SEE DETAIL SHT. S6

LODGE 6827.6

FLAG POLE

TACK RM 6825.6 (704)

BOAT HOUSE

FOOT BRIDGE

APPROX. NEW LOCATION OF TRAILERS

SEE NOTE 5

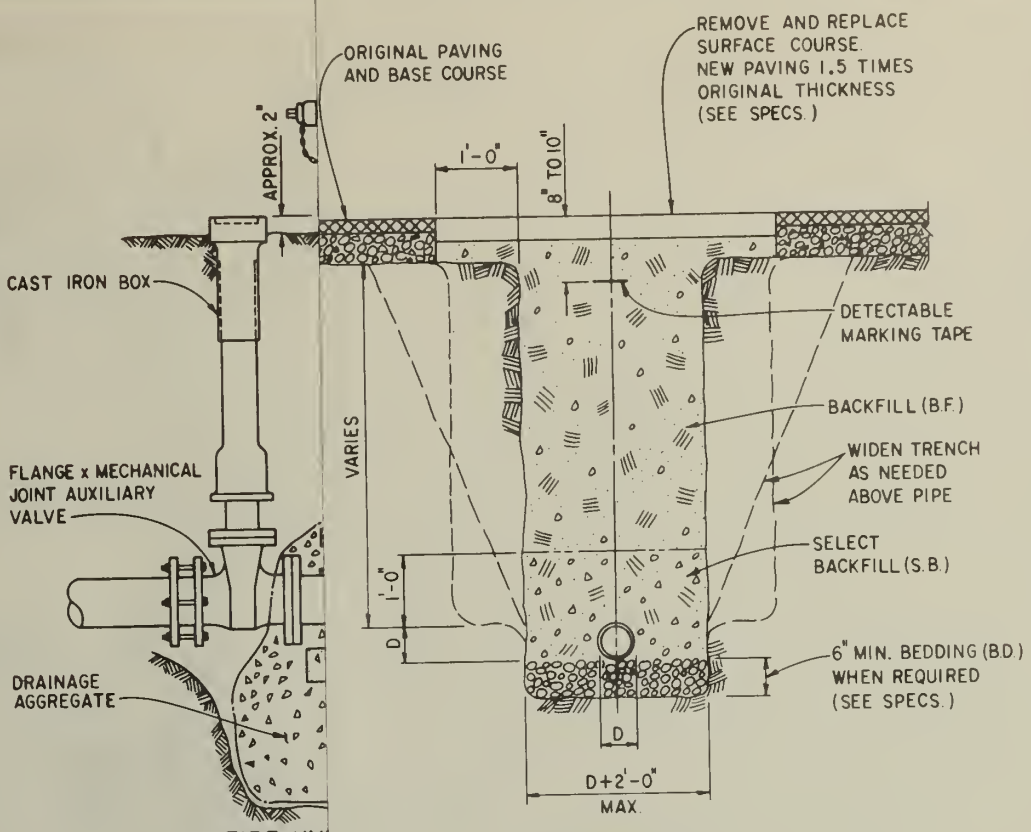
SEE NOTE 6

NOTES

1. SEE GENERAL LAYOUT, SHEET C7, FOR SURVEY PT DATA AND LEGEND.
2. ACTUAL LOCATION OF CONNECTION TO EXISTING STRUCTURES SHALL BE FIELD VERIFIED. BUILDINGS WITH FLOOR ELEVATIONS SHOWN SHALL HAVE SEWER SERVICE.
3. STRUCTURE NUMBERS ARE SHOWN IN PARENTHESIS.
4. SEE GENERAL LAYOUT, SHEET C7 FOR NOTE CONCERNING EXISTING UNDERGROUND UTILITIES.
5. BUILDINGS 703 AND 777 SHALL REMAIN ON EXISTING SEWER SYSTEMS.
6. PLUMBING INSIDE BUILOING 693 MAY REQUIRE REROUTING TO EXIT OUT EAST SIDE

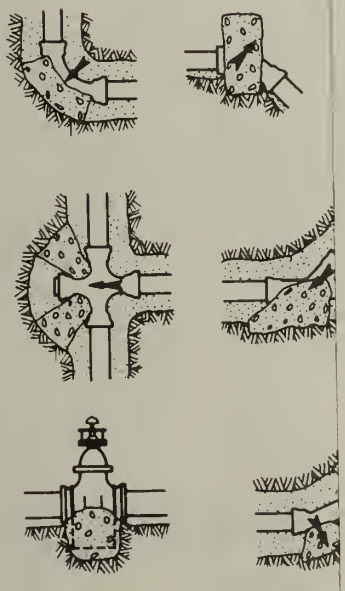
50 0 50 100
SCALE OF FEET

DESIGNED: DSC DRAWN: SAVAGE TECH. REVIEW: NIELSEN DATE: 10/85	SUB SHEET NO: C3	TITLE OF SHEET: SEWAGE COLLECTION/ DISPOSAL SYSTEM	DRAWING NO. 999 41,001 PKG. NO. 108 SHEET 7 OF 17

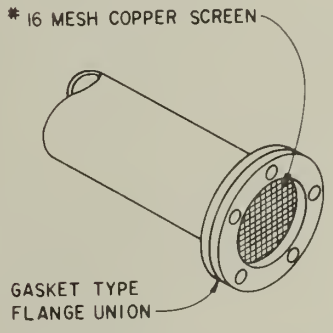


FIRE HY
(STANDARD DET
DRY BARRE
WITH VALVE

TRENCH DETAIL
SINGLE PIPE, PAVED AREA
(STANDARD DETAIL-#S0525)



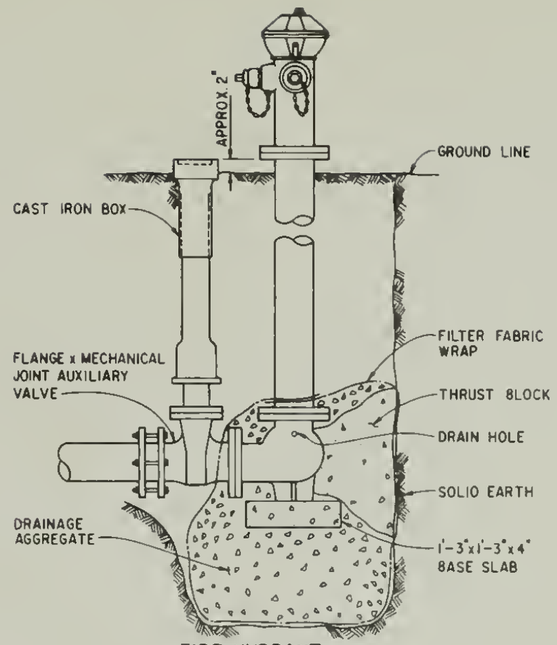
LOCATION OF
(STANDARD DE



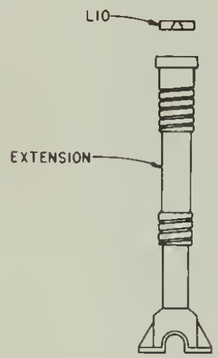
SCREENED END FOR
DRAIN LINE
(STANDARD DETAIL-#S0521)

NO SCALE

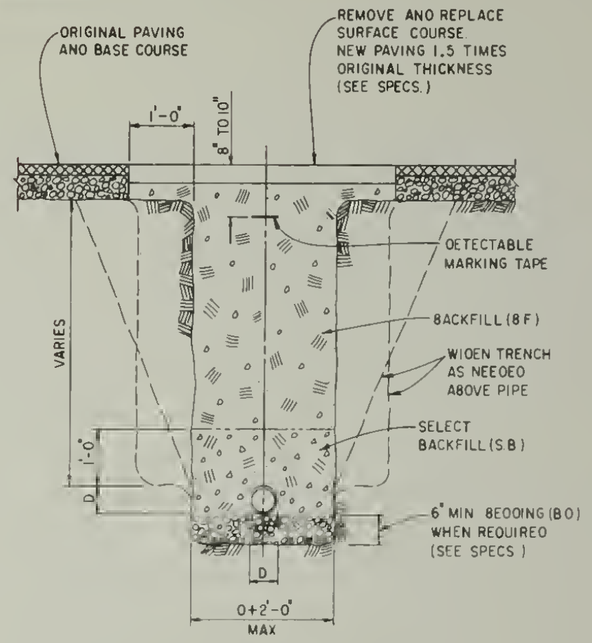
DESIGNED: DSC DRAWN: DRAFTING BR. TECH. REVIEW: NIELSEN DATE: 10/85	SUB SHEET NO. C4	TITLE OF SHEET: STANDARD DETAIL SHEET	DRAWING NO. 999/41,001 PKG. NO. 108 SHEET 8 OF 17



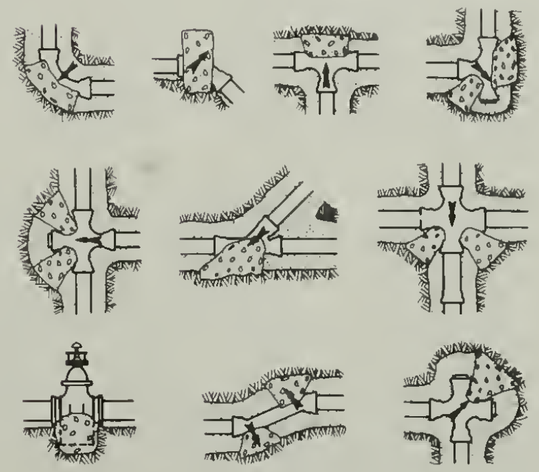
FIRE HYDRANT
(STANDARD DETAIL-*S0502)
DRY BARREL TYPE
WITH VALVE AND BOX



BUFFALO TYPE
CAST IRON VALVE BOX
(STANDARD DETAIL-*S0513)



TRENCH DETAIL
SINGLE PIPE, PAVED AREA
(STANDARD DETAIL-*S0525)



LOCATION OF THRUST BLOCKS
(STANDARD DETAIL-*S0543)

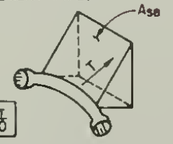
TABLE I
THRUST (T) AT FITTINGS, IN POUNDS AT 100 P.S.I WATER PRESSURE

PIPE SIZE	TEE OR DEAD END	90° BEND	45° BEND	22½° BEND	11¼° BEND
1½"	284	401	217	111	56
2"	443	627	339	173	87
2½"	649	918	497	253	127
3"	962	1361	736	375	189
4"	1810	2559	1385	706	355
6"	3739	5288	2862	1459	733
8"	6433	9097	4923	2510	1261
10"	9677	13685	7406	3776	1897
12"	13685	19353	10474	5340	2683
14"	18385	26001	14072	7174	3604
16"	23779	33628	18199	9278	4661

NOTE: INCREASE VALUES BY 15% FOR ASBESTOS-CEMENT PIPE.

TABLE II
SAFE BEARING LOADS (B)

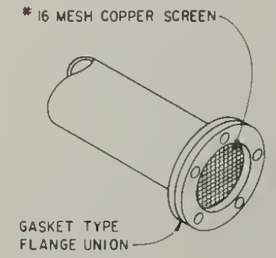
SOIL	SAFE BEARING LOAD, POUNDS PER SQ. FT.
SOUND SHALE	10000
CEMENTED SAND AND GRAVEL	4000
COARSE AND FINE COMPACTED SAND	3000
MEDIUM CLAY (CAN BE SPADED)	2000
SOFT CLAY	1000
MUCK	0



$A_{sb} = \frac{T}{B} \times \frac{P_T}{100}$

WHERE:
A_{sb} = AREA OF BLOCK BEARING AGAINST UNDISTURBED TRENCH MATERIAL IN SQ. FT.
T = THRUST FACTOR FROM TABLE I IN POUNDS AT 100 PSI.
B = SAFE BEARING LOAD FROM TABLE II IN POUNDS/SQ. FT.
P_T = PRESSURE USED FOR PIPELINE TEST IN PSI

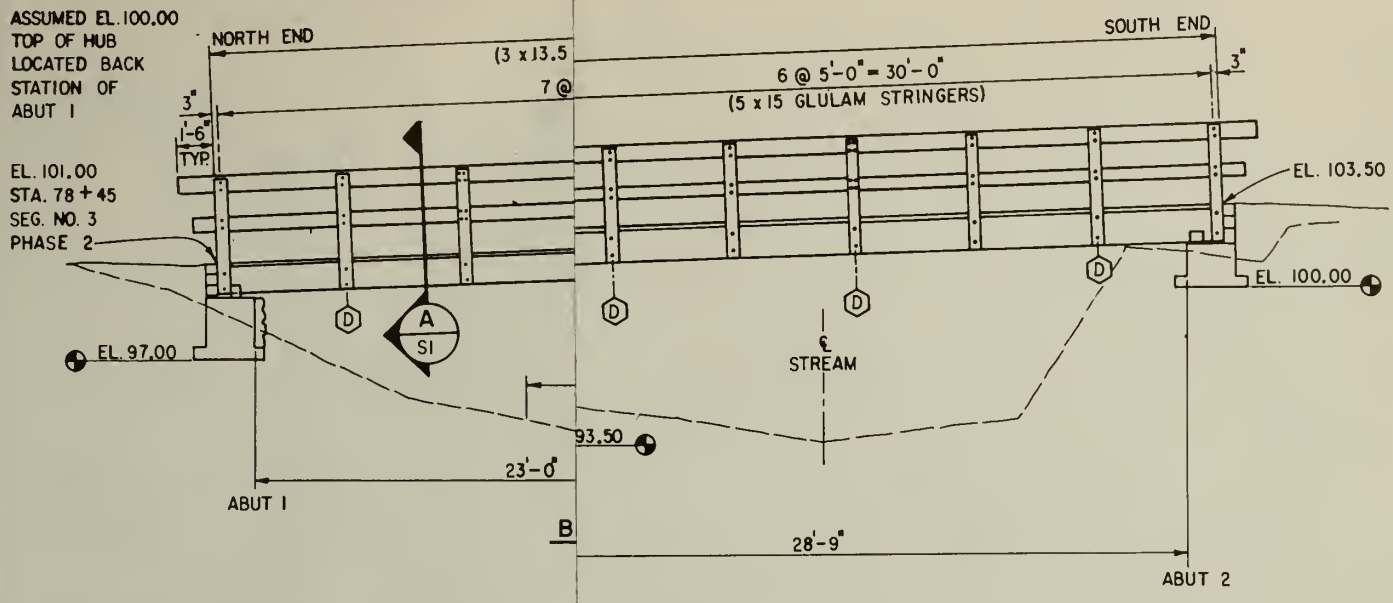
THRUST BLOCK SIZING
(STANDARD DETAIL-*S0544)

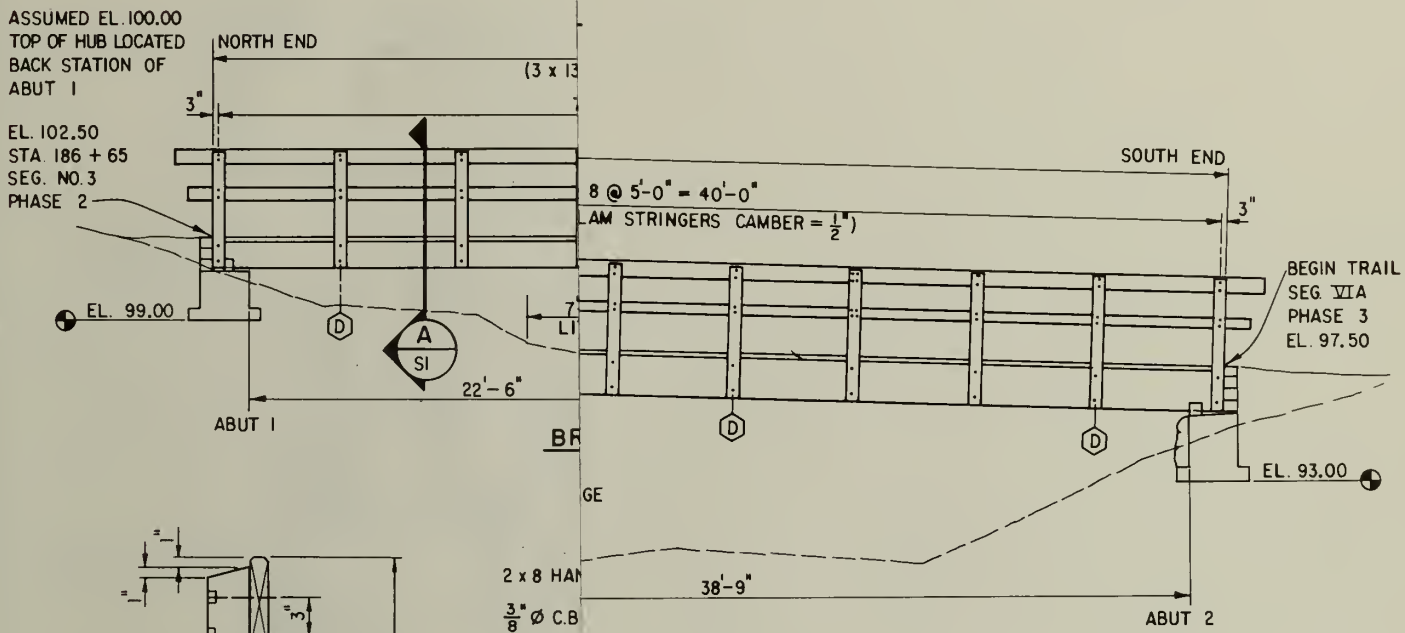


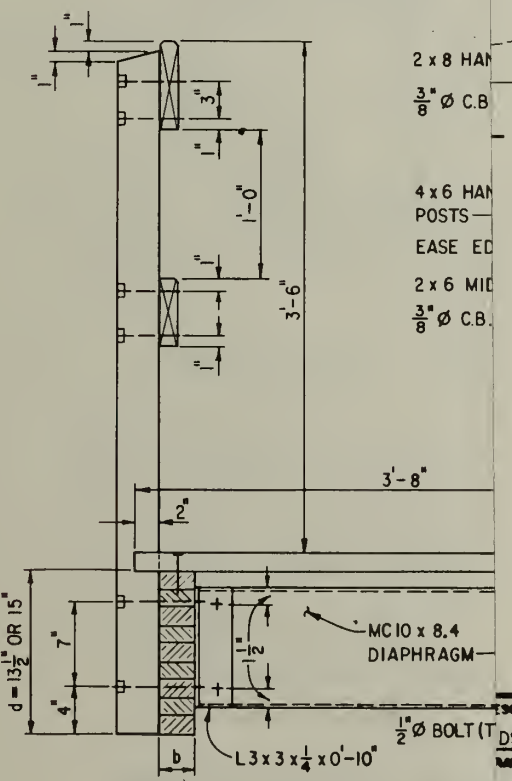
SCREENED END FOR DRAIN LINE
(STANDARD DETAIL-*S0521)

NO SCALE

DESIGNED	SUB SHEET NO	TITLE OF SHEET	DRAWING NO.
DSC	C4	STANDARD DETAIL SHEET	999 41,001
DRAWN: DRAFTING BR			PKG. NO. 108 / SHEET B
TECH. REVIEW: NIELSEN			OF 17
DATE: 10/85			







TYPICAL SECTION
SCALE (B)

NOTE

(D) – LOCATION OF DIAPHRAGMS.

SCALE (B) 12 6 0 12
SCALE OF INCHES

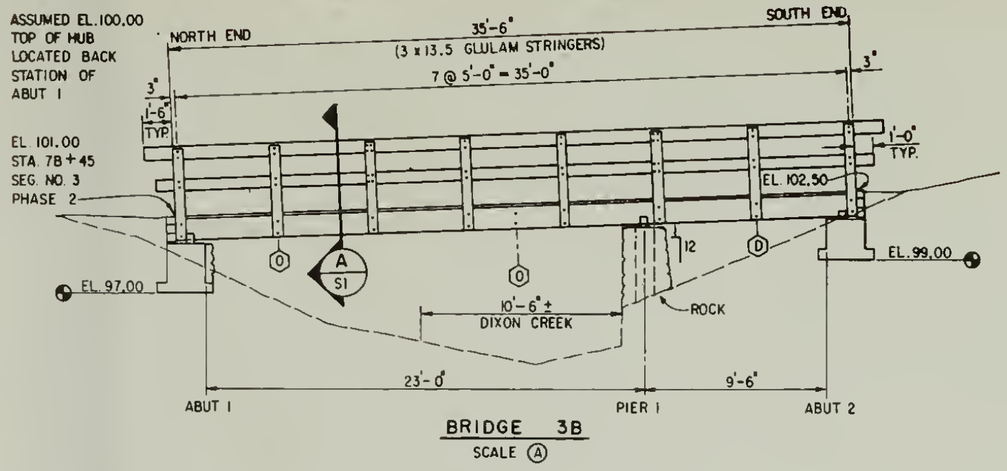
SCALE (A) 4 0 4 8
SCALE OF FEET

DESIGNED: DSC
DRAWN: DELIN
TECH. REVIEW: NIELSEN
DATE: 10/88

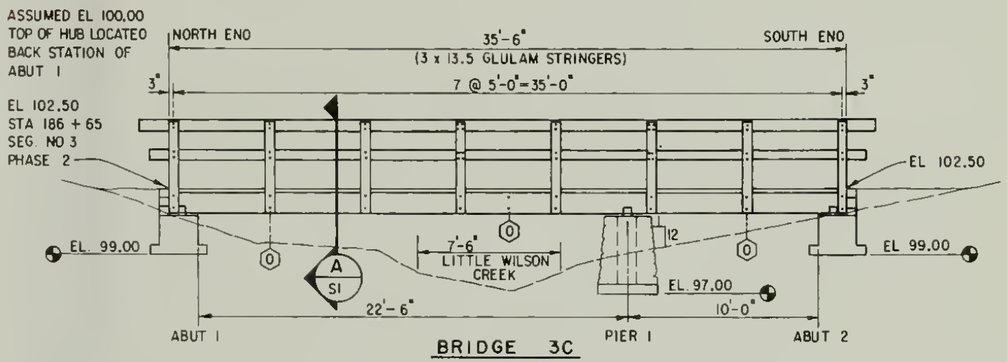
SUB SHEET NO. S1

TITLE OF SHEET
BRIDGE 3B, 3C, 5B, 5C ELEVATIONS AND DETAILS

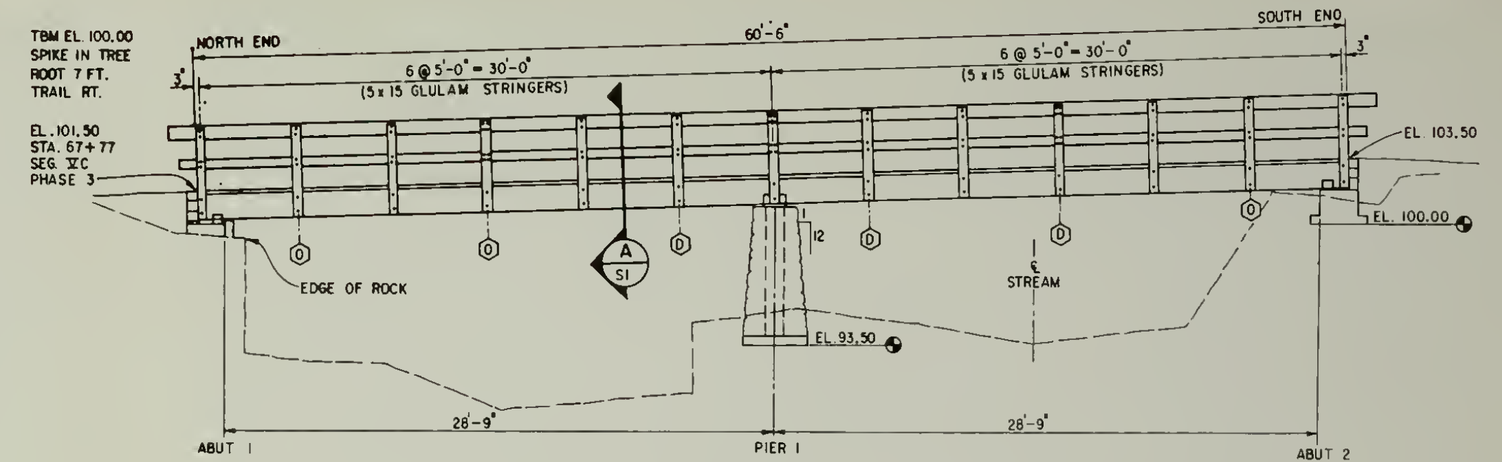
DRAWING NO. 999 41,001
PKG. NO. 108
SHEET 9 OF 17



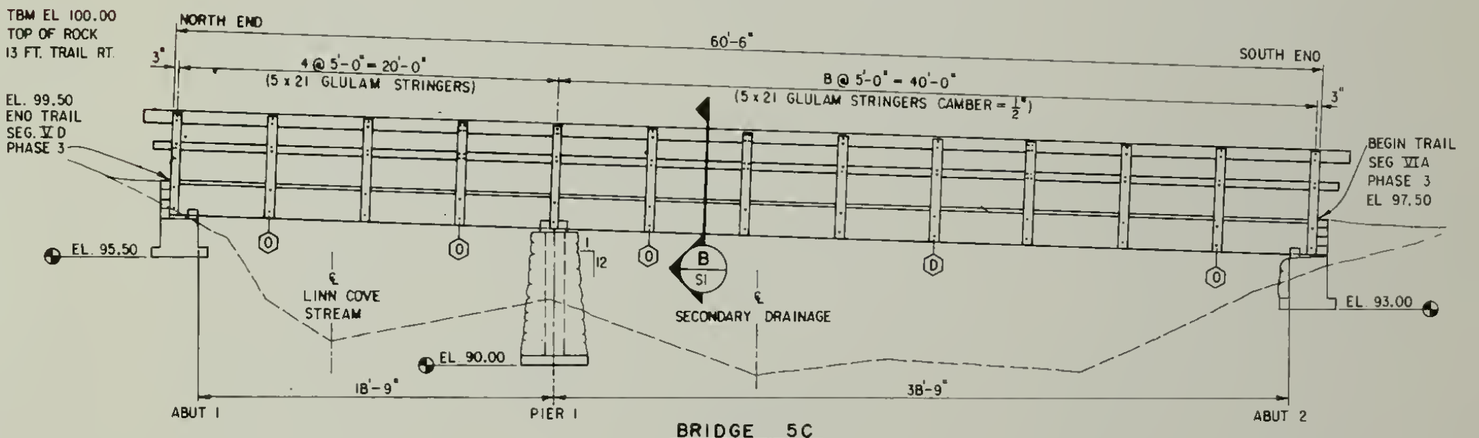
BRIDGE 3B
SCALE (A)



BRIDGE 3C
SCALE (A)

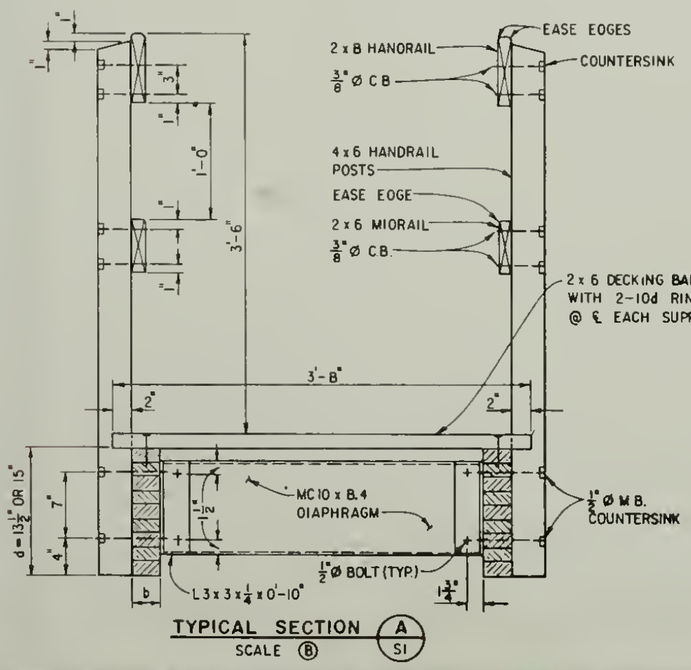


BRIDGE 5B
SCALE (A)

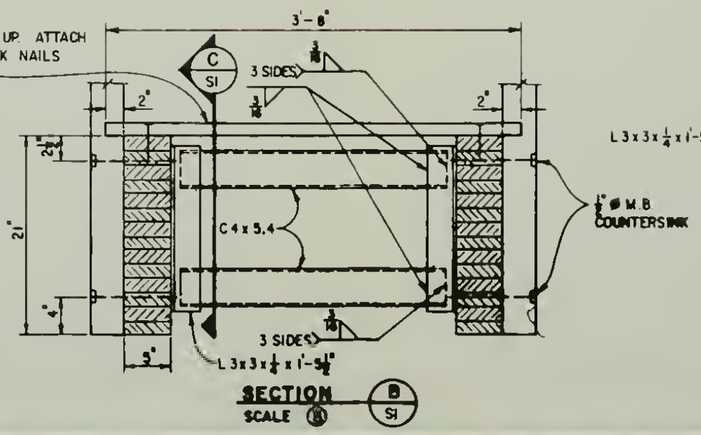


BRIDGE 5C
SCALE (A)

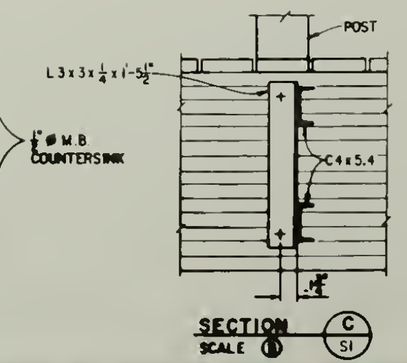
NOTE
(D) – LOCATION OF DIAPHRAGMS



TYPICAL SECTION
SCALE (B)



SECTION
SCALE (B)



SECTION
SCALE (B)

SCALE (B) 12 6 0 12
SCALE OF INCHES

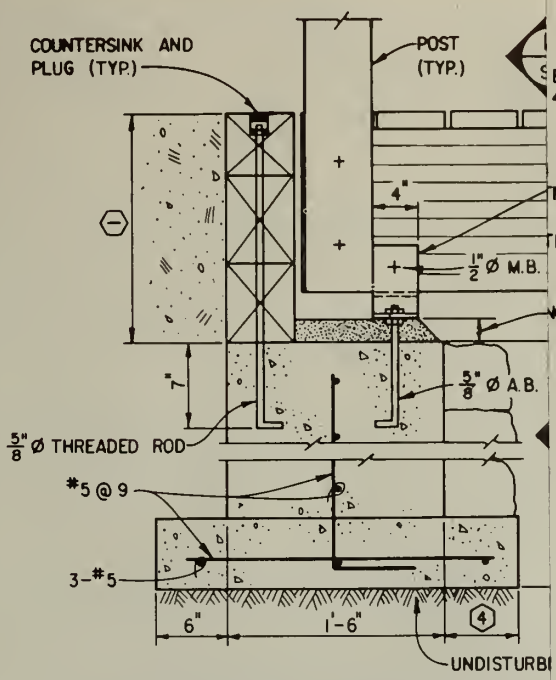
SCALE (A) 4 0 4 8
SCALE OF FEET

DESIGNED: OSC DRAWN: DELIN TECH. REVIEW: NIELSEN DATE: 10/88	SUB SHEET NO S1	TITLE OF SHEET BRIDGE 3B, 3C, 5B, 5C ELEVATIONS AND DETAILS	DRAWING NO. 999 41,001 PKG. NO. 108 SHEET 9 OF 17

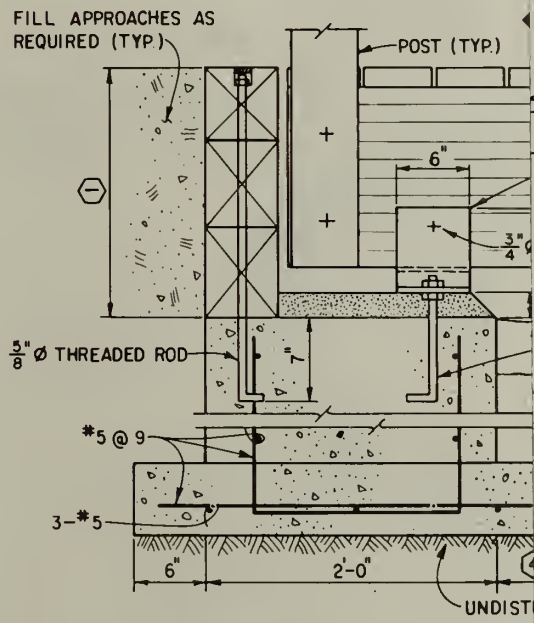
BRIDGE SCHEDULE				
MK	NAME	ABUT	PIER	REMARKS
3B	DIXON CREEK	A/3	B/3	
3C	LITTLE WILSON CREEK	↓	↓	
4A	CURVED BEAM	N/A	N/A	SEE SHEET 5
5A	WILSON CREEK ARCH	E/3	↓	
5B	SLAB CREEK	↓	G/3	
5C	LINN COVE	↓	↓	
6A	STACK ROCK SUSPENSION	N/A	N/A	SEE SHEET 9

NOTES

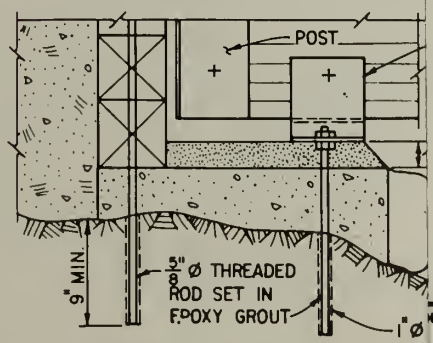
1. TIMBER RETAINING WALL COMPOSED OF 6 x 6, 6 x 8, AND RIPPED 6 x 6 TO MATCH DECK ELEVATION.
2. 3 RODS REQUIRED FOR 5'-0" DECK WIDTH.
3. WHEN ROCK ENCOUNTERED, OPTIONAL DETAIL MAY BE USED.
4. AS REQUIRED FOR ROCK FACING – 6" MIN.
5. AS REQUIRED FOR ROCK FACING – 1'-0" MIN.



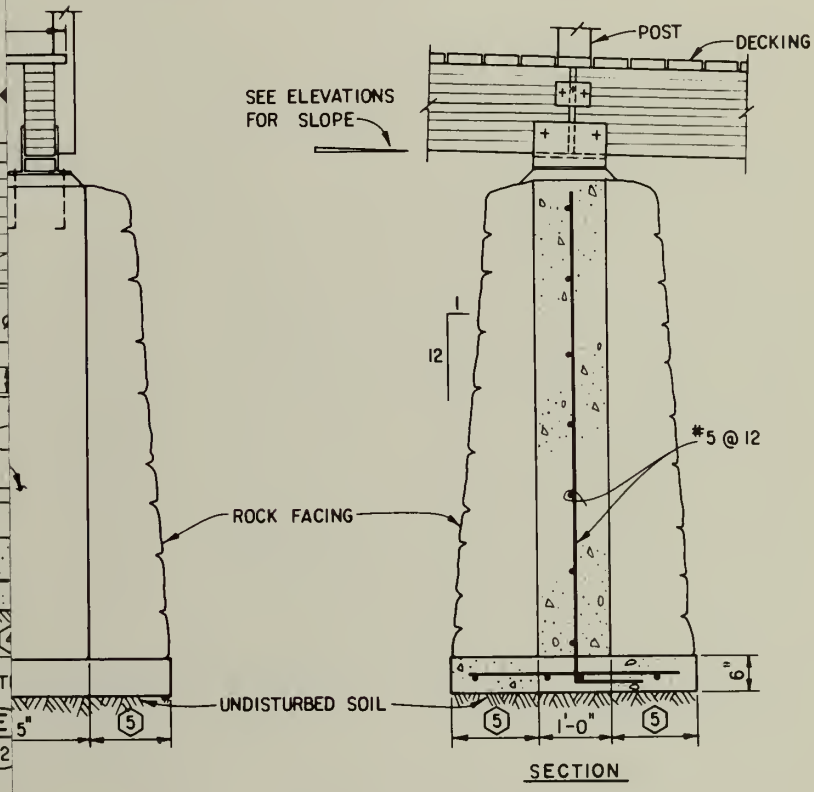
ABUTMENT DETAIL A
SCALE (A) S2



ABUTMENT DETAIL E
SCALE (A) S2



ABUTMENT DETAIL H
OPTIONAL (3)
SCALE (A) S2



TYPICAL PIER DETAILS L
SCALE (B) S2

SCALE (A)
12 6 0 12
SCALE OF INCHES

SCALE (B)
1 0 1 2 3
SCALE OF FEET

DESIGNED: DSC
DRAWN: DELIN
TECH. REVIEW: NIELSEN
DATE: 10/85

SUB SHEET NO. S2

TITLE OF SHEET
BRIDGE DETAILS

DRAWING NO. 999 41,001
PKG. NO. 108
SHEET 10 OF 17

GENERAL NOTES

1. ALL M.B. HEADS AND ALL NUTS IN CONTACT WITH WOOD SHALL HAVE WASHERS.
2. ALL EXPOSED PIERS AND ABUTMENTS SHALL BE FACED WITH ROCK. HEIGHTS GREATER THAN 4 FT. SHALL HAVE A 12 TO 1 BATTER.
3. ALL FABRICATED ITEMS FROM $\frac{3}{8}$" STEEL WITH FULL PENETRATION WELDS UNLESS NOTED OTHERWISE.
4. STEEL – HOT DIP GALVANIZE AFTER FABRICATION EXCEPT WEATHERING STEEL.
5. ALL BOLTS, NAILS, AND HARDWARE, UNLESS NOTED OTHERWISE, SHALL BE HOT DIP GALVANIZED.
6. DESIGN LIVE LOAD 85 PSF
   DEFLECTION LIMIT L/300

BRIDGE SCHEDULE

MK	NAME	ABUT	PIER	REMARKS
3B	DIXON CREEK	A/3	B/3	
3C	LITTLE WILSON CREEK	↓	↓	
4A	CURVED BEAM	N/A	N/A	SEE SHEET 5
5A	WILSON CREEK ARCH	E/3	↓	
5B	SLAB CREEK	↓	G/3	
5C	LINN COVE	↓	↓	
6A	STACK ROCK SUSPENSION	N/A	N/A	SEE SHEET 9

NOTES

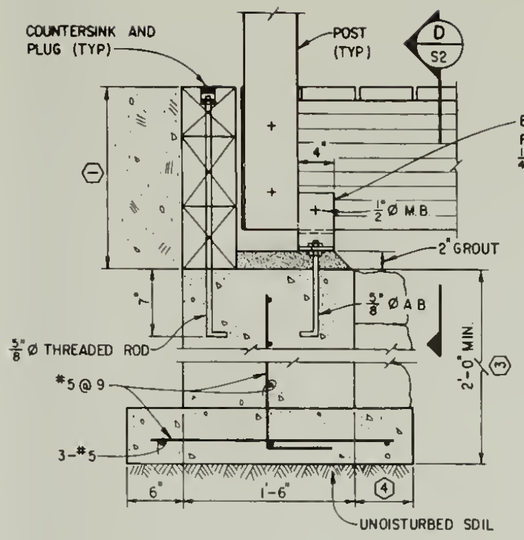
(1) TIMBER RETAINING WALL COMPOSED OF 6 x 6, 6 x 8, AND RIPPED 6x6 TO MATCH DECK ELEVATION.

(2) 3 RODS REQUIRED FOR 5'-0" DECK WIDTH.

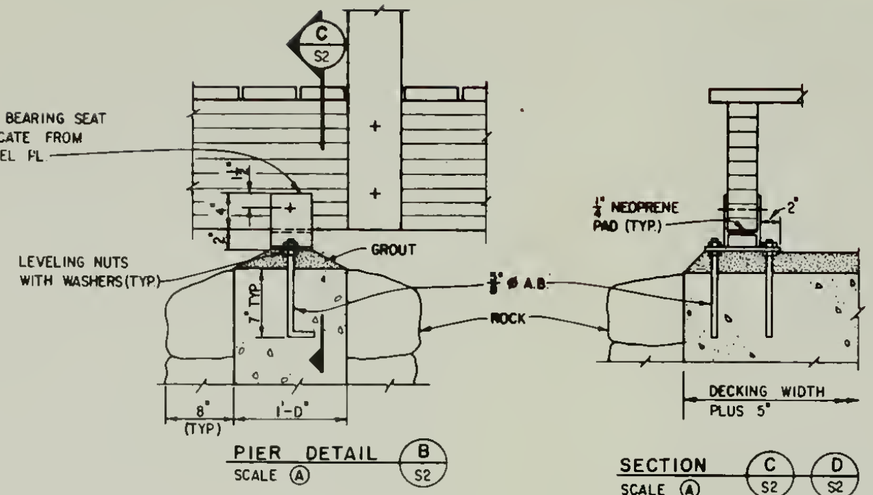
(3) WHEN ROCK ENCOUNTERED, OPTIONAL DETAIL MAY BE USED

(4) AS REQUIRED FOR ROCK FACING – 6" MIN.

(5) AS REQUIRED FOR ROCK FACING – 1'-0" MIN

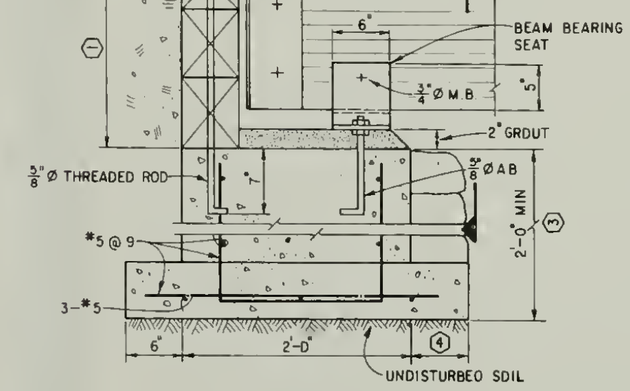


ABUTMENT DETAIL A
SCALE (A) S2

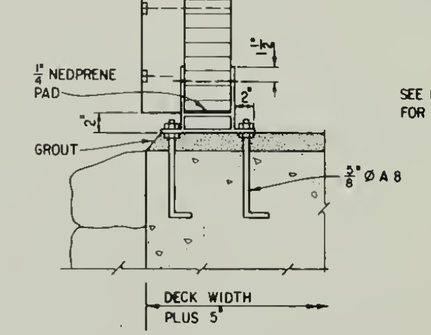


PIER DETAIL B
SCALE (A) S2

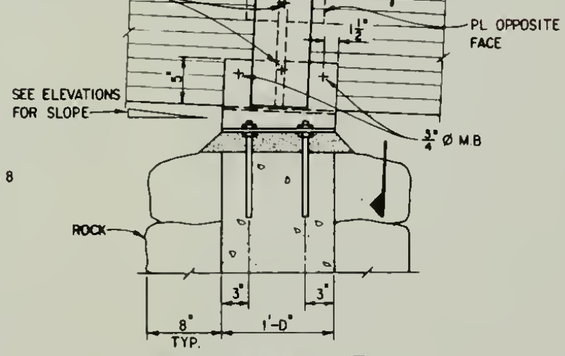
SECTION C S2 D S2 SIMILAR
SCALE (A)



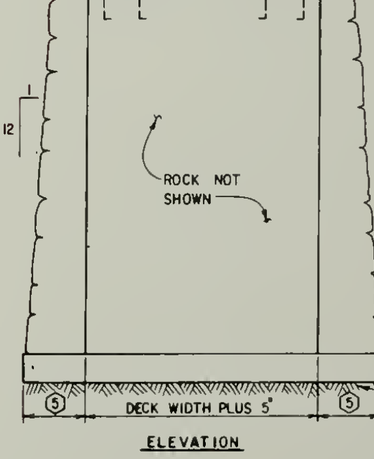
ABUTMENT DETAIL E
SCALE (A) S2



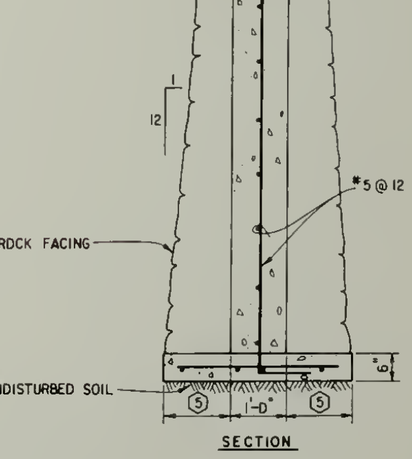
SECTION F S2
SCALE (A)



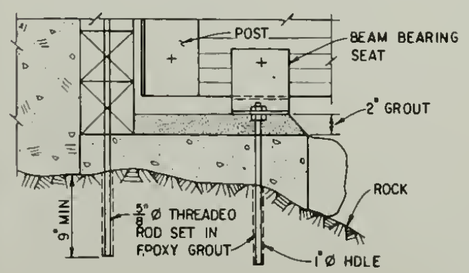
PIER DETAIL G S2
SCALE (A)



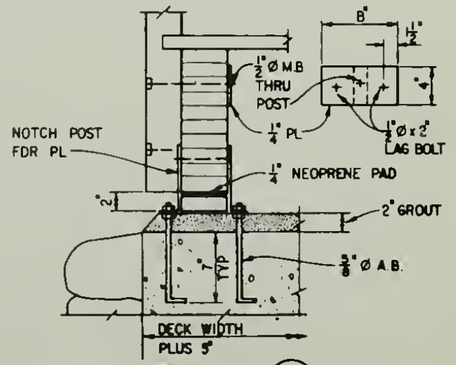
ELEVATION



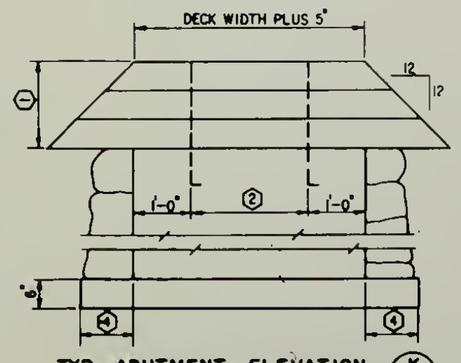
SECTION



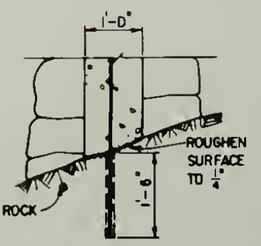
ABUTMENT DETAIL H
OPTIONAL (3)
SCALE (A) S2



SECTION J S2
SCALE (A)



TYP. ABUTMENT ELEVATION K S2
SCALE (B)



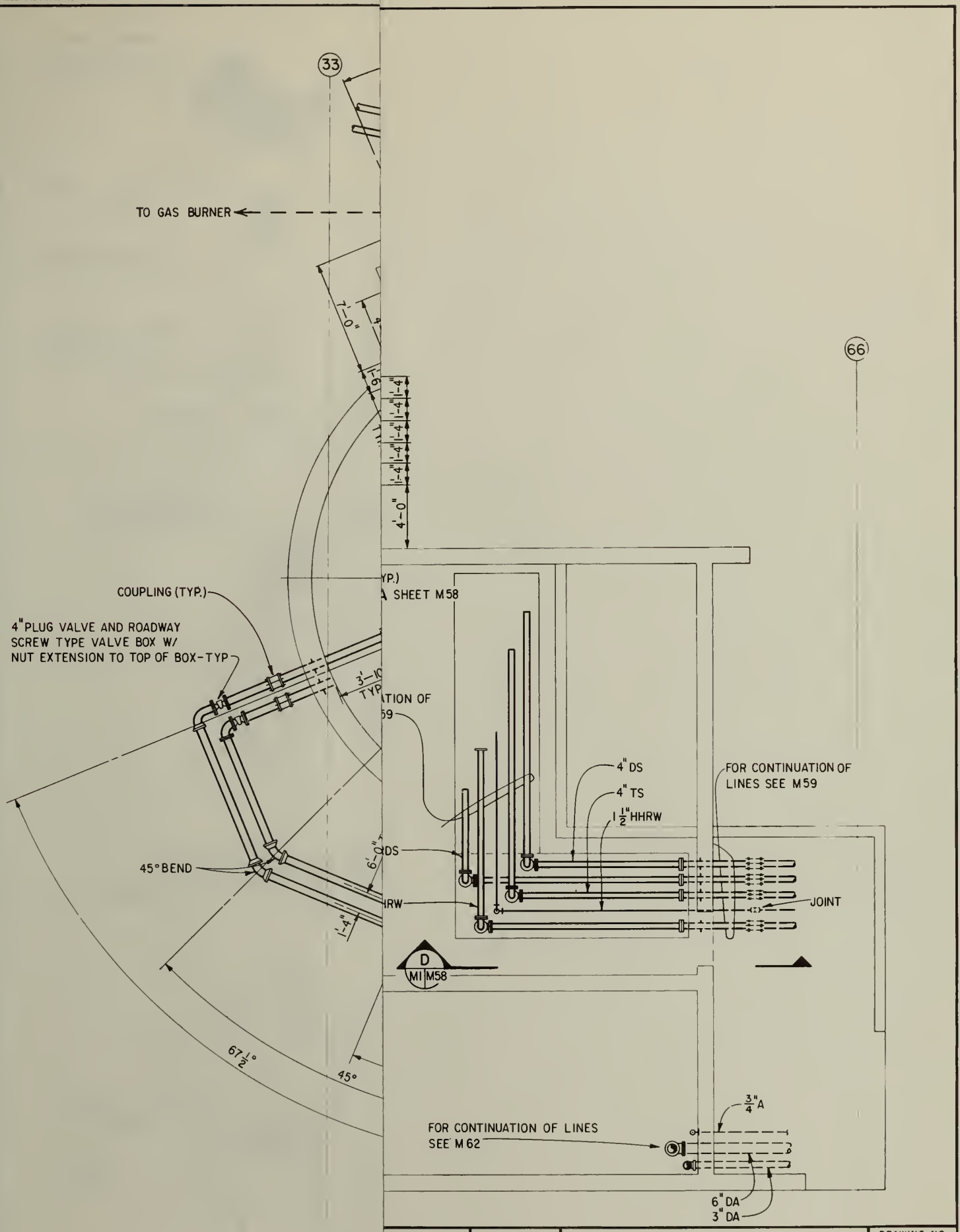
PIER DETAIL M S2
OPTIONAL (3)
SCALE (B)

TYPICAL PIER DETAILS L S2
SCALE (B)

SCALE (A) 12 6 0 12 SCALE OF INCHES

SCALE (B) 1 0 1 2 3 SCALE OF FEET

DESIGNED: DSC	SUB SHEET NO. S2	TITLE OF SHEET: BRIDGE DETAILS	DRAWING NO. 999 41,001
DRAWN: DELIN			PKG. NO. 10B
TECH. REVIEW: NIELSEN			SHEET 10 OF 17
DATE: 10/85			



DESIGNED: DSC DRAWN: EVERMAN TECH. REVIEW: NIELSEN DATE: 10/85	SUB SHEET NO. M1	TITLE OF SHEET PIPING PLAN	DRAWING NO. 999 41,001 PKG. NO. 108 SHEET 11 OF 17

33 44 55 66

$22\frac{1}{2}°$ $22\frac{1}{2}°$ $67\frac{1}{2}°$ $11\frac{1}{4}°$ BEND

E M1 M58

TO GAS BURNER

45° BEND

7'-0" 4'-0" 1'-6" 4'-0" 1'-6" 6'-0" TYP 15'-0" R

A M1 M58

G

45° BEND $22\frac{1}{2}°$ BEND

$22\frac{1}{2}°$ BEND 90° BEND

6" SM 6" SO 90° BEND

4" OS 4" HRW 2'-8" TYP 1'-0"

4'-0"

1'-0"

B M1 M58

6" SO 4" OO 6" SO 6" TYP

WALL PIPE (TYP) SEE DETAIL A SHEET M58

COUPLING (TYP.)

4" PLUG VALVE AND ROADWAY SCREW TYPE VALVE BOX W/ NUT EXTENSION TO TOP OF BOX-TYP

3'-10" TYP

PIPE SUPPORT SEE DETAIL B SHEET S27

FOR CONTINUATION OF LINES SEE M59

6'-0" TYP

45° BEND

FLANGED ADAPTER (TYP)

1'-4"

$22\frac{1}{2}°$ BEND

$67\frac{1}{2}°$ 45° $22\frac{1}{2}°$ $11\frac{1}{4}°$ $11\frac{1}{4}°$ $22\frac{1}{2}°$

6" SO

6" SM

C M1 M58

4" OS 4" TS $1\frac{1}{2}$" HHRW

4" RDS 4" HRW JOINT

D M1 M58

FOR CONTINUATION OF LINES SEE M59

FOR CONTINUATION OF LINES SEE M62

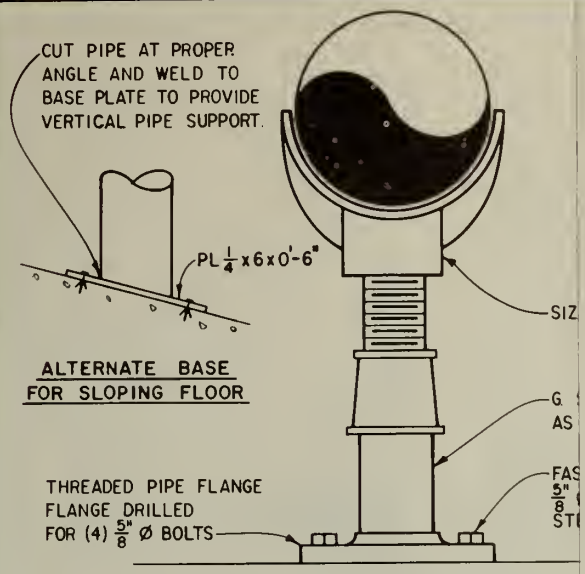
$\frac{3}{4}$" A 6" OA 3" OA

BLDG 23°

4 0 4 8

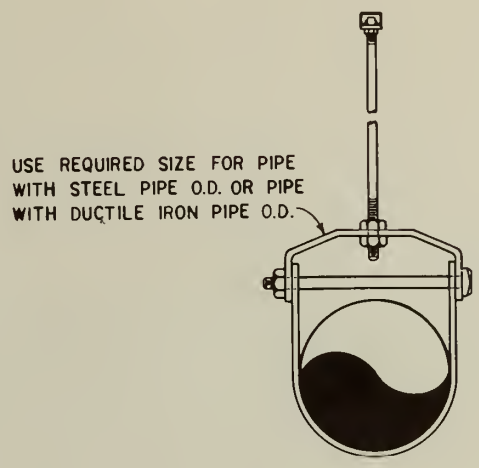
SCALE OF FEET

DESIGNED OSC	SUB SHEET NO	TITLE OF SHEET	DRAWING NO
DRAWN EVERMAN	M1	PIPING PLAN	999 41,001
TECH. REVIEW NIELSEN			PKG. NO. 108 / SHEET 11 OF 17
DATE 10/85			

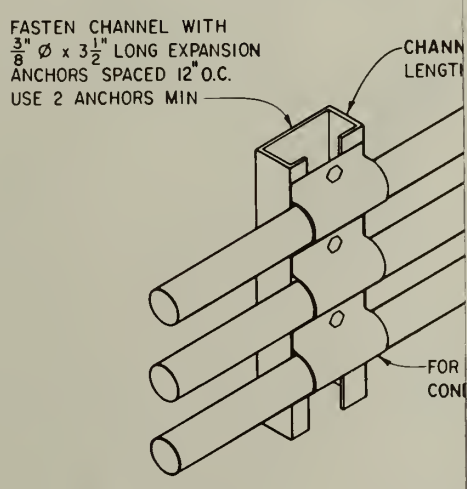


SUPPORT TYPE 1 (ST1)

USE FOR $2\frac{1}{2}$"+ PIPE

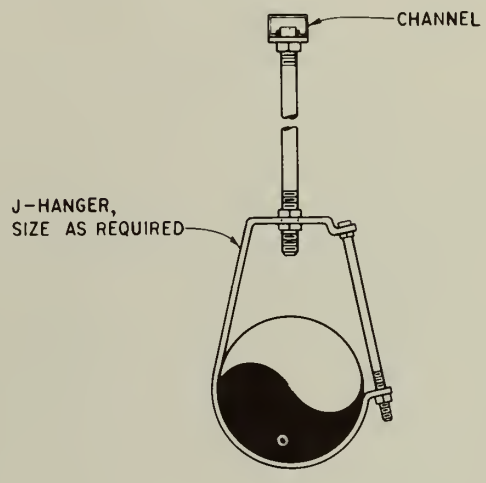


SUPPORT TYPE 4 (ST4)

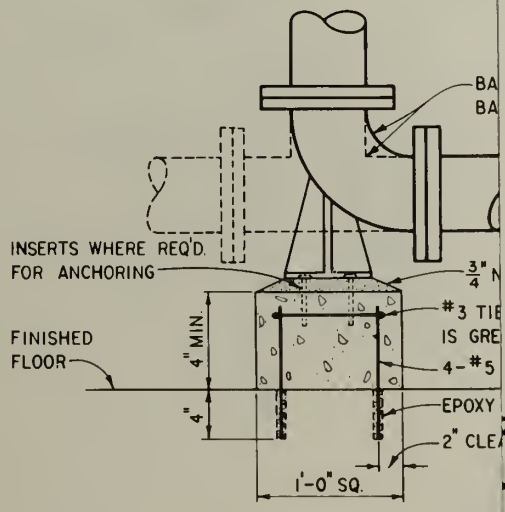


SUPPORT TYPE 5 (ST5)

MULTIPLE PIPE WALL SUPPORT



SUPPORT TYPE 8 (ST8)

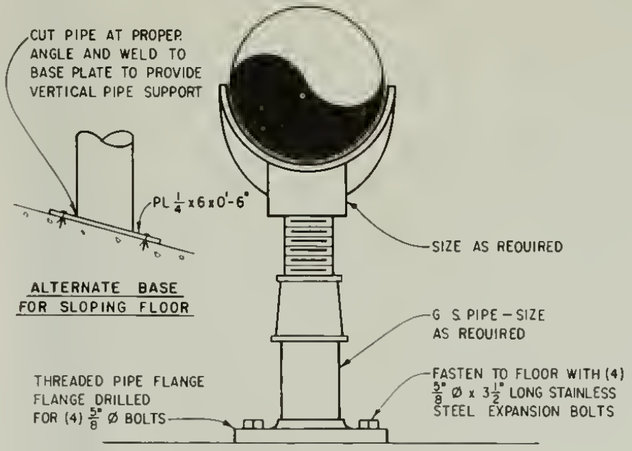


SUPPORT TYPE 9 (ST9)

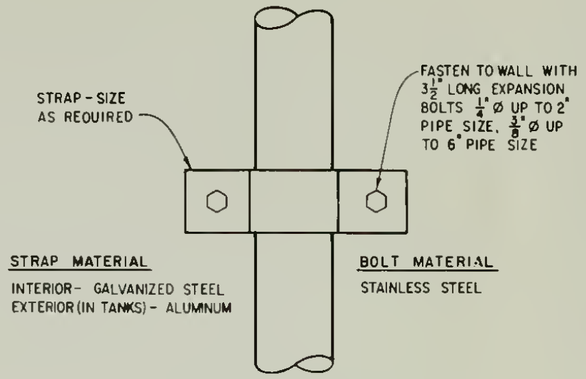
NOTES

1. PIPE AND UTILITY SUPPORTS SHALL BE PROVIDED WHERE SHOWN AND ADDITIONALLY AS REQUIRED BY SPECIFICATIONS.
2. ALL SUPPORTS SHALL BE HOT-DIPPED GALVANIZED WITH GALVANIZED FASTENERS UNLESS OTHERWISE NOTED.
3. CONTRACTOR SHALL VERIFY ALL SUPPORT DIMENSIONS AND LOCATIONS WITH APPROVED SHOP DRAWINGS FOR ITEMS BEING SUPPORTED BEFORE FABRICATION OR INSTALLATION OF SUPPORTS.

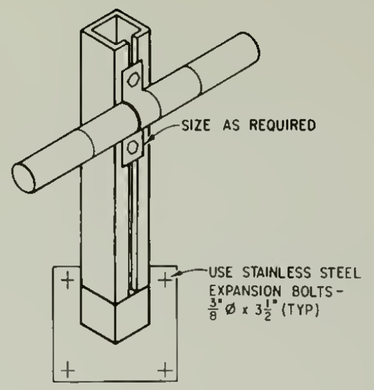
DESIGNED DSC DRAWN DELIN TECH. REVIEW NIELSEN DATE 10/85	SUB SHEET NO M2	TITLE OF SHEET PIPE AND UTILITY SUPPORT DETAILS	DRAWING NO 999 41,001 PKG NO 108 SHEET 12 OF 17



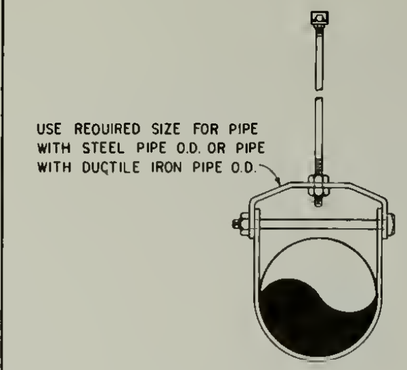
SUPPORT TYPE 1 (ST1)
USE FOR 2 1/2"+ PIPE



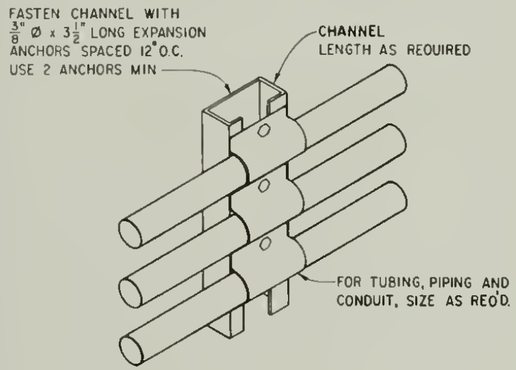
SUPPORT TYPE 2 (ST2)



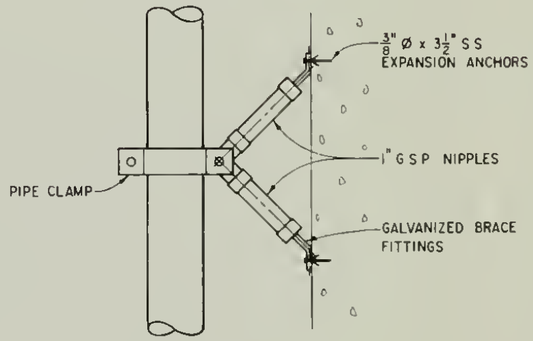
SUPPORT TYPE 3 (ST3)
USE FOR 2"- PIPE



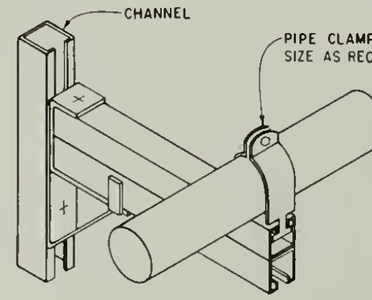
SUPPORT TYPE 4 (ST4)



SUPPORT TYPE 5 (ST5)
MULTIPLE PIPE WALL SUPPORT (6"-)

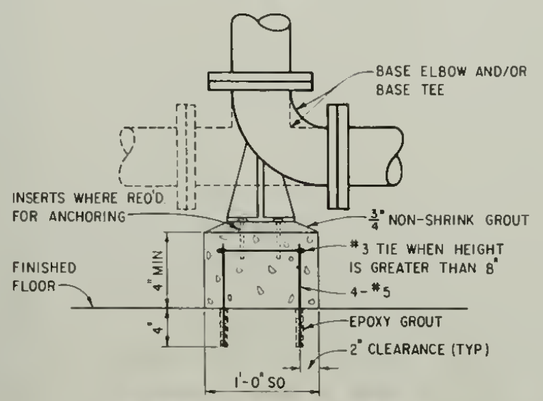


SUPPORT TYPE 6 (ST6)

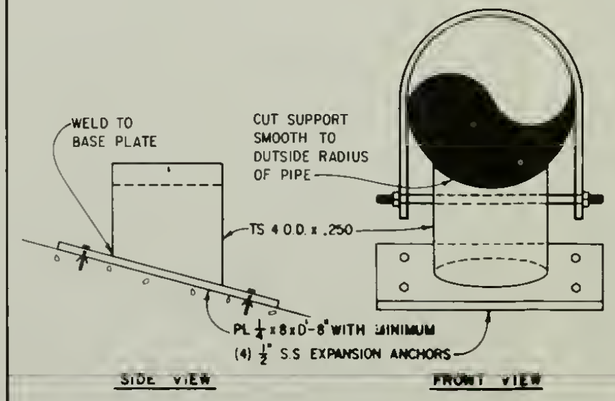


SUPPORT TYPE 7 (ST7)

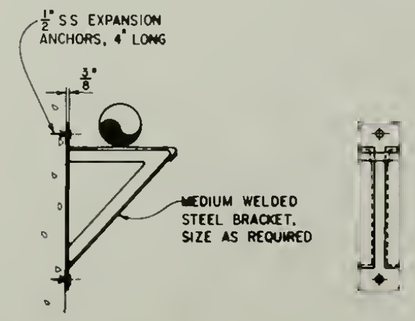
SUPPORT TYPE 8 (ST8)



SUPPORT TYPE 9 (ST9)



SUPPORT TYPE 10 (ST10)
FOR 4" PIPE OVER SLOPED FLOOR WITH INVERT LESS THAN 8" ABOVE FLOOR AT SUPPORT POINT.



SUPPORT TYPE 11 (ST11)

NOTES

1 PIPE AND UTILITY SUPPORTS SHALL BE PROVIDED WHERE SHOWN AND ADDITIONALLY AS REQUIRED BY SPECIFICATIONS

2 ALL SUPPORTS SHALL BE HOT-DIPPED GALVANIZED WITH GALVANIZED FASTENERS UNLESS OTHERWISE NOTED

3 CONTRACTOR SHALL VERIFY ALL SUPPORT DIMENSIONS AND LOCATIONS WITH APPROVED SHOP DRAWINGS FOR ITEMS BEING SUPPORTED BEFORE FABRICATION OR INSTALLATION OF SUPPORTS.

DESIGNED	SUB SHEET NO	TITLE OF SHEET	DRAWING NO
DSC	M2	PIPE AND UTILITY SUPPORT DETAILS	999 41,001
DRAWN			PKG NO 108 / SHEET 12
DELIN			OF 17
TECH REVIEW NIELSEN			
DATE 10/85			

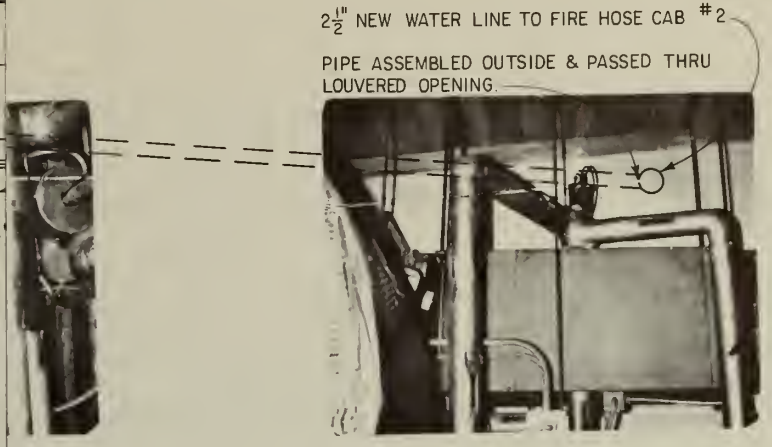
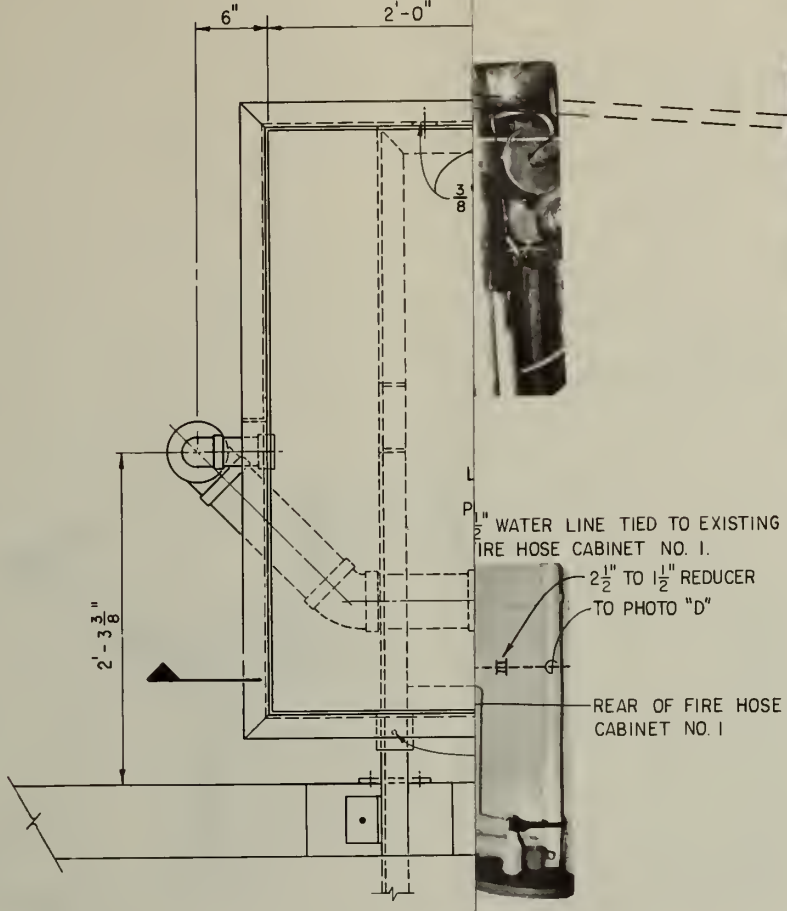
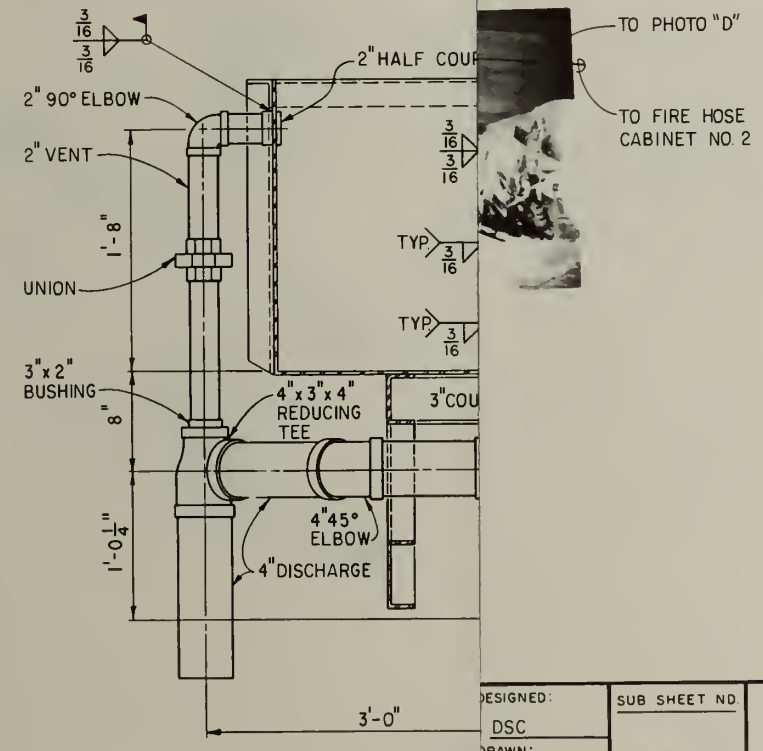
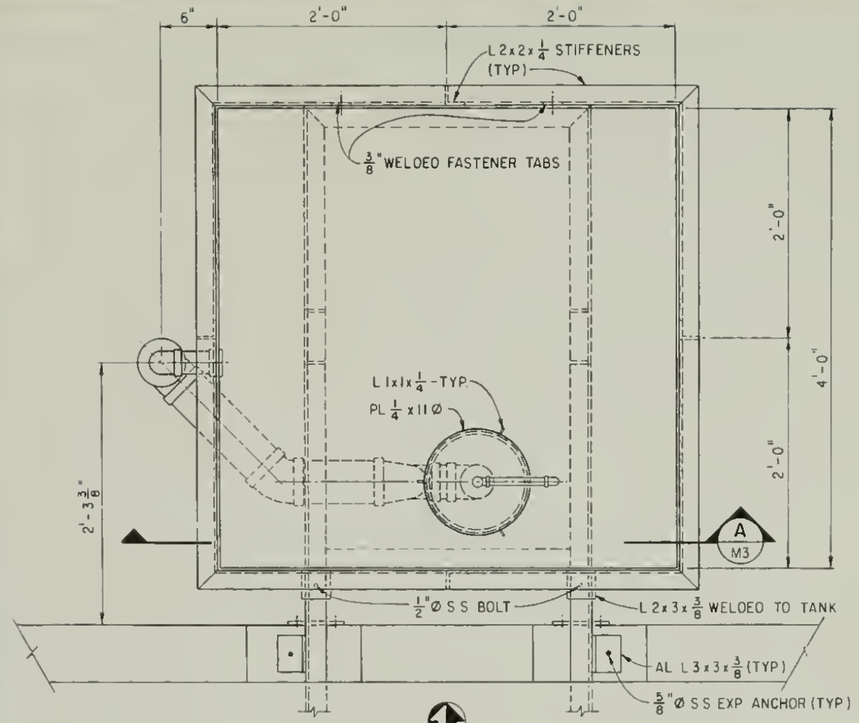


PHOTO "C"



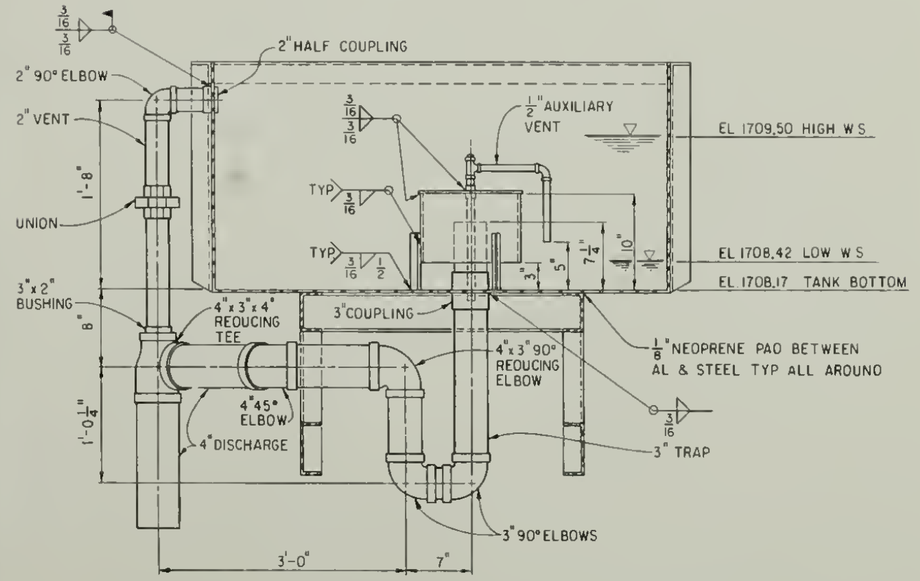


DESIGNED: DSC DRAWN: DRAFTING BR TECH. REVIEW: NIELSEN DATE: 10/85	SUB SHEET NO. M3	TITLE OF SHEET PIPING PLAN, SECTION AND PHOTOS	DRAWING NO. 999 41,001 PKG. NO. 108 SHEET 13 OF 17	



SIPHON BOX PLAN

12 6 0 12
SCALE OF INCHES



SECTION A M3

12 6 0 12
SCALE OF INCHES

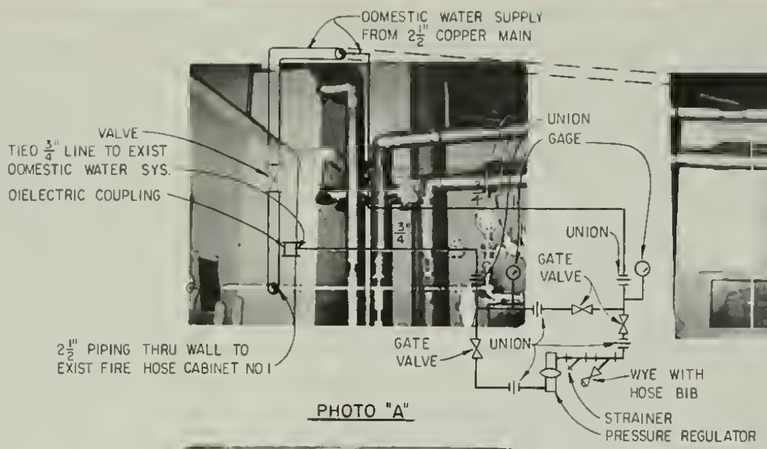


PHOTO "A"

PHOTO "B"

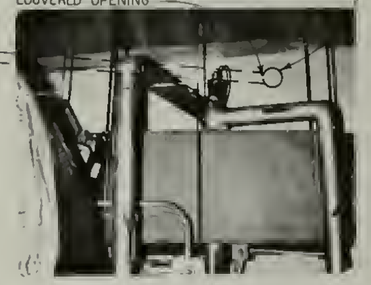


PHOTO "C"

PHOTO "D"

PHOTO "E"

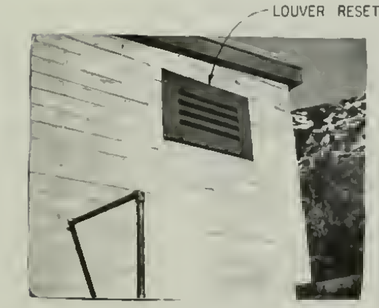


PHOTO "F"

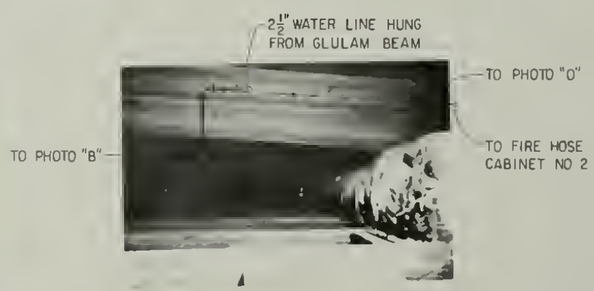
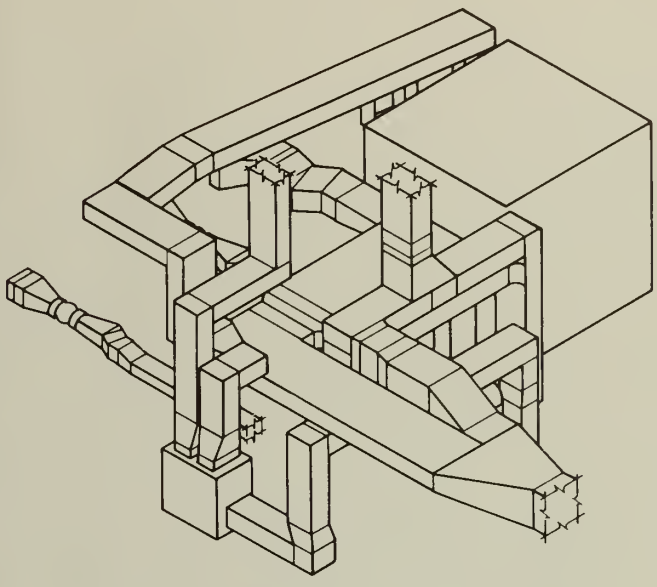
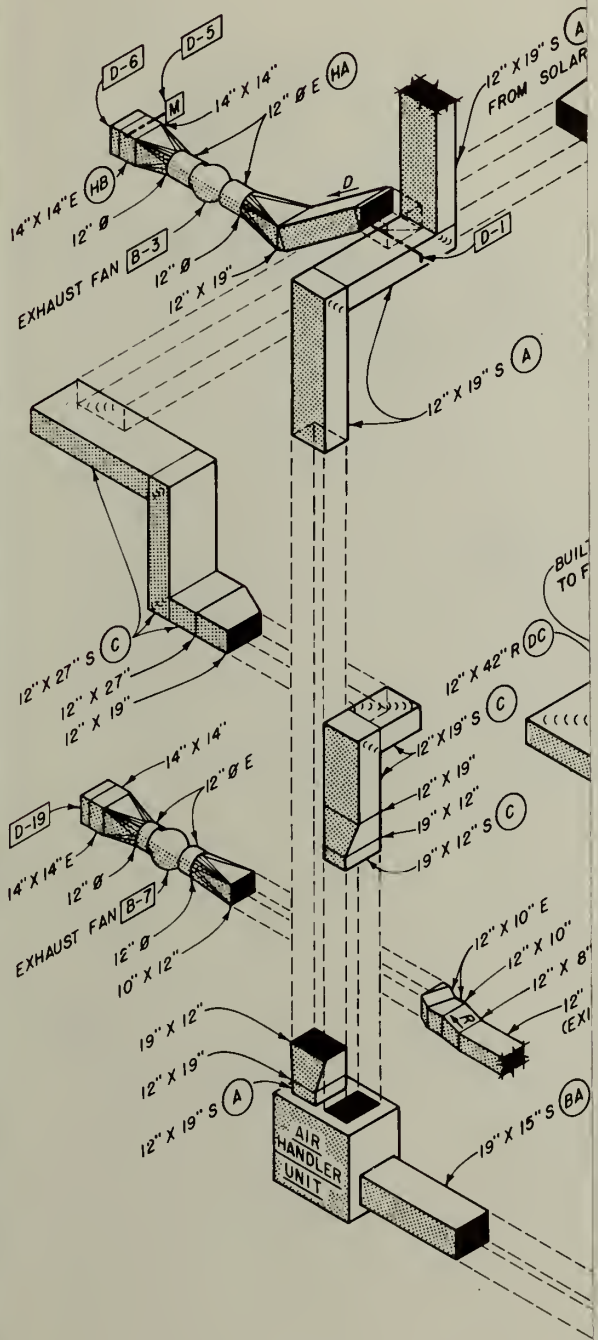


PHOTO "G"

DESIGNED OSC DRAWN DRAFTING BR TECH. REVIEW NIELSEN DATE 10/85	SUB SHEET NO M3	TITLE OF SHEET PIPING PLAN, SECTION AND PHOTOS	DRAWING NO. 999 41,001 PKG. NO. 10B	SHEET 13 OF 17

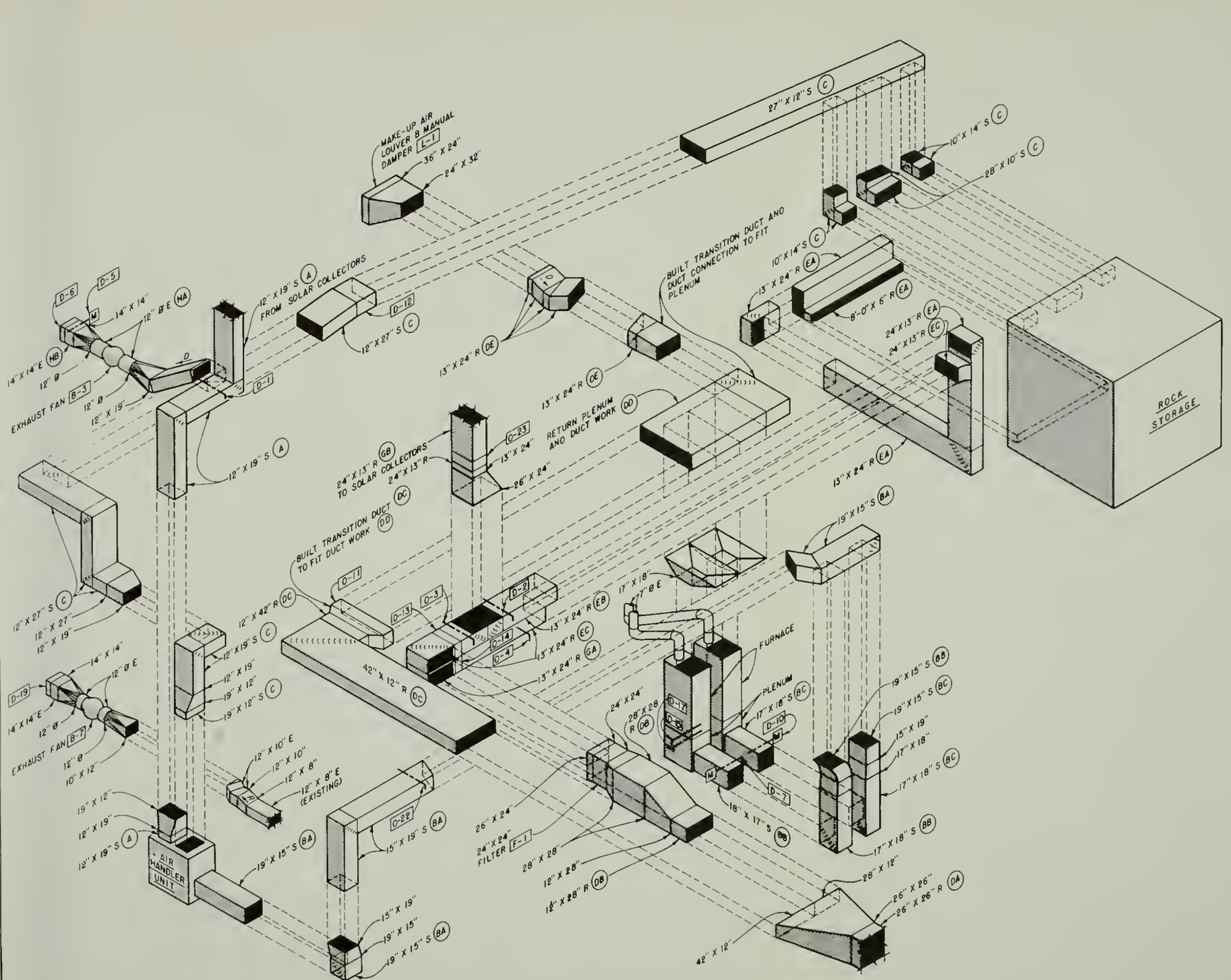


ASSEMBLED VIEW

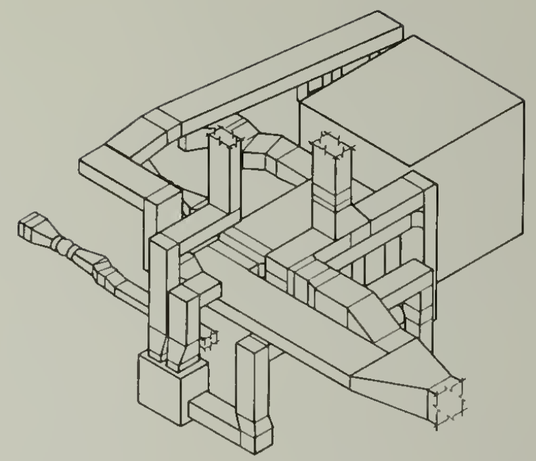


NO SCALE

DESIGNED: DSC DRAWN: DELIN TECH. REVIEW: NIELSEN DATE: 10/85	SUB SHEET NO M4	TITLE OF SHEET DUCTING & EQUIPMENT ISOMETRIC	DRAWING NO 999 41,001 PKG. NO. 108 SHEET 14 OF 17



EXPLODED VIEW



ASSEMBLED VIEW

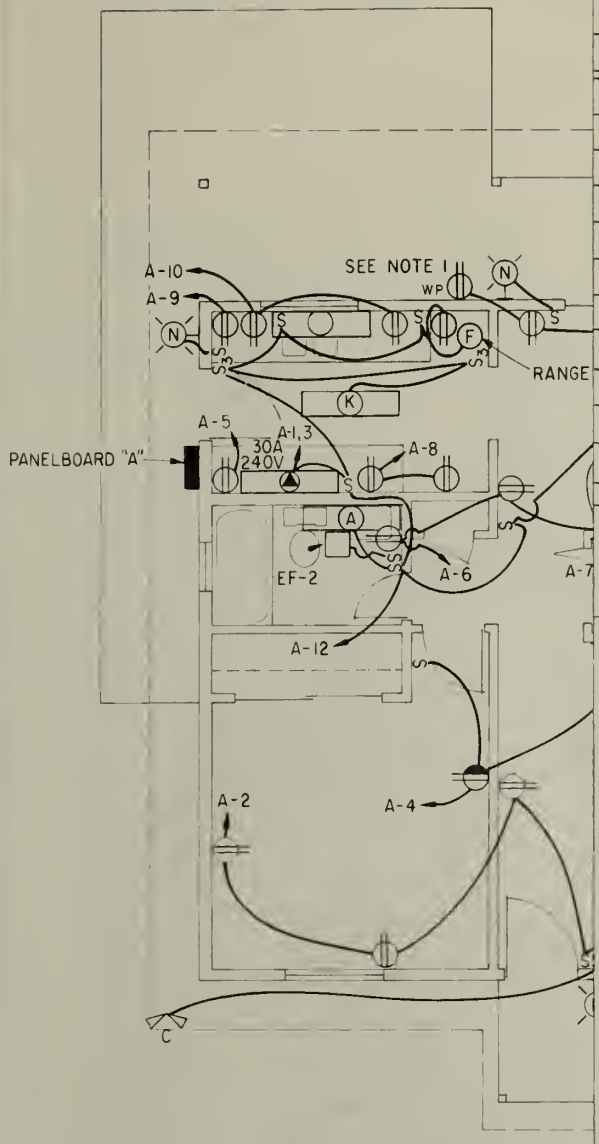
NO SCALE

DESIGNED	SUB SHEET NO	TITLE OF SHEET	DRAWING NO
OSC	M4	DUCTING & EQUIPMENT ISOMETRIC	999 41,001
DRAWN OELIN			PKG. NO 108 / SHEET 14
TECH. REVIEW NIELSEN			OF 17
DATE 10/85			

D A SCHEDULE

100 A. MAIN C.B., SURFACE MOUNT
), WITH NEUTRAL BUS, PROVIDE GROUND BUS
MANUFACTURER AND CAT. NO. SQUARE D NQOB

	DESCRIPTION	LOAD VA	BUS LOAD (VA) L1	L2
15	BEDROOM RECEPTACLES	1500	4000	
15	BEDROOM RECEPTACLES	1500		4000
20	DINING ROOM, OUTSIDE AND BATHROOM RECEPTACLES	1500	3000	
*20	KITCHEN RECEPTACLES	1500		2100
20	KITCHEN RECEPTACLES	1500	2700	
15	LIGHTS	1500		3000
	FIRE ALARM PANEL	600		600
	SPACE			
	SPACE			
	SPACE			
	SPACE			
	SPACE			
	BUS LOAD TOTALS (KVA)		9.7	9.7
	TOTAL LOAD (KVA)		19.4	
	ESTIMATED MAXIMUM DEMAND (KVA)			

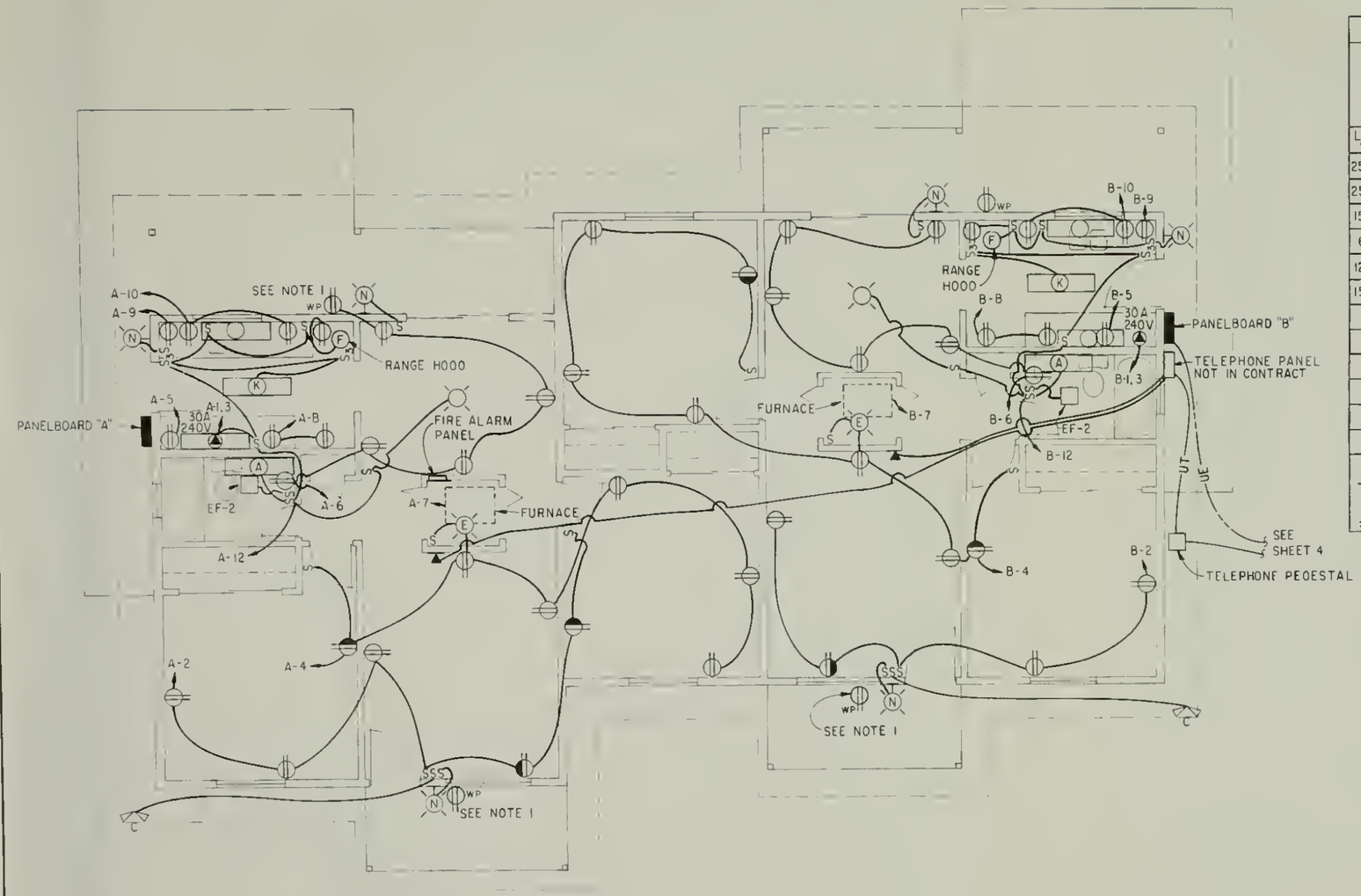


NOTE

1. INSTALL RECEPTACLE DIRECTLY BELOW LIGHT FIXT

4 0 4 8
SCALE OF FEET

SNED: C VN: VAGE REVIEW: ELSEN E: 10/85	SUB SHEET NO. E1	TITLE OF SHEET: POWER, LIGHTING PLANS, AND PANELBOARD SCHEDULE	DRAWING NO. 999 41,001 PKG. NO. 108 SHEET 15 OF 17



FIRST FLOOR PLAN

NOTE

1 INSTALL RECEPTACLE DIRECTLY BELOW LIGHT FIXTURE, MH = 1'-0" AFF

PANELBOARD A SCHEDULE

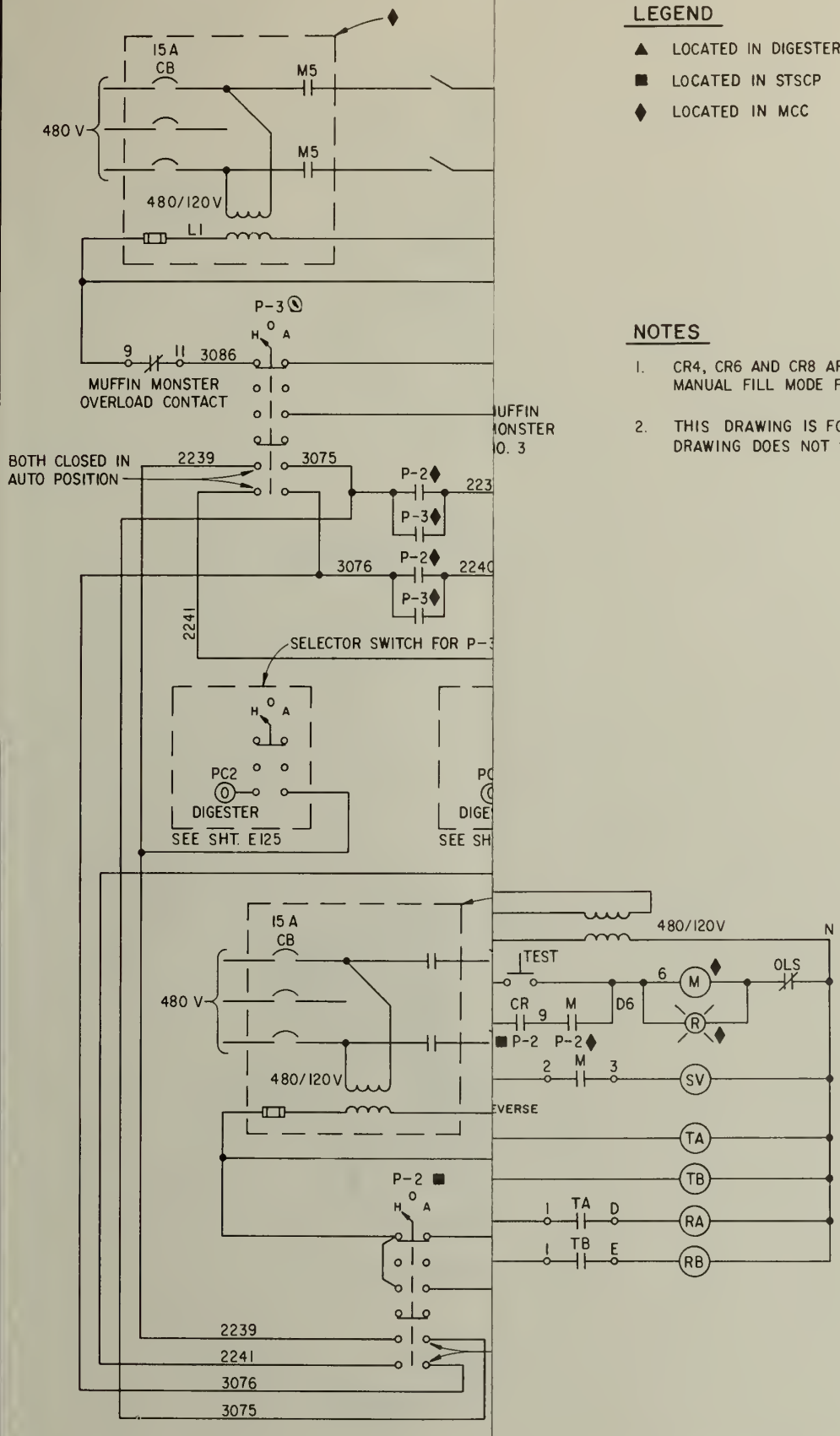
120/240 VOLTS, 1 Φ, 3 W, 100 A BUS, 100 A MAIN C.B., SURFACE MOUNT
SYM. A I.R. (MAIN C.B 10,000, BRANCH C.B 10,000), WITH NEUTRAL BUS, PROVIDE GROUND BUS
SNAP-ON BRANCH C.B., NEMA 3R ENCLOSURE, MANUFACTURER AND CAT NO. SQUARE D NQOB

LOAD VA	DESCRIPTION			DESCRIPTION	LOAD VA	BUS LOAD (VA) L1	BUS LOAD (VA) L2
2500	DRYER	30	1, 2	BEDROOM RECEPTACLES	1500	4000	
2500		30	3, 4	BEDROOM RECEPTACLES	1500		4000
1500	WASHER	20	5, 6	DINING ROOM, OUTSIDE AND BATHROOM RECEPTACLES	1500	3000	
600	FURNACE FAN MOTOR	20	7, 8	*20 KITCHEN RECEPTACLES	1500		2100
1200	DISHWASHER	20	9, 10	20 KITCHEN RECEPTACLES	1500	2700	
1500	EVAPORATIVE COOLER		11, 12	15 LIGHTS	1500		3000
	SPACE		13, 14	FIRE ALARM PANEL	600		600
	SPACE		15, 16	SPACE			
	SPACE		17, 18	SPACE			
	SPACE		19, 20	SPACE			
	SPACE		21, 22	SPACE			
	SPACE		23, 24	SPACE			
				BUS LOAD TOTALS (KVA)		9.7	9.7
				TOTAL LOAD (KVA)		19.4	
				ESTIMATED MAXIMUM DEMAND (KVA)			

NOTE
1. PANELBOARD B SIMILAR TO PANELBOARD A
*GFI TYPE RECEPTACLE

SCALE OF FEET 4 0 4 8

DESIGNED OSC DRAWN SAVAGE TECH REVIEW NIELSEN DATE 10/85	SUB SHEET NO. E1	TITLE OF SHEET: POWER, LIGHTING PLANS, AND PANELBOARD SCHEDULE	DRAWING NO. 999 41,001 PKG NO. 108 SHEET 15 OF 17



LEGEND

- ▲ LOCATED IN DIGESTER
- ■ LOCATED IN STSCP
- ♦ LOCATED IN MCC

NOTES

1. CR4, CR6 AND CR8 ARE ENERGIZED FROM SLUDGE THICKENER MANUAL FILL MODE FOR TANKS 4, 5 AND 6
2. THIS DRAWING IS FOR OVERALL CONTROL ONLY. THIS DRAWING DOES NOT SHOW ALL EQUIPMENT FOR P-33 AND P-34.

DESIGNED: DSC	SUB SHEET NO: E2	TITLE OF SHEET: SCHEMATIC DIAGRAM	DRAWING NO: 999 41,001
DRAWN: EVERMAN			PKG. NO. 108
TECH. REVIEW: NIELSEN			SHEET 16 OF 17
DATE: 10/85			

SEE NOTE 2

15A CB
M5
M5
48D V
48D/12DV
L1
5KVA 480/23DV 1Φ
DC ORIVE ■
C1
C2
2D 26 28
32
38
AI
A2
FI
F2
42 43
AUX CONTACT
CR23 OFF ON
CR23 OFF ON
P-3
2 HP
S19
L R
N
CR 23
P-3 ■
CR
N
S19
CR
P-3
R
CR23
LOCAL SPEED POT
CR23
CR23
CR23
REMOTE SPEED POT IN FILTER PANEL
CR23
MCC 28
48D V
START / STOP WHEN JUMPERED
MUFFIN MONSTER NO. 3
2 3 9 11
CR
P-3
LI
3086
P-3 ◆
H O A
9 11 3D86
MUFFIN MONSTER OVERLOAD CONTACT
291
CR11 ■
293
G
294
CR8 ■
CR6 ■
CR4 ■
R
P-3
M
RTM
OL
BOTH CLOSED IN AUTO POSITION
2239
3D75
P-2 ◆
P-3 ◆
SPRCR1
PMCR1
2237
2237A
76
M5
P-33
OL
04 NEUTRAL
3D76
P-2 ◆
P-3 ◆
SPRCR1
PMCR1
224D
M6
P-34
DL
04 NEUTRAL
2241
SELECTOR SWITCH FOR P-33 ▲
P-2 ■
P-3 ■
295
SELECTOR SWITCH FOR P-34 ▲
PC2
D
DIGESTER
SEE SHT E125
PC2
D
DIGESTER
SEE SHT E125
S9
SPR
CR 11
N
THERMAL SENSOR N.C.
S19
L R
N
CR 22
CR22 OFF ON
CR22 OFF ON
DC DRIVE ■
C1
C2
2D 26 28
32
38
AI
A2
FI
F2
42 43
AUX CONTACT
P-2
2 HP
P-2
CR
N
S19
CR
P-2
R
CR22
LOCAL SPEED POT
CR22
CR22
CR22
REMOTE SPEED POT IN FILTER PANEL
CR22
MCC 28
48D V
R8
RB RA
RA
SLUDGE GRINDER NO. 2
48D/12DV
N
LOS
TEST
1A
CR 9 M
D6
6
M
DLS
■P-2 P-2◆
2 M 3
SV
FORWARD
REVERSE
8
TA
C
T8
I TA D
RA
I TB E
R8
15 A CB
48D V
48D/12DV
5KVA 480/23DV 1Φ
283
281
P-2 ■
H O A
CR1D
G
282
CR8
283
CR6
CR4
DL
M
P-2
R
RTM
2239
2241
3D76
3D75
8DTH CLOSED IN AUTO POSITION
S9
SPR
CR 11
N
THERMAL SENSOR N.C.

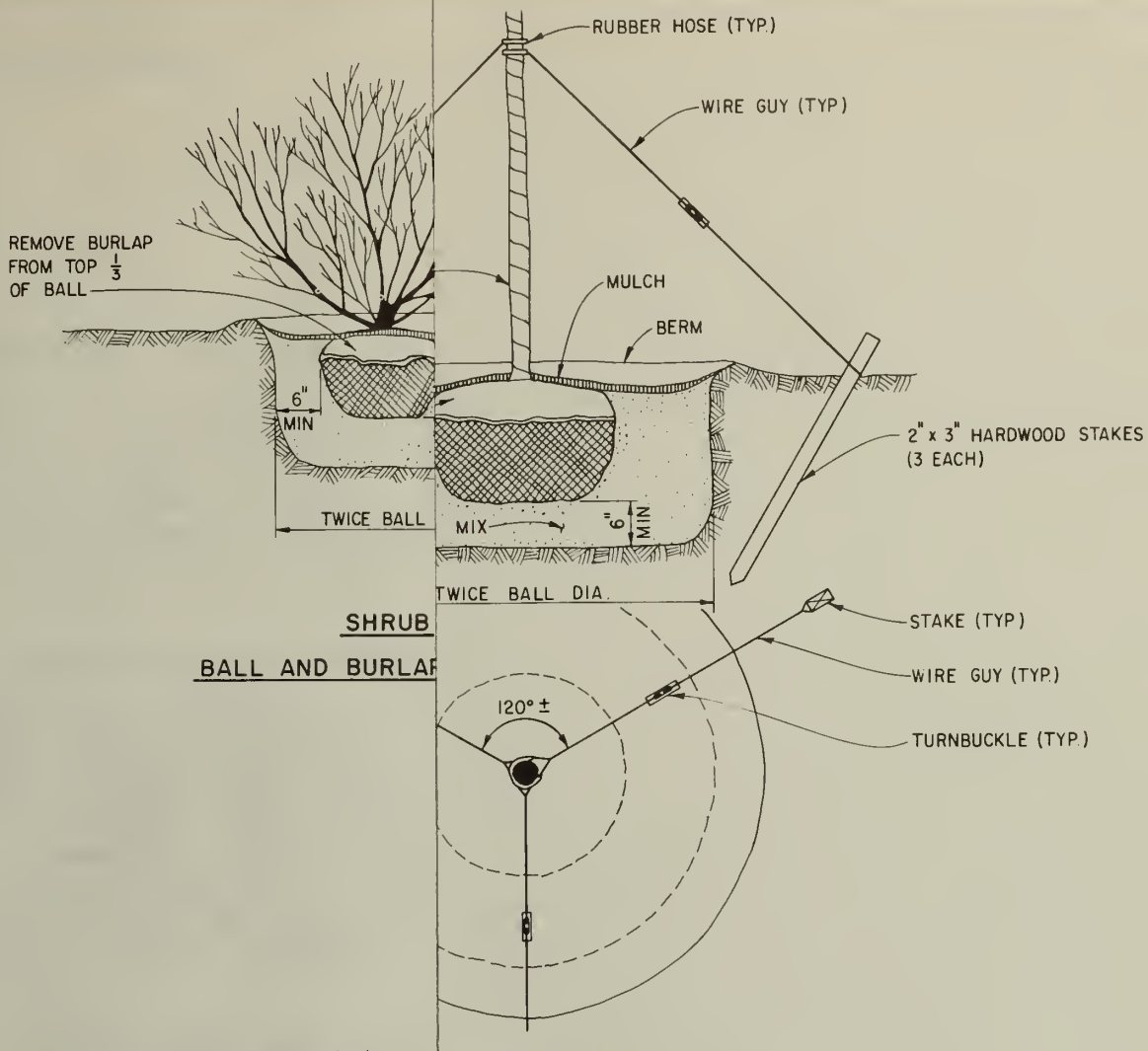
LEGEND

- ▲ LOCATED IN DIGESTER
- ■ LOCATED IN STSCP
- ◆ LOCATED IN MCC

NOTES

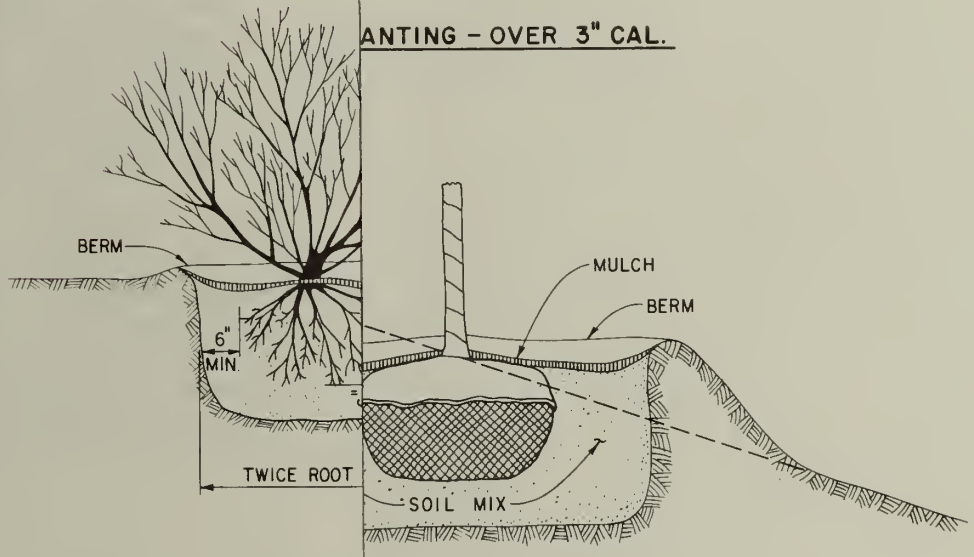
1. CR4, CR6 AND CR8 ARE ENERGIZED FROM SLUDGE THICKENER MANUAL FILL MODE FOR TANKS 4, 5 AND 6
2. THIS DRAWING IS FOR OVERALL CONTROL ONLY THIS DRAWING DOES NOT SHOW ALL EQUIPMENT FOR P-33 AND P-34.

DESIGNED DSC	SUB SHEET NO E2	TITLE OF SHEET SCHEMATIC DIAGRAM	DRAWING NO 999 41,001
DRAWN EVERMAN			PKG NO ID8
TECH. REVIEW NIELSEN			SHEET 16 OF 17
DATE ID/85			



SHRUB

BALL AND BURLAP

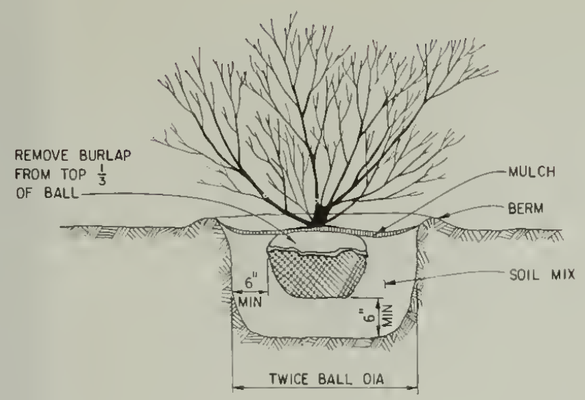


SHRUB

BAREROOT PL ING ON SLOPES 1:5 AND STEEPER

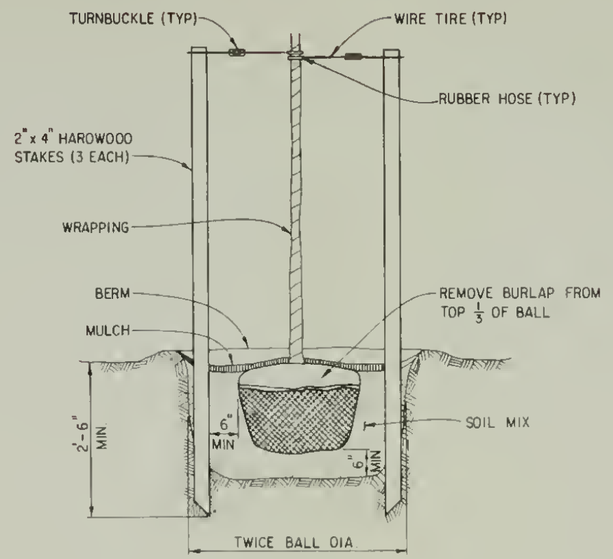
NO SCALE

ESIGNED DSC RAWN DELIN ECH REVIEW NIELSEN ATE 10/85	SUB SHEET NO LAI	TITLE OF SHEET STANDARD SHRUB AND TREE PLANTING DETAILS	DRAWING NO 999 41,001 PKG. NO. 108 SHEET 17 OF 17



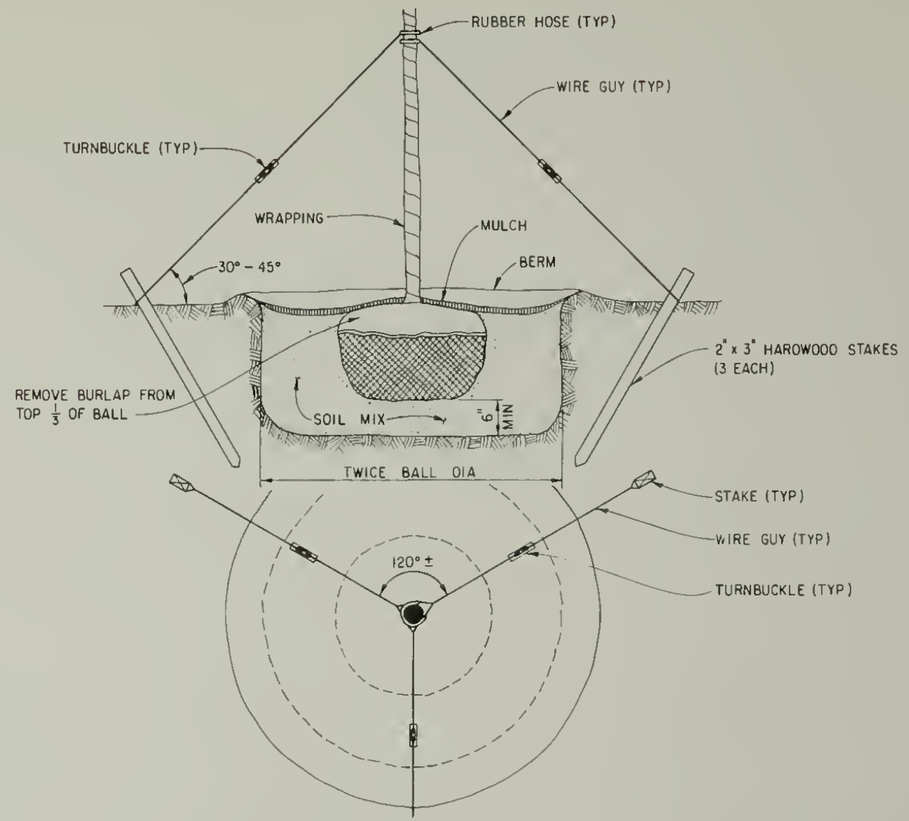
SHRUB

BALL AND BURLAP PLANTING

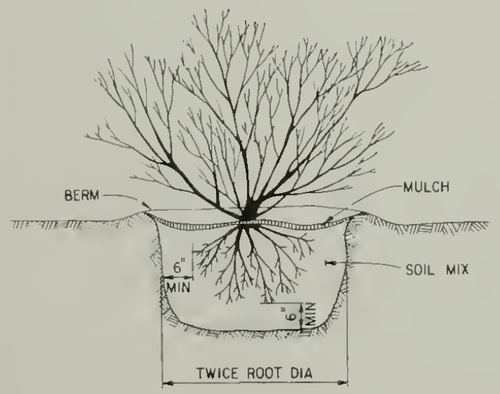


TREE - 1" TO 3" CAL.

BALL AND BURLAP PLANTING

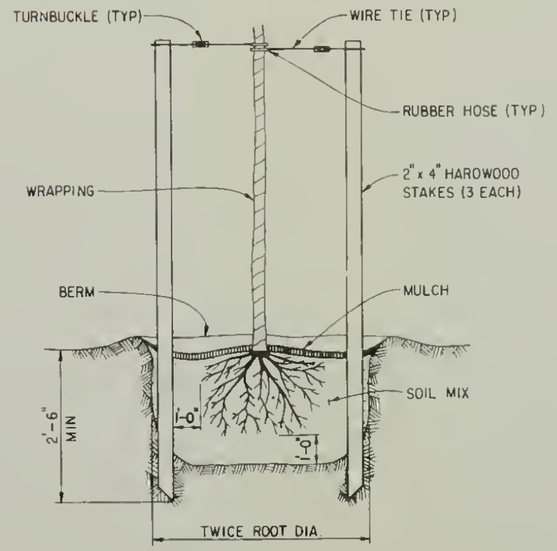


TREE PLANTING - OVER 3" CAL.



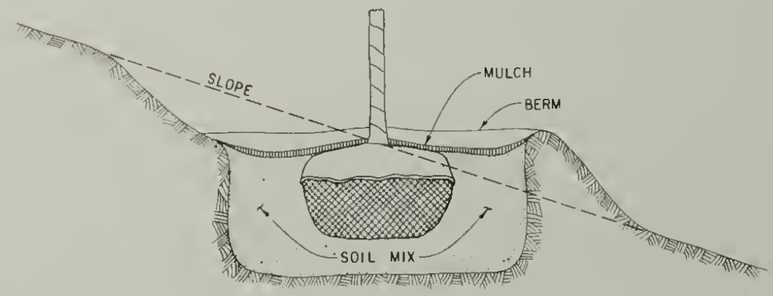
SHRUB

BAREROOT PLANTING



TREE - 1" TO 3" CAL.

BAREROOT PLANTING



GRADING FOR PLANTING ON SLOPES 1:5 AND STEEPER

NO SCALE

DESIGNED OSC DRAWN DELIN TECH REVIEW NIELSEN DATE 10/85	SUB SHEET NO LAI	TITLE OF SHEET STANDARD SHRUB AND TREE PLANTING DETAILS	DRAWING NO 999 41,001 PKG NO 108 — SHEET 17 OF 17

6. ADDITIONAL PROVISIONS FOR A&E CONTRACTORS

OWNERSHIP OF PRODUCTS

When an A&E contractor produces design or construction drawings as part of a contract, the original drawings are the property of the National Park Service, not the property of the contractor. The contractor must transmit acceptable archival originals or photographic reproducibles to the National Park Service before final payment will be made. The contractor cannot substitute diazo reproducibles for original drawings.

USE OF PHOTOGRAPHIC REPRODUCTIONS

In some cases, reproduction methods may be used as an efficient, cost-effective tool in the preparation of a set of drawings. For instance, if several drawing sheets require the same base sheet information (a floor plan, for example), duplicates made by photographic techniques may be used. (However, reproductions made by the diazo process, such as sepias and diazo mylars, and some other reproduction processes are not acceptable as final products.) In all cases, the end product must meet the same archival standards as original tracings or photographic reproductions.

When A&E contractors want to use "photo-drawing" techniques (that is, use a photographic image as base information for a drawing sheet), they must supply a high-quality, half-size, photographic mylar reproducible of the photo-drawing sheet in addition to supplying the full-size original to the National Park Service. The half-size reproducible must be capable of producing clear legible prints using the diazo printing process.

Photographic reproducibles should be printed on polyester base film, .004 inch thickness, reverse-reading, and they must be free of chemical stains, dirt, wrinkles, and other visual defects that would affect the quality of the reproduction. If photo art/tint is used on the photographic mylars, the screen should be 50% dot with no fewer than 85 lines per inch and no more than 120 lines per inch for a standard 24" by 36" drawing, and no fewer than 133 lines per inch and no more than 150 lines per inch for a half-size drawing.

DRAFTING PRACTICES

A&E contractors are expected to follow good drafting practices (see chapter 3, "Drafting Practices"). Contractors are reminded that original drawings that combine ink and pencil are unacceptable, as are drawings that contain miscellaneous adhesive-backed material, drawings with visible layout lines, or drawings that are of obviously poor quality.

A&E managers should ensure that these guidelines are strictly followed throughout the preparation of the drawings and not only imposed at the conclusion of the project.

7. MATERIALS AND SUPPLIES

The standard drawing sheet format is preprinted on both polyester film and tracing paper. The profile sheets are preprinted only on polyester film. The predrafted cover sheets for specific parks, other drawing sheets, and Stanpats can be obtained by NPS employees from the Denver Service Center supply room. A&E managers will supply NPS standard sheets to A&E contractors. Materials may also be ordered by mail. The address is

Chief, Branch of Drafting, PGD
National Park Service
Denver Service Center
P.O. Box 25287
Denver, Colorado 80225

The NPS lettering template is available from Letterguide, Inc., Lincoln, NE 68503. Order number LG 22581.

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