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August 10, 1984  
84056.019

Mr. J. B. George  
Project Manager  
Texas Utilities Generating Company  
Highway FM 201  
Glen Rose, Texas 76043

Subject: Cable Tray Support and Electrical Review Questions  
Comanche Peak Steam Electric Station  
Independent Assessment Program - Phase 4  
Texas Utilities Generating Company  
Job No. 84056

Dear Mr. George:

Attachments A and B to this letter contain additional cable tray support and electrical review questions, respectively. Also, Attachment C provides a status of all letters sent to date containing Phase 4 questions for all disciplines. If there is uncertainty as to the intent of the question while preparing responses, please call.

Very truly yours,

N. H. Williams  
Project Manager

Attachments

cc: Mr. D. Wade (w/attachments)  
Mr. G. Grace (w/attachments)  
Mr. S. Burwell (w/attachments)  
Mr. S. Treby (w/attachments)  
Mrs. J. Ellis (w/attachments)  
Mr. R. Ballard (w/attachments)

San Francisco Boston Chicago Richland

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Region IV  
H001  
1/1

## ATTACHMENT A

### 1. Detail "W" Drawing 2323-EI-0601-S, Hanger Number 2602

In calculation SCS-104C, Set 1, Sheet 27, the hanger members shown on Detail W were originally qualified by similarity to the hangers shown in Cases A and D. It is not obvious that the hangers can be qualified because support 2602 is a composite of Cases A and D; however, in reviewing the CMCs issued against Detail W, Cygna noted that the calculations for the design review of CMC 32513, Rev. 1, referenced a STRUDL analysis of the frame. It appears that the reanalysis was initiated since many modifications had been made to the support including the addition of more cable trays and conduits, use of alternate connection details, and use of alternate member types. The computer output was not included with the design review calculations, therefore Cygna was unable to verify the adequacy of the frame analysis and design.

CMC 32513, Rev. 1 also included revised base plate details. No calculations for these revised details were provided in the design review calculations.

Referring to Section A-A, in CMC 32513, Rev. 1, Sheet 3 of 4, Cygna noted that a 1/4" fillet weld was used on the connection between the 6 x 4 x 3/4" clip angle and a 1-1/4" base plate. It is Cygna's belief that this is in violation of AISC code section 1.17.2

Please provide Cygna with the following:

- (a) A copy of the STRUDL analysis computer output referenced in the design review calculations for CMC 32513, Rev. 1;
- (b) Justification for the lack of design calculations to qualify the base plates and anchor bolts; and,
- (c) Justification for the use of a 1/4" fillet weld to attach the clip angle to a 1-1/4" base plate as described above.

### 2. Cable Tray Span Violations

Cygna prepared field walkdown isometrics of the cable trays within the scope of the Independent Assessment Program, Phase 4. These isometrics (attached) show basic tray layout, presence of Thermolag fire barrier, tray size, and locations of transverse and longitudinal cable tray supports. Cygna's review of these isometrics identified several instances where the tray spans exceeded those allowed by the Gibbs & Hill project criteria.

## 2.1 Transverse and Vertical Supports

Spans were evaluated per Gibbs & Hill criteria as shown in calculation SCS-113C, Set 3 and on Drawing 2323-S-0901, Rev. 4. Spans for fire-protected trays were evaluated per TUGCO Engineering Instruction CP-EI-4.0-49, Rev. 1. Based on Cygna's interpretation of these criteria, for the trays in scope at El. 790'-6" in the Auxilary and Safeguards buildings, the maximum span must not exceed 8'-0".

Table 2.1 summarizes Cygna's findings of span violations for transverse and vertical supports.

Table 2.1  
Transverse and Vertical Cable Tray Support Spacing Violations

Ref. Dwg. No.	Cygna Iso. Sht.	Tray Seg. No.	Span	Supports No. Starting	Ending	Fire Protection
FSE-00174	1	T120ABC03	11'-0"	299	479	Yes
FSE-00174	2	T12GABF04	10'-5"	333	332	Yes
FSE-00176	4	T110SAA15	8'-4"	592	593	No
FSE-00176	4	T110SAA13	12'-0"	655	656	No
FSE-00176	5	T120SBC36	8'-8"	764	765	No
FSE-00176	5	T120SBC25	8'-4"	724	726	Yes
FSE-00176	5	T120SBC25	8'-2"	722	723	Yes
FSE-00176	6	T120SBC29	9'-3"	620	587	No
FSE-00185	7	T120ABC10	8'-9"	2986	2998	Yes
FSE-00185	7	T120ABC17	10'-0"	2953	2990	Yes
FSE-00185	8	T110AAA08	8'-10"	2992	2993	Yes
FSE-00185	8	T110AAA10	9'-4"	3134	2861	Yes

## 2.2 Longitudinal Supports

Spans were evaluated based on Gibbs and Hill drawing 2323-S-0901 and calculation SCS-113C, set 3 for non-fire-protected lines. No reference was located for allowable longitudinal spans for fire-protected trays. Cygna assumes that the criteria of a longitudinal support span maximum of 40'-0" for continuous straight tray runs, with at least one longitudinal support on each straight tray run, no matter what the segment length is, shall apply to both fire-protected and non-fire-protected trays.

In reviewing the trays within scope, Cygna located several violations, which are summarized in Table 2.2.

Table 2.2  
Longitudinal Cable Tray Support Spacing Violation

Ref. Dwg. No.	Cygn Iso. Sht.	Tray Seg. No.	Span	Supports No. Starting	Ending	Fire Protection	Comments
FSE-00174	1	T120ABC04	11'-10"	---	---	Yes	No longit. support on run between riser at CTH 367 and horiz. elbow at CTH 479.
FSE-00174	2	T12GABF01 to T12CABF04	40'	---	---	Yes	No longitudinal supports in this entire run from col. lines F-A through K-A.
FSE-00174	3	T12GABF33	48'	489	---	Yes	Span exceeds 40' from a longit. support to the elbow at CTH 124.
FSE-00176	4	T110SAA18	5'	---	---	No	No longitudinal support between elbow at CTH 589 and end of run at CTH 720.
FSE-00176	4	T110SAA11	60'-5"	3134	5807	No	Longitudinal span exceeds 40'-0"
FSE-00176	5	T120SBC25	57'-5"	2920	13080	Yes	Longitudinal span exceeds 40'-0"
FSE-00176	6	T120SBC29	60'-2"	586	587	No	Longitudinal span exceeds 40'-0"
FSE-00185	8	T110AAA08	10'-4"	---	---	Yes	No longitudinal supports on run between elbow at CTH 2923 and wall penetration at col. line F-A
FSE-00185	8	T110AAA10	63'-11"	2993	3134	Yes	Longit. span exceeds 40'-0"



Please provide Cygna with the following:

- (a) Justification for the increase in transverse and longitudinal spans beyond rated allowables;
- (b) Justification for using allowable longitudinal spans based on non-fire-protected tray loadings for those longitudinal spans which are additionally loaded with fire protection; and,
- (c) Assurance that longitudinal supports for fire-protected tray runs are adequately reviewed for the addition of the fire barrier under TUGCO Engineering Instruction CP-EI-4.0-49, Rev. 1.

3. Detail "N" Drawing 2323-EI-0601-S  
Hanger Numbers: 722, 723, 724, 726, 728, 730 and 2606

Calculation sheet 15 of SCS-104C, Set 1 contains the statement, "Det. 'N' is similar to Det. 'V' and 'R'. Use same beam and brace sizes and bolt requirements. No computation required." It is Cygna's belief that significant differences between hanger configurations preclude qualification by similarity.

The connection of the beam to the concrete is analyzed on sheet 39 of SCS-104C, Set 1. The two-bolt connection is designed for tension and shear loads.

Please provide Cygna with the following:

- (a) Justification for qualifying the support design by similarity as described above;
- (b) Justification for ignoring the induced moment in the design of the base connection; and,
- (c) Justification for ignoring possible eccentricities of the beam and brace from the centerlines of the base angle and anchor bolts.

4. Special Type per CMC 6114  
Hanger Number 2998

This support was originally designed in CMC 6114 (reference SC-1240, Set 1, sheets 6 - 9). During the review of the calculations, Cygna noted the following:

- (a) Section B-B is a plan of the wall-mounted base plate for the longitudinal braces. This plate was not rigorously analyzed for the effects of the applied loads including:
  - (i) Eccentricities of the attached tube steel sections from the longitudinal centerline of the base plate; and,
  - (ii) Attachment of one tube steel member between an anchor bolt and the edge of the base plate.

- (b) Section A-A is a plan of the floor mounted base plate for the tube steel columns. The base plate was not rigorously analyzed for the effects of applied loads including:
  - (i) The effects of induced concrete compressive forces; and,
  - (ii) Eccentricities of the attached tube steel sections from the longitudinal centerline of the base plate.
- (c) In attaching the tube steel sections to the base plates, a 1/4" fillet weld is employed. The plate thicknesses are 1" and 1-1/4". It is Cygna's belief that the use of the 1/4" fillet weld is in violation of minimum weld requirements of AISC code section 1.17.2.
- (d) Richmond inserts are allowed for attachments of the base plates to the concrete surface. These anchors are not checked for their ability to resist the applied loads.

Please provide Cygna with the following:

- (a) Justification of the base plates ability to resist the applied loads;
- (b) Justification that any Richmond inserts employed in the design will adequately resist the applied loads; and,
- (c) Justification for the use of 1/4" fillet welds in attaching the tube steel sections to the base plates.

5. Special Type per CMC 85720 (Revisions 0 - 4)  
Hanger Number 13080

Cable tray support 13080 was originally designed to replace support 594. A review of the CVCs for revisions 0 - 4 of CMC 85720 state that no new or revised design calculations were required to verify the adequacy of the support. A calculation sheet with design calculations is attached to revision 3 of the CVC but the calculations are unsigned and marked "For Reference Only." During Cygna's review of the available documentation on the support's design, the following points were noted:

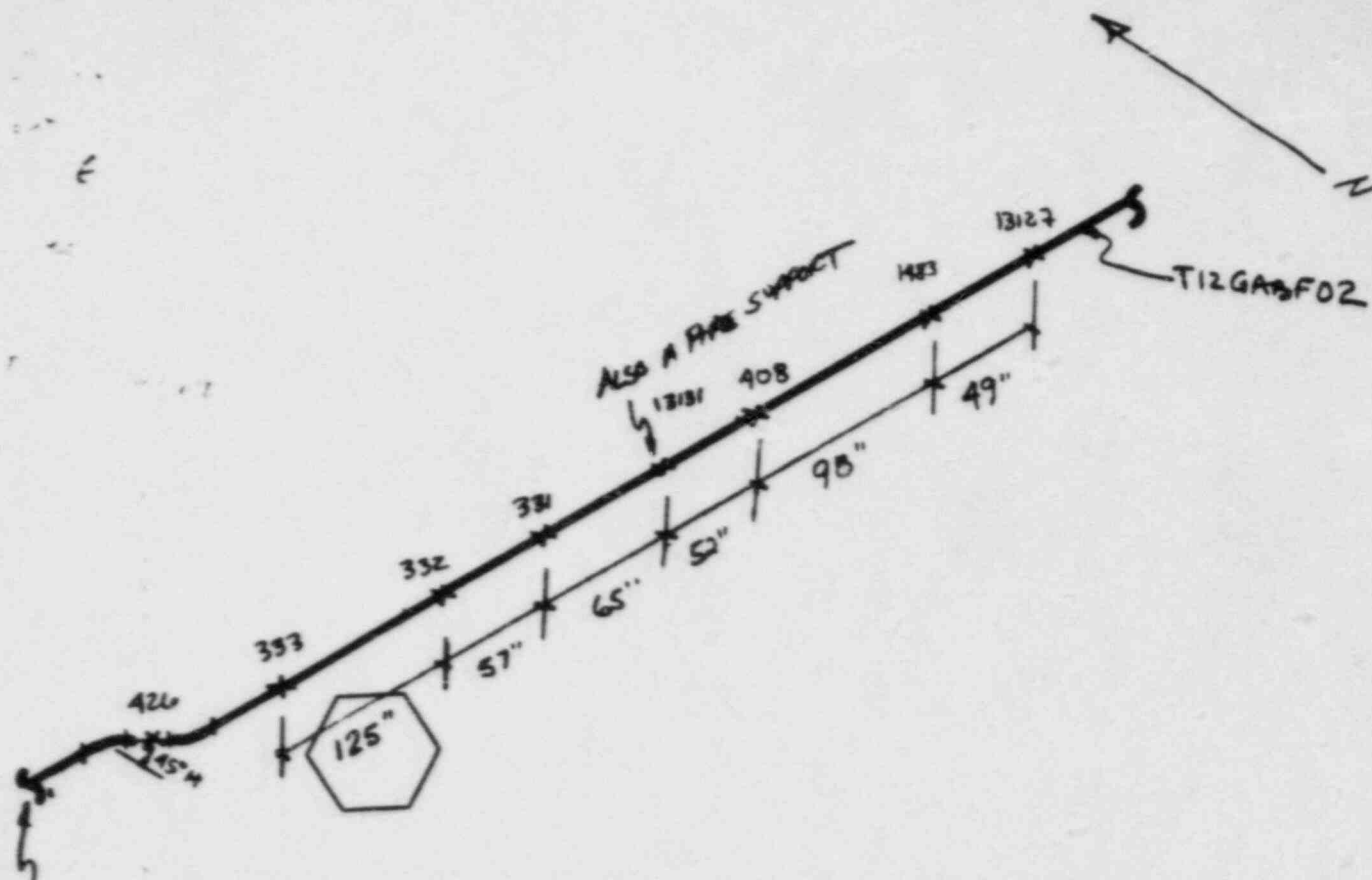
- (a) The tray support is located at a tee intersection of trays. It employs heavy clamps and is skewed with respect to the transverse axis of the cable tray. Due to its location, orientation and the use of the heavy duty clamps, the support is required to be designed for vertical, transverse and longitudinal loads. The longitudinal loads were not considered in any calculation, including those marked "For Reference Only."
- (b) The base plate was designed for a specific orientation and location of the 6" x 6" tube steel column. Subsequently, several modifications to the support resulted in a final orientation and location of the tube steel attachment. No calculations were performed to analyze the effects of these attachment alterations on the base plate and anchor bolts. Cygna believes that the final orientation as shown

on sheet 2 of CMC 85720, Rev. 4 differs greatly from the original orientation. Therefore, the present configuration cannot be qualified by similarity to the originally design condition.

Please provide Cygna with justification that the effects discussed above will not prevent the support from resisting any applied loads.







T12GABF04 12" w/ FIRE PROTECTION

1 TRAY / SUPPORT

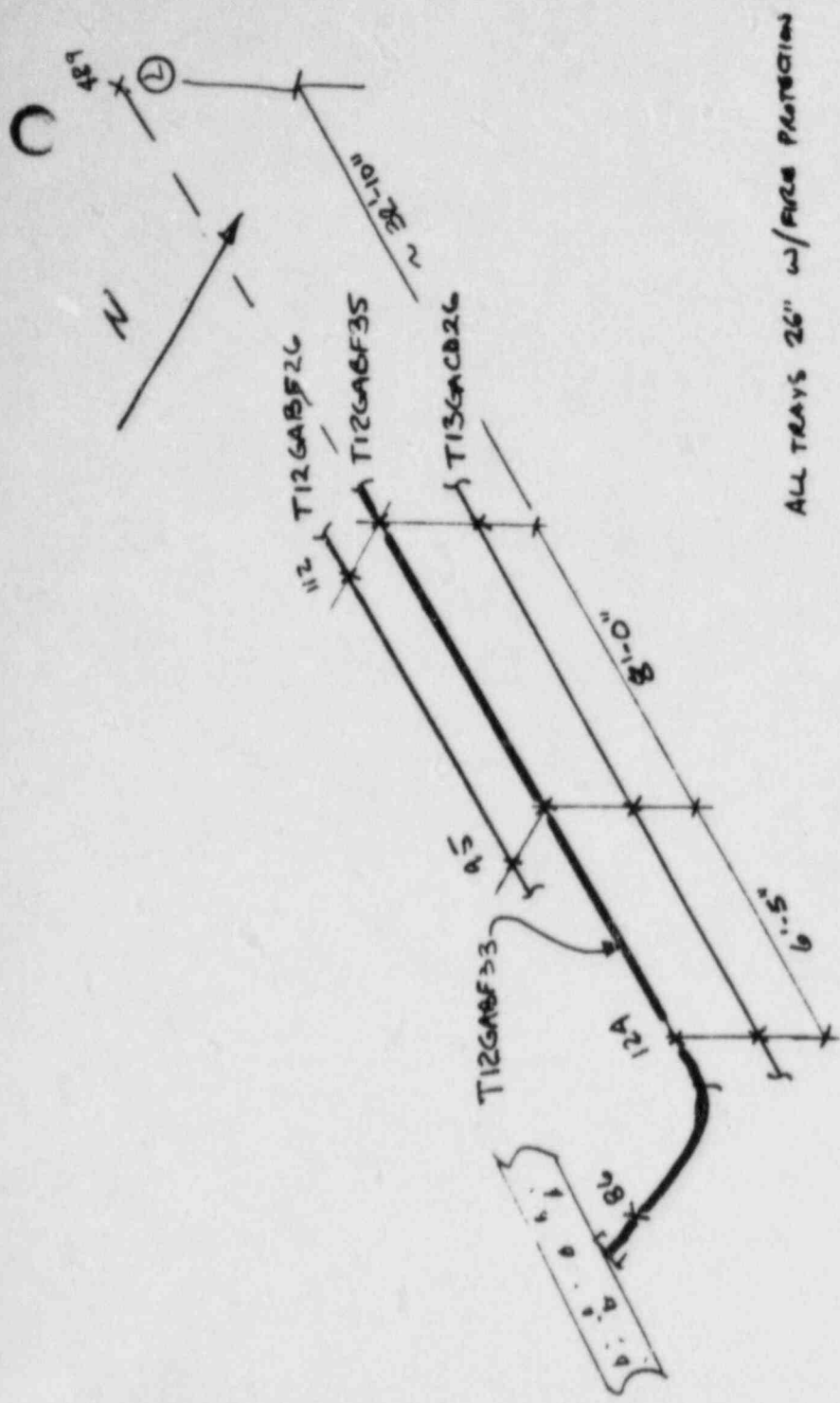
⬡ = ALLOWABLE  
SPAN  
EXCEEDED

Ⓛ = LONGITUDINAL  
SUPPORT

CABLE TRAYS- AS BUILT ISOMETRICS  
AUXILIARY BLDG. EL 790'-6"  
REF. DWG. F&E 00174

SHT 2

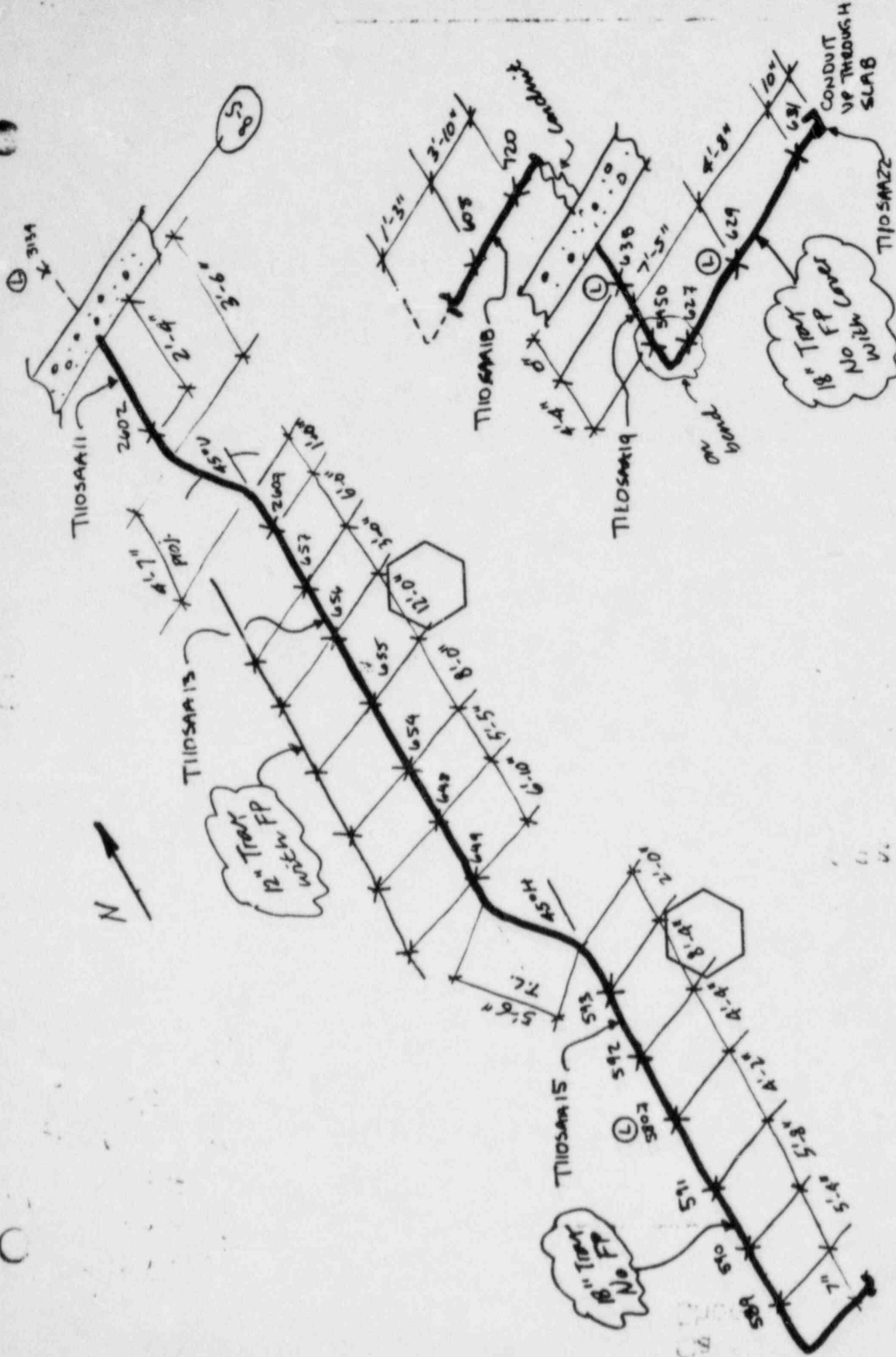




① = LONGITUDINAL  
SUPPORT

CABLE TRAYS - AS BUILT ISOMETRIC  
AUXILIARY BLDG. EL 790'-6"  
REF. DWG. FSE-00174



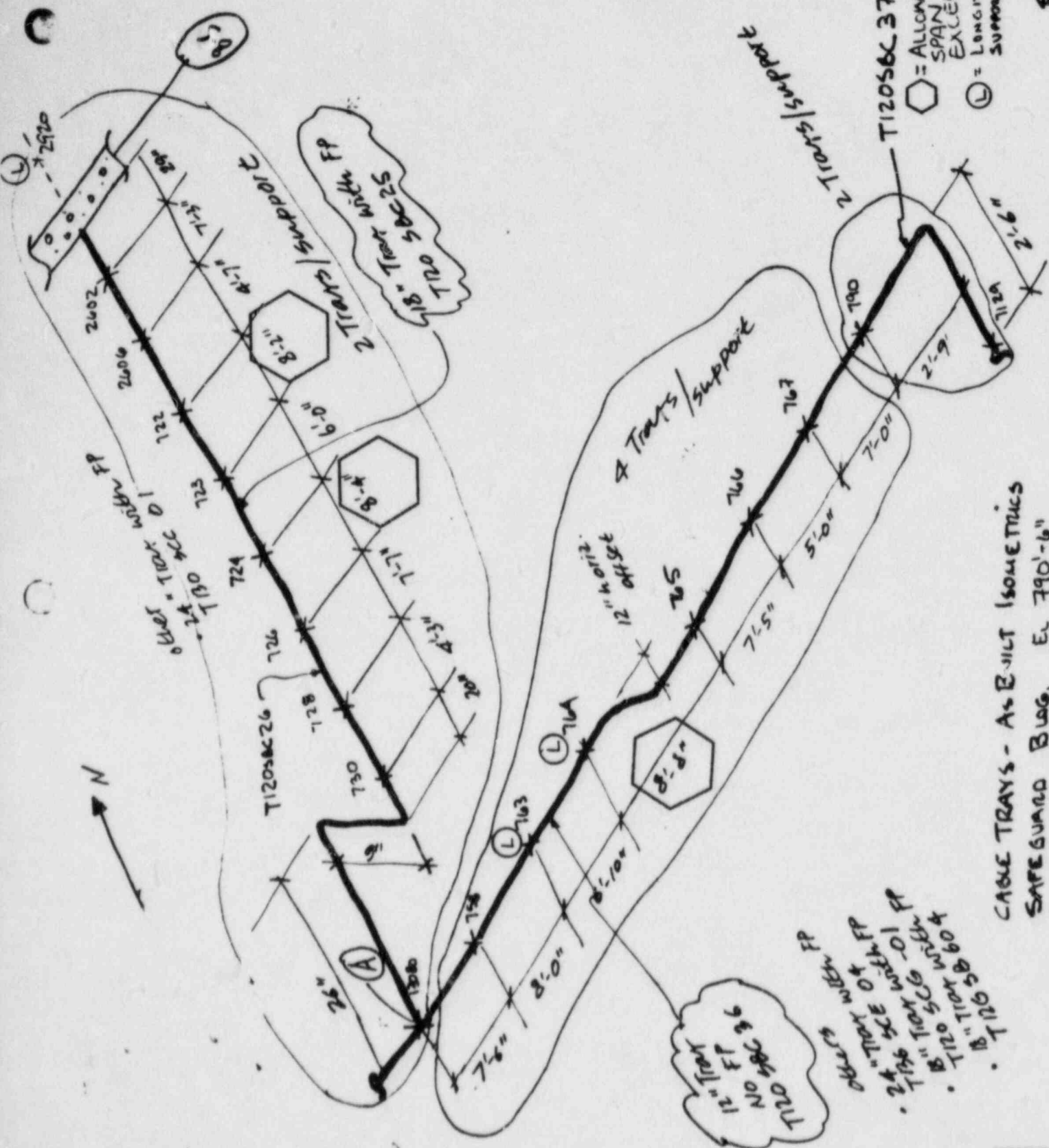


CABLE TRAYS- AS BUILT ISOMETRICS  
 SAFE GUARD Bldg, EL 790'-6"  
 REF. Dwg. FSE-00176

① = LONGITUDINAL  
 SUPPORT

② = ALLOWABLE  
 SPAN EXCEEDED

SHT 4



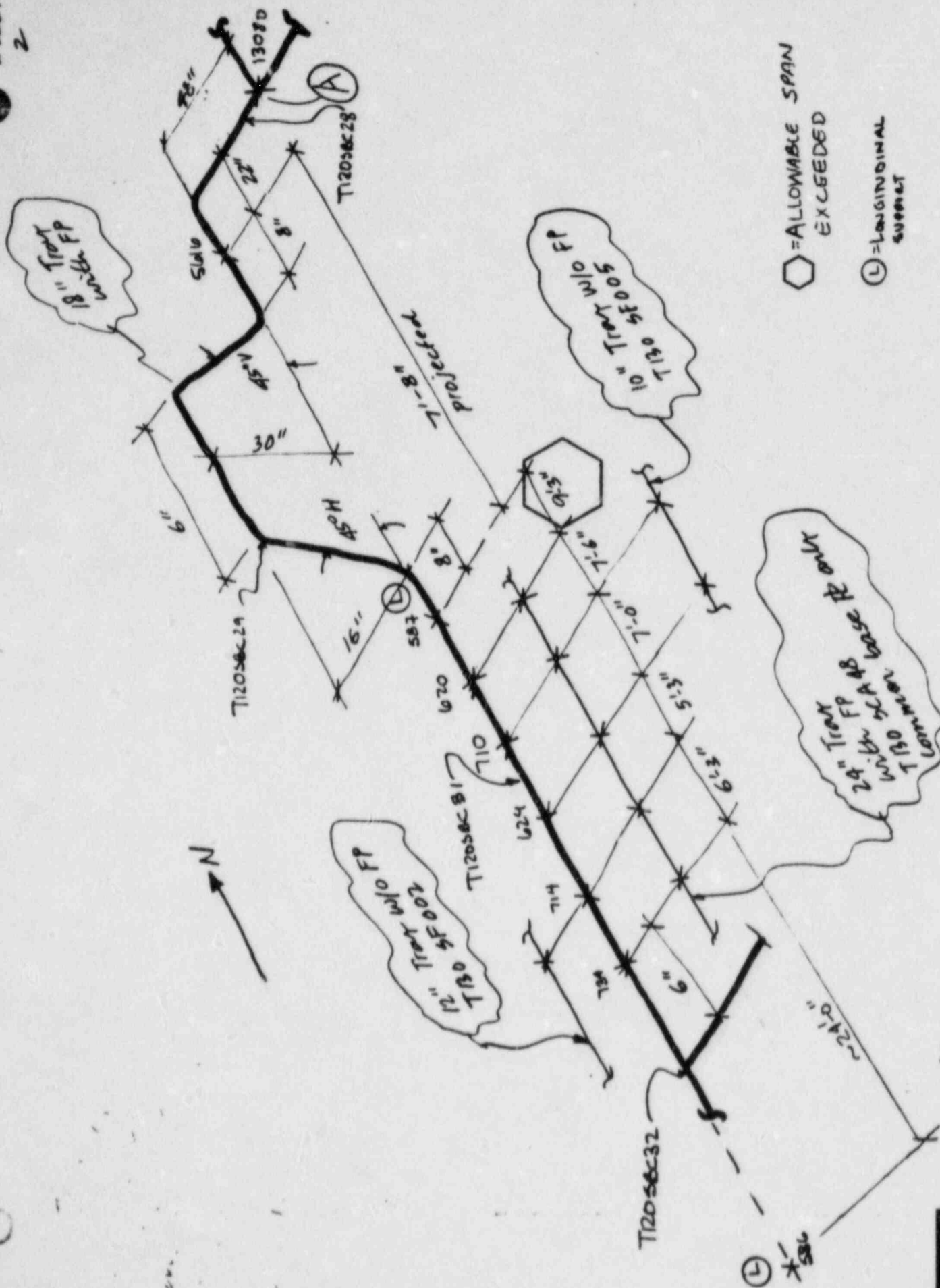
□ = ALLOWABLE SPAN EXCEEDED  
 ○ = LONGITUDINAL SUPPORT

SHT 5

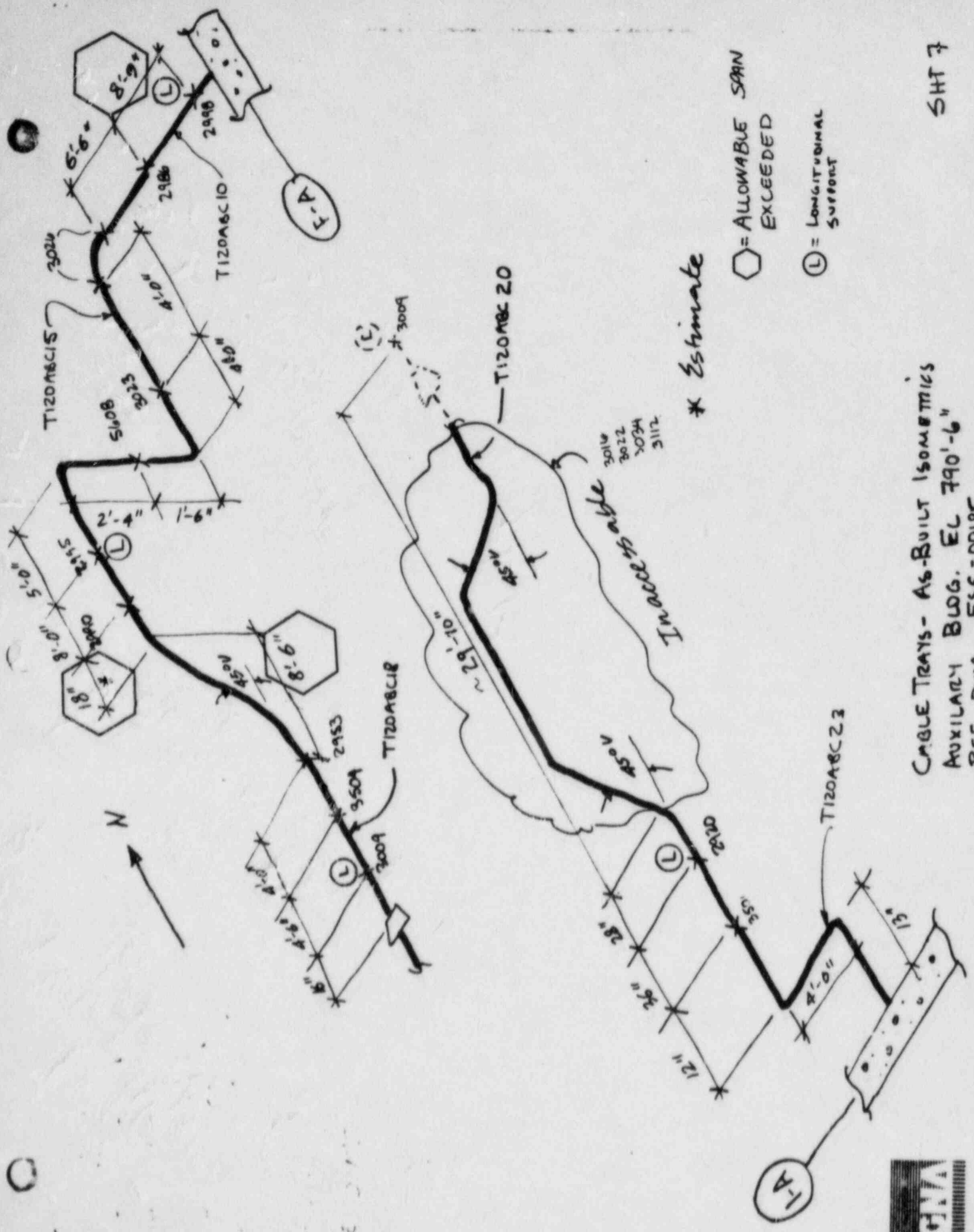
CABLE TRAYS - AS BUILT ISOMETRICS  
 SAFEGUARD BLDG. EL 790'-6"  
 REF. DWG. FSE-00176

12" FP NO BGC 36  
 12" FP NO BGC 37  
 24" FP NO BGC 36  
 24" FP NO BGC 37  
 12" FP NO BGC 36  
 12" FP NO BGC 37  
 12" FP NO BGC 36  
 12" FP NO BGC 37





CABLE TRAYS - AS BUILT ISOMETRICS  
SAFE GUARD BUG. EL 790'-6"  
REF. DWG. FSE-00176



○ = ALLOWABLE SPAN  
 EXCEEDED  
 (L) = LONGITUDINAL  
 SUPPORT

\* Estimate

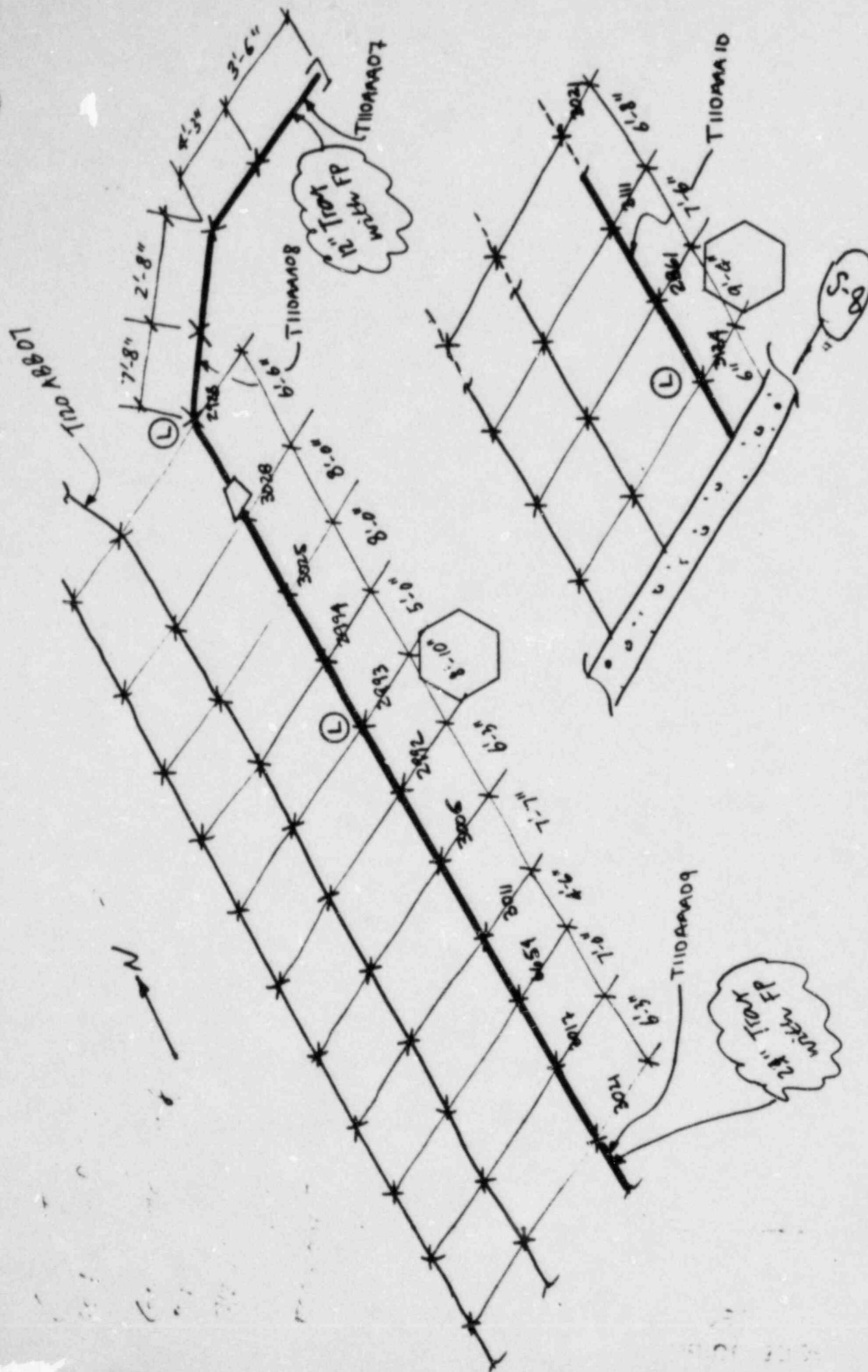
CABLE TRAYS - AS-BUILT ISOMETRICS  
 AUXILIARY BLDG. EL 790'-6"  
 REF. DWG. FSE-00195





CABLE TRANS - AS BUILT ISOMETRICS  
 AUXILIARY BLDG., EL 790'-6"  
 REF. DWG, FSE-00185

① = LONGITUDINAL  
 SUPPORT  
 ⬡ = ALLOWABLE  
 EXCEEDED  
 SHT 8



**ATTACHMENT B**  
**ELECTRICAL WALKDOWN QUESTION**

In reviewing additional information received on walkdown items, Cygna has found that MOV's HV-4512 and HV-4524 both have 0.7 HP motor operators instead of the 1.0 HP indicated in the vendor data and trip setting calculations. Please explain the difference and provide the appropriate documentation supporting the change.



ATTACHMENT C  
STATUS OF PHASE 4 QUESTIONS

<u>Letter No.</u>	<u>Date</u>	<u>Subject</u>	<u>Response Received</u>	<u>Comments</u>
84056.010	7/30/84	Mechanical & Electrical/I&C Review Questions	No	
84056.011	7/31/84	Request for Calculations for Affected Affected CVC's (Cable Tray Supports)	No	Necessary to complete review of calculations.
84056.013	7/31/84	Pipe Support Review Questions	No	
84056.014	7/31/84	Pipe Support Review Questions	No	
84056.015	8/6/84	Cable Tray and Conduit Support Review Questions	No	
84056.016	8/6/84	Design Control Review Questions	No	
84056.017	8/7/84	Pipe Support Review Questions	No	
84056.018	8/7/84	Cable Tray Support Review Questions	No	